Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effect of Well-defined Roughness on the Microdomain Orientation of Block Copolymer Thin Films KOOKHEON CHAR, YOUNGWOO CHOO, HYO SEON SUH, TAEHEE KIM, Seoul National University — It is well known that the perpendicular orientation of block copolymer (BCP) films is preferred over the parallel orientation when the BCP films are placed on rough surfaces due to the unfavorable elastic deformation of BCP chains in the parallel oriented microdomains. More recently, the approach to utilize the rough substrate for BCP domains in long range order has been reported. However, the quantitative analysis to explore the effect of each individual roughness factors, such as lateral or vertical displacement, on the microdomain orientation of BCP films has not been thoroughly studied yet. In order to examine the roughness effect systematically, we prepared substrates with well-defined roughness utilizing either nanoparticle monolayers or line patterns generated by e-beam lithographic technique. Based on the detailed observation of the orientational change of BCP films on the well-defined surface roughness, we analyzed the dependence of BCP domain orientation on each roughness parameter. Furthermore, we found that the BCP film thickness, coated on the substrate, is another important parameter determining the orientation of microphase-separated domains of BCP thin films in addition to the surface roughness.

Kookheon Char
Seoul National University

Date submitted: 17 Nov 2010 Electronic form version 1.4