Abstract of Presentation

Presentation Title:

"Soft" metallic contact to isolated C60 molecules

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Abstract :

One of the premier challenges in the field of molecular electronics is to realize good electrical contact between a metallic electrode and an individual molecule while retaining intrinsic properties of the organic material. We demonstrate how the electronic as well as structural properties of the $C_{60}/Ag(111)$ interface can be finely adjusted by an interfacial layer of the electron acceptor hexaazatriphenylene-hexanitrile (HATCN), yielding firmly surface-adsorbed isolated C_{60} molecules (with electronic properties not modified by adsorption) at room temperatures. Photoemission experiments as well as quantum-mechanical modeling reveal that HATCN on Ag(111) exhibits metallic character, in particular a partially filled band at the Fermi level. This allows to realize a metallic contact to C_{60} molecules, while at the same time the chemisorption on the Ag(111) surface including electron transfer from the metal to C_{60} is prevented. Additionally, scanning tunneling microscopy evidences that the honeycomb arrangement of HATCN on Ag(111) provides an ideal template for the adsorption of individual C_{60} molecules in a defined structure, with significantly decreased lateral intermolecular interaction between neighboring molecules.