

## **BUILDING POLYMER COMPLEXES AT INTERFACES**

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In this talk I shall review our work on the interaction of polymers, surfactants and cyclodextrins in solution and at interfaces. A common theme is the change in structure found when polymer chains are decorated with surfactants or cyclodextrins. A very large number of studies have been carried out to probe the interactions between these systems in aqueous solution but studies at interfaces are harder to find. The addition of particles to these complexes means that there is an additional competition between the surface and the adsorbed complex. There are many possible scenarios including adsorption, dissociation and gelation of the complexes formed. We shall focus on polymer brushes formed by grafting a polymer layer to an interface, formed spontaneously by the self assembly of block copolymers or occurring naturally in star polymers. In these systems surfactants and cyclodextrins play a very different role. Addition of surfactant can lead to a reduction in the brush height at low loadings but to an extension at high loadings. The resultant structure is a balance of a strong polymer surfactant interaction and repulsion between the decorating micelles. The cyclic oligomers form inclusion complexes with the brush and can change the polymer solubility dramatically. The complexes form much more rapidly than for homopolymers in solution because of the high density of chain ends in the brush system for inclusion by the invading cyclodextrins. In some cases for block copolymers, the micelles become soluble and break up and a fine control of the aggregation process can be achieved. For grafted chains the volume fraction profile is changed substantially depending on the degree of inclusion. These effects will be explored in detail in the presentation