Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Macroscopic Addressable Arrays of Block Copolymer Microdomains[1] SOOJIN PARK, DONG HYUN LEE, BOKYUNG KIM, SUNG WOO HONG, JI XU, Dept. of Polymer Science and Engineering, University of Massachusetts Amherst, UNYONG JEONG, Dept. of Metallurgical Engineering, Yonsei University, TING XU, Dept. of Materials Science and Engineering, University of California, Berkeley, THOMAS P. RUSSELL, Dept. of Polymer Science and Engineering, University of Massachusetts Amherst — Generating addressable, macroscopic arrays of nanoscopic elements with perfect lateral order has the potential to revolutionize the microelectronic and storage industries. A novel approach is shown using faceted surfaces of commercially available sapphire wafers to guide the self-assembly of block copolymer (BCP) microdomains into arrays with single crystal textures over the entire wafer surface. Perfectly ordered arrays of BCP microdomains, with areal densities in excess of 10 Terabit/inch^2, have been produced. The sawtoothed substrate topography provides registered, directional guidance of the BCP self-assembly that is tolerant of surface defects, maintaining the lateral registry and ordering of the microdomains over the entire surface. The approach provides unprecedented areal densities, and opens simple, yet versatile routes to ultrahigh density, addressable systems.

[1]This work was supported by the U.S. Department of Energy (DOE), the NSF supported MRSEC and NSEC at the University of Massachusetts Amherst. Use of the Advanced Light Source, Berkeley National Laboratory, supported by the U.S. Department of Energy, Office

Soojin Park
Dept. of Polymer Science and Engineering,
University of Massachusetts Amherst

Date submitted: 14 Nov 2008 Electronic form version 1.4