STM STUDY OF πCONJUGATED FLUORENONE-BASED SELF-ASSEMBLED ORGANIC SEMICONDUCTORS

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Studying the structural organization of πconjugated architectures and supramolecular assemblies adsorbed on substrates is of considerable importance for the development of organic and molecular electronics. We report here on a LC-STM study under UHV condition on self-assembled monolayers of two πconjugated fluorenone-based organic semiconductors, B4OTF and B5OTF.

Both B4OTF and B5OTF monolayers self-assemble on HOPG to give highly organized 2D crystals. They display moreover almost identical organization due to very close molecular structure. However, we will show that the different anchoring position of the n-octyl side-chains on the thiophene heterocycle induces strain inside the monolayer resulting in a periodic relaxation along one of the crystallographic axes.

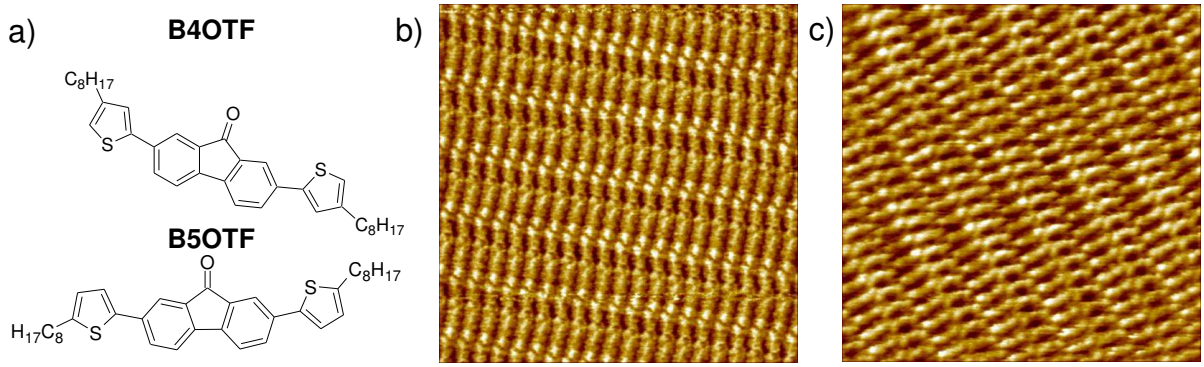

Fig1: a) B4OTF and B5OTF monomers b),c) STM (25x25 nm, 500x500 pixels) images of self-assembled monolayers B4OTF(b : I_t= 10pA, V_g=-1V) and B5OTF(c : I_t= 15pA, V_g=-1.5V).

Additionnally, we will show that, upon annealing under UHV condition, B5OTF monolayers can self-assemble into a second 2D crystalline phase. All these 2D structural organization will be discussed and analyzed and tentative 2D packing model will be proposed. These models will be compared to the 3D packing (DSC, POM and XRD) of these organic semiconductors in their "bulk" crystalline (single crystal) and liquid crystalline phases.