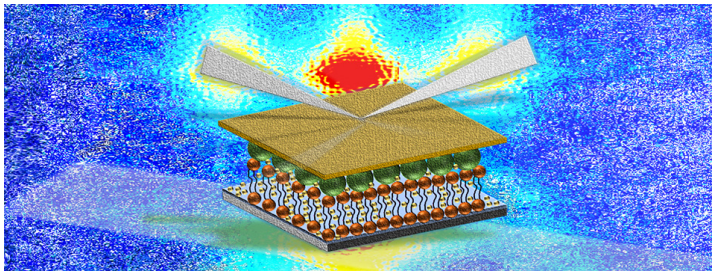

Beitrag ID: **22** Typ: **Talk**

# Small-angle scattering analysis of capillary rise in micro- and meso-porous carbons

*Mittwoch, 9. Oktober 2024 14:30 (15 Minuten)*

Numerous applications of nanoporous materials require their pores to be filled with liquids. In spite of its huge technological importance, the conditions for the wetting of nanometer-sized pores and its phenomenology are still poorly understood. Here, we report on time-resolved synchrotron small-angle scattering experiments performed during capillary rise of water in carbon xerogels. These materials are widely used for electrochemical applications, in battery, surpercapacitor, or fuel-cell electrodes. Their structure consists in molecular-sized micropores coexisting with larger mesopores about 10 nanometers across.

The time- and space-resolved scattering and data reveal a two-step wetting process whereby water first diffuses into molecular-sized micropores, and this is followed by the imbibition of the mesopores. A Cassie-Baxter analysis shows that the presence of water in the micropores is central as it turns the meso-pores from being hydrophobic to hydrophilic. Based on so-calculated contact angles, the overall nanometer-scale wetting kinetics is found to be quantitatively captured by macroscopic physical concepts.

**Hauptautor:** GOMMES, Cedric (University of Liege)

**Co-Autoren:** LEONARD, Alexandre; GODERIS, Bart; CHALTIN, François; ROSENTHAL, Martin

**Vortragende(r):** GOMMES, Cedric (University of Liege)

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