

Abstract Submitted  
for the MAS15 Meeting of  
The American Physical Society

**Detection and Modeling of Saturation Behavior of Eu Ion Emission in Eu-doped GaN under UV Excitation** NATALIE HERNANDEZ, Lehigh University, CIARA KERCKHOVE, Manchester University, VOLKMAR DIEROLF, Lehigh University — Europium doped Gallium Nitride (GaN:Eu) has been recognized as a candidate for the red-emitting active layer in nitride-based light emitting diodes. To better comprehend and improve the excitation energy transfer from the excited GaN host to the Eu ion, we performed an extensive study of GaN:Eu and GaN co-doped with Eu and silicon (GaN:Eu,Si) which were grown under varied growth and temperature conditions. In these experiments, we investigated the optical accessibility of Eu ions within the GaN host by using above band gap excitation in which the Eu centers were excited indirectly after the creation of charge carriers and/or electron-hole pairs. By employing confocal spectroscopy, we were able to measure the saturation behavior of the Eu emission. From this data, the percentage of the Eu population that was optically accessible and the excitation efficiency of the energy transfer between the host material and the Eu ions were determined. We determined that only a few percent of the total Eu ion concentration were emitting. Our results suggest that most of the Eu ions within the GaN do not participate in photoluminescence. Further studies were undertaken to compare these results to the emission from InGaN, the current material used in commercialized blue and green LEDs.

Natalie Hernandez  
Lehigh University

Date submitted: 28 Sep 2015

Electronic form version 1.4