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Photoluminescence studies of Eu^{3+} activated SrTiO_3 nanophosphor prepared by solution combustion approach

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ABSTRACT

Orange-red emitting europium doped (1-9 mol %) SrTiO_3 (ST) nanophosphor was synthesized by solution combustion method using urea as a fuel. The crystallinity and phase formation of the nanophosphor was studied by powder X-ray diffraction (PXRD). The Field- emission scanning electron microscopy (FE-SEM) images are evident for the porous and agglomeration nature for the product. The Fourier transform infrared spectroscopy (FT-IR) indicates the formation of the oxide bonds. The photoluminescence (PL) of $\text{SrTiO}_3:\text{Eu}^{3+}$ phosphor with different mol % of Eu^{3+} excited by 395 nm light was studied. The photoluminescence spectra exhibit characteristic luminescence from $^5\text{D}_0 \rightarrow ^7\text{F}_{1, 2, 3}$ intra-4f shell Eu^{3+} ion transitions. An intense orange red emission peak at 615 nm was observed due to electric dipole ($^5\text{D}_0 \rightarrow ^7\text{F}_2$) transition. The color purity of the phosphor was confirmed by CIE co-ordinates. The study demonstrates a simple and efficient method for the synthesis of novel nanophosphor with enhanced orange-red emission.

Keywords: nanophosphor; combustion method; photoluminescence; emission intensity; excitation intensity

1. Introduction.

From the past few decades the nanocrystalline phosphors have gained more attention due to their wide applications in optoelectronic devices [1]. The most of the phosphor consists of host

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