

Abstract Submitted
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Conformations of Amphiphilic Comb Copolymer Chains Confined to Two Dimensions Through Self-Organization at the Polymer/Water Interface WILLIAM KUHLMAN, ELSA A. OLIVETTI, LINDA G. GRIFFITH, ANNE M. MAYES, Massachusetts Institute of Technology — Amphiphilic comb copolymers composed of a hydrophobic poly(methyl methacrylate) (PMMA) backbone and short, hydrophilic PEO side chains (PMMA-*g*-PEO) are known to self-organize at the polymer/water interface, resulting in the effective confinement of the backbone to two dimensions for chains at the surface of a PMMA-*g*-PEO film. Conformations of polymers thus confined were studied through selective nanoparticle labeling of PEO side chains of polymer molecules at the film surface. Transmission electron microscopy was used trace the backbone trajectory of nanoparticle labeled chains. The distribution of observed chain lengths is found in good agreement with the distribution determined by gel permeation chromatography. The 2D radius of gyration (R_g) calculated from the observed conformations was found to scale with number of backbone segments (N) as $R_g \sim N^{0.69 \pm 0.02}$. This value agrees with Monte Carlo simulations for a system of similar polydispersity, which yield a scaling exponent between that for 2D isolated chains and monodisperse polymer melts ($R_g \sim N^{0.64 \pm 0.03}$).

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