Evidence for Non-DLVO Hydration Interactions in Solutions of the Protein Apoferritin

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Abstract

We have studied molecular interactions in solutions of the protein apoferritin by static and dynamic light scattering. When plotted against the electrolyte concentration, the second osmotic virial coefficient exhibits a minimum. The ascending branch of this dependence is a manifestation of a surprisingly strong repulsion between the molecules at electrolyte concentrations about and above 0.2 M, where electrostatic interactions are suppressed. We argue that the repulsion is due to the water structuring, enhanced by the accumulation of hydrophilic counterions around the apoferritin molecules, giving rise to so-called hydration forces.

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