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The influence of protein aggregation on adsorption kinetics JOEL ROVNER, NIST - Natl Inst of Stds & Tech, CHRISTOPHER ROBERTS, ERIC FURST, University of Delaware, STEVEN HUDSON, NIST - Natl Inst of Stds & Tech — When proteins adsorb to an air-water interface they lower the surface tension and may form an age-dependent viscoelastic film. Protein adsorption to surfaces is relevant to both commercial uses and biological function. The rate at which the surface tension decreases depends strongly on temperature, solution pH, and protein structure. These kinetics also depend on the degree to which the protein is aggregated in solution. Here we explore these differences using Chymotrypsinogen as a model protein whose degree of aggregation is adjusted through controlled heat treatment and measured by chromatography. To study these effects we have used a micropipette tensiometer to produce a spherical-cap bubble whose interfacial pressure was controlled – either steady or oscillating. Short heat treatment produced small soluble aggregates, and these adsorbed faster than the original protein monomer. Longer heat treatment produced somewhat larger soluble aggregates which adsorbed more slowly. These results point to complex interactions during protein adsorption.

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