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Conformation Distributions in Adsorbed Proteins. CURTIS W. MEUSE, JOSEPH B. HUBBARD, JOHN S. VRETTOS, Biochemical Science Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899, JACKSON R. SMITH, MARCUS T. CICERONE, Polymers Division, National Institute of Standards and Technology, Gaithersburg, MD, 20899 — While the structural basis of protein function is well understood in the biopharmaceutical and biotechnology industries, few methods for the characterization and comparison of protein conformation distributions are available. New methods capable of measuring the stability of protein conformations and the integrity of protein-protein, protein-ligand and protein-surface interactions both in solution and on surfaces are needed to help the development of protein-based products. We are developing infrared spectroscopy methods for the characterization and comparison of molecular conformation distributions in monolayers and in solutions. We have extracted an order parameter describing the orientational and conformational variations of protein functional groups around the average molecular values from a single polarized spectrum. We will discuss the development of these methods and compare them to amide hydrogen/deuterium exchange methods for albumin in solution and on different polymer surfaces to show that our order parameter is related to protein stability.

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