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Structural, Dielectric and Electrical Characteristics of BiFeO₃-NaNbO₃ Solid Solutions

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Abstract:

The paper mainly reports the effect of NaNbO₃ (as a doping material) on the structural (crystal data and microstructure), dielectric (permittivity, dissipation of energy) and electrical (impedance, modulus, and conductivity) characteristics of BiFeO₃ forming a solid solution of Bi_{0.8}Na_{0.2}Fe_{0.8}Nb_{0.2}O₃. By analysis of the room temperature X-ray diffraction data, the formation of pure-phase material and its crystal data were obtained. The comprehensive studies of dielectric parameters (relative dielectric constant (ϵ_r), and tangent loss ($\tan \delta$)) were measured in a wide range of temperature (25-450°C) and frequency (1 kHz-1MHz). The surface morphology, obtained with a gold-coated pellet sample, exhibits the high density of the sample. The frequency-temperature dependence of conductivity follows the Johnson's power Universal law. The electrical behavior of the compound has been studied using complex impedance and

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