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## Structural, optical and electrical properties of multiferroic $BiFe_{1-x}Ni_xO_3$ ceramic

## Abstract

**BiFe1−xNixO3 (x = 0.7, 0.8 and 0.9) polycrystalline ceramics are synthesized by a solid-state reaction, and their structural, absorption, leakage current and electrical properties are investigated. The X-ray diffraction easurements show that the lattice parameter values increase with increasing the substitution of Ni2+ ions for Fe3+ ions. The optical absorption spectra indicate that the band gap energy increases with increasing Ni2+ ions. Leakage currents are much decreased by about three orders of magnitude with increasing Ni ions. The J-E hysteresis was also investigated. Both real and imaginary dielectric constants are investigated as a function of both frequency and temperature. The room temperature dielectric measurement with a wide frequency range of 1 KHz–1MHz reveals that the real and imaginary dielectric constants are decreased with increasing frequency of BiFe1−xNixO3 (x = 0.7, 0.8, 0.9) ceramics. The real and imaginary dielectric constants are found to be increased with temperature. The temperature dependence of ε′ and ε″ exhibits an anomaly which shifted to lower temperature with**

**increasingNi2+. The anomaly indicates the possible existence of spin-glass states with Ni2+ ion substitution in places of Fe3+ ions.**