

**W0086**

**Small-Angle Neutron Scattering Studies of PEG/Protein Solutions under Crystallization Conditions.**

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The use of poly(ethylene glycol), PEG, as a crystallization agent for proteins is widespread, and its operation at the molecular level has been the subject of widespread investigation. However, small-angle neutron scattering (SANS) has seldom been used to study PEG and proteins together in solution, even though the individual contributions of protein and PEG to the process can be probed independently using the contrast variation technique. A preliminary SANS study has revealed that the protein Ribonuclease S (RNase S) at a concentration present in crystallization solutions perturbs the PEG far more than the PEG perturbs the RNase S. In solutions of crowded populations of two molecules that differ in stiffness, the free energy change in the softer of the two controls the solution energy. Thus, the softer molecules will gain volume for themselves by pushing the harder molecules together into clusters. Results of this preliminary study will be presented, along with those of a more extensive study of RNase S as well as alpha-lactalbumin, using different molecular weight PEGs and different concentrations of PEGs and proteins.