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Kinetically Controlled Adsorption to Freshly Formed Interfaces NICOLAS ALVAREZ, Chem. Eng. Dept., LYNN WALKER, Chem. Eng. Dept, SHELLEY ANNA, Mech. Eng. Dept. Carnegie Mellon University — The coefficients of diffusion, adsorption, and desorption are fundamental properties of surfactant molecules and should be independent of the nature in which they are applied. However, the approaches currently used to obtain these parameters are highly context dependent and can lead to unphysical trends such as a concentration dependent diffusion coefficient and large mismatches between predicted and observed dynamic behavior. In pendant drop studies one is restricted to diffusion or mixed controlled adsorption at small concentrations, but in reality to get at the kinetic coefficients it would be more advantageous to probe the kinetic controlled regime. Recently it was shown that a characteristic length scale, R_{D-K} , governs the transition from diffusion controlled adsorption to kinetically controlled adsorption for spherical interfaces. If the spherical interface has a radius smaller than R_{D-K} the adsorption process is kinetically limited. This paper uses a micro-tensiometer to probe the adsorption dynamics to micron diameter spherical interfaces to test the transition from diffusion limited to kinetic limited adsorption. Using this method we measure kinetic adsorption constants directly. We also describe a new timescale for diffusion, which better describes the adsorption of surfactants onto spherical interfaces.

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