Contribution ID : **27** Type : **not specified**

Nanoscale Ferroelectric domain structure of bismuth ferrite BiFeO3 under different strains

The effect of induced epitaxial strain on ferroelectric properties of thin films has received increased research interest in recent years. Researching studies have shown that the polarization[1], piezoelectricity[2], domain structure[3], and phase stability[2] of these materials in thin films can be modified by strain because of the inherent coupling between the elastic and ferroelectric phenomena [4].
Ferroelectric domain structure under mechanical tensile stress in bismuth ferrite (BFO) was observed using piezo response force microscopy (PFM) under different strain conditions. For this purpose a newly designed bending stage has been developed for tensile and compressive bending stress application. We have found that the ferroelectric domain structure changes under tensile stress and domain walls are displaced along the uniaxial strain direction. The change of domain structure is clearly seen in PFM with and without applied stress. Furthermore, in-plane polarization-electric field (P-E) hysteresis loops are recorded under different strains. We found that the positive coercive voltages are slightly changed in contrast with the negative coercive voltages under moderate tensile strain of the BFO film.

1. Choi, K.J., et al., Enhancement of ferroelectricity in strained BaTiO3 thin films. science, 2004. 306(5698): p. 1005-1009.
2. Zeches, R., et al., A strain-driven morphotropic phase boundary in BiFeO3. science, 2009. 326(5955): p. 977-980.
3. Chen, Z., et al., Low symmetry monoclinic MC phase in epitaxial BiFeO3 thin films on LaSrAlO4 substrates. 2010.
4. Chen, Z., et al., Study of strain effect on in-plane polarization in epitaxial BiFeO 3 thin films using planar electrodes. Physical Review B, 2012. 86(23): p. 235125.

Primary author(s) : Mr ALSUBAIE, Abdullah (student)

Co-author(s) : Prof. SEIDEL, Jan (UNSW); Dr SHARMA, Pankaj (UNSW)

Presenter(s) : Mr ALSUBAIE, Abdullah (student)