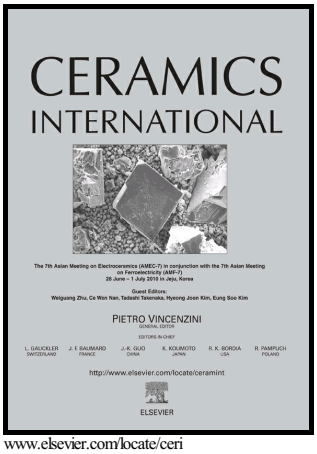

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Exploration on the origin of enhanced piezoelectric properties in transition-metal ion doped KNN based lead-free ceramics

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A B S T R A C T

In this work, we studied effects of Ni_2O_3 and Co_2O_3 doping on crystal structures, microstructures, orthorhombic and tetragonal phase transition temperature ($T_{o\text{-}t}$), and electrical properties of $[Li_{0.06}(Na_{0.57}K_{0.43})_{0.94}][Ta_{0.05}(Sb_{0.06}Nb_{0.94})_{0.95}]O_3$ (LNKTSN) lead-free ceramics. The experimental results showed that the Ni_2O_3 addition with appropriate amount could shift the $T_{o\text{-}t}$ downwards to the room temperature, and thus obviously increasing the room-temperature piezoelectric coefficient (d_{33}), dielectric coefficient (ε_r) and electromechanical coupling coefficient (k_p) of the LNKTSN ceramics. These were consistent with previous experimental results obtained in Fe_2O_3

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