

Ferroelectric versus Relaxor Behaviour in $\text{Na}_{0.5}\text{Bi}_{4.5}\text{Ti}_4\text{O}_{15}$ – $\text{BaBi}_4\text{Ti}_4\text{O}_{15}$ Solid Solutions

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Abstract

Sodium-bismuth titanate $\text{Na}_{0.5}\text{Bi}_{4.5}\text{Ti}_4\text{O}_{15}$ (NBT) and barium bismuth titanate $\text{BaBi}_4\text{Ti}_4\text{O}_{15}$ (BBT) and their solid solutions were prepared by solid state reaction of the constituent oxides. The room temperature structural characteristics were determined by X-ray diffraction and the dielectric properties investigated in a wide range of temperatures (20-750°C) and frequencies (1kHz-1MHz). As the barium content increases, the unit cell change from orthorhombic to pseudo-tetragonal, the paraelectric to ferroelectric phase transition decreases from 655°C to 400-420°C and a relaxor-like behaviour is observed for high barium contents. Depending on the composition, dielectric data were fitted using both classical (low Ba) and modified Curie-Weiss law for relaxors (high Ba).