

Scientist position in the scaling of hafnia-based ferroelectrics for device integration (predoctoral)

The field of ferroelectric hafnia – a material investigated from the beginning here at NaMLab - holds huge promise for future nanoscale electronics. Potential applications, such as in neuromorphic hardware, require a good understanding of the analog switching properties of hafnia films. However, there is still much to be understood about size-dependent effects in hafnia devices, both with thickness scaling and lateral device scaling. In this PhD position, you will be working at the cutting-edge of research in this field in order to scale down ferroelectric hafnia devices, integrate these in crossbar arrays, and characterise key device metrics. You will work closely with a circuit designer to match device behaviour to appropriate peripheral circuit design and vice versa, and to develop ferroelectric device models. The results of the scientific work can be used to obtain a PhD in Electrical Engineering at the TU Dresden.

Responsibilities:

- Cleanroom fabrication of ferroelectric devices
- Process development for thickness scaling (ALD, PVD)
- Process development for crossbar integration (laser lithography, E-beam lithography)
- Electrical measurements on manual and automatic probe stations
- Participation in EU projects with international collaborators

Your profile:

- Masters in Physics, Materials Science, Electrical Engineering or similar
- Experience in planning and executing experimental work
- Self-organised and driven approach
- Basic understanding of semiconductor device physics
- Fluent in German or English
- Good communication skills

The following skills are a plus:

- Experience working in a cleanroom
- Experience with lithography, atomic layer deposition, and/or material development

Period:

- Begin of employment: 1st January
- Duration: target 36 months (depending on the time to obtain a PhD)
- Full time position

We offer:

- A young, welcoming, international workplace
- A strong team consisting of PhD students, Postdocs from different fields and technical staff
- Focused guidance during your PhD studies
- Experience collaborating internally and internationally, with academia and industry
- Experience working with high-end characterization and fabrication tools

About Us

NaMLab gGmbH is a research organization and associated institute of the Technical University Dresden. NaMLab provides industry-oriented and basic research in material science for electronic devices. Based on its key expertise in dielectric materials for semiconductor devices, NaMLab focuses on the integration and application of materials applied to reconfigurable, energy efficient devices. NaMLab's approach of placing the device rather than the material system itself into the center of its research activities differentiates it from other world-class material research activities in the Dresden area. Additionally, it allows strong collaboration between different research groups and international partners. It thereby fills the gap between basic materials research and its application towards electronic circuits and systems.

Check also our video about working on capacitors at Namlab:

<https://www.youtube.com/watch?v=e8pqf5RTqw>

For further information please contact:

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