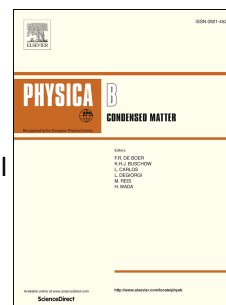


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Magnetic and dielectric properties of $\text{Mg}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$ ferrites prepared by the sol-gel method

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Abstract

$\text{Mg}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$ ferrites were prepared by the sol-gel method and sintered from 1100°C to 1300°C. The microstructures, magnetic and dielectric properties have been investigated. XRD patterns demonstrated that the samples have a single spinel phase with cubic symmetry. Mg^{2+} doping expands the lattice parameter slightly. The grain size increases with increasing sintering temperature but decreases with Mg^{2+} doping. The saturation magnetization value decreases from 64.26 emu/g to 26.05 emu/g with the increasing Mg^{2+} concentration from $x = 0.2$ to $x = 1.0$. And the coercivity of the samples also decreases from 0.32 kOe to 0.15 kOe. The dielectric results showed that the behavior of dispersion appeared at the low frequency, which can be attributed to the space charge polarization. And the dielectric constant increases with the increasing grain size. All the results indicated that the Mg^{2+} doping has a significant influence on the properties of CoFe_2O_4 .

Keywords: $\text{Mg}_x\text{Co}_{1-x}\text{Fe}_2\text{O}_4$; Sol-gel method; Ferrites; Magnetic properties; Dielectric properties

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