Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Pinning of Ferroelectric Domain Walls in Nanostructured $CoFe_2O_4$-$BiFeO_3$ Composite KEREN FREEDY, RYAN COMES, University of Virginia, Department of Materials Science and Engineering, Charlottesville, VA, KERRY SIEBEIN, National Institute of Standards and Technology, Center for Nanoscale Science and Technology, Gaithersburg, MD, JIWEI LU, University of Virginia, Department of Materials Science and Engineering, Charlottesville, VA, STUART WOLF, University of Virginia, Department of Materials Science and Engineering, Department of Physics, Charlottesville, VA — Ferroelectric domain walls in $BiFeO_3$(BFO) thin films have attracted interest due to the observation of enhanced electronic transport at the domain walls in an otherwise insulating material. To understand the properties of domain walls in nanostructured thin films having matrix-pillar morphology, thin films of $CoFe_2O_4$ (CFO)-BFO were grown epitaxially by pulsed electron deposition on $SrTiO_3$ (STO) substrates. Piezoresponse force microscopy (PFM) measurements indicate that the vertically-oriented CFO nanopillars act as pinning sites for the in-plane domain walls. The pinning effect is most likely due to misfit dislocations at the matrix/pillar interface which have been identified in transmission electron microscopy images. The ability to produce ordered nanocomposites by directed self-assembly offers potential for more extensive investigation of domain wall behavior.

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Date submitted: 12 Nov 2014 Electronic form version 1.4