Leibniz-Institut für Kristallzüchtung

The **Leibniz-Institut für Kristallzüchtung (IKZ)** is one of the leading institutions in the field of growth of crystalline solids. These play a fundamental role in photovoltaics, micro-, opto- and power electronics, sensor technology, optics and laser technology. Our work covers the full spectrum from basic over applied research up to pre-industrial development. The institute is part of Forschungsverbund Berlin e.V. (www.fv-berlin.de) and a member of the Leibniz Association (www.leibniz-gemeinschaft.de). More details can be found at the institute webpage: www.ikz-berlin.de.

We are currently looking for a

Master student (m/f/d)

for the topic:

"Artificial Neurons: Electrode-dependent electrical properties of $SrTiO_3$ based memristive switches"

Introduction. The rapid development of information technology has led to urgent requirements for high efficiency and ultralow power consumption. In the past few decades, neuromorphic computing has drawn extensive attention due to its promising capability in processing massive data with extremely low power consumption. However, artificial neuromorphic devices are still under development which can be attributed to the incomplete understanding of the physical switching effects in device design. It is believed that the method of electrode fabrication affects the switching behavior of the material.

The aim of this master program is to study the electrical properties of $SrTiO_3$ based memristive switches dependent on the method of fabrication of the electrodes. The influence of the electrode fabrication on the stiffness of the oxygen bonds will be investigated. Stiff oxygen bonds are the reason that a so called "dead layer" forms under the contact creating a depolarization field which suppresses the memristive switching behavior. A systematic study on surface pre-treatment via wet chemical etching and annealing for thermally induced surface reconstruction is performed. Hereby, epitaxially grown electrodes and different metals with different oxidation properties are investigated.

The candidate will perform the research activities at the Leibniz-Institut für Kristallzüchtung (IKZ, Berlin, Germany) in the group "Transport and electrical Properties" in close collaboration with the group "Strained functional perovskite films". We offer state-of-the art equipped laboratories, a young and dedicated team and a productive research environment. The project is embedded in the Leibniz Science Campus GraFOx and the results will feed in the FAIRmat machine learning algorithms for material development. This gives a great opportunity to network in an early stage of your career. **The project includes the introduction to scientific work, the research documentary evidence as well as the master thesis itself.**

There is also the possibility of a **part-time position as a student assistant** which includes the assistance in the laboratory operation and must not serve for the work in the master project.

Your tasks:

- Preparation of surfaces via chemical etching and annealing
- Characterization of surfaces via AFM measurements
- Deposition of metal electrodes via electron-beam evaporation
- Characterization of Memristors via I-V and C-V measurements
- Characterization of ferroelectricity via PFM and Sawyer-Tower circuit measurements

The candidate must have a Bachelor or an equivalent degree in physics, physical chemistry, electrical engineering, materials science, or a related discipline. In addition, the necessary coursework credits must be available to begin a master's thesis with a focus in solid state physics. Because of the international team, candidates with good English language skills would be preferred.

Are you interested?
Then send a short letter of motivation and curriculum vitae with relevant certificates or current performance chart to Dr. Andreas Fiedler (IKZ), andreas.fiedler@ikz-berlin.de, Phone +49(0)30 6392 3125. If you want to have more information about the project don't hesitate to contact me.

We look forward to receiving your application!