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# Fabrication and Characterization of 395 nm Ultraviolet GaN Light-Emitting Diodes

Min-Pang Lin, Chien-Ju Chen, Li-Wei Shan, and Meng-Chyi Wu\*

The Institute of Electronics Engineering, National Tsing Hua University, Hsinchu 30013, Taiwan

\* Electronic mail: [mcwu@ee.nthu.edu.tw](mailto:mcwu@ee.nthu.edu.tw)

**Abstract**—In this article; we demonstrated the fabrication and characterization of 395 nm GaN ultraviolet light-emitting diodes grown on patterned sapphire substrates. The current confining aperture is designed as 45, 55, 65, 75 and 85  $\mu\text{m}$ . The indium tin oxide (ITO) was used as a current spreading layer. Use the metals of nickel and gold to form ohmic contact with P-AlGaIn layer prior to dry etching. The 45- $\mu\text{m}$ -diameter LED exhibits a 3-dB modulation bandwidth of 134 MHz at 50 mA and a light output power density of 1.2 mW ( $78 \text{ W}/\text{cm}^2$ ) at 30 mA. In addition, the 3-dB frequency bandwidth is proportional to the square root of the injected current density.

*Index Terms*—indium tin oxide (ITO), UV LED, light output power density, 3-dB frequency

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