Experimental report

07/09/2022

Proposal:	**9-12-562**
Council:	4/2019
Title:	Influence of the Surfactant Head Group on the Viscosity in OppositelyChar- ged Polyelectrolyte Surfactant Complexes
Research area:	Soft condensed matter

This proposal is a new proposal

Main proposer:	**Ingo HOFFMANN**
Experimental team:	Ingo HOFFMANN Giuseppe Rosario DEL SORBO
Local contacts:	Ingo HOFFMANN

Samples: Sodium dodecyl sulphate with JR 400 (cellulose ether) in D2O

Instrument	Requested days	Allocated days	From	To
IN15	3	4	17/07/2019	21/07/2019

Abstract:

Oppositely charged polyelectrolyte (PE) surfactant complexes (PESCs) have attracted much interest over the past decades. Not last because of their relevance in numerous household applications such as detergency and paints, or as rheological modifiers. After having found out previously that mixtures of SDS and the cationic cellulose ether JR 400 form viscous networks with mixed rodlike aggregates as junctions, we proceeded to investigate mixtures of JR 400 and sodium dodecyl sulphate (SDP) where the headgroup bears 2 charges, which should hinder the formation of rodlike aggregates due to packing parameter constraints and in fact it is seen by rheology that the viscosity is lower than in comparable solutions with SDS but SANS showed the formation of rodlike aggregates. Their length can not be determined from SANS due to an overlap with the scattering from large clusters. Here, we want to use NSE to determine the length of the aggregates from their diffusion coefficient measured by NSE and their radius, which is known from SANS to answer the question, if the lower viscosity in SDP/JR 400 is due to the formation of shorter and therefore weaker mixed aggregates

Data of the experiment has been published in:
G. R. Del Sorbo, V. Cristiglio, D. Clemens, I. Hoffmann and E. Schneck: Influence of the Surfactant Tail Length on the Viscosity of Oppositely Charged Polyelectrolyte/Surfactant Complexes *Macromolecules*, **2021**, 54, 2529-2540, **DOI:10.1021/acs.macromol.0c02728**

G. R. Del Sorbo, D. Clemens, E. Schneck and I. Hoffmann: Stimuli-Responsive Polyelectrolyte Surfactant Complexes for the Reversible Control of Solution Viscosity *Soft Matter*, **2022**, 18, 2434-2440, DOI:**10.1039/D1SM01774H**

O. Kuzminskaya, I. Hoffmann, D. Clemens and M. Gradzielski: Viscosity of Polyelectrolyte Surfactant Complexes--The Importance of the Choice of the Polyelectrolyte Seen for the Case of PDADMAC Versus JR 400 *Macromolecules*, **2021**, 54, 4615-4625, DOI:**10.1021/acs.macromol.1c00327**