

IPR2016-00452
Patent No. 8,147,709 B2

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DAIKIN INDUSTRIES, LTD. and
DAIKIN AMERICA, INC.,
Petitioners,

v.

THE CHEMOURS COMPANY FC, LLC,
Patent Owner.

Case IPR2016-00452
Patent No. 8,147,709 B2

**PETITIONERS' NOTICE OF APPEAL TO THE UNITED STATES
COURT OF APPEALS FOR THE FEDERAL CIRCUIT**

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel
United States Patent and Trademark Office
Madison Building East, Room 10B20
600 Dulany Street
Alexandria, VA 22314

Dear Director:

Pursuant to 35 U.S.C. §§ 141(c) and 142, and in accordance with 37 C.F.R. § 90.2(a), Petitioners Daikin Industries, Ltd. and Daikin America, Inc. (collectively, “Daikin”) hereby appeal to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the Patent Trial and Appeal Board (“Board”) entered on July 5, 2017 (Paper 42, a copy of which is attached as Exhibit A), and from all adverse findings, orders, notices, decisions, rulings, and opinions in the underlying proceeding, including the Board’s November 3, 2017, decision denying Daikin’s Request for Rehearing (Paper 44, a copy of which is attached as Exhibit B).

For the limited purpose of providing the Director the information requested under 37 C.F.R. § 90.2(a)(3)(ii), Daikin anticipates that the issues on appeal may include, but are not limited to, the following, as well as any underlying findings, determinations, rulings, decisions, opinions, and other related issues:

1. The Board’s decision that Daikin did not show, by a preponderance of the evidence, that challenged claims 1–4, 7, and 8 of U.S. Patent No. 8,147,709 are

unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of U.S. Publication No. 2007/0100175 (“Miller”) and the ARI 2006 Standard for Specifications for Fluorocarbon Refrigerants (“ARI Standard”);

2. The Board’s finding that Daikin failed to show sufficiently that the additional reactor length and heated reaction zones in the experiment of its expert, Mr. Takahashi, were immaterial deviations from Example 1 of Miller;

3. The Board’s finding that Daikin did not adequately explain why Mr. Takahashi made such deviations to the experiment described in Example 1 of Miller;

4. The Board’s determination that evidence in the record suggests that such deviations could have materially affected the reaction products that Mr. Takahashi obtained;

5. The Board’s determination that Daikin’s arguments and Mr. Takahashi’s testimony that the experiments performed by Patent Owner’s expert, Dr. Sun, support Daikin’s position is inconsistent with Daikin’s assertion that Dr. Sun’s experiments are irrelevant;

6. The Board’s determination that the record does not include sufficient objective evidence to support a conclusion that 3,3,3-trifluoropropyne, HFO-1243zf, and E-HFO-1234ze are inherently produced in Example 1 of Miller; and

7. The Board's overlooking that Example 1 of Miller also includes a heated, catalyst-free zone.

Simultaneously with this filing, and in accordance with 37 C.F.R § 90.2(a)(1), this Notice of Appeal is being filed with the Board and is being served on the Patent Owner in accordance with 37 C.F.R. § 42.6(e). In addition, a copy of this Notice of Appeal and the required fees are being filed electronically with the Clerk's Office of the Court of Appeals for the Federal Circuit.

No fees are believed to be due to the United States Patent and Trademark Office in connection with this filing. However, if any fees are due in connection with this filing, authorization is hereby given to charge such fees to Deposit Account 01-1785.

Respectfully submitted,

AMSTER, ROTHSTEIN & EBENSTEIN
LLP
Attorneys for Petitioners
90 Park Avenue
New York, NY 10016
(212) 336-8000

Dated: January 5, 2018

By: /Anthony F. Lo Cicero/
Anthony F. Lo Cicero
Registration No. 29,403

CERTIFICATE OF SERVICE

I hereby certify that, pursuant to 37 C.F.R. § 42.6(e), a true and correct copy of the foregoing **PETITIONERS' NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT** is being served by electronic mail this 5th day of January 2018 on counsel for Patent Owner as follows:

Dipu A. Doshi (ddoshi@blankrome.com)
Michael S. Marcus (mmarcus@blankrome.com)
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Dated: January 5, 2018

By: /Marion P. Metelski/
Marion P. Metelski
Registration No. 38,557
AMSTER, ROTHSTEIN &
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CERTIFICATE OF FILING

I hereby certify that, pursuant to 37 C.F.R. §§ 90.2(a)(1), on this 5th day of January 2018 the foregoing **PETITIONERS' NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT** was filed electronically through the Patent Trial and Appeal Board's End to End system (PTAB E2E) in accordance with 37 C.F.R. § 42.6(b)(1), and mailed to the Director of the United States Patent and Trademark Office via the United States Postal Service's Priority Mail Express service in accordance with 37 C.F.R. §§ 1.10 and 104.2(a) at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

I further certify that, pursuant to 37 C.F.R. § 90.2(a)(2) and Fed. Cir. Rules 15, 25, and 52, on this 5th day of January 2018, an electronic copy of the foregoing **PETITIONERS' NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT**, along with the required docketing fee, was submitted electronically with the United States Court of Appeals for the Federal Circuit via CM/ECF. Per Fed. Cir. Rule 15(a)(1), one paper copy of this Notice of Appeal is also being simultaneously sent to the Clerk's Office of the United States Court of Appeals

for the Federal Circuit via the United States Postal Service's Priority Mail

Express service at the following address:

Hon. Peter R. Marksteiner
Circuit Executive and Clerk of Court
United States Court of Appeals
for the Federal Circuit
717 Madison Place, N.W., Room 401
Washington, D.C. 20439

Dated: January 5, 2018

By: *Marion P. Metelski*
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Exhibit A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DAIKIN INDUSTRIES, LTD. and
DAIKIN AMERICA, INC.,
Petitioner,

v.

THE CHEMOURS COMPANY FC, LLC,
Patent Owner.

Case IPR2016-00452
Patent 8,147,709 B2

Before LORA M. GREEN, JO-ANNE M. KOKOSKI, and
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

ANKENBRAND, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

Finding Claims 1–4, 7, and 8 Not Unpatentable
35 U.S.C. § 318(a); 37 C.F.R. § 42.73

Dismissing as Moot Petitioner’s Motion to Exclude
37 C.F.R. § 42.64(c)

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–4, 7, and 8 (collectively, “the challenged claims”) of U.S. Patent No. 8,147,709 B2 (Ex. 1001, “the ’709 patent”). We have jurisdiction under 35 U.S.C. § 6. For the reasons that follow, we determine that Petitioner does not demonstrate, by a preponderance of the evidence, that claims 1–4, 7, and 8 are unpatentable.

A. Procedural History

Daikin Industries, Ltd. and Daikin America, Inc. (collectively, “Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review pursuant to 35 U.S.C. § 311.¹ On July 8, 2016, we instituted trial to determine whether claims 1–4, 7, and 8 are unpatentable under 35 U.S.C. § 103(a) over the combination of Miller² and the ARI Standard.³ Paper 11 (“Institution Decision” or “Inst. Dec.”).

During trial, The Chemours Company FC, LLC (“Patent Owner”) filed a Response (Paper 22, “Resp.”), and Petitioner filed a Reply (Paper 25, “Reply”).⁴ Further, Patent Owner filed, and Petitioner responded to, observations on the cross-examination testimony of Mr. Takahashi. Paper

¹ In support of the Petition, Petitioner filed a declaration of Mr. Kazuhiro Takahashi (Ex. 1005) and a declaration of Dr. Georgi S. Kazachki (Ex. 1006).

² U.S. Publication No. 2007/0100175 A1, published May 3, 2007 (Ex. 1003).

³ Air-Conditioning & Refrigeration Institute (“ARI”), 2006 Standard for Specifications for Fluorocarbon Refrigerants (Ex. 1004).

⁴ With the Response, Patent Owner filed a declaration of Dr. Xuehui Sun (Ex. 2016). With the Reply, Petitioner filed a second declaration of Mr. Takahashi (Ex. 1066).

33 (Observations); Paper 39 (Petitioner's Response). Patent Owner also filed, with the Board's permission, a paper identifying arguments and evidence that Patent Owner contends are beyond the proper scope of a reply. Paper 38.

Petitioner filed a Motion to Exclude, which is fully briefed. Paper 32 (Motion); Paper 35 (Patent Owner's Opposition); Paper 37 (Petitioner's Reply). The record further includes a transcript of the final oral hearing conducted on March 9, 2017.⁵ Paper 41 ("Tr.").

B. Related Proceedings

Petitioner and Patent Owner do not identify any related proceedings involving the '709 patent. Pet. 4; Paper 7, 2.

C. The '709 Patent

The '709 patent, titled "Compositions comprising 3,3,3-trifluoropropyne," issued on April 3, 2012. The '709 patent relates to "a composition comprising HFO-1234yf [also known as 2,3,3,3-tetrafluoropropene] and at least one additional compound" selected from a group of twenty-five compounds, including 3,3,3-trifluoropropyne,

⁵ Petitioner and Patent Owner filed a Joint List of Objections to Demonstrative Exhibits. Paper 40. In this decision, we rely only on the arguments presented properly in the parties' papers and the evidence of record. Our decision does not rely on any information presented solely in Petitioner's or Patent Owner's demonstrative exhibits. We, therefore, overrule as moot Petitioner's and Patent Owner's objections.

HFO-1234ze, and HFO-1243zf.⁶ Ex. 1001, 1:39–49.⁷ The specification explains that environmental regulations “have led to the need for new compositions for use in refrigeration, air-conditioning, and heat pump apparatus,” especially compositions having low global warming potential. *Id.* at 1:27–30. One such composition is HFO-1234yf, which may be made by catalytic dehydrofluorination of 1,1,1,2,3-pentafluoropropane (also known as HFC-245eb). *Id.* at 1:13–25, 4:24–25, Fig. 1. According to the specification, in preparing HFO-1234yf by, *inter alia*, catalytic dehydrofluorination, it was discovered that “certain additional compounds are present in small amounts,” e.g., less than about 1 weight percent. *Id.* at 1:35–38. The challenged claims all require a composition comprising HFO-1234yf and 3,3,3-trifluoropropyne. *Id.* at 14:19–30, 48–49.

D. Illustrative Claim

Of the challenged claims, claims 1 and 7 are independent claims.

Claim 1 is illustrative of the claimed subject matter and recites:

1. A composition comprising HFO-1234yf and at least one additional compound selected from the group consisting of HFO-1234ze, HFC-254eb, HFC-254fb, HFO-1243zf, HFC-245eb, HFC-245fa, HFC-245cb, HFC-236cb, HFC-236ea, HFC-236fa, HFC-227ea, HFC-227ca, HFO-1225yc, HFO-1225zc, HFO-1225ye, 3,3,3-trifluoropropyne, methane, ethane, propane, HFC-23, HFC-143a, HFC-134, HFC-134a,

⁶ HFO-1243zf is another name for the compound 1,1,3-trifluoropropene, and HFO-1234ze is another name for the compound E- or Z-1,3,3,3-tetrafluoropropene. Ex. 1001, Table 1 (listing HFC/HFO code, structure, and chemical name for each additional compound). The “E-” and “Z-” notations refer to the fact that HFO-1234ze exists as the E-isomer, Z-isomer, or a combination of both isomers. *See, e.g., id.* at 11:64–67.

⁷ Unless otherwise noted, citations are to the original pagination of each exhibit, and not the pagination added by the parties.

HFO-1132a, and FC-1216: wherein the composition comprises 3,3,3-trifluoropropyne and the total amount of additional compounds in the composition comprising HFO-1234yf ranges from greater than zero weight percent to less than one weight percent.

Ex. 1001, 14:18–29.

Claims 2–4 ultimately depend from claim 1 and, therefore, also require a composition comprising HFO-1234yf and 3,3,3-trifluoropropyne. *Id.* at 14:31–36. Claim 2 narrows claim 1 to a composition with further additional compounds, reciting that the composition also includes “at least one compound selected from HFO-1243zf and HFO-1234ze.” *Id.* at 14:31–33. Claims 3 and 4 further narrow claim 2 to a composition that also includes E-HFO-1234ze and HFO-1234ze, respectively. *Id.* at 14:34–36. Claim 7 is directed to a composition comprising HFO-1234yf and at least one additional compound selected from the same group recited in claim 1. *Id.* at 14:41–46, 58–60. Claim 7, however, differs from claim 1 in that the composition includes both HFO-1243zf and 3,3,3-trifluoropropyne as additional compounds. *Id.* Claim 8 depends from claim 7, inherits the limitations of claim 7, and recites that the composition further comprises HFO-1234ze. *Id.* at 14:64–65.

II. DISCUSSION

Petitioner bears the burden of proving unpatentability of the challenged claims, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish the facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e);

37 C.F.R. § 42.1(d). Below, we explain why Petitioner has not met its burden with respect to the challenged claims.

A. Level of Ordinary Skill in the Art

We begin our analysis by addressing the level of ordinary skill in the art. Petitioner and Mr. Takahashi describe the person of ordinary skill as someone having at least a master's degree in organic chemistry and ten years of experience working on the research, development, and manufacture of fluorocarbon refrigerants. Pet. 46; Ex. 1005 ¶ 12. Mr. Takahashi further testifies that the ordinary artisan “would have had the knowledge and skill set necessary to synthesize HFO-1234yf . . . via gas-phase reactions using metal oxide-based catalysts,” like the reaction described in Example 1 of Miller, “to analyze the composition of the reaction product[] obtained, and to distill it under pressure in a closed system to attain reasonable purity levels.” Ex. 1005 ¶ 13. Dr. Sun testifies for Patent Owner that a person of ordinary skill in the art is someone having a doctorate degree in chemistry or chemical engineering, and three to six years of experience working on the research, development, and manufacture of fluorocarbon refrigerants. Ex. 2016 ¶ 9.

The parties' proposals for the level of ordinary skill in the art have slight distinctions, e.g., “a master's degree in organic chemistry” versus “a doctorate degree in chemistry or chemical engineering,” and “ten years of experience” versus “three to six years of experience.” We, however, find those distinctions to be of little consequence. An express definition of the level of ordinary skill is not required in all situations, as the prior art references can reflect the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (absence of specific

findings on “level of skill in the art does not give rise to reversible error ‘where the prior art itself reflects an appropriate level and a need for testimony is not shown’”) (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)). Neither party provides a sufficient explanation as to how either of the specific proposals regarding the level of ordinary skill changes the analysis in this proceeding. Rather, Mr. Takahashi acknowledges that his definition “is approximate, and an extended period of work experience may make up for a lesser period of formal education, and vice versa.” Ex. 1005 ¶ 12; Ex. 2015, 15:15–21, 16:8–17:11. Likewise, Dr. Sun testifies that her definition of the ordinary artisan “is consistent with Mr. Takahashi’s definition,” and that her opinions and testimony would not change if the Board adopts Mr. Takahashi’s definition of the person of ordinary skill in the art. Ex. 2016 ¶ 9.

Given the foregoing, we adopt the following as the level of ordinary skill in the art: a master’s degree in chemistry, organic chemistry, or chemical engineering, and at least ten years of experience in working on the research, development, and manufacture of fluorocarbon refrigerants, or a doctorate degree in chemistry, organic chemistry, or chemical engineering, and three to six years of experience working on the research, development, and manufacture of fluorocarbon refrigerants. The definition we adopt is based on the testimony of the parties’ experts, as well as our review of the ’709 patent, the type of problems and solutions described therein, and the prior art involved in this proceeding.

Based on their stated qualifications, we consider both Mr. Takahashi and Dr. Sun qualified to opine from the viewpoint of a person of ordinary

skill in the art regarding the subject matter of the '709 patent. Ex. 1005 ¶¶ 2–6; Ex. 2016 ¶¶ 3–6; Ex. 2018.

B. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under that standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner sets forth three terms for construction: “HFC-245cb,” “HFO-1234ze,” and “greater than zero weight percent to less than one weight percent.” Pet. 29–30. In the Institution Decision, we determined that, based on the record at that time, no claim term required express construction. Inst. Dec. 5. The parties do not propose constructions for any claim terms in the Patent Owner Response or Petitioner Reply, or ask us to reconsider our determination from the Institution Decision. *See* Resp. 15 (agreeing that “no claim term requires express construction”); *see generally* Reply. After reviewing the entire record developed during trial, we affirm our determination from the Institution Decision that no claim term requires express construction to resolve the parties’ dispute. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

C. Obviousness over Miller and the ARI Standard

Petitioner argues that the combination of Miller and the ARI Standard would have rendered the subject matter of claims 1–4, 7, and 8 obvious to a person of ordinary skill in the art. Pet. 45–59. In so doing, Petitioner relies, *inter alia*, on a theory of inherency. *Id.* at 45. Petitioner argues that certain compounds recited in claims 1–4, 7, and 8 (i.e., 3-3-3-trifluoropropyne, E-HFO-1234ze, and/or HFO-1243zf) are the natural result of following the process set forth in Miller’s example 1, as shown by the data from Mr. Takahashi’s experiments replicating Miller’s example 1. *Id.* at 45, 50–51. The thrust of Patent Owner’s position is that Mr. Takahashi’s experiments deviated from the method of example 1, and because such deviations are material, Petitioner fails to meet the requirements for showing inherency. Resp. 10, 27–34, 39–46. Based on our review of the arguments and evidence of record, we determine that Petitioner does not demonstrate, by a preponderance of the evidence, that the combination of Miller and the ARI Standard would have rendered obvious the subject matter of claims 1–4, 7, and 8.

1. Miller

Miller discloses a process for manufacturing HFC-1234yf⁸ comprising feeding HFC-245cb⁹ to a dehydrofluorination reaction zone in the presence of a dehydrofluorination catalyst, including fluorinated alumina. Ex. 1003

⁸ Miller uses the name HFC-1234yf, whereas the ’709 patent uses the name HFO-1234yf. Both names, however, refer to the same compound: 2,3,3,3-tetrafluoropropene. Ex. 1001, 1:22–23; Ex. 1003 ¶ 6; *see* Pet. 33 n.13.

⁹ HFC-245cb is another name for 1,1,1,2,2-pentafluoropropane, which has the chemical formula $\text{CF}_3\text{CF}_2\text{CH}_3$. Ex. 1003 ¶ 19.

¶¶ 21–22. The catalytic dehydrofluorination may be conducted at a temperature in the range from about 300 °C to about 450 °C. *Id.* ¶ 38.

Miller discloses an example in which HFC-1234yf is synthesized by dehydrofluorination with a fluorinated alumina catalyst. *Id.* ¶¶ 90–91 (describing example 1). Specifically, Miller describes the use of a Hastelloy tube reactor (outer diameter 1.0 inch, inner diameter 0.854 inch, length 9.5 inches) packed with 25 cc of gamma-alumina ground to 12–20 mesh, wherein the packed portion is heated by a 5 inch by 1 inch ceramic band heater clamped to the outside of the reactor. *Id.* ¶ 90. The catalyst is dried by heating at 200 °C for 15 minutes under a nitrogen purge and, subsequently, reacted with a mixture of HF/N₂ heated up to 425 °C, yielding activated fluorinated alumina. *Id.* Nitrogen (10 sccm or 1.7×10^{-7} m³/s) and HFC-245cb (15 sccm or 2.5×10^{-7} m³/s) are mixed and flowed through the reactor at an initial temperature of 350 °C, which is then raised to 400 °C. *Id.* ¶ 91.

Miller further discloses analyzing the effluent with Gas Chromatography/Flame Ionization Detector (“GC/FID”) instrumentation to determine the concentration of each component in the effluent. *Id.* The concentration results are listed in Table 1, which is reproduced below.

TABLE 1

Temp., ° C.	N ₂ flow (sccm)	HFC-245cb flow (sccm)	Concentrations, (GC/FID area %)		
			HFC- 1234yf	HFC- 245cb	Unknowns
350	10	15	84.2	12.8	3.0
400	10	15	91.3	1.9	6.8

The table above shows the concentration, in area percent, of each component of the effluent obtained from the reactor at a reaction temperature of 350 °C and 400 °C, analyzed using GC/FID. At 400 °C, HFC-1234yf is present at a concentration of 91.3% area. *Id.* at Table 1.

2. *The ARI Standard*

The ARI Standard discloses specifications for fluorocarbon refrigerants. Ex. 1004, 1.¹⁰ The purpose of the ARI Standard is “to establish purity specifications, to verify composition, and to specify the associated methods of testing for acceptability of fluorocarbon refrigerants . . . for use in new and existing refrigeration and air-conditioning products.” *Id.* at 5. The ARI Standard “is intended for the guidance of the industry including manufacturers, reclaimers, repackagers, distributors, installers, servicemen, contractors and users of fluorocarbon refrigerants.” *Id.* To that end, the ARI Standard includes tables setting forth the characteristics of each refrigerant, as well as permissible levels for contaminants, including volatile impurities from, *inter alia*, other refrigerants. *Id.* at 5–14. The permissible level of volatile impurities for each refrigerant listed in the ARI Standard is 0.5 percent by weight (i.e., each refrigerant listed should have a purity level of 99.5 percent by weight). *Id.*

3. *Legal Standards*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if 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 to a person of ordinary skill in the art at the time the invention was made. *KSR*

¹⁰ Our citations to Exhibit 1004 refer to the pagination that Petitioner provided, and not to the original pagination of the exhibit.

Int'l Co. v. Teleflex Inc., 550 U.S. 398, 406 (2007). Obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“[I]nherency may supply a missing claim limitation in an obviousness analysis.” *See PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1194–95 (Fed. Cir. 2014). To establish an inherent disclosure, a party must show that the limitation at issue is “necessarily present” or “the natural result of the combination of elements explicitly disclosed by the prior art.” *Id.* at 1195–96 (citing *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981)). “Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *Oelrich*, 666 F.2d at 581 (citations omitted).

4. *Compliance with 37 C.F.R. § 42.65(a)*

Patent Owner argues that we should accord Mr. Takahashi’s experiments and conclusions “no weight in this proceeding” because Petitioner did not provide the underlying test data or explanations regarding the testing methodology (which was intended to replicate Miller’s example 1) and, therefore, failed to comply with 37 C.F.R. § 42.65. Resp. 15–25. In that regard, Patent Owner contends that “for information most critical to the Petition’s [inherency] argument,” Mr. Takahashi “simply summarizes data in table format without the underlying data to substantiate or corroborate the data,” thereby leaving the person of ordinary skill in the art “guessing [as to]

how to reproduce” Mr. Takahashi’s experiments for confirmation. *Id.* at 18. Patent Owner provides examples of data and other information it contends is missing from Mr. Takahashi’s analysis. *See id.* at 18–24.

Petitioner asserts that Mr. Takahashi did disclose the underlying facts on which his testimony is based, as well as compilations or summaries of the data on which Mr. Takahashi relied in forming his opinions. Reply 1 (asserting that Mr. Takahashi’s declaration “set forth in detail how he reproduced [Miller’s] Example 1, and the data on which he based his opinion that the dehydrofluorination reaction of HFC-245cb ‘will always produce,’ *inter alia*, [3,3,3-trifluoropropyne]”). Further, Petitioner argues that, pursuant to Federal Rule of Evidence 1006, which applies to this proceeding according to Rule 42.62(a), Mr. Takahashi was permitted to summarize the results of his experiments, and did so in Exhibits 1025 and 1027–1030. *Id.* at 3. Petitioner also represents that Patent Owner “never sought any of th[e] allegedly omitted information through discovery under 37 C.F.R. § 42.51.” *Id.* at 3 n.1. Finally, “to eliminate th[e] non-issue,” Petitioner provided with the Reply a second declaration from Mr. Takahashi providing additional information to Patent Owner, as well as the raw data from all of Mr. Takahashi’s testing. *See id.* at 1; Exs. 1069–1074, 1079.

Patent Owner contends that Petitioner’s belated production of such evidence, and the portions of the Reply and Mr. Takahashi’s second declaration that explain the newly-provided evidence, are beyond the proper scope of a reply under 37 C.F.R. § 42.23. Paper 39.

We need not determine whether Petitioner should have provided with the Petition all of the raw data and information supporting Mr. Takahashi’s experiments because, even considering such data, information, and

explanations, we conclude that Petitioner does not meet its burden of showing, by a preponderance of the evidence, that the challenged claims are unpatentable.

5. *Analysis*

Petitioner asserts that a person of ordinary skill in the art would have been led from the above disclosures of Miller and the ARI Standard to a composition comprising HFO-1234yf, 3,3,3-trifluoropropyne, HFO-1243zf, and E-HFO-1234ze, wherein the total amount of additional compounds (3,3,3-trifluoropropyne, E-HFO-1243zf, HFO-1234ze) is within the range recited in each of claims 1 and 7. Pet. 30, 46–51 (citing Ex. 1003 ¶¶ 3–5; Ex. 1005 ¶¶ 29–34, 36, 39, 40, 43–47, 71, 72, 107; Ex. 1016, 18). Our analysis focuses on the limitation of the challenged claims that require “at least one additional compound” (i.e., 3,3,3-trifluoropropyne, and one or more of E-HFO-1234ze, and HFO-1243zf), as the parties’ arguments focus mainly on that limitation.

With respect to the “at least one additional compound” limitation, Petitioner acknowledges that the crude HFO-1234yf product Miller discloses “lacks an explicitly-recognized presence of 3,3,3-trifluoropropyne, E-HFO-1234ze, and HFO-1243zf.” Pet. 45. Petitioner, however, contends that such compounds are inherent products of the reaction disclosed in Miller’s example 1. *Id.* at 45. In other words, Petitioner asserts that the composition resulting from the catalytic dehydrofluorination of HFC-245cb described in Miller’s example 1 necessarily comprises 3,3,3-trifluoropropyne, E-HFO-1234ze, and HFO-1243zf. *Id.* at 50–51. As support for that argument, Petitioner points to testing conducted by Mr. Takahashi. *Id.* (citing Ex. 1005 ¶¶ 43–47, 71, 72, 107).

Mr. Takahashi testifies that he conducted experiments between March 20, 2015 and May 29, 2015. Ex. 1005 ¶ 42. In particular, Mr. Takahashi explains that he followed the method described in Miller’s example 1 using catalytic dehydrofluorination of HFC-245cb to produce a crude HFO-1234yf. *Id.* ¶¶ 43, 81–98. Mr. Takahashi further testifies that he used the types of materials and equipment that would have been available to a skilled artisan, and that “whenever Example 1 together with the specification of [Miller] did not provide sufficient details for carrying out the process, [he] filled those gaps with the steps that one of ordinary skill in the art would have taken around May 7, 2008.” *Id.* ¶¶ 44–45.

Mr. Takahashi subsequently distilled the crude effluent from the reaction to a purity of more than 99.5% by weight, then analyzed the distillates using GC/FID and Gas Chromatography-Mass Spectrometry to determine the composition of the final product. *Id.* ¶¶ 46, 53, 67–70 (citing Ex. 1027; Ex. 1028; Ex. 1029). Mr. Takahashi testifies that he obtained a final product comprising HFO-1234yf, 3,3,3-trifluoropropyne, E-HFO-1234ze, and HFO-1243zf, as depicted below.

Compound present	HFO-1234yf	3,3,3-trifluoropropyne	E-HFO-1234ze	HFO-1243zf
Proportion (mass%)	99.5921	0.0988	0.0830	0.0096

Mr. Takahashi’s table shows the compounds Petitioner alleges are present in the final product of Mr. Takahashi’s dehydrofluorination and distillation experiments, as well as the proportion of each compound in mass percent. Pet. 51; Ex. 1005 ¶ 71. According to Mr. Takahashi, the final product comprises HFO-1234yf (99.5921 mass percent), 3,3,3-

trifluoropropyne (0.0988 mass percent), E-HFO-1234ze (0.0830 mass percent), and HFO-1243zf (0.0096 mass percent). *Id.*; Ex. 1027, 1.

Patent Owner challenges Petitioner's showing that the composition resulting from the catalytic dehydrofluorination of HFC-245cb described in Miller's example 1 necessarily comprises 3,3,3-trifluoropropyne, E-HFO-1234ze, and HFO-1243zf. *See, e.g.*, Resp. 1, 39–46. Specifically, Patent Owner argues that Petitioner's approach to proving inherency is “fundamentally flawed” because Mr. Takahashi failed to reproduce example 1 as a person of ordinary skill would have done as of the critical date of the '709 patent and, instead, took intentional steps to modify example 1 to generate 3,3,3-trifluoropropyne and the other compounds of interest. *Id.* at 9, 27–34, 39–46. In that regard, Patent Owner points to several alterations or deviations that Mr. Takahashi made in reproducing Miller's example 1, including that Mr. Takahashi used a longer reactor and heated a significantly greater portion of the reactor when conducting his experiment. *Id.* at 28–30, 33–34, 40.

Patent Owner, citing Dr. Sun's testimony, asserts that Mr. Takahashi's alterations to the reactor length and heater “fundamentally changed the reaction process” because “approximately thirty inches of the reactor vessel [were] heated without a bed of fluorinated alumina catalyst, which would provide an environment suitable for secondary reactions” that could have produced the compounds recited in the challenged claims. Resp. 39–40 (citing Ex. 2016 ¶¶ 39, 44–45). Patent Owner further asserts that persons of ordinary skill in the art would have known that dehydrofluorination reactions occur in Hastelloy tube reactors in the absence of a catalyst and at elevated temperatures, “which is exactly what Mr. Takahashi's configuration

allowed.” *Id.* at 40 (citing Ex. 2016 ¶ 49). According to Patent Owner, Petitioner’s replication experiment, therefore, “changed the effluent” that would have resulted from following Miller’s example 1 without Mr. Takahashi’s alterations. *Id.*

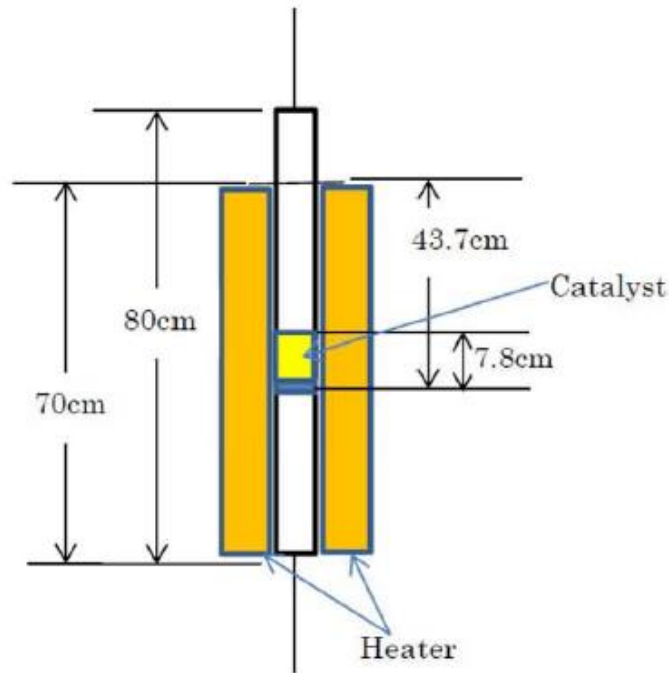
Petitioner does not dispute that Mr. Takahashi deviated from Miller’s example 1, but replies that Mr. Takahashi “adhered to all outcome-determinative parameters” set forth therein, such that Mr. Takahashi’s reproduction was consistent with the teachings of the example, and was performed fairly, accurately, and without material variation. Reply 4–6. Petitioner further asserts that none of Mr. Takahashi’s deviations “had a material effect” on the results Mr. Takahashi obtained. *Id.* at 9–23.

As an initial matter, we are not persuaded by Patent Owner’s argument that, to fall within the scope of an example, a reproduction must replicate exactly the experimental apparatus and conditions set forth in the example. *See* Resp. 27–38. Rather, an experiment reproducing or recreating an example falls within the scope of that example as long as the reproduction is consistent with the teaching of the example, any deviations in the reproduced experiment are immaterial, and the reasons for any deviations are adequately explained. *See, e.g., Purdue Pharma L.P. v. Epic Pharma, LLC*, 811 F.3d 1345, 1357 (Fed. Cir. 2016) (finding “no clear error” in the district court’s determination that the prior art application’s process was recreated “fairly, accurately, and with no material variation”); *Glaxo Inc. v. Novopharm Ltd*, 52 F.3d 1043, 1047 n.4 (Fed. Cir. 1995) (finding no error in the district court’s determination that one skilled in the art would have understood that testing departing from the “strict letter” of a prior art example was nonetheless consistent with that example).

We determine, however, that Petitioner fails to show sufficiently that the additional reactor length and heated reaction zones in Mr. Takahashi's experiment were non-material deviations from the process set forth in Miller's example 1—that is, that such deviations would not have changed the composition of the effluent. Petitioner also does not explain adequately why Mr. Takahashi made such deviations to the experiment described in Miller's example 1.

Petitioner acknowledges that Mr. Takahashi altered the experiment set forth in example 1 by using a longer reactor with additional heated zones. Reply 10. Indeed, as Petitioner explains, “Mr. Takahashi used a reactor that was 80 cm [31.5 inches] long, with a heater wrapped around a 70-cm [27.6 inch] length of the reactor,” whereas “the reactor disclosed in Example 1 was 9.5 [inches] long with a [5 inch by 1 inch] ceramic-band heater clamped to its outside.” *Id.* (citing Ex. 1003 ¶ 90; Ex. 1066 ¶ 56). Petitioner further states that Mr. Takahashi “mixed HFC-245cb and [nitrogen gas], and flowed the mixture through the reactor at a temperature of 400 °C.” *Id.* at 5; *see* Ex. 1005 ¶¶ 90–91 (Mr. Takahashi explaining that the flow of HFC-245cb was started after the temperature inside the reactor reached 400 °C); Ex. 1066 ¶ 69 (Mr. Takahashi's testimony that his example 1 reproduction experiment was “at a temperature of 400 °C”). Thus, the temperature in the heated portion of Mr. Takahashi's reactor at the time of his experiment was at least 400 °C.¹¹ A schematic of Mr. Takahashi's reactor configuration is reproduced below.

¹¹ The parties dispute whether the temperature in Mr. Takahashi's reactor was 400 °C or higher. *See* Resp. 42 (“Petitioners' expert necessarily performs the . . . reaction at a temperature greater than the [400 °C] reactor



Ex. 1066 ¶ 56;¹² Ex. 2025. The schematic depicts the configuration of the reactor, the catalyst in the reactor, and the heater outside of the reactor. The schematic also provides the dimensions of the reactor, the catalyst, and the heater. According to Mr. Takahashi, the catalyst was located “near the

[temperature] in Example 1”); Reply 5 (Mr. Takahashi flowed the HFC-245cb through the reactor at a temperature of 400 °C). We need not resolve that dispute, however, because our determination would be the same whether we found that the temperature in Mr. Takahashi’s reactor was 400 °C or greater than 400 °C.

¹² Patent Owner objects to paragraph 56 of Exhibit 1066 (Mr. Takahashi’s second declaration) as being beyond the scope of proper reply testimony. Paper 39. We have reviewed paragraph 56 in light of Patent Owner’s objections and determine that Mr. Takahashi’s schematic and measurements properly respond to Patent Owner’s arguments regarding the deviations Mr. Takahashi made to the reactor and heater lengths disclosed in Miller’s example 1. We further note that Patent Owner submitted the same schematic as an exhibit in this proceeding (Ex. 2025) and questioned Mr. Takahashi about the placement of the heater around the reactor and the catalyst within the reactor. *See, e.g.*, Ex. 2027, 74:11–75:16.

center of the area [of the reactor] covered by the heater,” as indicated by the blue arrow and section of the reactor colored bright yellow. Ex. 1066 ¶ 56. As depicted in the schematic, the catalyst made up 7.8 cm of the 70-cm (27.6 inch) area of the reactor that was heated. Mr. Takahashi’s configuration, therefore, included additional heated regions in the reactor that had no catalyst (i.e., a catalyst-free zone both before and after the catalyst bed).

Petitioner contends that such deviations would not have affected the products that Mr. Takahashi obtained (Reply 3), but evidence in the record suggests otherwise. For example, Patent Owner directs us to evidence that it was known that dehydrofluorination reactions can occur in reactors in the absence of a catalyst. Resp. 40; Ex. 2016 ¶ 49 (citing Ex. 1003 ¶ 42); Ex. 2020, 3:22–34. In particular, Miller discloses that dehydrofluorination of HFC-245cb “can be carried out in [a] reaction zone at an elevated temperature in the absence of a catalyst.” Ex. 1003 ¶ 42. Miller further teaches that appropriate temperatures for dehydrofluorination in the absence of a catalyst “may be between about 350 °C. and about 900 °C.,” with “[t]he residence time of gases in the reaction zone . . . from about 0.5 to 60 seconds.” *Id.* Thus, Miller indicates that the length of the reactor (i.e., including one or more catalyst-free zones heated to a temperature of at least 350 °C) can affect the reaction and reaction products.

Neither Petitioner nor Mr. Takahashi addresses the above-referenced disclosures in Miller. *See generally* Pet.; Reply; Ex. 1005; Ex. 1066. And although Mr. Takahashi testifies that he “used the types of materials and equipment that would have been available to one of ordinary skill in the art,” and that the skilled artisan would have used in the example 1 process (Ex. 1005 ¶ 45), Mr. Takahashi does not explain why the skilled artisan

would have departed from the explicit reactor length (9.5 inches) and heater size (5 inches by 1 inch) that Miller describes (Ex. 1003 ¶ 90), in view of Miller's additional teaching that dehydrofluorination of HFC-245cb can occur in heated catalyst-free areas of a reactor. *See generally* Ex. 1005; Ex. 1066. This stands in contrast to the specific explanations Mr. Takahashi provides for other deviations he made to example 1. *See, e.g.*, Ex. 1005 ¶ 44 (Mr. Takahashi testifying why he removed hydrogen fluoride gas from the effluent); Ex. 1066 ¶¶ 13 (explaining that “[a] Hastelloy tube having [a] wall thickness [of 2.11 mm] was the closest to the Hastelloy tube reactor of [e]xample 1 that I could reasonably procure in Japan where I carried out the experiments”), 131 (“I used a size of ‘10-18 mesh’ since both ‘10 mesh’ and ‘18 mesh,’ [which are] based on the metric system[,] . . . were readily available to me, whereas ‘12 mesh’ and ‘20 mesh’ were not.”).

Additionally, Mr. Takahashi agrees that dehydrofluorination of HFC-245cb can occur without a catalyst, but “think[s] that without a catalyst, the reaction mostly would not progress.” Ex. 2027, 76:19–77:2. Mr. Takahashi further testifies that even if he ran his experiments with no catalyst, there would not be “a sufficient amount of product generated that would affect [his] result.” *Id.* at 77:6–15. Mr. Takahashi, however, admits that he did not test whether HFC-245cb underwent a dehydrofluorination reaction in the heated portions of his reactor that were free of catalyst. *Id.* at 87:20–88:1, 90:10–20.

Nevertheless, Petitioner and Mr. Takahashi rely on the results of certain experiments Dr. Sun performed to support the position that dehydrofluorination in the catalyst-free portions of Mr. Takahashi's reactor would not have affected the products he obtained and, therefore, the reactor

length and heating zone deviations from example 1 are immaterial (i.e., “do[] not ‘have a profound and significant impact on the effluent composition by way of secondary/alternative reactions and byproducts’” (Ex. 1066 ¶ 78)). Reply 10–12, 15–16; Ex. 1066 ¶¶ 65, 71–77; Ex. 2027, 89:5–90:1. Petitioner’s argument on that point and Mr. Takahashi’s testimony, however, are inconsistent with Petitioner’s other assertion that Dr. Sun’s experiments “are irrelevant to this trial” because “Dr. Sun did not use HFC-245cb as the starting compound for her experiments, as required by Example 1.” Reply 12–13; *see* Ex. 1066 ¶¶ 66–68 (contrasting Dr. Sun’s starting compounds with HFC-245cb). Moreover, both Petitioner and Mr. Takahashi acknowledge that the starting materials Dr. Sun used in her experiments “behave completely differently from HFC-245cb.” Reply 14; Ex. 1066 ¶ 69. Accordingly, we are not persuaded that Dr. Sun’s experiments support Petitioner’s argument that the additional reactor length and heated zones in the reactor are non-material deviations from Miller’s example 1.

Petitioner also argues that Patent Owner “does not suggest what, if any, effect the[] differences [in reactor length and heat zone] may have had on the outcome of Mr. Takahashi’s reproduction of Example 1.” Reply 11 (citing Resp. 29–30). Putting aside the fact that Patent Owner does explain how the length of the reactor and heated zone could have affected the products produced in the reaction (*see* Resp. 39–41), Petitioner’s argument ignores the fact that it is Petitioner’s burden to establish, by a preponderance of the evidence, that 3,3,3-trifluoropropyne is an inherent product of the reaction described in Miller’s example 1. *See In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1376–77 (Fed. Cir. 2016) (explaining that “the

petitioner continues to bear the burden of proving unpatentability . . . by a preponderance of the evidence at trial”). As noted above, we are not persuaded that Petitioner meets its burden in that regard. That is, the record does not include sufficient objective evidence from which we can conclude that 3,3,3-trifluoropropyne, HFO-1243zf, and E-HFO-1234ze are “necessarily present, or the natural result of” the catalytic dehydrofluorination reaction disclosed in Miller’s example 1.

Based on the record before us, we conclude that Petitioner does not establish, by a preponderance of the evidence, that claims 1–4, 7, and 8, would have been obvious over the combined teachings of Miller and the ARI Standard.

D. Motion to Exclude

We turn next to Petitioner’s Motion to Exclude. *See* Papers 32, 35, 37. Petitioner moves to exclude Exhibit 2021, paragraphs 50–56 and 75–77 of Dr. Sun’s declaration, and Dr. Sun’s experiments 1–6 from the record of this proceeding. Paper 32, 1–5. All the evidence Petitioner moves to exclude relates to Dr. Sun’s experiments and the data Dr. Sun obtained from those experiments. Petitioner argues that we should exclude the experiments under Federal Rules of Evidence 401, 402, and 403 as irrelevant to the ground upon which we instituted trial because the compounds Dr. Sun used in her experiments were not the compounds used in Miller’s example 1, and were not among the compounds generated in Mr. Takahashi’s reproduction of example 1. *Id.* at 2–4. Because our decision does not affirmatively rely on Exhibit 2021, Dr. Sun’s experiments and data, or the paragraphs of Dr. Sun’s declaration that discuss those experiments and data, we dismiss Petitioner’s Motion to Exclude as moot.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner does not establish, by a preponderance of the evidence, that claims 1–4, 7, and 8 of the '709 patent are unpatentable under 35 U.S.C. § 103 as obvious over the combination of Miller and the ARI Standard.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner does not establish, by a preponderance of the evidence, that claims 1–4, 7, and 8 of the '709 patent are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude (Paper 32) is *dismissed* as moot; and

FURTHER ORDERED that this is a Final Written Decision; therefore, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2016-00452
Patent 8,147,709 B2

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Exhibit B

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DAIKIN INDUSTRIES, LTD. and
DAIKIN AMERICA, INC.,
Petitioner,

v.

THE CHEMOURS COMPANY FC, LLC,
Patent Owner.

Case IPR2016-00452
Patent 8,147,709 B2

Before LORA M. GREEN, JO-ANNE M. KOKOSKI, and
MICHELLE N. ANKENBRAND, *Administrative Patent Judges*.

ANKENBRAND, *Administrative Patent Judge*.

DECISION
Denying Petitioner's Request for Rehearing
37 C.F.R. § 42.71

I. INTRODUCTION

Daikin Industries, Ltd. and Daikin America, Inc. (collectively, “Petitioner”) filed a Request for Rehearing (Paper 43, “Reh’g Req.”) of the Final Written Decision (Paper 42, “Final Decision” or “Final Dec.”), in which we concluded that Petitioner did not show by a preponderance of the evidence that claims 1–4, 7, and 8 of U.S. Patent No. 8,147,709 B2 (Ex. 1001, “the ’709 patent”) are unpatentable under 35 U.S.C. § 103(a) over the combination of Miller¹ and the ARI Standard.²

For the reasons that follow, we deny Petitioner’s Request for Rehearing.

II. STANDARD OF REVIEW

A request for rehearing “must specifically identify all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed in a motion, an opposition, or a reply.” 37 C.F.R. § 42.71(d). The party challenging a decision bears the burden of showing that the decision should be modified. *Id.*

III. ANALYSIS

Petitioner requests rehearing to address two findings from our Final Decision. First, Petitioner argues that our Final Decision overlooked that the reactor configuration of Miller’s example 1 includes a heated, catalyst-free

¹ U.S. Publication No. 2007/0100175 A1, published May 3, 2007 (Ex. 1003).

² Air-Conditioning & Refrigeration Institute (“ARI”), 2006 Standard for Specifications for Fluorocarbon Refrigerants (Ex. 1004).

zone, like the reactor configuration utilized in Mr. Takahashi's³ experiment replicating Miller's example 1. Reh'g Req. 2–4, 6–10. Second, Petitioner asserts that we erred in determining that Petitioner's arguments regarding Dr. Sun's⁴ experiments were "inconsistent" with other arguments Petitioner made in the proceeding. *Id.* at 4, 10–15. We address each of Petitioner's arguments in turn.

A. The Reactor Configuration

Petitioner argues that the Final Decision "overlooked the crucial fact that—just as in Mr. Takahashi's reactor configuration—the reactor disclosed in Example 1 of Miller does include a heated, catalyst-free zone." Reh'g Req. 2. More particularly, Petitioner contends that we erred in finding that the presence of an additional heated, catalyst-free zone in Mr. Takahashi's experiment constituted a material deviation from Miller's example 1, because our finding was based on the "erroneous assumption" that such a zone did not exist in the reactor configuration in Miller. *Id.* at 3, 8 (pointing to Dr. Sun's testimony regarding Miller's reactor size and configuration). Thus, argues Petitioner, the presence of a heated, catalyst-free zone in Mr. Takahashi's reactor "cannot be a material deviation from Example 1 of Miller," given that Miller's reactor and Mr. Takahashi's reactor both include such a zone. *Id.* at 3. In other words, Petitioner contends that because both Mr. Takahashi's and Miller's reactor configurations include a heated, catalyst-free zone, both would have generated the same reaction products,

³ Mr. Takahashi provided a declaration in support of the Petition and a second declaration in support of Petitioner's Reply. Ex. 1005; Ex. 1066.

⁴ Dr. Sun provided a declaration in support of Patent Owner's Response. Ex. 2016.

albeit Miller's reaction to a lesser extent because the heated, catalyst-free zone in Miller's reactor is smaller. *Id.* at 4, 9–10.

Petitioner's argument suffers from several flaws. First, Petitioner's argument is not a proper basis for rehearing, because it is raised for the first time in the Request for Rehearing. That is, Petitioner fails to identify in its Request for Rehearing where in the Petition, Reply, or any other paper, Petitioner argued that Miller's reactor configuration included a heated, catalyst-free zone that would have generated the same reaction products that Mr. Takahashi obtained from his experiment. *See* Reh'g Req. 2–4, 6–10. In eight pages of argument, Petitioner cites to the Reply twice. Reh'g Req. 4 (citing Reply 21–22), 6 (citing Reply 16). Page 16 of the Reply discusses Dr. Sun's experiments and refers to Mr. Takahashi's testimony that the length of his reactor “did not have a material impact on the effluent composition generated in his reproduction.” Likewise, pages 21–22 of the Reply refer to Dr. Sun's experiments as supporting Petitioner's position that the additional length of Mr. Takahashi's reactor “*cannot* account for the amount of [3,3,3-trifluoropropyne] that was generated in Mr. Takahashi's reproduction of [Miller's] Example 1.” None of the pages Petitioner cites discuss Miller's example 1 reactor configuration, or the heated, catalyst-free reaction zone that Petitioner now contends is present in Miller's configuration. Thus, even under a liberal reading, Petitioner's Reply does not set forth, or suggest, the argument Petitioner now makes in the Request for Rehearing—that Miller's example 1 includes a heated, catalyst-free zone that would have generated the same reaction products as Mr. Takahashi's reactor configuration.

A request for rehearing is not an opportunity to develop new arguments. Put simply, we could not have overlooked or misapprehended arguments that Petitioner did not present or develop cogently in the Petition or Reply.

Second, Petitioner mischaracterizes our findings with respect to Mr. Takahashi's reactor configuration. We did not find that Mr. Takahashi's configuration included a single heated, catalyst-free zone, as Petitioner suggests throughout the Request for Rehearing. *See, e.g.*, Reh'g Req. 3 (referring to "the heated, catalyst-free zone in Mr. Takahashi's reactor configuration"), 6 (stating that "the Board observed that Mr. Takahashi's configuration included a heated, catalyst-free zone"). Rather, we found that Mr. Takahashi's configuration included multiple heated, catalyst-free zones. Final Dec. 18 (explaining that Petitioner acknowledged Mr. Takahashi altered Miller's example 1 "by using a longer reactor with additional heated zones"), 20 (finding that Mr. Takahashi's reactor configuration "included additional heated regions in the reactor that had no catalyst (i.e., a catalyst-free zone both before and after the catalyst bed)"). Accordingly, Mr. Takahashi's reactor configuration provided several opportunities for dehydrofluorination to occur in the absence of the catalyst.

Third, Petitioner's argument fails to appreciate that our Final Decision did not rest solely on the fact that Mr. Takahashi's reactor configuration included additional heated, catalyst-free zones that could have generated 3,3,3-trifluoropropyne. As we explained in the Final Decision, "an experiment reproducing or recreating an example falls within the scope of that example as long as the reproduction is consistent with the teaching of the example, any deviations in the reproduced experiment are immaterial,

and *the reasons for any deviations are adequately explained.*” Final Dec. 17 (emphasis added). In determining that Petitioner did not meet its burden of showing unpatentability by a preponderance of the evidence, we found that Petitioner failed to show sufficiently that the additional reactor length and heated, catalyst-free reaction zones in Mr. Takahashi’s experiment were immaterial deviations from Miller’s example 1, *and* that Petitioner and Mr. Takahashi failed to adequately explain why Mr. Takahashi made such deviations from Miller’s example 1. Final Dec. 18.

With regard to the reactor configuration, Petitioner also asserts that although we determined Miller suggests that the presence of a heated, catalyst-free zone could have affected the reaction products Mr. Takahashi obtained, Mr. Takahashi testified that such a zone “did not have a material effect on his results” and that the reactor length was “not critical information concerning the results [he] obtained” from the experiment. Pet. 6–7. Petitioner argues that, in view of such testimony, “it is apparent that, as a worker of ordinary skill in the art, Mr. Takahashi did not believe” that the additional reactor length in his experiment was critical. *Id.* at 7. Rather, argues Petitioner, Mr. Takahashi “properly focused on the catalytic aspect of the reaction mechanism in his reproduction” of Miller’s example 1. *Id.*

We are not persuaded by Petitioner’s argument because it fails to identify matters that we overlooked or misapprehended in the Final Decision. To the contrary, we considered Petitioner’s assertions that “none of Mr. Takahashi’s deviations [to Miller’s example 1] ‘had a material effect’ on the results Mr. Takahashi obtained.” Final Dec. 17 (citing Reply 9–23). A request for rehearing is not an opportunity to express mere disagreement with our Final Decision, or with our weighing of the evidence. Accordingly,

we are not persuaded that we misapprehended or overlooked Petitioner's arguments regarding Mr. Takahashi's and Miller's reactor configurations.

B. Dr. Sun's Experiments

Petitioner argues that we "erred in concluding that [Petitioner's] arguments with regard to Dr. Sun's experiments are 'inconsistent.'" Reh'g Req. 10 (citing Final Dec. 22); *id.* at 4. In that regard, Petitioner asserts no inconsistency exists in pointing out that Dr. Sun used different starting compounds for her experiments than HFC-245cb (i.e., the starting compound in Miller's example 1) and, therefore, her opinions regarding the heated catalyst free zones were unsupported, while also arguing that Dr. Sun's experimental results cannot account for the significant amounts of 3,3,3-trifluoropropyne and additional compounds of interest produced in Mr. Takahashi's experiment. *Id.* at 12. According to Petitioner, the Final Decision overlooked: (1) that Dr. Sun's experiments 1–4 were designed to generate results to support Patent Owner's argument that additional compounds could be generated in the heated, catalyst-free zone of Mr. Takahashi's reactor configuration; (2) Dr. Sun's experiments 1–4 demonstrate that the amount of any additional compounds that might have been generated in the heated, catalyst-free zone of Mr. Takahashi's reactor was very small in comparison to the actual amounts of 3,3,3-trifluoropropyne, E-HFO-1234ze, and HFO-1243zf that Mr. Takahashi obtained; and (3) the amounts of 3,3,3-trifluoropropyne, E-HFO-1234ze, and HFO-1243zf that Mr. Takahashi obtained "must have come from the catalytic zone of Mr. Takahashi's reactor configuration." *Id.* at 12–14.

We are not persuaded by Petitioner's arguments. First, Petitioner's arguments fail to account for the fact that Petitioner filed a motion to

exclude all of Dr. Sun's experiments. Paper 32. In the Motion, Petitioner urged us to exclude Dr. Sun's experiments 1–4 from the record “because they are *irrelevant to any ground upon which trial was instituted* and include[] information whose probative value (if any) is substantially outweighed by a danger of confusing the issues.” *Id.* at 2 (emphasis added) (citing Paper 23 ¶ 6). Petitioner continued: “the compounds HCFC-123 and HFC-236ea that were used in Experiments 1–4 are not relevant to the issues in this trial. These compounds were not used in [Miller's example 1].” *Id.* (citing Ex. 1066 ¶¶ 65–68). In reply to the Motion to Exclude, Petitioner further argued that Dr. Sun's experiments 1–4 demonstrate that “HCFC-123 and HFC-236ea *behave completely differently* from HFC-245cb.” Paper 37, 2 (emphasis added). Petitioner made those same arguments in the Reply to Patent Owner's Response. Reply 12–14.

As we explained in the Final Decision (Final Dec. 21–22), and reiterate here, Petitioner's reliance on Dr. Sun's experiments 1–4, and the results thereof, is inconsistent with Petitioner's arguments that Dr. Sun's experiments 1–4 are irrelevant, prejudicial, and should be excluded from the record. Petitioner's arguments to the contrary in the Request for Rehearing express mere disagreement with our determination in the Final Decision and weighing of the evidence. As we explain above, a request for rehearing is not an opportunity to reargue positions with which we disagreed in our Final Decision.

IV. ORDER

Accordingly, it is hereby:

ORDERED that Petitioner's Request for Rehearing is *denied*.

IPR2016-00452
Patent 8,147,709 B2

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