
S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

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"Capillary-bridge formation of non-polar fluids in nanoporous carbon CMK-3"

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After the synthesis of ordered nanoporous materials was achieved in the early 90s of the last century, they have found wide use in catalysis and as molecular sieves. The most prominent examples of these materials are SBA-15 and MCM-41, which are silica based materials with hexagonally ordered cylindrical mesopores. Because of the ordered nature on the mesopore scale, these materials also allowed in-depth studies on the physical processes concerning adsorption and condensation using gas sorption and/or in-situ small-angle X-ray and neutron scattering. Typically, the adsorption and desorption of a gas also results stresses in the material leading to sorption induced deformation, an effect which has also been studied by our group.

In this presentation I will present an approach to describe sorption in the more complex, concave pore spaces found in CMK-3 carbon materials, which are negative replica of the SBA-15 silica structure. The result is a first theoretical, numerically aided description of the processes of adsorption, liquid bridge formation, and capillary condensation in CMK-3, which is compared with some available experimental data.