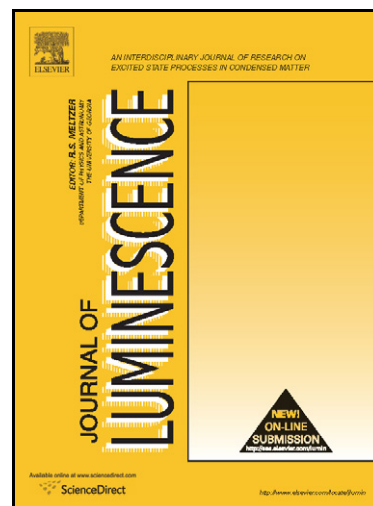


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ABSTRACT

Nanoparticles of Eu^{3+} activated $\text{K}_2\text{GdZr}(\text{PO}_4)_3$ has been successfully synthesized by controlled inclusive co precipitation method in high alkaline environment to enable complex crystalline phase formation. Much enhanced deep red luminescence, broadened emission bands with unusually prominent $^5\text{D}_0$ - $^7\text{F}_4$ transition at 699nm are defining characteristics of the nanoparticles compared to bulk counterpart synthesized by solid state reaction route. Among various excitation pathways such as charge transfer from O^{2-} - Eu^{3+} , Gd^{3+} - Eu^{3+} , the direct excitation of Eu^{3+} at 394nm is the most effective as revealed by photoluminescence and time resolved studies. Occurrence and variation of superparamagnetism in undoped and Eu^{3+} doped nanoparticles indicate the role of unpaired 4f electron spin of Gd^{3+} in making the nanoparticles superparamagnetic. A room temperature cost effective synthesis process of Eu^{3+} doped multimetallic complex phosphate supermagnetic nanophosphor can pave way for applications requiring such functionality.

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Keywords: *Fluorescent nanoparticles, Photoluminescence, Superparamagnetism*

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