

Postdoctoral Research Fellow

A*Midex Grant: Two-dimensional functionalized covalent organic frameworks

We are seeking to recruit a Postdoctoral Research Fellow to join a multidisciplinary research team in the framework of an Amidex grant "Initiative of Excellence" at the frontier of surface science and synthetic chemistry. The successful applicant will be based at Aix-Marseille University, Saint-Jérôme campus, and work under the supervision of Sylvain Clair and Mathieu Abel. The position is associated with a salary in the range €23 500 - €27 600 depending on experience and qualifications and is available initially for a 12 month period, with potential to extend funding for a second year, subject to evaluation. Applicants should be available to start work on January 1st, 2014.

Background and Research Objectives

The concepts of supramolecular chemistry have been successfully applied in the last decade to create well-organized structures on surfaces. Precise control of the spatial arrangement of nanometer-sized elementary building-blocks during the "bottom-up" construction of two-dimensional monolayers is the key step to get well-defined functional surfaces. Recently, a fundamental progress has been made with the demonstration that covalent linkages between organic molecules can be created on a metal surface. In this way, a two-dimensional (2D) polymer (or surface covalent organic framework, SCOF), a unique material raising large interest for various fields, can be directly synthesized. However, these preliminary researches reveal the difficulties encountered during the delicate growth mode: the strong covalent bonds lack flexibility and reversibility during the formation process in the low-dimensional environment of a surface and therefore strongly limit the possibility of defect self-healing. The development of 2D polymers based on new and more efficient chemistries or with controllable growth conditions is highly necessary and will condition the future of this emerging technology. The present project aims at elucidating the growth conditions of this new class of materials by a precise tuning of the molecular precursors and their interaction with the underlying substrate, as well as by proposing original 2D covalent organic frameworks with well-controlled properties. The main focus will be given to create new systems at the liquid-solid interface in ambient conditions.

You will be involved in the formation of various two-dimensional polymers in UHV environment or at the liquid-solid interface and in their characterization by scanning tunnelling microscopy (STM). Other surface characterization techniques such as LEED and XPS are also available in the laboratory. You will be working in close collaboration with the chemistry group of Didier Gigmes and Frédéric Dumur (ICR, Marseille) to initiate the synthesis of original molecular building blocks and provide feedback on their ability to successfully react on a surface.

Keywords

Supramolecular self-assembly, surface covalent organic frameworks, solid-liquid interface, UHV, STM.

We are looking for someone who has

- a PhD degree in condensed matter physics, physical chemistry or materials science.
- the knowledge, and the communication skills necessary to work in such a multi-disciplinary project involving chemists and physicists.
- a proven experience in experimental physics in general, more particularly in surface science.

A previous experience in scanning probe microscopy will be greatly appreciated.

Location and Environment

You will be working in the Nanostructuration team at IM2NP, campus de Saint-Jérôme, in Marseille, France. The project will be conducted in a research team with a high level of expertise in the field of scanning probe microscopy and surface physics, and in close collaboration with the chemistry lab of Didier Gimes (ICR, Marseille). A doctoral student is currently being recruited on the same project in the chemistry lab.

Further information can be found at:

<http://www.im2np.fr/recherche/nano/Labthemat.html>

How to apply

Applications should be emailed to Sylvain Clair: sylvain.clair@im2np.fr including coordinates of two persons who may be consulted.

Any enquiries relating to the project should be directed at the same address.

Deadline

The fellowship should start on **January 1st 2014**.

Funding Details: net salary in the range €23 500 - €27 600 depending on experience and qualifications.

Length of Award: initially 12 months, possible extension for a second year, subject to evaluation.

Eligibility: The applicant should have been working outside France in previous years.