

The mission of the Catalan Institute of Nanoscience and Nanotechnology (ICN2) is to achieve the highest level of scientific and technological excellence in Nanoscience and Nanotechnology. Its research lines focus on the newly-discovered physical and chemical properties that arise from the behavior of matter at the nanoscale. ICN2 has been awarded with the Severo Ochoa Centre of Excellence distinction for two consecutive periods (2014-2018 and 2018-2022). ICN2 comprises 19 research groups, 7 technical development and support units and facilities, and 2 research platforms, covering different areas of nanoscience and nanotechnology.

Please note that this is not a job offer. This is a call for expressions of interest from excellent postdoctoral researchers to apply for a Marie-Skłodowska-Curie Postdoctoral Fellowship with ICN2 as host institution. The process involves developing a joint application between candidate and host institution. Specifically, we are inviting expressions of interest for the following research group and project.

DESCRIPTION OF HOST RESEARCH GROUP

Host group: [Thermal Properties of Nanoscale Materials](#)

Group Leader: Prof. [Javier Rodríguez-Viejo](#)

Fellowship supervisor: Dr. Cristián Rodríguez-Tinoco

The Group of Thermal Properties of Nanoscale Materials (GTNaM) at ICN2 focus its activities around the study of thermal properties of glassy (disordered) and nanoscale materials, with special focus on thin films and low-dimensional solids. In particular, for the past 12 years we have been working on stable vapor-deposited organic glasses and some of their applications. Recent works include: the increase efficiency of organic light-emitting devices (OLEDs) using ultrastable glasses (Sci. Adv. 2018), the transformation mechanisms of stable glasses (Phys. Rev. Lett. 2019 and 2020), the absence of two-level systems in the low-temperature regime (PNAS, 2014) and anisotropy in the thermal transport of these materials (Phys. Rev. Mat. 2018). A new twist to the relevance of these materials would be to show their advantage as active layers in organic solar cells. The proposed project aims to advance our knowledge in this domain.

More information on our group is available at <https://icn2.cat/en/thermal-properties-of-nanoscale-materials>.

DESCRIPTION OF RESEARCH PROJECT / TOPIC

Research area: Physics (PHYS)

Project topic: Enhancing efficiency and thermal stability of solar cells through ultrastable PVD organic glasses

This project aims at investigating the use of multicomponent vapor-deposited ultrastable glasses as active layers in organic photovoltaic devices. We aim to benefit from the flexibility offered by the PVD technique to obtain out-of-equilibrium phases to grow thin amorphous films with vertical gradients and/or nm-sized microstructures to facilitate charge migration. We will first focus on the optimization of co-deposition parameters of non-fullerene small molecules. Characterization of the glass transition of the blend, their microstructure, interfaces and HOMO-LUMO energy levels will be carried out by nanocalorimetry, AFM, UPS. Infrared and UV/Vis spectroscopy will be used to characterize molecular orientation. In a second step OPV's devices will be in-situ fabricated within the PVD chamber. The external efficiency will be evaluated to understand the role of the deposition temperature and the mesoscale structure on device performance.

CONTACT

Candidates may contact both javier.rodriguez@icn2.cat and cristian.rodriguez@icn2.cat if interested in this opportunity.

Please send the following documents / information:

- CV (max. 4 pages)
- Letter of motivation
- Two referees

Please note that this is not a job offer. The process involves developing a joint application between candidate and host institution. Note also the following basic eligibility requirements established for these fellowships by the European Commission:

- Candidates must be in possession of their PhD at call deadline
- Candidates should have no more than 8 years' research experience after their PhD
- Candidates must comply with the **mobility rule**, i.e. they must not have resided or carried out their main activity (work, studies, etc.) in Spain for more than 12 months in the 36 months immediately before the call deadline.

For full details on eligibility, please see Annex 2 of [Horizon Europe Work Programme 2021-2022](#).