

Adsorption of poly-electrolyte – surfactant mixtures at the air-solution and solid-solution interfaces

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Abstract

The strong surface interaction between poly-electrolytes and ionic surfactants of opposite charge results in a wide range of different surface tension behaviour which are not easily interpretable. We demonstrate how neutron reflectivity is used to determine the composition and structure of the surface adsorbed layer at the air-solution interface for PSS / C<sub>n</sub>TAB and poly-dmdaac / SDS mixtures. The surface tension and adsorption can be rationalized in terms of the competition between the formation of surface and bulk polymer-surfactant complexes. For pH sensitive polymers, we illustrate how pH and polymer architecture can dramatically affect the surface tension and surface adsorption. At the hydrophilic silica-solution interface we show how the cationic polymer, poly-dmdaac, can enhance the adsorption of the anionic surfactant SDS and modify substantially the adsorption of SDS / nonionic surfactant mixtures. Dependent upon the nature of the adsorbed polymer layer, the surfactant can be reversibly adsorbed to the polymer coated surface, or only partially reversibly adsorbed and swell the thin polymer film.