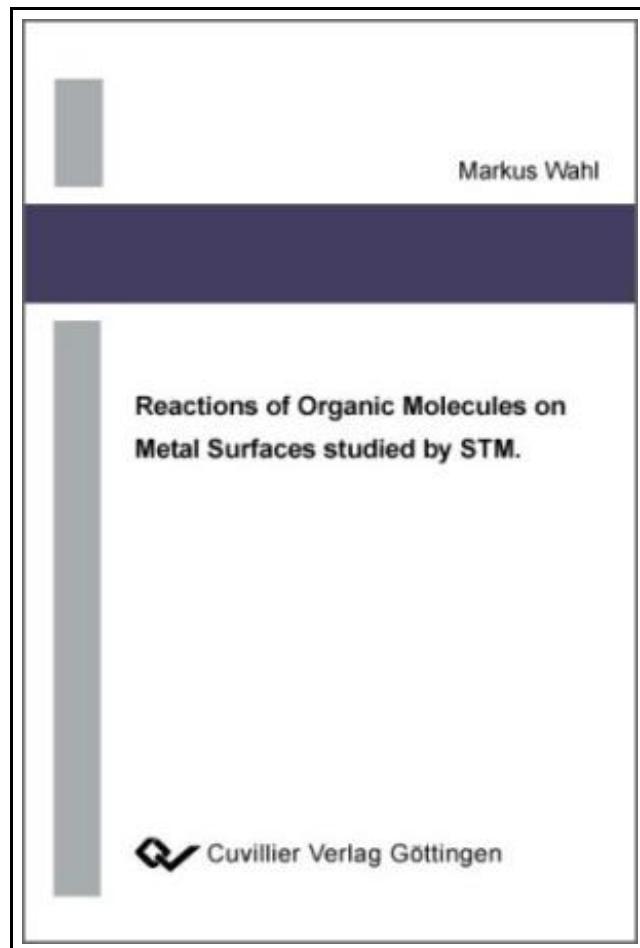


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Cuvillier Verlag Feb 2007, 2007. Taschenbuch. Book Condition: Neu. 210x149x9 mm. Neuware - Two distinct systems of surface reactions involving complex organic molecules were studied on single crystal metal surfaces by Scanning Tunneling Microscopy (STM), Low Energy Electron Diffraction (LEED) and X-ray Photoelectron Spectroscopy (XPS) under ultra high vacuum conditions. The first system focused on the Pt-cinchona alkaloid system, which is a powerful catalytic system in the field of enantioselective heterogeneous catalysis. Herein, an achiral reactant molecule is hydrogenated over a cinchona alkaloid modified platinum surface. The aim of the STM study was to gain direct insight in the molecular processes which occur during adsorption of modifiers and reactants involved. Therefore, the adsorption of cinchonidine (CD), cinchonine (CN) and 2,2,2-trifluoroacetophenone (TFAP) was investigated on both Pt(111) and Pd(111) single crystal surfaces. Different adsorption modes could be identified and a change in adsorption geometry upon addition of hydrogen could be followed. Our work showed, that the discrimination of different surface species by their mobility and the time-resolved observation of their surface chemical processes by STM provides a powerful tool for the investigation of complex catalyst systems. Such studies complement other surface analytical methods and quantum chemical calculations and help to gain insight into the mechanistic aspects. The second system is an example of how surface reactions can be used to efficiently self-assemble large complex structures. For this purpose a perylene derivative, 4,9-diaminoperylene-3,10-diimine (DPDI), was deposited on a Cu(111) single crystal surface and investigated by STM. These highly mobile precursor molecules are then transformed via a thermally induced surface-assisted dehydrogenation reaction by annealing in-situ at 300 °C. The resulting molecules form autocomplementary species of hydrogen-bond donor and acceptors and thereby can interact with each other via H-bonding. Due to strong so-called resonance-assisted hydrogen-bondings (RAHB) and an exact register with the Cu surface a highly...



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