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Resonant soft X-ray scattering on protein solutions DAN YE, THINH LE, Department of Chemical Engineering, The Pennsylvania State University, CHENG WANG, Advanced Light Source, Lawrence Berkeley National Laboratory, PETER ZWART, Berkeley Center for Structural Biology, Lawrence Berkeley National Laboratory, ESTHER GOMEZ, Department of Chemical Engineering, Department of Biomedical Engineering, The Pennsylvania State University, ENRIQUE GOMEZ, Department of Chemical Engineering, Materials research institute, The Pennsylvania State University — Protein structure is crucial for biological function, such that characterizing protein folding and packing is important for the design of therapeutics and enzymes. We propose resonant soft X-ray scattering (RSOXS) as an approach to study proteins and other biological assemblies in solution. Calculations of the scattering contrast suggest that soft X-ray scattering is more sensitive than hard X-ray scattering, because of contrast generated at the absorption edges of constituent elements such as carbon, nitrogen and oxygen. We have examined the structure of bovine serum albumin (BSA) in solution by RSOXS. We find that by varying incident X-ray energies, we are able to achieve higher scattering contrast near the absorption edge. From our RSOXS scattering result we are able to reconstruct the structure of BSA in 3D. These RSOXS results also agree with hard X-ray experiments, including crystallographic data. Our study demonstrates the potential of RSOXS for studying protein structure in solution.

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