

Influence of LiSbO_3 on Microstructure and Electrical Properties of $\text{Bi}_{0.5}(\text{Na}_{0.80}\text{K}_{0.20})_{0.5}\text{TiO}_3$ Ceramics

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This research studied the effect of LiSbO_3 on microstructure and electrical properties of lead-free $\text{Bi}_{0.5}(\text{Na}_{0.80}\text{K}_{0.20})_{0.5}\text{TiO}_3$ ceramics with the composition belonging to $\text{Bi}_{0.5}(\text{Na}_{0.80}\text{K}_{0.20})_{0.5}\text{TiO}_3\text{-LiSbO}_3$ or $(1-x)\text{BNKT-xLS}$ (when $x = 0, 0.005, 0.010, 0.015, 0.020$ mol fraction). The BNKT-LS ceramics were prepared by a conventional mixed oxide method and sintered at 1100°C for 2h. X-ray diffraction pattern of all compositions exhibited a single perovskite structure without impurity phase. Scanning electron microscopy (SEM) was used to determine the microstructure of ceramics. Pure BNKT ceramic promoted a formation of cubic-like shape grains with an average grain size of 0.25 ± 0.05 μm . With increasing LS concentration, average grain size value gradually increased and showed the maximum value of 0.34 ± 0.10 μm at $x = 0.02$. The addition of LS into BNKT ceramic did not obviously change grain morphology, however, it caused fracture surface to switch from mixed inter-transgranular fracture for pure BNKT to mainly transgranular fracture for LS-added samples. A large room temperature dielectric constant of 1367 and dielectric loss of 0.0435 were observed for BNKT-0.015LS sample.

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