Magnetoresistance, conductivity and magnetic properties of Sr and Co modified polycrystalline $BiFeO_3$

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Abstract

Sr^{2+} and Co^{3+} co-doping in an antiferromagnetic insulator $BiFeO_3$ (BFO), results the occurrence of room temperature conductivity and magnetoresistance and enhances the magnetic properties. Here we reported for a very first time the occurrence of magnetoresistance (MR%) up to 35% in polycrystalline BFO system with dopants of Sr and Co at room temperature. Bi^{3+} in A site of BFO substituted by Sr^{2+} results in the presentation of holes carrier and further changes its conductivity. The enhancement in MR% is observed with the increasing magnetic field and temperature. XPS results reveal that cobalt modification in Sr-doped BFO controls the formation of oxygen vacancies. Co substitution in Sr doped BFO also significantly enhances the magnetism, i.e. the values of saturation and remnant magnetization are 5 emu/g and 1.1 emu/g, respectively.

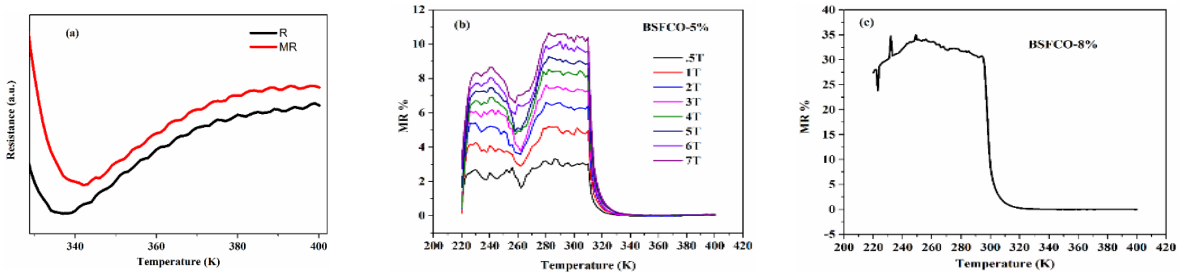

Figure (a) The room temperature metallic conductivity, (b) the magnetic field dependent MR% for 5% Cobalt doping in 15% Sr doped BFO and (c) MR% for 8% Cobalt doping in 15% Sr doped BFO at 7T.

References:

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