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Interfacial Microrheology of Lysozyme Layers During Formation at the Air-Water Interface DANIEL ALLAN, DANIEL REICH, ROBERT LEHENY, Johns Hopkins University — Proteins can adsorb to the air-water interface to form viscoelastic layers. Characterizing the rheology of such layers is challenging, due to the confined geometry, the fragility of the layers, and the possibility of mesoscale spatial heterogeneity. Passive microrheology — using the thermal motion of colloidal probes to interrogate the mechanical response of the surrounding medium — is a suitable technique for addressing these difficulties. In particular, this approach sheds light on the properties of incipient protein layers that are characterized by modest interfacial viscosities. We describe microrheology studies of lysozyme layers at the air-water interface, in which we determine the evolving interfacial shear response through the viscoelastic transition that signifies layer formation. Spatial heterogeneity in the interfacial rheology is identified and discussed within the framework of layer formation as a gel transition. Layers formed by adsorption of protein from the aqueous subphase and by spreading protein directly onto the interface are compared and studied across a range of concentrations, demonstrating the sensitivity of layer properties to the rate and manner of protein accretion.

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