IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Ex Parte* Reexamination of:	)	
	)	
U. S. Patent No. 9,502,612	)	Control No.: *To be assigned*
	)	
Issue Date: Nov. 22, 2016	)	Group Art Unit: *To be assigned*
	)	
Inventor: Mordehai Margalit	)	Examiner: *To be assigned*
	)	
Appl. No. 14/047,715	)	Confirmation No.: *To be assigned*
	)	
Filing Date: Oct. 7, 2013	)	
	)	
For: LIGHT EMITTING DIODE PACKAGE WITH ENHANCED HEAT CONDUCTION	)	

Mail Stop *Ex Parte* Reexam
Attn: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

REQUEST FOR *EX PARTE* REEXAMINATION OF U.S. PATENT NO. 9,502,612

TABLE OF CONTENTS

LIST OF EXHIBITS

Ex. PAT-A	U.S. Patent No. 9,502,612 ("the '612 patent")
Ex. PAT-B	Prosecution History of the '612 patent
Ex. CC-1	Claim Chart (Izumino)
Ex. CC-2	Claim Chart (Izumino-Weeks)
Ex. CC-3	Claim Chart (Izumino-Chitnis)
Ex. CC-4	Chart (Izumino-Chitnis-Weeks)
Ex. CC-5	Claim Chart (Yamada-Han)
Ex. CC-6	Claim Chart (Yamada-Han-Weeks)
Ex. CC-7	Claim Chart (Yamada-Han-Chitnis)
Ex. CC-8	Claim Chart (Yamada-Han-Tsai)
Ex. CC-9	Claim Chart (Yamada-Han-Tsai-Weeks)
Ex. CC-10	Claim Chart (Yamada-Han-Tsai-Chitnis)
Ex. CC-11	Claim Chart (Yamada-Hanaoka)
Ex. CC-12	Claim Chart (Yamada-Hanaoka-Weeks)
Ex. CC-13	Claim Chart (Yamada-Hanaoka-Chitnis)
Ex. CC-14	Claim Chart (Yamada-Hanaoka-Tsai)

Ex. CC-15	Claim Chart (Yamada-Hanaoka-Tsai-Weeks)
Ex. CC-16	Claim Chart (Yamada-Hanaoka-Tsai-Chitnis)
Ex. PA-DEC	Declaration of Dr. Baker
Ex. PA-DEC CV	Curriculum vitae of Dr. Baker
Ex. PA-DEC CC-1	Expert Claim Chart (Izumino)
Ex. PA-DEC CC-2	Expert Claim Chart (Izumino-Weeks)
Ex. PA-DEC CC-3	Expert Claim Chart (Izumino-Chitnis)
Ex. PA-DEC CC-4	Expert Chart (Izumino-Chitnis-Weeks)
Ex. PA-DEC CC-5	Expert Claim Chart (Yamada-Han)
Ex. PA-DEC CC-6	Expert Claim Chart (Yamada-Han-Weeks)
Ex. PA-DEC CC-7	Expert Claim Chart (Yamada-Han-Chitnis)
Ex. PA-DEC CC-8	Expert Claim Chart (Yamada-Han-Tsai)
Ex. PA-DEC CC-9	Expert Claim Chart (Yamada-Han-Tsai-Weeks)
Ex. PA-DEC CC-10	Expert Claim Chart (Yamada-Han-Tsai-Chitins)
Ex. PA-DEC CC-11	Expert Claim Chart (Yamada-Hanaoka)
Ex. PA-DEC CC-12	Expert Claim Chart (Yamada-Hanaoka-Weeks)

Ex. PA-DEC CC-13	Expert Claim Chart (Yamada-Hanaoka-Chitnis)
Ex. PA-DEC CC-14	Expert Claim Chart (Yamada-Hanaoka-Tsai)
Ex. PA-DEC CC-15	Expert Claim Chart (Yamada-Hanaoka-Tsai-Weeks)
Ex. PA-DEC CC-16	Expert Claim Chart (Yamada-Hanaoka-Tsai-Chitnis)
Ex. PA-1	Japanese Patent Publication No. 2005-123560 to Izumino *et al.* ("Izumino") (English translation)
Ex. PA-2	U.S. Patent No. 7,233,028 to Weeks *et al.* ("Weeks")
Ex. PA-3	U.S. Patent Publication No. 2007/0284602A1 to Chitnis *et al.* ("Chitnis")
Ex. PA-4	U.S. Patent Publication No. 2009/0206349 to Yamada *et al.* ("Yamada")
Ex. PA-5	U.S. Patent Publication No. 2008/0251781 to Han *et al.* ("Han")
Ex. PA-6	U.S. Patent No. 8,431,950 to Tsai *et al.* ("Tsai")
Ex. PA-7	Japanese Patent Publication No. 2004-327636 to Hanaoka *et al.* ("Hanaoka") (English translation)
Ex. PA-8	Kane, Processing and Characterization of Benzocyclobutene Optical Waveguides, IEEE Transactions on Components, Packaging, and Manufacturing Technology, Part B, Vol. 18, No. 3, pp. 565-571, August 1995

Ex. PA-9	Kane, Benzocyclobutene Optical Waveguides, IEEE Photonics Technology Letters, Vol. 7, No. 5, pp. 535-537, May 1995
Ex. PA-10	Tritt, Thermal Conductivity: Theory, Properties, and Applications, 2004
Ex. PA-11	U.S. Patent Application Publication No. 2010/0301307 to Fattal ("Fattal")
Ex. PA-12	U.S. Patent Application Publication No. 2011/0037086 to Kim *et al.* ("Kim")
Ex. PA-13	U.S. Patent No. 6,657,234 to Tanizawa *et al.* ("Tanizawa")
Ex. PA-14	U.S. Patent Application Publication No. 2008/0286894 to Chae ("Chae")
Ex. PA-15	U.S. Patent Application Publication No. 2002/0050600 to Hayakawa ("Hayakawa")
Ex. PA-16	Schubert, Light Emitting Diodes, Second Edition, 2006 ("Schubert")
Ex. PA-17	U.S. Patent Application Publication No. 2008/0006836 to Lee ("Lee")
Ex. PA-18	U.S. Patent No. 7,105,857 to Nagahama *et al.* ("*Nagahama*")
Ex. PA-19	U.S. Patent No. 7,358,522 to Yamamoto ("Yanamoto")
Ex. PA-20	U.S. Patent Application Publication No. 2006/0278885 to Tain *et al.* ("Tain")

Ex. PA-21	U.S. Patent Application Publication No. 2010/0283077 to Slater *et al.* ("Slater")
Ex. PA-22	U.S. Patent Application Publication No. 2009/0126783 to Lin *et al.* ("Lin")
Ex. PA-23	U.S. Patent Application Publication No. 2003/0099393 to Oshiumi *et al.* ("Oshiumi")
Ex. PA-24	U.S. Patent Application Publication No. 2005/0110037 to Takeda *et al.* ("Takeda")
Ex. PA-25	U.S. Patent Application Publication No. 2006/0104855 to Rothschild *et al.* ("Rothschild")
Ex. PA-26	U.S. Patent No. 6,287,947 to Ludowise ("Ludowise")
Ex. PA-27	Loebich, The Optical Properties of Gold (1972)
Ex. PA-28	U.S. Patent Application Publication No. 2008/0130305 to Wang *et al.* ("Wang")
Ex. PA-29	U.S. Patent Application Publication No. 2004/0159850 to Takenaka ("Takenaka")
Ex. PA-30	U.S. Patent Application Publication No. 2003/0232455 to Tanaka ("Tanaka")
Ex. LIT-1	Complaint (Dkt. #1), *LED Wafer Sols. LLC v. Samsung Elecs. Co.*, No 6:21-CV-00292 (W.D. Tex. Mar. 25, 2021)
Ex. LIT-2	Amended Joint Claim Construction Statement (Dkt. #88), *LED Wafer Sols. LLC v. Samsung Elecs. Co.*, No 6:21-CV-00292 (W.D. Tex. May 3, 2022)

Ex. LIT-3	LED Wafer Solutions LLC's Infringement Contentions regarding U.S. Patent No. 9,502,612 with respect to Samsung Galaxy S6 (August 13, 2021)
Ex. LIT-4	Transfer of *LED Wafer Sols. LLC v. Samsung Elecs. Co.*, No 6:21-CV-00292 (W.D. Tex.) to *LED Wafer Sols. LLC v. Samsung Elecs. Co.*, No 3:22-CV-04809 (N.D. Cal.)

I. Introduction

An *ex parte* reexamination is requested on claims 1-9 ("the challenged claims") of U.S. Patent No. 9,502,612, which issued on November 22, 2016 to Margalit ("the '612 patent," Ex. PAT-A), for which the U.S. Patent and Trademark Office ("Office") files identify LED Wafer Solutions LLC ("LED Wafer" or "Patent Owner") as the assignee. In accordance with 37 C.F.R. § 1.510(b)(6), Requester Samsung Electronics Co., Ltd. ("Requester") hereby certifies that the statutory estoppel provisions of 35 U.S.C. § 315(e)(1) and 35 U.S.C. § 325(e)(1) do not prohibit it from filing this *ex parte* reexamination request.

This request raises substantial new questions of patentability based on prior art that the Office did not have before it or did not fully consider during the prosecution of the '612 patent, and which discloses or suggests the features recited in the challenged claims. Requester respectfully urges that this Request be granted and that reexamination be conducted with "special dispatch" pursuant to 35 U.S.C. § 305. The Office should find the claims unpatentable over this art.

In accordance with 37 C.F.R. § 1.20(c), the fee for *ex parte* reexamination (non-streamlined) is submitted herewith. If this fee is missing or defective, please charge the fee as well as any additional fees that may be required to Deposit Account No. 50-2613.

Requester is also mailing courtesy colored copies of the request documents to the Office. If there are any questions regarding the colored copies or if the colored copies can be sent differently, please contact Naveen Modi at (202) 551-1990 or naveenmodi@paulhastings.com.

II. Related Proceedings

On March 25, 2021, Patent Owner filed suit against Requester asserting, *inter alia*, infringement of the '612 patent in *LED Wafer Solutions LLC v. Samsung Electronics Co., Ltd.*, No 6-21-CV-00292 (W.D. Tex.). (Ex. LIT-1.) Thereafter, on August 22, 2022, the case was transferred to *LED Wafer Solutions LLC v. Samsung Electronics Co., Ltd.*, No 3-22-CV-04809 (N.D. Cal.). (Ex. LIT-4.)

Requester filed an *inter partes* review petition against the '612 patent on September 20, 2021. IPR2021-01554, Paper 1. The Patent Trial and Appeal Board ("the PTAB") denied that petition on April 12, 2022. IPR2021-01554, Paper 10. Seoul Semiconductor Co, Ltd. separately filed an *inter partes* review petition against the '612 patent on September 8, 2021. IPR2021-01504, Paper 1. The PTAB denied that petition on March 15, 2022. IPR2021-01504, Paper 12.

This request, however, does not raise "the same or substantially the same prior art or arguments" previously presented, including in IPR2021-01554 and IPR2021-01504. 35 U.S.C. § 325(d). This request is based on prior art that the Office did not have before it or did not fully consider during the prosecution of the '612 patent, that the PTAB did not have before it or did not fully consider in IPR2021-01554 and IPR2021-01504, and which discloses or suggests the features recited in the challenged claims, especially under the broadest reasonable interpretation standard applicable to this request. This request also presents new combinations of references that were not before the Office or the PTAB. The references used in this request are substantially different than those considered by the Examiner during prosecution and those used in IPR2021-01554 and IPR2021-01504.

During prosecution, the Examiner allowed the claims over the Li reference (U.S Patent Publication No. 2009/0262516) based on Patent Owner's argument that Li did not teach a carrier wafer and thermally conductive layer that "define a relief to expose at least a portion of the second LED surface" (the "relief" limitation), as recited in claim 1. (Ex. PAT-B, 50 (Examiner's Reasons for Allowance), 75-76 (Patent Owner's arguments).) This request does not rely on Li. As discussed below in Section VI, the primary references relied on in this request (Izumino and Yamada) provide substantially different disclosure with respect to the "relief" limitation and expressly disclose a carrier wafer and thermally conductive layer that "define a relief to expose at least a portion of the second LED surface," as recited in claim 1. Thus, this request raises substantial new questions of patentability with respect to the "relief" limitation based on at least the disclosures of Izumino and Yamada that were not previously considered by the Office.

In IPR2021-01554, the PTAB denied institution because it determined that Petitioner had not demonstrated sufficiently that the Tanaka reference (U.S. Patent Publication No. 2003/0232455) discloses or suggests "a thermally conductive layer **disposed on** the second LED surface of the semiconductor LED" (the "thermally conductive layer" limitation), as recited in claim 1. IPR2021-01554, Paper 10 at 11-15 (P.T.A.B. Apr. 12, 2022). The Board reached this determination based on its finding that "**there is no contact** between wiring pattern 80 [mapped to the claimed thermally conductive layer] and the second LED surface shown in Tanaka's Figure 7 embodiment." *Id.* at 15 (emphasis added). That is, the Board's denial of institution was based on its interpretation of the "disposed on" term in this claim limitation to mean that the thermally conductive layer must be in contact with the second LED surface. *Id.* (noting that in the '612

patent, the adhesive layer 41 corresponding to the claimed thermally conductive layer "contacts" the semiconductor LED surface in multiple places while in Tanaka, electrode pads 51 and 52 intervene between the wiring pattern 80 and the surface of LED chip 70); *see also id.* at 12 (acknowledging Patent Owner's argument that Tanaka does not teach this limitation because LED chip 70 is suspended over the wiring pattern 80 by electrodes 51 and 52). This request does not rely on Tanaka. Rather, this request raises substantial new questions of patentability with respect to the "thermally conductive layer" limitation for at least two reasons.

First, the broadest reasonable interpretation standard applicable to this request raises a substantial new question of patentability because at least under that standard, the "disposed on" term in the "thermally conductive layer" limitation does not require that the thermally conductive layer be in contact with the second LED surface. The broadest reasonable interpretation of the "disposed on" term allows for intermediate layers to be interposed between the layers recited to be "disposed on" each other. *TPK America, LLC v. Wintek Corp.*, IPR2013-00433, Paper No. 12 at 8 (January 14, 2014) (Board concluding that "broadest reasonable interpretation of 'disposed on' allows intermediate layers to be interposed between the recited layers"); *see also AFG Industries, Inc. v. Cardinal IG Co., Inc.*, 239 F.3d 1239, 1251 (Fed. Cir. 2001) (term "formed on" as used in a limitation reciting "a second . . . layer . . . formed on the first layer" did not require direct contact between the second and first layer, and therefore, did not preclude the presence of an interlayer between the first and second layer that was used during the process of making the claimed substrate). Thus, as discussed below in Section VI, Izumino discloses the "thermally conductive layer" limitation under its broadest reasonable interpretation. (*See, e.g.*, SNQs 1-4.)

Second, even if the Board's interpretation of the "disposed on" term in IPR2021-01554 is considered, this request raises a substantial new question of patentability. In particular, as discussed below in Section VI, Yamada discloses the "thermally conductive layer" limitation under an understanding that the thermally conductive layer is in contact with the second LED surface. (*See, e.g.*, SNQs 5-16.)

Regarding IPR2021-01504, the PTAB denied institution when it determined that Hashimoto (U.S. Patent Publication No. 2004/0012958) did not disclose an intrinsic region or layer as recited in claim 1; that Schubert (Ex. PA-16) did not "recommend the use of an intrinsic (undoped) active or light emitting layer in an LED"; and that Nakamura (U.S. Patent No. 5,777,350) did "not show that the light emitting layers of LEDs were conventionally or commonly

undoped." IPR2021-01504, Paper 12 at 15-17. In all, the PTAB found that the petition did not adequately explain why a skilled artisan would have chosen to use an undoped ("intrinsic") layer as the light emitting layer of an LED based on the teachings of the cited prior art. *Id.* at 18-21. This request, however, does not rely on Hashimoto, Schubert, or Nakamura for the intrinsic region limitation of claim 1. And as discussed below in Section VI, the references in this request (for example, Izumino and Han) provide substantially different disclosure regarding the intrinsic region limitation.

Moreover, the Office erred in a manner material to patentability by not considering the teachings, arguments, obviousness combinations, and evidence presented in this request (Section VI). The primary references Izumino and Yamada, along with secondary references Han, Tsai, and Hanaoka, were not considered by the Office during prosecution and not presented in IPR2021-01554 and IPR2021-01504. And as discussed above and further discussed below in Sections VI.A and VI.E, Izumino and Yamada alone raise substantial new questions of patentability with respect to the "relief" limitation and "thermally conductive layer' limitation. With respect to the remaining references Weeks and Chitnis, Requester relies on Weeks (in combination with in combination with Izumino or Yamada) to address claim 3 under SNQs 2, 4, 6, 9, 12, and 15 and similarly relies on the Chitnis reference (in combination with Izumino or Yamada) to address claims 1-9 under SNQs 3-4, 7, 10, 13, and 16. In IPR2021-01554, Weeks (in combination with Tanaka) was relied on to address claim 3 and Chitnis (in combination with Tanaka) was relied on to address claims 4-7. However, the Board never reached the merits of Weeks or Chitnis in IPR2021-01554 because, as discussed above, the Board determined that Petitioner did not meet its burden to show that Tanaka disclosed the "thermally conductive layer" limitation. At least because the Office did not consider the teachings of Weeks and Chitnis previously, and because the combinations presented involving Weeks and Chitnis were not previously before the Office, the Office erred in a manner material to patentability.

III. Identification of Claims and Citation of Prior Art Presented

Requester respectfully requests reexamination of claims 1-9 of the '612 patent in view of the following prior art references, which are also listed on the attached PTO Form SB/08.

Ex. PA-1	Japanese Patent Publication No. 2005-123560 to Izumino *et al.* ("Izumino") (English translation)

Ex. PA-2	U.S. Patent No. 7,233,028 to Weeks *et al.* ("Weeks")
Ex. PA-3	U.S. Patent Publication No. 2007/0284602A1 to Chitnis et al. ("Chitnis")
Ex. PA-4	U.S. Patent Publication No.2009/0206349 to Yamada *et al.* ("Yamada")
Ex. PA-5	U.S. Patent Publication No. 2008/0251781 to Han *et al.* ("Han")
Ex. PA-6	U.S. Patent No. 8,431,950 to Tsai *et al.* ("Tsai")
Ex. PA-7	Japanese Patent Publication No. 2004-327636 to Hanaoka et al. ("Hanaoka") (English translation)

A copy of each of the above-listed references is attached to this request pursuant to 37 C.F.R. § 1.510(b)(3). A copy of the '612 patent is also attached to this request as Exhibit PAT-A pursuant to 37 C.F.R. § 1.510(b)(4).

IV. Overview of the '612 Patent

A. Specification and Drawings of the '612 Patent

The '612 patent relates to "a light emitting diode (LED) device." (Ex. PAT-A, 1:21-25.) The '612 patent admits that light emitting diode (LED) devices were conventional and well-known and, with reference to Figure 1 below, describes a known prior art Gallium Nitride (GaN) LED device. (*Id.*, 1:29-39, 2:1-3:6, 4:18, 5:4-17, 5:29-45; FIG. 1.)

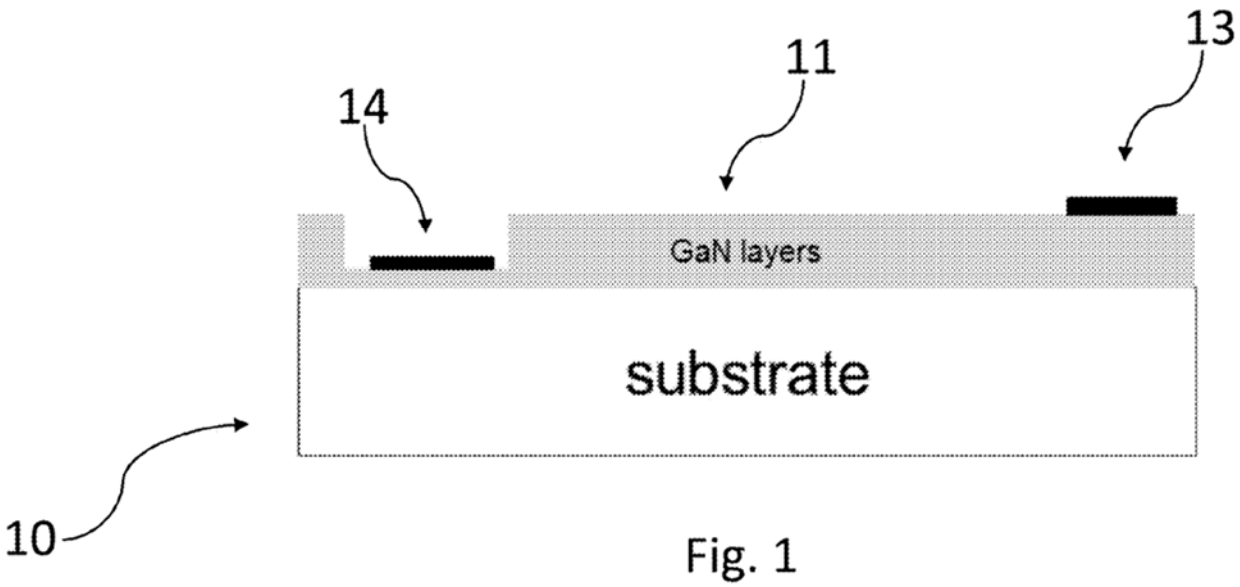


Fig. 1
(Prior Art)

(*Id.*, FIG. 1.)

As disclosed by the '612 patent:

> Modern LED devices are based on semiconducting materials and their properties. For example, some LEDs are made using Gallium Nitride (GaN) . . . Ga LEDs are typically epitaxially grown on a sapphire substrate. These LEDs comprise a P-I-N junction device having an intrinsic (I) layer disposed between a N-type doped layer and a P-type doped layer.

(*Id.*, 5:4-17.)

The prior art GaN LED chip 10 of Figure 1 includes GaN layers 11 grown on a substrate 12. (*Id.*, 5:29-32.) The GaN layers 11 include an n-type doped region disposed directly adjacent to substrate 12 and electrically connected to pad 14 and a p-type doped region electrically connected to pad 13. (*Id.*, 5:34-37.) As noted above, the '612 patent states that GaN LEDs "comprise a P-I-N junction device having an intrinsic (I) layer disposed between a N-type doped layer and a P-type doped layer." (*Id.*, 5:9-11.) In other words, the '612 patent admits that prior art GaN LEDs have an intrinsic region disposed between an n-type doped layer and a p-type doped layer.

The disclosed embodiments of the '612 patent build on the prior art device of Figure 1. For example, the '612 patent discloses "methods and apparatus for LED packaging to efficiently

remove excess heat during active operation." (*Id.*, 4:44-46; *see also id.*, 3:37-48, 4:46-52, 4:63-5:3.) Like the prior-art LED device in Figure 1 above, the device of Figure 5 includes a substrate, GaN layers constituting the semiconductor LED, and n-type/p-type pads 55, 56. (*Id.*, 8:60-9:28, FIG. 5; *see also id.*, 5:29-45, FIG. 1.)

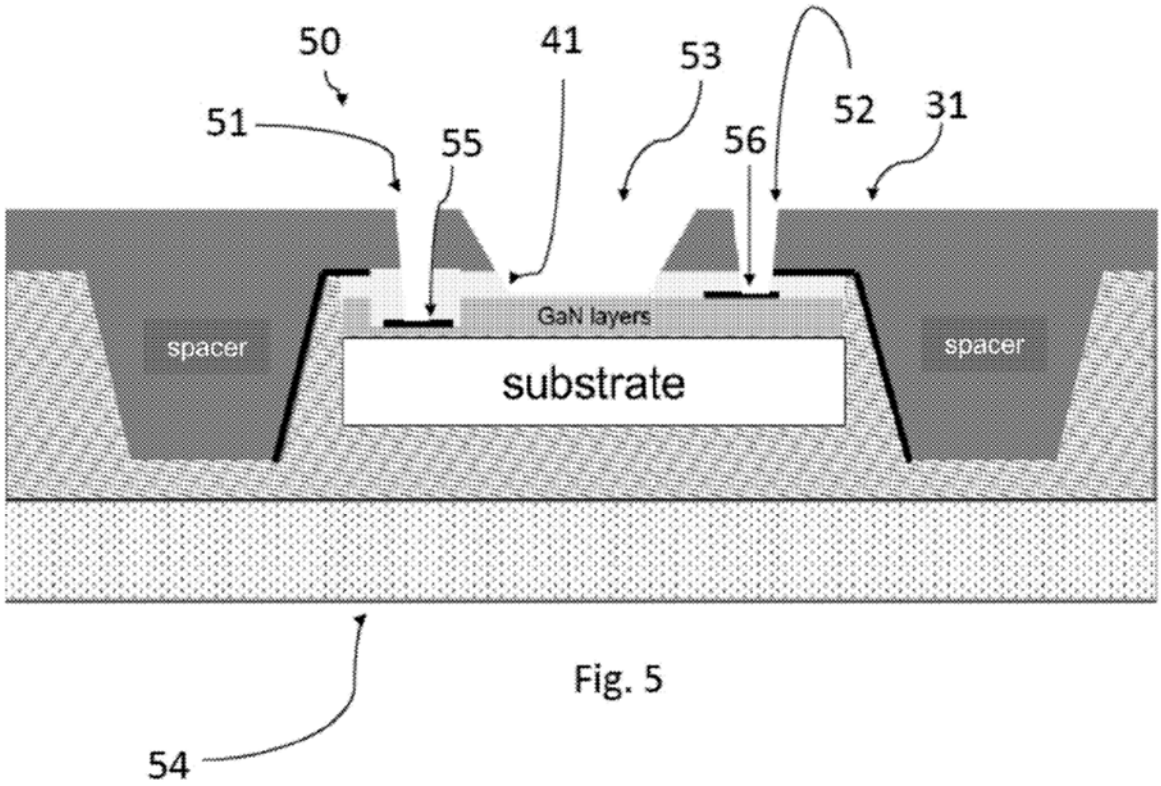


Fig. 5

(*Id.*, FIG.5.)

The Figure 5 device further includes an adhesive layer 41, silicon wafer 31, peripheral reflectors 34, 35 (labeled in Figure 4), a silicone encapsulation 42 that is an optically transmissive layer, and a relief defined by the silicon wafer 31 and adhesive layer 41. (*Id.*, 6:45-64 (describing silicon wafer 31 and peripheral reflectors 34, 35), 7:22-29 (describing adhesive layer 41), 7:54-58 (describing silicone encapsulation 42), 9:1-28 (describing the relief).) The '612 patent discloses that "[t]here are two types of geometrical reliefs which are evident in [] FIG. 5," namely (i) a "via (hole)" such as vias 51, 52 and (ii) a thermally conducting hole 53. (*Id.*, 9:1-28.)

As explained below and in the accompanying declaration of Dr. Baker, all of the limitations in the challenged claims were known in the prior art. (*See infra* Section VI; Ex. PA-DEC.)

B. Prosecution History of the '612 patent

As discussed above in Section II, the Examiner allowed the claims over the Li reference (U.S Patent Publication No. 2009/0262516) based on Patent Owner's argument that Li did not teach a carrier wafer and thermally conductive layer that "define a relief to expose at least a portion of the second LED surface" (the "relief" limitation), as recited in claim 1. (Ex. PAT-B, 50 (Examiner's Reasons for Allowance), 75-76 (Patent Owner's arguments).) Patent Owner's arguments were based on claim amendments made in response to the Examiner's rejection based on Li. (Ex. PAT-B, 67-75 (Patent Owner's amendment and arguments based on amendments), 80-86 (Office Action with rejection based on Li).) Izumino, Weeks, Chitnis, Yamada, Han, Tsai, and Hanaoka were not considered during prosecution of the '612 patent. (*See generally* Ex. PAT-B.)

C. The Effective Priority Date of the '612 Patent

For purposes of this reexamination only, Requester assumes that claims 1-9 are entitled to the filing date of the earliest related provisional application No. 61/244,046, which is September 20, 2009. (Ex. PAT-A, Cover.) Izumino, Weeks, Chitnis, and Hanaoka each issued more than one year prior to September 20, 2009, and thus qualify as prior art at least under pre-AIA 35 U.S.C. § 102(b); Han and Tsai, which were filed on April 14, 2008 and May 22, 2009, respectively, qualify as prior art at least under pre-AIA 35 U.S.C. § 102(e), and Yamada, which published on August 20, 2009, qualifies as prior art at least under pre-AIA 35 U.S.C. § 102(a).

V. Claim Construction

"During patent examination, the pending claims must be 'given their broadest reasonable interpretation consistent with the specification.'" MPEP § 2111; *see also* MPEP § 2258. Limitations in the specification are not read into the claims. MPEP § 2258. The standard of claim interpretation in reexamination is different than that used by the courts in patent litigation and the Board in *inter partes* review proceedings.[1] Therefore, any claim interpretations submitted or

[1] Requester reserves all rights and defenses available including, without limitation, defenses as to invalidity, unenforceability, and non-infringement regarding the '612 patent. Further, because the claim interpretation standard used by courts in patent litigation is different from the appropriate standard for this reexamination, any claim constructions submitted or implied herein for the purpose of this reexamination are not binding upon Requester in any litigation related to the '612 patent. Specifically, any interpretation or construction of the claims presented herein or in Dr.

implied herein for the purpose of this reexamination do not necessarily correspond to the appropriate construction under the legal standards mandated in litigation. MPEP § 2686.04.11; *see also In re Zletz*, 893 F.2d 319, 322, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). For purposes of this request, Requester believes that no constructions of the challenged claims are needed. (Ex. PA-DEC, ¶40.)

In the Western District of Texas litigation involving the '612 patent (*see generally* Ex. LIT-1), Requester and Patent Owner agreed that the claimed "relief" term should be construed as a "thermally conducting hole." (Ex. LIT-2, 1.)

While Requester believes no constructions are needed, the prior art mappings found in Section VI of this Request include analysis explaining how the claims of the '612 patent are unpatentable under the agreed construction for the "relief" term. And for certain claim terms that may be unclear in scope (e.g., "has the property of high thermal conductivity"), this request assumes an interpretation consistent with that advanced by the Patent Owner in litigation. (Ex. LIT-2, 5.)[2] Nonetheless, the claims would be unpatentable under any reasonable construction of this term and the other terms given how closely the prior art maps to the claims. This is particularly true given that the broadest reasonable interpretation standard governs this request.[3]

VI. Statement of Substantial New Questions of Patentability

As mentioned above, Izumino, Weeks, Chitnis, Yamada, Han, Tsai, and Hanaoka were never made of record or considered by the Office during original prosecution of the '612 patent.

Baker's declaration for reexamination, either implicitly or explicitly, should not be viewed as constituting, in whole or in part, the Requester's own interpretation or construction of such claims.

[2] Requester reserves all rights to raise claim constructions in other venues. For example, Requester has not necessarily raised all challenges to the '612 patent in this proceeding, including those under 35 U.S.C. § 112, given the limitations placed by the Rules governing this proceeding. For example, Requester has alleged some terms are indefinite in district court proceedings. But given how closely the prior art maps to the claims (as explained below), those issues do not need to be resolved to assess patentability in this proceeding. In addition, a comparison of the claims to any accused products in litigation may raise controversies that need to be resolved through claim construction that are not presented here given the similarities between the references and the '612 patent. Thus, the SNQs presented herein should not be interpreted to (and do not) conflict with Requester's indefiniteness positions in other proceedings regarding the '612 patent (Ex. LIT-2).

[3] As discussed in Section II, the "disposed on" term in the "thermally conductive layer" limitation is disclosed by the prior art relied upon herein both under its broadest reasonable interpretation (allowing for intervening layers) or under the interpretation advanced by the Board in IPR2021-01554.

However, the references (alone or in various combinations for respective claims) disclose or suggest all of the features of claims 1-9 of the ’612 patent.

SNQ1: Izumino raises a substantial new question of patentability (SNQ1) with respect to claims 1, 2, and 4-9 of the ’612 patent.

SNQ2: Izumino and Weeks raise a substantial new question of patentability (SNQ2) with respect to claim 3 of the ’612 patent.

SNQ3: Izumino and Chitnis raise a substantial new question of patentability (SNQ3) with respect to claims 1, 2, and 4-9 of the ’612 patent.

SNQ4: Izumino, Chitnis, and Weeks raise a substantial new question of patentability (SNQ4) with respect to claim 3 of the ’612 patent.

SNQ5: Yamada and Han raise a substantial new question of patentability (SNQ5) with respect to claims 1, 2, and 4-8 of the ’612 patent.

SNQ6: Yamada, Han, and Weeks raise a substantial new question of patentability (SNQ6) with respect to claim 3 of the ’612 patent.

SNQ7: Yamada, Han, and Chitnis raise a substantial new question of patentability (SNQ7) with respect to claims 4-7 of the ’612 patent.

SNQ8: Yamada, Han, and Tsai raise a substantial new question of patentability (SNQ8) with respect to claims 1, 2, and 4-8 of the ’612 patent.

SNQ9: Yamada, Han, Tsai, and Weeks raise a substantial new question of patentability (SNQ9) with respect to claim 3 of the ’612 patent.

SNQ10: Yamada, Han, Tsai, and Chitnis raise a substantial new question of patentability (SNQ10) with respect to claims 4-7 of the ’612 patent.

SNQ11: Yamada and Hanaoka raise a substantial new question of patentability (SNQ11) with respect to claims 1, 2, and 4-8 of the ’612 patent.

SNQ12: Yamada, Hanaoka, and Weeks raise a substantial new question of patentability (SNQ12) with respect to claim 3 of the ’612 patent.

SNQ13: Yamada, Hanaoka, and Chitnis raise a substantial new question of patentability (SNQ13) with respect to claims 4-7 of the ’612 patent.

SNQ14: Yamada, Hanaoka, and Tsai raise a substantial new question of patentability (SNQ14) with respect to claims 1, 2, and 4-8 of the ’612 patent.

SNQ15: Yamada, Hanaoka, Tsai, and Weeks raise a substantial new question of patentability (SNQ15) with respect to claim 3 of the '612 patent.

SNQ16: Yamada, Hanaoka, Tsai, and Chitnis raise a substantial new question of patentability (SNQ16) with respect to claims 4-7 of the '612 patent.

Thus, for these reasons and the reasons discussed below and in the accompanying claim charts for SNQs 1-16 (CC-1 to CC-16) and supporting declaration of Dr. Baker (Ex. PA-DEC), Izumino raises a substantial new question of patentability (SNQ1) with respect to claims 1, 2 and 4-9 of the '612 patent; Izumino and Weeks raise a substantial new question of patentability (SNQ2) with respect to claim 3 of the '612 patent; Izumino and Chitnis raise a substantial new question of patentability (SNQ3) with respect to claims 1, 2 and 4-9 of the '612 patent; Izumino, Chitnis, and Weeks raise a substantial new question of patentability (SNQ4) with respect to claim 3 of the '612 patent; Yamada and Han raise a substantial new question of patentability (SNQ5) with respect to claims 1, 2 and 4-8 of the '612 patent; Yamada, Han, and Weeks raise a substantial new question of patentability (SNQ6) with respect to claim 3 of the '612 patent; Yamada, Han, and Chitnis raise a substantial new question of patentability (SNQ7) with respect to claims 4-7 of the '612 patent. Yamada, Han, and Tsai raise a substantial new question of patentability (SNQ8) with respect to claims 1, 2 and 4-8 of the '612 patent; Yamada, Han, Tsai, and Weeks raise a substantial new question of patentability (SNQ9) with respect to claim 3 of the '612 patent; Yamada, Han, Tsai, and Chitnis raise a substantial new question of patentability (SNQ10) with respect to claims 4-7 of the '612 patent; Yamada and Hanaoka raise a substantial new question of patentability (SNQ11) with respect to claims 1, 2 and 4-8 of the '612 patent; Yamada, Hanaoka, and Weeks raise a substantial new question of patentability (SNQ12) with respect to claim 3 of the '612 patent; Yamada, Hanaoka, and Chitnis raise a substantial new question of patentability (SNQ13) with respect to claims 4-7 of the '612 patent; Yamada, Hanaoka, and Tsai raise a substantial new question of patentability (SNQ14) with respect to claims 1, 2 and 4-8 of the '612 patent; Yamada, Hanaoka, Tsai, and Weeks raise a substantial new question of patentability (SNQ15) with respect to claim 3 of the '612 patent; and Yamada, Hanaoka, Tsai, and Chitnis raise a substantial new question of patentability (SNQ16) with respect to claims 4-7 of the '612 patent.

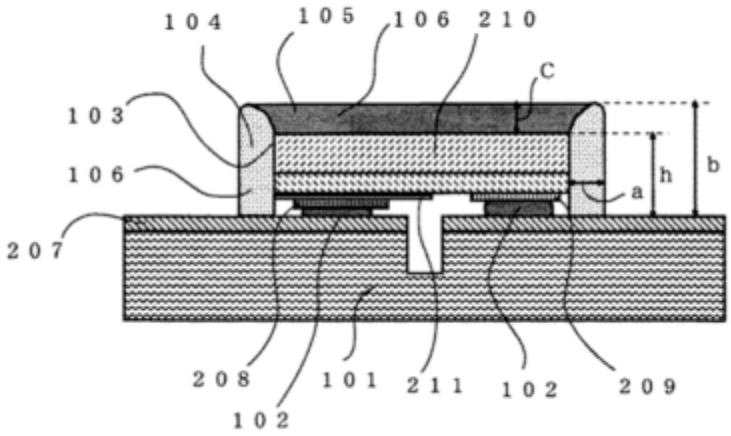
A. SNQ1: Izumino Discloses Claims 1, 2 and 4-9

As explained in attached claim chart CC-1 (Exhibit-CC-1) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Izumino discloses the limitations of claims 1, 2, and 4-9 of the '612 patent. (Ex. PA-DEC, ¶¶41-51.)

1. Overview of Izumino

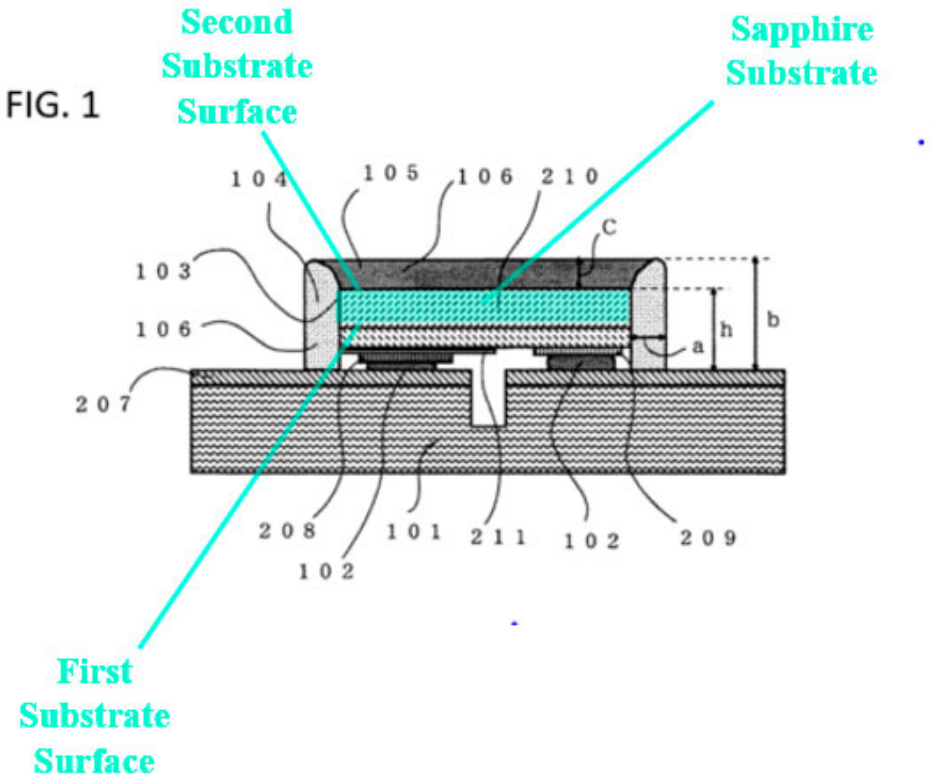
Izumino discloses "a **light emitting device** containing a light emitting element 103 in which electrodes 208 and 209 are facing and bonded to a conductive pattern 207 of a support substrate 101 via a conductive member 102." (Ex. PA-1, Abstract (emphasis added), [0001], [0008], [0021], FIG. 1.)

FIG. 1



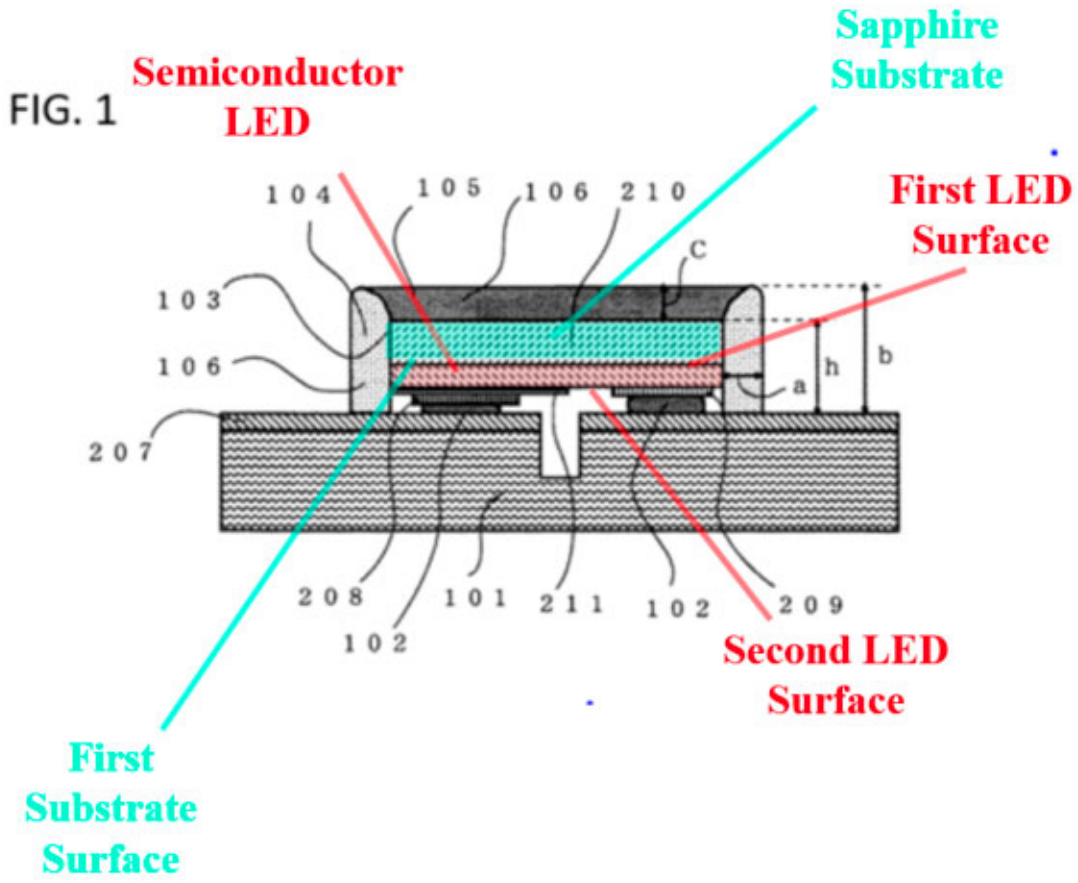
(*Id.*, FIG. 1.)

In particular, Izumino discloses an LED chip 103 that includes an LED formed on a translucent sapphire substrate 210, where the substrate 210 has opposing first and second surfaces. As shown in annotated Figure 1 below, the translucent sapphire substrate 210 ("substrate") has first and second substrate surfaces. (*Id.*, [0101]-[0102], [0112].)



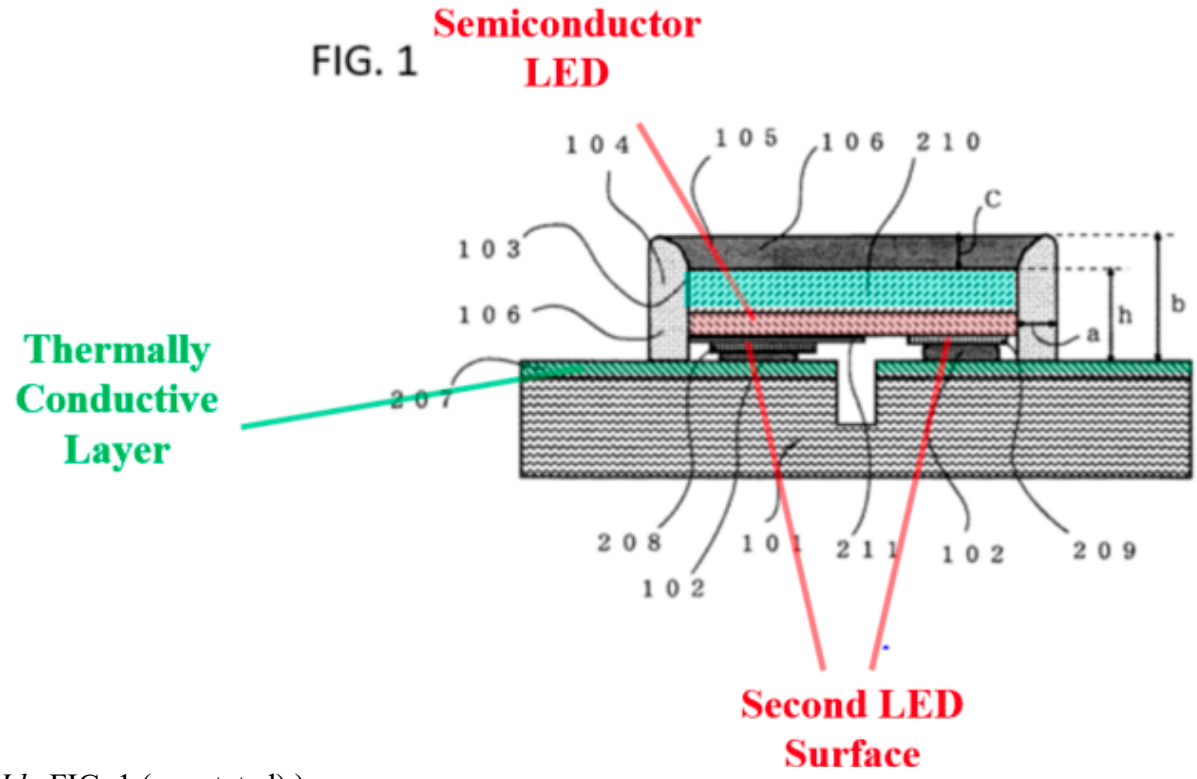
(*Id.*, FIG. 1 (annotated).)

Izumino discloses that the LED formed on the sapphire substrate (together LED chip 103) includes doped and intrinsic regions thereof. As shown in annotated Figure 1 below, the LED has opposing first and second LED surfaces, said first LED surface disposed on the first substrate surface of the translucent sapphire substrate 210. (*Id.*, [0095], [0112], [0114].)



(*Id.*, FIG. 1 (annotated).)

With respect to the "thermally conductive layer" limitation, as shown in annotated Figure 1 below, Izumino further discloses a conductive pattern 207 ("thermally conductive layer") disposed on the second LED surface of LED chip 103 ("semiconductor LED"). (*Id.*, [0104]; *see also id.*, Abstract.)



(*Id.*, FIG. 1 (annotated).)

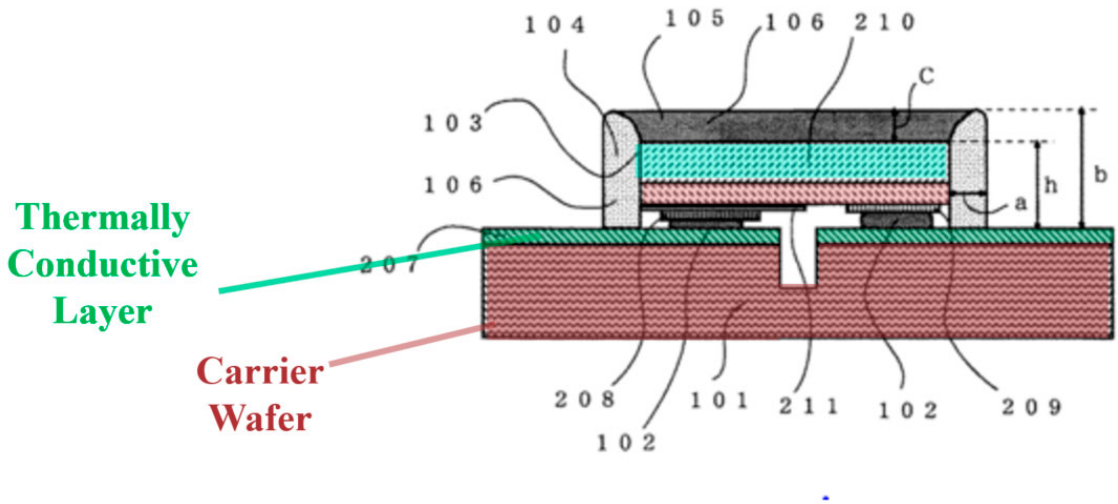
As shown above, conductive pattern 207 ("thermally conductive layer"), provided on the surface of the support substrate 101 (also referred to as a submount), is disposed on the second LED surface of LED chip 103 via certain intervening layers including bumps 102, p-side and n-side electrodes 208/209, and diffusion electrode 211. For example, conductive pattern 207 is disposed on the second LED surface of LED chip 103 as conductive pattern 207 overlaps the second LED surface of the LED chip 103 in the vertical direction of Izumino's Figure 1 embodiment.

As discussed above in Section II, the broadest reasonable interpretation of the "disposed on" term allows for intermediate layers to be interposed between the layers recited to be "disposed on" each other. *TPK America, LLC v. Wintek Corp.*, IPR2013-00433, Paper No. 12 at 8 (January 14, 2014) (Board concluding that "broadest reasonable interpretation of 'disposed on' allows intermediate layers to be interposed between the recited layers"); *see also AFG Industries, Inc. v. Cardinal IG Co., Inc.*, 239 F.3d 1239, 1251 (Fed. Cir. 2001) (term "formed on" as used in a limitation reciting "a second . . . layer . . . formed on the first layer" did not require direct contact between the second and first layer, and therefore, did not preclude the presence of an interlayer

between the first and second layer that was used during the process of making the claimed substrate). Thus, Izumino discloses the "thermally conductive layer" limitation under its broadest reasonable interpretation.

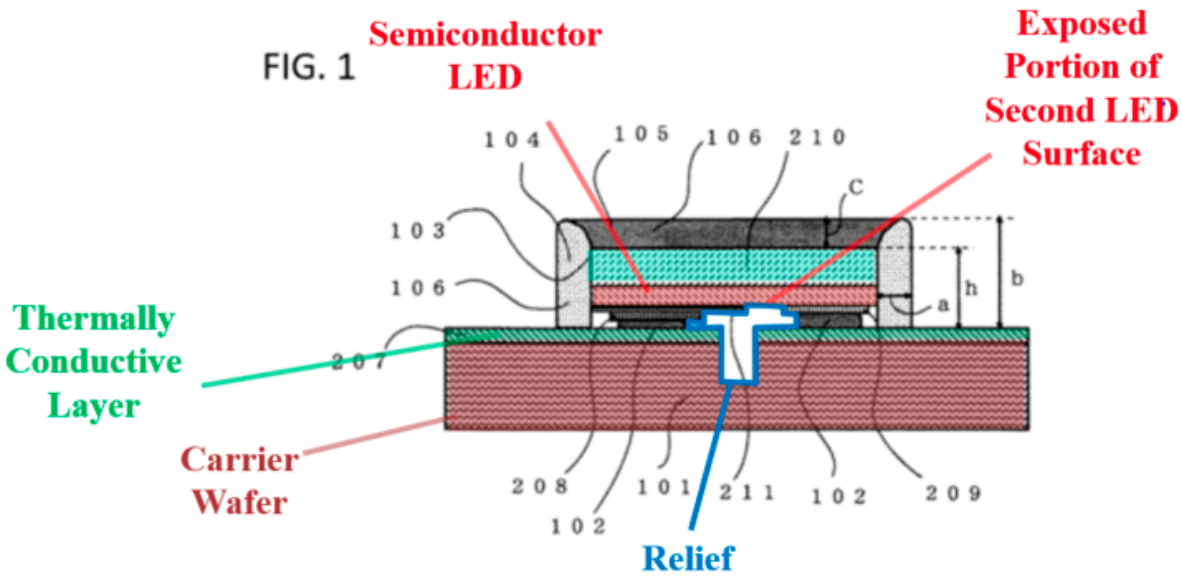
As shown in annotated Figure 1 below, Izumino further discloses a support substrate (submount) 101 ("carrier wafer") disposed on the conductive pattern 207 ("thermally conductive layer"). (*Id.*, [0021], [0104], [0112], [0116], [0118].)

FIG. 1



(*Id.*, FIG. 1 (annotated).)

With respect to the "relief" limitation, as shown in annotated Figure 1 below, the submount 101 ("carrier wafer") and conductive pattern 207 ("thermally conductive layer") define a hole ("relief") for heat dissipation that exposes at least a portion of the second LED surface of LED chip 103 (e.g., a portion of the p-type contact layer of the LED). (*Id.*, [0107].)



(*Id.*, FIG. 1 (annotated).)

In particular, Izumino discloses "**holes or recessions and ridges are preferably provided on the support substrate** [submount] at locations that do not adversely affect the mounting of the light emitting element." (*Id.*, [0107] (emphasis added).) Izumino discloses that "[b]y providing such a shape, **heat from the semiconductor element can be efficiently dissipated from the support**." (*Id.* (emphasis added).) Further, "[a]t least **one or more through holes is preferably provided in the thickness direction of the support substrate** to form the conductive member **such that the conductive member extends to the inner wall surface of the through hole**, **which further improves heat dissipation characteristics**." (*Id.* (emphasis added).) Thus, the relief defined by the submount 101 and the conductive pattern 207 is a hole for heat dissipation (e.g., a thermally conductive hole) as it conducts heat from the LED chip 103 (which is exposed by the hole).

Thus, Izumino raises a substantial new question of patentability with respect to the challenged claims of the '612 patent.

B. SNQ2: Izumino in View of Weeks Discloses or Suggests Claim 3

As explained in attached claim chart CC-2 (Exhibit-CC-2) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Izumino in view of Weeks discloses or suggest the limitations of claim 3 of the '612 patent. (Ex. PA-DEC, ¶52.)

C. SNQ3: Izumino in View of Chitnis Discloses or Suggests Claims 1, 2, and 4-9

As explained in attached claim chart CC-3 (Exhibit-CC-3) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Izumino in view of Chitnis discloses or suggests the limitations of claims 1, 2, and 4-9 of the '612 patent. (Ex. PA-DEC, ¶53.)

D. SNQ4: Izumino in View of Chitnis and Weeks Discloses or Suggests Claim 3

As explained in attached claim chart CC-4 (Exhibit-CC-4) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Izumino in view of Chitnis and Weeks discloses or suggests the limitations of claim 3 of the '612 patent. (Ex. PA-DEC, ¶54.)

E. SNQ5: Yamada in View of Han Discloses or Suggests Claims 1, 2, and 4-8

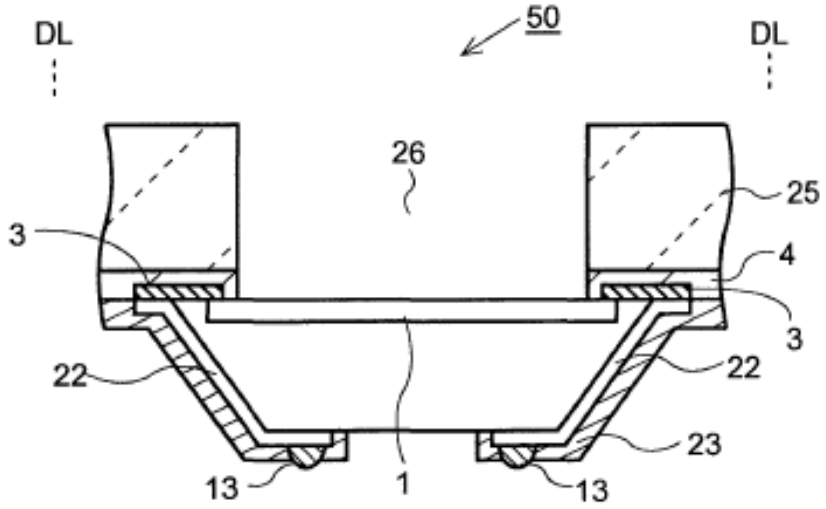
As explained in attached claim chart CC-5 (Exhibit-CC-5) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Han discloses or suggests the limitations of claims 1, 2, and 4-8 of the '612 patent. (Ex. PA-DEC, ¶¶55-62.)

1. Overview of Yamada

Yamada discloses a semiconductor device 50 ("light emitting device") in Figure 9 which is formed by the process described in Figures 6-9. (Ex. PA-4, [0022]-[0025], [0057]-[0058], [0068], FIGS. 6-9.) Yamada discloses with respect to the semiconductor device 50 that "a semiconductor substrate 2 made of silicon (Si) or the like is provided, **where a device element 1** (**e.g. a semiconductor element such as** a light receiving element such as CCD, an infrared ray sensor, a CMOS sensor or the like, or **a light emitting element**) is formed on the front surface." (*Id.*, [0057]-0058].)[4]

[4] Yamada's disclosures with respect to Figure 9 build from its disclosures of Figures 6-8 which describe the second embodiment. (Ex. PA-4, [0022]-[0025], [0057].) Thus, a POSITA would have understood that Yamada's disclosures with respect to its earlier figures (e.g., referencing the same reference elements) are equally applicable to Figure 9.

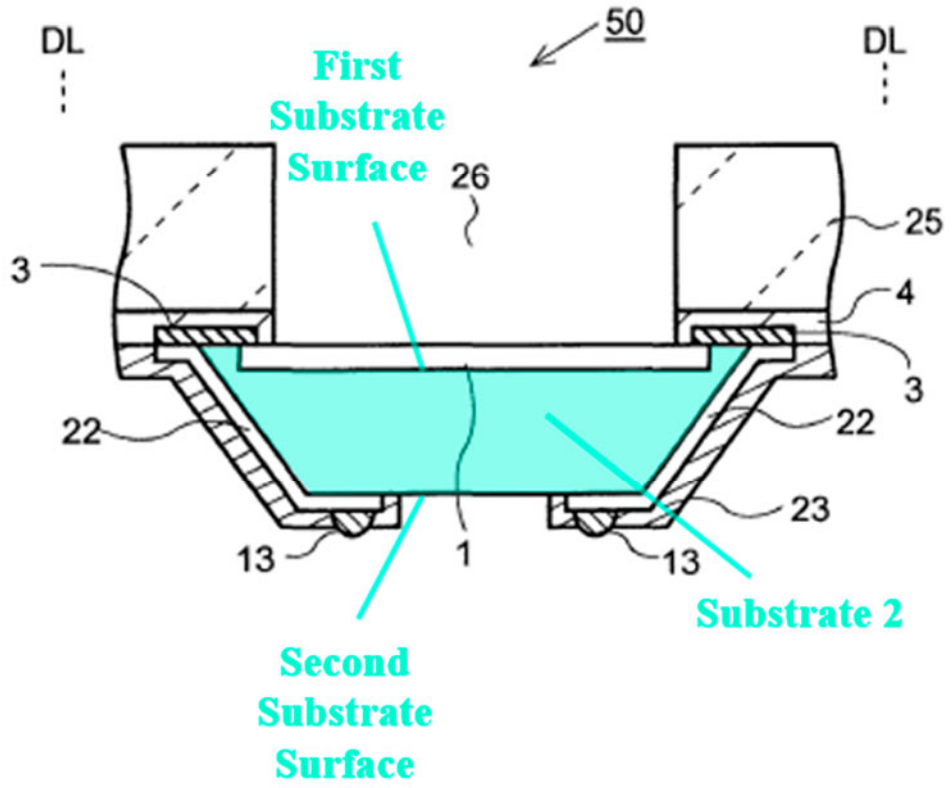
FIG.9



(*Id.*, FIG. 1.)

As shown in annotated Figure 9 below, Yamada discloses a semiconductor substrate 2 having opposing first and second surfaces. (*Id.*, [0058], [0068].)

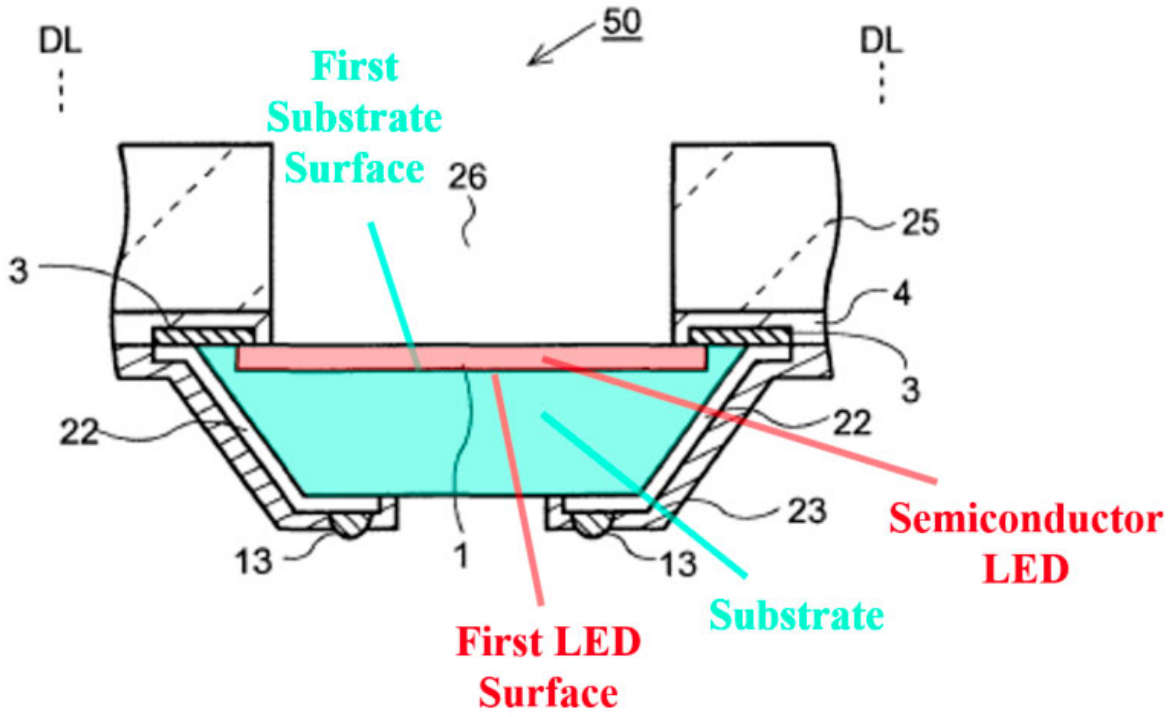
FIG.9



(*Id.*, FIG. 9 (annotated).)

Yamada further discloses a device element 1 such as a semiconductor light emitting element ("semiconductor LED") having opposing first and second LED surfaces, said first LED surface disposed on the first substrate surface, as shown in annotated Figure 9 below.

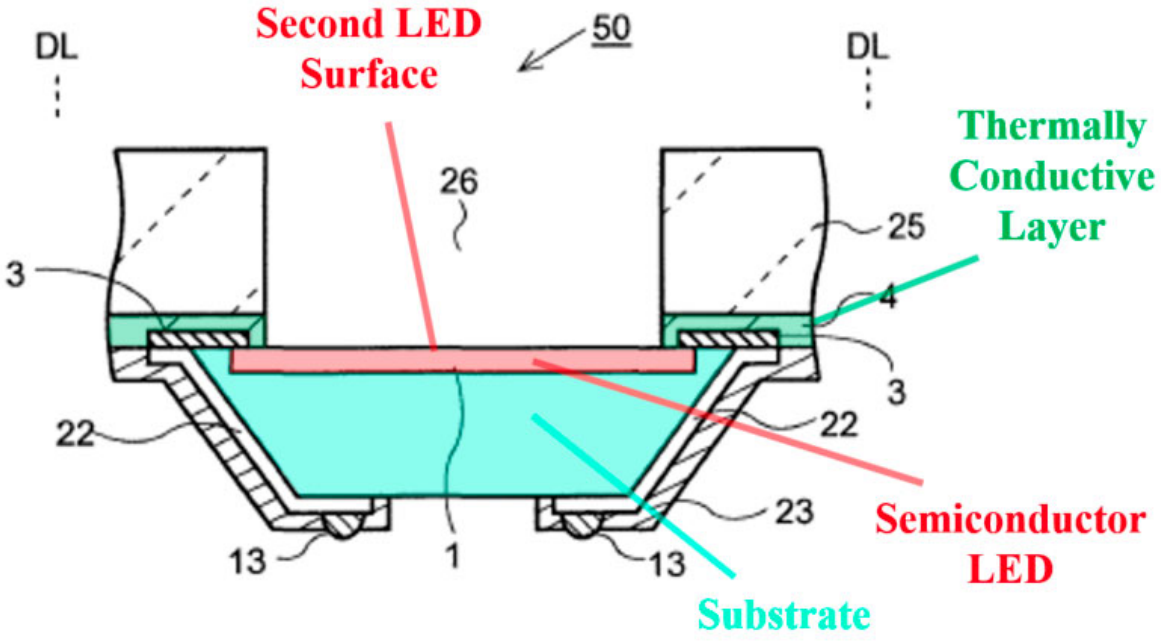
FIG.9



(*Id.*, FIG. 9 (annotated).)

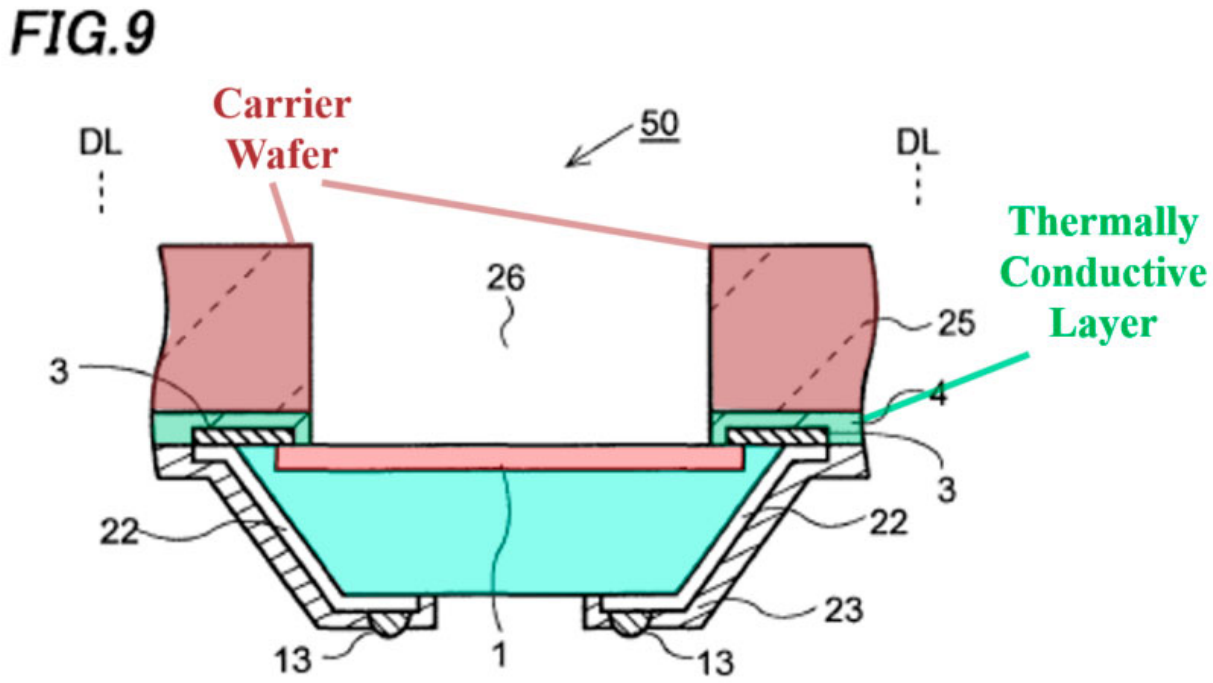
Moreover, as shown in annotated Figure 9 below, Yamada discloses an adhesive layer 4 ("thermally conductive layer") disposed on (e.g., directly on and in contact with) the second LED surface of semiconductor light emitting element 1 ("semiconductor LED"). (*Id.*, [0062].)

FIG.9



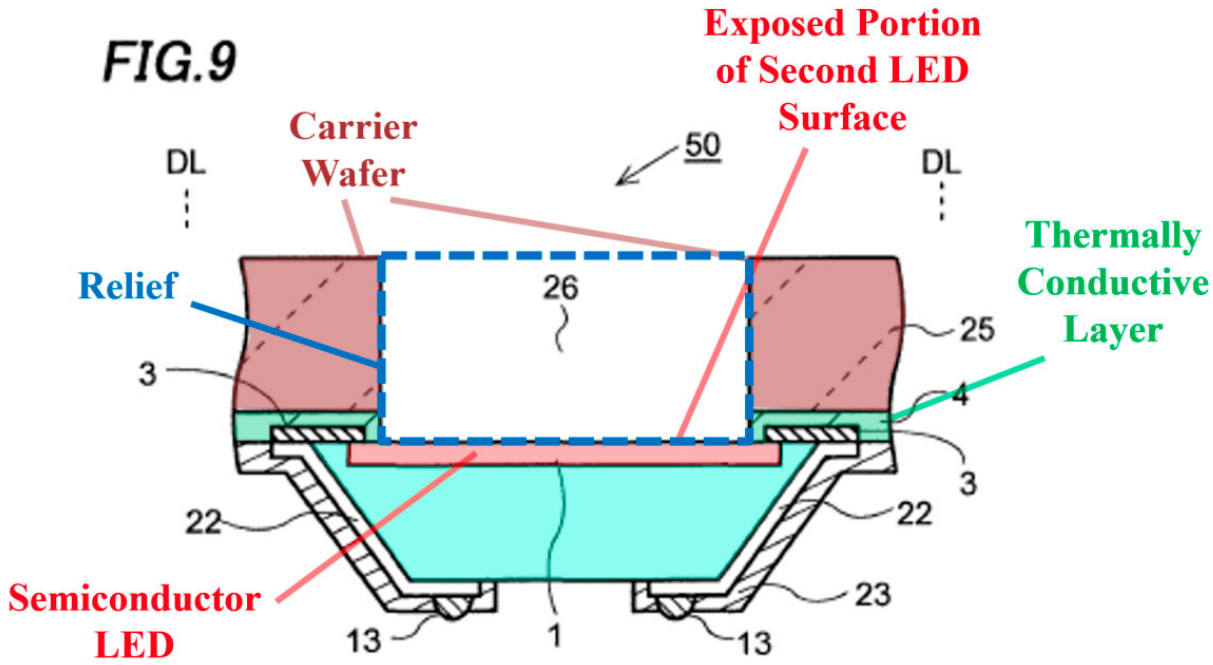
(*Id.*, FIG. 9 (annotated).)

Moreover, as shown in annotated Figure 9 below, the Yamada discloses a supporting body 25 ("carrier wafer") disposed on the adhesive layer 4 ("thermally conductive layer"). (*Id.,* [0062].)



(*Id.*, FIG. 9 (annotated).)

Yamada further discloses that the supporting body 25 ("carrier wafer") and adhesive layer 4 ("thermally conductive layer") define a hole ("relief") for heat dissipation in the form of a penetration hole 26 to expose at least a portion of the second LED surface of semiconductor light emitting element 1 ("semiconductor LED"), as shown in annotated Figure 9 below.



(*Id.*, FIG. 9 (annotated).)

Yamada specifically discloses that the supporting body 25 and adhesive layer underneath are removed to form a penetration hole 26, and thus they define the penetration hole 26. (*Id.*, [0063]; *see also id.*, [0012]-[0013].) Moreover, as shown above, the hole exposes the second surface of light emitting element 1.

F. SNQ6: Yamada in View of Han and Weeks Discloses or Suggests Claim 3

As explained in attached claim chart CC-6 (Exhibit-CC-6) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Han and Weeks discloses or suggests the limitations of claim 3 of the '612 patent. (Ex. PA-DEC, ¶63.)

G. SNQ7: Yamada in View of Han and Chitnis Discloses or Suggests Claims 4-7

As explained in attached claim chart CC-7 (Exhibit-CC-7) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Han and Chitnis discloses or suggests the limitations of claims 4-7 of the '612 patent. (Ex. PA-DEC, ¶64.)

H. SNQ8: Yamada in View of Han and Tsai Discloses or Suggests Claims 1, 2, and 4-8

As explained in attached claim chart CC-8 (Exhibit-CC-8) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Han and Tsai discloses or suggests the limitations of claims 1, 2, and 4-8 of the '612 patent. (Ex. PA-DEC, ¶65.)

I. SNQ9: Yamada in View of Han, Tsai, and Weeks Discloses or Suggests Claim 3

As explained in attached claim chart CC-9 (Exhibit-CC-9) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Han, Tsai, and Weeks discloses or suggests the limitations of claim 3 of the '612 patent. (Ex. PA-DEC, ¶66.)

J. SNQ10: Yamada in View of Han, Tsai, and Chitnis Discloses or Suggests Claims 4-7

As explained in attached claim chart CC-10 (Exhibit-CC-10) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Han, Tsai, and Chitnis discloses or suggests the limitations of claims 4-7 of the '612 patent. (Ex. PA-DEC, ¶67.)

K. SNQ11: Yamada in View of Hanaoka Discloses or Suggests Claims 1, 2, and 4-8

As explained in attached claim chart CC-11 (Exhibit-CC-11) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Hanaoka discloses or suggests the limitations of claims 1, 2, and 4-8 of the '612 patent. (Ex. PA-DEC, ¶68.)

L. SNQ12: Yamada in View of Hanaoka and Weeks Discloses or Suggests Claim 3

As explained in attached claim chart CC-12 (Exhibit-CC-12) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Hanaoka and Weeks discloses or suggests the limitations of claim 3 of the '612 patent. (Ex. PA-DEC, ¶69.)

M. SNQ13: Yamada in View of Hanaoka and Chitnis Discloses or Suggests Claims 4-7

As explained in attached claim chart CC-13 (Exhibit-CC-13) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Hanaoka and Chitnis discloses or suggests the limitations of claims 4-7 of the '612 patent. (Ex. PA-DEC, ¶70.)

N. SNQ14: Yamada in View of Hanaoka and Tsai Discloses or Suggests Claims 1, 2, and 4-8

As explained in attached claim chart CC-14 (Exhibit-CC-14) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Hanaoka and Tsai discloses or suggests the limitations of claims 1, 2, and 4-8 of the '612 patent. (Ex. PA-DEC, ¶71.)

O. SNQ15: Yamada in View of Hanaoka, Tsai, and Weeks Discloses or Suggests Claim 3

As explained in attached claim chart CC-15 (Exhibit-CC-15) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Hanaoka, Tsai, and Weeks discloses or suggests the limitations of claim 3 of the '612 patent. (Ex. PA-DEC, ¶72.)

P. SNQ16: Yamada in View of Hanaoka, Tsai, and Chitnis Discloses or Suggests Claims 4-7

As explained in attached claim chart CC-16 (Exhibit-CC-16) and in the attached declaration of Dr. Baker (Ex. PA-DEC), Yamada in view of Hanaoka, Tsai, and Chitnis discloses or suggests the limitations of claims 4-7 of the '612 patent. (Ex. PA-DEC, ¶73.)

VII. Detailed Explanation of the Pertinence and Manner of Applying the Prior Art to the Claims

A. Bases for Proposed Rejections of the Claims

The following is a quotation of pre-AIA 35 U.S.C. § 102 that forms the basis for all of the identified prior art:

> A person shall be entitled to a patent unless . . .
>
> (e) the invention was described in — (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent

> granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language . . . .

The following is a quotation of pre-AIA 35 U.S.C. § 103(a) that forms the basis of all of the following obviousness rejections:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negative by the manner in which the invention was made.

The question under 35 U.S.C. § 103 is whether the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention. In *KSR International Co. v. Teleflex Inc*., 550 U.S. 398 (2007), the Court mandated that an obviousness analysis allow for "common sense" and "ordinary creativity," while at the same time not requiring "precise teachings directed to the specific subject matter of the challenged claim[s]." *KSR*, 550 U.S. at 418, 420-421. According to the Court, "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *Id.* at 416. In particular, the Court emphasized "the need for caution in granting a patent based on the combination of elements found in the prior art." *Id.* at 401. The Court also stated that "when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious." *Id.* at 417.

The Office has provided further guidance regarding the application of *KSR* to obviousness questions before the Office.

> If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

MPEP § 2141(I) (quoting *KSR* at 417.)

The MPEP identifies many exemplary rationales from *KSR* that may support a conclusion of obviousness. Some examples that may apply to this reexamination include:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of a known technique to improve similar devices in the same way;
- Applying a known technique to improve devices in the same way;
- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success ("obvious to try")

MPEP § 2141(III).

In addition, the Office has published *Post-KSR* Examination Guideline Updates. *See* Fed. Reg. Vol. 75, 53464 (the "Guideline Updates"). The Guideline Updates discuss developments after *KSR* and provide teaching points from recent Federal Circuit decisions on obviousness. Some examples are listed below:

> A claimed invention is likely to be obvious if it is a combination of known prior art elements that would reasonably have been expected to maintain their respective properties or functions after they have been combined.

Id. at 53646.

> A combination of known elements would have been prima facie obvious if an ordinary skilled artisan would have recognized an apparent reason to combine those elements and would have known how to do so.

Id. at 53648.

> Common sense may be used to support a legal conclusion of obviousness so long as it is explained with sufficient reasoning.

Id.

B. Proposed Rejections

Pursuant to 37 C.F.R. § 1.510(b)(2), Requester identifies claims 1-9 as the claims for which reexamination is requested. The proposed rejections below, in conjunction with the analysis in Sections IV-VI above and the attached declaration of Dr. Baker (Ex. PA-DEC), provide a detailed explanation of the pertinence and manner of applying the prior art to each of claims 1-9.

1. Proposed Rejection #1

Claims 1, 2, and 4-9 are anticipated by Izumino under 35 U.S.C. § 102, as noted above in Section VI.A and the declaration of Dr. Baker provided in Exhibit PA-DEC.

2. Proposed Rejection #2

Claim 3 is obvious over Izumino and Weeks under 35 U.S.C. § 103(a), as noted above in Section VI.B and the declaration of Dr. Baker provided in Exhibit PA-DEC.

3. Proposed Rejection #3

Claims 1, 2, and 4-9 are obvious over Izumino in view of Chitnis under 35 U.S.C. § 103(a), as noted above in Section VI.C and the declaration of Dr. Baker provided in Exhibit PA-DEC.

4. Proposed Rejection #4

Claim 3 is obvious over Izumino, Chitnis, and Weeks under 35 U.S.C. § 103(a), as noted above in Section VI.D and the declaration of Dr. Baker provided in Exhibit PA-DEC.

5. Proposed Rejection #5

Claims 1, 2, and 4-8 are obvious over Yamada and Han under 35 U.S.C. § 103(a), as noted above in Section VI.E and the declaration of Dr. Baker provided in Exhibit PA-DEC.

6. Proposed Rejection #6

Claim 3 is obvious over Yamada, Han, and Weeks under 35 U.S.C. § 103(a), as noted above in Section VI.F and the declaration of Dr. Baker provided in Exhibit PA-DEC.

7. Proposed Rejection #7

Claims 4-7 are obvious over Yamada, Han, and Chitnis under 35 U.S.C. § 103(a), as noted above in Section VI.G and the declaration of Dr. Baker provided in Exhibit PA-DEC.

8. Proposed Rejection #8

Claims 1, 2, and 4-8 are obvious over Yamada, Han, and Tsai under 35 U.S.C. § 103(a), as noted above in Section VI.H and the declaration of Dr. Baker provided in Exhibit PA-DEC.

9. Proposed Rejection #9

Claim 3 is obvious over Yamada, Han, Tsai, and Weeks under 35 U.S.C. § 103(a), as noted above in Section VI.I and the declaration of Dr. Baker provided in Exhibit PA-DEC.

10. Proposed Rejection #10

Claims 4-7 are obvious over Yamada, Han, Tsai, and Chitnis under 35 U.S.C. § 103(a), as noted above in Section VI.J and the declaration of Dr. Baker provided in Exhibit PA-DEC.

11. Proposed Rejection #11

Claims 1, 2, and 4-8 are obvious over Yamada and Hanaoka under 35 U.S.C. § 103(a), as noted above in Section VI.K and the declaration of Dr. Baker provided in Exhibit PA-DEC.

12. Proposed Rejection #12

Claim 3 is obvious over Yamada, Hanaoka, and Weeks under 35 U.S.C. § 103(a), as noted above in Section VI.L and the declaration of Dr. Baker provided in Exhibit PA-DEC.

13. Proposed Rejection #13

Claims 4-7 are obvious over Yamada, Hanaoka, and Chitnis under 35 U.S.C. § 103(a), as noted above in Section VI.M and the declaration of Dr. Baker provided in Exhibit PA-DEC.

14. Proposed Rejection #14

Claims 1, 2, and 4-8 are obvious over Yamada, Hanaoka, and Tsai under 35 U.S.C. § 103(a), as noted above in Section VI.N and the declaration of Dr. Baker provided in Exhibit PA-DEC.

15. Proposed Rejection #15

Claim 3 is obvious over Yamada, Hanaoka, Tsai, and Weeks under 35 U.S.C. § 103(a), as noted above in Section VI.O and the declaration of Dr. Baker provided in Exhibit PA-DEC.

16. Proposed Rejection #16

Claims 4-7 are obvious over Yamada, Hanaoka, Tsai, and Chitnis under 35 U.S.C. § 103(a), as noted above in Section VI.P and the declaration of Dr. Baker provided in Exhibit PA-DEC.

VIII. Conclusion

For the reasons set forth above, the Requester has established at least one substantial new question of patentability with respect to claims 1-9 of the ’612 patent. The analysis provided in this Request and in the declaration of Dr. Baker (Ex. PA-DEC) demonstrates the invalidity of claims 1-9 in view of prior art that was not substantively considered by the Patent Office. Therefore, it is requested that this request for reexamination be granted and claims 1-9 be cancelled.

As identified in the attached Certificate of Service and in accordance with 37 C.F.R. §§ 1.33(c) and 1.510(b)(5), a copy of this Request has been served, in its entirety, to the address of the attorney of record.

Respectfully submitted,

PAUL HASTINGS LLP

Dated: October 14, 2022

By: /Naveen Modi/
Naveen Modi
Reg. No. 46,224