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Microrheology of protein layers at the air-water interface MYUNG HAN LEE, STEVEN CARDINALI, DANIEL REICH, Johns Hopkins University, KATHLEEN STEBE, University of Pennsylvania, ROBERT LEHENY, Johns Hopkins University — Due to their amphiphilic nature, many proteins in aqueous solution will adsorb at the air-water interface to create a viscoelastic interfacial layer. We present an investigation of the formation and mechanical properties of interfacial protein layers formed by beta-lactoglobulin using microrheological techniques including multiple particle tracking and magnetic nanowire microrheology. We observe the interfacial rheology evolve in time through three stages: (i) an increase in viscosity, (ii) a period of spatial heterogeneity in which the interface contains elastic and viscous regions, and (iii) the development of a uniformly rigid elastic film. We evaluate the dependence of this evolution on the protein-protein interactions, which we tune by varying solution pH. As we will discuss, these studies illustrate the power of microrheological approaches to interfacial rheology.

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