

CONTRATOS PREDOCTORALES 2022 SEVERO OCHOA

PROJECT TITLE / JOB POSITION TITLE:

Flexible organic electronics for sensing applications

JOB POSITION RESEARCH LINE:

RL4 - Tuneable and Low Cost Molecular Electronics

RESEARCH PROJECT / RESEARCH GROUP DESCRIPTION:

Despite the fact that silicon-based technology is clearly dominating today's electronics industry, the development of organic electronics has been the subject of important research efforts over the past few years. Organic electronics will certainly not compete with their inorganic counterpart in terms of high density and high speed circuits, however, they are bound to play an important role in low-cost and large area applications and will also certainly emerge in a large variety of new uses.

In particular, organic field effect transistors (OFETs) have been extensively investigated since their discovery. Significant efforts are currently being placed on finding printing processing techniques compatible with upscaling that can give rise to highly crystalline and homogenous organic semiconducting films. Remarkably, wide ranging opportunities for OFETs are open in sensing applications since they can provide a multi-parametric electric response to changes in the environment with high sensitivity.

The "*Molecular Materials for Electronic Devices*" (e-MolMat) group is focused on the design and preparation of new functional molecular materials for their application in electronic devices. This is an interdisciplinary group where researchers from different disciplines (i.e., chemistry, materials science, physics, engineering) are working together. Our work ranges from fundamental studies in order to better understand materials properties to a more applied perspective aiming at developing proof-of-principle devices.

This PhD project will be grounded on two different but inter-dependent pillars. The first one will be addressed to the improvement of the OFET performance by controlling the thin film morphology and the device interfaces and by developing novel doping methodologies. The second pillar will be devoted to the application of these devices in sensing. In this sense, our group has already shown very promising results in the field of light detectors and biosensors.

JOB POSITION DESCRIPTION:

We are looking for a talented and highly motivated PhD candidate. The fellow must hold a Bachelor degree in Chemistry, Physics, Materials Science or Nanoscience, and hold a recognized Master degree (or equivalent). An interdisciplinary outlook is desired and will be encouraged.

The successful candidate will work in an international environment, will receive a strong multidisciplinary training and work in a dynamic team. The group has also strong collaborations with international recognized groups in this field. If required, short visits to other laboratories will be realized.

To develop the project, the candidate will learn how to use a large variety of techniques and methodologies. The main tasks that will be carried out within the project include:

- a) Processing of organic semiconductors employing wet chemistry techniques.
- b) Thin films characterization (R-X, AFM, polarized optical microscopy, etc.)
- c) Device fabrication (lithography, metal evaporators, etc.) and electrical characterisation.
- d) Correlation studies of material properties with device characteristics.
- e) Development of sensors (light, strain, etc.).
- f) Use of state-of-the art techniques to perform local transport measurements.

This project is framed in the field of “organic electronic devices”, which is attracting great attention, both from fundamental and applied point of view. The project fits with the Host institution research lines and also with the current European research priorities. Further, this interdisciplinary project will give the candidate a wide perspective which will be very fruitful for his/her future academic or industrial career.

GROUP LEADER:

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