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Abstract

The effects of cobalt addition on the properties of $Na_{0.25}K_{0.25}Bi_{2.5}Nb_2O_9$ (NKBN)–based ceramics have been investigated in details. It was found that the ceramics possess a pure phase of bismuth oxide layer–type structure. The Curie temperature T_c gradually increases from 653 °C to 662 °C with increasing the Co modification. The electrical properties of NKBN–based ceramics are improved significantly by the addition of Co. The piezoelectric constant d_{33}, dielectric loss tan δ, mechanical quality factor Q_m and remanent polarization P_r for the NKBN ceramics with 0.20 wt% Co_2O_3 modification were found to be 23 pC/N, 0.35%, 3028, 12.03 μC/cm^2, respectively. Thermal annealing studies indicated that the cobalt–modified NKBN ceramics system possesses stable piezoelectric properties, demonstrating that the cobalt–modified NKBN–based ceramics are the promising candidates for high–temperature applications.

Keywords: Bismuth layer-structured; piezoelectric ceramics; microstructure; $Na_{0.25}K_{0.25}Bi_{2.5}Nb_2O_9$