

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LITE-ON TECHNOLOGY CORPORATION

Petitioner

v.

SENSOR ELECTRONIC TECHNOLOGY, INC.,

Patent Owner.

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Inter Partes Review No. 2022-00780

U.S. Patent No. 9,923,117

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**PATENT OWNER'S CONTINGENT MOTION TO AMEND**

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## EXHIBIT LIST

Ex. No.	Description
Ex. 2001	Chambers Dictionary of Science and Tech., definition for “homogeneous”, 2007.
Ex. 2002	United States Patent No. 7,812,366.
Ex. 2003	E. Fred Schubert, “Light-Emitting Diodes”, pgs. 167-168, 2006.
Ex. 2004	United States Patent and Trademark Office, Director Memorandum, dated June 21, 2022.
Ex. 2005	<i>Sensor Electronic Tech., Inc. v. Lite-On Tech. Corp. et al.</i> , Case No. 6:21-cv-00322-ADA (W.D. Texas), Dkt. No. 1, Complaint with Jury Demand, dated April 2, 2021.
Ex. 2006	<i>Sensor Electronic Tech., Inc. v. Lite-On Tech. Corp. et al.</i> , Case No. 6:21-cv-00322-ADA (W.D. Texas), Dkt. No. 45, Amended Scheduling Order, dated June 22, 2022.
Ex. 2007	<i>Burley Licensing LLC v. Micro-Star International Co. Ltd.</i> , Case No. 6:21-cv-00862-ADA (W.D. Texas), Docket Report.
Ex. 2008	<i>Frac Shack Inc. v. Alaska Fuel Distributors Inc.</i> , Case No. 7:19-cv-00026-ADA-DTG (W.D. Texas), Docket Report.
Ex. 2009	<i>MicroPairing Technologies LLC v. General Motors LLC</i> , Case No. 6:21-cv-00761-ADA (W.D. Texas), Docket Report.
Ex. 2010	<i>ParkerVision, Inc. v. LG Electronics Inc.</i> , Case No. 6:21-cv-00520-ADA (W.D. Texas), Docket Report.
Ex. 2011	<i>TrackThings LLC v. Amazon.com, Inc. et al</i> , Case No. 6:21-cv-00720-ADA (W.D. Texas), Docket Report.
Ex. 2012	Docket Navigator, Motion Stay Success Rates Pending <i>Inter Partes</i> Review in W.D. Texas.
Ex. 2013	Ryan Davis, “Albright Says He’ll Very Rarely Put Cases On Hold For PTAB”, Law360, dated May 11, 2021.
Ex. 2014	<i>Sensor Electronic Tech., Inc. v. Lite-On Tech. Corp. et al.</i> , Case No. 6:21-cv-00322-ADA (W.D. Texas), Dkt. No. 36, Agreed Scheduling Order, dated February 24, 2022.
Ex. 2015	Docket Navigator, Time to Trial in W.D. Texas.
Ex. 2016	<i>Sensor Electronic Tech., Inc. v. Lite-On Tech. Corp. et al.</i> , Case No. 6:21-cv-00322-ADA (W.D. Texas), Defendants’ Preliminary Invalidity Contentions, dated March 24, 2022.
Ex. 2017	Declaration of Dr. Daniel Feezell in Support of Patent Owner’s Response to Petition

<b>Ex. No.</b>	<b>Description</b>
Ex. 2018	Declaration of Dr. Daniel Feezell in Support of Patent Owner's Contingent Motion to Amend
Ex. 2019	Deposition Transcript of Dr. James R. Shealy, taken on January 26, 2023.
Ex. 2020	U.S. Patent Application No. 14/984,156

## **I. INTRODUCTION**

Sensor Electronic Technology, Inc (“SETi” or “Patent Owner”) respectfully submits this Contingent Motion to Amend (“Motion”) to request amendment of challenged claim 1 of U.S. Patent No. 9,923,117 (“the ’117 Patent”).

This Motion satisfies the statutory and regulatory requirements for a motion to amend the claims under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121 because the proposed amendments (i) do not enlarge the scope of the claim or introduce new subject matter, (ii) are responsive to at least one ground of unpatentability instituted in this proceeding, (iii) are supported by the disclosure of the originally-filed application, and (iv) are patentable over the closest known prior art references asserted in the Petition.

## **II. MOTION TO AMEND IS CONTINGENT**

This Motion is contingent upon a finding in a final written decision that challenged claim 1 is unpatentable. Specifically, SETi requests the following contingency: if claim 1 is found unpatentable, substitute proposed amended claim

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## **III. MOTION TO AMEND PILOT PROGRAM**

SETi requests that this Motion be subject to the MTA Pilot Program (84 F.R. 9497). This proceeding was instituted on October 28, 2022, see Paper 11, and thus qualifies for the MTA Pilot Program effective on March 15, 2019. SETi

requests preliminary guidance from the Board on this Motion and whether to file a revised motion to amend. SETi reserves its right to file a revised motion to amend subject to the Board's preliminary guidance.

#### **IV. A REASONABLE NUMBER OF CLAIMS ARE AMENDED**

Under 37 C.F.R. §42.121(a)(3), a motion to amend may propose a reasonable number of substitute claims for each challenged claim. Generally it is presumed "that only one substitute claim would be needed to replace each challenged claim," but that presumption may be rebutted upon a showing of need. 37 C.F.R. § 42.121(a)(3); *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4-5 (PTAB Feb. 25, 2019). This Motion complies with the requirement because only one substitute claim is proposed for challenged claim 1.

#### **V. THE PROPOSED AMENDMENTS RESPOND TO A GROUND OF UNPATENTABILITY INVOLVED IN THIS TRIAL**

Under 37 C.F.R. § 42.121(a)(2)(i), the amendment(s) to the claims must be responsive to at least one ground of unpatentability involved in the trial. In the Institution Decision, the Panel instituted an *inter partes* review proceeding based on the following asserted grounds of unpatentability:

- Ohmae in view of the knowledge of a POSITA (Ground 1);
- Ban in view of the knowledge of a POSITA (Ground 2);
- Shur in view of the knowledge of a POSITA (Ground 3);

- Saxler in view of the knowledge of a POSITA (Ground 4).

As set forth below, the amendments recited in proposed substitute claim 20 add further new limitations that are patentable over the closest known prior art—the Ohmae, Ban, Shur, and Saxler references cited in the Petition. Therefore, SETi submits that the amendments recited in proposed substitute claim 20 are directly responsive to the grounds of unpatentability involved in the trial.

#### **VI. THE PROPOSED AMENDMENTS DO NOT SEEK TO ENLARGE THE SCOPE OF THE CHALLENGED CLAIM**

The proposed amendments to challenged claim 1 of the '117 Patent are listed in Appendix A below. The amendments are indicated with underlining for the additional limitations that have been added. Under 35 U.S.C. § 316(d)(3) and 37 C.F.R. § 42.121(a)(2)(ii), a motion to amend may not seek to enlarge the scope of the challenged claims. This Motion satisfies the requirement because the amendments recited in proposed substitute claim 20 add further new limitations to challenged claim 1 (and do not delete any existing claim limitations), and thus do not enlarge the scope of this claim.

The addition of the claim phrase “wherein the set of transparent, reflective and/or conductive regions comprises a group III nitride semiconductor alloy that varies by adjusting a molar fraction of aluminum and/or indium within the regions” recited in amended claim limitation **20[h]** excludes interpretations allowing for

semiconductor heterostructures—such as those disclosed in the Petition’s prior art references—where the set of transparent, reflective and/or conductive regions do not have a group III nitride semiconductor alloy that varies by adjusting a molar fraction of aluminum and/or indium.<sup>1</sup>

The addition of the claim phrase “wherein two or more of the offset inhomogeneous regions of the same type at least partially overlap with one another, wherein the inhomogeneous regions include clusters of overlapping regions disconnected by gaps” recited in claim limitation **20[i]** excludes interpretations allowing for semiconductor heterostructures—such as those disclosed in the Petition’s prior art references—where two or more of the inhomogeneous regions of the same type at least partially overlap with one another and wherein the inhomogeneous regions includes clusters of overlapping regions disconnected by gaps.

The proposed amendments recited in substitute claim 20 thus do not enlarge the scope of original challenged claim 1, and therefore comply with the statutory and regulatory requirements of 35 U.S.C. § 316(d)(3) and 37 C.F.R. § 42.121(a)(2)(ii).

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<sup>1</sup> As set forth in Patent Owner’s Response, SETi contends that these references do not disclose “a plurality of inhomogeneous regions,” but this distinction is further clarified by the proposed amendment.



## VII. THE PROPOSED AMENDMENTS DO NOT INTRODUCE NEW SUBJECT MATTER

Under 35 U.S.C. § 316(d)(3) and 37 C.F.R. § 42.121(a)(2)(ii), a motion to amend may not introduce new subject matter. This requirement is satisfied because the claim limitations recited in proposed substitute claim 20 find support in the specification of the originally-filed application which issued as the '117 Patent. *See* U.S. Patent Application No. 14/984,156 (Ex. 2020) (“the '156 application”).

Concerning the **preamble** of proposed substitute claim 20, the '156 application provides written support for a semiconductor heterostructure recited in the preamble. *See, e.g.*, Ex. 2020 ¶¶ 8, 31, 60 (“The semiconductor heterostructure 132 can include an active region 140, a p-type contact layer 142 located on a first side of the active region 140, and a n-type contact layer 144 located on a second side of the active region 140 opposite the first side.”); Figs. 12; 13A; claim 1; Ex. 2018 ¶¶ 16-17.

Concerning **limitation 20[a]**, the '156 application provides written support for “an active region.” *See, e.g.*, Ex. 2020 ¶¶ 8, 29 (“an active region configured to generate radiation during operation of the device”), 33 (“An illustrative embodiment of a group III nitride based emitting device 10 includes an active region 18 (e.g., a series of alternating quantum wells and barriers)”), 41; Figs 2, 12, 13A; claim 1; Ex. 2018 ¶¶ 18-19.

Concerning **limitation 20[b]**, the '156 application provides written support for “a metallic contact.” *See, e.g.*, Ex. 2020 ¶¶ 8, 45, 53 (“a metallic contact 24 and/or a metallic contact 28 can comprise a multilayered structure”); 74 (“The top surface 152 of the optoelectronic device 150 can further include a p- type metallic contact 172 having p-type metallic domains 174 formed on the side 168 of the p-type contact layer 142.”); Fig. 13A; claim 1; Ex. 2018 ¶¶ 20-22.

Concerning **limitation 20[c]**, the '156 application provides written support for “a group III nitride semiconductor layer located between the active region and the metallic contact.” *See, e.g.*, Ex. 2020 ¶¶ 8, 29, 32 (“the various layers of the emitting device 10 are formed of group III nitride based materials”), 35 (“an emitting device 10 includes one or more layers, such as the n-type contact layer 16 and/or the p-type contact layer 22, formed of a semiconductor structure having one or more inhomogeneous regions located therein.”), 44 (“A semiconductor structure (e.g., the p-type contact layer 22) including transparent, reflective, and/or conductive regions can be fabricated using patterning.”); 60, Fig. 13A; claim 1; Ex. 2018 ¶¶ 23-28.

Concerning **limitation 20[d]**, the '156 application provides written support for “the semiconductor layer including a plurality of inhomogeneous regions arranged within multiple levels of the semiconductor layer along a height direction of the semiconductor layer.” *See, e.g.*, Ex. 2020 ¶¶ 8, 38 (“In an embodiment, the

semiconductor structure includes multiple regions of the same type, which can be located in various portions of the semiconductor structure and can be present at different levels along a height of the semiconductor structure.”), 49 (“As discussed herein, regions of any of the types (e.g., reflective, transparent, or conductive), can be located in various arrangements within a semiconductor structure. To this extent, FIGS. 7A-7C show illustrative arrangements of reflective regions according to embodiments. In FIG. 7A, a semiconductor base layer 70 is located adjacent to a metal contact 72 and includes two levels 74A, 74B of reflective regions. Each level 74A, 74B of reflective regions is immersed in the semiconductor base layer 70.”); 71 (“In one embodiment, the reflective elements 170 can be incorporated in multiple levels of the p-type contact layer 142.”); Figs. 7A-7C, 13A; claim 1; Ex. 2018 ¶¶ 29-31.

Concerning **limitation 20[e]**, the ’156 application provides written support for “wherein some of the inhomogeneous regions in a first level of the semiconductor layer are vertically offset from inhomogeneous regions in a second level of the semiconductor layer.” *See, e.g.*, Ex. 2020 ¶¶ 8, 49 (“Additionally, reflective regions located in level 74B are laterally offset (staggered) from reflective regions located in level 74A. FIG. 7C shows a top view of an embodiment in which the levels 74A, 74B of reflective regions can be staggered in a manner that forms a checkerboard arrangement.”), 71 (“In one embodiment, the

reflective elements 170 can be incorporated in multiple levels of the p-type contact layer 142. As shown in FIG. 13A, the reflective elements 170 in each level can be staggered with reflective elements in an adjacent level such that there is an offset in position between elements in the different levels.”); Figs. 7A-7C, 13A; claim 1; Ex. 2018 ¶¶ 32-33.

Concerning **limitation 20[f]**, the ’156 application provides written support for “wherein the plurality of inhomogeneous regions include one or more of a set of transparent regions, a set of reflective regions and/or a set of conductive regions.” *See, e.g.*, Ex. 2020 ¶¶ 8, 35 (“[T]he inhomogeneous regions can include one or more of: a set of transparent regions, a set of reflective regions, and/or a set of conductive regions.”), 49 (“As discussed herein, regions of any of the types (e.g., reflective, transparent, or conductive), can be located in various arrangements within a semiconductor structure. To this extent, FIGS. 7A-7C show illustrative arrangements of reflective regions according to embodiments. In FIG. 7A, a semiconductor base layer 70 is located adjacent to a metal contact 72 and includes two levels 74A, 74B of reflective regions.”), 71 (“In one embodiment, the reflective elements 170 can be incorporated in multiple levels of the p-type contact layer 142.”); Figs. 7A-7C, 13A; claim 1; Ex. 2018 ¶¶ 34-36.

Concerning **limitation 20[g]**, the ’156 application provides written support for “each of the inhomogeneous regions having a set of attributes differing from a

group III nitride material forming the semiconductor layer.” *See, e.g.*, Ex. 2020 ¶¶ 8, 28 (“Each inhomogeneous region has one or more attributes that differ from a material forming the semiconductor layer. The inhomogeneous regions can include one or more regions configured based on radiation having a target wavelength. These regions can include transparent and/or reflective regions.”), 35, 36, 61 (“[E]ach inhomogeneous region in either the p-type contact layer 142 and the n-type contact layer 144 can have a set of attributes that differ from the group III nitride material forming the semiconductor layer.”); claim 1; Ex. 2018 ¶¶ 37-40.

Considering **limitation 20[h]**, the ’156 application provides written support for “wherein the set of transparent, reflective and/or conductive regions comprises a group III nitride semiconductor alloy that varies by adjusting a molar fraction of aluminum and/or indium within the regions.” *See, e.g.*, Ex. 2020 ¶¶ 41 (“In an embodiment shown in FIG. 3B, a reflective region 40 (e.g., a Bragg mirror) can be epitaxially grown, and include a superlattice of group III nitride semiconductor sublayers 42, 44 of  $\text{Al}_x\text{In}_y\text{Ga}_{1-x-y}\text{N}$ / $\text{Al}_{x'}\text{In}_{y'}\text{Ga}_{1-x'-y'}\text{N}$ , where  $x$ ,  $y$ ,  $x'$ , and  $y'$  are chosen such that a refractive index of one sublayer is different from a refractive index of another sublayer by at least two percent (five percent in another embodiment). In a more particular embodiment, the refractive index of a group III nitride semiconductor alloy varies between values of 2.2 and 2.7 by adjusting a molar fraction of aluminum and/or indium.”); 47 (“In an embodiment, a

transparent region, such as one or more of the transparent regions 58, comprises an  $\text{Al}_x\text{In}_y\text{Ga}_{1-x-y}\text{N}/\text{Al}_{x'}\text{In}_{y'}\text{Ga}_{1-x'-y'}\text{N}$  superlattice with  $x$ ,  $y$ ,  $x'$ , and  $y'$  are chosen such that the transparency of the superlattice is at least ten percent for a target wavelength of radiation. In another embodiment, the transparent region can be configured to form a Fabry-Perot interference filter for a target wavelength of radiation. For example, FIG. 5 shows a structure for an illustrative Fabry-Perot interference filter 62 according to an embodiment. In this case, the filter 62 comprises a superlattice including a series of alternating layers of  $\text{Al}_x\text{In}_y\text{Ga}_{1-x-y}\text{N}/\text{Al}_{x'}\text{In}_{y'}\text{Ga}_{1-x'-y'}\text{N}$ , where  $x$  and  $x'$  molar fractions are larger than 0.35.”); 80 (“Adjacent semiconductor layers can be grown using such a group V/III ratio and growth temperatures, while varying a molar fraction of one or more of the elements (e.g., a molar fraction of aluminum can differ by at least one percent between adjacent layers)”); Figs. 5, 7A-7C; Ex. 2018 ¶¶ 41-43.

Considering **limitation 20[i]**, the ’156 application provides written support for “wherein two or more of the offset inhomogeneous regions of the same type at least partially overlap with one another, wherein the inhomogeneous regions include clusters of overlapping regions disconnected by gaps.” *See, e.g.*, Ex. 2020 ¶¶ 38 (“In an embodiment, the semiconductor structure includes multiple regions of the same type, which can be located in various portions of the semiconductor structure and can be present at different levels along a height of the semiconductor

structure. To this extent, two or more of the regions of the same type can at least partially overlap with one another.”), 51 (“In an embodiment, the semiconductor structure can include vertically and horizontally conductive regions arranged to form an interconnected network of conductive paths through the semiconductor structure. The term ‘interconnected’ network does not necessarily imply that all the conductive regions form a single network. As used herein, the term is applied loosely and includes clusters of overlapping conductive regions disconnected by gaps.”); Fig. 13A; Ex. 2018 ¶¶ 44-45.

Therefore, the original disclosure set forth in the ’156 application fully supports proposed substitute claim 20.

#### **VIII. THE PROPOSED SUBSTITUTE CLAIM 20 IS PATENTABLE**

The proposed substitute claim is patentable over the prior art of record. For at least the reasons set forth in SETi’s Response to the Petition, claim 1 is patentable over the art of record, unamended. The additional subject matter of claim 20 further establishes the patentability of the claim.

Claim 20 additionally recites “wherein the set of transparent, reflective and/or conductive regions have a group III nitride semiconductor alloy that varies by adjusting a molar fraction of aluminum and/or indium within the regions.” The prior art of record does not disclose this limitation. *See* Ex. 2018 ¶¶ 48-49. For example, in Ohmae, the protruded portions, (the alleged “inhomogeneous regions”)

are not group III nitride semiconductor alloys that vary by adjusting a molar fraction of aluminum and/or indium. Ex. 1004 ¶ 26; Ex. 2018 ¶ 49. Similarly, in Ban, the alleged “inhomogeneous regions” are composed of SiO<sub>2</sub>, not a group III nitride semiconductor alloy. Ex. 1005 ¶¶ 42-43; Ex. 2018 ¶ 50; Ex. 2019, 73:3-8.

Claim 20 also recites “wherein two or more of the offset inhomogeneous regions of the same type at least partially overlap with one another, wherein the inhomogeneous regions include clusters of overlapping regions disconnected by gaps.” The prior art of record does not disclose this limitation. *See* Ex. 2018 ¶ 51. The alleged “inhomogeneous regions” in Saxler do not overlap at all, let alone partially overlap. Ex. 1007 ¶ 21; Fig. 3; Ex. 2018 ¶ 51; Ex. 2019, 84:13-6. And Shur’s alleged inhomogeneous regions do not include clusters of overlapping regions disconnected by gaps. Ex. 1006, Fig. 5; Ex. 2018 ¶ 51.

Finally, there is no motivation to modify any of the cited prior art to include the additional limitations of claim 20. *See* Ex. 2018 ¶ 52. Should Lite-On allege such a motivation, SETi reserves the right to rebut it. Accordingly, proposed claim 20 is patentable over the prior art.

## **IX. PRIORITY**

All the references relied upon by the Petition, Ohmae, Ex. 1004 (April 19, 2007), Ban, Ex. 1005 (January 21, 2000), Shur, Ex. 1006 (February 14, 2013), and Saxler, Ex. 1007 (February 19, 2004), predate the filing of both the ’156



application and the filing date of the provisional application 61/768,581 (filed February 25, 2014). Because SETi does not currently seek the benefit of the filing date of the disclosure set forth in the earlier-filed provisional application, this Motion is not required to set forth written description support in the provisional application for the proposed substitute claim.

## **X. CONCLUSION**

Therefore, for the reasons set forth herein, SETi submits that proposed substitute claim 20 satisfies all of the statutory requirements for a motion to amend set forth in paragraphs (1) and (3) of 35 U.S.C. § 316(d) and paragraphs (a)(1), (a)(2), (a)(3), (b)(1) and (b)(2) of 37 C.F.R. § 42.121 and respectfully requests the Motion be granted contingent upon a finding that the challenged claim 1 is unpatentable.

Dated: February 9, 2023

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that a true and correct copy of the foregoing CONTINGENT MOTION TO AMEND has been served in its entirety this 9th day of February 2023, on Petitioner's lead and backup counsel by the following email addresses:

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## APPENDIX A

Patent Owner's amendments in proposed substitute claim 20 are set forth below. Use of underlining indicates inserted text.

### **AMENDED CLAIM 20 REPLACING CHALLENGED CLAIM 1**

20[pre] A semiconductor heterostructure, comprising:

20[a] an active region;

20[b] a metallic contact;

20[c] a group III nitride semiconductor layer located between the active region and the metallic contact;

20[d] the semiconductor layer including a plurality of inhomogeneous regions arranged within multiple levels of the semiconductor layer along a height direction of the semiconductor layer;

20[e] wherein some of the inhomogeneous regions in a first level of the semiconductor layer are vertically offset from inhomogeneous regions in a second level of the semiconductor layer, and

20[f] wherein the plurality of inhomogeneous regions include one or more of a set of transparent regions, a set of reflective regions and/or a set of conductive regions;

20[g] each of the inhomogeneous regions having a set of attributes differing from a group III nitride material forming the semiconductor layer;

20[h] wherein the set of transparent, reflective and/or conductive regions comprises a group III nitride semiconductor alloy that varies by adjusting a molar fraction of aluminum and/or indium within the regions;

20[i] wherein two or more of the offset inhomogeneous regions of the same type at least partially overlap with one another, wherein the inhomogeneous regions include clusters of overlapping regions disconnected by gaps.