

Post-Doctoral Position Available:

Atomically-printed 3-dimensional molecular assembly

- **Context :**
 - Host laboratory: [Institut Matériaux Microélectronique et Nanosciences de Provence \(IM2NP, UMR 7334 CNRS\)](#)
 - Research team: [Nanostructuration \(leader: Ch. Loppacher\)](#)
 - Host university: Aix-Marseille Université, France
- **Funding:**
 - Beginning / Duration : As soon as possible / 1 year
 - Gross salary : Depending on professional experience gross salary : 2 552 – 2900 Euros per month

On-surface synthesis is a newly developing field of research that aims at making use of well-defined solid surfaces as confinement templates to initiate chemical reactions.⁽¹⁾ The concepts of supramolecular chemistry are here applied to provide well-defined functional surfaces from the “bottom-up” self-assembly of nanometer-sized elementary building-blocks. The interest for creating covalent nanoarchitectures directly on surfaces is manifold. On-surface synthesis gives access to original reactions mechanisms in mild conditions that would be not easily accessible in standard chemistry conditions. Also, it represents an efficient route to the formation of robust organic networks and 2D polymers. Finally, the full range of available surface science techniques can deliver exquisite characterization of the different reaction processes with atomic precision.

The main objective of the post-doctoral researcher will be to use specially-designed original building blocks and build molecular 3D-edifices on surface with an atomic precision. To reach this goal our strategy consists in the combination of a radical-based chemistry with low temperature-scanning probe microscopy-tip manipulation.⁽²⁾ This interdisciplinary project will gather the expertise of our team for high-resolution AFM/STM experiments with the organic synthesis performed by our collaborators in chemistry (ICR laboratory with another postdoctoral researcher hired on the project, supervisor: D. Gigmes).

- (1) Clair, S.; De Oteyza, D. G. Controlling a Chemical Coupling Reaction on a Surface: Tools and Strategies for On-Surface Synthesis. *Chem. Rev.* **2019**, *119*, 4717-4776.
- (2) Kawai, S. *et al.*, Three-dimensional graphene nanoribbons as a framework for molecular assembly and local probe chemistry. *Sci. Adv.* **2020**, *6* (9), eaay8913.

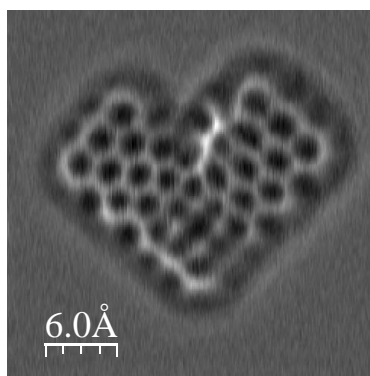


Figure : Image of a precursor obtained in the laboratory with high resolution AFM at 9K.

The molecules will be deposited in ultrahigh vacuum (UHV) and characterized by high resolution scanning probe microscopy (STM/AFM) at low temperature.

The research work will be carried in the Nanostructuration team at the Institut Matériaux Microélectronique et Nanosciences de Provence (IM2NP-UMR 7334) and in the framework of a collaborating project from the Initiative of Excellence (IdEx) foundation A*midex, involving Institut de Chimie Radicalaire (ICR), a partner laboratory for organic synthesis in Marseille.

The candidate must have a good experience in surface science and more specifically in scanning probe microscopy.

Keywords: Surface Science, Physical Chemistry, Scanning Probe Microscopy (STM/AFM).

Interested candidates are invited to send CV, motivation letter, and contact details of two referees to Sylvain Clair (sylvain.clair@im2np.fr).