

Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

The Role of Donor Acceptor Pairs (DAP) and Influence of Gallium Nitride Co-Doping on Excitation Efficiency NATALIE HERNANDEZ, BRANDON MITCHELL, Lehigh University, YASAFUMI FUJIWARA, Osaka University, DONGWHA LEE, Lawrence Livermore National Laboratory — Europium doped Gallium Nitride (GaN:Eu) has been identified as a candidate for the active layer in nitride-based light emitting diodes. In order to understand and improve the critical excitation energy transfer from the excited GaN host to the Eu ion, we performed an extensive study of a wide variety of GaN:Eu and GaN:Eu,Mg samples, which were grown under various growth and temperature conditions. In these studies, we focused on the different incorporation sites of the Eu ions and the role of intentionally doped and unintentional defects on the optical properties and excitation efficiencies. We found that Eu centers for which the ions is close to a donor acceptor pair exhibit the most efficient luminescence. We further discovered temperature and sample dependent structural changes of some defect complexes and studied their influence on the excitation efficiency.

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Date submitted: 26 Aug 2014

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