

Nd doped (K_{0.44}Na_{0.52}Li_{0.04})(Nb_{0.86}Ta_{0.1}Sb_{0.04})O₃ Multifunctional Ceramics

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Nd-doped (K_{0.44}Na_{0.52}Li_{0.04})(Nb_{0.86}Ta_{0.1}Sb_{0.04})O₃ ceramics were prepared by normal sintering. The structure, piezoelectric, ferroelectric and photoluminescence properties of the samples were investigated. All the samples exhibited typical perovskite structure and no secondary phase could be detected, suggesting that Nd³⁺ had completely diffused into the perovskite lattice. Abnormal grain growth occurred when small amount of Nd₂O₃ was added but the average grain size decreased at high amount of Nd₂O₃. Excellent ferroelectricity was realized in the proposed compositions. All the Nd-doped ceramics exhibited photoluminescence effects. The doping concentration played an important role in the photoluminescence response. The characteristics of the ceramics transferred to more relaxor-like with increasing Nd content. Accordingly, the temperature stability and fatigue resistance of the Nd-doped ceramics were significantly improved. The work provides an alternative routine to develop new multifunctional materials.

This work was supported by the National Natural Science Foundation of China (No. 51302124) and the Research Foundation of Liaocheng University (No. 318011306).