

PhD opportunity / Oferta contrato predoctoral



ON-SURFACE SYNTHESIS ON FUNCTIONAL SURFACES



Keywords: Nanotechnology, On-surface-synthesis, functionalized molecules, optoelectronic properties, spin coupling, scanning probe microscopy (STM-AFM).

Abstract: Covalently linked metal-organic structures are the building block of future molecular electronics. When its precursor constituents are deposited on a substrate, they are still weakly bonded to one another. The aim here is to transfer the flexibility of organic chemistry to the 2-dimensional benchmark imposed by an atomically clean surface, to create 2D and 1D covalently linked nanostructures with designated functionality. On top of the catalytic role played by the surface, one of the main advantages of this technique is its compatibility with the most precise and powerful surface science methods: scanning probe microscopy and electron spectroscopies. This so-called on-surface synthesis method [1-4] made possible, for example, to create nanoribbons of graphene on several substrates with atomic scale control of its structure and physical properties. These molecular layers hold great interest for devices based on organic electronics such as OLEDs type screens. But the state-of-the-art reaction pathways are limited to metallic surfaces, where the electronic transport properties of the nanostructures are shortcut by the substrate itself. In the course of this PhD, we will focus on creating covalent nanostructures on top of functional surfaces, as for instance insulating MgO, SrTiO₃ or magnetic surfaces. An example of the formation of such covalent networks is shown in the image below, exemplifying the feasibility of on-surface synthesis on (a) ferromagnetic Gd-Au alloys, (b) ferroelectric NaCl ultrathin films and (c) metallic Au(111) surface.

Candidate requirements:

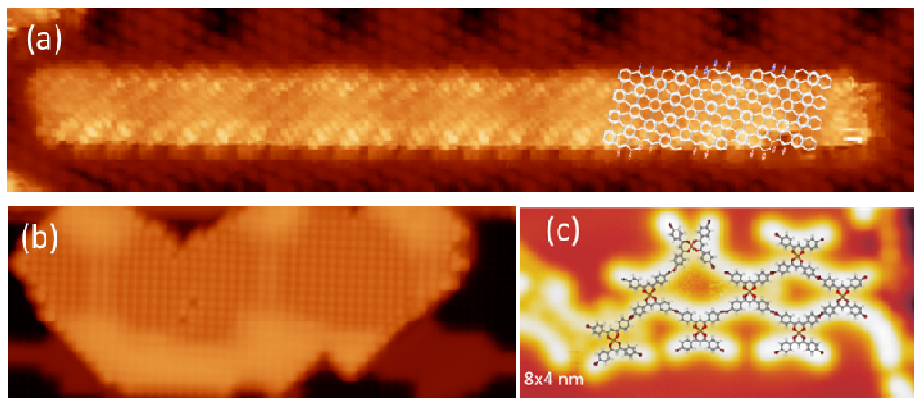
- ✓ Degree in Physics or Chemistry
- ✓ MSc. with strong Nanotechnology background
- ✓ Good at teamwork

Contract conditions:

- ✓ 18 months at University of Zaragoza (1150 €/month net)
- ✓ 18 months at CEMES, Toulouse (1600 €/month net)
- ✓ Start date: 01/02/2018
- ✓ End date: 31/01/2021

Additional info:

- ✓ The selected candidate will receive a double doctorate degree by University of Zaragoza and Université Paul-Sabatier (Toulouse)
- ✓ Strong interaction with SMEs in the field of Scientific Instrumentation.
- ✓ Access to the laboratories of other TNSI partners: ALBA synchrotron light source, CSIC, ICN2
- ✓ See contact details below for further info



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