Poster

GROWTH OF TTF-TCNQ ON METAL SURFACES

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Molecular charge transfer (CT) complexes are defined as the association of electron donor and electron acceptor molecules. The self-assembling properties of molecules open the possibility of building different donor-acceptor stacking structures which rule the electronic funcionality of the compound. Tetrathiafulvalene 7,7,8,8-tetracyanoquinodimethane (TTF-TCNQ) is a well-known example of a CT complex which shows a metal conducting behaviour at Room Temperature. The stacking of TTF and TCNQ forms in bulk one-dimensional partially occupied energy bands that gives rise to the metallicity. By means of Low Temperature Scanning Tunneling Microscopy/Spectroscopy we have characterised for the first time the mixed growth of TTF and TCNQ on a metallic surface in submonolayer and monolayer regimes. The self-assembled growth is governed by donor-acceptor recognition. In particular a one dimensional phase with alternating lines of TTF and TCNQ is formed and can be considered as the precursor stage for the bulk structure. A new phase, not existing in solid state has been additionally found having a 2:1 stoichiometry. This new phase tuned out to dominate in the regime of higher coverage frustrating that a linear phase can be grown beyond the first monolayer. By Scanning Tunneling Spectroscopy we associate electronic resonances with the Highest Occupied Molecular Orbital (HOMO) and the Lowest Unnoccupied Molecular Orbital (LUMO) of TTF and TCNQ and the self-assembled TTF-TCNQ. In the mixed phase the electronic configuration of TCNQ is strongly modified by the presence of TTF.