

## Eu<sup>3+</sup> Ion as a Luminescent Probe in ZrO<sub>2</sub>: Gd<sup>3+</sup> Co-Doped Nanophosphor

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**Abstract :** Well-defined 2D Eu<sup>3+</sup> co-doped ZrO<sub>2</sub>: Gd<sup>3+</sup> 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 Eu<sup>3+</sup> co-doped ZrO<sub>2</sub>:Gd<sup>3+</sup> nanoparticles and study of the luminescence behavior of Eu<sup>3+</sup> ion in ZrO<sub>2</sub>:Gd<sup>3+</sup> 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 Gd<sup>3+</sup> ion increases the crystallinity of the material and hence acts as a good nucleating agent. The ZrO<sub>2</sub>:Gd<sup>3+</sup> co-doped with Eu<sup>3+</sup> 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