

Eu³⁺ Ion as a Luminescent Probe in ZrO₂: Gd³⁺ Co-Doped Nanophosphor

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Abstract : Well-defined 2D Eu³⁺ co-doped ZrO₂: Gd³⁺ nanoparticles were successfully synthesized by microwave assisted solution combustion technique for luminescent applications. The present investigation reports the rapid and effective method for the synthesis of the Eu³⁺ co-doped ZrO₂:Gd³⁺ nanoparticles and study of the luminescence behavior of Eu³⁺ ion in ZrO₂:Gd³⁺ nanostructures. The optical properties of the prepared nanostructures were investigated by using UV-visible spectroscopy and photoluminescence spectra. The phase formation and the morphology of the nanoplatelets were studied by XRD, FESEM and HRTEM. The average grain size was found to be 45-50 nm. The presence of Gd³⁺ ion increases the crystallinity of the material and hence acts as a good nucleating agent. The ZrO₂:Gd³⁺ co-doped with Eu³⁺ nanoplatelets gives an emission at 607 nm, a strong red emission under the excitation wavelength of 255 nm.

Keywords : nanoparticles, XRD, TEM, photoluminescence

Conference Title : ICNN 2017 : International Conference on Nanomaterials and Nanodevices

Conference Location : Singapore, Singapore

Conference Dates : January 08-09, 2017