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Potassium gadolinium tungstate nanocrystals doped with Holmium ions as candidates for optical imaging

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Abstract

Holmium-doped monoclinic KGd(WO₄)₂ nanoparticles were synthesized by the mechanochemical method. The structure and morphology of KGW:Ho 10 at.% nanopowders were investigated with the use of X-ray Powder Diffraction, Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM). Emission and excitation spectra of KGW nanocrystals were also measured using a fluorometer with a xenon lamp and OPO laser source. The influence of nanoparticles of KGW doped with 10% at. of holmium on the viability of J774.1 mouse BALB/c monocyte macrophage cells was tested by the WST8 assay. Preliminary immunity cell studies demonstrated a high viability of KGW:Ho 10% at. Hence, these nanoparticles are promising for imaging applications. To characterize and quantify the physical stability of the nanoparticles of KGW:Ho 10 at.% suitable for biomedical applications, nanoparticles of KGW:Ho in the range of 80–200 nm were prepared.

Keywords: nanocrystals, biomedical, medical imaging, DICOM.

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