

Surface modified Eu:GdVO₄ nanocrystals for optical and MRI imaging

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Abstract

Nowadays, much attention is been paid in the biomedical field to the development of multifunctional nanoparticles suitable for both, optical and magnetic resonance (MRI) imaging applications^[1-5] because they combine the high sensitivity of optical imaging for *in vitro* applications with the excellent spatial resolution and depth for *in vivo* application associated to the MRI imaging.^[6-8] In this work, we have developed a simple method for the synthesis of uniform Eu-doped GdVO₄ nanocrystals (70 nm) with optimised luminescent properties and their functionalization with amino (two steps procedure) and carboxylate (one-pot procedure) groups provided by amino-dextran polymers (AMD) and polyacrylic acid (PAA), respectively.^[9] The luminescent and magnetic (relaxivity and phantom analyses) properties of the functionalized nanoparticles along with their negligible cytotoxicity and high colloidal stability in aqueous dispersion make them potential candidates for biotechnological applications as “in vitro” optical biolabels and negative contrast agent for magnetic resonance imaging (Figure 1).

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Figures

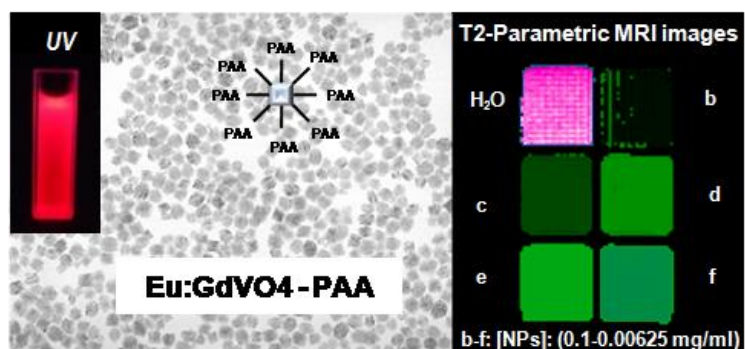


Figure 1. Morphology, luminescence and T2 parametric MRI phantom images of europium-doped GdVO₄ nanoparticles functionalized with PAA.