

Position Offered: POSTDOCTORAL RESEARCHER

Project: *Advanced Nanolithography using Hybrid Materials*

Technological and scientific fields: Nanofabrication, Quantum technologies

Location: Cerdanyola del Vallès, Catalonia, Instituto de Microelectrónica de Barcelona, IMB-CNM (CSIC); <https://www.imb-cnm.csic.es>

Research Group/PI: NanoNEMS (IMB-CNM), Marta Fernández Regúlez, <http://nanonems.imb-cnm.csic.es/>; PEND (ICN2), Juan Sierra, <https://nanodevices.icn2.cat/>

PROJECT SUMMARY

The objective of the Project is to develop hybrid organic-inorganic resists, specifically organic resists modified by vapor phase infiltration (VPI) with metal oxides for nanolithography. In VPI, metal oxides are sequentially introduced into a polymer matrix using processes similar to atomic layer deposition (ALD). This approach allows for adjusting the properties of Electron Beam Lithography (EBL) resists according to the application. A slight infiltration can improve contrast and roughness, facilitating the definition of the nanostructures. On the other hand, greater infiltration could enable these resists to be used directly as masks to define high aspect ratio structures. Three application areas are considered: (I) Fabrication of spin devices with two-dimensional (2D) materials; (ii) Reducing line roughness in the fabrication of silicon quantum devices (iii) Investigating the properties of infiltrated polymers as functional elements in devices

PROFESSIONAL PROFILE

Minimum requirements:

- PhD in physics, chemistry, engineering, material science or related areas
- Previous experience in micro/nanofabrication technologies in clean room environments
- Knowledge in quantum technologies and/or 2D materials
- Good communication and writing skills in English

Merits to be considered:

- Previous experience with EBL and ALD techniques
- Familiarity with hybrid material processing
- Experience in characterization techniques: SEM, AFM, Raman, EDX, FTIR etc.
- Basic competencies in scientific programming
- Relevant previous publications in the field of the offer

WHAT IS OFFERED

The hired person will receive support from the research team composed of several members of the IMB-CNM (NanoNEMS) and ICN2 (PEND) research groups. During the 4 years of the project, he/she will receive a comprehensive training plan equivalent to 240 ECTS credits, including specialized courses and seminars in advance nanofabrication, EBL, quantum technologies, and scientific programming, among others. She/He will also benefit from international stays at prestigious European centers and training in digital and complementary skills such as entrepreneurship, data management, intellectual property and leadership. The experimental work will be carried out in the clean rooms of IMB-CNM and ICN2. At least two stays in two European centers are planned to strengthen knowledge in EBL (3 months) and VPI (1.5 months)

Contract conditions:

Indefinite contract for a Postdoctoral Researcher associated to the Momentum Project of 4 years' duration according to Spanish science law. Gross annual salary (41.000 € - 52.000 €).

Start of contract: before 31 December 2024

PRINCIPAL INVESTIGATOR CONTACT

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