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Small-angle neutron scattering study of pH dependence of the liquid structure factor of concentrated solutions of eye lens gamma-B crystallin KENNETH DESMOND, GEORGE THURSTON, Department of Physics, Rochester Institute of Technology, ANNA STRADNER, PETER SCHURTENBERGER, Department of Physics, U. Fribourg — We are evaluating the pH dependence of the liquid structure of aqueous solutions of the eye lens protein, gammaB crystallin, near its critical point for liquid-liquid phase separation, to help evaluate the influence of protein charge on the phase separation. We have obtained small-angle neutron scattering data from gammaB crystallin solutions at pH 6.4, 7.1 and 7.4 in a 0.1 M sodium phosphate buffer, and at pH 4.5 in a 0.020M sodium acetate buffer, all in D2O. Protein concentrations ranged from 6 to 260 mg protein/ml solution and the scattering vector magnitude (q) ranged from 0.004 to 0.45 inverse Angstroms. At pH 6.4 to 7.4 liquid structure factors vs. concentration and temperature near the cloud point for liquid-liquid phase separation are well represented, in general, by the Baxter sticky sphere model. In contrast, at pH 4.5, concentrated gammaB shows a very different liquid structure indicating highly repulsive interprotein interactions, consistent with both high net protein charge and reduced screening.

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