

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.

Case IPR2025-00238
U.S. Patent No. 8,604,471

PATENT OWNER'S PRELIMINARY RESPONSE

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Patent Owner's Exhibit List

No.	Description
2001	Docket Navigator Stay Statistics
2002	February 14, 2025, DCO
2003	BOE's April 1, 2025, Invalidity Contentions
2004	Exhibit D-8 to BOE's April 1, 2025, Invalidity Contentions
2005	Exhibit D-2 to BOE's April 1, 2025, Invalidity Contentions
2006	Exhibit 2026 of IPR2024-01133, Dr. Bretschneider's Declaration
2007	Exhibit 2020 of IPR2024-01130, Dr. Bretschneider's Declaration
2008	Docket Navigator Median Time-to-Trial Statistics for the Eastern District of Texas
2009	<i>Dabico Airport Solutions Inc. v. Axa Power Aps</i> , IPR2025-00408 (Paper 21)
2010	Information Disclosure Statement filed in U.S. Patent Application No. 17/428,969 (Jan. 30, 2022).
2011	U.S. Pat. No. 11,974,463 to Wang et al.
2012	Declaration of Dr. Eric Bretschneider in Support of Patent Owner's Preliminary Response
2013	<i>Curriculum Vitae</i> of Dr. Eric Bretschneider

I. Introduction

The Board should decline to institute the Petition because it is weak. Even when Petitioner's allegations are taken as true (and they are not), the alleged prior art fails to teach at least the claimed limitations explained below.

II. Partial Summary of Patent 8,604,471

Patent 8,604,471 (the "'471 Patent") relates to a semiconductor structure and OLED capable of effectively preventing a device characteristic variation that occurs when a device is irradiated by light. Ex. 1001 at 1:43–45. The '471 Patent teaches embodiments that work as top emission or bottom emission configurations. Ex. 1001 at 4:60–5:9. Specifically, the '471 Patent discloses using a light shielding layer to mitigate influence of light irradiation on a thin film transistor. *Id.* at 3:8–13 ("In order to mitigate influence on a thin film transistor caused by light irradiation, for example, a drain induced barrier lowering (DIBL) effect and a current leakage phenomenon, a light mask is used to define a light-shielding layer covering the device, so as to shield the light from directly irradiating the channel layer."). The '471 Patent further recognizes that "if the light-shielding layer covers a drain electrode of the device, an extra electric field is generated during operation of the device, which may cause shift and decrease of a threshold voltage of the device driven by a high source voltage, and may also cause the current leakage phenomenon." *Id.* at 3:13–18. The '471 Patent teaches the importance of providing

a light-shielding layer that is “adjusted to balance a light-shielding effect and device performance.” *Id.* at 3:19–21. A conductive light-shielding pattern layer 172 is disposed on the dielectric layer 160, is electrically floating (meaning it is not grounded or connected to the other electrodes), and is overlapped to a portion of the source electrode 140 and a portion of the channel layer 130 in a vertical projection. *Id.* at 3:53–58. The ’471 Patent explains that, to balance the light-shielding effect with the device performance and the DIBL effect, the overlapping length $d1$ of the preferred embodiment is at least $0.3 \leq d1/L \leq 0.85$. *Id.* at 4:6–9.

The ’471 Patent discloses a semiconductor structure as shown in the embodiments in Figs. 1A-4B. Using Petitioner’s annotations, exemplary Figure 4A includes a substrate (12), channel layer (430), gate insulating layer, gate electrode, source electrode (440), drain electrode (450), dielectric layer, and conductive light shielding pattern layer.

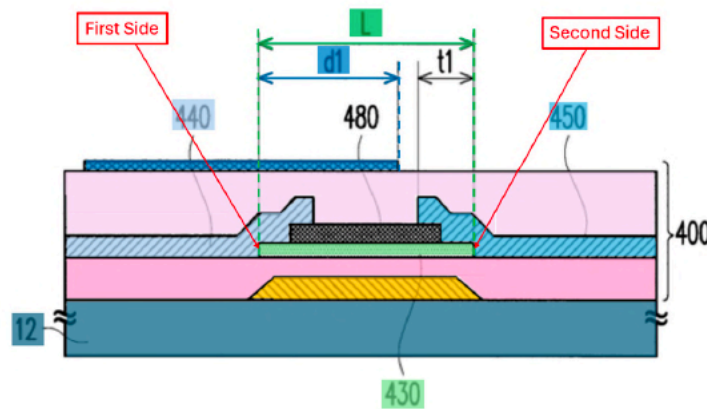


FIG. 4A

Petition at 3 (annotating Ex. 1001, Fig. 4A).

The '471 Patent further explains that its semiconductor structure may be implemented in an organic electroluminescent device.

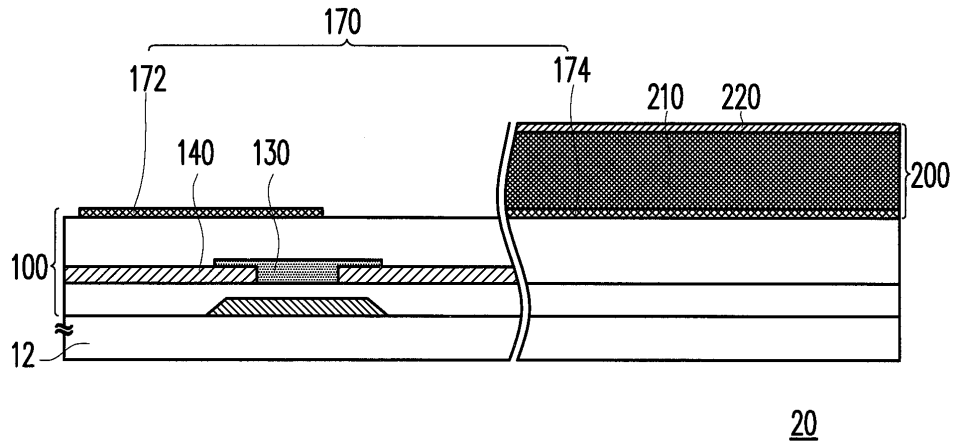


FIG. 2

Ex. 1001, Fig. 2 (showing OLED 200 including a lower electrode 174, organic light emitting material layer 210, and upper electrode 220). The '471 Patent discloses that “the conductive light-shielding pattern layer 172 and the lower electrode 174 can be obtained by patterning a same material layer.” *Id.* at 4:48–50. The '471 Patent explains that its structure enables embodiments where the OLED emits light upwards and embodiments where the OLED emits light downwards. *See id.* 4:58–5:9.

III. Summary of the References

A. U.S. Patent Pub. No. 2008/0158108 (“Hwang,” Ex. 1004)

Hwang describes a top emission OLED and describes the problem with

applying the technology to bottom emission OLED. *See* Ex. 1004, [0012]–[0013] (“The above-described [related art] OLED is a bottom emission OLED. The bottom emission OLED has stability by a sealing process and high degree of freedom in processing, but has a limited aperture ratio and thus is difficult to apply to a high resolution product. On the other hand, in a top emission OLED, a thin film transistor is easily designed and the aperture ratio can be improved, so that the top emission OLED is advantageous with respect to product life.”); *see also id.* at [0038], [0053], [0103]. Specifically, Hwang seeks to “prevent an output current saturation characteristic from being deteriorated and improve reliability and life of a driving device by a ground potential on the driving device in an OLED,” noting that this also “improves image quality by preventing brightness reduction and non-uniformity caused by a reducing current due to deterioration of an organic light emitting layer.” *Id.* at [0141], [0142].

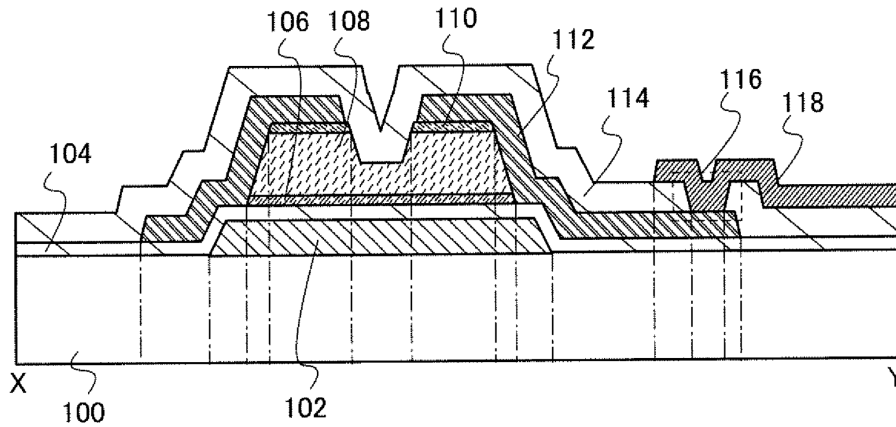
Hwang teaches an OLED having a **second semiconductor layer 158** disposed on the **gate insulating layer**¹ and located above the **gate electrode 134**, **source electrode 152**, **drain electrode 154**, **passivation layer 160**, **ground line 162**, **auxiliary**

¹ Fig. 3 of Hwang refers to the gate insulating layer as 183, and Hwang also labels its “second contact hole” as 183. The labeling of the gate insulating layer appears to be a mistake because the specification refers to gate insulating layer 138.

semiconductor layer 158 and does not overlap the second drain electrode 154. The auxiliary electrode 162a may be longer or shorter than the channel upon need. Accordingly, a short circuit between the auxiliary electrode 162a and the second drain electrode 154 can be prevented.”).

B. U.S. Patent Pub. No. 2010/0148175 (“Godo,” Ex. 1005)

Godo is directed generally to a thin film transistor for a display device, particularly liquid crystal display devices. See Ex. 1005, [0001], [0002], [0033], [0161]–[0164].



Ex. 1005, Fig. 1A (showing a thin film transistor including, inter alia, a gate electrode layer 102 and first semiconductor layer 106).

C. U.S. Patent Pub. No. 2009/0184898 (“Yamashita,” Ex. 1006)

Yamashita relates to electroluminescent displays. Ex. 1006, Abstract. “Each pixel circuit has a thin-film transistor in which a portion of a pattern of a metal wiring material above the channel layer of the thin-film transistor is so laid out as to shield

the channel region of the thin-film transistor.” *Id.*

IV. Claim Construction

A. “a conductive light-shielding pattern layer”

Patent Owner proposes that this term should be construed according to its plain and ordinary meaning, which is a conductive pattern layer that blocks directly irradiating light. This construction is consistent with the plain and ordinary meaning of the terms and the specification:

In order to mitigate influence on a thin film transistor caused by light irradiation, for example, a drain induced barrier lowering (DIBL) effect and a current leakage phenomenon, a light mask is used to define *a light-shielding layer covering the device, so as to shield the light from directly irradiating the channel layer.*

Ex. 1001 at 3:8–13 (emphasis added); *see also* MPEP 2111.01 (“the best source for determining the meaning of a claim term is the specification - the greatest clarity is obtained when the specification serves as a glossary for the claim terms.”) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005)); *id.* (“The words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification.”) (citing *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989)).

Petitioner urges the Board to adopt a construction that is inconsistent with the specification, and that would remove meaning from the plain language of the claims. For example, Petitioner’s primary proposed construction emphasizes that no “degree of conduction or light-shielding” is required by the term “conductive light-shielding

pattern layer.” *See* Petition at 6 (asserting the term is “not limited to any particular degree of conduction or light-shielding. For example, there is no claimed minimum level of electrical conductivity or percent optical opacity.”); *id.* at 8 (“Here, [it] would be improper to read in a ‘certain amount’ of light-shielding”). By arguing that no “particular degree of conduction or light-shielding” is necessary, Petitioner effectively removes both the “conductive” and “light-shielding” elements. Ex. 2012, ¶ 78. All material, no matter how insulating or transparent it is, has some amount of resistivity or opacity. *Id.* Accordingly, under Petitioner’s primary construction, virtually any layer would meet this limitation as construed by Petitioner. While the claim does not require a precise level of conductivity or light-shielding, a POSITA is familiar with whether a material was conductive or light-shielding in the art. *Id.* For example, while glass would be considered by a POSITA to be neither light-shielding (a POSITA would consider it transparent) or conductive (a POSITA would consider it an insulator), glass would be meet Petitioner’s overbroad construction of a conductive light-shielding pattern layer. *Id.* Conductive and light-shielding are not nonce words as proposed by Petitioner, and Petitioner’s proposal is contrary to the intrinsic evidence described above. Petitioner’s primary construction is therefore improper and should be rejected.

Petitioner’s alternate construction both overly broadens and overly narrows the term. Petitioner’s alternative proposed construction reads “a layer that the

designer subjectively intends to serve the purpose of being electrically conductive and shielding the channel layer from some light.” Petition at 9. Petitioner’s reference to “some light” imports the same overbroad, improper “no particular degree” construction addressed above. In addition, Petitioner proposes to import a “subjectively intends” limitation that is found nowhere in the intrinsic evidence or plain meaning. Conductivity and light-shielding are not issues of subjective intent in the art; a material does not become conductive or light-shielding to a POSITA simply because it is labeled as such. *Id.* at 27. This unsupported limitation should not be imported into the term. Petitioner’s proposed alternate construction is therefore also improper under the plain and ordinary meaning of the term, and should be rejected.

V. Institution Should Be Denied Because the References Lack Claimed Elements

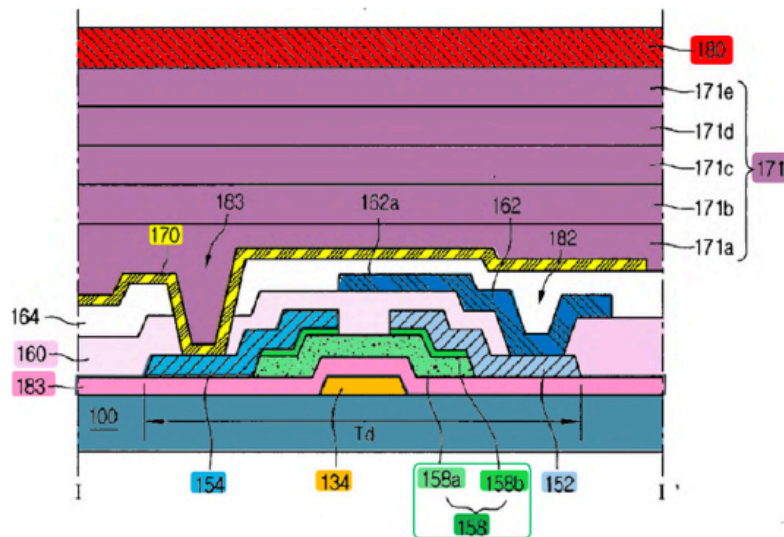
The Board should deny institution because the Petition fails to identify critical claim elements in each ground and thus has not established a reasonable likelihood of prevailing on the merits.

A. Ground 1 (Hwang § 103, Claims 1, 4, 6, 9, 12, 14, 17, and 18)

1. No “conductive light-shielding pattern layer”

Independent claims 1 and 9 similarly recite “a conductive light-shielding pattern layer.” The Petition identifies [ground line 162](#) and [auxiliary electrode 162a](#) as satisfying this element. But lower electrode 170 (bright yellow) covers [ground](#)

line 162 and auxiliary electrode 162a. Hwang describes a top emitting LED, meaning that light is designed to exit the top (e.g., through layer 180 in annotated Fig. 3 below). See Ex. 1004 at [0038], [0053], [0103]. Lower electrode 170 (bright yellow) blocks light from reaching ground line 162 and auxiliary electrode 162a. Therefore, regardless of the construction adopted by the Board, ground line 162 and auxiliary electrode 162a do not meet the light-shielding limitation because any light is blocked by lower electrode 170 (bright yellow).



Petition at 38 (annotating Ex. 1004, Fig. 3).

As shown above, light in Hwang's comes from organic light emitting layer 171. Lower electrode 170 (bright yellow) is disposed between ground line 162 and auxiliary electrode 162a and organic light emitting layer 171, covering ground line 162 and auxiliary electrode 162a, preventing light from reaching them. See Ex. 1004, [0050]. Moreover, as discussed below, the structure identified by Petitioner

as the channel layer ([second semiconductor layer 158](#)) is also protected from light by [passivation layer 160](#). In other words, lower electrode 170 (bright yellow) blocks the light, not the structures identified by Petitioner ([ground line 162](#) and [auxiliary electrode 162a](#)), and even if it did not, light is blocked by [passivation layer 160](#) regardless of Petitioner’s identified structure.² Petitioner’s argument is akin to identifying a first-floor ceiling as a “rain-blocking layer” even though the rain is actually blocked by the roof (among other structures in a house that are interposed between a first-floor ceiling and rain).

Hwang also discloses that at least some of Petitioner’s structures ([auxiliary electrode 162a](#)) combat an entirely different problem: electrical interference from lower electrode 170 (bright yellow). *See, e.g., id.* at [0050] (“However, the [auxiliary electrode 162a](#) is formed under the first electrode 170 [bright yellow] to . . . block an influence of the first electrode 170 [bright yellow] on the channel of the second semiconductor layer 158” (coloration added)).

Thus, Hwang does not render obvious the claimed “conductive light-shielding pattern layer” because [ground line 162](#) does not block light—the configuration of

² Petitioner appears to not argue that lower electrode 170 is the claimed conductive light-shielding pattern layer because it does not meet the other limitations of claim [1f].

lower electrode 170 (yellow) prevents light from reaching [ground line 162](#). Petitioner's attempt to categorize Hwang's electrical structure as the claimed "light-shield" is improper, plainly based on hindsight, and should be rejected.

Accordingly, Petitioner has not met its burden and institution should be denied.

2. Independent claims 1 and 9: no "overlapping length d_1 , and $0.3 \leq d_1/L \leq 0.85$ "

Petitioner's argument that Hwang renders obvious the specific, claimed range is based on assumptions and unreliable expert testimony. Indeed, in shaping its argument, Petitioner necessarily and explicitly makes assumptions and conclusions based on measurements from the figures even though Hwang does not disclose that the figures are drawn to scale and other disclose measurements. *E.g.*, Petition at 29–33 (arguing based on measurements of dimensionless drawing features), 56–57; Ex. 1002, ¶ 108 ("I estimated these relative proportions for the transistor dimensions by comparing a copy of Hwang's Fig. 6c overlaid with lines drawn within PowerPoint . . ."). The MPEP explicitly calls out the limited value of these types of arguments. MPEP § 2125(II) ("When the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value."). The Board should not credit Petitioner's arguments here.

For at least the reasons explained above, Petitioner has not met its burden

regarding Ground 1, and institution should be denied.

B. Ground 2 (Hwang and Godo § 103, Claims 1, 4, 6, 9, 12, 14, 17, and 18)

1. Independent claims 1 and 9: no “conductive light-shielding pattern layer”

Godo does not cure the deficiencies of Hwang with respect to the “conductive light-shielding pattern layer” as identified above, and Petitioner makes no assertion that it does so. Thus, Ground 2 should not be instituted for the same reasons as Ground 1.

2. No Motivation to Combine

Petitioner asserts that a “POSITA would have been motivated to investigate known suitable dimensions in the art for transistors suitable for driving an LED device and been led to Godo’s disclosures of appropriate dimensions.” Petition at 44. Such an assertion is based on hindsight using the claims as a roadmap, and is not a motivation to combine. Petitioner has failed to meet its burden. Specifically, although Petitioner has stated “[t]he combination of Hwang and Godo modifies Hwang’s general teachings for a broad genus of TFTs with Godo’s disclosure of more particular species of TFTs” (Petition at 44), the Petition is utterly devoid of reasoning for why a POSITA would arrive at Godo from Hwang and then apply “a particular species” to the broader genus. The only motivation is Petitioner’s knowledge of the claims and its desire to invalidate them. This is hindsight and

should be rejected.

Accordingly, Petitioner has failed its burden to demonstrate that Ground 2 should be instituted, and institution should be denied.

C. Ground 3 (Hwang and Yamashita § 103, Claims 1, 4, 6, 9, 12, 14, 17, and 18)

1. Ground 3 Only Applies if the Board Adopts Petitioner’s Alternative Construction of “conductive light-shielding pattern layer”

This Ground should not be instituted on its face because the Board should not adopt the Petitioner’s alternative construction that, among other things, imports a baseless subjectivity requirement into the “conductive light-shielding pattern layer” term. The Petition makes clear that “Ground 3 addresses the alternative, narrower construction of ‘conductive light-shielding pattern layer.’” Petition at 57; *see id.* at 9 (“In the alternative, this term could be construed to mean ‘a layer that the designer subjectively intends to serve the purpose of being electrically conductive and shielding the channel layer from some light.’”). Because the Petitioner does not argue that this Ground addresses its primary construction, let alone the plain and ordinary meaning of the term proposed by Patent Owner, by Petitioner’s own admission, this Ground should not be instituted unless the Board adopts Petitioner’s alternative proposed construction.

2. The Combination of Hwang with Yamashita Does Not Cure the Deficiencies of Hwang

Petitioner does not argue that the combination of Hwang and Yamashita addresses the lack of light-shielding by Hwang’s [ground line 162](#) and [auxiliary electrode 162a](#) (the structures identified by Petitioner as meeting the “conductive light-shielding pattern layer” element). Indeed, Petitioner takes the position that “*no modification to Hwang’s device is necessary*” for this combination to be invalidating. Petition at 57 (emphasis added). For the same reasons as above, therefore, regardless of the construction adopted by the Board, this Ground should not be instituted.

3. Petitioner’s Combination Materially Changes the Intended Purpose of the Structures in Hwang

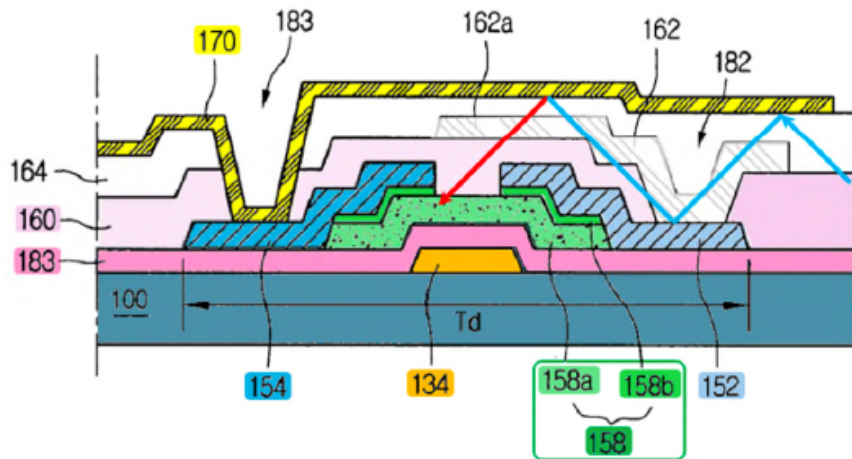
Petitioner relies on Yamashita for Petitioner’s imported intended purpose limitation in its alternative construction. Petition at 58-59. But, without hindsight, Petitioner does not explain why a POSITA would find Petitioner’s argument obvious. Hwang explicitly discloses that the subjective purpose for [auxiliary electrode 162a](#) is addressing electrical interference, as described above. *See* Ex. 1004 at [0050] (“However, the [auxiliary electrode 162a](#) is formed under the first electrode 170 [bright yellow] to . . . block an influence of the first electrode 170 [bright yellow] on the channel of the second semiconductor layer 158”) (coloration added). Indeed, *nowhere* does Hwang mention blocking light at all. *See id.*

Yamashita does not and cannot change Hwang's designer's subjective intent. This is particularly true where, as explained above, Hwang teach a top emitting LED, and any necessary light-shielding is already being addressed by lower electrode 170 (bright yellow) in Hwang. Indeed, Petitioner simply points to Yamashita as "adding the mental recognition that Hwang's layer 162/162a would indeed serve the intended design purpose of shielding the semiconductor layer from being exposed to light[.]" Petition at 58. Thus, Petitioner's argument is improper hindsight and should be rejected, Petitioner has not shown a reasonably likelihood of prevailing on the merits with respect to any of the claims, and institution should be denied.

Petitioner's argument about "incident light" during manufacturing (Petition at 58–59) is irrelevant. The claims are directed at completed devices, not incomplete devices at various stages of fabrication. They also have no basis in either Hwang or Yamashita because neither discusses blocking "incident light" during manufacturing.

Petitioner further asserts that "Figure 7 of Yamashita is an exemplary illustration showing a 'light ray' whereby light can be scattered into the channel region of a TFT." Petition at 59 (citing Ex. 1006, Fig. 7, [0035]-[0037]). Petitioner argues that "based on the teachings in Yamashita, a POSITA would have recognized that light generated by Hwang's LEDs can be internally scattered and enter the channel region of transistor Td, in the absence of metal layer 162/162a." *Id.*

But Petitioner’s exemplary illustration, reproduced below, is contrary to the understanding of a POSITA.



Petition at 61 (annotating Ex. 1004 to “show light path if [ground line 160/auxiliary electrode 162] is absent”). Petitioner inexplicably depicts a light ray originating from within passivation layer 160 and then passing through passivation layer 160 and second passivation layer 164 to argue that light would impact second semiconductor layer 158 without ground line 162 and auxiliary electrode 162a. A passivation layer, however, protects and insulates surfaces in a semiconductor; it does not emit light. Ex. 2012 at ¶ 90. And, in top emitting LEDs such as the one taught by Hwang, it would not have been obvious to consider, let alone use, the type of transparent passivation layers Petitioner’s hypothetical assumes. *Id.* Petitioner’s hypothetical is further evidence that its arguments are based on hindsight, not the knowledge and understanding of a POSITA at the time of the invention of the ’471 Patent.

Petitioner also fails to explain how its hypothetical meets any construction of “conductive light-shielding pattern layer.” Under Petitioner’s primary and alternative constructions, as discussed above, [passivation layer 160](#) and/or second passivation layer 164 would meet the limitation because they inherently block at least some light and have some, however small, measure of conductivity. Ex. 2012 at ¶ 90. And, under the plain and ordinary meaning proposed by Patent Owner, Petitioner’s “incident light” argument fails because Petitioner is not pointing at direct irradiating light. *See* Petition at 60. Accordingly, even if Petitioner’s hypothetical is taken at face value, the hypothetical does not demonstrate that it would be obvious to subjectively assign a light-shielding purpose to Hwang’s [ground line 162](#) and [auxiliary electrode 162a](#).

Thus, Petitioner has failed to meet its burden regarding Ground 3, and institution should be denied.

D. Ground 4 (Hwang, Godo, and Yamashita § 103, Claims 1, 4, 6, 9, 12, 14, 17, and 18)

For the purposes of the issues addressed in this POPR, Ground 4 incorporates the arguments of Grounds 1–3. Patent Owner therefore incorporates the arguments set forth in Grounds 1–3 above, including at least that (1) Hwang does not disclose a “conductive light-shielding pattern layer,” and neither Godo nor Yamashita cure this deficiency; (2) neither Hwang nor Yamashita disclose an overlapping length d_1 , $0.3 \leq d_1/L \leq 0.85$; and (3) there is no motivation to combine Hwang and Godo, as

explained above. Thus, for at least the reasons presented above, Petitioner has failed to meet its burden with respect to Ground 4, and institution should be denied.

VI. Conclusion

The Board should deny the Petition on the merits because no reference or combination of references discloses or renders obvious various claim elements, and Petitioner has not met its burden of showing a reasonable likelihood that it would prevail with respect to any of the claims challenged in the Petition.

Respectfully submitted,

Dated: July 18, 2025

/Jefferson Cummings/
Jefferson Cummings (Reg. No. 81,926)
RUSS AUGUST & KABAT
12424 Wilshire Boulevard, 12th Floor
Los Angeles, CA 90025
(310) 826-7474

Attorney for Patent Owner

CERTIFICATION REGARDING WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Patent Owner certifies that there are 3716 words in the paper excluding the portions exempted under 37 C.F.R. §42.24(a)(1).

Dated: July 18, 2025

/Jefferson Cummings/
Jefferson Cummings

CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))

The undersigned hereby certifies that the above document was served on July 18, 2025, by filing this document through P-TACTS as well as delivering a copy via electronic mail upon the following attorneys of record for Petitioners:

Brian Erickson
Michael Saulnier
Brian.Erickson@us.dlapiper.com
michael.saulnier@us.dlapiper.com
Dla-boe-optronicsscences-IPR@us.dlapiper.com

Date: July 18, 2025

/Jefferson Cummings/

Jefferson Cummings (Reg. No. 81,926)
RUSS AUGUST & KABAT
12424 Wilshire Boulevard, 12th Floor
Los Angeles, CA 90025
(310) 826-7474

Attorney for Patent Owner