Blucher Physics Proceedings
Janeiro de 2015, Número 3, Volume 1

INFLUENCE OF BARIUM DOPING ON MICROSTRAIN AND DIELECTRIC PROPERTIES OF THE LA2NIMNO6 DOUBLE PEROVSKITE

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Multiferroic are interesting materials that show coupling between at least two ferroic orders, usually magnetism and polarizability. La_2NiMnO_6 is one of the most studied ceramic bulk materials among multiferroics because presents magnetodielectric effect and is ferromagnet semiconductor near room temperature, but its intrinsic dielectric properties are scarcely investigated. In this investigation we doped La_2NiMnO_6 with different barium concentrations to observe the effects of structural strain variation in the intrinsic dielectric properties of La_2NiMnO_6. Ceramic samples were synthesized by standard solid state reaction and structural and vibrational characterization were performed by XRD and Infrared Spectroscopy. Rietveld Method and GSAS code were employed to refine the structure. Gervais and Piriou semi-quantum model was used to analyze the vibrational data. The results show that even the smallest degree of barium doping changes the phases ratio and decrease the strain in the lattice what favors high quality factors in the ceramic bulk. Large quality factors are usually related to high degrees of ordering in double perovskites which in La_2NiMnO_6 case means predominance of Ni^{2+} -O-Mn^{4+} superexchange bonds rather than Ni^{3+} -O-Mn^{3+} which is very desirable whereas superexchange bonds provides strong magnetism.