

Effect of sintering temperature on structural and morphological properties of europium (III) oxide doped willemite

ABSTRACT

Willemite- (Zn_2SiO_4 -) based glass ceramics doped with various amounts of europium oxide (Eu_2O_3) were prepared by solid state melting and quenching method. Effect of sintering temperature (600–1000° C) on structural and morphological properties of the doped samples was investigated. Phase composition, phase evolution, functional groups, and microstructure analysis were, respectively, characterized using X-ray diffractometer (XRD), fourier transform infrared spectroscopy, field emission scanning electron microscopy (FE-SEM), and energy-dispersive X-ray. XRD analysis detected the presence of rhombohedral crystalline phase in the doped samples sintered at different temperatures. FE-SEM and bulk density results confirmed that doping of the willemite with Eu_2O_3 effectively enhanced densification. The microstructural analysis of the doped samples showed that the average grain size increased with the increase of sintering temperature.