As a flagship research center in nanoscience and nanotechnology, our mission is to open and explore new frontiers of knowledge at the nanoscale and bring value to society in the form of new understanding, capabilities and innovation, while inspiring and providing broad training to the next generations of researchers.

Our research lines focus on the newly discovered physical and chemical properties that arise from the behaviour of matter at the nanoscale. ICN2 has been awarded with the Severo Ochoa Center of Excellence distinction for three consecutive periods (2014-2018 and 2018-2022 and 2023-2026). ICN2 comprises 19 Research Groups, 7 Technical Development and Support Units and Facilities, and 2 Research Platforms, covering different areas of nanoscience and nanotechnology.

Job Title: Postdoctoral Position on Green Synthesis of MXenes/Perovskite Solar Cell Heterojunctions

Research area or group: Nanostructured Materials for Photovoltaic Energy Group (NMPE)

Description of Group/Project:
Halide perovskite solar cells (PSCs) have revolutionized the photovoltaic arena providing power conversion efficiencies currently above 25 %, low cost and ease of fabrication. Their combination in tandem architectures with Silicon solar cells will permit building terawatt-scale energy production required for low-carbon economy, shaping the energy future of our society. However, the limited lifetime of PSC is a drawback for the deployment and commercialization of this technology.

We offer a Postdoctoral contract to work on MXenes and Halide Perovskites. The candidate will work on investigating and developing novel principles for solar-to-electricity and solar-to-fuel conversion using novel Pb-free MHPs/MXene heterojunctions and employing multiple photons in a process that mimics natural photosynthesis. The goal is to develop efficient solar energy convertors based on green, low-cost and abundant materials that offer prospects to be employed on large scale and contribute to global conversion and storage of solar energy. Synthesis of materials, device fabrication and characterization, as well as indoor and outdoor stability analyses of complete devices will be carried out together with data analysis and treatment. The work will be carried out at the Nanostructured Materials for Photovoltaic Energy Group at ICN2.

The Nanostructured Materials for Photovoltaic Energy Group at ICN2, in Barcelona (Spain), directed by Prof. Monica Lira-Cantu, focuses on the development of nanostructured materials by solution processing methods for Solar Energy Conversion such as Photovoltaics (Perovskite Solar Cells) and more recently H_2 production. The group has more than 15-year experience on the stability assessment of emerging photovoltaic technologies applying ISOS protocols. The group's interest is also the fabrication of PV devices on flexible and transparent/semitransparent substrates. The group also works on the integration of photovoltaics in flexible, transparent, battery-less, self-powered devices (e.g., smart textiles, wearables, etc.) for the IoT and printed electronics. The group is an expert in the fabrication and characterization of Perovskite solar cells, which can be obtained by the group with > 22% efficiency and more than 1000 h of stability under continuous light irradiation.

Main Tasks and responsibilities:

- Synthesis and functionalization of materials, especially MXenes and Pb-free Halide perovskites (including all inorganic and 2D).
- Fabrication of functionalized Pb-free MHPs/MXene heterojunctions and multijunctions by solution processing methods.
- Fabrication of Pb-free MHPs/MXene multijunctions as photocatalyst for H_2 generation with high gas rates.
- Stability analysis of materials and devices following the recently upgraded ISOS protocols and in-situ characterization.
- Process and analysis of data.
- Elaboration of periodic reports to keep track of the project progress.
- Preparation of scientific manuscripts and presentations in workshops or conferences to showcase your research results to the scientific community.
- Skills on proposal writing.
- PhD students supervision.

Requirements:

- **Education:** PhD degree in physics, chemistry, materials science, nanotechnology, electronics or closely related discipline
- **Knowledge and Professional Experience:**
  English (Advanced), knowledge of Spanish or Catalan would be beneficial but not necessary.
  Experience in synthesis of materials, device fabrication, solution processing methods, stability analyses of PSCs.
  Knowledge of ISOS protocols for PSCs. Data management and treatment
- **Personal Competences:**
  Ability to work safely in the lab environment. We encourage a high degree of responsibility and independence, but also stimulate interaction and discussion with colleagues.

Summary of conditions:

- Full time work (37,5 h/week)
- Contract Length: 1 year
- Location: Bellaterra (Barcelona)
- Salary will depend on qualifications and demonstrated experience.

Estimated Incorporation date: January 2024

How to apply:

All applications must be made via the ICN2 website https://jobs.icn2.cat/job-openings/576/postdoctoral-position-on-green-synthesis-of-mxenesperovskite-solar-cell-heterojunctions and include the following:

1. A cover letter.
2. A full CV including contact details.
3. 2 Reference letters or referee contacts.

Deadline for applications: December 30th, 2023

Equal opportunities:
ICN2 is an equal opportunity employer committed to diversity and inclusion of people with disabilities.
ICN2 is following the procedure for contract of people with disabilities according with article 59 of the Royal Decree 1/2015, of 30 of October.