POSTDOCTORAL RESEARCHER - NANOSTRUCTURED FUNCTIONAL MATERIALS GROUP

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 Center 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.

Job Title: Postdoctoral Researcher

Research area or group: Nanostructured Functional Materials group

Description of Group/Project:

The Nanostructured Functional Materials group (**Nanosfun**, www.nanosfun.com) is research group at the ICN2. **Nanosfun** is aimed to develop novel (supra)molecular and polymeric functional nanomaterials with application in **Health**, **Energy-Efficient** Devices and **Environment**. Specifically, one of our main research lines is the design and fabrication of polymeric coatings for the **modulation of surface properties**. In this area, the development of new materials with **outstanding features** is a pressing concern. In this scenario, **bioinspired materials** have emerged as potential candidates. Specifically, materials based on **catechol** molecules, present in various living organisms (e.g., mussels), have demonstrated unprecedented adhesive properties under wet conditions, biocompatibility, low toxicity and low cost/scalable processes. These excellent features turn bioinspired catechol-based materials unique for their use in coatings applications.

Special relevant is the development of novel materials for the capture and elimination of pathogens in those place that requires special attention as, for example, the healthcare centres. In this project we postulate that this can be achieved with an approach based on catechol-based polymers, bioinspired by the adhesion of mussels, combined with the use of microcapsules of ingredients with virucidal properties. The final commercial product, which would also contain a fragrance incorporated to provide the set with satisfactory olfactory properties for the end user (clean feeling), would be sprayed in such a way that the catechol polymer (soluble in water) would stick to the fibers trapping the virucides microcapsules in the fabrics. The exposed surface will retain the viruses that will be eliminated as the microcapsules release the content due to mechanical friction, temperature, steam or prolonged release over time. In this way, the coating/microcapsule mixture would extend the useful life of masks, filters and textiles, reducing waste (environmental considerations) and costs, while improving people's health and quality of life. In addition, when the ingredient with virucidal properties has been released, the filters and clothing would be washable and non-toxic, as the mixture is made up of biodegradable and biocompatible materials.

Specifically, this project belongs to the *Colaboración Publico-Privada 2021* grant CPP2021-08348 for the development of bioinspired multifunctional coatings for the elimination of pathogens in healthcare environments (COVICAP) funded by MCIN/AEI/ 10.13039/501100011033 and by the European Union NextGenerationEU/PRTR.

Main Tasks and responsibilities:

The research activity of the candidate will be mainly part of the COVICAP project, which aim at developing a new generation of functional bioinspired coatings for their application in the capture and elimination of pathogens in healthcare environments.

The candidate will be involved in activities related to the design, fabrication, functionalization, characterization and validation of polymeric coatings, based on different formulations containing catechol moieties. Besides, the candidate will be involved in the process of microcapsules formation trough different processes and using different compounds and the encapsulation of active ingredients (e.g. virucides agents). The candidate will be working in a very multidisciplinary project that covers topics such as materials science, encapsulation technologies, as well as *in vitro* validation and prototype validation in relevant environments.

The candidate will work as part of an international team and she/he is expected to actively participate and lead part of this project.

Requirements:

- **Education:**
  - PhD Degree in Materials Science, Chemistry or similar.

- **Professional Experience:**
  - Experience in the synthesis of polymeric materials and their application on surfaces.
  - Thin-film technology and deposition of materials in surfaces for final device fabrication.
  - Experience in the chemical synthesis and modification of organic and polymeric materials.
  - Experience in microcapsule formation and synthetic methodologies.
  - Experience in encapsulation of active compounds.
  - Experience in *in vitro* validation of polymeric materials.
  - Experience in microscopic and spectroscopic characterization techniques (XPS, DSC, TGA, UV-vis, FT-IR, contact angle, AFM, SEM, TEM and NMR).
  - Advanced knowledge in the design of experiments, data management and scientific software.
  - Fluent English both spoken and written

- **Skills:**
  - Excellent communication and writing skills
  - Intrinsic motivation, strong commitment, responsibility, independence, teamwork skills.

Summary of conditions:

- Full time work (37,5h/week)
- Contract Length: 3 years
- Location: Bellaterra (Barcelona)
- Salary will depend on qualifications and demonstrated experience.
- Support to the relocation issues.
- Life Insurance.

Estimated Incorporation date: December 2022

How to apply

All applications must be made via the ICN2 website 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: 25 November 2022

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.