Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Ordered Hexagonal Arrays of Holes with 40 nm Period by Shear Alignment of Diblock Copolymer Bilayers JOSE VEDRINE, DOUGLAS ADAMSON, RICHARD REGISTER, Princeton University, THOMAS PICKTHORN, Oxford University, PAUL CHAIKIN, New York University — An ordered hexagonal array of holes was fabricated by shear-aligning a molten bilayer film of a sphere-forming diblock copolymer in a nitrogen atmosphere. The block copolymer consisted of a polystyrene (PS) matrix and polyisoprene (PI) spheres, and was spin-coated onto a Si substrate prior to shearing. The top layer of microdomains in the bilayer was removed via a nonselective fluorine-based reactive ion etch (RIE). The PI spheres in the remaining bottom layer were then degraded with ozone to produce a PS mask with an ordered array of voids. The voids were transferred into the Si substrate by RIE, producing a dense array of holes approximately 20 nm wide and spaced 40 nm apart. This bilayer shearing procedure allows for the production of hole arrays with excellent long-range orientational order and few grain boundaries, which are unachievable by shearing a single-layer film. In addition, Au was evaporated onto the array, yielding a film of Au with regular perforations having a 40 nm period.

Jose Vedrine
Princeton University

Date submitted: 03 Dec 2005 Electronic form version 1.4