Optimizing the processing conditions of sodium potassium niobate thin films prepared by sol-gel spin coating technique

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Abstract

In the present study, potassium sodium niobate (KNN) thin films were synthesized by means of sol-gel spin coating method. Along with the synthesis, the effects of annealing temperature and various number of coating layers on both the structural and electrical properties were looked into. The results of the study revealed that the annealing temperature had a great impact on the properties of KNN. In addition, the XRD diffractograms and texture coefficient of the synthesized films confirmed that a highly oriented orthorhombic perovskite structure was obtained at 650 degrees C, whereas at a relatively higher temperature (700 degrees C), a spurious phase of K4Nb6O17 was evolved. In addition, the growth of KNN at 650 degrees C exhibited a reasonable resistivity value for piezoelectric applications. Looking into the results, it was discovered that the KNN thin films also found to be dependent on a number of coating layers. Field emission scanning electron microscopy (FESEM) showed that KNN with five coating layers was highly crystalline, cracks-free, and had significantly more homogenous surface morphology and the size of grains being uniform, the resistivity of KNN thin films improved with the increasing number of coating layers i.e., up to five.

Keywords

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