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Synthesis and Characterization of Down-converting $Ca_8(PO_4)_6$:Nd^{3+} Nanocrystals for Biomedical Imaging Applications NICOLAS BALLI, LAWRENCE MIMUM, FRANCISCO PEDRAZA, AJITH KUMAR, DIRAJ SARDAR, University of Texas at San Antonio — Currently, fluorescent probes (FPs), such as organic dyes and fluorescent proteins, are widely used for biomedical imaging, but exhibit undesirable characteristics such as small stokes shifts, large spectral overlaps, short fluorescence lifetimes, and photobleaching. In recent years rare earth doped nanoparticles (NPs) have shown promising results for use as FPs with properties that overcome the limitations of traditional fluorophores. Our current work utilizes the rare-earth ion, Nd3+, which exhibits NIR-NIR excitation and emission wavelengths that are within the low absorption and scattering region for biological tissues. Calcium phosphate was chosen as the host crystal because of its biocompatibility. The nanocrystals were then characterized by X-ray diffraction and TEM imaging. Spectroscopic studies were done to determine the emission and absorption intensity, quantum yield, and fluorescence lifetime. Analysis of the data was performed and the NPs were shown to possess superior properties when compared to those of traditional fluorophores.

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