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Surface Dynamics of Partially Tethered Polymer Films JIN KUK

LEE, Dept. of Polymer Science, The University of Akron, Akron, OH 44325, BULENT AKGUN, NIST Center for Neutron Research, NIST, Gaithersburg, MD 20899, ZHANG JIANG, SURESH NARAYANAN, X-ray Science Division, Argonne National Laboratory, Argonne, IL 60439, SUSHIL SATIJA, NIST Center for Neutron Research, NIST, Gaithersburg, MD 20899, MARK D. FOSTER, Dept. of Polymer Science, The University of Akron, Akron, OH 44325 — The surface dynamics of “partially tethered” thin films have been studied using X-ray photon correlation spectroscopy (XPCS). Polystyrene (PS) chains have been grafted to substrates with low grafting densities, untethered deuterated PS (dPS) chains spun cast on the tethered chains and the films annealed to create layers containing both tethered and untethered chains. The extent of mixing between the tethered PS and untethered dPS chains has been measured by neutron reflectivity. The relaxation of surface height fluctuations for these films depends on the density of grafting, molecular weight of tethered chains, and extent to which tethered chains extend into the layer. When the tethered chains are able to stretch to the top surface, the relaxation time is slowed most remarkably.

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