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Crystal Structure, Magnetic and Dielectric properties of (1-x) BiFe_{0.80}Ti_{0.20}O₃ – (x)Co_{0.5}Ni_{0.5}Fe₂O₄ Multiferroic Composites

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Abstract

 $(1-x)BiFe_{0.80}Ti_{0.20}O_3-(x)Co_{0.5}Ni_{0.5}Fe_2O_4$ multiferroic composites (x = 0.0, 0.3, 0.5, 0.7 and 1.0) was synthesized by the tartaric acid modified sol-gel method. The Rietveld refinements of all XRD patterns have been carried out to obtain the phase percentages of perovskite BiFe_{0.80}Ti_{0.20}O_3 and spinel Co_{0.5}Ni_{0.5}Fe₂O₄. A change in the lattice parameters of the BFTO and CNFO phase in the composites have been observed, which could be due to strain at the interface of BFTO and CNFO. A change in the peak positions in the Raman spectra of BFTO and CNFO in the composite has been observed and it is well correlated with the XRD results. A significant increase in the magnetization has been observed due to incorporation of Co_{0.5}Ni_{0.5}Fe₂O₄ phase in the composite. Vegard's law was used to calculate the theoretical value of magnetization for all the composites and compared with the experimental value. Excess value of magnetization observed in the experimental data of composites as compared to the theoretically calculated value and, explained on the basis of interfacial strain effect. An enhancement in the dielectric properties has been observed in Download English Version:

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