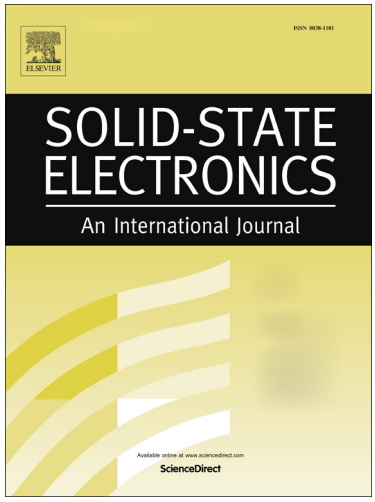

Electrically Heterogeneous High Dielectric $BaTi_{0.4}(Fe_{0.5}Nb_{0.5})_{0.6}O_3$ Ceramic

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Electrically Heterogeneous High Dielectric $BaTi_{0.4}(Fe_{0.5}Nb_{0.5})_{0.6}O_3$ Ceramic

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Abstract

The effect of sintering temperatures on the lattice parameters, microstructure and electrical properties of $BaTi_{0.4}(Fe_{0.5}Nb_{0.5})_{0.6}O_3$ perovskite ceramics were investigated. Impedance spectroscopy analysis confirms that this material is electrically heterogeneous which plays a major role for the high dielectric constant. The sintering temperatures have a sensitive influence on the values of the dielectric constant. High dielectric constant (12708) with low dielectric loss (0.23) was achieved at room temperature for 1250 °C sintered ceramic. Activation energy was found to be 0.25 eV and 0.31 eV corresponding to grain and grain boundary, respectively which confirms that the grain boundaries are more insulating than grains. We observed the high magnetocapacitance (5.8 %) at 9 kOe for 1250 °C sintered sample which is useful for the practical application. This study will help to modify the $BaFe_{0.5}Nb_{0.5}O_3$ based materials and lead to more applications in the microelectronics devices.

Keywords: Sintering; Schottky barrier; Electrical properties; Magnetocapacitance

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