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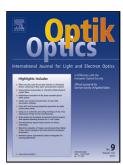
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Advantages of InGaN/InGaN quantum well light emitting diodes: better electron-hole overlap and

stable output

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Abstract

Shift of the emission spectrum and the efficiency loss with the operating current are the major

challenges in the conventional InGaN/GaN QW LEDs. Several approaches are being tried by different

research groups to overcome this hurdle, including, introduction of In in the barriers for which a rigorous

study seemed essential. In this paper, our comprehensive and systematic studies on InGaN/InGaN quantum

well light emitting diodes reveal that the overlap of electron and hole wave functions can be increased even

at low operating currents by the introduction of In in the barriers. The changes of output emission for different

In content in the barrier and various doping at different currents are reported, which show that the shift of the

energy can be minimized for suitable choice of parameters. The emission and the overlap of electron and

hole wave functions have a significant dependence on the doping in the barrier layers which may be used

advantageously. Computations have been performed through the self-consistent solutions of Schrödinger and

Poisson equations.

**Keywords**: InGaN; Quantum Well Light Emitting Diodes; Transition energy; Current density.

1 Introduction

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