

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Monoclinic phase transition in stress-induced BiFeO₃ epitaxial films YEN-CHIN HUANG, Department of Physics, National Cheng Kung University, Y.C. CHEN, C. CHENG, K.I. LIN, J.S. HWANG, W.I. LIANG, H.J. CHEN, Y.H. CHU — Material system near morphotropic phase boundary usually attracted a lot of attention due to their unique physical properties. The key issue of the mechanism is to reveal the coupling between the multiple phases or the intermediate states during phase transformation. Recently, highly-strained multiferroic BiFeO₃ (BFO) films had been reported to possess a particular isosymmetric boundary between tetragonal(T) and rhombohedral(R) phases. In this study, we investigated the as-grown state of mixed-phase BFO and the evolution of phases under external stimulus. Through first principle study and Raman measurement, we found the mixed phase BFO films at room temperature included two monoclinic phases, MA(Cm) and MC (Pm). When the temperature was increased to about 420 K, MC phase transformed to a R-like phase. The MA and the R-like phase coexisted until 620 K; after that, the R-like phase disappeared while the MA lasted to higher temperatures. This result showed the possible path of transition near the morphotropic phase boundary.

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Date submitted: 23 Dec 2010

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