



Investigation on the $(0.94-x)$ $\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$ - 0.06BaTiO_3 - $x\text{K}_{0.5}\text{Na}_{0.5}\text{NbO}_3$ Lead-free Films.

by Mr. Kang Guangqing

Date: 13th August 2009 (Thursday)
Time: 12:00pm to 12:30pm
Venue: EA-02-11 (Executive Seminar Room)

Abstract

Piezoelectric materials are widely used commercially due to the transformation of the size when electric field applied. However, most of the traditional piezoelectric materials with good properties contain lead, which is toxic to the environment and human being. Thus, Lead-free dielectric and piezoelectric materials has received much attention due to nontoxic properties. The promising system $(0.94-x)$ $\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$ - 0.06BaTiO_3 - $x\text{K}_{0.5}\text{Na}_{0.5}\text{NbO}_3$ (BNT-BT-KNN) discussed and reported here does not include lead yet has a giant electric strain which provides a good solution for the lead free actuators. In this project, BNT-BT-KNN film was deposited via a sol-gel method. The flow chart of fabrication will be presented and discussed. From the X-ray diffraction and SEM image, we determined that the optimized annealing temperature is 760°. The maximum strain and the piezoelectric coefficient D_{33} of the BNT-BT-KNN thick film can reach to 0.25% and 120 pm/V, respectively, when $x=0.06$, which is closed to the corresponding ceramics reported. Good dielectric and ferroelectric properties was derived and not very sensitive to various x .

Mr. Kang Guangqing Speaker

Mr. Kang Guangqing received his Bachelor Degree from Shandong University, China in 2008. Now he is a PhD candidate under the guidance of Professor John Wang in Department of Materials Science & Engineering, NUS.

Dr Xue Jun Min Host

All are Welcome!