Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Neutral Parameter Window for Perpendicularly Oriented Block Copolymer Resists Deposited on Organosilicate Substrates with Tunable Surface Energy HYOSEON SUH, KOOKHEON CHAR, Seoul National University, HUIMAN KANG, PAUL F. NEALEY, University of Wisconsin — Balancing the interfacial interactions of a block copolymer (BCP) with a substrate as well as the free surface can induce the perpendicular orientation of microdomains, allowing the BCP films to serve as templates for nanofabrication. However, it is known that such orientation of microdomains is quite sensitive to the film thickness. In this presentation, we investigated the effect of film thickness on the orientation of microdomains in lamellae-forming P(S-*b*-MMA) thin films placed on thermally cured organosilicate (OS) substrates. For the film thickness of a P(S-*b*-MMA) ranging from 1 L_0 up to 2.5 L_0, we varied the surface energy of the OS substrate around the value close to the enthalpically neutral condition by controlling the substrate cure temperature. We will demonstrate the origin of the observed thickness effect by taking into account the increase in surface area at the free surface when P(S-*b*-MMA) films make holes or islands depending on the incommensurable conditions of the BCP film. This analysis allows us to define a more accurate neutral window for the P(S-*b*-MMA) in terms of both substrate surface energy and BCP film thickness.

Hyoseon Suh
Seoul National University

Date submitted: 20 Nov 2008 Electronic form version 1.4