Toward conformational identification of molecules in 2D and 3D self-assemblies on surfaces

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The design of supramolecular networks based on organic molecules deposited on surfaces is highly attractive for various applications. One of the remaining challenges is the expansion of monolayers to well-ordered multilayers to enhance the functionality and complexity of self-assemblies. In this study, we present an assessment of molecular conformation from 2D to 3D supramolecular networks adsorbed onto an HOPG surface under ambient conditions utilizing a combination of scanning probe microscopies and atomic force microscopy- infrared (AFM-IR). We have observed that the infrared (IR) spectra of the designed molecules vary from layer to layer due to the modifications in the dihedral angle between the C=O group and the neighboring phenyl ring, especially in the case of a 3D supramolecular network consisting of multiple layers of molecules [1].

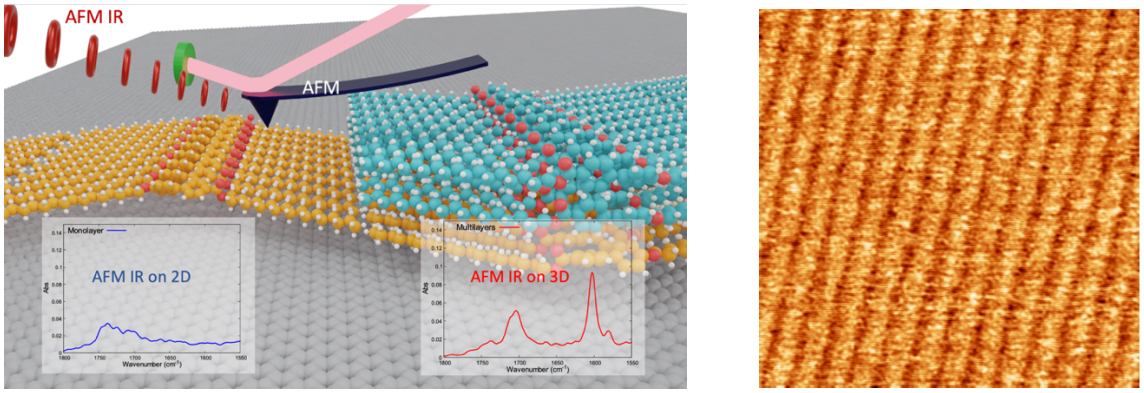

Figure 1 : Principle of the conformational identification of molecules in 2D and 3D self-assemblies by combining STM, AFM and AFM-IR (left) and Topography AFM image (right, 65×65 nm^2) of a monolayer of EsterOC18 molecules deposited on a HOPG surface showing a compact periodic network constituted by bright lines separated by darker stripes, with a periodicity of 5.60 ± 0.1 nm.

Références

[1] Hamadeh, A.; Palmino, F.; Mathurin, J. ; Deniset-Besseau, A. ; Grosnit, L. ; Luzet, V. ; Jeannoutot, J. ; Dazzi, A. ; Chérioux, F. *Communications Chemistry* **2023**, *6*, 246.