

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Flexible Confinement of Block Copolymer Films Between Tunable Surface Energy Elastomeric Films and Xerogel Substrates MANISH KULKARNI, GURPREET SINGH, Department of Polymer Engineering, University of Akron, Ohio 44325, SUSHIL SATIJA, NIST Center for Neutron Research, Gaithersburg, MD 20899, ALAMGIR KARIM¹, Department of Polymer Engineering, University of Akron, Ohio 44325 — Orientation control of block copolymer (BCP) films is important for advanced technological applications such as nanoscale lithography. Here we present a different strategy whereby both interfaces of the poly(styrene)-block-poly(methylmethacrylate) BCP films are tunably controlled. The BCP films were coated on a roughness and surface energy tunable xerogel substrates and the top surface of the polymer film was conformally covered by crosslinked PDMS elastomer. The surface energies of xerogel substrate and crosslinked PDMS is tunable from 28 and 18 mJ/m² to 45 and 55 mJ/m² resp. via UV-Ozone treatment. The confined BCP film was then thermally annealed to induce ordering. Such a unique approach allowed the BCP films to respond in its orientation of cylinders and lamellae from parallel to perpendicular. The morphology of these micro-phase separated BCP films was studied by tapping mode atomic force microscopy and neutron reflectivity.

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Date submitted: 18 Nov 2010

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