

Helmholtz – CSC – Fellowships 2010

- Helmholtz Centre:** Research Centre Jülich – (www.fz-juelich.de/portal/home)
- Research Field:** Information technology / solid state physics / ferroelectricity
- Research Project:** Ferroelectric thin films with engineered ferroelectric properties
- Position:** PhD Student or Sandwich PhD Student Postdoc
- Department/Supervising scientist:** Institute for Bio- and Nanosystems, Bioelectronics (IBN-2)
PD Dr. R. Wördenweber

Research Area:

Ferroelectric films with engineered properties are required in a number of applications ranging from high-k material for semiconductor technology, biocompatible dielectrics with low and high permittivity for biosensors to highly tunable paraelectric material for high frequency applications. Due to their ionic sublattice structures, oxides and, especially, perovskites are ideal candidates for these purposes.

In this project, the ferroelectric properties of oxide films are engineered via various means. First, combinations of ferroelectric oxide layers of different ferroelectric and structural properties are deposited via PLD and sputter technology. Using activated oxygen leads to an enhanced range of preparation parameters for the deposition and, thus, allows for the deposition of novel combination. Second, lattice mismatch between substrate and film as well as between adjacent layers induces strain that leads to strong modification of the polarization. Finally, micron- and nanopatterning is applied to test the use of the layer system for microwave and sensor application. All experimental equipment and long standing experience in the field of research are present in the Institute.

Duration of stay for a Sandwich PhD Student: 24 months
Duration of stay for a PhD Student: 36 months

Specific Requirements:

The candidate should have a general understanding of thin film technology and thin film processing, structural and electronic characterization of thin films. Instruction and guidance will be provided for all experimental techniques by the supervising team.

- Work Place:** Research Centre Jülich, Germany (near Cologne)
- Earliest Start** (between September 2010 and February 2011): September 2010
- Language Course:** A German language course will be offered parallel to the project
- Further Information:** r.woerdenweber@fz-juelich.de
http://www.fz-juelich.de/ibn/ibn2_en/

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