

and JARA-Fundamentals of Future Information Technology, Forschungszentrum Jülich, D-52425 Jülich, Germany — ²Institute of Solid State Research (IFF) and JARA-Fundamentals of Future Information Technology, Forschungszentrum Jülich, D-52425 Jülich, Germany

Single and aggregated $\{Mo_7Fe_{30}\} \cdot H_2O$ polyoxometalate (POM) clusters have been studied by low-temperature ultra high vacuum (UHV) scanning tunneling microscope (STM). Several methods were tried to deposit polyoxometalates on the Au(111) surface. "Drop casting" from a water solution in N₂ atmosphere and pulse injection techniques were used for POM cluster deposition onto a previously cleaned Au(111) surface. After subsequent annealing in UHV samples were studied in the STM. STM images shows that POM clusters were adsorbed on clean Au (111) surface and reveal a strong affinity towards cluster agglomeration. Nevertheless it was possible to image single POM clusters.

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STM study of growth, structure, and stability of DMDS on Au(111) — ●PATRICK MEHRING, AXEL BEIMBORN, DANIEL WEIER, FRANK SCHÖNBOHM, TOBIAS LÜHR, and CARSTEN WESTPHAL — Fakultät Physik - Technische Universität Dortmund, Otto-Hahn-Str. 4, D 44221 Dortmund, Germany

Systems of self-assembled monolayers (SAM) are in the focus of present research activities due to their potential applications in fields like molecular electronics, bio-sensing, and the manipulation of metallic surface characteristics. Therefore, monolayers of linear alkanethiols are considered as ideal model systems. In this study the growth, structure, and stability of Dimethyldisulfide (DMDS) layers on Au(111) was investigated by scanning tunneling microscopy. SAMs were formed by solution deposition methods at room temperature. We varied the deposition time from 6h to 24h. Subsequently, several thermal annealing steps with increasing temperatures were performed in vacuum. After each step, the monolayer was investigated by STM. A stripe phase with increasing coverage as a function of the deposition time was observed. After annealing at 80°C molecular islands were observed at the surface. After island formation the stripe phase is removed completely due to the rearrangement of molecules at the surface. Between the islands an amorphous phase was found. Increasing the temperature to 150°C leads to a disappearance of the islands. The herringbone reconstruction of the gold surface reappeared.

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Comparison of Different Porphyrin Derivatives in Scanning Tunneling Microscopy — ●FLORIAN VOLLNHALS, FLORIAN BUCHNER, INA KELLNER, YUN BAI, MARTIN SCHMID, J. MICHAEL GOTTFRIED, HANS-PETER STEINRÜCK, and HUBERTUS MARBACH — Lehrstuhl für Physikalische Chemie II, Interdisciplinary Center of Molecular Materials (ICMM), Universität Erlangen-Nürnberg, Egerlandstr. 3, D-91058 Erlangen

Porphyrin derivatives are considered as ideal building blocks for the self-assembly of molecular devices due to their rigid structure triggering long range order and versatile functionalities. Here we explore the appearance of different porphyrin derivatives, namely octaethylporphyrins (OEP) and tetraphenylporphyrins (TTP), on Ag(111) in scanning tunneling microscopy (STM). Additional information concerning the electronic structure, in particular the density of states close to the Fermi level, was acquired by means of ultraviolet photoelectron spectroscopy (UPS) and scanning tunneling spectroscopy (STS). It will be shown that the contrast in a layer of intermixed CoTPP and 2HTPP [1] and the appearance of individual CoTPP molecules in STM depends on the applied bias voltage. The comparison in particular of CoTPP and CoOEP reveals similar signatures in UPS but different bias dependent appearance in STM. These findings will be discussed in terms of intramolecular conformation, molecule substrate interaction and the corresponding electronic structure. Supported by the DFG through SFB 583. [1] K. Comanici et al., *Langmuir*, 24(2008), 1897.

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Organic-Metal Interface: Cysteine on Au(110) — ●BENJAMIN HÖFFLING, FRANK ORTMANN, KARSTEN HANNEWALD, and FRIEDHELM BECHSTEDT — Institut für Festkörpertheorie und -optik, Friedrich-Schiller-Universität, Jena, Germany

The interaction of thiol groups with gold surfaces is of particular importance in the research of transport properties of organic materials (organic electronics) since the sulfur-gold interaction is strong and es-

tablishes a link between electrode and organic semiconductor. Additional functional groups, however, might have an influence on this bond and deserve attention in adsorption studies. By means of density functional calculations, we study such an interplay of different functional groups upon adsorption for the model system of the amino acid cysteine on the Au(110) surface. The interaction of the functional groups with the surface is investigated in detail. We present results on the electrostatic potential, the charge redistribution upon adsorption, and induced changes in the density of states. Finally, we predict four qualitatively different adsorption configurations for cysteine on Au(110) and compare their characteristics.

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Room temperature STM investigation of organic molecules deposited by pulse injection — ●CARMEN PÉREZ LEÓN¹, CHRISTOPH SÜRGER¹, MARCEL MAYOR^{2,3}, and HILBERT V. LÖHNEYSEN^{1,4} — ¹Physikalisches Institut and DFG-Center for Functional Nanostructures (CFN), Universität Karlsruhe, D-76128 Karlsruhe, Germany — ²Forschungszentrum Karlsruhe, Institut für Nanotechnologie, D-76021 Karlsruhe, Germany — ³Department of Chemistry, University of Basel, CH-4056 Basel, Switzerland — ⁴Forschungszentrum Karlsruhe, Institut für Festkörperphysik, D-76021 Karlsruhe, Germany

π -conjugated oligomers C₁₁₄H₁₅₈O₈S₂Si₂ (CHOSSi) have been deposited on clean Cu(111) at room temperature using the pulse-injection method with tetrahydrofuran (THF) as solvent. Scanning tunneling microscopy measurements in ultra-high vacuum at room temperature demonstrate that the CHOSSi and THF molecules coadsorb on the copper surface. The solvent molecules form ordered structures with distinct orientations and domain boundaries suggesting a strong interaction of THF with the substrate. Individual and small clusters of CHOSSi molecules appear randomly distributed on the surface with no apparent correlation with the solvent. A detailed study of the self-organized adsorption of the THF molecules on Cu(111) will be presented.

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Self-assembly of amino acids on noble metal surfaces: universality of the amino acid bonding scheme — ●JOACHIM REICHERT¹, AGUSTIN SCHIFFRIN^{1,2}, YAN PENNEC², WILLI AUWÄRTER¹, ALEXANDER WEBER-BARGIONI², MATTHIAS MARSCHALL¹, DEAN CVETKO³, ALBANO COSSARO³, ALBERTO MORGANTE³, and JOHANNES V. BARTH¹ — ¹Physik Department, TU München, Germany — ²Chemistry Department, University of British Columbia, Vancouver, Canada — ³INFN/TASC, Trieste, Italy

We investigated the molecular self-assemblies of L-methionine on Cu(111) and L-tyrosine on Ag(111) by means of STM, HAS, XPS and NEXAFS in UHV. The self-assembly of L-methionine on Cu(111) is strongly influenced by the substrate reactivity and reveals a temperature dependent structural transformation involving a chiral orientational switch and the emergence of an ordered 1D high temperature phase. XPS data show that this transformation is triggered by a thermally activated deprotonation of the NH₃⁺ group. The ordered phase shows noncovalent molecular dimerization and alignment into chains which are commensurate with the underlying substrate. L-tyrosine on Ag(111) self-assembles into linear nanoribbons primarily following the substrate crystalline symmetry. A zwitterionic noncovalent molecular dimerization is observed, and NEXAFS data provide evidence of a non-flat adsorption of the phenol ring. This dimerization scheme is reminiscent of methionine on Cu(111) and Ag(111), and supports a universal self-assembling trend for amino acids on close-packed noble metal surfaces.

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Substrate Effect in the structure of ordered Bis-terpyridine monolayer networks — ●THOMAS WALDMANN¹, DANIELA KÜNZEL², HARRY E. HOSTER¹, AXEL GROSS², and R. JÜRGEN BEHM¹ — ¹Institute of Surface Chemistry and Catalysis, Ulm University, D-89069 Ulm, Germany — ²Institute of Theoretical Chemistry, Ulm University, D-89069 Ulm, Germany

We present different supramolecular networks formed by monolayers of a Bis-terpyridine derivative (2,4'-BTP)[1,2] on the (100) and (111) surfaces of Ag and Au. On all four substrates, ordered and disordered structures are observed by STM and LEED under UHV conditions at T = 300 K and at 90 K. On Ag(111) and Au(111) surfaces, single 2,4'-BTP molecules are observed in 12 different orientations with 30° difference. This is explained by a best fit of the molecules to the sub-