

Article Abstract

Title:	Structure, ac conductivity and complex impedance study of Co_3O_4 and Fe_3O_4 mixed spinel ferrites
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Abstract:	We have synthesized the composition of $\text{Fe}_{3(1-x)}\text{Co}_{3x}\text{O}_4$ ($x = 0.1, 0.3$ and 0.5) spinel ferrite using the techniques of mechanical alloying, high temperature annealing of milled samples and conventional solid state sintering. We present here comparative results of the crystal structure formation and dielectric properties of the materials studied at room temperature. The crystalline structure of the single phased samples is cubic spinel phase with space group $\text{Fd}3\text{m}$. The alloying of two spinel oxides (i.e., Fe_3O_4 and Fe_3O_4) is also complemented from FTIR spectrum. Impedance spectroscopy suggested only one semi circle in the Cole-Cole plot of mechanical milled samples, which indicated the dominant grain boundary contribution in the conduction mechanism. In addition to the grain boundary contribution, the electrical conduction from grains is also substantial in the single phased compositions of the present material. The present results could be interesting in tailoring the electrical conductivity in magnetic nanocomposite.
Keywords:	Mechanical alloying, Co doped magnetite, Grain and Grain boundary conduction, Magnetic composite.