

Abstract Submitted
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Strained BiFeO₃ Films: Rhombohedral-Orthorhombic and Rhombohedral-Tetragonal Phase Transitions. Part II: Film Growth by Molecular-Beam Epitaxy CAROLINA ADAMO, Cornell University, R. MISRA, A. MELVILLE, C. HEIKES, Q. HE, Y. CHU, J. LEE, R. HAISLMAIER, S. DENEV, V. GOPALAN, R. RAMESH, P. SCHIFFER, D. SCHLOM — Recently, Zeches et al.[1] reported the strain-temperature phase stability diagram of (001) BiFeO₃ thin films. Depending on the strain and temperature the stable polymorph of BiFeO₃ is predicted to be (monoclinically distorted) rhombohedral, tetragonal, or orthorhombic. To test these predictions commensurate BiFeO₃ thin films were grown by adsorption-controlled reactive molecular-beam epitaxy on (110) YAlO₃, (110) NdGaO₃, (100) LSAT, (001) SrTiO₃, (110) DyScO₃, (110) TbScO₃, (110) GdScO₃, (110) SmScO₃, (110) NdScO₃, and (110) PrScO₃ single crystalline substrates. The films span a biaxial strain range from -6.7% to +1.4%. Four-circle x-ray diffraction was used to determine the in-plane and out-of-plane lattice parameters. The rocking curve full widths at half maximum in omega of the films were nominally identical to the substrates on which they are grown and ranged from 11 arc sec (0.003 degrees) on (110) PrScO₃ to 49 arc sec (0.014degrees) on (110) YAlO₃. Magnetic data and second harmonic generation results will be presented. [1] R. J. Zeches, M. D. Rossell, J. X. Zhang, A. J. Hatt, Q. He, C.-H. Yang, A. Kumar, C. H. Wang, A. Melville, C. Adamo, G. Sheng, Y.-H. Chu, J. F. Ihlefeld, R. Erni, C. Ederer, V. Gopalan, L. Q. Chen, D. G. Schlom, N. A. Spaldin, L. W. Martin, and R. Ramesh, Science 326, 977 (2009).

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