unicat
Unifying Concepts in Catalysis

UniCat Colloquium

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FHI Berlin, Interface Science

Operando Nanocatalysis: Size, Shape, Composition and Chemical State Effects

Tailoring the chemical reactivity of nanomaterials at the atomic level is one of the most important challenges in catalysis research. In order to achieve this elusive goal, we must first obtain a fundamental understanding of the structural and chemical properties of these complex systems. In addition, the dynamic nature of the nanostructured films and nanoparticle (NP) catalysts and their response to the environment must be taken into consideration, since their working state might not be the state in which the catalyst was prepared, but rather a structural and/or chemical isomer that adapted to the particular reaction conditions.
This talk provides examples of recent advances in the preparation, plasma-functionalization and characterization of nanostructured films and NP catalysts with well-defined morphology, size, and shape. It discusses how to resolve the structure and composition of nm-sized metal catalysts via a combination of in situ and operando microscopy (AFM, STM, TEM) and spectroscopy (XAFS, XPS) methods, and how to follow its evolution under different gaseous or liquid chemical environments in the course of a catalytic reaction.
It will be highlighted that for structure-sensitive reactions, catalytic activity, selectivity and stability against sintering can be tuned through controlled synthesis. Examples of catalytic processes which will be discussed include the gas- and liquid-phase oxidation of 2-propanol and the reduction of CO2 in the gas phase at high pressure as well as electrochemically. Emphasis will be given to elucidating the role of the NP size, shape, composition and chemical state of the catalysts in the activity and selectivity of the former reactions.

Wednesday, November 15, 2017 at 5:15 PM
TU Berlin, Institute of Chemistry
Straße des 17. Juni 115, 10623 Berlin

Building C, Lecture Hall **C 264**

Prof. Dr. Schomäcker (TUB)
Organizer

Coffee and cake will be served 30 minutes before the lecture. Guests are cordially invited to attend!
Prof. Dr. Matthias Driess - Chair of the Cluster of Excellence UniCat - www.unicat.tu-berlin.de