

Abstract Submitted
for the TSF13 Meeting of
The American Physical Society

Novel Upconversion Nanoparticles for Biomedical Imaging Applications¹ BRIAN YUST, FRANCISCO PEDRAZA, DHIRAJ SARDAR, University of Texas at San Antonio — With the confluence of biology, chemistry, and physics now being a reality in many hot topics of research, nanoparticles are being translated into the realm of biomedicine as novel biomarkers, sensors, and therapeutic agents. In particular, rare-earth ions doped into fluoride, oxide, and oxysulfide nanocrystals exhibit extraordinary optical properties which are useful for biomedical applications including sharp absorption and emission lines in the visible and near-infrared (NIR) and long fluorescent lifetimes. Rare-earth based nanomaterials are advantageous as biomarkers because they do not photobleach like organic fluorophores, require lower power excitation sources, and do not blink such as quantum dots. Here, we present the optical characterization and upconversion quantum yield of KYb₂F₇:Er, Tm. The strong NIR to NIR upconversion emission is ideal for bio-imaging since light in the NIR regime is not strongly scattered or absorbed by most soft tissues. Finally, the nanoparticles are incubated with monkey retinal endothelial cells in order to determine toxicity, and nonspecific cell uptake is imaged using multiphoton microscopy.

¹This work was supported by the NSF PREM Grant No. DMR-0934218 and by a grant from the National Institute on Minority Health and Health Disparities (G12MD007591) from the National Institutes of Health.

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Date submitted: 13 Sep 2013

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