



Plenary 3

- **Date / Time:** May 26 (Thu.), 2022 / 17:00–17:45
- **Place:** Convention Hall A
- **Session Chair:** Dong-Seon Lee (GIST, Korea)
- **Title:** Deep UV LED Development and Technology Trends



President & CEO. Myeong Seok Oh
(Photon Wave Co., Ltd., Korea)

• Biography

Education

- Ph.D., Materials Engineering, Stevens Institute of Technology (New Jersey, U.S.A) (1986.8–1990.6)
- M.S., Materials Engineering, Stevens Institute of Technology (New Jersey, U.S.A) (1984.8–1986.5)
- B.S., Metallurgical Engineering, Hanyang University (Seoul) (1979.3–1983.1)

Experience

- Photon Wave Co., Ltd, President & CEO (2020.6–Present)
- TES Co. Ltd., Senior Vice President (2014.5~ 2020.5)
- LG Innotek, Head of LED R&D center, Vice President (2009.11~ 2014.3)
- Seoul Optodevice (Seoul Viosys) Co. Ltd., President (2008.9~2009.8)
- QSI Co. Ltd., President & CEO (2001.4~2008.8)
- Samsung Electro-Mechanics, LD/LED Biz Division Leader, General Manager (1996.2~2001.4)
- Samsung Advanced Institute of Technology, Principal Researcher (1990.9~1996.1)

Abstract

Deep UV LEDs Development and Technology Trends

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AlGaIn based deep ultraviolet (DUV) LEDs in the wavelength ranging from 230nm to 320nm have been very attracted for many applications such as sterilization, phototherapy, horticulture, UV curing and so on. A recent study also showed that irradiation at 254 nm and 265 nm efficiently inactivated coronavirus 2 (SARS-CoV-2) double times higher than that at 280 nm.[1]

However, 255/265nm UVC LEDs still have several challenges such as output power, reliability, and manufacturability. EQEs of 265nm UVC LED have been reported to be about 2/3 of those for 275-285 nm.[2] Reliability is also known to deteriorate with shorter wavelength LEDs below 280nm UVC LEDs.[3] On the other hand, the similar challenges occur at UVB LED wavelength longer than 285nm because larger lattice mismatch between AlN template and lower AlGaIn layer generates a lot of threading dislocations.

We have successfully grown high quality AlN template on sapphire substrates and optimized the DUV LED structure to achieve its high performance. In this talk, recent results in epitaxial growth, device design, and reliability improvement for high current driven UVC and UVB LEDs will be presented.

References:

- [1] Hiroshi Shimoda, Junji Matsuda, Tatsuyuki Iwasaki, Daisuke Hayasaka, Journal of Photochemistry and Photobiology 7, 100050 (2021).
- [2] Amano H. Et al, J. Phys. D: Appl. Phys. 53 503001 (2020)
- [3] Kaneda M, Pernot C, Nagasawa Y, Hirano A, Ippommatsu M, Honda Y, Amano H and Akasaki I, Japan. J. Appl. Phys. 56 061002 (2017)