## Abstract Submitted for the MAR06 Meeting of The American Physical Society

Diffusion and Equilibration in Surfactant-Bearing Interfaces NITASH BALSARA, BENEDICT REYNOLDS, MEGAN RUEGG, CLAYTON RADKE, University of California, Berkeley — The efficacy of surfactants for stabilizing interfaces between immiscible fluids depends on both thermodynamic and dynamic effects. Dynamic effects are especially important when the fluids are immiscible high molecular weight polymers. Block copolymers are used to stabilize interfaces between immiscible polymers. The chain-like character of polymers leads to molecular entanglement, which leads to extremely slow dynamics. We have prepared two surfactant-bearing polymeric interfaces that are initially out of equilibrium. The distance between the interfaces was varied from 50-600 nm, and the transport of the surfactant molecules was measured by dynamic secondary-ion mass spectroscopy. This transport depends on diffusion coefficients and the depth of the thermodynamic potential wells that trap the surfactant molecules at the interfaces. The diffusion coefficients were measured in independent experiments. The depth of the thermodynamic potential well was calculated using self-consistent field theory (SCFT), which required Flory-Huggins interaction parameters and statistical segment lengths measured by small angle neutron scattering. This enables a comparison of our experimental interfacial transport measurement and theoretical predictions with no adjustable parameters.

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Date submitted: 30 Nov 2005

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