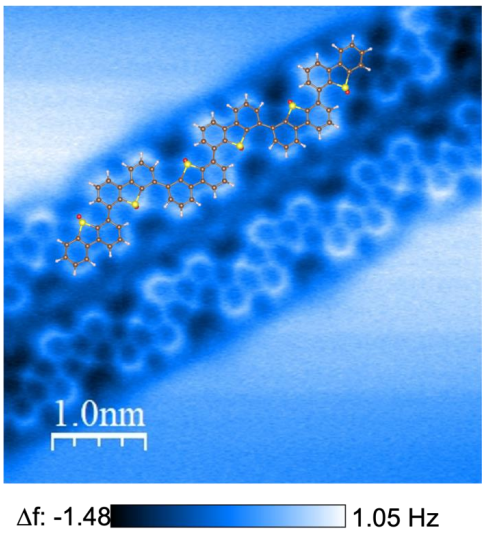
From single molecule to supramolecular or polymerized layer on surfaces

Organizers: Sylvain Clair (IM2NP, Marseille) Thomas Léoni (CINaM,Marseille) Christian Loppacher (IM2NP,Marseille) Laurent Nony (IM2NP,Marseille).

Support: **AMUtech**. Aix Marseille University recently structured its research activities into 12 establishment institutes. Among these, the AMUtech institute dedicated to the study of Advanced Materials and Nanotechnologies brings together 9 UMRs on the site with the aim of developing synergies between physicists and chemists. In this context, AMUtech sponsors and supports this mini-symposium.

This mini-symposium will focus on recent developments concerning the synthesis and characterization of deposits of organic molecules on solid surfaces. Whether we are interested in the intrinsic properties of single molecule, of self-assembled layers, or even in the influence they have on the surface which supports them, the characterization and understanding of these hybrid systems constitutes a field of research actively invested by various communities. Among them, that of near-field microscopy which allows direct access to the atomic topography of the surface, but also to various electronic, optical and magnetic spectroscopies, in order to establish local structure-property relationships of these layers. The reaction of molecular tectons between them, often catalyzed by the surface, can be induced thermally or under electromagnetic radiation, with the possible consequence of polymerizing them and thus forming new covalent architectures on the surface [1]. Among the other communities interested in these systems, we find that of mesoscopic characterizations of these materials in order to quantify their macroscopically exploitable properties (electronic transport, optical absorption, etc.) [2]. More recently, a community has developed which is interested in hybrid van der Waals heterostructures with the possibility of introducing a supramolecular layer as a 2D layer in weak interaction with its support, allowing vertical stacking of organic / inorganic tlayers. [3].

Understanding and modeling the mechanisms behind the growth of ordered organic layers, ribbons, or wires on surfaces; master and exploit this structural order at the molecular scale to force the emergence of innovative properties in the material; inducing surface reactions to synthesize new covalent structures, or even characterizing the physical properties of these systems, from the atomic scale to the mesoscopic scale will be at the heart of the interventions of this mini-symposium.



Atomic force microscopy image in non-contact mode with a CO functionnalized tip illustrating the on surface synthesis of dibromo-sulfoxide via Ulmann coupling obtained by annealing the molecular deposit on Au(111) surface at 200°C.(IM2NP,Marseille)

References

[1] Clair, S.; de Oteyza, D. G. *Chemical Reviews* **2019**, *119*, 4717–4776.
[2] Ayelet Vilan, Dinesh Aswal, and David Cahen *Chemical Reviews* **2017** 117 (5), 4248-4286
[3] Gobbi, M.; Orgiu, E.; Samorì, P. *Adv. Mater.* **2018**, *30* (18), 1706103.