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Invitation

Institute of Applied Physics – TU Wien

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Molecular architectures at the interface: From fundamental surface science to novel functional materials

Molecule-based nanoarchitectures play a central role in various field of nanotechnology such as OLEDs, solar cells, molecular electronics, and nanophotonics. Here, I report the bottom-up construction of functional molecular nanoarchitectures under ultra-high vacuum conditions on well-defined surfaces. After acquiring profound knowledge on the structural, chemical and electronic properties at the single-molecule level, the main target is the atom-precise fabrication of novel nanomaterials. The necessary comprehensive understanding is obtained by the so-called "STM+XS" approach combining scanning tunneling microscopy (STM) and X-ray spectroscopy (XS) with density functional theory investigations and all-atom molecular dynamic simulations. The multi-technique methodology achieves a precise characterization of the fabricated nanostructures and the underlying formation mechanisms as well as their electronic properties [4] and structural dynamics. A major focus of my current and future research is the fabrication of graphdiyne-related materials with surface-controlled polymerization processes. We have recently demonstrated that homo-coupling of terminal alkynes on a noble metal surface represents a promising approach with a reaction mechanism fundamentally different from the classic Glaser coupling. Control over side reactions via surface templating and secondary functional groups renders possible the fabrication of well-defined graphdiyne nanowires. The novel, semiconducting nanomaterial exhibits an exciting band structure and potential for polymeric information storage. In the last part of the talk envisioned future activities will be projected. Bases on our recent results on the versatile on-surface chemistry of corroles, I want to develop novel approaches towards catalytic interfaces. Further targets includes electron transport measurements of the organic semiconductor material and extending the templated covalent synthesis to 3D.

Date:

Thursday, **24.11.2016**, 08:30

Venue:

TU Wien
Freihaus Hörsaal 2
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