

Abstract Submitted  
for the OSS18 Meeting of  
The American Physical Society

**Temperature dependent luminescence characteristics of Ce: YAG nanophosphors and transparent ceramics and observation of novel phenomenon** SAHIL AGARWAL, Bowling Green State University — Cerium-doped YAG (Ce: YAG) has received considerable attention because of its intense emission at 525 nm and its important role in converting blue emission to white light in InGaN light-emitting diodes. In this work, the physical and luminescence properties of Ce: YAG NPs and their dependence on annealing temperature and atmosphere were investigated. Furthermore, photo-luminescence (PL) was measured as a function of temperature and compared with PL from Ce: YAG single crystals and transparent ceramics to understand the mechanism of luminescence decay with temperature. While the characteristics of PL emission as a function of temperature for single crystals and NPs are similar and follow common decay trends, Ce: YAG transparent ceramics exhibit an interesting unusual increase in PL with temperature. We explained this unique novel behavior by a 4-step mechanism involving localized states in the band gap, and provided evidence from thermo-luminescence measurements to support this interpretation. The work reveals a new luminescence phenomenon arising from the overlap of PL and TL emissions; this phenomenon is most likely characteristic of transparent ceramics.

Sahil Agarwal  
Bowling Green State Univ

Date submitted: 12 Mar 2018

Electronic form version 1.4