



2021-2022



Proposition de stage (Master 2R ou projet de fin d'études)

Development of Ga₂O₃ thin films for power electronics

Detailed Topic

The demand for power electronic devices keeps increasing due to the rapid development of industries related to electricity, automotive and consumer electronics. In order to meet this demand, the use of wide bandgap semiconductors such as diamond, aluminum nitride or gallium oxide (Ga₂O₃) has emerged as a potential avenue for development. Among these materials, β -phase Ga₂O₃ has many advantages, such as an ultra-wide bandgap (4.6-4.9 eV), particularly high breakdown voltage (≈ 8 MV/cm) as well as high electron mobility (≈ 250 cm²/Vs). In addition, the availability of large and reasonable-cost Ga₂O₃ substrates makes it possible to consider this semiconductor as building block for next-generation power devices.

The target of this internship is to develop the growth of thin layers of Ga₂O₃ by metalorganic chemical vapor deposition. A wide range of morphological and structural characterization techniques will be used (scanning and transmission electron microscopy, X-ray diffraction, Raman spectroscopy, optical absorption, etc.) to finely assess the thin film growth mechanisms involved as well as the resulting material properties. The final target will be to optimize the structural morphology of these thin layers and to develop innovative heterojunctions for power electronics.

Location and duration

The candidate will work in the Materials and Physical Engineering Laboratory (LMGP) of Grenoble INP-CNRS, in the Nanomaterials and Advanced Heterostructures team (NanoMAT), as well as in the Photonics, Electronics and Quantum Engineering Laboratory (PHELIQS) of CEA, in the Nanophysics and Semiconductor team (NPSC).

Web sites: <http://www.lmgp.grenoble-inp.fr/> and <https://www.pheliqs.fr/en/Pages/Presentation.aspx>

Internship length: 6 mois

Profile & required skills

The candidate should be a Master student (5 years of university studies) in the fields of semiconductor physics or electronic engineering. Skills for teamwork and oral and written English expression will be appreciated. We are looking for dynamic, motivated candidates, interested to pursue a PhD thesis.

Internship compensation (~550 euros/mois).

Contacts

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