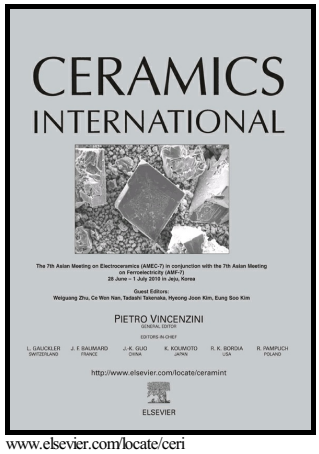

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Abstract

A series of co-precipitated $Zn_{1-x}Co_xGd_yFe_{2-y}O_4$ spinel ferrites (x=0.0-0.5, y=0.00-0.10) sintered at 1000^oC were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), vibrating sample magnetometery (VSM) and microwave cavity perturbation (MCP). XRD patterns and FTIR spectra reveal formation of the spinel phase along with few traces of $GdFeO_3$ second phase. The lattice constant decreases with an increasing amount of CoGd ions due to the segregation of Gd^{3+}on the grain boundaries and due to replacement of lager Zn^{2+} ions with smaller Co^{2+} ions. SEM shows grain size to decrease with the increase of CoGd contents due to grain growth inhibition by the second phase. VSM results show remanence and saturation magnetization to exhibit an increasing trend due to Co substitution on octahedral sites and presence of a second phase. The coercivity increases with the increase of CoGd contents due to anisotropic nature of Co. MCP shows the complex magnetic permeability to increase with CoGd concentration while the complex permittivity decreases.

Keywords:

Spinel ferrites, magnetization, permittivity, permeability

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