Preparation, characterization and applications of free-standing unimolecular nanosheets

Initiative: Komplexe Materialien (beendet)

Bewilligung: 05.07.2006

Laufzeit: 3 Jahre

The project deals with the preparation, the physical and chemical properties and possible applications of freely suspended unimolecular nanosheets. These nanosheets are novel ultrathin membranes with the thickness of a single molecule (1-2 nm). They are based on cross-linked self-assembled monolayers that can be released from their substrate and are stable as a free-standing nanomaterial. The sheet's structure and chemical composition, as well as mechanical properties (tensile strength, resonance frequencies), electrical conductivity and chemical properties such as surface functionalization, and gas adsorption will be investigated. The sheets will be characterized using surface analytical techniques as well as specialized instruments using single electron tunneling transistors, surface acoustic wave sensors and nanostructured electrodes. Possible applications of these nanosheets include ultrathin electron transparent substrates for high resolution transmission electron microscopy,ultrasensitive gas sensors or electrically conducting nanolayers and -wires.

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