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$NaGdF_4$:Nd^{3+}/Yb^{3+} Nanoparticles as Multimodal Imaging Agents FRANCISCO PEDRAZA, CHRIS RIGHTSELL, GA KUMAR, JASON GIULIANI, CAR MONTON, DHIRAJ SARDAR, Univ of Texas, San Antonio — Medical imaging is a fundamental tool used for the diagnosis of numerous ailments. Each imaging modality has unique advantages; however, they possess intrinsic limitations. Some of which include low spatial resolution, sensitivity, penetration depth, and radiation damage. To circumvent this problem, the combination of imaging modalities, or multimodal imaging, has been proposed, such as Near Infrared Fluorescence imaging (NIRF) and Magnetic Resonance Imaging (MRI). Combining individual advantages, specificity and selectivity of NIRF with the deep penetration and high spatial resolution of MRI, it is possible to circumvent their shortcomings for a more robust imaging technique. In addition, both imaging modalities are very safe and minimally invasive. Fluorescent nanoparticles, such as NaGdF4:Nd3+/Yb3+, are excellent candidates for NIRF/MRI multimodal imaging. The dopants, Nd and Yb, absorb and emit within the biological window; where near infrared light is less attenuated by soft tissue. This results in less tissue damage and deeper tissue penetration making it a viable candidate in biological imaging. In addition, the inclusion of Gd results in paramagnetic properties, allowing their use as contrast agents in multimodal imaging. The work presented will include crystallographic results, as well as full optical and magnetic characterization to determine the nanoparticle's viability in multimodal imaging.

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