

Synthesis of Rare Earth Doped Nano-Phosphors through the Use of Isobutyl Nitrite and Urea Fuels: Study of Microstructure and Luminescence Properties

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Abstract : In this investigation, red emitting Eu^{3+} doped YVO_4 nano-phosphors have been synthesized via the facile combustion method using isobutyl nitrite and urea fuels, individually. Field-emission scanning electron microscope (FE-SEM) images, high resolution transmission electron microscope (TEM) images and X-ray diffraction (XRD) spectra reveal that the mentioned fuels can be used successfully to synthesis $\text{YVO}_4: \text{Eu}^{3+}$ nano-particles. Interestingly, the fuels have a large effect on the size and morphology of nano-phosphors as well as luminescence properties. Noteworthy the use of isobutyl nitrite provides an average particle size of 65 nm, while the employment of urea, results in the formation of larger particles and also provides higher photoluminescence emission intensity. The improved luminescence performance is attributed to the condition of chemical reaction via the combustion synthesis and the size of synthesized phosphors.

Keywords : phosphors, combustion, fuels, luminescence, nanostructure

Conference Title : ICLMLS 2018 : International Conference on Luminescent Materials and Luminescence Science

Conference Location : Venice, Italy

Conference Dates : August 13-14, 2018