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## UNITED STATES PATENT AND TRADEMARK OFFICE

#### BEFORE THE PATENT TRIAL AND APPEAL BOARD

# SATCO PRODUCTS, INC., Petitioner,

v.

# THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, Patent Owner.

IPR2021-00662 Patent 10,644,213 B1

Before JEFFREY S. SMITH, JENNIFER S. BISK, and STEVEN M. AMUNDSON, *Administrative Patent Judges*.

BISK, Administrative Patent Judge.

JUDGMENT Final Written Decision on Remand Determining All Challenged Claims Unpatentable 35 U.S.C. §§ 144, 318

#### I. INTRODUCTION

We address this case on remand after a decision by the U.S. Court of Appeals for the Federal Circuit in *Regents of the Univ. of California v. Satco Prods., Inc.*, 2204 WL 4972639 (Fed. Cir. Dec. 4, 2024) ("Remand Decision") (Paper 61).

## A. Background

Satco Products, Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1 and 2 ("the challenged claims") of U.S. Patent No. 10,644,213 B1 (Ex. 1003, "the '213 patent"). Paper 2 ("Pet."). The owner of the '213 patent, Regents of the University of California ("Patent Owner"), filed a Preliminary Response. Paper 9 ("Prelim. Resp.").

We instituted review on November 8, 2021. Paper 13 ("Inst. Dec."). Subsequent to institution, Patent Owner filed a Request for Rehearing (Paper 17), which we denied (Paper 18). Patent Owner then filed a Patent Owner Response (Paper 28<sup>1</sup>, "PO Resp."), Petitioner filed a Reply (Paper 33, "Reply"), and Patent Owner filed a Sur-Reply (Paper 43, "Sur-Reply"). A transcript of the oral hearing held on September 16, 2022, has been entered into the record as Paper 49 ("Tr.").

On November 4, 2022, we issued a Final Written Decision pursuant to 35 U.S.C. § 318(a) concluding that Petitioner had established by a preponderance of the evidence that the challenged claims were unpatentable under 35 U.S.C. § 103(a) based on one of the asserted grounds—claim 1

<sup>&</sup>lt;sup>1</sup> Patent Owner filed both confidential (Paper 27) and public, redacted (Paper 28) versions of the Patent Owner Response as well as certain exhibits, pursuant to the protective order entered by the Board (Paper 56). This Decision does not refer to any confidential information filed under seal.

based on the combination of Yamazaki<sup>2</sup> and Schubert<sup>3</sup> and claim 2 based on the combination of Yamazaki, Schubert, and Tadatomo<sup>4</sup>. Paper 57 ("Final Dec.").

Patent Owner appealed to the Federal Circuit (Paper 58). In the Remand Decision, the Federal Circuit vacated the Final Decision based on improper reliance on certain aspects of a figure in Yamazaki. Paper 61, 10. In its instructions, the Federal Circuit remanded the case "for the Board to assess whether Yamazaki teaches the cathode/anode limitation<sup>5</sup> of claim 1 without reliance on the relative thickness of the bolded lines in Yamazaki's Figure 1." *Id.* 

Each party subsequently presented the panel with a proposed briefing schedule. Paper 64 (summarizing a scheduling call). The panel ordered a schedule in which both parties would simultaneously file a remand brief of

<sup>&</sup>lt;sup>2</sup> Japan Patent App. Pub. No. 2003-249692A (published Sept. 5, 2003). Ex. 1007 (certified English translation pages 7–13).

<sup>&</sup>lt;sup>3</sup> E. Fred Schubert, *Light-Emitting Diodes*, 1<sup>st</sup> ed. New York: Cambridge University Press, 2003. Ex. 1008.

<sup>&</sup>lt;sup>4</sup> Tadatomo, K. et al. "High Output Power Near-Ultraviolet and Violet Light-Emitting Diodes Fabricated on Patterned Sapphire Substrates Using Metalorganic Vapor Phase Epitaxy," Proceedings of SPIE – the International Society for Optical Engineering, vol. 5187, Third International Conference on Solid State Lighting, (26 January 2004): 243–249. Bellingham, WA: SPIE, c2004. Ex. 1012.

<sup>&</sup>lt;sup>5</sup> The cathode/anode limitation refers to "a sapphire plate, a cathode on a first end of the sapphire plate and an anode on a second end of the second end of the sapphire plate, *wherein the cathode an anode provide structural support to the sapphire plate* and are adapted to provide an electrical connection between the light emitting device and a structure outside the light emitting device." Ex. 1003, 21:18–22:4 (emphasis added).

no more than five pages. *Id.*; Paper 65 ("Pet. Remand Br."); Paper 66 ("PO Remand Br."). As the parties are familiar with the facts of this case, we recite, in this Decision, only those facts necessary to frame and decide the question on remand.

For the reasons discussed below, after considering the post-remand briefing, as well as the record previously developed during trial and the Federal Circuit's Remand Decision, we conclude that Petitioner has shown by a preponderance of the evidence that claims 1 and 2 are unpatentable.

#### B. The '213 Patent

The '213 patent, titled "Filament LED Light Bulb," issued on May 5, 2020, from an application filed on September 11, 2019. Ex. 1003, codes (22), (45), (54). To increase the light output power from the LED, the '213 patent discloses minimizing internal reflections within an LED by eliminating mirrors and/or mirrored surfaces, and minimizing reabsorption of light by the active region. *Id.* at 8:67–9:3.

To this end, the patent discloses a lead frame supporting a transparent plate and the III-nitride layers residing on the transparent plate, such that "the light emitted from the III-nitride layers is transmitted through the transparent plate in the lead frame." *Id.* at 8:59–61. The patent also discloses several LED structures "according to the preferred embodiment of the present invention." *See, e.g., id.* at 9:32–10:21, Figs. 4–22.

Figures 8A and 8B of the '213 patent (reproduced below) depict an LED structure "according to the preferred embodiment of the present invention":



FIG. 8B

Figures 8A and 8B illustrate an LED "wire bonded 816 to a lead frame or sub-mount 818 using the bonding pads 820, 822." *Id.* at 13:59–61, Fig. 8A. Figure 8B shows a top view of "the lead frame 818." *Id.* at 14:19–20, Fig. 8B.

Figures 10A and 10B in the '213 patent (reproduced below) depict an LED structure "according to the preferred embodiment of the present invention":



Figures 10A and 10B illustrate an LED "wire bonded 1024 to a lead frame 1026." *Id.* at 14:66–67, Fig. 10A. Figure 10B "shows a top view of the lead frame 1026." *Id.* at 14:67, Fig. 10B.

Figures 22A and 22B in the '213 patent (reproduced below) depict an LED structure "according to the preferred embodiment of the present invention":





Figures 22A and 22B illustrate an LED "wire bonded 2206 to a lead frame 2208." *Id.* at 20:19–21, Fig. 22A. Figure 22B "shows a top view of the lead frame 2208." *Id.* at 20:20–21, Fig. 22B. "The lead frame 2208 includes a transparent plate 2220." *Id.* at 20:32, Fig. 22A. The LED "is bonded to the transparent plate 2220 using a transparent/clear epoxy 2222 as a die-bonding material." *Id.* at 20:32–34, Fig. 22A.

## C. The Challenged Claims

Both claims of the '213 patent are challenged in this proceeding. They read as follows:

1. A light bulb, comprising at least one light emitting device, the at least one light emitting device each further comprising:

a sapphire plate, a cathode on a first end of the sapphire plate and an anode on a second end of the sapphire plate, wherein the cathode and anode provide structural support to the sapphire plate and are adapted to provide an electrical connection between the light emitting device and a structure outside the light emitting device;

at least one III-nitride light emitting diode (LED) comprising a sapphire growth substrate, the sapphire growth substrate in mechanical communication with the sapphire plate, and the LED and sapphire plate configured to extract light emitted by the LED through the sapphire plate; and

a molding comprising a phosphor and surrounding the LED, the molding configured to extract light from both a front side of the light emitting device and a back side of the light emitting device.

2. The light bulb of claim 1, wherein the sapphire growth substrate is a patterned sapphire substrate (PSS).

## Ex. 1003, 21:15–22:17.

# D. Asserted Grounds of Unpatentability

The Final Decision found claims 1 and 2 were shown to be unpatentable based on the following grounds:

<b>Claims Challenged</b>	35 U.S.C.	Basis
	§ <sup>6</sup>	
1	103(a)	Yamazaki, Schubert
2	103(a)	Yamazaki, Schubert, Tadatomo

<sup>6</sup> The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), included revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013. Because the '213 patent issued from an

Final Act. 61–62. Petitioner relies on the declaration of Russell D. Dupuis, Ph.D. in support of its arguments on remand. Ex. 1035. Patent Owner relies on the declaration of E. Fred Schubert, Ph.D., M.S. (Ex. 2112<sup>7</sup>) in support of its arguments on remand.

# II. ANALYSIS

As directed by the Federal Circuit, we assess whether Yamazaki teaches the cathode/anode limitation of claim 1. We do not revisit our analysis of the other limitations of claim 1. Remand Dec. 10–11 (agreeing with the Board's findings on the other limitations of claim 1 disputed on appeal).

# A. Yamazaki

Yamazaki is a Japanese patent publication titled "Semiconductor Light-Emitting Device," which describes an LED "that emits light in a plurality of directions through a simple structure." Ex. 1007, codes (54), (57). Figure 1 of Yamazaki is reproduced below.

application that was a continuation of an application filed before March 16, 2013, and, as stated in the Final Decision (Final Dec. 13–14), Petitioner has not persuaded us that, for purposes of this Decision, the claims of the '213 patent are not entitled to that priority date, we apply the pre-AIA versions of the statutory bases for unpatentability.

<sup>&</sup>lt;sup>7</sup> Exhibit 2112 is a redacted version of Exhibit 2034.



Figure 1 of Yamazaki depicts LED 10 with light-emitting chip 12 that is mounted on chip substrate 11, "a first resin molding portion 13 that is formed so as to cover the light-emitting chip 12 and also the entirety of the surface of the chip substrate 11," and "a second resin molding portion 14 that is formed so as to cover the entirety of the back face of the chip substrate 11." Ex. 1007 ¶ 25. An "electrically conductive pattern 11a is provided on the surface" of chip substrate 11. *Id.* ¶ 26.

#### *B. The Cathode/Anode Limitation*

#### 1. Background

In the Final Decision, we found that Yamazaki discloses the "cathode/anode limitation." Final Dec. 29–36. Specifically, we found that Yamazaki's Figure 1 discloses element 11a "wrapping around an edge of the substrate" and, therefore, discloses providing structural support to substrate 11 as recited by the cathode/anode limitation. *Id.* at 32, 35. This conclusion was based, in part, on our finding that "the lines depicting 11a are bolded . . . in such a way as to appear to emphasize the wrap around nature of the pattern" and that this emphasis would have led a person of

ordinary skill in the art to understand "Yamazaki to teach the use of relatively thickj-lead metal leads that provide[] structural support." *Id.* at 32, 35.

The Federal Circuit held that "this is not a case in which the boldness of certain lines can be read as disclosing relative thickness, since the figures could just as well demonstrate only the existence of a separate structure." Remand Dec. 8. Based on our reliance on the relative thickness of the leads, the Court directed us "to assess whether Yamazaki teaches the cathode/anode limitation of claim 1 without reliance on the relative thickness of" (and thus the structural support provided by) element 11a. *Id.* at 10.

#### 2. Inherency

Before analyzing whether the record supports a finding that a person of ordinary skill in the art would understand Yamazaki to disclose the cathode/anode limitation, we address Patent Owner's argument that Petitioner's argument is "substantively an inherency argument," and to prevail, Petitioner must show that Yamazaki *necessarily* includes j-leads as element 11a. PO Remand Br. 5. Patent Owner makes this assertion based on the following: (1) "Satco never argued obviousness for the cathode/anode limitation," (*id.* (citing Pet. 74–76)), and (2) the Remand Decision "framed the issue for remand as 'Yamazaki *teaches* the cathode/anode limitation" (*id.* (citing Remand Dec. 7–10).

We do not agree that Petitioner fails to argue obviousness and thus relies on inherency for the cathode/anode limitation. *See, e.g.,* Pet. 75–76 ("Thus, a POSITA would have reasonably understood Yamazaki's conductive leads 11a to at least teach and suggest relatively thick 'j-lead'

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metal leads that provide structural support."); Reply 8 ("Petitioner raised an obviousness argument relative to a POSITA's understanding of Yamazaki."). We also do not agree that the Federal Circuit's use of the term "teach" in directing the Board's further action on this case can be read to restrict Petitioner's arguments to inherency arguments with respect to this limitation.

Rather, we read both the Petition and the Remand Decision as requiring a determination of what is explicitly disclosed by Yamazaki, as well as the inferences that an ordinarily skilled artisan would draw from such disclosure. See Merck & Co. v. Biocraft Lab's, Inc., 874 F.2d 804, 807 (Fed. Cir. 1989) ("Unlike a section 102 defense which requires that a single reference describe each and every element of a claimed invention, the question under 35 U.S.C. [§] 103 is not merely what the references expressly teach but what they would have suggested to one of ordinary skill in the art....") (internal citation and quotation marks omitted); Intell. Ventures I LLC v. EMC Corp., 786 F. App'x 1021, 1034 (Fed. Cir. 2019) (nonprecedential)(concluding that substantial evidence supported the Board's finding that a cited prior art reference taught or suggested a disputed limitation despite not disclosing that limitation expressly or inherently). A patentability analysis "can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007).

#### 3. Claim 1

The main issue in this Decision is whether Yamazaki teaches the cathode/anode limitation of claim 1 without reliance on the relative thickness of the bolded lines in Yamazaki's Figure 1. Petitioner's position is

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that a person of ordinary skill in the art would have understood, even disregarding any disclosure of thickness, Yamazaki's Figure 1 to disclose element 11a as composed of j-leads, which provide the recited structural support to substrate 11. Pet. Remand Br. 2–3. PatentOwner's position is that Yamazaki's element 11a does not teach j-leads, but instead discloses "a metallization that provides no structural support." PO Remand Br. 2–4 (emphasis omitted).

## a. Methods of Creating Element 11a

The record indicates that a person of ordinary skill in the art would understand that there are two ways to create Yamazaki's element 11a: (1) stamping and bending sheet metal to create j-leads (the "j-lead method") or (2) depositing or etching thin metal film (the "thin film deposition method"). Pet. 75; Ex. 1035 ¶ 246; PO Resp. 28–41; Ex. 2112 ¶¶ 172–176; Final Dec. 34–35; Pet Remand Br. 4; PO Remand Br. 2–4. The record also supports that the j-lead method would result in element 11a providing structural support to the substrate as recited in claim 1.<sup>8</sup> Pet. 75; Ex. 1035 ¶ 46; *see* PO Resp. 28–30 (arguing that Yamazaki discloses the thin film deposition method, but not contradicting the assertion that j-leads would provide sufficient structural support); Ex. 2112 ¶¶ 160–208 (same).

The main dispute between the parties, therefore, is whether a person of ordinary skill would understand Yamazaki to disclose element 11a made

<sup>&</sup>lt;sup>8</sup> In its Remand Brief, Petitioner also argues that even if Yamazaki only teaches the thin film deposition method, a person of ordinary skill in the art would still understand element 11a to provide sufficient structural support to meet the cathode/anode limitation. Pet. Remand Br. 5. Because, as discussed below, we find a person of ordinary skill in the art would understand Figure 1 to show j-leads, we do not further address this argument.

using the j-lead method (Petitioner's position) or the thin film deposition method (PatentOwner's position). Pet Remand Br. 2–5; PO Remand Br. 1–4. Each side has arguments and expert testimony supporting their position.<sup>9,10</sup> After considering each side's arguments and all the associated evidence, we agree that the record supports Petitioner's position for the reasons discussed below.

## b. Figure 1 of Yamazaki

We find that Yamazaki's Figure 1 plainly shows electrically conductive patterns 11a at opposite edges of chip substrate 11, with each conductive pattern wrapping around an edge of the substrate. Ex. 1007

<sup>&</sup>lt;sup>9</sup> Patent Owner argues that Dr. Dupuis' analysis on this issue "is confined to a single paragraph and adds nothing of substance relative to the Petition" and the Board should, therefore, "afford it little or no weight." PO Remand Br. 1 (citing Ex. 1035 ¶ 246). Patent Owner also points to its own expert, Dr. Schubert, noting that his "opinions on this issue span over 20 pages and are supported by technical literature." *Id.* (citing Ex. 2112 ¶¶ 158–208). We do not agree that the length of expert testimony, by itself, is a determining factor in its reliability. Moreover, we note that Dr. Dupuis also cites to technical literature. Ex. 1035 ¶ 246 (citing Ex. 1017, Figs. 3–4, ¶ 22). We decline to discount expert testimony based on these arguments regarding their relative length.

<sup>&</sup>lt;sup>10</sup> Patent Owner also states that "the Federal Circuit noted how Dr. Schubert's opinions regarding Yamazaki were 'unrebutted' and that Satco 'provides no response.'" PO Remand Br. 2. This is a mischaracterization of the Federal Circuit's opinion, which explicitly identifies as unrebutted only Dr. Schubert's testimony that "'[i]n real applications," the "'adhesive between the LED chip and supporting substrate would be approximately 1 micron to 10 microns thick." Remand Dec. 9. We see no other statements in the Remand Decision characterizing any other, let alone all, of Dr. Schubert's opinions regarding Yamazaki as unrebutted.

Fig. 1; see Ex.  $1035 \P$  246. This is true even presuming, as directed by the Federal Circuit, that the bolding of this element does not provide any information on relative thickness of element 11a. *Id*.

Patent Owner's only argument to the contrary is that Yamazaki's element 11a has a reference number 11a that "only point[s] to the top surface" in Figure 1. PO Remand Br. 3. We do not find this argument persuasive. The labels on figures in a patent typically point to just one point on an element, even if the element has several distinct portions. For example, in Yamazaki's Figure 2, label "11a" points to only the vertical portion of "T-shaped" elements 11a, however, there is no dispute that the horizontal leg of the "T-shaped" elements is also included in element 11a. See Ex. 2112 ¶¶ 168–169 (discussing the leg of the T-shape as a portion of element 11a). Moreover, nothing in Dr. Schubert's testimony supports a finding that Figure 1's disclosure, by itself, would lead a person of ordinary skill in the art to understand that element 11a resides only on the top of the substrate. See Ex. 2112 ¶¶ 160–171 (discussing Figures 2 and 3 and their alleged irreconcilability with Figure 1). Thus, Patent Owner's argument on this issue is based solely on unsupported attorney argument. See In re Geisler, 116 F.3d 1465, 1470 (Fed. Cir. 1997); see also In re Pearson, 494 F.2d 1399, 1405 (CCPA 1974) (indicating attorney argument is not evidence).

Taking Figure 1 on its own, therefore, we find that it shows element 11a starting on the top of the substrate and wrapping around the side to the bottom of the substrate. *See* Ex. 1007, Fig. 1.

Petitioner asserts that a person of ordinary skill would understand this wrapped shape to disclose j-leads. Pet 75 (citing Ex. 1035  $\P$  246). In

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particular, Petitioner points to Figures 3 and 4, and paragraph 22 of Takahashi, a Japanese Published Patent Application published October 21, 2004, as disclosing j-leads using an element similar to that of element 11a in Yamazaki. *Id.* (citing Ex. 1017, Figs. 3–4, ¶ 22). Figures 3 and 4 of Takahashi are reproduced below.



Figure 3, above left, shows "external electrode terminals 18" in a similar wrapped shape as element 11a of Yamazaki's Figure 1. Ex. 1017. Figure 4, above right, shows "external electrode terminals 18 . . . are folded and mounted along a side and bottom surfaces." *Id.* ¶ 22.

Petitioner also points to Dr. Schubert's textbook as stating that "typical packages" of surface-mounted LEDs in the early 1990s included jleads. Reply 6 (citing Ex. 1040, 14–15). Figure 31.3 of Exhibit 1040 is reproduced below.



Exhibit 1040's Figure 31.3, above, shows, on the left, a "perspective view," and, on the right, a "cross-sectional view of surface-mount device (SMD) light-emitting diode (LED)." Ex. 1040, 15. A "Lead" is shown in the cross-section view with a similar shape to element 11a of Yamazaki. *Id.* This lead is described as being "bent around the package body so that they fold under the bottom." *Id.* 

Patent Owner disagrees, arguing that "[e]ven if *arguendo*, the electrically conductive patterns 11a wrap around the edges of the chip substrate 11, Yamazaki does not disclose how the electrically conductive patterns 11a are formed" and a person of ordinary skill would understand them to be "deposited or etched." PO Resp. 33 (citing Ex. 2112 ¶¶ 172–176; Ex. 2018, 3; Ex. 2019, 3–4). The evidence Patent Owner cites to provide support for this argument are dictionary definitions of the word "pattern." Ex. 2018, 3; Ex. 2019, 3–4; *see* Ex. 2112 ¶¶ 172–176 (arguing that a person of ordinary skill in the art would rely on the word "pattern" to determine the method used to create element 11a). We discuss this argument below in Section II.B.3.d.

Based on the evidence of record, therefore, we agree with Petitioner that a person of ordinary skill in the art would have understood Figure 1 of Yamazaki to teach element 11a as composed of j-leads.

## c. Figures 2 and 3 of Yamazaki

Instead of Figure 1, Patent Owner concentrates on the illustrations of Figures 2 and 3 to support its position. Patent Owner argues that Figures 2 and 3 show that element 11a does not wrap around the chip substrate. PO Remand Br. 2. Patent Owner provides annotated versions of the two figures, reproduced below, to support this argument.

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*Id.* Yamazaki's Figure 2, above left, is a "schematic plan view depicting a surface of a chip substrate in the semiconductor light-emitting device of Figure 1," and Figure 3, above right, "is a schematic bottom view depicting the back face of the chip substrate" of the same device. Ex. 1007 [Brief Description of the Drawings]. Patent Owner adds an annotation "gap" with a red arrow pointing to a separation between the left side of substrate 11 and the left side of element 11a in both Figures. PO Remand Br. 2. Patent Owner argues that this gap shows that element 11a "is only on the top surface" of the substrate and, therefore, does not teach j-leads. *Id* at 3 (citing Ex. 2112 ¶¶ 160–171.). Dr. Schubert supports this position by stating that this gap would lead a person of ordinary skill in the art to the conclusion that the element 11a does not wrap around the substrate. Ex. 2112 ¶ 163.

In addition, Dr. Schubert describes as "T-shaped" elements 11a shown on the left and right sides of Figures 2 and 3. *Id.* ¶¶ 162–170. Dr. Schubert acknowledges that these elements are not labeled in Figure 3. We agree that Figure 3 shows T-shaped elements similarly placed and shaped as in Figure 2. *See* Ex. 2112 ¶ 164. We also agree with Dr. Schubert that, because substrate 11 may be transparent, it is possible the T-shaped elements seen in Figure 3 are those on the top surface (Figure 2) being seen through the

substrate as opposed to a second set of these elements on the bottom surface of the substrate. *See id.* ¶¶ 165–170. Dr. Schubert states that a person of ordinary skill in the art would understand that the purpose of the leg of the "T," which extends toward the middle of the chip, is "to provide a bonding wire landing area to electrically connect the LED chip 12 to the electrically conductive pattern 11a via bond wires 15." *Id.* ¶ 168. According to Dr. Schubert, "[t]here is no reason to have this portion extending toward the chip mounting region 11c on the bottom surface of the chip substrate 11" in Figure 3 because LED chip 12 is on the opposite side—the top surface—of the substrate. *Id.* ¶ 169. Although Dr. Schubert does not support his assertions regarding this issue with by citing evidence (*see* Ex. 2112 ¶¶ 165– 170 (citing only to Yamazaki)), Petitioner does not present evidence opposing this position. Thus, for purposes of this Decision, we assume that the T-shaped elements shown in Figure 3 are the same as those shown in Figure 2 and, therefore, are shown only on the top surface of the substrate.

Both parties appear to agree that Figures 2 and 3 are inconsistent with Figure 1 in the disclosure of element 11a. *See* PO Remand Br. 2 (stating that the Final Dec. "discounted these inconsistencies" between Figure 1 and Figures 2 and 3); Ex.  $2112 \P 170$  (stating that even if there were no gap and Figures 2 and 3 "were interpreted as showing the conductive pattern 11a on both top and bottom surfaces of the chip substrate 11, FIGS. 2 and 3 are *still irreconcilable with* FIG.1.") (emphasis supplied); Reply 6 ("FIGS. 2–3 do not show the same clear j-lead shape shown in FIG.1.").

The parties disagree, however, on the significance of this inconsistency. Patent Owner argues that it would lead a person of ordinary skill in the art "to believe that the conductive pattern 11a is only on the top

surface of the chip substrate 11." Ex. 2112 ¶ 171. Petitioner, on the other hand, argues that "even if FIGS. 2–3 could be understood to reflect different lead/metallization options from FIG.1, that means Yamazaki discloses *all* such options," including both j-leads and the thin film deposition method. Reply 7.

We agree with Petitioner that even if Figures 2 and 3 are inconsistent with Figure 1 and instead disclose the thin film deposition method of creating element 11a, we see no persuasive evidence that a person of ordinary skill in the art would understand this inconsistency as a reason to reevaluate their understanding of Figure 1. Patent Owner points only to the testimony of Dr. Schubert stating that "[t]his inconsistency would lead a POSITA to believe that the conductive pattern 11a is only on the top surface of the chip substrate 11." Ex. 2112 ¶ 171. We do not find this We do not find this testimony persuasive because a person of ordinary skill in the art has Figure 1, as well as Figures 2 and 3 to consider when evaluating the teachings in Yamazaki.

## d. The word "pattern"

Patent Owner also argues that because Yamazaki describes element 11a as an "electrically conductive *pattern*," a person of ordinary skill would understand that element 11a is created using "a patterning process, such as etching or deposition." PO Remand Br. 4 (citing Ex. 2112 ¶¶ 175–176). According to Patent Owner, a person of ordinary skill in the art "would not consider j-leads to be a 'pattern,' nor would they understand bending metal to be 'patterning." *Id*.

However, as we explained in the Final Decision (Final Dec. 33–34), although Patent Owner points to dictionary definitions of the term "pattern,"

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Patent Owner does not point to any objective evidence that a person of ordinary skill in the art would have understood the use of the term as a label, in this context, to require any particular type of manufacture. *See* PO Resp. 33–35 (citing Ex. 2112 ¶¶ 172–176; Ex. 2018, 3; Ex. 2019, 3–4). Moreover, Patent Owner itself uses several phrases to refer to element 11a including both "pattern" and "leads." *See, e.g.*, PO Resp. 29 ("Fig. 2 illustrates a gap between the edge of the chip substrate 11 and the electrically conductive leads 11a"). Therefore, we do not agree with Patent Owner that the use of the word "pattern" is dispositive of the way this element would be manufactured.

## e. Most Efficient Method

The parties disagree on whether it would be easier or more efficient to use j-leads versus the thin film deposition method. Petitioner states that it was simpler to use stamping and bending of sheet metal to do so than to deposit a thin metal film around the edges. Pet Remand Br. 3–4 (citing Ex. 2112 ¶¶ 185–200); Ex. 1035 ¶ 246. Patent Owner argues, to the contrary, that j-leads would be impractical for Yamazaki's design. PO Remand Br. 3– 4 (citing Ex. 2112 ¶¶ 185–200). Specifically, Patent Owner asserts that "[d]epositing/etching a thin metal file, on the other hand, would have been simpler and would allow for commercially viable manufacturing." PO Resp. 37–38 (citing Ex. 2112 ¶¶ 185–200).

Because we find that a person of ordinary skill in the art would understand Figure 1 to show j-leads, we need not resolve the conflicting evidence regarding which of the two methods would be easier or more efficient.

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#### f. Two conventional options are both obvious

Petitioner argues that because there is no dispute that there are two conventional options for creating element 11a, that, regardless of the figures, both methods would have been obvious to a person of ordinary skill. Pet. RemandBr. 4–5. As stated, we find that Figure 1 teaches element 11a as composed of j-leads. However, we also agree that even if Figure 1 did not teach j-leads, the fact that there are only two conventional methods for creating element 11a indicates that both methods would have been obvious. *See Uber Techs., Inc. v. X One Inc.*, 957 F.3d 1334, 1340 (Fed. Cir. 2020). In *Uber,* the parties agreed that there were only two possible solutions for whether to plot locations, i.e., either *before* transmitting location information (server-side plotting) or *after* transmitting location information (terminal-side plotting). *Id.* at 1339. The Court held that both solutions would have been obvious to a person of ordinary skill. *Id.* at 1340.

The same is true here. The difference between the j-lead and thin film deposition methods amounts to a design choice between two ways to manufacture element 11a. A person of ordinary skill would therefore have two predictable choices for this manufacture, providing them with a simple design choice as to whether to use j-leads or thin film deposition. *See Uber*, 957 F.3d at 1340. "Because a person of ordinary skill 'has good reasons to pursue the known options within his or her technical grasp,' § 103 bars the patentability of such obvious variations." *Id.* (quoting *KSR*, 550 U.S. at 417, 421); *see also CRFD Rsch., Inc. v. Matal*, 876 F.3d 1330, 1347 (Fed. Cir. 2017) (explaining that "a person of ordinary skill would have two predictable choices for when the [prior art] would transmit browser information, providing a person of ordinary skill with a simple design

choice" between the two options); *ACCO Brands Corp. v. Fellowes, Inc.*, 813 F.3d 1361, 1367 (Fed. Cir. 2016) (explaining that where an "ordinary artisan would... be left with two design choices ... [e]ach of these two design choices is an obvious combination"); *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1241 (Fed. Cir. 2010) (holding that a motivation to combine and a reasonable expectation of success exist when "it is simply a matter of common sense" to combine known elements of the prior art to solve a known problem).

#### g. Conclusion

The record supports a finding that a person of ordinary skill in the art would have understood Figure 1 to teach element 11a as composed of j-leads. The record also supports a finding that a person of ordinary skill in the art would have understood that at the relevant time, both stamping j-leads and depositing/etching were conventional methods for creating metal leads. Based on either of these findings, we agree with Petitioner that a person of ordinary skill in the art would have understood that Yamazaki teaches the cathode/anode limitation of claim 1.

For the same reasons given in our Final Decision, we find that the combination of Yamazaki and Schubert teaches the other limitations of claim 1 and that an ordinarily skilled artisan would have had reasons, with rational underpinning, to combine the references, and the skilled artisan would have had a reasonable expectation of success. Final Dec. 28–42.

#### 4. *Claim* 2

Claim 2 depends from claim 1. Petitioner relies on Yamazaki and Schubert as applied to claim 1 for all the limitations inherited from that claim. Claim 2 also recites "wherein the sapphire growth substrate is a

patterned sapphire substrate (PSS)." Petitioner turns to Tadatomo to show this limitation. Pet. 87–89; Ex. 1035 ¶¶ 289–291.

On remand, Patent Owner does not specifically make any arguments related to claim 2. *See* PO Remand Br. 1–5. For the same reasons given in our Final Decision, we find that the combination of Yamazaki, Schubert, and Tadatomo teaches each limitation of claim 2 and that an ordinarily skilled artisan would have had reasons, with rational underpinning, to combine the references, and the skilled artisan would have had a reasonable expectation of success. Final Dec. 42–44.

#### C. Objective Indicia of Non-Obviousness

Before reaching a conclusion about obviousness, we consider evidence concerning objective indicia of non-obviousness. *See Apple Inc. v. Samsung Elecs. Co.*, 839 F.3d 1034, 1047–48 (Fed. Cir. 2016) (en banc). For such evidence to have substantial weight, "its proponent must establish a nexus between the evidence and the merits of the claimed invention." *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220 (Fed. Cir. 2016). "[T]here is no nexus unless the evidence presented is 'reasonably commensurate with the scope of the claims.""*Id.* (quoting *Rambus Inc. v. Rea*, 731 F.3d 1248, 1257 (Fed. Cir. 2013)). The patentee "bears the burden of showing that a nexus exists." *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1359 (Fed. Cir. 1999).

In the Final Decision we considered Patent Owner's evidence of objective indicia of non-obviousness, including long-felt but unsolved need, industry skepticism and praise, licensing, and commercial success. Final Dec. 44–53. We accorded this evidence little weight for each of the categories addressed and concluded that it did not outweigh the

countervailing evidence supporting a conclusion of obviousness. The Federal Circuit did not address these findings in the remand decision. *See generally*, Paper 61. The parties also did not address these findings in their post-remand briefing. *See generally*, Pet. Remand Br.; PO Remand Br. Accordingly, for the reasons given in our Final Decision, we find that Patent Owner's evidence of objective indicia of non-obviousness is entitled to little weight.

We, therefore, do not find that Patent Owner's evidence of objective indicia of non-obviousness outweighs the countervailing evidence supporting a conclusion of obviousness.

## **III. CONCLUSION**

Based on the full record, we determine that Petitioner shows by a preponderance of the evidence that claims 1 and 2 of the '213 patent are unpatentable.<sup>11</sup>

Claim(s)	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1	103(a)	Yamazaki, Schubert	1	

<sup>&</sup>lt;sup>11</sup> Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding after the issuance of this Final Written Decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. §§ 42.8(a)(3), (b)(2).

2	103(a)	Yamazaki, Schubert, Tadatomo	2	
Overall Outcome			1, 2	

IV. ORDER

Accordingly, it is:

ORDERED that, pursuant to 35 U.S.C. § 314(a), Petitioner has shown by a preponderance of the evidence that claims 1 and 2 of the '213 patent are unpatentable; and

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

For PETITIONER:

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