

HITEC Theme/Methods Day and Lab

Title: **Materials for High Temperature Applications
and
Experimental Methods for their Characterisation**

Date: **7 + 8 June 2017**

Time: **9:00 – 17:00 o'clock (morning: presentations; afternoon: lab)**

Location: **Forschungszentrum Jülich, IEK-2, Bld. 5.1, R. 1/2**

Materials are essential for developing and implementing new technologies and improving existing technologies. The current and future increase in renewable energy usage for electricity supply requires high load flexibility for energy conversion systems operating at high temperatures. New power plant concepts, e.g. IGCC, oxyfuel or CSP, require appropriate materials and new life prediction methods. Therefore, ongoing research focuses on materials and coatings which allow operating temperatures and pressures to be increased or new process media to be used to improve the efficiency and load flexibility of power plants or industrial processes.

The seminar will give an overview on materials for high temperature applications, their properties, and their characterisation. The hands-on training will provide an insight into experimental methods for their characterisation as well as the characterisation of related aggressive environments.

You will learn about:

- several metallic and ceramic materials,
- basics of physical and chemical properties,
- relevant characterization methods,
- current research activities,
- characterization of mechanical and thermodynamic properties as well as corrosion resistance.

Contents:

- area of application,
- constitution, microstructure, thermodynamics,
- ferritic steels, Ni-base alloys, refractory metals, composites,
- fracture mechanics, creep and fatigue,
- corrosion
- SEM, TEM, XRD, KEMS, DTA, MBMS, tensile and fatigue test, oxidation test etc.

Who should attend:

HITEC PhD-fellows; Postgraduate-, PhD- and postdoctoral fellows from the fields of energy and climate research; it is recommended to combine HITEC Day and Lab.

Number of participants: ≤ 24

HITEC Days are an inherent part of the graduate school HITEC. They devote a whole day to a method or a scientific topic with lectures and discussions. The methodological days serve to encourage scientific interdisciplinarity and will enable the PhD students to extend their range of methods with respect to their own scientific work. HITEC Days always end with a 'Get together', some snacks and drinks. HITEC Days are open for HITEC Ph.D. students and other interested young scientists.

The **HITEC Labs** are hands-on periods of practical training lasting 2 to 3 days, in which small groups of students from various institutes concentrate on one method that is applied in various fields. The aim of the HITEC Labs is to enable the PhD students to appreciate that a method originating from an unrelated field may also be applied in their own work. If students should discover that they require more intensive instruction in applying the method than can be imparted during the HITEC Lab, then they can make arrangements with PhD students at the institute in question to work at the institute for a limited period.