

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BOE TECHNOLOGY GROUP CO., LTD.,
Petitioner,

v.

OPTRONIC SCIENCES, LLC,
Patent Owner.

IPR2024-01134
Patent 9,406,733 B2

Before THU A. DANG, BENJAMIN D. M. WOOD, and
BRIAN J. MCNAMARA, *Administrative Patent Judges*.

DANG, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

BOE Technology Group Co., LTD. (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–5 (the “challenged claims”) of U.S. Patent No. 9,406,733 B2 (Ex. 1001, “the ’733 patent”). Paper 1 (“Pet.”). Optronic Sciences, LLC (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

Under 37 C.F.R. § 42.4(a) (2024), the Board has authority to determine whether to institute an *inter partes* review. Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we grant Petitioner’s request and institute an *inter partes* review of all challenged claims.

B. Related Proceedings

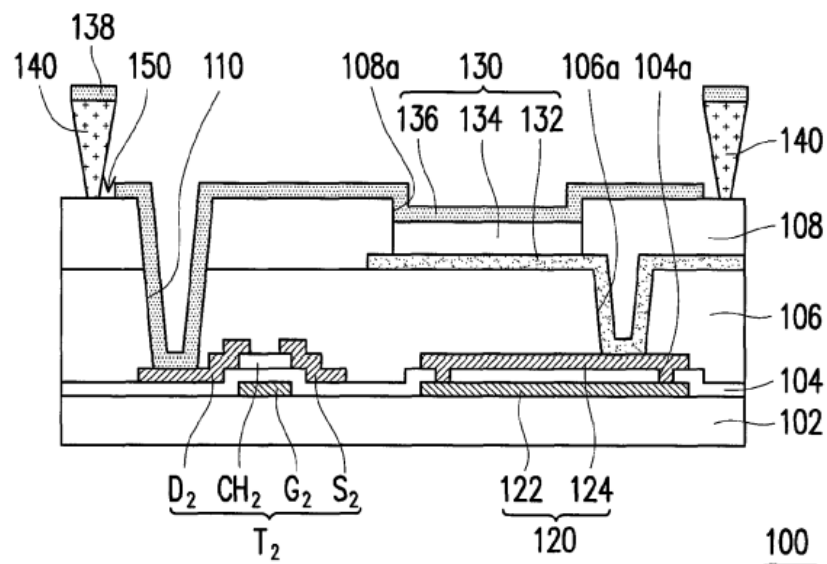
The parties identify the following litigation as involving the ’733 patent: *Optronic Sciences, LLC v. BOE Technology Group Co., LTD.*, No. 2:23-cv-00549 (E.D. Tex.). Pet. 62; Paper 3, 1. Patent Owner further indicates the following Board proceedings are related to this proceeding: IPR2024-01130; IPR2024-01131; IPR2024-01132; IPR2024-01133; and IPR2024-01315. Paper 6, 1.

C. The ’733 Patent

The ’733 patent, titled “Pixel Structure,” issued on August 2, 2016, from Application No. 14/973,758 (“the ’758 application”), with a filing date of December 18, 2015. Ex. 1001, codes (54), (45), (21), (22). The ’758 application is a divisional of the application from which U.S. Patent No.

As shown in Figure 1, “pixel structure 100 includes a data line DL, a scan line SL, at least one active device T₁ and T₂, a capacitor CS, a power line PL, and a light emitting device 130.” *Id.* at 2:65–3:1.

Figure 2, reproduced below, illustrates a schematic cross-sectional view of pixel structure 100, but omits certain commonly known components. *Ex.* 1001, 3:32–42.



As shown in Figure 2, active device T₂ of pixel structure 100 is located on substrate 102. *Id.* at 3:43–44, Fig. 2. Active device T₂ includes source S₂ and drain D₂ disposed on an etch-stop layer (not shown), channel layer CH₂ located under source S₂ and drain D₂, and gate G₂ located under channel layer CH₂. *Id.* 3:50–53, 3:65–4:2. Pixel structure 100 also includes first auxiliary electrode 120, which is electrically insulated from active device T₂. *Id.* at 4:5–6. In the Figure 2 embodiment, first auxiliary electrode 120 comprises bottom electrode layer 122 and top electrode layer 124, which are separated from each other by insulating layer 104. *Id.* at 4:6–8, 4:12–13. In

other embodiments, the first auxiliary electrode can be a single layer, for example, solely a bottom electrode layer or top electrode layer. *Id.* at 6:16–32, 6:44–47. Insulating layer 106 covers active device T₂ and first auxiliary electrode 120. *Id.* at 4:26–27.

Light emitting device 130, which may be “a top-emission organic electroluminescent device,” is located above first auxiliary electrode 120 in the Figure 2 embodiment and comprises first electrode layer 132, light emitting layer 134, and second electrode layer 136. Ex. 1001, 4:35–40. “[T]he first electrode layer 132 and the second electrode layer 136 serve as an anode and a cathode respectively.” *Id.* at 4:40–42. Further, first electrode layer 132 is disposed on first insulating layer 106, but is electrically connected to top electrode layer 124 of first auxiliary electrode 120 by way of first contact window opening 106a through insulating layer 106. *Id.* at 4:43–56. Second electrode layer 136 is disposed on second insulating layer 108, but is electrically connected to drain D₂ of active device T₂ by way of second contact window opening 110 through insulating layers 108 and 106. *Id.* at 4:63–5:3, 5:25–36.

Figure 5, reproduced below, illustrates a schematic cross-sectional view of a pixel structure similar to that illustrated in Figure 2, but with the addition of a second auxiliary electrode. Ex. 1001, 6:59–67.

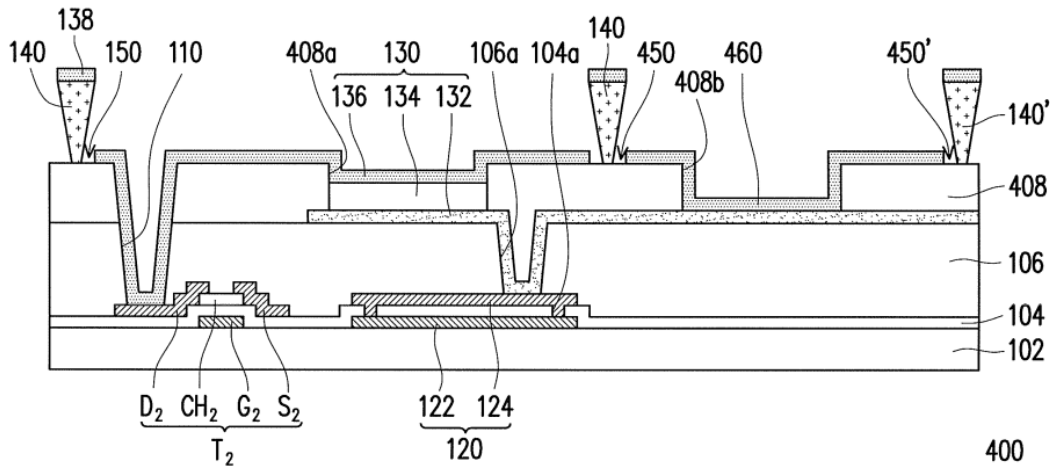


FIG. 5

As shown in Figure 5, “secondary auxiliary electrode 460 is electrically insulated from the active device T_2 and located at a side of the light emitting device 130, wherein the second auxiliary electrode 460 is electrically connected with the first electrode layer 132 of the light emitting device 130.”
Id. at 7:1–5.

D. The Challenged Claims

Of the challenged claims, claim 1 is independent. Independent claim 1 is illustrative of the challenged claims, and is reproduced below:

1. A pixel structure, comprising:

a data line and a scan line;

at least one active device electrically connected with the data line and the scan line;

a light emitting device electrically connected with the active device, wherein the light emitting device comprises:

a first electrode layer;

a light emitting layer disposed on the first electrode layer; and

a second electrode layer disposed on the light emitting layer, wherein the second electrode layer is electrically connected with the active device; and

an auxiliary electrode electrically insulated from the active device and disposed at a side of the light emitting device, wherein the auxiliary electrode is electrically connected with the first electrode layer of the light emitting device.

Ex. 1001, 8:42–58.

E. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–5 of the ’733 patent on the following grounds (Pet. 1):

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1	102	Hekmatshoar ² (Ground 1)

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102, 103, effective March 16, 2013. Because the application from which the ’733 patent issued has an earliest effective filing date after this date, the AIA versions of §§ 102, 103 apply. Ex. 1001, codes (22), (62), (30).

² “A Novel TFT-OLED integration for OLED-independent pixel programming in amorphous-Si AMOLED pixels,” Journal of the Society for Information Display (2008) (Ex. 1004, “Hekmatshoar”).

Claim(s) Challenged	35 U.S.C. § ¹	Reference(s)/Basis
1	103	Hekmatshoar, Gupta ³ or Han ⁴ (Ground 3)
1–5	103	Lee '149 ⁵ , Hekmatshoar or Weaver ⁶ (Ground 2)

Petitioner relies on the Declaration of R. Jacob Baker, Ph.D, P.E. (Ex. 1003) in support of its unpatentability contentions.

II. ANALYSIS

A. Claim Construction

We construe each claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b) (2024). Under this standard, claim terms are generally given their plain and ordinary meaning as would have been understood by a person of ordinary skill in the art (POSITA) at the time of the invention and in the context of the entire patent disclosure. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc).

Only those terms in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v.*

³ U.S. Patent No. 9,088,003 B2, published July 21, 2015, filed Mar. 6, 2013 (Ex. 1007, “Gupta”).

⁴ U.S. Patent Publication No. 2011/0248309 A1, published Oct. 13, 2011, filed Apr. 1, 2011 (Ex. 1008, “Han”).

⁵ U.S. Patent Publication No. 2009/0015149 A1, published Jan. 15, 2009, filed July 9, 2008 (Ex. 1005, “Lee ’149”).

⁶ U.S. Patent Publication No. 2004/0079945 A1, published Apr. 29, 2004, filed Oct. 28, 2002 (Ex. 1006, “Weaver”).

Zhongshan Broad Ocean Motor Co., 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner proposes constructions for the term “auxiliary electrode” appearing in claims 1, 2, 4, and 5 (Pet. 3–6), and for the term “disposed at a side of” appearing in claims 1 and 4 (*id.* at 6–9). Patent Owner does not propose any separate constructions but argues that “Petitioner’s arguments about wires and/or bus line being electrodes have no likelihood of success.” Prelim. Resp. 1.

In light of the parties’ arguments and evidence, we find that it is necessary to construe “auxiliary electrode,” but only to the extent necessary to resolve the disputed issues before us.

“auxiliary electrode”

Petitioner proposes construing “auxiliary electrode” recited in claims 1, 2, 4, and 5 “either broadly as ‘supplemental electrode’ or narrowly as ‘supplemental electrode to reduce the total resistance of the pixel structure.’” Pet. 3–4 (citing Ex. 1003 ¶¶ 55–59). Patent Owner contends that Petitioner’s proposed construction about “wires and/or bus lines being electrodes” have “no likelihood of success,” and thus, “Patent Owner requests that the Board’s institution decision confirm this.” *See* Prelim. Resp. 1.

The plain language in claim 1 of “auxiliary electrode” does not suggest a requirement that the “electrode” precludes “wires and/or bus lines,” as Patent Owner proposes. Prelim. Resp. 1; *see* Ex. 1001, 8:55–58. Further, nothing in the Specification clearly limits “auxiliary electrode” to preclude a wire or a bus line.

Here, Patent Owner points to no portions in the Specification that provide the requisite “reasonable clarity, deliberateness, and precision” to warrant interpreting the claim language at issue such that an “electrode” cannot be a wire or a bus line. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1984). Although the Specification discusses various examples wherein an auxiliary electrode may be implemented, Patent Owner points to no special definition, implicit or explicit, for “auxiliary electrode” that is set forth in the Specification which supports Patent Owner’s construction with reasonable clarity, deliberateness, and precision. *Paulsen*, 30 F.3d at 1480.

In view of the plain language of the claims and the Specification, we determine that the term “auxiliary electrode” recited in claim 1 does not preclude a wire or a bus line. We determine no further explicit construction is necessary to resolve the controversy. *See Vivid Techs.*, 200 F.3d at 803.

B. Principles of Law

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). There is no requirement that the prior art must use the same words to describe a claim element in order to teach or disclose that claim element. Identity of terminology is not required for a claim element to be anticipated by the prior art without resort to obviousness. *See In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

It is proper to take into account not only the literal and specific teachings of the reference, but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. *In re Preda*, 401 F.2d 825, 826 (CCPA 1968). For anticipation, the dispositive question is whether

one skilled in the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly and Co. v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017).

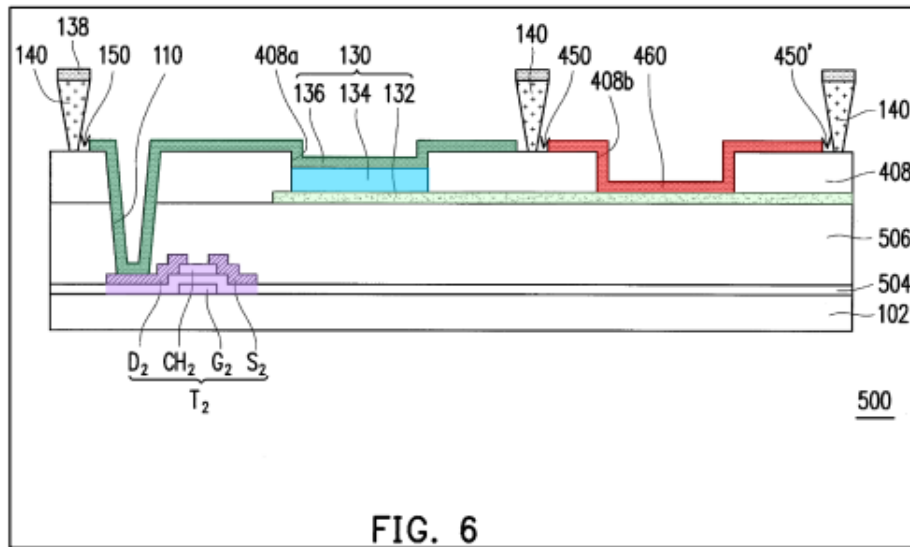
A patent claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103; *see KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of non-obviousness.⁷ *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

C. *Claim 1 as Allegedly Anticipated by Hekmatshoar (Ground 1); Claim 1 as Allegedly Obvious over Hekmatshoar in Further View of Gupta or Han (Ground 3)*

Petitioner contends that the ’733 patent is directed to a “pixel structure for solving the purported problem of poor overall luminous uniformity that occurs in traditional electroluminescent devices.” Pet. 1 (citing Ex. 1001, 1:48–50). According to Petitioner, “[t]he purported novelty is the inclusion of a second auxiliary electrode . . . that is electrically connected with the first

⁷ Neither party presents evidence or arguments regarding objective evidence of non-obviousness in the instant proceeding at this time.

electrode layer . . . , and disposed at a side of the light emitting device.”⁸ *Id.* at 2 (citing Ex. 1001, 4:36–38, 8:4–13, Fig. 6). Petitioner provides an annotated Figure 6 of the ’733 patent, reproduced below, to illustrate its contentions.



The above annotated Figure 6 of the ’733 patent in the Petition shows pixel structure 100 that includes active device T2 (purple), second auxiliary electrode 460 (red), light emitting device 130 comprising first electrode layer 132 (light green), light emitting layer 134 (blue), and second electrode layer (dark green). Pet. 2; *see also* Ex. 1001, 4:36–38, 8:4–13, Fig. 6.

Petitioner then contends that claim 1 is anticipated by Hekmatshoar (Ground 1). Pet. 10–22. Petitioner further contends claim 1 also would have been obvious over Hekmatshoar in view of Gupta or Han (Ground 3) (*id.* at 53–60).

⁸ Although Petitioner uses various color text in its arguments, this coloring is not reproduced in our quoting of Petitioner’s arguments.

In its Preliminary Response, Patent Owner does not specifically address Petitioner's contentions regarding the alleged anticipation of claim 1 by Hekmatshoar. Prelim. Resp. 1. Instead, Patent Owner contends that the technology in this case is "similar to the technology in related IPR 2024-01133 regarding U.S. Pat. 9,263,509," and thus, submits that "Petitioner's arguments in these two cases should be evaluated for inconsistencies with each other." *Id.* In particular, Patent Owner contends that "the Petition at 19[, i.e., Ground 1] appears to argue that a wire is an electrode," similar to the arguments in IPR2024-01133, but then "the Petition at 35[, i.e., Ground 2] argues that an 'electrode pattern 45' is an electrode (the only argument that is plausible)." *Id.* Thus, Patent Owner contends that, if the Board decides to institute, the Institution Decision should "clarify whether the Board believes Petitioner's argument that Hekmatshoar's wire is an electrode has any likelihood of success," as set forth in Ground 1. *Id.*

We briefly summarize Hekmatshoar, Gupta, and Han below.

1. Hekmatshoar

Hekmatshoar, titled "A Novel TFT-OLED integration for OLED-independent pixel programming in amorphous-Si AMOLED pixels," is an article related to "a new 'inverted' integration technique" for "direct voltage programming of active-matrix organic light-emitting-diode (AMOLED) pixels with *n*-channel amorphous-Si (a-Si) TFTs" by "connecting the driver *n*-channel a-Si TFT to the OLED cathode." Ex. 1004, Abstract.

Figure 3, comprised of Figures 3(a) and 3(b) and reproduced below, illustrates a "schematic cross section of an a-Si AMOLED pixel fabricated with the inverted integration process." Ex. 1004, p. 184 (§ 2).

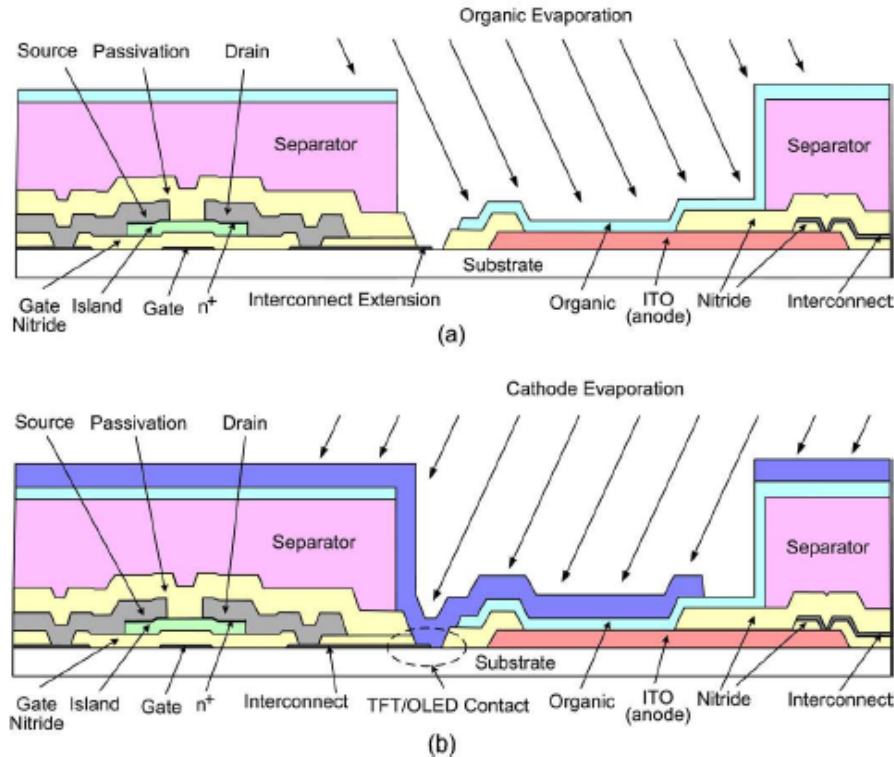


FIGURE 3 — Schematic cross section of the fabricated new “inverted” AMOLED structure of Fig. 1(c), during the evaporation of (a) the organic layers and (b) cathode.

The cross-section shown in Figures 3(a) and 3(b) corresponds to a circuit (shown in Figure 1(c)) that embodies a “technique for connecting the driver TFT to the OLED cathode instead of the OLED anode,” “so that the data voltage may be transferred directly to the gate source of the driver TFT.” *Id.* Figure 3(a) demonstrates that after “[t]he a-Si TFT backplane is fabricated” and “insulating ‘separators’ are formed by patterning a layer of positive photoresist using conventional photolithography,” “organic layers are then evaporated at an angle in such a way that an interconnect extension connected to the driving TFT is not coated with the organic layers.” *Id.* at 185. Then, as shown in Figure 3(b), the cathode is “evaporated at an angle opposite to the organic “evaporation angle to form the OLED cathode and

also to contact the interconnect extension.” *Id.* Figures 3(a) and 3(b) also show a separate interconnect contacting an “ITO (anode).”

Figure 6, comprised of Figures 6(a) and 6(b) and reproduced below, illustrates the result of a modified version of the integration process illustrated in Figure 3.

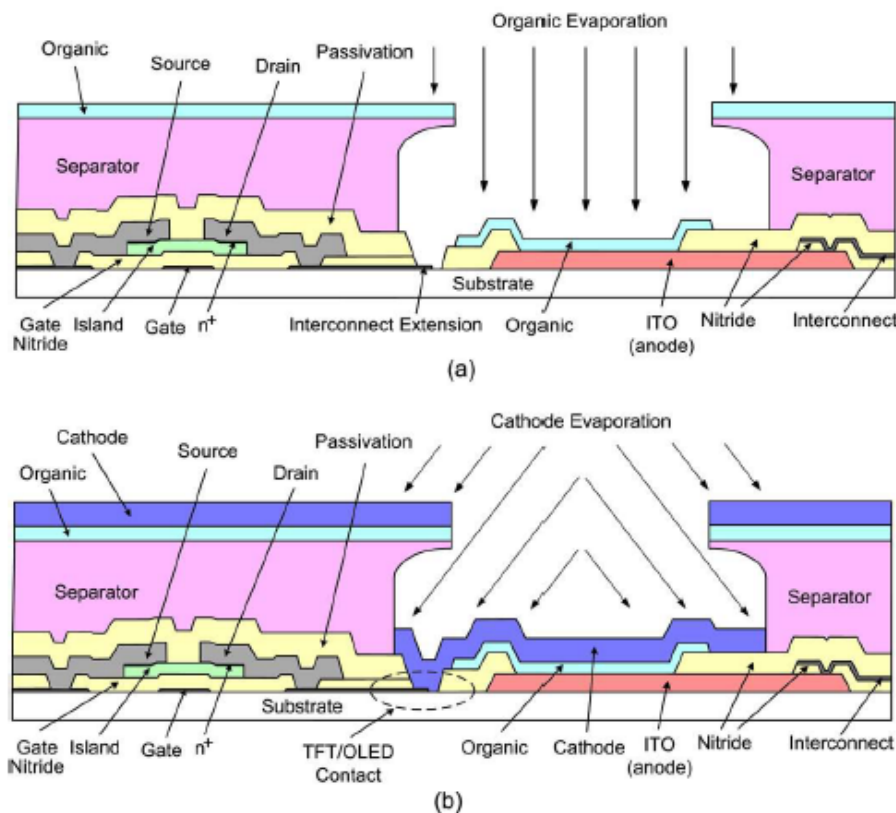


FIGURE 6 — Schematic cross section of the “modified” inverted AMOLED pixel, during the evaporation of (a) the organic layers and (b) cathode.

As shown in Figures 6(a) and 6(b), a modified integration process may use “insulating separators with an overhanging projection.” Ex. 1004, p. 186 (§ 4). This allows the organic layers to be “evaporated at normal incidence and the substrate [to be] rotated during organic evaporation,” as shown in Figure 6(a). *Id.* “The overhang shadows an exposed interconnect which is

connected to the driver TFT.” *Id.* at pp. 186–87. Next, as shown in Figure 6(b), the cathode is evaporated at an angle during substrate rotation and “the OLED cathode is connected to the exposed interconnect and the inverted structure of Fig. 1(c) is realized.” *Id.* at p. 187.

2. *Gupta*

Gupta, titled “Reducing Sheet Resistance for Common Electrode in Top Emission Organic Light Emitting Diode Display,” issued on July 21, 2015, with a filing date of March 6, 2013. Ex. 1007, codes (54), (45), (22). Gupta relates to “top emission AMOLED displays having a conductive mesh(es) or conductive strips coupled to a common electrode to reduce sheet resistance,” which “helps save power consumption in operating the AMOLED displays.” *Id.* at 4:55–60.

3. *Han*

Han, titled “Organic-Light-Emitting-Diode Flat-Panel Light-Source Apparatus and Method of Manufacturing the Same,” published on October 13, 2011, with a filing date of April 1, 2011. Ex. 1008, codes (54), (45), (22). Han relates to “improv[ing] the uniformity of electrical and optical properties of a large-area OLED flat-panel light-source apparatus required for an illumination system and a display device.” *Id.* ¶ 3.

4. *Analysis of Claim 1 as Allegedly Anticipated by Hekmatshoar (Ground 1)*

We begin by addressing in detail Petitioner’s contentions and Patent Owner’s arguments with respect to the limitations of claim 1.

i. *Preamble, “A pixel structure”*

Petitioner contends that, “[t]o the extent that the preamble is limiting, Hekmatshoar discloses ‘a pixel structure (Hekmatshoar’s a-SI AMOLED

pixel).” Pet. 10 (citing Ex. 1003 ¶¶ 71–75). At this stage of the proceeding, Patent Owner does not present arguments in the Preliminary Response addressing the specific merits of Petitioner’s contentions with respect to the preamble. *See generally* Prelim. Resp. 1.

Having reviewed all of Petitioner’s assertions regarding the preamble, as well as the supporting evidence, we determine on this record that Petitioner has made a sufficient showing that Hekmatshoar describes a “pixel structure.”⁹

- ii. *“a data line and a scan line,” “at least one active device electrically connected with the data line and the scan line,” “a light emitting device” comprising “a first electrode layer,” “a light emitting layer,” and “a second electrode layer”*

Petitioner contends that “Hekmatshoar discloses ‘a data line (line marked Vdata) and a scan line (line marked Vselect).” Pet. 11–12 (citing Ex. 1004, Fig. 1(c); Ex. 1003 ¶¶ 76–77). Petitioner further contends that “Hekmatshoar discloses ‘at least one active device (select transistor and N-Channel Driver TFT).” *Id.* at 12–13 (citing Ex. 1004, Fig. 1(c); Ex. 1003 ¶¶ 78–80). Petitioner then contends that “Hekmatshoar discloses ‘a light emitting device (OLED) electrically connected with the active device” (*id.* at 14–15 (citing Ex. 1003 ¶¶ 81–83)) that comprises “a first electrode layer

⁹ Because there is no dispute that Hekmatshoar teaches a pixel structure, as recited in the preamble, for purposes of institution, we need not decide whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017 (noting that “we need only construe terms ‘that are in controversy” (quoting *Vivid*, 200 F.3d at 803)).

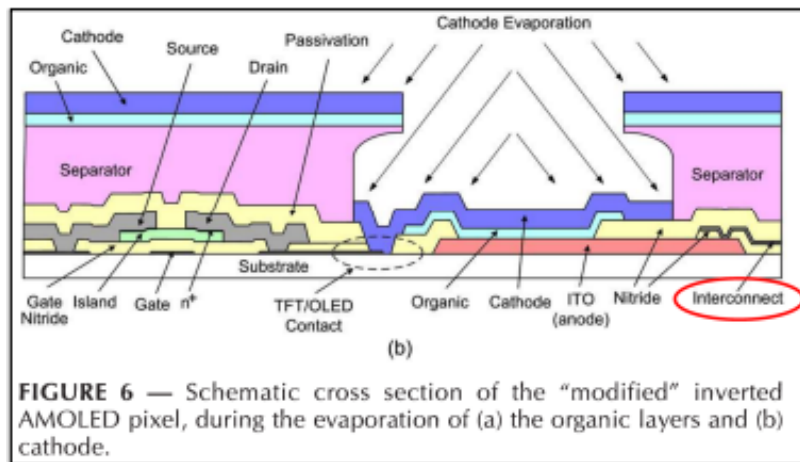
(ITO-anode)” (*id.* at 15–16 (citing Ex. 1003 ¶¶ 84–85)), “a light emitting layer (organic) disposed on the first electrode layer (ITO-anode)” (*id.* at 16–17 (citing Ex. 1003 ¶¶ 86–87)), and “a second electrode layer (cathode) disposed on the light emitting layer (organic), wherein the second electrode layer (cathode) is electrically connected (by TFT/OLED Contact, interconnect extension) with the active device (driver TFT)” (*id.* at 17–19 (citing Ex. 1003 ¶¶ 88–90)).

At this stage of the proceeding, Patent Owner does not present arguments in the Preliminary Response addressing the specific merits of Petitioner’s contentions with respect to these claim limitations. *See generally* Prelim. Resp. 1.

Having reviewed all of Petitioner’s assertions regarding these claim limitations, as well as the supporting evidence, we determine on this record that Petitioner has made a sufficient showing that Hekmatshoar describes “a data line and a scan line,” “at least one active device electrically connected with the data line and the scan line,” “a light emitting device” comprising “a first electrode layer,” “a light emitting layer,” and “a second electrode layer.”

iii. “an auxiliary electrode electrically insulated from the active device and disposed at a side of the light emitting device, wherein the auxiliary electrode is electrically connected with the first electrode layer of the light emitting device”

Petitioner contends that, like the ’733 patent, Hekmatshoar discloses “an auxiliary electrode . . . electrically insulated from the active device.” Pet. 19 (citing Ex. 1003 ¶¶ 91–95). Petitioner provides, for example, an annotated Figure 6b of Hekmatshoar, shown below, to illustrate its contentions.



The above annotated Figure 6b of Hekmatshoar, according to Petitioner, illustrates “an auxiliary electrode (Interconnect) electrically insulated from the active device (driver TFT) and disposed at a side (i.e., the right side) of the light emitting device,” wherein the light emitting device is “[O]LED that includes layers ITO-anode [red], organic [layer light blue], cathode [purple],” and “the auxiliary electrode (Interconnect) is electrically connected with the first electrode layer (ITO-anode [red]) of the light emitting device (OLED).” Pet. 19 (citing Ex. 1004, Fig. 6b; Ex. 1003 ¶¶ 91–95).

In response, Patent Owner contends that, here, the Petition “appears to argue that a wire is an electrode,” wherein such arguments “have no likelihood of success.” Prelim. Resp. 1. We find Patent Owner’s arguments unavailing because Patent Owner is relying on a claim construction of “electrode,” excluding a “wire” (*id.*), that we do not adopt as discussed above. On the present record, we are unpersuaded by Patent Owner’s contention that Hekmatshoar discloses a “wire,” i.e., an Interconnect, and thus, fails to disclose the claimed “auxiliary electrode.” *Id.*

We find availing Petitioner’s contention, supported by Dr. Baker’s testimony, that Hekmatshoar’s Interconnect is “an electrode . . . supplemental to other electrodes in the structure” that is “electrically insulated from driver TFT” and disposed at “the right side” of “the light emitting device (OLED that includes layers ITO-anode, organic, cathode).” Pet. 19–22; Ex. 1003 ¶¶ 91–95. That is, we find availing Petitioner’s contention, which Patent Owner does not contest, that, like the ’733 patent’s auxiliary electrode 460, Hekmatshoar’s Interconnect is electrically insulated from an active device and disposed at a side of a light emitting device. *Id.*; *see also id.* at 2 (annotated Figure 6 of the ’733 patent). We also find availing Petitioner’s contention that Hekmatshoar’s Interconnect is electrically connected with “the first electrode layer (ITO-anode [red]) of the light emitting device (OLED).” *Id.* at 19.

On this preliminary record, we are persuaded that Petitioner has made a sufficient showing that Hekmatshoar describes “an auxiliary electrode electrically insulated from the active device and disposed at a side of the light emitting device, wherein the auxiliary electrode is electrically connected with the first electrode layer of the light emitting device.”

iv. Conclusion

On the present record, we determine Petitioner has demonstrated a reasonable likelihood that it will prevail on its assertion that claim 1 would have been anticipated by Hekmatshoar.

5. *Claim 1 as Allegedly Obvious over Hekmatshoar in Further View of Gupta or Han*

Petitioner contends that, should “auxiliary electrode” of claim 1 be construed to be “supplemental electrode to reduce the total resistance of the

pixel structure,” then claim 1 would have been obvious over Hekmatshoar and Gupta or Han. Pet. 53–60. In particular, Petitioner argues that Gupta discloses “resistor 238 . . . added to be in parallel with the anode sheet resistance 234B to reduce the total resistance between anode 230 and VDD 202,” wherein “resistor 238 may be formed of a conductive mesh or strip,” and “is a supplemental electrode that reduces the total resistance of the pixel structure.” *Id.* at 55–56 (quoting Ex. 1007, 8:3–14; citing Ex. 1007, 4:55–60, 5:8–9, 7:42–43, Figs. 2A–2C; Ex. 1003 ¶ 171). Petitioner also contends that “Han discloses a solution that includes the addition of ‘first and third subsidiary electrodes 750 and 770, which may be bonded to the anode 720 and function to reduce a resistance component of the anode 720.’” *Id.* at 57–58 (citing Ex. 1008 ¶¶ 8–9, 30–33, Fig. 7A; Ex. 1003 ¶ 172). Petitioner then contends that “[a] POSITA would have had a reasonable expectation of success in combining Hekmatshoar with Gupta or Han, as all of these references disclose the various electrodes and connections for operating an organic light emitting device.” *Id.* at 60 (citing Ex. 1003 ¶ 178).

At this stage of the proceeding, Patent Owner does not present arguments in the Preliminary Response addressing the specific merits of Petitioner’s contentions with respect to Hekmatshoar in further view of Gupta or Han. *See generally* Prelim. Resp. 1.

Having reviewed Petitioner’s arguments and supporting evidence in the present record, we determine Petitioner has demonstrated a reasonable likelihood that it will prevail on its assertion that claim 1 would have been obvious over the combination of Hekmatshoar and Gupta or Han.

D. Claims 1–5 as Allegedly Obvious over Lee '149 in Further View of Hekmatshoar or Weaver

Petitioner further contends that claims 1–5 would have been obvious over Lee '149 and Hekmatshoar or Weaver (Ground 2). Pet. 22–53.

In its Preliminary Response, Patent Owner does not specifically address Petitioner's contentions with respect to Ground 2, but acknowledges that Petitioner's reliance on Lee '149's "electrode pattern 45" for an "electrode" is "plausible." Prelim. Resp. 1. Patent Owner contends that, if the Board does not believe Petitioner's arguments in Ground 1 have any likelihood of success, "the parties can focus their subsequent efforts on Ground 2." *Id.*

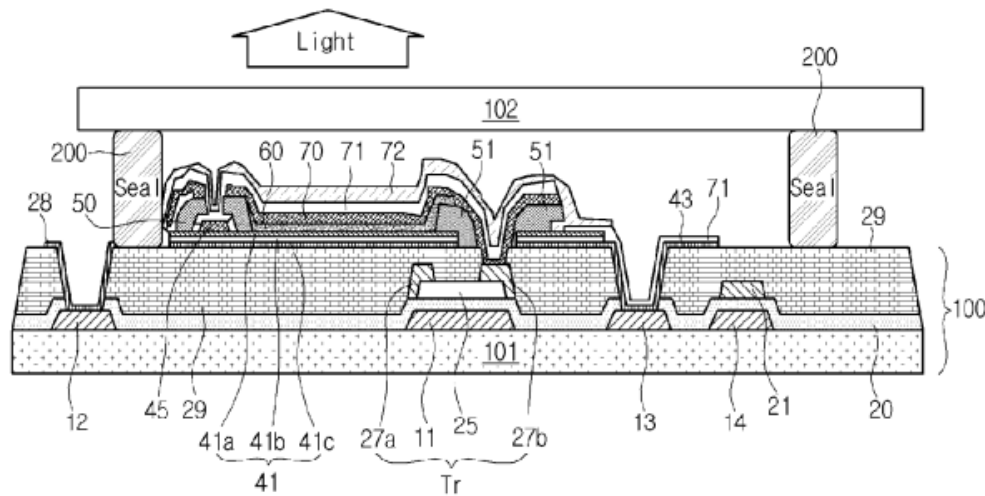
We briefly summarize Lee '149 and Weaver below.

1. Lee '149

Lee '149, titled "Organic Electroluminescent Device and Method for Fabricating the Same," published on January 15, 2009, with a filing date of July 9, 2008. Ex. 1005, codes (54), (43), (22). In particular, Lee '149 aims to prevent "infiltration of moisture or outgas into an organic electroluminescent layer" "by forming a plurality of passivation layers on a substrate on which the electroluminescent layer is formed." *Id.* ¶ 18.

Figure 1, reproduced below, "is a cross-sectional view of an organic electroluminescent device." Ex. 1005 ¶ 21.

FIG. 1



As shown in Figure 1, an electroluminescent device may include transparent dielectric substrate 101 on which gate electrode 11, power lines 12 and 13, and first dummy pattern 14 are formed. *Id.* ¶¶ 22, 24. Active layer 25, source electrode 27a, and drain electrode 27b are formed on gate electrode 11, and these components constitute TFT Tr, where gate dielectric 20 is interposed between gate electrode 11 and the other components of TFT Tr. *Id.* ¶ 23. “A planarization layer 29 is formed on the dielectric substrate 101 on which the TFT Tr is formed and a first electrode 41 formed with first, second, and third electrode layers 41a, 41b, and 41c is formed on the planarization layer 29.” *Id.* ¶ 24. A buffer layer 50 is formed with a dielectric film and defines a sub-pixel region. *Id.* ¶ 26. “An electrode pattern 45 is formed on the first electrode 41 at a central region of the buffer layer 50.” *Id.* ¶ 27.

“When buffer layer 50 is formed, an organic luminescent layer 60 and a second electrode 70 are sequentially formed.” Ex. 1005 ¶ 27. Together, “first electrode 41, electroluminescent layer 60, and second electrode 70

constitute a light emitting diode.” *Id.* ¶ 27. “First and second passivation layers 7[1] and 72 are formed on the second electrode to completely isolate the light emitting diode including the organic electroluminescent layer 60 from an external side.” *Id.* ¶ 28.

2. *Weaver*

Weaver, titled “Device Including OLED Controlled By N-Type Transistor,” published on April 29, 2004, with a filing date of October 28, 2002. Ex. 1006, codes (54), (43), (22). Weaver describes a device with “an n-type transistor fabricated over a substrate” as well as “non-inverted organic light emitting device [OLED] fabricated over the substrate,” where the cathode of the OLED is connected to an electrode of the n-type transistor. *Id.* ¶ 4.

3. *Analysis of Claims 1–5 as Allegedly Obvious over Lee ’149 in Further View of Hekmatshoar or Weaver*

We begin by addressing in detail Petitioner’s contentions with respect to the limitations of representative claim 1. As noted above, Patent Owner does not provide any argument to specifically address Petitioner’s contentions with respect to this ground. *See* Prelim. Resp. 1.

i. *Preamble, “A pixel structure”*

Petitioner contends that, “[t]o the extent that the preamble is limiting, Lee in combination with Hekmatshoar or Weaver renders obvious ‘a pixel structure (Lee’s sub-pixel region of an organic electroluminescent device).’” Pet. 25 (citing Ex. 1005 ¶¶ 4, 21, 26, Fig. 1; Ex. 1003 ¶¶ 106–107).

Having reviewed all of Petitioner’s assertions regarding this claim limitation, as well as the supporting evidence, we determine on this record

that Petitioner has made a sufficient showing that Lee teaches a “pixel structure.”¹⁰

- ii. *“a data line and a scan line,” “at least one active device electrically connected with the data line and the scan line,” “a light emitting device” comprising “a first electrode layer,” “a light emitting layer,” and “a second electrode layer”*

Petitioner contends that “Lee [’149] in combination with Hekmatshoar or Weaver renders obvious ‘a data line (Hekmatshoar’s line marked Vdata; Weaver’s data line 304) and a scan line (Hekmatshoar’s line marked Vselect; Weaver’s select line 306).” Pet. 25 (citing Ex. 1004, Fig. 1(c); Ex. 1006 ¶¶ 17, 19, 21, Figs. 2–3; Ex. 1003 ¶¶ 108–113). Petitioner also contends that the combination renders obvious “at least one active device (the select transistor from Hekmatshoar or Weaver and Lee [’149]’s thin film transistor TFT Tr)” electrically connected with the data line and scan line. *Id.* at 27 (citing Ex. 1004, Fig. 1(c); Ex. 1005 ¶¶ 5–6, 21, Fig. 1; Ex. 1006 ¶¶ 19, 21–22, Figs. 2–4; Ex. 1003 ¶¶ 114–121). Petitioner then contends that the combination renders obvious “a light emitting device (Lee [’149]’s light emitting diode) electrically connected with the active device (Lee [’149]’s thin film transistor TFT Tr)” (*id.* at 30–31 (citing Ex. 1005 ¶ 27, Fig. 1; Ex. 1003 ¶¶ 122–124)), wherein light emitting device comprises “a first electrode layer (Lee [’149]’s first electrode 41)” (*id.* at 32 (citing Ex. 1005 ¶ 27, Fig. 1; Ex. 1003 ¶¶ 125–126)), “a light emitting layer (Lee [’149]’s organic electroluminescent layer 60)” disposed on the first electrode

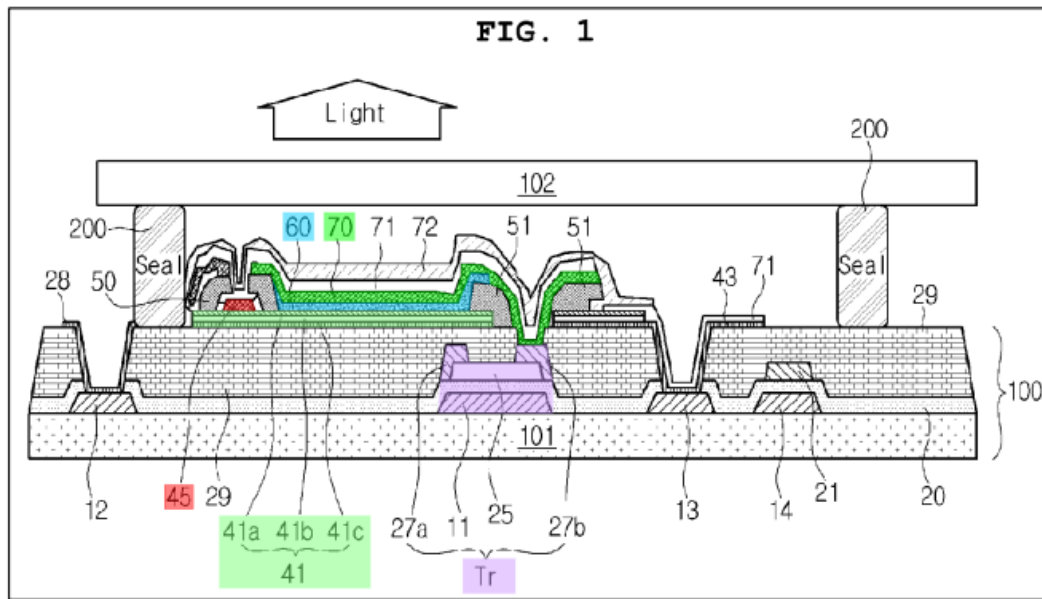
¹⁰ Because there is no dispute that Lee ’149 teaches a pixel structure, as recited in the preamble, for purposes of institution, we need not decide whether the preamble is limiting. *Nidec*, 868 F.3d at 1017.

layer (*id.* at 32–33 (citing Ex. 1005 ¶ 27, Fig. 1; Ex. 1003 ¶¶ 127–128)), and “a second electrode layer (Lee [’149]’s second electrode 70)” disposed on the light emitting layer (*id.* at 33–34 (citing Ex. 1005 ¶ 27, Fig. 1; Ex. 1003 ¶¶ 129–132)).

Having reviewed all of Petitioner’s assertions regarding these claim limitations, as well as the supporting evidence, we determine on this record that Petitioner has made a sufficient showing that Lee ’149 in combination with Hekmatshoar or Weaver teaches “a data line and a scan line,” “at least one active device electrically connected with the data line and the scan line,” “a light emitting device” comprising “a first electrode layer,” “a light emitting layer,” and “a second electrode layer.”

iii. “an auxiliary electrode electrically insulated from the active device and disposed at a side of the light emitting device, wherein the auxiliary electrode is electrically connected with the first electrode layer of the light emitting device”

Petitioner contends that, like the ’733 patent, Lee ’149 in combination with Hekmatshoar or Weaver discloses “an auxiliary electrode (Lee [’149]’s electrode pattern []) electrically insulated from the active device (Lee [’149]’s TFT []) and disposed at a side (i.e., the left side) of the light emitting device (Lee [’149]’s light emitting diode . . .).” Pet. 35 (citing Ex. 1003 ¶¶ 133–139). Petitioner provides, for example, an annotated Figure 1 of Lee ’149, shown below, to illustrate its contentions.



The above annotated Figure 1 of Lee '149, according to Petitioner, illustrates “[e]lectrode pattern 45 [red] electrically insulated from TFT Tr [purple] by planarization layer 29.” Pet. 36 (citing Ex. 1005, Fig. 1; Ex. 1003 ¶ 135). As shown in annotated Figure 1, “Lee [’149]’s electrode pattern 45 [red] is disposed at a side (i.e., the left side) of the light emitting device (light emitting diode that includes first electrode 41 [light green], organic electroluminescent layer 60 [blue], second electrode 70 [dark green]).” *Id.* at 37–38 (citing Ex. 1005, Fig. 1; Ex. 1003 ¶ 138). Further, “Lee [’149]’s electrode pattern 45 [red] is electrically connected with the first electrode 41 [light green] given they are in physical contact.” *Id.* at 36 (citing Ex. 1003 ¶ 135). According to Petitioner, Lee ’149 discloses that “electrode pattern 45 is an electrode that is supplemental to other electrodes in the structure,” wherein “electrode pattern 45 serves to lower the resistance of the first electrode 41.” *Id.* at 38 (citing Ex. 1005 ¶ 38, Fig. 1; Ex. 1003 ¶ 139).

Having reviewed all of Petitioner’s assertions regarding these claim limitations, as well as the supporting evidence, we determine on this record

that Petitioner has made a sufficient showing that Lee '149 in combination with Hekmatshoar or Weaver teaches “an auxiliary electrode electrically insulated from the active device and disposed at a side of the light emitting device, wherein the auxiliary electrode is electrically connected with the first electrode layer of the light emitting device.”

iv. Conclusion

On the present record, we determine Petitioner has demonstrated a reasonable likelihood that it will prevail on its assertion that claim 1 would have been obvious over Lee '149 and Hekmatshoar or Weaver. Furthermore, on this preliminary record, we are persuaded that Petitioner has made a sufficient showing that a POSITA would have had a reason to combine the teachings of Lee '149 and Hekmatshoar or Weaver.

v. Claims 2–5

Petitioner provides detailed explanations as to how Lee '149 in combination with Hekmatshoar or Weaver renders obvious claims 2–5, depending from claim 1, citing Dr. Baker’s testimony for support. Pet. 39–53 (citing Ex. 1005 ¶¶ 24, 26–27, 30, 38, Fig. 1; Ex. 1003 ¶¶ 141–153, 155–166).

Having reviewed Petitioner’s arguments and supporting evidence in the present record, we determine Petitioner has demonstrated a reasonable likelihood that it will prevail on its assertion that the subject matter of claims 2–5 would have been obvious over Lee '149 and Hekmatshoar or Weaver.

III. CONCLUSION

Because we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing at least one of the challenged claims is unpatentable, we institute *inter partes* review as to all challenged

claims and grounds presented in the Petition. 37 C.F.R. § 42.108(a) (2024). At this stage of the proceeding, we have not made a final determination as to the patentability of any of these challenged claims.

IV. ORDER

For the reasons given, it is

ORDERED that pursuant to 35 U.S.C. § 314, an *inter partes* review is instituted as to claims 1–5 of the '733 patent to determine whether:

- 1) claim 1 is unpatentable under 35 U.S.C. § 102 as anticipated by Hekmatshoar;
- 2) claim 1 is unpatentable under 35 U.S.C. § 103 as obvious over Hekmatshoar and Gupta or Han; and
- 3) claims 1–5 are unpatentable under 35 U.S.C. § 103 as obvious over Lee '149 and Hekmatshoar or Weaver.

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4 (2024), notice is hereby given of the institution of a trial, which commences on the entry date of this Decision.

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