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High-performance InGaN/GaN-based Light-emitting Diodes Using Advanced Technical Approaches

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High-performance GaN-based light emitting diodes (LEDs) with high efficiency and excellent reliability have been of technological importance forapplications in full color display, automotive lighting, and solid state lighting. To realize high-performance and excellent-reliability LEDs, various technologies such as surface texturing, transparent conducting oxide, surface Plasmon, highly p-conduction layer, current blocking layer, photon-enhanced layer, and nanostructures have been extensively investigated. Among them, advanced core technologies based on how to suppress surface leakage and current crowding, how to enhance current injection efficiency and output power, and how to resist electrostatic damage will be displayed and discussed using our reported and preliminary results. New approaches like integrated LEDs will be also introduced and discussed.