

Sintering, electrical and photoluminescence properties of KNN:Sm³⁺ nano-rods

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With aim of development new ferroelectrics materials for photovoltaics applications, has been study potassium sodium niobate ($K_{0.5}Na_{0.5}NbO_3$, KNN) system as 2-2 type nanostructure composites. These open new possibilities to fabricate 1-3 type nanostructures. We have fabricated KNN:Sm³⁺ (Samarium doped) nano-rods in SrTiO₃ (STO) substrate and LaNiO₃ (LNO) buffer by pulsed laser deposition (PLD). The main activity in this work described herein are a synthesis and characterization, in nano-rods form. Crystal structure, electrical and photoluminescence properties were investigated and the relationship with bulk system was established. The target for PLD deposition was prepared using conventional sintering for KNN lead free ferroelectric. LNO buffer was using for conductive layer and platinum contact was deposited by sputtering. The compressive strain mismatch limits growth of the thin films, observing that elastic relaxation energy increases with film thickness, leave to a coherent 3D island, subsequent growth of nano-rods. Electrical measures showed leakage current and Schottky barriers with metallic contact. Therefore minimize this effect could be explored in the future. The photoluminescence emission on which the effect of the crystal field strength was considered to be tailed by the host composition and highest emission intensity was observed in nano-rods compared with bulk ceramic.