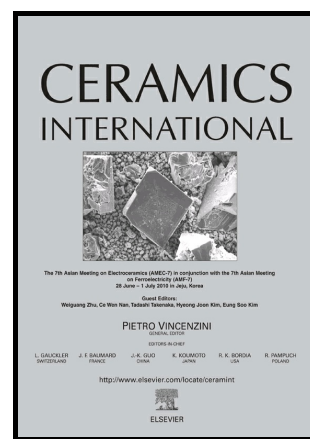


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Exploration on the origin of enhanced piezoelectric properties in transition-metal ion doped KNN based lead-free ceramics

Fang Xu ^{a, b, #}, Jian Chen ^{a, #}, Yinmei Lu ^a, Qingfeng Zhang ^{a,*}, Qi Zhang ^c, Taosheng Zhou ^a, Yunbin He ^{a,*}

^a Hubei Collaborative Innovation Center for Advanced Organic Chemical Materials, Hubei Key Lab of Ferro & Piezoelectric Materials and Devices, Ministry of Education Key Laboratory of Green Preparation and Application for Functional Materials, School of Materials Science & Engineering, Hubei University, Wuhan 430062, China

^b JiangXi University of Technology, Nanchang 330098, China

^c Department of Manufacturing and Materials, Cranfield University, Cranfield, Bedfordshire, MK43 0AL, UK

ABSTRACT

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 ($T_{\text{o-t}}$), and electrical properties of $[\text{Li}_{0.06}(\text{Na}_{0.57}\text{K}_{0.43})_{0.94}][\text{Ta}_{0.05}(\text{Sb}_{0.06}\text{Nb}_{0.94})_{0.95}]\text{O}_3$ (LNKTSN) lead-free ceramics. The experimental results showed that the Ni_2O_3 addition with appropriate amount could shift the $T_{\text{o-t}}$ 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

[#] These authors contributed equally to the work.

* Corresponding authors.

E-mail addresses: ybhe@hubu.edu.cn (Y. He), zhangqingfeng@hubu.edu.cn (Q. Zhang)

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