

## Helmholtz – CSC – Fellowships 2010

**Helmholtz Centre:** Karlsruhe Institute of Technology  
**Research Field:** Nanotechnology  
**Research Project:** **Materials for Energy Storage (Programm NANOMIKRO)**  
**Position:** PhD Student  Sandwich PhD Student  Postdoc

**Department/Supervising scientist:**

**Research Area:**

Hydrogen Storage Materials based on solid state reaction systems.

Recently, it was shown that nanocomposites consisting of N- or B-based hydrogen carrier materials and of binary light metal hydrides are able to reversibly absorb and desorb large amounts of hydrogen, up to 11 mass% H. Not much is known about the reaction path and the origin of kinetic barriers at the moment which make high working pressures and temperatures necessary. Knowledge of the reaction path and details of the reaction mechanism is essential, however, in order to understand and be able to further develop and optimize these interesting hydrogen storage systems.

The composites will be synthesized by high energy ball milling under inert gas atmosphere. The transformation kinetics of the systems will be investigated under various hydrogen backpressure conditions. Evaluation of the solid state kinetics and of structural details in the transformation shall shed light on the reaction path during de- and rehydrogenation of the solid state reaction systems.

**Specific Requirements:**

- Experimental background in development of H storage materials based on complex hydrides.
- Mechanical synthesis of nanocomposites, under inert conditions.
- Synthesis and handling of air sensitive materials under inert gas atmosphere.
- X ray diffraction, vibrational spectroscopy, DSC, volumetric method (Sieverts method).

**Work Place:** Institute of Nanotechnology; Karlsruhe Institute of Technology (KIT)

**Earliest Start** (between September 2010 and February 2011): March 2010

**Language Course:** German

**Further Information:** m.fichtner@kit.edu

**Address for application:** Dr. Maximilian Fichtner  
Group Leader - "Energy Storage Systems"  
Karlsruhe Institute of Technology  
Hermann-von-Helmholtz Platz 1  
D-76344 Eggenstein-Leopoldshafen  
Germany