

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG DISPLAY CO., LTD.,
Petitioner,

v.

PICTIVA DISPLAYS INTERNATIONAL LTD.,
Patent Owner.

Case No. IPR2024-01222
Patent No. 6,949,389 B2

PATENT OWNER'S NOTICE OF APPEAL

Pursuant to 35 U.S.C. §§ 141, 142, and 319, and in accordance with 37 C.F.R. §§ 90.2-90.3, Patent Owner Pictiva Displays International, Ltd. (“Pictiva”) appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the Patent Trial and Appeal Board (“Board”) entered on March 4, 2026 in IPR2024-01222 (Paper No. 37) (“Final Written Decision”), attached as Exhibit A, and from all underlying findings, determinations, rulings, opinions, orders, and decisions regarding the *inter partes* review (Case IPR2024-01222) of U.S. Patent No. 6,949,389 (the “’389 Patent”).

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Pictiva states that the issues on appeal include, but are not limited to: the Board’s determination that Claims 1-16 of the ’389 Patent has been shown by a preponderance of the evidence to be unpatentable; the Board’s construction of the challenged claim and application of its construction of the claim to the facts of record; the Board’s finding that the Yamazaki, Ghosh, Fujimori, Weaver, Palanisamy and Burrows references qualify as a proper basis for an IPR proceeding and as prior art references to Claims 34-37 and 40-46 of the ’389 patent; the Board’s procedural rulings; the adequacy of the Board’s consideration of the expert testimony, prior art, and other evidence in the record, including, but not limited to, evidence and testimony from related district court proceedings between Petitioner and Patent Owner; the Board’s factual findings, conclusions of law, or other determinations supporting or related to those issues

(such as motivation to combine or reasonable expectation of success); the Board's compliance with the Administrative Procedure Act, including whether the Final Written Decision is arbitrary, capricious, an abuse of discretion, not in accordance with law, or in excess of the Board's jurisdiction, and any procedural irregularities associated with the review proceeding; as well as all other issues decided adversely to Pictiva in any orders, decisions, rulings, and opinions.

This Notice of Appeal is being e-filed with the Clerk's Office for the United States Court of Appeals for the Federal Circuit, along with payment of the required docketing fees. In addition, a copy of this Notice of Appeal is being filed simultaneously with the Patent Trial and Appeal Board and filed by e-mail to the Director of the United States Patent and Trademark Office at efileSO@uspto.gov.

Dated: May 6, 2026

Respectfully submitted,

By: /Hong Zhong/

H. Annita Zhong (Reg. No. 65,530)
IRELL & MANELLA LLP
1800 Avenue of the Stars, Suite #900
Los Angeles, CA 90067-4276
Telephone: (310) 203-7183
hzhong@irell.com

Counsel for Patent Owner
Pictiva Displays International Ltd.

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. § 42.6, that on May 6, 2026, a complete copy of the foregoing document, **PATENT OWNER'S NOTICE OF APPEAL** was served by ELECTRONIC MAIL, as agreed to by the parties, upon the following:

COVINGTON & BURLING LLP

David A. Garr (Reg. No. 74,932)
dgarr@cov.com

Scott C. Weidenfeller (Reg. No. 54,531)
sweidenfeller@cov.com

SDC-Pictiva-IPR@cov.com

I also certify that in addition to being filed electronically with the Board, a copy of this Notice of Appeal was deposited with Priority Mail Express on May 6, 2026, for delivery to the Director of the United States Patent and Trademark Office at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel
Mail Stop 8
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF FILING

I further certify that a copy of the foregoing Notice of Appeal is being filed via CM/ECF on May 6, 2026 with the United States Court of Appeals for the Federal Circuit.

/Pia S. Kamath/
Pia S. Kamath

EXHIBIT A

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG DISPLAY CO., LTD.,
Petitioner,

v.

PICTIVA DISPLAYS INTERNATIONAL LTD.,
Patent Owner.

IPR2024-01222
Patent 6,949,389 B2

Before MIRIAM L. QUINN, GARTH D. BAER, and JASON M. REPKO,
Administrative Patent Judges.

BAER, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Petitioner, Samsung Display Co., Ltd., filed a Petition requesting an *inter partes* review of claims 34–37 and 40–46 of U.S. Patent No. 6,949,389 B2 (Ex. 1001, “the ’389 patent”). Paper 1 (“Pet.”). Patent Owner, Pictiva Displays International Ltd., filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). Pursuant to 35 U.S.C. § 314, we instituted *inter partes* review as to all of the challenged claims and all grounds raised in the Petition. Paper 12. Following institution, Patent Owner filed a Response. Paper 17 (“PO Resp.”). Petitioner filed a Reply to Patent Owner’s Response (Paper 23, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 32¹, “PO Sur-reply”). On December 9, 2025, we held an oral hearing. A transcript of the hearing is included in the record. Paper 36.

We have jurisdiction under 35 U.S.C. § 6. This decision is a Final Written Decision issued pursuant to 35 U.S.C. § 318(a). For the reasons we discuss below, we determine that Petitioner has proven by a preponderance of the evidence that the challenged claims are unpatentable.

A. *Related Matters*

The parties indicate that the ’389 patent is at issue in *Pictiva Displays International Ltd. v. Samsung Electronics Co., Ltd.*, Case No. 2:23-cv-00495 (E.D. Tex.) and *Pictiva Displays International Ltd. et al., v. Samsung Elecs. Co., Ltd. et al.*, No. 2:24-cv-00532 (E.D. Texas). Pet. 2; Paper 4, 1. The ’389 patent is also the challenged patent in IPR2024-01223.

¹ In this decision, we cite the redacted version of Patent Owner’s Sur-reply. Patent Owner also filed an unredacted version as Paper 30.

B. The '389 Patent

The '389 patent relates to an encapsulation method for organic light emitting diode (OLED) devices. Ex. 1001, code (54). According to the '389 patent, an “encapsulated OLED device is formed by: fabricating multiple OLED devices on a substrate; depositing at least one planarization layer on the OLED devices,” and “selectively depositing at least one barrier layer over the [planarization layer].” *Id.* at code (57).

Figure 5 of the '389 patent is reproduced below.

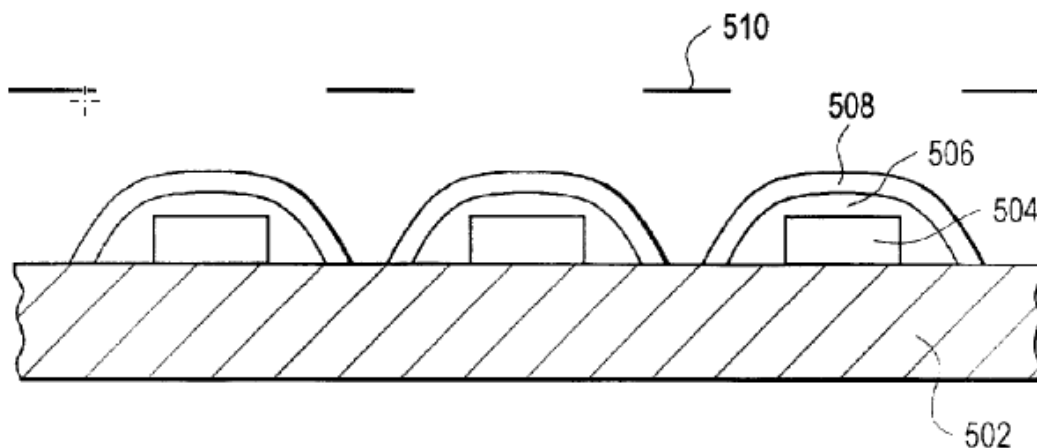


FIG. 5

Figure 5 is an “embodiment of encapsulation techniques in accordance with the present invention.” *Id.* at 6:54–55. In Figure 5, “OLED device **504** is . . . formed upon substrate **502**” and “[o]rganic layer **506** is deposited in a patterned fashion as well as barrier layer **508**.” *Id.* at 6:55–57.

C. Challenged Claims

Of the challenged claims, claims 34 and 41 are independent. Independent claim 34 is illustrative and is reproduced below.

34. A method of encapsulating a plurality of devices fabricated upon a substrate, the steps of said method comprising:

fabricating a plurality of devices on a substrate;
selectively depositing at least one planarization layer upon
said devices; and
selectively depositing at least one barrier layer over said
planarization layer.

Id. at 10:65–11:5.

D. Asserted Grounds of Unpatentability

Petitioner challenges claims 34–37 and 40–46 based on the asserted grounds of unpatentability set forth in the table below. Pet. 3.

Claim(s) Challenged	35 U.S.C. §	References/Basis
34, 35, 37, 40	103	Yamazaki ² , Ghosh ³
41–46	103	Yamazaki, Ghosh, Fujimori ⁴
34, 40	103	Weaver ⁵
35, 36	103	Weaver, Palanisamy ⁶
37	103	Weaver, Burrows ⁷

E. Claim Construction

1. “depositing by shadow mask, sputtering, ink jet deposition, screen printing evaporation”

Claim 40 recites “wherein the step for selectively depositing at least one barrier layer further comprises depositing by shadow mask, sputtering, ink jet deposition, screen printing, [or] evaporation.” Although the word

² U.S. 2003/0206332, filed Mar. 27, 2001 (Ex. 1005, “Yamazaki”).

³ U.S. 2001/0052752, Pub. Dec. 20, 2001 (Ex. 1006, “Ghosh”).

⁴ Japanese Published Application No. H10-41069, Pub. Feb. 13, 1998 (Ex. 1014, “Fujimori”) (English translation).

⁵ U.S. 2002/0140347, filed Mar. 29, 2001 (Ex. 1008, “Weaver”).

⁶ U.S. 2003/0011300, filed July 12, 2001 (Ex. 1007, “Palanisamy”).

⁷ U.S. 6,866,901, filed Sept. 28, 2001 (Ex. 1009, “Burrows”).

“or” does not appear in the claim, Petitioner proposes we should construe the claim to include the inserted “or” consistent with the file history, which shows an examiner’s amendment intended to replace an original “and” with the missing “or.” Pet. 10 (citing Ex. 1002, 399, 418). Patent Owner does not dispute Petitioner’s proposed construction. *See* PO Resp. 18–24. Given the ’389 patent’s file history, we agree with Petitioner’s construction.

2. “*planarization layer*”

Patent Owner asserts we should construe “planarization layer” as “a layer of material that planarizes such that the propagation of defects from one layer to another layer can be interrupted and the topography of the underlying layer and/or structure is not reproduced.” PO Resp. 18. According to Patent Owner, we should adopt this construction because the parties agreed to it in the related district court proceeding and it is supported by the intrinsic evidence. *Id.* at 21. Petitioner does not dispute this construction. Paper 36, 6:17–8:1; *see* Pet. Reply 1. We adopt the parties’ agreed-to construction.

3. “*selectively depositing*”

Patent Owner asserts we should construe “selectively depositing” as “depositing a material in only desired areas, such that no additional processing must be performed for removing unwanted material” because that is the construction “Samsung has proposed in the parallel litigation.” PO Resp. 22. The district court declined to adopt that proposed construction and the only briefing before us addressing the merits of Patent Owner’s proposed construction is Patent Owner’s assertion that it is wrong. *See* PO Resp. 22–23, Pet. Reply 1; Ex. 2048, 19–20. In these circumstances, we decline to

adopt Patent Owner's construction. Nonetheless, we agree with Petitioner that the prior art teaches this element under any construction.

F. Level of Skill in the Art

Petitioner argues a person of ordinary skill in the art “would have had a bachelor’s degree in Electrical Engineering, Materials Science, or a related field, and at least one year of experience in display technologies” and that “[a]dditional education might compensate for a deficiency in experience, and vice-versa.” Pet. 9. Patent Owner does not dispute the level of ordinary skill in the art. We agree with and adopt Petitioner’s proposal as reasonable and consistent with the level of skill reflected in both the prior art and the ’389 patent. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art may reflect an appropriate level of skill in the art).

II. VARIOUS DISPUTED ISSUES

A. Priority Date for Claims 34–37, 40–41, and 46

The ’389 patent was filed on May 2, 2002 and does not claim priority to any earlier application. Ex. 1001, codes (22), (65). However, Patent Owner attempts to antedate five asserted prior art references by showing that that “[t]he inventors conceived the challenged claims 34–37, 40–41 and 46 by February 8, 2001.” PO Resp. 5. In support, Patent Owner submits an email exchange between the ’389 patent’s inventors. *See* Ex. 2006.

Patent Owner bears the burden of production to establish that its claimed invention is entitled to an earlier priority date for this fact-intensive issue. *See In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1375–76 (Fed. Cir. 2016). We agree with Petitioner that the email chain does not support Patent Owner’s conception claim because it “does not discuss depositing a planarization layer, as required by both independent claims.” Pet. Reply 3.

Patent Owner asserts that the inventor's discussion of "PML" (polymer multi-layer) encapsulation in the email chain shows their conception of the claimed planarization layer because the '389 patent describes that PMLs "[t]ypically" include[e] 'a planarization layer' that 'is provided to give a planar surface' for deposition of an upper layer," and "address 'any point defects (i.e. pin holes)' that might appear in the barrier layer's surface." PO Resp. 6 (quoting Ex. 1001, 1:31–37, 1:41–44, 1:56–62). We disagree with Patent Owner for two reasons. First, the challenged patent's specification does not corroborate that the inventors conceived the claimed planarization *before* the challenged patent's priority because it did not exist at the time of the email. Whether the inventors, at the time of filing, considered PMLs to typically include a planarization layer as of the claimed priority date does not support the allegation that they conceived of that same planarization layer more than a year earlier. Moreover, the '389 patent's teaching that "[t]ypically, for PML structures, a planarization layer **106** is formed" (Ex. 1001, 1:30–31) shows that the inventors recognized PML structures and planarization layers were distinct because only a subset of PML structures formed planarization layers, even if they do so typically. Thus, the inventor's discussion of a PML layer in the email chain does not evidence their conception of the claimed planarization layer, as Patent Owner contends.

Additionally, even if we were to understand the inventors' mention of PML encapsulation in the emails, together with the discussion of patterning techniques for an organic layer, as discussing a planarization layer, such discussions are evidence of brainstorming ideas, rather than documenting the path taken with the claimed invention. For instance, the inventors use

phrases like “don’t know if this will work,” “these are all just ‘undeveloped’ ideas,” and “looking forward to keep this discussion rolling.” Ex. 2006, 1; *see also* Ex. 1034, 59:22–59:18. As Petitioner argues, and we agree, these are more theoretical and future-development discussions than an exchange of a definite idea. Pet. Reply 2–3 (citing *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed. Cir. 1986)).

For these reasons, we agree with Petitioner that Patent Owner has not shown that claims 34–37, 40–41 and 46 are entitled to an earlier priority date.

B. Whether Petitioner Relies on Applicant Admitted Prior Art

Patent Owner asserts we should “not consider” Yamazaki-based challenges because Petitioner included Applicant Admitted Prior Art (AAPA) in those grounds. *See* PO Resp. 16 (citing *Qualcomm Incorporated v. Apple Inc.*, 134 F.4th 1355 (Fed. Cir. 2025)) (holding that AAPA may not be part of the basis for an *inter partes* review). We disagree. As Petitioner notes, it “utilizes the AAPA *in the alternative* with Ghosh, to show that it was known to manufacture OLED devices in bulk (which [Patent Owner] does not dispute).” Pet. Reply 9. Because “[t]he Petition identifies disclosures in Ghosh that independently demonstrate the same teachings for which the AAPA is cited,” we agree with Petitioner that it does not improperly rely on AAPA for any of its challenges. *Id.*

C. Whether Yamazaki, Weaver, and Palanisamy Are Printed Publications under 35 U.S.C. § 311(b)

Patent Owner asserts that Yamazaki, Weaver, and Palanisamy do not qualify as printed publications under 35 U.S.C. § 311(b) because they only qualify as prior art under § 102(e). PO Resp. 17. According to Patent

Owner, “[e]ven though the Federal Circuit has held that such references are ‘printed publications’ under 311(b), to preserve arguments on appeal, Patent Owner submits that such an interpretation is inconsistent with the plain statutory language, the precedent, and non-public accessibility of an unpublished patent application.” *Id.* We disagree with this argument because the Federal Circuit has rejected it, as Patent Owner acknowledges. *See Lynk Labs, Inc. v. Samsung Electronics Co.*, 2023-2346, Slip. Op. (Fed. Cir. Jan. 14, 2025).

III. OBVIOUSNESS ANALYSIS

A. *Petitioner’s Challenge Based on Yamazaki and Ghosh*

Petitioner contends that claims 34, 35, 37, and 40 would have been obvious over Yamazaki and Ghosh. Pet. 17–38. For the reasons explained below, we determine that Petitioner has shown by a preponderance of evidence that these claims are unpatentable over the asserted prior art.

1. *Description of Yamazaki (Ex. 1005)*

Yamazaki generally relates to a method of manufacturing a self-light emitting device. Ex. 1005, code (54). Yamazaki’s Figure 11 is reproduced below.

Fig.11

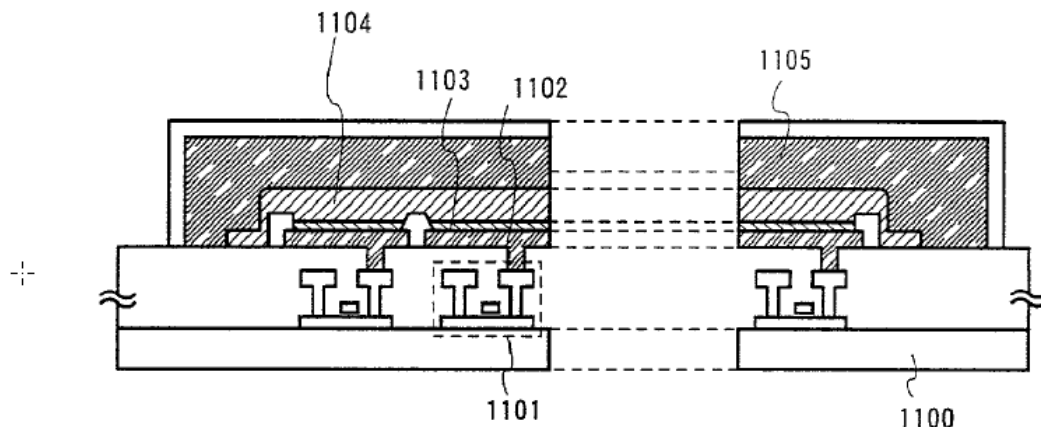


Figure 11 “is a diagram showing a cross-sectional structure of an active matrix type self-light emitting device.” *Id.* ¶ 26. Figure 11 includes “cover layer **1105**” and “barrier layer **1106**.” *Id.* ¶ 183. According to Yamazaki, “[b]ecause the cover layer **1105** is formed using the inkjet method, it can be selectively formed on the pixel portion.” *Id.* ¶ 178. Similarly, “barrier layer **1106** is formed selectively using a shadow mask.” *Id.* ¶ 183.

2. Petitioner’s Proposed Combination of Yamazaki, Ghosh, and Fujimori

Petitioner relies on Yamazaki for the bulk of the challenged claim elements. Specifically, Petitioner maps Yamazaki’s OLED display panel fabricated on a substrate 1100 as depicted in Yamazaki’s Figures 11 and 14 to the independent claims “fabricating a plurality of devices on a substrate.” Pet. 23–25. Petitioner further relies on Yamazaki’s cover layer 1105, which “can be selectively formed on the pixel portion,” for teaching selectively depositing a planarization layer on the devices, as the independent claims require. *Id.* at 26–27 (quoting Ex. 1005 ¶ 178); *see also id.* at 27–29 (Petitioner relying on cover layer 1407 of Yamazaki’s Figure 14 for similar disclosures of cover layer 1105 of Figure 11). Petitioner next maps Yamazaki’s barrier layer 1106/1408 to the claimed barrier layer that is selectively deposited over the planarization layer. *Id.* at 29–32. Petitioner asserts that Yamazaki also teaches several dependent-claim features including depositing an organic planarization layer by inkjet, (claim 35), depositing an organic planarization layer by shadow mask (claim 37), and depositing a barrier layer by shadow mask, sputtering, inkjet deposition, screen printing, or evaporation (claim 40). *Id.* at 32–34, 37.

Petitioner relies on Ghosh for several features. First, Petitioner explains that Ghosh’s batch fabrication/encapsulation teaches the claimed fabricating/encapsulating “a plurality of devices.” Pet. 21. According to Petitioner, skilled artisans would have been motivated to use Ghosh’s batch fabrication because it “was the conventional mode of manufacturing display panels for OLEDs” and because batch manufacturing had known benefits such as improved throughput, improved productivity, and reduced manufacturing costs. *Id.* at 22; Ex. 1003 ¶ 85. Second, Petitioner asserts that “to the extent there is any question whether Yamazaki teaches or suggests a shadow mask,” Ghosh’s “*shadow masking*” technique teaches that feature. Pet. 34, 35 (quoting Ex. 1006 ¶ 32). According to Petitioner, skilled artisans would have been motivated to use Ghosh’s shadow mask to selectively deposit Yamazaki’s cover layer because “[u]sing a shadow mask has known advantages, including allowing for good control of the positions on the substrate where the planarizing layers are formed and being amenable for use in conjunction with other processes for depositing a layer of liquid material, such as flash evaporation.” *Id.* at 36 (citing Ex. 1003 ¶ 117).

Patent Owner challenges several aspects of Petitioner’s Yamazaki-based obviousness challenges. We address those issues below.

3. *Yamazaki’s Planarization Layer*

Independent claims 34 and 41 require “depositing [a] . . . planarization layer.” Petitioner contends that Yamazaki teaches this feature because Yamazaki’s cover layer “is formed using the ink jet method,” and “has *planarity*.” *Id.* at 26–27 (quoting Ex. 1005 ¶ 178) (Petitioner’s emphasis). Petitioner explains further that Yamazaki’s cover layer flattens the underlying layer’s topography as the parties’ agreed-to claim construction

requires because, as evident in [Yamazaki's Figure 11] the top of the cover layer 1105 is planar (flat), whereas the underlying cathode 1104 has uneven surfaces." Pet. 27. Further, Petitioner explains with support from another prior-art reference, Suzuki, that it was known to use organic layers like Yamazaki's "to 'make[] a smooth surface on the relatively irregular surface of the cathode' when forming OLED devices." Pet. 27 (citing Ex. 1012, 5:59–62, Ex. 1003 ¶ 94).

Patent Owner contends that Petitioner's analysis is insufficient for several reasons. First, Patent Owner asserts Yamazaki's cover layer is too thin to prevent to prevent defect propagation because Yamazaki teaches its organic layer "has preferably a thickness range 'between 10 nm and 300 nm,'" which is thinner than Suzuki's preferable minimum thickness of 0.5 microns to "ensure good coverage of the unit U and to effectively intercept moisture." PO Resp. 27 (quoting Ex. 1012 ¶ 177). Thus, according to Patent Owner, "Yamazaki's cover layer could not interrupt defect propagation from the cathode to the barrier layer to slow down the permeation of oxygen and moisture, and would therefore not qualify as a planarization layer." *Id.* at 28. Further, Patent Owner argues that "at Yamazaki's preferred thicknesses of 0.01- 0.3 μm , the organic layer would be too thin to fully encapsulate particulates that could occur in manufacturing." *Id.*

First, we disagree with Patent Owner's argument because it asserts—incorrectly in our view—that the same basic planarization/planarity words mean one thing in the challenged patent and something different in the prior art, even though there is no indication that either employed a special definition different from the term's plan meaning. That issue aside, we also

disagree with Patent Owner's arguments because they address issues like ensuring good coverage, effectively intercepting moisture, slowing permeation of oxygen/moisture, and fully encapsulating particulates that could occur in manufacturing that are beyond what the parties' agreed-to construction requires—i.e., interrupting defect propagation. We agree with Dr. Subramanian that skilled artisans would understand Yamazaki's cover layer to interrupt defect propagation because some pinholes or defects on the cathode of OLED devices like Yamazaki's are "inevitable" and the "planarity" of Yamazaki's cover layer would ensure that those defects will be filled in or smoothed over and thereby not propagated. Ex. 1032 ¶ 14; *see also* Ex. 1012, 5:41–45. While Suzuki's minimum-thickness teaching might dissuade skilled artisans from using Yamazaki's preferred thickness range in Suzuki's encapsulation method, that is not what Petitioner proposes. Suzuki's minimum-thickness teaching does not undermine Petitioner's assertion that Yamazaki's cover layer, which has "planarity," interrupts defects. As Petitioner explains, "[t]hat Suzuki used a thicker layer does not mean that Yamazaki's cover layer is insufficient for Yamazaki's application." Pet. Reply 13. Moreover, even if Patent Owner were correct that Yamazaki's preferred thicknesses of 0.01–0.3 μm is too thin to interrupt defect propagation between layers, Yamazaki also teaches that "it is possible to make the film thickness thereof thicker than the above stated range [of 0.01–0.3 μm] by repeating the application and drying processes." Ex. 1005 ¶ 90.

Next, Patent Owner asserts that Yamazaki's inkjet printing and electric field application methods would not be sufficient to produce a layer thick enough to "decouple" defects in lower layers while still maintaining

planarity because multiple passes “would be needed to obtain a film of desired thickness,” thus increasing the risk of defects and unwanted material spreading. PO Resp. 29–30. We disagree with this argument because it assumes that Yamazaki’s preferred thickness is too thin to interrupt defect propagation, which we disagree with for the reasons above. We also disagree with it because Yamazaki teaches that its method produces a layer that has “planarity” and that it is possible to make films thicker than its preferred 0.01–0.3 μm range.⁸ Ex. 1005 ¶¶ 90, 178. Yamazaki does not indicate that such thicker films would sacrifice planarity. *Id.* To the contrary, as Dr. Subramanian explains, Yamazaki’s inkjet methods were known to be suitable for thicker layers, either by tuning the ink to increase viscosity or by using a large number of heads in parallel. Ex. 1032 ¶¶ 17–19. Although Patent Owner notes that Yamazaki’s thicker-films teaching “is associated with embodiment 1, which, unlike the configurations in Figures 11 and 14, deposits the cover layer above (not below) the barrier layer,” Patent Owner does not explain why that difference precludes thicker films in Yamazaki’s Figure 11/14 embodiments. PO Sur-reply 6.

For the reasons above, we agree with Petitioner that Yamazaki teaches the claimed planarization layer.

⁸ Patent Owner notes that Yamazaki’s thicker-films teaching “is associated with embodiment 1, which, unlike the configurations in Figures 11 and 14, deposits the cover layer above (not below) the barrier layer.” PO Sur-reply 6. Patent Owner does not explain, however, why that difference suggests precluding thicker films in Yamazaki’s Figure-11 and Figure-14 embodiments. *See id.*

4. Fabricating/Encapsulating Multiple Devices

Independent claims 34 and 41 require “fabricating a plurality of devices on a substrate; selectively depositing at least one planarization layer upon said devices; and selectively depositing at least one barrier layer over said planarization layer.” Petitioner asserts that together, Yamazaki and Ghosh teach this feature because Yamazaki teaches “manufacturing” and “encapsulating” an OLED (Pet. 17 (quoting Ex. 1005 ¶ 2)), and Ghosh teaches fabrication/encapsulation “for a plurality of OLED display devices 3 on a substrate 2” (Pet. 21 (quoting Ex. 1006 ¶ 3)). Petitioner also explains, with relevant support from Dr. Subramanian, that skilled artisans would have been motivated to apply Yamazaki’s selective-deposition method to Ghosh’s plurality of OLED devices “because such batch fabrication was the conventional mode of manufacturing display panels for OLEDs” and because batch manufacturing had known benefits such as improved throughput, improved productivity, and reduced manufacturing costs. Pet. 22; Ex. 1003 ¶ 85.

Patent Owner argues that Petitioner’s challenge fails because “Yamazaki does not involve multiple devices on a substrate” and Ghosh teaches “non-selective deposition of at least the barrier layer.” PO Resp. 31. We disagree with this argument because it attacks Yamazaki and Ghosh individually, rather than the combination of Yamazaki’s selective deposition and Ghosh’s plurality of devices that Petitioner asserts. *See In re Keller*, 642 F.2d 413, 426 (CCPA 1981). We also disagree with Patent Owner’s criticism that Petitioner fails to explain why skilled artisans would have ignored Ghosh’s non-selective deposition method for barrier layers on multiple devices. PO Resp. 32. This argument attacks a straw man as

Petitioner does not propose modifying Ghosh's method with Yamazaki's selective deposition. *See* Pet. 21–23. Rather, Petitioner proposes modifying Yamazaki's selective deposition method by applying it to Ghosh's teaching of encapsulating a plurality of OLED devices. *Id.*

Next, Patent Owner asserts that skilled artisans would not have extended Yamazaki's single-device fabrication/encapsulation method to a plurality of devices on a substrate because doing so would “multiply defects and errors, drop the yield exponentially, and increase the cost.” PO Resp. 34. Patent Owner asserts that precision/defect problems would be particularly acute when using Yamazaki's inkjet method to print devices' electro luminescence layers. *Id.* at 35–36. We disagree. Even if extending Yamazaki's method to Ghosh's multiple devices comes at a cost of potential defects, that tradeoff would not undermine Petitioner's proffered combination given Petitioner's articulated benefits outline above, including facilitating manufacturing display panels for OLEDs with improved throughput, improved productivity, and reduced manufacturing costs, as compared to fabricating/encapsulating just a single device. *See Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (“The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another.”). It also does not matter that “inkjet printing yielded devices of half the efficiency than spin coating,” as Patent Owner asserts (PO Resp. 35), because Petitioner does not need to show that Yamazaki's inkjet printing would be the best option for batch fabrication/encapsulation, only that it would was a suitable one from which the prior art did not teach away. *See Par Pharm., Inc. v. TWi Pharms., Inc.*,

773 F.3d 1186, 1197–98 (Fed. Cir 2014). That is, Petitioner does not need to show that Yamazaki’s inkjet method was an improvement over other known fabrication/encapsulation methods, so long as it was a known fabrication/encapsulation method and skilled artisans would understand that implementing it for a plurality of devices had known advantages over fabricating/encapsulating a single device, which Petitioner identifies. *See* Pet. 22.

We also agree with Dr. Subramanian that skilled artisans would have a reasonable expectation of success in making the proposed combination given similarities between the references (both are directed to encapsulation of an OLED display device with multiple thin-film layers and at least the first encapsulation is selectively deposited) and because “as the ’389 patent admits, in the prior art it was conventional to use batch fabrication to manufacture OLED display devices with thin-film encapsulation.” Ex. 1003 ¶ 86. As Dr. Subramanian explains, a particular advantage of inkjet printing is that it scales well to larger areas and it was known at the time of the ’389 patent that inkjet could be used to print multiple devices on a glass substrate. Ex. 1032 ¶¶ 2, 27–28. Patent Owner’s argument that “Yamazaki’s methods are far from ready for manufacturing” (PO Resp. 34) goes well beyond what is necessary to show that skilled artisans would have had a reasonable expectation of achieving what is claimed. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016).

Given Petitioner’s analysis outlined above, we agree with Petitioner that it would have been obvious to skilled artisans to fabricate and encapsulate multiple OLED devices on a substrate using Yamazaki’s ink-jet methods.

5. Depositing Through a Shadow Mask

Dependent claim 37 requires depositing the planarization layer by “depositing an organic layer through a shadow mask.” Petitioner asserts that Ghosh’s shadow-masking technique teaches this feature. Pet. 34, 35 (quoting Ex. 1006 ¶ 32). Petitioner explains, along with support from its expert and the prior art, that a skilled artisan would have been motivated to use Ghosh’s shadow-mask method because “[u]sing a shadow mask has known advantages, including allowing for good control of the positions on the substrate where the planarizing layers are formed and being amenable for use in conjunction with other processes for depositing a layer of liquid material, such as flash evaporation.” *Id.* at 36 (citing Exs. 1003, 1022).

Patent Owner argues that Petitioner’s challenge fails because Ghosh deposits its organic encapsulant layer via an evaporative process whereas Yamazaki employed a solution-based process. PO Resp. 42. We disagree with Patent Owner’s argument because it highlights a difference in the references’ processes without identifying any incompatibility.

We agree with Petitioner that Ghosh teaches deposition through a shadow mask, which Patent Owner does not dispute. *See* PO Resp. 41–43. In addition, given Petitioner’s explanation that Ghosh’s shadow-mask application had known advantages (i.e., good position control while being amenable for use in conjunction with other processes), Petitioner has articulated sufficient reasoning with rational underpinning to support the

legal conclusion that its proffered combination would have been obvious.
See KSR Int’l Co. v. Teleflex Inc., 550 U.S. 398, 418 (2007).⁹

6. Summary of Petitioner’s Challenge based on Yamazaki and Ghosh

Other than the arguments above, Patent Owner does not additionally challenge Petitioner’s showing for its challenge based on Yamazaki and Ghosh. Based on Petitioner’s analysis outlined above, we agree with Petitioner that claims 34, 35, 37, and 40 would have been obvious over Yamazaki and Ghosh.

B. Petitioner’s Challenge based on Yamazaki, Ghosh, and Fujimori

In its second ground, Petitioner adds Fujimori for its disclosure of “manufacturing OLED display elements using a ‘mask attached to a substrate with magnetic force,’” to address additional elements in claims 41–46 that “specify particular requirements for using a mask when depositing the planarization layer.” *Id.* at 38 (quoting Ex. 1014). These include “depositing a mask on top of said substrate,” (element 41[b]), “depositing at least one planarization layer upon said mask” (element 41[c]) “removing said mask from said substrate” (element 41[d]) “a magnetically held mask” (claim 42), “said mask is in contact with said substrate” (claim 43), “said mask comprising a material substantially nonsucking” (claim 44), and “said mask comprising a metal” (claim 45). *See* Pet. 38–62.

⁹ Patent Owner also challenges Petitioner’s alternative argument that Yamazaki teaches the claimed depositing through a shadow mask. PO Resp. 39–41. Because we find Petitioner’s based on Ghosh sufficient, we need not address Petitioner’s alternative reliance on Yamazaki.

Patent Owner challenges several aspects of Petitioner’s second ground. We address those issues below.

1. Petitioner’s Rationale for Combining Fujimori

According to Petitioner, a skilled artisan would have been motivated to use Fujimori’s magnetic-mask approach because it “achiev[es] favorable pattern processing accuracy,” and has “advantage[s] over conventional masking techniques, where for example ‘adhesion between the substrate and mask deteriorates due to warping and other factors.’” *Id.* at 38 (quoting Ex. 1014 ¶¶ 8–10). As Petitioner notes, Fujimori’s improved adhesion reduces the material deposited from the mask opening that bleeds to the shadow portion of the mask. Pet. 42; *see* Ex. 1044 ¶ 29.

Patent Owner argues that Petitioner’s rationale fails because Yamazaki’s mask is not in contact with the substrate and “if the mask does not even touch the substrate, then there would be no motivation to improve adhesion between the mask and the substrate by using Fujimori’s magnetized mask.” PO Resp. 44. We disagree with this argument because even if Yamazaki’s mask is not in contact with the substrate, Petitioner proposes using Fujimori’s magnetic mask, which is. *See, e.g.*, Pet. 42 (explaining that “Fujimori discloses a particular approach in which OLED elements are ‘formed through a mask attached to a substrate with magnetic force’”) (quoting Ex. 1014 ¶ 10).

Next, Patent Owner argues Petitioner has not shown that magnetic masks are suitable for depositing encapsulation layers with Yamazaki’s electric-field application, rather than with Fujimori’s “traditional evaporative deposition technique that does not utilize electric field to control the flight path of charged particles.” *Id.* at 45. According to Patent Owner, Fujimori’s

magnetized shadow mask would be problematic in Yamazaki's electric-field application method because the electromagnet used to adhere Fujimori's mask "***would introduce unpredictable change in the particles' trajectories, making it impractical to control the positions at which the particles will be deposited.***" *Id.* at 47.

We disagree. Even if Fujimori's magnetic mask might impact particles' trajectories in Yamazaki's electric-field application method, that does not undermine Petitioner's proffered combination, so long as the overall impact would be to improve accuracy. *See Winner*, 202 F.3d at 1340, 1349 n.8. On that issue, we agree with Dr. Subramanian that any particle-trajectory deviation due to Fujimori's magnetic mask would be "miniscule" and "much smaller than the natural deviation that occurs using an electric field method," such that it "would not impact the ability to deposit the layer as intended." Ex. 1032 ¶ 39. Dr. Subramanian further explains that, because the substrate is deposited only through the mask opening, "any lateral particle deviation would not impact the deposited layer" and "[i]t . . . further would have been well within the skill of a POSITA to adjust the magnetic force and magnetic position to perform the deposition process" to the extent that was necessary. *Id.* ¶ 40. Thus, we agree with Dr. Subramanian that Fujimori's magnetic mask would, on the whole, "reduce any uncertainty of the electric field method," by countering the effects of warping. *Id.* ¶ 39, *see id.* ¶ 37. Given that explanation, Petitioner has articulated sufficient reasoning with rational underpinning to support that its proffered combination would have been obvious. *See KSR*, 550 U.S. 398, 418.

2. Depositing a Mask on top of the Substrate

Claim 41 requires “depositing a mask on top of said substrate.” Petitioner asserts that Fujimori’s magnetic mask teaches this feature because it “discloses a particular approach in which OLED elements are ‘formed through a mask attached to a substrate with magnetic force.’” Pet. 42 (quoting Ex. 1014 ¶ 10). Patent Owner argues Petitioner’s challenge fails because Yamazaki teaches a mask that is “provided *between* the material chamber 111 and the substrate” and “[b]etween’ does not mean the mask is deposited ‘on top of’ or in contact with the substrate.” PO Resp. 49–50. We disagree with this argument because it attacks Yamazaki individually, rather than the combination of Yamazaki and Fujimori that Petitioner asserts. As noted above, even if Yamazaki’s mask is not in contact with the substrate, Petitioner proposes using Fujimori’s magnetic mask, which is. *See, e.g.*, Pet. 42 (explaining that “Fujimori discloses a particular approach in which OLED elements are ‘formed through a mask attached to a substrate with magnetic force’”) (quoting Ex. 1014 ¶ 10).

Given Petitioner’s analysis above, we agree that the proposed combination of Yamazaki and Fujimori teaches depositing a mask on top of the substrate, as claim 41 requires.

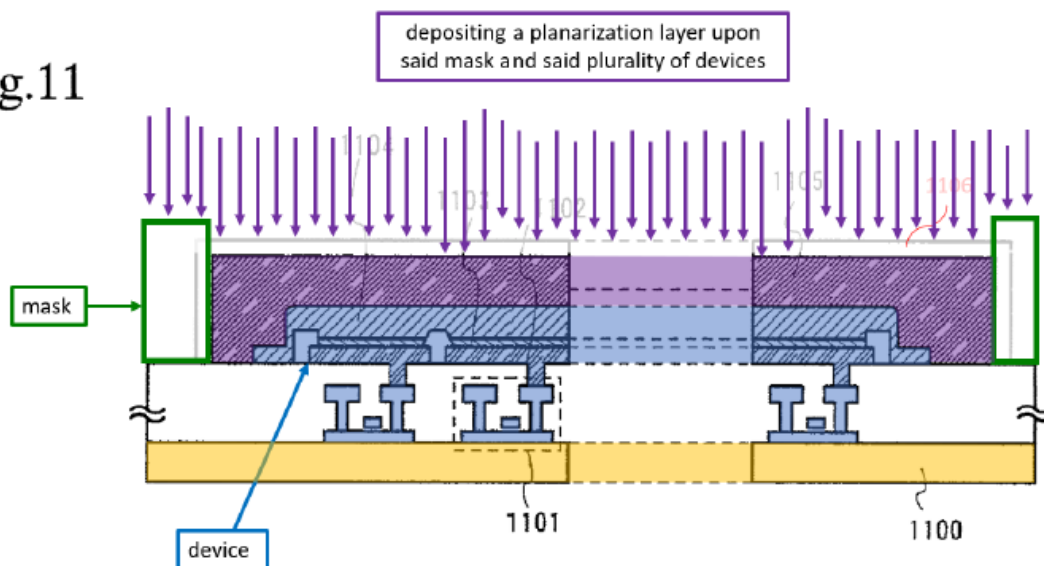
3. Depositing a Planarization Layer upon a Mask

Claim 41 requires “depositing at least one planarization layer upon said mask and said plurality of devices.” Petitioner contends that together, Yamazaki and Fujimori teach this limitation because “[w]hen Fujimori’s magnetic mask is used with Yamazaki, the formation of the cover layer would entail *depositing at least one planarization layer* (Yamazaki’s cover

layer 1105 or 1407) *upon said mask* (Fujimori's mask) *and said plurality of devices* (the plurality of OLED display devices)." Pet. 49.

Patent Owner asserts that Petitioner's challenge fails because Yamazaki uses a mask that controls the charged particles' trajectories such that "[t]he stream of the materials is shown to be narrower than the opening of the mask such that there is no deposition of the organic materials on the mask." PO Resp. 51–52 (quoting Ex. 2046 and referencing Yamazaki's Fig. 1C). We disagree with this argument because it attacks Yamazaki individually, rather than the combination of Yamazaki and Fujimori that Petitioner asserts. Petitioner's proposed combination of Yamazaki and Fujimori includes a planarization layer on *Fujimori's* mask and Yamazaki's device, as depicted in Petitioner's annotated version of Yamazaki's Figure 11, reproduced below.

Fig.11



Pet. 50; *see id.* at 49. Figure 11 of Yamazaki above is annotated to show a device highlighted in blue, a mask outlined in green, and a steady row of purple arrows directed at the surface of cover layer 1105 *and the mask*, with

a header that describes the arrows as “depositing a planarization layer upon said mask and said plurality of devices.” Pet. 50. Patent Owner addresses only Yamazaki’s mask (not Fujimori’s) and does not otherwise dispute Petitioner’s analysis in this regard. Given that analysis as outlined above, we agree with Petitioner that the proposed combination of Yamazaki and Fujimori teaches “depositing at least one planarization layer upon said mask and said plurality of devices,” as claim 41 requires.

4. Removing a Mask from the Substrate

Claim 41 requires “removing said mask from said substrate.” Petitioner asserts that “[w]hen Fujimori’s magnetic masking approach is used with Yamazaki, the method would entail removing said mask from said substrate because the mask would need to be removed after forming the cover layer, in order to subsequently deposit the barrier layer.” Pet. 51 (citing Ex. 1005 ¶¶ 8, 183, 203, Figs. 11, 14). Further, Petitioner explains, “Fujimori discusses removing the mask before the next step in the process.” *Id.* at 52 (citing Ex. 1014 ¶ 50 (explaining that “[s]ubsequently, the mask for the light-emitting layers was removed”)).

In challenging Petitioner’s showing, Patent Owner repeats its argument that “in Yamazaki, even when a mask is used, it is a distance away from the substrate,” and thus “there is . . . no ‘removing said mask *from* said substrate.’” PO Resp. 52. We disagree with Patent Owner’s argument because, as explained above, it attacks Yamazaki individually, instead of the combination of Fujimori’s mask in Yamazaki’s method that Petitioner proposes. Given Petitioner’s analysis above, we agree Petitioner that its

proposed combination teaches “removing said mask from said substrate,” as claim 41 requires.¹⁰

5. Summary of Petitioner’s Challenge based on Yamazaki, Ghosh, and Fujimori

Other than the arguments above, Patent Owner does not additionally challenge Petitioner’s showing for its challenges based on Yamazaki, Ghosh, and Fujimori. Based on Petitioner’s analysis outlined above, we agree with Petitioner that claims 41–46 would have been obvious over Yamazaki, Ghosh, and Fujimori.

C. Petitioner’s Challenge Based on Weaver and Palanisamy/Burrows

Petitioner contends that claims 34, 35, 37, and 40–46 would have been obvious over Weaver, along with Palanisamy or Burrows. Pet. 63–90. For the reasons explained below, we determine that Petitioner has shown by a preponderance of evidence that these claims are unpatentable over the asserted prior art.

1. Description of Weaver (Ex. 1008)

Weaver teaches “[a] covered substrate” including “a flexible substrate layer” and “a plurality of cooperative barrier layers” that “comprise one or more planarizing layers and one or more high-density layers.” Ex. 1008, code (57). Weaver’s Figure 6 is reproduced below.

¹⁰ Patent Owner makes a similar argument in asserting that Yamazaki’s mask is not in contact with the substrate as required by claim 43 and not non-sticking to the OLED substrate as required by claim 44. PO Resp. 53–54. We disagree with these arguments because they, too, attack Yamazaki individually, rather than the combination of Fujimori’s mask in Yamazaki’s method that Petitioner proposes.

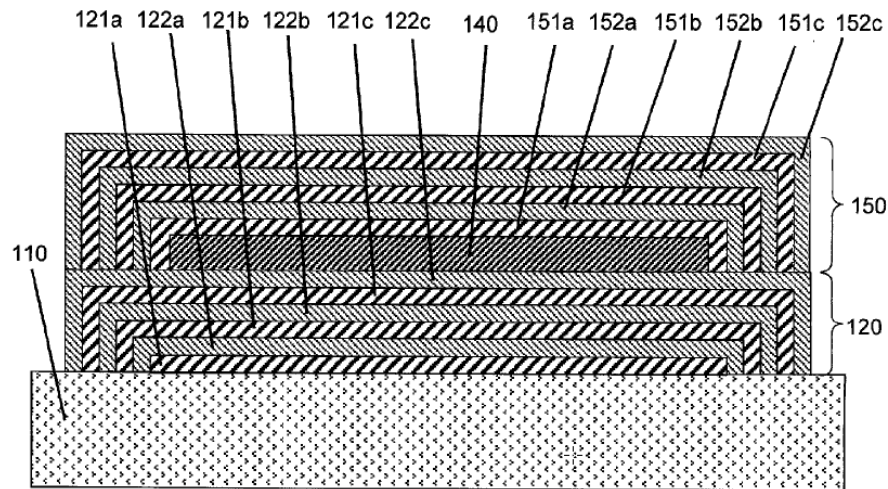


Fig. 6

Figure 6 “is a cross-sectional view of an OLED structure, which utilizes [a] covered substrate.” *Id.* ¶ 20. Figure 6 includes an OLED 140 and barrier region 150 “consisting of an alternating series of planarizing layers 151a-c and high-density layers 152a-c.” *Id.* ¶ 52; *see id.* ¶ 54.

2. Petitioner’s Proposed Combination of Weaver and Palanisamy/Burrows

Petitioner relies on Weaver for the bulk of the challenged claim elements. Specifically, Petitioner maps Weaver’s OLED 140 and base substrate 110/barrier region 120 to the independent claims “fabricating a plurality of devices on a substrate.” Pet. 70. Petitioner further relies on Weaver’s “planarizing layer” 151a, which Weaver describes as deposited from sources with varying apertures, for teaching selectively depositing a planarization layer on the devices, as the independent claims require. *Id.* at 71–73 (citing Ex. 1008 ¶¶ 52, 57–59). Petitioner further maps Weaver’s high-density layer 152a to the claimed barrier layer that is selectively deposited over the planarization layer. *Id.* at 74–76. Petitioner asserts that Weaver also teaches depositing a barrier layer by shadow mask, sputtering,

ink jet deposition, screen printing or evaporation (claim 40) because Weaver teaches its high-density layer 152a can be applied using “techniques known in the art such as *thermal evaporation*[and] *sputtering*.” *Id.* at 76 (quoting Ex. 1008 ¶ 36).

Petitioner relies on Palanisamy for teaching dependent claim 35’s ink-jet deposition and dependent claim 36’s screen-printing deposition. *Id.* at 78–79, 82–84. According to Petitioner, skilled artisans would have been motivated to use Palanisamy’s ink-jet or screen-printing method to selectively deposit Weaver’s planarizing layers because “Weaver . . . stat[es] that its planarizing layers can be ‘provided using techniques known in the art,’” and Palanisamy’s ink-jet and screen-printing methods were among those known techniques, with known benefits that Palanisamy identifies. *Id.* at 77 (quoting Ex. 1008 ¶ 35); *see id.* at 79–80 (identifying known benefits of ink jet); *id.* at 81–82 (identifying known benefits of screen printing). Petitioner relies on Burrows for teaching dependent claim 37’s deposition through a shadow mask because, like Palanisamy’s ink-jet and screen-printing methods, Burrows’s shadow mask method was among those “techniques known in the art” with known benefits that Weaver references as options for depositing its planarization layers. *Id.* at 84–86.

Patent Owner challenges several aspects of Petitioner’s Weaver-based obviousness challenges. We address those issues below.

3. *Weaver’s Planarization Layer*

Independent claims 34 and 41 require “depositing [a] . . . planarization layer.” Petitioner contends that Weaver teaches this feature because it teaches a “planarizing layer” 151a made from a “layer of planarizing material,” which “[m]eans a material that forms a smooth planar surface,

rather than forming a surface that reflects irregular contours of the underlying surface.” Pet. 71–72 (quoting Ex. 1008 ¶¶ 35, 52). Patent Owner contends that Petitioner’s analysis is insufficient because, even though Weaver describes its layer as “planarizing,” Weaver’s figures 5–7 “generally reproduce[] the topology of the underlying layer, contrary to the parties’ agreed-to construction for ‘planarization layer.’” Pet. Reply 56.

First, we disagree with Patent Owner’s argument because it again asserts that the same words mean one thing in the challenged patent and something different in the prior art, even though there is no indication that either employed a special definition, different from the words’ plain meaning. We also disagree with Patent Owner’s argument because it focuses exclusively on Weaver’s figures, even though there is no indication that they are drawn to scale or reflect all aspects of the planarizing layer. Patent Owner’s argument largely ignores Weaver’s express disclosure that its barrier region includes a “*planarizing layer*” made from a “layer of *planarizing material*,” which “[m]eans a material that forms a smooth planar surface, *rather than forming a surface that reflects irregular contours* of the underlying surface.” Ex. 1008 ¶¶ 35, 52. Because Weaver’s layer is smooth, planar, and does not reflect the underlying layer’s irregular contours, we agree with Dr. Subramanian that “Weaver’s ‘planarizing layer’ would not reproduce the underlying topology and would prevent defect propagation,” as the parties’ agreed-to construction requires. Ex. 1032 ¶ 42. Patent Owner’s arguments requiring suppression of intentional topography (*see* PO Resp. 57) and precluding sharp edges (*see* PO Sur-reply 17) go beyond what the claims require under the parties’ agreed-to construction.

For the reasons above, we agree with Petitioner that Weaver teaches a

planarization layer, as the challenged claims require.

4. *Selective Deposition*

Independent claims 34 and 41 require “selectively depositing at least one planarization layer upon said devices.” Petitioner argues that Weaver’s planarization layer 151a is selectively deposited because Figure 6 shows it “as surrounding the OLED device from the top and sides, but not extending laterally over the entire surface of the substrate.” Pet. 71–72. Further, Petitioner explains, Weaver’s Figure 8 and accompanying text describe deposition sources with varying *apertures* “such that the material being deposited from each source *progressively covers a wider area* as the substrate proceeds downstream.” *Id.* at 72 (quoting Ex. 1008 ¶¶ 57–59).

Patent Owner argues that Weaver’s Figure 6 falls short because the same pattern can “be obtained through non-selective deposition followed by patterned etching.” PO Resp. 59. According to Patent Owner, “the final structure does not inform how the structure is obtained.” *Id.* Although Patent Owner does not dispute that Weaver’s Figure-8 embodiment teaches selective deposition, Patent Owner argues Figure 8’s selective deposition applies to only Weaver’s barrier region 120 that covers the substrate, but not to barrier region 150, which is the only region that covers the OLED, as the challenged claims require. PO Resp. 60–62. Patent Owner further argues that according a 2015 presentation by Kateeva, a prominent inkjet supplier, in roll-to-roll applications like Weaver’s, non-selective deposition was “the only option.” *Id.* at 62 (quoting Ex. 2100, 20). According to Patent Owner, “[i]f the state of the art in 2015, some 13-14 years after the invention, was such that roll-to-roll encapsulation of an OLED (as opposed to substrate) could still only accommodate non-selective deposition of the barrier layer,

then a POSITA could [not] have done selective deposition of the barrier layer in 2001–2002.” PO Sur-reply 19. We disagree.

Weaver does not indicate any subsequent etching step, nor does it suggest a different deposition method for barrier region 150 as compared to barrier region 120. To the contrary, Weaver teaches that barrier region 150 “can be arranged in essentially the same fashion as the first barrier region 120.” Ex. 1008 ¶ 10. Although Weaver’s paragraph 54 describes its Figure-8 embodiment as applicable to forming the layers of Figure 2’s substrate cover, Weaver does not expressly limit Figure 8 to only the substrate’s layers. *See id.* at ¶ 54. Weaver’s paragraph 57 also expressly references Figure 8, but it does so more generally for “[d]eposition of progressively larger cooperative barrier layers,” which are the layers of both barrier region 120 and barrier region 150. In addition, Kateeva’s characterization of non-selective deposition as its “only option” in 2015 does not preclude Weaver’s selective-deposition disclosure more than a decade earlier, as Patent Owner suggests, because there may have been any number of factors like economic constraints or later-developed preferable alternatives that led Kateeva to view selective deposition as nonoptional in 2015. Even so, Weaver teaches selectively depositing its planarization layer, as explained above.

Based on Petitioner’s analysis and for the reasons above, we agree with Petitioner that Weaver teaches selectively depositing its planarization layer upon the devices, as required.

5. Inkjet Deposition

Dependent claim 35 recites “wherein the step for selectively depositing at least one planarization layer further comprises depositing by ink jet of an organic layer.” Petitioner asserts that Palanisamy teaches the

additional limitation in claim 35 because “Palanisamy specifically teaches the use of ‘an ink jet printer,’ which may be used for ‘selectively applying an organic passivation material to the recently deposited organic light emitting material.’” Pet. 78 (citing Ex. 1007, Abstract) (internal citation omitted). In addition, Petitioner explains, with support from Dr. Subramanian and the prior art, that skilled artisans would have used Palanisamy’s inkjet-printing technique because it was known to provide specific advantages, including “reduction of contamination risk, efficient use of deposition material, and scalability.” *Id.* at 80; *see id.* at 79 (citing 1003 ¶ 202; Ex. 1016 15–16, Ex. 1013, 2:9–62).

Patent Owner argues that Petitioner’s challenge fails because “Palanisamy does not characterize the materials it deposits as ‘planarizing.’” PO Resp. 64. We disagree with this argument because it attacks Palanisamy individually, rather than the Weaver-Palanisamy combination that Petitioner asserts. *See* Pet. 76–80. Petitioner relies on Weaver, not Palanisamy, for teaching the claimed planarization layer. Pet. 71–72.

Although Patent Owner does not challenge whether Palanisamy teaches claim 35’s inkjet deposition, Patent Owner asserts Petitioner’s rationale for combining Palanisamy’s inkjet-printing fails because Weaver already taught a directed-deposition technique with similar benefits to contamination risk, efficient material use, and scalability, and Petitioner does not explain why Palanisamy’s method is superior to Weaver’s. PO Resp. 65–69. We disagree. Petitioner does not need to show that Palanisamy’s method was an improvement over Weaver’s, so long as Palanisamy’s technique was known and skilled artisans would understand that implementing it had known advantages, such as reduced contamination

risk, efficient material deposition, and scalability, as Petitioner explains. *See Intel*, 61 F.4th 1373, 1381. That other potentially suitable or even superior deposition techniques were known does not make Palanisamy's inkjet deposition with known benefits nonobvious. Moreover, Weaver expressly teaches that its planarizing layers can be provided "in a number of ways" including "using techniques known in the art." Ex. 1008 ¶¶ 57, 35. Given inkjet's known benefits and Weaver's express teaching to use known layer-deposition techniques, Petitioner has articulated sufficient reasoning with rational underpinning to support that its proffered combination would have been obvious.

6. Deposition by Screen Printing

Claim 36 requires "wherein the step for selectively depositing at least one planarization layer further comprises depositing by screen printing of an organic layer or depositing by gas nozzle." Petitioner asserts that Palanisamy teaches this limitation because "Palanisamy specifically teaches the use of 'a screen printing technique,' which may be used for 'selectively applying an organic passivation material to ... recently deposited organic light emitting material.'" Pet. 82 (quoting Ex. 1007 ¶ 24, Abstract) (internal citation omitted). In addition, Petitioner explains that skilled artisans would have used Palanisamy's technique because Weaver suggests using "techniques known in the art" to deposit its planarization layers. *Id.* at 81 (quoting Ex. 1008 ¶ 35). Petitioner further explains, with support from Palanisamy and Dr. Subramanian, that Palanisamy's screen printing technique had known benefits including "'rapid processing time' at lower temperatures, and enabling 'a range of []material viscosities' to be used." *Id.* at 83 (quoting Ex. 1007 ¶ 25).

Patent Owner argues that Petitioner’s rationale for using Palanisamy’s screen printing technique fails because “even when two alternatives are interchangeable, that does not supply a reason for replacing one with the other.” PO Resp. 71. We disagree. Petitioner does not merely assert that Palanisamy’s screen printing technique was an interchangeable alternative. Instead, Petitioner asserts it would have been obvious to use Palanisamy’s screen printing technique because Weaver expressly teaches to use known techniques and screen printing had known benefits related to processing time, temperature, and available material viscosities, as Petitioner explains and as outlined above.

We also disagree with Patent Owner’s argument that screen printing would not increase processing speeds or facilitate operating at a lower temperature. PO Resp. 72–73. As Petitioner notes, Palanisamy expressly teaches that “[w]ith screen printing processes, a range of passivation material viscosities may be utilized” and that screen printing “makes for a very fast, low temperature, inline manufacturing process in one embodiment.” Pet. 82 (quoting Ex. 1007 ¶ 25). Last, we disagree with Patent Owner that there is no evidence that being able to use a range of material viscosities is “a desirable or even suitable choice.” PO Resp. 72–73. Weaver expressly states that a variety of deposition methods are suitable and increased flexibility is facially beneficial. *See* Ex. 1008 ¶ 35, Ex. 1032 ¶¶ 49–50.

Based on Petitioner’s analysis and for the reasons above, we agree with Petitioner that claim 36’s screen-printing deposition would have been obvious over Petitioner’s proposed combination of Weaver and Palanisamy.

7. Depositing Through a Shadow Mask

Dependent claim 37 requires “wherein the step for selectively depositing at least one planarization layer further comprises depositing an organic layer through a shadow mask.” Petitioner asserts that Burrows teaches this additional feature because “Burrows . . . teaches selectively depositing its planarizing decoupling layer using a “mask . . . [that] limits the deposition of the decoupling layer to an area which is smaller than, and contained within, the area covered by the barrier layer.” Pet. 87 (quoting Ex. 1009, 7:49–58). In addition, Petitioner explains that skilled artisans would have been motivated to use Burrows’s shadow-mask approach because Weaver states that its planarizing layers can be provided using known techniques like Burrows’s, and because “[a]s in Weaver, [Burrows’s] selective deposition ensures that the sides of the device are fully sealed by the barrier layer—thereby avoiding the problem of exposed edges.” *Id.* at 89 (citing Ex. 1009, 4:33–36).

Patent Owner argues Petitioner’s rationale for using Burrows’s shadow mask approach fails because Weaver already taught a selective deposition process and modifying Weaver to use Burrows’s shadow mask “adds cost, process steps, and increased risks of particulate contamination” without necessarily “improv[ing] precision over Weaver’s directed nozzles.” PO Resp. 73–74. We disagree. Weaver suggests using “techniques known in the art” to deposit its planarization layers. *Id.* at 81 (quoting Ex. 1008 ¶ 35). That other potentially suitable or even superior deposition techniques were known does not make Burrows’s known technique with known benefits nonobvious. Moreover, Petitioner does not need to show that Burrows’s method was an improvement over Weaver’s, so long as it was

known and skilled artisans would understand that implementing it had known advantages like full sealing without exposed edges, as Burrows teaches. *See* Pet. 87 (citing Ex. 1009, 4:33–36 7:49–58).

Based on Petitioner’s analysis and for the reasons above, we agree with Petitioner that claim 37’s shadow-mask deposition would have been obvious over Petitioner’s proposed combination of Weaver and Burrows.

8. Summary of Petitioner’s Challenge based on Weaver and Palanisamy/Burrows

Other than the arguments above, Patent Owner does not additionally challenge Petitioner’s showing for its challenges based on Weaver and Palanisamy/Burrows. Based on Petitioner’s analysis outlined above, we agree with Petitioner that claims 34, 35, 37, and 40–46 would have been obvious over Weaver, along with Palanisamy or Burrows.

IV. CONCLUSION

Based on the fully developed trial record, Petitioner demonstrates by a preponderance of the evidence that claims 34–37 and 40–46 are unpatentable. A summary of our conclusions is set forth in the table below.

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
34, 35, 37, 40	103	Yamazaki, Ghosh	34, 35, 37, 40	
41–46	103	Yamazaki, Ghosh, Fujimori	41–46	
34, 40	103	Weaver	34, 40	
35, 36	103	Weaver, Palanisamy	35, 36	
37	103	Weaver, Burrows	37	
Overall Outcome			34–37, 40–46	

V. ORDER

Accordingly, it is

ORDERED that claims 34–37 and 40–46 of the '389 patent have been shown to be unpatentable; and

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

IPR2024-01222
Patent 6,949,389 B2

FOR PETITIONER:

David Garr
Scott Weidenfeller
COVINGTON & BURLING LLP
dgarr@cov.com
sweidenfeller@cov.com

FOR PATENT OWNER:

Hong Zhong
IRELL & MANELLA LLP
hzhong@irell.com