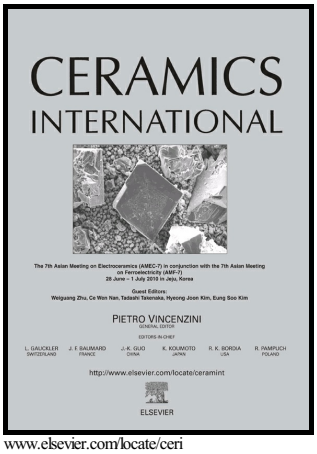

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Tuning violet to green emission in luminomagnetic Dy,Er co-doped ZnO nanoparticles

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ABSTRACT

This paper discusses the synthesis of undoped ZnO, 2mol% Dy doped ZnO, 2mol% Er doped ZnO and 1mol% Dy,Er co-doped ZnO nanoparticles by simple combustion technique and the characterization of their structural, morphological, magnetic and optical properties by X-ray diffraction (XRD), X-Ray Photoelectron Spectroscopy(XPS), Field Emission Scanning Electron Microscope (FESEM), High Resolution Transmission Electron Microscope (HRTEM), Diffuse Reflectance Spectroscope (DRS), Vibrating Sample Magnetometer (VSM) and Photoluminescence(PL). All samples are of hexagonal wurzite type structure which was found from XRD analysis. The effects of annealing on morphology and luminescence emission wavelengths were noticed in FESEM and PL, respectively. As-prepared sample displayed spherical morphology and annealed co-doped sample showed interwoven hexagonal stacking like morphology. VSM revealed the room temperature ferromagnetism in doped samples. The photoluminescence under the UV and IR excitations was observed in experiment. The as-prepared samples had violet region emission at the 325 nm excitation. The annealed samples had green region emission under the same excitation. Due to the annealing effect, the enhancement of upconversion luminescence intensity in co-doped sample in green (535nm) and red (665nm) regions was observed at the 980nm excitation.

Keywords: ZnO nanoparticles; Co-doping; Rare earth; Upconversion Luminescence.

1. Introduction