NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

IN RE: IKEDA FOOD RESEARCH CO., LTD.,
Appellant

2017-2624

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. 12/851,668.

Decided: January 29, 2019

THOMAS H. JENKINS, Finnegan, Henderson, Farabow, Garrett & Dunner, LLP, Washington, DC, argued for appellant. Also represented by MICHAEL PAUL BARKER, MICHAEL LIU SU, Palo Alto, CA.

SARAH E. CRAVEN, Office of the Solicitor, United States Patent and Trademark Office, Alexandria, VA, argued for appellee Andrei Iancu. Also represented by THOMAS W. KRAUSE, KAKOLI CAPRIHAN.

Before WALLACH, TARANTO, and HUGHES, *Circuit Judges*.

WALLACH, *Circuit Judge*.

Appellant Ikeda Food Research Co., Ltd. ("Ikeda") appeals a decision on appeal of the U.S. Patent and Trade-

mark Office's ("USPTO") Patent Trial and Appeal Board ("PTAB") in an ex parte reexamination affirming an examiner's rejection of, inter alia, claims 22–23 ("the Challenged Claims") of U.S. Patent Application No. 12/851,668 ("the '668 application") (J.A. 837–99) as obvious pursuant to 35 U.S.C. § 103(a) (2006).[1] *See In re Ikeda Food Research Co.*, No. 2015-002637 (P.T.A.B. July 28, 2017) (J.A. 2–17). We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (2012). We affirm.

BACKGROUND

I. The '668 Application

Entitled "Coenzyme-Binding Glucose Dehydrogenase," the '668 application generally relates to a "convenient" method for patients to regularly measure and monitor their blood glucose, i.e., blood sugar, "and a means for controlling the blood sugar level . . . which can be utilized not only in a hospital but also at home." J.A. 839. The enzymatic method employs blood glucose "biosensors,"[2]

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[1] Congress amended § 103 when it enacted the Leahy-Smith America Invents Act ("AIA"). Pub. L. No. 112-29, § 3(c), 125 Stat. 284, 287 (2011). However, because the '668 application never contained a claim having an effective filing date on or after March 16, 2013 (the effective date of the statutory changes enacted in 2011), or a reference under 35 U.S.C. §§ 120, 121, or 365(c) to any patent or application that ever contained such a claim, the pre-AIA § 103 applies. *See id.* § 3(n)(1), 125 Stat. at 293.

[2] Biosensors commonly rely on enzymes, with the most commonly used enzymes being those that catalyze (cause or accelerate) oxidation-reduction reactions. *See* J.A. 356. Such enzymes include glucose oxidases ("GOx") and glucose dehydrogenases ("GDH"), the latter of which includes enzymes that use nicotinamide adenine dinucleo-

J.A. 839, as "an important marker for diabetes," J.A. 838. The '668 application describes prior art methods that use "a biosensor employing a [GDH]" and exhibit various disadvantages, such as "high background noise" that leads to erratic readings "due to a level of residual oxygen," and "a complicated reaction system" that is "expensive." J.A. 839–40. The '668 application purports to improve upon the prior art by claiming use of, inter alia, a specific enzyme: a "flavin"-dependent GDH ("FAD-GDH") designated as Enzyme Commission ("E.C.")[3] 1.1.99.10, J.A. 890, whose "relative reactivity" (or "substrate specificity"), was found to exhibit "high activity" on glucose, and "low activity" on the seventeen other substrates tested, including maltose, *see* J.A. 864–65.

The "objective of the invention is to provide a novel [GDH] which exhibits an excellent substrate-recognizing ability toward glucose and which has low activity on maltose,[4] and also to provide a method for producing the same and a microorganism having an ability of producing the same." J.A. 841. The newly-discovered "coenzyme-binding [GDH] has [the] ability of catalyzing a reaction for oxidizing glucose, especially a hydroxyl group in the

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tide ("NAD(P)$^+$") or pyrroloquinoline quinone ("PQQ") as an expensive and unstable cofactors. *See* J.A. 356, 838–40, 843.

[3] E.C. numbers are promulgated by the Enzyme Commission, J.A. 176, and provide a common classification scheme for enzymes based on the chemical reactions they catalyze, *see* J.A. 7–8.

[4] Maltose is "a sugar produced by the breakdown of starch," and enzymes that have intrinsic enzymatic activity towards maltose, such as PQQ-GDH, were later reported to pose high risks for patients on infusion drugs. J.A. 269; *see* J.A. 840–41 (excerpts from another utility patent application).

[first] position of glucose, in the presence of an electron acceptor." J.A. 842. To obtain the FAD-GDH enzyme, a microorganism (or microbe) containing the enzyme is first "cultured," and the enzyme is "recovered from the culture by means of an ordinary protein purification method." J.A. 864, 869. The '668 application recounts the purified enzyme's activity to maltose as 1.4%, relative to its activity to glucose, which is regarded as 100%. *See* J.A. 882 (Table 1); *see also* J.A. 845 (describing the graphical data quantifying various activity of the coenzyme-binding GDHs). Accordingly, the purified FAD-GDH enzyme is used in prior-art biosensors that comprise "an action electrode, a counter electrode," and "an enzymatic reaction layer." J.A. 874.

Independent claim 22 is representative of the Challenged Claims, and recites:

> A biosensor for measuring glucose, comprising:
>
> > an electrode system comprising an action electrode and a counter electrode; and
> >
> > an enzymatic reaction layer in contact with the action electrode and/or the counter electrode, the enzymatic reaction layer comprising an electron acceptor and a soluble [f]lavin compound-binding glucose dehydrogenase, which has enzymatic activity to glucose comprising catalyzing a reaction for oxidizing glucose in the presence of the electron acceptor,
> >
> > wherein *enzymatic activity to maltose in the enzymatic reaction layer is 5% or less relative to the enzymatic activity to glucose*;
> >
> > wherein the biosensor can quantify glucose concentrations ranging from 4.5 mM to 30 mM.

J.A. 230 (emphasis added).

II. The Prior Art References

A. Senior

Entitled "Method for Determining Glucose Content of Fluid," European Patent Application Publication No. 0094161 ("Senior") (J.A. 283–300) discloses a qualitative procedure for determining blood glucose concentration, preferably using either a FAD-GDH enzyme derived from a strain of A. orzyae, which is a different microorganism than the '668 application's FAD-GDH enzyme yet similarly designated E.C. 1.1.99.10, or a PQQ-GDH enzyme which is designated E.C. 1.1.99.17. *See* J.A. 283 ("A method for determining glucose present in a fluid wherein a sample of a glucose-containing fluid is contacted with an assay mixture comprising . . . flavin-dependent glucose dehydrogenase enzyme E.C. 1.1.99.10 and a reducible compound, reduction of which can produce changes in electro-magnetic radiation absorbance characteristics and/or electrical changes."), 287 (discussing "a preferred source of E.C. 1.1.99.17" as the second enzyme). Senior states that the FAD-GDH enzyme it employs "need not be purified to an excessively high standard" and that the PQQ-GDH has some "lesser activity on other sugars." J.A. 289.

B. The Yugawa Patents

Related U.S. Patent Nos. 6,656,702 ("Yugawa A") and 6,059,946 ("Yugawa B") (collectively, "the Yugawa patents") disclose "a biosensor" comprising, inter alia, an "electrode system" with a "working electrode," "counter electrode," and "a reaction layer." Yugawa A col. 2 ll. 3–7; *see* Yugawa B col. 2 ll. 4–8 (same). The enzymes used in the reaction layer specifically include GDH and PQQ-GDH. Yugawa A col. 2 ll. 8–15; Yugawa B col. 5 l. 45. The Yugawa patents also describe stability and cost advantages of their biosensor similar to those described in

the '668 application. *Compare* Yugawa A col. 1 l. 63–col. 2 l. 2, *and* Yugawa B col. 1 ll. 66–67, *with* J.A. 840–41.

DISCUSSION

I. Standard of Review and Legal Standard

"We review the PTAB's factual findings for substantial evidence and its legal conclusions de novo." *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015) (citation omitted). "Substantial evidence is something less than the weight of the evidence but more than a mere scintilla of evidence," meaning that "[i]t is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *In re NuVasive, Inc.*, 842 F.3d 1376, 1379–80 (Fed. Cir. 2016) (internal quotation marks and citations omitted). "If two inconsistent conclusions may reasonably be drawn from the evidence in record, the PTAB's decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence." *Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, 881 F.3d 1354, 1357 (Fed. Cir. 2018) (internal quotation marks, brackets, and citation omitted).

A patent claim is invalid "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 at the time the invention was made to a person having ordinary skill in the art [('PHOSITA')]." 35 U.S.C. § 103(a). Obviousness is a question of law based on underlying findings of fact. *See In re Adler*, 723 F.3d 1322, 1325 (Fed. Cir. 2013). Those underlying findings of fact include: (1) "the scope and content of the prior art," (2) "differences between the prior art and the claims at issue," (3) "the level of ordinary skill in the pertinent art," and (4) the presence of objective indicia of nonobviousness, such "as commercial success, long felt but unsolved needs, failure of others," and unexpected results. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17 (1966); *see*

United States v. Adams, 383 U.S. 49, 50–52 (1966). For objective indicia of non-obviousness, a showing that a problem was both recognized in the prior art and there existed a failure of others to provide "a feasible solution to the long-standing problem" supports a finding of long-felt need. *In re Cyclobenzaprine Hydrochloride*, 676 F.3d 1063, 1083 (Fed. Cir. 2012) (citation omitted). Further, "[a]n obviousness determination requires finding that a [PHOSITA] would have been motivated to combine or modify the teachings in the prior art and would have had a reasonable expectation of success in doing so." *Regents of Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018) (citation omitted).

"We have recognized that inherency may supply a missing claim limitation in an obviousness analysis." *PAR Pharm., Inc. v. TWI Pharm., Inc.,* 773 F.3d 1186, 1194–95 (Fed. Cir. 2014); *see id.* at 1195 (collecting cases). However, "the limitation at issue necessarily must be present[] or the natural result of the combination of elements explicitly disclosed by the prior art" to be inherently disclosed by the reference. *Id.*; *see Southwire Co. v. Cerro Wire LLC*, 870 F.3d 1306, 1311 (Fed. Cir. 2017) (requiring the PTAB to find that a reference disclosed an "identical or substantially identical" process to that claimed by the patent in order to find inherent obviousness). Where "all process limitations . . . are expressly disclosed by [the prior art reference], except for the functionally expressed [limitation at issue], the [US]PTO can require an applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on." *Southwire*, 870 F.3d at 1311 (internal quotation marks and citation omitted).

II. Obviousness

The PTAB affirmed the Examiner's findings that employing the FAD-GDH enzyme preparation described in Senior with the biosensor described in the Yugawa pa-

tents would have rendered the Challenged Claims obvious to a PHOSITA. *See* J.A. 9–10; *see also* J.A. 153–57 (Examiner's findings). In rendering its obviousness decision, the PTAB specifically determined that even though Senior did not expressly disclose the low-maltose activity limitation of claim 22 of the '668 application, Senior's disclosed enzyme preparation inherently contains the same enzymatic specificity for glucose relative to maltose as the Challenged Claims. *See* J.A. 10; *see also* J.A. 10–11 (relying on the undisputed fact that both Senior and the '668 application classify their respective FAD-GDH enzyme in their enzyme preparations as E.C. 1.1.99.10, and concluding that it was reasonable to infer they have the same low substrate specificity for glucose relative to maltose). The PTAB also disagreed with Ikeda that Ikeda's proffered extrinsic evidence of another "contaminated" GDH preparation somehow established that Senior's enzyme preparation was likewise contaminated. J.A. 11–12. Ikeda contends that "the PTAB erred in its prima facie case" by (1) relying upon inherency to supply the necessary low-maltose activity claim element in making its obviousness determination, *see* Appellant's Br. 30, and (2) improperly shifting the evidentiary burden to Ikeda, *see id.* at 33. Ikeda also asserts that "the [PTAB] erred in discounting the objective indicia of nonobviousness," especially that of a long-felt need. *Id.* at 42 (capitalization modified). We address each argument in turn.

A. Substantial Evidence Supports the PTAB's Determination that the Challenged Claims Would Have Been Obvious over Senior and the Yugawa Patents

Ikeda contests the PTAB's determination that Senior's E.C. 1.1.99.10 FAD-GDH enzyme preparation *inherently* discloses the Challenged Claims' limitation of a reaction layer with low reactivity toward maltose relative to glucose, *id.* at 30, but does not contest that each of the

other limitations are taught by this combination, *see generally id.*[5] Specifically, Ikeda argues that because "Senior's enzyme preparation was contaminated with about 7,000 times more protein than the ['668 application]'s preparation," these impurities cause Senior's preparation to "differ[] vastly" from the '668 application's preparation in how it reacts with maltose. Appellant's Br. 31. We disagree.

Substantial evidence supports the PTAB's conclusion that Senior's FAD-GDH enzyme preparation inherently discloses the Challenged Claims' low-maltose activity limitation. Table 1 of the '668 application discloses that the E.C. 1.1.99.10 enzyme's activity for maltose is 1.4% relative to its activity for glucose. *See* J.A. 882 (reporting testing results in Table 1 that state that the FAD-GDH enzyme preparation's activity towards "maltose" is "1.4%" relative to its 100% activity towards glucose). Senior discloses an assay for determining blood glucose concentration and teaches, in relevant part, purifying an FAD-GDH enzyme from a crude cellular extract. *See* J.A. 287. Although Senior does not directly address glucose specificity or maltose, *see* J.A. 283–300, Senior's FAD-GDH enzyme, prepared from "A[.] oryzae," has the same "E.C. 1.1.99.10" classification number as the '668 application's FAD-GDH enzyme, even though each FAD-GDH enzyme is produced from a different microorganism, i.e., from "A. terreus," *compare* J.A. 287, 293, *with* J.A. 843. E.C. classification numbers are based on enzyme reactivity, *see* J.A. 176 (describing, in a scientific journal, the known

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[5] Ikeda also does not dispute the PTAB's finding that the Yugawa patents' biosensor (comprising "an insulating plate (layer), electrode system, and a reaction layer," J.A. 9), *could* be combined with Senior's FAD-GDH E.C. 1.1.99.10 enzyme to arrive at the Challenged Claims' biosensor, *see generally* Appellant's Br.

"genomics" and "chemical information" represented by E.C. classification numbers), and Ikeda's counsel does not dispute that *enzymes* with the same E.C. number have the same substrate specificity "for purposes of this appeal," Oral. Arg. at 6:32–:47, http://oralarguments.cafc.uscourts.gov/default.aspx?fl=2017-2624.mp3. Therefore, it was reasonable for the PTAB to conclude that both Senior and the '668 application characterize their microbe-derived *preparations* as having identical enzymatic activity, which necessarily includes having the same substrate specificity. *See* J.A. 7–8, 11; *cf. Butamax (TM) Advanced Biofuels LLC v. Gevo, Inc.*, 746 F.3d 1302, 1306 (Fed. Cir. 2014) (acknowledging that assignment "of different E[.]C[.] numbers to the same enzyme" indicates that "the difference between the numbers is the identity of the cofactor named"), *judgment vacated sub nom. on other grounds Gevo, Inc. v. Butamax Advanced Biofuels LLC*, 135 S. Ct. 1173 (2015). The PTAB had a reasonable basis to conclude that because Senior discloses the *use* of the FAD-GDH enzyme described in the '668 application, classified under E.C. 1.1.99.10, the claimed low "5% or less" activity against maltose relative to glucose in the reaction layer is inherently disclosed in Senior's enzyme preparation. *See* J.A. 11; *see also PAR Pharm.*, 773 F.3d at 1194–95 (concluding that "[t]he claimed . . . parameters . . . [were] inherent properties of the obvious . . . formulation," and thus "[t]he reduced food effect was an inherent result of [a composition] even if it was previously not known in the prior art that a food effect existed" (internal quotation marks and citation omitted)).

The PTAB properly adhered to our precedent regarding the prima facie framework to conclude that Ikeda failed to present sufficient evidence to rebut the substantial evidence supporting that Senior's FAD-GDH enzyme preparation inherently discloses the '668 application's claimed low maltose activity relative to glucose. *See In re Spada*, 911 F.2d 705, 708 (Fed. Cir. 1990) ("[W]hen the

[US]PTO shows *sound basis* for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." (emphasis added) (citation omitted)). Ikeda did not present evidence of testing any of the enzyme preparations found in the prior art, such as by replicating Senior's described process of creating its preparation, to support its argument that the purity of Senior's preparation must have differed from the '668 application because it contained maltose hydrolyzing contaminants (or impurities). *See* J.A. 110–25 (Reply Brief), J.A. 249–447 (Reply to Final Action). Instead, Ikeda presented evidence in the form of U.S. Patent No. 7,655,130 ("Tsuji") in support of its contention that because Tsuji's purified FAD-GDH E.C. 1.1.99.10 enzyme preparation "AOGDH"[6] has high maltose reactivity even after purification, there must likewise be maltose-hydrolyzing contaminants in Senior's FAD-GDH preparation that would cause the preparation to exhibit more than 5% activity toward maltose relative to glucose. *See* J.A. 110–25 (Ikeda Reply Brief); *see also* J.A. 432 (stating, in Tsuji's Example 1, that "[i]n the AOGDH purified preparation, . . . 90% of maltose was already degraded into glucose, and after reacting for ten minutes, nearly 100% maltose was degraded").[7] The

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[6] Tsuji refers to its GDH enzyme preparation as "AOGDH" because it is recovered from native fungus Aspergillus oryzae. *See* J.A. 431.

[7] The parties do not dispute that Tsuji, J.A. 426–48, which issued in 2010, qualifies as extrinsic evidence that may be relevant in determining what was inherently present in the prior art. *See generally* Appellant's Br.; Appellee's Br. Therefore, we deem it appropriate to consider Tsuji's teachings here. *See ASM Am., Inc. v. Genus, Inc.*, 401 F.3d 1340, 1347 (Fed. Cir. 2005) (concluding that extrinsic evidence that post-dated the patent filing date nonetheless was helpful in determining how a

PTAB found that "Tsuji's example of a contaminated preparation [did not] establish the presence of such contaminants in Senior." J.A. 11. In addition, there is no specific evidence in Tsuji or of record that any contaminant in Tsuji results in a greater than 5% maltose activity relative to glucose. *See* Tsuji col. 1 l. 28–col. 14 l. 8. To the contrary, Tsuji's AOGDH preparation Table 1 shows low, i.e., "0.4%," enzymatic reactivity to maltose relative to "100.0%" reactivity to glucose. *Id*. col. 12 ll. 1–43. The PTAB could reasonably find that Tsuji does not persuasively rebut the prima facie finding of inherency.

Moreover, simply because Senior never quantified maltose activity achieved by its disclosed embodiments does not preclude the PTAB's evidentiary finding that Senior's enzyme preparation process necessarily achieved the low activity of 5% or less relative to glucose claimed in the Challenged Claims, *see* J.A. 230; J.A. 11–12, especially since Senior's enzyme's stated E.C. classification was the same as the '668 application's enzyme, *compare* J.A. 293 *with* J.A. 843. "In the absence of any evidence that the claimed [low activity] would have been unexpected in light of [Senior's] disclosure, there is no indication that the limitation is anything other than mere quantification of the results of a known process." *Southwire*, 870 F.3d at 1311. As our predecessor court explained, the fairness of shifting the burden "is evidenced by the [US]PTO's inability to manufacture products or to obtain and compare prior art products." *In re Best*, 562 F.2d 1252, 1255 (CCPA 1997). Therefore, we see no reason to call into question the PTAB's finding "that the 'possible presence of contaminants' in Senior's enzyme preparation [does not] render the claimed biosensor non-obvious." J.A. 11; *see Elbit*, 881 F.3d at 1537 ("If two inconsistent conclu-

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PHOSITA would have understood the claim term at the time it was filed).

sions may reasonably be drawn from the evidence in record, the PTAB's decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence." (internal quotation marks and citation omitted)). Ikeda's evidence does not show that the PTAB lacked a reasonable basis for finding that Senior, as the operative prior art, necessarily possesses the '668 application's claimed low maltose activity relative to glucose. *See In re Spada*, 911 F.2d at 709 (determining that an appellant "showed no error, in science or in law, in the [PTAB]'s holding that . . . the products [at issue] appeared to be the same and thus that [the appellant's] products were not new").

Ikeda's counterarguments lack merit. First, Ikeda argues that the PTAB improperly "conflat[ed] Senior's enzyme preparation with the enzyme per se," Appellant's Br. 30, such that the E.C. 1.1.99.10 "designation does not mean that the enzyme preparation possesses only that single enzymatic activity," *id*. at 32. However, Ikeda's logic misses the mark. The Challenged Claims do not require such exclusivity; the only disputed limitation is that they require a low maltose relative to glucose. *See* J.A. 230. Thus, Ikeda's contention that an E.C. designation does not refer to a single enzymatic activity does not contradict the evidence supporting the PTAB's finding that the E.C. 1.1.99.10 designation means that the preparation has identical or similar substrate specificity for glucose.

Second, Ikeda avers that the PTAB "*ignored* [Ikeda]'s evidence when deciding whether there exists a reasonable basis for inherency." Appellant's Br. 36 (emphasis added). However, as we determine above, the PTAB expressly considered, and found unpersuasive, Ikeda's evidence in support of its argument that the purity of Senior's enzyme preparation differed from the '668 application and thus did not inherently possess low activity against maltose. *See, e.g.*, J.A. 11 (stating that, "[a]s an initial matter,

[Ikeda's] speculation about the possibility that Senior's preparation *may* contain contaminants does not establish that Senior's preparation *in fact* had such contaminants," and that while the PTAB "agree[d] with [Ikeda] that the claims are directed to the activity of the enzyme layer and not just of GDH," it "d[id] not agree that the 'possible presence of contaminants' in Senior's enzyme preparation renders the claimed biosensor non-obvious" (emphases added)), 12 ("[Ikeda's] example relied on a different preparation method than was used in Senior."). Accordingly, the PTAB properly considered the record evidence in affirming the Examiner's obviousness findings.

B. Substantial Evidence Supports the PTAB's Finding that Objective Indicia of Nonobviousness Do Not Rebut the Prima Facie Case of Obviousness

The PTAB found, inter alia, that Ikeda's "objective indicia of nonobviousness" do not "demonstrate[] the nonobviousness of the claimed biosensor" because the "scope of the [Challenged] Claims was not commensurate with the asserted need." J.A. 15. The PTAB accorded Ikeda's expert's testimony little weight when he testified that "biosensors based on NAD-GDH enzymes did not satisfy this long-felt need because they require a cofactor" because the Challenged Claims "encompass biosensors that use cofactors and thus do not satisfy the alleged need for dehydrogenase-based glucose sensors that do not rely on a cofactor." J.A. 15. Ikeda argues that "a need existed since at least 1986 for improved blood glucose monitors" that were "both specific and independent of separate cofactors." Appellant's Br. 43, 44 (capitalization modified). Ikeda also argues that the PTAB "erred by not crediting [Ikeda's] evidence of long-felt need" for a GDH enzyme with no separate cofactor. *Id.* at 47. We disagree with Ikeda.

We see no error in the PTAB's analysis, and ultimate rejection as unpersuasive, of Ikeda's evidence of secondary

considerations relating to long-felt need. Ikeda's expert stated that twenty years elapsed after the publication of Senior, and seventeen years elapsed after a 1986 publication by Ikeda's expert documenting a "need for a dehydrogenase-based glucose sensor" that "ha[d] no cofactor requirement," before the '668 application was filed. J.A. 273–74 (expert declaration); *see* J.A. 14 (acknowledging, by the PTAB, that "[a]lthough Senior does not require a cofactor, [Ikeda's expert] contends that Senior's disclosure failed to satisfy the need for a dehydrogenase-based glucose sensor because of the possible presence of contaminants and the low degree of purification" (internal quotation marks and citation omitted)). However, the PTAB considered Ikeda's expert testimony and concluded that it did not have any substantive relevance, *see* J.A. 14–15, a determination that we do not revisit, *see Elbit*, 881 F.3d at 1358 ("The PTAB is entitled to weigh the credibility of the witnesses." (brackets and citation omitted)). Furthermore, we recognize that claim 22 employs the transitional phrase "comprising" in the preamble, J.A. 230, and, therefore, does not *exclude* biosensors that employ a cofactor, *see CIAS, Inc. v. All. Gaming Corp.*, 504 F.3d 1356, 1360 (Fed. Cir. 2007) ("In the patent claim context[,] the term 'comprising' is well understood to mean 'including but not limited to.'" (citation omitted)). Thus, the Challenged Claims encompass biosensors that use cofactors, and it follows that they do not satisfy Ikeda's alleged need for dehydrogenase-based glucose sensors that do not rely on a cofactor.[8]

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[8] The PTAB found, as an alternative to its inherent obviousness analysis, that even if "Senior's [FAD-GDH] enzyme preparation includes contaminants, it would have been obvious for [a PHOSITA] *to modify* . . . Senior's chromatographic purification to" achieve the claimed low-maltose activity of the '668 application's FAD-GDH en-

CONCLUSION

We have considered Ikeda's remaining arguments and find them unpersuasive. Accordingly, the Decision on Appeal of the U.S. Patent and Trademark Office's Patent Trial and Appeal Board is

AFFIRMED

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zyme. J.A. 12 (emphasis added) (internal quotation marks and citation omitted). Although Ikeda challenges this alternative finding on appeal, *see* Appellant's Br. 5, 39–41, we need not address this alternative theory, given that we uphold the PTAB's inherent obviousness determination, *see supra* Section II.B; *In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (declining to address alternative grounds of unpatentability when we uphold one such ground).