Österreichische Physikalische Gesellschaft

⟨S|P|S⟩ swiss physical society

Gemeinsame Jahrestagung in Innsbruck
30. August - 03. September 2021

Universität Innsbruck, Technik Campus

Joint annual meeting in Innsbruck
30 August - 3 September 2021

in Zusammenarbeit mit - in collaboration with

CHiPP Swiss Institute of Particle Physics

beyondC

universität innsbruck

Bulletin SPG / SSP Vol 37, 2021; ÖPG Tagungsband Nr. 70

		Comparing the behavior of 2H-TPP with that of porphyne (2H-P) by angular resolved photoemission spectroscopy and scanning tunneling microscopy, we have investigated the role of the macrocycles on the metalation. We observed that 2H-P molecules self-metalated regardless of their charge state, demonstrating that the key factor in enabling the self-metalation of porphyrines on MgO is the proximity of the nitrogen atoms to the underlying surface.
18:15	**236**	**Stable metal-organic network on a weakly-interacting substrate: Fe-TCNQ on graphene** *Zdenek Jakub, Anna Kurowska, Lenka Cerna, Pavel Prochazka, Lukas Kormos, Azin Shahsavar, Jan Cechal* *Central European Institute of Technology (CEITEC)* 2D metal-organic networks show great promise for applications in catalysis, gas sensing or electronics. Ascertaining fundamental intrinsic properties of such systems requires their synthesis on weakly-interacting substrates. Here, we show Fe-TCNQ networks self-assembled on graphene/Ir(111), studied experimentally by Low Energy Electron Microscopy (LEEM), Scanning Tunneling Microscopy (STM) and X-Ray Photoemission Spectroscopy (XPS). A single Fe-TCNQ structure is present in three non-equivalent orientations on the graphene substrate; symmetry operations lead to observation of fifteen rotational domains. The network is thermally stable up to ca. 550°C, making this an ideal model system for fundamental studies of single-atom reactivity or charge transfer induced phenomena.
18:30	**237**	**Special Structures of a Prototypical Organic-Semiconductor Transparent-Electrode Interface: CuPc on In_2O_3(111)** *Matthias Blatnik [1], Fabio Calcinelli [2], Peter Jacobson [3], Andreas Jeindl [2], Oliver T. Hofmann [2], Jan Cechal [1], Michael Schmid [4], Ulrike Diebold [4], Margareta Wagner [4]* *[1] CEITEC VUT Brno, Czechia, [2] TU Graz, [3] The University of Queensland, Brisbane, Australia, [4] Institute of Applied Physics, TU Wien* Indium oxide (In_2O_3) is a ubiquitous anode material in OLEDs and photovoltaics due to its transmissivity to visible light and metal-like conductivity (when doped with Sn). When In_2O_3 is paired with organic materials, a thin organic buffer layer is often introduced to improve the charge injection from In_2O_3 to the organic active layers. We probe the adsorption behaviour and density of states (DOS) of the prototypical copper phthalocyanine (CuPc) - In_2O_3 interface combining scanning tunnelling microscopy, non-contact atomic force microscopy and local tunnelling spectroscopy. Starting from the clean In_2O_3(111) surface we identify morphological details of the molecular structures and their electronic properties and compare the results to DFT calculations.
18:45	**238**	**Biomimetic Passive Cooling** *August Hammel, Ilse Christine Gebeshuber, TU Wien* With the increasing average global temperature more and more households need a way to cool down. This study explores biomimetic passive cooling utilizing structured surfaces. The focus is put on structures that lower a body's average temperature without using electricity or replenishable resources. Biomimetics helps to find non-polluting ways to achieve such cooling structures. At first, the physical principles will be explained, accompanied with current studies about their implementation. Biomimetics and its importance for this thesis will be discussed. Some examples found in nature will be explained. Possible attempts to use those will be expatiated. Finally, a summary will be given with an outlook about the future of passive cooling.
19:00		
19:30		***Public Lecture***

16:30		***Coffee Break***
19:00		***Transfer to Dinner***
19:30		***Conference Dinner***

ID	SURFACES, INTERFACES AND THIN FILMS POSTER
251	**EFFIE - Effizientere, biobasierte und recyclebare Stretchfolie** *Maja Vasiljevic [1], Nadine Wild [2], Michael Feuchter [2], Paul Schindler [3], Anett Poczi [3], Martin Riester [3], Mark Macqueen [4], Harald Pamminger [5], Reiner Wittendorfer [5], Andreas Brandstätter [6], Ilse C. Gebeshuber [1]* *[1] TU Wien, [2] Montanuniversität Leoben, [3] Fraunhofer Austria Research GmbH, [4] AN-COR-TEK C.E. GmbH, [5] Pamminger Verpackungstechnik GesmbH, [6] Lenzing Plastics GmbH Co KG* Es werden die ersten Highlights des FFG Projekts der FTI-Initiative “Produktion der Zukunft” präsentiert. Das Ziel ist, eine konventionelle, erdölbasierte Wickelfolie für Supermarkt-Palettenverpackungen durch eine biobasierte, recycelbare Stretchfolie zu ersetzen. Da biobasierte Kunststoffe meist teurer, steifer und weniger dehnbar sind, sollen funktionale Perforationsmuster entwickelt werden, welche dabei helfen, Material einzusparen. Mit dem biomimetischen Lösungsansatz werden Bienenwaben-, Falt- und auxetische Strukturen als Vorlage für Perforationsmuster herangezogen. Um Materialverschwendung bei mechanischen Zugversuchen zu minimieren, werden FE Simulationen durchgeführt und ein iterativer SKO Algorithmus soll erstellt werden, welcher optimale Perforationsmuster berechnet. Das Ergebnis soll eine biobasierte, recycelbare Stretchfolie mit einem funktionalen und materialsparenden Perforationsmuster sein, welche ihre weniger nachhaltigen, erdölbasierten Vorgänger ersetzen kann.
252	**Mechanisms for direct wafer bonding of CVD dielectrics** *Nikolaus Rauch [1], Bernhard Rebhan [2], Viorel Dragoi [2], Heiko Groiss [1]* *[1] Christian Doppler Laboratory for Nanoscale Phase Transformations, Center for Surface and Nanoanalytics, Johannes Kepler University Linz* *[2] EV Group, DI E. Thaller Straße 1, AT-4782 St. Florian/Inn* The need for 3D integration in semiconductor industry has driven the key technology of wafer bonding to a new level. Low temperature plasma activated wafer bonding (LT-PAWB) requires high adhesive forces between two polished surfaces at reduced annealing temperatures. In this process silicon wafers with a deposited dielectric layer (SiO_2, SiC_xN_y) are activated, contacted and annealed. The plasma condition as well as the dielectric’s composition have a significant impact on the final bonding properties. TEM-EDX, AR-XPS, AES and SE are applied on single activated surfaces and bonded samples in order to derive a model of the physical mechanisms occurring during the bonding process.
253	**Controlled Manipulation of Single Molecules on an Ag(111) Surface** *Julia Lanz, Donato Civita, Leonhard Grill, Grant J. Simpson, University of Graz* The controlled motion of single molecules gives deeper understanding of the relation between molecular motion and the chemical and geometrical properties of molecules on the surface. However, the thermal motion of molecules is a stochastic process, which is difficult to control. Here, we have used scanning tunneling microscopy, kept at temperatures of about 7 K and ultrahigh vacuum conditions, to move individual molecules controllably across a flat Ag(111) surface. Lateral manipulation is used to gain insight into the dependence of molecular dynamics on the precise chemical structure of the molecules. Moreover, vertical manipulation provides information about the dependence of molecular motion on conformational changes.