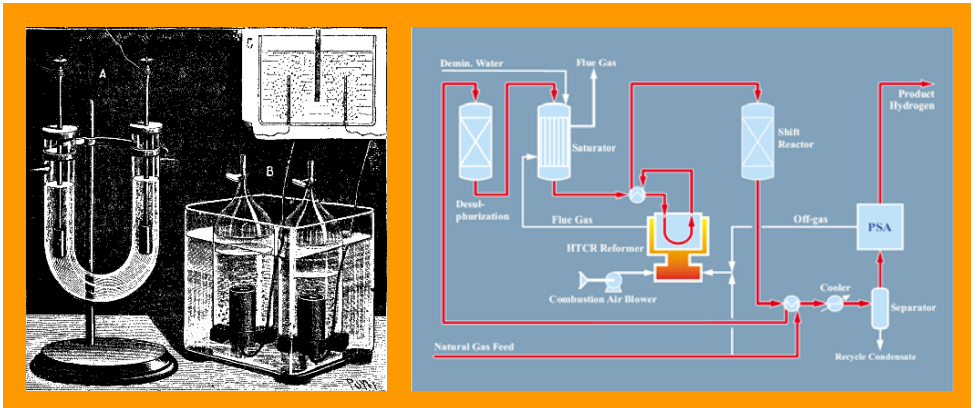


# *Future Hydrogen Generation and Application*

## TOPSOE CATALYSIS FORUM 2006



August 24-25<sup>th</sup>, 2006

Havreholm Castle, Hornbæk, Denmark



**HALDOR TOPSOE**

## Program

The Forum will be a two days session where the first day is devoted to overview lectures that will form the basis for discussions to take place after each lecture and also the following day, where three different groups will be formed to exchange views on specific themes.

### Wednesday, August 23<sup>th</sup>

Afternoon      Check-in at Havreholm Castle for participants from abroad  
19.00            Buffet at Havreholm with participants from abroad

### Thursday, August 24<sup>th</sup>

07.30-09.00    Breakfast and arrival of local participants

**Morning Session: Chairman: Henrik Topsøe, Haldor Topsoe**

09.00-09.15    Bjerne S. Clausen, Haldor Topsoe  
["Welcoming introduction"](#)

09.15-10.00    Martin Tallett (ENSYS), ["Global Outlook: Implications through 2020 of Alternative Fuel Scenarios for Refining, Crude, Hydrogen"](#)

10.10-11.00    Christopher Higman (Syngas Consultants Ltd.), ["Production of Hydrogen by Gasification"](#)

Coffee break

11.15-12.00    Oliver Görke (FZK, Karlsruhe), ["Hydrogen Generation Using Microreactor Technology"](#)

Lunch

**Afternoon Session: Chairman: Kim Grøn Knudsen, Haldor Topsoe**

13.30-14.20    Svein Sunde (NTNU), ["Electrolysis for Hydrogen Production"](#)

14.30-15.30    Greg Fleming (Air Liquide), ["Membranes for Recovery of Hydrogen"](#)

Coffee break

16.00-16.50    Thorsteinn I. Sigfusson (IPHE), ["Hydrogen Economy in Iceland"](#)

19.00-            Conference dinner at Havreholm Castle

### Friday, August 25<sup>th</sup>

07.30-08.45    Breakfast

08.45-09.00    Henrik Guldberg Pedersen, Haldor Topsoe  
*"Introduction to group discussions"*

09.00-12.30    Group Discussions

### **Group 1: Fuel Cells: Chairman Niels Christiansen, Haldor Topsoe**

- Ulrich Stimming (Technical University of Munich), "[Hydrogen, the Best Fuel for Fuel Cells?](#)"
- John Bøggild Hansen (Haldor Topsoe), "[Fuel Processing and System Designs for Fuel Cells](#)"
- Raymond Gorte (University of Pennsylvania), "[Developing SOFC Anodes for Direct Utilization of Hydrocarbon Fuels](#)"

### **Group 2: Unconventional Hydrogen Production: Chairman Jesper Nerlov, Haldor Topsoe**

- Albin Czernichowski (ECP France), "[Hydrogen or SynGas Generation using Plasma Technology](#)"
- Luca Basini (Research Center for Catalysis and Process Technologies, EniTechnologie), "[Hydrogen Generation using Short Contact Time - Catalytic Partial Oxidation](#)"
- Magnus Rydén (Chalmers University of Technology), "[Two Novel Approaches for Hydrogen Production; Chemical-looping Reforming and Steam Reforming Integrated with Chemical-looping Combustion](#)"

### **Group 3: Towards a Hydrogen Society: Chairman P. E. Højlund Nielsen, Haldor Topsoe**

- Tejs Vegge (Risø), "[Computational and Experimental Advances in Hydrogen Storage](#)"
- Niels Henriksen (Elsam), "[Hydrogen in Power Plants](#)"
- Morten Rønnekleiv (Statoil), "[Statoil's View on Hydrogen Production and CO<sub>2</sub> Management](#)"

Lunch

Closing Session: Chairman: Bjerne S. Clausen, Haldor Topsoe

14.00-15.00 Closing Lecture: Jens Rostrup-Nielsen (Haldor Topsoe), "[Hydrogen, Energy Vector of the Future](#)"

### **Participants**

Besides the presenters, a few representatives from industrial collaboration partners may attend the meeting, but the majority of the participants will be from Haldor Topsoe. Up to 80 persons will attend the presentations on the first day and approximately 50 persons will take part in the discussions on day two. The meeting will be held on a non-confidential basis.

### **Scientific Committee**

Bjerne S. Clausen ([bsc@topsoe.dk](mailto:bsc@topsoe.dk))  
Henrik Topsøe ([het@topsoe.dk](mailto:het@topsoe.dk))  
Niels Christiansen ([nc@topsoe.dk](mailto:nc@topsoe.dk))  
Poul Erik Højlund Nielsen ([pehn@topsoe.dk](mailto:pehn@topsoe.dk))  
Kim G. Knudsen ([kik@topsoe.dk](mailto:kik@topsoe.dk))  
Jesper Nerlov ([jen@topsoe.dk](mailto:jen@topsoe.dk))

### **Programme Committee**

Christian Olsen ([co@topsoe.dk](mailto:co@topsoe.dk))  
Joachim Jacobsen ([jcj@topsoe.dk](mailto:jcj@topsoe.dk))  
Søren Dahl ([sda@topsoe.dk](mailto:sda@topsoe.dk))  
Susanne Mainz ([sum@topsoe.dk](mailto:sum@topsoe.dk))  
Nina Sant Nielsen ([nisn@topsoe.dk](mailto:nisn@topsoe.dk))

## **Background**

The **TOPSOE CATALYSIS FORUM** has been created as a framework for an open exchange of views on catalysis in the fields of interest to Haldor Topsoe. The idea is to discuss new reactions and new principles of catalysis in an attempt to jointly look beyond the horizon. In order to facilitate open discussions and to enable all participants to make use of the information received during the meetings in their future work, the meetings will be held on a non-confidential basis.

The **CATALYSIS FORUM** works through individual contacts and annual meetings focusing on a single topic.

### **“Future Hydrogen Generation and Application”**

Hydrogen production and chemical processes using hydrogen is core business to Haldor Topsoe. The topic of the third **TOPSOE CATALYSIS FORUM** is “Future Hydrogen Generation and Application” covering what could be the hydrogen technology of tomorrow.

Hydrogen is by many envisioned to play a central role as energy carrier in the future – The Hydrogen Economy. Even though this scenario might never be realized, it is certain that hydrogen will play a more pronounced role as we move away from oil and gas towards synthetic fuels. This requires the use of untraditional feed stocks for hydrogen production, e.g. coal and biomass. Also untraditional approaches, such as hydrogen generation in connection with peak shaving in power plants, will be touched upon. Use of the alternative feed stocks can result in an additional increase in CO<sub>2</sub> emission and other unwanted emissions. Thus efficient and benign hydrogen and synthetic fuels production is highly in demand for the future. Efficient separation of hydrogen from other gasses is a key issue in such new technology.

The new applications of hydrogen are highly connected to the future of Fuel Cells, which are improving rapidly at the moment. Many Fuel Cell types are known. Topsoe Fuel Cell is working on developing Solid Oxide Fuel Cells and systems for processing different fuels for them.

The aim of the seminar will be to discuss the future of hydrogen. This should be done with a very open mind, since the idea is not just to review current knowledge, but also to provide a basis for new innovations within the area in question.