

The STM team at the Chair of Physical Chemistry of the Technical University of Munich focuses on fundamental dynamics in catalytic processes on small supported metal clusters and in functional surfaces. For our new project as part of the Alberta / TU Munich International Graduate School (ATUMS) on functional hybrid materials, we offer a

PhD Position (66% TV-L E13) for Studies on 2D-Hybrid Functional Nanomaterials under Gas Environments

Project Description

Within ATUMS, researchers from Canada and Germany collaborate to identify and investigate hybrid materials consisting of semiconductor nanoparticles and functional polymers as energy materials. Such materials are promising in applications from solar energy conversion over sensors to optical devices. This project aims at taking a closer look at Si particles on 2D-polymers in gas environments. By observing structural and chemical changes of highly defined surfaces and clusters, we will address fundamental questions such as: Can we identify particular sites as preferred bonding sites for Si clusters in 2D-grown functional polymers? How does the interface influence material properties? Is the stability of bare Si particles comparable to that of ligand-covered ones? What is the influence of the gas environment (e.g. humidity)?

As the successful candidate, you will prepare two-dimensional analogs of silicon-based functional materials, characterize them using ultra-high vacuum (UHV) techniques and investigate their stability with near ambient pressure scanning tunneling microscopy (NAP-STM). You will be involved in setting up and calibrating a newly purchased NAP-STM and will have the opportunity to learn about state-of-the-art video rate STM techniques and experiments under NAP-conditions. In addition, you will have the opportunity to travel to synchrotrons around the world (e.g. to Berkeley, Oxford, Lund, Trieste) to perform complementary NAP X-ray photoelectron spectroscopy (NAP-XPS) measurements and to spend two or three months stays at the University of Alberta, Canada to further pursue your project with our collaborators and get to know a different research landscape.

Required qualifications

Prospective candidates have a degree in chemistry, physics or a related field and are highly motivated to work on sophisticated experimental setups. They show a strong interest in method development and solving technical challenges and bring along good communication skills in English. The successful candidate will further show a willingness to learn about new techniques and scientific fields and contribute their own ideas to the project. We are looking for a team player who collaborates closely with other team members while also working independently on their own project. Experience in surface chemistry, UHV methods, scanning probe microscopy, synchrotron techniques and/or basic programming skills (Matlab, Python, ...) are advantageous.

Our offer

The position is funded as part of the ATUMS research group, available from October 2020 and will be limited to three years. Payment will be based on the Collective Agreement for the Civil Service of the Länder (TV-L). TUM strives to raise the proportion of women in its workforce and explicitly encourages applications from qualified women. Applications from disabled persons with essentially the same qualifications will be given preference.

Application

Please send your CV, letter of motivation (max. 1 page) and contact details of two potential references to Barbara A. J. Lechner (bajlechner@tum.de). Further information on our research groups is available at www.department.ch.tum.de/pc and www.barbaralechner.com.