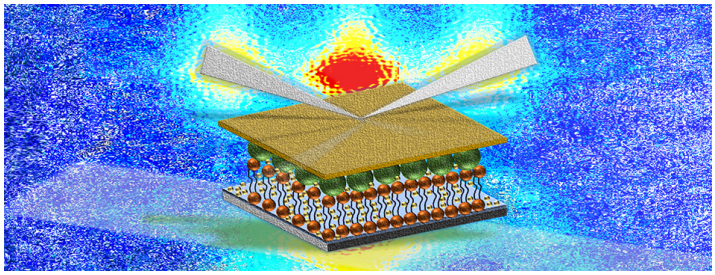

Beitrag ID: **53** Typ: **Poster**

Tuning contact angle and colloidal stability by charge

Mittwoch, 9. Oktober 2024 17:27 (7 Minuten)

*Poster contribution
Self-assembled nanocrystal crystals of nanoparticles (NPs) offer the opportunity to create devices with collective properties from the individual NP building blocks. Applications in plasmonic, optoelectronic, catalysis, magnetic, phonon, biomedical and electrochemical devices with much improved performance are expected [1,2]. Large area 2D nanocrystals may be prepared by Langmuir type deposition, where particles are dispersed at a liquid/air interface and compressed by barriers to form close packed 2D nanocrystals. These can then be transferred onto solid substrates. The formed layer at the interface and its long-range order can be tuned by the particle size, surfactant shell properties, solvent interaction, charge, and magnetic moment of the particles among others. The fundamental science and optimization of this self-assembly is key to preparing large area functional devices at high throughput and low costs. One important parameter is the contact angle of the particles and the interface, which is related to the NPs affinity to adsorb at a fluid surface. Previous studies [3] and theory [4] suggests that the contact angle is dependant on the magnitude and sign of the charge of a single particle, since the air/water interface is believed to possess a negative charge. Also, a distance dependant out-of-plane force, pushing particles downwards and deforming the interface has been observed [3] because of the assymetric charge distribution of the particle surface in air and liquid medium. To add to this, we have tuned the charge magnitude and sign of negatively charged SiO2 nanoparticles by varying the amount of cationic surfactant coating. For these samples we aim to present results with neutron reflectometry, surface pressure-area isotherms, GISAXS and UV-spectroscopy on the charge dependant contact angle, colloidal stability and long range order of films at the air/liquid interface and of transferred films to solid substrates.

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[3] G. Chen et al. Nat Commun, 9, 1335 (2018)
[4] S. May et al. Langmuir, 28(40), 14301-14307 (2012)

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