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Transition from Non-interacting to Interacting Regime of Tethered Polymer Chains RYAN VAN HORN, JOSEPH X. ZHENG, MINGSIAO HSIAO, BERNARD LOTZ, EDWIN L. THOMAS, JUTTA LUETTMERSTRATHMANN, STEPHEN Z.D. CHENG, University of Akron — Tethered polymer chains have become an important area of research over the last few decades. Their unique properties make them appealing for various applications. The tethering density of the chains determines the state of the chains as well as the resulting properties, as shown by various theoretical and experimental work. Our group uses single crystals of crystalline-amorphous diblock copolymers to study tethered polymer chains. This system provides better control of tethering density and molecular weight as compared to previous methods. Previous work on PS-b-PEO and PS-b-PLLA shows, for the first time, the reduced tethering density value of the interacting regime transition regardless of molecular weight or solvent quality. Other factors that were not addressed include adsorption and chain stiffness effects. The work presented here will look at the role of chain adsorption using miscible polymers, namely PMMA-b-PLLA, and chain stiffness with PEO-b-PCL where PEO is the amorphous block. In addition to experimental results, Monte Carlo simulations were used to estimate the chain conformation of adsorbed PMMA.

Ryan Van Horn
University of Akron

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