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Novel $\text{MgTiO}_3\text{:Eu}^{3+}$ Nanophosphor Its Photometric Analysis for Multifunctional Applications

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Abstract

$\text{MgTiO}_3\text{:Eu}^{3+}$ (1-11 mol %) nanophosphors were synthesized by a facile solution combustion process. PXRD studies confirm single phase rhombohedral structure with the space group R-3. The average crystallite size determined by TEM and Scherrer's method was found to be in the range 20-50 nm. Effects of Eu^{3+} (1-11 mol %) cations on the luminescence properties of MgTiO_3 nanoparticles exhibit intense red emission upon 415 nm near ultra violet (NUV) excitation. The characteristic emission peaks recorded in the range 500-700 nm may be attributed to the 4f-4f intra shell transitions ($^5\text{D}_0 \rightarrow ^7\text{F}_{j=0,1,2,3}$) of Eu^{3+} cations. The CIE chromaticity co-ordinates were calculated from emission spectra and the values (x, y) were very close to NTSC standard values for red emission. Therefore, the present phosphor may be highly useful for solid state display applications and for wLEDs.

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Keywords: $\text{MgTiO}_3\text{:Eu}^{3+}$, phosphor, Photoluminescence, CIE n CCT.

1. Introduction

Phosphors in nano range were investigated significantly during the last decades due to their potential applications in solar energy converters, flat panel displays, optical amplifiers, electroluminescent devices, photodiodes,

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