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**MPO₄:Nd³⁺ (M=Ca, Gd), Luminomagnetic Nanophosphors with
Optical and Magnetic Features for Multimodal Imaging Applications¹**

CHRIS RIGHTSSELL, LAWRENCE C. MIMUN, AJITH G. KUMAR, DHIRAJ K. SARDAR, Univ of Texas, San Antonio — Nanomaterials with multiple functionalities play a very important role in several high technology applications. A major area of such applications is the biomedical industry, where contrast agents with multiple imaging modalities can provide better results than conventional materials. Many of the contrast agents available now have drawbacks such as toxicity, photobleaching, low contrast, size restrictions, and overall cost of the imaging system. Rare-earth doped inorganic nanophosphors are alternatives to circumvent several of these issues, together with the added advantage of super high resolution imaging due to the excellent near infrared sensitivity of the phosphors. In addition to optical imaging features, by adding a magnetic ion such as Gd³⁺ at suitable lattice positions, the phosphor can be made magnetic, yielding dual imaging functionalities. In this research, we are presenting the optical and magnetic imaging features of sub-nanometer size MPO₄:Nd³⁺ (M=Ca, Gd) phosphors for the potential application of these nanophosphors as multimodal contrast agents. Cytotoxicity, in vitro and in vivo imaging, penetration depth etc. are studied for various phosphor compositions, and optimized compositions are explored.

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