

CONTRATOS PREDOCTORALES 2022 SEVERO OCHOA

PROJECT TITLE / JOB POSITION TITLE:

Development of an electronic-skin (eSkin) for sensing

JOB POSITION RESEARCH LINE:

RL, General.- FUNCTIONAL OR MULTIFUNCTIONAL NANOSTRUCTURED MATERIALS

RESEARCH PROJECT / RESEARCH GROUP DESCRIPTION:

The human skin is a remarkable organ. It consists of an extensible and integrated network of sensors that transmit information about tactile and thermal stimuli to the brain, allowing us to maneuver within our environment safely and effectively. Thus, the development of electronic networks comprising flexible, stretchable, and robust devices that are compatible with large-area implementation and integrated with multiple functionalities are crucial components to progress in **electronic skin (e-Skin)** applications. Composites exhibit unique synergistic properties emerging when components with different properties are combined. For instance, the tuning of the energy bandgap in the electronic structure of the material allows designing tailor-made systems with desirable mechanical, electrical, optical, and/or thermal properties. [1,2]

This project deals with the preparation and characterization of novel composite materials comprising different conductive fillers embedded in polymers prepared by solution processing techniques. Materials and free standing films will be characterized by means of UV-Vis, FT-IR, SEM, XRD as well as electrically characterized under different environments (strain, temperature, humidity, irradiation, black-body radiation, etc.) mimicking human physiological conditions. The most promising materials will be used for the development of simple wearable prototypes to monitor mechanical, thermal, optical and/or acoustic information originating from the human body.

References:

- [1] *ACS Applied Electronic Materials* 4, 2432-2441, (2022).
- [2] <https://scholar.google.com/citations?user=aU0l6NAAAAAJ&hl=en>

JOB POSITION DESCRIPTION:

We are looking for a highly motivated candidate. He/she should have recently obtained a master's degree (in physics, chemistry, engineering, material science or related) with outstanding grades. The candidate will work in a very interdisciplinary environment and will be part of a research group composed of chemists, physicists and engineers. For this, the candidate should have the ability to work in a team formed by researchers with different backgrounds formations and nationalities.

Good communication skills and fluency in English are required.

The project involves experimental work in materials synthesis and characterization, including UV-Vis, FT-IR, SEM, XRD, as well as several electrical characterization techniques and prototype development.

The PhD student will work in collaboration with other PhD students and senior scientists, and the PhD project will involve international collaborations.

GROUP LEADER:

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Research project / Research Group website <https://molecularelectronics.icmab.es/>