

## FORMATION OF LOW DIMENSIONAL DISPERSIVE BANDS AT A MOLECULAR-METAL INTERFACE

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Metal/organic interfaces are a subject of increasing interest in the condensed matter community. On the one hand, organic materials have advantageous properties like ease of growth and electronic tunability by molecular synthesis. However, they possess low electron mobility, which makes them not so efficient for their use in electronic devices. The combination of inorganic metal surfaces and molecular layers opens a new perspective for increasing the efficiency of the organic device by merging the high carrier mobility of the metal and the patterning of the molecular film.

Here we report on the creation of interface bands with high electron mobility and low dimensionality developed upon adsorption of a TTF-TCNQ molecular adlayer on a Au(111) surface. The study has been carried out by means of Low Temperature Scanning Tunneling Microscopy (STM) and Spectroscopy (STS), in combination with Density Functional Theory (DFT) calculations.

TTF-TCNQ is a prototypical charge-transfer complex, known by its bulk quasi-one dimensional metallicity induced by electron delocalisation along  $\pi$ -stacked molecular chains. In the ultrathin-film regime, TTF and TCNQ self-assemble via donor-acceptor recognition and form domains where the molecules are distributed in rows in a similar fashion as the bulk organization, but adsorbed parallel to the surface. The interaction of the TTF-TCNQ film with the metal is dominated by the TTF, while TCNQ remains fairly unperturbed by the surface.

The electronic structure of the interface is characterized by two quasi-metallic bands exhibiting the anisotropic fingerprint of the molecular row structure. They arise from the Au(111) surface state distorted and shifted due to the interaction of the metal with the TTF rows. This molecular arrangement induces a periodic potential across the molecular chains that further folds the interface band, resulting in interface states with novel molecular and metallic hybrid character with dispersion confined along the molecular rows.

