IAP Seminar

Tuesday, 28th June 2022, 16:00 s.t.
TU Wien, Institut für Angewandte Physik, E134
1040 Wien, Wiedner Hauptstraße 8-10
Yellow Tower „B“, 5th floor, SEM.R. DB gelb 05 B

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Metals Oxides as Model Supports for Single Atom Catalysis

Single-atom catalysis (SAC) offers an opportunity to minimize the amount of precious catalyst material required for traditional heterogeneous catalysis and to “heterogenize” reactions presently requiring homogeneous catalysis; this would eliminate the problem of separating catalyst and product, while retaining the excellent selectivity and activity of homogeneous catalysts.
Unravelling how metal atoms bind to metal oxide supports is crucial for a better understanding of the SAC´s catalytic properties. Using STM, nc-AFM and XPS, we compare several transition metals on different metal oxide support surfaces such as $Fe_2O_3(1\bar{1}02)$, rutile $TiO_2(110)$ and anatase $TiO_2(101)$ and the influence of water on the dispersion of these systems.
This study points out the importance of metal-support interaction and the surprisingly different behaviour of the transition metals on different metal oxide supports.

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Surface Structures of $La_{0.8}Sr_{0.2}MnO_3$ (001) Thin Films

Lanthanum-strontium manganite ($La_{0.8}Sr_{0.2}MnO_3$, LSMO) is a perovskite oxide used as a cathode material in solid oxide fuel cells. To gain deeper insights into the reaction mechanisms, it is important to understand the structure of the surface at the atomic scale. To this end, atomically flat single-crystalline LSMO thin films were grown on Nb-doped $SrTiO_3$ (001) substrates via pulsed laser deposition (PLD). The as-grown films were transferred in UHV from the PLD chamber to a surface science system. Studying the LSMO (001) surface by STM and LEED unveils various and unusual (cubic quasi-periodic) surface structures. They depend on the oxygen chemical potential upon annealing and termination of the surface (Mn or La/Sr).

All interested colleagues are welcome to this seminar lecture(s)
(2 x 20 min. presentations followed by discussion).

Friedrich Aumayr
(LVA-Leiter)

Ulrike Diebold
(Seminar Chair)