Chair of Physical Chemistry
TUM School of Natural Sciences
Technical University of Munich
Lichtenbergstraße 4
D-85748 Garching

PhD Position (67% TV-L E13): Properties and Reaction Pathways of Cluster Catalysts in Ion-Molecule Reactions

Job Description:

Unique properties and high surface-to-volume ratios make small metal clusters ideally suited as active sites in heterogeneous catalysts. The study of trapped metal clusters in defined reaction environments enables the elucidation of the clusters' intrinsic catalytic activity and the identification of reaction pathways on a molecular scale, overcoming the limitation of applied systems caused by their complexity.

The PhD student's role is the investigation of Pt- and Pd-cluster materials in the oxidation of NH_3 and CH_4 – crucial reactions for emission control in sustainable chemistry. He/she will perform measurements at a world-wide unique apparatus based on a combination of different mass-spectrometric techniques. It enables exact changes in the chemical composition of the clusters (e.g., their size, charge and oxidation state) to identify key parameters and reaction pathways of catalytic materials, which will be assessed quantitatively by kinetic modelling. As the project is part of a collaborative research center, the results will be put into a broad context to enable the development of superior applied catalytic materials. Therefore, the PhD student must strongly collaborate with different groups (from TUM but particularly the Karlsruhe Institute of Technology) and present the results at different national and international meetings.

Qualification Requirements:

Prospective candidates hold an above average degree in chemistry, physics or related fields and are motivated to work with sophisticated experimental setups. A willingness to learn about new techniques and scientific fields is mandatory. After a training period, the PhD student shall be able to use and maintain a state-of-the-art vacuum apparatus and contribute to the project with own ideas. We seek for team players with good communication skills in English, who collaborates closely with research partners but also works independently. Experience with mass spectrometry or vacuum technology is of advantage but not required.

Our Offer:

At TUM we offer a stimulating research environment at one of Europe's highest-ranked universities, with targeted training and individual supervisions. The position is available immediately and fully funded, based on the Collective Agreement for the Civil Service of the Länder (TV-L). We are committed to equal opportunities and value diversity. We thus welcome applications from all individuals who feel addressed. TUM strives to raise the proportion of women in its workforce and encourages qualified women to apply. If equally qualified, severely disabled persons are given preference.

Interested applicants shall send their CV, a letter of motivation and a letter of recommendation to Martin Tschurl (recruitment.pc@nat.tum.de). More information is available at the project's website: https://www.ch.nat.tum.de/pc/research/gas-phase-cluster-kinetics/.