

Abstract Submitted
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Effect of Molybdenum Doping on the Magnetism Properties of Cobalt Ferrite¹ SRINIVASA RAO SINGAMANENI, LUIS MARTINEZ, The Department of Physics, University of Texas at El Paso, El Paso, Texas 79968, USA, C. V. RAMANA, The Department of Mechanical Engineering, University of Texas at El Paso, El Paso, Texas 79968, USA — This work investigates the effect of molybdenum (Mo) doping on the magnetic properties of cobalt ferrite (CoFe_2O_4 , referred to CFO) polycrystalline material. Mo incorporated CFO ($\text{CoFe}_{2-x}\text{Mo}_x\text{O}_4$, referred to CFMO) ceramics were prepared by solid-state reaction by varying the Mo concentration ($x = 0.0-0.3$). X-ray diffraction studies indicate that the CFMO materials crystallize in inverse spinel cubic phase. Mo doping increases the lattice parameter from 8.322 to 8.343 Å. We noticed ferromagnetic-like behavior from all the samples studied, in which, the Curie temperature is found to be close to 300 K. Furthermore, we find almost 2-fold decrease in coercive field (H_c) from 2143 Oe to 1145 Oe with the increase in Mo doping up to 30%, and is consistently observed at all the temperatures measured (4, 100, 200 and 300 K). In addition, the saturation magnetization estimated at 4 K and at 1.5 T goes through a peak at 92 emu/g (at 15% Mo doping) from 81 emu/g (pristine CFO), and starts decreasing to 79 emu/g (at 30% Mo doping). Our experimental findings led us to believe that the magnetic properties observed here could be due to the complex interplay of double-exchange and super exchange interactions between $\text{Fe}^{3+}/\text{Fe}^{2+}$ via Mo^{6+} .

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