

Influence of Zn-Nb on the magnetic properties of barium hexaferrite

ABSTRACT

In the present study, $\text{BaFe}_{12-2x}\text{Zn}_x\text{Nb}_x\text{O}_{19}$ ($x=0, 0.2, 0.4, 0.6$ and 0.8) hexaferrites were prepared by the sol-gel technique and subsequent thermal treatment. The crystal structure, grain size, and magnetic properties were studied by means of X-ray diffraction (XRD), high-resolution scanning electron microscope (HR-SEM) and vibrating sample magnetometer (VSM). The X-ray diffraction analysis showed that the barium hexaferrite with small substitutions still maintained a hexagonal magneto-plumbite phase. It was found that the mean size of the grains increased with increasing substitution. The saturation magnetization increased slightly with increasing x , which was attributed to different preferential site occupation of Zn-Nb at low and high concentration ranges. The coercivity decreased with increasing x . Structural and magnetic characterizations of these ferrites provide significant information about their reactive physical properties.

Keyword: Ceramics; Magnetic materials; Magnetic properties; Surface properties