

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Tunable Cosolvent Annealing Affects on Block Copolymer Morphology** KEVIN GOTRIK, JEONG GON SON, ADAM HANNON, ALFREDO ALEXANDER-KATZ, CAROLINE ROSS, Massachusetts Institute of Technology — Being able to precisely and reproducibly control block copolymer (BCP) morphology is of interest for lithographic applications due to the techniques ability to result in feature sizes ranging from 10-100nm. We explore the morphological phase behavior that thin films (30-40nm) of poly(styrene-b-dimethylsiloxane) (PS-PDMS, 45kg/mol,  $\sim 0.26$  segmental Flory-Huggins interaction parameter) exhibit under different cosolvent vapors of toluene and heptane. Variation in the solvent conditions results in selective swelling of the different blocks of the copolymer depending on relative Hildebrand solubility parameters (e.g. PS- 18.5, toluene-18.3 (MPa)<sup>1/2</sup>) resulting in cylinders, spheres, lamella, and perforated lamella self-assembled features which can be revealed by selectively etching the PS with an oxygen plasma (50W CF4). Here we describe precision solvent vapor control while doing in situ spectral reflectometry (230-1500nm) to track swelling of the BCP films as a function of time to gain insight into this BCP system.

Kevin Gotrik  
Massachusetts Institute of Technology

Date submitted: 22 Dec 2010

Electronic form version 1.4