

**O 78: Poster Session - Focus Session: Functional Molecules at Surfaces - Motion and Intramolecular Processes**

Time: Wednesday 18:15–20:00

Location: P2/EG

O 78.1 Wed 18:15 P2/EG

**The influence of the screening towards the properties of phthalocyanine monolayer structures** — •T.T.NHUNG NGUYEN, T.N.H. NGUYEN, T. SOLLFRANK, and C. TEGENKAMP — TU Chemnitz, Germany

Proximity effects due to molecular monolayers on two-dimensional materials, e.g. on epitaxial graphene, is a promising approach to modify the properties of the delocalized charge carriers. Thereby, long-range dispersing forces between the molecules and of the molecular film with the substrate provide a high degree of flexibility to realize various phases. Moreover, the concomitant screening of the substrate adds a further degree of freedom to alter the properties of the molecular film. Using STM/STS, we investigated the electronic properties of shuttlecock-like PbPc and planar magnetic MnPc on epitaxial graphene on SiC(0001) and compared with results on highly oriented pyrolytic graphite (HOPG). The incommensurate ratio of the graphene lattice with the molecular size fosters the growth of densely packed and chiral PbPc monolayers, with similar lattice parameters on monolayer graphene (MLG) and quasi-free monolayer graphene (QFMLG). The pronounced difference of the electronic structure is related to the different dielectric screening. On contrast, magnetic MnPc on MLG shows zig-zag like structures coexisting with a square unit cell, seen for PbPc. Such effects were not found for Pc/HOPG despite the same surface structure of graphene and graphite. Apparently, the dielectric screening of the 2D and 3D versions of the C-sp<sup>2</sup> allotrope is different and modifies the molecular interaction scheme.

O 78.2 Wed 18:15 P2/EG

**Fast one-dimensional motion of single molecules on a metal surface** — •DONATO CIVITA, GRANT J. SIMPSON, and LEONHARD GRILL — Department of Physical Chemistry, University of Graz, Austria

Molecular motion on crystalline surfaces is of great importance to understand fundamental physical and chemical properties as well as in

the field of heterogeneous catalysis. We studied the lateral motion of molecules over a Ag(111) surface by scanning tunnelling microscopy (STM). Single molecules are observed in a stable adsorption orientation, but by manipulating the molecules with the STM tip they can be reoriented into an orientation where they move much more easily. This behaviour will be discussed in terms of incommensurability, which creates a low diffusion barrier, and molecule composition as we have compared different molecules. It turns out that the implementation of halogen atoms surprisingly does not alter the effect of the fast motion, but increases the adsorption energy and stability of the molecule in one orientation and consequently the one-dimensionality of the motion.

O 78.3 Wed 18:15 P2/EG

**Covalent-Coupling Reaction of Aromatic Aldehyde on Ag(111)** — •NAN CAO, MARYAM EBRAHIMI, ALEXANDER RISS, ALEKSANDR BAKLANOV, KNUD SEUFERT, EDUARDO CORRAL RASCON, WILLI AUWÄRTER, and JOHANNES V. BARTH — Physics Department E20, Technical University of Munich, D-85748 Garching, Germany

Surface-confined reactions offer a promising pathway for the controlled synthesis of two-dimensional (2D) molecular networks. The 2D structures can be further characterized at an atomic scale resolution using scanning probe microscopy techniques. Within the last decade, many organic reactions have been investigated on metal single crystal surfaces, for examples, Ullmann-coupling, Glaser-coupling, and Schiff-base condensation. Here, we report on a new coupling reaction of aromatic aldehyde molecules on Ag(111) under ultrahigh vacuum conditions. The deposition of aldehyde reactants on Ag(111), following a post-annealing treatment, resulted in the formation of a polymeric network. Our atomic force microscopy and scanning tunnelling microscopy data indicate the linkage of aldehyde groups in the periphery of the reactants. Furthermore, we propose a reaction pathway enriched from our complementary X-ray photoelectron spectroscopy and density functional theory calculations data. Our data suggest on an unprecedented on-surface reaction strategy for designing novel 2D polymers.