

PhD Position (67% TV-L E13) for Ambient Pressure Scanning Tunneling Microscopy Investigations of Dynamic Catalysts

The group of Functional Nanomaterials at the Technical University of Munich investigates chemical and structural dynamics of functional surfaces such as small oxide-supported metal clusters with state-of-the-art spectroscopy and microscopy surface science techniques. We offer a stimulating research environment in a multidisciplinary laboratory in one of the highest-ranked universities in Europe. The advertised PhD position is funded within our ERC project on the dynamics of cluster catalysts under reaction conditions.

Project Description

Size-dependent structural and electronic effects make sub-nm clusters extremely interesting for highly selective, mild, sustainable catalysis. We investigate model catalysts of clusters, produced with atomic size selection, in reactive gas environments using a sophisticated near-ambient pressure scanning tunneling microscope (NAP-STM). By recording videos, we can follow catalyst restructuring *in situ* upon heating, due to adsorbates, or during a reaction, obtaining unique insight into the elusive dynamics of a working catalysts. X-ray photoelectron spectroscopy (NAP-XPS) complements microscopy with information on the chemical composition and oxidation state of the system. These measurements are performed both at synchrotrons and with our on-site lab-based instrument.

As the successful candidate, you will prepare the samples, perform and analyze NAP-STM experiments and maintain the UHV apparatus. In addition, you will occasionally perform NAP-XPS experiments, both at synchrotrons (e.g. Lund, Barcelona, Berkeley) and on-site using a new lab-based system. You will benefit from membership at the TUM Graduate School and an active international scientific network within the Cluster of Excellence e-conversion and a DFG Collaborative Research Center. You will participate in meetings with international collaborators, present your results at national and international conferences, and write publications for internationally renowned journals.

Required Qualifications

Prospective candidates have a degree in physics, chemistry, or a related field and are highly motivated to work on sophisticated physicochemical experimental setups. They show a strong interest in scientific questions within physical chemistry, enjoy solving technical challenges and bring along good communication skills in English. The successful candidate will further be able to handle, maintain and support a state-of-the-art ultra-high vacuum (UHV) instrument, and contribute their own ideas to projects. We are looking for a team player who collaborates closely with other researchers while also working independently. Experience in (NAP-)STM, UHV technology, surface chemistry, NAP studies, synchrotron techniques and programming skills (Matlab, Python, LabVIEW, ...) is advantageous.

Our offer

The position is fully funded and available immediately. 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. The position is suitable for applicants with disabilities, who will be given preference if their suitability, qualifications and professional performance are otherwise substantially equal.

Application

Please send your CV, letter of motivation (max. 1 page) and two letters of reference to Prof. Dr. Barbara A. J. Lechner (recruitment.lechner@tum.de). Only complete applications will receive full consideration. The position is open until 30/09/2024 or until filled. Further information on our research group is available at www.ch.nat.tum.de/nanomaterials.