

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Rapid Self- Assembly and Perpendicular Alignment in lamellar PS-b-PEO System for Fabrication of Sub 20 nm Nanolithography Templates PARVANEH MOKARIAN-TABARI, University College Cork and Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Dublin, Ireland, TIMOTHY W. COLLINS, University College Cork and Tyn-dall National Institute, RAMSANKAR SENTHAMARA KANNAN, JUSTIN D. HOLMES, MICHAEL A. MORRIS, University College Cork and Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Dublin, Ireland — Creating perpendicular alignment in lamellar block copolymer systems has considerable industrial and commercial significance. In general, these lamellar systems require careful interface engineering to obtain vertical orientation of the blocks. To avoid the strong preferential adsorption of one block to either the substrate or the polymer/air interface, the surface must be ‘neutralised’ by chemical brushes or external forces e.g. solvent fields. Reported here is a step-wise thermo/solvent annealing process called “combinatorial annealing” allowing the formation of perpendicular domains of polystyrene-b-polyethylene oxide (PS-b-PEO) lamellar structures while avoiding brush or other surface modification. The Thermo/solvent annealing is done in a commercial microwave reactor and perpendicular alignment is observed within a few minutes. This BCP has a very small minimum feature size, relevant to the fabrication of nano-features in electronic devices and results are presented here.

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Date submitted: 20 Nov 2011

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