Eidgenössische Technische Hochschule Zürich
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PREC
Professorship of Renewable Energy Carriers

Energy Science Center

Institute of Energy Technology – Professorship of Renewable Energy Carriers

Invitation to a Seminar

Date: July 27, 2016

Time: 11:00- 12:15

Place: ETH Zürich, ML-J25

Speaker: **Dr. Martin Roeb**
DLR - German Aerospace Center
Institute of Solar Research
51147 Köln, Germany

Title:

Processes Utilizing Redox Materials for Solar Thermal Energy Conversion

Abstract – Thermochemical multistep processes are promising options to face future energy problems. Such reactions can be used to enhance the availability of solar energy in terms of energy transport, of energy demand/supply management and of potential energy related applications. Coupling concentrated sunlight to suitable sequences of thermochemical reaction enables the production of fuels like hydrogen or syngas and other fuels by water- and CO_2-splitting as well as the storage of solar energy by breaking and forming chemical bonds in suitable reversible reactions. These processes are sustainable and environmentally attractive since only water and CO_2 are used as the only raw materials and solar power and heat as the only energy source. The concentrated solar energy is converted into storable and transportable chemicals and fuels. One of the major barriers to technological success of many of those processes is the identification of suitable active materials like catalysts and redox materials exhibiting satisfactory durability, reactivity and efficiencies. Besides materials aspects also process engineering issues needs to be overcome. Challenges are to couple an intermittent energy source to a chemical process and to efficiently recover high temperature heat. The most promising processes and the main applications are being described and discussed with respect to further development and future potential. Technical approaches and development progress in terms of solving them are addressed and assessed.

Brief Biography – Dr. Martin Roeb holds a diploma in chemistry from the University of Cologne and a doctoral degree in physical chemistry from the same university. Since 1999 he has been working as a scientist, project manager and group leader in DLR's Solar Research Division in the field of solar high temperature applications. He took over the lead of the team "high temperature solar chemical engineering". He has been work package leader and coordinator of several domestic and EU projects on solar high temperature processes and in particular on solar fuels. His research interests address technologies related to solar thermochemical water and CO2 splitting, solar upgrading of hydrocarbons, high temperature electrolysis and solar recycling and production processes.

Host: Prof. A. Steinfeld, www.prec.ethz.ch