Abstract Submitted
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Self-Assembled Multiferroic Nanocomposites for Use in Magnetic Logic Architecture[1] RYAN COMES, MIKHAIL KHOKHLOV, HONGXUE LIU, JIWEI LU, STUART WOLF, University of Virginia, Dept. of Materials Science and Engineering — $CoFe_2O_4$ (CFO) offers unique properties as a magnetoelectric material due to its large magnetoelastic response when strained. Previous work has shown that when CFO is co-deposited with $BiFeO_3$ (BFO) nanostructured phase segregation occurs, with CFO pillars forming in a BFO matrix. The CFO-BFO nanocomposite system has been proposed as a possible multiferroic logic or memory scheme.[1] We will discuss the patterning and growth of CFO-BFO composites using e-beam lithography and pulsed electron deposition.[2] Our results have demonstrated the ability to pattern the composites into square arrays of pillars with spacing as small as 100 nm. The magnetic properties of the patterned films have been characterized using magnetic force microscopy and are in good agreement with previous results from our group for unpatterned composites.[3] Cross-sectional TEM analysis of the films was used to quantify the strain in the CFO pillars and evaluate the elastic anisotropy. Piezoresponse force microscopy analysis and lithographic domain patterning of the BFO matrix is also presented. [1] S.A. Wolf, et al. Proc. IEEE 98 (2010). [2] R. Comes, et al. Nano Lett. 12 (2012). [3] R. Comes, et al. J. App. Phys. 111 (2012).

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