Research Training Group 2721
Hydrogen Isotopes ^{1,2,3}H

UNIVERSITÄT LEIPZIG

Fakultät für Chemie und Mineralogie
Wilhelm-Ostwald-Institut für
Physikalische und Theoretische Chemie

Colloquium

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Exp.-HS (room 029, Johannisallee 29)

Design of functional interfaces using ion soft landing

Controlled deposition of complex molecules and clusters onto supports presents an opportunity to explore the fundamental processes underlying the design of functional 2D and 3D interfaces with applications in isotope separation, materials science, energy production and storage, physics, and biology. Ion soft-landing, in which intact polyatomic ions are deposited onto surfaces with or without retention of charge, is a unique tool for fundamental studies of ion-surface interactions controlling the preparation of layered architectures and doping of 3D materials with unique active components. The ability to select the mass-to-charge ratio of the precursor ion, its kinetic energy, and charge state along with precise control of the size, shape, and position of the ion beam on the deposition target makes soft-landing an attractive approach for surface modification. High-purity uniform thin films on surfaces generated using this technique facilitate understanding of critical interfacial phenomena relevant to a broad range of applications. Experimental studies of charge retention by complex ions on surfaces have demonstrated efficient charge retention by anions and relatively facile charge loss by cations soft-landed onto self-assembled monolayer surfaces. These findings provide the scientific foundation for the rational design of interfaces for advanced catalysts and energy storage devices. Recent developments of the soft-landing instrumentation have enabled high-coverage deposition of ions and opened up opportunities for generating reactive ionic species, which are promising building blocks for the design of functional interfaces. Furthermore, current ion soft landing instrumentation enables co-deposition of positive and negative ions providing a path for generating novel ionic materials. In this presentation, I will discuss the fundamental aspects of ion-surface interactions inferred from ion soft-landing experiments and present several examples of systems that may be of interest for hydrogen isotope separation.

The ^{1,2,3}H Colloquium will be streamed via Zoom:

https://uni-leipzig.zoom.us/j/67221664393
?pwd=eFRVRm5URE9rc256WDh3ZTB3NnNlZz09

Meeting ID: 672 2166 4393 / Passcode: 245588