O 48: Invited Talk (Florian Klappenberger)

Time: Wednesday 15:00–15:45 Location: H36

Invited Talk O 48.1 Wed 15:00 H36

Surface-confined molecular nanoarchitectures: non-covalent and covalent construction and templated dynamics — •Florian Klappenberger — Physik Department E20, James-Franck-Str.1, 85748 Graching

The in vacuo engineering of molecular nanoarchitectures using non-covalent interactions and covalent bonding between carefully designed building blocks on well-defined surfaces is investigated with a complementary multitechnique approach combining scanning tunneling microscopy and X-ray spectroscopy with the appropriate theoretic tools. First, the hierarchic formation principles of supramolecular networks combining hydrogen bridges, proton acceptor ring interactions and metal-organic bonding are unraveled and some exemplary functionalities, e.g., the confinement of electrons or the controlling of the growth of magnetic clusters, are reviewed. In addition, the nanoporous architectures can control translational, rotational and constitutional dynamics and provide a new way to study such phenomena on the single molecule level. We present a detailed analysis of the caged molecular dynamics by molecular force-field simulations customized on the basis of density functional theory calculations. In the second part, the construction of novel carbon scaffolds with the help of an on-surface covalent reaction formally reminiscent of the Glaser-Hay homo-coupling of terminal alkynes is discussed. After showing the controlled formation of dimerized species and polymerized irregular networks we discuss our current understanding of the reaction pathway on the noble metal Ag(111) surface differing from the classic pathway on more reactive substrates.