DS 25: Organic Thin Films V

Time: Wednesday 18:00–19:00 Location: GER 37

DS 25.1 Wed 18:00 GER 37

Controlled Surface Modification by Electrospray Ion Beam Deposition: Coverage, Homogeneity and Soft Landing Energy — •Stephan Rauschenbach[1], Nicha Thontasen[1], Zhitao Deng[1], Ralf Vogelgesang[1], Nikola Malinowski[1,4], Jürgen Gerlach[3], and Klaus Kern[1,2] — [1]Max-Planck-Institut für Festkörperforschung, Heisenbergstrasse 1, D-70569 Stuttgart, Germany — [2]Institut de Physique des Nanostructures, Ecole Polytechnique Fèdèrale de Lausanne, CH-1015 Lausanne, Switzerland — [3]Leibniz-Institut für Oberflächenmodifizierung e. V., Permoserstr. 15, D-04318 Leipzig, Germany — [4]Central Laboratory of Photographic Processes, Bulgarian Academy of Sciences, 1113 Sofia, Acad. G. Bonchev St., Bl. 109, Bulgaria

The soft landing ion beam deposition (IBD) of Rhodamine dye molecules on solid surfaces in high vacuum is investigated with the goal to fabricate molecular nanostructures from non-volatile molecules for in-situ analysis. Molecular ion beams created by electrospray ionization with controlled composition and energy are deposited on SiO_x surfaces. Fluorescence spectroscopy and time-of-flight secondary-ion-mass-spectrometry (TOF-SIMS) are employed in order to characterize the sample with respect to coverage, homogeneity and soft landing ratio. We find that homogeneous films of material can be produced at energies of 2-75 eV. The coverage is found to be proportional to the ion dose and soft landing is found for energies up to 24 eV.

DS 25.2 Wed 18:15 GER 37

Investigation of the structure of TCNQ molecules on Cu(100) by Helium Atom Scattering — •Katrin Fladischer[1,2], Antonio Politano[1], Daniel Farías[3], and Rodolfo Miranda[1,3] — [1]Instituto Madrileño de Estudios Avanzados en Nanociencia (IMDEA-Nanociencia) Cantoblanco, 28049 Madrid, Spain — [2]Institute of Experimental Physics, Graz University of Technology, Petersgasse 16, 8010 Graz, Austria — [3]Departamento de Física de la Materia Condensada and Instituto de Ciencia de Materiales Nicolás Cabrera, Universidad Autónoma de Madrid, 28049 Madrid, Spain

The relatively young field of organic electronics can be related to the discovery of the conducting charge-transfer salt TTF-TCNQ in 1973. The salt consists of the two organic compounds TTF (Tetrathiafulvalene) and TCNQ (Tetracyanochinodimethan). We have studied the structure formed by TCNQ on Cu(100) by Helium Atom Scattering (HAS), LEED and Temperature Programmed Desorption (TPD). We have found that adsorption at 110 K followed by thermal annealing leads to the appearance of a well-ordered structure, as demonstrated by the presence of pronounced diffraction peaks in the HAS spectra. The corresponding LEED pattern suggests that molecular self-assembly is accompanied by a reconstruction of the Cu(100) substrate. This information was used to determine the lattice parameters of the TCNQ adlayer structure. Three desorption peaks were observed in the TPD spectra, which indicates that TCNQ desorbs in the temperature range between 200-350K. Finally, HAS was used to measure the phonon dispersion curves of TCNQ/Cu(100) at different scattering conditions.

DS 25.3 Wed 18:30 GER 37

Smoothening and efficient void filling in Perfluoropentacene-templated growth of Pentacene — •Alexander Hinderhofer, Stefan Kowarik, Alexander Gerlach, and Frank Schreiber — Institut für Angewandte Physik, Universität Tübingen, Auf der Morgenstelle 10, 72076 Tübingen

Pentacene (PEN) and perfluoropentacene (PFP) have been found to be promising candidates for organic electronic and opto-electronic applications due to their high mobilities[1].

We use *in situ* real-time x-ray reflectivity to monitor crystallinity and roughness evolution during growth of a heterojunction of PEN and PFP. PEN evaporated on PFP leads to efficient gap filling of the rough PFP surface so that the heterojunction is coherently ordered throughout the complete bilayer. The growth of such a coherent crystalline system is facilitated by similar geometry and similar crystalline lattice spacing of the molecules. In addition the growth of PEN on PFP has a smoothening effect, i.e. the top roughness of the PEN film is lower than the roughness of the underlying PFP film and far lower compared with PEN growth on a SiO_2 substrate.

The data analysis of a coherently ordered PFP-PEN bilayer is presented and possible explanations for the anomalous growth behavior are discussed.

[1] A. Hinderhofer, U. Heinemeyer, A. Gerlach, *et al.*, *J. Chem. Phys.* **127**, 194705 (2007).

DS 25.4 Wed 18:45 GER 37

Structured Polymer Brushes by AFM Lithography — •Michael Hirtz[1], Marion K. Brinks[2], Saskia Miele[2], Armido Studer[2], Harald Fuchs[1], and Lifeng Chi[1] — [1]Physikalisches Institut, Westfälische Wilhelms-Universität, Wilhelm-Klemm-Straße 10, 48149 Münster (Germany) and Center for Nanotechnology (CeNTech), Heisenbergstraße 11, 48149 Münster (Germany) — [2]Organisch-Chemisches Institut and NRW Graduate School of Chemistry, Westfälische Wilhelms-Universität, Corrensstraße 40, 48149 Münster (Germany)

Structured polymer brush films (i.e. films covalently linked to the substrate) of different polymers (polystyrene (PS), poly n-butyl acrylate (PNBA) and poly N-isopropylacrylamide (PNIPAM)) with thicknesses from 20 to 30 nm on silicon wafers were obtained by AFM lithography. In comparison to corresponding spin-coated films considerable differences in concern to AFM lithography were observed. Well-defined line pattern with a constant line width around 100 nm and a periodicity of 200 nm are obtained on polymer brushes, whereas the spin-coated films show extensive line broadening and ablation. The finding indicates less lateral crosslink in the polymer brush film thus allowing the high resolution AFM lithography. In addition, site selective immobilization of dye and bioactive molecules into the structured brushes was demonstrated as well as the possibility of parallel large area writing with cantilever arrays.

[1] M. Hirtz, M. K. Brinks, S. Miele, A. Studer, H. Fuchs, L. F. Chi, Small, in print. (DOI: 10.1002/smll.200801339)