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Observing Cooperative Behavior with Molecular Surface Structures

By Manfred Matena

Cuvillier Verlag Dez 2009, 2009. Taschenbuch. Condition: Neu. Neuware - In the work at hand the interplay between molecules as well as molecules and substrate is studied in ultrahigh vacuum (UHV). In Chapter 3 hydrogen-bond (H-bond) recognition, which is based on an H-bonding motif well-known in supramolecular chemistry, is investigated on Ag(111) for a three component system. Moreover, for one of the molecules a thermally induced phase transition from a porous network to a close-packed structure is found. Scanning tunneling microscopy (STM) and low energy electron diffraction (LEED) show that both surface structures exhibit long-range order and are commensurate with the Ag-substrate. In particular, this transition involves a conformational change of each molecule that is not observed in solution. Chapter 4 deals with the study of intermolecular interactions of the perylene derivative 1,3,8,10-tetraazaperopyrene (TAPP) on Cu(111). Different surface structures are observed which exhibit different types of intermolecular interactions. Surface structures formed by TAPP molecules interacting via weak van-der-Waals forces are transformed into a long-range-ordered porous network upon annealing. For this network, which is commensurate to the substrate, the intermolecular interactions are based on the coordination of Cu-adatoms to the N-atoms of TAPP. Upon further annealing covalent C-C couplings between TAPP molecules result...



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