

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

PATENT OWNER'S PRELIMINARY RESPONSE

Mail Stop "PATENT BOARD"

Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

	<u>Page</u>
I. Introduction.....	1
II. The ‘389 Inventions.....	4
III. Yamazaki, Weaver, and Palanisamy Are Not Printed Publications under 35 U.S.C. § 311(b).....	14
IV. Claim Construction.....	18
V. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Ground I.....	20
A. The Petition does not explain why Yamazaki discloses a “planarization layer” in accordance with Samsung’s construction	20
B. A POSITA would not have used the method described in Yamazaki’s Figure 11 (Embodiment 3) or Figure 14 (Alternative Embodiment 4) to arrive at the claimed inventions	22
1. A POSITA would recognize that Yamazaki’s organic layer is too thin for effective protection.....	22
2. A POSITA would have deposited the organic layer under vacuum rather than under atmosphere in light of the state of the art	25
C. Petitioner has also not shown a reasonable likelihood to prevail on dependent claims.....	29
VI. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Ground II	37
A. The Petition fails to make a <i>prima facie</i> case that a POSITA would have combined Yamazaki with Fujimori	37
B. The combination still fails to disclose multiple limitations	42
1. No disclosure or suggestion of “planarization layer”	42

Page

2.	No disclosure or suggestion of 41[b].....	43
3.	No disclosure or suggestion of 41[c]	45
4.	No disclosure or suggestion of 41[d]	46
C.	Petitioner also fails to make a <i>prima facie</i> case of obviousness for claims 42-46.....	48
VII.	Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Grounds III-V	50
A.	Petitioner does not explain why Weaver discloses a “planarization layer” under Samsung’s construction.....	50
B.	Petitioner has not offered competent evidence to demonstrate that Weaver performs selective deposition	53
C.	Petitioner provides no competent reason for depositing Weaver’s organic layer using ink-jetting (claim 35)	54
D.	Petitioner provides no competent reason for depositing Weaver’s organic layer using screen printing (claim 36)	58
E.	Petitioner provides no competent reason for depositing Weaver’s organic layer using a shadow mask (claim 37).....	61
VIII.	The Board Should Exercise Its Discretion Under 314(a).....	64

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Arendi S.A.R.L v. Apple Inc.</i> , 832 F. 3d 1355 (Fed. Cir. 2016)	33, 34, 61
<i>ATI Technols. ULC v. Iancu</i> , 920 F.3d 1362 (Fed. Cir. 2019)	10
<i>In re Bayer</i> , 568 F.2d 1357 (C.C.P.A. 1978)	17
<i>Belden Inc. v. Berk-Tek LLC</i> , 805 F.3d 1064 (Fed. Cir. 2015)	<i>passim</i>
<i>Cisco Sys., Inc. v. C-Cation Techs., LLC</i> , IPR2014-00454, Paper 12 (PTAB, Aug. 29, 2014)	63
<i>In re Cronyn</i> , 890 F.2d 1158 (Fed. Cir. 1989)	16
<i>Elbit Systems of Am., LLC v. Thales Visionix, Inc.</i> , 881 F. 3d 1354	63
<i>In re Klopfenstein</i> , 380 F.3d 1345 (Fed. Cir. 2004)	16
<i>In re Lister</i> , 583 F.3d 1307 (Fed. Cir. 2009)	17
<i>In re Nuvasive, Inc.</i> , 842 F.3d 1376 (Fed. Cir. 2016)	16
<i>Plas-Pak Indus. v. Sulzer Mixpac AG</i> , 600 Fed. Appx. 755 (Fed. Cir 2015)	36, 59
<i>Samsung Elecs. Co. v. Infobridge Pte. Ltd.</i> , 929 F.3d 1363 (Fed. Cir. 2019)	15
<i>Scott v. Koyama</i> , 281 F.3d 1243 (Fed. Cir. 2002)	13

Page(s)

<i>Valve Corp. v. Ironburg Inventions Ltd.</i> , 8 F.4th 1364 (Fed. Cir. 2021)	17
<i>Virtek Vision Int’l ULC v. Assembly Guidance Sys.</i> , 97 F.4th 882 (Fed. Cir. 2024)	<i>passim</i>
<i>Voter Verified, Inc. v. Premier Election Sols., Inc.</i> , 698 F.3d 1374 (Fed. Cir. 2012)	17

Statutes

35 U.S.C. § 102	15, 16, 17, 18
35 U.S.C. § 122(a)	18
35 U.S.C. § 311(b)	14, 16

Rules

37 C.F.R. § 42.104(b)	<i>passim</i>
-----------------------------	---------------

EXHIBIT LIST

Exhibit No.	Document Description
EX2001	Declaration of Mr. Kurt Humphrey
EX2002	Declaration of Dr. E. Fred Schubert on behalf of Samsung Electronics Co., Ltd. et al. in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495 (Nov. 12, 2024)
EX2003	Samsung's Notice of Corrected Exhibit B to Joint P.R. 4-3 Statement in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495, Dkt. 110 & 110-1 (E.D. Tex. Nov. 13, 2024)
EX2004	Samsung's Proposed Claim Constructions for the Terms and Phrases Identified for Construction per Local Rule 4-2 in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495 (E.D. Tex. Oct. 22, 2024)
EX2005	omitted
EX2006	389 Invention Disclosures
EX2007	U.S. Patent Application No. 2003/0054579A1 to Pakbaz et al.
EX2008	U.S. Patent Application No. 2003/0052616A1 to Antoniadis et al.
EX2009	U.S. Patent Application No. 2004/009304A1 to Pichler et al.
EX2010	U.S. Pat. No. 7,121,642 to Stoessel et al.
EX2011	U.S. Pat. No. 6,702,419 to Stoessel et al.
EX2012	Seog Soon Kim et al., <i>Ultra-high Precision Inkjet Printing Technology for Display</i> , 64-1 SID 2018 Digest, 839-842 (2018), available from https://sid.onlinelibrary.wiley.com/doi/abs/10.1002/sdtp.12244 (last visited Dec. 10, 2024)
EX2013	Lorentz Force downloaded from https://en.wikipedia.org/wiki/Lorentz_force (last visited Dec. 10, 2024)
EX2014	Docket Control Order in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd.</i> , et al., Case No. 2:23-cv-000495, Dkt. 40 (E.D. Tex. Apr. 17, 2024)

Exhibit No.	Document Description
EX2015	Federal Court Management Statistics for U.S. District Courts, available from https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2024/06/30-1
EX2016	Samsung Invalidity Contentions in <i>Pictiva Displays Int'l Ltd. v. Samsung Electronics Co. Ltd., et al.</i> , Case No. 2:23-cv-000495 (E.D. Tex. Jun. 11, 2024)
EX2017	Stephen J. Matthews, <i>Back to Basics: Organic LEDs</i> , Laser Focus World (Jul. 31, 2001), downloaded from https://www.laserfocusworld.com/lasers-sources/article/16556776/back-to-basics-organic-leds (last visited Dec. 10, 2024)

I. Introduction

The Petition relies on two primary references, Yamazaki and Weaver. Petitioner fails to explain why either includes a “planarization layer” under the construction that Samsung advanced in the district court, which requires that the alleged “planarization layer” be “a layer of material that planarizes such that the propagation of defects from one layer to another layer is interrupted and the topography of the underlying layer is not reproduced.” EX2002 at 15. The Petition, however, does not even contend that either Yamazaki’s cover layer 1105/1407 or Weaver’s organic layer 121a-c help interrupt propagation of defects from one layer to another layer, let alone showing that this is the case. The petition thus fails as a matter of law. *See* 37 C.F.R. § 42.104(b)(3),(4) (requiring the petition to identify how the challenged claims are unpatentable under the proffered construction).

The Petition also fails in other fatal aspects. For Ground I, Petitioner has not offered any competent evidence that a POSITA—defined as someone having a bachelor’s degree in a relevant field and as few as one year of experience in display technology (Pet. 14-15)—would have even started with Yamazaki, given the reported experimental data that organic layers thinner than 500 nm could not effectively protect against oxygen and moisture or dark spots growth (*e.g.*, Suzuki, Figure 4, 9:8-9) and Yamazaki’s statement that its cover layer—when deposited

between the devices and a barrier layer as required by the claims—is preferably between 10-300 nm (Yamazaki, [0177]).

For Ground II, Petitioner proposes combining Yamazaki’s electric field application method with Fujimori’s magnetized masks, (Pet. 41), but does not even consider how the magnetic field used to hold the magnetized masks to the substrate would affect the flight path of the charged particles that are controlled by an electric field. In other words, Petitioner fails to consider the fact the Lorenz force would cause not only particle-to-particle variation within a material stream, but also a time-dependent variation as the particles fly from the material chamber towards the substrate. This introduces unpredictable changes in the particles’ trajectories, making it impractical to control the positions at which the particles are deposited. *Cf.* EX2001, ¶38 (Mr. Humphrey not aware of such usage despite his decades of experience in display industry and despite purported benefits of a magnetically adhered mask known since the 1970s). The industry’s non-use of such an approach provides objective evidence of non-obviousness.

Moreover, even if Yamazaki’s electric field application method would have used a magnetized mask, Petitioner still fails to show that the combination discloses

(i) a selectively deposited “planarization layer”;

(ii) a mask that is deposited “on top of the substrate” (element 41[b]), as opposed to one “*between* the material chamber ... and the substrate”

(Yamazaki, [0086]);

(iii) a planarization layer that is deposited “on the masks” as well as on the devices (element 41[c]), as opposed to one only deposited on the devices (see Pet. 34 (Petitioner’s own illustration showing that the material for the planarization layer bypasses the masks)); or

(iv) removal of the masks “from the substrate” (element 41[d]).

Petitioner has failed to make a *prima facie* case of obviousness for claims 41-46.

Petitioner likewise fails to make a *prima facie* case for the Weaver-based Grounds III-V. First, Weaver’s organic layers 121a-c are illustrated as reproducing the topologies of the underlying layers and are not asserted to interrupt propagation of defects from one layer to another layer. There are therefore no competent evidence that Weaver’s organic layers meet Samsung’s definition of “planarization layer.”

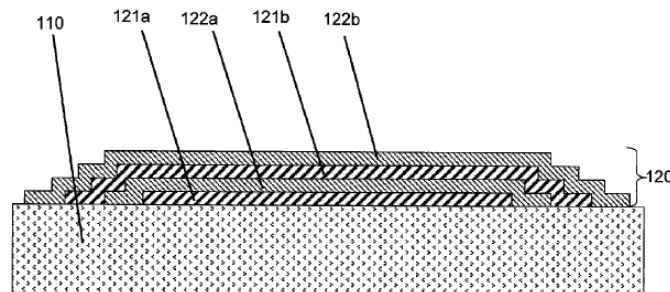


Fig. 5

Second, Weaver controls the deposition by controlling the amount of liquids rather than the deposition positions. *E.g.*, Weaver, Fig. 8 (controlling the coverage area by controlling the nozzle aperture size and the amount of materials deposited); EX2001, ¶56. There is therefore no selective deposition of planarization or barrier layers.

Third, Petitioner's theories for substituting Weaver's web-based processes with ink-jetting, screen-printing or deposition with shadow masking amount to alleging that those were known ways to deposit organic materials. That is insufficient as a matter of law because "obviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention." *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).

For these and other reasons stated below, the Board should deny the petition.

II. The '389 Inventions

The challenged claims of the '389 patent all relate to encapsulating multiple devices fabricated on a substrate. *E.g.* claims 34, 41. At the time of the inventions, thin film encapsulation methods were being explored as "a cheaper and better manner of encapsulation." EX1001, 1:17-19. One way to achieve thin film encapsulation is using PML or polymer multi-layer comprising "alternating and repeating layers of an organic ... and a barrier layer." *Id.*, 1:19-22. The organic

layer, such as layer 106, typically serves as a “planarization layer” that “is provided to give a planar surface for the deposition of the PML structure 112a” as depicted below. *Id.*, 1:30-36, Fig. 1. The PML structure 112a includes a barrier layer 108 and another organic planarization layer 110. *Id.*, 1:37-47. The PML structure 112 may be repeated with the barrier layer deposited on a planarization layer of a lower PML structure. *Id.*

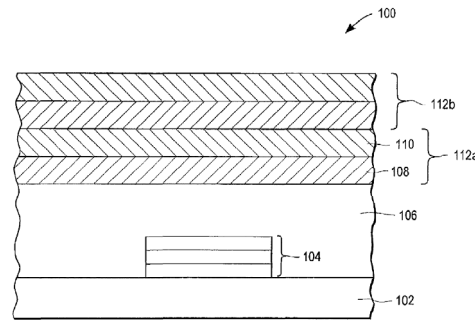


FIG. 1 (PRIOR ART)

Direct thin-film encapsulation results in “thinner and/or lighter and/or mechanically more flexible” encapsulation with “cost reduction and improved reliability.” *Id.*, 1:48-52. The use of the planarization layer also address the drawbacks associated with “point defects (i.e., pin holes) in [the barrier layer’s] surface.” *Id.*, 1:56-62.

One significant drawback of the traditional direct thin film encapsulation method was that the PML structure was deposited on areas—such as “electrical contact pads,” “scribe and break lines and/or the glue lines”—that do not require and should in fact not have encapsulation. EX1001, 2:17-29.

The '389 patent addresses this drawback by providing for selective deposition of the PML layers and/or easy removal of materials deposited in undesired areas. *E.g.*, EX1001, Figs. 3A-3B (using mask to selectively cure a portion of deposited organic layer and remove organic layer from undesired areas, followed by selective deposition of barrier layer), Figs. 4A-4B (selectively depositing barrier layer on deposited organic layer using a mask and using the barrier layer as an etching mask to remove organic layer from undesired areas), Fig. 5 (using a mask to selectively deposit organic layers and barrier layers), Figs. 6A-6E (using masks deposited on the substrate to control the areas of deposition for organic layers, followed by selective deposition of barrier layers); Figs. 7A-7C (using gas to direct organic materials away from undesired areas).

Certain of the inventions were conceived by February 8, 2001. For example and as relevant to the claims at issue, the inventors conceived the concepts described in at least claims 34-37 and 40 by February 8, 2001, as evidenced by an email chain on that day. EX2006-389-ID at 1. First, the context of the email exchanges indicates that the discussion relates to “producing an array of small displays on a large plate of glass,” *i.e.*, to producing multiple display devices on a substrate, and in particular, to depositing a multi-layer encapsulation that includes at least one organic layer and a barrier layer over the organic layer. *Id.* This can be seen from the reference to “PML” and the use of the term “barrier layer.” *Id.*

The '389 patent describes "PML" as understood by the inventors. EX1001, 1:19-47. According to the inventors' description, "PML" is the abbreviation for "polymer multi-layer," which "compris[es] alternating and repeating layers of an organic (usually acrylate or the like) and a barrier layer." *Id.*, 1:19-22. The inventors understood the PML structures as "[t]ypically" including "a planarization layer" that "is provided to give a planar surface" for deposition of an upper layer, such as another PML structure or a "barrier layer." *Id.*, 1:31-37, 1:41-44. The planarization layer may be formed on top of an OLED device or a barrier layer. *Id.*; Fig. 1 (planarization layer 106 formed over an OLED device 104 and planarization layer 110 formed over barrier layer 108). The inventors regarded barrier layer(s) as "provid[ing] the necessary environmental isolation from the corrosive effects of oxygen and moisture." *Id.*, 1:39-41.

The inventors' description of the planarization layer in the '389 patent matches that for the organic layers in the email exchange. Thus, even though the term "planarization layer" does not appear, Inventor Pichler's discussion of the desire to "provide a smooth transition from the regions with to those without the organic layer (instead of a sharper step)" makes it clear that the organic layer would serve the purpose of providing a planar surface, a function performed by planarization layers. EX2006-389-ID at 1. This matches the description of the planarization layer in the PML structure given by the '389 patent, which discloses

that “a planarization layer ...is formed on top of OLED structure” or a barrier layer “to give a planar surface.” EX1001, 1:17-22, 1:30-36, 1:41-44.

The inventors exchanged ideas for selectively depositing organic (planarization) layers and barrier layers to avoid deposition on scribe lines and electric pins. EX2006 at 1. Those included depositing the organic layer by ink-jetting, screen printing using a mask, and vaporization through a mask, and depositing the barrier layer by sputtering “through a mask.” *Id.* For example, Inventor Frischknecht expressed his preference for “vapor deposition through a shadow mask” and his expectation that this method “will keep the pins free of coating.” *Id.* He also suggested “masking the area for the scribe lines” as “a good practice” because he is “not too sure if scribing through the [PML] multilayer is a good idea.” *Id.* He also proposed ink-jetting, screen printing and/or spin-coating via a mask for depositing at least the organic layer. *Id.* Inventor Pichler in turn suggested sputtering the barrier layer through a mask to selected areas over the OLED devices to leave contact pads and scribe lines free of the barrier layer. *Id.*

The chart below provides an element-by-element mapping of the ideas conceived by February 8, 2001 against the claim elements.

Element	Evidence
34[pre] & 34[a]	“[I]t very well may be that vapor deposition through a shadow mask is the easiest <i>method for producing an array of small displays on a large plate of glass.</i> ”

Element	Evidence
34[b]	“I anticipate that vapor deposition through a shadow mask will keep the pins free of the coating; therefore I have been quite partial to the vapor deposition method. Also I am not too sure if scribing through the multilayer is a good idea; therefore, I anticipate that masking the area for the scribe lines will be a good practice.” “[I]t very well may be that <i>vapor deposition through a shadow mask</i> is the easiest method for producing an array of small displays on a large plate of glass.” “we could consider printing techniques (Screen/Inkjet).” “Any thoughts on masking for spin coating”?
34[c]	“Spin-, roll- or whatever-coat, cross-link/cure and then <i>sputter the dielectric barrier through a mask over the OLED area only</i>, i.e. leave the contact pads, scribe lines, etc. free from the barrier and then stick the whole thing in, for example, a plasma asher and ash-off the organic where there is no dielectric barrier film.”
35 & 36	“we could consider printing techniques (Screen/Inkjet).”
37	“I anticipate that vapor deposition through a shadow mask will keep the pins free of the coating; therefore I have been quite partial to the vapor deposition method. Also I am not too sure if scribing through the multilayer is a good idea; therefore, I anticipate that masking the area for the scribe lines will be a good practice.” “[I]t very well may be that <i>vapor deposition through a shadow mask</i> is the easiest method for producing an array of small displays on a large plate of glass.”
40	“Spin-, roll- or whatever-coat, cross-link/cure and then <i>sputter the dielectric barrier through a mask over the OLED area only</i>, i.e. leave the contact pads, scribe lines, etc. free from the barrier”

As the witnessed lab pages demonstrate, Inventor Pichler continued to work on improving the encapsulation process, including sketching out additional thoughts about ink-jetting processes on August 14 and 15, 2001. EX2006 at 40-41. As part of the invention disclosure process, he flushed out the inventive ideas with detailed description, drawings and proposed claims on September 30, 2001. *Id.* at 8, 14-38. He further developed the invention on October 14, 2001. *Id.* at 11. Closer to the application filing date of May 2, 2002, Inventor Pichler also drew a diagram for the patent agent/attorney that became Figure 7C of the '389 patent on April 15, 2002. *Id.*, 12. The drawing reflects the fact that work on drafting the application leading to the 389 patent had been underway by at least April 2002.

Patent filing between 2001-2003 by the inventors also provides evidence of reasonable diligence exercised by the inventors. Even if these efforts were not directly directed to encapsulating electronic devices, they can be used to demonstrate reasonable diligence because the work was on related parts of a research program that resulted in the patent. *See ATI Technols. ULC v. Iancu*, 920 F.3d 1362, 1370-75 (Fed. Cir. 2019) (work done on the R400 in general sufficient to establish diligence, noting “[d]iligence is not negated if the inventor works on improvements and evaluates alternatives while developing an invention” and can be shown by “work required to develop a first invention in order to develop or reduce to practice a second invention”).

For example, Inventor Pichler was named in a pair of applications filed on September 19, 2001, both involving using selective deposition techniques such as ink-jetting to deposit organic layers of OLED devices. *E.g.*, EX2007-US2003/0054579, [0002] (uniform deposition of polymer layers over the whole substrate could cause “the resultant OLED display unreliable”), [0003] (“desirable to deposit the polymer layers precisely on the display initially”), [0004] (disclosing “a novel method for fabricating an OLED display wherein one or more conducting polymer layers is/are selectively deposited over the surface of the display”); EX2008-US2003/0052616, [0012] (“The active layers ... could be deposited selectively via ink jet printing (continuous stream, drop-on demand, micro-contact printing, etc.), screen printing, off-set printing, electrostatic printing, gravure printing, flexographic printing, laser-induced thermal transfer, shadow stencil masking ... or other”); [0013]-[0014] (organic layer 108 may be deposited “up to several microns thick” so that “large particle impurities ... that find their way on the surface of the active panel during manufacture can be nicely coated and covered under the thick polymer layer” and avoid “a pinhole defect, which otherwise would have shorted anode and cathode”). These efforts were directed towards fabricating OLED devices to be encapsulated, as related to *e.g.*, 34[a] of the ‘389 patent (a requisite part of the invention for subsequent encapsulation steps). *E.g.*, EX2007-US2003/0054579, pending claims (directed to methods for

“fabricating an organic light emitting display”); EX2008-US2003/0052616, pending claims (directed to “[a]n OLED light source”). Additionally, the ink-jetting method developed for emission layer can also be applied to the organic encapsulation layer. *E.g.*, EX1005-Yamazaki, abstract (applying the same deposition method, in particular ink-jetting and electric field application methods, to deposit emission layers and organic cover layers). The work therefore can be used to demonstrate reasonable diligence.

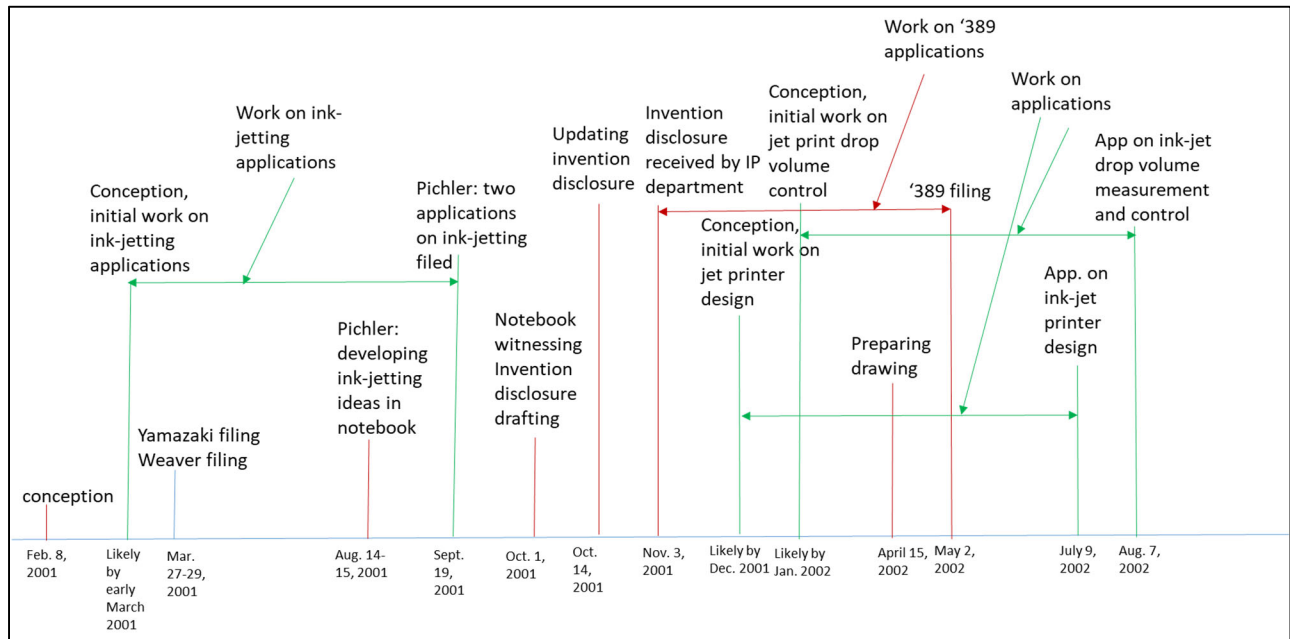
As EX2006 demonstrates, during the relevant time, it could take about 7 months after receiving the inventor disclosure before filing an application. *See* EX2006-389-ID, 42 (invention disclosure received on Nov. 3, 2001); EX1001, field 22 (May 2, 2002 filing date). Thus, the September 19, 2001 filing of the applications suggests that the invention disclosures for these applications would likely have been received by mid-March, 2001, before the filing dates of Yamazaki and Weaver. Work was then performed by the attorney and the inventors to file these inventions.

An application filed on July 9, 2002 by Pichler and co-inventor described an improved design for a print head of an ink-jet printer and ink-jetting method. EX2009-US2004/0009304, abstract. This was followed by an application filed on August 7, 2002 that describes novel ways to measure inkjet drop volume and thereby control ink-jet printing. EX2010-US7121642, abstract. These work on

improving ink-jet printing constituted qualifying work because ink-jetting was one of the proposed ways to selectively deposit the organic layer of the thin-film encapsulation at issue in the 389 patent. *E.g.*, EX2006 at 1 (discussing using ink-jetting to deposit organic layers). The July and August filing of the invention suggests that the invention was likely disclosed by early 2002, demonstrating reasonably continuous work by Inventor Pichler on selective deposition techniques after the October 2001 invention disclosure.

Other OSRAM engineers were also working in the critical time period on improving the selective deposition. For example, OSRAM filed an application on May 3, 2002 on improved targeted delivery of inkjet droplets. *E.g.*, EX2011-US6702419 (teaching using two cameras to help determine an angular displacement of the nozzle for targeted inkjet droplet delivery). The first named inventor of that application, Mr. Stoessel, is a co-inventor of EX2009-US2004/0009304 mentioned above. Thus work reflected in the '419 patent constituted efforts toward actual reduction to practice and thus was evidence of diligence. *E.g.*, *Scott v. Koyama*, 281 F.3d 1243, 1248-49, (Fed. Cir. 2002) (activities directed at building a plant to practice the claimed process of producing tetrafluoroethane on a large scale constituted efforts toward actual reduction to practice, and thus were evidence of diligence).

A timeline for these relevant activities are shown below.



These activities in the critical period provide substantial objective evidence of continuous improvement on creating a commercial OLED embodying the inventions during the critical period.

III. Yamazaki, Weaver, and Palanisamy Are Not Printed Publications under 35 U.S.C. § 311(b)

The AIA limits the basis for an IPR to “prior art consisting of patents or printed publications.” 35 U.S.C. §311(b). Yamazaki, Weaver and Palanisamy are not patents. They also do not qualify as “printed publications” because they are patent applications published after the effective filing date of the ‘389 patent. Specifically, Yamazaki was not published until November 6, 2003, more than 18 months after the filing date of the ‘389 patent (May 2, 2002); Weaver was not

published until October 3, 2002, about five months after the filing date of the ‘389 patent; and Palanisamy was not published until January 16, 2003, about 8.5 months after the filing date of the 389 patent. EX1001, field 22 (389 filing date was May 2, 2002), EX1005, field 43 (Yamazaki’s publication date was Nov. 6, 2003), EX1008 field 43 (Weaver’s publication date was Oct. 3, 2002); EX1007, field 43 (Palanisamy’s publication date was Jan. 16, 2003).

Pre-AIA patent law only refers to certain art as a “printed publication.” In particular, pre-AIA 35 U.S.C. § 102 provides that the prior art includes inventions that were “described in a printed publication ... before the invention,” §102(a), or “described in a printed publication ... more than one year prior to the date of [one’s] application for patent,” §102(b). The critical date for a “printed publication” is the date it is “**published**, *i.e.*, accessible to the public.” *Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1368, 1370 (Fed. Cir. 2019). Section 102(e), by contrast, includes no reference to “printed publication[s].”

Yamazaki, Weaver and Palanisamy did not become printed publications until their publication on November 3, 2002, October 3, 2002 and January 16, 2003 respectively, long after the filing date of the ‘389 patent. *Compare* EX1001, field 22 (May 2, 2002) *with* EX1005, field 43 (Nov. 6, 2003), EX1008 field 43 (Oct. 3, 2002), EX1007, field 43 (Jan. 16, 2003). Petitioner concedes that Yamazaki, Weaver and Palanisamy only qualify as prior art under pre-AIA 35

U.S.C. § 102(e). Pet. 3-4. But Section 102(e) does not even mention “printed publications” or describe a qualifying application as a printed publication before its date of publication.

As is well established, a “printed publication” prior art must be sufficiently accessible before the critical date. *In re Klopfenstein*, 380 F.3d 1345, 1348 n.2 (Fed. Cir. 2004) (quoting *In re Cronyn*, 890 F.2d 1158, 1160 (Fed. Cir. 1989) (“The statutory phrase ‘printed publication’ has been interpreted to mean that before the [relevant] date the reference must have been sufficiently accessible to the public interested in the art; dissemination and public accessibility are the keys to the legal *determination whether a prior art reference was ‘published.’*”)).

In *In re Nuvasive, Inc.*, 842 F.3d 1376 (Fed. Cir. 2016), the Federal Circuit observed:

Pursuant to § 311(b), “[a] petitioner in an inter partes review may request to cancel as unpatentable [one] or more claims of a patent only on a ground that could be raised under [§] 102 or [§] 103 and only on the basis of prior art consisting of patents or printed publications.” 35 U.S.C. § 311(b). Section 102 provides that prior art includes “printed publication[s]” describing the invention either “before the invention thereof” or “more than one year prior to the date of the [patent] application....” 35 U.S.C. § 102(a), (b).

Nuvasive, 842 F.3d at 1380. Thus, “printed publications” as defined in the Patent

Act and referenced in 311(b) are those qualifying references under 35 U.S.C.

§ 102(a), (b), and not a document—such as one qualifying as prior art only under 35 U.S.C. § 102(e)—that is published after the effective filing date of the challenged patent.

To determine whether Yamazaki, Weaver and Palanisamy are qualifying bases for the IPR, the critical question is whether they qualify as “printed publication” under the Patent Act on the critical date and not on some later date. *E.g., Valve Corp. v. Ironburg Inventions Ltd.*, 8 F.4th 1364, 1373 (Fed. Cir. 2021) (“For a reference to qualify as a printed publication, ‘before the critical date the reference must have been sufficiently accessible to the public interested in the art.’” (citations omitted)); *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012) (“When considering whether a given reference qualifies as a prior art ‘printed publication,’ the key inquiry is whether the reference was made ‘sufficiently accessible to the public interested in the art’ before the critical date.”); *In re Lister*, 583 F.3d 1307, 1311 (Fed. Cir. 2009) (“In order to qualify as a printed publication ..., a reference ‘must have been sufficiently accessible to the public interested in the art.’”); *In re Bayer*, 568 F.2d 1357, 1359 (C.C.P.A. 1978) (“It is well settled that in determining whether a printed document constitutes a publication bar ... the touchstone is public accessibility.”).

It is notable that, when the Congress enacted pre-AIA § 102(e)(1) in 1999 to add certain “secret” patent applications as a category of prior art, it did not redefine the term “printed publication” to encompass patent applications, but characterized this new category of prior art as “application for patent.” 35 U.S.C. § 102(e)(1). The choice was deliberate. Likewise, the Congress could have but chose not to include “application[s] for patent” as a proper basis for *inter partes* review; and the Congress’s deliberate choice must be respected.

It is undisputed that Yamazaki, Weaver and Palanisamy are patent applications published after the critical date and patent applications are kept confidential without public accessibility until their publication. 35 U.S.C. § 122(a) (a patent application “shall be kept in confidence by the Patent and Trademark Office” and subject to exceptions not relevant here, “no information concerning the [application shall be] given without authority of the applicant”). Thus, Yamazaki, Weaver and Palanisamy did not become publicly accessible until after the critical date of May 2, 2002 (the filing date of the ‘389 patent). They do not qualify as either “patents” or “printed publications” under the Patent Act; and all grounds fail.

IV. Claim Construction

For purposes of this POPR, Patent Owner applies the constructions that Petitioner’s real parties-in-interest (“Samsung”) propose in the district court, including those for “planarization layer” and “selectively depositing.” *See* EX2003

at 6-10 (pp. 3-7). This comports with 37 C.F.R. § 42.104(b)(3), (4), which requires the petition to identify “[h]ow the challenged claim is to be construed” and “[h]ow the construed claim is unpatentable under the statutory grounds identified in paragraph (b)(2) of [37 C.F.R. § 42.104].”

Samsung proposes in the district court that “planarization layer” means “a layer of material that planarizes such that the propagation of defects from one layer to another layer is interrupted and the topography of the underlying layer is not reproduced.” EX2003 at 6. Samsung’s expert contends that the construction is supported by the specification and the prosecution history. EX2002, ¶¶56-59; EX1002, 371 (applicants stating “this ‘sealing material 20’ is not a planarization layer since it is not used to interrupt the propagation of defects from one layer to another layer.”).

Samsung also proposes that “selectively depositing” means “depositing a material in only desired areas, such that no additional processing must be performed for removing unwanted material.” EX2003 at 10. According to Samsung’s expert, this construction finds support in the specification. EX2002, ¶¶64-66.

V. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Ground I

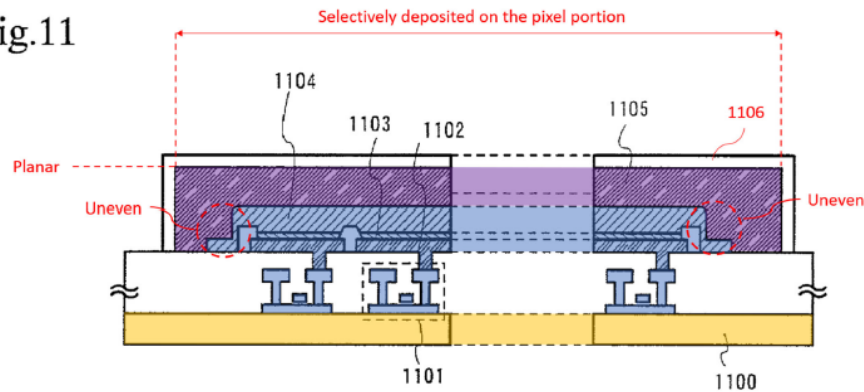
A. The Petition does not explain why Yamazaki discloses a “planarization layer” in accordance with Samsung’s construction

The Petition asserts that “Yamazaki’s cover layer 1105 constitutes a *planarization layer*.” Pet. 27 (emphasis in original). The Petition argues that cover layer 1105 is a planarization layer because it is “a material that ... has *planarity*” and “the uneven surfaces [below 1105] are planarized (flattened) by the cover layer.” *Id.* (emphasis in original). The Petition alleges that Yamazaki’s cover layer is a planarization layer because allegedly “it was known to use such an organic layer to ‘make[] a smooth surface on the relatively irregular surface of the cathode’ when forming OLED devices.” *Id.*

The Petition similarly asserts that Yamazaki’s “cover layer 1407 constitutes a planarization layer, because the top surface of cover layer 1407 is flat (i.e., planar) even though the underlying structure is uneven and thus the addition of layer 1407 results in a planar surface topography.” Pet. 28.

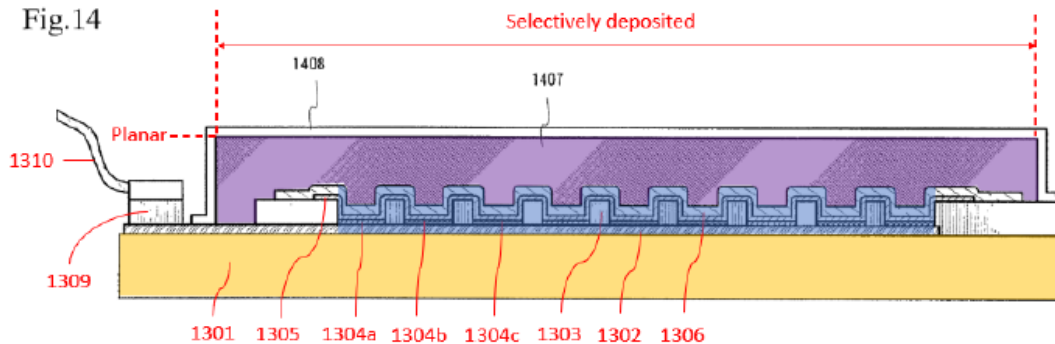
Put another way, Petitioner asserts that Yamazaki’s cover layers 1105 and 1407 are planarization layers because they have flat top surfaces that cover the allegedly uneven underlying topology, *i.e.*, the steps at the edges of the cathode (portions that Petitioner circled as “Uneven”).

Fig.11



(Pet. 26, annotation by Petitioner)

Fig.14



(Pet. 27, annotation by Petitioner)

Yet, the Petition provides no analysis whatsoever for why either layer 1105 or 1407 planarizes “such that the propagation of defects from one layer to another layer is interrupted,” as required by Samsung’s proposed construction. *See* EX2003 at 6-7; 37 C.F.R. § 42.104(b)(4) (requiring a petition to identify “[h]ow the construed claim is unpatentable ...”). Indeed, the Petition does not even assert that the underlying cathode structure has defects or that the “Uneven” surfaces in the annotated figures constitute defects. Pet. 26-29. The word “defect” or variations therefore does not appear anywhere in the Petition. *See* Petition

generally. Consequently, Petitioner has not shown that either 1105 or 1407 constitutes a planarization layer under Samsung's proposed construction.

B. A POSITA would not have used the method described in Yamazaki's Figure 11 (Embodiment 3) or Figure 14 (Alternative Embodiment 4) to arrive at the claimed inventions

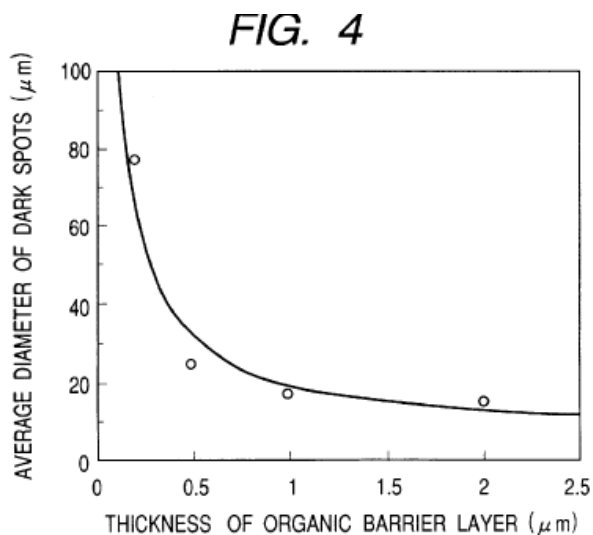
As Petitioner's own submitted references, such as EX1010-Kijima and EX1012-Suzuki, demonstrate, a POSITA would not have expected that OLED devices made in accordance with Yamazaki's embodiment 3 or the alternative embodiment 4 to provide acceptable performance and therefore would not have started with Yamazaki's methods.

1. A POSITA would recognize that Yamazaki's organic layer is too thin for effective protection

Yamazaki suggests that the organic barrier layer formed by its methods has preferably a thickness range "between 10 nm and 300 nm." EX1005-Yamazaki, [0177].¹ Suzuki discloses, however, large dark spots would form if the organic

¹ Yamazaki's first embodiments provides for a cover layer of "preferably 0.1 μm to 20 μm " "after forming a barrier layer." EX1005, [0090]. The properties stated in [0090] relate to "the cover layer 46 [formed] *at this point*," *i.e.*, "after forming a barrier layer." *Id.* But this structure, with the cover layer deposited on the barrier layer, is not relied on by Petitioner and does not disclose or suggest "depositing at

barrier layer in contact with the electrodes is below 0.5 micron (or 500 nm). *See* EX1012, Fig. 4, 7:11-14 (“The organic barrier layer 20 should preferably be form[ed] in a thickness of 0.5 μm or over in order to ensure good coverage of the unit U and to effectively intercept moisture therewith.”).²



(EX1012, Fig. 4)

According to Suzuki, an organic layer of sufficient thickness is needed because allegedly defects in cathodes would form due to “foreign matter inevitably
least one barrier layer over said planarization layer” recited in 34[c] because it is the planarization layer that is deposited over the barrier layer.

² Suzuki’s Figure 4 demonstrates that the thickness should be 1 μm or over because at 0.5 μm , the curve is still in the rapidly decreasing range, while at 1 μm or over, the size of the dark spots levels off. EX2001, ¶23.

deposited on the electroluminescent unit U during the course of the fabrication thereof” EX1012, 5:54-58. As explained above, according to Suzuki, these defects must be addressed by an organic layer having a thickness of 0.5 μm (500nm) or above as opposed to the 10-300nm thickness in Yamazaki. Suzuki, 9:8-9 (“As will be apparent from the figure [Fig. 4], the sealing effect is significant when the layer thickness is 0.5 [μm] or over.”).

Suzuki suggests using the same type of resins as Yamazaki. *Compare* EX1005-Yamazaki, [0178] (Yamazaki’s resins include “epoxy resin, acrylic resin, polyimide, polyamide, and silicon[e] resin”) *with* EX1012-Suzuki, 6:7-25 (preferred resins include those formed from trimethylol acrylates, long-chain acrylates, epoxy acrylates, urethane acrylates, ether acrylates) & 6:56-64 (preferred examples include TPAC, polymethyl methacrylate, polyethylene terephthalate and the like); EX2001, ¶25. Thus, to the extent that Suzuki’s teachings are universal (an assumption that Petitioner applies in IPR2024-01223 when it argues that a POSITA would have included Suzuki’s organic layer in Kijima), a POSITA who is aware of all the relevant prior art would recognize that Yamazaki’s organic layer would be ineffective in preventing oxygen and moisture intrusion or dark spot growths. EX2001, ¶25. “That is, in light of Suzuki’s experimental data and Yamazaki’s organic layer thickness, a person of ordinary skill in the art would recognize that Yamazaki’s organic layer would not be suitable for an OLED

devices and therefore would not started with Yamazaki's organic deposition method." *Id.*, ¶26. The ineffectiveness of Yamazaki's methods is consistent with the fact that Yamazaki does not report the performance data of its devices. *Id.*

Notably, there is also no evidence that inkjet printing and electric field application method would be able to deposit organic materials with sufficient thickness when deposited over the OLED devices. For example, "[u]nlike vacuum evaporation, Yamazaki's ink-jetting method and electric field application method both involve dissolving the organic material in a solvent and applying the solvent to the desired positions." EX2001, ¶22; EX1005-Yamazaki, [0182], [0012]-[0013]. "The solvent would then be removed to leave behind the organic material." EX2001, ¶22. When "several passes are made to build up the organic materials (something that Yamazaki does not disclose), each time the solvent would dissolve a bit of the deposited materials from the previous pass, changing the topologies and increasing the risk of defects as well as the risk of the material spreading onto undesired parts." *Id.* Petitioner does not provide any evidence to the contrary, and hence offers no evidence that Yamazaki's ink-jetting and electrical field application method could build up a sufficiently thick organic layer.

2. A POSITA would have deposited the organic layer under vacuum rather than under atmosphere in light of the state of the art

Yamazaki discloses applying the alleged planarization layer 1105 "using the

ink jet method.” EX1005-Yamazaki, [0178]. According to Yamazaki, when ink-jetting, “pressure is applied to the material chamber 1207 ... whereby the organic resin liquid provided in the material chamber 1207 is pushed out and then applied.” *Id.*, [0182]. Yamazaki also discloses forming a cover layer (*e.g.*, cover layer 1407) using an electric field application method. *E.g.*, *Id.*, [0202]-[0203] (cover layer formed using the same method as EL layer); [0188] (EL layer formed using electric field application method). The electric field application method “involves dissolving the cover layer material in a solvent to form an application liquid, atomizing the application liquid to create charged particles or droplets, controlling the application liquid by the electric field, and forming the cover layer over a substrate at the application position.” EX2001, ¶16; EX1005-Yamazaki, [0012]-[0013], [0038] (describing electric field application method in reference to EL layer, and “[t]he cover layer is formed by an application method that is similar to that for the formation of the EL layer”). Yamazaki further discloses using inert gas or “an atmosphere of the solvent” when depositing the EL layer. EX1005, [0087]. If Yamazaki “us[es] a same film deposition method to form the EL layer and the cover layer,” (EX1005, abstract), Yamazaki’s “organic cover layer would also be deposited under the same atmospheric conditions rather than under vacuum.” EX2001, ¶16.

Kijima warns against exposing devices to atmosphere before forming a

protective layer. *See* EX1010-Kijima, [0076]-[0081] (a comparative example to demonstrate “the adverse effects of exposing the element [OLED device] to the atmosphere before the formation of the conductive sealing film 7”). Kijima does not explain why the failure occurs when the devices are exposed to atmosphere before encapsulation, only that failure occurs. *Id.* Suzuki also discloses using vacuum deposition to apply the organic barrier layer followed by the inorganic barrier layers. *See* EX1012, 8:48-55 (vacuum depositing TPAC as an organic barrier layer over an electroluminescent unit, followed by thermal treatment and vacuum deposition of an inorganic barrier layer), 8:64-9:3 (same); 9:13-17 (same), 9:26-34 (same).

Given Kijima’s warning and the disclosure in Suzuki, a POSITA, who is supposedly aware of all relevant literature but has only one year of relevant experience would be dissuaded to use Yamazaki’s inkjet or electric field application method to apply the organic layer on the cathode “except under low pressure and controlled atmospheric conditions even when the cathode has other protective layers.” EX2001, ¶18.

A POSITA would also be aware that there is a higher risk of device degradation after the top electrode is deposited than when the EL is applied (before the top electrode is deposited). EX2001, ¶20. For example, Weaver states that the concern of susceptibility to oxygen and moisture arises mostly after the top

electrode, such as a cathode, is deposited:

In forming an OLED, a layer of metal is typically utilized as the cathode to ensure efficient electron injection and low operating voltages. However, metals and their interface with the organic material are susceptible to oxygen and moisture, which can severely limit the lifetime of the devices. Moreover, moisture and oxygen are also known to increase “dark spot areas” in connection with OLEDs.

EX1008-Weaver, [0004]. The top electrodes of Yamazaki are deposited after the emission layer. *E.g.*, Yamazaki, [0177] (“Provided on the EL layer 1103 is a cathode 1104” followed by formation of organic cover layer 1105), [0198]-[0199] (top electrodes formed after EL layer formation).

Thus, a POSITA “would recognize that, even if inkjet and the electric field application method that typically use atmospheric pressure may be suitable for depositing organic light emitting EL layers, the encapsulation steps after depositing the top electrodes should still take place under vacuum in order to obtain a suitable and operable OLED device.” EX2001, ¶20; EX1010-Kijima, [0076]-[0081] (comparative example 2, showing the “adverse effects of exposing the element to the atmosphere before the formation of the conductive sealing film 7”; Yamazaki’s devices in figures 3 and 14 examples would be in a comparable state—i.e., without any protective layer—when the organic cover layer is deposited), [0082]-[0087] (comparative example 3, showing “[t]he adverse effects of exposing the element to

the atmosphere before the formation of the insulating sealing film 8” (*i.e.*, the barrier layer). Hence, as Mr. Humphrey testifies, a POSITA “would not have started with Yamazaki’s embodiments that would have deposited the first encapsulation/protective layer under pressure, *e.g.* atmospheric pressure.”

EX2001, ¶20.

That Yamazaki’s methods might not yield satisfying results is consistent with the fact that Yamazaki does not report any performance data for the seven devices that it describes in the patent application. EX2001, ¶26. This is in contrast to Kijima and Suzuki which provide the performance data. *See* Kijima, [0054], [0064], [0068], [0072]; Suzuki, Figures 3-4; 8:6-9:49 (reporting average size for dark spots after 100 hours). A POSITA, with only one year of industry experience (Pet. 14-15), would have credited disclosures that provided verifiable performance data over disclosures with no performance data for reported devices. EX2001, ¶¶21, 16.

C. Petitioner has also not shown a reasonable likelihood to prevail on dependent claims

Petitioner also challenges claims 35, 37 and 40 under Ground 1.

Claim 35 requires the planarization layer to be “deposit[ed] by ink jet of an organic layer.” For reasons stated in Section B—*i.e.*, the resulting 10-300nm organic layer (EX1005, [0177]) would be too thin to be effective and the need to

break vacuum—a POSITA would be dissuaded to use Yamazaki’s ink-jetting.

Claim 37 requires depositing the planarization layer by “depositing an organic layer through a shadow mask.” Yamazaki’s inkjet method described for Embodiment 3 (Figure 11) does not mention the use of a mask. *See id.*, [0178]-[0182]; EX2001, ¶27, *see also id.*, ¶37 (Mr. Humphrey not aware “of any ink-jet printing method that also used a shadow mask in the 2001-2002 time frame or even today” and explaining that no shadow mask is used in ink-jet printing because “ink-jet printing is a patterned printing method whose deposition positions are controlled by print head instead of an external mask” and “[s]hadow masks are to be avoided whenever possible as they are notorious particulate defect generators due to unavoidable excess deposition material that builds up on the shadow mask and the frequent cleaning or replacement of the used shadow masks”).

Unable to find disclosure in embodiment 3, Petitioner points to [0202] which describes forming a cover layer 1308 “by the same method for forming the EL layer.” Pet. 33. But [0202] describes an embodiment in which the cover layer 1308 is deposited over an inorganic (barrier) layer, and not an embodiment in which the inorganic layer is over the cover layer. *See* EX1005-Yamazaki, [0203] (“The passive type self-light emitting device shown in FIG. 13 has a structure in which the barrier layer 1307 is formed on the EL element over the substrate, and the cover layer 1308 is formed on the barrier layer 1307.”). There is no

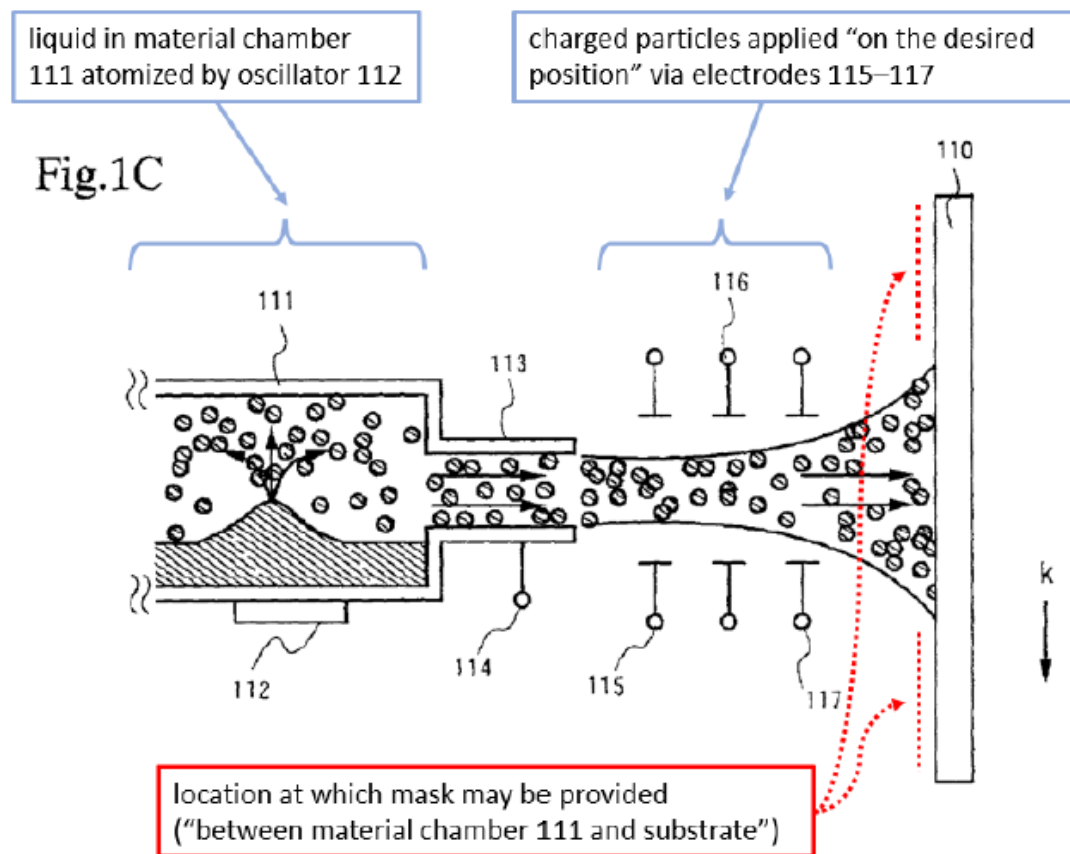
corresponding description for cover layer 1407. *Id.*

And even if the description for cover layer 1308 applies also to cover layer 1407, the application method of EL layer in embodiment 4 still does not mention the use of a mask. In particular, the EL is supposedly “formed by using the electric field application method described in Embodiment 1.” EX1005-Yamazaki, [0188]. The EL in Embodiment 1 is formed without the use of any mask. *See id.*, [0080]-[0085], [0016], Fig. 1C (no mask shown in the figure that illustrates “a thin film formation method of [Yamazaki’s] present invention”). Indeed, in the paragraph relied on by Petitioner, Yamazaki states, “although *not used herein*, a mask may be provided” EX1005, [0086]. That is, Yamazaki expressly discloses that the electric field application method of embodiment 1 does not use a mask. EX2001, ¶38 (Mr. Humphrey confirming that disclosures in [0086] “would indicate to a [POSITA] that the EL in embodiment 1 is formed without a mask”).

By extension, embodiment 4’s EL application and hence the organic cover layer application also would not involve the use of a mask. *Id.*, ¶28. This is consistent with Yamazaki’s description of EL application in embodiment 4, with no reference to mask whatsoever. *Id.*, [0188]-[0198]. In fact, Yamazaki states that “the application liquid for the EL layer is controlled by an electric field to thereby form the EL layer, resulting in making it possible to control the application position.” *Id.*, [0198]. That is, no mask is used to control where the liquid is

applied. EX2001, ¶28 (Mr. Humphrey noting that in Yamazaki, “electric field rather than mask controls where the application liquid will land or be applied to”).

Moreover, “even if a mask is used in the electric field application method, the mask is not a shadow mask because, as Samsung’s own annotation demonstrates, electrodes 115-117 define the positions at which the liquid is applied and the mask does nothing to further define that position” (*id.*, ¶¶ 28-29):



(Pet. 34)

Petitioner then argues that even if Yamazaki does not disclose a shadow mask, a POSITA would have nevertheless used Ghosh’s deposition method that

involved the use of a shadow mask. Pet. 34-35. As Petitioner acknowledges, Yamazaki discloses that the organic cover layer is formed “by the ink jet method or the electric field application method.” EX1005, [0011] (cited on Pet. 35). Petitioner argues that these are “known” methods described in Yamazaki [0007]. Pet. 35. Yamazaki [0007] references “[a] method in which an application is controlled by an electric field and an ink-jet method proposed by Seiko-Epson, Co.” Thus, [0007] does not reference any “known selective deposition methods” as Petitioner argues, but only ink-jetting and electric field application methods proposed by Seiko-Epson. *Contra* Pet. 35.

Ghosh, however, is neither by Seiko-Epson nor relates to ink-jetting or electric field application method. *See* EX1006 *generally*. Instead, Ghosh deposits its organic layer via “forming vapor phase monomer species able to condense and polymerize on the first dielectric oxide encapsulation layer.” EX1006, [0018]; *see also* [0032] (forming patterned first encapsulation layer 21 via a polymer layer using “shadow masking”); Pet. 36 (arguing that shadow masking allows use of “flash evaporation”). To the extent Petitioner’s argument is that because Yamazaki referenced Seiko-Epson’s proposed method in its background section, that somehow made using ink-jetting or electric-field application to deposit an encapsulation layer examples of “well-known, conventional” ways referenced by Ghosh, that is legally deficient. *Arendi S.A.R.L v. Apple Inc.*, 832 F. 3d 1355,

1365-66 (Fed. Cir. 2016) (searching by names or addresses for duplicative entries does not disclose an approach that searched for duplicative entries by telephone numbers). The Petition provides no evidence that Ghosh “even knew about Seiko-Epson’s ink-jetting or electric field application proposal to have included it as one of the referenced ‘well-known, conventional’ means.” EX2001, ¶33.

Indeed, the novel aspect of Yamazaki is “using a same film deposition method to form the EL layer and the cover layer.” EX1005, abstract. In other words, although Seiko-Epson proposed using ink-jetting and electric field application to deposit EL layer (*id.*, [0007]), it was Yamazaki that suggested trying the same with the cover layer (*id.*, abstract, [0008]). EX2001, ¶31. Hence, a POSITA would recognize that Seiko-Epson’s usage of ink-jetting or electric field to apply EL does not make using the same for an organic cover layer “well-known” or “conventional.” *Id.* (Mr. Humphrey concluding from Yamazaki’s disclosure that “applying the same EL application methods of ink-jetting and electric field application to organic cover layer is a novel aspect of Yamazaki, not known in the prior art”).

Nor does the Petition provide any evidence that Seiko’s proposal was known outside Seiko-Epson and Yamazaki inventors. For instance, the first commercial use of inkjet technology in display manufacturing did not occur until 2004, and only for color filters. *See* EX2012, abstract.

Indeed, Ghosh never mentions or suggests ink-jetting or electric field application methods. *See* EX1006 *generally*. Instead, Ghosh involves “shadow masking before layer formation and ablation ... following layer formation.” EX1006, [0032]. Petitioner ignores the ablation step, but that step is part of the alleged “well-known, conventional means.” As Mr. Humphrey observes, “Yamazaki never mentions such ablation steps in its electric field application method or ink-jet method; and a [POSITA] would not have linked Yamazaki’s electric field application method or ink-jet method with Ghosh’s laser ablation method.” EX2001, ¶34.

Petitioner also does not provide any reason for why a POSITA would have substituted Yamazaki’s electric field application method or ink-jet method—its point of novelty—with Ghosh’s evaporation method. Pet. 35-37. As the Federal Circuit has made clear, the fact that an alternative was known does not provide a motivation to use that alternative. *Virtek Vision Int’l ULC v. Assembly Guidance Sys.*, 97 F.4th 882, 886-87 (Fed. Cir. 2024) (holding that it was not enough that two alternative arrangements for computer controlled aiming system were known; a reason to modify must be provided); EX1005, [0011] (“The multi-chamber employed for the purpose of attaining the above object is a film deposition device which has an application chamber for forming the EL layer and the cover layer made of an organic material by the ink jet method or the electric field application

method”).

Yamazaki is aware of the evaporation method: it deposits cathodes by evaporation but does not suggest depositing the organic layer via evaporation. EX1005-Yamazaki, [0011]. Thus, Petitioner should have, but does not explain, why a POSITA would have altered Yamazaki’s principle operation to apply the organic layer using Ghosh’s vaporization method. *Plas-Pak Indus. v. Sulzer Mixpac AG*, 600 Fed. Appx. 755 (Fed. Cir 2015) (not obvious when the proposed combination would change the principle operation of the primary reference); EX2001, ¶36.

Finally, a deposition method that involves further removal of unwanted material as in Ghosh would not even qualify as “selectively depositing” a material under Petitioner’s understanding of the term “selectively depositing.” See EX2002-Schubert at 17 (Samsung construes “selectively depositing” as “depositing a material in only desired areas, *such that no additional steps must be performed for removing unwanted material*”); EX1006-Ghosh, [0032] (Ghosh’s well-known deposition step involves “shadow masking before layer formation and **ablation ... following layer formation.**”). Ablation involves material removal. EX2001, ¶33 n.1 (“ablation method would involve removal of unwanted method”). Hence, Petitioner has not even shown that Ghosh’s shadow masking method discloses “selectively depositing” an organic layer under Samsung’s construction

as required under 37 C.F.R. § 42.104(b)(3), (4), which requires a petition to identify “How the challenged claims is to be construed” and “How the construed claim is unpatentable” Because Ghosh’s method does not disclose a key element of claim 34 and claim 37 under Samsung’s construction, this provides an additional reason why Petitioner has not shown a reasonable likelihood to prevail on claim 37.

Claim 40 depends on claim 34. For the same reasons stated for claim 34, Petitioner has not shown a reasonable likelihood to prevail on claim 40.

VI. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Ground II

A. The Petition fails to make a *prima facie* case that a POSITA would have combined Yamazaki with Fujimori

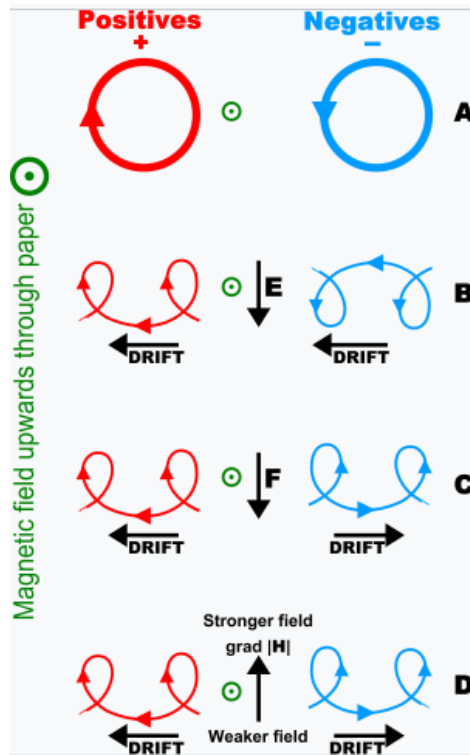
As explained in connection with claim 37—the discussion of which is incorporated herein by reference, Petitioner has not made a *prima facie* case for why a POSITA would have used a shadow mask with Yamazaki’s electric field application method or ink-jet method. Indeed, concerning the ink-jetting method described in embodiment 3, nothing in Yamazaki ever suggests using a mask in connection with applying the organic layer (the alleged “planarization layer”). *See* EX1005, [0179]-[0182]; *cf.* Palanisamy, [0021]-[0025] (ink jetting is distinct from methods such as shadow masking); EX2001, ¶37.

But even if they would have used a mask (as optionally in an electric field

application method outside Yamazaki's embodiments), there is no showing that a POSITA would have used a magnetized shadow mask in such a method or even that such a mask would be suitable for an electric field application method. There is no analysis on how the "electromagnet" used to adhere the mask and that "can electrically control the switching of the magnetic field" (Pet. 52) would alter the force operating on the charged particles. Nor is there any analysis on how the electromagnet would affect the trajectory of the charged particles to be deposited on the substrate and whether the effects could be controlled to reliably deposit the cover layer to the selected spots.

For instance, according to Lorentz force law, the force on a particle of charge q moving with a velocity v in an electric field E and a magnetic field B experience a force of $F = q(E + v \times B)$. EX2001, ¶41. That is, as Mr. Humphrey explains, "the force on the moving charged particle is a combination of (1) a force in the direction of the electric field E (proportional to the magnitude of the field and the quantity of charge), and (2) a force at right angles to both the magnetic field B and the velocity v of the charge (proportional to the magnitude of the field, the charge, and the velocity)." *Id.* "Thus, as the charge approaches the magnetic field, it veers off the path set by the electrodes 115-117 in Yamazaki Figure 1C." *Id.* "For instance, below are trajectories of a charged particle (A) in a homogenous field with no additional force; (B) in a homogenous field with an electric field; (C)

with a non-EM force such as gravity; and (D) in an inhomogeneous field with gradient H ." *Id.*



EX2013 at 8 (https://en.wikipedia.org/wiki/Lorentz_force)

As Mr. Humphrey explains:

The strength of a magnetic field experienced by a particle would vary depending on its distance from the magnet as well as its velocity (for instance, the particle may move at an accelerated velocity as it approaches the substrate). Thus, the Lorentz force on a charged particle would vary depending on the particle's distance from the magnet as well as the angle. As a result, there would not only be particle-to-particle variation within a material stream but also a time-dependent variation as the particles fly from the material chamber towards the

substrate, to the back of which a magnetic is attached at certain places.

This would introduce unpredictable change in the particles' trajectories, making it impractical to control the positions at which the particles will be deposited.

EX2001, ¶42; *see also* ¶40 (“The electromagnet would affect the trajectory of the charged particles to be deposited on the substrate and there is no indication that the resulting combined forces could be controlled to reliably deposit the cover layer to the selected spots”).

Simply put, Fujimori does not disclose or suggest that its magnetic mask and the attendant magnets used to adhere the mask are suitable for any and all deposition methods. In particular, it never mentions electric field application method or ink-jet method as a suitable deposition method with its modified masks. *See* EX1014, [0041] (evaporation), [0044] (same), [0046] (same), [0050] (same); EX2001, ¶¶39, 43. Thus, there is no evidence that applying the magnetic mask to Yamazaki’s electric field application method would constitute applying a known method to a similar application case with predictable results. This is not about the weight of evidence, but the complete absence of evidence. In fact, as Mr. Humphrey testifies, despite his decades of experience in the industry, and

[d]espite the proposed benefits of using a magnetically adhered mask, which was known in the art since the 1970s, I have never known of an instance where a magnetically attached shadow mask was used in

connection with an electric field application method, such as that described in Yamazaki. Similarly, electrostatic chucks commonly used in the display industry to accurately align and secure substrates, especially for masked film deposition processes, are not commonly used in conjunction with magnetic masks to my knowledge.

EX2001, ¶38. That the industry has never combined an electric field application method with a magnetized mask in over half a century is strong objective evidence that such a combination is not obvious.

Additionally, Fujimori does not use its magnetic masks for depositing encapsulation layers: it was only used for depositing electrodes and emission layers. Fujimori, [0041] (Al electrode), [0044] (Al electrode), [0046] (lithium doping and Al electrode), [0050] (emission layer and electrode), [0049] (despite disclosure in [0027], non-emitting black matrix region was applied using spin-coating followed by photolithography without the use of the magnetic mask); EX2001, ¶¶44-45. This is not surprising because Fujimori's reason to use the magnetic mask is to prevent "a short in the elements [or] cross-talk" caused by the deteriorated adhesion of the mask to the substrate. EX1014, [0008]. Depositing an insulating organic layer would not cause the same concern. *Cf.*, Fujimori [0049] (not using masks for depositing insulating spacer and black matrix). EX2001, ¶45.

Additionally, unlike EL and electrodes that need to be deposited at fine pitches and would benefit from the finer resolution resulting from the better

adhesion to the substrate afforded by a magnetic mask, encapsulation layers “generally do[] not require such higher resolutions.” EX2001, ¶44. “As a result, need for good adhesions to ensure very fine resolutions is absent in encapsulation at the time of the inventions and there would therefore be no market or design need for a [POSITA] to use a mask with good adhesions, such as a magnetized mask as disclosed by Fujimori, for encapsulation processing, especially when its usage would cause unpredictable interfere with the electric field controlled charged particle flight path.” *Id.* Hence, nothing in the record suggests applying Fujimori’s mask to Yamazaki’s methods of forming insulating organic cover layers.

B. The combination still fails to disclose multiple limitations

1. No disclosure or suggestion of “planarization layer”

As explained for Ground 1, Petitioner has not shown that Yamazaki discloses or suggests a “planarization layer” as Samsung has construed. The same defect exists in Ground 2. *See* Pet. 49-51 (Petitioner not explaining why Yamazaki’s organic layer allegedly would “interrupt[]” “the propagation of defects from one layer to another layer” as required by its own construction). It is Petitioner’s burden to specifically point out “[h]ow the construed claim is unpatentable under the statutory grounds identified” in the petition, including “specify[ing] where each element of the claim is found in the prior art patents or

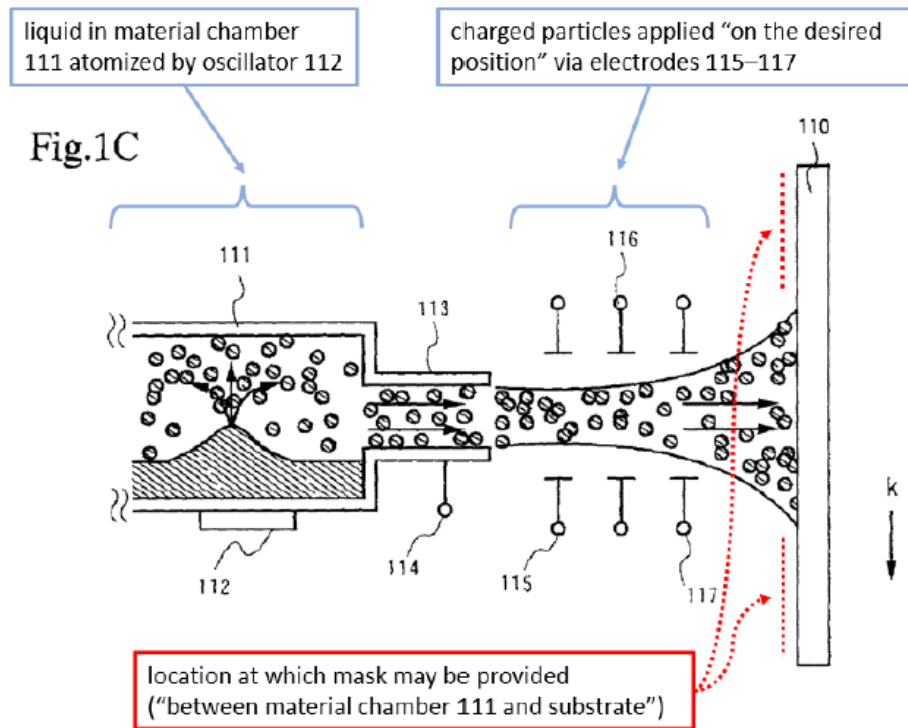
printed publications relied on.” 37 C.F.R. § 42.104(b)(4). The Petition fails to explain where “planarization layer” as Samsung construes is found in Yamazaki.

2. No disclosure or suggestion of 41[b]

Even if a POSITA would have used Fujimori’s mask, nothing in Yamazaki suggests that a mask should be “deposit[ed] ... on top of [the] substrate” as in element 41[b]. Specifically, [0086] relied on Petitioner states that “a mask may be provided *between* the material chamber 111 and the substrate to thereby control the positions on the substrate at which the application liquid is via the mask.”

EX1005-Yamazaki, [0086]. “Between” does not mean the mask is deposited “on top of” or in contact with the substrate as Petitioner suggests. Pet. 42-45 (arguing for the use of Fujimori’s magnetized mask for added adhesion between the substrate and mask).

Rather, as Petitioner’s own figure correctly shows, in Yamazaki, if a mask is used, the mask would not be in contact with the substrate. *See* Pet. 34 (reproduced below); EX2001, ¶47 (“A [POSITA] would not understand placing a mask ‘between the material chamber ... and the substrate’ as requiring the mask to be placed in physical contact with the substrate as Samsung suggests.”).

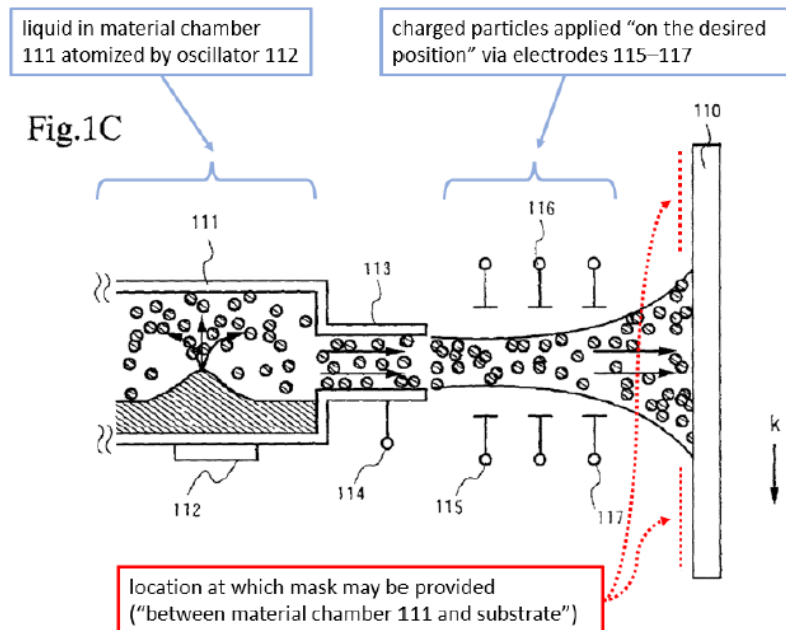


(Pet. 34)

If the mask is not even in contact with the substrate (directly or indirectly), then there would be no motivation to improve adhesion between the mask and the substrate by using a magnetized mask. Put another way, Petitioner has not shown that concerns expressed by Fujimori—that material would bleed below the mask due to warpage and other factors—would even apply to Yamazaki's electric field application method (or the ink-jetting method) such that a POSITA would have modified Yamazaki to ensure that it adheres to the substrate as Petitioner suggests. EX2001, ¶48.

3. No disclosure or suggestion of 41[c]

Petitioner points to Fujimori's disclosure that "organic material or electrode material flying towards the substrate *in vapor deposition* or the like is deposited on the substrate through the mask opening" to argue that the same is true in Yamazaki. Pet. 51. But Yamazaki does not involve vapor deposition or the like: there is no showing that ink-jetting or electric field application would occur similarly to vapor deposition. There is thus no evidence that what happens in vapor deposition would also happen in electrical field application method.



(Pet. 34 (no deposition of charged particles on the mask as illustrated))

Indeed, as Petitioner's own annotation shows, electrodes 115-117 control the trajectory of the charged particles and "[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.” EX2001, ¶49; *contra* Pet. 51. That is, Petitioner has not provided any competent evidence that the combination discloses element 41[c], which recites “*depositing at least one planarization layer upon said mask* and said plurality of devices.” As Mr. Humphrey confirms, “[i]n Samsung’s own annotation, the organic materials is deposited on the devices, but *not also ‘upon said mask.’*” EX2001, ¶49 ().

4. No disclosure or suggestion of 41[d]

Because in Yamazaki, even when a mask is used, it is a distance away from the substrate, there is also no “removing said mask *from* said substrate” as recited by element 41[d]. EX2001, ¶50.

Petitioner argues that the mask “would need to be removed after forming the cover layer, in order to subsequently deposit the barrier layer.” Pet. 51. Not so. “For example, the distance between the mask and the substrate can be adjusted to control the area of coverage in a manner similar to that disclosed in Weaver.” EX2001, ¶51 (citing EX1008, Fig. 9, [0060], which discloses “as shown in FIG. 9, each deposition source can have the same aperture. However, in this embodiment, each source 221b-c and 222 a-c is provided at a larger distance from the substrate than is the adjacent upstream source ... such that the material being deposited from each source again covers a progressively wider area as the substrate proceeds downstream”).

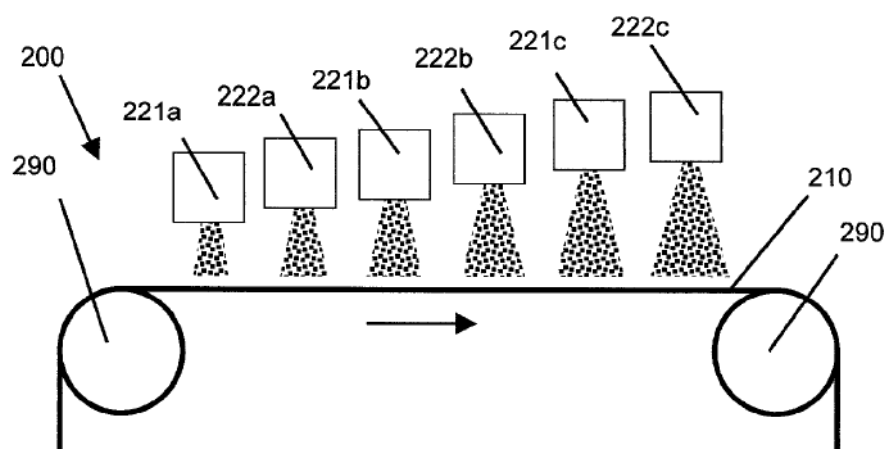
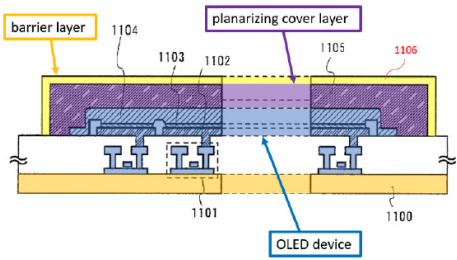
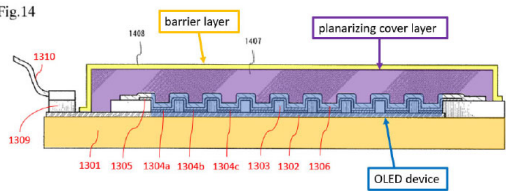
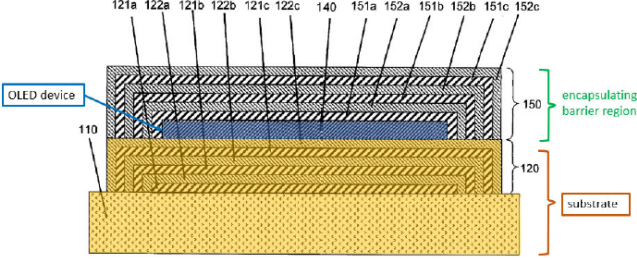


Fig. 9

Notably, even without a mask, Weaver's deposition also results in a subsequent layer wrapping around a previously deposited layer, just as in Yamazaki, as shown below.

Yamazaki	Weaver
Fig. 11  Fig. 14  (Yellow barrier layer surrounding the purple planarization layer)	Fig. 6  (barrier layer 151b surrounding the planarization layer 151a)

Hence, there is no need for the mask to be removed before proceeding to the barrier layer deposition. Instead, the distance between the mask and the substrate can be adjusted to control the area of deposition. See EX1005-Yamazaki, [0086] (“[A]lthough not used herein, a mask may be provided between the material chamber 111 and the substrate to thereby control the positions on the substrate at which the application liquid is via the mask.”).

C. Petitioner also fails to make a *prima facie* case of obviousness for claims 42-46

Because claims 42-46 depend on claim 41, for at least the same reasons as stated for claim 41, Petitioner has not made a *prima facie* case of obviousness

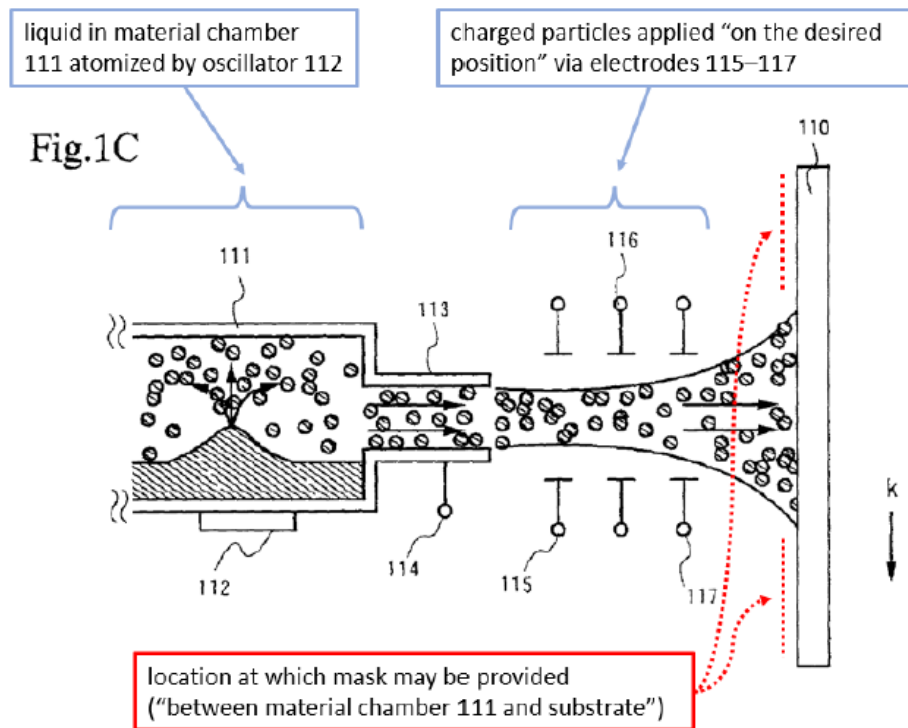
against claims 42-46.

In addition, for reasons stated in Section VI.B.2, Petitioner has not demonstrated that a POSITA would have deposited a mask “in contact with the substrate” as required by claim 43. That is, Yamazaki at most suggests providing a mask “between” the material chamber 111 and substrate, and not “in contact with the substrate.” *See* EX1005, [0086]; EX2001, ¶¶ 46-47 (“A [POSITA] would not understand placing a mask ‘between the material chamber ... and the substrate’ as requiring the mask to be placed in physical contact with the substrate as Samsung suggests”).

Additionally, because Yamazaki’s mask would not be in contact with the substrate, there is no need for the material to be non-sticking to the OLED substrate over the areas in between the active areas, as required by claim 44. EX2001, ¶53 (“because Yamazaki’s mask is not in contact with the substrate, there is no need for the material to be non-sticking to the OLED substrate over the areas in between the active areas, as required by claim 44”).

Additionally, for reasons stated in Section VI.B.3, according to Petitioner’s own illustration, the organic material simply passes through the mask opening without depositing on the mask, let alone “over the entire mask” as required by claim 46. *Id.*, ¶49 (“In Samsung’s own annotation, the organic materials is deposited on the devices, but not also ‘upon said mask.’ And Samsung’s own

depiction also does not show that the organic material is deposited ‘over the entire mask’ as recited in claim 46”).



(Pet. 34 (no deposition of charged particles on the mask as illustrated))

VII. Petitioner Has Not Shown a Reasonable Likelihood to Prevail on Grounds III-V

A. Petitioner does not explain why Weaver discloses a “planarization layer” under Samsung’s construction

Petitioner also challenges claims 34, 35-37 and 40 based Weaver and one or more secondary references. But as for Yamazaki-based references, Petitioner also fails to demonstrate that Weaver discloses a planarization layer under its own construction. Pet. 63-84. Specifically, Samsung argues that “planarization layer”

means “a layer of material that planarizes such that the propagation of defects from one layer to another layer is interrupted and the topography of the underlying layer is not reproduced.” EX2003 at 6. Samsung’s expert claims that the construction is based on intrinsic evidence. *E.g.*, EX2002-Schubert, ¶¶53, 58-59 (arguing for instance that inventors made statements during prosecution that support Samsung’s proposed construction).

But Weaver only describes its “planarizing material” as “a material that forms a smooth planar surface upon application, rather than forming a surface that reflects irregular contours of the underlying surface.” EX1008, [0035]. The Petition likewise only argues that Weaver’s “planarizing layer 151a constitutes a *planarization layer* because it is used to form a smooth planar surface,” citing to Weaver, [0035]. Pet. 71. The Petition is silent on whether Weaver’s layer 151a enables “the propagation of defects from one layer to another [to be] interrupted” as Samsung’s definition requires. *See* Pet. 70-73. Thus, there is a complete failure of proof under 37 C.F.R. § 42.104(b)(3), (4), which requires a petition to identify “How the challenged claims is to be construed” and “How the construed claim is unpatentable”

Additionally, Petitioner has not even shown that Weaver’s planarizing layer does not reproduce the topology of the underlying layer, as also require by Samsung’s construction of the term “planarization layer.” To the contrary,

Weaver's planarizing layer reproduces the underlying topology. EX2001, ¶¶54-55.

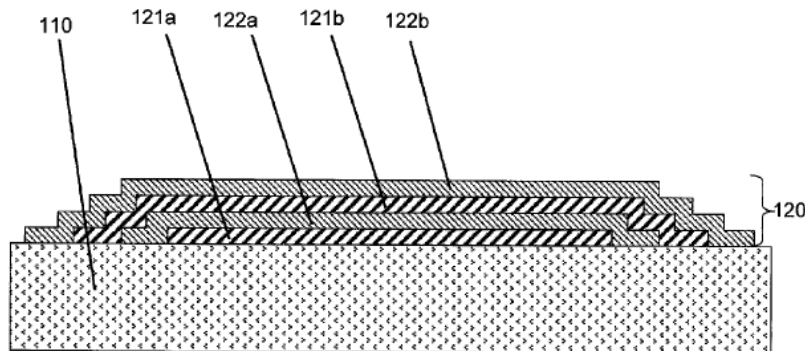


Fig. 5

As Mr. Humphrey observes:

For example, in Figure 5 above, planarizing layer 121a follows the surface topology of the underlying substrate 110 and the planarizing layer 121b follows the topology of high-density layer 122a. For instance, where the high-density layer 122a has steps along the edges the deposition, so does 122a. And where the substrate has a general flat topology (except for unintentionally created surface irregularity), the planarizing layer also has that topology. In other words, Weaver's "planarizing layer" reproduces the topology of the underlying layer.

Id., ¶55. In other words, Weaver's "planarizing layer" reproduces the topology of the underlying layer and therefore does not meet Samsung's own definition of "planarization layer." *Id.* The same is true for the relied-on Figure 6, in which "layers 151a-c follow the topology of the underlying layers 140, 152a-b respectively."

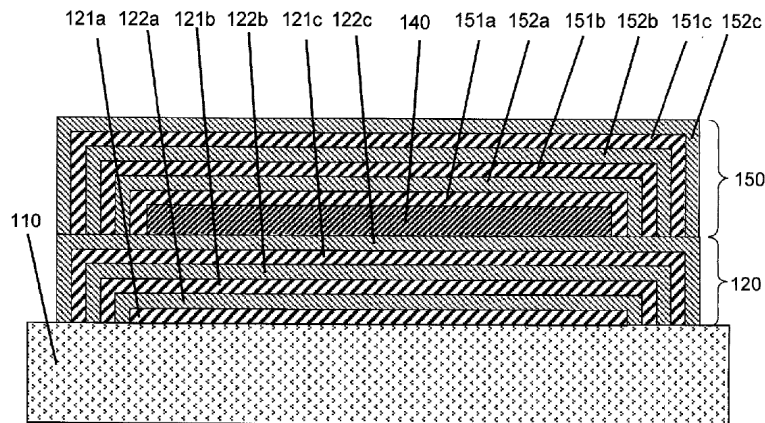


Fig. 6

Because all challenges in Grounds III-IV rely solely on Weaver to supply the “planarization layer” limitation, all Weaver-based challenges fail as a matter of law.

B. Petitioner has not offered competent evidence to demonstrate that Weaver performs selective deposition

Petitioner argues that because successive planarization layers and high-density layers each completely covers an underlying layer and because Weaver uses nozzles with predefined apertures, Weaver discloses selectively depositing it planarizing layers and high-density (barrier) layers. Pet. 72-73, 75-76. But Weaver discloses that it controls the coverage area by controlling the amount of materials. *E.g.*, Weaver, [0059] (“In FIG. 8, each deposition source is provided with an aperture that is larger than that of the adjacent upstream source ... such that the material being deposited from each source progressively covers a wider area as the substrate proceeds downstream”); EX2001, ¶56 (“Weaver does not

intentionally create a patterned deposition as in ink-jet printing of encapsulation layers”).

C. Petitioner provides no competent reason for depositing Weaver’s organic layer using ink-jetting (claim 35)

For claim 34, Petitioner relies on Weaver’s disclosure in Figure 8 to argue that the planarization layer is allegedly deposited selectively. Pet. 71-73. Figure 8 depicts a web-based processing technique. EX1008, [0057]. According to Weaver, in the Figure 8 embodiment, the preferred sources for depositing the planarization layer are “thermal evaporation, organic vapor phase deposition (OVPD), chemical vapor deposition (CVD), spraying and flash evaporation sources.” *Id.* Ink-jetting is not mentioned. *Id.*

Petitioner argues that a POSITA would have deposited the planarization layer using ink-jetting because it was one of the techniques known in the art for selectively depositing an organic layer. Pet. 77-78. That argument fails as a matter of law. *Virtek*, 97 F. 4th at 886-87 (the existence of two interchangeable alternatives does not supply a reason for replacing one with the other).

Petitioner also argues that a POSITA would have used ink-jetting to “minimize[] risk of contamination” because “ink jet printing is a non-contact deposition technique.” Pet. 79. But the web-based process shown in Figure 8 also uses a “non-contact deposition technique” that, according to Petitioner’s logic,

would already pose no risk of contamination. *See* Fig. 8 (see below for figure annotated by Petitioner); EX2001, ¶58 (“Weaver’s web-based process shown in Figure 8 already uses a ‘non-contact deposition technique,’ so it also would have a minimized contamination risk under Samsung’s theory.”).

Petitioner also contends that a POSITA would have used ink-jetting because it is “a directed deposition technique.” Pet. 79. But so is Weaver’s existing method, as Mr. Humphrey confirms. *See* Fig. 8 (nozzle directing material to the deposition area); EX2001, ¶59.

Petitioner also argues that ink-jetting is “conducive to depositing multiple coats, allowing for the deposition of thicker layers.” Pet. 79. Again, so can Weaver’s existing method that used multiple nozzles, each depositing one layer of material, as Mr. Humphrey confirms. *See* Fig. 8 (annotation by Petitioner below); EX2001, ¶60; *see also* ¶22 & ¶60 n.3 (solution in ink-jetting ink would dissolve previously deposited material such that “multiple coats would increase the risk of the solution re-dissolving a portion of already deposited and dried ink material and the risk of the materials seeping to adjacent regions”).

Mr. Humphrey also confirms that Weaver’s methods can also provide scalability by ganging together large numbers of nozzle heads to “rapidly print over large areas.” Pet. 79; EX2001, ¶60. “For example, Figure 8 shows just one nozzle array for one cross-sectional area, and in practice, there are other cross-

sectional areas (not shown) with similar nozzle arrays.” *Id.*

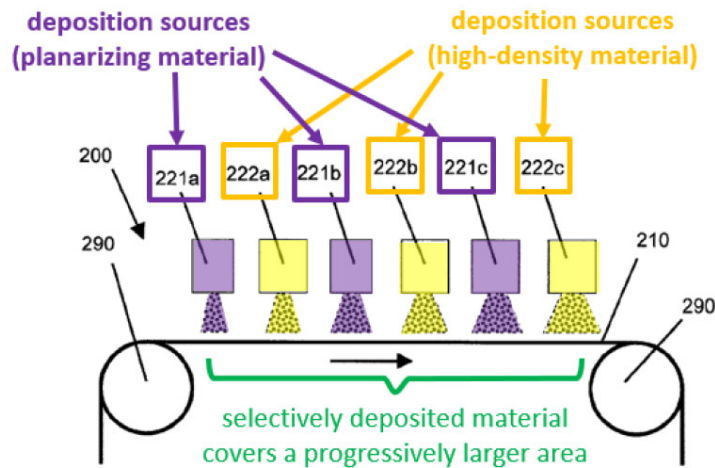


Fig. 8

(Pet. 66).

As Mr. Humphrey explains:

[I]n the above annotated figure, the nozzles are above the substrate and do not contact the moving substrate, and therefore have a minimal risk of contamination. In addition, each nozzle in the nozzle array directs the desired amount of materials to the substrate to add one coated layer to form multiple coats as illustrated in Weaver Figures 4-6, and there can be multiple nozzle arrays for scalability. Put another way, Weaver’s method already provides the same alleged benefits as ink-jetting, but does so without using an ink-jet head. A [POSITA] would not have substituted Weaver’s method with ink-jetting that does not seem to have any added benefits, but would require an ink-jet printer that adds costs, but no associated benefits.

EX2001, ¶61. The Petition and the associated Subramanian declaration do not provide any evidence to the contrary, as they do not explain why a POSITA would have replaced Weaver’s existing method with ink-jetting when the existing method already provides the alleged functionality of ink-jetting at lower cost (without the need for an ink-jet printer). In effect, Petitioner at most argues that ink-jetting could be used for Weaver, but it does not provide any cogent reason for why a POSITA would have replaced Weaver’s method with ink-jetting. *Belden*, 805 F.3d at 1073 (“[O]bviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention.”).

That “ink jetting *may be* used as part of a continuous or web-based processing technique as taught in Weaver” (Pet. 80) does not mean a POSITA would have done so. As in *Virtek*, Petitioner here also fails to provide any competent evidence on why a POSITA would have replaced Weaver’s existing method with ink-jetting.

Nor is there any competent evidence that ink-jetting is “one of a finite number of predictable solutions for ‘selectively applying an organic passivation material’ for OLEDs.” *Contra* Pet. 80. Although Weaver gave many specific examples of suitable techniques for depositing the planarization layers—ranging from dipping, spin coating, spraying to various evaporation techniques (OVPD,

CVD, flash evaporation) and sputtering—ink-jetting was not mentioned. EX1008, [0035], [0057]. “The existence of many other choices indicates that ink-jetting is not just one of a finite number of choices, but that it is one of a large number of choices.” EX2001, ¶62.

In summary, there is no competent evidence that a POSITA would have used ink-jetting in the context of Weaver.

D. Petitioner provides no competent reason for depositing Weaver’s organic layer using screen printing (claim 36)

Petitioner also argues that a POSITA would have replaced Weaver’s web-based processes shown in Figure 8 with screen printing. Pet. 81-84 (claim 36), 71-73 (relying on Weaver Figure 8 for depositing planarization layer). But as with ink-jet printing, the preferred sources for depositing the planarization layer in Weaver’s Figure 8 embodiment does not include screen-printing. Weaver, [0057] (the list of preferred sources does not mention screen printing).

Furthermore, neither Petitioner nor its expert has provided any evidence that the screen-printing process would be suitable for successively depositing progressively larger cooperative barrier layers as in Weaver. Pet. 82-84. Palanisamy, for example, does not involve depositing multiple layers successively. *See* Palanisamy, [0024]-[0026]; EX2001, ¶64. Mr. Humphrey voices his doubt because “it is not clear how screen printing could yield the ‘progressively larger

cooperative barrier layers' that are at the heart of Weaver." EX2001, ¶63. A modification is not obvious when the proposed combination would change the principle operation of the primary reference. *Plas-Pak*, 600 Fed. Appx. 755.

Petitioner argues nevertheless that the substitution is obvious because "screen printing was among the 'techniques known in the art' for selectively depositing [a] planarizing layer." Pet. 81-82. That argument fails as a matter of law. *Virtek*, 97 F.4th at 886-87 (even when two alternatives are interchangeable, that does not supply a reason for replacing one with the other; let alone when screen-printing and web-pages processes are not interchangeable).

Petitioner also argues that a POSITA would have used screen printing because it allegedly provided for "rapid processing time at lower temperatures," and "enabl[ed] a range of material viscosities to be used for Weaver's planarizing layer 151a." Pet. 83 (cleaned up). But while Weaver's method allows for continuous deposition of the successive layers with progressive larger cooperative barrier layers as the substrate moves through the process line, it is unclear how this could be achieved with screen-printing. Pet. 82-84. As Mr. Humphrey observes, "a new screen would need to be set down and then removed for each successive layer," and "[t]his would add process steps and reduce, rather than increase, the process speed." EX2001, ¶64. In other words, the proposed substitution would harm, rather than improve, Weaver's processing time. Nor is it clear why screen-

printing would operate at a lower temperature than Weaver's web-page process or why being able to use a range of material viscosities is a desirable or even suitable choice for Weaver's continuous process. Pet. 82-84.

Screen-printing is also not "one of a finite number of predictable solutions for 'selectively applying an organic passivation material' for OLEDs," especially in the context of Weaver, which specifically requires the barrier stacks to include multiple layers, each upper layer cooperatively enveloping the layer immediately below. *See* Weaver, [0038] (explaining that in the traditional method, after cutting a large sheet to produce an OLED structure, the edges of the barrier layers would be exposed to moisture and oxygen), [0052] & Fig. 6 (Weaver's barrier stacks include progressively enveloped multi-layer structure). Although Weaver gave many specific examples of suitable techniques for depositing the planarization layers—ranging from dipping, spin coating, spraying to various evaporation techniques (OVPD, CVD, flash evaporation) and sputtering—screen printing was not mentioned. EX1008, [0035], [0057]. "The existence of many other choices indicates that ink-jetting is not just one of a finite number of choices, but that it is one of a large number of choices." EX2001, ¶65.

In summary, there is no competent evidence that a POSITA would have used screen printing in the context of Weaver.

E. Petitioner provides no competent reason for depositing Weaver’s organic layer using a shadow mask (claim 37)

According to Petitioner, the fact that Weaver’s nozzles have respective apertures somehow suggest the use of a shadow mask, because “[a] ‘shadow’ mask is a mask having apertures” Pet. 85 (emphasis in original). Petitioner does not explain why a method that relies on the aperture size in **nozzles** but **without the use of a mask** would have inspired a POSITA to use a method with an aperture size in **masks**. The Federal Circuit has rejected that type of reasoning when it found in *Arendi* that searching by names or addresses for duplicative entries does not render obvious an approach that searched for duplicative entries by telephone numbers. *Arendi S.A.R.L v. Apple Inc.*, 832 F. 3d 1355, 1365-66 (Fed. Cir. 2016); *see also* EX2001, ¶66 (Mr. Humphrey confirming “an aperture in **nozzles** has nothing to do with an aperture size in **masks**, and the reference to one would not suggest the other to a [POSITA]”).

Nowhere in the Petition does Petitioner explain why a POSITA would have replaced Weaver’s method with Burrow’s approach, other than that Burrow’s mask-based method was a known technique that allegedly could be used in Weaver’s web-based process. Pet. 85-89. As the Federal Circuit has made clear, that a technique was known in the art does not make it obvious to substitute the existing technique with that also-known technique. *Virtek*, 97 F. 4th at 887-89.

No reason was given as to why a POSITA would have substituted Weaver's existing nozzle-based approach that does away the use of a mask with one that uses a shadow mask. Pet. 85-89. For instance, there is no analysis whatsoever as to why "Weaver's Figure 8 apparatus for web-based processing of OLED devices" was allegedly "ready for improvement." Pet. 89. There is not even a reference to what the alleged drawbacks were for Weaver's Figure 8 apparatus.

In fact, the Burrow's method would be more costly than Weaver's with no clear advantages. EX2001, ¶68. As Mr. Humphrey explains:

For example, Weaver's Figure 8 apparatus could deposit progressively larger cooperative barrier layers without the use of shadow masks and different work stations. *See* EX1008, Fig. 8, [0057]-[0059]. In contrast, Burrow's method needs not only additional equipment (shadow masks and process stations), but also additional process steps to align the masks with the substrate, to remove the masks in order to deposit barrier layers that cover a larger area, and to move the substrate through different processing stations. *See* Burrows, 8:10-47. Thus, replacing Weaver with Burrow's method would not be an improvement but a step-back.

Id.

Petitioner then argues that a POSITA would have used Burrow's approach because allegedly "a shadow mask allows precise control of the positions on the substrate where the planarizing layers are formed." Pet. 90. That argument is

made without any support and therefore amounts to conclusory attorney argument that is not evidence and has no weight. *Elbit Systems of Am., LLC v. Thales Visionix, Inc.*, 881 F. 3d 1354, 1359 (“attorney argument is not evidence”) (cleaned up).

If Petitioner argues that the statement is supported by its block citation to the 8-page declaration of its expert, spanning the entirety of his declaration regarding claim 37, that would be an impermissible incorporation by reference that the Board should reject and ignore. *Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 (PTAB, Aug. 29, 2014). At any rate, the expert’s statement that “a POSITA would further be motivated to use this approach, as using a shadow mask allows *a good control* of the positions on the substrate where the planarizing layers are formed” is conclusory and does not support the Petition’s assertion that shadow masking “allows *precise* control of the positions on the substrate.” Compare EX1003, ¶222 with Pet. 90. The expert does not assert, for example, that Weaver’s method would not already have provided good control of the deposition positions or that Burrow’s would improve Weaver (*e.g.*, in terms of improved precision, less material waste, or some other improvement). This is a required showing because Petitioner’s obviousness theory is that Weaver’s Figure 8 apparatus was allegedly “ready for improvement.” Pet. 89. As such, it needs to show what improvement Burrows can bring to Weaver.

Finally, Petitioner makes the strawman argument that “a shadow mask can be used in conjunction with other processes for depositing a layer of liquid material, such as flash evaporation.” Pet. 90. That statement does not explain why a POSITA would have used a shadow mask in place of Weaver’s Figure 8 apparatus that does away with shadow masking and that Petitioner relies on for claim 34, from which claim 37 depends.

In summary, because Petitioner’s obviousness analysis amounts to no more than Burrow’s method *could have been* used, rather than why it *would have been* used, Petitioner’s obviousness ground as to claim 37 fails. *Belden*, 805 F.3d at 1073 (“[O]bviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention.”).

VIII. The Board Should Exercise Its Discretion Under 314(a)

The Board should exercise its discretion to deny the Petition under 35 U.S.C. § 314(a) and *Apple Inc. v. Fintiv, Inc.*, IPR2020-0019, Paper 11 (PTAB Mar. 20, 2020) (precedential), in view of the co-pending litigation, *Pictiva Displays Int’l Ltd. v. Samsung Elecs. Co.*, No. 2:23-cv-0495 (E.D. Tex.) (Gilstrap, J.).

First, Petitioner has not requested a stay in the co-pending litigation, nor is there evidence that Judge Gilstrap would grant a stay if a trial is instituted. In fact, Judge Gilstrap frequently denies stays in such cases. *E.g., Netlist, Inc. v. Micron*

Tech., Inc., Civ. No. 2:22-cv-00294-JRG, Dkt. 72 (ED. Tex. Mar. 12, 2024) (denying motion to stay pending instituted IPRs); *Netlist, Inc. v. Samsung Elec. Co.*, Civ. No. 2:22-cv-00293-JRG, Dkt. 180 (ED. Tex. Oct. 17, 2023) (denying motion to stay pending instituted IPRs); *id.*, Dkt. 689 (Mar. 11, 2024) (same).

Second, as Petitioner acknowledges, trial is scheduled for August 4, 2025, (Pet. 90; EX2014 at 1), more than seven months before the projected statutory deadline of early March 2026 for a final written decision here. And August 4, 2025, is about 21.6 months from October 19, 2023, the date when Pictiva filed its complaint against Samsung, which is also the median time-to-trial in the Eastern District of Texas. *See* EX2015, at 35. Notably, the Board recently declined to institute another IPR involving a petition filed by Petitioner (with the same real parties-in-interest) (with the POPR due nearly 3.5 months prior to this POPR) challenging a different Pictiva patent involved in the same district court litigation, finding that this factor “favors denial based on the trial date set for the District Court action, as well as the District Court’s median time-to-trial data.” *Samsung Display Co. v. Pictiva Displays Int’l Ltd.*, IPR2024-00855, Paper 12, at 8-9 (PTAB Nov. 19, 2024).

Third, on the current schedule, by the projected institution date, the parties would have completed fact discovery, the court would have already held a *Markman* hearing, and opening expert reports would be due in a week. *See*

EX2014, at 3-4. In the IPR2024-00855 decision, the Board found that this factor favored Samsung, but in that case, the Board noted that it was “directed to no substantive orders issued by the District Court” or evidence of “concrete discovery activity,” and thus concluded that there had not been “a substantial investment by the parties and the District Court in the parallel litigation.” IPR2024-00855, Paper 12, at 10. Now, however, the parties and the court will have invested heavily in the parallel litigation, as evidenced by a recent Order addressing motions to compel, *Pictiva Displays Int’l Ltd. v. Samsung Elecs. Co.*, No. 2:23-cv-00495-JRG, Dkt. 104 (Order) (ED. Tex. Oct. 23, 2024), and the parties’ recent filing of the joint claim construction and prehearing statement pursuant to Local Patent Rule 4-3. *See id.*, Dkt. 108 (Joint 4-3 Statement) (Nov. 12, 2024). In addition, an expert deposition is happening today (December 11, 2024); and the parties are scheduling five depositions for January 2025. Pictiva has also already served its 30(b)(6) deposition notices with Samsung agreeing to produce a witness for most topics. The deadline for substantial completion of document production is two weeks away on December 24, 2024. EX2014 at 4. It suffices to say that the parties will have invested significant resources in the district court litigation by the deadline for institution.

Fourth, there is significant overlap between this proceeding and the parallel district court action given that Samsung has also asserted the same primary

references in the district court (*see* EX2016 at 32-34) and has not filed any stipulation regarding the use of the references in district court that it has raised or could have reasonably raised in the Petition. Like the petition in IPR2024-00855, Samsung asserts the same prior art references in the district court action and has not filed any stipulation regarding their use. *Id.* Thus, as in that case, “[e]ven if the trial in the District Court action ultimately resolves fewer than all of the claims challenged in the Petition ... significant concerns about duplicative efforts persist because the same substantive issues related to the same prior art references are in contention in both forums.” IPR2024-00855, Paper 12, at 11.

Fifth, Petitioner admits that the named defendants in the parallel district court case—its parent company, Samsung Electronics Co., Ltd., and its sibling company, Samsung Electronics America, Inc.—are real parties-in-interest. Pet. 1. Thus, as in IPR2024-00855, “[t]his factor favors denial.” IPR2024-00855, Paper 12, at 11.

In summary, each of the first five *Fintiv* factors favors denial. In the recent case involving an earlier-filed petition involved in the same parallel litigation, the Board determined that “[u]nder a holistic view of the first five *Fintiv* factors, we find that these factors, taken together, weigh in favor of denial.” *Id.*, 12. The balance tips even greater in Patent Owner’s favor here because all five factors

favor denial, unlike that case, in which the Board only found that the “second, fourth, and fifth *Fintiv* factors favor denial.” *Id.*

Additionally, as demonstrated above, the Petition lacks compelling merits. And as in the case of IPR2024-00855, priority dispute and reasonable diligence are at issue. These issues are complicated, may require subpoenaing third-party records, and can unfairly constrain Patent Owner’s ability to fully address the patentability issues on the merits. Such issues are better dealt with in the district court. Petitioner has also filed a second petition in IPR2024-01223 challenging the same claims, but that petition does not involve the priority issues. Petitioner also does not contend that the current petition is stronger than the second petition. Paper 3 at 3-4. Consequently, denying this petition under 314(a) works no prejudice to Petitioner or Samsung as they not only can still make the same invalidity challenges in the district court, but can also do so in IPR2024-01223 that they consider is at least as strong but does not have the extraneous issues associated with priority, reasonably continuous diligence, and “printed publication” status.

For these reasons, the Board should exercise its discretion to deny institution.

Dated: December 11, 2024

Respectfully submitted,

By: / Hong Zhong /

H. Annita Zhong (Reg. No. 66,530)
IRELL & MANELLA LLP
1800 Avenue of the Stars, Suite 900
Los Angeles, CA 90067
Tel: (310) 277-1010
Fax: (310) 203-7199
Email: hzhong@irell.com

CERTIFICATE OF WORD COUNT

I hereby certify, pursuant to 37 C.F.R. section 42.24, that the foregoing Patent Owner Preliminary Response contains 13,955 words, excluding the words in the table of contents, table of authorities, exhibit list, this certificate of word count, signature block and certificate of service. The word count is based on the word count of the Microsoft Word program used to prepare the Patent Owner Preliminary Response.

/Susan M. Langworthy/
Susan M. Langworthy

CERTIFICATE OF SERVICE

I hereby certify, pursuant to 37 C.F.R. section 42.6, that on December 11, 2024, a complete copy of the foregoing document **PATENT OWNER'S PRELIMINARY RESPONSE and EXHIBITS 2001-2005, 2006-2017** were 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

/Susan M. Langworthy/

Susan M. Langworthy