Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Institut für Energietechnik: Prof. R. Abhari (LSM), Prof. K. Boulouchos (LAV),
Prof. D. Poulikakos (LTNT), Prof. A. Steinfeld (PRE), Prof. G. Yadigaroglu (LKT)
Institut für Fluiddynamik: Prof. P. Jenny, Prof. L. Kleiser, Prof. T. Rösgen
Institut für Computational Science: Prof. P. Koumoutsakos

20/01/05

E I N L A D U N G

zu einem Vortrag im Rahmen des

Kolloquiums Thermo- und Fluiddynamik

Datum: **Mittwoch, 2. Februar 2005**

Zeit: **16:15** Uhr

Ort: Maschinenlaboratorium ETH Zentrum
Hörsaal ML H 44

Referent: **Prof. Andreas Züttel**
Institute for Renewable Energy Switzerland, Physics Department
University of Fribourg, Switzerland

Thema: **Materials for Hydrogen Storage**

The intense use of fossil hydrocarbons as energy carriers has caused an increase of CO_2 in the atmosphere and therefore a significant global warming. Furthermore, the reserves of fossil fuels on earth are finite and no matter how long they will last, we have to develop an energy system without fossil fuels for the future.

Hydrogen exhibits the highest heating value (39.4 kWh/kg) of all chemical fuels. Furthermore, hydrogen is regenerative and environment friendly. There are two reasons why hydrogen is not the major fuel of toady's energy consumption: First of all hydrogen is just an energy carrier and has to be produced even it is the most abundant element in the universe, on earth it only occurs in the form of water. This implies that we have to invest for the solar energy conversion and this is a difficult economic task because since the industrialization we are used to consume energy for free. The second difficulty with hydrogen as an energy carrier is the low critical temperature of 33K, i.e. hydrogen is a gas at room temperature. For mobile and in many cases also for stationary applications the volumetric and gravimetric density of hydrogen in a storage material is crucial. Hydrogen can be stored by six different methods and phenomena:

- high pressure gas cylinders (up to 800 bar)
- liquid hydrogen in cryogenic tanks (at 21 K)
- adsorbed hydrogen on materials with a large specific surface area (at T< 100 K)
- absorbed on interstitial sites in a host metal (at ambient pressure and temperature)
- chemically bond in covalent and ionic compounds (at ambient pressure)
- oxidation of reactive metals e.g. Li, Na, with water

The different hydrogen storage methods will be reviewed in order to define the challenges and opportunities for future research and applications.

Host: Prof. A. Steinfeld

Gäste sind willkommen!

Weitere Informationen:

http://www.lsm.ethz.ch, http://www.lav.ethz.ch, http://www.ltnt.ethz.ch, http://www.pre.ethz.ch
http://www.lkt.mavt.ethz.ch, http://www.ifd.mavt.ethz.ch, http://www.icos.ethz.ch