Abstract

Electroluminescence from Eu-doped GaN MIS Structure

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Visible electroluminescence (EL) at room temperature has been achieved from a metal-insulator-semiconductor device (MIS) made on GaN thin film doped with Eu ions. The GaN film used for this investigation was grown by metal-organic chemical vapor deposition (MOCVD) on sapphire and implanted with Eu ions. MIS devices were fabricated on GaN films using silicon dioxide layer (9.5 nm) and indium-tin-oxide (100 nm) as transparent electrode deposited by electron beam evaporation. The EL spectra show dominant red emission line at 622 nm and weaker lines at 554 nm, 594 nm and 665 nm, corresponding to the transition between $^5D_{0,1}$ and $^7F_{1,2,3}$ states in Eu^{3+}. A systematic study of EL signal was conducted in 10–300 K temperature range with an applied bias voltage changing from 10–110 V, respectively. The strongest EL signal due to $^5D_0 \rightarrow ^7F_2$ transition was recorded at 300 K under forward bias.

¶Presenter