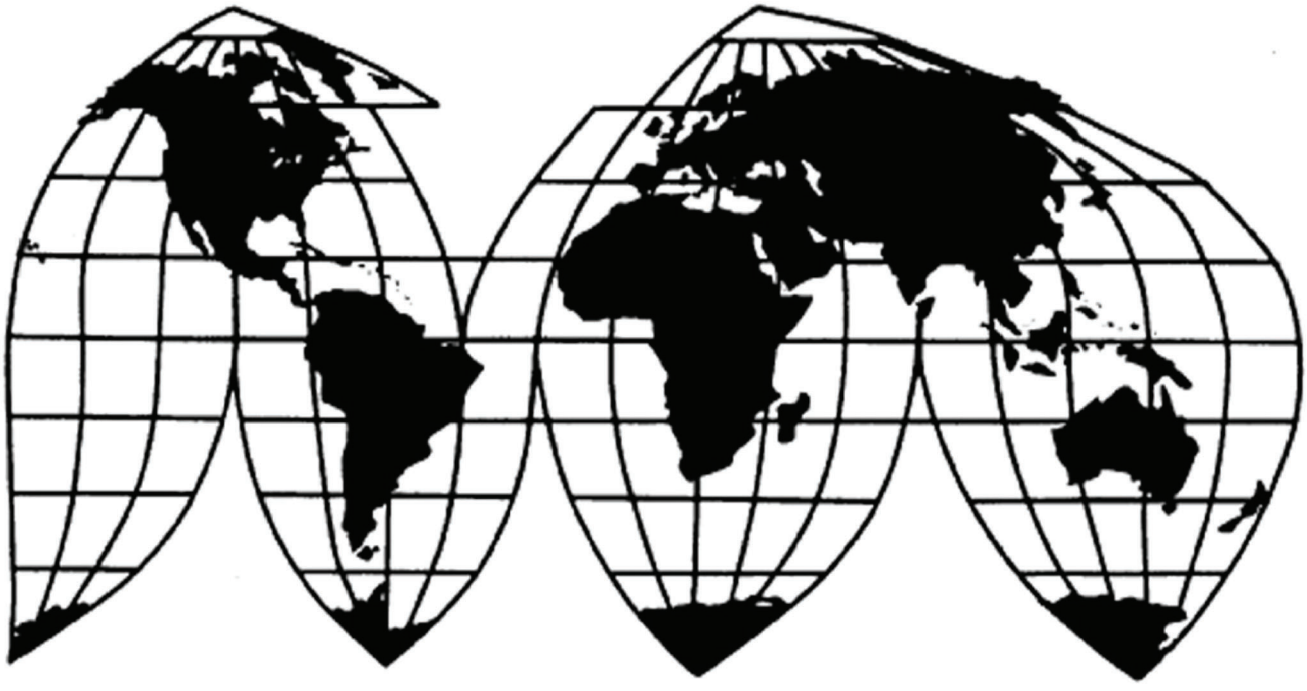
In the Matter of

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Investigation No. 337-TA-1003

Publication 4932 **August 2019**

U.S. International Trade Commission



Washington, DC 20436

U.S. International Trade Commission

COMMISSIONERS

Rhonda Schmidtlein, Chairman
David Johanson, Vice Chairman
Irving Williamson, Commissioner
Meredith Broadbent, Commissioner

Address all communications to
Secretary to the Commission
United States International Trade Commission
Washington, DC 20436

U.S. International Trade Commission

Washington, DC 20436
www.usitc.gov

In the Matter of

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Investigation No. 337-TA-1003

Publication 4932

August 2019

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME	Investigation No. 337-TA-1003

NOTICE OF COMMISSION'S FINAL DETERMINATION FINDING A VIOLATION OF SECTION 337; ISSUANCE OF A LIMITED EXCLUSION ORDER; TERMINATION OF THE INVESTIGATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has found a violation of Section 337 of the Tariff Act of 1930, as amended, in the unlawful importation, sale for importation, and sale after importation by respondents Nano Tech Co., Ltd. ("Nano") of Zhejiang, China, and Guangdong Alison Hi-Tech Co., Ltd. ("Alison") of Guangzhou, China, of certain composite aerogel insulation materials by reason of infringement of certain claims of U.S. Patent No. 7,078,359 ("the '359 patent"); U.S. Patent No. 6,989,123 ("the '123 patent"); and U.S. Patent No. 7,780,890 ("the '890 patent"). The Commission's determination is final, and the investigation is terminated.

FOR FURTHER INFORMATION CONTACT: Cathy Chen, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436, telephone (202) 205-2392. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on June 8, 2016, based on a complaint filed by Aspen Aerogels, Inc. ("Aspen") of Northborough, Massachusetts. 81 FR 36955-956 (Jun. 8, 2016). The complaint alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, in the importation into the United

States, the sale for importation, and the sale within the United States after importation of certain composite aerogel insulation materials and methods for manufacturing the same by reason of infringement of certain claims of U.S. Patent No. 7,399,439 ("the '439 patent"); U.S. Patent No. 9,181,486 ("the '486 patent"); the '359 patent; the '123 patent; and the '890 patent. The complaint further alleges that an industry in the United States exists as required by 19 U.S.C. 1337(a)(2). The notice of investigation named Nano and Alison as respondents. The Office of Unfair Import Investigations ("OUII") is also a party in this investigation.

All asserted claims of the '439 patent and the '486 patent and certain asserted claims of the '359 have been terminated from the investigation. *See* Comm'n Notice (Nov. 2, 2016); Comm'n Notice (Feb. 9, 2017). Only claims 15-17, and 19 of the '123 patent; claims 1, 5, 7, 9, 12, 15, and 16 of the '359 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent ("the Asserted Claims") remain in the investigation.

On November 15, 2016, the presiding administrative law judge ("ALJ") issued Order No. 19, granting Aspen's motion for summary determination that the economic prong of the domestic industry requirement has been satisfied under section 337(a)(3)(A) and (B). The Commission determined to review in part Order No. 19. *See* Comm'n Notice (Dec. 7, 2016). On review, the Commission affirmed with modification the summary determination that Aspen satisfies the economic prong of the domestic industry requirement. *See id.* at 1-2.

On September 29, 2017, the ALJ issued the final initial determination ("ID"), finding a violation of section 337 by Respondents Alison and Nano in connection with claims 1, 5, 7, and 9 of the '359 patent; claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent. The ID also found a violation of section 337 by Respondent Nano in connection with claims 12, 15, and 16 of the '359 patent. In addition, the ID found that Aspen has shown that its domestic industry products satisfy the technical prong of the domestic industry requirement for the Asserted Patents. The ID further found that Respondents have not shown that the Asserted Claims are invalid. The ID also contained the ALJ's Recommended Determination on remedy and bonding.

On October 16, 2017, Respondents and OUII each filed a timely petition for review of the final ID. Respondents and OUII challenged certain of the ID's findings with respect to the validity of the Asserted Claims and the ID's findings with respect to claim 5 of the '359 patent. Respondent Alison separately challenged the ID's finding of infringement with respect to claim 9 of the '359 patent. That same day, Aspen filed a contingent petition for review of the final ID, challenging the ALJ's construction of two claim limitations in the '359 patent. On October 24, 2017, the parties filed timely responses to the petitions for review. On October 31, 2017, the parties filed their public interest comments pursuant to Commission Rule 210.50(a)(4).

On November 30, 2017, the Commission determined to review the ID in part and requested briefing on issues it determined to review, and on remedy, the public interest, and bonding. 82 FR 57611-13 (Dec. 6, 2017). Specifically, with respect to the '359 patent, the Commission determined to review the ALJ's construction of the "lofty fibrous batting" limitation in claim 1 of the '359 patent. The Commission's review of the "lofty fibrous batting" limitation did not include the ID's finding that Respondents have not proven that the term is invalid for

indefiniteness. The Commission also determined to review the ALJ's constructions of the additional limitations in claims 5 and 9, and the "total surface area of that cross section" limitation of claim 12 of the '359 patent, and the ID's associated findings on infringement and the technical prong of the domestic industry requirement with respect to those claims and claims 15 and 16 of the '359 patent. In addition, the Commission determined to review the ID's findings that the asserted claims of the '359 patent are not invalid in view of Ramamurthi by itself or in combination with other prior art. With respect to the '123 and the '890 patents, the Commission determined to review the ID's finding that claim 15 of the '123 patent and claims 11-13, 15, 17, and 21-23 of the '890 patent are not obvious in view of Ramamurthi and either Uchida or Yada.

On December 15, 2017, Aspen and OUII each filed initial written submissions regarding issues on review, remedy, the public interest, and bonding. On the same day, Respondents jointly filed their initial written submission regarding issues on review, remedy, the public interest, and bonding. Responses to the initial written submissions were filed on December 22, 2017.

Having examined the record of this investigation, including the parties' submissions and responses thereto, the Commission has determined that Aspen has proven a violation of section 337: (1) based on infringement of claims 1, 7, and 9 of the '359 patent; claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent by Respondents Alison and Nano; and (2) based on infringement of claims 12, 15, and 16 of the '359 patent by Respondent Nano.

Specifically, with respect to the '359 patent, the Commission affirms with modifications the ALJ's constructions of the "lofty fibrous batting" limitation in claim 1 and the "about 1 to 20%" limitation in claim 9. The Commission modifies the ALJ's constructions of the additional limitation in claim 5 and the "the total surface area of that cross section" limitation in claim 12. Applying these claim constructions, the Commission affirms the ID's findings that Respondents infringe claims 1, 7 and 9, and that Respondent Nano infringes claims 12, 15, and 16, but reverses the ID's finding that Respondents infringe claim 5. The Commission also reverses the ID's finding that Aspen's domestic industry products practice claim 5, but affirms the ID's finding that Aspen's domestic industry products practice the other asserted claims of the '359 patent. The Commission further affirms with modifications the ID's findings that claims 1, 5, 7, 9, and 12 of the '359 patent are not anticipated by Ramamurthi and that claims 9 and 16 are not rendered obvious in view of Ramamurthi and other prior art. The Commission takes no position on the ID's findings on secondary considerations of nonobviousness,

With respect to the '123 patent and the '890 patent, the Commission affirms with modifications the ID's findings that claim 15 of the '123 patent and claims 11-13, 15, 17, and 21-23 of the '890 patent are not obvious in view of Ramamurthi and either Uchida or Yada. As with the '359 patent, the Commission takes no position on the ID's findings on secondary considerations of nonobviousness.

The Commission has determined that the appropriate form of relief is a limited exclusion order prohibiting the unlicensed entry of infringing composite aerogel insulation materials that are manufactured abroad by or on behalf of, or imported by or on behalf of Respondents or any of their

affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns. The Commission has carefully considered the submissions of the parties and has determined that the public interest factors enumerated in section 337(d) do not preclude issuance of its order.

Finally, the Commission has determined that excluded composite aerogel insulation materials may be imported and sold in the United States during the period of Presidential review (19 U.S.C. § 1337(j)) with the posting of a bond of one-hundred (100) percent of the entered value for all infringing products manufactured by, for, or on behalf of Respondents. The Commission's Order and Opinion were delivered to the President and to the United States Trade Representative on the day of their issuance.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in Part 210 of the Commission's Rules of Practice and Procedure (19 CFR Part 210).

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: February 5, 2018

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Inv. No. 337-TA-1003

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Yoncha Kundupoglu, Esq.,** and the following parties as indicated, on **February 5, 2018.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

☐ Via Hand Delivery
☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, NW
Washington, DC 20006

☐ Via Hand Delivery
☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Timothy Bickham
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036

☐ Via Hand Delivery
☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of **CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME**	**Investigation No. 337-TA-1003**

CORRECTED LIMITED EXCLUSION ORDER

The Commission has determined that there is a violation of Section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), in the unlawful importation, sale for importation, and sale after importation by respondents Nano Tech Co., Ltd. ("Nano") of Zhejiang, China, and Guangdong Alison Hi-Tech Co., Ltd. ("Alison") of Guangzhou, China, of certain composite aerogel insulation materials by reason of infringement of U.S. Patent Nos. 7,078,359 ("the '359 patent"); 6,989,123 ("the '123 patent"); and 7,780,890 ("the '890 patent").

Having reviewed the record of this investigation, including the written submissions of the parties, the Commission has made its determination on the issues of remedy, the public interest, and bonding. The Commission has determined that the appropriate form of relief is a limited exclusion order prohibiting the unlicensed entry of infringing composite aerogel insulation materials that are manufactured abroad by or on behalf of, or imported by or on behalf of Respondents or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns.

The Commission has also determined that the public interest factors enumerated in 19 U.S.C. §§ 1337(d) do not preclude the issuance of the limited exclusion order.

During the Presidential review period, the Commission has further determined to set a bond of one hundred (100) percent of the entered value for all infringing products manufactured by, for, or on behalf of Respondents.

Accordingly, the Commission hereby **ORDERS** that:

1. Composite aerogel insulation materials that infringe one or more of claims 1, 7, and 9 of the '359 patent and that are manufactured abroad by or on behalf of, or imported by or on behalf of Respondents Alison and Nano or any of their affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns, are excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining term of the patent, except under license of the patent owner or as provided by law.

2. Composite aerogel insulation materials that infringe one or more of claims 12, 15, and 16 of the '359 patent and that are manufactured abroad by or on behalf of, or imported by or on behalf of Respondent Nano or any of its affiliated companies, parents, subsidiaries, or other related business entities, or its successors or assigns, are excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining term of the patent, except under license of the patent owner or as provided by law.

3. Composite aerogel insulation materials that are manufactured using the process in one or more of claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent; and that are manufactured abroad by or on behalf of, or imported by or on behalf of Respondents Alison and Nano or any of their

affiliated companies, parents, subsidiaries, or other related business entities, or their successors or assigns, are excluded from entry for consumption into the United States, entry for consumption from a foreign trade zone, or withdrawal from a warehouse for consumption, for the remaining term of the patent, except under license of the patent owner or as provided by law.

4. Notwithstanding paragraphs 1-3 of this Order, the aforesaid composite aerogel insulation materials are entitled to entry into the United States for consumption, entry for consumption from a foreign-trade zone, or withdrawal from a warehouse for consumption under bond in the amount of one hundred (100) percent of the entered value for all infringing products pursuant to subsection (j) of Section 337 (19 U.S.C. § 1337(j)) and the Presidential Memorandum for the United States Trade Representative of July 21, 2005 (70 *Fed. Reg.* 43,251), from the day after this Order is received by the United States Trade Representative until such time as the United States Trade Representative notifies the Commission that this Order is approved or disapproved but, in any event, not later than sixty days after the date of receipt of this Order.

5. At the discretion of U.S. Customs and Border Protection ("CBP") and pursuant to procedures that it establishes, persons seeking to import composite aerogel insulation materials that are potentially subject to this Order may be required to certify that they are familiar with the terms of this Order, that they have made appropriate inquiry, and thereupon state that, to the best of their knowledge and belief, the products being imported are not excluded from entry under one or more of paragraphs 1-3 of this Order. At its discretion, CBP may require persons who

have provided the certification described in this paragraph to furnish such records or analyses as are necessary to substantiate the certification.

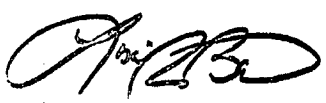
6. In accordance with 19 U.S.C. § 1337(l), the provisions of this Order shall not apply to composite aerogel insulation materials that are imported by and for the use of the United States, or imported for, and to be used for, the United States with the authorization or consent of the Government.

7. The Commission may modify this Order in accordance with the procedures described in section 210.76 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 210.76).

8. The Secretary shall serve copies of this Order upon each party of record in this investigation.

9. Notice of this Order shall be published in the *Federal Register*.

By order of the Commission.



Lisa R. Barton
Secretary to the Commission

Issued: February 8, 2018

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME **Inv. No. 337-TA-1003**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, **Yoncha Kundupoglu, Esq.,** and the following parties as indicated, on **February 8, 2018.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, NW
Washington, DC 20006

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Timothy Bickham
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME	Investigation No. 337-TA-1003

COMMISSION OPINION

The investigation is before the Commission for a final disposition on the issues under review, remedy, the public interest, and bonding. On review, the Commission has determined to affirm with modifications the administrative law judge's ("ALJ") final initial determination ("ID") finding that Aspen Aerogels, Inc. of Northborough, Massachusetts ("Aspen" or "Complainant") has proven a violation of section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), by Nano Tech Co., Ltd. ("Nano") of Zhejiang, China, and Guangdong Alison Hi-Tech Co., Ltd. ("Alison") of Guangzhou, China (collectively, "Respondents") based on infringement of claims 15-17, and 19 of U.S. Patent No. 6,989,123 ("the '123 patent"); claims 11-13, 15, 17-19, and 21 of U.S. Patent No. 7,780,890 ("the '890 patent"); and claims 1, 7, and 9 of U.S. Patent No. 7,078,359 ("the '359 patent"). The Commission has also determined to affirm with modifications the ID's finding that Aspen has proven a violation of section 337 by Respondent Nano based on infringement of claims 12, 15, and 16 of the '359 patent. The Commission has further determined to reverse the ID's finding that Aspen has proven a violation of section 337 by both Respondents based on infringement of claim 5 of the '359 patent.

Because the Commission finds that the statutory public interest factors do not weigh against the issuance of a remedy in this investigation, the Commission has determined to issue a

limited exclusion order ("LEO") barring entry of both Respondents' composite aerogel insulation materials that infringe one or more of claims 1, 7, and 9 of the '359 patent; claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent; and barring entry of Respondent Nano's composite aerogel insulation materials that infringe one or more of claims 12, 15, and 16 of the '359 patent. The Commission has also determined to set a bond of 100 percent of the entered value of the infringing products during the Presidential review period.

I. BACKGROUND

A. Procedural History

The Commission instituted this investigation on June 8, 2016, based on a complaint filed by Aspen. 81 *Fed. Reg.* 36955-956 (Jun. 8, 2016). The complaint alleges violations of section 337 in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain composite aerogel insulation materials and methods for manufacturing the same by reason of infringement of certain claims of the '359 patent, the '123 patent, and the '890 patent (collectively "the Asserted Patents"). The complaint also alleged violations of section 337 by reason of infringement of certain claims of U.S. Patent Nos. 7,399,439 (''the '439 patent'') and 9,181,486 (''the '486 patent''). *Id.* Nano and Alison are named as respondents in the Commission's notice of investigation. A Commission investigative attorney ("IA") participated in the investigation.

All asserted claims of the '439 patent and the '486 patent and certain asserted claims of the '359 have been terminated from the investigation. *See* Comm'n Notice, EDIS Doc ID 594197 (Nov. 2, 2016); Comm'n Notice, EDIS Doc ID 603311 (Feb. 9, 2017). The only remaining claims in this investigation are: claims 15-17, and 19 of the '123 patent; claims 1, 5,

7, 9, 12, 15, and 16 of the '359 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent ("the Asserted Claims").

On November 15, 2016, the ALJ issued Order No. 19, granting Aspen's motion for summary determination that the economic prong of the domestic industry requirement has been satisfied under section 337(a)(3)(A) and (B). The Commission determined to review-in-part Order No. 19 and, on review, affirmed with modification the summary determination that Aspen satisfies the economic prong of the domestic industry requirement. *See* Comm'n Notice at 1-2, EDIS Doc ID 597110 (Dec. 7, 2016).

On January 31, 2017, the ALJ issued Order No. 35, construing certain disputed claim terms of the Asserted Patents. Order No. 35, EDIS Doc ID 602687 (Jan. 31, 2017). The evidentiary hearing was held on February 17, 21-24, and 28, 2017.

On September 29, 2017, the ALJ issued her final ID and a recommended determination ("RD") on remedy and bonding in this investigation. The ID found a violation of section 337 by both Respondents in connection with claims 1, 5, 7, and 9 of the '359 patent; claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent. The ID also found a violation of section 337 by Respondent Nano in connection with claims 12, 15, and 16 of the '359 patent. Thereafter, each party filed a petition for review of the final ID and responses to the petitions for review.[1,2] On October 31, 2017, the parties filed their public interest comments pursuant to Commission Rule 210.50(a)(4).

[1] Petition of Respondent Nano Tech Co., Ltd. for Review-In-Part of the Final Initial Determination (Oct. 16, 2017) ("NanoPet"); Respondent Guangdong Alison Hi-Tech Co., Ltd.'s Petition for Review of Initial Determination (Oct. 16, 2017) ("AlisonPet"); Office of Unfair Import Investigations' Contingent Petition for Review of Initial Determination (Oct. 16, 2017) ("IAPet"); Complainant Aspen Aerogels, Inc.'s Contingent Petition for Review of Initial Determination (Oct. 16, 2017) ("AspenPet"). Other than separate arguments made with regard to claims 5 and 9 of the '359 patent, Respondent Alison's petition for review is substantially the

On November 30, 2017, the Commission determined to review the final ID in part and asked the parties to brief certain issues under review and to brief issues of remedy, the public interest, and bonding. Specifically, with respect to the '359 patent, the Commission determined to review the ID's construction of the "lofty fibrous batting" limitation in claim 1 of the '359 patent. The Commission's review of the "lofty fibrous batting" limitation did not include the ID's finding that Respondents have not proven that the limitation is invalid for indefiniteness. The Commission also determined to review the ID's constructions of the additional limitations in dependent claims 5 and 9, and the "total surface area of that cross section" limitation of claim 12, and the ID's associated findings on infringement and the technical prong of the domestic industry requirement with respect to those claims and dependent claims 15 and 16 of the '359 patent. In addition, the Commission determined to review the ID's findings that the asserted claims of the '359 patent are not invalid in view of Ramamurthi by itself or in combination with other prior art. With respect to the '123 and the '890 patents, the Commission determined to review the ID's findings that claim 15 of the '123 patent and claims 11-13, 15, 17, and 21-23 of the '890 patent are not obvious in view of Ramamurthi and either Uchida or Yada. The parties

---

same as Nano's petition for review. This opinion cites only to Nano's petition for issues common to both Respondents.

[2] Complainant Aspen Aerogels, Inc.'s Combined Response to Respondents' and Staff's Petitions for Review of Initial Determination (Oct. 24, 2017) ("AspenResp"); Office of Unfair Import Investigations' Response to Petitions for Review of Initial Determination (Oct. 24, 2017) ("IAResp"); Nano Tech Co., Ltd.'s Combined Response to Aspen Aerogel, Inc.'s Contingent Petition for Review and the Office of Unfair Import Investigations' Petition for Review (Oct. 24, 2017) ("NanoResp"); Respondent Guangdong Alison Hi-Tech Co., Ltd.'s Combined Response to Aspen Aerogel, Inc.'s Contingent Petition for Review and the Office of Unfair Import Investigations' Petition for Review (Oct. 24, 2017) ("AlisonResp"). Alison's response to the petitions for review is substantially the same as Nano's response to the petitions for review. This opinion cites only to Nano's response.

filed their respective initial submissions on December 15, 2017,[3] and their respective reply submissions on December 22, 2017.[4]

B. U.S. Patent No. 7,078,359 ("The Product Patent")

The '359 patent, titled "Aerogel Composite with Fibrous Batting," issued on July 18, 2006. The '359 patent relates to "aerogel composites" used for thermal insulation that "exhibit[] improved performance . . . in one or more" areas, including "improved flexibility and drapeability; improved durability; [and] decreased aerogel particle shedding." JX-7 at 1:10-21. The background section of the patent discusses several prior art aerogel composite materials, including an aerogel matrix composite described in U.S. Patent No. 5,306,555 (Ramamurthi et al.). *Id.* at 1:62-2:21. The '359 patent states that Ramamurthi's aerogel matrix composite suffers from two major drawbacks: "having a high elastic modulus, making the products quite stiff as manufactured," and having "relatively high" thermal conductivities compared to the preferred embodiments of the present invention. *Id.* at 2:12-21. The '359 patent explains that "prior aerogel composite materials have not been suitable for many uses due to one or more of: low flexibility, low durability, excessive aerogel sintering when exposed to heat, less than ideal

[3] Complainant Aspen Aerogels, Inc.'s Written Submission on the Issues Identified in the Notice of Commission Decision to Review in Part a Final Initial Determination Finding a Violation of Section 337 (Dec. 15, 2017) ("AspenSub"); Brief of the Office of Unfair Import Investigations' on Issues Under Review and Remedy (Dec. 15, 2017) ("IASub"); Respondents' Written Submission Addressing Issues Raised in the Notice of Commission Determination to Review in Part a Final Initial Determination Finding a Violation of Section 337 (Dec. 15, 2017) ("RespSub").

[4] Complainant Aspen Aerogels, Inc.'s Combined Response to Respondents' and Staff's Written Submissions on the Issues Identified in the Notice of Commission Decision to Review in Part a Final Initial Determination Finding a Violation of Section 337 (Dec. 22, 2017) ("AspenReply"); Reply Brief of the Office of Unfair Import Investigations' on Issues Under Review and Remedy (Dec. 22, 2017) ("IAReply"); Respondents' Combined Reply to the Written Submissions of Complainant Aspen Aerogels, Inc. and the Office of Unfair Import Investigations (Dec. 22, 2017) ("RespReply").

thermal conductivity, [and] insufficient x-y thermal and/or electrical conductivity." *Id.* at 3:1-5. It is the aim of the '359 patent to solve these problems. *Id.* at 3:7-15.

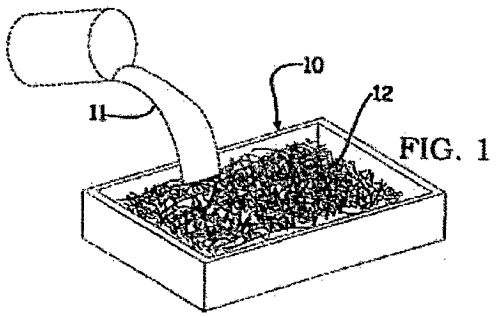


FIG. 1

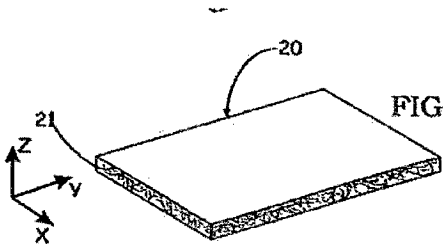


FIG. 2

Fig. 1 (reproduced above) of the '359 patent "illustrates the fabrication process of the present invention wherein a gel precursor **11** is added to a reinforcing batting **12** in some constraining mold type structure **10**." *Id.* at 4:65-5:1. The '359 patent describes an aerogel composite (*e.g.*, FIG. 2, element **20**) that has two parts: "reinforcing fibers and an aerogel matrix." *Id.* at 3:24-26, 5:1-4. The "reinforcing fibers are in the form of a lofty fibrous structure (i.e. batting)" (*e.g.*, FIG. 2, element **21**). *Id.* at 3:26-27, 5:1-3. "For the purposes of this patent, a lofty batting is defined as a fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)." *Id.* at 7:1-3.

The '359 patent explains that a "batting is 'lofty' for purposes of this invention if it contains sufficiently few individual filaments (or fibers) that it does not significantly alter the thermal properties of the reinforced composite as compared to a non-reinforced aerogel body of the same material." *Id.* at 7:28-32. "Generally this will mean that upon looking at a cross-section of a final aerogel composite, the cross-sectional area of the fibers is less than 10% of the total surface area of that cross section." *Id.* at 7:32-35. The patent teaches that the "lofty batting preferably has a thermal conductivity of 50 mW/m-K, or less at room temperature and pressure to facilitate the formation of low thermal conductivity aerogel composites." *Id.* at 7:36-39.

The patent also explains that "[a]nother way of determining if a batting is sufficiently lofty to be within the scope of this invention is to evaluate its compressibility and resilience." *Id.* at 7:40-42. "In this case a lofty batting is one that (i) is compressible by at least 50% of its natural thickness, preferably at least 65%, and most preferably at least 80%, and (ii) is sufficiently resilient that after compression for a few seconds it will return to at least 70% of its original thickness, preferably at least 75%, and most preferably at least 80%." *Id.* at 7:42-48. The patent states that "[b]y this definition a lofty batting is one that can be compressed to remove the air (bulk) yet spring back to substantially its original size and shape." *Id.* at 7:48-50.

The '359 patent distinguishes a lofty batting from "a fibrous mat," which is "'a densely woven or thickly tangled mass,' i.e. dense and relatively stiff fibrous structures with minimal open space between adjacent fibers, if any." *Id.* at 7:60-64.

The '359 patent teaches that dopants "may be added to improve thermal performance at higher temperatures." *Id.* at 6:9-13. According to the patent, "[s]uitable amounts of such dopants generally range from about 1 to 20% by weight of the finished composite, preferably about 2 to 10%." *Id.* at 6:15-17.

Aspen alleges both Respondents infringe claims 1, 5, 7, and 9 of the '359 patent, and only Respondent Nano infringes claims 12, 15, and 16 of the '359 patent. Claims 1 and 12 are independent. For example, claims 1, 7, 9, and 12 recite:

> **1.** A composite article to serve as a flexible, durable, light-weight insulation product, said article comprising a lofty fibrous batting sheet and a continuous aerogel through said batting.
>
> **7.** The composite article of claim 1, further comprising a dopant.
>
> **9.** The composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite.

> **12.** A composite article comprising a fibrous batting sheet and a continuous aerogel through said batting, where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section.

Id. at 14:36-39, 15:14-19.

C. U.S. Patent Nos. 6,989,123 and 7,780,890 ("The Method Patents")

The '123 patent, titled "Methods to Produce Gel Sheets," issued on January 24, 2006. The '890 patent, titled "Advanced Gel Sheet Production," issued on August 24, 2010, and shares a common specification with the '123 patent. Both patents relate to "preparation of solvent filled gel sheets in a continuous fashion." JX-6 at 1:17-18. More specifically, the common specification describes methods for continuously combining a sol[5] "and an agent (heat catalyst or chemical catalyst) that induces gel formation and forming a gel sheet on a moving element such as a conveyor belt . . . by dispensing the catalyzed sol at a predetermined rate effective to allow gelation to [occur] on the moving element." *Id.* at 2:34-41. After gelation, the resulting gel sheets "are rolled into a plurality of layers." *Id.* at 3:41-44. The common specification describes the process as "a novel and effective way of producing gel sheets for efficient drying operations." *Id.* at 3:44-46.

By contrast, "[c]onventional methods for gel sheet and/or fiber-reinforced composite gel sheet production formed via sol-gel[6] chemistry . . . involve batch casting," which entails

---

[5] "A sol is liquid with a colloidal suspension of solid particles." IAPet at 30 (citing Complainant Aspen Aerogels, Inc.'s Post-Hearing Brief at 7, EDIS Doc ID 605124 (Mar. 8, 2017) ("AspenPHB") (citing Tr. (Gould) at 94:1-3; Tr. (Schiraldi) at 406:5-10; Tr. (Scherer) at 947:9-17)). "A gel is formed by treating a sol with a catalyst that causes the suspended particles in the sol to connect together to form a three-dimensional lattice structure throughout the sol that holds all the liquid." *Id.* (citing AspenPHB at 8 (citing Tr. (Schiraldi) at 406:11-23; Tr. (Gould) at 93:16-94:12; Tr. (Scherer) at 845:17-19, 948:24-949:1)).

[6] "Sol-gel solution is another term for 'catalyzed sol.'" IAPet at 32 n. 8 (citing Tr. (Leventis) at 1040:21-1041:2).

"catalyzing one entire volume of sol to induce gelation simultaneously throughout that volume." *Id.* at 2:3-8. The common specification discusses Ramamurthi's batch casting method for preparing aerogel matrix composites as related prior art. *Id.* at 2:22-25. According to the common specification, the continuous casting methods "are greatly improved over conventional batch sol-gel casting methods for gel sheets" because, *inter alia*, "large volumes of material can be fashioned in a smaller production area than with traditional batch casting." *Id.* at 2:29-31, 3:63-64. In addition, with continuous casting methods, "gel properties can be controlled in a novel fashion to a degree not possible with batch casting methods." *Id.* at 3:21-23.

Referring to the exemplary embodiment shown in Fig. 8 (reproduced below) of the common specification, the continuous casting method comprises three phases. In the first phase, a stable sol precursor solution **21** and a catalyst **22** is mixed thoroughly by a static mixer **24** before being dispensed onto a conveyor belt **28** in a continuous manner. *Id.* at 10:59-61; 9:54-65. The catalyst **22** is added to induce gelation of the sol when added in a proper quantity in controlled conditions. *Id.* at 9:60-62. Fibrous batting materials **27** may be added to the sol prior to the point of polymer gelation to reinforce the matrix materials. *Id.* at 5:10-13; 9:65-67.

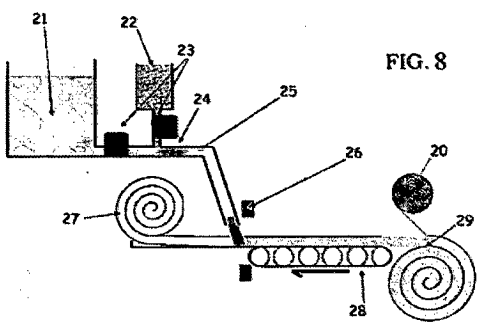


FIG. 8

"The second [phase] involves dispensing the blended sol onto a moving conveyor mold" and "may also include introduction of heat or radiation to the ungelled sol . . . to either induce gelation or modify the properties of the gel." *Id.* at 6:45-51. Control of the variables in gel

formation, such as solution pH, "can permit control of the growth and aggregation of the matrix species [organic, inorganic, or inorganic/organic hybrid] throughout the transition from the 'sol' state to the 'gel' state." *Id.* at 5:4-6, 8:19-24.

In the third phase, gels are cut and conveyed to a postprocessing area, or the gel sheets are rolled **29** into a plurality of layers. *Id.* at 3:41-44, 6:52-57, 9:39-41 ("Gel composite sheets can be produced in rolled form if mechanically wound at the end of the belt."), 10:2-3, 10:62-63 (gel sheets are rolled onto a mandrel), Figs. 1, 8. When rolled, the gel sheets can be rolled with a permeable or impermeable spacer material to provide "a favorable flow pattern in a subsequent drying," as well as "flow paths for subsequent silation (aging) fluids to easily pass through." *Id.* at 3:46-54, 10:63-11:5.

Aspen alleges both Respondents infringe claims 15-17 and 19 of the '123 patent. Independent claim 15 is illustrative of these asserted claims and recites:

> **15.** A process for preparing gel sheets, comprising the steps of:
> dispensing a catalyzed sol onto a moving element as a continuous sheet;
> rolling the dispensed sheet into a plurality of layers.

Id. at 14:48-52.

Aspen also alleges both Respondents infringe claims 11-13, 15, 17-19, and 21 of the '890 patent. Independent claim 11 is illustrative of these asserted claims and recites:

> **11.** A method for preparing gel sheets, comprising the steps of:
> dispensing a sol onto a moving element as a continuous sheet;
> rolling the dispensed sheet into a plurality of layers; and
> drying the layers.

JX-9 at 13:64-14:2.

D. Key Prior Art

i. U.S. Patent No. 5,306,555 ("Ramamurthi")

Ramamurthi discloses aerogel matrix composites (AMCs) composed of fibers mixed with an aerogel. RX-11 at 1:10-15, 2:3-8, 16:42-47. Ramamurthi explains that, in contrast to monolithic aerogels known in the art that are "extremely fragile and have low elasticities," the disclosed fiber reinforced AMCs can have a range of flexibilities and possess "enhanced strength, decreased sensitivity to moisture, [and] good thermal insulation values." *Id.* at 2:3-8, 3:57-59, Fig. 1 (comparing the properties of fiber reinforced AMCs with conventional aerogels). The fibers are added "[t]o enhance the mechanical properties of these sol-gel derived monolithic aerogels." *Id.* at 4:10-14. Ramamurthi discloses fibers that are in the "form of individual fibers, bundles of fibers, mats or sheets, woven or unwoven." *Id.* at 4:35-37. Ramamurthi also discloses the use of "glass wool" and "rock wool" as materials from which the fibers can be made. *Id.* at 4:27-29, 6:49-9:58.

Ramamurthi also discloses a batch method for preparing AMCs. *See id.* at 1:10-15, 2:3-8. The method generally comprises: "preparing an aerogel precursor; mixing fibers with the aerogel precursor; aging the aerogel precursor containing the fibers to obtain a gelled composition; completely submerging the gelled composition in a liquid suitable for supercritical drying;" and then drying the gelled composition. *Id.* at 2:15-31.

In one disclosed embodiment, Ramamurthi describes a method for preparing "[r]igid varieties of AMCs . . . by supercritically drying a silicate sol-gel solution reinforced with varying loadings of pyrex glass wool." *Id.* at 7:18-20. Ramamurthi teaches mixing a sol with a catalyst to produce a "sol-gel solution that is flowable for a brief period following mixing." *Id.* at 7:26-34. Ramamurthi also teaches "[s]ilica fibers, cut to 4-6 inches . .. in length, were laid in a thin layer in a silicone rubberized mold" before "a small amount of sol-gel solution was poured and a

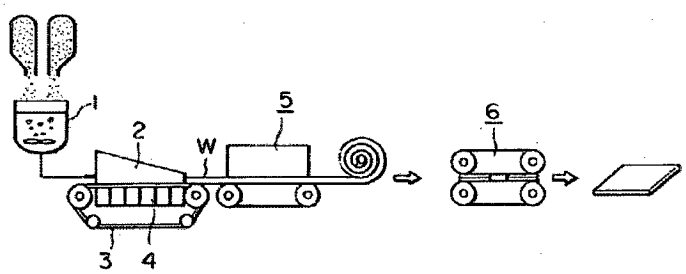
layer of silica fibers was overlaid at an angle of 90 [degrees] to the earlier layer." *Id.* at 7:34-39. Ramamurthi describes that the "alternate layers of fibers and sol-gel solution resulted in a fiber-gel composition with a weaved silica fiber mat." *Id.* at 7:39-41. "The AMC samples had good thermal insulation properties, with thermal conductivities ranging from 0.014 and 0.021 W/mK." *Id.* at 9:48-50.

In connection with another disclosed embodiment, Ramamurthi describes the "effect of compressive load on the thermal insulation values of AMCs." *Id.* at 11:6-7. Specifically, a sample "was compressed at 27-28 psi . . . such that the disc thickness decreased from . . . 1.57 cm to 1.27 cm." *Id.* at 11:9-12. "After the loads were removed the sample sprang back to almost the same original thickness of approximately . . . 1.55 cm." *Id.* at 11:12-14.

ii. U.S. Patent No. 6,123,882 ("Uchida")

Uchida discloses an apparatus for manufacturing "fiber reinforced thermoplastic resin sheet[s]." RX-14 at 1:7-9. In one embodiment of the Uchida apparatus (Fig. 1, reproduced below), thermoplastic resin and reinforcing fibers are mixed in dispersion tank **1**. *Id.* at 2:15-26.

FIG. 1



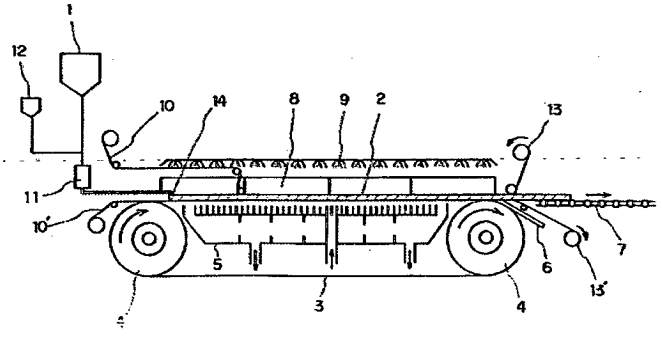
The resulting aqueous dispersion is then transferred onto mesh belt **3** having "small pores penetrating to its reverse surface." *Id.* at 2:32-37. The aqueous medium is then "sucked" through the small pores of the belt into suction box **4**, thereby separating the thermoplastic resin and reinforcing fibers from the aqueous medium. *Id.* at 2:33-41. The web material remaining on

mesh belt **3** is transferred to drying section **5**, where residual water is removed, "the thermoplastic resin is melted by heating to a temperature above the melting point of the resin," and the resulting web "is wound into a roll by a take-up reel." *Id.* at 2:43-44, 2:56-65. The web is then transferred to consolidating section **6**, where "the web is cut and heat-pressed so that the thermoplastic resin is thoroughly impregnated into the reinforcing fibers." *Id.* at 2:66-3:2.

iii. U.S. Patent No. 5,004,761 ("Yada")

Yada "relates to a process for the continuous preparation of an acrylic polymer, and more particularly to an improved process for continuously preparing an acrylic polymer by photopolymerization of a monomer on a moving support." RX-17 at 1:6-10. These acrylic polymers are used, for example, as durable drinking cups or desktop organizers. AspenResp at 61 (citing Tr. (Schiraldi) at 1177:6-8). Yada describes "continuously feeding an aqueous monomer solution in the form of a thin layer onto a moving support" and "continuously taking the produced sheet-like polymer gel off the support." RX-17 at 1:11-20, 5:35-37. The "moving support" can be a "belt used in an industrial production" and is preferably "an endless belt." *Id.* at 2:49-50, 6:63-64. Yada describes producing polymer gel using this process, with polymerization of the monomer solution beginning "200 mm from the inlet end" and transformation of the monomer solution to "a nonflowable pudding-like gel . . . 400 mm from the inlet end." *Id.* at 10:8-14, Fig. 1 (reproduced below).

FIG. 1



E. Products at Issue

Aspen accuses Respondent Alison's Composite Blankets DRT603, DRT606, DRT610, and GR1006 of infringing one or more of the Asserted Claims. Specifically, Aspen alleges that all variants of these Alison products infringe claims 1 and 5 of the '359 patent, but only [redacted] infringe claims 7 and 9 of the '359 patent. ID at 26 (Table 2). Aspen also alleges that only [redacted] infringe the asserted claims of the Method Patents. *Id.* at 27 (Table 2). Aspen stipulates that products [redacted] do not infringe any asserted claims of the Method Patents, but Aspen alleges that those products infringe certain claims of the '359 patent. *Id.*; JX-28C (Stipulation). Products [redacted] have a "Z" designator in the product name, *e.g.*, DRT610-Z. *Id.*

Aspen accuses Respondent Nano's Composite Blankets FMA450, FMA650, FMB350, FMB350-6, FMC100, FMC200, and FMD400 [redacted] of infringing the asserted claims of the Method Patents (except claim 12 of the '890 patent) and claims 1, 5, 7, and 9 of the '359 patent. ID at 28 (Table 3). Aspen also alleges that only variants of these Nano products that are [redacted] infringe claim 12 of the '890 patent. *Id.* Furthermore, Aspen alleges that only Nano's Composite Blankets FMB350-6 and FMC200 [redacted] infringe claims 12, 15, and 16 of the '359 patent. *Id.* at 28-29 (Table 3).

Aspen asserts that its Cryogel, Cryogel Z, Spaceloft, Spaceloft Subsea, and Pyrogel products, and the methods Aspen uses to make them practice certain claims of the Asserted Patents. *Id.* at 29-30 (Table 4).

II. ANALYSIS

A. THE PRODUCT PATENT

With respect to the '359 patent, the Commission affirms the ID's finding of a violation of section 337 by both Respondents in connection with claims 1, 7, and 9, and by Respondent Nano in connection with claims 12, 15, and 16, but reverses the ID's finding of a violation of section 337 by both Respondents in connection with claim 5. As explained below, the Commission affirms with modified reasoning the ID's constructions of the "lofty fibrous batting" limitation in claim 1 and the "about 1 to 20%" limitation in claim 9. The Commission modifies the ID's constructions of the additional limitation in claim 5 and the "the total surface area of that cross section" limitation in claim 12. Applying the Commission's claim constructions, the Commission affirms the ID's finding that both Respondents infringe claims 1, 7 and 9, and that Respondent Nano infringes claims 12, 15, and 16, but reverses the ID's finding that both Respondents infringe claim 5. The Commission also reverses the ID's finding that Aspen's domestic industry products practice claim 5, but affirms the ID's finding that Aspen's domestic industry products practice the other asserted claims. The Commission further affirms with modifications the ID's finding that claims 1, 5, 7, 9, and 12 are not anticipated by Ramamurthi and that claims 9 and 16 are not rendered obvious in view of Ramamurthi and other prior art. Finally, the Commission takes no position on the ID's findings on secondary considerations of nonobviousness.

i. Claim 1 of the '359 Patent

a. *Claim Construction*

Independent claim 1 of the '359 patent recites "a lofty fibrous batting." Claims 5, 7, and 9 of the '359 patent depend from claim 1. The ID construed "lofty . . . batting" to mean "a fibrous material that shows the properties of bulk and some resilience (with or without full bulk

recovery)." Order No. 35, Appendix A at 4-5 (citing JX-7 at 7:1-3). We find that the intrinsic evidence supports the ID's claim construction.

There is no dispute that the patentees acted as their own lexicographers in the '359 patent: "For the purposes of this patent, ***a lofty batting is defined as*** a fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)." JX-7 at 7:1-3 (emphasis added). Immediately following this definition, the patent specification describes types of "batting" and characteristics of "reinforcing fibrous material" that constitute a sufficiently "lofty" batting for purposes of the invention:

> The reinforcing fibrous material used in the present invention is one or more layers of a lofty fibrous batting . . .While generally a "batting" is a product resulting from carding or Garnetting fiber to form a soft web of fiber in sheet form, for purposes of this invention "batting" also includes webs in non-sheet form, e.g. the Primaloft® products from Albany International, provided that they are sufficiently open to be "lofty."
>
> . . . .
>
> ***A batting is "lofty" for purposes of this invention*** if it contains sufficiently few individual filaments (or fibers) that it does not significantly alter the thermal properties of the reinforced composite as compared to a non-reinforced aerogel body of the same material. Generally this will mean that upon looking at a cross-section of a final aerogel composite, the cross-sectional area of the fibers is less than 10% of the total surface area of that cross section, preferably less than 8%, and most preferably less than 5%.
>
> . . . .
>
> ***Another way of determining if a batting is sufficiently lofty to be within the scope of this invention*** is to evaluate its compressibility and resilience. In this case a lofty batting is one that (i) is compressible by at least 50% of its natural thickness, preferably at least 65%, and most preferably at least 80%, and (ii) is sufficiently resilient that after compression for a few seconds it will return to at least 70% of its original thickness, preferably at least 75%, and most preferably at least 80%. ***By this definition*** a lofty batting is one that can be compressed to remove the air (bulk) yet spring back to substantially its original size and shape.

Id. at 7:11-50 (emphasis added). The patent specification also describes what does not constitute a "lofty [] batting" for purposes of the invention:

> The batting useful herein is substantially different from a fibrous mat. A fibrous mat is "a densely woven or thickly tangled mass," i.e. dense and relatively stiff fibrous structures with minimal open space between adjacent fibers, if any. While a mat generally has a density of greater than 25 lbs/ft^3 (0.41 g/cc), a lofty batting useful herein has a much lower density, i.e. in the range of about 0.1 to 16 lbs/ft^3 (0.001-0.26 g/cc), preferably about 2.4 to 6.1 lbs/ft^3 (0.04 to 0.1 g/cc). Generally, mats are compressible by less than about 20% and show little to no resilience. In an aerogel composite prepared with a mat reinforcement, the cross sectional surface area of the mat fibers is about 30 to 50% of the total surface area of the cross section.

Id. at 7:60-8:5.

The '359 patent's prosecution history provides insight as to the applicants' and the PTO examiner's understanding of the meaning of the "lofty [] batting" term. During prosecution of the '359 patent, the PTO examiner expressly stated in her Reasons for Allowance that the specification defines "lofty fibrous batting" as "a fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)" and "clearly distinguishes the difference between a fibrous mat and batting." JX-1 at 353. In response to the Reasons for Allowance, the applicants stated:

> A lofty fibrous batting is a fibrous material defined by the terms "lofty" and "batting" such that the batting is not limited solely by properties of bulk and some resilience. Instead, the specification includes detailed discussion and guidance regarding a lofty fibrous batting to a person of skill in the art. That discussion and guidance includes at least the portion extending from page 11, first full paragraph, through page 13, first full paragraph.

Id. at 361-362.[7] Thus, in view of the intrinsic evidence as a whole, we find that the applicants did not intend to limit the scope of "lofty [] batting" beyond the express definition provided in the specification.

The Commission rejects Aspen's argument that the ID's construction is too broad and that it should be further limited to batting that it is "compressible by at least 50% of its natural

[7] The applicants' reference to pages 11 through 13 corresponds to the portion of the '359 patent specification from columns 7 and 8 reproduced above (*supra* at 16-17).

thickness, and has resilience such that it will return to at least 70% of its thickness." AspenPet at 7. Aspen's proposed construction arbitrarily imports one characteristic, *i.e.*, the 50% compressibility and 70% resilience, and ignores the patent's other described characteristics of a "lofty batting" such as, thermal properties, cross-sectional area of fibers, and density ranges. *See* JX-7 at 7:33-36 ("upon looking at a cross-section of a final aerogel composite, the cross-sectional area of the fibers is less than 10% of the total surface area of that cross section, preferably less than 8%, and most preferably less than 5%"), 7:36-38 ("The lofty batting preferably has a thermal conductivity of 50 mW/m-K, or less at room temperature and pressure . . . ."), 7:65-8:1 ("a lofty batting useful herein has a much lower density, i.e. in the range of about 0.1 to 16 lbs/ft^3 (0.001–0.26 g/cc), preferably about 2.4 to 6.1 lbs/ft^3 (0.04 to 0.1 g/cc).").

b. ***Validity***

The ID found that Respondents have not shown by clear and convincing evidence that Ramamurthi anticipates independent claims 1 and 12. Specifically, the ID found that Ramamurthi does not disclose a fibrous batting sheet that is "lofty" (claim 1) or "sufficiently lofty" (claim 12) and "a continuous aerogel through said batting" (claims 1 and 12). ID at 106-118. The Commission affirms the ID's finding with certain modifications as explained below.

In their petition for review, Respondents argue that "a person of ordinary skill in the art would know that at least some of the fibrous batting used in Ramamurthi was a 'lofty' type," because the Ramamurthi aerogel composite "achieve the desired mechanical and thermal properties that would only occur with a 'lofty' batting." NanoPet at 11 (citing RX-11 at Fig. 1; Tr. (Gould) at 113:21-25, 116:2-6; Tr. (Leventis) at 298:14-18). The IA made the same argument. IAPet at 19. Respondents also argue since "the ALJ acknowledged that the

Ramamurthi composite aerogel is flexible (as well as durable and lightweight), it must use a lofty batting to achieve those characteristics." NanoPet at 20.

Under the ID's construction of "lofty" batting, Respondents assert that Ramamurthi discloses a batting that has "bulk." *Id.* at 18 (citing RX-11 at 12:46-51). Respondents argue that the ID erred in finding Ramamurthi's "porous spaces in the silica fiber matrix" does not disclose "bulk" because the ID improperly redefined "bulk" to be limited to "***only*** a specific type of air, namely the air or empty space 'that is generated by the specific intertwining of the fibers in such a way that gives the batting the property of resilience.'" *Id.* at 13-14 (citing ID at 113), 18.

Respondents and the IA assert that Ramamurthi inherently discloses a batting that has "some resilience" because Ramamurthi's disclosure of "glass wool" is generally the same thing as fiberglass and the '359 patent teaches that fiberglass is compressible and "springs back." *Id.* at 18 (citing JX-7 at 7:56-59); IAPet at 17. Respondents argue that the ID erred in relying on the ASTM Handbook cited by Aspen's expert listing different applications of fiberglass fibers. NanoPet at 18; ID at 107 (citing CX-1870.0008). According to Respondents, just because the book discloses "that ***fibers*** can be arranged in a variety of configurations" does not mean that Ramamurthi's "***mats and sheets***, such as ***glass wool*** and ***rock wool*** . . . would *not* have bulk and resilience." NanoPet at 19.

Respondents further assert that Example 1-B of "Ramamurthi expressly discloses a sample composite aerogel that was compressible and resilient." *Id.*; RX-11 at 11:6-14; Tr. (Gnade) at 667:1-13. Respondents argue that the ID erred in concluding that aerogel alone, and not the batting, could account for the resilience in the batting used in Ramamurthi. NanoPet at 19 (citing ID at 111). In particular, Respondents contend that the ID erred in relying on a publication that was published almost twenty years after the Ramamurthi invention to show that

pure silica aerogel can be 92% resilient at 20% compression. *Id.* at 19-20 (citing ID at 112 (citing CX-1877, "Super-Compressibility of Ultralow-Density Nanoporous Silica," S. O. Kucheyev, et. al., Advanced Materials, 24, 776-780 (Jan. 9, 2012))).

Respondents further argue that the "mat" used in Example 2 of Ramamurthi is different from the dense mat described years later in the '359 patent because Dr. Leventis and Dr. Gnade agreed Ramamurthi's mat described in Example 2 must be lofty to have such excellent thermal characteristics. *Id.* at 21 (citations omitted). Still further, Respondents' expert testified that the "mat" in Example 2 of Ramamurthi has a low density within the range disclosed in the '359 patent. *Id.* at 22 (citing Tr. (Gnade) at 671:7-12). Respondents contend that the ALJ abused her discretion in striking Dr. Gnade's testimony even though she denied Aspen's motion to strike that very testimony in Order No. 38. *Id.* at 22 n. 7.

As an initial matter, the Commission notes that "although the burden of proof for showing invalidity remains clear and convincing evidence, that burden may be harder to meet 'when the invalidity contention is based upon the same argument on the same reference that the PTO already considered.'" *Sciele Pharma Inc. v. Lupin Ltd.*, 684 F.3d 1253, 1260 (Fed. Cir. 2012). Here, Ramamurthi was not only before the PTO examiner, but it was discussed during prosecution, distinguished in the '359 patent specification, and considered by the PTAB in *inter partes* review proceedings.[8] AspenResp at 23 ((citing JX-1 at 348-354; JX-7 at 1:62-2:21; CX-2272 at 2-9 (denying institution of IPR re '359 patent)). The examiner allowed the claims over Ramamurthi and the PTAB denied *inter partes* review of the '359 patent. *Id.*

[8] Respondent Alison filed a Petition seeking *inter partes* review of claims 1-3, 5-7, 9, and 49 of the '359 patent. CX-2272 at 2. Among other grounds, Respondent Alison contended before the PTAB that Ramamurthi anticipates claims 1-3, 5-7, and 49 and that Ramamurthi by itself and/or in combination with other prior art renders claim 9 obvious. *Id.* at 3. The PTAB denied institution of an *inter partes* review of these claims of the '359 patent. *Id.* at 18.

Respondents' invalidity theory with respect to Ramamurthi's alleged disclosure of the claimed "lofty" batting relies on the doctrine of inherent disclosure. *See* ID at 106 (citing Tr. (Gnade) at 670:14-19). Respondents do not argue that Ramamurthi itself discloses that its glass wool and rock wool have these properties. Instead, they argue that these are intrinsic properties of Ramamurthi's glass wool and glass wool in general. "Inherency requires that essentially all species must have the property in question for it to be 'inherent' in the genus." AspenResp at 27 (citing *In re Brink*, 419 F.2d 914, 917-18 (C.C.P.A. 1970)).

However, based on the record evidence, we find that Aspen has shown that Ramamurthi not only does "not disclose fiber arrangements that necessarily have the bulk and resilience needed to be a lofty batting sheet," but actually describes fiber arrangements that *lack* those properties. *Id.* at 23-24, 28. Relying on the testimony of Aspen's expert, the ID identified several examples of glass wool products that are not lofty battings: "(1) loose collection of individual fibers; (2) rovings (rope-like cylindrical structures) which plainly are not [lofty batting] sheets; and (3) dense fibrous mats (which the '359 patent expressly distinguishes from a lofty batting)." ID at 108 (citing Tr. (Leventis) at 1027:11-25).

Furthermore, the record evidence supports the ID's conclusion that Respondents' expert "did not present credible evidence supporting his conclusions" that Ramamurthi's glass wool and rock wool exhibit the properties of bulk and resilience. ID at 106. As the ID found, Respondents' expert "pulled one particular picture of one particular glass wool from a Wikipedia article and asserted without testing or analysis that it is lofty." *Id.*; *see* Tr. (Gnade) at 669:16-670:19. The conclusory testimony of Respondents' expert and Respondents' attorney arguments cannot supplant the requirement of anticipatory disclosure in Ramamurthi itself. Even Respondents appear to have conceded that "the categories 'glass wool' and 'fiberglass' may

include both lofty and non-lofty battings." *See* NanoPet at 11. Respondents argue that "a person of ordinary skill in the art would appreciate that Ramamurthi's disclosure of glass wool battings would include 'lofty' batting," and not non-lofty batting. *Id.* But other than attorney argument, Respondents present no evidence to support their argument. *Id.*

Still further, Respondents' petition improperly shifts the burden of persuasion to Aspen. *See, e.g., id.* at 18 ("Aspen did not provide any credible evidence that a glass wool (as opposed to glass fibers generally) would not be resilient, especially materials with the characteristics described in Ramamurthi which [are] the same as in the '359 patent."); 19 ("The ALJ – and Aspen – failed to identify any configurations of fibrous mats and sheets, including glass wool and rock wool, that would *not* have bulk and resilience.").

Even if some types of glass wool or rock wool exhibit properties of bulk and resilience, this is not sufficient to demonstrate the inherency of bulk and resiliency in the glass wool and rock wool disclosed in Ramamurthi. *See Brink*, 419 F.2d at 917-18. Ramamurthi describes its glass wool as constituting randomly-oriented individual fibers laid down "in a thin layer," a flat fiber mat, and a layer of pure aerogel sandwiched between two flat fiber mats. AspenResp at 29 (citations omitted). The Commission finds that Aspen's expert has convincingly explained why these fiber arrangements do not exhibit the properties of bulk and resilience. Aspen's expert demonstrated that the resilience of a final aerogel composite product may not necessarily be a result of the fibrous batting, but can come from interactions between the aerogel and the fibers and, to some extent, even the aerogel itself. *See* Tr. (Leventis) at 1045:24-1047:9, 1048:8-1049:9, 1145:8-21. For example, while Ramamurthi discloses an exemplary aerogel composite product that exhibits a small amount of compressibility and resilience, the ID correctly points out that Ramamurthi does not expressly teach the compressibility or resilience of the fibrous element

itself that is used in the composite product. RX-11 at 11:11-14; ID at 111-113; Tr. (Leventis) at 1045:24-1047:9; AspenResp at 24. Even if it may be possible to rearrange Ramamurthi's glass wool fibers into a configuration or arrangement that exhibits bulk and some resiliency, that is not sufficient to demonstrate the inherency of such properties in the material disclosed by Ramamurthi. "The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) (citations omitted).

Respondents argue that the ID's reliance on expert testimony based on information published in 2000 in the ASTM Handbook of Composites and literature published in 2012 concerning the properties of pure silica aerogel was an abuse of discretion. Since Respondents have not presented *prima facie* evidence that Ramamurthi discloses "lofty" batting, we find that the ID's reliance on such evidence is harmless error. Moreover, since Respondents do not suggest that the species of glass wool and the properties of pure silica aerogel discussed in the ID changed since 1992, the year the Ramamurthi patent application was filed, the disputed evidence certainly raises doubt as to Respondents' inherency theory.[9]

Finally, Respondents' argument that Ramamurthi's fibrous materials must be "lofty" because they exhibit good thermal conductivity, have low density, and high porosity is unpersuasive. *See* NanoPet at 11, 21-22. Respondents do not identify or explain the point at which a fibrous material transitions from "not lofty" to "lofty" in terms of porosity, density, or

[9] Aspen's expert testified as to his own personal experience of 35 years using glass wool that does not show the properties of bulk and resilience. Tr. (Leventis) at 1028:1-17. However, Respondents argue any reliance on that testimony is an abuse of discretion because Aspen's expert did not cite such material in his expert report or deposition, and Aspen did not refer to it in its prehearing brief. NanoPet at 19 n.5. The Commission's determination that Respondents have not presented sufficient evidence to support their inherency argument does not rely on this testimony.

thermal conductivity to support their inherency argument. Without such information, Respondents' argument is insufficient to assess whether Ramamurthi's fibrous materials are "lofty." Moreover, Dr. Leventis and Dr. Gnade appear to agree that it is possible for a fiber material to have low density and not be lofty. AspenResp at 37 (citing Tr. (Gnade) at 748:11-16; Tr. (Leventis) at 1031:3-1032:16).

Aside from the Commission's analysis above, the Commission makes two modifications to the ID's analysis as to whether claim 1 of the '359 patent is anticipated by Ramamurthi. First, as part of the ID's discussion of the evidence showing that Ramamurthi discloses the preamble of claim 1 ("A composite article to serve as a flexible, durable, light-weight insulation product"), the ID states that the "evidence adduced in this Investigation demonstrates that Ramamurthi discloses a composite aerogel that is the same as that disclosed in the '359 patent." ID at 104. Respondents argue that this statement from the ID supports their argument that Ramamurthi's composite aerogel exhibits the same properties of bulk and resilience as the claimed composite aerogel. However, this statement merely establishes that Ramamurthi's composite aerogel satisfies the preamble of claim 1. Nevertheless, the Commission strikes this statement in the ID (at 104) since it is confusing and unnecessary.

Second, the ID stated that "Dr. Gnade's testimony regarding his density calculation of the batting used in Ramamurthi's Example 2 is stricken." *Id.* at 109; *see also id.* at 118. Respondents argue that the ALJ erred in striking this testimony because she denied Aspen's motion to strike this very same testimony in Order No. 38. NanoPet at 22 n.7; Order No. 38 at 5-7, EDIS Doc ID 609482 (Apr. 24, 2017). The Commission finds the ALJ's determination to strike this portion of Dr. Gnade's testimony to be harmless error because both parties' experts agreed that low density fiber does not inherently create a lofty batting. ID at 109-111.

In view of the above, we affirm with modifications the ID's finding that Respondents have not shown by clear and convincing evidence that Ramamurthi discloses a fibrous batting sheet that is "lofty" as recited in independent claim 1 of the '359 patent and that is part of asserted claims 5, 7, and 9 of the '359 patent. For the same reasons, Respondents have not shown by clear and convincing evidence that Ramamurthi discloses a "sufficiently lofty" fibrous batting sheet as recited in independent claim 12 of the '359 patent and that is part of asserted claims 15 and 16 of the '359 patent.

ii. Claim 5 of the '359 Patent

a. *Claim Construction*

Claim 5 of the '359 patent recites "the lofty fibrous batting consists essentially of fibers having a thermal conductivity less than 50 mW/m-K." Other than "lofty . . . batting," the parties did not ask the ALJ to construe any other limitation in this claim. The ID adopted Aspen's interpretation of claim 5 to require that the "batting" as a whole, instead of the individual "fibers" in the batting, have the specified thermal conductivity. *Id.* at 92. The ID based its construction on (i) the specification's statement that "[t]he lofty batting preferably has a thermal conductivity of 50 mW/m-K, or less at room temperature," (ii) the testimony of Aspen's expert that one of ordinary skill in the art would not read claim 5 as requiring fibers to meet the thermal conductivity requirement; and (iii) [redacted]. *Id.* at 90-91.

Respondents and the IA argue that the ID's interpretation of claim 5 of the '359 patent is legal error because it is based on extrinsic evidence that is inconsistent with the undisputed plain language of the claim. IAPet at 11-12; NanoPet at 38-39; AlisonPet at 94-95. Alison argues that the ID's interpretation reads out the words "consists essentially of" from the claim. AlisonPet at 95. The IA notes that Aspen's expert admitted that his proposed construction was contrary to the

plain unambiguous meaning of the claim. IAPet at 13 (citing Tr. (Leventis) at 314:2-315:6). The IA also notes that "the statement the ID cites in the specification and claim 5 are drafted using different language," and other claims in the '359 patent and portions of the specification focus on the properties of the fibers that comprise the lofty batting. IAPet at 13-14; *see* AlisonPet at 95-96. Under their interpretation of claim 5, Respondents and the IA assert that the evidence undisputedly does not support the ID's findings that the accused products infringe claim 5 and that the domestic industry products practice claim 5. IAPet at 14-15; NanoPet at 39-40; AlisonPet at 96.

Aspen argues that the ID's conclusion "is mandated by the patent specification, expert testimony, and the testimony of Respondent Alison's own chief engineer." AspenResp at 96. Aspen notes that the patent specification explains that "[t]he lofty batting preferably has a thermal conductivity of 50 mW/m-K." *Id.* (quoting JX-7 at 7:36-39). Aspen asserts that its expert stated that this portion of the specification "resolves any doubts that might exist" about the interpretation of claim 5. *Id.* (citing Tr. (Leventis) at 314:9-315:6). According to Aspen, that expert also explained that a person of ordinary skill would not read claim 5 as referring to the thermal conductivity of individual batting fibers because "what we are interested in is the thermal conductivity of the batting itself so we can infer the effects it might have to the final product, not the individual fibers." *Id.* (citing Tr. (Leventis) at 314:2-315:6).

Having reviewed the record evidence, the Commission finds that application of Federal Circuit precedent in this case necessitates a modification of the ID's construction. The Federal Circuit has repeatedly stated that the unambiguous plain meaning of a claim limitation controls and extrinsic evidence cannot be used to contradict the plain meaning. *See, e.g., Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group. Inc.*, 262 F.3d 1258, 1267-69 (Fed. Cir. 2001)

("[I]f the meaning of the claim limitation is apparent from the intrinsic evidence alone, it is improper to rely on extrinsic evidence other than that used to ascertain the ordinary meaning of the claim limitation."); *Northern Telecom Ltd. v. Samsung Elecs., Co.*, 215 F.3d 1282, 1295 (Fed. Cir. 2000) ("[E]xtrinsic evidence is rarely, if ever, probative of a special and particular definition of a limitation found in a claim ... because extrinsic evidence 'may not be used to vary or contradict the claim language' as discerned from the intrinsic record.").

In this case, the claim language unambiguously requires that the individual fibers in the fibrous batting meet the specified thermal conductivity. The ID erroneously relied on the testimony of Aspen's expert and the testimony of a fact witness to contradict the unambiguous plain meaning. Moreover, the ID's interpretation of claim 5 renders superfluous the "consists essentially of fibers" language.

While Aspen correctly notes that the patent specification explains that "[t]he lofty batting preferably has a thermal conductivity of 50 mW/m-K," we are not convinced that this portion of the specification "resolves any doubts that might exist" about the interpretation of claim 5. AspenResp at 96 (quoting JX-7 at 7:36-39; Tr. (Leventis) at 314:9-315:6). As the IA notes, "the statement the ID cites in the specification and claim 5 are drafted using different language." IAPet at 13-14. Accordingly, the Commission construes claim 5 to require that the individual "fibers," as opposed to the "batting" as a whole, have the claimed thermal conductivity, *i.e.*, less than 50 mW/m-K.

b. *Infringement and Technical Prong*

It is undisputed that Aspen did not offer any evidence that the batting used in the accused products and the domestic industry products "consists essentially of fibers having a thermal conductivity less than 50 mW/m-K" as required by claim 5. *See* IAPet at 14-15; NanoPet at 39-

40; AlisonPet at 96. Thus, Aspen has failed to establish infringement and domestic industry with respect to claim 5 of the '359 patent. Accordingly, the Commission reverses and vacates those portions of the ID. *See* ID at 89-93, 255-56.

c. *Validity*

We note that Aspen did not dispute that Ramamurthi discloses the additional limitation recited in claim 5.[10] *See* ID at 116. The ID concluded that Ramamurthi does not anticipate claim 5 only because Ramamurthi does not anticipate the "lofty batting" limitation in claim 1 of the '359 patent. *See id.* at 117. Since the Commission affirms with modifications the ID's finding that claim 1 has not been shown to be invalid, the Commission also affirms with modifications the ID's finding that Ramamurthi does not anticipate claim 5 of the '359 patent.

iii. Claims 7 and 9 of the '359 Patent

Claim 7 requires that the "composite article" of claim 1 comprises a "dopant" and claim 9 requires that "the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite." The ID found (i) Aspen has proven that Respondents have infringed these claims; (ii) Aspen has shown that certain of its Cryogel, Pyrogel, and Spaceloft products practice these claims; and (iii) Respondents have not shown that these claims are invalid. On review, the Commission affirms the ID's findings with respect to claims 7 and 9 of the '359 patent.

a. *Claim Construction*

In its petition for review, the IA asserts that "[a]lthough the parties disputed the meaning of the claim term 'of about 1 to 20%' recited in claim 9," the ID errs in not construing this term. IAPet at 26. The Commission determined to review this issue and the ID's associated findings

[10] Ramamurthi discloses use of fibers that have a thermal conductivity less than 50 mW/m-K. IAPet at 21-22 (citing Tr. (Gnade) at 673:11-674:5; RX-11 at 4:25-38 (examples of preferred fibers are glass wool with a thermal conductivity of 42 mW/m-K or rock wool, which has a thermal conductivity of 37 mW/m-K which may be in the form of individual fibers, bundles of fibers, mats or sheets, woven or unwoven)).

on infringement, the technical prong of the domestic industry requirement, and validity. In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 1. Please address the proper scope of claim 9 of the '359 patent and, in particular, the "about 1 to 20%" limitation. Your response should be limited to the evidence in the record, including a discussion of relevant statements, if any, made in the prosecution history.

In response to the Commission's notice, all of the parties agree that the word "about" does not have a universal meaning in patent claims, but instead depends upon the technological facts of the particular case. *See, e.g.*, IASub at 6 (citing *Ortho-McNeil Pharm., Inc. v .Caraco Pharm. Labs., Ltd.*, 476 F.3d 1321, 1326 (Fed. Cir. 2007)). The parties also agree that the use of the word "about," however, avoids a strict numerical boundary to the specified parameter. *Id.* Respondents and the IA argue that the "about 1 to 20%" limitation is properly construed to encompass a dopant present in an amount greater than zero, but less than twenty-one (21), percent. IAResp at 10; IASub at 8; NanoPet at 26; RespSub at 2. By contrast, Aspen argues that the term "about" should be given its plain and ordinary meaning of "approximately," and that the claim language "'about 1%' does not extend down to zero." AspenSub at 4-5.

Although the ID does not expressly construe the "about 1 to 20%" limitation in claim 9, the ID appears to reject Respondents' and the IA's proposed construction that allows any amount of dopant above zero and below 21%. *See* ID at 117 (finding that Respondents' expert "provided no evidence or plausible rationale why the disclosed opacifier cannot be more than 0% but less than 'about 1%.'").

The Commission finds Aspen's proposed construction is supported by the intrinsic evidence and more closely aligned with the principles of *Phillips*. The '359 patent specification teaches that "[s]uitable amounts of such dopants generally range from about 1 to 20% by weight of the finished composite, preferably about 2 to 10%." JX-7 at 6:15-17. The specification also

describes several embodiments of composite articles with dopants ranging from 5% to 10% by weight of the composite article. *Id.* at 14:10-28 ("Sample C" includes 5% carbon black dopant by weight; "Sample D" includes 6% carbon black dopant by weight; "Sample E" includes 6% carbon black dopant by weight and 10% polydimethylsiloxane dopant by weight). Other than these references to dopant weights, the specification and the prosecution history provide no further description regarding dopants.

Respondents and the IA contend that the use of whole numbers to indicate percent weight of dopant in sample embodiments discussed in the '359 patent specification indicates that the patentees determined that precision to the tenths of a percentage point was not warranted, and that the term "about" contemplates variances on the order of at least a whole percentage point. RespSub at 3; IASub at 6-7. To the contrary, Aspen argues that "the specification explains that the 1% lower bound already includes a substantial tolerance over the preferred and intended range, which begins at 2%." AspenSub at 4. We find Aspen's argument more persuasive in view of the intrinsic evidence. As Aspen argues, the preferred embodiments described in the specification, which "[a]ll have dopants in amounts well above 1% by weight" "confirm that no large deviation below 1% were intended." *Id.*

We reject Respondents' proposed construction because it reads out the lower limit by redrafting the claim to read simply "below 20%." *Id.* at 3. Claim 7 already requires the presence of a dopant in the composite article, which necessarily means that the composite article of claim 7 has a dopant weight greater than zero. JX-7 at 14:63-64. Thus, construing the term "about 1[%]" broadly to encompass any dopant weight above zero, as proposed by Respondents and the IA, would render the "about 1[%]" term meaningless.

Respondents and the IA make three other arguments in support of their proposed construction, all of which the Commission rejects. First, Respondents argue that "there is nothing in the patent to indicate that the applicants viewed the lower limit as critical, or that there was anything inventive about a dopant in the amount of 1% as opposed to 0.5% or 0.1%. RespSub at 3. However, as discussed above, the specification does not teach using dopant weights far less than 1%. Rather, all of the embodiments described in the specification have dopant weights in amounts well above 1%. JX-7 at 14:10-28.

Second, relying on the testimonies of both Dr. Leventis and Dr. Gnade, the IA asserts that the extrinsic evidence "supports construing the range of 'about 1 to 20%' to mean greater than zero and less than 21 percent." IASub at 7 (citing Tr. (Leventis) at 1051:4-13; Tr. (Gnade) at 675:10-12). However, both experts' cited testimonies were in the context of whether Ramamurthi anticipates the claimed dopant range in claim 9; not the proper construction of the "about 1[%]" term. In fact, Dr. Gnade testified that "because of the role the dopant plays, you have to have some [and it] has to be at least 1 percent." Tr. at 675:8-10. Dr. Leventis testified that although Ramamurthi discloses the use of dopants, claim 9 is not anticipated by Ramamurthi because one of ordinary skill reading Ramamurthi would have been motivated to use dopants less than 1% or "way less than 1%" by weight. *Id.* at 1050:19-1051:16.

Third, the IA argues that, as reported to the government in Material Safety Data Sheets, some of Aspen's domestic industry products that practice claim 9 "can contain dopant in an amount greater than zero, but less than one percent," which is consistent with its proposed claim construction. IASub at 8. However, according to those datasheets, Aspen's domestic industry products contain dopant amounts within the range of 0-5%, which does not necessarily imply that they contain dopant amounts less than 1%. In fact, Complainant's expert testified that [redacted]

[redacted]. Tr. (Leventis) at 351:12-352:13.

Thus, applying the principles articulated in *Phillips*, the Commission rejects Respondents' and the IA's argument that any dopant weight above zero percent is within the scope of claim 9. Rather, the claimed "about 1" percent is construed to include dopant amounts closer to 1 percent. The Commission need not provide a precise lower or upper boundary for the claimed range since resolving the parties' dispute does not require such precision as evident from the parties' infringement and validity arguments discussed below.

b. *Infringement*

In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 2. With reference to question one, please address whether Respondent Alison's accused products infringe claim 9 of the '359 patent under the proper construction of the "about 1 to 20%" limitation.

The Commission finds substantial evidence supports the ID's finding of infringement with respect to Alison.[11] [redacted]

[11] Aspen also accused certain Nano products of infringing claim 9 of the '359 patent. The ID found that Aspen showed that Nano's accused products meet the claimed range [redacted]. ID at 95-96. No party petitioned for review of this finding and there is no reason for the Commission to disturb this finding. [redacted]. *See* Tr. (Leventis) at 396:6-9.

[redacted]

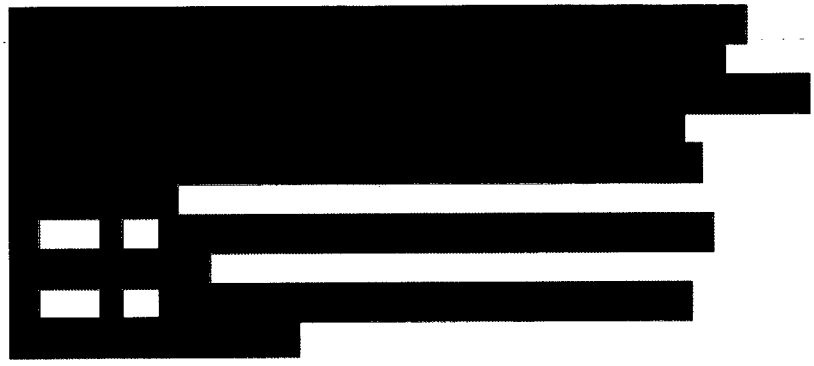
[redacted]

Tr. (Leventis) at 333:13-18, 336:9-19. The ID relied on Aspen's expert testimony to conclude that [redacted] consistent with claim 9. ID at 94 (citing Tr. (Leventis) at 333:21-337:7; JX-37C (Wei Dep.) at 27:8-10, 27:22-25)).

Alison makes a number of attorney arguments challenging Dr. Leventis's analysis. In particular, Alison argues that [redacted] as claim 9 requires. AlisonPet at 97. [redacted]

[redacted]

[redacted]



Tr. (Leventis) at 383:5-24; *see also* Tr. (Leventis) at 394:1-16.

Alison also argues that "Aspen's expert did not testify

AlisonPet at 98 (citing Tr. (Leventis) at 383:9-24). However, as the IA argues, while Aspen's expert "did not include express calculations in his expert report, he testified that (i) the calculation is rudimentary, (ii) he performed the calculation, and (iii) he determined that

IAResp at 11 (citing Tr. (Leventis) at 381:5-383:24).

19 JUDGE MC NAMARA: Was there a reason that you

Tr. (Leventis) at 395:19-396:5; *see also id.* at 394:1-16.

Alison further argues that [redacted]

Finally, Alison asserts that the ID erred in noting that Aspen's expert testimony was unrebutted since Alison rebutted Aspen's assertion in its post-hearing briefs. AlisonPet at 99; *see* Respondent Guangdong Alison Hi-Tech Co.'s Reply Post-Hearing Brief at 45, EDIS Doc ID 605641 (Mar. 15, 2017) ("AlisonRPHB"). But Alison did not challenge Dr. Leventis's testimony before the ALJ other than an attorney argument that Dr. Leventis's analysis *might* be flawed. Alison's experts, Dr. Gnade and Dr. Scherer, offered no testimony disputing Dr. Leventis's calculation or challenging his conclusion as to Alison's infringement of claim 9. AspenSub at 8 (citing Tr. (Gnade) at 729:23-730:10; Tr. (Scherer) at 971:7-9). Even now before the Commission, Alison cites no evidence to counter Dr. Leventis's opinion.

Thus, in view of the record evidence as a whole, the Commission affirms the ID's finding that Aspen has proven by a preponderance of the evidence that Alison's accused products [redacted] infringe claims 7 and 9 of the '359 patent.

c. ***Validity***

In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 3. With reference to question one, please discuss whether Ramamurthi anticipates the limitation "the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite" in claim 9 of the '359 patent.

Having reviewed the record evidence and the parties' submissions, the Commission affirms with modifications the ID's finding that Ramamurthi does not anticipate or render obvious claim 9 of the '359 patent. The ID's analysis is consistent with our construction for the "about 1 to 20%" limitation in claim 9. Specifically, the ID found that Respondents have not shown by clear and convincing evidence that Ramamurthi anticipates claims 7 and 9 of the '359 patent for the same reasons discussed above in connection with claim 1 of the '359 patent. In addition, the ID found that Ramamurthi does not anticipate or render obvious the additional limitation recited in claim 9, namely, "the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite." ID at 116-117, 196-198. While Ramamurthi discloses the use of an opacifier as a dopant, the ID found that Ramamurthi does not disclose the amount of opacifier to use. *Id.* at 116. Relying on primarily the testimony of Aspen's expert, the ID found that one of ordinary skill in the art would "want as small an amount [of Ramamurthi's opacifier] as possible so you do not compromise the properties of the aerogel," which "means, if possible, below 1 percent, or way below 1 percent." *Id.* (quoting Tr. (Leventis) at 1051:4-13); *see also id.* at 197-198. The ID found Respondents' expert "provided no evidence or plausible

rationale why the disclosed opacifier cannot be more than 0% but less than 'about 1%.'" *Id.* at 117.

There is no question that Ramamurthi does not expressly disclose the use of dopants in any specific percentage amount. Respondents, however, contend that the additional limitation of claim 9 is inherently disclosed in Ramamurthi and/or obvious in view of Ramamurthi and knowledge of one of ordinary skill in the art. RespSub at 7-9. The IA does not agree with Respondents' inherency argument but agrees with Respondents that the limitation is obvious over Ramamurthi. IASub at 12-13. The Commission finds Respondents' and the IA's arguments unpersuasive as discussed below.

As an initial matter, it appears that Aspen does not dispute Respondents' assertion that both parties' experts "agreed that it was inherent that the amount of dopant would be less than 20%," RespSub at 7 (citing Tr. (Gnade) at 676:1-3; Tr. (Leventis) at 1252:8-21), and that "both testified that a person of skill in the art would add enough dopant to have an effect on the aerogel composite, while limiting the amount of dopant so that the dopant does not cause an undesired effect." NanoPet at 25 (citing ID at 116-117). Aspen's expert, Dr. Leventis, testified in his rebuttal expert report that he agreed with Dr. Gnade that an "opacifying dopant 'will be more than ***0%***' by weight . . . and also that it would be a small fraction that is much less than 20% [but that he] disagree[d] that it would necessarily or inherently be more than ***1%*** by weight." CX-2256C at Q246.

Nevertheless, Respondents and the IA have failed to present any evidence beyond attorney argument and "vague and speculative" expert testimony that Ramamurthi's dopant could be used in an amount "about 1-20% by weight." *See* ID at 197. In support of their argument that Ramamurthi discloses using dopants in "a suitable amount," Respondents cite to

the '359 patent's teaching that a "suitable amount of dopant" "generally range[s] from about 1 to 20% by weight of the finished composite." RespSub at 8. However, the asserted patent disclosure cannot be used to fill in the gaps in Ramamurthi's disclosure. *See, e.g., W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983) ("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.").

Respondents argue that "[w]hile Ramamurthi did not quantify the amount of dopant added, there was no need to; a person of ordinary skill in the art would have known to use an amount large enough to have the desired impact on the composite, and small enough to avoid any undesirable effect." NanoPet at 28; *see* RespSub at 8 (citing Tr. (Gnade) at 717:16-19 ("[A]n amount less than 1 or less than about 1 probably will not have the effect that you want."), 653:9-15 ("[Y]ou have to put in enough in order to make [the aerogel composite] more opaque or to change the optical properties. So there has to be some. It has to be more than zero. So we're going to put in a small amount or 1 percent.")). Dr. Gnade also later testified that the amount of dopant "has to be at least 1 percent." Tr. (Gnade) at 675:9-10. However, Dr. Gnade failed to provide any supporting evidence for his testimony. Dr. Gnade's conclusory testimony does not satisfy the standard for inherent disclosure. *Rexnord Indus. v. Kappos*, 705 F.3d 1347, 1355 (Fed. Cir. 2013) (Anticipation by inherent disclosure is "appropriate only when the reference discloses prior art that must necessarily include the unstated limitation.") (quoting *In re Omeprazole Patent Litig.*, 483 F.3d 1364, 1378 (Fed. Cir. 2007)).

Moreover, the ID found Dr. Gnade's testimony "purely speculative." ID at 117 (citing Tr. (Gnade) at 675:10-12, 675:23-676:1, 717:16-19, 719:20-22). The ID relied on Dr. Leventis'

testimony that the amount of dopant that Ramamurthi would have used is much less than 1% by weight. *Id.* at 116 (citing Tr. (Leventis) at 1051:4-13 ("you want as small an amount as possible so you do not compromise the properties of the aerogel. So small amount as possible means, if possible, below 1 percent, or way below 1 percent")); *see also* Tr. (Leventis) at 370:10-21; AspenSub at 9-10. There is no reason to disturb the ALJ's credibility determination.

Nor does the record evidence support a finding that Ramamurthi renders this claimed range obvious. For instance, "[w]hile it was known in the art to use some dopants in amounts over 1%, that is not true of the only dopants that are actually used in Ramamurthi—namely opacifiers." AspenResp at 41 (citing Tr. (Leventis) at 1051:1-13). In particular, Aspen's expert testified that one of ordinary skill would use "below 1 percent, or way below 1 percent" of opacifiers because larger amounts may "compromise the properties of the aerogel." *Id.* In view of the record evidence, the Commission finds no reason to disturb the factual findings made in the ID. Thus, in addition to the ID's finding that Ramamurthi does not disclose a "lofty" batting as recited in claim 1 (which claims 7 and 9 depend from), Respondents have not met their clear and convincing burden of proving that Ramamurthi anticipates or that Ramamurthi in combination with the knowledge of a person of skill in the art would render obvious the additional limitation of claim 9.

The ID provides an analysis of the secondary considerations of nonobviousness for the Asserted Patents following its conclusion that the evidence is insufficient to demonstrate that the Asserted Claims are invalid under 35 U.S.C. § 103. ID at 216-230. Since Respondents have not presented a *prima facie* case of nonobviousness with respect to the Asserted Claims, the Commission does not need to consider the secondary considerations factors on review. *See Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012) (finding no need

to address a district court's findings on objective evidence because the district court's finding that an accused infringer failed to prove *prima facie* obviousness was correct). Thus, the Commission takes no position on the ID's findings on secondary considerations of nonobviousness.

d. *Technical Prong*

No Respondent petitioned for review of the ID's technical prong findings with respect to claims 7 and 9 of the '359 patent. The IA petitioned for review on this issue solely because she believes the claims are invalid in view of Ramamurthi. However, since the Commission is affirming the ID's infringement and validity findings, the Commission also affirms the ID's finding that Aspen has shown that its domestic industry products practice claims 7 and 9 of the '359 patent.

iv. Claims 12, 15, and 16 of the '359 Patent

a. *Claim Construction*

Claim 12 of the '359 patent recites *inter alia* "a fibrous batting sheet . . . where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section" (hereinafter "Surface Area Limitation").

The parties dispute the meaning of "the total surface area of that cross section" in claim 12. Aspen's expert, Dr. Leventis, testified that the total surface area of the cross section of the composite is calculated by multiplying its length by its width. ID at 98 (citing Tr. (Leventis) at 320:14-15). Respondents' expert, Dr. Gnade, testified that determining the total surface area of the cross section is "much more difficult," *id.* at 120, because "***there's lots of nooks and crannies and lots of open space.***" *Id.* at 121 (quoting Tr. (Gnade) at 656:1-25). Thus, according to Respondents' expert, the total surface area of the cross section is "***a whole lot bigger than***

length times width." *Id.* The ALJ found the testimony of Respondents' expert more persuasive and concluded that "[g]iven the 'nooks and crannies' of an aerogel composite's surface, simply basing a calculation of the total surface area of the cross-section on the width, as Dr. Leventis did, is neither convincing nor supported by evidence." *Id.* at 122.

In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 4. Please address whether the Commission should adopt Dr. Gnade's interpretation or Dr. Leventis' interpretation of the "total surface area of that cross section" limitation in claim 12 of the '359 patent. Your response should be limited to the evidence in the record, including a discussion of relevant statements, if any, made in the prosecution history.

In response to the Commission's notice, Aspen argues that "Dr. Leventis's straightforward interpretation is the only one that is consistent with the plain language of the term, the specification, and the practical realities in the art." AspenSub at 11. First, Aspen contends that "the plain meaning of 'total surface area of [the] ***cross section***' supports Dr. Leventis's interpretation" and that "Dr. Gnade conflates the surface area of a three-dimensional ***block*** of aerogel material with the two-dimensional surface area of a two-dimensional ***cross section*** through it." *Id.* As Dr. Leventis testified, "the surface area of the aerogel" and "the surface area of the cross section" are "[t]wo totally different things." *Id.* at 12 (citing Tr. (Leventis) 386:9-12). "The former is 'the internal surface area of a spongy material' while the latter is the 'cross section' that results when '[y]ou cut something.'" *Id.* (citing Tr. (Leventis) 386:12-16). According to Aspen, "a ***cross section*** of a sponge, an aerogel, or any other porous material . . . is by definition a slice through the block, Tr. (Leventis) at 320:3-8; Tr. (Gnade) at 797:22-24, and is thus a two-dimensional rectangle, Tr. (Leventis) at 320:9-11." *Id.* By contrast, Aspen agrees with Dr. Gnade that "a ***block*** of aerogel has a large surface area; indeed, there is

'about as much surface area as a football field ... in one gram of [aerogel] material.'" *Id.* at 12 (citing Tr. (Gnade) at 657:16-18; *see also* ID at 122).

Second, Aspen argues that "Respondents admitted that this would be an empty limitation under Dr. Gnade's interpretation, and that '[b]ecause of that large surface area of an aerogel, the fibers seen in a cross-sectional area will ***never*** be more than 10 percent of the total surface area.'" *Id.* at 13 (citing Tr. (Nano Counsel) at 77:7-9). Moreover, Aspen argues that "Staff has calculated that it is ***physically impossible*** for an aerogel composite not to meet the limitation under Dr. Gnade's interpretation because it would allow for a thousand times more fiber to be present in a cross-section than the entire size of that cross section." *Id.*

Third, Aspen argues that Dr. Gnade's interpretation contradicts the '359 patent specification, "which says that certain aerogel fiber arrangements (specifically mats) ***do*** have more than 10% cross-sectional fiber area: 'In an aerogel composite prepared with a mat reinforcement, the cross sectional surface area of the mat fibers is about ***30 to 50% of the total surface area of the cross section***.'" *Id.* at 13-14 (citing JX-7 at 8:2-5 (emphasis added)). Aspen contends that Dr. Gnade's interpretation further contradicts the specification "because he admits that it is impossible as a practical matter to determine" the cross-sectional area even though the patent "has no difficulty measuring and reporting the cross-sectional fiber density of its samples." *Id.* at 14 (citing Tr. (Gnade) 656:1-23; JX-7 at 14:1-3 ("Sample A used a less than 2 denier lofty polyester batting where ***the cross-sectional area of fibers was less than 15%*** of the total cross-sectional area of the aerogel composite ...." (emphasis added))).

Respondents argue for the adoption of Dr. Gnade's interpretation of "total surface area of the cross section" in claim 12 because it is "consistent with (1) the plain claim language itself; (2) the specification; and (3) the inventor's testimony." RespSub at 12. In particular,

Respondents contend that Dr. Gnade's interpretation "properly takes into consideration ***all*** of the surface area visible in a cross section of an aerogel composite – just as the limitation requires." *Id.* at 11 (citing Tr. (Gnade) at 656:1-25 (explaining that "there's lots of nooks and crannies" in aerogel that must be taken into account as part of the total surface area)). Respondents assert that in the case of an aerogel, total surface area of a cross section includes "all the surface that's exposed" as explained by Dr. Gould, Aspen's corporate representative and an inventor of the '359 patent. *Id.* at 12 (quoting Tr. (Gould) at 95:11-12). By contrast, Respondents assert that under Dr. Leventis's interpretation, a cross section of any material will have the same total surface area. *Id.* at 10.

Respondents also assert that the only discussion of surface in the '359 patent specification relates to the large surface area (often 900 m^2/g or higher) of aerogels. *Id.* at 11-12 (citing JX-7 at 1:38-41). Respondents contend that Dr. Gnade did not testify that the fibers could never be more than 10% of the total surface area. *See* RespReply at 9-10. Rather, Respondents argue that "Dr. Gnade's interpretation is consistent with the statements in the specification: if the thermal properties of a pure aerogel are to be retained in a composite aerogel, the fibers in the cross section must be less than 10% of the total surface area of the cross section." *Id.* at 10-11 (citing Tr. (Gnade) at 677:4-12). Respondents argue that the "fact that many aerogel composites, particularly aerogel composites with a low thermal conductivity, might meet this limitation does not establish that Dr. Gnade's interpretation is incorrect." *Id.* at 10.

The IA argues that Dr. Leventis's interpretation improperly "construes 'the total surface area of that cross section in claim 12' to mean the *area* of the cross section." IASub at 14. The IA asserts that "the express claim language requires comparing the '*area*' of the fibers in the cross section to the '*total surface area*' of the composite's cross section." *Id.* at 15. According to

the IA, the "area and surface area of a non-porous material, such as the fibers in the aerogel composite's cross section, will be the same," *id.*, but "[d]ue to their extreme nano-porosity, there is a difference between (i) the way the *area* of a cross section of aerogel is calculated and (ii) the way the *surface area* of that cross section is determined." *Id.* at 16. The IA contends that "both Drs. Gnade and Leventis testified that there is a special method used to determine the *surface area* of an aerogel's cross section." *Id.* (citing Tr. (Gnade) at 677:19-678:9 (BET is a technique for determining the surface area of an aerogel, which can be as high as 900 meters squared per gram), 797:20-799:15 (an aerogel can have a surface area of 900 meters squared per gram; uniquely large surface area of aerogels is one reason for their unique properties); Tr. (Leventis) at 376:11-23 (aerogels are famous for their high surface areas and special techniques are used to measure an aerogel's surface area); *see also* RX-11 (Ramamurthi) at 12:45-46 (monolithic aerogels have typical BET surface areas in the range of 5-800 meters squared per gram)).

The Commission finds that the intrinsic evidence does not provide a clear indication as to what is meant by the claim language "total surface area of that cross section" in claim 12 of the '359 patent. However, in view of the extrinsic evidence as a whole, the Commission finds Dr. Leventis' interpretation more persuasive and consistent with the intrinsic record. Therefore, the Commission modifies the ID's construction of the Surface Area Limitation in claim 12.

The specification teaches that "[a]erogels describe a class of material based upon their structure, namely low density, open cell structures, ***large surface areas*** (often 900 m^2/g or higher) and sub-nanometer scale pore sizes." JX-7 at 1:38-41 (emphasis added). Both parties' experts agree that the "surface area" of aerogels is not calculated simply by multiplying length

times width and that "specialized" testing and equipment are used to calculate it.[12] *See* Tr. (Leventis) at 376:11-23; Tr. (Gnade) at 656:1-25. Both parties' experts also agree that the term "cross section" has no special meaning in the context of the patent and that a person of ordinary skill in the art would understand the meaning of a "cross section" of an aerogel to result from "a slice through the block," and, thus, is a two-dimensional rectangle. Tr. (Leventis) at 320:3-11; *see* Tr. (Gnade) at 797:22-24; IASub at 15.

Respondents focus their arguments on the significance of the claim language "total surface area" and rely on evidence of the undisputed high surface areas of aerogel composites to support Dr. Gnade's interpretation. *See, e.g.*, RespSub at 11-12 ("the '359 patent states that aerogels often have large surface areas of 900 m^2/g or higher"), 12 ("This surface area takes into account the ***total*** surface area of the aerogel, including all of the surface that is exposed."). However, those arguments ignore the fact that the claim refers to the "total surface area" of a "cross section of the composite" article and not to the "total surface area" of the composite article itself.

The IA argues there is a difference between the "area" and the "surface area" of a cross section of porous material like aerogels. *See, e.g.*, IASub at 16; IAReply at 8 ("That there is a difference in the meaning of 'area' and 'surface area' is also illustrated by the differing use of the terms in claim 12."). However, the specification appears to use the terms "area" and "surface

[12] The ID's characterization of Dr. Leventis' testimony on this issue is inconsistent. For example, the ID finds on the one hand that "both experts agreed that the surface area of a cross-section of an aerogel is not determined by multiplying length times width." ID at 119 (citing Tr. (Leventis) at 376:21-23; Tr. (Gnade) at 797:25-798:23). However, the ID also finds that "Complainant's expert, Dr. Leventis, interpreted the 'total surface area of the cross section' to be the length of the cross section multiplied by its width." *Id.* at 120. To the contrary, Dr. Leventis has consistently testified that the surface area of an aerogel is not computed by length times width, but that the surface area of a cross section of an aerogel composite is. *See* Tr. (Leventis) at 376:21-23, 320:14-15.

area" interchangeably when referring to the cross section of an aerogel composite. *See* JX-7 at 7:32-36 ("upon looking at a cross-section of a final aerogel composite, the cross-sectional **area** of the fibers is less than 10% of the total **surface area** of that cross section . . . ."), 8:2-4 ("In an aerogel composite prepared with a mat reinforcement, the cross sectional **surface area** of the mat fibers is about 30 to 50% of the total **surface area** of the cross section."), 14:1-3 ("Sample A used a less than 2 denier lofty polyester batting where the cross-sectional **area** of fibers was less than 15% of the total cross-sectional **area** of the aerogel composite . . . ."). Thus, there is no reason to believe that the patentees intended for the terms "area" and "surface area" to have different meanings in the context of a cross section of an aerogel composite.

Finally, no expert testified how to actually compute the total surface area of a cross section of a composite under Dr. Gnade's construction. Contrary to Respondents' assertion that "Drs. Gnade and Leventis testified that there is a special method used to determine the surface area of an aerogel's cross section," RespReply at 11 (citing Tr. (Gnade) at 677:19-678:9, 797:20-799:15; Tr. (Leventis) at 376:11-23)), Dr. Gnade admitted that he did not know how to make such a calculation, AspenSub at 14 (citing Tr. (Gnade) at 656:1-23). Dr. Gnade testified that there is a special technique called BET that can be used to measure the total surface area of bulk aerogel, which is different from the cross section of an aerogel composite. *See* Tr. (Gnade) at 677:19-678:9. However, there is no dispute that the patent discloses that the total surface area of a cross section of a composite can be measured. *See* JX-7 at 14:1-3 ("Sample A used a less than 2 denier lofty polyester batting where the cross-sectional area of fibers was less than 15% of the total cross-sectional area of the aerogel composite . . . ."). Calculating "the total surface area of that cross section" by multiplying its length by width, as proposed by Dr. Leventis, is one reasonable interpretation. Accordingly, the Commission finds Dr. Leventis' interpretation of

"the total surface area of that cross section" is supported by substantial evidence and consistent with the intrinsic evidence.

b. *Infringement and Technical Prong*

In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 5. With reference to question four, please address whether Respondents' accused products and Aspen's domestic industry products meet the limitation "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section" under both Dr. Gnade's interpretation and Dr. Leventis' interpretation of the scope of claim 12 of the '359 patent.

As discussed above, the Commission construes claim 12 according to Dr. Leventis's interpretation of "the total surface area of [a] cross section" of the aerogel composite as its length times its width. Applying this construction, the Commission affirms the ID's finding that Aspen has proven that two of Respondent Nano's accused products infringe claims 12, 15, and 16 of the '359 patent. ID at 97-101. Respondents did not challenge Aspen's assertion that, under Dr. Leventis's interpretation, these products infringe these claims. *See* RespSub at 14. With respect to claim 12, the ID found that Aspen's expert used x-ray tomography data to compute "the percentages of the cross-section occupied by fiber and aerogel" and compared the percentages with the surface area of the cross-section, which he computed by multiplying length by width of the cross-section. ID at 98 (citing Tr. (Leventis) at 319:18-325:25). Moreover, the ID found Respondents' expert testified that "it is not possible to have the cross-section of the visible fibers in an aerogel composite exceed 10% of an aerogel composites surface area." *Id.* at 99 (citing Tr. (Gnade) at 678:10-22).

Applying Dr. Leventis's interpretation of claim 12, the Commission also affirms the ID's finding that Aspen has shown that two of its domestic industry products practice claims 12, 15,

and 16 of the '359 patent. *Id.* at 259-62. Respondents did not dispute that Aspen's products practice these claims or petition the Commission to review the ID's finding that they do. *See* RespSub at 14; AspenSub at 16.

c. *Validity*

The ID found that Respondents have not shown by clear and convincing evidence that Ramamurthi anticipates claims 12 and 15 of the '359 patent and that Ramamurthi in combination with Japanese Patent Publication No. H08-34678 ("Sonoda") renders obvious claim 16 of the '359 patent. ID at 117-125, 201-204. Specifically, the ID found that the asserted prior art does not disclose the following claim limitations:

- a fibrous batting sheet that is "lofty" or "sufficiently lofty" (all Asserted Claims);
- "a continuous aerogel through said batting" (all Asserted Claims);
- "the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section" (claims 12, 15, and 16); and
- "the batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness" (claim 15).

Id.

In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 6. With reference to question four, please discuss whether Ramamurthi anticipates the limitation "the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section" in claim 12 of the '359 patent.

The IA argues that "Ramamurthi anticipates claim 12 because it inherently teaches that the ratio of the cross-sectional area of fibers in a cross section of the composite cannot exceed ten percent of the cross-section's surface area due to the large surface areas present in aerogels."

IASub at 20 (citing Tr. (Gnade) at 676:4-678:9, 690:7-21). Respondents make the same argument. *See* RespSub at 16-17. Respondents also point out that "if the fiber content were more than 10% of the total surface area of the aerogel composite, the aerogel composite would have so much fiber that the thermal conductivity would increase significantly." *Id.* at 16 (citing Tr. (Gnade) at 677:9-12. Respondents contend that "because the aerogel composite disclosed in Ramamurthi retained the excellent thermal properties of aerogel, the cross-sectional area of the fibers of the batting disclosed in Ramamurthi must necessarily be less than 10% of the total surface area of that cross section." *Id.* at 16-17.

Aspen contends that Respondents have not argued that "Ramamurthi anticipates this limitation under Dr. Leventis's interpretation and cannot satisfy their heavy burden of proving by clear and convincing evidence that Ramamurthi anticipates under Dr. Gnade's interpretation." AspenSub at 19. Aspen asserts that "[r]ather than apply either of these constructions in accordance with the Commission's request, Respondents repeat their conclusory argument that Ramamurthi's aerogel composites necessarily meet the limitations of claim 12 because they had good thermal conductivities." AspenReply at 13-14.

Aspen contends Respondents' argument fails for three reasons. First, Aspen argues that "Respondents have not proven any objective relationship between the thermal conductivity of an aerogel composite and the percent of visible fibers in a cross section of that composite." *Id.* at 14. According to Aspen, "[n]or have Respondents proven that Ramamurthi discloses a particular thermal conductivity that inherently (*i.e.*, necessarily) results in an aerogel composite that meets the limitations of claim 12." *Id.* Second, Aspen asserts that Respondents' inherency argument "is flatly contradicted by the express teachings of the '359 patent," which "discloses an aerogel composite that has a low thermal conductivity and a 'cross-sectional area of fibers [that] was less

than ***15% of the total cross-sectional area of the aerogel composite***.'" *Id.* (quoting JX-7 at 14:1-5 (emphasis added)). Third, Aspen argues that "Respondents attempt to buttress their inherency argument with false equivalencies between Ramamurthi's aerogel composites and those disclosed in the '359 patent." *Id.* at 15. According to Aspen, however, "the inventions of the '359 patent allow for aerogel composites with far lower thermal conductivities than those disclosed in Ramamurthi and the '359 patent expressly distinguishes Ramamurthi on this basis." *Id.* (citing JX-7 at 2:14-21).

As explained below, the Commission affirms with modified reasoning the ID's finding that Ramamurthi does not anticipate the Surface Area Limitation of claim 12. The Commission adopts the ID's other findings with respect to the validity of claims 12, 15, and 16 that are not inconsistent with our analysis below and the Commission's construction of claim 12 (*see supra* at section II(A)(iv)(a)).

As an initial matter, there is no dispute that Ramamurthi fails to expressly disclose the Surface Area Limitation. Moreover, Respondents fail to present sufficient evidence to support their argument that Ramamurthi inherently discloses the Surface Area Limitation. First, Respondents improperly rely on teachings from the '359 patent to purportedly show that Ramamurthi's aerogel composites necessarily meet the Surface Area Limitation because they have good thermal conductivities. *See* RespSub at 15-16; *W.L. Gore & Assocs., Inc.*, 721 F.2d at 1553 ("To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.").

Second, the conclusory statements of Respondents' expert are insufficient to support Respondents' inherency argument and are refuted by the '359 patent. RespSub at 16; AspenReply at 14-15. Specifically, Dr. Gnade testified:

> Q Do you have an opinion on whether Ramamurthi shows the claimed limitations of claim 12?
> A My opinion is that it does, because with the very large surface areas that you have in these cross sections, because of the inherent cross-sectional area or the huge surface area for the aerogels, I think if you got anywhere close to 10 percent of the total surface area of that cross-section, you would have so much fiber that the thermal conductivity would start to go up significantly.
> I mean -- so you really are trying to put in just enough fiber to give you all the other properties you want. And if you got above 10 percent of the total surface area -- and the claim is pretty clear about calling out total surface area, you know. It says the total surface area of that cross-section.

Tr. (Gnade) at 677:4-18. However, the '359 patent "discloses an aerogel composite that has a low thermal conductivity and a 'cross-sectional area of fibers [that] was less than ***15% of the total cross-sectional area of the aerogel composite***.'" AspenReply at 14 (quoting JX-7 at 14:1-5 (emphasis added)). Notably, "the thermal conductivity of this aerogel composite is equal to or *lower* than that disclosed in Ramamurthi." *Id.* (citing *Compare* JX-7 at Fig. 7 (showing thermal conductivities of Sample A), *with* RX-0011 (Ramamurthi) at 2:15-22 (describing thermal conductivities between 0.018 to 0.020 W/mK)). There is no evidence of any objective relationship between the thermal conductivity of an aerogel composite and the percent of visible fibers in a cross section of that composite. *Id.* Nor have Respondents proven that Ramamurthi discloses a particular thermal conductivity that inherently results in an aerogel composite that meets the Surface Area Limitation. *Id.* Accordingly, Respondents have not met their burden of proving that Ramamurthi anticipates claim 12.

Finally, the Commission takes no position on the ID's findings on secondary considerations of nonobviousness with respect to claim 16 of the '359 patent. *See Sandoz*, 678 F.3d at 1296 (finding no need to address a district court's findings on objective evidence because the district court's finding that an accused infringer failed to prove *prima facie* obviousness was correct).

B. THE METHOD PATENTS

With respect to the Method Patents, the Commission affirms with modifications the ID's finding that claim 15 of the '123 patent and claims 11-13, 15, 17, and 21-23 of the '890 patent are not obvious in view of Ramamurthi and either Uchida or Yada. As with the '359 patent, the Commission takes no position on the ID's findings on secondary considerations of nonobviousness. The Commission did not review the ID's findings that Respondents' accused manufacturing processes directly infringe the asserted claims of the Method Patents and that Aspen's domestic industry manufacturing process practices certain claims of the Method Patents. *See* ID at 42-80, 231-250. The Commission also did not review the ID's other findings with respect to the validity of the asserted claims of the Method Patents. Thus, the Commission affirms the ID's finding of a violation of section 337 by both Respondents in connection with claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent.

i. Claim 15 of the '123 Patent and Claims 11-13, 15, 17, and 21-23 of the '890 Patent

a. *Aspen's contention that Respondents' petitions for review raise new arguments and new evidence concerning Uchida and Yada*

Aspen argues that Respondents' petitions for review raised the following new arguments:

- that a person of ordinary skill in the art would recognize that Uchida's dryer would not be necessary in making gel sheets and thus the combination of Ramamurthi and Uchida taught the claimed step of "dispensing onto a moving element" AlisonPet. at 78 (citing Tr. (Scherer) at 990:5-22));

- that a person of ordinary skill in the art would understand how to use Yada's rollers to introduce fibrous batting material onto a moving element, thereby rendering obvious the step of "providing a fibrous batting material" in claim 13 of the '890 patent (*id.* at 80 (citing Tr. (Scherer) at 1017:8-13));

- that the ALJ erred by accepting the testimony of Aspen's expert that sol would "fall through the holes [of Uchida's mesh belt] onto the floor" (*id.* at 77 (quoting Tr. (Schiraldi) at 1194:10-16)); and

- that a person of ordinary skill would know that Uchida's vacuums could "help draw the liquid in and saturate [the fibrous batting]" (*id.* at 78 (citing Tr. (Scherer) at 988:16-19)).

RespSub at 17; *see* AspenSub at 23-25.

In its November 30, 2017 notice of review, the Commission asked the parties to address the following:

> 7. Please address Aspen's contention in its combined response (at 82-84) that Respondents' petitions for review presents new arguments and new evidence concerning Uchida and Yada that they failed to raise in their post-hearing briefs.

In its response to the Commission's notice, the IA argues that "[w]hether waiver has occurred is not dependent upon a specific citation to every possible portion of the record, or a strict requirement addressing every subspecies of argument, in post-hearing briefs, but whether the contention has been clearly made before the ALJ, is present in the record certified to the Commission, and at least within the scope of arguments that appear in post-hearing briefs." IASub at 21. As discussed below, Respondents' alleged new arguments and new evidence concerning Uchida and Yada are reasonably within the scope of arguments that they made in their post-hearing briefs, contrary to Aspen's assertion.

Aspen asserts that Respondents argue, "for the first time, that 'a person of ordinary skill in the art of aerogels would know not to use Uchida's dryer' by applying 'common sense and ordinary creativity.'" AspenSub at 23 (citing AlisonPet at 78). Aspen also asserts that

Respondents argue "for the first time, that Uchida's vacuums could actually 'help draw the liquid in and saturate [the batting].'" *Id.* at 24 (citation omitted). There is no dispute that Respondents' post-hearing briefs do not expressly make the disputed arguments regarding Uchida's dryers and vacuums. *See* IASub at 22, 23; RespSub at 19. However, Respondents' post-hearing briefs "argued that Uchida and Yada should not be limited to the specific structures described in the preferred embodiments but instead should be read for what the references as a whole would have taught a person of ordinary skill in the art." RespSub at 19; *see* IASub at 22, 23. In their petitions for review, Respondents made nearly identical arguments in criticizing the ID for its narrow interpretation of the prior art:

> [I]t was error for the ALJ to demand a literal substitution of Uchida's disclosed equipment in combining that reference with Ramamurthi . . . Rather, the ALJ was required to consider what Uchida as a whole would have taught to a person of ordinary skill in the aerogel field . . . Instead of following the law, the ALJ focused exclusively on the specific embodiments in Uchida, such as the mesh belt, the dryer, and the vacuums. *See* ID at 177.

NanoPet at 71. Moreover, the expert testimony cited in Respondents' petitions for review in support of their arguments regarding Uchida's dryers and vacuums is present in the record. *Id.* at 70 (citing Tr. (Scherer) at 990:5-22), 71 (citing Tr. (Scherer) at 988:16-19). Thus, the Commission finds that Respondents' arguments regarding Uchida's dryers and vacuums is within the scope of arguments raised in Respondents' post-hearing briefs.

Aspen further asserts that Respondents argue for the first time "that the independent claims of the Method Patents would have been obvious because 'Dr. Scherer clearly explained how a person of ordinary skill would have replaced Yada's plastic film on rollers 10' with a roll of fibrous batting as taught by Ramamurthi.'" AspenSub at 24 (citing AlisonPet at 80). However, Respondents "raised this issue in their initial posthearing briefs, citing the same expert testimony from the hearing that is cited in Respondents' Petitions." IASub at 22 (citing

Respondent Guangdong Alison Hi-Tech Co.'s Initial Post-Hearing Brief at 86, EDIS Doc ID 605106 (Mar. 8, 2017) ("AlisonPHB") ("For example, a POSA could easily fashion a process whereby Ramamurthi's mats or sheets (*i.e.*, fibrous batting) are on the conveyor belts disclosed by the prior art, and the sol is dispensed onto it (for example, as taught by Nakanishi or Yada).") (citing Tr. (Scherer) at 1017:40-13)). Thus, we find Respondents' argument in their petitions for review is not new. *See* RespSub at 18-19.

Finally, Aspen asserts that Respondents' argument addressing Uchida's mesh belt in their petitions for review is new. However, Respondents disputed Aspen's arguments concerning the Uchida mesh belt in both their post-hearing and post-hearing reply briefs. IASub at 23. In particular, Respondents explain that "[w]hile Aspen previously criticized Uchida's teaching of a mesh belt, its expert conceded that the moving element recited by the asserted claims could include a mesh belt—like that in Uchida." RespSub at 18 (citing AlisonPHB at 65). Respondents also argued that Uchida's mesh belt could be used to practice the claims' limitations. *Id.* (citing AlisonRPHB at 29). Thus, the Commission finds this argument is also not new and has not been waived.

b. ***Validity of claim 15 of the '123 patent and claims 11-13, 15, 17, and 21-23 of the '890 patent in view of Ramamurthi and Uchida or Yada***

The two steps recited in claim 15 of the '123 patent are nearly identical to the first two steps recited in claim 11 of the '890 patent. *See supra* at 10. Specifically, claim 15 of the '123 patent recites "dispensing a catalyzed sol onto a moving element as a continuous sheet" while claim 11 of the '890 patent recites "dispensing a sol onto a moving element as a continuous sheet." Because there is no dispute that Ramamurthi discloses both a "sol" and a "catalyzed sol," the parties and the ID treated the "dispensing" steps in both claims identically for purposes of

invalidity. *See, e.g.*, ID at 188-189; NanoPet at 43. Both claims also recite the step of "rolling the dispensed sheet into a plurality of layers." *Supra* at 10.

The ID found that "[f]or over ***seventy years*** before Aspen's discovery of the claimed continuous processes, 'batch casting methods like those disclosed in Ramamurthi were the exclusive means for manufacturing' aerogels due to the extremely delicate nature of these materials and the gels used to create them."[13] AspenResp at 53 (citing ID at 1, 173; *see also* Tr. (Schiraldi) at 416:5-12, 1167:23-25; JX-23). Respondents' expert agreed "that batch casting methods [like Ramamurthi's] and continuous casting methods [like the Method Patents'] represent 'two extremes.'" ID at 169 (citing Tr. (Scherer) at 961:12-21); *compare* RX-11 at 7:27-49, 12:14-16 (Ramamurthi disclosing batch casting process for forming both rigid and flexible gel samples) *with* JX-6 at 2:29-33 (the '123 patent explaining that the disclosed continuous and semi-continuous casting methods "are greatly improved over conventional batch sol-gel casting methods for gel sheets, fiber-reinforced flexible gel sheets, and rolls of composite gel materials.").

Based on the record evidence, we agree with the ID's finding that "Respondents cherry-picked the few aspects of [Uchida and Yada] that look similar in hindsight to the disclosures of the Method Patents." ID at 189. As the Supreme Court explained in *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007), an invention "composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in

[13] Like the '359 patent, Ramamurthi was not only before the PTO examiner, but it was discussed during prosecution of the Method Patents and distinguished in the common patent specification. AspenResp at 53 (citing JX-6 at 2:19-25; JX-9 at 2:18-25). The PTAB also considered Ramamurthi in a Petition filed by Respondent Alison seeking *inter partes* review of claims 15-17 and 19 of the '123 patent and claims 11-13, 15, 17-19, and 21 of the '890 patent. CX-2269 at 2; CX-2270 at 2. However, Respondent Alison did not assert any grounds of unpatentability based on Ramamurthi in combination with Uchida or Yada. The PTAB determined to deny institution of an *inter partes* review of both patents. *Id.*

the prior art." Rather, "there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). A determination of obviousness cannot be reached where the record lacks "explanation as to *how* or *why* the references would be combined to produce the claimed invention." *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016).

Respondents contend that "a person of ordinary skill in the aerogel field would have been motivated to produce gel sheets (as taught by Ramamurthi) on a commercial scale using a continuous process (as taught by Uchida and Yada). NanoPet at 45. However, as the ID found, Respondents point to only continuous processes used in manufacturing completely different, much stronger, materials; namely, "Uchida's thermoplastic resins (used, e.g., as desktop organizers) and Yada's high impact strength acrylic polymers," as alleged evidence of obviousness of the claimed method steps. AspenResp at 54; *see* ID at 174-175. Substantial evidence supports the ID's finding that Uchida's thermoplastic resin and Yada's high impact strength acrylic polymers are chemically very different from the extremely fragile aerogels and the gels used to create aerogels.[14] *See* ID at 175. In particular, "as a sol turns into a gel, a three-dimensional lattice forms with internal structures that are around the size of a nanometer." AspenResp at 56 (citing Tr. (Schiraldi) at 406:11-19; Tr. (Gould) at 94:1-12); *see* ID at 173. It is undisputed that this structure is very fragile. *See* ID at 173; NanoPet at 69 (citing Tr. (Schiraldi) at 1175:11-15).

Respondents assert that "it was undisputed that the sol being dispensed onto the moving element is not" fragile and Ramamurthi's fiber-reinforced aerogels are not fragile. NanoPet at

[14] Aspen points out that Respondents' assertion that Uchida is directed to "gel sheets" is false because Uchida does not disclose gels in the first instance, as Respondents' own expert testified. AspenResp at 86 (citing Tr. (Scherer) at 898:11-16); *see also* ID at 180.

66. Respondents' assertion is disingenuous because it focuses on the strength of materials *before* the sol-gel process begins and *after* it ends, while ignoring the critical time period in between when the fragile three-dimensional lattice structure is being formed. AspenResp at 74 (citing Tr. (Scherer) at 959:24-960:2). Based on the record evidence, we find no error in the ID's conclusion that "[a]fter 70 years of making these materials in stationary molds [as taught for example in Ramamurthi], using a continuous process would have been counterintuitive because it would have been expected to impose additional stresses and damage the sol-gel structures." ID at 173 (citing Tr. (Schiraldi) at 417:3-418:9, 1175:1-1176:4).

Moreover, Respondents have not proven by clear and convincing evidence that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the claimed process for "preparing gel sheets" by combining the teachings of Ramamurthi with those of Uchida or Yada. Establishing obviousness through a combination of prior-art references requires showing that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the benefits of the claimed invention when combining the teachings of the prior art. *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016). The record evidence supports the ID's finding that "Uchida's system—*i.e.*, the mixer, the mesh belt (which Respondents point to for the "moving element" limitation), and vacuums—would have been ***harmful*** in manufacturing Ramamurthi's aerogel composites." AspenResp at 60 (citing ID at 177 (citing Tr. (Gould) at 99:17-24; Tr. (Schiraldi) at 1194:4-19; Tr. (Scherer) at 988:21-989:5, 990:5-22)).

Likewise, Aspen argues that "Yada uses ultraviolet lamps to facilitate polymerization, cooling systems, and an air-tight chamber, all of which are equipment that would be unnecessary for manufacturing Ramamurthi's composites." *Id.* at 61-62 (citing Tr. (Schiraldi) at 1199:1-16).

Given the very different nature and chemistries between the materials disclosed in Ramamurthi and those disclosed in Yada and Uchida, the ID correctly found that Respondents' analysis suffer from hindsight bias and that, prior to the inventions of the Method Patents, a person of ordinary skill in the art would have had neither the motivation nor a reasonable expectation of success in manufacturing Ramamurthi's aerogel composites using a continuous process, including those disclosed in Uchida or Yada. *Id.* at 54 (citing ID at 168-92).

With respect to the "rolling" step, Aspen argues that Respondents "do not identify a single reference that discloses how to roll a gel sheet, much less a fragile gel sheet made from a 'sol,' relying instead on disparate materials like those disclosed in Uchida and toilet paper." *Id.* at 65. We find no reason to disturb the ID's finding that "the process for rolling Uchida's [thermoplastic resin] into a plurality of layers is very different than that for rolling Ramamurthi's materials into a plurality of layers." *Id.* at 64 (citing ID at 180). Respondents' bare argument that a person of ordinary skill in the art would have known how to combine the teachings of Ramamurthi with Uchida in a way that accomplished the "rolling" step because doing so was a matter of trivial design choice is not sufficient to carry their burden. *See* NanoPet at 50. Neither is Respondents' expert testimony that "rolling is simply 'a natural outcome," sufficient to carry Respondents' burden. *See id.* at 51 (quoting Tr. (Scherer) at 905:3-6); *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017) ("Absent some articulated rationale, a finding that a combination of prior art would have been 'common sense' or 'intuitive' is no different than merely stating the combination 'would have been obvious.' Such a conclusory assertion with no explanation is inadequate to support a finding that there would have been a motivation to combine.").

The IA argues that claim 15 of the '123 patent and claim 11 of the '890 patent are drafted very broadly to cover methods for making gel sheets, which are not aerogels or aerogel

composites. *See* IAPet at 31. The IA also argues that the ID erred in construing the asserted method claims "as a product claim when the ID found that the Ramamurthi-Uchida combination does not produce Ramamurthi's composite aerogel." *Id.* at 37. First, we agree with Aspen that "it is inappropriate to fault the ALJ for addressing the very argument that Respondents had presented," *i.e.*, that "a POSA would have been motivated to produce Ramamurthi's fiber-reinforced aerogel sheets on a mass scale." AspenResp at 75 (citations omitted). Second, while the claims are drafted broadly to cover "gel sheets," the claims do cover methods for making aerogels and aerogel composites. That is because the common specification for the Method Patents uses the term "gel sheets" to include not only "sheets of catalyzed sol," as the IA contends, but also "fiber-reinforced flexible gel sheets" and "rolls of composite gel materials." JX-6 at 2:29-33. Respondents assert that "gel sheets do not become an aerogel until after supercritical drying." NanoPet at 66. However, dependent claim 12 of the '890 patent recites that the "drying" step of claim 11 "is accomplished using supercritical fluids." JX-9 at 14:3-4. Thus, claim 11's "method for preparing gel sheets" is part of the process for making aerogels.

Since Respondents have not presented a *prima facie* case of nonobviousness with respect to the asserted claims of the Method Patents, the Commission does not need to consider the secondary considerations factors on review. *See Sandoz*, 678 F.3d at 1296. The Commission takes no position on the ID's findings on secondary considerations of nonobviousness.

III. REMEDY, PUBLIC INTEREST, AND BONDING

A. Remedy

We have concluded above that Aspen has shown a violation of section 337 by both Respondents based on infringement of the Asserted Patents. Under the statute, if the Commission determines that a violation has occurred, "it shall direct that the articles concerned . . . be excluded from entry into the United States, unless, after considering the effect

of such exclusion upon the public health and welfare, competitive conditions in the United States economy, the production of like or directly competitive articles in the United States, and United States consumers, it finds that such articles should not be excluded from entry." 19 U.S.C. § 1337(d)(1).

The RD recommends the issuance of a LEO with a certification provision because "whether any specific aerogel material or product infringes any of the patents, but particularly the '359 patent, would be impossible to detect by inspection." ID at 267. The RD recommends no issuance of a cease and desist order because Aspen has withdrawn its request for such an order. *Id.* at 266-267. Furthermore, the RD notes that the parties stipulated to a bond of 100% of the entered value of covered products during the period of Presidential review. *Id.* at 268.

i. Aspen's Proposed Certification Provision

Aspen acknowledges that "certification provisions have become standard in ITC exclusion orders so as to provide Customs and Border Protection [CBP] with flexibility in the enforcement of the order, as well as minimize any disruption to the legitimate importation of goods found to be non-infringing." AspenSub at 25. However, Aspen asserts that the "Commission and CBP have repeatedly stated that the certification provision is not to be used with respect to newly designed products or processes that a respondent may believe to be non-infringing." *Id.* at 25-26 (citing *Eaton Corp. v United States*, Slip Op. 05-121 at 22-25 (C.I.T. Sept. 9, 2005); *Certain GPS Devices and Products Containing Same*, Inv. No. 337-TA-602, Comm'n Op. at 19-20). Because the ID found that all of Respondents' accused products infringe at least one of the Asserted Claims, Aspen contends that "there were *no* adjudications of non-infringement upon which Respondents could rely to certify a product for entry into the United States." *Id.* at 26. As such, Aspen requests that the LEO state that "only products that have been

adjudicated as non-infringing by a court, the Commission, or CBP may be imported under the certification provision." *Id.*, Ex. 1, ¶ 3.

Respondents and the IA contend that there is nothing unique about this investigation that warrants anything other than use of a standard certification provision. RespReply at 17; IAReply at 10-11.

The Commission denies Aspen's request to depart from our standard certification provision. The standard certification provision does not allow an importer to simply certify that it is not violating the exclusion order as Aspen suggests. As the Commission has previously stated, CBP only accepts a certification that the goods have been previously determined by CBP or the Commission not to violate the exclusion order. *Certain Network Devices, Related Software and Components Thereof (I)*, Inv. No. 337-TA-944, Comm'n Op. at 53 n. 19 (Jul. 26, 2016).

Moreover, Aspen's request is contrary to the Commission's standard practice for the past several years to include certification provisions in exclusion orders to aid CBP.[15] *See, e.g.*, *Certain Mobile Devices, Associated Software, and Components Thereof*, Inv. No. 337-TA-744, Comm'n Op., 2012 WL 3715788 at *13 (June 5, 2012); *Certain Network Devices, Related Software and Components Thereof (I)*, Inv. No. 337-TA-944, Comm'n Op. at 53 (Jul. 26, 2016). Certification provisions are especially helpful to CBP "where the patent(s) that form the basis of the order cover processes for manufacturing goods and Customs is unable to readily to determine how goods sought to be imported were made." *Certain Abrasive Products Made Using a*

[15] Prior to this practice, the Commission refused to include certification provisions where the CBP could readily test any incoming product to determine if they are covered by our order and the evidence suggested that respondents were likely to falsify their certifications to CBP. *See Certain Neodymium-Iron-Boron Magnets, Magnet Alloys, and Articles Containing Same*, Inv. No. 337-TA-372, USITC Pub. 2964, Comm'n Op. at 10-12 (May 1996).

Process for Powder Preforms, and Products Containing Same, Inv. No. 337-TA-449, Commission Opinion on Remedy, the Public Interest, and Bonding, 2002 WL 31093610, at *3 (Jul. 26, 2002) (citing *Certain Acid Washed Denim Garments and Accessories,* Inv. No. 337-TA-324, Commission Op. at 23 (Aug. 14, 1992)). Aspen does not dispute the ID's finding that "whether any specific aerogel material or product infringes any of the patents, but particularly the '359 patent, would be impossible to detect by inspection." ID at 267.

In addition, the '359 patent expires several years before the Method Patents and certain accused products that infringe one or more asserted claims of the '359 patent do not infringe the Method Patents. Thus, it is conceivable that Respondents may use the certification provision to import non-infringing products after the expiration of the '359 patent. Further, there is no evidence that Respondents have operated in bad faith.[16] Therefore, the LEO will not include Aspen's proposed certification provision.

ii. Respondents' Proposed Non-Infringement Statements

Respondent Alison requests that any LEO should include specific statements of non-infringing products, as follows:

- that "Alison's [redacted] products do not infringe claims 7 and 9 of the '359 patent," ID at 3;
- that "Alison's products having a 'Z' designator in the product name are not subject to exclusion for the '123 and '890 patents" because "Aspen and Alison have stipulated the products [redacted] do not infringe any asserted claim of the '123 and '890 patents." JX-0028C (Stipulation between Aspen and Alison); *see* ID at 3-4; and

[16] The Commission required respondent in *Certain Opaque Polymers*, Inv. No. 337-TA-833, to obtain an advisory ruling from the Commission prior to importing allegedly noninfringing products in view of the respondent's pattern of deceit and spoliation of evidence in that investigation and complainant's allegation that the respondent did not make any products that might inadvertently get excluded. *See Certain Opaque Polymers*, Inv. No. 337-TA-883, Comm'n Op. at 23-24 (Apr. 30, 2015).

- that "Alison has not violated Section 337 for claims 12, 15, and 16 of the '359 patent."

RespReply at 17-18.

The Commission denies all of Alison's requests to carve out allegedly non-infringing products. The products that Alison's seeks to carve out do in fact infringe claim 1 of the '359 patent. *Supra* at section II(A)(i); ID at 26-27. In other words, even though Alison's [redacted] products do not infringe claims 7 and 9 of the '359 patent and Alison's products [redacted] do not infringe the Method Patents, those same accused products infringe claim 1 of the '359 patent. Moreover, Alison's requests would not be helpful to CBP's enforcement of the LEO given that Alison's [redacted] products and Aspen's products having a "Z" designator in the product name will be covered by the proposed LEO.

B. Public Interest

Section 337 defines a two-stage process for the Commission to act upon a complaint. The Commission first "determines, as a result of an investigation under this section" whether "there is a violation of this section." *See* 19 U.S.C. § 1337(d)(1). If the Commission determines a violation has occurred, the Commission "*shall* direct that the articles concerned . . . be excluded from entry into the United States unless after considering *the effect* of such exclusion" on four public interest factors the Commission determines a remedy should not issue. *Id.* (emphasis added). Those factors are: (1) the public health and welfare; (2) competitive conditions in the U.S. economy; (3) the production of competitive articles in the U.S.; and (4) U.S. consumers. *Id.*

With this context in mind, we turn to the particular facts of this investigation. Aspen and the IA assert that the statutory public interest factors do not weigh against the issuance of an

LEO in this investigation. Respondent Alison disagrees.[17] Alison argues that "Aspen has lost money in every year since its inception in 2001." RespReply at 18 (citing CX-904 at 17); *see also* Respondent Guangdong Alison Hi-Tech Co., Ltd.'s Submission Regarding Public Interest at 2 ("AlisonPISub"), EDIS Doc ID 627416 (Oct. 31, 2017) (citing Tr. (Gould) at 238:8-13; 239:11-13). Alison contends that "Aspen's corporate witness attempted to mask these financial woes by [] attributing Aspen's losses to a stock purchase, championing its increasing revenue, and denying any operational losses." RespReply at 18 Relying primarily on information from Aspen's public financial records, Alison asserts that Aspen has yet to achieve positive total cash flow and its ability to generate positive cash flow is uncertain. *Id.* at 18-19 (citing CX-903 at 17; CX-904 at 17). According to Alison, "[g]iven Aspen's admittedly shaky financial condition, as revealed by its own SEC filings, there are significant concerns that if Alison and Nano are eliminated as competitors, U.S. consumers could be left without a supply of aerogel products." *Id.* at 19; *see also* AlisonPISub at 2.

In response, Aspen argues that "Alison's assertion that Aspen's financial condition is 'tenuous' is belied by the fact that Aspen's revenues have continued to scale exponentially for a period of over sixteen years." AspenSub at 29 (citing CDX-1105 (showing Aspen's revenue has grown from $65,000 in 2001 to $120,532,000 in 2015)). Aspen argues that "Respondents aired this argument not through an accounting expert, but via a cross-examination of Dr. Gould that ignored crucial portions of Aspen's SEC filings—portions which revealed that Aspen is '[a]bsolutely not' selling its aerogel blankets at a loss and has had 'positive cash flows from operating activities' of millions of dollars in recent years." *Id.* at 30 (citing Tr. (Gould) at 251:1-

[17] Respondent Nano's public interest statement only asks the Commission to adopt the recommended determination that any limited exclusion order includes a certification provision. *See* Respondent Nano Tech Co., Ltd.'s Public Interest Submission, EDIS Doc ID 627418 (Oct. 31, 2017).

4, 255:14-15). Aspen asserts that the "net losses" cited by Respondents "stemmed from a stock conversion loss in connection with Aspen's IPO that must be reported to the SEC—the 'loss' had nothing to do with the patents-in-suit or Aspen's immensely successful sales of products that are covered by these patents." *Id.* (citing Tr. (Gould) at 249:5-253:17). Aspen contends that "it continues to expand its aerogel product offerings." *Id.* at 29. Aspen concedes "that some of Aspen's net losses are attributed to construction costs for new facilities," as Respondents argue, but that such "expenditures on additional manufacturing facilities only further demonstrate that Aspen's endeavors are successful and, moreover, that Aspen is willing to invest and scale its output to satisfy additional demand for composite aerogel insulation products." *Id.* at 31.

The Commission finds there is insufficient evidence to support Alison's contention that U.S. consumers could be left without a supply of aerogel products if the Commission issues a LEO in this investigation. Even though Aspen experienced net losses in 2013, 2014, and 2015 as reported in Aspen's SEC filing and confirmed by Dr. Gould, such losses by themselves do not demonstrate a likelihood that "Aspen could soon go out of business." AlisonPISub at 5. Dr. Gould is not an accounting expert and repeatedly stated at the hearing that he was not qualified to discuss the financial implications of statements made in Aspen's SEC filings. *See* Tr. (Gould) at 249:13-14, 250:12-13, 254:19-20. Moreover, Aspen has provided reasonable explanations for the net losses cited by Respondents and it is undisputed that Aspen's revenue has increased exponentially since its inception in 2001. AspenSub at 28-31; *see also* Tr. (Gould) at 250:4-17 (testifying that Aspen's earnings before income taxes, depreciation, and amortization has been positive many times), 251:1-9 (testifying that Aspen absolutely does not sell its aerogel blankets at a loss). Thus, the Commission finds that Alison's prediction that "Aspen could soon go out of business" is conjecture and not supported by the record evidence as a whole.

Other than the above-discussed argument regarding the potential effect of the proposed remedy on U.S. consumers, Respondents do not address the other statutory public interest factors.

Aspen argues that the proposed exclusion order will have no adverse effect on the public health and welfare in the U.S. because composite aerogel insulation material "is not a technology that is unique to medical products, pharmaceuticals, or other products that are important in the delivery of healthcare or the maintenance of public health or safety." AspenSub at 32. Aspen also points out that there are other non-infringing alternative insulation materials available, both aerogel and non-aerogel, and that Aspen can fulfill any additional demand for insulation materials. *Id.* Respondents do not dispute these statements. RespReply at 18-20.

Aspen asserts that the exclusion order will have no adverse effect on the production of like or directly competitive articles in the U.S. because it "manufactures and sells aerogel insulation materials in the United States that are similar to the infringing products that would be excluded." AspenSub at 28. Aspen argues that "Respondents have purportedly sold only small quantities of samples of their products to date in the United States," and "[g]iven Aspen's ability to meet demands of the United States market, it is unlikely that consumers would experience any supply-related impact if the recommended exclusion order issues." *Id.* at 31. Respondents provide no information pertaining to the production of like or directly competitive articles in the United States. RespReply at 18-20.

Finally, Aspen argues that the "exclusion order will have no adverse effects on competitive conditions in the U.S. economy, and there is no evidence suggesting that the opposite could be the case." AspenSub at 33. Aspen contends that the "record is clear that Aspen will continue to provide composite aerogel insulation material to the various segments of

the U.S. economy that purchase such materials." *Id.* Respondents provide no information to address the public interest factor of competitive conditions in the United States economy, other than referencing its certification and validity arguments. RespReply at 19-20.

Based on the parties' submissions, the Commission finds that the evidence of record as to the statutory public interest factors does not militate against the Commission's issuance of a limited exclusion order with the standard certification provision.

C. Bonding

During the 60-day period of Presidential review, imported articles otherwise subject to remedial orders are entitled to conditional entry under bond. 19 U.S.C. § 1337(j)(3). The amount of the bond is specified by the Commission and must be an amount sufficient to protect the complainant from any injury. *Id.*; 19 C.F.R. § 210.50(a)(3). Here, the parties have stipulated to a bond of 100% of the entered value of covered products. ID at 268. Thus, the Commission sets a bond of 100% of the entered value of infringing products during the period of Presidential review.

IV. CONCLUSION

For the reasons discussed above, the Commission affirms with modifications the ID's finding of a violation of section 337 by both Respondents in connection with claims 1, 7, and 9 of the '359 patent; claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent; and by Respondent Nano in connection with of claims 12, 15, and 16 of the '359 patent. The Commission reverses the ID's finding of a violation of section 337 by both Respondents in connection with claim 5 of the '359 patent.

The Commission has determined to issue relief in the form of an LEO with the standard certification provision barring entry of both Respondents' composite aerogel insulation materials that infringe one or more of claims 1, 7, and 9 of the '359 patent; claims 15-17, and 19 of the

'123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent; and barring entry of Respondent Nano's composite aerogel insulation materials that infringe one or more of claims 12, 15, and 16 of the '359 patent. The Commission has also determined to set a bond of 100% of the entered value of infringing products during the period of Presidential review.

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: February 22, 2018

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME **Inv. No. 337-TA-1003**

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **OPINION** has been served by hand upon the Commission Investigative Attorney, **Yoncha Kundupoglu, Esq.,** and the following parties as indicated, on **February 22, 2018.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

☐ Via Hand Delivery
☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, NW
Washington, DC 20006

☐ Via Hand Delivery
☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Timothy Bickham
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036

☐ Via Hand Delivery
☒ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME	Investigation No. 337-TA-1003

NOTICE OF COMMISSION DECISION TO REVIEW IN PART A FINAL INITIAL DETERMINATION FINDING A VIOLATION OF SECTION 337; REQUEST FOR WRITTEN SUBMISSIONS

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review in part the presiding administrative law judge's ("ALJ") final initial determination ("ID") issued on September 29, 2017, finding a violation of section 337 of the Tariff Act of 1930, as amended, in the above-captioned investigation.

FOR FURTHER INFORMATION CONTACT: Cathy Chen, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436, telephone (202) 205-2392. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street SW, Washington, DC 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov*. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov*. Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation on June 8, 2016, based on a complaint filed by Aspen Aerogels, Inc. of Northborough, Massachusetts ("Aspen"). 81 *Fed. Reg.* 36955-956 (Jun. 8, 2016). The complaint alleges violations of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. 1337, in the importation into the United States, the sale for importation, and the sale within the United States after importation of certain composite aerogel insulation materials and methods for manufacturing the same by reason of infringement of certain claims of U.S. Patent No. 7,399,439 ("the '439 patent"); U.S. Patent No. 9,181,486 ("the '486 patent"); U.S. Patent No. 7,078,359

("the '359 patent"); U.S. Patent No. 6,989,123 ("the '123 patent"); and U.S. Patent No. 7,780,890 ("the '890 patent"). The complaint further alleges that an industry in the United States exists as required by 19 U.S.C. 1337(a)(2). The notice of investigation named Nano Tech Co., Ltd. of Zhejiang, China ("Nano"), and Guangdong Alison Hi-Tech Co., Ltd. of Guangzhou, China ("Alison"), as respondents. The Office of Unfair Import Investigations ("OUII") is also a party in this investigation.

All asserted claims of the '439 patent and the '486 patent and certain asserted claims of the '359 have been terminated from the investigation. *See* Comm'n Notice (Nov. 2, 2016); Comm'n Notice (Feb. 9, 2017). Only claims 15-17, and 19 of the '123 patent; claims 1, 5, 7, 9, 12, 15, and 16 of the '359 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent ("the Asserted Claims") remain in the investigation.

On November 15, 2016, the ALJ issued Order No. 19, granting Aspen's motion for summary determination that the economic prong of the domestic industry requirement has been satisfied under section 337(a)(3)(A) and (B). The Commission determined to review in part Order No. 19. *See* Comm'n Notice (Dec. 7, 2016). On review, the Commission affirmed with modification the summary determination that Aspen satisfies the economic prong of the domestic industry requirement. *See id.* at 1-2.

On September 29, 2017, the ALJ issued the final ID in this investigation, finding a violation of section 337 by Respondents Alison and Nano in connection with claims 1, 5, 7, and 9 of the '359 patent; claims 15-17, and 19 of the '123 patent; and claims 11-13, 15, 17-19, and 21 of the '890 patent. The ID also finds a violation of section 337 by Respondent Nano in connection with claims 12, 15, and 16 of the '359 patent. In addition, the ID finds that Aspen has shown that its domestic industry products satisfy the technical prong of the domestic industry requirement for the Asserted Patents. The ID further finds that Respondents have not shown that the Asserted Claims are invalid.

The ID also contains the ALJ's recommended determination on remedy and bonding. The ALJ recommended that the appropriate remedy is a limited exclusion order with a certification provision prohibiting the entry of certain composite aerogel insulation materials manufactured abroad by or on behalf of Respondents Alison and Nano that infringe certain claims of the '359 patent, and/or that are manufactured using certain claimed methods of the '123 patent and the '890 patent.

On October 16, 2017, Respondents and OUII each filed a timely petition for review of the final ID. Respondents and OUII challenge certain of the ID's findings with respect to the validity of the Asserted Claims and the ID's findings with respect to claim 5 of the '359 patent. Respondent Alison separately challenges the ID's finding of infringement with respect to claim 9 of the '359 patent. That same day, Aspen filed a contingent petition for review of the final ID, challenging the ALJ's construction of two claim limitations in the '359 patent. On October 24, 2017, the parties filed timely responses to the petitions for review. On October 31, 2017, the parties filed their public interest comments pursuant to Commission Rule 210.50(a)(4).

Having examined the record of this investigation, including the ID, the petitions for review, and the responses thereto, the Commission has determined to review the ID in part. Specifically, with respect to the '359 patent, the Commission has determined to review the ALJ's construction of the "lofty fibrous batting" limitation in claim 1 of the '359 patent. The Commission's review of the "lofty fibrous batting" limitation does not include the ID's finding that Respondents have not proven that the term is invalid for indefiniteness. The Commission has also determined to review the ALJ's constructions of the additional limitations in claims 5 and 9, and the "total surface area of that cross section" limitation of claim 12 of the '359 patent, and the ID's associated findings on infringement and the technical prong of the domestic industry requirement with respect to those claims and claims 15 and 16 of the '359 patent. In addition, the Commission has determined to review the ID's findings that the asserted claims of the '359 patent are not invalid in view of Ramamurthi by itself or in combination with other prior art. With respect to the '123 and the '890 patents, the Commission has determined to review the ID's finding that claim 15 of the '123 patent and claims 11-13, 15, 17, and 21-23 of the '890 patent are not obvious in view of Ramamurthi and either Uchida or Yada. The Commission has determined not to review the remaining issues decided in the ID.

The parties are requested to brief their positions on the issues under review with reference to the applicable law and the evidentiary record. In connection with its review, the Commission is particularly interested in responses to the following questions:

1. Please address the proper scope of claim 9 of the '359 patent and, in particular, the "about 1 to 20%" limitation. Your response should be limited to the evidence in the record, including a discussion of relevant statements, if any, made in the prosecution history.

2. With reference to question one, please address whether Respondent Alison's accused products infringe claim 9 of the '359 patent under the proper construction of the "about 1 to 20%" limitation.

3. With reference to question one, please discuss whether Ramamurthi anticipates the limitation "the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite" in claim 9 of the '359 patent.

4. Please address whether the Commission should adopt Dr. Gnade's interpretation or Dr. Leventis' interpretation of the "total surface area of that cross section" limitation in claim 12 of the '359 patent. Your response should be limited to the evidence in the record, including a discussion of relevant statements, if any, made in the prosecution history.

5. With reference to question four, please address whether Respondents' accused products and Aspen's domestic industry products meet the limitation "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section" under both Dr. Gnade's interpretation and Dr. Leventis' interpretation of the scope of claim 12 of the '359 patent.

6. With reference to question four, please discuss whether Ramamurthi anticipates the limitation "the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section" in claim 12 of the '359 patent.

7. Please address Aspen's contention in its combined response (at 82-84) that Respondents' petitions for review presents new arguments and new evidence concerning Uchida and Yada that they failed to raise in their post-hearing briefs.

The parties have been invited to brief only these discrete issues, as enumerated above, with reference to the applicable law and evidentiary record. The parties are not to brief other issues on review, which are adequately presented in the parties' existing filings.

In connection with the final disposition of this investigation, the Commission may issue an order that could result in the exclusion of the subject articles from entry into the United States. Accordingly, the Commission is interested in receiving written submissions that address the form of remedy, if any, that should be ordered. If a party seeks exclusion of an article from entry into the United States for purposes other than entry for consumption, the party should so indicate and provide information establishing that activities involving other types of entry either are adversely affecting it or likely to do so. For background, see *Certain Devices for Connecting Computers via Telephone Lines*, Inv. No. 337-TA-360, USITC Pub. No. 2843 (December 1994) (Commission Opinion).

If the Commission contemplates some form of remedy, it must consider the effects of that remedy upon the public interest. The factors the Commission will consider include the effect that an exclusion order would have on (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) U.S. production of articles that are like or directly competitive with those that are subject to investigation, and (4) U.S. consumers. The Commission is therefore interested in receiving written submissions that address the aforementioned public interest factors in the context of this investigation.

If the Commission orders some form of remedy, the U.S. Trade Representative, as delegated by the President, has 60 days to approve or disapprove the Commission's action. *See* Presidential Memorandum of July 21, 2005, 70 FR 43251 (July 26, 2005). During this period, the subject articles would be entitled to enter the United States under bond, in an amount determined by the Commission and prescribed by the Secretary of the Treasury. The Commission is therefore interested in receiving submissions concerning the amount of the bond that should be imposed if a remedy is ordered.

WRITTEN SUBMISSIONS: The parties to the investigation are requested to file written submissions on the issues identified in this notice. Parties to the investigation, interested government agencies, and any other interested parties are encouraged to file written submissions on the issues of remedy, the public interest, and bonding. Such submissions should address the recommended determination by the ALJ on remedy and bonding. Complainant and the Office of Unfair Import Investigations are also requested to submit proposed remedial orders for the Commission's consideration. Complainant is further requested to state the dates that the patents

expire, the HTSUS numbers under which the accused products are imported, and any known importers of the accused products. The written submissions and proposed remedial orders must be filed no later than close of business on **December 15, 2017**. Initial submissions are limited to 40 pages, not including any attachments or exhibits related to discussion of the public interest. Reply submissions must be filed no later than the close of business on **December 22, 2017**. Reply submissions are limited to 20 pages, not including any attachments or exhibits related to discussion of remedy, the public interest, and bonding. No further submissions on these issues will be permitted unless otherwise ordered by the Commission.

Persons filing written submissions must file the original document electronically on or before the deadlines stated above and submit 8 true paper copies to the Office of the Secretary by noon the next day pursuant to section 210.4(f) of the Commission's Rules of Practice and Procedure (19 C.F.R. 210.4(f)). Submissions should refer to the investigation number ("Inv. No. 337-TA-1003") in a prominent place on the cover page and/or the first page. *See* Handbook on Filing Procedures, (https://www.usitc.gov/secretary/documents/handbook_on_filing_procedures.pdf). Persons with questions regarding filing should contact the Secretary (202-205-2000).

Any person desiring to submit a document to the Commission in confidence must request confidential treatment. All such requests should be directed to the Secretary to the Commission and must include a full statement of the reasons why the Commission should grant such treatment. *See* 19 CFR 201.6. Documents for which confidential treatment by the Commission is properly sought will be treated accordingly. All information, including confidential business information and documents for which confidential treatment is properly sought, submitted to the Commission for purposes of this Investigation may be disclosed to and used: (i) by the Commission, its employees and Offices, and contract personnel (a) for developing or maintaining the records of this or a related proceeding, or (b) in internal investigations, audits, reviews, and evaluations relating to the programs, personnel, and operations of the Commission including under 5 U.S.C. Appendix 3; or (ii) by U.S. government employees and contract personnel[1], solely for cybersecurity purposes. All nonconfidential written submissions will be available for public inspection at the Office of the Secretary and on EDIS.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. 1337), and in Part 210 of the Commission's Rules of Practice and Procedure (19 CFR Part 210).

[1] All contract personnel will sign appropriate nondisclosure agreements.

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: November 30, 2017

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Inv. No. 337-TA-1003

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Yoncha Kundupoglu, Esq.,** and the following parties as indicated, on **November 30, 2017.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, NW
Washington, DC 20006

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Timothy Bickham
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

Public Version

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of	
CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME	**Inv. No. 337-TA-1003**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge MaryJoan McNamara

(September 29, 2017)

Appearances:

For the Complainant Aspen Aerogels, Inc.:

Kevin K. Su, Esq., Frank E. Scherkenbach, Esq., Kurt L. Glitzenstein, Esq., Proshanto Mukherji, Esq., Andrew G. Pearson, Esq., and Chet Campbell, Esq. of Fish & Richardson P.C., Boston, MA.

Thomas S. Fusco, Esq. of Fish & Richardson P.C., Washington, D.C.

For the Respondent Guangdong Alison Hi-Tec Co., Ltd.:

Gary M. Hnath, Esq., Bryan Nese, Esq., and Anita Y. Lam of Mayer Brown LLP, Washington, D.C.

Joseph A. Mahoney, Esq. and Erick J. Palmer, Esq. of Mayer Brown LLP, Chicago, IL.

For the Respondent Nano Tech Co., Ltd.:

Timothy Bickham, Esq., Charles F. Schill, Esq., Harold H. Fox, Esq., Matthew N. Bathon, Esq., and Ericka J. Sowers, Esq. of Steptoe & Johnson LLP, Washington, D.C.

Douglas R. Peterson, Esq. of Steptoe & Johnson LLP, Los Angeles, CA.

For the Commission Investigative Staff:

Jeffrey T. Hsu, Esq., Supervisory Attorney; and Yoncha Kundupoglu, Esq., Investigative

Attorney, of the Office of Unfair Import Investigations, U.S. International Trade Commission, Washington, D.C.

SELECTED SUMMARY FINDINGS

Pursuant to the Notice of Investigation, 81 Fed. Reg. 36955, dated June 8, 2016, this is the Initial Determination ("ID") of the Investigation in the Matter of Certain Composite Aerogel Insulation Materials and Methods for Manufacturing the Same, United States International Trade Commission Investigation No. 337-TA-1003. *See* 19 C.F.R. § 210.42(a).

It is a finding of this ID that Complainant, Aspen Aerogels, Inc. ("Aspen" or "Complainant"), has proven by a preponderance of evidence that Respondents Guangdong Alison Hi-Tech Co., Ltd. ("Respondent Alison") and Nano Tech Co., Ltd. ("Respondent Nano," and collectively, "Respondents") have violated subsection (b) of Section 337 of the Tariff Act of 1930, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain composite aerogel insulation materials and methods for manufacturing the same.

It is a finding of this ID that Respondents have infringed the asserted claims 15, 16, 17 and 19 of U.S. Patent No. 6,989,123 ("'123 patent"); the asserted claims 1, 5, 7, and 9 of U.S. Patent No. 7,078,359 ("'359 patent"); and the asserted claims of 11-13, 15, 17-19, and 21 of U.S. Patent No. 7,780,890 ("'890 patent"). It is also a finding of this ID that Respondent Nano has infringed the asserted claims 12, 15, and 16 of the '359 patent.

It is a finding of this ID that the asserted patents are not invalid under 35 U.S. §§ 102 or 103.

It was held earlier in the Investigation by Summary Determination that Complainant satisfied the economic prong of the domestic industry requirements of Section 337(a)(3)(A) and (B). (*See* Order No. 19, Initial Determination Granting Complainant's Summary Determination Motion that It Satisfies the Economic Prong of the Domestic Industry Requirement (Nov. 15,

2016); Notice of Commission Determination to Review in Part an Initial Determination Granting Complainant's Motion for Summary Determination (Doc. ID No. 597110 (Dec. 7, 2016)) (noting that the "Commission's action does not disturb the summary determination that complainant satisfies the economic prong of the domestic industry requirement").).

A 100% bond during the Presidential Review Period, and a Limited Exclusion Order ("LEO") with a certification provision, are recommended.

TABLE OF CONTENTS

ABBREVIATIONS

The following abbreviations for pleadings, exhibits, briefs, and Orders are used in this Initial Determination:

Compl.	Complaint
Def.	Defenses
Alison Resp.	Response of Respondent Alison to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
Nano Resp.	Response of Respondent Alison to the Notice of Investigation and Complaint Under Section 337 of the Tariff Act of 1930, as Amended
PH	Prosecution History
Rep.	Report
CX	Complainant's exhibit
CDX	Complainant's demonstrative exhibit
CPX	Complainant's physical exhibit
CPBr.	Complainant's Corrected Pre-Hearing Brief[1]
CBr.	Complainant's Initial Post-Hearing Brief
CRBr.	Complainant's Post-Hearing Reply Brief
CPSt.	Complainant's Pre-Hearing Statement
CMBr.	Complainant's Initial Claim Construction Brief

[1] The parties, including Staff, filed redacted Pre-Hearing Briefs to eliminate moot issues as ordered by the *Markman* Order. (*See* Order No. 35 at 4 (Jan. 31, 2017).). Complainant's Pre-Hearing Brief cited to in this ID is Doc. ID No. 603663 filed on February 15, 2017. All citations to Pre-Hearing Briefs are to corrected, redacted briefs.

CMRBr.	Complainant's Reply Claim Construction Brief
JX	Joint exhibit
RX	Respondents' exhibit
RDX	Respondents' demonstrative exhibit
RPX	Respondents' physical exhibit
RAPBr.	Respondent Alison's Pre-Hearing Brief[2]
RNPBr.	Respondent Nano's Pre-Hearing Brief[3]
RABr.	Respondent Alison's Initial Post-Hearing Brief
RNBr.	Respondent Nano's Initial Post-Hearing Brief
RARBr.	Respondent Alison's Post-Hearing Reply Brief
RNRBr.	Respondent Nano's Post-Hearing Reply Brief
RAPSt.	Respondent Alison's Pre-Hearing Statement
RNPSt.	Respondent Nano's Pre-Hearing Statement
RMBr.	Respondents' Initial Claim Construction Brief
RMRBr.	Respondents' Reply Claim Construction Brief
SPBr.	Commission Investigative Staff's Pre-Hearing Brief[4]
SBr.	Commission Investigative Staff's Initial Post-Hearing Brief
SRBr.	Commission Investigative Staff's Post-Hearing Reply Brief

[2] Respondent Alison's Pre-Hearing Brief cited to in this ID is Doc. ID No. 603680 filed on February 16, 2017.

[3] Respondent Nano's Pre-Hearing Brief cited to in this ID is Doc. ID No. 603783 filed on February 16, 2017.

[4] Staff's Pre-Hearing Brief cited to in this ID is Doc. ID No. 603733 filed on February 16, 2017.

SPSt.	Commission Investigative Staff's Pre-Hearing Statement
SMBr.	Commission Investigative Staff's Initial and Reply Claim Construction Brief
SX	Commission Investigative Staff's exhibit
Tr.	Hearing transcript
Dep. Tr.	Deposition transcript
***Markman* Order**	Order No. 35

The following shorthand references to certain products and patents at issue in this are used in this Initial Determination:

Asserted Patents	'123, '359, and '890 patents, collectively
Method Patents	'123 and '890 patents, collectively
Product Patent	'359 patent
Accused Processes	Accused Alison and Accused Nano Manufacturing Processes, collectively, accused of infringing the Method Patents
Accused Aerogel Composite Blankets	Accused Alison and Nano Aerogel Composite Blankets, collectively, accused of infringing the Product Patent
Accused Alison Manufacturing Process	Process used to manufacture DRT0610, DRT0606, DRT0603, and GR1006 blankets
Accused Nano Manufacturing Process	Process used to manufacture FMA450, FMA650, FMB350, FMC100, FMC200, and FMD450 blankets
Accused Alison Aerogel Composite Blankets	DRT0610, DRT0606, DRT0603, and GR1006 blankets
Accused Nano Aerogel Composite Blankets	FMA450, FMA650, FMB350, FMC100, FMC200, and FMD450 blankets
DI Manufacturing Process	Process used to make Complainant's Cryogel, Pyrogel, Spaceloft, and Spaceloft Subsea blankets

DI Aerogel Composite Blankets	Cryogel (x201 and Z), Spaceloft, Spaceloft Subsea, and Pyrogel (XT, XT-E, XT-F)
DI Aerogel Composite Blankets I	Cryogel Z (5mm and 10mm) and Spaceloft Subsea (10mm)
'123 patent	U.S. Patent No. 6,989,123
'359 patent	U.S. Patent No. 7,078,359
'890 patent	U.S. Patent No. 7,780,890

The following are additional abbreviations used in this Initial Determination:

AIA	The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, § 3, 125 Stat 284, 285-92 (2011)
PTO or USPTO	U.S. Patent and Trademark Office
PTAB	U.S. Patent and Trademark Office Trial and Appeal Board
SEC	Securities and Exchange Commission

I. SELECTED HISTORICAL OVERVIEW AND SUMMARY OF FINDINGS

This ID concerns aerogel insulation products and the processes by which they are made. Two (2) of the patents at issue, the '123 and the '890 patents (the "Method Patents"), are directed to the manufacturing processes for preparing sheets of gelled materials, while the third patent, the '359 patent (the "Product Patent"), is directed to the combination of composite materials that comprise the aerogel products of this Investigation, also called "aerogel blankets."

Complainant and Respondents agree that the invention of aerogels is widely attributed to Dr. Samuel Kistler, around 1930. (*See* Tr. at 12:24–13:3; CPBr. at 1; RAPBr. at 6; RNPBr. at 9.). Complainant and Respondents also agree that aerogels are considered to be the one of the best thermal insulating materials available. (*See* CPBr. at 1; RAPBr. at 5; Tr. at 13:3-4, 73:23-24.). In Complainant's opening statement during the hearing, aerogel was described categorically as the "best insulator known to mankind." (Tr. at 13:3-4.). However, aerogels were known to be fragile with somewhat limited commercial uses because products made from it could be made only in small quantities through "cumbersome batch processes." (CPBr. at. 1; *see also* JX-0023 ("Technology Stipulation").). Some 70 years passed between the time that aerogels were first invented and Complainant's combination of manufacturing processes and product that lead to its commercial success. (*See* CPBr. at 1-2.). From there, any agreements diverge.

As this ID finds, Complainant's continuous form of aerogel using a unique "fibrous batting," when combined with Complainant's manufacturing processes, lead to the dramatic expansion in the Complainants' (and others') capabilities to produce a product with greater durability and flexibility at a level of commercialization that had not been realized previously. (*See* CPBr. at 1-5, 66.). Complainant's products have been used by private and public entities,

for insulation of oil pipes as deep as 21 miles under the sea to insulation used by NASA for space shuttle valves and for space gloves on the Mars exploration (where temperatures can fall to -400°F. (*See* CPBr. at 3; *see also* Tr. at 13:11–14:25.).

Respondents Alison's and Nano's manufacturing operations, both in the People's Republic of China, are also large operations. Respondent Nano claims to be the "the biggest aerogel manufacturer in China" (CX-0124; Compl. at Ex. 30; *see also* RNPBr. at 4-9) while Respondent Alison also claims to be "No. 1 in China" in aerogel production capacity, and "No. 2 around the world" behind Complainant (*see* CBr. at 5 n.20 (citations omitted); *see also* RAPBr. at 4-5). Both Respondents began manufacturing aerogel blankets after Complainant's three (3) patents were filed. (*See* RAPBr. at 4; Tr. at 73:6–74:16.).

However, as part of their narrative and arguments, both Respondents contend that there was nothing unique either about Complainant's processes or the product they produced. While both Respondents largely staked their arguments on the validity of the Asserted Patents, they generally did not contest or provide rebuttal evidence with respect to infringement or domestic industry.

As this ID reflects, the essence of Respondents' arguments is that: (1) the manufacturing process that Complainant alleges it invented in the Method Patents was simply a matter of "scaling up" an already known "batch casting" production process, using well-known technology and equipment such as conveyor belts; and (2) the product that Complainant alleges it invented was also little more than another form of a product that was known in prior art that had not been scaled up.[5]

[5] As I listened to and later considered the experts' arguments in this Investigation with respect to the prior

This ID arrived at conclusions at odds with those arguments. That is, as simple as it sounds, if scaling up production using a conveyor belt was well-known and all that was involved, why would it have taken 70 years to make a product based on a different fiber arrangement/ structure that became such a commercial success when, clearly, there was a need for such a composite insulation product in many industries long before?

Table 1: Summary of Findings

Product	Patent	Asserted Claims	Conclusion
Respondent Alison: *All variants—* DRT603 DRT606 DRT610 GR1006	'359 patent	1, 5	***Violation (claims 1, 5):*** Claims 1 and 5 are valid and infringed by all variants of the Accused Alison Aerogel Composite Blankets DRT603, DRT606, DRT610, and GR1006.
Respondent Alison: *Only variants with TiO_2—* DRT603 DRT606 DRT610 GR1006	'359 patent	7, 9	***Violation (claims 7, 9):*** Claims 7 and 9 are valid and infringed by the Accused Alison Aerogel Composite Blankets DRT603, DRT606, DRT610, GR1006 with TiO_2.
Respondent Alison: *Variants using Respondent Alison's*	'123 patent	15-17, 19	***Violation (claims 15-17, 19):***

art, and whether the inventions of the Asserted Patents were obvious or anticipated, I was reminded of a cartoon that I would have incorporated into this decision but for the Copyright fee. The cartoon is comprised of four (4) frames. In the first, a late Neolithic man dressed in animal skins is standing and staring at a stone wheel and scratching his head. (Is it a potter's wheel? A wheel for carrying objects?). In the second frame, there is a picture of an axel attached to two wheels, with nothing more. There is also a man staring at the wheel and axel scratching his head. In the third frame, there is a partially open chassis of what appears to be a chariot (which derives from Proto- Celtic "*karros*" (wagon) or the Latin *carrus* (wagon or chariot)) with an axel attached to wheels lying near-by. A man wearing a type of toga, is looking at the different pieces and looking dumbfounded. In the last frame is a modern car, with axel, wheels, a closed chassis and it is moving down a road. The caption reads: "Which is the invention?"

Product	Patent	Asserted Claims	Conclusion
low temperature process— DRT603 DRT606 DRT610* GR1006 *Excluding DRT610-Z.			Claims 15-17 and 19 are valid and infringed by Respondent Alison's low temperature process (i.e., Accused Alison Manufacturing Process) for making DRT603 DRT606 DRT610 (excluding DRT610-Z), and GR1006.
	'890 patent	11-13, 15, 17-19, 21	***Violation (claims 11-13, 15, 17-19, 21):*** Claims 11-13, 15, 17-19, and 21 are valid and infringed by Respondent Alison's low temperature process (i.e., Accused Alison Manufacturing Process) for making DRT603 DRT606 DRT610 (excluding DRT610-Z), and GR1006.
Respondent Nano: *Made in Workshop 1 or 2—* FMA450 FMA650 FMB350 FMB350-6 FMC100 FMC200 FMD400	'123 patent	15-17, 19	***Violation (claims 15-17, 19):*** Claims 15-17 and 19 are valid and infringed by the Accused Nano Aerogel Composite Blankets FMA450, FMA650, FMB350, FMB350-6, FMC100, FMC200, and FMD400 made in either Workshop 1 or Workshop 2.
	'890 patent	11, 13, 15, 17-19, 21	***Violation (claims 11, 13, 15, 17-19, 21):*** Claims 11, 13, 15, 17-19, and 21 are valid and infringed by the Accused Nano Aerogel Composite Blankets FMA450, FMA650, FMB350,

Product	Patent	Asserted Claims	Conclusion
			FMB350-6, FMC100, FMC200, and FMD400 made in either Workshop 1 or Workshop 2.
	'359 patent	1, 5, 7, 9	***Violation (claims 1, 5, 7, 9):*** Claims 1, 5, 7, and 9 are valid and infringed by the Accused Nano Aerogel Composite Blankets FMA450, FMA650, FMB350, FMB350-6, FMC100, FMC200, and FMD400 made in either Workshop 1 or Workshop 2.
Respondent Nano: *Made in Workshop 2—* FMA450 FMA650 FMB350 FMB350-6 FMC100 FMC200 FMD400	'890 patent	12	***Violation (claim 12):*** Claim 12 is valid and infringed by the Accused Nano Aerogel Composite Blankets FMA450, FMA650, FMB350, FMB350-6, FMC100, FMC200, and FMD400 made in Workshop 2.
Respondent Nano: *Made in Workshop 1 or 2—* FMB350-6 FMC200	'359 patent	12, 15-16	***Violation (claims 12, 15-16):*** Claims 12 and 15-16 are valid and infringed by the Accused Nano Aerogel Composite Blankets FMB350-6 and FMC200 made in either Workshop 1 or Workshop 2.

II. BACKGROUND OF THIS INVESTIGATION

A. Institution and Initial Pleadings.

On May 5, 2016, Aspen Aerogels, Inc. filed a complaint under Section 337 of the Tariff Act of 1937, as amended, 19 U.S.C. § 1337, alleging infringement of certain claims of U.S. Patent No. 6,989,123 (JX-0006, hereafter "the '123 patent"), U.S. Patent No. 7,078,359 (JX-0007, hereafter "the '359 patent"), U.S. Patent No. 7,399,439 (JX-0008, hereafter "the '439 patent"), U.S. Patent No. 7,780,890 (JX-0009, hereafter "the '890 patent"), and U.S. Patent No. 9,181,486 (JX-0010, hereafter "the '486 patent"). (Compl. at ¶ 2 (May 5, 2016).).

The Commission instituted this Investigation pursuant to subsection (b) of Section 337 of the Tariff Act of 1930, as amended, to determine:

> whether there is a violation of subsection (a)(1)(B) of section 337 in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain composite aerogel insulation materials and methods for manufacturing the same by reason of infringement of one or more of claims 15-17 and 19 of the '123 patent; claims 1-3, 5-7, 9, 10, 12-18, 49, and 50 of the '359 patent; claims 1-4, 6-9, 15, 16, and 18-21 of the '439 patent; claims 11-13, 15, 17-19, and 21 of the '890 patent; and claims 1, 2, and 11 of the '486 patent, and whether an industry in the United States exists as required by subsection (a)(2) of section 337[.]

81 Fed. Reg. 36956 (June 8, 2016).

Following a series of terminations of both patents and claims, the Asserted Patents and claims remaining that are the subject of this decision are claims 15-17 and 19 of the '123 patent, claims 1, 5, 7, and 9 of the '359 patent, and claims of 11-13, 15, 17-19, and 21 of the '890 patent.[6]

---

[6] On October 12, 2016, an ID was issued granting Complainant's partial termination of this Investigation ("First Partial Termination") against Respondent Nano with respect to claims 1-4, 6, 7-9 15-16, and 18-21 of the '439 patent, and claims 10 and 17 of the '359 patent. (Order No. 17 (Oct. 12, 2016).). The ID also granted Complainant's partial termination of this Investigation against Respondent Alison with respect to

The Notice of Investigation ("NOI") names Aspen Aerogels, Inc. of Northborough, MA as complainant ("Complainant"). 81 Fed. Reg. 36956 (June 8, 2016). The NOI names Guangdong Alison Hi-Tech Co., Ltd. of Guangzhou, China ("Respondent Alison") and Nano Tech Co., Ltd. of Zhejiang, China ("Respondent Nano") as respondents (collectively, "Respondents"). *Id.*

The Commission Investigative Staff of the Office of Unfair Import Investigations ("Staff") is also a party to this Investigation. *Id.*

On June 27, 2016, Respondent Alison filed its response to the Complaint and NOI ("Alison Response"). (Doc. ID No. 584625 (June 27, 2016).). On July 5, 2016, Respondent Nano filed its response to the Complaint and NOI ("Nano Response"). (Doc. ID No. 585162 (July 5, 2016).).[7] Respondent Alison identifies six (6) affirmative defenses ("Respondent Alison's Affirmative Defenses"), and Respondent Nano identifies eight (8) affirmative defenses ("Respondent Nano's Affirmative Defenses"). (Alison Resp. at 17-19; Nano Resp. at 30-32, ¶¶ 2-10.).

---

claims 10, 12-18, and 50 of the '359 patent. (*Id.*). On January 17, 2017, a second ID issued granting Complainant's partial termination of this Investigation ("Second Partial Termination") against Respondents with respect to the remaining asserted claims of the '439 patent (claims 1-4, 6, 7-9 15-16, and 18-21), the remaining asserted claims of the '486 patent (claims 1, 2, and 11), and asserted claims 2, 3, 6, 13, 14, 18, 49, and 50 of the '359 patent. (Order No. 28 (Jan. 17, 2017).). The Commission determined not to review the IDs. (Doc. ID No. 594197 (Nov. 2, 2016); Doc. ID No. 603311 (Feb. 9, 2017).).

[7] On June 22, 2016, Respondent Nano filed an unopposed motion ("Unopposed Motion") for an extension of time to respond to the Complaint and NOI. (Motion Docket No. 1003-001 (June 22, 2016).). On June 24, 2016, an Order issued granting Respondent Nano's Unopposed Motion. (Order No. 4 (June 24, 2016).).

B. The Parties.

1. Complainant Aspen Aerogels, Inc.

Complainant is a publicly traded Delaware corporation (NYSE:ASPN) headquartered in Northborough, Massachusetts. (Compl. at ¶ 9.). Complainant designs, develops, manufactures, markets, and sells aerogel insulation for private and public customers worldwide. (*Id.* at ¶ 11.). Complainant's technology enables commercially viable applications for aerogels across a wide variety of industries. (*Id.*).

2. Respondent Guangdong Alison Hi-Tech Co., Ltd.

Respondent Alison is a corporation organized under the laws of the People's Republic of China and has its principal place of business at Rm. 1202, Golden Lake Building, No. 2 Donghu Road West, Guangzhou, People's Republic of China. (*Id.* at ¶ 16; Alison Resp. at ¶ 16.). Respondent Alison sells for importation into the United States, imports, and/or sells within the United States after importation certain composite aerogel insulation materials. (Compl. at ¶ 16; Alison Resp. at ¶ 16.). Respondent Alison manufactures and markets composite aerogel insulation materials, including flexible thermal insulation "blanket" products, including, but not limited to, Respondent Alison's "DRT06 Series" products.[8] (Compl. at ¶ 17; Alison Resp. at ¶ 17.).

3. Respondent Nano Tech Co., Ltd.

Respondent Nano is a corporation organized under the laws of the People's Republic of China and has its principal place of business at No. 9 Baichuan Road, Binhai New Area, Shaoxing, Zhejiang, People's Republic of China. (Compl. at ¶ 14; Nano Resp. at ¶ 14.).

[8] Complainant has accused the following products of infringing the Asserted Patents: DRT0610, DRT0606, DRT0603, and GR1006. (Compl. at ¶ 17; CPBr. at 10.).

Respondent Nano manufactures aerogel insulation blankets including "FMA450-6," "FMA450-10," "FMA650-10,"and "FMB350-6" product lines.[9] (Compl. at ¶ 15; Nano Resp. at ¶ 15.).

C. Procedural History.

On September 14, 2016, the parties jointly filed their *Markman* hearing proposal ("Joint *Markman* Hearing Proposal") requesting that there be no *Markman* hearing. (Doc. ID No. 590616 at 2-3 (Sept. 14, 2016).). On October 3, 2016, an Order issued granting the Joint *Markman* Hearing Proposal. (Order No. 16 (Oct. 3, 2016).).

On October 12, 2016, an ID issued granting Complainant's First Partial Termination against Respondent Nano with respect to claims 1-4, 6, 7-9 15-16, and 18-21 of the '439 patent, and claims 10 and 17 of the '359 patent. (Order No. 17 (Oct. 12, 2016).). Order No. 17 also granted Complainant's partial termination of this Investigation against Respondent Alison with respect to claim claims 10, 12-18, and 50 of the '359 patent. (*Id.*). The Commission determined not to review the ID. (Doc. ID No. 594197 (Nov. 2, 2016).).

On October 31, 2016, Complainant filed a motion for summary determination ("SD Motion") that it satisfied the economic prong of the domestic industry ("DI") requirement under Section 337(a)(3)(A) and (B). (Motion Docket No. 1003-012 (Oct. 31, 2016); SD Mot. at 1.).

On November 7, 2016, Respondent Alison filed a response ("Alison SD Response") stating, *inter alia*, that while it "does not contest that Aspen would satisfy the economic prong of the domestic industry requirement[,] . . . [it] does contest, however, that Aspen's products and processes practice the asserted patents." (Doc. ID No. 594642 (Nov. 7, 2016); Alison SD Resp. at 1.). On the same day, Staff filed its response ("Staff SD Response") supporting Complainant's

[9] Complainant has accused the following products of infringing the Asserted Patents: FMA450, FMA650, FMB350, FMC100, FMC200, and FMD450 blankets. (Compl. at ¶ 15; CPBr. at 9.).

SD Motion. (Doc. ID No. 594629 (Nov. 7, 2016); Staff Resp. at 2.). On November 15, 2016, an ID was issued granting Complainant's SD Motion. (Order No. 19 (Nov. 15, 2016).). On December 7, 2016, the Commission issued a notice that it determined to review in part the ID (Order No. 19). (Doc. ID No. 597110 (Dec. 7, 2016).).

On review, the Commission struck two (2) paragraphs summarizing certain allocations and figures upon which Complainant relied to establish that it satisfied the economic prong of the DI requirement, but did not, otherwise, "disturb the summary determination that complainant satisfies the economic prong of the domestic industry requirement." (*Id.* at 1-2.).

On January 17, 2017, an ID issued granting Complainant's Second Partial Termination against Respondents as to the remaining asserted claims of the '439 patent (claims 1-4, 6, 7-9 15-16, and 18-21), the remaining asserted claims of the '486 patent (claims 1, 2, and 11), and asserted claims 2, 3, 6, 13, 14, 18, 49, and 50 of the '359 patent. (Order No. 28 (Jan. 17, 2017).). The Commission determined not to review the ID. (Doc. ID No. 603311 (Feb. 9, 2017).).

On January 31, 2017, an Order issued construing certain claim terms of the Asserted Patents ("*Markman* Order"). (Order No. 35 (Jan. 31, 2017).). The evidentiary hearing was held on February 17, 21-24, and 28, 2017. (Doc. ID Nos. 603923, 603924, 604019, 604018, 604190, 604255, 604256, 604135, 604137, 604315, 604562 (Feb. 21-24, and 27, 2017; Mar. 1, 2017).).

On June 14, 207, Complainant filed an unopposed motion to reopen this Investigation for the limited purpose of receiving into evidence the June 8, 2017 decision by the U.S. Patent and Trademark Office Patent Trial and Appeal Board ("PTAB") denying institution of Respondent Alison's petition for *inter partes* review of the '359 patent. (Motion Docket No. 1003-035 (June 14, 2017).). Complainant's unopposed motion was granted. (*See* Order No. 41 (June 16, 2017).).

D. Post-Hearing Motions

1. Complainant's Motion to Strike No. 1 Was Denied

In its Post-Hearing Reply Brief, Complainant moved to strike what it alleged is a "new argument" by Respondents' expert, Dr. George Scherer,[10] regarding the stresses imposed on a moving element. (CRBr. at 117-18.). Dr. Scherer's allegedly "new argument" suggests that a moving element would not impose significant stresses on the materials on top of it. (*Id.* at 118.). According to Complainant, Respondents presented this argument for the first time at the evidentiary hearing over Complainant's timely objection. (*Id.*; Tr. (Su) at 906:22–907:2.).

On March 27, 2017, Respondents filed an opposition to Complainant's Motions to Strike. (Doc. ID No. 606727 (Mar. 27, 2017).). On the same day, Staff filed a response also opposing Complainant's Motions to Strike. (Doc. ID No. 606629 (Mar. 27, 2017).).

Complainant's Motion to Strike No. 1 was denied. (*See* Order No. 38 (Apr. 24, 2017.).

2. Complainant's Motion to Strike No. 2 Was Denied

In its Post-Hearing Reply Brief, Complainant moved to strike what it alleged is a "new" invalidity theory Respondents raised for the first time at the evidentiary hearing and in their Initial Post-Hearing Briefs based on Fiberfrax, a batting that Complainant's fact witness, Dr.

[10] At the time he gave his testimony on February 23 and 24, 2017, Dr. George Scherer was a Professor of Civil Engineering at Princeton University. (RAPSt. at 4; RNPSt. at 4.). Dr. Scherer was retained by Respondents as an expert to provide testimony regarding sol-gel and aerogel technology and related technologies, including processes to make gel materials such as aerogels. (RAPSt. at 5; RNPSt. at 5.). Dr. Scherer also was retained by Respondents as an expert to testify about the prior art of the Method Patents, the level of skill in the art, the construction of the claims of the Method Patents, non-infringement of the Method Patents, and the scope and invalidity of the Method Patents, including addressing any secondary considerations raised by Complainant regarding the obviousness of the asserted claims of the Method Patents. (RAPSt. at 5; RNPSt. at 5-6.).

George Gould,[11] testified about at his deposition in conjunction with asserted prior art reference U.S. Patent No. 6,068,882 to Ryu ("Ryu"). (CRBr. at 118 (citing RNBr. at 105; RABr. at 132; CRBr., Ex. 2 (Gould Dep.) at 27:10–32:33).). Complainant argued that Ryu does not mention this material, and that Respondents did not include the material in their invalidity contentions, Dr. Bruce Gnade's expert report,[12] or Respondents' Pre-Hearing Briefs. (*Id.*).

On March 27, 2017, Respondents filed an opposition to Complainant's Motions to Strike. (Doc. ID No. 606727 (Mar. 27, 2017).). On the same day, Staff filed a response also opposing Complainant's Motions to Strike. (Doc. ID No. 606629 (Mar. 27, 2017).).

Complainant's Motion to Strike No. 2 was denied. (*See* Order No. 38 (Apr. 24, 2017.).

3. Complainant's Motion to Strike No. 3 Was Denied

In its Post-Hearing Reply Brief, Complainant moved to strike what it alleged is a "new argument" by Respondents. (CRBr. at 118.). According to Complainant, Respondents argued for the first time in their Initial Post-Hearing Briefs that the "silica fiber mat" disclosed in Example 2 of U.S. Patent No. 5,306,555 (RX-0011) to Ramamurthi et al. ("Ramamurthi"), which Respondents have asserted as invalidating prior art against the patents-in-suit, has a low density

---

[11] At the time he gave his testimony on February 17, 2017, Dr. George Gould was the Vice-President of Research and Development at Aspen Aerogels, Inc. (Tr. (Gould) at 88:10-16.). Dr. Gould was identified by Complainant as a fact witness to provide testimony with regard to the background of Aspen Aerogels, Inc., the "invention story," and technical and financial information concerning the company and its product. (CPSt. at 1.).

[12] At the time he gave his testimony on February 22-24, 2017, Dr. Bruce Gnade was Vice-President of Research at the University of Texas at Dallas. (RAPSt. at Ex. 1; RNPSt. at Ex. 1.). Dr. Gnade was retained by Respondents as an expert to provide testimony on the technology involved in this Investigation, the prior art, the level of skill of a person of ordinary skill in the art, the construction of the claims of the '359 patent, non-infringement of the Asserted Patents, Complainant's failure to practice the asserted claims of the '359 patent, and the scope and invalidity of the '359 patent, including addressing any secondary considerations raised by Complainant regarding the obviousness of the asserted claims of the '359 patent. (RAPSt. at 4; RNPSt. at 4.).

and cannot be the "dense" mat described in the '359 patent due to its high thermal conductivity. (*Id.* (citing RNBr. at 77-78; RABr. at 102-03).). Complainant contended that in his expert report, Respondents' expert, Dr. Bruce Gnade, did not: (1) mention the word "density" when discussing Ramamurthi and claim1 of the '359 patent; (2) discuss the specific calculation he relied upon at the evidentiary hearing; or (3) discuss the thermal conductivity of the fibrous material in Example 2 of the '359 patent. (*Id.* (citing RDX-0014C at 56 (demonstrative reflecting Dr. Gnade's new density calculation); Tr. (Su) at 626:13-16 (objecting to the demonstrative as being unsupported by Dr. Gnade's timely expert report; RX-561C (Gnade Rep.) at ¶¶ 87-95)).).

On March 27, 2017, Respondents filed an opposition to Complainant's Motions to Strike. (Doc. ID No. 606727 (Mar. 27, 2017).). On the same day, Staff filed a response also opposing Complainant's Motions to Strike. (Doc. ID No. 606629 (Mar. 27, 2017).).

Complainant's Motion to Strike No. 3 was denied. (*See* Order No. 38 (Apr. 24, 2017).).

4. Complainant's Motion to Strike No. 4 Was Denied

In its Post-Hearing Reply Brief, Complainant moved to strike what it alleged are "new" calculations of the weight of Ryu's coatings. (CRBr. at 119.). Complainant contended that at the evidentiary hearing, Dr. Gnade provided for the first time a new analysis: (1) purporting to identify copper as the dopant of interest; (2) speculating about the thickness of copper that might have been used; (3) opining on the density of the materials involved; and (4) putting forth a new calculation based these assumptions. (*Id.* (citing RX-0561C (Gnade Rep.) at ¶ 155; RNPBr. at 127; RAPBr. at 135-36).).

On March 27, 2017, Respondents filed an opposition to Complainant's Motions to Strike. (Doc. ID No. 606727 (Mar. 27, 2017).). On the same day, Staff filed a response also opposing Complainant's Motions to Strike. (Doc. ID No. 606629 (Mar. 27, 2017).).

Complainant's Motion to Strike No. 4 was denied. (*See* Order No. 38 (Apr. 24, 2017).).

III. JURISDICTION AND IMPORTATION

To have the authority to decide a case, a court or agency must have both subject matter jurisdiction and jurisdiction over either the parties or the property involved. *See Certain Steel Rod Treating Apparatus and Components Thereof*, Inv. No. 337-TA-97, Commission Memorandum Opinion, 215 U.S.P.Q. 229, 231 (U.S.I.T.C. 1981). For the reasons discussed below, this decision finds that the Commission has jurisdiction over this Investigation.

A. The Parties Have Stipulated that the Commission Has Subject Matter and *In Rem* Jurisdiction over the Accused Alison and Nano Aerogel Composite Blankets

The Commission has *in rem* jurisdiction over infringing articles that are imported into the United States, sold for importation, or sold within the United States after importation by the owner, importer, or consignee. 19 C.F.R. § 1337(a)(1)(B). A complainant need only establish the importation of a single accused product to satisfy the importation requirement of Section 337. *See, e.g.*, *Certain Trolley Wheel Assemblies*, Inv. No. 337-TA-161, Comm'n Op. at 7-8, USITC Pub. No. 1605 (Nov. 1984) (finding the importation requirement met by the importation of a single product); *Certain Absorbent Garments*, Inv. No. 337-TA-508, Order No. 16, 2004 WL 2251882, at *2 (U.S.I.T.C. Aug. 20, 2004).

Section 337 declares to be unlawful "[t]he importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles" that infringe a valid and enforceable United States patent if an industry relating to the articles protected by the patent exists or is in the process of being established in the United States. *See* 19 U.S.C. §§ 1337(a)(1)(B)(i) and (a)(2). Pursuant to Section 337, the Commission investigates alleged violations of the Section and hears and decides actions

involving those alleged violations.

Before the evidentiary hearing, Respondent Alison entered into a stipulation with Complainant that reflects an agreement between Respondent Alison and Complainant that at least one unit of each of the following products has been imported into the United States, sold for importation into the United States, or sold within the United States after importation, within the meaning of 19 U.S.C. § 1337(a)(1)(B) ("Respondents' Import Stipulation"): (1) DRT0610; (2) DRT0606; (3) DRT0603; and (4) GR1006 blankets. (Doc. ID No. 603526 (Respondents' Import Stipulation) at ¶¶ 1-3 (Feb. 14, 2017).).

Respondent Nano and Complainant also agreed that at least one unit of each of the following products has been imported into the United States, sold for importation into the United States, or sold within the United States after importation, within the meaning of 19 U.S.C. § 1337(a)(1)(B): (1) FMA650; (2) FMB350; (3) FMC100; (4) FMC200; and (5) FMD450 aerogel composite blankets. (*Id.* at ¶¶ 4-6.).

Accordingly, all of the parties agree that the Commission has subject matter and *in rem* jurisdiction.

B. Respondents Have Submitted to the Personal Jurisdiction of the Commission

The Respondents responded to the Complaint and Notice of Investigation and have fully participated in the Investigation by, among other things, participating in discovery, participating in the evidentiary hearing, and filing pre-hearing and post-hearing briefs. Respondents have not contested jurisdiction (*see* RAPBr. at 22; RNPBr. at 14). *Certain Liquid Crystal Display Modules, Prods., Containing Same, & Methods for Using the Same*, Inv. No. 337-TA-506, ID at 3 (June 12, 2009).). Accordingly, Respondents have submitted to the personal jurisdiction of the Commission and the Commission has *in rem* jurisdiction over Respondents. *Certain Cloisonné*

Jewelry, Inv. No. 337-TA-195, Initial Determination at 40-43 (U.S.I.T.C. March 1985) (un-reviewed).

C. Complainant Has Standing in the Commission

Jurisdiction also requires standing. *See SiRF Technology, Inc. v. Int'l Trade Comm'n*, 601 F.3d 1319, 1326 (Fed. Cir. 2016) (standing to bring an infringement suit is the same under Commission Rules as it would be in a Federal District Court case); *Certain Optical Disc Drives, Components Thereof and Prods. Containing Same*, Inv. No. 337-TA897, Opinion Remanding the Investigation at 4 (Jan. 7, 2015). Commission Rule 210.12 also requires that intellectual property-based complaints filed by a private complainant "include a showing that at least one complainant is the exclusive license of the subject intellectual property." 19 C.F.R. § 210.12(a)(7).

Complainant has standing to bring suit for infringement under Section 337 because it is the owner of the Asserted Patents. (Compl. at ¶¶ 26, 43, 54; JX-0011; JX-0013; JX-0015.). Moreover, because Respondents have not presented any arguments or evidence contesting Complainant's standing, Respondent Alison's Sixth Affirmative Defense (i.e., lack of standing) and Respondent Nano's Eighth Affirmative Defense (i.e., lack of standing) are deemed by this decision to be waived and abandoned pursuant to Ground Rules 7.2 and 10.1. (*See* G.R. 7.2, 10.1; *see also* Section XI, *infra.*).

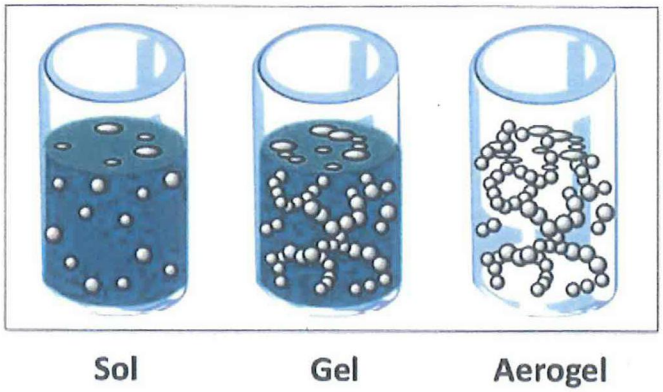
IV. THE ASSERTED PATENTS

A. Overview of the Technology

Aerogels, first created in or about 1930, are very light materials that have excellent insulating properties. (JX-0023 (Technology Stipulation) at 1.). To form an aerogel, a liquid solution comprising a gel precursor and a solvent (together, known as "sol") are combined to

initiate a chemical reaction. (*Id.*; CMBr. at 3; SMBr. at 6 n.1.). This mixture is allowed to set and turn into a gel ("gelation").

Figure 1: Sol-Gel Process



(CDX-1102 (Direct Examination of Dr. Gould (Feb. 17, 2017)).).

Such gels have a liquid phase interspersed within a three-dimensional solid phase. (JX-0023 at 1.). The liquid portion of the gel is then extracted from the pores of the solid gel structure without appreciably degrading the three-dimensional lattice structure. (*Id.* at 1-2.). This leaves behind an aerogel, i.e., a solid three-dimensional lattice structure with a high volume fraction of very small (nanometric size) pores, filled predominantly with air. (*Id.* at 2.).

A YouTube clip describes an aerogel as follows: "An everyday example of a gel is Jell-O. Jell-O is actually a solid network of particles that contains pores which are filled with liquid. The solid network of particles is what allows Jell-O to have a form, as opposed to a formless liquid. Aerogel is made by removing all liquid from a gel, leaving its solid molecular structure intact." (*Id.* (citing https://www.youtube.com/watch?v=mAJWyRIDDVQ at 4:14 and at 17:45–21:20).).

Although pure aerogel has very good insulating properties, it is also fragile and brittle. (*Id.*). Aerogel can be combined with fibrous materials to create a "composite," which is intended

to support the gel and result in better mechanical properties than pure aerogel. (*Id.*). An aerogel fiber composite includes a combination of aerogel and fibrous materials. (*Id.*). The patents at issue in this Investigation relate to aerogel or gel fiber composite materials, methods of manufacturing aerogel or gel materials, including aerogel or gel fiber composite materials, and additives to aerogel fiber composite materials. (*Id.*).

B. The Method Patents

1. U.S. Patent No. 6,989,123 ("'123 Patent")

a) Overview of the '123 Patent

The '123 patent, titled "Methods to Produce Gel Sheets," was filed on February 18, 2005, as U.S. Patent Application No. 11/061,037 ("the '037 application"). (JX-0006 at (54), (21), (22).). The '037 application issued as the '123 patent on January 24, 2006, and names Kang P. Lee, George L. Gould, William Gronemeyer, and Christopher John Stepanian as the inventors. (*Id.* at (10), (45), (75).). The '037 application is a division of U.S. Application No. 10/876,103, filed on June 23, 2004. (*Id.* at (62).).[13] The '123 patent claims priority to U.S. Provisional Application No. 60/482,359, filed on June 24, 2003. (*Id.* at (60).).

The '123 patent describes continuous and semi-continuous sol-gel casting methods for gel sheets, fiber-reinforced flexible gel sheets, and rolls of composite gel materials. (*Id.* at 2:29-33.). Specifically, "the methods describe the formation of monolithic gel sheets or fiber-reinforced gel composites having two parts, namely reinforcing fibers and a gel matrix wherein the reinforcing fibers are in the form of a lofty fibrous structure (i.e. batting) . . . ." (*Id.* at 2:53-57.).

[13] This application issued as the '439 patent, which was originally asserted in this Investigation but has subsequently been withdrawn. (*See* Order Nos. 17, 28).).

The methods disclosed in the '123 patent comprise three distinct phases.

> The first is blending all constituent components (solid precursor, dopants, additives) into a low-viscosity sol that can be dispensed in a continuous fashion. The second involves dispensing the blended sol onto a moving conveyor mold that may also have a synchronized counter-rotating top belt to form a molded upper surface. The second phase may also include introduction of heat or radiation to the ungelled sol within a defined area of the moving conveyor apparatus to either induce gelation or modify the properties of the gel such as gel modulus, tensile strength, or density. The third phase of the invention process involves gel cutting and conveyance of monolithic gel sheets to a post-processing area or co-rolling a flexible, fiber-reinforced gel composite with a flexible, porous flow layer to generate a particularly preferred form factor of the material.

(*Id.* at 6:41-57.).

An example of the gel casting method is shown in Figure 1, reproduced below.

Figure 2: Illustration Depicting a Conveyor Belt to Produce Fiber-Reinforced Gel Sheets

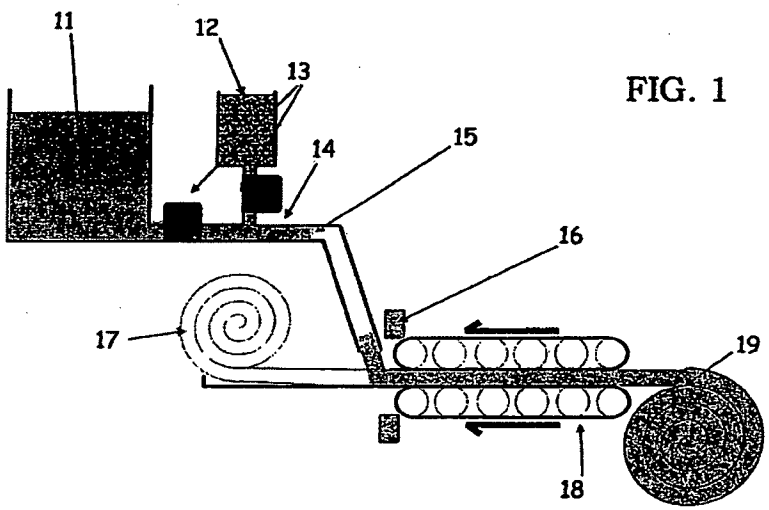


FIG. 1

(*Id.* at Fig. 1.).

Figure 1 illustrates a method that produces fiber-reinforced gel sheets in a continuous or semi-continuous fashion using a sol-dispensing and catalyst-mixing system and a counter-rotating conveyor belt mold apparatus. Gel composite sheets can be produced in rolled form if mechanically wound at the end of the belt. The internal figure numbers correspond as follows:

11 is a stable sol precursor solution, **12** is a catalyst to induce gelation of the sol when added in a proper quantity in controlled conditions, **13** indicates flow control positions, **14** is a static mixer, **15** is the position in the fluid mixing system wherein the sol has been mixed thoroughly with catalyst, **16** is a scraper/lubrication device (optional), **17** is a fibrous batting material[14] (may come in discrete sheets or rolls that are fed into the assembly), **18** indicates two counter rotating belt assemblies that form molding surfaces along the length of which gelation occurs prior to the rolling assembly indicated by **19**. (*Id.* at 9:36-53.).

The specification informs that "when a gel matrix is reinforced by a lofty batting material, particularly a continuous non-woven batting comprised of very low denier[15] fibers, the resulting composite material when dried into an aerogel . . . product by solvent extraction, maintains similar thermal properties to a monolithic aerogel[16] . . . in a much stronger, more durable form." (*Id.* at 2:64–3:3.).

b) Asserted Claims of '123 Patent

Remaining asserted claims 15-17 and 19 of the '123 patent are shown below.[17] They are method claims directed to, *inter alia*, process for preparing gel sheets that include "dispensing a catalyzed sol onto a moving element as a continuous sheet" and "rolling the dispensed sheet into

[14] Batting refers to "layers or sheets of a fibrous material, commonly used for lining quilts or for stuffing or packaging or as a blanket of thermal insulation." (JX-0006 at 9:14-17.). The '123 patent also discloses that "[s]uitable fibrous materials for forming both the lofty batting and the x-y oriented tensile strengthening layers include any fiber-forming material." (*Id.* at 9:24-26.).

[15] The '123 patent does not define the meaning of "denier." A common dictionary definition of "denier" is a unit of fineness for yam equal to the fineness of a yarn weighing one gram for each 9000 meters. *See, e.g.*, https://www.merriam-webster.com/dictionary/denier (last visited on Sept. 28, 2017).

[16] An "aerogel monolith" is a uniformly structured block of material. (JX-0001 (PH of '359 patent) at ASPEN0000142.).

[17] Bolded patent claim numbers indicate independent claims.

a plurality of layers." (JX-0006 at 14:48-58, 14:61-63.). These gel sheets "are used in manufacturing aerogel blankets, aerogel composites, aerogel monoliths and other aerogel based products." (*Id.* at 1:18-20.).

> **15.** A process for preparing gel sheets, comprising the steps of: dispensing a catalyzed sol onto a moving element as a continuous sheet; rolling the dispensed sheet into a plurality of layers.
>
> 16. The process of claim 15, further comprising the step of: providing a spacer layer between any two predetermined layers of the continuous sheet.
>
> 17. The process of claim 16, wherein the spacer layer is permeable.
>
> 19. The process of claim 17, wherein the permeable spacer layer is effective to provide radial flow patterns in connection with a drying process.

(*Id.* at 14:48-58, 14:61-63.).

2. U.S. Patent No. 7,780,890 ("'890 Patent")

a) Overview of the '890 Patent

The '890 patent, titled "Advanced Gel Sheet Production," was filed on June 13, 2007, as U.S. Patent Application No. 11/762,654 (" the '654 application"). (JX-0009 at (54), (21), (22).). The '654 application issued as the '890 patent on August 24, 2010, and names Kang P. Lee, George L. Gould, William Gronemeyer, and Christopher John Stepanian as the inventors. (*Id.* at (10), (45), (75).). The '654 application is a division of U.S. Application No. 10/876,103, filed on June 23, 2004. (*Id.* at (63).).[18] The '890 patent claims priority to U.S. Provisional Application No. 60/482,359, filed on June 24, 2003. (*Id.* at (60).). The '890 and '123 patents share the same specification. (*See* JX-0006; JX-0009; *see also* SBr. at 8.).

[18] This application issued as the '439 patent, which was originally asserted in this Investigation but was subsequently withdrawn. (*See* Order Nos. 17, 28).).

b) Asserted Claims of the '890 Patent

Remaining asserted claims 11-13, 15, 17-19, and 21 of the '890 patent are shown below.[19] They are method claims directed, *inter alia*, to a process for preparing gel sheets that include "dispensing a sol onto a moving element as a continuous sheet," "rolling the dispensed sheet into a plurality of layers," and "drying the layers." (JX-0009 at 13:64–14:13, 14:27-34.). These gel sheets "are used in manufacturing aerogel blankets, aerogel composites, aerogel monoliths and other aerogel based products." (*Id.* at 1:19-21.).

> **11.** A method for preparing gel sheets, comprising the steps of: dispensing a sol onto a moving element as a continuous sheet; rolling the dispensed sheet into a plurality of layers; and drying the layers.
>
> 12. The method of claim 11 wherein drying is accomplished using supercritical fluids.
>
> 13. The method of claim 11 wherein drying is accomplished using supercritical fluids.
>
> 15. The method of claim 11, wherein the sol comprises a material selected from the group consisting of zirconia, yttria, hafnia, alumina, titania, ceria, and silica, magnesium oxide, calcium oxide, magnesium fluoride, calcium fluoride, and combinations thereof.
>
> 17. The method of claim 11 wherein dispensed sol is gelled before rolling.
>
> 19. The method of claim 11 further comprising the step of introducing a spacer layer between any two gel sheet layers.
>
> 21. The method of claim 17 wherein the gelling of the sol is enhanced by a process selected from the group consisting of (a) a chemical process, and (b) dissipating a predetermined quantity of energy from an energy source into a cross-sectional area of the sol.

(*Id.* at 13:64–14:13, 14:27-34.).

[19] Bolded patent claim numbers indicate independent claims.

C. The Product Patent

1. U.S. Patent No. 7,078,359 ("'359 Patent")

a) Overview of the '359 Patent

The '359 patent, entitled "Aerogel Composite with Fibrous Batting," was filed on December 21, 2001 and issued on July 18, 2006. (*See* JX-0007.). The '359 patent claims priority to U.S. Provision Application No. 60/257,437, filed on December 22, 2000. (CBr. at 11; SBr. at 9; *see also* JX-0007.). Christopher J. Stepanian, George L. Gould and Redouane Begag are the named inventors listed on the '359 Patent. (JX-0007 at (10), (45), (75).). The '359 patent is directed to fiber-reinforced aerogel composite insulation with an arrangement of reinforced fibers, i.e., a lofty batting, with a continuous aerogel throughout that exhibits reduced sintering and aerogel particle shedding. (*See* CBr. at 11; JX-0007 at claim 1.).

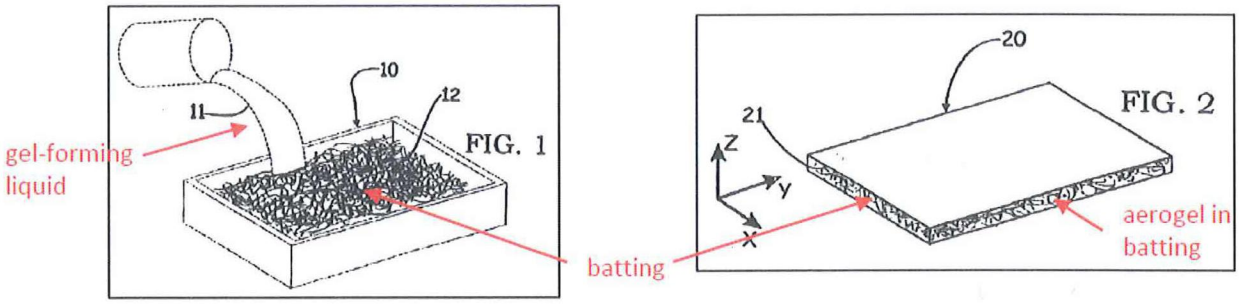
An important aspect of the '359 patent is that it moved away from aerogel powders to use a continuous aerogel, with an attached batting, that was designed to improve mechanical performance without losing thermal performance. (*See* CBr. at 11 n.70 (citing Tr. (Gnade) at 740:13-15).).

A key feature of the '359 patent is directed to a lofty fibrous batting reinforcement in combination with one or both of individual, short, randomly oriented microfibers and conductive layers. This results in aerogel composites with improved performance in one or all of the following characteristics: flexibility, drape, durability, resistance to sintering, x-y electrical conductivity, radio frequency interference ("RFI"), electromagnetic interference ("EMI") attenuation, and/or burn-through resistance. (JX-0007 at Abstract, 1:10-22, 3:8-15, 3:19-30; *see also id.* at claims 1, 5.). Because of their durability, flexibility and excellent insulating properties, the aerogel composites (or as they are processed into "blankets" as made in this

Investigation), make them useful for a variety of products in a variety of industries. Complainant describes the product as being used by private and government customers worldwide, in building materials (wall insulation), in under seas pipelines, and in gloves used in Mars space exploration. (CPBr. at 2-3.).

Complainant generally describes the process of producing the claimed composite aerogel insulation as first introducing into a batting sheet a gel precursor liquid so that it occupies the spaces between the fibers of the batting, which is shown on in Figure 1 of the '359 patent, on the left, below. (JX-0007 at 4:65–5:1, Fig. 1.). The material is subsequently gelled and dried to form a composite aerogel insulation. In the resulting composite aerogel insulation, shown in Figure 2 of the '359 patent, right below, the aerogel is continuous through the batting sheet.

Figure 3: Illustration Depicting a Fabrication Process of an Aerogel Composite/ Resulting Aerogel Composite



(JX-0007 at FIGS. 1 and 2.).

The aerogel products with the characteristics of the '359 patent also exhibit higher temperature performance through enhanced burn-through resistance. (JX-0007 at 1:10-22, 3:8-15, 3:19-30.).

Specifically, the '359 patent is directed to a composite material with two parts: (i) reinforcing fibers in the form of a lofty fibrous structure or batting (*id.* at 4:54-56*; see also* Figs. 1 and 2, above; and (ii) an aerogel matrix (*see id.* at 3:24-30.). According to the '359 patent, the

lofty batting "minimizes the volume of unsupported aerogel while generally improving the thermal performance of the aerogel." (*Id.* at 3:30-33.). Where the lofty batting is recited to be a preferred embodiment of a continuous non-woven batting with "very low denier fibers," the aerogel composite "at least maintains the thermal properties of a monolithic aerogel in highly flexible, drapeable form." (*Id.* at 3:34-37.). Because of their thermal and other characteristics, aerogel products are flexible, able to conform to different structures, thereby making the composite suitable, for example, for use in clothing applications, to insulate undersea pipelines, and even for use on the Mars Rover. (*Id.* at 3:33-40; Tr. (Gould) at 124:1-12, 126:6–127:10, 127:23–128:6; CDX-1107 (excepting CX-1493 (May 10, 2005 Press Release for Ticonderoga Offshore Oil Development Project)).

b) Asserted Claims of the '359 Patent

Remaining asserted claims 1, 5, 7, 12, and 15-16 of the '359 patent are shown below.[20] They are product claims directed, *inter alia*, to composite articles having "a lofty fibrous batting" and "a continuous aerogel" through the batting. (JX-0007 at 14:36-39.).

> **1.** A composite article to serve as a flexible, durable, light-weight insulation product, said article comprising a lofty fibrous batting sheet and a continuous aerogel through said batting.
>
> 5. The composite article of claim 1, wherein the lofty fibrous batting consists essentially of fibers having a thermal conductivity less than 50 mW/m-K.
>
> 7. The composite article of claim 1, further comprising a dopant.
>
> 9. The composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite.
>
> **12.** A composite article comprising a fibrous batting sheet and a continuous aerogel through said batting, where the batting is sufficiently lofty

[20] Bolded patent claim numbers indicate independent claims.

that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section.

15. The composite article of claim 12, wherein the batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness.

16. The composite article of claim 12, wherein the fibrous batting is sufficiently lofty that it retains at least 50% of its thickness after addition of the gel forming liquid to form said aerogel.

(JX-0007 at 14:36-39, 55-57, 53-64; *id.* at 15:3-5, 14-19, 28-35.).

V. THE PRODUCTS AT ISSUE.

A. Accused Aerogel Composite Blankets/Processes

1. Respondent Alison's Accused Aerogel Composite Blankets/Accused Manufacturing Process

Complainant accused the following aerogel composite blankets and the manufacturing process by which Respondent Alison makes certain aerogel composite blankets of infringing the '123, '890, and '359 patents. (*See, e.g.*, CBr. at 15; SBr. at 11.).

Table 2: Accused Alison Aerogel Composite Blankets and Accused Manufacturing Process

Accused Alison Aerogel Composite Blankets/Accused Manufacturing Process	'123 Patent	'890 Patent	'359 Patent
All variants: DRT603 DRT606 DRT610 GR1006			1, 5
Only variants with TiO_2: DRT603 DRT606 DRT610 GR1006			7, 9

Accused Alison Aerogel Composite Blankets/Accused Manufacturing Process	'123 Patent	'890 Patent	'359 Patent
Variants made using Respondent Alison's low temperature process: DRT603 DRT606 DRT610* GR1006 *Excluding DRT610-Z.	15-17, 19	11-13, 15, 17-19, 21	

The Accused Alison Aerogel Composite Blankets use fibrous batting sheets. (JX-0031C (Dep. of Kevin Chen)[21] at 13:21–14:1 ("Q: [ ] that you testified about, is that a fibrous material? A: Yes, it is a fibrous material. Q: Is this fibrous material the material that is used in your aerogel blankets? A: Yes.").). Respondent Alison manufactures all of its aerogel composite blankets, except its DRT0610-Z product, [ ] at Respondent Alison's factory in China. (JX-0037C and JX-0038C (Dep. of Mr. Ronghui Wei)[22]

[21] When he gave his testimony on February 22, 2017, Mr. Kevin Chen was the International Department Manager of Guangdong Alison Hi-Tech Co., Ltd. (RAPSt. at 2.). Mr. Chen was identified by Respondent Alison as a fact witness to provide testimony concerning Respondent Alison's business activities, its importation and sale of its aerogel products in the United States, the market for aerogel products, and Respondent Alison's knowledge of Complainant's patents, and to respond to any contentions by Complainant regarding the aerogel market and Complainant's commercial success. (*Id.*).

[22] When Mr. Rong Hui Wei was deposed on September 7, 2016, he testified both in his personal capacity and as a Rule 30(b)(6) deponent on a variety of topics for Respondent Alison, including its manufacturing process at its factory in Yingde City, Guandong Province, China; on the different Accused Blankets; and on the composition of Respondent Alison's Accused Aerogel Composite Blankets. (*See* JX-0037C, 0038C, 0039C (Wei Dep.); JX-0037C, Vol. 1 (Sept. 7, 2016) at 9:18-20; 10:14-16; 12:1-6.). Mr. Wei was present in Alison's factory in.Yingde City, China, when Complainant's representatives visited Respondent Alison's factory on September 2, 2016 to examine Respondent Alison's manufacturing process. (*Id.* at 11:3-23.).

at 12:20-24, 13:5-15, 13:21–15:10, 17:3–19:17, 180:6-9, 180:21–181:3; Tr. (Dr. David Schiraldi)[23] at 449:12–450:3.).

2. Respondent Nano's Accused Aerogel Composite Blankets/Accused Manufacturing Process

Complainant accused the following aerogel composite blankets and the manufacturing process by which Respondent Nano makes certain aerogel composite blankets of infringing the '123, '890, and '359 patents. (*See, e.g.*, CBr. at 13-14; SBr. at 11.).

Table 3: Accused Nano Aerogel Composite Blankets and Accused Manufacturing Process

Accused Nano Aerogel Composite Blankets/Accused Manufacturing Process	'123 Patent	'890 Patent	'359 Patent
Made in Workshop 1 or 2: FMA450 FMA650 FMB350 FMB350-6 FMC100 FMC200 FMD400	15-17, 19	11, 13, 15, 17-19, 21	1, 5, 7, 9
Made in Workshop 2: FMA450 FMA650 FMB350 FMB350-6 FMC100 FMC200 FMD400		12	
Made in Workshop 1 or 2:			12, 15-16

[23] At the time he gave his testimony on February 21 and 24, 2017, Dr. David A. Schiraldi was Professor of Organic Chemistry at Case Western Reserve University. (CPSt. at 2, Ex. B.). Dr. Schiralidi was retained by Complainant as an expert to provide testimony on the infringement and the technical prong of the domestic industry with regard to the '123 and '890 patents. (*Id.* at 2.).

Accused Nano Aerogel Composite Blankets/Accused Manufacturing Process	'123 Patent	'890 Patent	'359 Patent
FMB350-6 FMC200			

The Accused Nano Aerogel Composite Blankets contain fibrous batting sheets. (JX-0040C (Dep. of Mr. Xiandong Yao)[24] at 55:20–57:18 (all of the Accused Nano Aerogel Composite Blankets "include a fibrous material component"); JX-0046C ("Jan. 9, 2017 Stipulation") (stating that "the Nano aerogel insulation blankets accused of infringing U.S. Patent No. 7,078,359 ('the '359 Patent') all contain fibrous battings"). The letters "FM" in Respondent Nano's product names stand for "fibrous materials, or blanket type of materials." (JX-0040C (Yao Dep.) at 48:5-17.). The two types of fibrous batting are a "glass fiber needled" blanket and a "blended" blanket. (*Id.* at 72:19–77:12.). Respondent Nano manufactures its aerogel composite blankets on lines referred to as "Workshop 1" and "Workshop 2." (CX-0006C (Respondent Nano's Supp. Resp. to Interrog. No. 52) at 6-9; Tr. (Schiraldi) at 419:1-8.).

B. DI Aerogel Composite Blankets/Process

Complainant contended that it meets the technical prong of the domestic industry requirement for the asserted '123, '890, and '359 patents because its Cryogel, Cryogel Z, Spaceloft, Spaceloft Subsea, and Pyrogel products ("DI Aerogel Composite Blankets"), and the

[24] When he gave his deposition testimony on September 15 and September 16, 2016, Mr. Xiandong Yao was employed by Respondent Nano as a Senior Engineer with a position as Executive Vice-President, a position he had held for three (3) years at the time he testified. (Tr. (Yao) at 18:15-18; 19: 6-19.). He holds a Bachelor of Science degree in chemistry from the University of Hangzhou, Zhejiang, China. (Id. at 20:18-21: 2.). In his position as Executive Vice-President with Respondent Nano, Mr. Yao oversees general management, quality assurance, the environmental safety and procurement departments (*id.* at 33:3-8.). He testified, among other topics, about the structure of Respondent Nano as a company from its predecessor companies through its creation (Tr. (Yao) at 25:1-32:25), its operations, manufacturing processes and capacity and its products. (*See id., e.g.*, at 28-77.). Mr. Yao is responsible for overseeing this Investigation on Respondent Nano's behalf. (*Id.*at 33:18-34:4.).

methods Complainant uses to make them ("DI Manufacturing Process"), practice the following claims of the Asserted Patents. (*See, e.g.*, CBr. at 12-13.).

Table 4: DI Aerogel Composite Blankets and Process

'123 Patent	**'890 Patent**	**'359 Patent**	
Claims 15-17, 19	Claims 11-13, 15, 17-19, 21-23	Claims 1, 5, 7, 9	Claims 12, 15-16
Methods used to make: Cryogel Pyrogel Spaceloft Spaceloft Subsea	Methods used to make: Cryogel Pyrogel Spaceloft Spaceloft Subsea	Cryogel (x201 and Z) Pyrogel (XT, XT-E, XT-F) Spaceloft Spaceloft Subsea	Cryogel Z (5 and 10 mm) Spaceloft Subsea (10 mm)

Complainant manufactures a variety of different products that have a lofty fibrous batting sheet with continuous aerogel through that batting. (CBr. at 13.). The DI Aerogel Composite Blankets include a lofty PET or polyester fibers and/or fibrous glass batting. (*Id.*). All of Complainant's DI Aerogel Composite Blankets are manufactured at Complainant's East Providence, Rhode Island, factory ("Rhode Island Factory") on one of three production lines there: Phase 1, Phase 2, and Phase 3 ("DI Manufacturing Process"). (CBr. at 37-38; Tr. (Gould) at 142:13-24.).

Dr. Gould and Dr. Schiraldi testified that each of the manufacturing lines is capable of manufacturing any of the DI Aerogel Composite Blankets, and each line is materially the same for purposes of this Investigation and the '123 and '890 manufacturing processes. (Tr. (Gould) at 91:23–92:9; Tr. (Schiraldi) at 471:6-12, 491:7-15; CX-2258C (Schiraldi Rep.) at ¶¶ 429-30.). Dr. Schiraldi explained that Complainant's manufacturing process begins with the creation of both sols and gel-inducing agents [

] to form a catalyzed sol. (Tr. (Schiraldi) at 472:5–473:18; CDX-

1381C ("Complainant's Manufacturing Process Diagram"), CX-0988C at 4).). [

] (Tr. (Schiraldi) at 472:5–473:18.).

Figure 4: Depiction of Complainant's Aerogel Composite Manufacturing Process [

]

CDX-1381C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (Complainant's Manufacturing Process Diagram); CX-0988C at 4).).

Dr. Schiraldi explained that [

]

Figure 5: Photograph of Complainant's Manufacturing Process Showing Dispensing Sol at Complainant's Rhode Island Factory

[

]

(CDX-1382C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (annotated CX-0938C at 3);[25] Tr. (Schiraldi) at 474:23–475:16).

Dr. Schiraldi testified that [

] (Tr. (Schiraldi) at 473:19–474:22.). The following is Complainant's diagram of its manufacturing process, which is reproduced below in annotated form:

[25] Dr. Gould also presented a video of an operating manufacturing line at Complainant's Rhode Island Factory. (*See* CDX-1121; Tr. (Gould) at 136:21–142:24.).

Figure 6: Depiction of Complainant's Manufacturing Process

(CBr. at 39; CDX-1383C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (annotated CX-0988C at 4).).

VI. THE ASSERTED PATENTS

A. Level of Ordinary Skill in the Art

1. Relevant Law

The relevant time for assessing the level of ordinary skill in the art is the effective filing date of the patent. *Phillips v, AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) ("We have made clear, moreover, that the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.")

Factors to consider in determining the level of ordinary skill in the art include: (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) the prior art solutions to those problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) the educational level of active workers in the field. *See Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696 (Fed. Cir. 1983). "These factors

are not exhaustive but are merely a guide to determining the level of ordinary skill in the art." *Daiichi Sankyo Co., Ltd. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007).

2. Definition of Person of Ordinary Skill in the Art

a) The Method Patents ('123 and '890 Patents)

For the '123 and '890 patents, Complainant proposed that a person of ordinary skill in the art would have had a Bachelor's degree in Chemistry, Chemical Engineering, Industrial Engineering, or Mechanical Engineering, or an equivalent level of knowledge and skill attained through work experience, as well as three (3) or more years of experience working with aerogel technologies. (CMBr. at 11, 16 (citing CXM-0001 (Schiraldi Decl.) at ¶¶ 10-11).).

Respondent Alison proposed that a person of ordinary skill in the art would have had a substantial working knowledge of gels and aerogels, composite materials and their methods of production. (RMBr. at 10.). Respondent Alison also proposed that this person would have gained this knowledge through undergraduate studies in chemical, mechanical, aerospace or other related engineering or materials science. (*Id.*). In addition, Respondent Alison submitted that this person would have had five (5) or more years of experience (or equivalent) working in testing environments, which would have included using a variety of gels and composites. (*Id.*). Alternatively, Respondent Alison proposed that this person would have gained this knowledge by attaining a Master's degree or higher in chemical, mechanical, aerospace or other related engineering, or materials science, with advanced studies providing some or all of the knowledge that would otherwise be obtained from the work experience described above. (*Id.*).

Respondent Nano proposed that a person of ordinary skill in the art would have been a person with good working knowledge of methods of aerogel production. (*Id.*). Respondent Nano represented that this person would have gained this knowledge through undergraduate

studies in chemical engineering or a similar discipline. (*Id.*). In addition, Respondent Nano submitted that this person would have one (1) to two (2) years of industrial experience in this or a related field.

Staff contended that because the claimed inventions in the '123 and '890 patents are suitable for industrial manufacturing, Complainant's proposed level of ordinary skill in the art, which includes a Bachelor's degree in, *inter alia*, Industrial Engineering, is more appropriate. (SMBr. at 9.).

It was determined that a person of ordinary skill in the art, for the relevant timeframe of the '123 and '890 patents, would have had at least a Bachelor's degree in Chemistry, Chemical Engineering, Industrial Engineering, or Mechanical Engineering, or an equivalent level of knowledge and skill attained through work experience, as well as three (3) or more years of experience working with aerogel technologies. (*Markman* Order at 14-15.).

b) The Product Patent ('359 Patent)

Complainant proposed that a person of ordinary skill in the art would have had a Bachelor's degree in Chemistry, Chemical Engineering, or Mechanical Engineering, or an equivalent level of knowledge and skill attained through work experience, as well as three (3) or more years of experience working with aerogel technologies. (CMBr. at 26 (citing CXM-0002 (Decl. of Dr. Nicholas Leventis)[26] at ¶ 13).).

Like the '123 and '890 patents, Respondent Alison proposed that a person of ordinary skill in the art would have had five (5) or more years of experience (or equivalent) working in

[26] At the time he gave his testimony on February 21, 23, and 24, 2017, Dr. Nicholas Leventis was a Professor of Chemistry at the Missouri University of Science and Technology. (CPSt. at 2, Ex. A.). Dr. Leventis was retained by Complainant as an expert to testify on infringement by Respondents of Complainant's Asserted Patents and the technical prong of domestic industry with respect to the '359 patent. (*Id.* at 2.).

testing environments, which would have included using a variety of gels and composites, or in the alternative, this person would have gained this knowledge by attaining a Master's degree or higher in chemical, mechanical, aerospace or other related engineering, or materials science, with advanced studies providing some or all of the knowledge that would otherwise be obtained from the work experience described above. (RMBr. at 10.).

Respondent Nano proposed that a person of ordinary skill in the art would have one (1) to two (2) years of industrial experience in this or a related field and would have gained this knowledge through undergraduate studies in chemical engineering or materials science, or a similar discipline. (RMBr. at 10-11.).

Staff argued that because the patent involves manipulating an aerogel's properties at the molecular level, requiring a level of technical sophistication such as by enhancing its x-y plane thermal or electrical conductivity or reducing its combustibility, Complainant's proposed level of ordinary skill in the art is more applicable. (SMBr. at 9.).

It was determined that a person of ordinary skill in the art, for the relevant timeframe of the '359 patent, would have had at least a Bachelor's degree in Chemistry, Chemical Engineering, or Mechanical Engineering, or an equivalent level of knowledge and skill attained through work experience, as well as three (3) or more years of experience working with aerogel technologies. (*Markman* Order at 14-15.).

B. Claim Construction

1. Relevant Law

Claim construction begins with the plain language of the claims themselves. Claims should be given their ordinary and customary meaning as understood by a person of ordinary skill in the art, viewing the claim terms in the context of the entire patent. *Phillips v. AWH*

Corp., 415 F.3d 1303, 1312-13 (Fed. Cir. 2005), *cert. denied*, 546 U.S. 1170 (2006). In some cases, the plain and ordinary meaning of the claim language is readily apparent and claim construction will involve little more that "the application of the widely accepted meaning of commonly understood words." *Id.* at 1314. In other cases, claim terms have a specialized meaning and it is necessary to determine what a person of ordinary skill in the art would have understood the disputed claim language to mean by analyzing "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, as well as the meaning of technical terms, and the state of the art." *Id.* (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

The claims themselves provide substantial guidance with respect to the meaning of disputed claim language. *Id.* "[T]he context in which a term is used in the asserted claim can be highly instructive." *Id.* Likewise, other claims of the patent at issue, "both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term." *Id.* (citation omitted).

With respect to claim preambles, a preamble may limit a claimed invention if it (i) recites essential structure or steps, or (ii) is "necessary to give life, meaning, and vitality" to the claim. *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003) (citations omitted). The Federal Circuit has explained that a "claim preamble has the import that the claim as a whole suggests for it. In other words, when the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects." *Id.* (quoting *Bell Commc'ns Research, Inc. v. Vitalink Commc'ns Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995)). When used in a patent preamble,

the term "comprising" is well understood to mean "including but not limited to," and thus, the claim is open-ended. *CIAS, Inc. v. Alliance Gaming Corp.*, 504 F.3d 1356, 1360 (Fed. Cir. 2007). The patent term "comprising" permits the inclusion of other unrecited steps, elements, or materials in addition to those elements or components specified in the claims. *Id.*

In cases in which the meaning of a disputed claim term in the context of the patent's claims remains uncertain, the specification is the "single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1321. Moreover, "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Id.* at 1316. As a general rule, however, the particular examples or embodiments discussed in the specification are not to be read into the claims as limitations. *Id.* at 1323.

The prosecution history may also explain the meaning of claim language, although "it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* at 1317. The prosecution history consists of the complete record of the patent examination proceedings before the U.S. Patent and Trademark Office ("USPTO" or "PTO"), including cited prior art. *Id.* It may reveal "how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.*

If the intrinsic evidence is insufficient to establish the clear meaning of a claim, a court may resort to an examination of the extrinsic evidence.[27] *Zodiac Pool Care, Inc. v. Hoffinger*

[27] "In those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996).

Indus., Inc., 206 F.3d 1408, 1414 (Fed. Cir. 2000). Extrinsic evidence may shed light on the relevant art, and "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317. In evaluating expert testimony, a court should disregard any expert testimony that is conclusory or "clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent." *Id.* at 1318. Furthermore, expert testimony is only of assistance if, with respect to the disputed claim language, it identifies what the accepted meaning in the field would be to one skilled in the art. *Symantec Corp. v. Comput. Assocs. Int'l, Inc.*, 522 F.3d 1279, 1289 n.3., 1290-91 (Fed. Cir. 2008). Testimony that recites how each expert would construe the term should be accorded little or no weight. *Id.* Extrinsic evidence is inherently "less reliable" than intrinsic evidence, and "is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Phillips*, 415 F.3d at 1318-19.

2. The Method Patents ('123 and '890 Patents)

a) Agreed Constructions

Complainant, Respondents, and Staff agreed to the following construction of "fibrous batting." The *Markman* Order adopted the parties' and Staff's agreed upon construction for this claim term. (*Markman* Order at 15.).

Table 5: Agreed Upon Claim Term

Claim Term	Construction
"fibrous batting" (claim 13 of the '890 patent)	Plain meaning, for example, "fibrous material," or material consisting of or characterized by fibers. (Doc. ID 591044 ("Joint List") at 3, 6; *Markman* Order at 15.).

b) Construed Terms

In their Joint List of claim terms, the parties identified an additional 18 disputed claim terms. (Joint List at 1-9.). As a result of Complainant's First and Second Partial Terminations (*see* Order Nos. 17, 28), only nine (9) terms remained in dispute. (Order No. 35 at 15.).

Pursuant to the *Markman* Order, the disputed claim terms in the Method Patents have been construed as set forth below.

Table 6: Construed Claim Terms

Claim Term	Construction
"a moving element" (claim 15 of the '123 patent; claim 11 of the '890 patent)	Plain meaning to one of ordinary skill in the art in light of the use of the "comprising" transition, for example, "at least one moving element." (*Markman* Order, App. A at 1.).
"lofty . . . batting" (claims 1, 5, and 6 of the '359 patent)	A fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery). (*Id.* at 4.).

3. The Product Patent ('359 Patent)

a) Construed Terms

Pursuant to the *Markman* Order, the disputed claim terms in the Product Patent have been construed as set forth below.

Table 7: Construed Claim Terms

Claim Term	Construction
"flexible" (claim 1 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Markman* Order, App. A at 6.).
"durable"	Plain meaning to one of ordinary skill in the

Claim Term	Construction
(claim 1 of the '359 patent)	art. (*Id.* at 8.).
"light-weight" (claim 1 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Id.* at 9.).
"continuous gel" (claims 1 and 12 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Id.* at 10.).
"sufficiently lofty" (claims 12 and 16 of the '359 patent)	Plain meaning to one of ordinary skill in the art. No construction required, "sufficiently lofty" defined by subsequent claim language. (*Id.* at 11-12.).
"about 0.1 to 16 lbs/ft^3 (0.001-0.4 g/cc)" (claim 17 of the '359 patent")	Approximately 0.1 to 16 lbs/ft^3 (0.001 to 0.26 g/cc). (*Id.* at 12.).

VII. INFRINGEMENT

A. Relevant Law

"Determination of infringement is a two-step process which consists of determining the scope of the asserted claim (claim construction) and then comparing the accused product . . . to the claim as construed." *Certain Sucralose, Sweeteners Containing Sucralose, and Related Intermediate Compounds Thereof*, Inv. No. 337-TA-604, Comm'n Op. at 36 (U.S.I.T.C., April 28, 2009) (citing *Litton Sys., Inc. v. Honeywell, Inc.*, 140 F.3d 1449, 1454 (Fed. Cir. 1998) ("*Litton*")).

An accused device literally infringes a patent claim if it contains each limitation recited in the claim exactly. *Litton*, 140 F.3d at 1454. Each patent claim element or limitation is considered material and essential. *London v. Carson Pirie Scott & Co.*, 946 F.2d 1534, 1538 (Fed. Cir. 1991). In a Section 337 investigation, the complainant bears the burden of proving infringement of the asserted patent claims by a preponderance of the evidence. *Enercon GmbH*

v. Int'l Trade Comm'n, 151 F.3d 1376, 1384 (Fed. Cir. 1998). If any claim limitation is absent, there is no literal infringement of that claim as a matter of law. *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

B. Respondent Alison's and Respondent Nano's Accused Manufacturing Processes Directly Infringe the Asserted Claims of the '123 Patent

Complainant has accused Respondent Alison's "low-temperature" manufacturing process used to manufacture all variants of DRT0610 (except DRT0610-Z), DRT0606, DRT0603, and GR1006 ("Accused Alison Manufacturing Process") of directly infringing claims 15-17 and 19 of the '123 patent. (CPBr. at 10.). Complainant also has accused Respondent Nano's process for manufacturing FMA450, FMB650, FMC100, FMC200, and FMD450 of directly infringing these claims ("Accused Nano Manufacturing Process," and with Accused Alison Manufacturing Process, "Accused Manufacturing Processes"). (*Id.* at 9.).

Respondent Alison's only meaningful rebuttal was with regard to whether the Accused Alison Manufacturing Process involves "dispensing a catalyzed sol onto a moving element as a continuous sheet." Respondent Alison argued that the Accused Alison Manufacturing Process: (1) does not "***dispense***" a catalyzed sol onto a moving element; and (2) the catalyzed sol is not dispersed onto a moving element "as a ***continuous*** sheet." Respondent Alison's arguments are unavailing.

Respondent Nano did not provide any testimony or evidence regarding non-infringement of the '123 patent by the Accused Nano Manufacturing Process.

As discussed below, the record evidence supports the finding by a preponderance of the evidence that the Accused Manufacturing Processes include every claim limitation recited in claims 15-17 and 19 of the '123 patent.

1. Construction of Relevant Claim Term

Table 8: Construction of Claim Term Recited in the '123 Patent

Claim Term	Construction
"a moving element" (claim 15 of the '123 patent)	Plain meaning to one of ordinary skill in the art in light of the use of the "comprising" transition, for example, "at least one moving element." (*Markman* Order, App. A at 1.).

2. Independent Claim 15

a) "A process for preparing gel sheets, comprising the steps of"

i. Respondent Alison's Accused Manufacturing Process Meets the Preamble

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the preamble of claim 15 of the '123 patent. (CBr. at 22.). The evidence adduced in this Investigation demonstrates that the Accused Alison Manufacturing Process is a process for preparing aerogel composite blankets, which involves the preparation of gel sheets. (Tr. (Schiraldi) at 456:8–457:11.).

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the preamble of claim 15 of the '123 patent is met by the Accused Alison Manufacturing Process.

ii. Respondent Nano's Accused Manufacturing Process Meets the Preamble

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the preamble of claim 15 of the '123 patent. (CBr. at 34.). As Complainant and Staff pointed out, Respondent Nano presented no testimony regarding non-infringement of the '123 patent. (CBr. at 28; SBr. at 24; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano).). Nor did Respondent Nano raise any non-infringement arguments in its Post-Hearing Brief. (RNBr. at 21 ("Subject to Nano's preservation of its right to contest the ALJ's construction of certain terms at

dispute in the *Markman* Order, Nano does not challenge Aspen's assertion of infringement of claim 15.").).

Moreover, the evidence adduced in this Investigation demonstrates that the Accused Nano Manufacturing Process is a process for preparing aerogel composite blankets, which involves the preparation of gel sheets. (Tr. (Schiraldi) at 431:9–432:9; CDX-1318C (citing CX-0006C (Respondent Nano's Supp. Resp. to Interrog. No. 52) at 10 [

]; *see also* CX-0006C at 8 [

]

[

]

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the preamble of claim 15 of the '123 patent is met by the Accused Nano Manufacturing Process.

b) "dispensing a catalyzed sol onto a moving element as a continuous sheet"

i. Respondent Alison's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged that the Accused Alison Manufacturing Process involves dispensing a catalyzed sol onto a moving element as a continuous sheet. (CBr. at 22.). Respondent Alison's non-infringement position is based on two main arguments: (1) the Accused Alison Manufacturing Process does not "dispense" sol onto a moving element "as a continuous sheet" on the first conveyor belt; and (2) moving a sol-soaked blanket onto the second conveyor belt is

not "dispensing" sol. (RABr. at 39, 44.).

[

]

(RDX-0016C.).

Respondent Alison's first argument is premised on its assertion that "when [sol is] deposited onto the fiber blanket on the first moving element prior to entering the pool of sol, there is a lack of continuity to the dispensed sol in the sense that there are air pockets in the sol-blanket." (*Id.* at 39.). According to Respondent Alison's expert, Dr. Scherer, a "continuous" sheet must be a "thermally continuous sheet," that is, free of holes or air pockets. (Tr. (Scherer) at 857:25–858:4.). [

]

(*Id.* at 857:12-17.).

This argument is flawed for several reasons. First, it has no basis in the claims or the specification of the '123 patent. The term "thermally continuous" does not appear in the '123 patent. Nor is there any disclosure regarding the notion that the fiber blanket must be completely saturated or soaked with sol, and without any holes, to be "continuous." In arriving at this opinion, Dr. Scherer provided no intrinsic evidence that supports this opinion.

Second, based on Dr. Scherer's testimony that [

] (*Id.* at 857:14-17, 858:2-4.). The "continuous sheet" of claim 15 refers to the dispensed sol.

As Staff noted, Complainant presented sufficient evidence that the Accused Alison Manufacturing Process [

]

(Tr. (Schiraldi) at 457:12–462:24.).

[

]

The dispensing of sol was confirmed by Respondent Alison's Equipment Department Manager, Mr. Wei, who testified that [

]

[

]

(Tr. (Wei) at 611:10–612:4.).

Additionally, Dr. Scherer agreed that the video of Respondent Alison's [

] (*Id.* (Scherer) at 945:16-23 (emphasis added).).

Respondent Alison's second argument—that moving a sol-soaked blanket onto a conveyor belt is not "dispensing"—is both flawed and nonsensical. Respondent Alison contended that Complainant's expert, Dr. Schiraldi, interpreted "dispensing" too broadly.[28] (RABr. at 44-45.). That is not the case. Respondent Alison's expert, Dr. Scherer, improperly narrowed the meaning of the term "dispensing" to specific examples disclosed in the '123 and '890 patents.

> Q: . . . [D]o you have a more accurate way to describe dispensing, as that term is used in the claims of the method patents?
>
> A: Right. Well, I understand dispensing in the plain and ordinary sense and ***literally in the wording of the patents as discharging of a liquid through a dispensing head. Dispensing of liquid through a nozzle or an orifice of some kind.***
>
> Q: And you mentioned some examples of this in the method patents.
>
> A: Yes.

[28] The parties did not ask that the term "dispensing" be construed. (*See, e.g.*, Doc. ID No. 591044 (Joint List of Claim Terms and Constructions).). Common synonyms of "dispense" include "distribute" and "disburse." *See, e.g.*, Merriam-Webster, Inc., https://www.merriam-webster.com/thesaurus/dispense (last visited Sept. 26, 2017); *see also* Webster's Collegiate Thesaurus 243 (Mairé Weir Kay et al. eds., 1st ed. 1976.).

Q: Do you have any in mind?

A: Well, sure.

* * *

Q: Can you talk us through what you are showing on this slide.

A: Right. The first citation there is from the '123 patent, from column 11, lines 24 to 27, where it explains that the catalyzed sol, after it exits the static mixer, is deposited through a dispensing head. And that would be the orifice to the left of the object numbered 26. So the orifice is the end of that tube. The dispensing head is the end of that tube, which dispenses onto the blanket. And the second citation is from column 12, lines 47 to 51, which says that the silica sol is pumped at a fixed rate through a dispensing head onto a flat moving conveyor surface. So the dispensing is separated from the moving of the conveyor. ***The dispensing head dispenses. The conveyor does not dispense.***

(Tr. (Scherer) at 860:3–861:9 (emphases added) (referring to JX-0006 ('123 patent) at 11:24-27 (Example 1), 12:47-51 (Example 4).).

Reading embodiments from the specification into the claims is an error of law. *See, e.g.*, *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments."); *Nazomi Commc'ns, Inc. v. ARM Holdings, PLC*, 403 F.3d 1364, 1369 (Fed. Cir. 2005) (claims may embrace "different subject matter than is illustrated in the specific embodiments in the specification").

On cross-examination, Dr. Scherer conceded that claim 15 of the '123 does not include any limitation requiring a specific type of "dispensing" mechanism.

Q: So you would agree that the claim does not include any limitation as to who the dispensing must occur, through what mechanism that must occur; correct?

A: In the context of the process – well, it's not described in the claim, no.

Q: In either claim, claim 11 of the '890 patent or claim 15 of the '123; correct?

A: Correct.

(Tr. (Scherer) at 968:20–969:22.).

Respondent Alison's second argument is moot in light of the finding that the catalyzed sol dispensed from the sol pouring sinks onto the first conveyor belt meets the "dispensing a catalyzed sol onto a moving element as a continuous sheet" limitation recited in claim 15.

For the forgoing reasons, Complainant has met its burden and proven by a preponderance of the evidence that this limitation of claim 15 of the '123 patent is met by the Accused Alison Manufacturing Process.

ii. Respondent Nano's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets this claim limitation. (CBr. at 34.). As Complainant and Staff pointed out, Respondent Nano presented no testimony regarding non-infringement of the '123 patent. (CBr. at 28; SBr. at 24; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano).). Nor did Respondent Nano raise any non-infringement arguments in its Post-Hearing Brief. (RNBr. at 21 ("Subject to Nano's preservation of its right to contest the ALJ's construction of certain terms at dispute in the *Markman* Order, Nano does not challenge Aspen's assertion of infringement of claim 15.").).

Moreover, based on Dr. Schiraldi's testimony and evidence presented in this Investigation, the Accused Nano Manufacturing Process involves dispensing a catalyzed sol onto a moving element as a continuous sheet. (Tr. (Schiraldi) at 432:10–433:4; CX-0006C (Nano's Supp. Resp. to Interrog. No. 52) at 8-9 (discussing preparation and dispensation of catalyzed sol at both workshops).).

[

]

Respondent Nano does not dispute that [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that this limitation of claim 15 of the '123 patent is met by the Accused Nano Manufacturing Process.

c) "rolling the dispensed sheet into a plurality of layers"

i. Respondent Alison's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets this claim limitation. (CBr. at 26.). The evidence adduced in this Investigation demonstrates that the Accused Alison Manufacturing Process involves rolling the dispensed sheet into a plurality of layers. (Tr. (Schiraldi) at 462:25–463:11.).

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets this limitation of claim 15 of the '123 patent.

ii. Respondent Nano's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets this claim limitation. (CBr. at 34.). As Complainant and Staff pointed out, Respondent Nano did not present any testimony or any proof to rebut Complainant's infringement allegation of the '123 patent. (CBr. at 28; SBr. at 24; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 21.).

Dr. Schiraldi's testimony and the evidenced adduced in this Investigation confirm that the Accused Nano Manufacturing Process involves rolling the dispensed sheet into a plurality of layers. (Tr. (Schiraldi) at 433:5–434:14; *see also* CX-0006C at 8-9 [

]

[

]

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that this limitation of claim 15 of the '123 patent is met by the Accused Nano Manufacturing Process.

3. Dependent Claim 16

a) "The process of claim 15, further comprising the step of: providing a spacer layer between any two predetermined layers of the continuous sheet."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the limitation recited in claim 16. (CBr. at 27.). [

]

[

]

(CX-0101C.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 16 of the '123 patent.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 16. (CBr. at 35.). Respondent Nano did not present any testimony or arguments on non-infringement of the '123 patent. (CBr. at 28; SBr. at 24; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 21.). There was no rebuttal to

Complainant's evidence.

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the additional limitation recited in claim 16 of the '123 patent is met by the Accused Nano Manufacturing Process.

4. Dependent Claim 17

a) "The process of claim 16, wherein the spacer layer is permeable."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the limitation recited in claim 17. (CBr. at 27.). [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 17 of the '123 patent.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 17 of the '123 patent. (CBr. at 36.). Respondent Nano did not present any testimony or arguments regarding non-infringement of the '123 patent. (CBr. at 28; SBr. at 24; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 21.).

Moreover, the evidence adduced in this Investigation supports an unrebutted finding that the Accused Nano Manufacturing Process carried out in both workshops involves a permeable spacer layer. [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the additional limitation recited in claim 17 of the '123 patent is met by the Accused Nano Manufacturing Process.

5. Dependent Claim 19

a) "The process of claim 17, wherein the permeable spacer layer is effective to provide radial flow patterns in connection with a drying process."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the limitation recited in claim 19. (CBr. at 27.). [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 19 of the '123 patent.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 19 of the '123 patent. (CBr. at 36.). Respondent Nano did not present any testimony or any arguments regarding non-infringement of the '123 patent. (CBr. at 28; SBr. at 24; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 21.).

As explained in Section VII.B4(a)(ii) above, the spacer layers used in the Accused Nano

[29] Supercritical drying is a process by which the liquid in a substance is transformed into gas in the absence of surface tension and capillary stress. (*See, e.g.*, http://www.aerogel.org/?p=345 (last visited on Sept. 28, 2017).). It is the process most commonly used to transform gels into aerogels. (*Id.*; *see also* (JX-0006 at 1:26-28, JX-0009 at 1:27-29 ("Supercritical . . . fluid extraction technologies are commonly used to extract the fluid from the fragile cells of the [aerogel] material.").). Supercritical drying is performed to replace the liquid in a material with a gas without destroying the materials' delicate nanostructured pore network. (*See, e.g.*, http://www.aerogel.org/?p=345 (last visited on Sept. 28, 2017).).

Manufacturing Process in its factory in Workshops 1 and 2 are permeable. [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the additional limitation recited in claim 19 of the '123 patent is met by the Accused Nano Manufacturing Process.

6. Conclusion

For the reasons discussed in Sections VII.B.2-5 above, the Accused Manufacturing Processes infringe claims 15-17 and 19 of the '123 patent. The Accused Manufacturing Processes involve dispensing a catalyzed sol onto a moving element as a continuous sheet and rolling the dispensed sheet into a plurality of layers, as recited in claim 15. The Accused Manufacturing Processes also include the claimed spacer layer, as recited in claims 16, 17, and 19.

C. Respondent Alison's and Respondent Nano's Accused Manufacturing Processes Directly Infringe the Asserted Claims of the '890 Patent

Complainant has accused Respondent Alison's "low-temperature" manufacturing process

used to manufacture all variants of DRT0610 (except DRT0610-Z), DRT0606, DRT0603, and GR1006 ("Accused Alison Manufacturing Process") of directly infringing claims 11-13, 15, 17-19, and 21 of the '890 patent. (CPBr. at 10.). Complainant has also accused Respondent Nano's process for manufacturing FMA450, FMB650, FMC100, FMC200, and FMD450 of directly infringing these claims ("Accused Nano Manufacturing Process," and with Accused Alison Manufacturing Process, "Accused Manufacturing Processes"). (*Id.* at 9.).

Respondent Alison's only meaningful rebuttal was with regard to whether the Accused Alison Manufacturing Process involves "dispensing a catalyzed sol onto a moving element as a continuous sheet." Respondent Alison argued that the Accused Alison Manufacturing Process: (1) does not "***dispense***" a catalyzed sol onto a moving element; and (2) the catalyzed sol is not dispersed onto a moving element "as a ***continuous*** sheet." Respondent Alison's arguments are unavailing.

Respondent Nano did not provide any testimony or evidence regarding non-infringement of the '890 patent by the Accused Nano Manufacturing Process.

As discussed below, the record evidence shows by a preponderance of the evidence that the Accused Manufacturing Processes include every claim limitation recited in claims 11-13, 15, 17-19, and 21 of the '890 patent.

1. Construction of Relevant Claim Terms

Table 9: Construction of Claim Terms Recited in the '890 Patent

Claim Term	Construction
"a moving element" (claim 11 of the '890 patent)	Plain meaning to one of ordinary skill in the art in light of the use of the "comprising" transition, for example, "at least one moving element." (*Markman* Order, App. A at 1.).

Claim Term	Construction
"fibrous batting" (claim 13 of the '890 patent)	Plain meaning, for example, "fibrous material," or material consisting of or characterized by fibers. (Joint List at 3, 6.).

2. Independent Claim 11

a) "A method for preparing gel sheets, comprising the steps of"

i. Respondent Alison's Accused Manufacturing Process Meets the Preamble

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the preamble of claim of the '890 patent. (CBr. at 84.). As discussed in Section VII.B.2(a)(i) above, the evidence adduced in this Investigation demonstrates that the Accused Alison Manufacturing Process is a process for preparing aerogel composite blankets, which involves the preparation of gel sheets. (Tr. (Schiraldi) at 465:6-15 (concluding that the preamble of claim 11 of the '890 patent is satisfied for the same reasons that the preamble of claim 15 of the '123 patent is satisfied).).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the preamble of claim 11 of the '890 patent is met by the Accused Alison Manufacturing Process.

ii. Respondent Nano's Accused Manufacturing Process Meets the Preamble

Complainant alleged, and Respondent Nano did not dispute, that for the reasons set forth with regard to claim 15 of the '123 patent (*see* Section VII.B.2(a)(ii)), the Accused Nano Manufacturing Process meets the preamble of claim 11 of the '890 patent. (CBr. at 88.). As Complainant and Staff pointed out, Respondent Nano did not present any testimony or

arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

For the reasons discussed in Section VII.B.2(a)(ii) above, the evidence adduced in this Investigation demonstrates that the Accused Nano Manufacturing Process, carried out and its Workshops 1 and 2, is a method for preparing gel sheets. (Tr. (Schiraldi) at 438:19–439:2 (concluding that the preamble of claim 11 of the '890 patent is satisfied for the same reasons that the preamble of claim 15 of the '123 patent is satisfied).).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process satisfies the preamble of claim 11 of the '890 patent.

b) "dispensing a sol onto a moving element as a continuous sheet"

i. Respondent Alison's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged that, for the reasons set forth with regard to claim 15 of the '123 patent (*see* Section VII.B.2(b)(i)), the Accused Alison Manufacturing Process involves dispensing a catalyzed sol onto a moving element as a continuous sheet. (CBr. at 84.). As explained in Section VII.B.2(b)(i) above, the Accused Alison Manufacturing Process involves dispensing a sol onto a moving element as a continuous sheet. (Tr. (Schiraldi) at 465:16-21 (concluding that for the same reasons discussed in connection with the first limitation of claim 15 of the '123 patent, the Accused Alison Manufacturing Process meets this limitation).).

Accordingly, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Allison Process meets this claim limitation.

ii. Respondent Nano's Accused Manufacturing Process Meets this Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets this claim limitation. (CBr. at 88.). Respondent Nano did not present any testimony or any arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

For the reasons discussed in Section VII.B.2(b)(ii) above, the evidence adduced in this Investigation demonstrates by a preponderance of evidence that the Accused Nano Manufacturing Process, carried out at its Workshops 1 and 2, includes dispensing a sol onto a moving element as a continuous sheet. (Tr. (Schiraldi) at 439:3-18 (concluding that for the same reasons discussed in connection with the first limitation of claim 15 of the '123 patent, the Accused Nano Manufacturing Process meets this limitation).).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets this claim limitation.

c) "rolling the dispensed sheet into a plurality of layers"

i. Respondent Alison's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that for the reasons set forth with regard to claim 15 of the '123 patent (*see* Section VII.B.2(c)(i)), the Accused Alison Manufacturing Process meets this claim limitation. (CBr. at 84-85.). As explained in Section VII.B.2(c)(i) above, the Accused Alison Manufacturing Process involves rolling the dispensed sheet into a plurality of layers. (Tr. (Schiraldi) at 465:22–466:3 (concluding that for the same

reasons discussed in connection with the second limitation of claim 15 of the '123 patent, the Accused Alison Manufacturing Process meets this limitation).).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Allison Process meets this claim limitation.

ii. Respondent Nano's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets this claim limitation. (CBr. at 88.). Respondent Nano did not present any testimony or arguments on non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

For the reasons discussed in Section VII.B.2(c)(ii) above, the evidence adduced in this Investigation demonstrates that the Accused Nano Manufacturing Process, carried out at its Workshops 1 and 2, involves rolling the dispensed sheet in a plurality of layers. (Tr. (Schiraldi) at 439:19–440:4 (concluding that for the same reasons discussed in connection with the second limitation of claim 15 of the '123 patent, the Accused Nano Manufacturing Process meets this limitation).).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets this claim limitation.

d) "drying the layers"

i. Respondent Alison's Accused Manufacturing Process Meets This Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison

Manufacturing Process meets this claim limitation. (CBr. at 85.). The evidence adduced in this Investigation demonstrates that the Accused Alison Manufacturing Process involves drying the layers via supercritical drying. [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets this claim limitation.

ii. Respondent Nano's Accused Manufacturing Process Meets This Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets this claim limitation. (CBr. at 88.). Respondent Nano did not present any testimony or any arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

The evidence adduced in this Investigation demonstrates that the Accused Nano Manufacturing Process includes drying the layers at its factory in Workshop 1 and Workshop 2. (Tr. (Schiraldi) at 440:5–441:23; CX-0006C (Nano's Supp. Resp. to Interrog. No. 52) at 9-10 (explaining drying at Workshops 1 and 2); CX-2128C (specifying drying procedures at

Workshop 1) (Chinese language original: CX-2127C); CDX-1332C-1333C (citing the aforementioned interrogatory responses and Nano documents). Respondent Nano performs non-supercritical drying at Workshop 1 (Tr. (Schiraldi) at 440:5-441:2; CX-0006C at 9; CX-2128C; CDX-1332C) and Workshop 2 (Tr. (Schiraldi) at 441:3-23; CX-0006C at 10; CDX-1333C.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets this claim limitation.

3. Dependent Claim 12

a) "The method of claim 11 wherein drying is accomplished using supercritical fluids."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 12 of the '890 patent. (CBr. at 85.). The evidence upon which Complainant relies demonstrates that the Accused Alison Manufacturing Process includes supercritical drying, which makes use of supercritical fluids. [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 12.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process carried out in Workshop 2 meets the additional limitation recited in claim 12 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or any arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

The evidence adduced in this Investigation confirms that at Respondent Nano's Workshop 2, drying is accomplished by supercritical drying, which makes use of supercritical fluids. [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process carried out in Workshop 2 meets the additional limitation recited in claim 12.

4. Dependent Claim 13

a) "The method of claim 11 further comprising the step of providing a fibrous batting material in the gel sheet."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 13 of the '890 patent.

(CBr. at 85.). [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 13.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 13 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets the

additional limitation recited in claim 13.

5. Dependent Claim 15

a) "The method of claim 11, wherein the sol comprises a material selected from the group consisting of zirconia, yttria, hafnia, alumina, titania, ceria, and silica, magnesium oxide, calcium oxide, magnesium fluoride, calcium fluoride, and combinations thereof."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 15 of the '890 patent. (CBr. at 86.). [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 15.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation set forth in claim 15 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or arguments regarding non-

infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 49.).

[

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 15.

6. Dependent Claim 17

a) "The method of claim 11 wherein dispensed sol is gelled before rolling."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 17 of the '890 patent. (CBr. at 86.). [

]

Accordingly, and because there is no dispute, the Accused Alison Manufacturing Process meets the additional limitation recited in claim 17.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 17 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 50.).

The evidence adduced in this Investigation demonstrates that at both Workshops 1and 2, the dispensed sol is gelled before rolling. (JX-0041C (Yao Dep.) at 236:8-10; JX-0042C (Yao Dep.) at 309:20-23; Tr. (Schiraldi) at 445:13–446:5; CDX-1342C.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 17.

7. Dependent Claim 18

a) "The method of claim 11 further comprising the step of introducing a spacer layer between any two gel sheet layers."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison

Manufacturing Process meets the additional limitation recited in claim 12 of the '890 patent. (CBr. at 87.). As explained in Section VII.B.3(a)(i) above, the Accused Alison Manufacturing Process includes the step of introducing a spacer layer between two gel sheet layers. (Tr. (Schiraldi) at 469:6-18 (concluding that for the same reasons discussed in connection with the claim 16 of the '123 patent, the Accused Alison Manufacturing Process meets claim 18 of the '890 patent); CX-2258C (Schiraldi Rep.) at ¶¶ 246-48.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 18.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 18 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 50.).

As discussed in Section VII.B.3(a)(ii) above, at both workshops, Respondent Nano introduces a spacer layer between all its (multiple) gel sheet layers. (Tr. (Schiraldi) at 446:6-16 (concluding that claim 19 of the '890 patent is satisfied for the same reasons that claim 16 of the '123 patent is satisfied); CX-2258C (Schiraldi Rep.) at ¶¶ 150-54.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 18.

8. Dependent Claim 19

a) "The method of claim 18 wherein the spacer layer is permeable."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 12 of the '890 patent. (CBr. at 87.). As explained in Section VII.B.4(a)(i) above, the spacer layer associated with Accused Alison Manufacturing Process is permeable. (Tr. (Schiraldi) at 469:6-21 (concluding that for the same reasons discussed in connection with the claim 17 of the '123 patent, the Accused Alison Manufacturing Process meets claim 19 of the '890 patent); CX-2258C (Schiraldi Rep.) at ¶¶ 249-53.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 19.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 19 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 50.).

As discussed in Section VII.B.4(a)(ii) above, at both workshops, [

] (Tr. (Schiraldi) at 446:17-23 (concluding that claim 19 of the

'890 patent is satisfied for the same reasons that claim 17 of the '123 patent is satisfied); CX-2258C (Schiraldi Rep.) at ¶¶ 150-54.).

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 19.

9. Dependent Claim 21

a) "The method of claim 17 wherein the gelling of the sol is enhanced by a process selected from the group consisting of (a) a chemical process, and (b) dissipating a predetermined quantity of energy from an energy source into a cross-sectional area of the sol."

i. Respondent Alison's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Alison did not dispute, that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 12 of the '890 patent. (CBr. at 87.). [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Alison Manufacturing Process meets the additional limitation recited in claim 21.

ii. Respondent Nano's Accused Manufacturing Process Meets the Additional Claim Limitation

Complainant alleged, and Respondent Nano did not dispute, that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 21 of the '890 patent. (CBr. at 88.). Respondent Nano did not present any testimony or arguments regarding non-infringement of the '890 patent. (CBr. at 88; SBr. at 46; Tr. at 517:17 (no cross-examination by Respondent Nano); *id.* at 527:10 (no re-cross examination by Respondent Nano); RNBr. at 50.).

The evidence on which Complainant relies shows that at both workshops, the Accused Nano Manufacturing Process infringes claim 21. [

]

Accordingly, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that the Accused Nano Manufacturing Process meets the additional limitation recited in claim 21.

10. Conclusion

For the reasons discussed in Sections VII.C.2-9 above, the Accused Alison Manufacturing Process infringes claims 11-13, 15, 17-19, and 21 of the '890 patent; the Accused Nano Manufacturing Process carried out in both Workshops 1 and 2 infringes claims 11, 13, 15, 17-19, and 21. The Accused Nano Manufacturing Process carried out in Workshop 2 infringes claim 12. The Accused Manufacturing Process that infringes these claims involve dispensing a sol onto a moving element as a continuous sheet, rolling the dispensed sheet into a plurality of

layers, and drying the layers, as recited in claim 11. The Accused Manufacturing Process also includes the claimed drying, fibrous batting material, and sol recited in claims 12, 13, and 15, respectively. In addition, the Accused Manufacturing Processes dispense a sol that is gelled before rolling, have the claimed spacer layer, and have the claimed enhancing process, as recited in claims 17-19 and 21.

D. Respondent Alison's and Respondent Nano's Accused Aerogel Composite Blankets Directly Infringe the Asserted Claims of the '359 Patent

1. Construction of Relevant Claim Terms

Table 10: Construction of Claim Terms Recited in the '359 Patent

Claim Term	Construction
"lofty . . . batting" (claims 1, 5, and 6 of the '359 patent)	A fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery).[30] (*Markman* Order, Appx . A at 4-6.).
"flexible" (claim 1 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Id.* at 6.).
"durable" (claim 1 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Id.* at 8.).
"light-weight" (claim 1 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Id.* at 9.).
"continuous gel" (claims 1 and 12 of the '359 patent)	Plain meaning to one of ordinary skill in the art. (*Id.* at 10.).
"sufficiently lofty" (claims 12 and 16 of the '359 patent	Plain meaning to one of ordinary skill in the art. No construction required, "sufficiently lofty" defined by subsequent claim language. (*Id.* at 11-12.).

[30] "Bulk" is air. (*See Markman* Order, App. A at 13 (citing JX-0007 at 7:49).).

Claim Term	Construction
"about 0.1 to 16 lbs/ft3 (0.001-0.4 g/cc)" (claim 17 of the '359 patent")	Approximately 0.1 to 16 lbs/ft3 (0.001 to 0.26 g/cc). (*Id.* at 12.).

2. Overview of Infringement of the '359 Patent

a) Respondent Alison's Accused Aerogel Composite Blankets Directly Infringe the '359 Patent

Complainant has accused all variants of Respondent Alison's Accused Aerogel Composite Blankets DRT603, DRT606, DRT610 and GR1006, of infringing claims 1 and 5 of the '359 patent, and variants of the Accused Alison Aerogel Composite Blankets with TiO_2 (titanium dioxide) of also infringing claim 7 and 9 of the '359 patent.[31] (Compl. ¶¶ 72-74; CPBr. at 10, 101-06; SBr. at 11-12.). Complainant did not assert claims 12, 15 and 16 of the '359 patent against Respondent Alison. (CPBr. at vii, 101-06; CBr. at 103-07; SBr. at 11, 65-69.).

With the exception of claims 5 and 9, Respondent Alison argued in its Pre-Hearing and Post-Hearing Briefs that it has not infringed "any valid claim" of the '359 patent, thereby relying primarily upon its invalidity arguments that the '359 patent is obvious under pre-America Invents Act, 35 U.S.C. § 103 and anticipated under 35 U.S.C. § 102. (RAPBr. at 107; RABr. at 93-94; *see also* SRBr. at 11.).

However, Respondent Alison did not provide expert report(s) or other evidence to dispute Complainant's infringement evidence for claims 1, 5, 7, and 9 of the '359 patent. (*See* RABr. at

[31] [

]

93-94.). Dr. Scherer confirmed during the hearing that he was not offering *any* opinions with respect to the '359 patent. (*See* CBr. at 103 n.533 (citing Tr. (Scherer) at 971:7-9).). Dr. Gnade also confirmed during the hearing that he also was not offering *any* opinions on infringement of the '359 patent on behalf of either Respondents Alison or Nano. (*Id.* n.534 (citing Tr. (Gnade) at 730:4-6); *see also* Expert Report of Dr. Bruce Gnade Regarding Invalidity of United States Patent No. 7,078,359 (Doc. ID No. 603810 (Feb. 15, 2017).).[32]

Accordingly, only two (2) claims, claims 5 and 9, were subject to any rebuttal argument by Respondent Alison. As is discussed in Section VII.D.5(b)(i) below, Respondent Alison argued that Complainant did not meet its burden of proving that Respondent Alison's Accused Aerogel Composite Blankets infringe claim 9 because Respondent Alison claimed that Complainant did not present the calculated value of dopant by percent weight of the total weight of Alison's Accused Aerogel Composite Blankets as taught in claim 9. (RABr. at 93-94.). That argument is unavailing and disproven. [

]

Respondent Alison provided only a contingent, non-infringement position for claim 5, which is discussed in Section VII.D.4(a)(i). (RPABr. at 108.). As is explained below in Section VII.D.4(a)(i), that argument is unavailing.

Complainant has proven by a preponderance of evidence that: [

[32] It should be noted that consistent with the *Markman* Order, the parties redacted their Pre-Hearing Briefs to eliminate issues rendered moot by *Markman* Order claim construction. All references to Pre-Hearing Briefs are to the parties' redacted briefs. Respondent Alison redacted its non-infringement arguments with respect to claims 1 and 7 from its Pre-Hearing Brief. (RAPBr. at 107).

]

b) Respondent Nano's Accused Aerogel Composite Blankets Directly Infringe the '359 Patent

Complainant has accused all of Respondent Nano's aerogel composite blankets ("Accused Nano Aerogel Composite Blankets"), FMA450, FMA650, FMB350, FMB350-6, FMC100, FMC200, and FMD450, of infringing claims 1, 5, 7 and 9 of the '359 patent; and Accused Nano Aerogel Composite Blankets FMB350-6 and FMC200 of infringing claims 12, 15 and 16 of the '359 patent. (Compl. ¶¶ 72-74; CPBr. at 107-17; RNPBr. at 97.).

Like Respondent Alison, Respondent Nano has reserved its rights with respect to the construction of the claim terms "flexible," "durable" and "light-weight" [

] (RNBr. at 65-66; *see* discussion in Section VII.D.3(a)(ii), *infra.*). None of the Respondent Nano's employee witnesses asked for definitions for the terms flexible, durable or light-weight. (*See* Section VII.D.3(a)(ii), *infra.*). Moreover, Respondent Nano's own marketing materials, including certain materials on their websites, extol the flexibility, durability and light-weight characteristics of their products, clearly assuming in context the plain and ordinary meanings that most people understand. (*See* citations to evidence in Section VII.D.3(a)(ii), *infra.*).

Respondent Nano has joined Respondent Alison in its legal arguments with respect to claims 5 and 9, discussed in Sections VII.D.4-5 below. However, also like Respondent Alison, Respondent Nano did not provide rebuttal evidence that undermined Complainant's proof that

Respondent Nano's Aerogel Composite Blankets infringe claims 1, 5, and 9 of the '359 patent. (RNBr. at 65-66.). Similarly, Respondent Nano did not challenge Complainant's arguments, including with rebuttal evidence, Complainant's proof that Respondent Nano's Aerogel Composite Blankets, FMB350-6 and FMC200, infringe claims 12, 15 and 16 of the '359 patent. (RNBr. at 66-67.).

Complainant has proven by a preponderance of evidence that: (1) the Accused Nano Aerogel Composite Blankets infringe claims 1, 7, 9, 12 and 15-16 of the '359 patent; and (2) the Accused Nano Aerogel Composite Blankets, FMB350-6 and FMC200, infringe claims 12, 15 and 16 of the '359 patent.

3. Independent Claim 1

a) "A composite article to serve as a flexible, durable, light-weight insulation product, said article comprising"

i. Respondent Alison's Accused Aerogel Composite Blankets Meet the Preamble

Complainant has proven by a preponderance of evidence that the Accused Alison Aerogel Composite Blankets infringe claim 1 of the '359 patent. (CBr. at 103-05; Staff Br. at 66-67; Tr. at (Leventis) at 326:22–332:4; CX-1249C (Leventis Rep.) at ¶¶ 8.3.1.1-43.0.). Through the testimony of its expert Dr. Leventis, Complainant has also proven by a preponderance of evidence, that Respondent Alison's Accused Aerogel Composite Blankets are insulation composites products comprised of aerogel and fibrous batting. (CBr. at 103 n.536 (citing Tr. (Leventis) at 326:25–327:6, 330:21–331:25 (other citations omitted)).).

In its Pre-Hearing Brief, Alison argued that that the terms "flexible," "durable" and "light-weight" should be construed because the preamble of claim 1 is limiting. (RAPBr. at 102; *see also Markman* Order, App. A at 4.). Approximately two (2) weeks after Respondent Alison

filed its Pre-Hearing Brief, the *Markman* Order issued and construed each of the identified terms as limiting, for the reasons provided in the *Markman* Order, but also construed each of the terms as having a plain and ordinary meaning consistent with common dictionary terms. (*Markman* Order, App. A at 7-9.). Even if the terms "flexible," "durable" and "light-weight" in the preamble of the '359 patent are not limiting, the result one way or another makes no difference to the outcome. All of Respondent Alison's Accused Aerogel Composite Blankets contain the characteristics in the preamble of claim 1.

Figure 18: Photograph Showing Respondent Alison's Aerogel Composite Blanket Is Flexible, Durable, and Light-Weight

(CDX-1241C (Direct Examination of Dr. Leventis (Feb. 21, 2017)) (citing CX-0201C at 5).).

The unequivocal, unrebutted hearing testimony of Complainant's expert, Dr. Leventis, and based upon Dr. Leventis' photographs of certain Respondent Alison's Accused Aerogel Composite Blankets, from Respondent Alison's own marketing materials, and from deposition testimony, is that Respondent Alison's Accused Aerogel Composite Blankets are "flexible." (*See* Tr. (Leventis) at 327: 7-16; CX-2241C; CDX-1241 (marketing image of a rolled Alison

blanket.). Moreover, one of Respondent Alison's employees, Kevin Chen, verified that the Accused Alison Aerogel Composite Blankets are flexible and durable. (*See* JX-0031C (Chen. Dep.) at 93:11-16, 112:5-8; *see also* CX-0043C.).

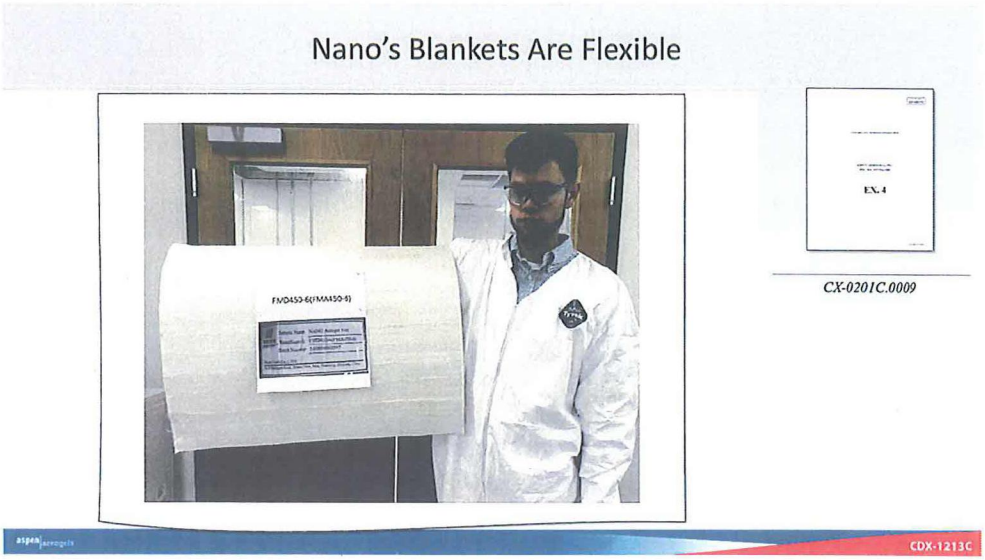
Dr. Leventis testified and confirmed through Respondent Alison's own marketing materials that its aerogel composite blankets are "durable." (Tr. (Leventis) at 327: 25–328:15.). Dr. Leventis quoted from Respondent Alison's marketing materials that touted the "15-20 year" lifespan of the Accused Alison Aerogel Composite Blankets. (*See* CX-0043C at 22; *see also* CX-0043C for more general description of qualities.).

Dr. Leventis confirmed by holding the Accused Alison Aerogel Composite Blankets, and by quoting Respondent Alison's own marketing materials that claim, *inter alia*, that "aerogel insulation blanket is the lightest" to conclude that Respondent Alison's Accused Aerogel Composite Blankets are "light-weight." (*See* Tr. (Leventis) at 328:16–329:3 (citing CDX-1244C).).

ii. Respondent Nano's Accused Aerogel Composite Blankets Meet the Preamble

Through Dr. Leventis' expert testimony, as well as through the testimonial admissions of two (2) of Respondent Nano's own employees, it is unequivocally evident that all of Respondent Nano's Accused Aerogel Composite Blankets are flexible, durable and light-weight. (*See* Tr. (Leventis) at 304:7–307:19; CX-0201C (Ex. 4 to Leventis Rep. at 9-12); JX-0041C (Yao Dep.) at 155:21–156:1; CX-0125 at 2-6; JX-0040C (Yao Dep.) at 118:1-14; *see also* SBr.at 71.).

Figure 19: Photograph Showing Respondent Nano's Aerogel Composite Blanket Is Flexible and Light-Weight



(CDX-1213C (Direct Examination of Dr. Leventis (Feb. 21, 2017)).).

Accordingly, Complainant has proven by a preponderance of evidence that the Accused Nano Aerogel Composite Blankets meet the preamble of claim 1 of the '359 patent.

b) "a lofty fibrous batting sheet and a continuous aerogel through said batting"

i. Respondent Alison's Accused Aerogel Composite Blankets Meet These Claim Limitations

Respondent Alison's Accused Aerogel Composite Blankets are fibrous batting sheets that have "bulk and resilience" "with or without full recovery," according to the claim term and its *Markman* Order construction. (*Markman* Order, App. A at 4-6.). According to unrebutted testimony, both Dr. Leventis and Dr. Gnade agreed that regardless of how much actual resilience is required in the aerogel composite blankets, pictures of and tested characteristics of the

Accused Alison Aerogel Composite Blankets reflect that they have compression resistance and resilience. (*See* SBr. at 67 (citing Tr. (Leventis) at 239:4–331:25; CX-0043C; CX-2240C (App. C to Leventis Rep.) at ¶¶ 1-27; CX-2248C; *see also* CBr. at 101-02 (citing Tr. (Gnade) at 743:8-16)).). Specifically, Dr. Leventis relied in part on microscope photographs that he took of Respondent Alison's Accused Aerogel Composite Blankets. (*See* (Tr. (Leventis) at 329:4-25.).

Through his testing of Respondent Alison's Accused Aerogel Composite Blankets, his review of certain power-point presentations that are part of Respondent Alison's marketing materials, and through his testimony, Dr. Leventis demonstrated and proved that the Accused Alison Aerogel Composite Blankets are made of "lofty fibrous batting" sheets that have a continuous aerogel throughout the batting as required by claim 1. (Tr. (Leventis) at 239:4-331:25; CX-0043C; CX-2240C; CX-2248C; CX-2241C; SBr. at 67 (citations omitted).).

Accordingly, the Accused Alison Aerogel Composite Blankets meet this limitation of claim 1 of the '359 patent.

ii. Respondent Nano's Accused Aerogel Composite Blankets Meet These Claim Limitations

Through Dr. Leventis' expert testimony, and through tests that he performed and pictures he took, Complainant established that the Accused Nano Aerogel Composite Blankets are made of "lofty fibrous batting sheets" that have a continuous aerogel throughout the batting as recited by claim 1 of the '359 patent. (*See* Tr. (Leventis) at 307:22–313:8; JX-0040C (Yao Dep.) at 80:12-15; (JX-0041C (Yao Dep.) at 155:21–156:1; CX-2238C (App. A. to Leventis Rep.) at 2-21.). Among other testing, Dr. Leventis took photographs showing the continuity of aerogel in Respondent Nano's Accused Aerogel Composite Blankets (CX-2239C (App. B to Leventis Rep.) at 2-15) and photographs of the lofty batting Respondent Nano uses (CX-2238C (App. A to

Leventis Rep.) at 2-21). [

]

Dr. Leventis also produced results of resilience testing he performed on batting used in Respondent Nano's Accused Aerogel Composite Blankets to demonstrate that their batting has "bulk with some resilience (with or without full recovery)." (*See* CBr. at 109 n.568 (quoting Tr. (Leventis) at 307:20–311:6; *id.* (quoting JX-0040C; CX-2252C).).

As noted in Section VII.D.2(b), since Respondent Nano provided no evidence to rebut Complainant's assertion that Respondent Nano's infringe claim 1 of the '359 patent, Complainant has proven by a preponderance of evidence that Respondent Nano's accused products meet this limitation of claim 1 of the '359 patent. (*See* Tr. (Gnade) at 729:23–730:6.).

4. Dependent Claim 5

a) "The composite article of claim 1, wherein the lofty fibrous batting consists essentially of fibers having a thermal conductivity less than 50 mW/m-K."

i. Respondent Alison's Accused Aerogel Composite Blankets Meet the Additional Claim Limitation

Claim 1 depends from claim 5 and further limits claim 1 by limiting the measurable thermal conductivity of aerogel composite blankets. Complainant contended that Respondent Alison's Accused Aerogel Composite Blankets infringe claim 5. (CBr. at 105.). Staff and Respondent Alison disagreed. (SBr. at 69; RABr. at 117.). This is the only claim about which there is a serious dispute with respect to at least part of the meaning of claim 5, and whether there is infringement.

Staff and Respondent Alison argued that each of the ***individual fibers*** in the batting must have a thermal conductivity of less than 50 mW/m-K while Complainant argued that it is the batting as a whole that must have a thermal conductivity less than 50 mW/m-K. (SBr. at 69; RABr. at 93 n.11; CBr. at 105.).

Staff's position is that the phrase "consists essentially of" signals that claim 5 is a partially open claim, and that it must include the ingredient that the fibers themselves have the requisite thermal conductivity, and not the ***batting as a whole***. (SBr. at 69 (citing *PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1354 (Fed. Cir. 1998)).). Staff noted that because Complainant's expert, Dr. Leventis, did not test individual fibers in any of the Respondent Alison's Accused Composite Blankets, of necessity, the Accused Alison Aerogel Composite Blankets do not infringe claim 5 if claim 5 is construed according to Staff's reasoning. (*Id.* (citing Tr. (Leventis) at 369: 15-20).). That is accurate if Staff's and Respondents' position is correct. However, this decision concludes otherwise.

Complainant's expert, Dr. Leventis, argued that a person of ordinary skill would not read claim 5 as requiring ***each fiber*** to meet the thermal conductivity requirements because the batting as a whole is considered for its thermal conductivity and the other beneficial effects that the batting will have on the final aerogel product. (*See* CBr. at 105 (citing Tr. (Leventis) at 314:2–315:6.). Complainant contended that Dr. Leventis' understanding also is consistent with multiple statements Respondent Alison's employee, Mr. Wei, who testified extensively on Respondent Alison's manufacturing and processes, made during the hearing. For example, Complainant notes that Mr. Wei testified that when Respondent Alison [

]

Additionally, Dr. Leventis cited to another section of the '359 patent specification to confirm his understanding. That part of the specification repeats the language and thermal conductivity requirement of claim 5 in stating: "The lofty batting preferably has a thermal conductivity of 50 mW/m-K, or less at room temperature and pressure to facilitate the low thermal conductivity aerogel composites." (CBr. at 106 n. 551 (citing CDX-1224 (quoting JX-0007 at 7:36-39)).).[33] Clearly, as with the previous reference, it is the batting that is being considered for its properties, not the fibers.

One of the primary characteristics of and the improvement made by the '359 patent over prior art is that it is directed toward an "aerogel composite" a key component of which is a lofty fibrous material, or lofty batting, that reinforces "unsupported aerogels" which are fragile. (*See, e.g.*, JX-0007 at 3:24-40, 7:1-39.).

The '359 patent specification distinctively identifies the thermal conductivity of ***specific*** fibers only where it discusses that the performance of the aerogel composite may be substantially enhanced by incorporating certain types of randomly distributed microfibers into the composite. (*Id.* at 8:36-42.). After discussing the diameter, aspect ratios, distribution in the composite and desirable length of the microfibers, the patent specification specifically addresses the thermal

[33] Dr. Leventis also argued that Respondent Alison's expert on invalidity, Dr. Gnade, implicitly agreed that claim 5 of the '359 patent was anticipated by the Ramamurthi because Ramamurthi teaches "lofty fibrous batting sheets" and looked to the thermal conductivity of the fibrous sheets and not the individual fibers. (*See* CBr. at 106, 106 n.552 (citing Tr. (Gnade) at 762:22–764:5).).

conductivity of the microfibers as follows: "The microfibers preferably have a thermal conductivity of 200 mW/m-K or less to facilitate low thermal conductivity of the aerogel composites." (*Id.* at 8:64-67.). This grammatical description of the optional addition of microfibers is quite different than the grammatical construction of claim 5. Moreover, in this part of the specification, it is clear that the microfibers are "incorporated into the composite by dispersing them in the gel precursor liquid and then using the liquid to infiltrate the lofty batting." (*Id.* at 8:48-51.). So, in other words, the microfibers are placed into the pre-cursor liquid very early in the process, well before the batting has been drenched with the sol liquid and well before the aerogel composite with batting has been cured.

There are other obvious problems if the thermal conductivity of each of the individual fibers is considered as the correct way to read claim 5. There is no method described in the patent specification for how to arrive at the desired thermal conductivity if the conductivity of any of the individual fibers when measured is more than 50 mW/m-K. Would an average of all the fibers be taken? At what point would the individual fibers be measured? The patent specification does not say. Ultimately, Dr. Leventis' arguments that the batting as a whole should be considered when measuring thermal conductivity, consistent with claim 5, are more compelling and persuasive and supported from the standpoint of one skilled in the art, rather than by the legal arguments alone. Therefore, it is a finding of this decision that Complainant's interpretation, using Dr. Leventis' expert testimony, is the better one in the context of the '359 patent specification. Since Respondent Alison has not provided any expert testimony of its own, Complainant has proven by a preponderance evidence that the Accused Alison Aerogel Composite Blankets meet the additional claim limitation and infringe claim 5 of the '359 patent.

ii. Respondent Nano's Accused Aerogel Composite Blankets Meet the Additional Claim Limitation

As noted previously, claim 5 depends from claim 1. The issue is whether the required thermal conductivity is measured in the individual fibers or in the lofty batting in its entirety. (*See* Section VII.D.4(a)(ii), *supra.*). This decision has taken the position that the proper reading of the patent specification suggests that claim 5 requires measurement of the lofty batting as a whole. (*Id.*). [

] By a preponderance of evidence, Complainant has proven that Respondent Nano's Accused Aerogel Composite Blankets meet the additional claim limitation and infringe claim 5 of the '359 patent.

5. Dependent Claims 7 and 9

a) "The composite article of claim 1, further comprising a dopant."

b) "The composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite."

i. Respondent Alison's Accused Aerogel Composite Blankets Meet the Additional Claim Limitations

Claim 7 depends from claim 1 of the '359 patent and limits claim 1 by requiring that the composite aerogel product contain a dopant, while claim 9 requires that the amount of dopant be between 1-20% of by weight of the total weight of the composite. (JX-0007 at 15:3-5.). Complainant has proven with unrebutted testimony that all of the Accused Alison Aerogel Composite Blankets, [ ] infringe claims 7 and 9 of the '359 patent. [

] Dr. Leventis relied upon the deposition testimony of Respondent Alison's employee, Mr. Wei, that the Respondent Alison Aerogel Composite Blankets [

]

By a preponderance of evidence, Complainant has proven that Respondent Alison's Accused Aerogel Composite Blankets [ ] meet and infringe claims 7 and 9 of the '359 patent. (*See* CBr. at 107.). Respondent Alison offered no expert testimony, opinion or rebuttal to Complainant's evidence of infringement. (*See* SBr. at 68 (citing Tr. (Gnade) at 730:4-10 (Dr. Gnade offered no opinions on non-infringement.).).

ii. Respondent Nano's Accused Aerogel Composite Blankets Meet the Additional Claim Limitations

Claim 7 of the '359 patent depends from and limits claim 1 by requiring the aerogel composite to contain dopant. (JX-0007 at 14:63-64.). Claim 9 of the '359 patent requires that the amount of dopant be between one and 20% by weight of the total composite. (*Id.* at 15:3-5.). Expert testimony in conjunction with Respondent Nano's own internal documents support a finding by a preponderance of evidence that Respondent Nano's Accused Aerogel Composite Blankets meet and infringe claims 7 and 9 of the '359 patent.

[

]

Each of Respondent Nano's Accused Aerogel Composite Blankets also infringe claim 9 of the '359 patent because they contain the amount of dopant within the percentage range specified by claim 9.

[

[34] Dr. Leventis described Material Safety Data Sheets (or MSDSs) as "important document[s] that [are] required by the government for manufacturers to provide to downstream users for safety reasons." (*See* CBr. at 111 n.577 (citing Tr. (Leventis) at 316:1–318:22); *see also* CX-2225C (Leventis Rep.) at ¶¶ 7.3.6.1-4 and 7.3.7.1-3.).

]

While Respondent Nano claimed in its Pre-Hearing Brief that evidence would show that Respondent Nano's Accused Aerogel Composite Blankets FMC200 and FMB350 do not contain a dopant, it offered no evidence during the hearing either with respect to the Accused Nano Aerogel Composite Blankets or any others. (*See* RNPBr. at 101; *see also* Tr. (Gnade) at 729:23–730:6 (Dr. Gnade presented no opinions with respect to Respondent Nano's infringement of the '359 patent.). Similarly, Respondent Nano did not raise this argument in Respondents' Statement of Streamlined Issues. (Doc. ID No. 604414) (Feb. 27, 2017).). Respondent Nano has waived any rebuttal argument with respect to infringement of claims 7 and 9 of the '359 patent by the identified aerogel composite blankets under Ground Rules 7.2 and 10.1. (*See* G.R. 7.2, 10.1.).By a preponderance of evidence, Complainant has proven that Respondent Nano's Accused Aerogel Composite Blankets meet the additional claim limitations and infringe claims 7 and 9 of the '359 patent.

6. Independent Claim 12

a) "A composite article comprising a fibrous batting sheet"

i. Respondent Nano's Accused Aerogel Composite Blankets Meet the Preamble

Complainant has accused Respondent Nano's Aerogel Composite Blankets, FMB350-6 and FMC200, of infringing claim 12 of the '359 patent. By a preponderance of evidence,

through the testimony of Dr. Leventis, Complainant has proven that they meet the preamble. (*See* Tr. (Leventis) at 318:20–323:25; *see also* CX-2255C (Leventis Rep.) at ¶¶ 7.3.8.1-7.8.13.).

[

]

b) "a continuous aerogel through said batting"

i. Respondent Nano's Accused Aerogel Composite Blankets Meet this Claim Limitation

The language of claim 12 is also found in claim 1 of the '359 patent. Dr. Leventis concluded that since Respondent Nano's Aerogel Composite Blankets, FMB350-6 and FMC200, satisfy claim 1, they satisfy the referenced language of claim 12. (Tr. (Leventis) at 319:9–319:17, 311:8–313:3.). As noted under claim 1, Dr. Leventis took photographs of these Accused Nano Aerogel Composite Blankets that demonstrate that the aerogel is continuous throughout the batting Respondent Nano uses in its blankets. (CX-2239C.). Respondent Nano offered no rebuttal.

c) "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross-section"

i. Respondent Nano's Accused Aerogel Composite Blankets Meet This Claim Limitation

Complainant has proven by a preponderance of evidence that the batting Respondent Nano uses in its Accused Aerogel Composite Blankets, FMB350-6 and FMC-200, are lofty battings in which the cross-section of the fibers visible in the cross-section of the composite is less than 10% of the total surface area of the cross-section. (*See* Tr. (Leventis) at 319:18–323:25.).

First, the "composite" and language is found also in claim 1, which Respondent Nano's

Accused Aerogel Composite Blankets satisfy, [

] Dr. Leventis testified that a "fibrous batting sheet" that is "lofty" in claim 12 is satisfied by similar language in claim 1 of the '359 patent. (*See* CBr. at 113 n.586 (citing.Tr. (Leventis) at 307:20–311:6; CDX-1218C (photograph of Respondent Nano batting); CX-2252C (test data)).). Dr. Leventis also testified that "fibrous batting sheet" is implicit in "lofty fibrous batting sheet." (Tr. (Leventis) at 307:20–311:6.).

To determine whether Respondent Nano's referenced Accused Aerogel Composite Blankets satisfy the requirement that the cross-section of the fibers visible in the cross-section of the composite is less than 10% of the total surface area of the cross-section, Dr. Leventis testified that he used x-ray tomography data that was then analyzed by software that enabled him to determine the percentages of the cross-section occupied by fiber and aerogel. (*See* CBr. at 113 n.588 and 114 n.589 (citing Tr. (Leventis) at 319:18–323:25).).

As part of his determination, Dr. Leventis computed the surface area of the cross-section by multiplying length by width. (Tr. (Leventis) at 320:14-15.). However, as Staff expresses somewhat differently, the surface area of the composite is calculated differently than a cross-section because of the porous nature of aerogels. (*See* SBr. at 74-75 (citing Tr. (Gould) at 93:16–95:14; Tr. (Gnade) at 677:19–678:9, 797:20–799:15; JX-0007 at 4:36-42 (aerogels have very high surface areas, generally from 400 to 1000 meters squared per gram, high porosity and large pore volume)).). Although neither Respondents Nano nor Alison offered any rebuttal testimony

or any evidence of their own calculations, Dr. Gnade testified that it is not possible to have the cross-section of the visible fibers in an aerogel composite exceed 10% of an aerogel composites surface area. (Tr. (Gnade) at 678:10-22.). Adopting Dr. Gnade's calculation, but with his and Dr. Leventis' conclusion, Complainant has proven by a preponderance of evidence that Respondent Nano's Accused Aerogel Composite Blankets, FMB350-6 and FMC-200, meet the last limitation of claim 12. (SBr. at 75; CBr. at 114.).[35]

7. Dependent Claim 15

a) "The composite article of claim 12, wherein the batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness."

i. Respondent Nano's Accused Aerogel Composite Blankets Meet the Additional Claim Limitation

Claim 15 depends from claim 12. By its plain language, this limitation requires that batting used to make the composite be sufficiently resilient to spring back to at least 70% of its thickness after it has been compressed to 50% of its thickness for 5 seconds. Respondent Nano's Accused Aerogel Composite Blankets, FMB350-6 and FMC200, meet and infringe claim 15. (Tr. (Leventis) at 324:1–325:6; *see also* CX-2255C at ¶¶ 7.3.1.26-28, 7.3.11.1-2.). Dr. Leventis performed compression tests on Respondent Nano's Accused Aerogel Composite Blankets by which he demonstrated that Respondent Nano's batting meets the referenced limitation of claim 15. (Tr. (Leventis) at 324:4-325:6 (citing CX-2252C).). Respondent Nano did not offer any

[35] Respondents noted that Respondent Nano argued in its Pre-Hearing Brief that Dr. Leventis' analysis and calculations would be inadequate to support Complainant's allegations that Respondent Nano's Accused Blankets infringe claim 12. (RNPBr. at 101-02.). However, as Complainant also noted, since Respondent Nano did not raise the argument in the Respondents' Statement of Streamlined Issues, Respondent Nano's argument has been waived under Ground Rules 7.2 and 10.1. (Doc. ID No. 604414; *see also* G.R. 7.2, 10.1.). This decision concurs.

testimony or rebuttal with respect to whether its Accused Aerogel Composite Blankets meet and infringe claim 15. Complainant has proven by a preponderance of evidence that Respondent Nano's Accused Aerogel Composite Blankets, FMB350-6 and FMC200, meet the additional claim limitation and infringe claim 15 of the '359 patent.

8. Dependent Claim 16

a) "The composite article of claim 12, wherein the fibrous batting is sufficiently lofty that it retains at least 50% of its thickness after addition of the gel forming liquid to form said aerogel."

i. Respondent Nano's Accused Aerogel Composite Blankets Meet the Additional Claim Limitation

Claim 16 also depends from claim 12. By its plain language, claim 16 requires that the batting used to make the composite be sufficiently lofty that it springs back to 50% of its thickness after the addition of the aerogel forming liquid. Respondent Nano's Accused Aerogel Composite Blankets, FMB350-6 and FMC200, meet and infringe claim 16. (SBr. at 76-77; CBr. at 115-16.). Respondent Nano did not offer any of its own evidence, including rebuttal to Complainant's contentions. As with all of Complainant's infringement contentions, Dr. Gnade, Respondent's expert, did not offer any opinions on infringement. (*See* Tr. (Gnade) at 729:23–730:6.).

However, Dr. Leventis tested Respondent Nano's Accused Aerogel Composite Blankets. In his testing, Dr. Leventis compared the measured thickness of Respondent Nano's Accused Aerogel Composite Blankets with the measured thickness of the fibrous battings that Respondent Nano used. He confirmed that the thickness of the final product was 50% or more of the thickness of the batting alone. (*See* Tr. (Leventis) at 325:7–326:4; CDX-1236C (citing to CX-2252C).). [

] Dr. Leventis confirmed, and Complainant has proven by a preponderance, that Respondent Nano's Accused Aerogel Composite Blankets, FMB350-6 and FMC200, meet the additional claim limitation and infringe claim 16 of the '359 patent.

VIII. VALIDITY[36]

Patent claims are presumed valid. 35 U.S.C. § 282. A respondent that has raised patent invalidity as an affirmative defense must overcome the presumption by "clear and convincing" evidence of invalidity. *Checkpoint Sys., Inc. v. U.S. Int'l Trade Comm'n*, 54 F.3d 756, 761 (Fed. Cir. 1995). As stated by the Federal Circuit in *Ultra-Tex Surfaces, Inc. v. Hill Brothers Chemical Co.*:

> when a party alleges that a claim is invalid based on ***the very same references*** that were before the examiner when the claim was allowed, that party assumes the following additional burden:
>
> When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden[37] of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.

Ultra-Tex Surfaces, Inc. v. Hill Bros. Chem. Co., 204 F.3d 1360, 1367 (Fed. Cir. 2000)

---

[36] The Asserted Patents resulted from applications that were filed before September 16, 2012. Therefore, the pre-AIA versions of the patent statutes apply. *See, e.g., Alcon Research Ltd. v. Barr Labs., Inc.*, 745 F.3d 1180, 1183 n.1 (Fed. Cir. 2014).

[37] This is not an added burden of proof but instead goes to the weight of the evidence. *Sciele Pharma v. Lupin Ltd.*, 684 F.3d 1253, 1260-61 (Fed. Cir. 2012). New evidence not considered by the PTO may carry more weight than evidence previously considered by the PTO. (*Id.*).

(emphasis added) (quoting *Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984)).

A. Anticipation

1. Relevant Law

A determination that a patent is invalid as being anticipated under 35 U.S.C. § 102 requires a finding, based upon clear and convincing evidence, that each and every limitation is found either expressly or inherently in a single prior art reference. *See, e.g.*, *Celeritas Techs. Inc. v. Rockwell Int'l Corp.*, 150 F.3d 1354, 1361 (Fed. Cir. 1998). Anticipation is a question of fact, including whether a limitation, or element, is inherent in the prior art. *In re Gleave*, 560 F.3d 1331, 1334-35 (Fed. Cir. 2009). The limitations must be arranged or combined the same way as in the claimed invention, although an identity of terminology is not required. *Id.* at 1334 (noting that "the reference need not satisfy an *ipsissimis verbis* test"); MPEP § 2131.

In addition, the prior art reference's disclosure must enable one of ordinary skill in the art to practice the claimed invention "without undue experimentation." *Gleave*, 560 F.3d at 1334-35. A prior art reference that allegedly anticipates the claims of a patent is presumed enabled; however, a patentee may present evidence of nonenablement to overcome this presumption. *Impax Labs., Inc. v. Aventis Pharmaceuticals Inc.*, 468 F.3d 1366, 1382 (Fed. Cir. 2006). "[W]hether a prior art reference is enabling is a question of law based upon underlying factual findings." *Gleave*, 560 F.3d at 1335.

2. The '359 Patent[38]

Respondents have alleged that U.S. Patent No. 5,306,555 to Ramamurthi et al. ("Ramamurthi") anticipates claims 1, 5, 7, 9, 12, and 15 of the '359 patent (RNBr. at 72); Japanese Patent Publication No. H08-34678 to Sonoda et al. ("Sonoda") anticipates claims 1, 12, 15, and 16 of the '359 patent (*id.* at 91); and U.S. Patent No. 6,068,882 to Ryu ("Ryu") anticipates claims 1, 7, 9, 12, and 16 of the '359 patent (*id.* at 102).

As discussed below in Section VIII.A.2, Respondents have not proven by clear and convincing evidence that claims 1, 5, 7, 9, 12, 15, and 16 are not invalid as anticipated by Ramamurthi, Sonoda, and/or Ryu. Ramamurthi, Sonoda, and Ryu do not disclose "a lofty fibrous batting sheet" and "a continuous aerogel through said batting."

a) U.S. Patent No. 5,306,555 ("Ramamurthi") Does Not Anticipate the '359 Patent

i. Independent Claim 1

Respondents contended that Ramamurthi discloses the preamble of claim 1 of the '359 patent, which Complainant did not dispute. (RABr. at 98; RNBr. at 73; CBr. at 130-40.). As Respondents noted, during the evidentiary hearing, Complainant's expert on the '359 patent, Dr. Leventis, did not present any evidence or testimony that Ramamurthi fails to disclose a composite article that serves as a flexible, durable, light-weight insulation product. Moreover, pursuant to a stipulation between the private parties, Complainant agreed not to dispute that the

[38] Respondents contended in their Pre-Hearing Briefs that U.S. Patent No. 6,087,407 ("Coronado"; RX-0018); U.S. Patent No. 5,786,059 ("Frank I"; RX-0019); and U.S. Patent No. 6, 887,563 ("Frank II"; RX-0020) anticipate the '359 patent. (RAPBr. at 137-49; RNPBr. at 120-40.). Respondents did not present any evidence with respect to these patents during the evidentiary hearing, or include any arguments with regard to these patents in their Initial Post-Hearing Briefs. (*Accord*, SBr. at 85 n.7; CBr. at 156.). Thus, Respondents waived any validity arguments involving Frank I, Frank II, and Coronado pursuant to Ground Rule 10.1. (*See* G.R. 10.1.).

insulation product disclosed in Ramamurthi is "flexible." (JX-0029C.0003 (Stipulation) (Jan. 6, 2017).).

The evidence adduced in this Investigation demonstrates that Ramamurthi discloses a composite aerogel that is the same as that disclosed in the '359 patent. (Tr. (Gnade) at 664:17-20; *see also* SBr. at 86; RX-0011 at 18:31.). Both Ramamurthi and the '359 patent teach the concept of including a fiber reinforcement in an aerogel to provide mechanical stability and flexibility, while maintaining good insulating properties. (Tr. (Gnade) at 664:17-20; *see also* RX-0011 at claim 20 ("An aerogel composite comprising: (a) a monolithic aerogel; and (b) fibers dispersed within the monolithic aerogel."); *id.*at claim 22 ("The composite of claim 20, comprising fibers in form of a mat or sheet.").

It is undisputed that Ramamurthi discloses an insulation product. (RABr. at 98; RNBr. at 73; CBr. at 130-40.). For instance, Ramamurthi discloses that "[t]he invention deals with inorganic aerogel matrix composites (AMCs) that have . . . ***good thermal insulation values*** . . . ." (RX-0011 at 2:3-8) (emphasis added). Ramamurthi also explains that "[t]he present system will provide [good] thermal conductivities for ***insulation purposes***." (*Id.* at 16:27-32 (emphasis added).). Moreover, Ramamurthi states that "applications of this material may include packaging, comforters, and other ***thermally efficient apparel***." (*Id.* at 16:27-32 (emphasis added).).

It is undisputed that Ramamurthi discloses an insulation product that is durable. (RABr. at 98; RNBr. at 73; CBr. at 130-40.). For example, Ramamurthi describes the claimed invention as having "enhanced strength." (RX-0011 at 2:3-8.). Figure 1 of Ramamurthi lists "mechanically strong" as one of the salient and novel characteristics of its aerogel composite. (*Id.* at Fig. 1.). Ramamurthi also states that the disclosed composite article can be "rolled up in a

cylindrical shape," further confirming some degree of durability and flexibility. (*Id.* at 12:21-23; *see also* Tr. (Gnade) at 665:2-7.).

It is undisputed that the insulation product disclosed in Ramamurthi is also light-weight. (RABr. at 98; RNBr. at 73; CBr. at 130-40.). For instance, Ramamurthi discloses that "[t]he bulk densities of these infiltrated silica fiber samples were in the range of 0.09-0.13 g /cc." (RX-0011 at 12:46-48.) The low density of the aerogel matrix composites disclosed in Ramamurthi establishes that the insulation products are light-weight. (*See, e.g.*, Tr. (Gnade) at 669:10-12.). The fact that the applications for the composite disclosed in Ramamurthi include "comforters[] and other thermally efficient apparel" (RX-0011 at 16:27-33) further confirms that it is flexible, durable and light-weight. Tr. (Gnade) at 665:8-11.).

For the foregoing reasons, Respondents have proven by clear and convincing evidence that Ramamurthi discloses the preamble of claim 1 of the '359 patent.

Respondents asserted that Ramamurthi discloses both: (i) a fibrous batting sheet; and (ii) a fibrous batting sheet that is "lofty." (RABr. at 100; RNBr. at 75.).

With regard to a fibrous batting sheet, Respondents relied on disclosures in Ramamurthi that its "aerogel composites consist of a bulk or monolith aerogel matrix prepared by supercritical drying a gel with a ***fiber-type reinforcement***" and that these gel matrices were "reinforced with long or short ***fibers***." (RX-0011 at 3:63-67, 4:10-14 (emphases added).). Respondents argued that Ramamurthi provided examples of fibers such as a glass wool and rock wool. (*Id.* at 4:27-29.). Respondents also pointed out that Ramamurthi's fibrous batting can be in the form of "mats or ***sheets***." (*Id.* at 4:34-38 (emphasis added).).

As Respondents noted, Complainant did not dispute this in its Pre-Hearing Brief or Initial Post-Hearing Brief. (CPBr. at 134-39; CBr. at 130-40.). Thus, under Ground Rules 7.2 and

10.1, any argument on this issue is deemed abandoned or waived. (*See* G.R. 7.2, 10.1.).

With respect to a fibrous batting sheet that is "lofty," Respondents contended that Ramamurthi discloses a lofty batting because the reference discloses fibrous material that shows the properties of bulk and some resilience (with or without recovery), as the term "lofty . . . batting" has been construed. (RABr. at 101; *see also Markman* Order, App. A at 4.). Respondents' expert, Dr. Gnade, heavily relied on the preferred fibers of glass wool and rock wool disclosed in Ramamurthi. (RX-0011 at 4:20-29.). Dr. Gnade explained that glass wool and materials like it are compressible and resilient enough to re-expand back to their original shape. (Tr. (Gnade) at 670:14-19 ("So the resilience is sort of inherent in that glass wool, that as I unroll it it's going to puff up and give me a larger volume."). He also testified that glass wool, as disclosed in Ramamurthi, is generally the same thing as "fiberglass," which is specifically identified in the '359 patent as a suitable fibrous material for forming lofty battings. (*Id.* at 671:13–672:6; 688:20–689:3 ("To one skilled in the art, fiberglass is just another term for glass wool. It's common terminology that's used in the field."); JX-0007 at 9:25-27.). Dr. Gnade pointed to disclosure in the '359 patent that fiberglass can be compressed and "springs back" to about 80% of its original thickness.[39] (Tr. (Gnade) at 671:16–671:1; JX-0007 at 7:56-59.).

In providing this testimony, Dr. Gnade did not present credible evidence supporting his conclusions. As Complainant noted, he pulled one particular picture of one particular glass wool from a Wikipedia article and asserted without testing or analysis that it is lofty because "as I unroll it it's going to puff up and give me a larger volume." (Tr. (Gnade) at 670:17-19.).

[39] The '359 patent notes that fiberglass springs back to about 80% of its original thickness "quite slowly." (JX-0007 at 7:56-59.). However, as Respondents pointed out, there is nothing in the asserted claims, or in the construction of lofty batting, that limits the time for the lofty batting to spring back. (RABr. at 102 n.15.).

Nevertheless, as Dr. Gnade and Respondents have emphasized, the '359 patent expressly identifies fiberglass as a suitable lofty batting. (JX-0007 at 9:25-27; Tr. (Gnade) at 671:13–672:6.).

However, based on contemporaneous evidence, Dr. Leventis provided persuasive testimony that fiberglass and glass wool are (and were in 2000) extremely broad categories that encompass many different materials and fiber arrangements with a great variety of physical, mechanical, and thermal properties. (Tr. (Leventis) at 1024:13–1028:17; CX-2256C (Leventis Reb.) at ¶¶ 98-99.). Indeed, on cross-examination, Dr. Gnade described glass wool as "a general term that is used for a broad variety" of materials and that fiberglass is also "a very general term that gets used a lot of different ways." (Tr. (Gnade) at 795:17-19, 796:14-22.).

In support of his testimony, Dr. Leventis introduced an entire book that listed a subset of the many fiberglass and glass wool products available in 2000 and their properties ("ASTM Handbook"). (Tr. (Leventis) at 1026:7-18 (discussing slide CDX-1502C); CX-1870.0001, CX-1870.0008 (ASTM Handbook: Composites).). Not only did the individual fibers differ in many ways that affected their compressibility, resilience, thermal conductivity, and suitability to be made part of a lofty fibrous batting sheet, but the diverse glass fibers Dr. Leventis discussed were then organized into a variety of different arrangements with very different mechanical and thermal properties.[40] (CX-2256C (Leventis Reb.) at ¶¶ 109-15, 116-27; CX-1870.0001-0005;

[40] Among these were: (1) fiberglass rovings (rope-like cylindrical packages); (2) woven rovings "produced by weaving fiberglass rovings into a fabric form"; (3) chopped-strand fiberglass mats "formed by randomly depositing chopped fibers onto a belt or chain and binding them with a chemical binder"; (4) continuous-strand fiberglass mats made using longer strands of glass fibers that had increased mechanical entanglement, mechanical integrity, and less and/or different binder; (5) combinations of mats and woven roving "either bound together with a chemical binder or mechanically knit or stitched together"; (6) textile yarns made by twisting glass yarn fibers together before weaving to provide additional integrity; (7) fiberglass fabric made by weaving fiberglass yarns into fabric form; (8) texturized yarns, in which jets

Tr. (Leventis) at 1024:13–1028:17.).

Many of the fiber arrangements described in the ASTM Handbook were inherently not lofty fibrous batting sheets. (Tr. (Leventis) at 1026:23-1027:10; CX-1870.0005-0007.). A few examples include: (1) loose collection of individual fibers; (2) rovings (rope-like cylindrical structures) which plainly are not sheets; and (3) dense fibrous mats (which the '359 patent expressly distinguishes from a lofty batting). (Tr. (Leventis) at 1027:11-25.). During the prosecution of the '359 patent, the examiner agreed with the distinction between a lofty batting and a fibrous mat. (CX-2256C (Leventis Reb.) at ¶ 98 n.6 (citing JX-0001 (PH of '359 patent) at ASPEN0000353); *see also* JX-0007 at 7:60–8:5.). Dr. Leventis testified that he has used glass wools in his laboratory that are not compressible or resilient, as required of a lofty batting. (Tr. (Leventis) at 1028:1-17.).

Dr. Gnade acknowledged that Ramamurthi does not expressly state a specific density of the fibrous batting disclosed in the reference. (Tr. (Gnade) at 667:18-19.). Accordingly, he calculated on his own the density of the batting used in Example 2 of Ramamurthi and found that the density of Ramamurthi's fibrous batting was 0.026 g/cc, within the range disclosed in the '359 patent. (Tr. 667:16–668:14, 671:7-12; RDX-0014.0056; RX-0011 at 12:12-14, 20-21.). Dr. Gnade explained that battings with a low density, such as those disclosed in Ramamurthi and the '359 patent, will have more "air" or "volume" and will thus be "lofty." (Tr. (Gnade) at 669:10-12 ("[I]f I have a lower density, you know, I'm going to have more voids, more open spaces, you know, for the aerogel to get into."); JX-0007 at 7:65-67 ("a lofty batting useful herein has a

---

of air are used to break the surface filaments, giving the yarn a bulkier appearance; and (9) carded glass fibers created by adjusting the alignment of the fibers. (Tr. (Leventis) at 1026:23–1027:10; CX-1870.0005-0007.).

much lower density, i.e. in the range of about 0.1 to 16 lbs/ft^3 (0.001–0.26 g/cc)").

As Complainant pointed out, density is not part of the construed construction of "lofty . . . batting." (*See Markman* Order, App. A at 4.). Moreover, the claims clearly show that it is an additional requirement beyond a lofty batting. For instance, claims 49-51 of the '359 patent expressly recite density in addition to the requirement for a lofty batting. (JX-0007 at 14:36-39 (claim 1, reciting a "lofty . . . batting"); *id.* at 18:4-11 (claims 49-51, reciting density limitations in addition to the lofty batting requirement of claim 1, from which they depend).).

In addition, Dr. Gnade's expert report regarding invalidity of the '359 patent made no mention of the specific density calculation he relied upon during the evidentiary hearing. There was no calculation included in Respondents' Pre-Hearing Briefs that supported evidence of a "lofty . . . batting." (RAPBr. at 115-18; RNPBr. at 108-11.). As Complainant indicated, Dr. Gnade's calulcation was first raised during the evidentiary hearing and in Respondents' Initial Post-Hearing Briefs. (Tr. (Gnade) 667:16–669:13; RX-0561C (Gnade Rep.) at ¶¶ 87-95; RABr. at 102; RNBr. at 77.). Thus, Dr. Gnade's testimony regarding his density calculation of the batting used in Ramamurthi's Example 2 is stricken. Additionally, under Ground Rules 7.2, any argument on this issue is deemed abandoned or withdrawn. (*See* G.R. 7.2.).

Complainant's expert, Dr. Leventis, also opined that it is not scientifically true that any particular fiber density inherently creates a lofty batting. (CX-2256C (Leventis Reb.) at ¶¶ 86-93.). Dr. Leventis proffered unrebutted testimony that the same mass of fiber in the same volume may or may not have bulk compressibility and resilience, depending on how the fibers are arranged. (Tr. (Leventis) at 1031:3–1032:16 (discussing CDX-1506C); CX-2256C (Leventis Reb.) at ¶¶ 87-90.). He provided this testimony while discussing the picture and drawing below.

Figure 20: Depiction of Fibrous Material with Layers of Fibers [

]

[

] Referring to the figure on the left, Dr. Leventis testified that if the fibers are arranged in other ways (for example, as layers of individual fibers as in some Ramamurthi embodiments), they will collapse if compressed and will not spring back. (*Id.*). Dr. Gould agreed. (Tr. (Gould) at 269:10-14 ("Q: Does knowing the density of a batting tell you whether something is lofty or not? A: As a single data point, no, it is not a proxy for assessing loftiness."). Dr. Gnade also acknowledged the same on cross-examination.

Q: You agree that loftiness and low density are not synonymous; correct?

A: Yes.

Q: You can have something that is low density and not be lofty; correct?

A: Yes.

(Tr. (Gnade) at 748:11-16.).

Ramamurthi does disclose that the fibers "may be randomly distributed or ***oriented***" and that these fibers can be in the form of "individual fibers, bundles of fibers, mats or sheets, woven or unwoven." (RX-0011 at 4:34-38 (emphasis added).). However, nothing in Ramamurthi explains that orienting the fibers in a particular manner will impart any compressible, resilient, or "lofty" qualities to Ramamurthi's aerogel composites.

As another indicator of resilience, Dr. Gnade relied upon the following disclosure in Ramamurthi:

> [One] ***sample*** was compressed at 27-28 psi (approximately 0.19 MPa) pressure such that the disc thickness decreased from 0.62" to 0.5" (1.57 cm to 1.27 cm). After the loads were removed the ***sample*** sprang back to almost the same original thickness of approximately 0.61" (1.55 cm).

(RX-0011 at 11:9-14 (emphases added); Tr. (Gnade) at 667:1-13.).

As Dr. Gnade recognized, Ramamurthi explains that this applies to the ***aerogel composite*** (i.e., the "sample"), meaning the structure that contains both the aerogel and the batting, not the batting alone. (Tr. (Gnade) at 667:1-4 ("This is talking about the composite. It is not just the batting or the fiber reinforcement.").). Dr. Gnade attempted to sidestep this issue by opining, without any factual support, that because the aerogel alone cannot account for this resilience, the resilience must necessarily come from the fibrous component within it. (*Id.* at 667:1-13 ("Because the aerogels are so brittle and so fragile, to get that resilience, I believe that it has to be due to the fact that the fiber batting had to have resilience to start with to push it back. So the

fiber batting is really what is giving it this resilience to be able to spring back."); *see also id.* at 812:15-17 ("Q: What would happen to the aerogel alone if it was compressed to 20 percent? A: It would crumble.").

Dr. Gnade's testimony is not persuasive and it is contradicted by the evidence. Dr. Leventis opined that the final composite's resilience is a property that comes from ***interactions between the aerogel and the fibers*** and not from that of the fibrous component by itself.

> Q: . . . .And what, if anything, does the compressibility and resilience of the final composite tell us about the same properties of the fibrous component in it?
>
> A: It does not tell us anything. I mean, the compressibility of the composite is exactly that, the compressibility of the composite, of the combination of aerogel with the fibers, is not a property of either component. It is a logistic property of putting the two components together. That's why we make composites, yes.

(Tr. (Leventis) at 1045:24–1046:7.).

The fibers hold the aerogel together and the aerogel holds the fibers in place, thus giving the composite resilience that neither component may have by itself. (*Id.*).

For example, as Dr. Leventis explained, Ramamurthi's randomly oriented individual fibers can provide some resilience to a composite when held in place by an aerogel, but without the aerogel, the fibers would collapse into a flat layer with neither bulk nor resilience. (*Id.*). Dr. Gnade did not dispute this example.

Moreover, the experts agreed that the negligible amount of compressibility and resilience of Ramamurthi's composite could arise from the ***aerogel alone***. Dr. Leventis testified to it based on personal experience as well as the published literature in the field, which shows that pure silica aerogel can be 92% resilient at 20% compression. (Tr. (Leventis) at 1048:8–1049:9, 1145:8-21; CX-1877 at Fig. 4.). Likewise, Dr. Gnade testified that "you can make an aerogel that is compressible and springs back to its original thickness" even "without any sort of

reinforcement." (Tr. (Gnade) at 755:22–756:15 (citing JX-53C (Scherer Dep. Impeachment) at 38:19–39:8).). Dr. Gnade agreed that "the aerogel monoliths that Ramamurthi teaches has [sic] more than zero resilience." (Tr. (Gnade) at 756:24–757:1; RX-0011 (Ramamurthi) at 3:56-57 (disclosing that the monolithic aerogels it addresses have some elasticity, albeit a "low" level). In short, pure silica aerogel inherently has resilience (despite being fragile), which it readily displays when combined with fibers that hold it together and prevent it from shattering under compression. (Tr. (Gnade) at 743:14-16.).

Respondents contended that based upon Dr. Leventis' and Dr. Gnade's testimony regarding "bulk," the batting disclosed in Ramamurthi has bulk. (RABr. at 104 (citing Tr. (Leventis) at 298:13–299:6 ("[T]his empty space provides – is a space that is filled by aerogel."); Tr. (Gnade) at 651:24–652:2 ("So it's really just filling in the open space. The batting has a bulk, and we're pouring the sol in there to fill up that space in order to end up with the composite.").). Respondents relied on disclosure in Ramamurthi that "the porous spaces in the silica fiber matrix were almost completely filled by the infiltrated monolithic aerogel material." (RX-0011 at 12:46-51.). This is not necessarily a disclosure of bulk as claimed in the '359 patent. Indeed, Dr. Leventis described bulk as "empty space filled with air." (Tr. (Leventis) at 298:13–299:6.). However, he also explained that this "empty space" is generated by the specific ***intertwining of the fibers*** in such a way that "gives the batting the property of resilience," as shown below. (*Id.*).

[

]

Based on Dr. Leventis' testimony and the specification of the '359 patent, Ramamurthi does not disclose fibrous materials that have the bulk needed to be a lofty batting. (JX-0007 at 7:48-50 ("a lofty batting is one that can be compressed to remove the air (bulk) yet spring back to substantially its original size and shape").

Respondents' reliance on Example 2 of Ramamurthi is misguided and unsupported by evidence.[41] To begin with, almost none of Respondents' general arguments apply to Example 2. Respondents did not argue that the slightly compressible composite aerogel "sample" has anything to do with Example 2. (RABr. at 102-03; RNBr. at 77-78.). That "sample" is clearly part of Example 1. (RX-0011 at 11:20–27 (this part of the discussion of "Example 1," which begins at column 6 and runs through the beginning of column 12 (*id.* at 6:50–12:9 (headed "Example 1-A" and "Example 1-B"); Example 2 begins afterwards, in the middle of column 12 (*id.* at 12:12–13:2 (headed "Example 2"))).). Respondents also did not contend that Example 2 uses any "glass wool" structure. (*Id.* at 6:50–12:9; *id.* at 12:12-14 (disclosing that Example 2 uses multiple reinforcements (plural) of individual silica fibers).).

Respondents' sole argument for the loftiness of Example 2 is that this example's "silica fiber mat" has a low density, based on Dr. Gnade's calculation, and low thermal conductivities, as disclosed in Ramamurthi. (RX-0011 at 12:46-48, 12:56-58.). As discussed above, Dr. Gnade's testimony on this calculation has been stricken. Accordingly, Respondents have not presented adequate evidence that the silica fiber mat used in Example 2 is "lofty."

For the foregoing reasons, Respondents have not proven by clear and convincing evidence that Ramamurthi discloses the claimed "lofty fibrous batting sheet."

Respondents argued that Ramamurthi discloses a continuous aerogel through the batting. (RABr. at 104; RNBr. at 79; Tr. (Gnade) at 672:7-18.). Ramamurthi does not disclose "said

[41] In its Pre-Hearing and Initial Post-Hearing Brief, Complainant asserted that Ramamurthi discloses three specific ways to combine glass fibers with aerogel, none of which is a lofty batting sheet. (CPBr. at 135; CBr. at 137.). Complainant referred to these categories as the "flat fiber mat configuration," the "random oriented fibers," and the "sandwich arrangement." (CBr. at 137-39.). These configurations are all from column 7 of Ramamurthi, which describe Example 1, and more specifically, "[r]igid varieties of AMCs." (RNRBr. at 57.).

batting" because this element refers to the "lofty fibrous batting sheet," which is not disclosed in Ramamurthi for the reasons discussed above in Section VIII.A.2(a)(i)(2). Without a teaching in Ramamurthi of the claimed "lofty . . . batting sheet," Respondents' arguments fail. *See, e.g.*, *Celeritas Techs.*, 150 F.3d at 1361 (noting that a determination that a patent is invalid as being anticipated requires a finding, based upon clear and convincing evidence, that each and every limitation is found either expressly or inherently in a single prior art reference).

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that Ramamurthi anticipates claim 1 of the '359 patent.

ii. Dependent Claims 5, 7, and 9

Respondents contended that Ramamurthi discloses the additional limitations recited in claims 5 ("the lofty fibrous batting [that] consists essentially of fibers having a thermal conductivity less than 50 mW/m-K") and 7 ("comprising a dopant") of the '359 patent, which Complainant did not dispute in its Initial Post-Hearing Brief. (RABr. at 105; CBr. at 140.).

Respondents also argued that Ramamurthi discloses the additional limitation recited in claim 9 of the '359 patent. (RABr. at 107.). Complainant's expert, Dr. Leventis, testified that Ramamurthi does not expressly or inherently disclose that "the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite." (Tr. (Leventis) at 1050:19–1051:21; CX-2256C (Leventis Reb.) at ¶¶ 243–246.). While Ramamurthi discloses using titanium dioxide as an opacifier, there is no disclosure of the amount in which it is used. According to Dr. Leventis, "you want as small an amount as possible so you do not compromise the properties of the aerogel. So small amount as possible means, if possible, ***below 1 percent, or way below 1 percent.***" (Tr. (Leventis) at 1051:4-13 (emphasis added).).

Respondents' expert, Dr. Gnade, seemed to agree on the point that "we don't want to

have detrimental effects . . . . You want to minimize and put in the least amount possible." (Tr. (Gnade) at 675:10-12.). However, Dr. Gnade opined that the dopant must be ***at least about 1%*** by weight of the total weight of the composite in order to have a desired effect on the composite. (*Id.* at 675:23–676:1 ("because Ramamurthi is using a pigment for the intended effect of reducing the thermal conductivity… [i]t will be ***more than 1 percent***") (emphasis added); *id.* at 717:16-19 ("an amount less than 1 or less than about 1 probably will not have the effect that you want."); *id.* at 719:20-22 ("it's inherent because you have to have some, you know. It has to be some amount greater than zero, so about 1 percent, you know."). His opinions are purely speculative. He provided no evidence or plausible rationale why the disclosed opacifier cannot be more than 0% but less than "about 1%."

Moreover, for the reasons stated above in the discussion of claim 1 in Section VIII.A.2(a)(i), it is a finding of this Initial Determination that Ramamurthi does not anticipate claim 1. Since claims 5, 7, and 9 ultimately depend from claim 1, Ramamurthi does not anticipate claims 5, 7, and 9. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (holding that because the independent claim was not anticipated, claims depending from the independent claim were also not anticipated) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987).).

iii. Independent Claim 12

Respondents contended that claim 12 is anticipated by Ramamurthi. (RABr. at 109; RNBr. at 83-84.).

As an initial matter, two of the limitations of claim 12 are nearly identical to the corresponding limitations of claim 1: (i) "a fibrous batting sheet . . . where the batting is

sufficiently lofty"; and (ii) "a continuous aerogel through said batting." For the same reasons discussed in Section VIII.A.2(a)(i) above, Ramamurthi does not teach "a fibrous batting . . . [that] is sufficiently ***lofty***," that is, a fibrous batting that "shows the properties of bulk and some resilience," and "a continuous aerogel through ***said batting***."

For example, Respondents failed to provide any evidence that the glass wool disclosed in Ramamurthi is suitable lofty batting, that is, that it has bulk and resilience. (*See* Section VIII.A.2(a)(i), *supra.*). Respondents' argument also fails because Respondents made no showing that glass wool is in fact used in the embodiments upon which they rely, namely in Example 2. (RNBr. at 75-80.). Respondents' assertion that fiber density translates in some way into compressibility and resilience is also not supported by the evidence. (Tr. (Gnade) at 667:16–669:13; *see also* Section VIII.A.2(a)(i), *supra.*).

Respondents' reliance on Example 2 of Ramamurthi is equally flawed. The slightly compressible composite aerogel "sample" to which Respondents refer is part of Example 1, not Example 2. (RABr. at 102-03; RNBr. at 77-78; RX-0011 at 11:20-27.). Moreover, the evidence upon which Respondents rely regarding the loftiness of the batting described in Example 2 (i.e., Dr. Gnade's density calculation of the fibrous material used in Example 2) has been stricken for the reasons explained in Section VIII.A.2(a)(i) above.

Because Ramamurthi does not teach "a lofty fibrous batting sheet," Ramamurthi cannot teach "a continuous aerogel through ***said batting***."

For these reasons, the "a lofty fibrous batting sheet" and "a continuous aerogel through said batting" limitations required by claim 12 of the '359 patent are not anticipated by Ramamurthi. Thus, claim 12 is not invalid as anticipated by Ramamurthi on these bases alone.

The only additional claim limitation recited in claim 12 is "where the batting is

sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section." (JX-0007 at 15:15-19.).

During the evidentiary hearing, Dr. Gnade explained that very large surface area is one of the important features of aerogels that gives the aerogel its thermal insulation properties. (Tr. (Gnade) at 657:7-22; 799:1-2 ("large surface area of the aerogel is what gives it a lot of its unique properties").). As an example, from the '359 patent, he referenced a typical surface area of an aerogel on the order of 900 m^2/g or higher, which Dr. Gnade explained is "about the area of a football field. So I have about as a much surface area as a football field . . . in one gram of material." (*Id.* at 657:7-22 (discussing JX-0007 at 1:38-41).).

This is consistent with testimony provided by Dr. Gould and Dr. Leventis. (Tr. (Gould) at 95:4-14 (describing the unique properties of aerogels as "light weight, high surface area because of all the surface that's exposed, and low thermal conductivity value"); Tr. (Leventis) at 376:11-23 (aerogels are famous for their high surface areas and special techniques are used to measure an aerogel's surface area); *see also* RX-0011 at 12:45-46 (monolithic aerogels have typical BET surface areas in the range of 500-800 meters squared per gram); JX-0007 at 4:36-42 (aerogels have very high surface areas, generally from 400-1,000 meters squared per gram, high porosity and large pore volume). Furthermore, both experts agreed that the surface area of a cross-section of an aerogel is not determined by multiplying length times width. Tr. (Leventis) at 376:21-23; Tr. (Gnade) at 797:25–798:23.).

Based on the evidence adduced in this Investigation, Dr. Gnade agreed that aerogel composites also have "high porosity, small pore sizes, and large surface area." (*Id.* at 733:8-12.). (*See, e.g.*, CX-2266 (article from the International Journal of Heat and Mass Transfer, "Aerogel

blankets: From mathematical modeling to material characterization and experimental analysis") ("The modeling results show that the highly porous structure of aerogel blanket and micro-scale pore sizes as well as large surface areas are the key features that make the aerogel blanket as an effective insulation material having very low thermal conductivity.")).

Because of the large total surface area of aerogel composites, Dr. Gnade opined that the fibers of the batting that are visible in the cross section must be less than 10% of the total surface area of that cross section. (*Id.* at 677:9-12, 678:10-22.). Dr. Gnade explained that if the percent surface area of the fiber were more than 10%, the aerogel composite "would have so much fiber that the thermal conductivity would start to go up significantly." (*Id.*). Thus, he concluded that because the thermal properties of the aerogel composite disclosed in Ramamurthi are retained, the cross-sectional area of the fibers of the batting disclosed in Ramamurthi must necessarily be less than 10% of the total surface area of that cross section. (*Id.*; RX-0011 at 4:10-38.). Staff agreed. (SBr. at 94.).

Complainant's expert, Dr. Leventis, interpreted the "total surface area of the cross section" to be the length of the cross section multiplied by its width. (Tr. (Leventis) at 310:14-15.). Dr. Gnade confirmed that this would be the case for a solid piece of material but explained that obtaining the cross-sectional surface area of an aerogel composite is much more difficult. (Tr. (Gnade) at 656:1-25.). Below is a picture of a piece of cleaved silicon on the left, and a SEM image of Complainant's Cryogel Z blanket on the right. (RDX-0014.0028; CX-2266.).

Figure 23: Picture of Cleaved Silicon

Figure 24: SEM Image of Complainant's Cryogel Z Blanket

(RDX-0014.0028 (Direct Examination of Dr. Gnade (Feb. 22-23, 2017)); CX-2266.).

Referring to the demonstrative exhibit above, Dr. Gnade provided the following testimony:

> [Q:] How is cross-section measured?
>
> A: So, you know, if you look at the one on my left, so the solid one, this is just a piece of cleaved silicon. It's a wafer that one of the kids broke in two, take a picture of it in cross-section. Here, if I'm going to get the total cross-sectional surface area or total cross-sectional area, I can really just take length times width. It's pretty straightforward to get what the area of that is.
>
> The figure on my right is an aerogel blanket. Again, a cross-section that I looked through -- it actually comes from the same reference on the previous one. But here -- and I would like to point out, the scales are about the same. The silicon wafer is 530 microns thick. The one on the right is probably 650 or so, so roughly on the same scale. If I look at the one on the right, I'm not really sure. I don't know how to get the cross-sectional area. When I look, ***there's lots of nooks and crannies and lots of open space***. So if you really wanted me to give a number for what is the cross-sectional area, I'm not sure I know what it is. ***But I certainly know it's a whole lot bigger than length times width***. And that's very consistent with what we would expect from an aerogel.

(Tr. (Gnade) at 656:1-25 (emphases added).).

Dr. Gnade's testimony is more persuasive. Given the "nooks and crannies" of an aerogel composite's surface, simply basing a calculation of the total surface area of the cross-section on the width, as Dr. Leventis did, is neither convincing nor supported by evidence. (*See, e.g.*, *id.*; *see also* CX-2266 (article from the International Journal of Heat and Mass Transfer, "Aerogel blankets: From mathematical modeling to material characterization and experimental analysis").).

Dr. Leventis testified that Dr. Gnade's understanding of the limitation is incorrect because what is claimed is the surface area of the cross section of the ***composite***, not the surface area of the ***aerogel***. (Tr. (Leventis) at 1053:4–11.). However, on cross, Dr. Leventis acknowledged that the surface area of the aerogel composite necessarily includes the surface area of the aerogel. (Tr. (Leventis) at 393:13-18.). He acknowledged that the surface area of a cross section of an aerogel is not determined by multiplying length times width, thereby undermining his previous testimony.

> Q: In fact, the '359 patent talks about, in column 1, they talk about the large surface area of aerogels, don't they?
>
> A: They refer to something like 900 milisquares per 20 gram.
>
> Q: You don't get that by taking length times width, do you, Dr. Leventis?
>
> A: No, you have specialized testing.

(Tr. (Leventis) at 376:21-23.).

Dr. Gnade's opinion that the cross-sectional area of the fibers of the batting disclosed in Ramamurthi must necessarily be less than 10% of the total surface area of that cross section is also consistent with the '359 patent. The '359 states that the aerogel composite should use a batting that "does not significantly alter the thermal properties of the reinforced composite as compared to a non-reinforced aerogel body of the same material. Generally this will mean that

upon looking at a cross-section of a final aerogel composite, the cross-sectional area of the fibers is less than 10% of the total surface area of that cross section." (JX-0007 at 7:28-35.). The '359 patent recognized that if the fibers in the cross sectional area are more than 10%, the thermal properties of the reinforced composite will be "significantly altered" as compared to a non-reinforced aerogel.

Complainant asserted that "Respondents' reading is inconsistent with the '359 patent itself, which indicates that certain fiber arrangements (specifically mats) can have far more than 10% fiber area in the cross section—'30 to 50%'—which would be impossible under Respondents' interpretation." (CBr. at 141 (citing RX-0007 at 8:2-5).). This argument is not persuasive. The statement to which Complainant refers is describing the likely total surface area of the cross-sectional surface area of a composite prepared with a ***mat*** reinforcement, which the '359 patent describes as "a densely woven or thickly tangled mass" that is "substantially different from" the claimed batting, and not the total surface area of the claimed batting. (JX-0007 at 7:60–8:5.).

Respondents also argued that Ramamurthi discloses that the weight percent of the fibers can range from eight to 21 percent. (RX-0011 at 10:46-47.). Taking the lowest weight percent of 8%, Dr. Gnade testified that based on the assumption that the fibers are "randomly distributed," this translates into less than 8% fiber area in all cross-sections. (Tr. (Gnade) at 679:23–681:12.). However, Dr. Gnade provided no evidence that the "8%" number necessarily relates to fibers with "random distributions" or that this range refers to the same composite as the disclosures Respondents relied on for other claim elements. (RNBr. at 86-87; RABr. at 141-42.). By contrast, Complainant's expert, Dr. Leventis testified that cross-sectional fiber area depends on fiber arrangement, not just density. (Tr. (Leventis) at 1053:13–1054:8.). Thus, this aspect of

Respondents' argument fails.

Although Dr. Gnade provided plausible testimony that aerogel composites generally must meet this limitation, this is not clear and convincing evidence that Ramamurthi discloses this limitation. Moreover, as discussed above, Ramamurthi does not disclose the claimed "fibrous batting sheet . . . [that] is sufficiently lofty" and "a continuous aerogel through said batting" required by claim 12. Accordingly, Respondents have failed to prove by clear and convincing evidence that Ramamurthi anticipates claim 12.

iv. Dependent Claim 15

Respondents contended that Ramamurthi discloses the additional limitation recited in claim 15 of the '359 patent ("the batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness"). (RABr. at 113; RNBr. at 87.).

Respondents raised identical arguments for claim 15 as they did for claims 1 and 12. According to Dr. Gnade, because Ramamurthi uses fibers such as glass wool and rock wool (RX-0011 at 4:20-29), he explained that Ramamurthi's composites are necessarily compressible by a minimum of 50% of their thickness and sufficiently resilient that after compression for about 5 seconds, they return to at least 70% of their original thickness. (Tr. (Gnade) at 681:20–682:19.). As discussed above in Sections VIII.A.2(a)(i) and VIII.A.2(a)(iii), Ramamurthi does not clearly and convincingly disclose that: (i) the glass/rock wool used in Ramamurthi is suitable as the claimed "lofty . . . batting"; (ii) the fibrous material used in Ramamurthi is compressible or resilient such that it is "lofty"; and (iii) the fibrous material of Ramamurthi has the claimed "bulk."

Respondents also contended with no supporting evidence that Ramamurthi's disclosure

that one unidentified composite aerogel sample can be compressed by 19% means that the fibrous component can be compressed by 50% and meets the resilience limitation of claim 15. (RNBr. at 88.). Thus, Ramamurthi does not disclose a fibrous batting that "is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness." (Tr. (Leventis) at 1054:17–1055:1; CX-2256C (Leventis Reb.) at ¶¶ 152-86; 194-202.).

Additionally, for the reasons stated above in the discussion of claim 12 in Section VIII.A.2(a)(iii), it is a finding of this Initial Determination that Ramamurthi does not anticipate claim 12. Since claim 15 depends from claim 12, Ramamurthi does not anticipate claim 12. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (holding that because the independent claim was not anticipated, claims depending from the independent claim were also not anticipated) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987).).

b) Japanese Patent Application 08-34678 ("Sonoda") Does Not Anticipate the '359 Patent

i. Independent Claim 1

Respondents argued that Sonoda discloses the preamble of claim 1, which Complainant did not dispute. (RABr. at 117; RNBr. at 91; CPBr. at 142-45; CBr. at 143-46.). During the evidentiary hearing, Complainant's expert on the '359 patent, Dr. Leventis, did not present any evidence or testimony that Sonoda fails to disclose a composite article that serves as a flexible, durable, light-weight insulation product. Moreover, pursuant to a stipulation between the private parties, Complainant agreed not to dispute that the insulation product disclosed in Sonoda is

"flexible." (JX-0029C.0003 (Stipulation) (Jan. 6, 2017).).

The evidence adduced in this Investigation shows that Sonoda discloses a composite aerogel. (Tr. (Gnade) at 684:9-12.). Like the '359 patent, Sonoda teaches the idea of including a fiber reinforcement in an aerogel to provide mechanical stability and flexibility, while maintaining good insulating properties. (*See, e.g.*, RX-0028 at ¶ [0003] (Sonoda "has the objective of providing an aerogel panel with improved strength while maintaining its heat insulating properties").).

It is undisputed that Sonoda discloses an insulation product and that this insulation product is durable. (*Id.* (Sonoda "has the objective of providing an aerogel panel with ***improved strength*** while ***maintaining its heat insulating properties***") (emphases added); Tr. (Gnade) at 684:13-19, 22-23; RX-0028 at ¶ [0034] ("By using this fiber body (1) as a core, the ***strength*** of the aerogel (2) is increased while maintaining heat insulation properties. Consequently, breaking or crumbling of the aerogel (2) is prevented during handling.") (emphasis added).).

It is also undisputed that the insulation product disclosed in Sonoda is light-weight. Sonoda describes the use of glass wool with a density of 0.01 g/cc to prepare an aerogel composite with a density of 0.055 g/cc. (RX-0028 at ¶¶ [0039], [0046].). The low density of the aerogel matrix composites disclosed in Sonoda establishes that the insulation products are light-weight. (Tr. (Gnade) at 684:20-21.).

For the foregoing reasons, Respondents have proven by clear and convincing evidence that Sonoda discloses the preamble of claim 12 of the '359 patent.

Respondents contended that Sonoda discloses a fibrous batting sheet and that the fibrous batting sheet is "lofty." (RABr. at 118; RNBr. at 93.).

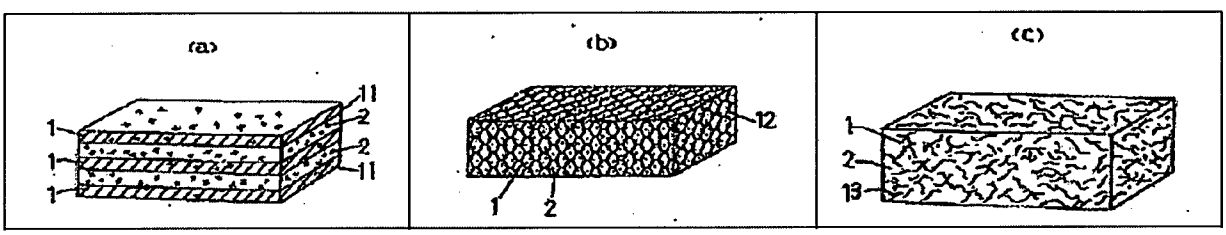
With regard to a fibrous batting, Respondents relied on disclosures in Sonoda that: (i)

Sonoda's invention is "characterized by comprising a ***fiber body*** (1) having heat insulating properties as the core material and an aerogel (2) having a silica backbone that is affixed to this fiber (1)" (RX-0028 at [0005] (emphasis added)); (ii) the fiber body may comprise a "multilayered nonwoven cloth having transparency," a "block-form fiber aggregate having voids," or "dispersed fibers" (*id.* at claims 1-4); and (iii) the fiber body can be composed of various materials, including "glass fiber, ceramic fiber, polyester, polyamide or other organic macromolecular compounds" (*id.* at ¶ [0025]).

As Respondents noted, Complainant did not dispute that Sonoda discloses a fibrous batting. (CPBr. at 142-45; CBr. at 143-46.). Thus, under Ground Rules 7.2 and 10.1, any argument on this issue is deemed abandoned or waived. (*See* G.R. 7.2, 10.1.).

Complainant argued that none of the three embodiments described in Sonoda disclose a "***lofty*** fibrous batting" in the form of a "***sheet.***" (CX-2256C (Leventis Reb.) at ¶¶ 297-349.). Complainant's arguments are persuasive.

Figure 25: Illustration Depicting Embodiments of Sonoda's Aerogel Panels



(RX-0028 at Figs. 1(a), 1(b), 1(c).).

As Dr. Leventis testified, the first disclosed embodiment (Fig. 1(a)) is a cloth sandwich arrangement in which layers of pure monolithic aerogel (2) are sandwiched between three layers of cloth (11) with negligible thickness (0.1–0.5 mm.). (Tr. (Leventis) at 1075:15-25; CX-2256C (Leventis Reb.) at ¶¶ 309-13 (citing RX-0028 at [0025], [0027]).). The cloth layers both

individually and collectively are not a batting sheet and would have no resilience against compression. (Tr. (Leventis) at 1075:15-25; CX-2256C (Leventis Reb.) at ¶¶ 309-13 (citing RX-0028 at [0025], [0027]).). Thin, flat cloths have no resilience whatsoever. (Tr. (Leventis) at 1075:15-25 ("The cloth, the formation it gives about the cloth is it is very thin and does not have bulk and like cloth does not have resilience, compressibility and resilience.").).

The second embodiment in Sonoda (Fig. 1(b) above) is a block form fiber aggregate of glass wool fibers. (Tr. (Leventis) at 1076:16–1077:13.). In this embodiment, blocks of fiber, like clumps of cotton wool, are stuck together to form an aggregate. (*Id.* at 1077:3-13 ("This embodiment, the fiber is in form of block forms, pretty much like cotton balls that have been arranged in an array and has been used as the fibrous reinforcement."); RX-0028 at [0039] (identifying Superfine SPF-210 from Nippon Muki Co., Ltd. as a type of glass wool); *see also* RX-0028 [0025] (The "aggregates [are] formed f[ro]m block-form fiber.").). Dr. Leventis explained that such aggregated clumps are not a sheet—a wide, long, thin and continuous structure like a sheet of paper—but rather an array of clumped aggregates. (Tr. (Leventis) at 1077:7-13, 1078:5–1079:3.).

Moreover, as Complainant pointed out, the term "sheet" was added to the claims during prosecution specifically to exclude this very arrangement of Sonoda, and the examiner confirmed that this "collection of fiber aggregates . . . is considered to be ***non-sheet form***." (JX-0001 (PH of '359 patent) at ASPEN0000353 (emphasis added); Tr. (Leventis) at 1078:14–22; CX-2256C (Leventis Reb.) at ¶ 314.). Dr. Gnade acknowledged that: (i) "sheet" was expressly added by examiner's amendment to distinguish the '359 patent claims over Sonoda; and (ii) the examiner found none of the three embodiments of Sonoda teaches a lofty fibrous batting sheet. (Tr. (Gnade) at 759:16-23.). Dr. Gnade also conceded that "a lofty batting sheet is not just a handful

of lofty batting." (*Id.* at 747:1-8.).

Additionally, Respondents' arguments that the block form aggregate arrangement has resilience is unavailing. Without any supporting evidence, Dr. Gnade opined that the disclosed embodiments necessarily have the required resilience merely because they have low densities. (Tr. (Gnade) at 684:24–685:4, 686:20–687:19; CX-2256C (Leventis Reb.) at ¶¶ 322–24.). However, on cross, Dr. Gnade acknowledged that loftiness and low density are not synonymous. (Tr. (Gnade) at 748:11-16.). Also, without any support, Dr. Gnade testified that because Sonoda discloses that Super Fine SPF-210 is a form of "glass wool," it is necessarily a lofty fibrous batting sheet. (RX-0028 (Sonoda) at [0039]; Tr. (Gnade) at 687:20–688:4.).

As discussed in Section VIII.A.2(a)(i) above with regard to Ramamurthi, Complainant presented evidence that glass wool is and was in 2000 a very broad category that encompasses a multitude of different materials, many of which were not lofty battings. (Tr. (Leventis) at 1026:7-18 (discussing slide CDX-1502C); CX-1870.0001-0005, CX-1870.0008 (ASTM Handbook: Composites); (CX-2256C (Leventis Reb.) at ¶¶ 109-15, 116-27; CX-1870.0001-0005; Tr. (Leventis) at 1024:13–1028:17.).

The third embodiment (Fig. 1(c) above) uses randomly oriented fibers, as in Ramamurthi. (Tr. (Leventis) at 1074:7–1075:7; CX-2256C (Leventis Reb.) at ¶¶ 317–18, 338.). Dr. Leventis explained that without the aerogel, the fibers would collapse into a flat layer of individual fibers without z-axis fibers or intertwining. (Tr. (Leventis) at 1074:7–1075:7; CX-2256C (Leventis Reb.) at ¶¶ 317–18, 338.). This is not a batting, and is also not compressible or resilient, as discussed with regard to Ramamurthi's similar arrangement. (*See* Section VIII.A.2(a)(i), *supra*.). As already discussed, Dr. Gnade acknowledged during the evidentiary hearing and at his deposition that a collection of loose fibers is not a lofty batting. (Tr. (Gnade) at 747:9-11

("Q: And we can agree that a collection of loose fibers is also not a lofty batting; correct? A: Probably not."); JX-0052C (Gnade Dep. Impeachment) at 124:10-14 (Q: . . . Is a collection of loose fibers a lofty batting, sir? . . . [A:] No.").

Sonoda also does not disclose fibrous materials that have the bulk needed to be a lofty batting. (Tr. (Leventis) at 1075:20-25; CX-2256C (Leventis Reb.) at ¶¶ 329-35.). There is no express disclosure of bulk, and Sonoda's arrangements lack this property. (CX-2256C (Leventis Reb.) at ¶ 330.). Considered in isolation from the aerogel, the cloth sandwich of Fig. 1(a) consists of layers of flat (negligible thickness) cloth laid down in layers without sufficient three-dimensional pockets of air or bulk between the fibers. (Tr. (Leventis) at 1075:20-25; 1079:4-14; CX-2256C (Leventis Reb.) at ¶ 332.). The randomly oriented individual fibers arrangement of Fig. 1(c) is similarly a flat layer of fibers absent the aerogel holding it up. (CX-2256C (Leventis Reb.) at ¶ 333.). Moreover, the block form fiber aggregate arrangement of Fig. 1(b) is ambiguous as to whether it has voids between individual fibers (i.e., bulk) or only between fiber blocks (i.e., no bulk). (Tr. (Leventis) at 1079:4-14; CX-2256C (Leventis Reb.) at ¶ 334.).

Respondents asserted that "[Complainant] has not, and cannot, explain how [Figures 3, 4, and 6] in the '359 patent depict fibrous sheets yet ***nearly identical*** Figures 1(a), 1(b), and 1(c)] in Sonoda somehow do not." (RABr. at 119-20; RNBr. at 94.). As the specification of the '359 patent clearly states:

> In another embodiment of this invention, the lofty reinforcing fibrous batting is used in the form of a ***multi-layer laminate*** as shown in FIGS. 3, 4, and 6. ***In addition to including fibrous material batting, the laminates may include layers of materials which will help provide specific characteristics to the final composite structure.***
>
> * * *
>
> FIG. 3 shows a 3 layer laminate consisting of ***a layer of lofty fiber batting 32, a***

> ***fine copper mesh 31, and a second layer of lofty fiber batting 32.*** FIG. 4 shows ***another 3 layer laminate of a layer of lofty fiber batting 42, a woven carbon fiber textile 41, and a second layer of fiber batting 42.***
>
> * * *
>
> FIG. 6 is an exploded view of a laminate consisting of ***a layer of fiber batting 61, a layer of silicon carbide felt 62, a fine copper mesh 63, a layer of silicon carbide felt 62, and a layer of fiber batting 61.***

(JX-0007 at 9:57-62 (emphases added), 10:13-19 (emphases added), 10:60-63 (emphases added).).

As discussed above, Sonoda's Figure 1(a) discloses an aerogel panel in a cloth sandwich arrangement in which layers of ***pure monolithic aerogel (2)*** are sandwiched ***between three layers of cloth (11)*** with negligible thickness (0.1–0.5 mm.). (Tr. (Leventis) at 1075:15-25; CX-2256C (Leventis Reb.) at ¶¶ 309-13 (citing RX-0028 at [0025], [0027]).). Figure 1(b) is an aerogel panel in which a block form fiber aggregate consisting ***glass wool fibers that are clumped together*** is used as the fiber body. (Tr. (Leventis) at 1076:16–1077:13.). Figure 1(c) involves an aerogel panel in which ***randomly oriented loose fibers*** are used as the fiber body. (Tr. (Leventis) at 1074:7–1075:7; CX-2256C (Leventis Reb.) at ¶¶ 317–18, 338.). The configurations illustrated in Sonoda's figures are not "nearly identical" to Figure 3, 4, and 6 of the '359 patent. As explained above, they are substantially different.

For the foregoing reasons, Respondents have not proven by clear and convincing evidence that Sonoda discloses the claimed "lofty fibrous batting sheet."

Respondents argued that Sonoda discloses a continuous aerogel through the batting. (RABr. at 122; RNBr. at 96.). As Respondents pointed out, Complainant did not dispute that Sonoda discloses this limitation. (CPBr. at 142-45.).

Nevertheless, Sonoda does not disclose "a continuous aerogel through ***said batting***." (Tr.

(Leventis) at 1080:2–1081:7.). Dr. Gnade's sole argument that it does relates to the block form fiber aggregate arrangement, which is shown in Figure 4 of Sonoda. (Tr. (Gnade) at 688:5–19 (relying solely on Fig. 4); see also CX-2256C (Leventis Reb.) at ¶ 351; RX-0561C (Gnade Rep.) at ¶ 121; Ex.7.). As discussed above in Section VIII.A.2(b)(i), this arrangement is not a batting sheet. (Tr. (Leventis) at 1080:16–25.). The other two embodiments also do not meet this limitation. The cloth sandwich arrangement, like the sandwich aggregate of Ramamurthi, has pure aerogel ***between*** the batting layers rather than through them. (Tr. (Leventis) at 1081:1–7.). The randomly oriented individual fibers arrangement is also not a batting sheet. (CX-2256C (Leventis Reb.) at ¶ 351 n.12.).

For the foregoing reasons, Respondents have not proven by clear and convincing evidence that Sononda anticipates claim 1 of the '359 patent.

ii. Independent Claim 12

Respondents argued that Sonoda anticipates claim 12 of the '359 patent. (RABr. at 123; RNBr. at 97.).

As an initial matter, two of the limitations of claim 12 are nearly identical to the corresponding limitations of claim 1: (i) "a fibrous batting sheet . . . where the batting is sufficiently lofty"; and (ii) "a continuous aerogel through said batting." For the same reasons discussed in Section VIII.A.2(b)(i) above, Sonoda does not teach "a fibrous batting ***sheet*** . . . [that] is sufficiently ***lofty***," that is, a fibrous batting that "shows the properties of bulk and some resilience," and "a continuous aerogel through ***said batting***."

For example, as discussed in Section VIII.A.2(b)(i) above, Sonoda discloses: (i) an embodiment involving layers of nonwoven cloth; (ii) an embodiment consisting of clumped glass wool fibers; and (iii) an embodiment containing loose fibers. These are not fibrous batting

sheets. (*See* Section VIII.A.2(b)(i)(2), *supra*.). Respondents also failed to establish that the alleged fibrous material used in Sonoda is "***lofty***," that is, having the required resilience and bulk. (*Id.*). Respondents' assertion that fiber density translates into compressibility and resilience is also not supported by the evidence. (Tr. (Gnade) at 686:18–687:19, 642:17-20, 669:10-12; *see also* Section VIII.A.2(b)(i)(2), *supra*.). Lastly, Respondents did not show that Sonoda's embodiments include "a continuous aerogel through ***said batting***," because Sonoda does not disclose the claimed "fibrous batting sheet." (*See* Section VIII.A.2(b)(i), *supra*.). Thus, claim 12 is not invalid as anticipated by Sonoda on these bases alone.

The only additional claim limitation recited in claim 12 is "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section." (JX-0007 at 15:15-19.). Dr. Gnade testified that "similar to what we did . . . for Ramamurthi, . . . the cross-sectional area has to be less than 10 percent because the aerogel has such a low density relative to the batting material, you know, at the fiber level." (*Id.*). As discussed in Section VIII.A.2(a)(iii) above with regard to Ramamurthi, although Dr. Gnade provided plausible testimony that aerogel composites generally must meet this limitation, this is not clear and convincing evidence that Sonoda discloses this limitation.

Accordingly, Respondents have failed to prove by clear and convincing evidence that Sonoda anticipates claim 12.

iii. Dependent Claims 15 and 16

Respondents argued that Sonoda anticipates claims 15 and 16 of the '359 patent. (RABr. at 124-25; RNBr. at 98-99.). These claims depend from claim 12. (JX-0007 at 15:28-35.).

Respondents raised identical arguments for claim 15 as they did for claims 1 and 12.

According to Dr. Gnade, because Sonoda uses fibers such as glass wool (Super Fine SPF 210), Sonoda's composites are necessarily compressible by a minimum of 50% of their thickness and sufficiently resilient that after compression for about 5 seconds, they return to at least 70% of their original thickness. (Tr. (Gnade) at 690:22–691:11; RX-0028 at ¶ [0039].). For the reasons explained in Sections VIII.A.2(b)(i) and VIII.A.2(b)(ii) above with regard to claims 1 and 12, Respondents' assertion that fiber density translates into compressibility and resilience is also not supported by the evidence. (Tr. (Gnade) at 686:18–687:19, 642:17-20, 669:10-12; *see also* Section VIII.A.2(b)(i)-(ii), *supra.*).

With respect to claim 16, Dr. Gnade testified, without any plausible supporting evidence, that if the batting did not retain 50% of its thickness, the resulting product would not be able to function as a flexible, durable insulation product. (Tr. (Gnade) at 658:24–659:4, 722:15-23.). Dr. Gnade's only basis for his opinion is a comparison of the relative sizes of the fibrous component in two (2) figures from Sonoda that are not necessarily drawn to scale. (Tr. (Gnade) at 762:12-18 ("Q: And the basis of your conclusion that claim 16 is taught by Sonoda is that you are comparing the figure, figure 4 with figure 1B; correct? A: Correct. Q: Do you see any scale to those figures disclosed in Sonoda? A: No."); *id.* at 691:12–692:22 (direct testimony on this element).). "[P]atent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue." *Hockerson–Halberstadt, Inc. v. Avia Group. Int'l, Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000).

Additionally, as discussed above in Section VIII.A.2(b)(ii), Sonoda does not clearly and convincingly disclose the following limitations recited in claim 12: (i) the fibrous material used in Sonoda is a "fibrous batting ***sheet***"; (ii) the fibrous material used in Sonoda is compressible or

resilient and has bulk such that it is "***lofty***"; and (iii) the embodiments described in Sonoda include "a continuous aerogel through said batting." Because Sonoda does not disclose the claimed fibrous batting sheet recited in claim 12, it does not disclose: (i) one that "is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness," as claimed in claim 15; or (ii) one that "retains at least 50% of its thickness after addition of the gel forming liquid to form said aerogel," as claimed in claim 16. (Tr. (Leventis) at 1082:17–1083:12; CX-2256C (Leventis Reb.) at ¶¶ 302–328, 336–346, 404-10.).

For the foregoing reasons, and because Sonoda does not anticipate claim 12 from which claims 15 and 16 depend, Sonoda does not anticipate claims 15 and 16. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (holding that because the independent claim was not anticipated, claims depending from the independent claim were also not anticipated) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987).).

c) U.S. Patent No. 6,068,882 ("Ryu") Does Not Anticipate the '359 Patent

The Ryu patent was invented by Jaesoek Ryu, who worked for Complainant's predecessor, Aspen Systems, Inc. (RX-0021 at [75]; *see also* Tr. (Gould) at 110:2-8.). The Ryu patent was filed on April 17, 1998 and issued on May 30, 2000. (*See* RX-0021 at [22], [45]; Tr. (Gnade) at 694:2-7.). The Ryu patent was assigned to Aspen Systems, Inc. (RX-0021 at [73].). As Complainant notes, the Ryu patent was Complainant's predecessor's unsuccessful attempt to create a practical, composite aerogel insulator. (CPBr. at 147; CBr. at 148 n.791 (citing Tr. (Gould) at 112:25-113:6; CX-2256C (Leventis Reb.) at ¶¶ 421-26; *see also* Tr. (Leventis) at

1084:5-12.). Complainant does not dispute that Ryu constitutes prior art. (CPBr. at 142-46; CBr. at 124.).

According to Dr. Gould, one of the inventors of the '359 patent, there was no commercial request for the Ryu material and none was sold after 1999. (Tr. (Gould) at 113:3-6.). By emphasizing the Ryu material's lack of commercial success, Dr. Gould seems to suggest that is a point of validity comparison with the '359 patent as a largely unusable product and whose deficits the '359 patent rectified. Dr. Gould describes Ryu as having been a very different product than the '359 patent, with clear design flaws. (CBr. at 149.).

First, according to Dr. Gould, the Ryu product has a fibrous "mat" combined with "discrete aerogel material that was designed to work as a vacuum insulation material. (Tr. (Gould) at 110:19–111:4.). He noted that the design of the material created under Ryu was to "interrupt fiber-to-fiber contact." (*Id.* at 111:5-7, 118:18-23.). He described the product as being powdery, and not "classically flexible . . .[but] conformable." (*Id.* at 112:1-6.). He testified that one of the most noticeable shortcomings of the Ryu product was that "it shed dust so easily." (*Id.* at 120:12-14.).

Dr. Leventis described the Ryu patent as: (i) using aerogels that stuck to fibers rather than a continuous aerogel through the batting; and (ii) not using a lofty batting, but rather a dense mat. (CBr. at 149 n.796 (citing Tr. (Gould) at 110:17-22).). Dr. Leventis also described the Ryu patent material as being more like "chunks" and testified that Ryu does not talk anywhere about compressibility or resilience of the "fiber matrix." (CBr. at 149 n.798; *see also* Tr. (Leventis) at 1085:1-23.). According to Dr. Leventis, unlike previous aerogel products, the structural arrangement of the fibers mattered (rather than only density) to produce the loftiness of the '359

composite material, and the resilience and compressibility described in the '359 patent. (*See* CBr. at 123 (citing Tr. (Leventis) at 1021:19–1023:1; CX-2256C (Leventis Reb.) at ¶¶ 30-42).).

Complainant also noted that the Ryu patent is distinguished in the '359 patent and was considered by the patent examiner, which even Respondents' expert, Dr. Gnade, acknowledged. (CBr. at 148 n.795 (citing JX-0007 at 2:59-67; Tr. (Gnade) at 780:7-12).). Complainant argued that "it is harder to meet the clear and convincing burden when the invalidity argument is based on the same reference that the PTO already considered." (CBr. at 124 (citing *Sciele Pharma Inc. v. Lupin Ltd.*, 684 F.3d 1253, 1260 (Fed. Cir. 2012).). The *Sciele* opinion actually states that "it ***may be*** harder" to meet this standard but made clear that "whether a reference was previously considered by the PTO, the burden of proof is the ***same***: clear and convincing evidence of invalidity." *Sciele*, 684 F.3d at 1260 (emphases added).

> As the Supreme Court explained . . . there is ***no heightened burden of proof*** when a reference was previously considered by the PTO, and no lowered burden of proof if a defendant raises a new reference or argument during litigation. . . . Importantly, whether a reference was before the PTO goes to the ***weight of the evidence*** . . . .

Id. at 1260-61 (emphases added). Complaint noted that the patent examiner allowed the '359 patent over Ryu. (*Id.*).

Thus, the issue of validity of claims 1, 7, 9 and 12 and 16 of the '359 patent over Ryu pursuant to 35 U.S.C. ¶102 was hotly contested by the experts and the parties. No expert testimony was presented whether Ryu anticipates claims 5 or 15 of the '359 patent. While Complainant contended that none of the claims of the '359 patent are anticipated by Ryu, Staff has agreed with Respondents that claims 1, 7 and 9 are invalid over Ryu. (CBr. at 148; SBr. at 84; RNBr. at 102; RABr. at 128.). Staff departed from Respondents' position and agreed with

Complainant that claims 12 and 16 are not invalid over Ryu. (*See* SBr. at 84.). Respondents did not offer expert validity opinion with respect to claim 15.

This decision finds that Respondents have not proven by clear and convincing evidence that all limitations of claim 1 are anticipated by Ryu. Additionally, Respondents have not proven by clear and convincing evidence that Ryu anticipates claims 7, 9, 12 and 16 and, therefore, they are not invalid under 35 U. S. C. § 102.

i. Independent Claim 1

Complainant argued initially that these terms are part of the preamble, and therefore, are not limiting terms. (*Id.* n.551 (citing *Allen Eng. 'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002). The *Markman* Order, which issued after the Pre-Hearing Briefs were filed, construed the terms "flexible," "durable" and "light-weight" as not being part of a preamble because during prosecution, the patentee clearly relied upon the descriptive properties as distinguishing the '359 patent from prior art, which then transformed these descriptive properties into limitations. (*Markman* Order, App. A at 6 (citing *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (citation omitted)).).

Ryu discloses a composite aerogel product, with insulating properties, that is described as flexible and light-weight. Quoted below are lines from the specification of the Ryu patent that reflect the properties of the product as Ryu discloses them:

> A thermal insulation is produced by forming aerogels interstitially within a fiber matrix.

(RX-0021 at Abstract.).

> The low density aerogels within the composite blanket insulation greatly improve the thermal conductivity performance of the fiber blanket insulation, i.e. reduces the thermal conductivity thereof.

(*Id.* at 1:17-20.)

> It is a still further object to produce a flexible insulation product wherein there are no fiber—fiber contacts.

(*Id.* at 2:66-67.).

> The presence of the closely packed aerogels substantially, completely eliminates open spaces in the insulation and suppresses gas conduction heat transfer and is believed to result in the improved thermal resistance . . . . Highly flexible composite structures may be produced.

(*Id.* at 3:19-25.).

> The fibrous matrix is a critical element of the present invention. The matrix provides a support base to carry the aerogels. Generally, the matrix is flexible so that the composite insulation product will be flexible. In addition, the fibrous matrix provides load carrying capability. Optionally, the matrix is pre-shaped to define a shape of a still flexible but more rigid aerogel insulation product.

(*Id.* at 4:37-44.).

Staff and Respondents agreed that Ryu describes the product of the invention as flexible and light-weight. (SBr. at 100; RABr. at 129-30; RNBr. at 103-04.). While Ryu does not use the word "durable" to describe the product of the invention, Staff and Respondents equate durability with Ryu's language that the "fibrous matrix provides load carrying capability." (SBr. at 100; RABr. at 130; RNBr. at 104 (citing JX-0021 at 4:38-42.).

Respondents noted that Dr. Gnade also testified that because the material Ryu disclosed would be capable of maintaining its structural integrity during the supercritical drying process, it would be durable. (RABr. at 130 and RNBr. at 104 (citing Tr. (Gnade) at 694:21-24; JX-0021 at 4:44-51.). Staff and Respondents agreed that the insulation product disclosed in Ryu would be light-weight relying first upon the Ryu disclosure that "[t]he materials suited for use in forming the fibrous matrix will preferably . . . have a low bulk density, i.e. less than about 0.15, preferably less than about 0.07g/cc." (RABr. at 131 and RNBr. at 104 (citing RX-0021 at 4:44-

52).). The proposition that the Ryu product would be light-weight is supported by Dr. Gnade's testimony. (*See* Tr. (Gnade) at 669:10-12.). Moreover, Respondents also argued, again citing to a Ryu disclosure and Dr. Gnade's testimony, that because the Ryu insulation product would be available in the form of a blanket, it would be light-weight. (RABr. at 131 and RNBr. at 104 (citing JX-0021 at 1:10-11; Tr. (Gnade) at 694:25–695:2).).

Complainant largely abandoned its arguments that the Ryu product was not flexible or light-weight, and focused instead on the Ryu product's durability during and after the hearing. (*See* CBr. at 153-54.). Complainant argued that the Ryu product was not durable "because its powder-based materials disintegrate in everyday use. (*Id.* at 154 n.833 (citing Tr. (Leventis) at 1089:11-24 (other citation omitted)).). To that end, Dr. Gould described working with a Ryu product that shed so much aerogel powder that enveloped him that he was unable to wet his hair and get rid of the powder when he washed his hair. (*Id.* at 154 n.835 (citing Tr. (Gould) at 111:11–112:19, 120:9-17).).

In this instance, this decision adopts Staff's and Respondents' argument that Respondents have proven by clear and convincing evidence that Ryu discloses at least those limitations of claim 1, that the Ryu product is flexible, light-weight and durable.

One of the most contested points among the parties was whether Ryu discloses a "lofty fiber batting sheet" that showed the necessary properties of bulk and resilience.[42] While all parties agreed that Ryu discloses a composite aerogel product with a fibrous material, there the agreement ended. (*See* SBr. at 100; CBr. at 123-39; RABr. at 130-32; RNBr. at 105.).[43] Since

[42] "Bulk" was construed as "air" in the *Markman* Order. (*Markman* Order, App. A at 4.).

[43] A collection of loose fibers may not necessarily be a "lofty batting." (*See* Tr (Gould) at 747:16-25.). A

its Pre-Hearing Brief, Complainant has maintained that the demarcation point for the '359 patent was its "lofty batting" which is defined, in part, by its properties of resilience and compressibility. (*See* JX-0007 at 15:28-35; CPBr. at 98-100; CBr. at 149-50.). Unlike Ryu, the '359 patent specifically requires at least 50% compressibility after more than 20% compression. (*See* JX-0007 at 15:28-35; *cf.* RX-0021 at col. 4:20-22, 53-54.).

Complainant argued, and this decision agrees, that the properties of loftiness, and the degree of resilience and compressibility are properties that distinguish the '359 patent from Ryu. (*See* Tr. (Leventis) at 1084:24–1085:5.). There are no such specific requirements that expressly disclose the properties of the '359 patent in Ryu. It is equally clear that it is worth repeating the *Markman* Order's construction:

> The '359 specification expressly defines a "lofty batting." "For the purposes of this patent, a ***lofty batting is defined as*** a fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)." (JXM-0001 at 7:1-3 (emphasis added).). The '359 specification also discloses, *inter alia*, that bulk is "air" (*id.* at 7:49) and a lofty batting is "sufficiently resilient" if "after compression for a few seconds it will return to at least 70% of its original thickness."

Markman Order, App. A at 4; *see also* CBr. at 98-100.

Staff appears to take issue with the *Markman* construction of "lofty batting" by saying that Ryu discloses lofty batting "when that term is properly construed." (SBr. at 100.). Staff did not say what the "proper construction" is. (*Id.*).[44] If Staff's position is that the loftiness factor hinges on thermal conductivity, the same position it took in its *Markman* Brief, that would limit

---

handful (or several) of lofty batting is not a lofty batting sheet. (*See id.* at 747:1-3.).

[44] Staff's proposed *Markman* construction for "lofty batting" was not adopted because the Staff's proposed construction improperly limited the term to only one of its properties, which was the fibrous material's thermal conductivity. (*See Markman* Order, App. A at 4-6; *see also* SMBr. at 19.).

impermissibly and leave out the other qualities of a lofty batting. (SBr. at 100; *see also* SMBr. at 19.). *See Imaginal Systematic, LLC v. Leggett & Platt, Inc.*, 805 F.3d 1102, 1109-10 (Fed. Cir. 2015) ("This court has repeatedly cautioned against limiting the claimed invention to preferred embodiments or specific examples in the specification."). Moreover, Staff relies on Dr. Gnade's testimony to the exclusion of both Dr. Gould's and Dr. Leventis' testimony. (*See* SBr. at 100 (citing Tr. (Gnade) at 695:6-9, 695:18–697:17).).

Dr. Gnade testified that Ryu was interested in certain fibrous-based material, such as a Q fiber, and a silica based material that has low bulk density that falls within the range of the densities that the '359 patent calls out. (Tr. (Gnade) at 696:11–697:17 (citing RDX-14.100, 109, 113).). Dr. Gnade also noted that Ryu mentions many commercially available fibrous products that ***could be used*** as matrices, and these were available in the form of a "blanket." (*See* Tr. (Gnade) 695:6-9; RX-0021 at 4:53-54.). This appeared to be a superficial comparison.[45] While none of the parties used analogies, anyone who sews or works with cloth knows that a merino wool blanket is different from a lambs wool blanket which is different from a Shetland wool blanket. All are blankets. All are blankets made of wool. However, because of the size of the fibers, their density, and other properties, they each have different warmth, texture, and different

[45] There were a number of comparisons Respondents made between Ryu and the '359 patent that appeared to be superficial and simply did not work. (*See* RABr. at 130-33; RNBr. at 104-07.). For example, the aerogel products disclosed in both '359 and Ryu both have "bulk" because they both contain "air." (RABr. at 130-33; RNBr. at 104-07; *see also* Tr. (Gould) at 115:1–116:2.). So what? Both products use a fibrous material, each of which spring back, at least to some extent. (RABr. at 130-33; RNBr. at 104-07; *see also* Tr. (Gould) at 115:1–116:2.). However, Dr. Gould, described the material disclosed in Ryu as more "conformable" rather than exhibiting the degree of flexibility of the '359 patent. (Tr. (Gould) at 112:1-6; *see also id.* at 111:5-25, 114:5-25.).

durability.[46]

Complainant made the valid point that Dr. Gould never saw or tested the materials that Ryu describes. (CBr. at 150.). Dr. Gnade equated the '359 patent's suggestion that fiberglass can be a suitable material with the Ryu patent's mention of using fiberglass "preshaped fibrous matrices." (*See* Tr. (Gnade) at 597:7-17.). Respondents Alison and Nano both relied upon this same testimony, with the same problems. (RABr. at 130-32; RNBr. at 105-07.). Dr. Gnade's testimony relies almost entirely on an "inherency" argument, which has been rejected in [Section VIII.A.2(a).

Dr. Gnade did not testify explicitly that Ryu discloses resilience, the structure and arrangement of the fibers, or the compressibility that the '359 patent requires. (Tr. (Gnade) at 671:13–672:6, 695:17–697:17.). Moreover, as Complainant noted, Dr. Gnade appeared to equate density with loft. (*See id.* at 748:8-18.). He acknowledged on cross-examination that they are not the same. (*See* CBr. at 127 nn.658-60; *see also* Tr. (Gnade) at 748:11–749:4 ("Q: You agree that loftiness and low density are not synonymous; correct? A: Yes. Q: You can have something that is low density but not be lofty, correct? A: Yes. Q: You can have something that is lofty but low density; correct? A: I think that's harder to do. Q: If I made a lofty batting out of gold, is that a low density batting, sir? A: It would be lower density than bulk gold. . . . Q: But the point is, they're not synonymous, correct? A: Correct.").). Dr. Leventis also provided expert opinion they density and loft are not the same. (*See* CX-2256C (Leventis Reb.) at ¶¶ 86-93.).

---

[46] *See* Wikipedia, Types of wool explained, http://blog.pendleton-usa.com/2017/04/28/types-of-wool-explained-merino-lambswool-shetland-more/.

Density, as Complainant noted, correctly, is an additional requirement in the '359 patent. (CBr. at 127 n.655 (citing JX-0007 at 18:4-11; *see also* CBr. at 127 n.659 (quoting Tr. (Gould) at 269:10-14 ("Q: Does knowing the density of a batting tell you whether something is lofty or not? A: As a single data point, no, it is not a proxy for assessing loftiness.").).

By contrast, when asked if Ryu discloses the compressibility or resiliency requirements of claims 15 and 16 of the '359 patent, Dr. Leventis' unhesitating answer was "No. It does not. Ryu, as I mentioned before, does not mention about compressibility, resilience of the fiber matrix he is using." (Tr. (Leventis) at 1092:21-23.). When asked if Ryu discloses the "retention of the thickness required by claim 16," Dr. Leventis testified "No, it does not." (Tr. (Leventis) at 1092:24–1093:1.).

Another issue that neither Respondents nor Staff addressed is the limitation that the '359 patent discloses with respect to the area of fibers visible in a cross-section of lofty batting. (SBr. at 100; RABr. at 130-32; RNBr. at 105-07.). As Dr. Leventis testified "No, Ryu does not disclose anything about cross sections or areas of fibers within cross sections." (Tr. (Leventis) at 1092:12-13.).

Dr. Gould, who briefly overlapped with Dr. Ryu when they both worked at Aspen Systems, and with the Ryu product, described the Ryu product as more like a "fibrous mat." (Tr. (Gould) at 110:11-22, 112:1-5; *see also id.* at 117:21–118:2) ("A fibrous mat is a 'densely woven or thickly tangled mass,' i.e. dense and relatively stiff fibrous structures with minimum open space between adjacent fibers, if any. And then later on, I summarize what a mat is. 'Generally, mats are compressible by less than about 20 percent and show little or no resilience.'") (referencing JX-0007 at 7:60-64).). Dr. Gould contrasted the Ryu product as a vacuum insulation material which was designed to "interrupt fiber to fiber contact, which precipitated

powder within the structure, and made it "very dusty." (Tr. (Gould) at 110:19–111:12.). He described the material as "being broken into pieces and taped into place. A lot of tape was required. A lot of dust was generated." (*Id.* at 112:1-10.). As Dr. Gould testified, the '359 patent was different because he and the other inventors "thought if we changed the structure of the fiber to make it more flexible, to make it more resilient, to have more air, to literally make it more squishy, that we would be able to fit more aerogel into it." (*Id.* at 114:3-10.).

These are among the distinctions between Ryu and the '359 patent. (*See id.* at 119:5-11.). Ultimately, Dr. Gould's and Dr. Leventis' testimony was not only more persuasive; it was grounded. Dr. Gould worked with the Ryu product. He understood its limits and flaws. As an inventor of the '359 patent, which the patent examiner allowed over Ryu, Dr. Gould was able to describe the differences in properties and utility between the Ryu and the '359 patent. Dr. Leventis looked directly at the disclosures in the Ryu patent, or lack thereof; he did not rely on an inherency principle as Dr. Gnade did. For all the reasons described, it is a finding of this decision that Respondents have not proven by clear and convincing evidence that the Ryu patent discloses a "lofty batting."

The focus of Complainant's argument or the meaning of the term "continuous aerogel through said batting" was different from Respondents' and Staff's based on seemingly different concepts, or even what they were discussing. Complainant appeared to focus on the ***form*** of the aerogel used in the Ryu patent, which is an ***aerogel powder***, as opposed to an aerogel "monolith" and then the ***properties*** that resulted in the final product from the use of a use of aerogel powders. (CBr. at 151-52 (citations omitted).). Complainant argued that Ryu discloses an "aerogel powder that is packed together and comes apart during use." (*Id.* at 151.). Complainant relied on Dr. Gould's testimony that aerogels are known to come in two forms: "continuous"

and "discrete," the latter being made up of "small individual pieces." (*Id.* at 151 nn.813-16.). To Complainant, the inventors/applicants of the '359 patent distinguished their invention from "aerogel powder-fiber compacts." (*Id.* at 152 nn.821-23.). According to the inventors/ applicants, during prosecution history, the '359 patent initially changed the "aerogel monolith" which changed to "a continuous aerogel through said batting," which would exclude powder-fiber compacts. (*Id.*). It is also true, as Complainant asserted, that Ryu discloses aerogel powder that broke up in discrete chunks. (*Id.* at 153 nn. 824-30 (citations omitted).).

By contrast, Respondents and Staff focused on how the product is ***formed***, that is, an aerogel precursor solution is placed around every fiber and aerogel is distributed throughout, thereby leading to a continuous aerogel. (*See* SBr. at 100 (citing Tr. (Gnade) at 695:10-17, 697:18–798:24; RX-0021 at 4:24-33; *see also* RX-0021 at 14:55-60 (the product contains aerogels throughout the fibrous matrix); *see also* RABr. at 133-34; RNBr. at 107-08.).

All parties looked at the same language in Ryu but saw different concepts. Respondents and Staff are correct, that Ryu does, in fact, disclose a fabrication *process* whereby the sol precursor solution is poured into and around the fibrous matrix so that without aging, the precursor to form a gel, the matrix is dried leaving the aerogel product. (JX-0021 at 4:24-33, 14:55-60.).[47] Similarly, Complainant is correct in its argument of the prosecution history and the distinction between the product that formed as result, that is an aerogel fiber that shed and feel apart as discrete chunks.

However, if Ryu is read in its entirety, what is being described in this instance is a ***formation process*** in which the sol precursor surrounds all fibers. That suggests a "continuous"

[47] In the '359 patent, the fibrous matrix and batting are gelled first, and then dried supercritically. (*See* Tr. (Gnade) at 698:4-24.).

aerogel formation process even if what results, as in Ryu, is a product that crumbles into chunks because of the form of the aerogels used, that is powders. Because Complainant's interpretation (and that of Dr. Leventis) more closely adheres to the arguments made to the patent examiner, which the patent examiner accepted, Respondents have not proven by clear and convincing evidence that Ryu discloses "a continuous aerogel through said batting".

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that Ryu anticipates claim 1 of the '359 patent.

ii. Dependent Claim 7

Claim 7 depends from claim 1. Complainant's position is that Ryu does not disclose a dopant, but only an opacifier that coats the fibers. (CBr. at 154 n.836 (citing Tr. (Leventis) at1090:3-25; CX-2256C at ¶¶ 492-94).). When asked what an opacifier is as opposed to a dopant, Dr. Leventis' explanation was not clear, and not supported with any references to Ryu. He testified: "[A] dopant is something that you put into the sol and finds eventually its way trapped inside the aerogel body. . . . You dope the sol in order to dope with particles, let's say, the final aerogel." (Tr. (Leventis) at 1090:11-17.).

By contrast, Dr. Gnade provided a clearer and more expansive explanation that Ryu does disclose a dopant. When he was asked, Dr. Gnade testified: "A dopant is a material that typically you would add to another material in order to change a particular property. Ideally, you want to put in a dopant that changes the property you are interested in but doesn't change other properties negatively. (Tr. (Gnade) at 652:7-13 (citing RDX-14.24).).

In the case of claim 7, Dr. Gnade testified that Ryu uses an opacifier, a coating, and in this case a dopant, in order, to improve the insulation performance of the fiber by precoating a fibrous matrix with a material that is IR opaque, such as a molecular sieve carbon. (*Id.* at

699:12–701:6; *see also* RX-0021 at 8:59-67.). Dr. Gnade testified that when a material such as a carbon sieve is used, it turns the fibers black so that the fibers (material) absorbs infrared radiation (IR) and lessens transfer of heat. (Tr. (Gnade) at 700:20–701:6.).[48] Moreover, Dr. Gnade explicitly testified that there is no requirement that dopants be included "as part of the sol from which the aerogel is produced." (*Id.* at 699:12–701:6; 703:24–704:6.). As Respondent Nano noted, the '359 patent specification merely states that dopants may be dispersed through the aerogel matrix, but does not mention, let alone require, that the dopant must be part of the sol. (JX-0007 at 1:56-57.). Moreover, Dr. Gould, an inventor of the '359 patent, testified that dopants could be used on fibers to stiffen them. (Tr. (Gould) at 162:6-11.).

In this case, Complainant's explanation is not sufficient. However, for the reasons stated above in Section VIII.A.2(c)(i), Ryu does not anticipate claim 1. Since claim 7 depends from claim 1, Ryu does not anticipate claim 7. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987)).

iii. Dependent Claim 9

Claim 9 depends from claim 7. While Ryu discloses the use of a dopant, it does ***not*** disclose the amount of dopant to be used in the claimed composite aerogel by a percentage range of weight of the total weight of the claimed composite. (*Accord* SBr. at 101; CBr. at 155 n.838

[48] Dr. Gould described Complainant's process for making the aerogel composite blankets from a video he was shown early in his testimony. [

]

(citing Tr. (Leventis) at 1091:2-23 ("A: . . . I cannot find anywhere that they are talking about the amount of the coating that is going on the fibers. Q: And will they be inherently present in this amount? A: No."); CX-2256C (Leventis Reb.) at ¶¶ 497-500).).

By contrast, Dr. Gnade testified, without analysis or support, that a person of ordinary skill in the art would understand that the Ryu patent must be 20% or less, inherently, because any amount of dopant above 20% would negatively affect the thermal properties of the aerogel composite. (*See* RABr. at 136 (citing Tr. (Gnade) at 676:1-3, 701:16-18).). Respondents tried to extrapolate to Ryu Dr. Gnade's testimony that use of a dopant in the Ramamurthi composite must be at least 1%, and that more than 20% by weight would have a negative impact. (*See* RABr. at 136-37; RNBr. at 110-11; *see also* Tr. (Gnade) at 701:7-20 (referencing 674:24–676:3; *see also* Tr. (Gnade) at 701:16-18 ("By the time you get to 20 percent, you know, you're going to start having detrimental effects.").).

Moreover, Respondents tried to reinforce Dr. Gnade's conjectural testimony by linking it to Dr. Leventis' testimony in which he states: "I agree with Dr. Gnade that an opacifying dopant . . . would be a small fraction that is much less than 20%." (RABr. at 136-37; RNBr. at 110-11 (citing CX-2256C (Leventis Reb.) at ¶ 256).). Respondents mischaracterized Dr. Leventis' testimony. Dr. Leventis specifically testified that an opacifier as disclosed in Ryu is ***not*** a dopant. (*See* Tr. (Leventis) at 1090:3-14 ("Q: For dependent claim 7, does Ryu disclose that the composite aerogel comprises a dopant? A: Ryu does not disclose a dopant. Q: And why is that? A: Well Ryu is concerned with opacification of his product, and in order to achieve opacifiction, he just coats the fibers with an opacifier. That is not a dopant. It's called an opacifier.").).

As Staff concluded, correctly, Respondents' attempts to bootstrap testimony about Ramamurthi onto Ryu are improper. *See, e.g.*, *King Pharms., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1274 (Fed. Cir. 2010) (noting that a prior art reference anticipates a claim "if each and every limitation is found either expressly or inherently" in ***that reference***) (quoting *Celeritas*, 150 F.3d at 1360). Respondents continually cited to Dr. Gnade's testimony with respect to Ramamurthi, not Ryu. (RABr. at 136 (citing Tr. (Gnade) at 676:1-3); RNBr. at 10, (citing Tr. (Gnade) at 676:1-3).). There are no such disclosures involving ***any amount of necessary dopant*** in Ryu. (*See* SBr. at 101.). Additionally, Respondents distorted Dr. Leventis' testimony.

Complainant also argued that for the first time during the hearing and in Respondents' Post-Hearing Briefs, Respondents noted that Ryu teaches "coating the fibers of the matrix with a thin layer of a low emissive metal." (CBr. at 155 n.839 (citing RAPBr. at 135-36; RNPBr. at 127); *see* RABr. at 137 (citing RX-0021 at 10:34-42, 13:19-21 ("An IR reflective; thin film was deposited on the fibers . . . ."); *see also* RNBr. at 110-11).). Citing to Ryu's use of an emissive level as a coating, Dr. Gnade testified that Ryu discloses that adding an IR reflective copper as a dopant to the aerogel composite is designed to change the thermal properties of the material. (*See* Tr. (Gnade) at 701:21–705:22 (citing JX-0021 at 10:34-42; RDX-0014.0121; RDX-0014.0022).). According to Dr. Gnade's example, the copper (or other metals that Ryu calls out including silver, aluminum and gold) would be used as a type of radiation shield of the fiber coatings that would change the IR transmission and IR reflective. The metals would be used to make the fibers more thermally conductive. (*Id.* at 704:4–705: 22.).

Citing Dr. Gnade's testimony quoted in the preceding paragraph, Respondents also argued that Dr. Gnade confirmed that one of ordinary skill in the art would know to use a

traditional amount of metal, to suggest the weight of the copper used will be between about 1 and 20% of the total weight of the composite. (RABr. at 137-38.).

In turn, Complainant argued that because Respondents did not raise this argument in their Pre-Hearing Briefs (RAPBr. at 135-36; RNPBr. at 127), they waived that argument consistent with Ground Rule 7.2. (CBr. at 155; G.R. 7.2.). This decision did not agree. Ryu was an example of copper as an emissive, which Dr. Gnade merely explained.

However, Respondents' arguments are unavailing for other, obvious reasons. There is not a single disclosure in the Ryu specification, let alone in the claims, about the amount of any dopant that should be used, by weight, by material, or by reference. Dr. Leventis is correct that there is simply no disclosure. (*See* Tr. (Leventis) at 1091:2-23.).

Dr. Gnade offered an opinion, belatedly, about a construct that does not appear anywhere in Ryu. In this case, extrinsic evidence is inherently "less reliable" than intrinsic evidence. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1318-1319 (Fed. Cir. 2005.). Dr. Gnade's testimony and Respondents' arguments are deficient for two (2) additional reasons. Respondents did not raise during claim construction the issue of how one of ordinary skill in the art might infer whether there would be, of necessity, a certain percentage range of dopant that would be infused in aerogel to create thermal conductivity. (*See Markman* Order at App. A.).

Finally, Respondents also argued that the non-existent disclosure in Ryu is ***inherent***. That is not sufficient. *See Bettcher Indus., Inc. v. Bunzl USA, Inc.*, 661 F.3d 629, 639 (Fed. Cir. 2011) (the prior art necessarily must include the claimed limitations, and do so by clear and convincing evidence). Dr. Grade's conclusion about necessary dopant that must be inherent is conclusory and without any support or analysis. He says it is because he says it is. In sum, Respondents' arguments are improper, and factually and legally incorrect. Therefore,

Respondents have not proven by clear and convincing evidence that Ryu anticipates claim 9 of the '359 patent.

Additionally, for the reasons stated above in Section VIII.A.2(c)(ii), Ryu does not anticipate claim 7. Since claim 9 depends from claim 7, Ryu does not anticipate claim 9. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987)).

iv. Independent Claim 12

Ryu does not anticipate claim 12 of the '359 patent because it does not meet all the limitations of claim 12. (*Accord*, CBr. at 155 n.841 (citing Tr. (Leventis) at 1092:7-13; CX-2256C at ¶¶ 501-515; *cf.* Staff Br. at 102; RABr. at 138-139; RNBr. at 112-113.).

While Ryu may contain an aerogel composite that discloses an insulation product that has an aerogel sol infused into the fiber matrix that surrounds the fibers (much like a continuous aerogel), Ryu does not disclose a "lofty batting" let alone a batting that is "sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section." (*See* JX-0007 at 15:14-19; *id.* at 14:42–16:26.). By inference, Dr. Gnade does not dispute there is a lack of an express disclosure of claim 12 in Ryu with respect to fibers that are less than 10% of the total surface area of the cross-section. That is so because he relies upon a Ramamurthi reference that he claims applies to Ryu. (Tr. (Gnade) at 706:4–707:16.). He never addressed the cross-sectional language of claim 12 head-on.

Without analysis, without pictures, without measurements, and without reference to Ryu, Dr. Gnade simply declared in testimony that the cross-sectional area of the fibers of the batting

visible in the cross-section of the composite will be less than 10% of the total surface area of that cross-section would be known to a person of skill in the art. (*See* RABr. at 138; RNBr. at 112 (citing Tr. (Gnade) at 676:18–677:12, 707:1-9.).

Respondents identically described this remaining limitation of claim 12 as nothing more than "a statement of fact that any person of ordinary skill in the art would know . . . ." (*Id.*). (*See Markman* Order at App. A.).

With respect to Ryu, Dr. Gnade explained as he did with Ramamurthi, that because of the large surface area of aerogels, which give aerogels their insulating properties, the fibers of the batting that are visible in the cross section must be less than the total surface area of the cross section. (RABr. at 139; RNBr. at 113 (citing Tr. (Gnade) at 677:9-12).). According to Dr. Gnade, if the percent surface area of the fiber "got anywhere close to 10% of the total surface area of the cross-section, you would have so much fiber that thermal conductivity would start to go up significantly." (Tr. (Gnade) at 677: 9-12).).

First, Dr. Gnade's testimony specifically referenced Ramamurthi, and not Ryu, which both Respondents failed to acknowledge explicitly. (RABr. at 139; RNBr. at 113 (citing Tr. (Gnade) at 677:9-12).). Second, both Respondents changed, and thereby misquoted Dr. Gnade's testimony in their Post-Hearing Briefs to suggest Dr. Gnade testified that if "the surface area of the fiber were more than 10%," thermal conductivity would go up significantly. (RABr. at 139; RNBr. at 113.). In fact, Dr. Gnade's testimony suggests that the cross-section of the surface area must be far less than 10%, without ever saying how much less. The limitation of claim 12 does not provide ***any*** additional language that limits or lowers the 10% ceiling. (JX-0007 at 15:14-19.).

Dr. Gnade's testimony is speculative in terms of Ryu. Respondents' arguments relied

upon testimony he gave with respect to Ramamurthi. Without ever discussing specifically how or why he knows the visible fibers of the Ryu product would be "anywhere close to the 10% of the total surface area of the cross-section," he simply says it is so. Dr. Gnade's testimony is not supported. Moreover, he never addressed the fact that one feature of the Ryu patent is that it has extremely low density, "with no fiber-fiber contacts within the fiber matrix which would permit solid heat transfer through the matrix." (JX-0021 at 3:13-15.). It is not at all clear how the low density of Ryu relates to the percentage of fibers visible in the cross-section which claim 12 requires. For the foregoing reasons, Respondents have not proven by clear and convincing evidence that Ryu anticipates claim 12 of the '359 patent.

v. Dependent Claim 15

Claim 15 depends from claim 12. Dr. Gnade did not offer an opinion on whether Ryu anticipates claim 15 of the '359 patent. (*See* CBr. at 156 n.859 (citing Tr. (Gnade) at 709:8-12.). Respondents did not present a legal argument with respect to whether Ryu anticipates claim 15 of the '359 patent. (*See* RABr. at 138-39; RNBr. at 112-13.). Staff did not take a position. (SBr. at 102.). If, as this decision finds, Ryu does not anticipate claim 12 of the '359 patent (*see* Section VIII.A.2(c)(iv), then claim 15 does not anticipate claim 12 of the '359 patent. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987).). It should be noted that Ryu does not disclose the measurement of resiliency that claim 15 of the '359 patent explicitly discloses. (JX-0007.). Indeed, there is little to no discussion of resiliency in Ryu.

vi. Dependent Claim 16

Ryu does not anticipate claim 16. Claim 16 depends from claim 12. Again, there is no

disclosure in Ryu that the fibrous material described in Ryu is "sufficiently lofty that it retains at least 50% of its thickness" after the addition of a gel. Leaving aside the issue of "fibrous batting," as Dr. Leventis noted correctly, Ryu does not disclose retention thickness, let alone that the fibrous material retains at least 50% of its thickness after addition of gel. (Tr. (Leventis) at 1092:24–1093-4.). Staff agreed. (SBr.at 102-03.).

The same problems that plague Respondents' arguments with respect to whether Ryu anticipates claim 9 of the '359 patent plague Respondents' arguments with respect whether Ryu anticipates claim 16. (*See* RABr. at 139-40; RNBr. at 113-14.). Yet again, without any factual or analytical basis, let alone without a reference to an explicit disclosure in Ryu, Dr. Gnade testified during the hearing that one of ordinary skill in the art would necessarily know that the Ryu material would have to retain 50% of its thickness after addition of an aerogel or it would not function as a flexible, durable product. (RABr. at 139; RNBr. at 113-14 (citing Tr. (Gnade) at 707:18–709:7.).

Dr. Gnade's argument is an argument for inherent disclosure that is legally improper in this case. *Bettcher Indus.*, 661 F.3d at 639. Moreover, the example that Dr. Gnade uses for the percentage of compressibility is based improperly on Dr. Gnade's testimony with respect to Ramamurthi, not Ryu. (RABr. at 139; RNBr. at 113 (citing Tr. (Gnade) at 707:17–709:7.). Equally troubling is that Respondents, again, imported Dr. Gnade's testimony about claim 16 of the '359 patent, which ***does*** contain a specific disclosure about the 50% percentage of thickness retained after the infusion of the aerogel, ***directly into Ryu—where such a disclosure does not exist***. (*See* RABr. at 140; RNBr. at 114 (citing Tr. (Gnade) at 658:24–659:4).).

Finally, Dr. Gnade seemingly assumed that fiberglass, as used in Ryu, would be the same content and structure for all products, some of which are compressible (glass wool insulated

clothing) and some of which are not (fiberglass boat). (*See* CBr. at 156.). This cannot be correct, and is an *ipse dixit* statement even in context. Complainant is correct that whether fiberglass or glass wool products retains its thickness after addition of a gel liquid to form the aerogel depends upon the nature of the fibers, binder and their arrangement. (CBr. at 156 (citing CX-2256C (Leventis Reb. at ¶¶ 532-33).). Aside from Respondents' mischaracterization of certain of Dr. Leventis' testimony, they have not proven by clear and convincing evidence that Ryu anticipated claim 16 of the '359 patent.[49]

Additionally, for the reasons discussed in Section VIII.A.2(c)(iv) above, Ryu does not anticipate claim 12, from which claim 16 depends. Thus, Ryu does not anticipate claim 16 of the '359 patent. *See Certain Static Random Access Memories and Prods. Containing Same*, Inv. No. 337-TA-792, 2013 WL 1154018, at *10 (U.S.I.T.C. Feb. 25, 2013) (citing *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987).).

B. Obviousness

1. Relevant Law

Under 35 U.S.C. § 103(a), a patent is valid unless "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made" to a person having ordinary skill in the art. 35 U.S.C. § 103(a). The ultimate question of obviousness is a question of law, but "it is well understood that there are factual issues underlying the ultimate obviousness decision."

[49] Respondents argued that neither Complainant nor its experts disagree that a batting must retain at least 50% of its thickness if a product is going to have the insulating properties cited in Ryu. (RABr. at 154; RNBr. at 114 (citing Tr. (Gnade) at 97:7-20).). This is not accurate. Clearly, Complainant disagreed with Respondents' and Dr. Gnade's inherency argument, and also argued that there is no such explicit disclosure of a 50% thickness retention of the composite after the addition of the aerogel. (CBr. at 125, 156.).

Richardson-Vicks, 122 F.3d 1476, 1479 (Fed. Cir. 1997) (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966)).

After claim construction, "[t]he second step in an obviousness inquiry is to determine whether the claimed invention would have been obvious as a legal matter, based on underlying factual inquiries including: (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences between the claimed invention and the prior art, and (4) secondary considerations of non-obviousness." *Smiths Indus. Med. Sys., Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1354 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17). The existence of secondary considerations of non-obviousness does not control the obviousness determination; a court must consider "the totality of the evidence" before reaching a decision on obviousness. *Richardson-Vicks*, 122 F.3d at 1483.

The Supreme Court clarified the obviousness inquiry in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 389 (2007). The Supreme Court said:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* and *Anderson's-Black Rock* are illustrative–a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.
>
> Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known

> elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.
>
> * * *
>
> The obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents. The diversity of inventive pursuits and of modern technology counsels against limiting the analysis in this way. In many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature, will drive design trends. Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility.

KSR, 550 U.S. at 417-19.

The Federal Circuit has since held that when a patent challenger contends that a patent is invalid for obviousness based on a combination of several prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007) (citations omitted).

> The TSM[50] test, flexibly applied, merely assures that the obviousness test proceeds on the basis of evidence--teachings, suggestions (a tellingly broad term), or motivations (an equally broad term)--that arise before the time of invention as the statute requires. As *KSR* requires, those teachings, suggestions, or motivations need not always be written references but may be found within the knowledge and creativity of ordinarily skilled artisans.

Ortho-McNeil Pharm., Inc. v. Mylan Labs., Inc., 520 F.3d 1358, 1365 (Fed. Cir. 2008).

"Whether a reference was previously considered by the PTO, the burden of proof is the

[50] TSM is an acronym that stands for teaching, suggestion, motivation.

same: clear and convincing evidence of invalidity." *Sciele Pharma Inc. v. Lupin Ltd.*, 684 F.3d 1253, 1260 (Fed. Cir. 2012) (citing *Microsoft Corp. v. i4i Ltd. P'ship*, 131 S.Ct. 2238, 2250 (2011) (noting that there is no heightened burden of proof when a reference was previously considered by the PTO)). "[T]he fact that references were previously before the PTO goes to the weight the court or jury might assign to the proffered evidence." *Id.*

2. Prior Art References Are Asserted Alone or in Certain Combinations[51]

a) Ramamurthi

Ramamurthi was filed on June 26, 1992, and issued on April 26, 1994. (RX-0011.). Thus, Ramamurthi is prior art to the Method Patents and the Product Patent under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 44-45, 134.). Ramamurthi was cited during prosecution of the Method Patents and the Product Patent and is discussed in their specifications. (Tr. (Schiraldi) at 1168:8-16; CDX-1608 (citing JX-0006 ('123 patent) at 2:19-25; JX-0009 ('890 patent) at 2:18-25); JX-0011 ('359 patent) at 1:62-65; Tr. (Scherer) at 974:21-24.).

Ramamurthi generally discloses rigid and flexible aerogel matrix composites composed of aerogel and fibers dispersed within the aerogel. (*See, e.g.*, RX-0011 at Abstract.). Ramamurthi's aerogel composites are made using a "silica" gel (*id.* at 12:12-28) by conventional batch casting methods (*id.* at 7:34-38; Tr. (Schiraldi) at 1167:23-25; Tr. (Scherer) at 979:9-17).

[51] In their Pre-Hearing briefs, in addition to the prior art references discussed in this section, Respondents alleged that any one of U.S. Patent No. 6,187,250 ("Champagne"; RX-0003); U.S. Patent No. 5,665,442 ("Anderson I"; RX-0029); and U.S. Patent No. 6,899,840 ("Ueda"; RX-0015), in combination with Ramamurthi, render the Method Patents obvious. (RAPBr. at 47, 72; RNPBr. at 39, 69.). Respondents did not present any evidence with respect to these patents during the evidentiary hearing or include any arguments with regard to these patents in their Initial Post-Hearing Briefs. Thus, Respondents waived any validity arguments involving Champagne, Anderson I, and Ueda under Ground Rule 10.1. (*See* G.R. 10.1.).

In batch casting, a catalyzed sol is poured into a stationary mold where it sits undisturbed until a gel is formed, at which point the gel is carefully removed from the mold and dried. (*See generally* Tr. (Gould) at 129:4-22; Tr. (Schiraldi) at 408:1-23, 1175:22-1176:4; Tr. (Scherer) at 961:12–965:2.). Ramamurthi does not include any figures depicting its claimed aerogel matrix composites.

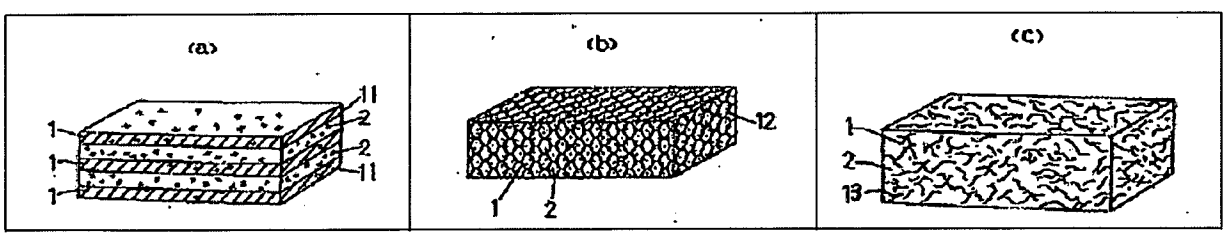
As described in the "Field of the Invention," "[t]he invention has utility in various kinds of thermal insulation and acoustic insulation applications." (RX-0011 at 1:18-19.). Example applications include "refrigeration, appliance, floor, wall and home, airplane body, boats and other marine equipment, and electrical equipment." (*Id.* at 1:19-26; *see also* Tr. (Schiraldi) at 1172:24–1174:1.).

b) Sonoda

Sonoda was published on February 6, 1996. (RX-0028.). Thus, Sonoda is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 142-46.). Sonoda was before the examiner and discussed during prosecution of the '359 patent. (*See, e.g.*, JX-0001 at SPEN0000348-354.).

Sonoda generally relates to an aerogel panel having heat insulating properties. (RX-0028 at [0001].). Sonoda's aerogel panel "comprises a fiber body . . . as core material and an aerogel . . . with a silica backbone that is affixed to this fiber [body]." (*Id.* at [0005].).

Figure 26: Illustration Depicting Embodiments of Sonoda's Aerogel Panels



(RX-0028 at Figs. 1(a), 1(b), 1(c).).

The fiber body increases the strength of the aerogel "so that breakage or disintegration of the aerogel . . . is prevented during handling." (*Id.* at [0025]; *see also id.* at [0003].). The fiber body can be composed of various materials, including "glass fiber, ceramic fiber, polyester, polyamide or other organic macromolecular compounds." (*Id.* at [0025].). Sonoda specifically discloses using glass wool (Super Fine SPF 210) as the fiber body. (*Id.* at [0039].).

c) Ryu

Ryu was filed on April 7, 1998, and issued on May 30, 2000. (RX-0021.). Ryu is thus prior art to the '359 patent under at least 35 U.S.C. §§ 102(a) and (e), which Complainant did not dispute. (*Id.*; Tr. (Gnade) 694:2-7; CPBr. at 146-47.). Ryu was before the examiner and discussed during prosecution of the '359 patent. (JX-0007 at 2:59-67.).

Ryu generally discloses a flexible composite blanket insulation consisting of extremely low density aerogels formed amongst the interstices of a fibrous blanket matrix. (RX-0021 at 1:15-17.). The aerogel-filled fibrous matrix has substantially no fiber-fiber contacts within the fibrous matrix. (*Id.* at 3:11-15.). Each fiber is completely surrounded by aerogels. (*Id.* at 5:37-40.). The examples disclose the use of fiberglass fibers with aerogels to form the claimed aerogel composite. (*Id.* at 11:42-44, 12:44-47.). Ryu does not include any figures depicting its claimed aerogel composite.

d) Moving Element References

i. U.S. Patent No. 4,950,148 ("Nakanishi")

Nakanishi issued on August 21, 1990, and has a filing date of July 13, 1987. (RX-0009.). Thus, Nakanishi is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant did not dispute. (CPBr. at 45-47.). Nakanishi was not considered during examination of the

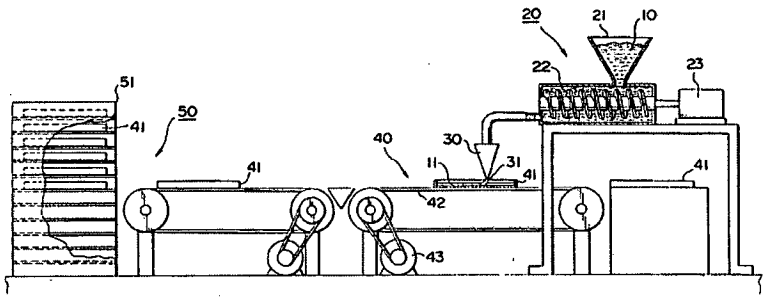
Method Patents.

Nakanishi is directed to "an apparatus capable of automatically processing silicone gel material with high viscosity without manual operation." (RX-0009 at 1:36-41.). Specifically, Nakanishi discloses a conveyor belt system for making gelled thin sheets of silicon. (*Id.* at 2:47–3:51.). Nakanishi discloses two embodiments.

The first embodiment of Nakanishi is shown in Figure 1 below. In this embodiment, hopper 21 stores kneaded silicone gel material 10. (*Id.* at 2:47-65; *see also* Tr. (Schiraldi) at 1179:5-11.). "The screw conveyor **22** supplies under the specified pressure silicone gel material **10** supplied from the hopper **21** to the nozzle **30** and silicone gel material 10 is extruded from the nozzle 30 by virtue of this pressure." (RX-0009 at 2:65-69.).

Figure 27: Side View Illustration Depicting a First Apparatus Disclosed in Nakanishi

FIG. 1

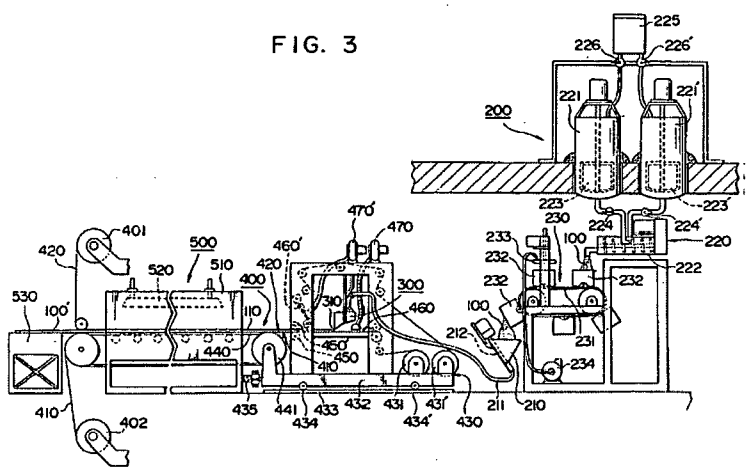


(*Id.* at Fig. 1.).

The second embodiment is shown in Figure 3 of Nakanishi, below. In this embodiment, the gel is kneaded at element **222** into a "gelled solidifiable state of material." (*Id.* at 4:64-69.). After that, the gelled material is fed to the debubbling unit **230** which removes air bubbles from the material. (*Id.* at 4:64-69.). The gelled material then travels through "debubbling tanks **232**" and into hopper **210**. (*Id.* at 5:1-9.). "The pressurized feeding screw **212** is provided inside the

hopper **210** and silicone gel material **100** in the hopper **210** is pushed out toward the nozzle **300**." (*Id.* at 5:37-39.).

Figure 28: Side View Illustration Depicting a Second Embodiment Disclosed in Nakanishi



(*Id.* at Fig. 3.).

ii. U.S. Patent No. 6,123,882 ("Uchida")

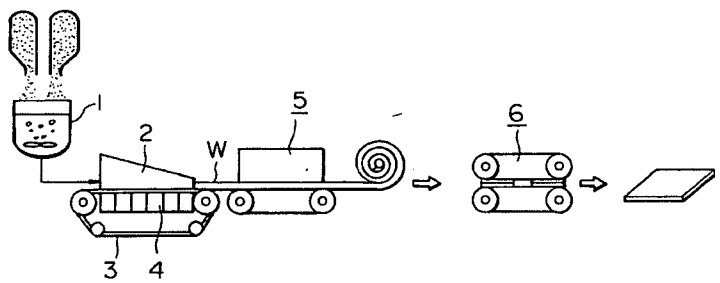
Uchida was filed on August 19, 1996, and issued on September 26, 2000. (RX-0014.). Thus, Uchida is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 48-49.). Uchida was not considered during examination of the Method Patents.

Uchida is directed to manufacturing fiber-reinforced "thermoplastic resin having excellent strength and rigidity" and "high impact strength." (RX-0014 at 1:5-18.). As shown in Figure 1 of Uchida, a thermoplastic resin and dispersed fibers are mixed in an aqueous medium to form a "dispersion." (*Id.* at 2:16-26.). The dispersion is pumped onto a mesh belt **3** which has a suction box **4** underneath it. (*Id.* at 2:26-32.). "For separating the solid component, i.e., the reinforcing fibers and the thermoplastic resin, from the aqueous medium, the mesh belt **3** has small pores penetrating to its reverse surface. The aqueous medium is sucked into the suction

box **4** (FIG. 1) and, by filtration, the reinforcing fibers and the thermoplastic resin assume the shape of a sheet on the mesh belt **3** (of which the mesh openings are smaller than the grain size of the thermoplastic resin)." (*Id.* at 2:24-41.). The sheet-like material then goes through dryer **5**, where the thermoplastic resin is melted and flows around the fibers. (*Id.* at 11:63-68; *see also* Tr. (Schiraldi) at 1193:17-22.).

Figure 29: Illustration Depicting Equipment for Manufacturing a Fiber Reinforced Thermoplastic Resin Sheet Disclosed in Uchida

FIG. 1



(RX-0014 at Fig. 1.).

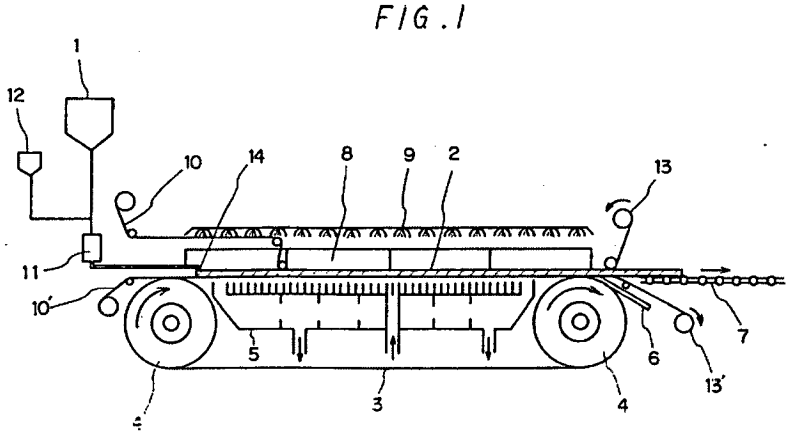
iii. U.S. Patent No. 5,004,761 ("Yada")

Yada issued on April 2, 1991. (RX-0017.). Thus, Yada is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 50-52.). Yada was not considered during examination of the Method Patents.

Yada is directed to a process for the continuous preparation of an acrylic polymer by photopolymerization of a monomer on a moving support. (RX-0017 at 1:6-10.). As shown in Figure 1 of Yada, a monomer solution (in tank **1**) and a photoinitiator solution (in tank **12**) are mixed. (*Id.* at 9:33–10:5.). The solution is then dispensed from monomer feed port **14** onto a belt, where it passes through a gas-tight chamber **8**, is irradiated by ultraviolet lamps **9**, and

begins to gel. (*Id.* at 9:6–10:29, 14:38-44.). After that, the gel is cut into chips and then "pulverized to particles." (*Id.* at 10:30-34; *see also* Tr. (Scherer) at 995:6-12; Tr. (Schiraldi) at 1198:3–1199:16.).

Figure 30: Illustration Depicting an Apparatus Suitable for Practicing the Process Claimed in Yada



(*Id.* at Fig. 1.).

e) Spacer References

i. U.S. Patent No. 6,106,722 ("Chew")

Chew issued on August 22, 2000, and has a filing date of August 12, 1997. (RX-0004.). Thus, Chew is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 54.). Chew was not considered during examination of the Method Patents.

Chew is generally directed to a method of filtering feed liquid that includes a photoresist substance. (RX-0004 at Abstract, 2:10-11.). "The method comprises removing, for example, divalent cations from the feed liquid using an ion exchange material. Fine particles and/or dissolved solids (e.g., soluble monomer and soluble polymer fragments) are removed from the feed liquid using a filter." (*Id.* at 2:12-16.). The filter includes a "membrane" that performs the

actual filtering function, and the membrane has "spacers" between its rolled layers. (*Id.* at 4:38-62.). These spacers allow for faster liquid flow and filtration. (*Id.* at 4:59-62.). Chew does not include any figures depicting its spacers or the inside of its filters.

ii. U.S. Patent No. 4,496,461 ("Leeke")

Leeke issued on January 29, 1985, and has a filing date of June 17, 1983. (RX-0008.). Thus, Leeke is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 54-55.). Leeke was not considered during the examination of the Method Patents.

Leeke is directed to "a novel molecular separation column, e.g. chromatography column, and more particularly to a novel column using a solid stationary phase in cartridge format." (RX-0008 at 1:7-9.). Leeke discloses a "spacer means" between each layer of a spirally-wound fibrous matrix, wherein the spacer means is used to "permit[] the controlled expansion of the swellable media 22 . . ." (*Id.* at 6:50-51.). The spacer means is shown as "mesh **22**" in Figure 2 of Leeke.

Figure 31: Illustration Depicting Cross-Sectional View of the Chromatography Column and Spacers Disclosed in Leeke

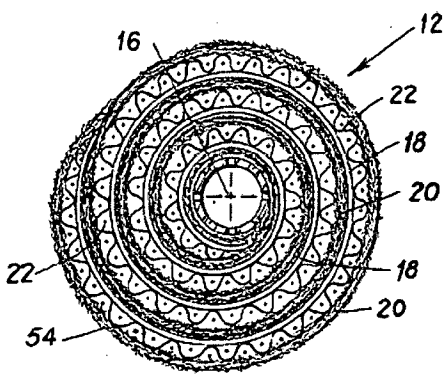


FIG. 2

(*Id.* at Fig. 2.).

iii. U.S. Patent No. 5,073,495 ("Anderson")

Anderson was filed on October 21, 1988, and issued on December 17, 1991. (RX-0001.). Thus, Anderson is prior art to the Method Patents under 35 U.S.C. § 102(b), which Complainant does not dispute. (CPBr. at 47.).

Anderson's "invention relates to molecular biology, and more specifically to genetic engineering techniques for isolating samples of cloned vectors or cloned cells containing recombinant DNA." (RX-0001 at Abstract.). Anderson discloses a process for depositing a culture medium gel onto a film (resembling or identical to film of the type used in motion pictures). (*Id.* at 2:62-63, 8:1-4.). The film includes spacers mounted parallel to the lengthwise edges of the film. (*Id.* at 2:63-65, 8:7-15.). "[W]hen stored in a rolled form, the spacers provide for sufficient air circulation between successive layers of the rolled film to support cell growth." (*Id.* at 2:67–3:3.). The mounted spacers **86** are depicted in Figure 6 below.

Figure 32: Illustration Depicting the Spacers on Film Disclosed in Anderson

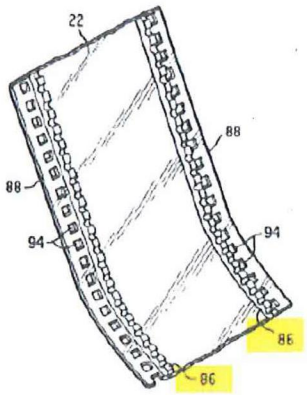


FIG. 6

(*Id.* at Fig. 6.).

3. The '123 Patent Is Not Obvious Over Ramamurthi Combined with Any One of the Moving Element References or in Further View of Any One of the Spacer References

Respondents contended that the following claims are obvious in view of the following combinations of prior art:

Table 11: Asserted 103 Prior Art Combinations

'123 Patent Claims		
15	**16 and 17**	**16, 17, and 19**
Ramamurthi combined with any one of: Nakanishi (RX-0009) Uchida (Rx-0014) Yada (RX-0017)	Ramamurthi combined with any one of: Nakanishi (RX-0009) Uchida (Rx-0014) Yada (RX-0017) in view of any one of: Anderson (RX-0001)	Ramamurthi combined with any one of: Nakanishi (RX-0009) Uchida (Rx-0014) Yada (RX-0017) in view of any one of: Chew (RX-0004) Leeke (RX-0008)

(RABr. at 58; RNBr. at 28.).

As discussed below, Respondents have not proven by clear and convincing evidence that claims 15-17 and 19 are not invalid as obvious over Ramamurthi in combination with any of the additional references identified by Respondents.

a) Independent Claim 15

Respondents argued that claim 15 of the '123 patent is invalid as obvious over Ramamurthi,[52] in combination with any of Nakanishi, Uchida, or Yada. (RABr. at 58; RNBr. at

[52] Ramamurthi was cited during prosecution of the Method Patents and is discussed in their specifications. (Tr. (Schiraldi) at 1168:8-16; CDX-1608 (citing JX-0006 ('123 patent) at 2:19-25; JX-0009 ('890 patent) at 2:18-25); Tr. (Scherer) at 974:21-24.). The Methods Patents were allowed over Ramamurthi. (*See, e.g.*, Tr. (Schiraldi) at 1168:8-16.).

28.).

As an initial matter, it is undisputed that Ramamurthi does not disclose a "moving element" on which a catalyzed sol is dispensed. (Tr. (Scherer) at 871:4-6 ("Q: Does Ramamurthi teach the moving element recited by the method patents' claims? A: She does not."); *id.* at 893:2-14 ("If we combine Ramamurthi with those references, we could use the chemistry of Ramamurthi and the procedures of Uchida to produce a catalyzed sol on a moving element to produce a gel sheet."); Scherer Opening Report ("Scherer Rep."), Ex. 123-1 at 4; Tr. (Schiraldi) at 1169:23–1170:1; Schiraldi Rebuttal Expert Report ("Schiraldi Reb. Rep.") at 216-18.).

Both Complainant's and Respondents' experts agreed that the aerogel composites described in Ramamurthi are manufactured using a ***batch casting method***, and not a continuous casting method. (Tr. (Scherer) at 979:9-17; Tr. (Schiraldi) at 1167:23-25.). During the evidentiary hearing, even Dr. Scherer acknowledged that batch casting methods and continuous casting methods represent "two extremes." (Tr. (Scherer) at 961:12-21.).

To cure this deficiency, Respondents relied on Nakanishi, Uchida and Yada ("Moving Element References") for the "dispensing a catalyzed sol onto a moving element as a continuous sheet" limitation of claim 15. (RABr. at 60; Tr. (Scherer) at 893:2-16.). According to Respondents, "[t]here is nothing novel about scaling up a batch process using a conveyor belt, as demonstrated by references such as Nakanishi, Yada, and Uchida." (RABr. at 11.). Thus, Respondents argued that "common sense should prevail here" because "conveyor belts and continuous processing has been the preferred means for more efficient, large-scale manufacturing for nearly a century." (RABr. at 1.).

Similarly, when asked "how a person of ordinary skill in the art would have put these

teachings together" with Ramamurthi, Respondents' expert, Dr. Scherer testified:

> A: Well, when I was thinking of Ramamurthi's situation, she had prepared material which is essentially the material in these battings. It was a fiber with a silica gel in it that had the properties that were desired. And she used a fiber batting that she probably cut off of a roll that she purchased somewhere. And you can imagine that if their marketing manager came in and suggested that we should scale up the process, you would –
>
> * * *
>
> It just seems to me that a person in Ramamurthi's position who was asked to scale up the process would have recognized that it would be a relatively straightforward process to take the batting and not cut it into pieces but drag it out onto a movable element and roll it up at the end. So the steps that we've seen beyond Ramamurthi's invention are conventional and familiar steps that would not be unexpected from anyone who is scaling up the process.

(Tr. (Scherer) at 936:21–937:16.).

Respondents' and Dr. Scherer's arguments are flawed for several reasons. ***First***, Respondents' and Dr. Scherer' arguments suffer from impermissible hindsight. *See, e.g.*, *Cheese Sys., Inc. v. Tetra Pak Cheese & Powder Sys., Inc.*, 725 F.3d 1341, 1352 (Fed. Cir. 2013) ("Obviousness 'cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention.'") (citing *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998)).

It is undisputed that aerogels and the idea of continuous manufacturing were both around for more than seven (7) decades before the Method Patents. (JX-0023 (Joint Technology Stipulation) at 1; RABr. at 11.). Despite this, Dr. Scherer conceded that he could not identify a single anticipatory reference disclosing an aerogel composite manufactured on a moving element. (Tr. (Scherer) at 973:18-22 ("Q: Despite 70-plus years of literature on aerogels, you are unable identify a single prior art reference that you contend anticipates any of the asserted claims of the method patents; right? A: Anticipates all of the asserted claims, yes.").). In other

words, "nobody . . . ever thought to make aerogels using continuous processes," as Complainant pointed out. (CRBr. at 2.). Respondents simply cherry-picked, with hindsight guidance by the Method Patents, the components that have now been shown to work for the continuous casting of aerogels, and ignored the remaining key components of the Moving Element References that have nothing to do with aerogels.

Respondents' argument that "a POSA could easily have scaled up [Ramamurthi's] production using the continuous process described by Nakanishi, Uchida, or Yada" is purely conclusory and based solely on Dr. Scherer's unfounded opinions. (RABr. at 60 (citing Tr. (Scherer) at 875:4-13, 903:5-10, 905:3–906:2); *but see* Tr. (Scherer) at 875:4-13 ("Q: So again, why is Uchida important to your analysis? A: It's the ubiquity of this kind of a process of depositing a slurry on a sheet and on a moving element and preparing a sheet. It's analogous to papermaking or dying of fabrics or many hundreds of other processes that are analogous that would be in the mind of person of skill in the art and would ***naturally suggest*** to them that, if they were going to upscale a process like Ramamurthi, they would turn to a procedure of this kind.") (emphasis added); *id.* at 903:5-10 ("Q: And if we scaled up Ramamurthi based on Nakanishi or Uchida or Yada, how would this affect rolling, if at all? A: Well, if you scaled up the process to make a long continuous strip, at the end of the conveyor, ***you would have little choice but to roll it up***.") (emphasis added); *id.* at 905:3-8 ("Q: Would a person of ordinary skill in the art have been motivated to use Uchida's teaching of rolling when scaling up Ramamurthi? A: Yes, I think it would be ***natural outcome***. Once one is scaled up onto the moving element, ***you have few choices other than to roll up the product***.").).

This is insufficient as a matter of law. "[E]xpert[] testimony on obviousness [that is] essentially a conclusory statement that a person of ordinary skill in the art would have known . . .

how to combine any of a number of references to achieve the claimed inventions . . . is not sufficient and is fraught with hindsight bias." *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012); *see also KSR*, 550 U.S. at 418 ("A patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently, known in the art."); *Innogenentics, N.V. v. Abbot Labs.*, 512 F.3d 1363, 1373-74 (Fed. Cir. 2008) ("Such vague testimony would not have been helpful to a lay jury in avoiding the pitfalls of hindsight that belie a determination of obviousness."). Here, Dr. Scherer failed to explain how Ramamurthi and the Moving Element References could be combined, which combinations of elements in these references would yield a predictable result, or how any specific combination would operate or read on the asserted claims. *ActiveVideo Networks*, 694 F.3d at 1327.

Second, Respondents have not provided sufficient evidence of a motivation to combine Ramamurthi with Nakanishi, Uchida, or Yada. *PharmaStem Therapeutics*, 491 F.3d at 1360 (when a patent challenger contends that a patent is invalid for obviousness based on a combination of several prior art references, "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, and would have had a reasonable expectation of success in doing so"). Ramamurthi discloses that "long or short fibers of varying thicknesses" were added to "[t]o enhance the mechanical properties of these sol-gel derived monolithic aerogels." (RX-0011 at 4:10-14.).

Example 2 of Ramamurthi also teaches the preparation of a flexible aerogel matrix composite (sheet) in which silica fiber reinforcements are added to a sol-gel solution. (RX-0011 (Ramamurthi) at 12:12-14.). Although the specification of Ramamurthi describes the resulting

aerogel composites as having "a range of flexibility (rigid to flexible)" and "improved mechanical properties," there is nothing in Ramamurthi clearly indicating that the claimed aerogel composites would be strong or durable enough to withstand being manufactured in a different way, much less on a conveyor belt or other type of moving element. Additionally, Ramamurthi discloses that the aerogel composites "are significantly easier to handle compared with conventional aerogels eliminating the need for special gel ***handling*** techniques." (RX-0011 at 6:3-6 (emphasis added).). However, again, Ramamurthi makes no reference to, or even a suggestion that, a different method for ***manufacturing*** the aerogel composites, other than the batch casting method.

In fact, there appear to have been a number of reasons that ***discouraged*** the adoption of a continuous method to make aerogels. As both Complainants and Respondents stipulated, pure aerogels are "fragile and brittle." (JX-0023 (Joint Technology Stipulation) at 2; *see also, e.g.*, RX-0011 at 3:53-59 ("monolithic aerogels are extremely fragile and have low elasticities").). Due to the delicate nature of these aerogels, batch casting methods like those disclosed in Ramamurthi were the exclusive means for manufacturing them prior to inventions claimed in the Method Patents, which Respondents did not dispute. (Tr. (Schiraldi) at 416:5–418:9, 1167:23-25; *see also* Tr. (Scherer) at 959:24–960:2 ("Q: So throughout the process of forming an aerogel from sol to gel to drying, one would take care not to destroy the three-dimensional network; correct? A: Yes.".). After 70 years of making these materials in stationary molds, using a continuous process would have been counterintuitive because it would have been expected to impose additional stresses and damage the sol-gel structures. (Tr. (Schiraldi) at 417:3–418:9, 1175:1–1176:4.).

Nakanishi, Uchida, and Yada do not involve any materials as fragile as Ramamurthi's

aerogel composites or the gels used to make them. For example, Nakanishi is directed to silicone gels that are used as a "buffer material" or "shock absorbing material," and subjects those gels to kneading and extrusion steps appropriate for processing a material with "high viscosity." (RX-0009 at 1:9-10, 1:36-42, 1:42-68, Figs. 1 and 3; *see also* Section VIII.B.2(d)(i), *supra*.).[53] Likewise, Uchida is directed to manufacturing fiber-reinforced thermoplastic resin having "excellent strength and rigidity" and "high impact strength." (RX-0014 at 1:5-18.). The method

[53] Respondents' expert, Dr. Scherer, provided unsupported opinion that the silicone gel disclosed in Nakanishi is made from a catalyzed sol and not a solidified gel. (Tr. (Scherer) at 871:15-25, 892:8-15.). Specifically, he testified that the disclosure of "a gelled solidifiable state of material" in Nakanishi is "an illustration of several cases of oxymorons that appear in this patent, apparently as a result of a translation problem from Japanese." (*Id.* at 896:1-6; *see also id.* at 998:16–999:20, 1001:9-25 (describing Nakanishi as "internally contradictory").). Dr. Scherer explained that "because a gel is already solidified," a person of ordinary skill would recognize that this is a "contradiction" and would conclude that "Nakanishi is delivering a sol" and not a solid gel. (*Id.* at 896:14–897:9.). When asked about the "translation error" on cross-examination, Dr. Scherer testified that he never obtained a translation of the original Japanese application to confirm any error, but assumed "there was an error in Mr. Nakanishi's English" because of the "clear contradictions." (*Id.* at 1001:5–1002:3.). To figure out the "inconsistency," Dr. Scherer explained that "liquids A and B" that he testified are mixed into a "gelled solidifiable state of material" was made by a company Toray, which he discovered had "some sort of collaboration" with Dow Corning. (*Id.* at 999:21–1000:4.). According to Dr. Scherer, he went to the Dow Corning website, found the specification for liquids A and B (RX-0147), and based his testimony on the specification. (*Id.* at 1000:5-24.). Dr. Scherer agreed that the specification referred to a "gel," but that the sheet is using the term "very generally" and is "careless terminology" because it is "aimed at customers. . . . not scientists." (*Id.* at 1277:15–1278:14.). Dr. Scherer's testimony is not only conjectural but also confusing and contradictory. By contrast, Complainant's expert, Dr. Schiraldi, testified that Nakanishi is entirely consistent in its description of a gel being dispensed—not a sol or a catalyzed sol as required by the asserted claims. (Tr. (Schiraldi) at 1178:13-1191:2.). Nakanishi expressly states that a "silicone gel material" is dispensed and uses the past-tense verb "gelled" to describe it. (Tr. (Schiraldi) at 1178:16-22; CDX-1619 (citing RX-0009 (Nakanishi) at 2:65-67, 4:64-68).). As Dr. Schiraldi explained, in both of the embodiments disclosed by Nakanishi, gelation occurs in a ***kneading process prior to dispensing***. In the Figure 1 embodiment in Nakanishi, kneading occurs before the "kneaded silicone gel material" is placed into the hopper 21. (Tr. (Schiraldi) at 1179:5-11 (Fig. 1 embodiment).). In the Figure 3 embodiment, kneading occurs at element 220, which is called the "kneading feeder." (*Id.* at 1179:15-1180:6 (Fig. 3 embodiment); RX-0009 (Nakanishi) at 4:29-35.). Dr. Schiraldi also testified that the Dow Corning specification describes liquid A and B as "thixotropic gels that provide controlled flow," indicating that these are "gels" with "controlled flow." (*Id.* at 1190:8-15; RX-0147 at 2.). The evidence weighs in favor of Dr. Schiraldi's conclusions, which are supported by Nakanishi (RX-0009) and the Dow Corning specification (RX-0147). Moreover, how could one of ordinary skill in the art possibly think there are translation problems without finding out if such a theory is true before testifying? Dr. Schiraldi clearly distinguished the materials and process of Nakanishi.

disclosed in Uchida involves subjecting the reinforced resin to suction and filtration, and later melting, drying, and heat-pressing the reinforced resin to produce "a consolidated sheet . . [that] is generally used as a molding material." (RX-0014 at Abstract, 2:15–3:3, Fig. 1; Tr. (Schiraldi) at 1177:11-13.). Yada is directed to a process for the continuous preparation of a tough acrylic polymer that involves photopolymerization of a monomer on a moving support, which is eventually cut into chips and "pulverized to particles." (RX-0017 at 1:6-10, 10:30-34; Tr. (Schiraldi) at 1177:6-8, 1198:3–1199:16; Tr. (Scherer) at 995:6-12.). Given the very different nature and chemistries of the gels described in Nakanishi, Uchida, and Yada, Respondents did not present any plausible reason for combining Ramamurthi with the methods of manufacture disclosed in these references. *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d at 1327, 1351 (Fed. Cir. 2014) ("A reason for combining disparate prior art references is a critical component of an obviousness analysis; 'this analysis should be made explicit.'") (quoting *KSR*, 550 U.S. at 418); *see also KSR*, 550 U.S. at 418 (arguments need to provide an "articulated reasoning with some rational underpinning" to make the asserted combinations) (citation omitted).

Third, Respondents did not provide any evidence or rationale that the apparatuses disclosed in these references can be used by a skilled artisan to make Ramamurthi's aerogel composites with a reasonable expectation of success. *See, e.g.*, *Pozen Inc. v. Par Pharm., Inc.*, 696 F.3d 1151, 1165 (Fed. Cir. 2012); *see also PharmaStem Therapeutics*, 491 F.3d at 1360.

As Complainants explained, there appear to be significant design challenges that would have discouraged persons of ordinary skill in the art from moving to a continuous process like those used in Nakanishi, Uchida, and Yada to manufacture Ramamurthi's aerogel composites. For example, the chemistry of the catalyzed sol has to be prepared exactly correctly, as it is

dispensed onto the conveyor belt and the degree of gelation on the conveyor belt has to be carefully controlled so that the sheet can be rolled at the end of the conveyor belt. (*See generally* Tr. (Schiraldi) at 417:12–418:9; Tr. (Gould) at 97:21–100:5.). The Method Patents' specifications include detailed examples explaining how these processes can be performed and disclose, among other things, exemplary apparatuses, chemical compositions and temperature controls. (*See, e.g.*, JX-0006 at Examples 1-5; JX-0009 at Examples 1-5.).

Dr. Scherer offered no testimony that describes how to modify Ramamurthi's batch casting process or how the methods disclosed in the Moving Element References could be used to make Ramamurthi's aerogel composites. (*See, e.g.*, Tr. (Scherer) at 992:12-14 (confirming that he is "ignoring most of the detail from Uchida").). With regard to Nakanishi, Dr. Schiraldi opined that other than the conveyor belt itself, almost all the other equipment would be either affirmatively harmful or at best useless if used with an aerogel-precursor sol rather than the tough silicone gel material disclosed in Nakanishi. (*See* Tr. (Schiraldi) at 1191:3-24.).

For instance, Dr. Schiraldi explained that Nakanishi's many devices for moving the already gelled silicone material gel under pressure such as its "screw conveyer," "feeder," or "pressurized feeding screw," would spray the sol liquids out under pressure, and the various pressurized kneaders and debubblers would damage the fragile lattice structure formed during Ramamurthi's sol-gel process. (*See generally id.* at 1181:5–1191:24; CX-2259C (Schiraldi Reb.) at ¶¶ 157-62, 332-37; RX-0009 (Nakanishi) at Fig. 3, 1:42-45, 2:60-69, 4:9-13, 4:64-69.). In addition, Nakanishi does not disclose any fibrous materials or any means to include them in a composite, and Respondents' expert, Dr. Scherer, did not offer any explanation of how Nakanishi could be modified to make a composite material. (Tr. (Schiraldi) at 1178:10-12, 1191:22-24.). Accordingly, Nakanishi's methods would not and could not have been used by

persons of ordinary skill in the art to manufacture Ramamurthi's aerogel composites.

With respect to Uchida, Dr. Scherer testified that the reference is not directed to gels, is "not even representative of sol-gel processes," and is "chemically very different" than Ramamurthi. (Tr. (Scherer) at 874:18-19, 875:2-3, 898:11-16, 992:4-6, 903:23–904:2.). Thus, the mixer used to combine Uchida's thermoplastic resin and fibers would not be used in manufacturing Ramamurthi's composite. (Tr. (Schiraldi) at 1194:4-9.). As Dr. Gould, Complainant's fact witness, pointed out, any sort of vigorous swirling of a catalyzed sol would cause the lattice structure to be disrupted, resulting in a mush or fine powder. (Tr. (Gould) at 99:17-24.). Moreover, Dr. Schiraldi explained that if a sol-fiber mix were dispensed onto Uchida's moving element—a mesh belt—it would simply fall through the holes onto the floor, both because of gravity and because of the suction means located below the mesh belt. (Tr. (Schiraldi) at 1194:10-16.). Dr. Scherer confirmed that "[c]ertainly when you're making silica aerogels, you wouldn't want those vacuums 4 underneath the belt." (Tr. (Scherer) at 988:21–989:5.).

Additionally, while Uchida uses a dryer to melt the thermoplastic resin and fibers together, Dr. Scherer testified that "[y]ou wouldn't want to melt [silica gels]." (Tr. (Scherer) at 990:5-22.). As with Nakanishi, almost none of the equipment disclosed in Uchida would be suitable for manufacturing Ramamurthi's aerogel composites. (Tr. (Schiraldi) at 1194:17-19.). Accordingly, Uchida's methods would not and could not have been used by persons of ordinary skill in the art to manufacture Ramamurthi's aerogel composites.

Like Nakanishi and Uchida, the acrylic polymer disclosed in Yada involves a different chemistry than Ramamurthi's aerogel composite. (Tr. (Scherer) at 900:5-11 ("a person of skill in the art would recognize that the chemistry of Yada could be directly replaced by the chemistry of

Ramamurthi"); *see also* Tr. (Schiraldi) at 1195:3-9, 1197:18-20.). Dr. Schiraldi explained that Yada's polymer is prepared by mixing a monomer solution with a photoinitiator that is activated by the ultraviolet lamps. (Tr. (Schiraldi) at 1196:15–1197:14.). The activated solution begins the polymerization reaction that ultimately gels into Yada's polymer. (*Id.* at 1197:8-17.). Dr. Schiraldi concluded that the ultraviolet lamps to facilitate polymerization, the cooling systems, and the air-tight chamber used to form the polymer of Yada would not be necessary for manufacturing Ramamurthi's composites. (Tr. (Schiraldi) at 1199:1-16.). Dr. Schiraldi testified that the sol-gel process "is not something that happens in this sort of reaction." (*Id.* at 1197:18-24.). Moreover, both experts agreed that Yada teaches pulverizing the polymer sheet into a powder. (Tr. (Scherer) at 995:6-12; Tr. (Schiraldi) at 1198:3-17 (citing RX-0017 (Yada) at 10:30-35).). In addition, Yada does not disclose any fibrous materials or any means to include them in a composite. (Tr. (Schiraldi) at 1195:10-14.). Accordingly, Yada's disclosed methods would not and could not be used by persons of ordinary skill in the art to manufacture Ramamurthi's aerogel composites.

Respondents' expert, Dr. Scherer, testified that Ramamurthi discloses "rolling . . . into a plurality of layers." (Tr. (Scherer) at 891:14–892:3, 901:22–902:1, 907:12-13.). His testimony was based on the disclosure in Example 2 of Ramamurthi that the "silica fiber mat/sheet was rolled up in a cylindrical shape and submerged in minimum methanol." (*Id.* at 891:14–892:3, 901:22–902:1, 907:12-13; *see also* RDX-0015C.62 (citing RX-0011 (Ramamurthi) at 12:12-27).). Dr. Scherer also opined that it would have been obvious to have rolled the dispensed sheets into a plurality of layers. (Tr. (Scherer) at 902:8-10 ("if you scaled up the process to make a long continuous strip, at the end of the conveyor, you would have little choice but to roll it up").).

Complainants argued that Ramamurthi does not disclose "rolling the dispensed sheet into ***a plurality of layers***" but rather rolling "into a cylindrical shape," which does not necessarily have a plurality of layers. (CBr. at 68-70; CRBr. at 29.). According to Dr. Schiraldi, Example 2 of Ramamurthi describes rolling into a single loop which does not have a "plurality of layers." (Tr. (Schiraldi) at 1200:1-1202:3.).

As an initial matter, Ramamurthi does not disclose "the dispensed sheet" because this element refers to the sheet made from "dispensing a catalyzed sol onto a moving element as a continuous sheet," which is not disclosed in Ramamurthi for the reasons described above. Without a teaching in Ramamurthi of the claimed "dispensed sheet," Respondents' arguments fail. "[O]bviousness can only be found when the prior art discloses all limitations of the claim or claims." *LifeScan, Inc. v. Shasta Techs., LLC*, 933 F. Supp. 2d 1243, 1256 (N.D. Cal. 2013), *rev'd on other grounds*, 734 F.3d 1361 (Fed. Cir. 2013) (citing *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003)); *see also In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974) (obviousness requires a suggestion of all limitations in a claim)).[54]

Dr. Scherer's opinions regarding the "rolling the dispensed sheet into a plurality of layers" upon which Respondents rely are merely speculative and lack any evidentiary support. For example, he testified that "[w]hat [Ramamurthi] said was that the gel sheet was rolled up into a cylindrical shape. ***That's what we know. How many layers it would have would depend on how large the sheet was and how small her autoclave was***." (Tr. (Scherer) at 1011:11-17 (emphasis added).). Dr. Scherer also speculated that Ramamurthi "***probably*** had a small bench top autoclave, and therefore, it's ***not implausible*** that she had to roll it into a fairly small shape to

[54] For purposes of providing the Commission with a thorough analysis of the issues in this Investigation, the following analysis is given.

introduce it." (*Id.* at 903:2-4 (emphases added).).

Even if one were to accept *arguendo* Dr. Scherer's speculation that Ramamurthi used a bench top autoclave, given the sizes of the materials disclosed in Example 2 of Ramamurthi (5 inches by 6 inches by a quarter inch thick; 12 inches by 12 inches by half inch thick), Dr. Schiraldi's testimony that "[you] certainly wouldn't be overlapping it and wrapping it around more than once" is persuasive. (Tr. (Schiraldi) at 1200:25–1201:12.). Because Ramamurthi is directed to materials no larger than a square foot, it would appear to have been both undesirable and unnecessary to roll such small materials into a plurality of layers. Moreover, although Ramamurthi describes the aerogel composites as having a "range of flexibility" with "improved mechanical properties," nothing in Ramamurthi suggests that Ramamurthi's aerogel composites could withstand the stresses of rolling something of such a small size into a plurality of layers.

Respondents' expert, Dr. Scherer, presented an alternative opinion that it would have obvious for a person of ordinary skill in the art to modify Ramamurthi to include the step of "rolling the dispensed sheet into a plurality of layers" in view of Uchida.[55] (Tr. (Scherer) at 901:4-11, 903:11-18.). Dr. Scherer testified that once a process is "scaled up on a moving element, you have few choices other than to roll up the product" and that rolling is simply "a natural outcome." (*Id.* at 905:7-8, 905:3-6.).

However, Dr. Scherer failed to identify any disclosure in Uchida of how to roll a ***gel*** sheet into a plurality of layers. Uchida does not involve gels, which Dr. Scherer did not dispute. (Tr. (Scherer) at 898:3-16.). Uchida's thermoplastic resin cools and becomes tough before it is rolled. (*See, e.g.*, RX-0014 at 2:59-65 ("In this drying step, the water content is removed and,

[55] Respondents' expert, Dr. Scherer, did not provide any testimony that Nakanishi or Yada teaches this limitation. (*Cf.* Tr. (Scherer) at 901:4-11; 903:11-18.).

further, the thermoplastic resin is melted by heating to a temperature above the melting point of the resin so as to strengthen the compounding of the reinforcing fibers. The resultant dried web shows excellent fracture resistance and form stability. The web is wound into a roll by a take-up reel in the take-up section."); *see also id.* at Fig. 1; Tr. (Schiraldi) at 1202:8–1202:23 ("almost as soon as it comes out of this oven, it cools down, and it's no longer sticky").). By contrast, with Ramamurthi's gel sheets, a person of ordinary skill in the art would "have to worry about it sticking. You have to worry about it breaking. It's not at all the same process." (Tr. (Schiraldi) at 1202:24–1203:2.).

Respondents argued that the "rolling of sheet-like products is common in industries as diverse as photographic film, newsprint paper, plastic sheets, and textiles." (RABr. at 12, 68; RNBr. at 34, 36.). Respondent Alison asserted that "[b]ecause gel sheets are generally flat and flexible, the most logical solution to transporting and storing material coming off of a moving conveyor belt is to roll the sheet as it reaches the end of the conveyor." (*Id.* at 12.). However, as Complainant pointed out, just because one can roll materials like paper and plastic does not mean one can obviously do the same with the aerogel disclosed in Ramamurthi. (CRBr. at 30; CBr. at 7-9.).

Respondents also have failed to point to any evidence let alone expert testimony explaining ***how*** to roll Ramamurthi's aerogel into a plurality of layers or ***why*** a person of ordinary skill in the art would have known how to do so. Instead, Respondents described the benefits of rolling and suggested that the actual implementation would be "simple." (RABr. at 68 ("Rolling is a particularly advantageous choice: it employs simple equipment, is easy to use, efficiently uses space, and allows for easy transport of the resulting rolls.").). Such conclusory assertions are not clear and convincing evidence of a reasonable expectation of success. *See,*

e.g., *ActiveVideo Networks*, 694 F.3d at 1327 (such conclusory assertions are "fraught with hindsight bias"). This is simplistic at worst and deeply flawed at best because it ignores materials, chemistry, and a process modulated to both.

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that claim 15 of the '123 patent is rendered obvious by Ramamurthi in view of any of Nakanishi, Uchida, or Yada. Accordingly, claim 15 of the '123 is not invalid as obvious over Ramamurthi in combination with any of the Moving Element References.

b) Dependent Claims 16, 17, and 19

Respondents argued that claims 16 and 17 of the '123 patent are invalid as obvious over Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada in view of any of Anderson, Chew, and Leeke. (RABr. at 58; RNBr. at 28.). Respondents also contended that claim 19 is invalid as obvious over Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada in view of any of Chew and Leeke.

For the reasons discussed above in Section VIII.B.3(a), claim 15 is not obvious over Ramamurthi in combination with Nakanishi, Uchida, or Yada. Since claims 16, 17, and 19 ultimately depend from claim 15, Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada in view of any of Anderson, Chew, and Leeke, or Chew and Leeke, does not render obvious claims 16, 17, and 19. *See, e.g.*, *Otsuka Pharm. Co., Ltd. v. Sandoz, Inc.*, 678 F.3d 1280, 1296 (Fed. Cir. 2012) (holding there was no need to separately analyze the lower court's ruling on the asserted dependent claims because the independent claim at issue was not obvious over the asserted prior art).

Moreover, none of the combinations would have obvious to a person of ordinary skill in the art at the time of the invention of the subject matter of the Method Patents. For example, as

Dr. Schiraldi testified and Dr. Scherer acknowledged, Anderson's "spacers" do not qualify as a "spacer ***layer***." (Tr. (Scherer) at 984:7-21; JX-0053C (Scherer Dep.) at 134:19–135:3 ("Q: You don't see a spacer layer in figure 6; correct? A: Well, it's a row of spacers that would create a layer of space. So they're designed to keep the two layers apart, the layers of gel. But the ***spacers themselves do not constitute a layer***. They create a layer.") (emphasis added); Tr. (Scherer) at 984:17-19 ("Q: And would you further agree, Dr. Scherer, that the spacers 86 are not spacer layers; correct? A: And this is not a spacer layer . . . ."); Tr. (Schiraldi) at 1217:1-10.). The configuration of the spacers (86) are shown below.

Figure 33: Illustration Depicting the Spacers on Film Disclosed in Anderson

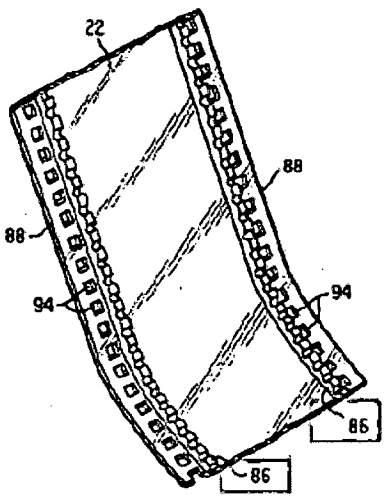


FIG. 6

(RX-0001 at Fig 6.).

Dr. Scherer conceded that the "spacers" in Anderson are the "only way" that Anderson teaches the spacer layer element. (Tr. (Scherer) at 985:6-10; JX-0053C (Scherer Dep.) at 137:22–138:4 ("Q: Well, the way that they've done it in figure 6 is the only way they've taught

it; correct? A: Right. It's the logical way.").).[56]

Specifically, Anderson's spacers are used to prevent the culture samples from being damaged and to allow for air circulation. (Tr. (Schiraldi) at 1215:19–1216:5, 1217:1-10; RX-0001 (Anderson) at 8:20-24.). The spacers are not "spacer layers," but rather small standoffs (3-4mm^2) that are cemented in a row onto the edges of 70mm piece of motion picture film. (Tr. (Schiraldi) at 1215:4-18; 1216:8-25; CDX-1632 (citing RX-0001 (Anderson) at Figs. 6-7, 8:9-20, 12:46-55).). Dr. Scherer admitted that "putting a spacer layer onto Anderson's cell culture film would likely destroy the cell cultures" where they are touched. (Tr. (Scherer) at 985:21-24.).

In addition, it would not have been obvious to combine Anderson with Ramamurthi's aerogel composites. Dr. Scherer conceded that Anderson teaches "gluing . . . spacers **86** onto the movie film." (Tr. (Scherer) at 983:10-12.). While Anderson's spacers are suitable for being glued onto a piece of motion picture film, it would make little sense to glue them onto the periphery of Ramamurthi's gel composite sheets before any rolling of such sheets (if such were even possible, and Dr. Scherer did not explain how it would be). (Tr. (Schiraldi) at 1211:11–1218:9 ("The little stand-offs that are being glued onto the film in Anderson, how are you going to do that onto the gelled sheets that we've been talking about for the last week? It makes no sense. I don't know how you could do that. . . . It would not improve the salability [sic] of your final product, even if you could do it. It's not a good fit.").). In other words, Dr. Scherer conceded that the gluing process disclosed in Anderson would not work in a gel process.

---

[56] During the evidentiary hearing, Dr. Scherer introduced an "additional teaching" in Anderson of a "porous spacer layer" that he "missed" when he provided his deposition testimony on December 23, 2016. (Tr. (Scherer) at 984:19-25, 985:12-17; RX-0001 at 8:20-23.). This alternative argument is not persuasive. As Dr. Schiraldi explained, these "perforated, serrated, or porous spacers" are just minor modifications to the stand-off spacers discussed above. (Tr. (Schiraldi) at 1217:4-10.). Adding holes or serrations to the stand-off spacers do not convert them into a "spacer ***layer***." (*Id.*).

The Chew and Leeke references are not appropriate because they are not analogous art. To begin with, Chew does not involve aerogel composites, aerogels, or gel sheets, much less manufacturing such materials using a continuous process. Rather, Chew relates to filtration systems. (Tr. (Schiraldi) at 1210:1-17.). This difference is further evidenced by the stated field of invention of Chew and the Method Patents, and the subject matter classifications given to them by the PTO. For instance, according to Chew, "[t]he present invention is directed to filtering photoresist-containing liquid and, in particular, to removing fine particles and dissolved solids from such liquid." (Tr. (Schiraldi) at 1210:24-1211:3; RX-0004 (Chew) at 1:3-7.). By contrast, according to the Method Patents, "[t]his invention relates to the preparation of solvent filled gel sheets in a continuous fashion. Such gel sheets are used in manufacturing aerogel blankets, aerogel composites, aerogel monoliths and other aerogel based products." (Tr. (Schiraldi) at 1210:24-1211:3; JX-0006 at 1:16-20; JX-0009 at 1:17-21.). The PTO assigned Chew subject matter classification 210 ("Liquid Purification or Separation") whereas the Method Patents are in class 264 ("Plastic and Nonmetallic Article Shaping or Treating: Processes"). (RX-0004 (Chew) at (52); JX-0006 at (52); JX-0009 at (52).).

Chew's spacers are also not reasonably pertinent to a problem addressed by the Method Patents. (Tr. (Schiraldi) at 1211:11–1213:25.). Chew's spacer is a permanent component in a filtration system, whereas the Method Patents temporarily use a spacer layer to facilitate a drying process. (*Id.* at 1212:2-6, 1211:11–1213:12; CX-2259C (Schiraldi Reb.) at ¶ 107.). Chew's spacers are for separating a filtration media to allow for faster liquid flow and filtration. (Tr. (Schiraldi) at 1211:22–1213:12.). As Dr. Schiraldi opined, contrary to the aims of the Method Patents' spacer layers, it would be undesirable to dry out Chew's filter. (Tr. (Schiraldi) at 1213:9-12.). Chew is not applicable to the Method Patents, even by a long stretch.

Like Chew, Leeke does not involve aerogel composites, aerogels, or gels, and does not describe manufacturing such materials using a continuous process. Rather, Leeke is directed to a chromatography column which, much like filtration, is used to separate materials. (*Id.* at 1205:2-23.).

Figure 34: Illustration Depicting Cross-Sectional View of the Chromatography Column and Spacers Disclosed in Leeke

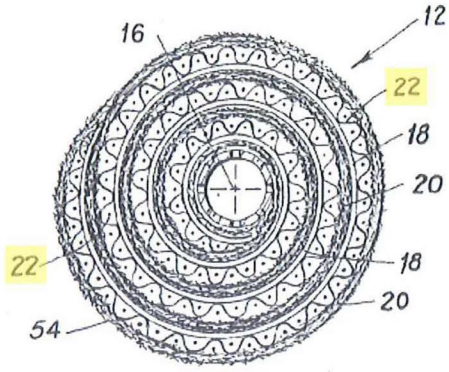


FIG. 2

(RX-0008 at Fig. 2.).

The differences between Leeke and the Method Patents are suggested by their stated fields of invention and the subject matter classifications assigned by the PTO. According to Leeke, "[t]his invention relates to a novel molecular separation column, e.g. chromatography column, and more particularly to a novel column using a solid stationary phase in cartridge format." (Tr. (Schiraldi) at 1205:24–1206:10; RX-0008 (Leeke) at 1:5-9.). By contrast, the Method Patents, "relate[] to the preparation of solvent filled gel sheets in a continuous fashion. Such gel sheets are used in manufacturing aerogel blankets, aerogel composites, aerogel monoliths and other aerogel based products." (Tr. (Schiraldi) at 1210:24–1211:3; JX-0006 at 1:16-20; JX-0009 at 1:17-21.). Like Chew, Leeke is in class 210 ("Liquid Purification or Separation") whereas the Method Patents are in class 264 ("Plastic and Nonmetallic Article

Shaping or Treating: Processes"). (RX-0008 (Leeke) at (52); JX-0006 at (52); JX-0009 at (52).).

Leeke's spacer layers are also not reasonably pertinent to a problem addressed by the Method Patents. (Tr. (Schiraldi) at 1206:11–1208:25.). For example, Leeke's spacers (22 highlighted in Figure 2 above) are a permanent component in a chromatography column whereas the Method Patents' spacer layers are temporarily used to facilitate a drying process. (*Id.* at 1211:22–1212:8; *see also* CX-2259C (Schiraldi Reb.) at ¶ 110.). Leeke's spacers "permit[] the controlled expansion of the swellable media 22 . . ." (Tr. (Schiraldi) at 1207:25–1208:9 (citing RX-0008 (Leeke) at 6:50-51).). Another important difference is that the Leeke's spacer layers are intended to allow liquid to flow radially "***toward*** the center" (as Dr. Scherer testified), and keep (and separate) liquids in the column, whereas the Method Patents' spacer layers allow liquids and vapors to flow "radially ***outward***" in order to dry the rolled gel blanket. (Tr. (Scherer) at 917:7-10 (emphasis added); Tr. (Schiraldi) at 1208:10-25 (emphasis added).).

Respondents took the most simplistic elements of the prior art and equally simplistically tried to pass them off as applicable to the Method Patents when they do not apply. The complexity of the manufacturing methods, the materials used, and the chemistry involved in the prior art by contract to the Method Patents are starkly, clearly different.

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that: (1) claims 16 and 17 of the '123 patent are rendered obvious by Ramamurthi in combination with any of Nakanishi, Uchida, or Yada in view of any of Anderson, Chew, and Leeke; and (2) claim 19 of the '123 patent is rendered obvious by Ramamurthi in combination with any of Nakanishi, Uchida, or Yada in view of any of Chew and Leeke. Accordingly, claims 16, 17 and 19 of the '123 patent are not invalid as obvious over Ramamurthi in combination with

any of the Moving Element References in view of any of the Spacer References.

4. The '890 Patent Is Not Obvious Over Ramamurthi Combined with Any One of the Moving Element References or in Further View of Any One of the Spacer References

Respondents contended that the following claims are obvious in view of the following combinations of prior art:

Table 12: Asserted 103 Prior Art Combinations

'890 Patent Claims	
11-13, 15, 17, and 21-23	**18 and 19**
Ramamurthi combined with any one of: Nakanishi (RX-0009) Uchida (Rx-0014) Yada (RX-0017)	Ramamurthi combined with any one of: Nakanishi (RX-0009) Uchida (Rx-0014) Yada (RX-0017) in view of any one of: Anderson (RX-0001) Chew (RX-0004) Leeke (RX-0008)

(RABr. at 81; RNBr. at 52.).

As discussed below, Respondents have not proven by clear and convincing evidence that claims 11-13, 15, 17-19, and 21-23 are invalid as obvious over Ramamurthi in combination with any of the additional references identified by Respondents.

a) Independent Claim 11

Respondents argued that claim 11 of the '890 patent is invalid as obvious over Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada. (RABr. at 81; RABr. at 52.).

As an initial matter, claim 11 of the '890 patent recites verbatim the limitations of claim

15 of the '123 patent. Accordingly, the "dispensing a sol onto a moving element as a continuous sheet" and "rolling the dispensed sheet into a plurality of layers" limitations are not obvious over Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada, for the same reasons discussed in Section VIII.B.3(a) above. In summary, the Moving Element References are directed to manufacturing processes involving materials with very different chemistries than the aerogel composite described in Ramamurthi.

For instance, the silicone gel disclosed in Nakanishi has "high viscosity" and is useful material as "a buffer material or a shock absorbing material." (RX-0009 at 1:9-10, 1:36-41.). Uchida's thermoplastic resin is described in the reference as "having excelling strength and rigidity," and is used for making various structural members for which "high rigidity" and "high impact" are required. (RX-0014 at 1:11-18.). Yada's acrylic polymer gel can be used as durable drinking cups or desktop organizers. (Tr. (Schiraldi) at 1177:6-8; *see also* CDX-1614 (citing RX-17 (Yada) at 1:6-10).).

Respondents cherry-picked the few aspects of the Moving Element References that look similar in hindsight to the disclosures of the Method Patents. Such hindsight is impermissible an insufficient as a matter of law. *See, e.g.*, *Cheese Sys.*, 725 F.3d at 1352 ("Obviousness 'cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention.'") (citation omitted).). Moreover, Respondents failed to provide sufficient evidence of a motivation to combine Ramamurthi with such disparate references as Nakanishi, Uchida, or Yada. Respondents also failed to provide any evidence or rationale that the apparatuses disclosed in the Moving Element References can be used to make Ramamurthi's aerogel composites.

Although Ramamurthi's specification describes the resulting aerogel composites as

having "a range of flexibility (rigid to flexible)" and "improved mechanical properties," there is nothing in Ramamurthi clearly indicating that the claimed aerogel composites would be strong or durable enough to withstand being manufactured on a conveyor belt or other type of moving element. Ramamurthi also that the aerogel composites "are significantly easier to handle compared with conventional aerogels eliminating the need for special gel ***handling*** techniques." (RX-0011 at 6:3-6 (emphasis added).). However, Ramamurthi makes no reference to or even suggests a different method for ***manufacturing*** the aerogel composites, other than the batch casting method.

For these reasons, the "dispensing a sol onto a moving element as a continuous sheet" and "rolling the dispensed sheet into a plurality of layers" limitations required by claim 15 of the '123 patent and claim 11 of the '890 patent are not obvious over Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada. Thus, claim 15 is not invalid as obvious on these bases alone.

The only additional limitation recited in claim 11 of the '890 patent is "drying the layers." (JX-0009 at 14:2.). Respondents argued that Ramamurthi teaches an aerogel matrix composite consisting "of a bulk or monolith aerogel matrix prepared by supercritical drying of a gel with a fiber-type reinforcement." (RX-0011 at 3:65-67; *see also* Tr. (Scherer) at 870:2-11.).

Because Ramamurthi does not disclose and it would not have been obvious to adapt Ramamurthi to include "rolling the dispensed sheet into a ***plurality of layers***," Ramamurthi necessarily does not disclose "drying ***the layers***."

Moreover, Respondents' contention improperly assumes the existence of a long-sheet of material. Ramamurthi only discloses aerogel composites as large as a square foot, which could have been fit into conventional autoclaves without being rolled into a plurality of layers. (Tr.

(Schiraldi) at 1200:25-1202:3; RX-0011 at Ex. 2.). Given the size of Ramamurthi's disclosed materials, "[y]ou certainly wouldn't be overlapping it and wrapping it around more than once," as Complainant's expert, Dr. Schiraldi, pointed out. (Tr. (Schiraldi) at 1200:25–1201:12.). Moreover, Respondents' expert, Dr. Scherer, failed to demonstrate that the Moving Element References disclose this additional step. (Tr. (Schiraldi) at 1203:10-25.).

For the foregoing reasons, Respondents failed to prove by clear and convincing evidence that Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada, renders obvious the additional limitation of claim 11. Accordingly, claim 11 of the '890 is not invalid as obvious over Ramamurthi in combination with any of the Moving Element References.

b) Dependent Claims 12, 13, 15, 17, and 21-23

Respondents argued that claims 12, 13, 15, 17, and 21-23 of the '890 patent are invalid as obvious over Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada. (RABr. at 81; RABr. at 52.).

For the reasons discussed above in Section VIII.B.4(a), claim 11 is not obvious over Ramamurthi in combination with Nakanishi, Uchida, or Yada. (*See also* Section VIII.B.3(a), *supra*, discussing non-obviousness of claim 15 of the '123 patent.). Since claims 12, 13, 15, 17, and 21-23 ultimately depend from claim 11, these claims are not obvious over Ramamurthi in combination with any of Nakanishi, Uchida, or Yada. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296 (holding there was no need to separately analyze the lower court's ruling on the asserted dependent claims because the independent claim at issue was not obvious over the asserted prior art).

c) Dependent Claims 18 and 19

Respondents argued that claims 18 and 19 of the '890 patent are invalid as obvious over

Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada in view of any one of Anderson, Chew, and Leeke. (RABr. at 81; RNBr. at 52.).

For the reasons discussed above in Section VIII.B.4(a), claim 11 is not obvious over Ramamurthi in combination with Nakanishi, Uchida, or Yada. Since claims 18 and 19 ultimately depend from claim 11, Ramamurthi, in combination with any of Nakanishi, Uchida, or Yada in view of any of Anderson, Chew, and Leeke, does not render obvious claims 18 and 19. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296. Additionally, these claims are not obvious for the same reasons discussed in Section VIII.B.3(b) regarding dependent claims 16 and 17 of the '123 patent.

5. The '359 Patent Is Not Obvious Over Ramamurthi Alone or in Combination with Sonoda or Ryu

Respondents contended that the following claims are obvious in view of the following combinations of prior art:

Table 13: Asserted 103 Prior Art Combinations

	Ramamurthi (RX-0011) Alone	Ramamurthi (RX-0011) and Sonoda (RX-0028)	Ramamurthi (RX-0011) and Ryu (RX-0021)
'359 Patent Claims	1 and 9	1, 5, and 16	1, 5, 9, 12, and 16

(Tr. (Gnade) at 709:16-23; RDX-0014.0131.).

As discussed in further detail below, Respondents have not proven by clear and convincing evidence that claims 1, 5, 9, 12, and 16 are invalid as obvious over Ramamurthi alone

or in combination with Sonoda or Ryu.[57]

a) Ramamurthi

i. Independent Claim 1

Respondents argued that to the extent Ramamurthi is not found to disclose a "lofty . . . batting," which is has not (*see* Section VIII.A.2, *supra*), it would have been obvious to a person of ordinary skill in the art to use a "lofty batting" with the aerogel composite disclosed in Ramamurthi. (Tr. (Gnade) at 711:9-22.).

According to Dr. Gnade, substituting the fibrous batting disclosed in Ramamurthi with a "lofty batting" would have involved nothing more than combining known available prior art elements (i.e., aerogel, lofting batting) based on a known method (i.e., the method disclosed in Ramamurthi).

> So I think, you know, if you look at Ramamurthi, it gives you the idea that, if I make a composite, you know, putting fiber reinforcement in an aerogel, I get these improved properties. Somebody skilled in the art of aerogels, composites, making thermal insulation, I think, would look at the different pieces of Ramamurthi and say gosh, this is an obvious thing to do, you know. Once Ramamurthi showed that I can make an aerogel composite, it opens up all kinds of things that you could go to. I think the fact that Ramamurthi showed that was the key invention in order to be able to make it obvious for other people to go and do that.

(Tr. (Gnade) at 711:12–712:13.).

Dr. Gnade also opined that the result of combining aerogel and lofty batting would have yielded nothing more than predictable results, that is, a flexible, durable, light-weight aerogel

[57] In their Pre-Hearing and Initial Post-Hearing Briefs, Respondents asserted that claims 1, 5, 7, 9, 12, 15, and 16 are invalid as obvious over Ramamurthi alone or in combination with Sonoda or Ryu. (RAPBr. at 153-68; RNPBr. at 145-63; RABr. at 145-67; RNBr. at 120-43.). Respondents' expert on the '359 patent, Dr. Gnade, only provided testimonial support for obviousness of claims 1 and 9 in view of Ramamurthi alone; claims 1, 5, and 16 in view of Ramamurthi and Sonoda; and claims 1, 5, 9, 12, and 16 in view of Ramamurthi and Ryu. (Tr. (Gnade) at 709:16-23; RDX-0014.0131.).

composite to serve as an insulation product. (Tr. (Gnade) at 711:12–712:13 ("So even if one of the particular, you know, pieces were not called out specifically, I think Ramamurthi teaches you all those -- it's obvious from the teachings in Ramamurthi that that's what you want to do.").).

Dr. Gnade's testimony is conclusory, factually unsupported, and "fraught with hindsight bias." *ActiveVideo Networks, Inc. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012) (citing *KSR*, 550 U.S. at 418)). "A patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently known in the prior art." *KSR*, 550 U.S. at 418. Dr. Gnade's generic testimony fails to explain why a person of ordinary skill in the art would have combined Ramamurthi with lofty batting, such as 3M Company's Thinsulate® Lite Loft that is used in the '359 patent, "in the way the claimed invention does." *ActiveVideo Networks*, 694 F.3d at 1328 (citing *KSR*, 550 U.S. at 418). There is nothing in Ramamurthi disclosing, much less suggesting, that the arrangement of the fibrous material, i.e., a lofty fibrous batting sheet, would result in an aerogel composite with the qualities described in the '359 patent.

Rather, Ramamurthi discloses the conventional approach of trying to improve mechanical properties by adding more fibers. (Tr. (Leventis) at 1034:6-14; CX-2256C (Leventis Reb.) at ¶ 160; RX-0011 (Ramamurthi) at 10:52-56 ("[F]lexible AMCs may contain larger amounts of silica fiber . . . as compared to rigid AMCs ..."); *id.* 11:1-5 ("The substantial improvement in the mechanical properties with increasing weight percent fibers provides additional opportunities for rigid and flexible AMCs with no loss in the thermal insulation abilities of the materials.").). Thus, as Dr. Leventis opined, there is nothing in Ramamurthi to guide a person of skill in the art to choose a lofty batting from the "hundreds, perhaps thousands, of glass fiber products which [were] available." (Tr. (Leventis) at 1093:8-22.).

Dr. Leventis' testimony is not contradicted by Dr. Gould's decision to use "new batting" that was different from the Ryu material Complainant had been using previously, as Respondents argued. (*See* RABr. at 147; RNBr. at 121.). To overcome certain "shortcomings" Complainant experienced with the Ryu material, Dr. Gould explained that it was "a compelling idea to be able to apply the world's best thermal insulation properties practically to objects of interest" and "we thought if we changed the structure of the fiber to make it more flexible, to make it more resilient, to have more air, to literally make the material squishy, that we would be able to fit more aerogel into it." (Tr. (Gould) at 113:12–114:10.). Dr. Gould also testified that "if we would make the material more practical, we felt that we could create a market, and we could have a lot of success." (*Id.* at 113:25–114:2.).

That Dr. Gould and the other inventors of the '359 patent contemplated and ultimately decided to modify the batting to one that has more flexibility, resilience, and bulk—that was also commercially available at the time—does not necessarily render this choice obvious. *See, e.g.*, *KSR*, 550 U.S. at 418 ("A patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently, known in the art."). As simple as such a modification may appear in hindsight, as Dr. Leventis stated, none of the prior art thought to use such lofty battings in composite aerogels. (CX-2256C (Leventis Reb.) at ¶ 761.). The PTO agreed. In allowing the issuance of the '359 patent, the PTO concluded that the prior art references, including Ramamurthi, "fail to teach or suggest using ***a lofty fibrous batting sheet*** through a continuous aerogel." (JX-0001 (PH of '359 patent) at ASPEN0000353 (emphasis in original).).

Respondents contended that because Ramamurthi was attempting to solve the same problem as the '359 patent—finding a flexible aerogel composite to serve as an insulation

product—a person of ordinary skill would have selected a fibrous material that had flexibility, bulk, and good thermal properties. (Tr. (Gnade) at 642:17-20.). However, "knowledge of a problem and motivation to solve it are entirely different from motivation to combine particular" prior art elements. *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008); *see also id.* ("A generalized motivation to develop a method is not the kind of motivation required by the patent laws."). "[T]here must be some ***articulated reasoning*** with some ***rational underpinning***" to support his conclusions, which Dr. Gnade's testimony wholly lacks. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (emphases added).

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that Ramamurthi renders claim 1 of the '359 patent obvious. Accordingly, claim 1 of the '359 is not invalid as obvious over Ramamurthi.

ii. Dependent Claim 9

Respondents argued that to the extent claim 9 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), it would have been obvious to a person of skill in the art of use a dopant disclosed in Ramamurthi in the claimed amount. (RABr. at 149; RNBr. at 124.). Claim 9 depends from claim 7, which recites "[t]he composite article of claim 1, further comprising a dopant."[58] (JX-0007 at 14:63-64.). Claim 9 recites "[t]he composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite." (*Id.* at 15:3-5.).

With regard to the addition of dopants, there is no dispute that dopants were known in the art at the time of the '359 patent. (Tr. (Gould) at 161:15-18 ("Dopants were used by others and

[58] Dr. Gnade did not opine that claim 7 is invalid as obvious over any reference or references. (Tr. (Gnade) at 709:16-23.).

reported in the literature well before your group began doing work on the '359 patent; correct? A: Correct. Q: And those dopants or additives were used for purposes such as to modify the structure to influence mechanical responses or chemical responses; is that correct? A: That could be the case, yes."); Tr. (Gnade) at 652:7-13 ("Q: Dr. Gnade, what is a dopant? A: A dopant is a material or substance that typically you would add to another material in order to change a particular property. Ideally, you want to put in a dopant that changes the property you're interested in but doesn't change other properties negatively. So it's there to serve a specific purpose.").).

With respect to having a dopant present in the claimed range, Respondents rely solely on conclusory statements made by Dr. Gnade that "because of the role the dopant plays, you have to have some. It has to be at least 1 percent. And because we don't want to have detrimental effects, . . . it is going to be less than 20 percent." (Tr. (Gnade) at 675:6–676:3.). Both experts agreed that a dopant would be less than 20 percent. (CX-2256C (Leventis Reb.) at ¶ 500 ("I agree with Dr. Gnade that an opacifying dopant . . . would be a small fraction that is much less than 20% . . . ."); Tr. (Gnade) at 676:1-3, 701:16-18.).

However, the experts disagreed as to whether such a dopant would be more than 1 percent. Dr. Gnade testified that "an amount less than 1 [percent] or less than about 1 [percent] ***probably*** will not have the effect that you want." (*Id.* at 717:16-19 (emphasis added).). This testimony is vague and speculative. He also opined that "you have to put in enough in order to make [the aerogel composite] more opaque or to change the optical properties. So there has to be some. It has to be more than zero. So we're going to put in a small amount or 1 percent." (*Id.* at 653:80-15.). This is not a sufficient explanation why the dopant has to be "***at least 1 percent.***" Dr. Leventis provided testimony to the contrary. Confirming that Ramamurthi does

not provide any percentages of necessary dopant, Dr. Leventis testified that because the opacifiers discussed in Ramamurthi "absorb[] a lot of IR radiation, . . . you want as small an amount as possible . . . ***below 1 percent, or way below 1 percent.***" (Tr. (Leventis) at 1051:1-13 (emphasis added); *cf. id.* at 1150:9-14 (confirming that use of dopants in aerogel products in the range of 1 to 20 percent was known in the art).). In view of Dr. Leventis' opposing opinion, Dr. Gnade's testimony is neither clear nor convincing.

Additionally, for the reasons discussed above in Section VIII.B.5(a)(i), claim 1 is not obvious in view of Ramamurthi. Since claims 7 and 9 ultimately depend from claim 1, these claims are not obvious in view of Ramamurthi. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296.

b) Ramamurthi with Sonoda

i. Independent Claim 1

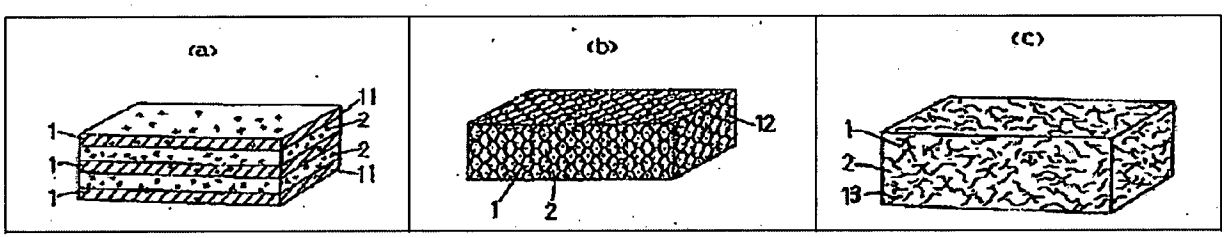
Respondents asserted that to the extent Ramamurthi is not found to disclose a "lofty . . . batting," which it has not (*see* Sections VIII.A.2, VIII.B.5(a), *supra*), it would have been obvious to one of ordinary skill in the art to use the "lofty batting" disclosed in Sonoda with the aerogel composite disclosed in Ramamurthi. (Tr. (Gnade) 712:22–713:10.).

According to Dr. Gnade, using Sonoda's "lofty batting" would have involved nothing more than combining known, available prior art elements (i.e., aerogel, lofty batting) according to known method (i.e., the method disclosed in Ramamurthi). (*Id.* at 712:22–713:10 ("I'm already trying to make a thermal insulation out of an aerogel composite. So I think it would be obvious to put the two of those together to get the required properties or the desired properties that you wanted.").). However, as discussed above in Section VIII.B.5(a)(i) with regard to Ramamurthi alone, Dr. Gnade's testimony is conclusory, factually unsupported, and based on impermissible hindsight. *See, e.g.*, *ActiveVideo Networks*, 694 F.3d at 1327; *KSR*, 550 U.S. at

418 ("A patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently known in the prior art.").

To begin with, it is unclear from Dr. Gnade's testimony to which of Sonoda's embodiments, examples, or figures he is referring as Sonoda's "lofty batting" or Sonoda's "fiber reinforcement batting." (Tr. (Gnade) at 712:22–713:10.). As illustrated in Figures 1(a)-(c), Sonoda describes 3 embodiments: (i) an aerogel panel in a cloth sandwich arrangement in which layers of pure monolithic aerogel are sandwiched between three layers of cloth with negligible thickness (0.1–0.5 mm) (Fig. 1(a)); (ii) an aerogel panel in which a block form fiber aggregate consisting glass wool fibers that are clumped together is used as the fiber body (Fig. 1(b)); and (iii) an aerogel panel in which dispersed fibers are used as the fiber body (Fig. 1(c)).

Figure 35: Illustration Depicting Embodiments of Sonoda's Aerogel Panels



(RX-0028 at Figs. 1(a), 1(b), 1(c).).

As discussed in Sections VIII.A.2(b)(i) and VIII.A.2(b)(ii) above with regard to Respondents' anticipation contentions by this prior art reference, Sonoda does not disclose the claimed "lofty batting sheet." There is no disclosure in Sonoda suggesting that any of the fibrous bodies have resilience/compressibility or bulk. In fact, Sonoda does not once describe any of its fiber bodies as "resilient," "compressible," or the like. Throughout the reference, the reinforced aerogel panels are described as having "improved ***strength***." (RX-0028 at [0003] ("The present invention . . . has the objective of providing an aerogel panel with improved ***strength*** while

maintaining its heat insulating properties.") (emphasis added); *id.* at [0025] ("The ***strength*** of the aerogel (2) is increased by using the fiber body (1) for the core so that breakage or disintegration of the aerogel (2) is prevented during handling.") (emphasis added); *id.* at [0028] ("The resulting aerogel panel has improved ***strength*** . . . .") (emphasis added); *id.* at [0034] ("By using this fiber body (1) as a core, the ***strength*** of the aerogel (2) is increased while maintaining heat insulation properties.") (emphasis added).). Thus, it is clear that Sonoda is directed primarily to adding strength to aerogel panels.

Sonoda discloses that the "bend strength" of certain examples was "measured for strength." (*Id.* at [0044].). The Sonoda measurements are displayed in Table 1. (*Id.* at [0046], Table 1.). However, Sonoda does not define what this measurement means, how the measurement for each example was taken, or the significance of the actual measurements. Likewise, Dr. Gnade provided no testimony on this matter. The fact that there are no other references to Sonoda's fiber bodies as "resilient," "compressible," or the like, strongly suggests that "bend strength" has very little relevance, if at all, to the resilience or compressibility of a material.

Given the embodiments described in Sonoda, Respondents' contention that a person of ordinary skill would have had reason to make the Ramamurthi composite aerogel using Sonoda's fiber body and that this combination would have predictably resulted in "a flexible, durable, light-weight aerogel composite" is unavailing and without any evidentiary support. (Tr. (Leventis) at 1095:1-7 ("So when you read Ramamurthi, you want to find out about how to make flexible blank[ets].. When you read Sonoda, he states that he wants to improve the strength of panels. So it is – when you're looking for flexibility, you don't go look for somebody who talks about rigid panels in order to find something to combine, you know."); RABr. at 156; Tr.

(Gnade) at 711:12–712:13, 715:8-24.).

For the foregoing reasons, Respondents failed to prove by clear and convincing evidence that Ramamurthi in combination with Sonoda renders claim 1 obvious. Accordingly, claim 1 of the '890 is not invalid as obvious in view of Ramamurthi and Sonoda.

ii. Dependent Claim 5

Respondents asserted that to the extent claim 5 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), Ramamurthi combined with Sonoda renders it obvious. (RABr. at 157; RNBr. at 132; Tr. (Gnade) at 716:3–717:6.). Claim 5, which depends from claim 1, recites "[t]he composite article of claim 1, wherein the lofty fibrous batting consists essentially of fibers having a thermal conductivity less than 50 mW/m-K." (JX-0007 at 14:55-57.).

Dr. Gnade opined that it would be obvious to a person of ordinary skill in the art to combine Sonoda with Ramamurthi to provide an aerogel product with fibers with a low thermal conductivity because the purpose of the teachings in Ramamurthi and Sonoda is to provide a suitable insulation product with low thermal conductivity. (Tr. (Gnade) at 716:3–717:6.). In its Initial Post-Hearing Brief, Complainant did not dispute that Ramamurthi meets this limitation. (CBr. at 161-62.).

Nevertheless, for the reasons discussed above in Section VIII.B.5(i), claim 1 is not obvious in view Ramamurthi in combination with Sonoda. Since claim 5 depends from claim 1, claim 5 is not obvious in view of Ramamurthi in combination with Sonoda. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296.

iii. Dependent Claim 16

Respondents argued that to the extent claim 16 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), the combination of Ramamurthi and Sonoda renders it obvious.

(RABr. at 160; RNBr. at 128.). Claim 16 depends from claim 12. Respondents contended that Ramamurthi, either alone or in combination with Sonoda, renders obvious claim 12.[59] (RABr. at 160; RNBr. at 128.).

As an initial matter, two of the limitations of claim 12 are nearly identical to the corresponding limitations of claim 1: (i) "a fibrous batting sheet . . . where the batting is sufficiently lofty"; and (ii) "a continuous aerogel through said batting." For the same reasons discussed in Sections VII.A.2 and VIII.B.5(b)(i) above, neither Ramamurthi nor Sonoda teaches "a fibrous batting . . . [that] is sufficiently ***lofty***," that is, a fibrous batting that "shows the properties of bulk and some resilience," and "a continuous aerogel through ***said batting***."

In summary, with regard to Ramamurthi, Respondents did not: (i) provide any evidence that the glass wool disclosed in Ramamurthi is ***lofty*** batting with bulk and resilience; and (ii) demonstrate that glass wool is used in the embodiments on which Respondents rely. (*See* Section VIII.B.5(b)(i), *supra.*). With respect to Sonoda, Respondents failed to establish that the fiber bodies disclosed in Sonoda are "fibrous batting ***sheets***." (*See id.*). Moreover, with regard to Ramamurthi and Sonoda, Respondents did not proffer sufficient evidence that fiber density corresponds directly to compressibility and/or resilience. (*Id.*). Because Respondents did not prove that Ramamurthi and Sonoda disclose the claimed "fibrous batting sheet," Ramamurthi and Sonoda cannot disclose "a continuous aerogel through ***said batting***." (*Id.*).

Additionally, Respondents relied on conclusory and unsupported testimony from Dr. Gnade that was also fraught with hindsight. As discussed in Section VIII.B.5(a)(i) above regarding Respondents' obviousness contentions of claim 1 based on Ramamurthi alone, Dr.

[59] Dr. Gnade did not opine that claim 12 is invalid as obvious over Ramamurthi and Sonoda. (Tr. (Gnade) at 709:16-23.).

Gnade provided generic testimony that a person of ordinary skill in the art would have combined Ramamurthi with lofty batting because doing so would have involved nothing more than combining known available prior art elements. (Tr. (Gnade) at 711:12–712:13.). Dr. Gnade gave similar testimony for why a person of ordinary skill would combine Ramamurthi and Sonoda. (Tr. (Gnade) at 712:22–713:10 ("If for some reason you didn't think Ramamurthi actually disclosed a lofty batting, it would be pretty straightforward, if that was your one limitation that Ramamurthi didn't have, you would say gosh, Sonoda gives me that, why don't I put the two of these together, because I'm already trying to make a thermal insulation out of an aerogel composite. So I think it would be obvious to put the two of those together to get the required properties or the desired properties that you wanted."). However, "[a] patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently known in the prior art." *KSR*, 550 U.S. at 418. Additionally, Dr. Gnade failed to provide "some articulated reasoning with some rational underpinning" to support his conclusions. *In re Kahn*, 441 F.3d at 988.

The only additional claim limitation recited in claim 12 is "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section." (JX-0007 at 15:15-19.). As discussed in Sections VIII.A.2(a)(iii) and VIII.A.2(b)(ii) above with respect to anticipation of claim 12 by Ramamurthi and Sonoda, Dr. Gnade provided plausible testimony that aerogel composites generally must meet this limitation. (*See* Sections VIII.A.2(a)(iii), VIII.A.2(b)(ii).). However, this does not meet the clear and convincing standard required to demonstrate that the fibrous material disclosed in either Ramamurthi or Sonoda disclose this limitation.

Moreover, since claim 12 is not obvious in view Ramamurthi in combination with Sonoda, claim 16, which depends from claim 12, is not obvious in view of the same. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296. In conclusory fashion, Dr. Gnade opined that "it would be obvious to try, because [Ramamurthi and Sonoda], you know, are aerogel matrix composites. If for some reason Ramamurthi didn't meet the requirement [of claim 16], it would be obvious to look for somebody else's fiber material that did retain 50 percent and use that as your fiber reinforcement. . . . . And [Sonoda] teach[es] it. So you would look to combine [Ramamurthi and Sonoda] to give you this particular part of claim 16." (Tr. (Gnade) at 723:1-16.). In doing so, Dr. Gnade did not refer to a single portion or embodiment of Sonoda as allegedly disclosing this feature.

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that the combination of Ramamurthi and Sonoda render obvious claim 16. Accordingly, claim 16 of the '890 is not invalid as obvious over Ramamurthi in combination with Sonoda.

c) Ramamurthi with Ryu

i. Independent Claim 1

Respondents argued that to the extent Ramamurthi is not found to disclose a "lofty . . . batting," which it has not (*see* Sections VIII.A.2, VIII.B.5(a), *supra*), it would have been obvious to a person of ordinary skill in the art to use the "lofty batting" disclosed in Ryu with the aerogel composite disclosed in Ramamurthi. (Tr. (Gnade) at 712:22-713:10.).

Similar to his testimony regarding the combination of Ramamurthi and Sonoda, Dr. Gnade opined that using Ryu's "lofty batting" would have involved nothing more than combining known, available prior art elements (i.e., aerogel, lofty batting) according to known

method (i.e., the method disclosed in Ramamurthi). (Tr. (Gnade) at 712:22–713:10.). He testified that because both Ramamurthi and Ryu teach the use of fibrous reinforcement to add mechanical stability while maintaining the desired thermal insulation properties, one of ordinary skill could have created the invention of the '359 patent simply by substituting the fibrous batting disclosed in Ramamurthi with the "lofty" batting disclosed in Ryu. (Tr. (Gnade) at 714:8-15, 715:1-4 ("all you would have to do is change one thing in one in order to be able to make the properties that you want. And because they're so close together, I do think it would be obvious to try").). This is insufficient as a matter of law. *See, e.g.*, *ActiveVideo Networks*, 694 F.3d at 1327; *KSR*, 550 U.S. at 418 ("A patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently known in the prior art.").

As discussed in Sections VIII.A.2(c)(i) and VIII.A.2(c)(iii) above, Ryu does not disclose the claimed lofty batting. Dr. Gould explained that the composite disclosed in Ryu had two design flaws: (i) it used aerogel particles stuck to the fibers rather than a continuous aerogel through a batting; and (ii) it did not use a lofty batting but a dense mat. (Tr. (Gould) at 110:17-22.). As a result, as the '359 patent explains, any kind of flexure of the Ryu product shed very large quantities of aerogel powder; its thermal performance was significantly degraded as compared to aerogel alone; and it was readily fractured. (JX-0007 at 2:59-67.).

Dr. Gould provided the following testimony regarding the difference between the batting used in Ryu and the lofty batting claimed in the '359 patent.

> Q: First of all, the improved or changed batting that you decided to use in place of the Ryu batting, how was the new batting that you had in mind different from what Ryu used?
>
> A: The battings that we were focused on had a lot more aerospace, and ***they had***

> ***a much more resilient and stretchy character, if you will, where the material could be squished to remove air, and it would bounce back if you release the compressive force.*** That, as a substrate for the material, was very compelling. And when we combined it with a continuous sheet of aerogel throughout the structure, it made a material that was more flexible, had the same thermal physical properties, more or less, as the continuous sheet, and it was rather extraordinary.
>
> Q: Did you come to apply a name or label to this new type of batting that you were substituting for the Ryu-type batting?
>
> A: To give it a name, we called it lofty. We were intending to get more loft, more bulk, and to really pick up on that resilience property.

(Tr. (Gould) at 115:18–116:12 (emphasis added).).

Moreover, Dr. Gould explained that the change from Ryu's "mat" to "lofty batting" was "remarkable."

> Q: So I asked you about the change to the aerogel and what affect that had. Overall, what was the impact, in your experience, of making both these changes to the Ryu material, so in other words using a lofty batting instead of a mat and using the continuous aerogel instead of the powder?
>
> A: Combining the lofty batting instead of a mat with the continuous phase of the aerogel throughout the volume of the structure was remarkable. Like I said, it was ***so different than the materials that we had been working with that were fragile, delicate, shed powder, would crack, would break, would tear.*** These materials were really astounding.
>
> (Tr. (Gould) at 121:22–122:9 (emphasis added).).

Ryu does not disclose that its fiber arrangements have the necessary resilience. (Tr. (Gnade) at 695:18–697:17.). As Dr. Leventis pointed out, Ryu provides a list of desired features of the fibrous material, and resilience is not one of them. (Tr. (Leventis) at 1085:9–18; RX-21 (Ryu) at 4:43-57; CX-2256C (Leventis Reb.) at ¶¶ 442-43.). Dr. Gould also provided testimony that the '359 patent's section distinguishing "dense fiber mats" as different from lofty battings was written specifically with Ryu's dense mats in mind. (Tr. (Gould) at 117:12–118:9 (discussing JX-0007 at 7:60–8:2).).

Similar to his testimony with respect to Ramamurthi in Sections VIII.A.2(a) and VIII.B.5(a)(i) above, Dr. Gnade asserted that all the fibrous elements disclosed in Ryu must necessarily be sufficiently resilient because they have a density of about 0.07 or 0.15 g/cc. (Tr. (Gnade) at 696:11–697:6.). He gave no evidence to support this assumption, and acknowledged that low density cannot be equated with loftiness. (*Id.* at 748:11-16.). Likewise, Dr. Gnade provided an unsupported assumption that because Ryu discloses the use of fiberglass fibers in some embodiments, it inherently refers to a lofty fibrous batting sheet. (*Id.* at 696:22–697:17.). However, as discussed in Sections VIII.A.2(a) and VIII.B.5(a)(i) above, Complainant presented evidence that fiberglass is, and was in 2000, an extremely broad category that encompasses a multitude of different materials and arrangements with a great variety of different physical, mechanical, and thermal properties, most of which were not lofty battings.

Dr. Gnade testified to his new assertion during the evidentiary hearing—not raised in either his expert report or in Respondents' Pre-Hearing Briefs—that because one particular kind of fiber (Q-Fibers) in Ryu has a thermal conductivity that is not in the range disclosed by the '359 patent, it somehow follows that this must necessarily be a lofty fibrous batting sheet. (RX-0561C (Gnade Rep.) at ¶¶ 144, 146-47; RNPBr. at 124-26; Tr. (Gnade) at 695:18–696:10.). Under Ground Rule 7.2, his testimony on this new theory is deemed waived. (*See* G.R. 7.2.).

Because Ryu does not disclose the claimed "lofty fibrous batting sheet," Ryu does not disclose "a continuous aerogel through ***said batting***." Moreover, Dr. Gould gave uncontradicted testimony that aerogels are known to come in two forms, "continuous" and "discrete," the latter being made up of "small individual pieces." (Tr. (Gould) at 100:3-5, 100:17-21.). Dr. Gould explained that these two forms have radically different properties, including very different strengths, transparency and refraction, acoustic properties, and thermal insulation characteristics,

and that as a result they are useful for different applications. (Tr. (Gould) at 100:3-5 ("But the physical properties of the materials are different when they are in a continuous form versus a powder form or a discrete form."); *id.* at 102:1-20 (physical properties); *id.* at 102:21–103:2 (acoustic properties); 103:3-10 (thermal properties); *id.* at 103:11–104:18.).

Dr. Leventis opined that the plain meaning of "continuous" in the art, which is consistent with its use in the '359 patent and its prosecution history, is the opposite of "discrete" and thus, opposite of an aerogel that consists of discrete chunks. (Tr. (Leventis) at 1084:14-16; *see also id.* at 311:24-25, 331:5-7, 347:15-16; CX-2256C (Leventis Reb.) at ¶ 748.). Dr. Gnade confirmed this. (Tr. (Gnade) at 740:13-15 ("Q: [T]he scope of the claims excludes aerogel powders; right? A: Yes."); *id.* at 802:12-14 ("Q: So an aerogel powder, would that be continuous? A: So no, just the powder, I wouldn't say. I would say that's not continuous."); *id.* at 730:16-21 ("Q: And we can agree that 'continuous aerogel,' in your opinion, is met by 'monolithic aerogel' in Ramamurthi; correct? A: Yes."); *id.* at 735:5–7 ("Q: In your mind, those are synonymous terms? A: Yes.").).

The '359 patent and its prosecution history confirm that a "continuous aerogel," under its plain meaning, is one that is not made up of discrete chunks of aerogel packed together. The '359 patent distinguishes Ryu on the ground that "[t]he aerogel contents of the [Ryu] product were an aerogel powder rather than an aerogel monolith." (JX-0007 at 2:59-62.). In addition, during prosecution, the applicants expressly distinguished their invention from "aerogel powder-fiber compacts" such as those disclosed in Ryu. (JX-0001 at ASPEN0000297.). Moreover, the claim language when the applicants made these distinctions expressly included "an aerogel monolith," which was later changed to the present "a continuous aerogel through said batting." *(Id.)*. The applicants made it clear at the time of the change that the new language was intended to have

exactly the same scope, thus confirming that the plain meaning of "continuous aerogel" also excludes such powder-fiber compacts. (*Id.*).

Dr. Gnade agreed. (Tr. (Gnade) at 735:13-18) ("Q: And we can agree that the inventors explicitly stated in the file history that the claimed subject matter is distinct from aerogels that are formed by joining together of aerogel particles or granules in a binder; right? A: Yes.); *id.* at 739:23–740:6 (Q: . . . So the inventor of the '359 patent is telling the examiner that he has revised his claim language no longer to read 'aerogel monolith' but to read a 'continuous aerogel'; right? A: Yes. Q: And the inventor is also telling the examiner that, despite the revision to read 'a continuous aerogel,' the scope of the claims has not changed; right? A: Yes.").).

There is no dispute that Ryu discloses aerogel powder, i.e., discrete aerogel chunks. (Tr. (Leventis) at 1088:12–1089:7.). Dr. Gnade agreed that "Ryu was forming powders through its process" (Tr. (Gnade (citing JX-0052C (Gnade Dep. Impeachment) at 127:13–128:5)) at 782:4-10; *id.* at 781:13-16.). Ryu shows aerogel powder particles in its figures (RX-0021 at Fig. 1B) and Ryu explains that its composites contain "closely packed aerogels"—i.e., discrete powder particles. (Tr. (Leventis) at 1088:12–1089:7; CX-2256C (Leventis Reb.) at ¶ 467; RX-0021 at 3:19-21, 4:21-22, 3:15-16.). Dr. Leventis explained that this powder results in part because Ryu supercritically dries the sol without letting it gel first, meaning that small powder particles form rather than a continuous aerogel. (CX-2256C (Leventis Reb.) at ¶¶ 468–69; RX-0021 at 2:36-41.). Again, Dr. Gnade agreed. (JX-0052C (Gnade Dep. Impeachment) at 127:13–128:5 ([Q:] Do you know what happens when an aerogel precursor is supercritically dried without allowing it to gel first? A: It shrinks. . . . Q: Ryu was forming powders through its process, correct? A: You know, they go directly from the sol to the supercritical drying. So it does shrink. So, yes,

you do get powders.").).

Dr. Gnade also testified that the result of combining Ramamurthi's aerogel and Ryu's "lofty batting" would have yielded nothing more than predictable results: a flexible, durable, light-weight aerogel composite to serve as an insulation product. (Tr. (Gnade) at 711:12–712:13, 713:11–714:7 ("Ryu calls out fiberglass. The '359 calls out fiberglass as a preferred material to use. So if for Ramamurthi [does not disclose] a lofty batting... I would look at Ryu and say gosh, they have a good lofty batting, why don't I put that with Ramamurthi and between the two of those, I would be able to get a good aerogel composite material."). Dr. Gnade's testimony is not persuasive and unsupported by the evidence.

As Dr. Gould and Dr. Leventis pointed out, Ryu is Complainant's predecessor's own earlier, commercially unsuccessful attempt to create a practical composite aerogel insulator. (Tr. (Gould) at 112:25–113:6; CX-2256C (Leventis Reb.) at ¶¶ 421-26.). Dr. Gould explained that Ryu was "not a commercially attractive" or "viable material," and that since 1999, no customer has ever asked Complainant to make it. (Tr. (Gould) at 112:25–113:6, 273:25–274:1.). According to Dr. Gould, none of the applications and customers who use Complainant's materials ever used Ryu-type material. (*Id.* at 124:21-23.). Dr. Gould also testified that that the inventors conceived of using the '359 patent's lofty batting sheet in part because they were dissatisfied with the battings used in Ryu. (Tr. (Gould) at 113:12–116:12; CX-2256C (Leventis Reb.) at ¶¶ 424-26.). Thus, Respondents' argument that combining Ramamurthi with Ryu would have predictably resulted in a flexible, durable, light-weight aerogel composite is contrary to the evidence; it is counter-factual.

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that the combination of Ramamurthi and Ryu render obvious claim 1 of the '359 patent.

Accordingly, claim 1 of the '359 is not invalid as obvious in light of Ramamurthi and Ryu.

ii. Dependent Claim 5

Respondents asserted that to the extent claim 5 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), Ramamurthi combined with Ryu renders it obvious. (RABr. at 163; RNBr. at 138-39; Tr. (Gnade) at 716:3–717:6.). Claim 5 of the '359 patent depends from claim 1. Claim 5 recites "[t]he composite article of claim 1, wherein the lofty fibrous batting consists essentially of fibers having a thermal conductivity less than 50 mW/m-K." (JX-0007 at 14:55-57.).

Dr. Gnade opined that it would be obvious to a person of ordinary skill in the art to combine Ramamurthi with Ryu to provide an aerogel product having fibers with a low thermal conductivity because the purpose of the teachings in Ramamurthi and Ryu is to provide a suitable insulation product with low thermal conductivity. (Tr. (Gnade) at 716:3–717:6.). In its Initial Post-Hearing Brief, Complainant did not dispute that Ramamurthi meets this limitation. (CBr. at 161-62.).

Nevertheless, since claim 1 is not obvious in view Ramamurthi in combination with Ryu, claim 5, which depends from claim 1, is not obvious in view of the same. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296.

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that the combination of Ramamurthi and Ryu render claim 5 obvious. Accordingly, claim 5 of the '359 is not invalid as obvious in view of Ramamurthi and Ryu.

iii. Dependent Claim 9

Respondents asserted that to the extent claim 9 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), Ramamurthi combined with Ryu renders it obvious. (RABr. at

164; RNBr. at 139-40.). Claim 9 of the '359 patent depends from claim 7. Claim 7 depends from claim 1. Claim 7 recites "[t]he composite article of claim 1, further comprising a dopant." (JX-0007 at 14:63-64.). Claim 9 recites "[t]he composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite." (*Id.* at 15:3-5.).

Respondents argued that Ramamurthi combined with Ryu renders claims 7 and 9 obvious.[60] Respondents contended that it would have been obvious to one of ordinary skill to combine combine Ryu with Ramamurthi to provide an aerogel product with a dopant because it is undisputed that the use of dopants was well-known in the art and the purpose of the teachings in Ramamurthi and Ryu is to provide a suitable insulation product with low thermal conductivity. (RABr. at 163; RNBr. at 140.).

As Dr. Gnade testified with regard to the obviousness of this claim over Ramamurthi alone (*see* Section VIII.B.5(a)(ii), *supra*), he opined that "an amount less than 1 or less than about 1 probably will not have the effect that you want." (Tr. (Gnade) at 717:16-18.). However, neither reference discloses the addition of a dopant that is at least 1%. Moreover, Dr. Leventis provided opposing testimony. (Tr. (Leventis) at 1051:4-13 ("So you want as small an amount as possible so you do not compromise the properties of the aerogel. So small amount as possible means, if possible, below 1 percent, or way below 1 percent.").).

Additionally, since claim 1 is not obvious in view Ramamurthi in combination with Ryu, claim 9, which ultimately depends from claim 1, is not obvious in view of the same. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296.

---

[60] Dr. Gnade did not opine that claim 7 is invalid as obvious over any reference or references. (Tr. (Gnade) at 709:16-23.).

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that the combination of Ramamurthi and Ryu render claim 9 obvious. Accordingly, claim 9 of the '359 is not invalid as obvious in view of Ramamurthi and Ryu.

iv. Independent Claim 12

Respondents asserted that to the extent claim 12 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), Ramamurthi combined with Ryu renders it obvious. (RABr. at 164; RNBr. at 139-40.). Claim 12 recites "[a] composite article comprising a fibrous batting sheet and a continuous aerogel through said batting, where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section." (JX-0007 at 15:14-19.). For the reasons discussed in Section VIII.B.5(c)(1) above, the combination of Ramamurthi and Ryu do not disclose "a fibrous batting sheet . . . [that] is sufficiently lofty" and "a continuous aerogel through said batting." (*See* Section VIII.B.5(c)(1), *supra*.).

To summarize, with regard to Ramamurthi, Respondents did not: (i) provide any evidence that the glass wool disclosed in Ramamurthi is ***lofty*** batting with bulk and resilience; and (ii) demonstrate that glass wool is used in the embodiments upon which Respondents rely. (*See* Section VIII.B.5(c)(1), *supra*.). With respect to Ryu, Dr. Gould testified that the '359 patent's section distinguishing "dense fiber mats" as different lofty battings claimed in the '359 patent was written specifically with Ryu's dense mats in mind. (Tr. (Gould) at 117:12–118:9 (discussing JX-0007 at 7:60–8:2).). With respect to Ramamurthi and Ryu, Respondents did not proffer sufficient evidence that fiber density corresponds directly to compressibility and/or resilience. (*See* Section VIII.B.5(c)(1), *supra*.). Because Respondents did not show that Ramamurthi and Ryu disclose the claimed "fibrous batting sheet," Ramamurthi and Sonoda

cannot disclose "a continuous aerogel through ***said batting***." (*Id.*).

Respondents contended that to the extent Ramamurthi is not found to expressly disclose batting "sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section," Ramamurthi combined with Ryu renders obvious claim 12 because Ryu discloses such a "sufficiently lofty" batting. (RABr. at 164; RNBr. at 140-41.). Dr. Gnade provided generic testimony that using such a batting would have involved nothing more than combining known, available prior art elements (i.e., aerogel, sufficiently lofty batting) according to a known method (i.e., the method disclosed in Ramamurthi). (Tr. (Gnade) at 713:15–714:7 ("if I have Ramamurthi and I have everything but the lofty batting, I would look at Ryu and say gosh, they have a good lofty batting, why don't I put that with Ramamurthi, and between the two of those, I would be able to get a good aerogel composite material").).

As discussed in Section VIII.B.5(c)(1) above, Dr. Gnade's testimony is conclusory and not supported by evidence. Moreover, "[a] patent composed of several elements is not proved obvious by merely demonstrating that each of its elements was, independently known in the prior art." *KSR*, 550 U.S. at 418. Dr. Gnade failed to provide "some articulated reasoning with some rational underpinning" to support his conclusions. *In re Kahn*, 441 F.3d at 988.

The only additional claim limitation recited in claim 12 is "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section." (JX-0007 at 15:15-19.). As discussed in Sections VIII.A.2(a)(iii) and VIII.A.2(b)(ii) above with respect to anticipation of claim 12 each by Ramamurthi and Ryu, Dr. Gnade provided plausible testimony that aerogel composites generally must meet this limitation. (*See* Sections

VIII.A.2(a)(iii), VIII.A.2(b)(ii).). However, this does not meet the clear and convincing standard required to demonstrate that the fibrous material disclosed in either Ramamurthi or Ryu disclose this limitation.

For the foregoing reasons, Respondents have failed to prove by clear and convincing evidence that the combination of Ramamurthi and Ryu render claim 12 obvious.

v. Dependent Claim 16

Respondents asserted that to the extent claim 12 is not found anticipated, which it has not (*see* Section VIII.A.2, *supra*), Ramamurthi combined with Ryu renders it obvious. (RABr. at 165; RNBr. at 141.). Claim 16 recites "[t]he composite article of claim 12, wherein the fibrous batting is sufficiently lofty that it retains at least 50% of its thickness after addition of the gel forming liquid to form said aerogel." (JX-0007 at 15:32-35.).

Since claim 12 is not obvious in view Ramamurthi in combination with Ryu, claim 16, which depends from claim 12, is not obvious in view of the same. *See, e.g.*, *Otsuka Pharm.*, 678 F.3d at 1296. Additionally, Ryu does not disclose any fibrous material that is sufficiently lofty that it retains at least 50% of its thickness after addition of the gel forming liquid to form said aerogel. (CX-2256C (Leventis Reb.) at ¶¶ 531–34.). Dr. Gnade asserted without any evidence or analysis that all "fiberglass" or "glass wool" inherently satisfies this limitation. (Tr. (Gnade) at 707:18–709:7.). As discussed in Section VIII.A.2(a) above, "fiberglass" and "glass wool" are and were in 2000 extremely broad categories that encompassed many different materials. Whether any of these retains its thickness after addition of the gel forming liquid to form the aerogel depends on the nature of the fibers (and any binder) and their arrangement. (CX-2256C (Leventis Reb.) at ¶¶ 532–33.).

For the foregoing reasons, Respondents have failed to prove by clear and convincing

evidence that the combination of Ramamurthi and Ryu render claim 16 obvious. Accordingly, claim 16 of the '359 is not invalid as obvious in view of Ramamurthi and Ryu.

6. Secondary Considerations

a) Legal Standard

"The Supreme Court explained that various factors 'may also serve to "guard against slipping into use of hindsight," and to resist the temptation to read into the prior art the teachings of the invention in issue.' These factors are commonly known as secondary considerations or objective indicia of non-obviousness." *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1052 (Fed. Cir. 2016) (en banc) (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 36 (1966)). "Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. *Graham*, 383 U.S. at 17-18; *see also KSR*, 550 U.S. at 406.

The burden of showing the existence and applicability of secondary considerations is on the patentee and, therefore, the patentee must establish a nexus between the evidence and the merits of the claimed invention. However, a *prima facie* case is generally set forth "when the patentee shows both that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent." *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1324 (Fed. Cir. 2004) (quoting *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988)); *Certain Crystalline Cefadroxil Monohydrate*, Inv. No. 337-TA-294, Comm'n Op. (Mar. 15, 1990).

b) Complainant Has Proven Secondary Considerations of Non-Obviousness for the Asserted Patents

For the reasons set forth above, Respondents have not proven by clear and convincing

evidence that any of the asserted claims of the Asserted Patents are invalid as obvious. Because the evidence is insufficient to demonstrate that the asserted claims are invalid under 35 U.S.C. § 103, a limited analysis of the secondary considerations of nonobviousness is provided below. For the foregoing reasons, Complainant has demonstrated that because of the manufacturing processes claimed in the Method Patents, and the product claimed in the Product Patent, Complainant enjoyed commercial success. *See Iron Grip Barbell*, 392 F.3d 1324 (noting that a *prima facie* case is generally set forth "when the patentee shows both that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent").

i. Long Felt, but Unmet, Need

In one sentence, Complainant succinctly explained the importance of the '359 patent: "[W]ith the invention of the '359 patent, Aspen solved a nearly century-old problem and filled a nearly century-long need." (CBr. at 164.). While the "Selected History Overview" section (*see* Section I) of this document notes that aerogels date to approximately 1930, Dr. Gould's demonstration of a beautiful, delicate flower that can be insulated from an intense flame when it is insulated by only a small piece of continuous aerogel, was compelling. (*Id.* n.887 (citing CDX-1120; *see also* Tr. (Gould) at 96:19–97:20.). The video demonstration of this evidence is worth watching. (CDX-1120.). As the parties agreed, aerogels may be the best insulating materials around since the 1930's, but their structures—usually in the form of a powder or an aerogel monolith—are brittle and fragile, or in the case of powder aerogel, turned into an aerosol that could not be used for the types of applications for which the continuous aerogel product has been used since the early 2000's. (*See* CBr. at 164 n.888 (citations omitted).). No one, including Ramamurthi, had figured out how to "scale up" a manufacturing process that could produce

quantities of a useful product that also retained the insulating and thermal properties for which aerogels were known.

While Respondents tried to make the scaling up process sound so simple so as to be obvious, it was not, or so this decision finds.

The '359 patent describes a continuous aerogel composite that is flexible and durable (which neither aerogel powders nor monoliths were) "that can be cut," "sown [sic][sewn]," "glued," "affixed," and "wrapped around pipes." (*Id.* at 165 n.890 (quoting Tr. (Gould) at 105:5–106:4).). Moreover, as Complainant also pointed out, Respondents were unable to provide ***any testimony*** of any sales of aerogel blanket products before the commercialization of the invention claimed in the '359 patent. This includes all the alleged prior art, including those that Respondents alleged are prior art, including the closest in time and features, that is the Ramamurthi patent. (*Id.* at 165.). However, while Ramamurthi's owners abandoned their patent, even the subsequent attempts by those who considered potentially creating "a full-size production plant" to produce the Ramamurthi patent product, never launched. (*Id.* at 166 n.900 (citations omitted.)). Dr. Gnade, Respondents' expert, was unable to cite to any evidence of the commercialization of the Ramamurthi patent product. (*Id.* at 167 nn. 901, 902 (citations omitted).).

Other sections of this decision describe in detail why the other prior art patents to the '359 patent, that is, Sonoda and Ryu, that Respondents raised and for which they provided some evidence, cannot be considered prior art to the '359 patent. They have neither the structure of the fibrous arrangements that the '359 patent invented nor a continuous aerogel through the claimed composite material.

ii. Commercial Success

Complainant's commercial success supports its contention of non-obviousness of the Method Patents and the Product Patent. "When a patentee asserts that commercial success supports its contention of non-obviousness, there must of course be a sufficient relationship between the commercial success and the patented invention. The term 'nexus' is often used, in this context, to designate a legally and factually sufficient connection between the proven success and the patented invention, such that the objective evidence should be considered in the determination of non-obviousness. The burden of proof as to this connection or nexus resides with the patentee." *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988) (citing *Cable Electric Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1027 (Fed.Cir.1985)). When the patentee has presented a *prima facie* case of nexus, the burden of coming forward with evidence in rebuttal shifts to the challenger. *Id.* at 1393.

Complainant demonstrated that the continuous casting process claimed in the '123 and '890 patents, when married with the invention of the '359 patent, led to growth in revenue from $176,000.00 of annual revenue in 2003 to more than $100 million of annual revenue in 2015, and a "3,000 fold increase in production capacity" over Complainant's previous manufacturing technology and the Ryu patent product, that is Complainant's predecessor's own product, that broke into chunks and was not commercially successful. (Tr. (Gould) at 128:12–129:8, 149:4–150:23; *see also* Sections VIII.A.2(c)(i), (iv).).

Figure 36: Growth of Aspen Revenue

Aspen Revenue (2001-2015)

Year	Revenue (rounded to nearest thousand)
2001	$65,000
2002	$169,000
2003	$176,000
2004	$2,205,000
2005	$7,821,000
2006	$5,571,000
2007	$8,774,000
2008	$16,951,000
2009	$24,752,000
2010	$38,690,000
2011	$42,785,000
2012	$60,389,000
2013	$82,057,000
2014	$99,259,000
2015	$120,532,000

(CDX-1105 (Direct Examination of Dr. Gould (Feb. 17, 2017)) (citing CPX-0058C to CPX-0063C).). The yearly revenue increases Complainant realized from the Method and Product Patents clearly reflect that Complainant's product enjoyed commercial success. Complainants noted that purchasers of its '359 patent product ranged from NASA, to the Italian company, Ferrari, to Boeing, and to companies engaged in sports requiring thermal insulation, such as snow-boarding (i.e., Burton Snowboards.). (CBr. at 167.).

Respondents contended that Complainant failed to prove that the methods and product that Complainant has claimed are commercially successful are the inventions disclosed and claimed in the Method and Product Patents. (RABr. at 76.). Respondents also contended that Complainant failed to demonstrate a legally significant relationship between that which is patented and that which is sold. (*Id.*).

Respondents' arguments do not work well or resonate given Complainant's evidence and

Respondents' lack of counter-evidence. Dr. Gould, Complainant's Chief Technical Employee, testified that ***every product*** Complainant sells is produced using the continuous casting processes claimed in the Method Patents. (Tr. (Gould) at 150:6-23 ("Q: And has all of the revenue that Aspen subsequently received from 2004 to the present been derived from products made using the continuous casting process? A: Yes, all of this is from commercial products made in the continuous casting process.").).

Moreover, as discussed in Sections IX.B, IX.C, and IX.D below with respect to the technical DI requirement, the evidence adduced in this Investigation confirms that Complainant's DI Aerogel Composite Blankets are made by the claimed processes. This can be seen clearly in the pictures of Complainant's Rhode Island Factory where Complainant's DI Aerogel Composite Blankets are made.

Figure 37: Photograph of Complainant's Manufacturing Process in Complainant's Rhode Island Factory

(CDX-1382C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (citing CX-0938C at 2).).

Figure 38: Photograph Depicting Resulting Aerogel Composite Blankets on Rollers

(CX-1501C.).

Dr. Gould explained that Complainant's claimed, continuous casting manufacturing process is dramatically more efficient than prior art, batch-casting and led to "more than a tenfold jump in" Complainant's annual revenue in 2004, the year in which the continuous casting process was introduced. (Tr. (Gould) at 149:25–150:23.). Dr. Gould also explained that Complainant's continuous casting manufacturing process enabled it to tap into certain markets that were either impossible or difficult to satisfy using its batch casting process. (*Id.* at 147:22–149:3.).

As Dr. Gould described, Complainant's batch casting manufacturing process imposed size limitations on the products that Aspen could produce, limiting it to aerogel blankets that were approximately 3'x15' in size. (*Id.* at 131:4-133:19.). The problem that the Method Patents solved together with the Product Patent allowed Complainant to make aerogel composite blankets more cheaply and more than 10 times longer than using batch casting, which together

"had a dramatic impact on the markets that [Aspen] could serve." (*Id.* at 147:22–149:3; *see also* CPBr. at 67 ns 376-38.).

For example, Dr. Gould testified that because Complainant could make ***more*** insulation using the continuous casting process, Complainant was able to pursue projects that required insulating "gigantic object[s]," including petrochemical projects that required "millions of square feet" of insulation, which was "not possible" using batch casting. (*Id.*; *see also id.* at 124:24–125:21 ("[Aspen's] applications and [Aspen's] performance is so good that companies that have outdoor facilities, refineries in particular, or have very difficult thermal challenges like extracting oil from the bottom of the ocean through a pipeline, where if it were to cool down it would form a wax and plug the pipe. . . .[Aspen] sell[s] to 24 of the top 25 oil companies in the world").). Additionally, Dr. Gould noted that because Complainant could make ***longer*** sheets of insulation using the continuous casting process, it enabled "efficient" and "very fast" application of Complainant's insulation, and avoided having to "splice" many small pieces of insulation together to insulate "very tall" objects. (*Id.* at 135:11–136:3.).

Another problem that the Method Patents solved was the "window of time" necessary to ensure in manufacturing that the sol poured into the composite had not gelled too soon before the product could be rolled, or that the rolling process came too late after the gelling so that the gelled product cracked. (CPBr. at 67, 68 (citations omitted).). That process, of knowing the amount of sol to use, the type of batting, and the continuous nature of the process disclosed in the Method Patents, was some recombination of chemistry and mechanics that no one had thought of previously in the same way.

While Respondents' tried to cast doubt on Complainant's commercial success using Complainant's Securities and Exchange Commission 10-K filings ("SEC 10K Filings") which

reflected that Complainant had incurred net losses every year since its inception and has yet to achieve positive cash flow, the SEC 10K filings have limited utility and are not the final word on Complainant's commercial success. (CX-0904.0017; Tr. (Gould) 238:8-13, 239:11-13 ("Q: So 16 years later [Aspen is] still losing millions of dollars a year; correct? A: That would be correct.").). They are one prescribed method of accounting for certain purposes.

As Complainant pointed out, Respondents introduced this argument not through an accounting expert, but through a cross-examination of Dr. Gould in which Respondents ignored crucial portions of Complainant's SEC 10K Filings—portions which revealed that Complainant is "[a]bsolutely not" selling its aerogel composite blankets at a loss and has had "positive cash flows from operating activities" of millions of dollars in recent years. (Tr. (Gould) at 251:1–256:19.). Moreover, in response to additional questioning, Dr. Gould explained that the "net losses" cited by Respondents as taken from Complainant's SEC 10K Filings was actually the result of a stock conversion loss in connection with Complainant's Initial Public Offering ("IPO"), which Complainant had to report to the SEC. Complainant's "loss" had nothing to do with "operational losses from making and selling these blankets." (*Id.* at 125:22–126:15, 249:5–253:17.). Thus, Respondents' arguments are neither persuasive nor supported by persuasive evidence.

Respondents argued that even if Complainant met its burden of showing a nexus between the claims at issue and Complainant's alleged commercial success, Complainant proffered evidence to show that the commercial success was due to extraneous factors other than the patented invention, such as advertising, and superior workmanship. (RABr. at 76.). To that end,

Respondents relied on deposition testimony of Mr. Jack M. Rocha,[61] Assistant Corporate Controller for Complainant, that revenue can be based on many factors, including the quality of the products; the ease in handling, storing, and installing the products; and the fact that they last longer than other commercially available products. (JX-0036C (Rocha Dep.) at 28:3-7, 28:9–30:6, 30:10-13, 30:18-20.).

Respondents also referenced Complainant's SEC 10-K Filing as evidence that its trademarks and product names themselves contribute to its alleged success: "We believe that having distinctive names is an important factor in marketing our products." (CX-0904.0015.).

Ultimately, Respondents assertions are not supported by the weight of the evidence. Although factors such as the quality of the products, and the ease in handling, storing, and installing the products, may have contributed to Complainant's commercial success, the testimony and evidence adduced in this Investigation with respect to the advantages of the continuous casting methods over the conventional batch casting technique, and the significance of a product 'made from a continuous aerogel that cut be wrapped, cut, sewn, molded and used for such a wide array of purposes, supports a finding that the claimed methods and product are responsible for Complainant's commercial success. *See Railroad Dynamics, Inc. v. A. Stucki Co.*, 579 F. Supp. 353, 366-67 (E.D. Pa. 1983), *aff'd*, 727 F.2d 1506 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 871 (1984).

In sum, Complainant has established a *prima facie* case of a nexus between its commercial success and the claims of the '123, the '890 and the '359 patents because

[61] At the time he gave his deposition testimony on August 10, 2016, Mr. Jack M. Rocha was the Assistant Corporate Controller for Aspen Aerogels, Inc. (RAPSt. at 6; JX-0036C (Rocha Dep.) at 7:1-9.). As a designated corporate representative for Complainant, Mr. Rocha testified about Complainant's business relating to aerogel products and its sales and finances. (RAPSt. at 6.).

Complainant has proven "that there is commercial success, and that the thing (product or method) that is commercially successful is the invention disclosed and claimed in the patent." *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988).

Respondents have failed to meet their "burden of coming forward with evidence in rebuttal . . . ." *Id.* at 1393. Accordingly, the commercial success of the processes claimed in the Method Patents and in the Product Patent weigh against a finding of obviousness.

iii. Copying

Complainant alleged that Respondent Nano's manufacturing process copied Complainant's manufacturing process, thereby supporting its contention of non-obviousness of the Method Patents. (CBr. at 81.). To support its assertion, Complainant relied upon: (i) a slide Respondent Nano copied from a presentation given by Complainant; and [

]

Copying requires the replication of a specific product, which may be demonstrated by internal documents, direct evidence such as disassembling a patented prototype, photographing its features, and using the photographs as blueprints to build a virtually identical replica, or access to, and substantial similarity to, the patented product (as opposed to the patent). *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004). A showing of copying is only equivocal evidence of non-obviousness in the absence of more compelling objective indicia of other secondary considerations. *Geo M. Martin*, 618 F.3d at 1305.

In this case, there is insufficient evidence to support a finding that Respondent Nano copied Complainant's claimed manufacturing processes to make its aerogel insulation blankets.

With regard to the slide presentation that Respondent Nano used, there is no dispute that a Nano employee copied the slide from a publicly available presentation authored by Complainant that illustrates its manufacturing process for making aerogel insulation blankets. (JX-0043 (Yao Dep.) at 465:11-22 (admitting Nano salesperson copied slide marked as CX-1081 (Resp. Nano Presentation)); Tr. (Gould) at 223:3–224:12 (admitting copied slide was public). However, this single piece of evidence alone does not demonstrate copying of the claims inventions of the Method Patents. In this instance, the copied slide is nothing more than a high-level pictogram that does not include all steps of the process Complainant uses to make its products, and it was incorporated into a marketing presentation for Respondent Nano. (Tr. (Gould) at 224:21–225:20; JX-0043C (Yao Dep.) at 467:16-24.). Moreover, there is no evidence that the drawing used by Respondent Nano depicts the way in which Respondents Nano's manufacturing process actually works.

[

]

For the foregoing reasons, Complainant has failed to meet its burden and show that Respondent Nano copied the specific processes claimed in the Method Patents. *Iron Grip Barbell*, 392 F.3d at 1325.

iv. Industry Praise

Complainant alleged that industry praise it received additionally supports its contention of non-obviousness of the Method Patents. (CBr. at 82.). As evidence of industry praise, Complainant presents two (2) press releases it authored, one announcing a contract with a third party and another announcing government funding to expand production capacity. (*Id.* at 82-83; CX-1494 (Technip Contract Press Release); CX-1495 (Government Funding Press Release); Tr. (Gould) at 225:21–226:3, 228:7-13, 228:25–229:6, and 230:17-23 (Complainant authored press releases marked as CX-1494 and CX-1495).).

Praise in the industry for a patented invention, and specifically praise from a competitor tends to indicate that an invention is not obvious. *In re Cree, Inc.*, 818 F.3d 694, 702 (2016). However, self-serving statements from researchers about their own work do not have the same reliability. *Id.* at 702 (holding Board permissibly concluded press releases were not persuasive evidence of industry praise).

Dr. Gould testified that receiving the funding from the U.S. government to expand its production capacity "a real stamp of approval . . . because it establishes, I believe, that we made materials that were very valuable for military applications, and it was important to the country. This is not money that's just handed out to anyone. You need to have a compelling case. And

the amount of money [close to $20 million] was a significant amount of money." (Tr. (Gould) at 151:2-24.). He also testified that Complainant would not have won a third-party contract to supply "millions of square feet" of insulation for a 21 kilometer undersea gas pipeline using its batch casting process. (*Id.* at 147:22–149:3.). Dr. Gould explained that Complainant's increased production capacity through its continuous casting process claimed in the Method Patents enabled Aspen to secure the account. (*Id.*).

Dr. Gould's testimony does not support sufficiently a finding of secondary considerations of nonobviousness. The evidence of industry praise Complainant presented is comprised solely of Complainant's ***own*** statements, ***not*** that of third parties or industry participants. This is not sufficient to support a finding of industry praise for the processes claimed in the '123 and '890 patents.

For the foregoing reasons, Complainant has failed to meet its burden and to prove that it received industry praise for the processes claimed in the Method Patents. *In re Cree, Inc.*, 818 F.3d at 702.

IX. TECHNICAL PRONG

A. Relevant Law

A complainant in a patent-based Section 337 investigation must demonstrate that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. § 1337(a)(2) and (3); *Certain Microsphere Adhesives, Process for Making Same, and Prods. Containing Same, Including Self-Stick Repositionable Notes*, Inv. No. 337-TA-366, Comm'n Op. at 8, Pub. No. 2949 (U.S.I.T.C., Jan. 16, 1996) ("*Microsphere Adhesives*"). The technical prong of the domestic industry requirement is satisfied when the complainant establishes that it is practicing or exploiting the patents at issue. *See id.*

The test for claim coverage for the purposes of the technical prong of the domestic industry requirement is the same as that for infringement. *Certain Doxorubicin and Preparations Containing Same*, Inv. No. 337-TA-300, Initial Determination at 109, 1990 WL 710463 (U.S.I.T.C., May 21, 1990), *aff'd*, Views of the Commission at 22 (October 31, 1990). "First, the claims of the patent are construed. Second, the complainant's article or process is examined to determine whether it falls within the scope of the claims." *Id.* The technical prong of the domestic industry can be satisfied either literally or under the doctrine of equivalents. *Certain Dynamic Sequential Gradient Devices and Component Parts Thereof*, Inv. No. 337-TA-335, Initial Determination at 44, Pub. No. 2575 (U.S.I.T.C., Nov. 1992). "In order to satisfy the technical prong of the domestic industry requirement, it is sufficient to show that the domestic industry practices any claim of that patent, not necessarily an asserted claim of that patent." *Certain Ammonium Octamolybdate Isomers*, Inv. No. 337-TA-477, Comm'n Op. at 55 (U.S.I.T.C., Jan. 5, 2004) ("*Certain Isomers*").

B. Complainant's Domestic Industry (DI") Manufacturing Process Practices the Asserted Claims of the '123 Patent

Complainant alleged that its DI Manufacturing Process practices claims 15-17 and 19 of the '123 patent. (CBr. at 39-43.). Respondents' experts, Dr. Scherer and Dr. Gnade, did not provide any testimony regarding the technical prong of the domestic industry requirement for the '123 patent. (Tr. (Scherer) at 969:23–970:3 ("I didn't hear any testimony from you regarding the technical prong of domestic industry for any patent; correct? A: Correct."); Tr. (Gnade) at 782:21-25 ("I did not hear you provide any testimony regarding the technical prong of domestic industry with respect to any patent; correct? A: That's correct.").). Moreover, Respondents' Statement of Streamlined Issues does not indicate that Respondents are challenging

Complainant's satisfaction of the technical prong of the domestic industry requirement for the '123 patent. (*See* Doc. ID No. 604414 (Respondents' Statement of Streamlined Issues).). In their Initial Post-Hearing Briefs, Respondents merely contended that Complainant failed to satisfy the technical prong of the DI requirement for claims 15-17 and 19 of the '123 patent because the claims are invalid as obvious.[62] (RABr. at 47; RNBr. at 21-22.). Thus, Respondents offered no rebuttal concerning Complainant's satisfaction of technical domestic industry that depend on any specific manufacturing processes.

1. Independent Claim 15

a) "A process for preparing gel sheets, comprising the steps of"

Dr. Schiraldi confirmed, including from his own personal inspection of Complainant's Rhode Island Factory and Complainant's manufacturing process diagram, that Complainant's DI Manufacturing Process practices a method for preparing gel sheets. (Tr. (Schiraldi) at 475:17-24; CX-2258C (Schiraldi Rep.) at ¶ 493; *see also* CBr. at App. C.).

[62] Staff argued that the evidence shows that Complainant's DI Manufacturing Process practices claims 15-17 and 19 of the '123 patent. (SBr. at 26.). However, based on Staff's position that these claims are invalid, Staff concluded that Complainant has not met the technical prong of the DI for the '123 patent. (*Id.* at 27.).

Figure 39: Depiction of Complainant's Manufacturing Process Showing Preparation of Gel Sheets

(CDX-1383C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (annotated CX-0988C at 4).).

Figure 40: Photograph of Complainant's Manufacturing Process Showing Preparation of Gel Sheets

(CDX-1382C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (annotated CX-0938C at

3).).

Respondents offered no rebuttal, as explained above in Section IX.B. (RABr. at 47; RNBr. at 21-22; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices the preamble. (SBr. at 27-28.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the preamble of claim 15 of the '123 patent.

b) "dispensing a catalyzed sol onto a moving element as a continuous sheet"

As Dr. Schiraldi testified, the catalyzed sol in Complainant's manufacturing process is dispensed onto a moving element as a continuous sheet. (Tr. (Schiraldi) at 475:25–477:19; CBr. at App. C.). Dr. Schiraldi explained that the satisfaction of this limitation is clear from his personal inspection of Complainant's Rhode Island Factory. (*Id.* at 475:25–477:14.). He also pointed out that dispensing a catalyzed sol onto a moving element as a continuous sheet is visible in photograph's of Complainant's manufacturing lines included in Complainant's process documentation.

Figure 41: Photographs of Complainant's Manufacturing Process Showing Dispensing a Catalyzed Sol

(CDX-1384C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (showing photographs of dispensing as a continuous sheet, CX-1499C and CX-0938C at 17; CX-0938C at 1

[

]

Respondent Alison offered no rebuttal. (RABr. at 47; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). In its Pre-Hearing Brief, Respondent Nano argued that "the evidence will show that [

] (RNPBr. at 29, 66.) However, in its Initial Post-Hearing Brief, Respondent Nano only asserted generally that Complainant failed to satisfy the technical prong of the DI requirement for the asserted claims because the claims are invalid as obvious. (RNBr. at 21-22.). Thus, Respondent Nano has waived this argument under Ground Rule 10.1. (*See* G.R. 10.1.).

Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this limitation. (SBr. at 27-28.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices this limitation of claim 15 of the '123 patent.

c) "rolling the dispensed sheet into a plurality of layers"

Dr. Schiraldi's testimony confirmed that after gelation, Complainant rolls the dispensed sheet into a plurality of layers at its Rhode Island Factory. (Tr. (Schiraldi) at 477:15–478:6.). He explained that the satisfaction of this limitation is clear from his inspection of Complainant's Rhode Island Factory, process diagram, and photographs showing the rolling process (with

permeable separator). (Tr. (Schiraldi) at 477:15–478:6 ("And I confirmed this from my own visual inspection of all three lines. I saw all three lines being rolled into a plurality of layers.").

Figure 42: Pictograph and Photograph of Complainant's Manufacturing Process with Rolled Aerogel Composite Blanket

(CDX-1385C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (annotating the rolling step in Complainant's manufacturing process diagram, CX-0988C at 4, and showing a photograph of rolling with a permeable separator at Complainant's factory, CX-1501C).).

Respondents offered no rebuttal, as explained above in Section IX.B. (RABr. at 47; RNBr. at 21-22; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this limitation. (SBr. at 27-28.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices this limitation of claim 15 of the '123 patent.

2. Dependent Claim 16

a) "The process of claim 15, further comprising the step of: providing a spacer layer between any two predetermined layers of the continuous sheet."

Complainant's DI Manufacturing Process practices this claim at its Rhode Island Factory. (Tr. (Schiraldi) at 478:12–479:15; *see also* CX-2258C (Schiraldi Rep.) at ¶¶ 497-99.). This was confirmed by Dr. Schiraldi via personal inspection, Complainant's manufacturing process documents, [

] (CDX-1387C (quoting Complainant's manufacturing process document: [

] CX-0943C at 12, [

] CX-1501C); Tr. (Schiraldi) at 478:12–479:15.). [

]

Figure 43: Photograph of [ ] in Complainant's Manufacturing Process

(CX-1501C.).

Respondents offered no rebuttal, as explained above in Section IX.B. (RABr. at 47; RNBr. at 21-22; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 29-30.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 16 of the '123 patent.

3. Dependent Claim 17

a) "The process of claim 16, wherein the spacer layer is permeable."

Complainant's DI Manufacturing Process practices this claim at its Rhode Island Factory. (Tr. (Schiraldi) at 478:1 –480:2; CX-2258C (Schiraldi Rep.) at ¶¶ 500-02.). Dr. Schiraldi explained based on his personal inspection, Complainant's manufacturing process documents,

and photographs that "[t]hey tell us it's permeable. [ ] That's how you get a permeable spacer. Again, I inspected it. I looked at it. Clearly, to my eyes, it has to be permeable to fluid." (Tr. (Schiraldi) at 478:12–480:2; CDX-1388C (quoting Complainant's process document: [

] CX-1501C (*see* Fig. 43, *supra*)).).

Respondents offered no rebuttal, as explained above in Section IX.B. (RABr. at 47; RNBr. at 21-22; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 29-30.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 17 of the '123 patent.

4. Dependent Claim 19

a) "The process of claim 17, wherein the permeable spacer layer is effective to provide radial flow patterns in connection with a drying process."

Complainant's DI Manufacturing Process practices this claim at its Rhode Island Factory. (Tr. (Schiraldi) at 480:3-16; CX-2258C (Schiraldi Rep.) at ¶¶ 503-04.). Dr. Schiraldi explained that the purpose of [ ] in Complainant's permeable spacer layer is to "get a radial flow of liquids." (CDX-1389C (quoting Complainant's process document: [

] CX-0943C at 12, and

showing a zoomed-in picture of Complainant's rolling system with the permeable spacer layer visible, CX-1501C); Tr. (Schiraldi) at 478:12–480:2, 480:3-16.).

Complainant's spacer layer [ ] that allows liquid or gases to flow through it in a direction perpendicular to the surface of the net (i.e., the radial direction, when the spacer layer is rolled up). (CX-0943C at 12; Tr. (Schiraldi) at 480:3-16.). When the spacer layer is rolled up with the gel sheet layers, the permeable spacer permits radial flow of liquids and/or gases in connection with Complainant's supercritical drying process. (CX-0943C at 12; Tr. (Schiraldi) at 480:3-16.).

Respondents offered no rebuttal, as explained above in Section IX.B. (RABr. at 47; RNBr. at 21-22; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 29-30.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 19 of the '123 patent.

C. Complainant's DI Manufacturing Process Practices the Asserted Claims of the '890 Patent

Complainant alleged that its DI Manufacturing Process practices claims 11-13, 15, 17-19, and 21-23 of the '890 patent. (CBr. at 93-97.). Like the '123 patent, Respondents' experts, Drs. Scherer and Gnade, did not provide any testimony regarding the technical prong of the domestic industry requirement for the '890 patent. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25.). Moreover, Respondents' Statement of Streamlined Issues did not challenge Complainant's satisfaction of the technical prong of the domestic industry requirement for the '890 patent. (*See*

Doc. ID No. 604414 (Respondents' Statement of Streamlined Issues).). In their Initial Post-Hearing Briefs, Respondents merely contended that Complainant failed to satisfy the technical prong of the DI requirement for claims 11-13, 15, 17-19, and 21-23 because the claims are invalid as obvious.[63] (RABr. at 80; RNBr. at 50-52.). Thus, Respondents offered no rebuttal concerning Complainant's satisfaction of technical domestic industry that depend on any specific manufacturing processes.

1. Independent Claim 11

a) "A method for preparing gel sheets, comprising the steps of"

As explained in Section IX.B.1 above, Complainant's DI Manufacturing Process practices a method for preparing gel sheets. (Tr. (Schiraldi) at 480:17–481:1 (concluding that the preamble of claim 11 of the '890 patent is satisfied for the same reasons that the preamble of claim 15 of the '123 patent is satisfied).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices the preamble. (SBr. at 52.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the preamble of claim 11 of the '890 patent.

[63] Staff argued that the evidence reflects that Complainant's DI Manufacturing Process practices claims 11-13, 15, 17-19, and 21-23 of the '890 patent. (SBr. at 51.). However, because Staff argued that these claims are invalid, Staff concluded that Complainant has not met the technical prong of the DI for the '890 patent. (*Id.*).

b) "dispensing a sol onto a moving element as a continuous sheet"

As explained in Section IX.B.1 above, Complainant's DI Manufacturing Process involves dispensing a sol onto a moving element as a continuous sheet. (Tr. (Schiraldi) at 481:2-7 (concluding that the first limitation of claim 11 of the '890 patent is satisfied for the same reasons that the first limitation of claim 15 of the '123 patent claim is satisfied and noting that "[i]f you're dispensing a catalyzed sol, by definition you're catalyzing a sol").).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this limitation. (SBr. at 52.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices this limitation of claim 11 of the '890 patent.

c) "rolling the dispensed sheet into a plurality of layers"

As explained in Section IX.B.1 above, Complainant's DI Manufacturing Process involves rolling the dispensed sheet into a plurality of layers. (Tr. (Schiraldi) at 481:8-13 (concluding that the second limitation of claim 11 of the '890 patent is satisfied for the same reasons that the final limitation of claim 15 of the '123 patent is satisfied).).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this limitation. (SBr. at 52.).

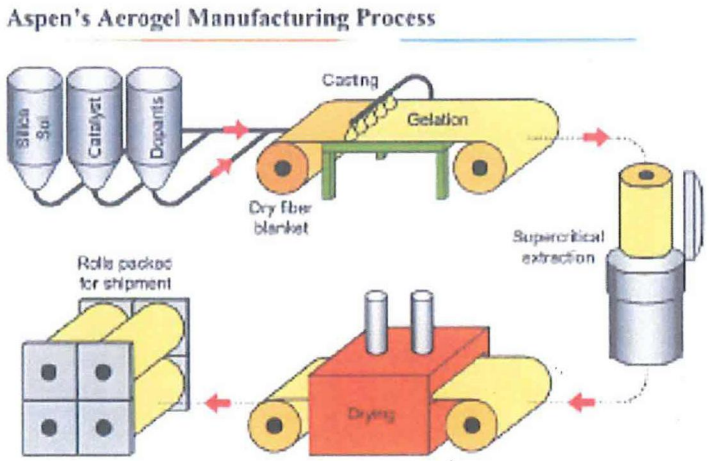
For the foregoing reasons, and because there is no dispute, Complainant has met its

burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices this limitation of claim 11 of the '890 patent.

d) "drying the layers"

Complainant's DI Manufacturing Process involves drying the layers using supercritical extraction, as explained by Dr. Schiraldi with reference to Complainant's manufacturing process diagram and his personal inspection of Complainant's Rhode Island Factory. (Tr. (Schiraldi) at 481:14–482:5.).

Figure 44: Pictograph of Complainant's Manufacturing Process Including Supercritical Drying



(CDX-1394C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)) (showing Complainant's manufacturing process diagram which displays a "Supercritical extraction" step, CX-0988C at 4).).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this limitation. (SBr. at 52.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices this limitation of claim 11 of the '890 patent.

2. Dependent Claim 12

a) "The method of claim 11 wherein drying is accomplished using supercritical fluids."

Complainant's DI Manufacturing Process practices this claim, where drying is accomplished using supercritical drying, which, as explained by Dr. Schiraldi, makes use of supercritical fluids. (Tr. (Schiraldi) at 481:14-482:16; CDX-1394C (showing Complainant's manufacturing process diagram which displays a "Supercritical extraction" step, CX-0988C at 4); CX-2258C (Schiraldi Rep.) at ¶¶ 455-57.).

Figure 45: Illustration Depicting Infusion of Fibrous Batting with Sol Solution, Resulting in Fiber-Reinforced Aerogel Blanket

(CX-0988C at 3.).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 52-53.).

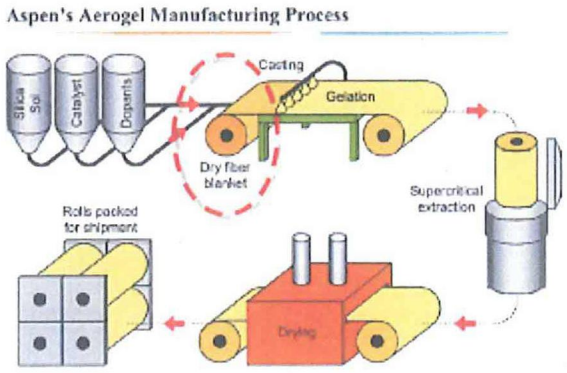
For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 12 of the '890 patent.

3. Dependent Claim 13

a) "The method of claim 11 further comprising the step of providing a fibrous batting material in the gel sheet."

Complainant's DI Manufacturing Process practices this claim at its Rhode Island Factory. (Tr. (Schiraldi) at 482:17–483:2; CX-2258C (Schiraldi Rep.) at ¶¶ 458-66.). Complainant's manufacturing process diagram shows that it combines a "[d]ry fiber blanket" (a fibrous batting) with catalyzed sol which is then gelled, thus providing a fibrous batting in the resulting gel sheet, and Dr. Schiraldi confirmed this fact with reference to photographs and his personal inspection of Complainant's Rhode Island Factory. (Tr. (Schiraldi) at 482:17-23; CDX-1396C (showing provision of the "[d]ry fiber blanket" in Complainant's process, CX-0988C at 4).).

Figure 46: Pictograph of Complainant's Manufacturing Process and Illustration Depicting Infusion of Fibrous Batting with Sol Solution



(CDX-1396C (Direct Examination of Dr. Schiraldi (Feb. 21, 2017)); CX-0988C at 3.).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 52-53.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 13 of the '890 patent.

4. Dependent Claim 15

a) "The method of claim 11, wherein the sol comprises a material selected from the group consisting of zirconia, yttria, hafnia, alumina, titania, ceria, and silica, magnesium oxide, calcium oxide, magnesium fluoride, calcium fluoride, and combinations thereof."

Complainant's DI Manufacturing Process practices this claim, because its dispensed catalyzed sol includes silica. (Tr. (Schiraldi) at 483:3-484:19; CX-2258C (Schiraldi Rep.) at ¶¶ 467-470.). Complainant's sol comprises [

] as Dr. Schiraldi testified. (CDX-1398C (quoting Complainant's manufacturing process document explaining that [

]

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 52-53.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 15 of the '890 patent.

5. Dependent Claim 17

a) "The method of claim 11 wherein dispensed sol is gelled before rolling."

Complainant's DI Manufacturing Process practices this claim, as explained by Dr. Schiraldi with reference to his personal inspection of Complainant's Rhode Island Factory and description of its operation. (Tr. (Schiraldi) at 473:19–474:22 [

] 484:20–485:3; CX-2258C (Schiraldi Rep.) at ¶¶ 471-74.).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.).

Staff agreed with Complainant that the DI Manufacturing Process practices this claim. (SBr. at 52-53.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 17 of the '890 patent.

6. Dependent Claim 18

a) "The method of claim 11 further comprising the step of introducing a spacer layer between any two gel sheet layers."

Complainant's DI Manufacturing Process practices claim 18 at its Rhode Island Factory. As explained in Section IX.B.2 above, Complainant introduces a spacer layer between [ ] gel sheet layers. (Tr. (Schiraldi) at 485:4-12, 486:7-18 (concluding that claim 18 of the '890 patent is satisfied for the same reasons that claim 16 of the '123 patent is satisfied); CX-2258C (Schiraldi Rep.) at ¶¶ 475-77.).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 52-53.).

For the foregoing reasons, and because there is no dispute, Complainant has proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 18 of the '890 patent.

7. Dependent Claim 19

a) "The method of claim 18 wherein the spacer layer is permeable."

Complainant's DI Manufacturing Process practices claim 19 at its Rhode Island Factory.

As explained in Section IX.B.3 above, the spacer layer used by Complainant at its factory is a [ ] which is visibly and necessarily permeable to gases and/or liquids. (Tr. (Schiraldi) at 485:13-19, 486:19–487:1 (concluding that claim 19 of the '890 patent is satisfied for the same reasons that claim 17 of the '123 patent is satisfied); CX-2258C (Schiraldi Rep.) at ¶¶ 478-83.).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices this claim. (SBr. at 53-54.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 19 of the '890 patent.

8. Dependent Claim 21

a) "The method of claim 17 wherein the gelling of the sol is enhanced by a process selected from the group consisting of (a) a chemical process, and (b) dissipating a predetermined quantity of energy from an energy source into a cross-sectional area of the sol."

Complainant's DI Manufacturing Process practices claim 21 at its Rhode Island Factory. (Tr. (Schiraldi) at 487:2–488:2; CX-2258C (Schiraldi Rep.) at ¶¶ 484-87.). Specifically, Complainant catalyzes its sol using [ ] which Dr. Schiraldi confirmed during his personal inspection of Complainant's Rhode Island Factory and through Complainant's manufacturing process documentation. (CDX-1420C (showing an excerpt from a Complainant process document that shows that [

] Tr. (Schiraldi) at 487:2–488:2.).

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80; RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant that the DI Manufacturing Process practices this claim. (SBr. at 53-54.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitation recited in claim 21 of the '890 patent.

9. Dependent Claims 22 and 23

a) "The method of claim 13 wherein fibers in the fibrous batting have a diameter within a range of about 0.1 μm to about 10000 μm."

b) "The method of claim 13 wherein fibers in the fibrous batting have a diameter within a range of about 0.001 μm to about 10 μm."

Complainant's DI Manufacturing Process practices claims 22 and 23 at its Rhode Island Factory. (Tr. (Schiraldi) at 489:14–490:14, 490:21–491:6; CX-2258C (Schiraldi Rep.) at ¶¶ 488-89, 490-91.). With reference to Complainant's specifications for its battings, Dr. Schiraldi confirmed that Complainant's fibrous battings have [

] which is within the claimed range. (CDX-1450C (excerpting Complainant's batting specification, CX-1093C at 2, and citing Complainant's other batting specifications); *see also* Tr. (Schiraldi) at 489:14–490:14, 490:21–491:6 (confirming that Complainant's other batting specifications [

]

Respondents offered no rebuttal, as explained above in Section IX.C. (RABr. at 80;

RNBr. at 50-52; Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Manufacturing Process practices these claims. (SBr. at 53-54.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Manufacturing Process practices the additional limitations recited in claims 22 and 23 of the '890 patent.

D. Complainant's DI Aerogel Composite Blankets Practice the Asserted Claims of the '359 Patent

Complainant alleged that its DI Aerogel Composite Blankets and DI Aerogel Composite Blankets I practice claims 1, 5, 7, 9, 12, 15, and 16 of the '359 patent. (CBr. at 116-23.). Like the Method Patents, Respondents' experts, Drs. Scherer and Gnade, did not provide any testimony regarding the technical prong of the domestic industry requirement for the '359 patent. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25.). Additionally, in Respondents' Statement of Streamlined Issues, they do not challenge Complainant's conclusion that is satisfies the technical prong of the domestic industry requirement for the '359 patent. (*See* Doc. ID No. 604414 (Respondents' Statement of Streamlined Issues).). In their Initial Post-Hearing Briefs, Respondents merely contended that Complainant failed to satisfy the technical prong of the DI requirement for claims 1, 5, 7, 9, 12, 15, and 16 because the claims are invalid as obvious.[64] (RABr. at 94; RNBr. at 67-68.). Moreover, Respondent Nano asserted that other than claim 5, it did not dispute that Complainant's DI Aerogel Composite Blankets and DI Aerogel Composite

[64] Staff argued that the evidence proved that Complainant's DI Aerogel Composite Blankets practices claims 1, 7, 9, 12, 15, and 16 of the '359 patent. (SBr. at 77.). However, based on Staff's argument that these claims are invalid, Staff concluded that Complainant has not met the DI technical prong for the '359 patent. (*Id.*).

Blankets I practice these claims.[65] (RNBr. at 68.). Thus, Respondents offered no rebuttal concerning Complainant's satisfaction of technical domestic industry that depend upon any specific aerogel composite blankets.

1. Independent Claim 1

a) "A composite article to serve as a flexible, durable, light-weight insulation product, said article comprising"

Complainant's expert, Dr. Leventis, provided testimony that the DI Aerogel Composite Blankets are insulation products that are composites of at least aerogel and fibrous batting. (Tr. (Leventis) at 338:3-13, 347:4–348:3; CDX-1272C (citing Dr. Leventis's photographs of the Complainant's DI Aerogel Composite Blankets, CX-2243C).

Dr. Leventis confirmed that the DI Aerogel Composite Blankets are flexible by handling and flexing the blankets, and by relying upon photographs [ ] of the Complainant's DI Aerogel Composite Blankets, and Complainant's datasheets for the its DI Aerogel Composite Blankets. (Tr. (Leventis) at 338:16-24; CDX-1241C (showing a photograph of a draping blanket, CX-0201C); CDX-1257 to CDX-1259 (excerpting Complainant's MSDSs, which characterize the DI Aerogel Composite Blankets as "flexible," CX-0912, CX-0913, CX-0920, CX-0915, CX-0917, CX-1464).).

[65] Staff argued that Complainant's DI Aerogel Composite Blankets do not practice claim 5 of the '359 patent. (SBr. at 83-84.).

Figure 47: Photograph Showing that Complainant's DI Aerogel Composite Blankets Are Flexible and Light-Weight

(CX-0201C at 5.).

Referencing Dr. Gould's testimony during the evidentiary hearing and Complainant's MSDSs for the DI Aerogel Composite Blankets, which characterize the blankets as "physically robust," Dr. Leventis also confirmed that the DI Aerogel Composite Blankets are durable. (Tr. (Leventis) at 339:25–341:7; CDX-1260 to CDX-1262 (excerpting Complainant's MSDSs, which characterize the DI Aerogel Composite Blankets as "physically robust," which means that the blankets are "durable," CX-0912, CX-0913, CX-0920, CX-0915, CX-0917, CX-1464).).

Additionally, Dr. Leventis testified that the DI Aerogel Composite Blankets are light-weight, based on his own handling of the products, their aerogel composition, and Complainant's datasheets for the DI Aerogel Composite Blankets, which characterize the blankets as having "minimal weight" or explain that they have low density. (Tr. (Leventis) at 341:13–344:8; CDX-1263 (excerpting Complainant's datasheets for its Cryogel blankets, which characterize them as having "minimal weight," CX-0912 and CX-0913); CDX-1264 to CDX-1265 (excerpting Complainant's datasheets for its Spaceloft and Pyrogel blankets, specifying density ranging from

10 lb/ft^3-12.5 lb/ft^3, which Dr. Leventis testified means that the blankets are "a light weight material," CX-0920, CX-0915, CX-0917, CX-1464).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Aerogel Composite Blankets practice the preamble. (SBr. at 78-79.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets practice the preamble of claim 1 of the '359 patent.

b) "a lofty fibrous batting sheet"

Dr. Leventis confirmed that the DI Aerogel Composite Blankets comprise a lofty fibrous batting sheet, which requires that the fibrous batting sheet in the Aspen Blankets have "bulk and some resilience (with or without full bulk recovery)." (Tr. (Leventis) at 345:3-347:3; Order No. 35, App. A at 4-6.). Relying upon microscopic photographs of battings that he took, Dr. Leventis confirmed that the batting in the DI Aerogel Composite Blankets has bulk. (Tr. (Leventis) at 345:3–346:11; CDX-1269C (citing Dr. Leventis's microscope photography of Complainant's battings, CX-2242C); *see also* CDX-1267 (explaining which of the battings correspond to each DI Blanket product).). Dr. Leventis also confirmed through testing that the batting in the Complainant's DI Aerogel Composite Blankets has a high degree of resilience, with [

] (Tr. (Leventis) at 346:12–347:3; CDX-1270C (showing Dr. Leventis's test data, CX-2250C); *see also* CDX-1267 (explaining which of the battings correspond to each DI Blanket product).).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Aerogel Composite Blankets practice this limitation. (SBr. at 78-79.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets practice this limitation of claim 1 of the '359 patent.

c) "a continuous aerogel through said batting"

Dr. Leventis testified that the DI Aerogel Composite Blankets comprise a continuous aerogel through the fibrous batting. (Tr. (Leventis) at 347:4–348:3.). Dr. Leventis inspected the DI Aerogel Composite Blankets to confirm that the aerogel therein is continuous and that it was not composed of [ ] (Tr. (Leventis) at 347:4–348:3; CDX-1272C (citing Dr. Leventis's photographs of the DI Aerogel Composite Blankets, CX-2243C).). Dr. Leventis also confirmed the satisfaction of this limitation with reference to Complainant's manufacturing process, in which [ ] "a continuous aerogel going through the batting." (Tr. (Leventis) at 347:4–348:3.).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Aerogel Composite Blankets practice this limitation. (SBr. at 78-79.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel

Composite Blankets practice this limitation of claim 1 of the '359 patent.

2. Dependent Claim 5

a) "The composite article of claim 1, wherein the lofty fibrous batting consists essentially of fibers having a thermal conductivity less than 50 mW/m-K."

Complainant's DI Aerogel Composite Blankets practice claim 5. (Tr. (Leventis) at 348:8–349:18; CX-2255C (Leventis Rep.) at ¶¶ 9.3.4.1-5.). Dr. Leventis confirmed this by testing the thermal conductivity of the battings used in the DI Aerogel Composite Blankets, which showed that the thermal conductivity of these battings are [

] (Tr. (Leventis) at 348:8–349:18; CDX-1274C (showing Dr. Leventis's test data, CX2254C); see also CDX-1267 (explaining which of the battings correspond to each DI Blanket product).).

Respondent Nano and Staff argued that this claim requires that each individual fiber in the batting has a thermal conductivity of less than 50 mW/m-K. (*See, .e.g.*, RNBr. at 68, SBr. at 83-84.). Based on this position, Respondent Nano and Staff contended that Complainant did not provide any evidence of the thermal conductivity of the ***fibers***. (RNBr. at 68, SBr. at 83-84.). To the contrary, Dr. Leventis explained that a person skilled in the art would not read claim 5 in this manner because "what we are interested in is the thermal conductivity of the batting itself so we can infer the effects it might have to the final product, not the individual fibers." (Tr. (Leventis) at 314:2–315:6.).

This understanding was confirmed by Respondent Alison's technical fact witness, Mr. Wei, who confirmed that when Respondent Alison buys its fibrous blankets from suppliers, it "measures the thermal conductivity of the blanket as a whole" and "does not measure the thermal conductivity of single individual fibers in the blanket." (Tr. (Wei) at 613:22–614:24.). Mr. Wei

also confirmed his prior testimony that "we do not care about the thermal conductivity of each individual strain of fiber," and that "the reason Alison doesn't care about the thermal conductivity of individual fibers is because Alison's product use[s] the glass blanket as a whole." (*Id.* at 617:9–618:11.).

Additionally, Dr. Leventis explained that the '359 patent specification "resolves any doubts that might exist" about the interpretation of claim 5, because it states that "[t]he ***lofty batting*** preferably has a thermal conductivity of 50 mW/m-K," and not that individual fibers must have this thermal conductivity. (CDX-1224 (quoting JX-0007 at 7:36-39) (emphasis added); Tr. (Leventis) at 314:9-315:6.).

For the foregoing reasons, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets practice the additional limitation recited in claim 5 of the '359 patent.

3. Dependent Claims 7 and 9

a) "The composite article of claim 1, further comprising a dopant."

b) "The composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite."

Complainant's DI Aerogel Composite Blankets practice claims 7 and 9. (Tr. (Leventis) at 349:19-352:19; CX-2255C (Leventis Rep.) at ¶¶ 9.3.6.1-5, 9.3.7.1-3.). Dr. Leventis confirmed this with reference to Complainant's MSDSs[66] (Tr. (Leventis) at 349:19–352:19), which list the type and amount of dopant used in the DI Aerogel Composite Blankets, as shown below:

[66] *See* n.32, *supra.*

(CDX-1276 (summarizing Complainant's safety data sheets as relates to the amount of dopant used in the DI Aerogel Composite Blankets, CX-0911, CX-0921, CX-0919, CX-0918, CX-0916, CX-1465).). Dr. Leventis [

] (Tr. (Leventis) at 351:12-17.).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the DI Aerogel Composite Blankets practice these claims. (SBr. at 80.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets practice the additional limitations recited in claims 7 and 9 of the '359 patent.

4. Independent Claim 12

a) "A composite article comprising"

Complainant's Cryogel Z and Spaceloft Subsea 10mm blankets ("DI Aerogel Composite Blankets I") are composites of at least aerogel and fibrous batting, as explained in Section IX.D.1

above. (Tr. (Leventis) at 353:3-8 (concluding that the preamble of claim 12 of the '359 patent is satisfied for the same reasons that the preamble of claim 1 of the '359 patent, with respect to "composite article").).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that Complainant's Cryogel Z and Spaceloft Subsea 10mm blankets practice the preamble. (SBr. at 81-83.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets I practice the preamble of claim 12 of the '359 patent.

b) "a fibrous batting sheet and"

Complainant's DI Aerogel Composite Blankets I contain a fibrous batting sheet, as explained in Section IX.D.1 above. (Tr. (Leventis) at 353:3-8 (concluding that the "fibrous batting sheet" limitation of claim 12 of the '359 patent is satisfied for the same reasons that this limitation of claim 1 of the '359 patent is satisfied).).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that Complainant's Cryogel Z and Spaceloft Subsea 10mm blankets practice this limitation. (SBr. at 81-83.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets I practice this limitation of claim 12 of the '359 patent.

c) "a continuous aerogel through said batting"

Complainant's DI Aerogel Composite Blankets I comprise a continuous aerogel through the fibrous batting, as explained in Section IX.D.1 above. (Tr. (Leventis) at 353:9-11 (concluding that the "continuous aerogel through said batting" limitation of claim 12 of the '359 patent is satisfied for the same reasons that the corresponding limitation of claim 1 of the '359 patent is satisfied).).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that Complainant's Cryogel Z and Spaceloft Subsea 10mm blankets practice this limitation. (SBr. at 81-83.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets I practice this limitation of claim 12 of the '359 patent.

d) "where the batting is sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section

Complainant's DI Aerogel Composite Blankets I are sufficiently lofty that the cross-sectional area of the fibers of the batting visible in the cross-section of the composite is less than 10% of the total surface area of that cross section. (Tr. (Leventis) at 353:12–354:5; CX-2255C (Leventis Rep.) at ¶¶ 9.3.8.6-13.). Dr. Leventis made this determination by analyzing x-ray tomography data of Cryogel Z and Spaceloft Subsea 10mm, which show cross-sections of these blankets. (Tr. (Leventis) at 353:12–354:5.). Dr. Leventis processed these cross-sections using software to determine what percentage of the area of the cross-sections is occupied by fiber, and

what percentage is occupied by aerogel. (*Id.* at 322:21–323:9 (explaining Dr. Leventis's analysis in the context of the Nano Aerogel Composite Blankets). Dr. Leventis confirmed that the cross-sectional area of fibers in these blankets is less than 10% of the total cross-section surface area:

(CDX-1279C (showing Dr. Leventis's data, CX-1842C); Tr. (Leventis) at 353:12–354:5.).

Respondents asserted in their Pre-Hearing Briefs that Complainant failed to prove that it satisfied this claim limitation because "Dr. Gnade will testify that Aspen's X-ray tomography, and analysis thereof, are inadequate to support Aspen's allegations that its products practice Claim 12" and "Aspen has failed to establish that the aerogel did not affect the analysis." (RAPBr. at 112; RNPBr. at 105.). Dr. Gnade never gave that testimony, and Respondents adduced no other evidence concerning any purported deficiencies in Dr. Leventis's analysis of this claim. (Tr. (Gnade) at 730:4-6, 782:21-25 (Dr. Gnade conceded that he offered no non-infringement or technical prong domestic industry testimony at the evidentiary hearing).). Respondents also did not raise this argument in their Statement of Streamlined Issues. (Doc. ID No. 604414 (Respondents' Statement of Streamlined Issues).). Moreover, Respondents did not raise any such arguments in their Initial Post-Hearing Briefs. (RABr. at 94; RNBr. at 69.). Thus, these arguments have been deemed waived. (*See* G.R. 10.1.).

Staff agreed with Complainant and took the view that the Complainant's Cryogel Z and Spaceloft Subsea 10mm blankets practice this limitation. (SBr. at 81-83.).

For the foregoing reasons, and because there is no dispute, Complainant has met its

burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets I practice this limitation of claim 12 of the '359 patent.

5. Dependent Claims 15 and 16

a) "The composite article of claim 12, wherein the batting is compressible by a minimum of 50% of its thickness and is sufficiently resilient that after compression for about 5 seconds it returns to at least 70% of its original thickness."

b) "The composite article of claim 12, wherein the fibrous batting is sufficiently lofty that it retains at least 50% of its thickness after addition of the gel forming liquid to form said aerogel."

Complainant's DI Aerogel Composite Blankets I practice claims 15 and 16. (Tr. (Leventis) at 354:6-25, 355:1–356:13; CX-2255C (Leventis Rep.) at ¶¶ 9.3.1.22-24, 9.3.11.1-2, 9.3.12.1-7.). With regard to claim 15, Dr. Leventis explained that he compressed the battings used in these Nano Aerogel Composite Blankets to 50% thickness, held the compression for five seconds, and observed the thickness to which the batting returned. (Tr. (Leventis) at 354:9-21.). Dr. Leventis reported that the tested battings [

] thus claim 15 is satisfied. (CDX-1281C (showing Dr. Leventis's data, CX-2250C); Tr. (Leventis) at 354:6-25.).

With respect to claim 16, Dr. Leventis compared the thickness of the Cryogel Z and Spaceloft Subsea 10mm blankets with the thickness of the battings that go into these blankets, and confirmed that the thickness of the final blanket product (after addition of the catalyzed sol, a gel forming liquid) was 50% or more of the thickness of the constituent batting. (CDX-1283C (comparing average batting thickness to average product thickness and concluding that Complainant's batting retained more than 50% thickness after addition of gel forming liquid to form aerogel) (relying on the following data sheets for blanket thickness: CX-0911, CX-0912,

CX-0913, CX-0914 (Cryogel Z data sheets); CX-0919, CX-0920, CX-0921 (Spaceloft Subsea data sheets); relying on the following specifications for batting thickness: CX-1104C (5mm Cryogel Z batting specification), CX-1094C (10mm Cryogel Z batting specification), CX-1098C (10mm Spaceloft Subsea batting specification)); Tr. (Leventis) at 355:1–356:13.).

Respondents offered no rebuttal, as explained above in Section IX.D. (Tr. (Scherer) at 969:23–970:3; Tr. (Gnade) at 782:21-25; RABr. at 94; RNBr. at 67-68; Doc. ID No. 604414.). Staff agreed with Complainant and took the view that the Complainant's Cryogel Z and Spaceloft Subsea 10mm blankets practice these claims. (SBr. at 81-83.).

For the foregoing reasons, and because there is no dispute, Complainant has met its burden and proven by a preponderance of the evidence that Complainant's DI Aerogel Composite Blankets I practice the additional limitations recited in claims 15 and 16 of the '359 patent.

X. BY SUMMARY DETERMINATION PRE-HEARING, THE ECONOMIC PRONG OF THE DOMESTIC INDUSTRY REQUIREMENT WAS DETERMINED TO BE SATISFIED

On October 31, 2016, pursuant to Commission Rule 210.18, Complainant filed a motion for summary determination that it satisfies the economic prong of the domestic industry requirement ("SD Motion") under 19 U.S.C. § 1337(a)(3)(A) and (B). (Motion Docket No. 1003-012 (Oct. 31, 2016).). On November 7, 2016, Staff filed a response neither opposing nor contesting Complainant's SD Motion. (Doc. ID No. 594269 (Nov. 7, 2016).). On the same day, Respondent Alison filed a response ("Alison Response to SD Motion") in which it stated that it does not contest that Complainant is able to satisfy the economic prong of the domestic industry

requirement.[67] (Doc. ID No. 594642 (Nov. 7, 2016); Alison Resp. SD Mot. at 2.).

On November 15, 2016, an ID other than final was issued finding that Complainant satisfied the economic prong of the domestic industry requirements of Section 337(a)(3)(A) and (B). (*See* Order No. 19 (Nov. 15, 2016).). The Commission did not disturb this finding. (Notice of Commission Determination to Review in Part an Initial Determination Granting Complainant's Motion for Summary Determination (Doc. ID No. 597110 (Dec. 7, 2016)) (noting that the "Commission's action does not disturb the summary determination that complainant satisfies the economic prong of the domestic industry requirement").).

XI. WAIVER OR WITHDRAWAL OF RESPONDENTS' DEFENSES

Respondent Alison did not raise in its Pre-Hearing Brief or offer any evidence during the hearing to support any of the following Affirmative Defenses asserted in its Answer to the Complaint and NOI: (1) Third Defense (patent prosecution history estoppel); (2) Fifth Defense (incorrect inventorship); and (3) Sixth Defense (lack of standing). (Doc. ID No. 584625 (June 27, 2017); Alison Resp. at 18-19.). Respondent Nano did not raise in its Pre-Hearing Brief or offer any evidence during the hearing to support any of the following Affirmative Defenses asserted in its Answer: (1) Sixth Defense (incorrect inventorship); (2) Seventh Defense (lack of standing); and Eighth Defense (prosecution history estoppel). (Doc. ID No. 585162 (July 5, 2016); Nano Resp. at 31-32.).

Consequently, it is a finding of this decision that the Affirmative Defenses identified above have been withdrawn, waived and/or abandoned consistent with Ground Rules 7.2 and

[67] In its response, Respondent Alison contested that Complainant's products and processes practice the Asserted Patents, and also disagreed with Complainant's statements in the SD Motion such as Complainant's description of itself as "a quintessential American company," which Respondent calls "argumentative and unnecessary to resolve the economic prong issue." (Alison Resp. at 2.). The phrase "quintessential American company" is nothing more than description or opinion.

10.1. *Kinik Co. v. Int'l Trade Comm'n*, 362 F.3d 1359, 1367 (Fed. Cir. 2004). (*See also* G.R. 7.2, 10.1.).

XII. CONCLUSIONS OF FACT OR LAW: THIS INITIAL DETERMINATION FINDS A SECTION 337 VIOLATION BASED ON INFRINGEMENT OF THE '123, '890, AND '359 PATENTS

1. The Commission has subject matter, personal, and *in rem* jurisdiction in this Investigation.

2. The Accused Alison Aerogel Composite Blankets and Accused Nano Aerogel Composite Blankets have been imported into the United States.

3. Complainant has proven by a preponderance of the evidence that the Accused Alison Manufacturing Process and Accused Nano Manufacturing Process infringe asserted claims 15-17 and 19 of U.S. Patent No. 6,989,123.

4. Complainant has proven by a preponderance of the evidence that the Accused Alison Aerogel Composite Blankets and Accused Nano Aerogel Composite Blankets infringe asserted claims 1, 5, 7, and 9 of U.S. Patent No. 7,078,359.

5. Complainant has proven by a preponderance of the evidence that the Accused Nano Aerogel Composite Blankets infringe asserted claims 12, 15, and 16 of U.S. Patent No. 7,078,359.

6. Complainant has been proven by a preponderance of the evidence that the Accused Alison Manufacturing Process and Accused Nano Manufacturing Process infringe asserted claims 11-13, 15, 17-19, and 21 of U.S. Patent No. 7,780,890.

7. Respondents have not proven by clear and convincing evidence that any of the asserted claims of the Asserted Patents are invalid.

8. Complainant has proven that it satisfies the technical prong of the domestic industry requirement.

9. Complainant has proven that it satisfies the economic prong of the domestic industry requirement.

10. Complainant has proven that Respondents have violated Section 337 of the Tariff Act of 1930, as amended.

There may be evidence or arguments submitted or raised by the parties in their briefs or during the hearing that are not discussed in this ID. That does not mean they were not

considered. More likely, weight was given to more compelling evidence or arguments, and less reliance was placed on evidence or arguments that were duplicative or cumulative.

XIII. INITIAL DETERMINATION AND ORDER

Based upon the foregoing, it is my Initial Determination on Violation of Section 337 that Respondent Alison and Respondent Nano have violated Section 337 of the Tariff Act of 1930, as amended, by importing into the United States, selling for importation, or selling within the United States after importation certain composite aerogel insulation materials, by reason of infringement of:

- Asserted claims 15-17 and 19 of U.S. Patent No. 6,989,123;
- Asserted claims 1, 5, 7, 9, 12, and 15-16 of U.S. Patent No. 7,078,359; and
- Asserted claims 11-13, 15, 17-19, and 21 of U. S. Patent No. 8,780,890.

This Initial Determination is certified to the Commission. All orders and documents, filed with the Secretary, including the exhibit lists enumerating the exhibits received into evidence in this Investigation, that are part of the record, as defined in 19 C.F.R. § 210.38(a), are not certified, since they are already in the Commission's possession in accordance with Commission Rules. *See* 19 C.F.R. § 210.38(a).

In accordance with 19 C.F.R. § 210.39(c), all material found to be confidential by the undersigned under 19 C.F.R. § 210.5 is to be given *in camera* treatment.

After the parties have provided proposed redactions of confidential business information ("CBI") that have been evaluated and accepted, the Secretary shall serve a public version of this ID upon all parties of record. The Secretary shall serve a confidential version upon counsel who are signatories to the Protective Order (Order No. 1) issued in this Investigation.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the

determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

RECOMMENDED DETERMINATION ON REMEDY AND BOND

I. REMEDY AND BONDING

A. A Limited Exclusion Order with a Certification Provision Is Warranted

Pursuant to Commission Rule 210.42, an administrative law judge ("ALJ") must issue a recommended determination on: (i) an appropriate remedy if the Commission finds a violation of Section 337; and (ii) an amount, if any, of the bond to be posted. 19 C.F.R. § 210.42(a)(1)(ii). When a Section 337 violation has been found, as here, "the Commission has the authority to enter an exclusion order, a cease and desist order, or both." *Certain Flash Memory Circuits and Prods. Containing the Same*, Inv. No. 337-TA-382, Commission Opinion on the Issues Under Review and on Remedy, the Public Interest and Bonding, at 26 (June 9, 1997). There is a mandate in 337(d), which provides: "if the Commission determines, as a result of an investigation under this section, that there is a violation of this section, it shall direct that the articles concerned, imported by any person violating the provision of this section, be excluded from entry to the United States . . . ." 19 U.S.C. § 1337(d).

As a starting point, Complainant has withdrawn its request for a cease and desist order and a general exclusion order. (Doc. ID No. 595388 (Nov. 18, 2016).).[68]

---

[68] In its Pre-Hearing and Post-Hearing Briefs, Respondent Alison claimed that Complainant is not entitled to a cease and desist order because not only has it not infringed any of the patents, [

] There is no counter-evidence that refutes Respondent Alison's claim. However, Respondent Alison's position is irrelevant since Complainant withdrew its request for a cease and desist order on November 18, 2017, almost two (2) months before Respondent Alison filed its Pre-Hearing Brief

Complainant has asked for a permanent, limited exclusion order ("LEO") with a certification provision. (*See* CBr. at 173; *see also* Compl. at ¶¶ 102-109, 112.). Respondent Alison's position in its Pre-Hearing and Post-Hearing Briefs is that Complainant is not entitled to any exclusion order. (*See* RAPBr. at 171; RABr. at 169.). Respondent Nano has agreed that in the event of a finding of violation, that a LEO with a certification provision would be appropriate. (RNBr. at 145; RNPBr. at 167.). Staff agreed with Respondent Nano's position. (SBr. at 108.). That is also the recommendation of this decision with respect to both Respondent Alison's and Respondent Nano's Accused Aerogel Composite Blankets.

In this case, the Commission and then the U.S. Customs and Board Protection should accept a LEO with a certification provision because whether any specific aerogel material or product infringes any of the patents, but particularly the '359 patent, would be impossible to detect by inspection. (*Accord* SBr. at 108 (citing e.g. *Certain GPS Devices and Prods. Containing Same*, Inv. No. 337-TA-602, Comm'n Op., 2005 ITC LEXIS 881, at *92-94 (Sept. 28, 2005)).).

B. The Parties Have Stipulated to a Bond During the Presidential Review Period

Even if the Commission enters a LEO with a certification provision, Respondents Alison and Nano (at least theoretically) may continue to import and sell their products during the 60-day Presidential Review Period under an amount determined by the Commission to be "sufficient to

---

(Jan. 13, 2017) and almost four (4) months before Respondent Alison filed its Post-Hearing Brief (Mar. 8, 2017). In its Pre-Hearing Brief, Respondent Alison claimed that Complainant is not entitled to an exclusion order because: (1) the asserted claims are not infringed; (2) the asserted claims are invalid; and (3) Complainant failed to meet the technical prong of the domestic industry requirement (presumably because of Respondent Alison's position that all asserted claims are invalid.). (RAPBr. at 171.). However Respondent Alison's position changed in its Post-Hearing Brief. Respondent Alison modified its position to: (1) Respondent Alison has not infringed the asserted claims of the Method Patents and claim 9 of the '359 patent; and (2) that the asserted claims are invalid. (*See* RABr. at 169.).

protect the complainant from any injury." 19 U.S.C. ¶ 1337(j)(3); 19 C.F.R. § 210.50. In this case, Complainant and Respondents Alison and Nano have stipulated to a bond of 100% of the entered value of products during Presidential Review Period. (*See* JX-0027C ("Bond Stipulation"), Doc. No. 600163 (Jan. 5, 2017).). Staff agreed. (SBr. at 109; JX-0027C.). The Bond Stipulation includes all products that were made using the processes determined to infringe, whether entitled to entry into the United States from a foreign trade zone, or any warehouse. (JX-0027C.). In the event the Commission agrees that there has been a violation of Section 337, this decision recommends that the Commission adopt the private parties' Bond Stipulation and Staff's concurrence that a 100% bond is appropriate.

II. CONCLUSION

For the reasons set forth above, the weight of the evidence supports a finding that there has been a violation of Section 337 because of infringement of certain asserted claims of the '123, '890, and '359 patents. Complainant has proven that its Domestic Industry Manufacturing Process and Domestic Industry Aerogel Composite Blankets satisfy the technical and economic prongs of the domestic industry requirements for the '123, '890, and '359 patents. Respondents have not proven by clear and convincing evidence that these patents are invalid or unenforceable.

Within fourteen (14) days of the date of this document, the party shall submit to the Office of Administrative Law Judges a joint statement regarding whether or not they seek to have any portion of this document deleted from the public version. The parties' submission shall be made by hard copy and must include a copy of this ID with red brackets indicating any portion asserted to contain CBI to be deleted from the public version. The parties' submission shall also include an index identifying the pages of this document where proposed redactions are located. The parties' submission concerning the public version of this document need not be

filed with the Commission Secretary.

SO ORDERED.

MaryJoan McNamara
Administrative Law Judge

APPENDIX A

Respondent Alison's Accused Aerogel Composite Blankets
DRT603 DRT606 DRT610 GR1006

APPENDIX B

Respondent Nano's Accused Aerogel Composite Blankets
FMA450
FMA650
FMB350
FMB350-6
FMC100
FMC200
FMD400

APPENDIX C

Complainant's DI Aerogel Composite Blankets
Cryogel (x201 and Z) Pyrogel (XT, XT-E, XT-F) Spaceloft Spaceloft Subsea

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Inv. No. 337-TA-1003

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **INITIAL DETERMINATION** has been served by hand upon the Commission Investigative Attorney, Yoncha Kundupoglu, Esq., and upon the following parties as indicated on **October 23, 2017**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

- ☐ Via Hand Delivery
- ☒ Via Express Delivery
- ☑ Via First Class Mail
- ☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, N.W.
Washington, DC 20006-1101

- ☐ Via Hand Delivery
- ☒ Via Express Delivery
- ☐ Via First Class Mail
- ☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Timothy R. Bickhan, Esq.
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, N.W.
Washington, DC 20036

- ☐ Via Hand Delivery
- ☒ Via Express Delivery
- ☐ Via First Class Mail
- ☐ Other:_____

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of	
CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME	Investigation No. 337-TA-1003

NOTICE OF A COMMISSION DETERMINATION TO REVIEW IN PART AN INITIAL DETERMINATION GRANTING COMPLAINANT'S MOTION FOR SUMMARY DETERMINATION THAT IT SATISFIES THE ECONOMIC PRONG OF THE DOMESTIC INDUSTRY REQUIREMENT, AND ON REVIEW TO STRIKE A PART OF THE SUMMARY DETERMINATION

AGENCY: U.S. International Trade Commission.

ACTION: Notice.

SUMMARY: Notice is hereby given that the U.S. International Trade Commission has determined to review in part an initial determination ("ID") issued by the presiding administrative law judge ("ALJ") (Order No. 19) granting complainant's motion for summary determination that it satisfies the economic prong of the domestic industry requirement, and on review, to strike a portion of the ID. The Commission's action does not disturb the summary determination that complainant satisfies the economic prong of the domestic industry requirement.

FOR FURTHER INFORMATION CONTACT: Michael Liberman, Esq., Office of the General Counsel, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-3115. Copies of non-confidential documents filed in connection with this investigation are or will be available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 500 E Street, S.W., Washington, D.C. 20436, telephone (202) 205-2000. General information concerning the Commission may also be obtained by accessing its Internet server at *https://www.usitc.gov.* The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *https://edis.usitc.gov.* Hearing-impaired persons are advised that information on this matter can be obtained by contacting the Commission's TDD terminal on (202) 205-1810.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation under section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337 ("section 337"), on June 8, 2016, based on a complaint filed by Aspen Aerogels, Inc. of Northborough, Massachusetts ("Aspen," or "Complainant"). 81 *Fed. Reg.* 36955-56 (Jun. 8, 2016). The complaint alleges a

violation of section 337 by reason of infringement of certain claims of U.S. Patent Nos. 6,989,123; 7,078,359; 7,399,439; 7,780,890; and 9,181,486. The notice of investigation named Nano Tech Co., Ltd., of Zhejiang, China, and Guangdong Alison Hi-Tech Co., Ltd., of Guangzhou, China ("Alison," or "Respondent"), as respondents. The Commission's Office of Unfair Import Investigations was named as a party.

On October 31, 2016, pursuant to Commission Rule 210.18, Complainant filed a motion for summary determination that it satisfies the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(A) and (B). On November 7, 2016, the Commission investigative attorney ("the IA") filed a response to Complainant's motion. The IA did not oppose or contest either Complainant's motion or its Statement of Material Facts. On November 7, 2016, Respondent Alison filed a response in which it stated that it does not contest that Complainant is able to satisfy the economic prong of the domestic industry requirement, but that it does contest that Complainant's products and processes practice the asserted patents. No other responses were filed.

On November 15, 2016, the ALJ issued an ID (Order No. 19) granting Complainant's motion. No party petitioned for review of the ALJ's ID.

The Commission has determined to review the ID in part and, on review, to strike the ID's summary discussion in two full paragraphs on page 9 of the ID. No other part of the ID has been reviewed.

The authority for the Commission's determination is contained in section 337 of the Tariff Act of 1930, as amended (19 U.S.C. § 1337), and in Part 210 of the Commission's Rules of Practice and Procedure (19 C.F.R. Part 210).

By order of the Commission.

Lisa R. Barton
Secretary to the Commission

Issued: December 7, 2016

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Inv. No. 337-TA-1003

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **NOTICE** has been served by hand upon the Commission Investigative Attorney, **Yoncha Kundupoglu, Esq.,** and the following parties as indicated, on **December 8, 2016.**

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainants Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, NW
Washington, DC 20006

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Steven E. Adkins, Esq.
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, NW
Washington, DC 20036

☐ Via Hand Delivery
☐ Via Express Delivery
☒ Via First Class Mail
☐ Other:_____

Public Version

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME**	**Inv. No. 337-TA-1003**

ORDER NO. 19: **INITIAL DETERMINATION GRANTING COMPLAINANT'S SUMMARY DETERMINATION MOTION THAT IT SATISFIES THE ECONOMIC PRONG OF THE DOMESTIC INDUSTRY REQUIREMENTS OF SECTIONS 337(a)(3)(A) and (B)**

(November 15, 2016)

I. Introduction

On October 31, 2016, pursuant to Commission Rule 210.18, Complainant Aspen Aerogels, Inc. ("Complainant") filed a motion for summary determination that it satisfies the economic prong of the domestic industry requirement under 19 U.S.C. § 1337(a)(3)(A) and (B). ("Economic DI Motion," Mot. Docket No. 1003-012, Mot. at 1.). In support of its Economic DI Motion, Complainant filed a Statement of Material Facts ("SMF," Doc. ID No. 594067) and a Memorandum of Points and Authorities ("Memo."). Complainant certifies the accuracy of its financial information in part through the October 31, 2016 Declaration of its Assistant Controller, Jack Rocha ("Rocha Decl."). (Exhibit ("Ex.") 1C to Memo.). Additionally, Complainant provided its Securities and Exchange Commission ("SEC") 10-Q report that provides its unaudited, consolidated balance sheet as of December 31, 2015, and March 31, 2016

(Ex. 2 to Memo.), as well as cash flow and operations information for the three (3) months preceding December 31, 2015, and March 31, 2016. (*Id.*).[1]

In its Economic DI Motion, Complainant requested that the schedule for responsive briefing be expedited because fact discovery closes on November 10, 2016, and initial expert reports are due on November 22, 2016. (Economic DI Mot. at 2 & n.1.). Complainant suggests that resolution of its Economic DI Motion would likely eliminate unnecessary discovery as well as evidentiary hearing time. (*Id.*).

On November 1, 2016, responsive briefing was ordered expedited to November 7, 2016. (Order No. 18 (Nov. 1, 2016), Doc. ID No. 594118.). Order No. 18 shortened response time by approximately four (4) days.

On November 7, 2016, the Office of Unfair Import Investigations ("Staff") filed its response to Complainant's Economic DI Motion. ("Staff Res." at 1, 2, Doc. ID No. 594269.). Staff does not oppose or contest either Complainant's Economic DI Motion or its Statement of Material Facts. (*Id.* at 2.).

On November 7, 2016, Respondent Guangdong Alison Hi-Tech, Co., Ltd. ("Respondent"), filed a response in which it stated that it does not contest that Complainant is able to satisfy the economic prong of the domestic industry requirement, but that it does contest that Complainant's products and processes practice the asserted patents. ("RRes." at 2, Doc. ID No. 594642.). However, Respondent offers no evidence of any type (documentary or expert) to counter Complainant's domestic industry evidence, even with regard to the allocations to the Complainant's DI Products, or to its allocation method. (*Id.*). Respondent also says it does not agree with all of Complainant's statements in its Motion, such as Complainant's description of

[1] Complainant provided a wealth of financial information with regard to plant, operations, and allocation of its expenses in its Exhibits to its Memorandum.

itself as "a quintessential American company," which Respondent calls "argumentative and unnecessary to resolve the economic prong issue." (*Id.*).[2] Finally, Respondent claims that it did not receive Order No. 18 expediting briefing until November 7, 2016, the day its response to Complainant's Economic DI Motion was due. (*Id.*).

With regard to the latter claim, Order No.18 was posted on EDIS on November 1, 2016, and was available to Respondent. (Order No. 18.).

Based upon Complainant's evidence and its explanation of the method by which it allocates its expenditures to its Domestic Industry Products ("DI Products"), Complainant has proven that it satisfies the economic prong under Section 337(a)(3)(A) and (B).

II. Legal Standards

In a Section 337 investigation, the complainant has the burden of proving the existence of a domestic industry relating to the articles protected by the patents-at-issue. 19 U.S.C. § 1337(k)(2)(A). For a patent-based claim, the domestic industry requirement consists of a technical prong and an economic prong. (*See, e.g., Certain Variable Speed Wind Turbines & Components Thereof*, Inv. No. 337-TA-376, USITC Pub. 3003, Comm'n Op. at 14-17 (1996).). A domestic industry must be proven to "exist[] or is in the process of being established." 19 U.S.C. § 1337(a)(2). The economic prong is satisfied by meeting any one of the following three (3) criteria with regard to articles protected by the patents-at-issue: (A) significant investment in plant and equipment; (B) significant employment of labor or capital; or (C) substantial investment in its exploitation, including engineering. *Id.* § 1337(a)(3).

---

[2] Respondent did not identify any other statements in Complainant's Motion or Memorandum that it claimed were "unnecessary and argumentative." (RRes. at 2.). Any objection Respondent may have to Complainant's descriptive narrative language that does not affect the substantive evidence is relatively harmless and not sufficient to defeat Complainant's Economic DI Motion.

The criteria contained in Section 337(a)(3)(A)-(C) are disjunctive; that is, satisfaction of any one of them is sufficient to satisfy the economic prong. *Certain Digital Imaging Devices & Related Software*, Inv. No. 337-TA-717 (Digital Imaging Devices), ID at 305 (May 12, 2011), *aff'd,* Notice of Commission Decision Not to Review the ALJ's Final ID at 2 (July 18, 2011).

In analyzing the economic prong under subsections A, B, and C, the Commission examines whether the domestic activities and investments in the form of the criteria identified in the statute (e.g., significant employment of labor or capital) "are important to the articles protected by the asserted patents in the context of a company's operations, the marketplace, or the industry..." *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 30, USITC Pub. 4289 (Nov. 2011). The Commission also considers whether "the complainant's undertakings had a direct bearing on the practice of the patent." (*Id.*). Whether investments are considered "substantial" or "significant" "is not measured in the abstract or in an absolute sense," or according to "any rigid mathematical formula." *Digital Imaging Devices*, ID at 26.[3] Moreover, there is no requirement that the domestic industry conform to a specific size. *Bally/Midway Mfg. Co. v. Int'l Trade Comm'n*, 714 F.2d 1117, 1123 (Fed. Cir. 1983) (citing *In re Von Clemm*, 229 F.2d 441, 444 (CCPA 1955)).). The Commission has stated that in analyzing the activities of a domestic industry for purposes of an economic prong analysis, that a "precise accounting" is not necessary "as most people do not document their daily affairs in contemplation of possible litigation." (Memo. at. 20 (quoting *Certain Digital Imaging Devices & Related Software*, Inv. No. 337-TA-717 (Digital Imaging Devices), ID at 305 (May 12, 2011), *aff'd*, Notice of Commission Decision Not to Review the ALJ's Final

[3] Even after the Federal Circuit's decision in *Lelo, Inc. v. Int'l Trade Comm'n*, 786 F.3d 879, 883 (Fed. Cir. 2015), which requires quantitative analysis, there is still no rigid "bright line" rule with regard to how large a financial investment must be to satisfy the economic prong of the domestic industry requirement.

ID at 2 (July 18, 2011). Accordingly, the Commission permits "reasonable and appropriate allocation methodologies" in its analysis. (*Id.* (citing *Certain Ink Cartridges and Components Thereof*, Inv. No. 337-TA-946, Order No. 12 at 67 (Oct. 28, 2015) (initial determination unreviewed in relevant part)).).

For a summary determination motion, under Commission Rule 210.18(a) and (b), the moving party bears the initial burden of establishing that there is an absence of a genuine issue of material fact and that it is entitled to judgment as a matter of law. 19 C.F.R. § 210.18(a) and (b). Rule 210.18 is analogous to summary judgment under the Federal Rule of Civil Procedure 56. *Certain Integrated Circuit Devices and Products Containing Same*, Inv. No. 337-TA-873, Order No. 32 (unreviewed initial determination) at 2 (Oct. 21, 2013).

III. Analysis: Complainant's Evidence Satisfies the Economic Prong

In its uncontested Statement of Material Facts ("SMF"), Complainant states that it manufactures aerogel products under the brand names of Pyrogel, Cryogel, Spaceloft, Spaceloft Gray, and Spaceloft Subsea ("DI Products"). (SMF at 5-6.). Complainant alleges that all of these DI Products practice four of the five asserted patents, [

]

As it describes its operations, including with supporting evidence, Complainant says that its research and development operations are based "entirely" in the United States. (Memo. at ii; SMF at 5.). According to its description and uncontested evidence, Respondent manufactures all of its domestic industry products ("DI Products"), and only those products, in a manufacturing

facility in East Providence, Rhode Island. (Memo. at ii; SMF at 5, 6.). According to Complainant, it oversees its operations from its headquarters in Massachusetts. (Memo. at 1; SMF at 1.).

In order to satisfy the economic prong of the domestic industry requirement, Complainant has provided extensive and detailed financial evidence of its investment in plant and equipment, and in labor and capital, all of which Complainant attributes to the manufacture of its DI Products in its East Providence, Rhode Island manufacturing facility. (Memo. at 6, 7; SMF at 9, 13-14, 18-19, 21-24, 27-28.). Then, as its methodology for allocating its investments that can be attributed to the DI Products to satisfy the economic prong of the domestic industry requirement, Complainant uses a production-based allocation method. (*See* SMF at 6, 9; Memo. at 7, 8.). To implement its allocation, Complainant determined the percentage of its DI Products manufactured in its East Providence, Rhode Island facility in relation to total production, and then calculated its domestic industry investments by multiplying its total investments by the percentage of the DI Products it produces. (SMF at 6-10, 12; Memo. at 8-9.). Complainant reported its investments, and allocated them as follows:

Complainant's Domestic Industry [4] [

[4] The numbers contained in the chart on this page labeled "Complainant's Domestic Industry" are taken directly from Complainant's chart labeled "Summary of Aspen's Domestic Industry" in its Memorandum at page 6. The numbers cover the last two most recent calendar years that are also Complainant's Fiscal Years ("FY"). The figures generally represent Complainant's investments as of December 31, 2015. (Memo. at 6, 9; *see also* Memo. at 9, Table 3.).

] (Memo. at 6.).

Complainant explains and provided evidence that it has [ ] square feet in a manufacturing facility in East Providence, Rhode Island that it says is devoted almost entirely to the manufacturing of its DI Products [

] (Memo. at 8; SMF at 10; *see also* SMF at 1, 4-6; Memo. at ii.). According to Complainant's figures, [ ] of the square footage of its East Providence facility is attributable to the manufacture of "all" of its aerogel insulation products. (Memo. at 8; SMF at 11; *see also* Mot. at ii; SMF at 6.). Of this, Complainant says that [ ] of this consisted of DI Products, and so [ ] of the total investment in plant is attributed to its DI Products. (Memo. at 8; *see also* SMF at 9.). The investment dollar figures that Complainant associates with the percentages referenced immediately above are that [ ] million in 2015 and [ ] million in 2014 were expenditures it made to maintain and operate the plant and equipment used to manufacture its DI Products. (Memo. at 10; SMF at 18.).

With regard to § 337(a)(3)(B), the labor or capital prong of the domestic industry requirement, Complainant provided evidence that as of December 31, 2015, it had [ ] full-time employees worldwide, of which [ ] are located in the United States. (Memo. at 11; SMF at 11.). Of its U.S. employees, Complainant offered evidence that [ ] worked in

manufacturing and supply chain operations, while [ ] worked in research involving its aerogel DI Products. (Memo. at 11; SMF at 20.). With regard to total employee compensation for those engaged in manufacturing the DI Products, Complainant spent some [ ] in FY 2015 and [ ] in FY 2014. (Memo. at 12, Table 6; SMF at 22.). According to Complainant's evidence, the percentage of compensation for employees engaged in engineering and development that can be attributed to the DI products is equal to [ ] of the total compensation for FY 2015, and [ ] of the total compensation for FY 2014. (Memo. at 12.). Complainant offered evidence that its total expenditures on labor, for both manufacturing and research and development with respect to the DI Products, were [ ] in 2015 and [ ] in 2014. (Memo. at 13 & Table 7; SMF at 23-24.).

With regard to its capital expenditures under Section 337(a)(3)(A) for plant and equipment, Complainant offered evidence that it built a third production line to produce aerogel products in its East Providence, RI facility that spanned both FY14 and FY15. (Memo. at 13-14; SMF at 26-27.). DI Products constituted [ ] of its total production of all of its aerogels in the East Providence, RI facility, or some [ ] that it attributes to its DI Products. (Memo. at 13-14.).

With regard to its capital expenditures, Complainant offered evidence that it spent [ ] million in 2014 on operating and maintaining its Providence, RI facility and that rose to [ ] million in 2015. (*Id.* at 14; SMF at 27.). Because [ ] of the 2014 expenditures are attributable to DI Products, Complainant's total expenditures to maintain and operate the plant and equipment used for manufacturing DI Products was [ ] million in 2015 and [ ] million in 2014, for a total of [ ] million. (Memo. at 14; SMF at 28.). For research and

development, Complainant offered evidence that it spent [ ] in FY 2014 and FY 2015. (Memo. at 14, Table 8; SMF at 29.).

To summarize, according to Complainant's allocation of the figures described above to its DI Products under Section 337(a)(3)(A), for plant and equipment, some [ ] of [ ] square feet from East Providence, RI is attributable to its four (4) DI Products, while [ ] is attributable to the fifth DI Product, [ ]. (SMF at 9, 12, 34.). According to Complainant's figures, of its plant's net book value as of December 31, 2015, [ ] of the total netbook value of [ ] million is attributable to the 4 DI Products while [ ] million, or [ ], is attributable to the fifth DI Product, [ ]. (*Id.* at 11, 33.). Of the [ ] million Complainant spent on equipment during 2015, some [ ], or [ ] million, is attributed to the 4 DI Products, while [ ], or [ ] million, is attributed to the 5th DI Product, [ ]. (*Id.* at 13-17.).

With regard to Complainant's allocation of its expenditure or investment figures described above to the DI Products under Section 337(a)(3)(B), or to labor or capital, some [ ] of Complainant's workforce, or [ ] employees, are attributed to domestic labor for the 4 DI Products as of December 31, 2015, while [ ] employees, or [ ], are attributed to the 5th DI Product, [ ]. (*Id.* at 18-20.). With regard to labor compensation, Complainant allocates some [ ], or [ ] million, to the 4 DI Products, while [ ], or [ ] million, are attributed to the 5th DI Product, [ ]. With regard to total labor or capital employed, Complainant spent [ ] million during 2014 and 2015. (*Id.* at 24-29.). Of this sum, Complainant allocates and attributes [ ] million, or [ ], to the 4 DI Products, while Complainant allocates and attributes [ ] million, or [ ], to the 5th DI Product, [ ]. (*Id.*).

IV. Conclusion and Order

In this case, Complainant has provided more than sufficient evidence that it satisfies the economic prong of the domestic industry requirement with respect to Sections 337(a)(3)(A) and (B) through its "significant" investments in plant and equipment, and "significant" investments in labor and capital. Because of the disjunctive nature of the three (3) economic prongs under Section 337, Complainant did not need to prove the third prong, Section 337(a)(3)(C). *Digital Imaging Devices*, ID at 305, *aff'd,* Notice of Commission Decision Not to Review the ALJ's Final ID at 2. In this case, Complainant has provided a fairly detailed accounting of its expenditures for its labor and for its capital investments in plant and equipment in the United States for the two (2) years preceding the April 2016 filing of its Complaint. (*See* Doc. ID No. 578695.). Complainant's multi-million dollar expenditures on labor, equipment and other capital items can hardly be called "modest" either qualitatively or quantitatively. *See Lelo, Inc.*, 786 F.3d at 882. No evidence has been provided to counter the Complainant's investment and expenditure figures, its quantitative analysis or methodology. Accordingly, there are no material facts in dispute with regard to Complainant's investments, its quantitative analysis or its allocation method.

In this case, Respondent's single, specific objection to Complainant's description of itself as "a quintessential American company" has no impact on the finding that Complainant has met the domestic industry requirement with respect to Sections 337(a)(3)(A) and (B). Complainant's description of itself is narrative; it is hardly "argumentative." (RRes." at 2.).

Respondent had the same opportunity as Complainant and Staff to check EDIS for Order No. 18 that set an expedited briefing requirement for its and Staff's response to Complainant's

Economic DI Motion. If Respondent had evidentiary support to contest any aspect of Complainant's Economic DI Motion, or its allocation method, Respondent could have requested to extend the briefing deadline.

Because there are no contested facts and because there is no counter evidence that could disturb a finding that the Complainant is not entitled to summary determination, the Complainant's motion for summary determination that it satisfies the domestic industry requirement under Section 337(a)(3)(A) and (B), that is Motion Docket No. 1003-012, is hereby ***granted.***

This Initial Determination is hereby certified to the Commission. Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review of the Initial Determination pursuant to 19 C.F.R. § 210.43(a), or the Commission orders on its own motion a review of the Initial Determination or certain issues herein pursuant to 19 C.F.R. § 210.44.

Within seven (7) business days of the date of this document, each party shall submit to the Office of the Administrative Law Judges a statement as to whether or not / [5] it seeks to have any confidential portion of this document deleted from the public version. Any party seeking redactions to the public version(s) must submit to this office two (2) copies of a proposed public version of this document pursuant to Ground Rule 1.10 with red brackets clearly indicating any portion asserted to contain confidential business information.

The Parties' submissions may be made by facsimile and/or hard copy by the aforementioned date. In addition, an electronic courtesy copy is required pursuant to Ground

[5] / This means that parties that do not seek to have any portion redacted are still required to submit a statement to this effect.

Rule 1.3.2. The Parties' submissions concerning the public version of this document need not be filed with the Commission Secretary.

SO ORDERED.

Maryloan McNamara
Administrative Law Judge

CERTAIN COMPOSITE AEROGEL INSULATION MATERIALS AND METHODS FOR MANUFACTURING THE SAME

Inv. No. 337-TA-1003

PUBLIC CERTIFICATE OF SERVICE

I, Lisa R. Barton, hereby certify that the attached **ORDER** has been served by hand upon the Commission Investigative Attorney, Yoncha Kundupoglu, Esq., and upon the following parties as indicated on **December 16, 2016**.

Lisa R. Barton, Secretary
U.S. International Trade Commission
500 E Street, SW, Room 112
Washington, DC 20436

On Behalf of Complainant Aspen Aerogels, Inc.:

Kevin K. Su, Esq.
FISH & RICHARDSON P.C.
1 Marina Park Drive
Boston, MA 02210

☐ Via Hand Delivery
☑ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Guangdong Alison Hi-Tech Co., Ltd.:

Gary M. Hnath, Esq.
MAYER BROWN LLP
1999 K Street, N.W.
Washington, DC 20006-1101

☐ Via Hand Delivery
☑ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____

On Behalf of Respondent Nano Tech Co., Ltd.:

Steven E. Adkins, Esq.
STEPTOE & JOHNSON LLP
1330 Connecticut Avenue, N.W.
Washington, DC 20036

☐ Via Hand Delivery
☑ Via Express Delivery
☐ Via First Class Mail
☐ Other:_____