

Abstract

Influence of Ho^{3+} substitution on the structural, magnetic and dielectric properties of various $\text{Mn}_{0.55}\text{Zn}_{0.45}\text{Ho}_x\text{Fe}_{2-x}\text{O}_4$ are thoroughly investigated. X-ray diffraction patterns indicated that the samples possess fairly single-phase cubic spinel structure for a small amount of Ho^{3+} substitution. The value of lattice parameter increases with increasing Ho^{3+} content. The bulk density decreases and porosity increases with increasing Ho^{3+} content. FESEM images showed that Ho^{3+} have a significant effect on the grain growth. The maximum real part of initial permeability of 338 is obtained for $x=0.03$ sample. Due to the addition of Ho^{3+} there is a decrease of saturation magnetization from 71 to 44 emu/g and increase of the coercivity from 21 to 70 Oe. It was observed that real part of the dielectric constant decrease with increasing of frequency on the basis of Wagner and Koop's theory. The mechanism of conduction can be explained by the small polaron hopping model.