CO-ADSORPTION OF TRIPTYCENE AND FULLERENES ON Au(111): THE ROLE OF π-π INTERACTION AS A PRECURSOR OF A MULTILAYER GROWTH AND SUPRAMOLECULAR STRUCTURES

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The adsorption of triptycene molecules ($C_{20}H_{14}$) on Au(111) is studied by means of Low-Temperature Scanning Tunnelling Microscopy and Spectroscopy. We use triptycene as a model system to investigate the balance between the tendency of the aromatic units to bond flat, parallel to the metallic surface, and the intermolecular π-π interactions. In planar aromatic molecules the interaction of π states with the metal electronic states usually dominates. The structure of triptycene frustrates partially such planar configuration. As a result, the interaction of triptycene with the Au(111) metal surface is described by a weak adsorption. As soon as the substrate temperature is above 100 K, triptycene grow in self-assembled molecular islands with a characteristic multilayer structure, which present a insulator behaviour with a gap of 6eV. The growth mechanism is mediated by strong intermolecular interactions, due to the frustration of chemisorption at the Au(111) surface.

Once the Triptycene growth is characterised, the interaction of two π-conjugated molecules [1,2] is also studied through the co-adsorption of Fullerenes (C_{60}) and Triptycene. The first results show a strong attraction between these two molecules via orbital interaction and the formation of different supramolecular-patterns depending on the characteristics of deposition.

References:

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