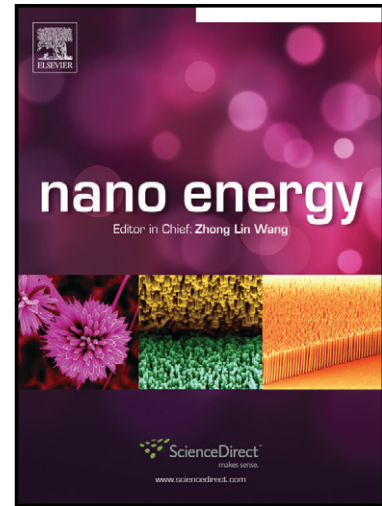


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Enhanced light extraction of light-emitting diodes *via* nano-honeycomb photonic crystals

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Abstract

We present an effective light extraction scheme for GaN-based multi-quantum-well (MQW) light emitting diodes with periodic SiO₂ nano-honeycomb arrays fabricated by natural lithography and reactive ion etching. The nano-honeycombs significantly boost light output by providing additional light extraction channels, not only guiding the internal modes into air but also alleviating the severe droop effect at high input power. At the driving current of 400 mA, light output power through the nano-honeycombs is 77.8% higher than that of the bare device. In addition, the output power is particularly enhanced at the diffraction angle around 65°, which is attributed to the intensive first order diffraction on the honeycombs. Simulations based on finite-difference time-domain method are also

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