

**HONEYWELL INTERNATIONAL INC., Appellant,**  
**v.**  
**MEXICHEM AMANCO HOLDING S.A. DE C.V., DAIKIN INDUSTRIES, LTD., Appellees.**

No. 2016-1996.

**United States Court of Appeals, Federal Circuit.**

Decided: August 1, 2017.

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. 95/002,189, 95/002,204.

GREGG F. LOCASCIO, Kirkland & Ellis LLP, Washington, DC, argued for appellant. Also represented by WILLIAM H. BURGESS, NOAH SAMUEL FRANK; JOSEPH MICHAEL SKERPON, Banner & Witcoff, Ltd., Washington, DC.

JOSEPH A. KROMHOLZ, Ryan, Kromholz & Manion, S.C., Milwaukee, WI, argued for appellee Mexichem Amanco Holding S.A. de C.V. Also represented by PATRICK J. FLEIS.

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Before LOURIE, REYNA, and WALLACH, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge* LOURIE.

Opinion dissenting-in-part filed by *Circuit Judge* WALLACH.

LOURIE, *Circuit Judge*.

Honeywell International, Inc. ("Honeywell") appeals from a decision of the U.S. Patent and Trademark Office ("the PTO") Patent Trial and Appeal Board ("the Board") affirming the Examiner's rejection, in two merged *inter partes* reexaminations, of claims 1-26, 31-37, 46-49, 58, 59, 61-68, 70-75, 80, and 81 of U.S. Patent 7,534,366 ("the '366 patent") under 35 U.S.C. § 103. See *Mexichem Amanco Holding S.A. De C.V. v. Honeywell Int'l Inc.*, No. 2015-006430, 2016 WL 1254603 (P.T.A.B. Mar. 29, 2016) ("*Decision*"). Because the Board erred in its analysis, and hence its decision, we vacate and remand.

## BACKGROUND

Honeywell owns the '366 patent, which is directed to the use of 1,1,1,2-tetrafluoropropene ("HFO-1234yf")—an unsaturated hydrofluorocarbon ("HFC") compound—and a polyalkylene glycol ("PAG") lubricant in heat transfer systems, such as air conditioning equipment. See, e.g., '366 patent col. 13 ll. 37-45. Claim 1 is illustrative and reads as follows:

A heat transfer composition for use in an air conditioning system comprising:

- (a) at least about 50% by weight of 1,1,1,2tetrafluoropropene (*HFO-1234yf*) having no substantial acute toxicity; and
- (b) at least one *poly alkylene glycol lubricant* in the form of a homopolymer or co-polymer consisting of 2 or more oxypropylene groups and having a viscosity of from about 10 to about 200 centistokes at about 37 °C.

*Id.* (emphases added).

Mexichem Amanco Holding S.A. DE C.V. ("Mexichem Amanco") and Daikin Industries, Ltd. ("Daikin") (together, "Mexichem") filed requests for *inter partes* reexamination of the '366 patent, which the PTO granted and merged into a consolidated proceeding. During the reexamination, the Examiner rejected claims 1-26, 31-37, 46-49, 58, 59, 61-68, 70-75, 80, and 81 of the '366 patent as obvious over Japanese Patent H04-110388 ("Inagaki") in view of either: (1) U.S. Patent 4,755,316 ("Magid"); (2) Acura Service Bulletin No. 92-027 ("Acura") and "Patentee's Admissions"<sup>11</sup>; or (3) U.S. Patent 6,783,691 ("Bivens"). The Examiner found that Inagaki expressly discloses HFO-1234yf and that each of the secondary references—Magid, Acura/Patentee's Admissions, and Bivens—teaches the use of PAG lubricants with HFC refrigerants. Thus, the Examiner concluded that the claims would have been obvious over the cited prior art at the time of invention.

Honeywell appealed to the Board, arguing that Inagaki does not teach the use of HFO-1234yf with any particular lubricant, much less a PAG lubricant, and that such a combination would not have been obvious to one of ordinary skill in the art. See *Decision*, 2016 WL 1254603, at \*5. Honeywell argued that Inagaki does not teach or suggest the use of a PAG lubricant with HFO-1234yf because it teaches that the HFO refrigerants can be combined with other, less environmentally-friendly refrigerants, in order to "improve solubility," thereby indicating that it teaches the combination of HFO refrigerants with *immiscible* lubricants, such as those commonly employed in the prior art. See *id.* Further, Honeywell argued that Magid, Acura, and Bivens use "HFC" to refer only to *saturated* HFC refrigerants, not *unsaturated* (i.e., HFO) refrigerants. See *id.* at \*6.

Honeywell submitted evidence that HFO refrigerants were disfavored at the time of the invention by those of skill in the art in that they were known to be reactive and unstable, and that PAG lubricants were also understood to be hygroscopic and thus unstable. See *id.* Therefore, Honeywell argued, one of ordinary skill would not have been led by Inagaki to combine HFO-1234yf, one of a disfavored class of refrigerants, with a PAG lubricant, known to be unstable. It argued that one of ordinary skill would have expected the combination to result in peroxide formation that leads to degradation reactions of HFO compounds that are not possible with the prior art saturated HFC compounds. See *id.* Honeywell also submitted evidence of secondary considerations—namely, the unexpected stability of HFO-1234yf in combination with PAG lubricants over other similar refrigerants combined with PAGs; long-felt but unmet need for compositions having certain environmentally-favorable characteristics; and skepticism that such an environmentally-friendly composition existed, particularly one that also exhibits other desirable properties, such as low toxicity, stability, reactivity, and effectiveness. See *id.*

The Board affirmed the Examiner's rejection of claims 1-26, 31-37, 46-49, 58, 59, 61-68, 70-75, 80, and 81 of the '366 patent as obvious. First, the Board found that PAGs were known lubricants for "HFC-based refrigeration systems," as evidenced by Magid, Acura/Patentee's Admissions, and Bivens. *Id.* at \*9. Thus, the Board concluded, because Inagaki teaches that the disclosed refrigerants, including HFO-1234yf, "do not have any problem with respect to their general characteristics (e.g., *compatibility with lubricants* . . .)," it would have been obvious to combine HFO-1234yf with "known lubricants" such as PAGs. *Id.* at \*10 (emphasis added) (internal quotation marks omitted). The Board explained that the known drawbacks of using HFO-1234yf, such as toxicity, flammability, reactivity, and so forth, would not have deterred one of ordinary skill from choosing HFO-1234yf, as taught by Inagaki, because such disadvantages would have been viewed as merely a "tradeoff" for the benefits touted by Inagaki—namely, "good cooling with little effect on the ozone." *Id.* at \*8. Further, the Board found that, because PAGs were known lubricants, one of ordinary skill motivated to use HFO-1234yf based on the teachings of Inagaki would have arrived at its combination with a PAG lubricant by mere routine testing. *Id.* at \*10.

Second, the Board rejected Honeywell's argument that the claimed combination would not have been obvious because of the unpredictability of finding suitable lubricants for *unsaturated* HFO refrigerants based on information pertaining to *saturated* HFC refrigerants, or in light of the unexpected stability and miscibility of HFO-1234yf with PAG lubricants. *Id.* The Board found that Inagaki expressly discloses HFO-1234yf as possessing ozone-friendliness and other favorable characteristics for use in heat transfer compositions, and that its stability and miscibility with a PAG lubricant are properties that are "inherent to the *refrigerant*." *Id.* at \*7-8 (emphasis in original). Thus, the Board concluded, the stability and miscibility of HFO-1234yf with a PAG lubricant are "*inherent properties* of an otherwise known refrigerant"

that could not confer patentable weight to the claimed mixture. *Id.* (emphasis added).

Finally, the Board found Honeywell's evidence of secondary considerations to be unpersuasive because of a perceived lack of nexus between the evidence and the claimed composition. *Id.* at \*11. The Board explained that most of Honeywell's evidence shows that a "particular *refrigerant*" possessed desirable properties long sought after in the art, but that the refrigerant—HFO-1234yf— was known in the art. *Id.* at \*12 (emphasis in original). Because the claims are directed to the *combination* of HFO-1234yf with a PAG lubricant, the Board concluded that Honeywell's evidence lacked a nexus to the claimed composition. *See id.*

The Board also rejected Honeywell's evidence of unexpected stability/miscibility of the claimed combination in light of JP H5-85970A ("Omure"). The Board disagreed with the Examiner, who reasoned that Honeywell's evidence of unexpected stability "do[es] not contradict the fact that stability is an *inherent property* of the refrigerant/lubricant pair." *Id.* at \*13 (emphasis added) (internal quotation marks omitted). The Board acknowledged that "[e]ven inherent properties, to the extent that they demonstrate results beyond what would have been expected to one of ordinary skill in the art, particularly superior results that demonstrate more than a mere improvement in a property, are evidence that the invention is non-obvious and must be considered accordingly." *Id.* (citing *In re Geisler*, 116 F.3d 1465, 1470 (Fed. Cir. 1997)).

Yet the Board found Honeywell's evidence to be unpersuasive because Omure states that a different unsaturated propene HFO compound has "relatively superior thermal stability" in PAG. *Id.* (internal quotation marks omitted). Thus, the Board concluded that, although Honeywell's evidence persuasively shows the *unpredictability* of "how various refrigerants would have reacted with various lubricants," Omure provides evidence that one of skill in the art "*would no more have expected failure* with respect to the stability of combining [HFOs] with PAG *than would have expected success*." *Id.* at \*14 (emphases added). Thus, the Board found that, due to the "overall unpredictability as to stability in the art," one of ordinary skill would have arrived at the claimed combination by mere routine testing. *Id.* at \*15.

Honeywell timely appealed to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

## DISCUSSION

We review the Board's legal determinations *de novo*, *In re Elsner*, 381 F.3d 1125, 1127 (Fed. Cir. 2004), and the Board's factual findings underlying those determinations for substantial evidence, *In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). A finding is supported by substantial evidence if a reasonable mind might accept the evidence to support the finding. *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938). Obviousness is a question of law, based on underlying factual findings, including what a reference teaches, whether a person of ordinary skill in the art would have been motivated to combine references, and any relevant objective indicia of nonobviousness. *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1047-48, 1051 (Fed. Cir. 2016) (en banc).

On appeal, Honeywell argues that the Board erred in (1) finding a motivation to combine the references with a reasonable expectation of success, (2) rejecting Honeywell's objective evidence, and (3) relying on a new ground of rejection when it relied on Omure, without giving Honeywell notice and opportunity to respond. We discuss each issue in turn.

I

We first consider whether the Board erred in finding that one of ordinary skill in the art would have been motivated to combine the references with a reasonable expectation of success and in considering Honeywell's evidence of unexpected results.

Honeywell argues that the Board improperly relied on hindsight to find that one of ordinary skill would have had a reasonable expectation of success in combining HFO-1234yf with PAG lubricants. Honeywell provided evidence that at the time of the invention, HFO refrigerants were known to be highly reactive and unstable and yet HFO-1234yf was

unexpectedly stable in combination with PAGs, which were also previously understood to be unstable. Honeywell also points to evidence of the unexpected miscibility of the claimed combination, and argues that the Board improperly disregarded it as an "inherent property" of the refrigerant, when in fact miscibility is a property of the *combination*. Thus, Honeywell argues that both the *ex ante* unpredictability of the stability/miscibility of HFO-1234yf with PAGs, as well as the *ex post* unexpected results weigh against the Board's obviousness determination. Honeywell also challenges the Board's reasoning concerning inherency in making the obviousness determination.

Mexichem responds that the Board's findings were supported by substantial evidence. Mexichem contends that the Board properly found a *reasonable* expectation of success, emphasizing that "*absolute* predictability of success in combining references is not required" for an obviousness determination. Appellee's Br. 36 (emphasis added) (citing *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364 (Fed. Cir. 2007)). Mexichem argues that Inagaki discloses HFO-1234yf as one of five preferred embodiments and generally teaches its use with lubricants. It asserts that one of ordinary skill would have been motivated to combine HFO-1234yf with PAG lubricants, which were known to be used with HFC-based refrigerants. Thus, Mexichem urges, there would have been a reasonable expectation of success in combining the references, and the Board's findings were supported by substantial evidence.

We agree with Honeywell that the Board's analysis was flawed. The Board committed legal error by improperly relying on inherency to find obviousness and in its analysis of motivation to combine the references.

As an initial matter, we find the Board's analysis to be internally inconsistent. Early in its analysis, the Board rejected Honeywell's argument concerning unexpected results and its argument that the unpredictability of the art weighs against finding a motivation to combine the references with a reasonable expectation of success. The Board found that the claimed combination's stability/miscibility is an *inherent property* of HFO-1234yf and thus cannot confer patentable weight to the composition. See *Decision*, 2016 WL 1254603, at \*8. Yet, when the Examiner used similar reasoning in responding to Honeywell's evidence of secondary considerations, the Board rejected that reasoning, acknowledging that inherent properties must be considered if they demonstrate unexpected and nonobvious results. See *id.* at \*13.

Thus, on the one hand, the Board dismissed Honeywell's evidence regarding the unpredictability and unexpected properties of the claimed combination by characterizing them as "inherent" and of non-patentable weight. See *id.* at \*8. On the other hand, the Board later credited that very same evidence, conceding that it *persuasively* established the "overall unpredictability" in the art, but then dismissed it for other reasons—namely, that *because of* the unpredictability as to stability of the claimed combination, "routine testing" would have led to its discovery. *Id.* at \*14-15.

Each part of that internally inconsistent analysis was individually flawed. First, the Board erred in relying on inherency to dismiss evidence showing unpredictability in the art—evidence which it later acknowledged *did* persuasively demonstrate unpredictability—in order to reject Honeywell's argument that one of ordinary skill would not have been motivated to combine the references with a reasonable expectation of success. See *Decision*, 2016 WL 1254603, at \*8 ("[I]nherent properties of refrigerants include their specific toxicity [and] miscibility, . . . *whether or not these properties are predictable.*" (emphasis added)), \*15 ("[T]he evidence presented by Patent Owner as a whole *shows the unpredictability* of how various refrigerants would have reacted with various lubricants." (emphasis added)).

We have previously stated that the use of inherency in the context of obviousness must be carefully circumscribed because "[t]hat which may be inherent is not necessarily known" and that which is unknown cannot be obvious. *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993) (internal quotation marks omitted) (quoting *In re Spormann*, 363 F.2d 444, 448 (1966)); see also *PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1195 (Fed. Cir. 2014) (distinguishing a prior case finding obviousness based on inherency because, in that case, "neither party disputed that the [claimed features] were *expected* in light of the dosages disclosed in the prior art" (emphasis added)).

What is important regarding properties that may be inherent, but unknown, is whether they are unexpected. All properties of a composition are inherent in that composition, but unexpected properties may cause what may appear to be an obvious composition to be nonobvious. See, e.g., *In re Papesch*, 315 F.2d 381, 391 (C.C.P.A. 1963) (emphasizing that "[f]rom the standpoint of patent law, a compound and all of its properties are inseparable; they are one and the same thing," and yet in comparing the similarity of the one compound to another, "[t]here is no basis in law

for ignoring any property in making such a comparison"). Thus, the Board here, in dismissing properties of the claimed invention as merely inherent, without further consideration as to unpredictability and unexpectedness, erred as a matter of law.

Second, the Board erred in dismissing Honeywell's evidence of unpredictability in the art when it stated that one of ordinary skill would no more have expected failure than success in combining the references. The Board made what amounts to a finding that one of ordinary skill would *not* have had a reasonable expectation of success in combining HFO-1234yf with PAG lubricants, but then seemed to make a burden-shifting argument that Honeywell did not persuasively establish that one of ordinary skill would have expected *failure*. *Id.* at \*14-15 ("[T]he evidence presented by Patent Owner as a whole *shows the unpredictability* of how various refrigerants would have reacted with various lubricants. Thus, . . . the skilled artisan *would no more have expected failure . . . than would have expected success.*" (emphases added)). The Board rejected Honeywell's evidence, concluding that, *because* there would have been no reasonable expectation of success, one of ordinary skill would have arrived at the claimed combination by mere "routine testing." *Id.* (finding Honeywell's stability data to be unpersuasive "in light of the evidence of *routine testing* and *overall unpredictability* as to stability in the art" (emphases added)).

Thus, the Board seems to have determined that, because stability in the art was entirely unpredictable, one of ordinary skill would have made no predictions at all, but rather would have expected to undertake efforts to find an optimal combination and thus that "routine testing" would have led the skilled artisan to the claimed combination. *Id.*

In an *inter partes* reexamination involving obviousness, the standard is not whether the patent owner can persuasively show that one of ordinary skill would have expected *failure*. Rather, the burden is on the Examiner to show that one of ordinary skill would have had a motivation to combine the references with a *reasonable expectation of success*. See, e.g., *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015) ("When asserting that a claimed invention would have been obvious, that party must demonstrate . . . that a skilled artisan would have had reason to combine the teaching of the prior art references to achieve the claimed invention, and that the skilled artisan *would have had a reasonable expectation of success* from doing so." (emphasis added) (internal quotation marks omitted)); *Rambus Inc. v. Rea*, 731 F.3d 1248, 1255 (Fed. Cir. 2013) (reversing the Board's obviousness determination where "[t]he Board erroneously placed the burden on [the Patent Owner] to prove that its claims were not obvious" and emphasizing that "[i]n reexamination proceedings, `a preponderance of the evidence must show nonpatentability before the PTO may reject the claims of a patent application'" (citing *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988)); *In re Jung*, 637 F.3d 1356, 1365-66 (Fed. Cir. 2011) (explaining that while "the applicant must identify to the Board what the examiner did wrong, . . . the examiner retains the burden to show invalidity").

The Board made what amounts to a finding that one of ordinary skill would *not* have expected success, because Honeywell's evidence persuasively established the "overall unpredictability" in the art, but then glossed over that finding with a "routine testing" rationale because Honeywell did not persuasively prove an expectation of *failure*. See *Decision*, 2016 WL 1254603, at \*15.

That is reverse reasoning. Unpredictability of results equates more with nonobviousness rather than obviousness, whereas that which is predictable is more likely to be obvious. Thus, reasoning that one would no more have expected failure than success is not a valid ground for holding an invention to have been obvious. The Board erred in so holding.

Even when presenting evidence of unexpected results to "rebut" an Examiner's *prima facie* case for obviousness, a patent owner need not demonstrate that one of ordinary skill would have expected *failure*—rather, the patent owner need only establish that the results would have been *unexpected* to one of ordinary skill at the time of invention, or "much greater than would have been predicted." *Leo Pharm. Prod., Ltd. v. Rea*, 726 F.3d 1346, 1358 (Fed. Cir. 2013) ("Unexpected results are useful to show the improved properties provided by the claimed compositions are much greater than would have been predicted." (internal quotation marks omitted)); *In re Baxter Travenol Labs.*, 952 F.2d 388, 392 (Fed. Cir. 1991) ("[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art."); *In re De Blauwe*, 736 F.2d 699, 706 n.8 (Fed. Cir. 1984) ("A proper showing of unexpected results will rebut a *prima facie* case of obviousness.").

A further point regarding so-called "routine testing" is that § 103 provides that "[p]atentability shall not be negated by the manner in which the invention was made." 35 U.S.C. § 103 (2012). That provision was enacted to ensure that routine experimentation does not necessarily preclude patentability. *See, e.g., In re Saether*, 492 F.2d 849, 854 (C.C.P.A. 1974) ("In his argument that 'mere routine experimentation' was involved in determining the optimized set of characteristics, the solicitor overlooks the last sentence of 35 U.S.C. § 103. . . Here we are concerned with the question of whether the claimed invention would have been obvious at the time it was made to a person having ordinary skill in the art—not how it was achieved." (internal citation omitted)); *In re Fay*, 347 F.2d 597, 602 (C.C.P.A. 1965) ("[W]e do not agree that 'routine experimentation' negatives patentability. The last sentence of section 103 states that 'patentability shall not be negated by the manner in which the invention was made.'").

We thus conclude that the Board's analysis was legally erroneous in its consideration of inherency, in concluding that unpredictability indicates obviousness, and in rejecting Honeywell's objective evidence. Because finding a motivation to combine the references and consideration of objective evidence are fact questions, we vacate and remand for the Board to make determinations consistent with this opinion.

## II

We next consider whether the Board relied on a new ground of rejection, when it raised Omure as a basis for dismissing Honeywell's evidence of unexpected results.

During reexamination, both Mexichem Amanco and Daikin mentioned Omure in their "Third Party Requester Comments" after the Non-final Action and the Action Closing Prosecution, and Mexichem Amanco proposed a rejection based on Omure. Joint Appendix 1365, 1567, 8588. However, the Examiner never addressed those comments or entered the proposed rejection. Yet in its review of Honeywell's evidence of unexpected results, the Board relied on Omure as evidence that, although one of ordinary skill would not have expected success in combining HFO-1234yf with a PAG lubricant, one would also not have expected failure. *See Decision*, 2016 WL 1254603, at \*14 ("[A]s evidenced by Omure, the skilled artisan *would no more have expected failure* with respect to the stability of combining hydrofluoroolefins with PAG *than would have expected success*." (emphases added)). The Board found Honeywell's evidence to be unpersuasive of nonobviousness, based on Omure's teachings. The question before us is whether that reliance on Omure constituted a new ground of rejection.

Under the Administrative Procedure Act ("APA"), the PTO must ensure that the parties before it are "fully and fairly treated at the administrative level." *Rambus Inc. v. Rea*, 731 F.3d 1248, 1255 (Fed. Cir. 2013) (internal quotation marks omitted). The APA requires the PTO "to provide prior notice . . . of all matters of fact and law asserted prior to an appeal hearing before the Board." *Id.* (internal quotation marks omitted). Such a framework "limits the Board's ability to rely on different grounds than the examiner." *Id.*

When considering whether the Board issued a new ground of rejection, the "ultimate criterion" is "whether applicants have had fair opportunity to react to the thrust of the rejection." *Id.* (internal quotation marks omitted). While the Board need not "recite and agree with the examiner's rejection *in haec verba*" to avoid issuing a new ground of rejection, mere reliance on the same statutory basis and the same prior art references, alone, is insufficient to avoid making a new ground of rejection when the Board "relies on *new facts and rationales not previously raised to the applicant by the examiner*." *Id.* (emphasis added) (internal quotation marks omitted). A new ground of rejection, however, generally will not be found based on the Board "further explain[ing] the examiner's rejection" or the Board's thoroughness in responding to an applicant's argument. *See In re Jung*, 637 F.3d 1356, 1364-65 (Fed. Cir. 2011). Whether the Board relied on a new ground of rejection is a legal issue that we review *de novo*. *Rambus*, 731 F.3d at 1343.

Honeywell argues that the Board relied on a new ground of rejection in its reliance on Omure, which was never mentioned or relied upon by the Examiner. Honeywell asserts that, during reexamination, the patent owner responds only to the Examiner's rejections, not to the "unacknowledged arguments" of the Requesters. Appellant's Br. 41. Therefore, Honeywell contends, even though Mexichem raised Omure with the Examiner, "the Examiner did not have a position on Omure, so Honeywell could not address that position." *Id.* at 43. Thus, Honeywell continues, it did not

have notice of or an opportunity to respond to Omure, and the Board's reliance on it constituted a new ground of rejection.

Mexichem responds that the Board relied on Omure only to explain why Honeywell's evidence of secondary considerations did not support a determination of nonobviousness. Ultimately, Mexichem argues, "the thrust of the Board's analysis of secondary considerations was the same as that of the Examiner." Appellee's Br. 25-26.

We disagree. The Board's analysis was different from that of the Examiner. During its analysis of Honeywell's evidence of secondary considerations, the Board expressly stated that it "disagree[d]" with the Examiner's treatment of that evidence. See *Decision*, 2016 WL 1254603, at \*13 ("The Examiner determined that the stability data `do not contradict the fact that the stability is an inherent property of the refrigerant/lubricant pair.' *We disagree*. Even inherent properties, to the extent that they demonstrate results beyond what would have been expected to one of ordinary skill in the art . . . must be considered accordingly." (emphasis added)).

The Board instead concluded that Honeywell's evidence persuasively shows the "overall unpredictability" of the art, but that Omure is evidence that one of ordinary skill would not have expected failure in combining HFO-1234yf with PAG lubricants. *Id.* at \*14-15. Accordingly, the Board rejected the Examiner's conclusions regarding the evidence of unexpected results and instead relied on Omure to find the evidence unpersuasive.

Thus, it is not correct that "the thrust of the Board's analysis of secondary considerations was the same as that of the Examiner," Appellee's Br. 25-26, when the Board expressly disagreed with the Examiner's reasons and instead stated reasons of its own, based on Omure. As in prior cases where we have found a new ground of rejection, the Board's findings regarding Omure here were "completely new" and the Board did more than merely "elaborate on the examiner's findings with more detail." *Rambus*, 731 F.3d at 1256 (internal quotation marks omitted). It expressly rejected the Examiner's findings and then articulated findings of its own.

Furthermore, it cannot be said that Honeywell had a "fair opportunity to react to the thrust of the rejection," as premised on Omure. *Id.* at 1255. Mexichem raised Omure with the Examiner, who did not adopt or respond to that argument. As Honeywell notes, during reexamination, the patent owner responds to the Examiner's reasoning, not to the Requesters' unadopted arguments. Thus, because the Examiner did not credit Omure's teachings in issuing the rejections, Honeywell had no reason to respond to Mexichem's arguments regarding Omure. We have held in an original application setting that "[i]t is crucial that *the examiner* issue a rejection. . . so the applicant is on notice that it is obligated to respond." *In re Stepan Co.*, 660 F.3d 1341, 1344-45 (Fed. Cir. 2011) (emphasis added). Moreover, "[a] new ground of rejection is not negated by the fact that the Board is responding to [a party's] argument." *In re Biedermann*, 733 F.3d 329, 338 (Fed. Cir. 2013). "Notice does not focus on the applicant's arguments divorced from the examiner's rejections of record that are actually appealed to the Board. Instead, it focuses on the `adverse decisions of examiners' during prosecution which form the basis of the Board's scope of review." *Stepan*, 660 F.3d at 1346 (emphasis added) (citing 35 U.S.C. § 6(b)). Thus, even though Mexichem raised Omure with the Examiner, the Examiner never relied upon, or even mentioned, Omure, so Honeywell was not on notice that it needed to respond to that argument.

In sum, we conclude that the Board's reliance on Omure constituted a new ground of rejection. We therefore vacate the Board's decision and remand with instructions to designate its rejection as a new ground of rejection, if it intends to continue relying on Omure in evaluating Honeywell's appeal.

Honeywell separately argues that the Examiner erred in rejecting dependent claims 36, 37, 46-49, 70, and 75. However, because we find the Board's analysis of the representative independent claim legally flawed, we need not address those separate arguments.

## CONCLUSION

We have considered the parties' remaining arguments but find them to be unpersuasive. For the foregoing reasons, we vacate and remand the decision of the Board.

## VACATED AND REMANDED

### COSTS

Costs to Honeywell.

WALLACH, Circuit Judge, dissenting-in-part.

The instant appeal concerns whether certain claims of U.S. Patent No. 7,534,366 ("the '366 patent") would have been obvious over various prior art references. In consolidated inter partes reexaminations, an examiner with the U.S. Patent and Trademark Office ("PTO") concluded that the claims are invalid as obvious, basing its decision on twenty-eight different grounds of rejection. See J.A. 2548-78. The PTO's Patent Trial and Appeal Board ("PTAB") affirmed the Examiner's conclusions in full. See *generally Mexichem Amanco Holding S.A. De C.V. v. Honeywell Int'l Inc.*, No. 2015-006430, 2016 WL 1254603 (P.T.A.B. Mar. 29, 2016).

I agree with the majority's decision to vacate and remand the consolidated reexaminations to the PTAB, except for the discussion pertaining to a purported new ground of rejection issued by the PTAB. I respectfully disagree with the majority's conclusion that the PTAB "relied on a new ground of rejection[]" when it raised [Japanese Patent Application No. H05-85970 ('Omure') (J.A. 7956-60)] as a basis for dismissing Honeywell's evidence of unexpected results" in its analysis of secondary considerations. Maj. Op. 14. Rather, under the facts of this case, I conclude that the PTAB did not issue a new ground of rejection. The analysis below focuses solely on that point of disagreement with the majority.

### A. Standard of Review and Legal Standard for New Ground of Rejection

"Whether the [PTAB] relied on a new ground of rejection is a legal question that we review de novo." *In re Stepan Co.*, 660 F.3d 1341, 1343 (Fed. Cir. 2011). "When considering whether the [PTAB] issued a new ground of rejection, the ultimate criterion of whether a rejection is considered new in a decision by the [PTAB] is whether applicants have had fair opportunity to react to the thrust of the rejection." *In re Biedermann*, 733 F.3d 329, 337 (Fed. Cir. 2013) (internal quotation marks and citation omitted). The PTAB is not limited to "recit[ing] and agree[ing] with the examiner's rejection *in haec verba*"; indeed, it may "further explain[] the examiner's rejection" and thoroughly "respond[] to an applicant's argument." *Id.* (internal quotation marks and citations omitted). However, if the PTAB "finds facts not found by the examiner regarding the differences between the prior art and the claimed invention, and these facts are the principal evidence upon which the [PTAB]'s rejection was based," then the PTAB improperly enters a new ground of rejection. *In re Leithem*, 661 F.3d 1316, 1320 (Fed. Cir. 2011) (citation omitted).

### B. The PTAB Did Not Issue a New Ground of Rejection

The majority holds that the PTAB's analysis of claims 1, 3, 5-6, 8, 11-16, 18-20, 23-25, and 31-33 of the '366 patent ("subject claims") "was different from that of the Examiner" because "[d]uring its analysis of Honeywell's evidence of secondary considerations, the [PTAB] expressly stated that it disagreed with the Examiner's treatment of that evidence." Maj. Op. 16 (internal quotation marks, brackets, and citation omitted).<sup>[1]</sup> Specifically, the majority believes that the PTAB "rejected the Examiner's conclusions regarding the evidence of unexpected results and instead relied on Omure to find the evidence unpersuasive." *Id.* I do not agree with this assessment of the record.

Having concluded that the record supported the Examiner's determination that a prima facie case of obviousness exists as to the subject claims, *Mexichem*, 2016 WL 1254603, at \*5-11, the PTAB next considered Honeywell's evidence relating to secondary considerations of non-obviousness, including whether a nexus exists between what was claimed in the '366 patent and the evidence of secondary considerations submitted, see *id.* at \*11-15; see also *Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1052-53 (Fed. Cir. 2016) (*en banc*) ("[E]vidence of secondary considerations . . . is to be considered as part of all the evidence, not just when the decisionmaker remains in doubt

after reviewing the art." (citation omitted)). The PTAB's affirmative analysis of whether the requisite nexus exists here does not mention Omure. See *Mexichem*, 2016 WL 1254603, at \*5-13, an approach that tracks the Examiner's, see J.A. 2548-605. Therefore, the PTAB's analysis of secondary considerations does not include an improper new ground of rejection.

Although the PTAB discussed Omure in other portions of its secondary considerations analysis in rejecting Honeywell's arguments, that discussion does not alone necessitate a different conclusion because the PTAB's analysis of Omure was not "the principal evidence upon which the [PTAB]'s rejection was based." *Leithem*, 661 F.3d at 1320 (citation omitted). The PTAB's discussion of Omure was limited to consideration of Honeywell's argument that the claimed combination of a known refrigerant, 2,3,3,3-tetrafluoropropene (also known as "1,1,1,2-tetrafluoropropene" or "HFO-1234yf"), with a known poly alkylene glycol ("PAG") lubricant exhibited an unexpected superior stability. See *Mexichem*, 2016 WL 1254603, at \*13-15. The PTAB disagreed with Honeywell, basing its conclusion in part on statements in Omure. See *id.* The PTAB's discussion of Omure reflects the reality that the PTAB addresses arguments presented by adverse parties, and we have permitted the PTAB to thoroughly respond to such arguments in its decisions without the fear of entering an improper new ground of rejection. See *Biedermann*, 733 F.3d at 337. Here, the PTAB discussed Omure merely to explain why Honeywell's evidence of secondary considerations did not overcome the Examiner's determination of a prima facie case of obviousness. See *Mexichem*, 2016 WL 1254603, at \*13-15. That discussion provided a more thorough explanation of the Examiner's conclusion regarding the stability data. See *id.* at \*11-15; see also J.A. 2580-85 (Examiner's Right of Appeal Notice). Under such circumstances, the PTAB does not enter an improper new ground of rejection. See *In re Noznick*, 391 F.2d 946, 947-48 (CCPA 1968) ("It does not constitute a new ground of rejection to point out to an appellant why his arguments are not persuasive of error in the [e]xaminer's rejection, nor does it constitute an implied invitation to present belated showings to supply the deficiencies."); see also *In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) ("To assert that the [PTAB]'s thoroughness in responding to [the examiner's] explanation put it in the position of a 'super-examiner' would limit the [PTAB] to verbatim repetition of the examiner's office actions, which would ill-serve the [PTAB]'s purpose as a reviewing body."). For these reasons, I respectfully dissent-in-part.

[1] During original prosecution of the '366 patent, in the Supplemental Response, filed November 10, 2008, at page 20, Honeywell made a statement that a well-known lubricant, ND-8, meets the structural requirements of the claimed lubricant. See *Decision*, 2016 WL 1254603, at \*5. The Examiner relied on this statement by Honeywell in combination with Acura, which teaches the use of ND-8 with saturated HFC refrigerants. See *id.*

[1] While the majority opinion does not mention the specific subset of claims, the enumerated "subject claims" are those claims the PTAB analyzed specifically with respect to Omure. See *Mexichem*, 2016 WL 1254603, at \*5-15.

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