Ph.D. position: Vibrational Properties and the role of temperature and pressure in chalcogenides

Advertising institute: JCNS-2 - Jülich Center for Neutron Science
Reference number: D156/2014, Physics, chemistry, materials sciences or crystallography

Start: asap - by agreement

The position is at Forschungszentrum Jülich, one of the largest interdisciplinary research centres in Europe, focusing its expertise in research with neutrons at the Jülich Centre for Neutron Science (JCNS), maintaining outstations at the world's leading neutron sources. The JCNS in collaboration with the RWTH Aachen offers a a PhD position dedicated to the research on *Vibrational properties and the role of temperature and pressure in chalcogenides.*

The PhD project is embedded in the Collaborative Research Centre 917 (SFB917) *Nanoswitches: Resistively Switching Chalcogenides for Future Electronics – Structure, Kinetics, and Device Scalability* which comprises more than 25 groups from the Rheinisch-Westfälisch Technische Hochschule Aachen and the Forschungszentrum Jülich GmbH. The Collaborative Research Centre is dedicated to the investigation of resistive switching phenomena in oxides and higher chalcogenides in which the change of atomic configurations represents the essential functionality. The overall goal is to understand and explore the potential of advanced nanoswitches based on such configuration changes.

The main focus of your work will be the fundamental understanding of the dynamic nature in crystalline phase change materials. In order to clarify the crystallization mechanism, to obtain the vibrational entropy, and correlate the electronic bonding properties with the lattice dynamics, a systematic study of the lattice dynamics in selected ternary chalcogenide and binary oxide systems will be carried out in the pressure range from 0-20 GPa. To this end, new experimental methods for phonon spectroscopy under pressures at synchrotron sources have to be developed and optimized. The investigations will be complemented by x-ray powder diffraction experiments under high pressure and, in addition, Mössbauer spectroscopy experiments will be carried out in cooperation with the Oak Ridge National Laboratory, U.S. . A strong interaction with a computational group of the RWTH Aachen is planned.

The successful candidate will be based at the Jülich Centre for Neutron Science, Forschungs-zentrum Jülich GmbH, Germany, and will receive the PhD from the RWTH Aachen University.

Requirements

- M. Sc.or Diploma in physics, chemistry, materials sciences, crystallography or a related field
- Experience in scattering techniques is of advantage
- Skills in spectroscopic methods, data analysis, high pressure techniques and/or basic knowledge in crystallography are welcome
- Good oral and written command of the English language

We Offer

- Carrying out research in an international and multidisciplinary environment at leading research facilities
- Strong interaction with other researcher within the RWTH and the Collaborative Research Centre
- Possibilities to attend national and international conferences

Applications and further Information:

PD Dr. Karen Friese
Jülich Centre for Neutron Science-2
Forschungszentrum Jülich GmbH
D-52425 Jülich
Phone: +49(0)2461 61 3826
Fax: +49(0)2461 61 2610
k.friese@fz-juelich.de
http://www.jcns.de