

**Institute of Microelectronics of Barcelona IMB-CNM (CSIC)**  
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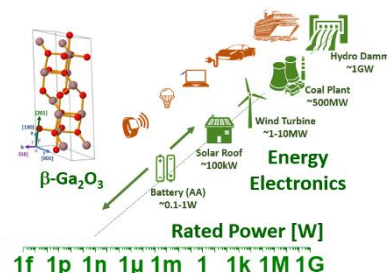
## Job Offer - Development of Advanced Ultra-wide Bandgap Devices in Ga<sub>2</sub>O<sub>3</sub> for High Power Electronics

The IMB-CNM is the largest institute in Spain dedicated to the research and development of Micro and Nano Technology and microsystems and with unique capabilities in silicon technology. It belongs to CSIC since its foundation in 1985 and is distinguished with the AEI María de Maeztu Unit of Excellence accreditation.

The main activities of IMB-CNM are basic and applied research and development, education and training in micro and nanotechnologies, components and systems. Its mission is to improve knowledge and contribute to the implementation of solutions based on these technologies in new products to solve societal challenges.

### A New Generation of Ga<sub>2</sub>O<sub>3</sub> Electronic Devices

As most energy usage worldwide will be electrical, the efficient management of electrical power is thus central to achieve the XXI century climatic goals. Ultra-wide bandgap (UWBG) semiconductors are at the very frontier of electronics for energy management or energy electronics. A new generation of UWBG semiconductors will open new territories for higher power rated power electronics and solar-blind deeper ultraviolet optoelectronics. Candidate UWBG semiconductors include aluminium nitride (AlN), cubic boron nitride, and diamond, but during the past decade, the greatest increase in research activity has likely been directed at gallium oxide (Ga<sub>2</sub>O<sub>3</sub>). This interest is driven in part by its large bandgap of ~4.85 eV and breakthroughs in crystal growth that led to the first Ga<sub>2</sub>O<sub>3</sub> transistor demonstration in 2012. Ga<sub>2</sub>O<sub>3</sub> has recently emerged pushing the limits set by more conventional WBG (~3 eV) materials, such as SiC and GaN. Indeed, Ga<sub>2</sub>O<sub>3</sub> as the first oxide used as a semiconductor for power electronics, has sparked an interest in oxide semiconductors to be investigated. Therefore, Ga<sub>2</sub>O<sub>3</sub> has promise as the fourth and definitive platform for power electronics, but there are challenges in bringing this UWBG semiconductor into commercial use within the next decade.



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**References:** Marko J. Tadjer, *Toward gallium oxide power electronics*. **Science** 378,724-725 (2022) <https://www.science.org/doi/10.1126/science.add2713> (2) Perez-Tomas et al., *Ga<sub>2</sub>O<sub>3</sub> and Related Ultra-Wide Bandgap Power Semiconductor Oxides: New Energy Electronics Solutions for CO<sub>2</sub> Emission Mitigation*. **Materials** 15, 1164 (2022) <https://doi.org/10.3390/ma15031164>

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## Key Responsibilities

- The candidate will learn the fundamentals of microelectronic fab including device design, clean-room fabrication and characterization.
- As a multidisciplinary project, the candidate will also learn material science characterization applied to semiconductors.
- The candidate will work within a vibrant international project which is currently leading the field in the EU. The contract is for 3 years with a possibility of an extension.

## Required skills

- A Master's degree in Engineering, Material Science, Physics, Nanotechnology or similar.
- Research-oriented attitude, initiative and with a solid problem-solving attitude.
- Ability to work in an interdisciplinary team, w/ good spoken and written English.

## Job conditions

- Full time contract (37,5/week)
- Temporal contract
- On site work and flexible schedule
- Trial period of 6 months
- Salary according to qualifications, proven experience and CSIC conditions
- Estimated start date: Dec 2024 – Jan 2025

The person hired will be working on Power Devices and Systems Group at IMB-CNM-CSIC, located on the Bellaterra Campus of the UAB (Cerdanyola del Vallès). Further inquiries may be addressed to Dr Amador Pérez-Tomás [amador.perez@imb-cnm.csic.es](mailto:amador.perez@imb-cnm.csic.es) from Power Devices and Systems Group <https://power.imb-cnm.csic.es/>

## How to apply

Applications should be submitted to [rrhh@imb-cnm.csic.es](mailto:rrhh@imb-cnm.csic.es) with copy to [amador.perez@imb-cnm.csic.es](mailto:amador.perez@imb-cnm.csic.es) stating the job title as the Subject of the message. The mail should include a cover letter and an updated CV. Sending CVs to the above address implies consent to the Legal Advice | IMB CNM (csic.es).

More information on IMB-CNM: <https://www.imb-cnm.csic.es/en/>  
<https://www.imb-cnm.csic.es/en/about-center/careers/open-positions>