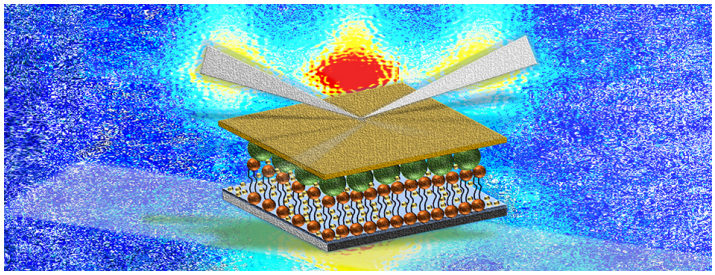

Beitrag ID: **38** Typ: **Talk**

Self-Assembly of the biosurfactant rhamnolipid in concentrated aqueous solutions studied with SAXS and SANS

Dienstag, 8. Oktober 2024 17:00 (15 Minuten)

Research on the physico-chemical properties of microbial biosurfactants is a very active field as these compounds are of increasing interest to industry due to their enhanced biodegradability and their derivation from renewable sources [1]. To achieve the goal of replacing existing surfactant formulations with this greener alternative, a solid knowledge of the latter's properties is required.
In this contribution, we present investigations on the self-assembly of the biosurfactant di-rhamno-di-lipid (Rha_2-$C_{10}C_{10}$) in concentrated aqueous solutions. We used a combination of Small-Angle X-ray (SAXS) and Neutron (SANS) Scattering to elucidate the structural evolution of the rhamnolipid micelles up to concentrations of 50 wt.%, taking advantage of the different contrasts detected by the two scattering techniques.
Most previous studies in literature have focused on very dilute rhamnolipid concentrations to not have to deal with interaction effects when analysing the scattering data [2]. In order to shed light on the self-assembly of rhamnolipids also in highly concentrated systems, we used the Generalised Indirect Fourier Transformation (GIFT) [3] technique to separate the micellar form factor and the structure factor describing the interaction between them with a minimum of a priori knowledge of the structure. We found that globular micelles dominate the phase behaviour over a surprisingly large surfactant concentration range and that the transition to a hexagonal (H_1) liquid crystalline mesophase occurs almost instantly.

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[2] N. Baccile, A. Poirier, J. Perez, T. Tiso et al., Langmuir, 39(27), 9273 (2023).
[3] J. Brunner-Popela, O. Glatter, J. Appl. Cryst., 30, 431 (1997).

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