Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Development of Multifunctional Luminomagnetic Nanoparticles as Bioimaging Contrast Agents[1] LAWRENCE C. MIMUN, CHRIS RIGHTSELL, G.A. KUMAR, FRANCISCO PEDRAZA, SERGIO A. MONTELONGO, TEJA GUDA, University of Texas at San Antonio, VINAYAK P. DRAVID, Northwestern University, DHIRAJ K. SARDAR, University of Texas at San Antonio — Trivalent rare earth doped nanocrystalline materials with multiple functionalities have drawn special attention in biomedical industry. Current research is focused on the use of various materials with dual functionality for potential multifunctional applications. In this project, we are developing near infrared(NIR) based nanocrystals (NCs) as contrast agents with multimodal features comprising of strong NIR fluorescence, X-ray fluorescence and magnetic properties by utilizing the superparamagnetic features of Gd^{3+}, the high X-ray excitation cross section of Lu^{3+}, and the NIR fluorescence of Nd^{3+}. Halides, such as $MGdLuF_4$ (M=K,Na), were doped with NIR active rare earth ions, Nd^{3+}, where synthesis conditions have been optimized to obtain the brightest phosphor with a size of sub-50 nm. Characterization of the NCs were performed to explore the excitation and emission properties, crystal structure, morphology, magnetization properties, and X-ray fluorescence properties. The potential use of these NCs can be utilized as contrast agents for medical imaging application such as optical imaging, magnetic resonance (MRI) and X-ray imaging.

[1]This research was, in part, funded by NIGMS MBRS-RISE GM060655 and from the National Science Foundation Partnerships for Research and Education in Materials (NSF-PREM) grant N0-DMR-0934218

Lawrence C. Mimun
University of Texas at San Antonio

Date submitted: 13 Nov 2014 Electronic form version 1.4