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Structural characterization and rheology of bio-compatible wormlike micelles

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Wormlike micelles exhibit a unique viscoelastic behavior, which has been investigated intensely in the past decades, experimentally as well as by theoretical calculations [1,2]. Within our studies we explore the self-assembled structure and the flow behavior of wormlike micelles formed by mixing a short-chained C_8 cationic surfactant and the sodium salts of omega-9 fatty acids [3]. Within the class of the latter one, the alkyl chain length is varied from C_{18} to C_{22} , yielding an increase of the micellar cross section. The structure of the micelles is characterized by neutron scattering experiments. Beside the thickness of the micelles the persistence length is an important key quantity which strongly influences the flowing properties and is depending on the mixing ratio of both surfactants. Further, it is observed that the dynamical response, i.e., the time scales such as the relaxation or breakage time, of the micelles is influenced by the molecular architecture. Combining the results of rheological measurements with the neutron scattering experiments allows us to get a detailed insight into the micellar structure and dynamics.

[1] C. Dreiss, *Soft Matter* **3**, 956, (2007)

[2] P. D. Olmsted, *Rheo. Acta* **47**, 283, (2008)

[3] Raghavan *et al.*, *Langmuir* **18**, 3797 (2002)

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