

Abstract Submitted
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Role of polymers and surfactants in synthesis of high quantum yield upconverting nanoparticles. KEVIN NEWCOMBE, BRIAN YUST, Univ of Texas Rio Grande Valley — Rare earth doped fluoride nanoparticles with a size of about 25 nm have been synthesized by either solvothermal or microwave assisted techniques. The role of differing biocompatible polymeric compounds to act as nucleation agents and surfactants, including polyethylene glycol, polyvinylpyrrolidone, and polyethylene oxide, in the final size, crystallinity, and optical properties is investigated in depth. These upconverting nanoparticles which can be excited in the near-infrared (NIR) are ideal for biomedical applications because of the low absorption of these excitation wavelengths by soft tissues in the body. Their fluorescence can be used for NIR imaging as well as non-invasive activation of drugs conjugated to the surface for cancer therapy. After optimizing the synthesis parameters, wide angle x-ray diffraction, FTIR, Raman, and Vis-NIR spectroscopy are used to characterize the samples. By varying the polymer added to the precursor solution, we can elucidate the primary mechanisms of interaction during the synthesis process and optimize for the best possible optical properties. Finally, the dependence of the fluorescence intensity on the biocompatible polymer type and concentration will also be investigated.

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