Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Two-dimensional phase separated structures of block copolymers on solids[1] MANI SEN, NAISHENG JIANG, MAYA ENDOH, TADANORI KOGA, Stony Brook University, ALEXANDER RIBBE, UMass, Amherst — The fundamental, yet unsolved question in block copolymer (BCP) thin films is the self-organization process of BCPs at the solid-polymer melt interface. We here focus on the self-organization processes of cylinder-forming polystyrene-block-poly (4-vinylpyridine) diblock copolymer and lamellar-forming poly (styrene-block-butadiene-block-styrene) triblock copolymer on Si substrates as model systems. In order to reveal the buried interfacial structures, the following experimental protocols were utilized: the BCP monolayer films were annealed under vacuum at T>T_g of the blocks (to equilibrate the melts); vitrification of the annealed BCP films via rapid quench to room temperature; subsequent intensive solvent leaching (to remove unadsorbed chains) with chloroform, a non-selective good solvent for the blocks. The strongly bound BCP layers were then characterized by using atomic force microscopy, scanning electron microscopy, grazing incidence small angle X-ray scattering, and X-ray reflectivity. The results showed that both blocks lie flat on the substrate, forming the two-dimensional, randomly phase-separated structure irrespective of their microdomain structures and interfacial energetics.

[1]Acknowledgement of financial support from NSF Grant (CMMI -1332499)

Mani Sen
Stony Brook University

Date submitted: 10 Nov 2016 Electronic form version 1.4