

The Leibniz Institute for Solid State and Materials Research Dresden e. V. (IFW Dresden) conducts modern materials research on a scientific basis for the development of new and sustainable materials and technologies. The institute employs an average of 500 people from over 40 nations and, in addition to its scientific tasks, is dedicated to promoting young scientists and engineers. Further information at: <http://www.ifw-dresden.de>.

The Institute for Metallic Materials (Prof. K. Nielsch) of the IFW Dresden offers a

PhD position (m/f/d)

on the following topic:

Area Selective Atomic Layer Deposition under Micropatterned Fields

on a part-time basis with a weekly working time of 30 hours.

The application of magnetic or electric fields during the growth of thin films has a strong influence on the deposition rate, composition and morphology, as well as the transport properties of thin films. These observations have been made for film growth using chemical vapor deposition (CVD), electrochemical deposition and aerosol deposition. In this thesis project, localized and switchable electric and magnetic fields are used for the selective deposition of mainly 2D materials on the microscale. Atomic Layer Deposition (ALD) is a conformal deposition technique based on a surface-limited and well-defined chemical reaction. Here, we aim to apply magnetic and electrical stimuli during the ALD deposition process. Based on our previous experience with a MEMS platform for thermoelectric measurements [J. Mater. Res. 31, 196 (2016)], we will develop novel microstructured platforms for these in situ deposition experiments at the project beginning. More details about this Ph.D. project:

- Development of microstructured electrical platform/ chip for area selective ALD and integration into an ALD reactor.
- In-situ experiments with established ALD processes for oxides and metals under the influences of switchable magnetic or electrical fields or modulated temperature profiles over time.
- Electrical and structural characterization of the micropatterned films grown by area selective ALD.
- Simulation of the local ALD process behavior by means of finite element simulations.

We are seeking highly motivated applicants (m/f/d) with a university degree (Master / Diploma) with a background in chemistry or physics, materials science, mechanical engineering, or a relevant subject, who are interested in interdisciplinary research, like to be involved in the ALD community and creatively contribute their own ideas. We are looking for a candidate (m/f/d) with pronounced initiative, creativity, ability to work effectively in a team, as well as fluency of written and spoken English.

The project duration is limited to 3 years, starting on October 1, 2023. A research stay abroad of maximum 6 months is supported and strongly recommended. Remuneration is based on the TV-L (EG 13, 75 %). The first contract is limited to 1 year, an extension for another 2 years is possible. Doctoral students (m/f/d) are facilitated to participate in the doctoral program in order to successfully complete their dissertation. We offer an attractive workplace with excellent facilities and surroundings in Dresden.

IFW Dresden strives for a balanced gender ratio in all areas. In science, IFW Dresden would like to increase the proportion of women and therefore explicitly invites suitably qualified female scientists to apply. The application of severely disabled persons is explicitly welcome.

Application including a CV, a motivation letter describing the research career goals, skills and experience, copies of all certificates should be sent citing the reference number **025-23-2001** no later than **June 12th, 2023** online as a single pdf-file to:

bewerbung@ifw-dresden.de.

For further information, please contact: Prof. Kornelius Nielsch (k.nielsch@ifw-dresden.de).

