Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Structure of Irreversibly Adsorbed Star Polymers BULENT AKGUN, Bogazici University, MERYEM SEYMA AYKAN, SEDA CANAVAR, Department of Chemistry, Bogazici University, Bebek 34342, Istanbul, Turkey, SUSHIL K. SATIJA, Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, Maryland 20899, USA, DAVID UHRIG, KUNLUN HONG, Center for Nanophase Materials Sciences, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA — Formation of irreversibly adsorbed polymer chains on solid substrates have a huge impact on the wetting, glass transition, aging and polymer chain mobility in thin films. In recent years there has been many reports on the formation, kinetics and dynamics of these layers formed by linear homopolymers. Recent studies showed that by varying the number of polymer arms and arm molecular weight one can tune the glass transition temperature of thin polymer films. Using polymer architecture as a tool, the behavior of thin films can be tuned between the behavior of linear chains and soft colloids. We have studied the effect of polymer chain architecture on the structure of dead layer using X-ray reflectivity (XR) and atomic force microscopy. Layer thicknesses and densities of flattened and loosely adsorbed chains has been measured for linear, 4-arm, and 8-arm star polymers with identical total molecular weight as a function of substrate surface energy, annealing temperature and annealing time. Star polymers have been synthesized using anionic polymerization. XR measurements showed that 8-arm star PS molecules form the densest and the thickest dead layers among these three molecules.

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Date submitted: 11 Nov 2016 Electronic form version 1.4