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Role of Sodium Deficiency on the Relaxor Properties of $Bi_{1/2}Na_{1/2}TiO_3$-$BaTiO_3$

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Abstract

The influence of *A*-site deficiency on the relaxor properties in the lead-free (1-*x*)($Bi_{1/2}Na_{1/2}$)TiO_3-*x*$BaTiO_3$ solid solution system was studied by intentionally reducing Na content in reference to the stoichiometric compositions. We observed that for all compositions, the higher the level of Na deficiency was, the lower the transition temperature from a ferroelectric to relaxor state became. The compositions with intermediate $BaTiO_3$ contents (*x* = 0.06, 0.09, 0.13, and 0.40) showed sprout-shaped strains and pinched polarization curves at room temperature, indicating a crossover from a non-ergodic