UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

NITEK, INC.,	§	
	§	
Plaintiff,	§	
	§	
v.	§	
	§	**CIVIL ACTION NO. _____**
PHOTON WAVE CO., LTD.	§	
	§	
Defendant.	§	
	§	

COMPLAINT FOR PATENT INFRINGEMENT AND DEMAND FOR JURY TRIAL

Plaintiff Nitek, Inc. ("Nitek" or "Plaintiff") for its Complaint against Defendant Photon Wave Co., Ltd. ("Photon Wave" or "Defendant") alleges as follows:

NATURE OF THE ACTION

1. This is a civil action for patent infringement under the patent laws of the United States, Title 35, United States Code, Section 271, et seq., involving United States Patent Nos. 8,354,687 (Exhibit A, "the '687 patent"), 8,680,551 (Exhibit B, "the '551 patent"), 10,147,848 (Exhibit C, "the '848 patent"), 9,042,420 (Exhibit D, "the '420 patent"), and 10,903,391 (Exhibit E, "the '391 patent") (collectively, "Asserted Patents") and seeking damages and injunctive relief as provided in 35 U.S.C. §§ 281 and 283-285.

2. Nitek brings this patent infringement action to protect its valuable patented technology related to ultraviolet light-emitting diodes ("UV LEDs").

3. A UV LED is a semiconductor device that converts electrical energy into ultraviolet light.

4. Ultraviolet light has many applications including optical sensors, disinfection, forensics, medical imaging, protein analysis, and polymer curing.

5. UV LEDs have many advantages over conventional UV lamps, including lower energy consumption, longer lifetime, and smaller size.

THE PARTIES

6. Plaintiff Nitek is a corporation organized and existing under the laws of the State of South Carolina with its principal place of business at 110 Atlas Court Columbia, SC 29209. Nitek is the owner by assignment of the Asserted Patents.

7. Defendant Photon Wave Co., Ltd. is a company organized and existing under the laws of the Republic of Korea.

8. Photon Wave's headquarters are located at 52, Jugyang-daero 1763 beon-gil, Wonsam-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17166 Republic of Korea.

JURISDICTION AND VENUE

9. This is an action for patent infringement, under the patent laws of the United States, 35 U.S.C. § 271 *et seq*. This Court has subject matter jurisdiction under 28 U.S.C. §§1331 and 1338(a).

10. Jurisdiction and venue for this action are proper in this judicial district.

11. This Court has personal jurisdiction over Defendant. Nitek is informed and believes, and on that basis alleges, that Photon Wave conducts business and has committed acts of patent infringement and/or has induced acts of patent infringement by others in this Judicial District, the State of Texas, and elsewhere in the United States. Photon Wave has purposefully directed infringing activities at residents of the State of Texas, and this litigation results from those infringing activities. Photon Wave sells and/or has sold (either directly or indirectly), its products in Texas. For example, Photon Wave has placed, and continues to place, products alleged to be infringing in the Complaint and/or made by processes alleged to be infringing in the Complaint, into the stream of commerce via an established distribution channel (including intermediaries, agents, distributors, resellers, and/or importers) with knowledge or understanding that such products are being, and will continue to be, imported into the United States, sold, offered for sale, and/or used in the State of Texas and this Judicial District. Photon Wave vicariously through, or

in concert with, its distribution channel (including intermediaries, agents, distributors, resellers, and/or importers) engages in persistent conduct, including advertising through their web sites, targeting Texas residents and residents of this Judicial District. Photon Wave has established sufficient minimum contacts with the State of Texas and this Judicial District such that it should reasonably and fairly anticipate being brought into court in the State of Texas and this Judicial District without offending traditional notions of fair play and substantial justice. Photon Wave is subject to this Court's specific and/or general personal jurisdiction pursuant to due process and/or the Texas Long Arm Statute, due to its business in this State and Judicial District, including its infringing activities alleged herein from which Photon Wave has derived, and will continue to derive, revenue from goods sold to Texas residents and consumers. At least a portion of the patent infringement claims alleged herein arise out of or are related to one or more of the foregoing activities.

12. Upon information and belief, Photon Wave is not resident in the United States.

13. Because Photon Wave is not resident in the United States, pursuant to 28 U.S.C. § 1391(c)(3), it may be sued in any judicial district.

THE ASSERTED PATENTS

14. Nitek is the lawful owner of all right, title, and interest in United States Patent No. 8,354,687 entitled "Efficient Thermal Management and Packaging for Group III Nitride Based UV Devices" ("the '687 patent"), including the right to sue and to recover for any and all infringement thereof. The '687 patent was duly and legally issued on January 15, 2013, and names Vinod Adivarahan, Qhalid Fareed, and Asif Khan as the inventors. On June 2, 2015, a certificate of correction was issued for the '687 patent. The certificate of correction replaced references to "$Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$" with "$Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$."

15. A copy of the '687 patent including the certificate of correction is attached hereto as Exhibit A.

16. Nitek is the lawful owner of all right, title, and interest in United States Patent No. 8,680,551 entitled "High Power Ultraviolet Light Sources and Method of Fabricating the Same" ("the '551 patent"), including the right to sue and to recover for any and all infringement thereof. The '551 patent was duly and legally issued on March 25, 2014, and names Vinod Adivarahan, Qhalid Fareed, and Asif Khan as the inventors.

17. A copy of the '551 patent is attached hereto as Exhibit B.

18. Nitek is the lawful owner of all right, title, and interest in United States Patent No. 10,147,848 entitled "Contact Configuration for Optoelectronic Device" ("the '848 patent"), including the right to sue and to recover for any and all infringement thereof. The '848 patent was duly and legally issued on December 4, 2018, and names Mikhail Gaevski, Maxim S. Shatalov, Alexander Dobrinsky, and Michael Shur as the inventors.

19. A copy of the '848 patent is attached hereto as Exhibit C.

20. Nitek is the lawful owner of all right, title, and interest in United States Patent No. 9,042,420 entitled "Device With Transparent and Higher Conductive Regions in Lateral Cross Section of Semiconductor Layer" ("the '420 patent"), including the right to sue and to recover for any and all infringement thereof. The '420 patent was duly and legally issued on May 26, 2015, and names Michael Shur, Maxim S. Shatalov, Alexander Dobrinsky, Remigijus Gaska, and Jinwei Yang as the inventors.

21. A copy of the '420 patent is attached hereto as Exhibit D.

22. Nitek is the lawful owner of all right, title, and interest in United States Patent No. 10,903,391 entitled "Optoelectronic Device with Modulation Doping" ("the '391 patent"), including the right to sue and to recover for any and all infringement thereof. The '391 patent was duly and legally issued on January 26, 2021, and names Rakesh Jain, Maxim S. Shatalov, Alexander Dobrinsky, and Michael Shur as the inventors.

23. A copy of the '391 patent is attached hereto as Exhibit E.

BACKGROUND OF DEFENDANT'S INFRINGING CONDUCT

24. Photon Wave is an optoelectronic company that makes, uses, sells, offers for sale, and/or imports into the United States, or otherwise has made, used, sold, offered for sale, and/or imported into the United States UV LEDs in the form of packaged chips, including UV LED packages designated by Photon Wave as PKD-H10-F35, and in the form of LED chips, including UV LEDs designated by Photon Wave as PCD-H10.

25. On information and belief, the LED chip in the Osram 720-SUCULDP1VCMBMG57 is made and supplied by Photon Wave.

26. On information and belief, the LED chip in the Osram 720-SUCULDP1VCMBMG57 is substantially identical, for purposes of the infringement analyses below, as the LED chip in the Photon Wave PKD-H10-F35.

27. On information and belief, the the LED chip in the Osram 720-SUCULDP1VCMBMG57 is a Photon Wave PCD-H15.

28. Photon Wave was established in August 2016 and started its UVC epi-wafer development in April 2017.

29. Photon Wave launched its UV-B and UV-C LED chip products line-up in December 2018.

30. Photon Wave launched its second upgraded version of its UV-B and UV-C LED chip products and its UV-B and UV-C package products in December 2019.

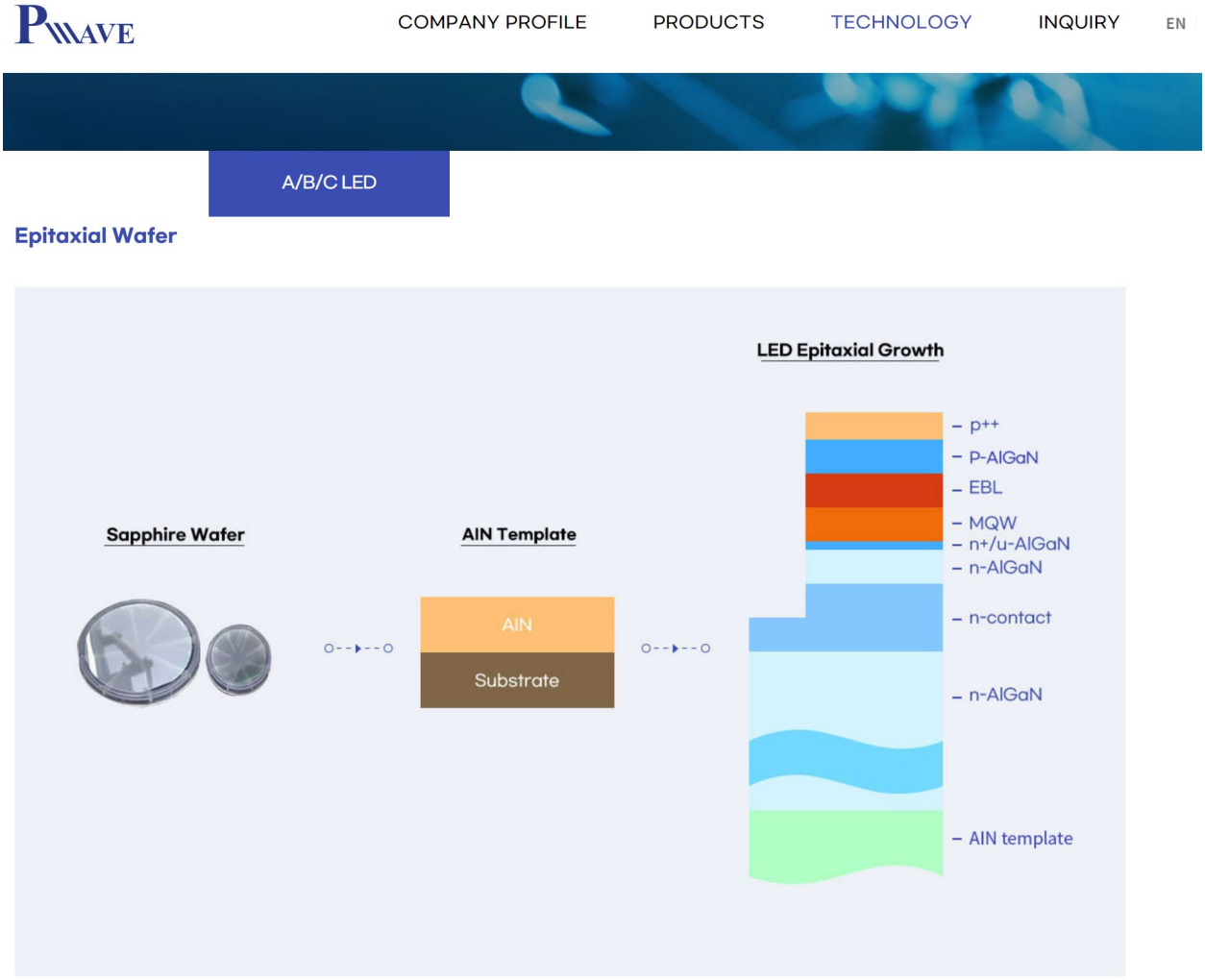
31. Photon Wave launched its third upgraded version of its products, the H-series, in May 2022.

32. The PCD-H10 is a product that is used, sold, or offered for sale in the United States or is imported into the United States and/or has been used, sold, offered for sale in the United States or has been imported into the United States.

33. The PKD-H10-F35 is a product that is used, sold, or offered for sale in the United States or is imported into the United States and/or has been used, sold, offered for sale in the United States or has been imported into the United States.

34. The Osram 720-SUCULDP1VCMBMG57 is a product that is used, sold, or offered for sale in the United States or is imported into the United States and/or has been used, sold, offered for sale in the United States or has been imported into the United States.

35. Photon Wave includes the following diagram on the Technology section of its website at http://www.Photon_Wave.co.kr/technology/photon-wave-core-technology to indicate the LED Epitaxial Growth of its products:



36. Photon Wave claims that its core technology for manufacturing its crystalline epitaxial layer enables it to manufacture "UVA/B/C LEDs with higher efficiencies and longer lifetime in the 230~340nm wavelength range." http://www.Photon Wave.co.kr/technology/photon-wave-core-technology

37. Photon Wave claims that its core technology for manufacturing its products have "a large active area and a uniform current spreading design" and that design "allows high injection current operation." http://www.Photon Wave.co.kr/technology/photon-wave-core-technology

38. Photon Wave maintains its corporate website, which is publicly available worldwide, including in the United States and this Judicial District, at http://www.Photon Wave.co.kr/main.

39. Photon Wave's website provides product information for various UV LED chips and packages including product data sheets that specify detailed product information and operating conditions for its products.

40. Photon Wave's website and product data sheets, including for the products identified herein, provide advice, direction, and information for its agents, customers, distributors, resellers, importers, and/or end-users on how to make additional products incorporating the Photon Wave infringing products (which additional products also infringe), how to use the infringing products, and encouraging the sale and offer for sale of such infringing products.

41. Photon Wave has published its website and product data sheets with the full knowledge of Nitek's patent and Photon Wave's infringement of Nitek's Patents (or willful blindness thereto).

42. A copy of Photon Wave's Data Sheet for the PKD-H10-F35 is attached as Exhibit F.

43. A copy of the Osram 720-SUCULDP1VCMBMG57 data sheet is attached as Exhibit G.

44. On May 4, 2022, counsel for the prior owner of the '848 patent and the '420 patent, Sensor Electronic Technology, Inc. ("SETi"), sent a letter to informing Photon Wave that it was

selling products that were infringing SETi's patents. SETi expressly warned that Photon Wave was selling a UVC package identified as PKD-50-F35 that infringed the '848 patent and the '420 patent. SETi provided pictures of the Photon Wave product. SETi also warned Photon Wave that it could be liable for inducing infringement where it took steps to actively encourage infringement by others, including selling products that Photon Wave knows are likely to wind up in the United States. SETi asked Photon Wave to confirm that it would stop selling products that infringed the patents, including the '848 patent and the '420 patent.

45. Since the May 4, 2022 letter Photon Wave has continued to advertise LED chips and packages containing its LED chips, and provide instructions for the use of such products and for the incorporation of its products into other products such as sterilization devices, in an effort to encourage others to purchase and use the products, and to include the products in other products to be sold, offered for sale, and used in the United States, and to be imported into the United States.

46. On June 15, 2022, SETi's counsel sent a further warning letter to Photon Wave, warning that patent infringement is a serious matter, and again asking it to confirm that Photon Wave would stop selling products that infringed SETi's patents.

47. On July 11, 2022, Photon Wave responded to SETi's counsel and attached a boilerplate series of denials that it was infringing SETi's patents. Counsel for SETi pointed this out in a response letter on July 13, 2022, and again requested that Photon Wave stop selling products that were infringing its patents.

48. On July 25, 2022, Photon Wave responded but did not include any commitment to stop selling products infringing SETi's patents.

49. On August 9, 2022, SETi's counsel again wrote to Photon Wave, notifying it that its product was infringing SETi's patents and stating that "SETi does not consent to Photon Wave selling products that infringe any of its patents."

50. On August 10, 2023, counsel for SETi and Nitek wrote again to Photon Wave, referencing the earlier May 3, June 15, July 13 and August 9 prior warning letters. SETi and Nitek's counsel noted that it had made several attempts to resolve the matter amicably, but Photon

Wave did not ever stop selling the products infringing SETi's patents, including the '848 and '420 patents.

51. Nitek's counsel also noted that Photon Wave was selling products that also infringe Nitek's patents, including the '687 patent, the '551 patent, the '420 patent (which was acquired by Nitek from SETi), the '848 patent (which was also acquired by Nitek from SETi), and the '391 patent. Nitek warned Photon Wave that its LED packages, such as PKD-H10-F35, were infringing Nitek's patents, as well as LED chips incorporated in the packages of Photon Wave's customer, such as the Osram 720-SUCULDP1VC MBMG57. The August 10, 2023 letter notified Photon Wave that Nitek and SETi believed that Photon Wave's supply of LED chips to Photon Wave's contractors, manufacturers and/or customers was inducing infringement of Nitek's and SETi's patents. On behalf of both companies, counsel requested that Photon Wave provide confirmation that it would stop selling products that infringe SETi's and Nitek's patents.

52. The August 10, 2023 letter was sent via mail. A copy was also sent via electronic mail, and an additional copy was sent via DHL overseas courier with tracking. Despite this, Nitek never received any substantive response to the August 10, 2023 letter.

53. Photon Wave has not denied that the Osram 720-SUCULDP1VC MBMG57 includes an LED chip manufactured by Photon Wave.

COUNT I.

INFRINGEMENT OF U.S. PATENT NO. 8,354,687

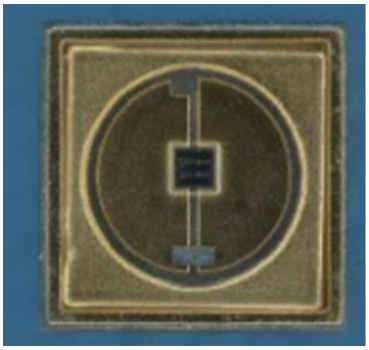
EXAMPLARY CLAIM 17

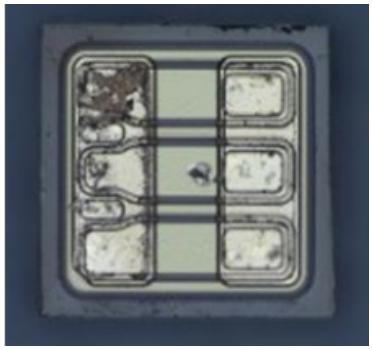
54. Nitek incorporates by reference the allegations contained in the foregoing paragraphs.

55. Photon Wave has offered for sale, sold, used, and/or imported products within or into the United States, including at least the Photon Wave PKD-H10-F35, made by a process, patented in the United States, that infringes, either literally or under the doctrine of equivalents, one or more claims of the '687 patent in violation of 35 U.S.C. § 271(g), including exemplary claim 17.

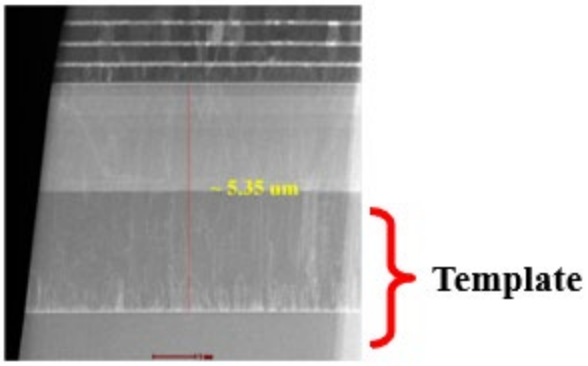
56. Upon information and belief, the Photon Wave PKD-H10-F35 is formed by practicing a method for forming a light emitting diode comprising the steps of: forming a template; forming a first layer on said template wherein said first layer has a first conductivity and a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$; forming light emitting quantum well region above said first layer wherein said light emitting quantum well region has a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$; and forming a second layer over said light emitting quantum well with a second conductivity comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$; forming a first-contact layer in electrical connection with said first layer; forming a second-contact layer in electrical connection with said second layer; providing a carrier wherein said carrier comprises a first contact zone and a second contact zone; and bonding said first contact zone to said first-contact layer and said second contact zone to said second contact layer.

57. Upon information and belief, the Photon Wave PKD-H10-F35 is manufactured by practicing a method for forming a light emitting diode. The resulting light emitting diode is shown in the optical microscope images of a Photon Wave PKD-H10-F35 reproduced below.

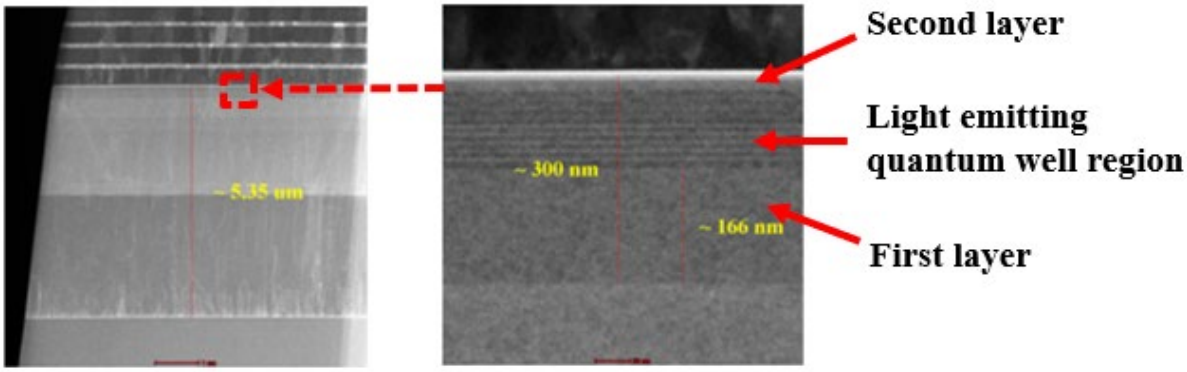




58. Upon information and belief, the method for manufacturing the light emitting diode of the Photon Wave PKD-H10-F35 includes the step of forming a template. The resulting template is shown in the transmission electron microscope ("TEM") image reproduced below.



59. Upon information and belief, the method for manufacturing the light emitting diode of the Photon Wave PKD-H10-F35 includes the step of forming a first layer on said template wherein said first layer has a first conductivity and a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$. The resulting layer is depicted in the TEM images below.

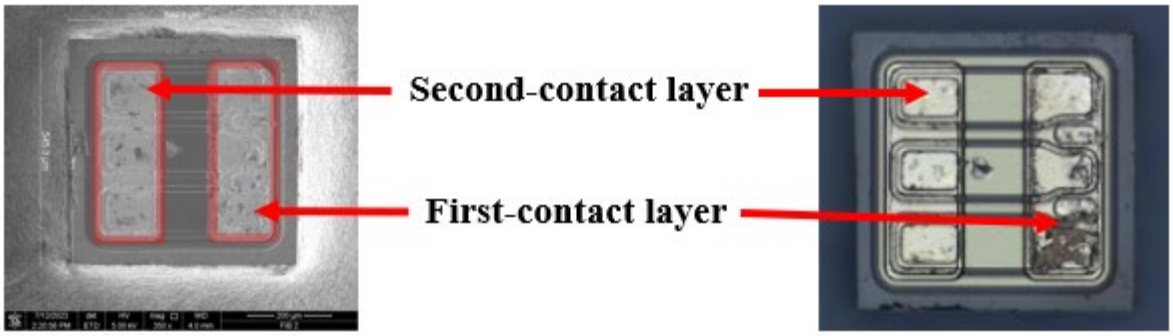


60. Upon information and belief, the method for manufacturing the light emitting diode of the Photon Wave PKD-H10-F35 includes the step of forming a light emitting quantum well region above said first layer wherein said light emitting quantum well region has a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$. The resulting quantum well region is visible in the image above right above the first layer.

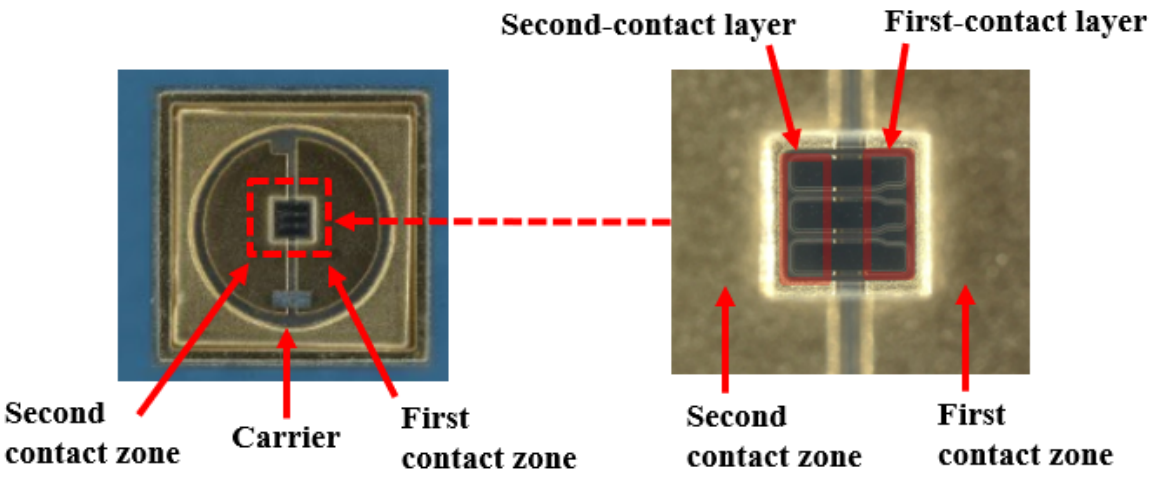
61. Upon information and belief, the method for manufacturing the light emitting diode of the Photon Wave PKD-H10-F35 includes the step of, and forming a second layer over said light

emitting quantum well with a second conductivity comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$. The resulting second layer is visible in the images above located above the quantum well region.

62. Upon information and belief, the method for manufacturing the light emitting diode of the Photon Wave PKD-H10-F35 includes the steps of forming a first-contact layer in electrical connection with said first layer, and forming a second-contact layer in electrical connection with said second layer. The scanning electron microscope ("SEM") image and microscope image of the Photon Wave PKD-H10-F35 below show the first contact layer and second contact layer located on the left and right, respectively.



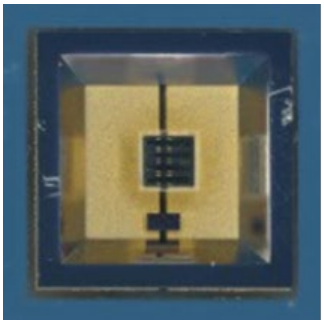
63. The method for manufacturing the light emitting diode of the Photon Wave PKD-H10-F35 further comprises providing a carrier wherein said carrier comprises a first contact zone and a second contact zone, and bonding said first contact zone to said first-contact layer and said second contact zone to said second contact layer. The images below were created using an optical microscope. The image below left depicts a light emitting diode deposed on a carrier. And the image below right depicts the back surface of the light emitting diode following removal.

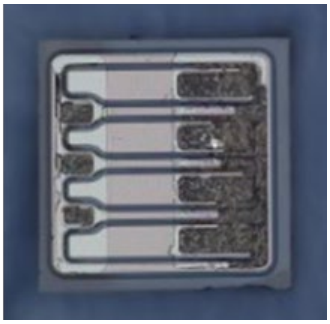


64. The rectangular regions visible on the left and right sides of the light emitting device in the image above right correspond to where the first and second zones of the carrier respectively were bonded to the light emitting device. The device was bonded to the first and second zones of the carrier prior to being removed from the carrier.

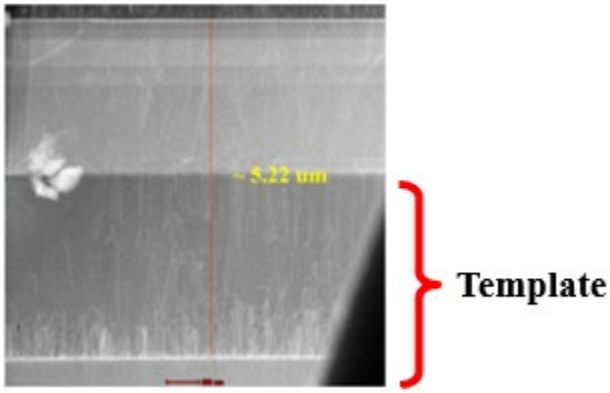
65. Upon information and belief, Osram 720-SUCULDP1VCMBMG57 is formed by practicing a method for forming a light emitting diode comprising the steps of: forming a template; forming a first layer on said template wherein said first layer has a first conductivity and a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$; forming light emitting quantum well region above said first layer wherein said light emitting quantum well region has a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$; and forming a second layer over said light emitting quantum well with a second conductivity comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$; forming a first-contact layer in electrical connection with said first layer; forming a second-contact layer in electrical connection with said second layer; providing a carrier wherein said carrier comprises a first contact zone and a second contact zone; and bonding said first contact zone to said first-contact layer and said second contact zone to said second contact layer

66. Upon information and belief, the Osram 720-SUCULDP1VCMBMG57 is formed by practicing a method for forming a light emitting diode. The resulting light emitting diode is in the optical microscope images of the Osram 720-SUCULDP1VCMBMG57 reproduced below.

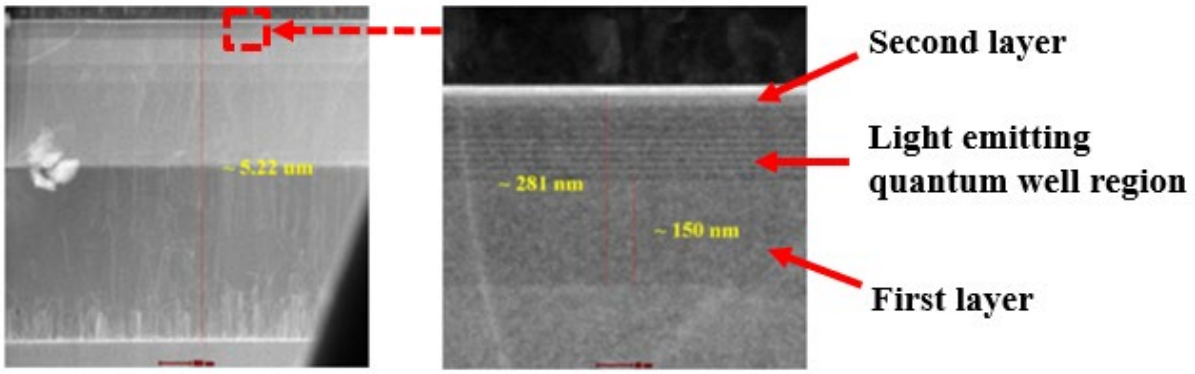




67. Upon information and belief, the method for forming the light emitting diode of the Osram 720-SUCULDP1VCMBMG57 comprises the step of forming a template. The resulting template is shown in the TEM image reproduced below.



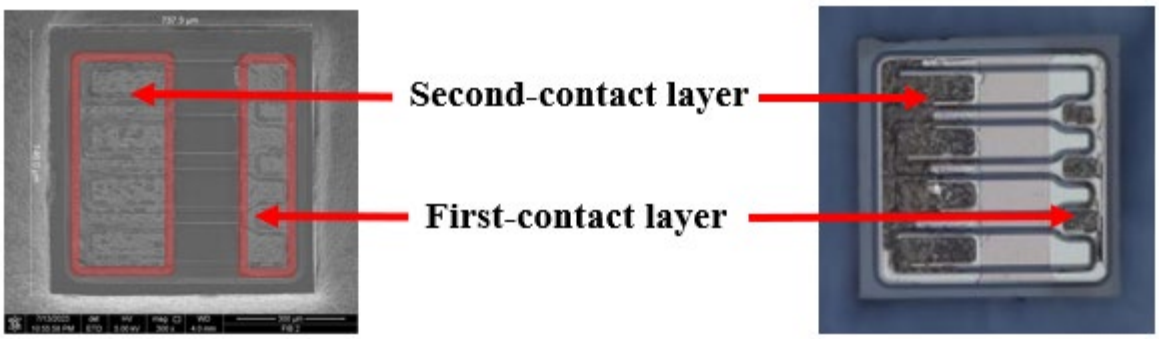
68. Upon information and belief, the method for forming the light emitting diode of the Osram 720-SUCULDP1VCMBMG57 further comprises the step of forming a first layer on said template wherein said first layer has a first conductivity and a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$. The resulting layer is depicted in the TEM images below.



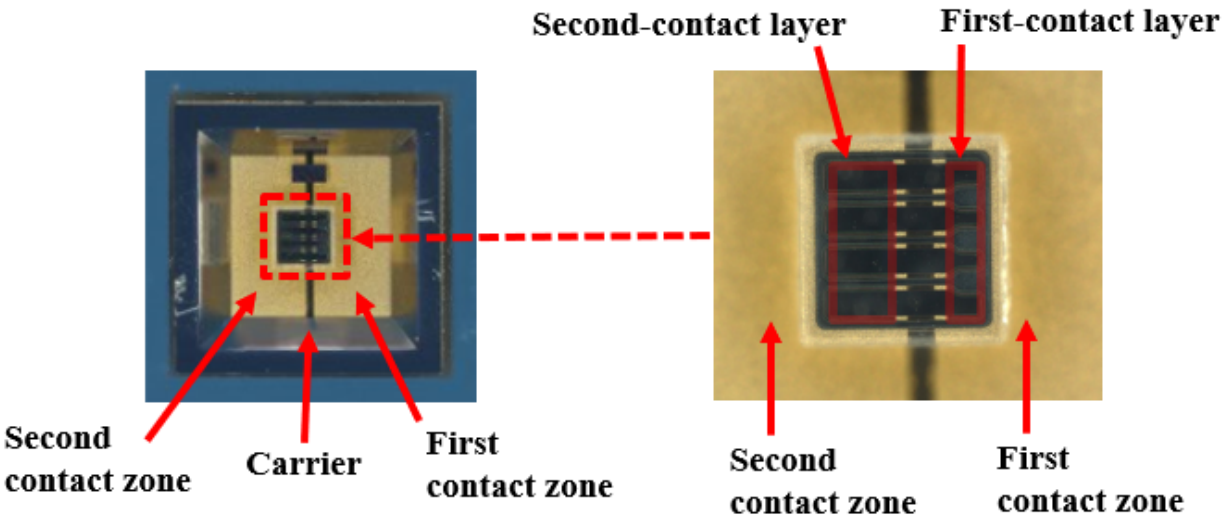
69. Upon information and belief, the method for forming the light emitting diode of the Osram 720-SUCULDP1VCMBMG57 further comprises the step of forming a light emitting quantum well region above said first layer wherein said light emitting quantum well region has a composition comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$. The resulting quantum well region is visible in the image above right above the first layer.

70. Upon information and belief, the method for forming the light emitting diode of the Osram 720-SUCULDP1VCMBMG57 further comprises the step of forming a second layer over said light emitting quantum well with a second conductivity comprising $Al_xIn_yGa_{1-x-y}N$ wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$, and $0 \leq x+y \leq 1$. The resulting second layer is visible in the images above located above the quantum well region.

71. Upon information and belief, the method for forming the light emitting diode of the Osram 720-SUCULDP1VCMBMG57 further comprises the steps of forming a first-contact layer in electrical connection with said first layer, and forming a second-contact layer in electrical connection with said second layer. The SEM image and microscope image of the Osram 720-SUCULDP1VCMBMG57 below show the first contact layer and second contact layer located on the left and right, respectively.



72. The method for forming the light emitting diode of the Osram 720-SUCULDP1VCMBMG57 further comprises providing a carrier wherein said carrier comprises a first contact zone and a second contact zone, and bonding said first contact zone to said first-contact layer and said second contact zone to said second contact layer. The images below were created using an optical microscope. The image below left depicts a light emitting diode deposed on a carrier. And the image below right depicts the back surface of the light emitting diode following removal.



73. The rectangular regions visible on the left and right sides of the light emitting device in the image above right correspond to where the first and second zones of the carrier respectively were bonded to the light emitting device. The device was bonded to the first and second zones of the carrier prior to being removed from the carrier.

74. On information and belief, with knowledge of the ’687 patent, Photon Wave has willfully, deliberately, and intentionally infringed, directly and indirectly, the ’687 patent, and continues to willfully, deliberately, and intentionally infringe, directly and indirectly, the ’687 patent.

75. On information and belief, Defendant had actual knowledge of the ’687 patent at least as of August 10, 2023.

76. On information and belief, Defendant had actual knowledge of, or was willfully blind to, its infringement of the ’687 patent as least as of August 10, 2023.

77. On information and belief, after acquiring knowledge of the ’687 Patent and its infringement thereof (or willful blindness thereof), Defendant directly and indirectly infringed the ’687 patent as set forth above.

78. As discussed above in paragraphs 44-53, Photon Wave has been aware of its infringement of the ’687 Patent, or has been willfully blind to such infringement, since at least August 10, 2023.

79. As discussed above in paragraphs 44-53, since August 10, 2023, Photon Wave has actively induced infringement of the ’687 Patent by others at least through its continued marketing, support, and sale of at least the PKD-H10-F35 and the LED chip included in the Osram 720-SUCULDP1VCMBMG57 with knowledge of its infringement of the ’687 Patent.

80. Nitek is entitled to injunctive relief and damages in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

81. On information and belief, Defendant will continue to infringe the ’687 patent unless and until it is enjoined by this Court. Defendant, by way of its infringing activities, has caused and will continue to cause Nitek to suffer damages in an amount to be determined, and has caused and is causing Nitek irreparable harm. Nitek has no adequate remedy at law against Defendant’s acts of infringement and, unless Defendant is enjoined from its infringement of the ’687 patent, Nitek will continue to suffer irreparable harm.

82. Nitek is entitled to recover from Defendant damages at least in an amount adequate to compensate for its infringement of the '687 patent, which amount has yet to be determined, together with interest and costs fixed by the Court.

COUNT II.

INFRINGEMENT OF U.S. PATENT NO. 8,680,551

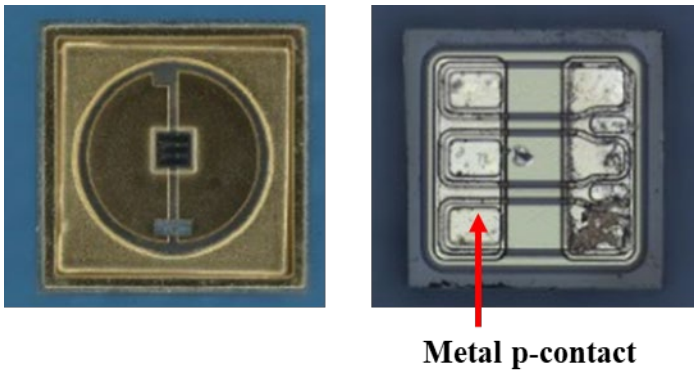
EXAMPLARY CLAIM 22

83. Nitek incorporates by reference the allegations contained in the foregoing paragraphs above.

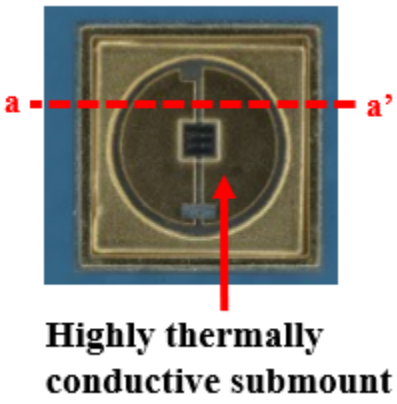
84. Photon Wave has made, used, offered for sale, sold, and/or imported products within or into the United States, including at least the Photon Wave PKD-H10-F35, that infringe, either literally or under the doctrine of equivalents, one or more claims of the '551 patent in violation of 35 U.S.C. § 271(a), including claim 22.

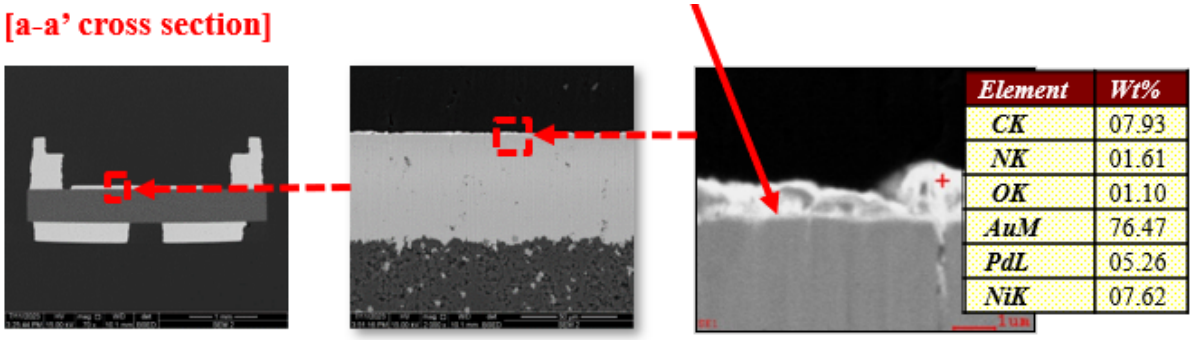
85. The Photon Wave PKD-H10-F35 comprises an LED comprising in a layered arrangement: a metal p-contact; a highly thermally conductive submount attached to said metal p-contact, wherein said highly conductive submount has a thermal conductivity of at least 100 W/m^0K; a p-type layer on said thermally conductive submount, said p-type layer comprising $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$; a quantum well layer on said p-type layer, said quantum well layer comprising $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$; an n-type layer on said quantum well layer, said n-type layer comprising $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$; and an n-type contact layer on said metal n-contact; and wherein said LED has a peak emission at 200-365 nm

86. The Photon Wave PKD-H10-F35 comprises an LED, as shown in the optical microscope images of a Photon Wave PKD-H10-F35 UV LED reproduced below. The image below left shows the LED chip located in the middle. The image below right shows a metal p-contact on the back-surface of the LED chip.



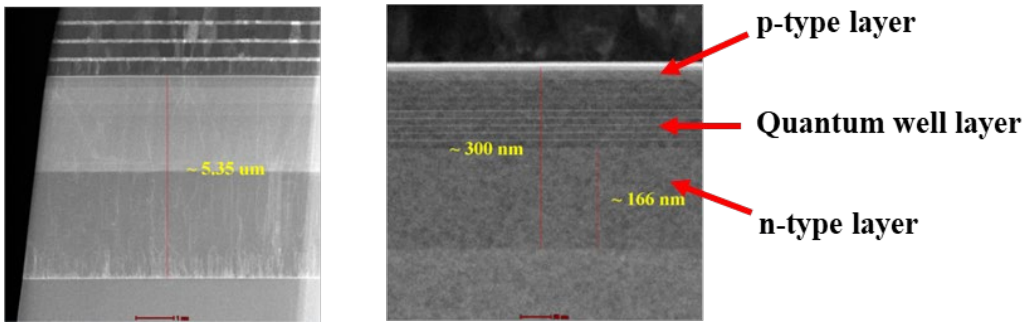
87. The LED of the Photon Wave PKD-H10-F35 further comprises a highly thermally conductive submount attached to the metal p-contact, wherein the highly conductive submount has a thermal conductivity of at least 100 W/m°K. The submount includes material having a thermal conductivity higher than 100 watts per meter Kelvin.



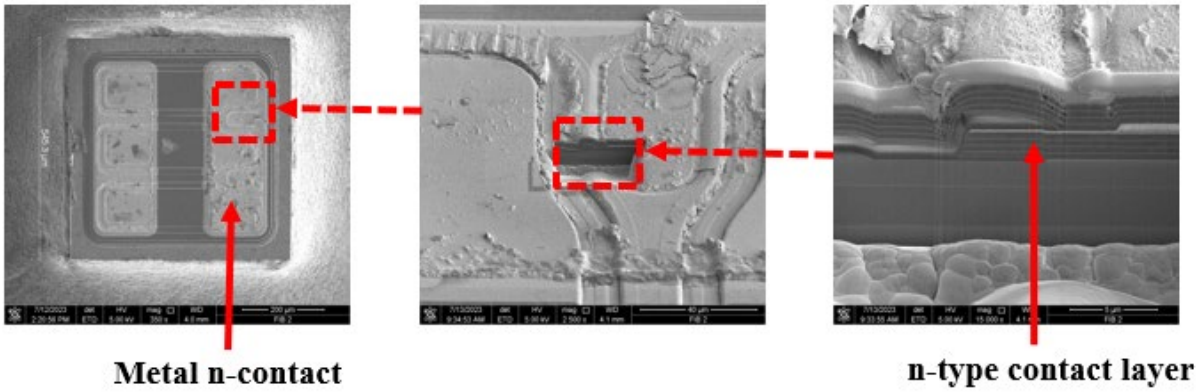


88. The LED of the Photon Wave PKD-H10-F35 further comprises a p-type layer on the thermally conductive submount. The TEM images below show, from bottom to top in relevant part of the LED, a p-type layer, a quantum well layer on the p-type layer, and an n-type layer on

the quantum well layer. The p-type layer comprises $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$. The quantum well layer comprises $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$. The n-type layer comprises $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$.



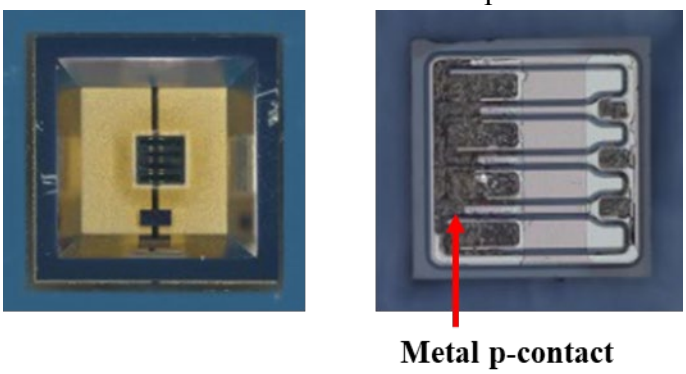
89. The LED of the Photon Wave PKD-H10-F35 also meets the requirement of "an n-type contact layer on the metal n-contact" which a person of skill in the art would understand to mean "a metal n-contact electrically connected with said n-type layer and said metal n-contact on an n-type contact layer." The images below middle and right are SEM images created after a hole was milled into the LED using a focused ion beam ("FIB"). The SEM images show how electrical contact is made to the n-type layer. An n-type contact layer is provided in electrical contact on the n-type layer. In addition, the metal n-contact is provided on the n-type contact layer.



90. According to its packaging, the Photon Wave PKD-H10-F35 has a peak emission within the claimed range of 200-365 nm.

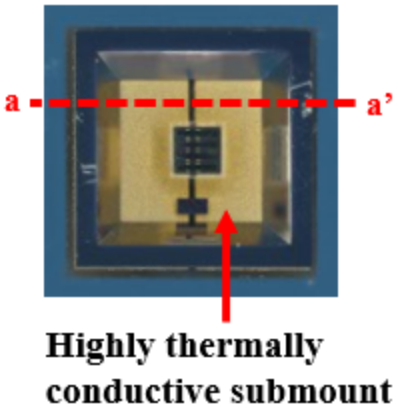
91. The Osram 720-SUCULDP1VCMBMG57 comprises an LED comprising in a layered arrangement: a metal p-contact; a highly thermally conductive submount attached to said metal p-contact, wherein said highly conductive submount has a thermal conductivity of at least 100 W/m^0K; a p-type layer on said thermally conductive submount, said p-type layer comprising $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$; a quantum well layer on said p-type layer, said quantum well layer comprising $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$; an n-type layer on said quantum well layer, said n-type layer comprising $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$; and an n-type contact layer on said metal n-contact; and wherein said LED has a peak emission at 200-365 nm

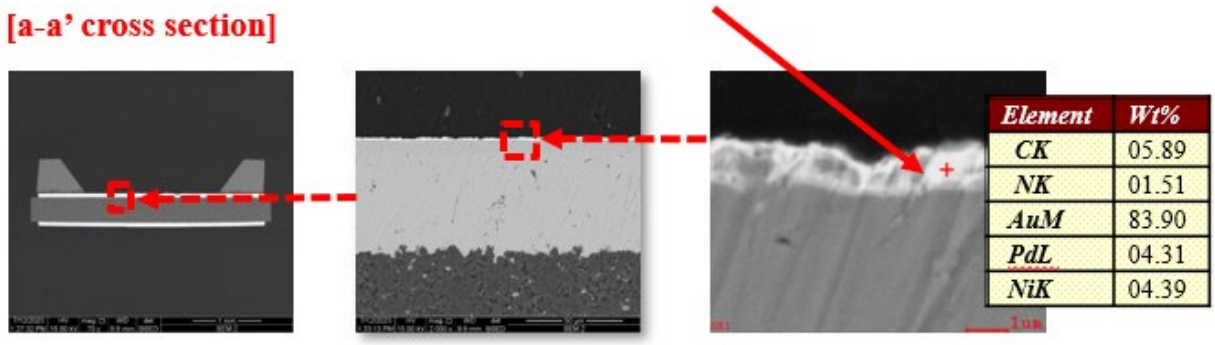
92. The Osram 720-SUCULDP1VCMBMG57 comprises an LED, as shown in the optical microscope images of a Osram 720-SUCULDP1VCMBMG57 UV LED reproduced below. The image below left shows the LED chip located in the middle. The image below right shows a metal p-contact on the back-surface of the LED chip.



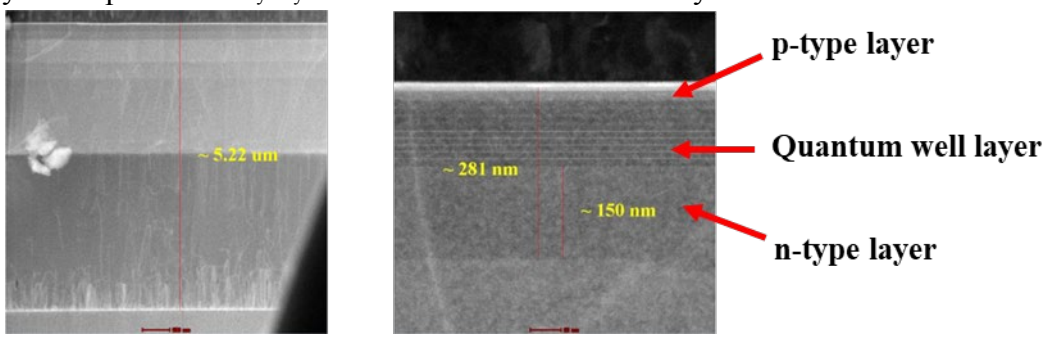
93. The LED of the Osram 720-SUCULDP1VCMBMG57 further comprises a highly thermally conductive submount attached to the metal p-contact, wherein the highly conductive

submount has a thermal conductivity of at least 100 W/m°K. The submount includes material having a thermal conductivity higher than 100 watts per meter Kelvin.

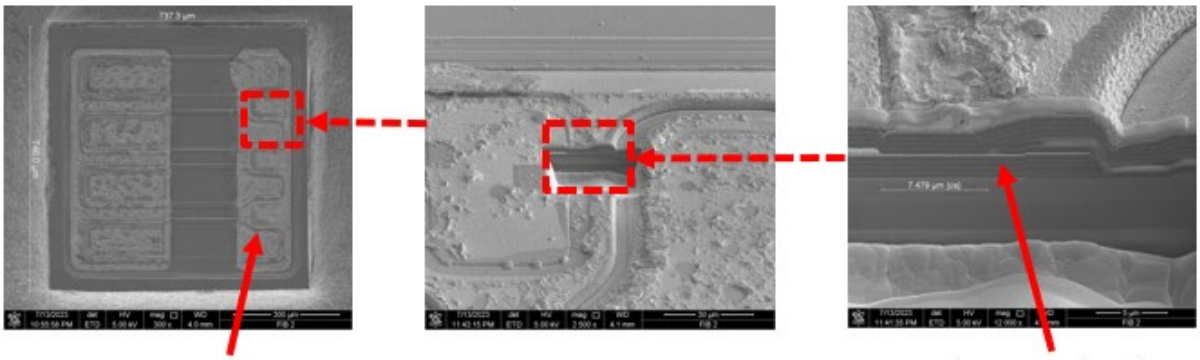




94. The LED of the Osram 720-SUCULDP1VCMBMG57 further comprises a p-type layer on the thermally conductive submount. The TEM images below show, from bottom to top in relevant part of the LED, a p-type layer, a quantum well layer on the p-type layer, and an n-type layer on the quantum well layer. The p-type layer comprises $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$. The quantum well layer comprises $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$. The n-type layer comprises $Al_{1-x-y}In_yGa_xN$ wherein $0 \leq x \leq 1$ and $0 \leq y \leq 1$.



95. The LED of the the Osram 720-SUCULDP1VCMBMG57 also includes an n-type contact layer on the metal n-contact, which a person of skill in the art would understand to mean "a metal n-contact electrically connected with said n-type layer and said metal n-contact on an n-type contact layer." The images below middle and right are SEM images created after a hole was milled into the LED using a FIB. The SEM images show how electrical contact is made to the n-type layer. An n-type contact layer is provided in electrical contact on the n-type layer. In addition, the metal n-contact is provided on the n-type contact layer.



96. According to its packaging and datasheet, the Osram 720-SUCULDP1VCMBMG57 has a peak emission within the claimed range of 200-365 nm.

Features

- Package: Ceramic package
- Chip technology: AlGaN based flip chip
- Typ. Radiation: 120° (Lambertian emitter)
- Color: λ_{peak} = 275 nm (ultraviolet (UV-C))

97. As discussed above in paragraphs 44-53, Photon Wave has been aware of its infringement of the '551 Patent, or has been willfully blind to such infringement, since at least August 10, 2023.

98. As discussed above in paragraphs 44-53, since August 10, 2023, Photon Wave has actively induced infringement of the ’551 Patent by others at least through its continued marketing, support, and sale of at least the PKD-H10-F35 and the LED chip included in the Osram 720-SUCULDP1VCMBMG57 with knowledge of its infringement of the ’687 Patent.

99. On information and belief, with knowledge of the ’551 patent, Photon Wave has willfully, deliberately, and intentionally infringed, directly and indirectly, the ’551 patent, and continues to willfully, deliberately, and intentionally infringe, directly and indirectly, the ’551 patent.

100. On information and belief, Defendant had actual knowledge of the ’551 patent at least as of August 10, 2023.

101. On information and belief, Defendant had actual knowledge of, or was willfully blind to, its infringement of the ’551 patent as least as of August 10, 2023.

102. On information and belief, after acquiring knowledge of the ’551 Patent and its infringement thereof (or willful blindness thereof), Defendant directly and indirectly infringed the ’551 patent as set forth above.

103. Nitek is entitled to injunctive relief and damages in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

104. On information and belief, Defendant will continue to infringe the ’551 patent unless and until it is enjoined by this Court. Defendant, by way of its infringing activities, has caused and will continue to cause Nitek to suffer damages in an amount to be determined, and has caused and is causing Nitek irreparable harm. Nitek has no adequate remedy at law against Defendant’s acts of infringement and, unless Defendant is enjoined from its infringement of the ’687 patent, Nitek will continue to suffer irreparable harm.

105. Nitek is entitled to recover from Defendant damages at least in an amount adequate to compensate for its infringement of the ’551 patent, which amount has yet to be determined, together with interest and costs fixed by the Court.

COUNT III.

INFRINGEMENT OF U.S. PATENT NO. 10,147,848

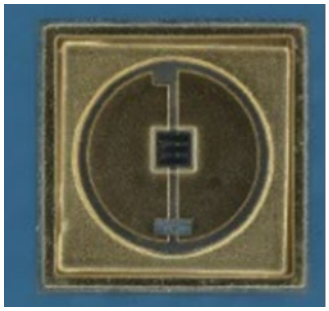
EXAMPLARY CLAIM 1

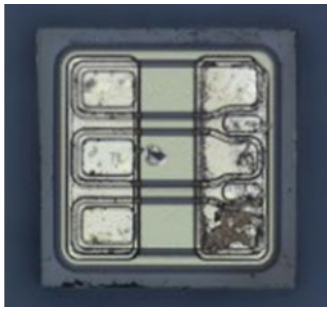
106. Nitek incorporates by reference the allegations contained in foregoing paragraphs above.

107. Photon Wave has made, used, offered for sale, sold, and/or imported products within or into the United States, including at least Photon Wave PKD-H10-F35, that infringe, either literally or under the doctrine of equivalents, one or more claims of the '848 patent in violation of 35 U.S.C. § 271(a), including claim 1.

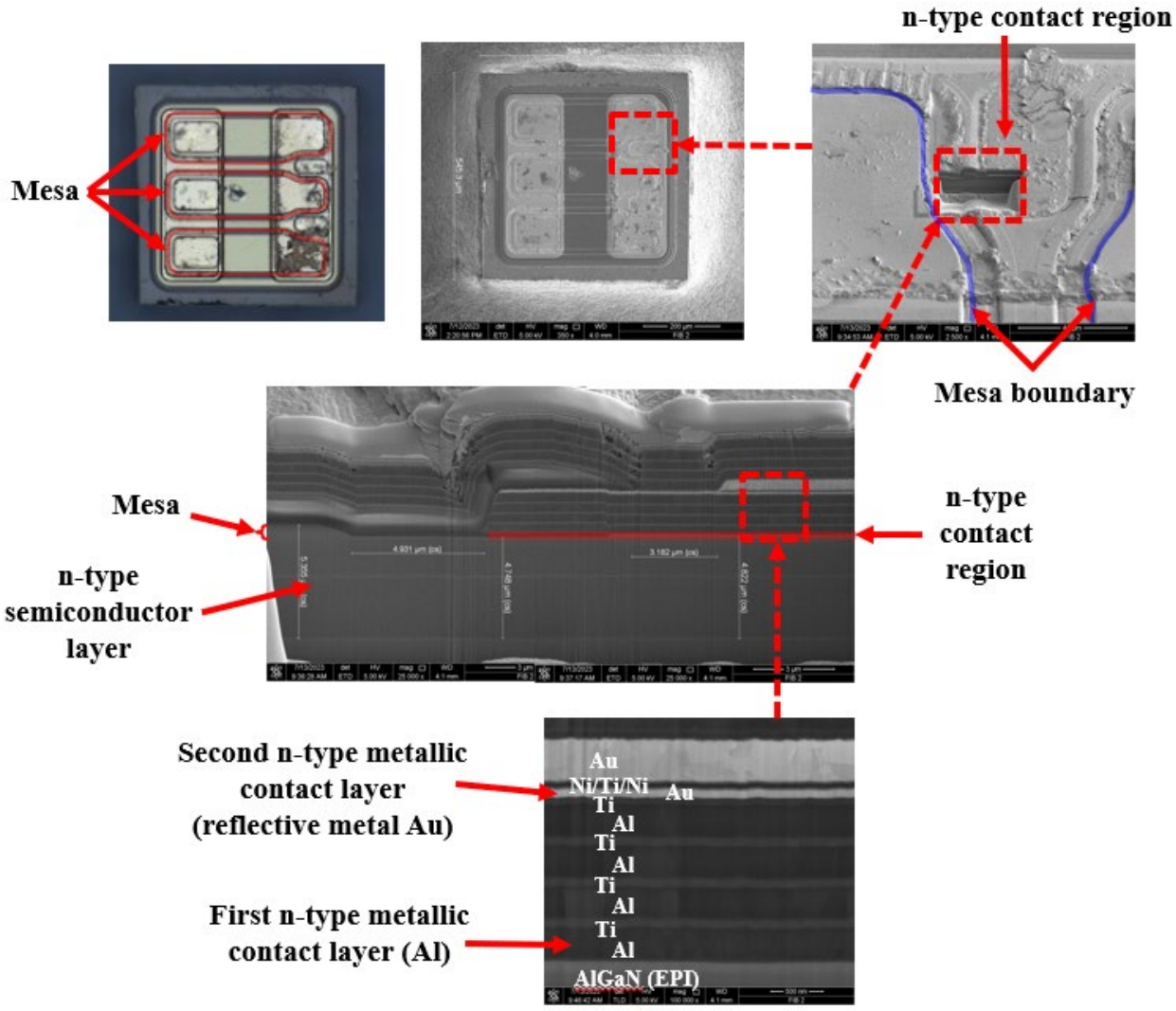
108. The Photon Wave PKD-H10-F35 comprises an optoelectronic device comprising: an n-type semiconductor layer having a surface; a mesa located over a first portion of the surface of the n-type semiconductor layer and having a mesa boundary; an n-type contact region located over a second portion of the surface of the n-type semiconductor layer entirely distinct from the first portion, wherein the n-type contact region is at least partially defined by the mesa boundary; a first n-type metallic contact layer located over at least a portion of the n-type contact region in proximity of the mesa boundary, wherein the first n-type metallic contact layer forms an ohmic contact with the n-type semiconductor layer; and a second n-type metallic contact layer located over a second portion of the n-type contact region, wherein the second n-type metllic contact layer is formed of a reflective metallic material distinct from a metallic material used to form the first n-type metallic contact layer.

109. The Photon Wave PKD-H10-F35 comprises an optoelectronic device, as shown in the optical microscope images of a Photon Wave PKD-H10-F35 LED reproduced below.





110. Below are SEM images taken after a hole was milled into the Photon Wave PKD-H10-F35 LED optoelectronic device using FIB.



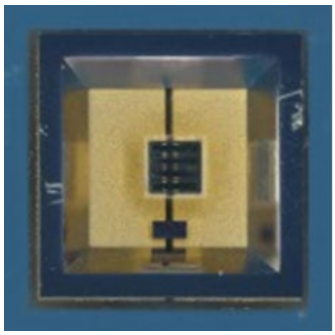
111. The SEM images above show an n-type semiconductor layer having a surface, and a mesa located over a first portion of the surface of the n-type semiconductor layer having a mesa boundary, an n-type contact region located over a second portion of the surface of the n-type semiconductor layer entirely distinct from the first portion, wherein the n-type contact region is at least partially defined by the mesa boundary, a first n-type metallic contact layer located over at least a portion of the n-type contact region in proximity of the mesa boundary and a second n-type metallic contact layer located over a second portion of the n-type contact region. The n-type contact

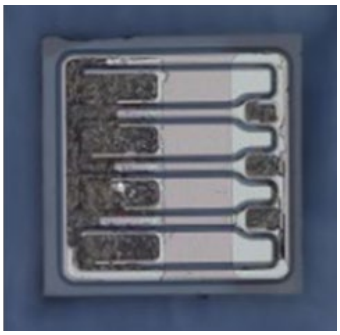
region is at least partially defined by the mesa boundary. The first n-type metallic contact layer forms an ohmic contact with the n-type semiconductor layer.

112. The above SEM image also shows a second n-type metallic contact layer located over a second portion of the n-type contact region, and the second n-type metallic contact layer is formed of a reflective metallic material (e.g., gold) distinct from a metallic material used to form the first n-type metallic contact layer (e.g., aluminum).

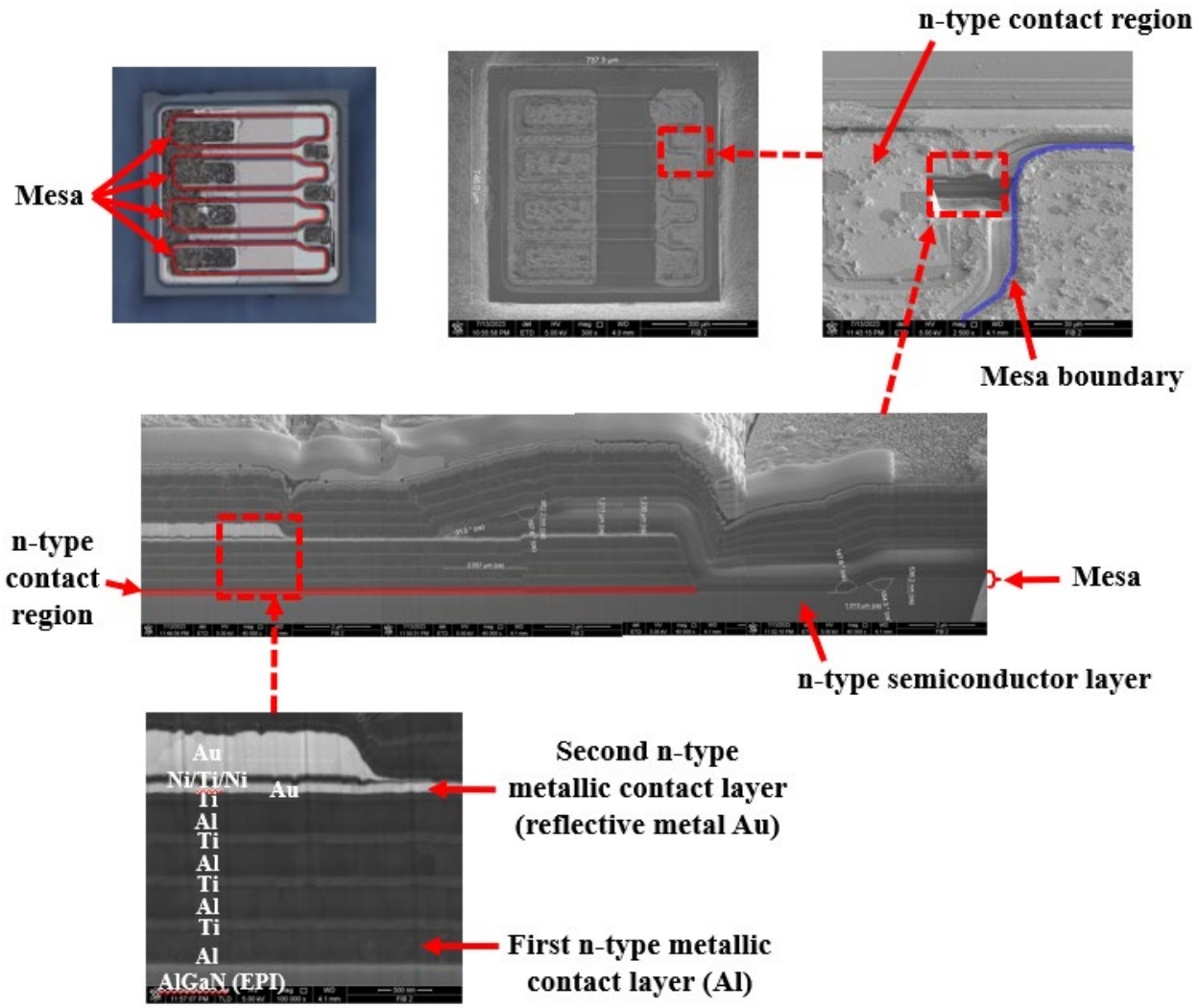
113. The Osram 720-SUCULDP1VCMBMG57 comprises an optoelectronic device comprising: an n-type semiconductor layer having a surface; a mesa located over a first portion of the surface of the n-type semiconductor layer and having a mesa boundary; an n-type contact region located over a second portion of the surface of the n-type semiconductor layer entirely distinct from the first portion, wherein the n-type contact region is at least partially defined by the mesa boundary; a first n-type metallic contact layer located over at least a portion of the n-type contact region in proximity of the mesa boundary, wherein the first n-type metallic contact layer forms an ohmic contact with the n-type semiconductor layer; and a second n-type metallic contact layer located over a second portion of the n-type contact region, wherein the second n-type metllic contact layer is formed of a reflective metallic material distinct from a metallic material used to form the first n-type metallic contact layer.

114. The Osram 720-SUCULDP1VCMBMG57 comprises an optoelectronic device, as shown in the optical microscope images of an Osram 720-SUCULDP1VCMBMG57 LED reproduced below.





115. Below are SEM images taken after a hole was milled into the optoelectronic device using FIB.



116. The SEM images above show an n-type semiconductor layer having a surface, and a mesa located over a first portion of the surface of the n-type semiconductor layer having a mesa boundary, an n-type contact region located over a second portion of the surface of the n-type semiconductor layer entirely distinct from the first portion, wherein the n-type contact region is at least partially defined by the mesa boundary, a first n-type metallic contact layer located over at least a portion of the n-type contact region in proximity of the mesa boundary and a second n-type metallic contact layer located over a second portion of the n-type contact region. The n-type contact

region is at least partially defined by the mesa boundary. The first n-type metallic contact layer forms an ohmic contact with the n-type semiconductor layer.

117. The above SEM image also shows a second n-type metallic contact layer located over a second portion of the n-type contact region, and it is formed of a reflective metallic material distinct from a metallic material used to form the first n-type metallic contact layer.

118. On information and belief, with knowledge of the ’848 patent, Photon Wave has willfully, deliberately, and intentionally infringed, directly and indirectly, the ’848 patent, and continues to willfully, deliberately, and intentionally infringe, directly and indirectly, the ’848 patent.

119. On information and belief, Defendant had actual knowledge of the ’848 patent at least as of May 4, 2022.

120. On information and belief, Defendant had actual knowledge of, or was willfully blind to, its infringement of the ’848 patent as least as of May 4, 2022.

121. As discussed above in paragraphs 44-53, Photon Wave has been aware of its infringement of the ’848 Patent, or has been willfully blind to such infringement, since at least May 4, 2022 and, with respect to the specific products identified in this Complaint, since at least as of August 10, 2023.

122. As discussed above in paragraphs 44-53, since May 4, 2022, Photon Wave has actively induced infringement of the ’848 Patent by others at least through its continued marketing, support, and sale of its products with knowledge of its infringement of the ’848 Patent and, with respect to the specific products identified in this Complaint, since at least as of August 10, 2023.

123. On information and belief, after acquiring knowledge of the ’848 Patent and its infringement thereof (or willful blindness thereof), Defendant directly and indirectly infringed the ’848 patent as set forth above.

124. Nitek is entitled to injunctive relief and damages in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

125. On information and belief, Defendant will continue to infringe the ’848 patent unless and until it is enjoined by this Court. Defendant, by way of its infringing activities, has caused and will continue to cause Nitek to suffer damages in an amount to be determined, and has caused and is causing Nitek irreparable harm. Nitek has no adequate remedy at law against Defendant’s acts of infringement and, unless Defendant is enjoined from its infringement of the ’848 patent, Nitek will continue to suffer irreparable harm.

126. Nitek is entitled to recover from Defendant damages at least in an amount adequate to compensate for its infringement of the ’848 patent, which amount has yet to be determined, together with interest and costs fixed by the Court.

COUNT IV.

INFRINGEMENT OF U.S. PATENT NO. 9,042,420

EXAMPLARY CLAIM 1

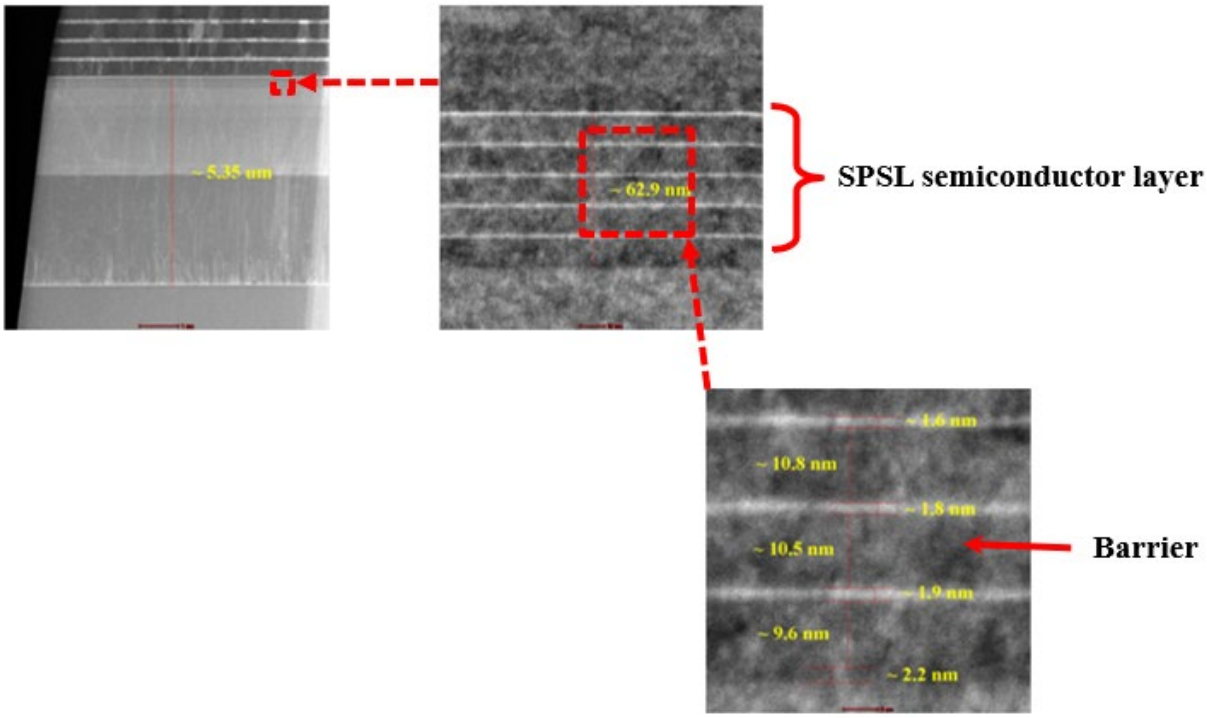
127. Nitek incorporates by reference the allegations contained in foregoing paragraphs above.

128. Photon Wave has made, used, offered for sale, sold, and/or imported products within or into the United States, including at least the Photon Wave PKD-H10-F35, that infringe, either literally or under the doctrine of equivalents, one or more claims of the ’420 patent in violation of 35 U.S.C. § 271(a), including claim 1.

129. The Photon Wave PKD-H10-F35 is a device comprising: a short period superlattice (SPSL) semiconductor layer, wherein a composition of at least one barrier in the SPSL semiconductor layer varies along lateral dimensions of the at least one barrier such that a lateral cross section of the at least one barrier includes: a set of transparent regions having a first characteristic band gap, wherein the set of transparent regions are at least ten percent of an area of the lateral cross section of the at least one barrier; and a set of higher conductive regions having a second characteristic band gap at least five percent smaller than the first characteristic band gap, wherein the set of higher conductive regions are at least two percent of the area of the lateral cross section of the at least one barrier, and wherein lateral inhomogeneities in at least one of: the

composition or a doping of the at least one barrier forms the set of transparent regions and the set of higher conductive regions.

130. The Photon Wave PKD-H10-F35 comprises an LED chip. The TEM images of the LED chip from the Photon Wave PKD-H10-F35 are reproduced below. The LED chip of the Photon Wave PKD-H10-F35 has an active layer which acts as a short period superlattice ("SPSL") semiconductor layer.



131. The SPSL comprises barriers that are predominantly aluminum gallium nitride. The barriers' material composition varies laterally across the plane of the barriers, as shown in the TEM image above right. The darker regions of the barriers represent a relatively high aluminum concentration; the lighter regions, a relatively low aluminum concentration. Thus, lateral inhomogeneities in the composition of the barriers forms the barriers' different regions

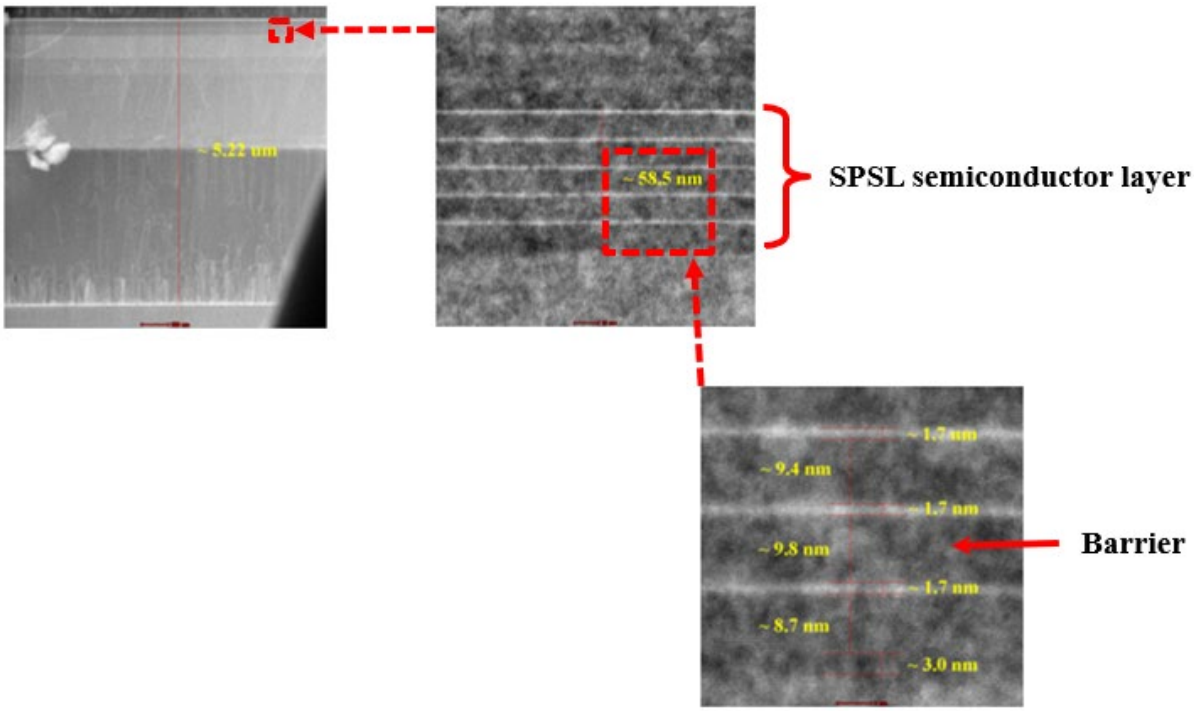
132. The barriers' darker, high-aluminum regions necessarily have a characteristic band gap (i.e., a "first characteristic band gap") that differs from the characteristic band gap of the lighter, low-aluminum regions (i.e., a "second characteristic band gap"). The high aluminum

regions are more transparent to the UV light generated by the LED chip of the Photon Wave PKD-H10-F35 than the low-aluminum regions. Thus, the high-aluminum regions form a set of transparent regions having a first characteristic band gap in the barriers. These transparent regions are at least ten percent of the area of the lateral cross section of at least one of the SPSL barriers.

133. The barriers' low-aluminum regions are more conductive to current flow than the high-aluminum regions. Thus, the low-aluminum regions form a set of higher conductive regions having a second characteristic band gap in the barriers. These conductive regions are at least two percent of the area of the lateral cross section of at least one of the SPSL barriers.

134. The Osram 720-SUCULDP1VCMBMG57 is a device comprising: a short period superlattice (SPSL) semiconductor layer, wherein a composition of at least one barrier in the SPSL semiconductor layer varies along lateral dimensions of the at least one barrier such that a lateral cross section of the at least one barrier includes: a set of transparent regions having a first characteristic band gap, wherein the set of transparent regions are at least ten percent of an area of the lateral cross section of the at least one barrier; and a set of higher conductive regions having a second characteristic band gap at least five percent smaller than the first characteristic band gap, wherein the set of higher conductive regions are at least two percent of the area of the lateral cross section of the at least one barrier, and wherein lateral inhomogeneities in at least one of: the composition or a doping of the at least one barrier forms the set of transparent regions and the set of higher conductive regions.

135. The Osram 720-SUCULDP1VCMBMG57 comprises an LED chip. The TEM images of the LED chip from the Osram 720-SUCULDP1VCMBMG57 are reproduced below. The LED chip of the Osram 720-SUCULDP1VCMBMG57 has an active layer which acts as a SPSL semiconductor layer.



136. The SPSL comprises barriers that are predominantly aluminum gallium nitride. The barriers' material composition varies laterally across the plane of the barriers, as shown in the TEM image above right. The darker regions of the barriers represent a relatively high aluminum concentration; the lighter regions, a relatively low aluminum concentration. Thus, lateral inhomogeneities in the composition of the barriers forms the barriers' different regions

137. The barriers' darker, high-aluminum regions necessarily have a characteristic band gap (i.e., a "first characteristic band gap") that differs from the characteristic band gap of the lighter, low-aluminum regions (i.e., a "second characteristic band gap"). The high-aluminum regions are more transparent to the UV light generated by the LED chip of the Osram 720-SUCULDP1VCMBMG57 than the low-aluminum regions. Thus, the high-aluminum regions form a set of transparent regions having a first characteristic band gap in the barriers. These transparent regions are at least ten percent of the area of the lateral cross section of at least one of the SPSL barriers.

138. The barriers' low-aluminum regions are more conductive to current flow than the high-aluminum regions. Thus, the low-aluminum regions form a set of higher conductive regions having a second characteristic band gap in the barriers. These conductive regions are at least two percent of the area of the lateral cross section of at least one of the SPSL barriers.

139. On information and belief, with knowledge of the '420 patent, Photon Wave has willfully, deliberately, and intentionally infringed, directly and indirectly, the '420 patent, and continues to willfully, deliberately, and intentionally infringe, directly and indirectly, the '420 patent.

140. On information and belief, Defendant had actual knowledge of the '420 patent at least as of May 4, 2022.

141. On information and belief, Defendant had actual knowledge of, or was willfully blind to, its infringement of the '420 patent as least as of May 4, 2022.

142. As discussed above in paragraphs 44-53, Photon Wave has been aware of its infringement of the '420 Patent, or has been willfully blind to such infringement, since at least May 4, 2022 and, with respect to the specific products identified in this Complaint, since at least as of August 10, 2023.

143. As discussed above in paragraphs 44-53, since May 4, 2022, Photon Wave has actively induced infringement of the '687 Patent by others at least through its continued marketing, support, and sale of its products with knowledge of its infringement of the '420 Patent and, with respect to the specific products identified in this Complaint, since at least as of August 10, 2023.

144. On information and belief, after acquiring knowledge of the '420 Patent and its infringement thereof (or willful blindness thereof), Defendant directly and indirectly infringed the '420 patent as set forth above.

145. Nitek is entitled to injunctive relief and damages in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

146. On information and belief, Defendant will continue to infringe the '420 patent unless and until it is enjoined by this Court. Defendant, by way of its infringing activities, has

caused and will continue to cause Nitek to suffer damages in an amount to be determined, and has caused and is causing Nitek irreparable harm. Nitek has no adequate remedy at law against Defendant's acts of infringement and, unless Defendant is enjoined from its infringement of the '420 patent, Nitek will continue to suffer irreparable harm.

147. Nitek is entitled to recover from Defendant damages at least in an amount adequate to compensate for its infringement of the '420 patent, which amount has yet to be determined, together with interest and costs fixed by the Court.

COUNT V.

INFRINGEMENT OF U.S. PATENT NO. 11,903,391

EXAMPLARY CLAIM 1

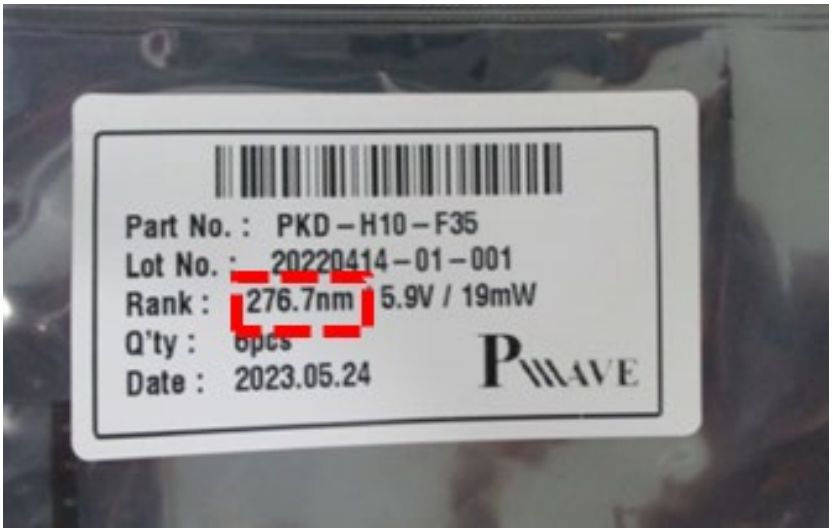
148. Nitek incorporates by reference the allegations contained in foregoing paragraphs above.

149. Photon Wave has made, used, offered for sale, sold, and/or imported products within or into the United States, including at least Photon Wave PKD-H10-F35, that infringe, either literally or under the doctrine of equivalents, one or more claims of the '391 patent in violation of 35 U.S.C. § 271(a), including claim 1.

150. The Photon Wave PKD-H10-F35 comprises a heterostructure comprising: a group III nitride active region including a series of alternating quantum wells and barriers, wherein the active region is configured to generate ultraviolet radiation within a range of approximately 210 nanometers to approximately 350 nanometers; a group III nitride n-type contact layer having an n-type doping, the n-type contact layer located on a first side of the active region; a group III nitride p-type contact layer having a p-type contact layer dopant concentration, the p-type contact layer located on a second side of the active region opposite the first side; a group III nitride electron blocking layer located between the active region and the p-type contact layer, wherein the group III nitride electron blocking layer includes a plurality sublayers formed by alternating a sublayer of higher aluminum content with a sublayer of lower aluminum content; and a p-type electrode located adjacent to the group III nitride p-type contact layer, wherein the p-type contact layer is at

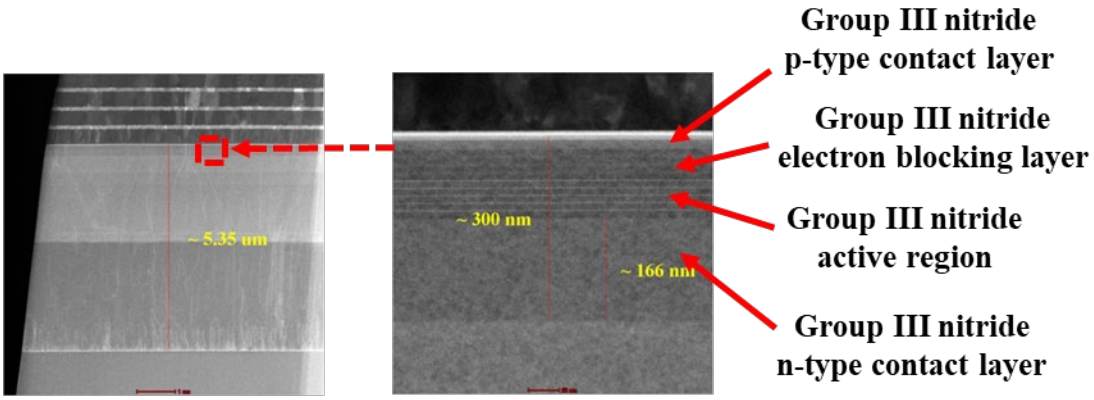
least partially transparent to the ultraviolet radiation generated by the active region, wherein the p-type electrode comprises at least one conductive layer and at least one reflective layer.

151. The Photon Wave PKD-H10-F35 comprises a LED chip that comprises a heterostructure comprising: a group III nitride active region including a series of alternating quantum wells and barriers, wherein the active region is configured to generate ultraviolet radiation within a range of approximately 210 nanometers to approximately 350 nanometers. The below image shows that the PKD-H10-F35 is designed to generate ultraviolet radiation at approximately 276.7 nm which is within the range of approximately 210 nanometers to approximately 350 nanometers.

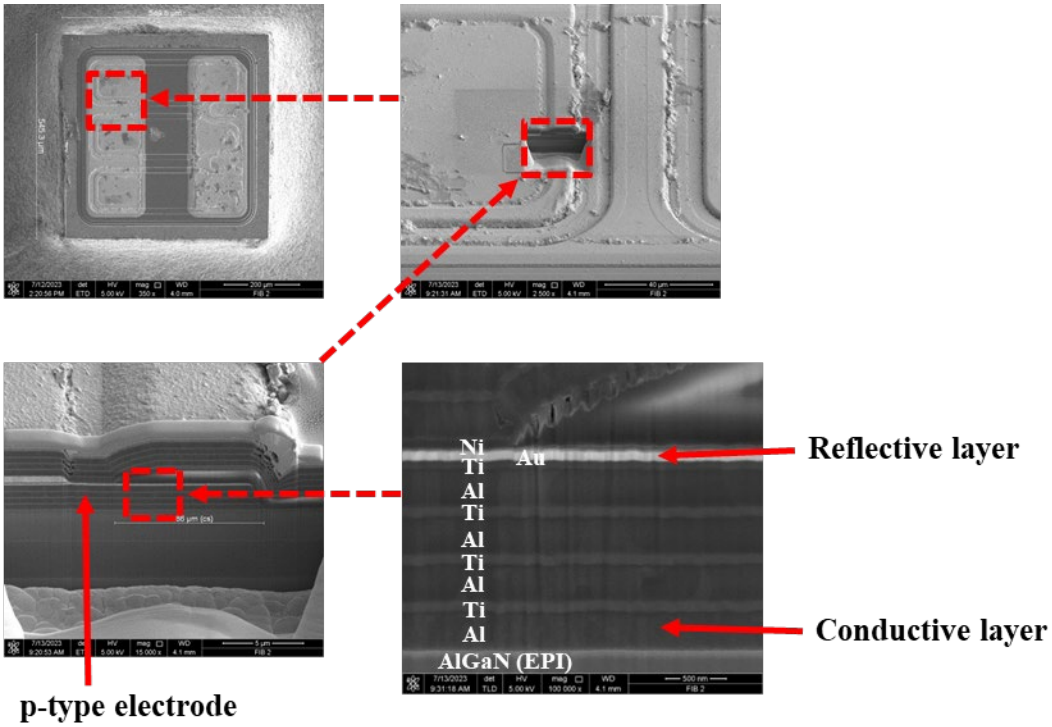


152. As seen in the TEM images below, the Photon Wave PKD-H10-F35 comprises a group III nitride active region including a series of alternating quantum wells and barriers, which as seen above includes an active region configured to generate ultraviolet radiation within a range of approximately 210 nanometers to approximately 350 nanometers; a group III nitride n-type contact layer having an n-type doping, the n-type contact layer located on a first side of the active region; a group III nitride p-type contact layer having a p-type contact layer dopant concentration, the p-type contact layer located on a second side of the active region opposite the first side; a group III nitride electron blocking layer located between the active region and the p-type contact layer,

wherein the group III nitride electron blocking layer includes a plurality sublayers formed by alternating a sublayer of higher aluminum content with a sublayer of lower aluminum content.



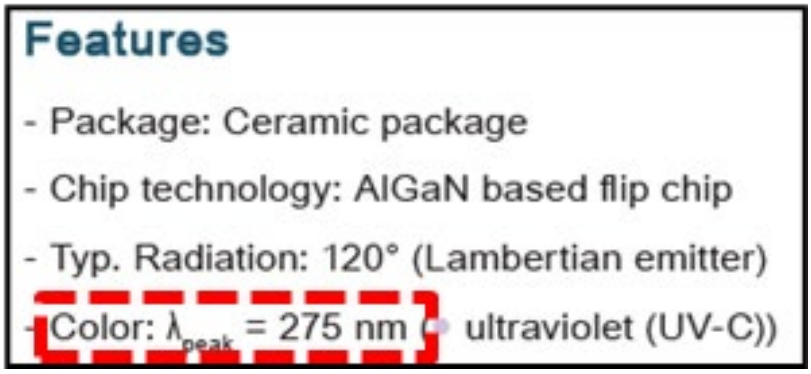
153. As seen in the TEM images below, the Photon Wave PKD-H10-F35 further comprises a p-type electrode located adjacent to the group III nitride p-type contact layer, wherein the p-type contact layer is at least partially transparent to the ultraviolet radiation generated by the active region, wherein the p-type electrode comprises at least one conductive layer and at least one reflective layer.



154. The Osram 720-SUCULDP1VCMBMG57 comprises a heterostructure comprising: a group III nitride active region including a series of alternating quantum wells and barriers, wherein the active region is configured to generate ultraviolet radiation within a range of approximately 210 nanometers to approximately 350 nanometers; a group III nitride n-type contact layer having an n-type doping, the n-type contact layer located on a first side of the active region; a group III nitride p-type contact layer having a p-type contact layer dopant concentration, the p-type contact layer located on a second side of the active region opposite the first side; a group III nitride electron blocking layer located between the active region and the p-type contact layer, wherein the group III nitride electron blocking layer includes a plurality sublayers formed by alternating a sublayer of higher aluminum content with a sublayer of lower aluminum content; and a p-type electrode located adjacent to the group III nitride p-type contact layer, wherein the p-type contact layer is at least partially transparent to the ultraviolet radiation generated by the active region, wherein the p-type electrode comprises at least one conductive layer and at least one reflective layer.

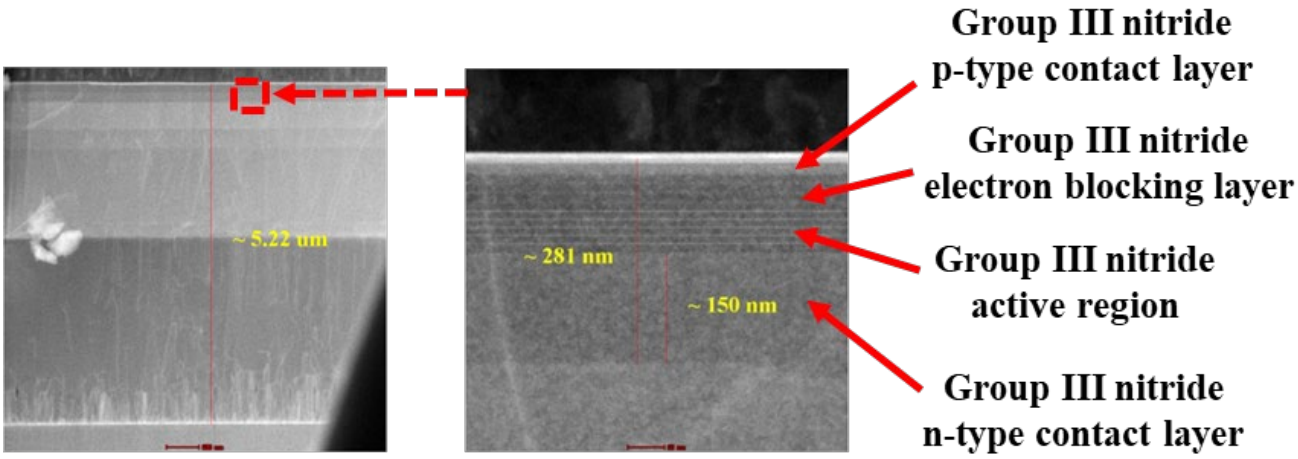
155. The Osram 720-SUCULDP1VCMBMG57 comprises a LED chip that comprises a heterostructure comprising: a group III nitride active region including a series of alternating quantum wells and barriers, wherein the active region is configured to generate ultraviolet radiation within a range of approximately 210 nanometers to approximately 350 nanometers. The below image shows that the PKD-H10-F35 is designed to generate ultraviolet radiation at approximately 275 nm which is within the range of approximately 210 nanometers to approximately 350 nanometers.

[Datasheet]

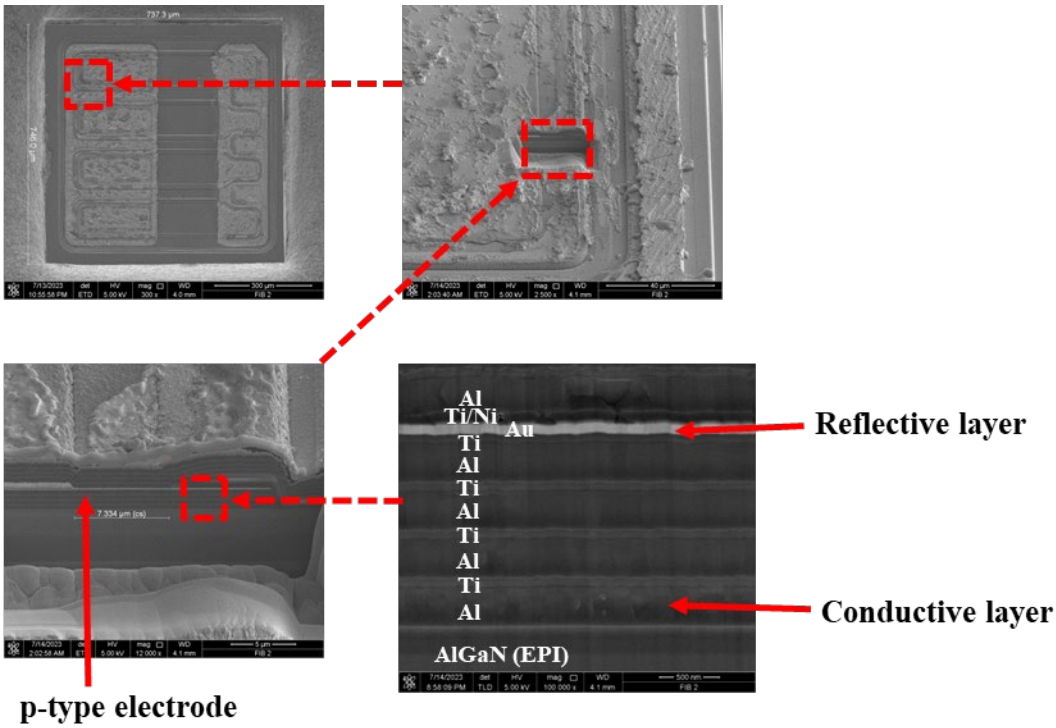


156. As seen in the TEM images below, the Osram 720-SUCULDP1VCMBMG57 comprises a group III nitride active region including a series of alternating quantum wells and barriers, which as seen above includes an active region configured to generate ultraviolet radiation within a range of approximately 210 nanometers to approximately 350 nanometers; a group III nitride n-type contact layer having an n-type doping, the n-type contact layer located on a first side of the active region; a group III nitride p-type contact layer having a p-type contact layer dopant concentration, the p-type contact layer located on a second side of the active region opposite the first side; a group III nitride electron blocking layer located between the active region and the p-type contact layer, wherein the group III nitride electron blocking layer includes a plurality

sublayers formed by alternating a sublayer of higher aluminum content with a sublayer of lower aluminum content.



157. As seen in the TEM images below, the Osram 720-SUCULDP1VCMBMG57 further comprises a p-type electrode located adjacent to the group III nitride p-type contact layer, wherein the p-type contact layer is at least partially transparent to the ultraviolet radiation generated by the active region, wherein the p-type electrode comprises at least one conductive layer and at least one reflective layer.



158. On information and belief, with knowledge of the ’391 patent, Photon Wave has willfully, deliberately, and intentionally infringed, directly and indirectly, the ’391 patent, and continues to willfully, deliberately, and intentionally infringe, directly and indirectly, the ’391 patent.

159. On information and belief, Defendant had actual knowledge of the ’391 patent at least as of August 10, 2023.

160. On information and belief, Defendant had actual knowledge of, or was willfully blind to, its infringement of the ’391 patent as least as of August 10, 2023.

161. On information and belief, after acquiring knowledge of the ’391 Patent and its infringement thereof (or willful blindness thereof), Defendant directly and indirectly infringed the ’391 patent as set forth above.

162. As discussed above in paragraphs 44-53, Photon Wave has been aware of its infringement of the ’391 Patent, or has been willfully blind to such infringement, since at least August 10, 2023.

163. As discussed above in paragraphs 44-53, since August 10, 2023, Photon Wave has actively induced infringement of the ’391 Patent by others at least through its continued marketing, support, and sale of at least the PKD-H10-F35 and the LED chip included in the Osram 720-SUCULDP1VCMBMG57 with knowledge of its infringement of the ’391 Patent.

164. Nitek is entitled to injunctive relief and damages in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

165. On information and belief, Defendant will continue to infringe the ’391 patent unless and until it is enjoined by this Court. Defendant, by way of its infringing activities, has caused and will continue to cause Nitek to suffer damages in an amount to be determined, and has caused and is causing Nitek irreparable harm. Nitek has no adequate remedy at law against Defendant’s acts of infringement and, unless Defendant is enjoined from its infringement of the ’391 patent, Nitek will continue to suffer irreparable harm.

166. Nitek is entitled to recover from Defendant damages at least in an amount adequate to compensate for its infringement of the ’391 patent, which amount has yet to be determined, together with interest and costs fixed by the Court.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs respectfully requests that this Court enter judgment in its favor and against Defendant Photon Wave, as follows:

A. A judgment that Defendant has infringed and infringes the ’687, ’551, ’848, ’420 and ’391 patents;

B. A permanent injunction restraining and enjoining Defendant, its officers, partners, agents, servants, employees, parents, subsidiaries, divisions, affiliate corporations, joint ventures, other related business entities and all other persons acting in concert, participation, or in privity with it, and its successors and assigns, from infringing the ’687, ’551, ’848, ’420 and ’391 patents;

C. An award of damages to Plaintiff Nitek arising from Defendant's past and continuing infringement up until the date Defendant is finally and permanently enjoined from further infringement, including compensatory damages;

D. A determination that Defendant's infringement of the '687, '551, '848, '420 and '391 patents has been willful, and an award of treble damages to Plaintiff Nitek pursuant to 35 U.S.C. § 284;

E. A determination that this is an exceptional case and awarding Plaintiff Nitek's attorneys' fees pursuant to 35 U.S.C. § 285;

F. An order awarding Plaintiff Nitek costs and expenses in this action;

G. An order awarding Plaintiff Nitek pre- and post-judgment interest on its damages; and

H. Such other and further relief in law or in equity as this Court deems just and proper.

JURY DEMAND

Plaintiff Nitek respectfully requests a jury trial on all issues so triable.

Dated: September 15, 2023

Respectfully submitted,

/s/ Kevin S. Kudlac

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