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Anelastic and optical properties of $\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$ and $(\text{Bi}_{0.5}\text{Na}_{0.5})_{0.94}\text{Ba}_{0.06}\text{TiO}_3$ lead-free ceramic systems doped with donor Sm^{3+}

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Abstract

The effect of Sm^{3+} substitution in $(\text{Bi}_{0.5}\text{Na}_{0.5})_{(1-x)}\text{Sm}_x\text{TiO}_3$ (BNT-100 x Sm) and $[(\text{Bi}_{0.5}\text{Na}_{0.5})_{0.94}\text{Ba}_{0.06}]_{(1-x)}\text{Sm}_x\text{TiO}_3$ (BNT6-100 x Sm) has been studied by conventional X-ray diffraction (XRD), mechanical spectroscopy and photoluminescence (PL) measures. Ceramic samples of BNT-100 x Sm ($x=0$ and 0.02) and BNT6-100 x Sm ($x=0, 0.01, 0.02$ and 0.04) were prepared via the conventional mixed-oxide method. X-ray diffraction patterns obtained for all the sintered samples at room temperature (RT) confirm the formation of perovskite structure without spurious phases. The BNT-0Sm and BNT-2Sm compositions have the same rhombohedral (R3c) crystalline structure at RT. The BNT6-0Sm composition is confirmed to be at the morphotropic phase boundary of the BNT-BT system, and when samarium is added, a clear evolution towards the tetragonal phase was observed, with correspond-

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