MESA+ SOFT MATTER symposium
Time and location: Thursday, March 22nd, 9:30h – 12:00h , Carre 3H

Program:

Interfacial fluids: ion adsorption, solvation, friction.

9:30h Prof. Markus Mezger (Max-Planck-Institute for Polymer Science Mainz)

"Surface induced order in ionic liquids"

10:10h Prof. Christian Holm (Univ. Stuttgart)
"Coarse-grained models for studying ionic liquids: Construction schemes and some results for bulk, interfaces, and model pores."

10:50-11:00h coffee break

11:00h Prof. Roland Bennewitz (Leibnitz Institute for New Materials, Saarbrücken)
"Force microscopy of shear in nanometer-confined liquids"

11:40h Simone van Lin (Univ. Twente)
"Cation adsorption-induced enhancement and disruption of oscillatory hydration forces at mica-electrolyte interfaces."

Abstracts:

Prof. Markus Mezger:
In supported ionic liquid (IL) phase catalysis, the chemical reaction takes place in a sub-micrometer IL film, wetting a solid support material with high surface area. To understand diffusion of reactants and products across the IL/vapor interface, knowledge of the interfacial structure is crucial.

We employ X-ray scattering techniques to investigate the near surface structure on the molecular length scale. Depending on the molecular architecture of the ILs containing long aliphatic side chains, we observe pinning of bulk correlations at the surface and surface induced smectic order. In the case of surface induced smectic order, lamellar structures extending up to 30 nm into the isotropic bulk are observed.

In microheterogeneous ILs, solvates aggregates site-specifically within high affinity domains. Non-polar molecules, for example, are preferentially situated in the aliphatic regions. At liquid/vapor interfaces, this can strongly affect the near surface structure. For different IL based multi component systems, we observe the formation of monomolecular adsorbate layers and solvate induced surface phase transitions.

Prof. Christian Holm:
In this talk I will present recent efforts to construct systematically polarisable force fields for coarse-grained ionic liquid models. Moreover I will show some recent results on the charging dynamics for model nanopores using the restricted primitive model.

Prof. Roland Bennewitz:
Abstract not available .

Simone van Lin:
High resolution AFM spectroscopy was used to investigate the oscillatory hydration forces at mica-electrolyte interfaces for the chloride salts of alkali cations for concentration up to 4M. Pronounced force oscillations reflecting the layering in purified water are modified in an ion specific manner beyond an ion-dependent threshold concentration. While only a slight enhancement of the oscillatory forces is seen for the so-called kosmotropic ('structure forming') ions Na^+ and K^+, the force oscillations completely disappear for the chaotropic (i.e. 'structure-breaking') ions Cs^+ and Rb^+ suggesting a disruption of the hydration layers.