
O 22: Invited talk (Martin Sterrer)

Time: Tuesday 9:30–10:15

Location: HE 101

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Surface science approach to supported metal catalyst preparation - from UHV to metal deposition from solution

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Oxide-supported metal nanoparticles represent an important class of heterogeneous catalysts. Their catalytic activity depends on various parameters such as nanoparticle size, morphology, or nature of the support. Surface science studies of metal nanoparticles grown on single-crystalline oxide supports contributed substantially to the understanding of the physical and chemical properties of these systems and with the availability of spectroscopic methods that allow for in situ studies at elevated pressure, even reactivity studies under realistic pressure

conditions are possible. Maximizing the abundance of active sites for catalysis is the primary goal and is achieved by choosing appropriate preparation conditions. While UHV model systems are typically prepared by physical vapor deposition of the metal onto clean oxide surfaces, in most preparation procedures used for powder catalysts the precursor for the metal nanoparticle is a metal salt dissolved in an aqueous solution and the important adsorption process occurs at the solid-liquid interface. In this contribution, I will present results of our surface science approach to supported metal catalyst preparation utilizing thin single crystalline oxide films as substrates. I will discuss the influence of hydroxyl groups on Au and Pd nucleation and sintering on MgO(001) films and present first results for the deposition of Pd from aqueous PdCl₂ solutions on Fe₃O₄(111) films.