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Structural investigation of biopolyelectrolyte-surfactant complexes: Developments in the understanding of viscosity behaviour

Oppositely charged polyelectrolyte (PE)-Surfactant Complexes (OP-SCs) have attracted much interest over the past decades. Not least because of their relevance in numerous household applications such as detergency and paints, or as rheological modifiers [1]. In general, these mixtures form clear, homogeneous solutions if either an excess of PE or surfactant charges is present and precipitates around charge equilibrium. Near the phase boundary on the PE-rich side, depending on their composition and chemical nature, some of these OPSCs can greatly increase the viscosity of aqueous solutions upon addition of relatively small amounts of material on the order of less than 1 wt%, while others have no effect [2]. The behaviour of the system is governed by a number of parameters, including the composition, the chemical nature of the PE and the surfactant. Here, we have investigated OPSCs consisting of the well characterised PE JR 400 and two different surfactants, namely sodiumoctyl sulphate (SOS) and sodium tetradecyl sulphate (STS), which only differ in the length of their alkyl chains. In a preliminary study, the system's phase behaviour and viscosity have been investigated, showing that the viscosity of JR 400/STS is significantly increased near the phase boundary, while SOS did not show a significant effect in tube inversion tests. Therefore, we can assume that the surfactant chain length plays a crucial role for the rheological behaviour of OPSCs. In order to achieve this information, different kind of experiments were performed such as Dynamic Light Scattering and Small Angle Neutron Scattering measurements.

1. E.D. Goddard, R.B. Hannan, *J. Colloid Interface Sci.* 55 (1976), 73-79.
2. I. Hoffmann, B. Farago et al., *J. Chem. Phys* 143 (2015), 1-11.

Preferred topic

Polymers and environment

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