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Ordering in Mixed Polymer Brushes[1] AMALIE L. FRISCHKNECHT, CHESTER K. SIMOCKO, DALE L. HUBER, Sandia National Laboratories — Mixed polymer brushes, consisting of two different homopolymers grafted to a substrate, microphase separate into phases reminiscent of those of diblock copolymer thin films. However, mixed polymer brushes typically display less long range order than diblock copolymers. One reason for the lack of long-range order is variations in the grafting densities of the two polymers, which result in quenched disorder in the system. Here we use self-consistent field theory (SCFT) to explore whether mixed brushes consisting of AB and AC diblock copolymers grafted to the surface can order better than homopolymer mixed brushes. In particular, we consider the case when A is a random copolymer of B and C, and thus has equivalent interaction strengths with both B and C blocks. Large cell SCFT calculations are performed for systems with Gaussian-correlated grafting density distributions. The theory predicts that mixed diblock brushes with a random copolymer block grafted to the surface are more ordered than the equivalent mixed homopolymer brush. The dependence of these results on polymer volume fractions and interaction parameters, as well as preliminary comparison with experiments, will be discussed.

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