Humidity Resistance and Recovery of Sintered Sodium Potassium Niobate-Based Piezoelectrics (2023)

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Abstract

This study delves into the crucial impact of humidity on the microstructure, phase composition, dielectric, ferroelectric, and piezoelectric properties of sintered 0.06LiNbO3–0.94(K0.5Na0.5)NbO3 lead-free piezoelectric ceramics during storage. By subjecting the samples to different humidity environments over six months, this research uncovers that storage conditions with 20% relative humidity or less maintain the samples unaltered. Moreover, the study reveals that exposure to higher humidity drastically decreases dielectric and piezoelectric performance in as little as two days due to adsorption of water. However, this research also demonstrates that even after six months in extremely humid conditions, the original performance can be restored with a simple and effective recovery procedure, indicating that the intrinsic performance after the adsorbed water is removed is mainly intact. This work therefore provides valuable insights into the shelf-life and possible resistance of piezoelectric ceramics to harsh environments.

Access the full study here:
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