Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Surfactant Adsorption at the Air-Liquid and Hydrophobic Solid-Liquid Interfaces: Unraveling the Mechanism for Superspreading MAKONNEN PAYNE, The Graduate School - University Center of CUNY & The City College of New York, CHARLES MALDARELLI, ALEXANDER COUZIS, The City College of New York — In this paper we report our findings with regard to the synergistic interactions between polyethylene oxide surfactants of the general structure CiEj and compare the behavior to a known super wetting surfactant. Pendant drop tensiometry experiments and sessile drop contact angle measurements on hydrophobic surfaces were conducted on combinations of CiEj surfactants with 1-dodecanol. We found that a number of combinations were capable of reducing significantly the air-liquid tension, however only systems that exhibited the propensity to form extended liquid crystalline phases, as shown by the combination of cross-polarized microscopy, cryo-TEM, and light scattering experiments, were able to improve on the wetting performance of the these systems. We have also conducted the parallel experiment focused on the surfactant adsorption at the hydrophobic solid-liquid interface. Using in-situ infrared internal reflection spectroscopy and complimentary sum-frequency generation spectroscopy, we are able to dynamically interrogate the surfactant adsorption kinetics and interfacial water structure evolution at the hydrophobic solid-liquid interface. We will relate these findings to gain insight into the molecular requirements for superspreading.

Makonnen Payne
The Graduate School - University Center of CUNY &
The City College of New York

Date submitted: 27 Dec 2006 Electronic form version 1.4