

PhD position in Material Science of Surfaces – Nanostructures

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The current projects focus on a variety of aspects in the synthesis and investigation of the properties of a wide range of nanostructures. We are interested in the study of the fundamental chemical and physical mechanisms which govern the selective formation of nanostructures. The goal is to tailor the properties and spatial arrangement of nanoscale building blocks (quantum dots, carbon macromolecules, metal clusters) and understand the relation between structure and properties in this size regime. One important area is carbon-based nanostructures such as fullerenes, carbon onions and nanotubes and their combination with metals and semiconductors. A new project will center on the use of topography control through ion-impact and subsequent self-organized growth of metal clusters and quantum dots on a wide range of surfaces. In addition we anticipate studying the environmental degradation of nanoparticles due to the interaction with water and light, this project will concentrate on a study of the reaction pathways and synergistic effects. The analytical methods are scanning probe microscopy (STM and AFM) and photoelectron spectroscopy. The synthesis of the nanostructures is mostly performed in situ and the progression of the reaction, the movement of atoms and the modification of the surface topography can be observed directly. A student working in our group will be exposed to many different aspects of surface science and nanotechnology, and work in an interdisciplinary environment. A strong background in material science, physics, and chemistry will serve well.

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