

Abstract Submitted  
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**Self-assembled Oniontype Multiferroic Nanostructures** SHEN-  
QIANG REN, ROBERT M. BRIBER, MANFRED WUTTIG, Dept. of Mater.  
Sci. & Engi. University of Maryland, College Park — Spontaneously self-assembled  
oniontype multiferroic nanostructures based on block copolymers as templating ma-  
terials are reported. Diblock copolymer containing two different magnetoelectric  
precursors separately segregated to the two microdomains have been shown to form  
well-ordered templated lamellar structures. Onion-type multilamellar ordered mul-  
tiferroic (PZT/CoFe<sub>2</sub>O<sub>4</sub>) nanostructures have been induced by room temperature  
solvent annealing in a magnetic field oriented perpendicular to the plane of the film.  
The evolution of the onion-like microstructure has been characterized by AFM,  
MFM, and TEM. The structure retains lamellar periodicity observed at zero field.  
The onion structure is superparamagnetic above and antiferromagnetic below the  
blocking temperature. This templating process opens a route for nanometer-scale  
patterning of magnetic toroids by means of self-assembly on length scales that are  
difficult to obtain by standard lithography techniques.

Shenqiang Ren  
Dept. of Mater. Sci. & Engi. University of Maryland, College Park

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