POSTDOCTORAL POSITION ON ULTRAHIGH PRESSURE CHEMISTRY AT THE NANOSCALE

POSITION DETAILS:

A short contract (5,7 months) as a postdoc is available in the group of Prof. Fernando Martín (http://campusys.qui.uam.es/) at the Dept. of Chemistry of University Autonoma de Madrid. The position is funded by the IFIMAC Condensed Matter Center through the MINECO award "Unidad de Excelencia Maria de Maeztu", with reference MDM-2014-0377.

THE RESEARCH PROJECT:

The aim of the project is to study chemical reactions at ultrahigh pressure1 (UP)(> 10 GPa). Atomic force microscopy (AFM) provides a unique platform to perform such reactions without the technical drawbacks of classical UP procedures.2 We will employ AFM diamond tips to induce UP on graphene3 (or few layers graphene) flakes laying on a flat substrate. The high breaking strength of both diamond and graphene4 is the key point to achieve UP regime. We expect to induce chemical bonding on the region between the flake and the substrate. This region can be additionally filled with molecules to study their reactivity under UP. This configuration might allow transforming a multilayer graphene flake on a diamond one. By scanning the diamond tip on the flake, we expect to induce reactions on selected regions with size ranging from □50 nm2- 100 □m2. Reactions will be performed in different samples and media, including ultrahigh vacuum conditions, controlled atmospheres at pressure ranging from 10-6 mbar - 4 atm, atmospheric conditions and liquids. We will use AFM for initial sample characterization. Spectroscopic characterization will be performed using Photoemission Electron Microscopy. Further analysis will involve specific core levels from the embedded molecules, whose binding energies and line shapes will be compared to the results from the pristine molecules and additional information will be obtained using He diffraction. Theoretical interpretation and guide for experiments will be provided by density functional theory calculations.

CANDIDATE PROFILE:

- **PhD** degree in **Physics**
- At least two years' experience on theoretical simulation of periodic systems, electronic structure and molecular dynamics methodologies.
- Strong programming skills.

STARTING DATE:

The position should start on **July 21st, 2017**.

REMUNERATION:

Gross salary (before applying national income taxes) is **2.208,59 Euros/month.**

APPLICATION:

Applicants should send his/her CV and contact information for 2 references (in a single pdf file named as the candidate) to beatriz.martin@uam.es **before June 15, 2017** *(Applications not following this procedure will be disregarded).*
Recommendation letters could be requested during the selection process. Selected candidates shall be contacted for an interview.