

(Na,K,Li)(Nb,Sb)O₃ 세라믹스의 압전특성과 미세조직의 변화

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Microstructure and Piezoelectric Properties in the (Na,K,Li)(Nb,Sb)O₃ system

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Abstract : Lead oxide-based ferroelectrics are the most widely used materials for piezoelectric actuators, sensors and transducers due to their excellent piezoelectric properties. Considering lead toxicity, there is great interest in developing lead-free piezoelectric materials, which are biocompatible and environmentally friendlier. Recently alkali oxide materials, including sodium - potassium niobate (NKN), have been given attention in view of their ultrasonic application and also as promising candidates for piezoelectric lead-free system. However, it is difficult to sinter such NKN-based materials via conventional sintering process. In this reason, many researchers have investigated hot press, hot isostatic press or spark-plasma sintering of NKN-based ceramics. In this study, as candidates for lead-free piezoelectric materials, dense (Na,K,Li)(Nb,Sb)O₃ systems were developed by conventional sintering process. The microstructures and piezoelectric properties of the (Na,K,Li)(Nb,Sb)O₃ systems were investigated as a function of variable compositions. The excellent piezoelectric and electromechanical properties indicate that this system is potentially good candidate as lead-free material for a wide range of electro-mechanical transducer applications.

Key Words : piezoelectric, ceramics, lead-free, sodium-potassium niobate