

Abstract Submitted
for the TSF10 Meeting of
The American Physical Society

Synthesis and Optical Properties of Nd^{3+} in Nanocrystalline $\text{Nd}^{3+}:\text{BaGd}_2\text{O}_4$ ¹ KENNETH RAMSEY, ROBERT DENNIS, JIANHUI YANG, MAOGEN ZHANG, DHIRAJ SARDAR — Rare earth (RE) based spinel structures (BaRE_2O_4), when doped judiciously with trivalent RE ions, are not susceptible to photobleaching, offer many sharp electronic transitions (from the visible to the NIR wavelengths) with excited state lifetimes on the order of milliseconds, and are promising for many applications ranging from high efficiency lighting, solar cells, and biomedical devices. BaRE_2O_4 has hitherto been synthesized on the nanoscale and many of the spectroscopic properties are unknown. Divalent barium, in particular, has been known to sensitize rare earth elements when incorporated into amorphous glasses. Here we report the synthesis and comparative optical properties of nanocrystalline $\text{Nd}^{3+}:\text{Gd}_2\text{O}_3$ and $\text{Nd}^{3+}:\text{BaGd}_2\text{O}_4$. Structural characterization was accomplished by scanning transmission electron microscopy, energy dispersive spectroscopy, and x-ray diffraction. The optical properties of Gd_2O_3 and BaGd_2O_4 were recorded and compared to other well known systems, such as $\text{Nd}^{3+}:\text{Y}_2\text{O}_3$.

¹This research was supported by the National Science Foundation PREM Grant No. DMR-0934218.

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Date submitted: 23 Sep 2010

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