Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

New insight into adsorption of polymer melts onto impenetrable surfaces[1] TAD KOGA, PETER GIN, NAISHENG JIANG, CHEN LIANG, ZEXI HAN, Stony Brook University, BULENT AKGUN, SUSHIL SATIJA, NIST, MAYA ENDOH, Stony Brook University — We report the novel structures of irreversibly adsorbed polystyrene (PS) layers composed of six different molecular weights ranging from 30k to 2,000k. Spin cast PS films (originally $\sim$ 100 nm in thickness) prepared onto hydrogen-passivated silicon substrates were annealed at 170 $^\circ$C for about 50h under vacuum and subsequently rinsed with toluene (a good solvent for PS) thoroughly. X-ray reflectivity results show that the adsorbed layers are well described by a two-layer model: the one is a higher density layer relative to the bulk adjacent to the substrate and the other is a nearly bulk density layer on top of the bottom layer. On the other hand, a single-layer model with the higher density layer is valid for the adsorbed layers composed of low molecular weights PS. We will reveal the origin of the difference, shedding light on a new pathway for the formation of the equilibrium adsorbed polymer layers at the impenetrable interfaces.

[1]We acknowledge the financial support from NSF Grant No. CMMI-084626.

Tad Koga
Stony Brook University

Date submitted: 10 Nov 2011 Electronic form version 1.4