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Thermodynamics and Dynamics of Diblock Copolymers at Polymer/Polymer Interfaces BENEDICT J. REYNOLDS, MEGAN L. RUEGG, NITASH P. BALSARA, C. J. RADKE, Department of Chemical Engineering, UC Berkeley — The efficacy of diblock copolymers for stabilizing interfaces between immiscible polymers depends on both thermodynamic and dynamic factors. We have exploited the slow dynamics of polymer chains to prepare two surfactant-bearing polymeric interfaces that are initially out of equilibrium. The distance between the interfaces was varied from 50 to 600 nm, and the transport of the surfactant molecules from one interface to another was measured by dynamic secondary-ion mass spectroscopy. This transport depends on the traditional diffusion coefficients and the depth of the thermodynamic potential wells that trap the surfactant molecules at the interfaces. The diffusion coefficients of our system were measured in independent experiments and the well depths were obtained from SCFT using a Flory-Huggins interaction parameter and statistical segment lengths measured by small-angle neutron scattering from homogeneous binary blends. This enables a comparison of our experimental interfacial transport measurement and theoretical predictions with no adjustable parameters.

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