RUHR-UNIVERSITÄT BOCHUM
Fakultät für Chemie und Biochemie

Interdisciplinary Lecture Series
Gemeinsames Kolloquium –Wintersemester 2013/14

Thursday, 12.12.2013
17:15 hrs, Lecture Hall HNC 30

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Nanocatalysis: The Shape of Things to Come

Abstract: In order to comprehend the properties affecting the catalytic performance of metal nanoparticles (NPs), their dynamic nature and response to the environment must be taken into consideration. The working state of a NP catalyst might not be the state in which the catalyst was prepared, but a structural and/or chemical isomer that adapted to the particular reaction conditions. This work provides examples of recent advances in the preparation and characterization of NP catalysts with well-defined sizes and shapes. It discusses how to resolve the shape of nm-sized Pt, Au, Pd, and PtNi catalysts via a combination of *in situ* microscopy (AFM, STM, TEM), *operando* spectroscopy (XAFS, GISAXS) and modeling, and how to follow its evolution under different gaseous or liquid chemical environments and in the course of a reaction. It will be highlighted that for structure-sensitive reactions, catalytic properties such as the reaction rates, onset reaction temperature, activity, selectivity and stability against sintering can be tuned through controlled synthesis.

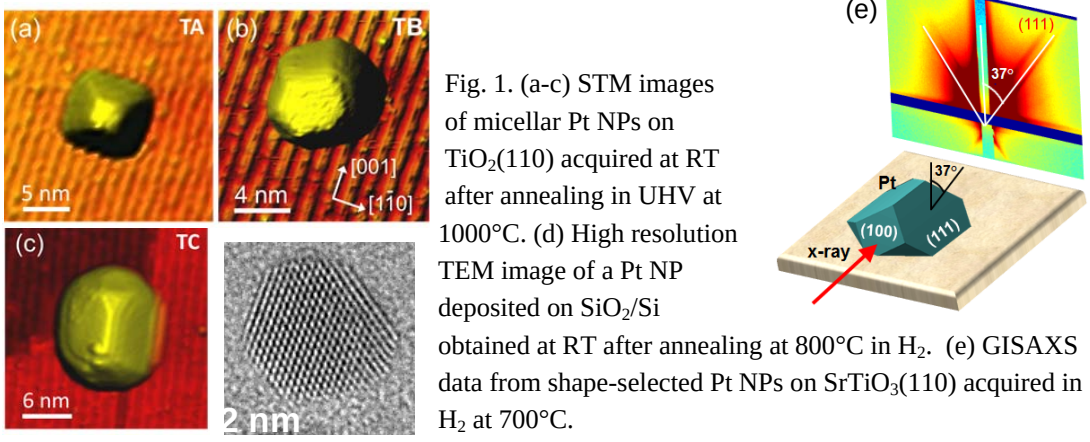

Fig. 1. (a-c) STM images of micellar Pt NPs on TiO_2(110) acquired at RT after annealing in UHV at 1000°C. (d) High resolution TEM image of a Pt NP deposited on SiO_2/Si obtained at RT after annealing at 800°C in H_2. (e) GISAXS data from shape-selected Pt NPs on $SrTiO_3$(110) acquired in H_2 at 700°C.

Gäste sind herzlich willkommen – Guests are most welcome!

gez. N. Metzler-Nolte GSCB	gez. W. Sander Dekan	gez. M. Muhler GDCh