Abstract Submitted
for the TSF10 Meeting of
The American Physical Society

Comparative study of Nd^{3+} in various nanocrystalline sesquioxide hosts (Nd^{3+}:RE_2O_3 where RE = Y, Gd, La, Yb, and Sc)[1] JESSE SALAS, University of Texas at San Antonio, ROBERT DENNIS, KELLY NASH, DHIRAJ SARDAR — Rare earth sesquioxides have obtained much attention for their unique optical properties. Their strong and sharp electronic transitions coupled with their long excited state lifetimes make them favorable candidates for biophotonic applications such as fluorescent biological markers. Neodymium was chosen as the fluorophore for its efficient fluorescence from 860-1200nm. This emission is ideal for deep tissue imaging and sensing as it lies within a wavelength region of minimal attenuation from biotissues. Here we report the synthesis of nanocrystalline Nd3+ doped oxides and consider their phase dependent optical properties. Room temperature absorption of Nd^{3+}:RE_2O_3 are reported and analyzed through the Judd-Ofelt (J-O) theoretical model to reconstruct the fluorescence linestrengths and branching ratios of the Nd^{3+} ($4f^3$) transitions $^4F_{3/2} \rightarrow {}^4I_J$ (J = 9/2, 11/2, 13/2, and 15/2) . Additionally, we report room temperature and 8K fluorescence, excited state lifetimes, and X-ray diffraction as a function of crystal phase.

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

Jesse Salas
University of Texas at San Antonio

Date submitted: 23 Sep 2010 Electronic form version 1.4