

Photoluminescence properties of Eu³⁺-doped low cost zinc silicate based glass ceramics

ABSTRACT

In this paper, Zn₂SiO₄:xEu³⁺ phosphors were synthesized with different concentrations of Eu³⁺ ions (x = 1, 3 and 5 wt.%) by using waste bottle glasses as silicate source. The structure, morphology, and luminescent properties of the phosphors were characterized using X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), and photoluminescence (PL) spectroscopy. The XRD analysis revealed that addition of dopant increased the crystallinity of the samples, and then were decreased dramatically when the dopant concentration further to 5 wt.%. The FESEM images showed the samples have irregular in shapes while their emission and excitation peak of Zn₂SiO₄:xEu³⁺ phosphor was observed at 600 and 400 nm, respectively.

Keyword: Eu³⁺-doped Zn₂SiO₄; Solid state method; XRD; Photoluminescence