

## Background

The TOPSØE CATALYSIS FORUM was created as a framework for an open exchange of views on catalysis in the fields of interest to Haldor Topsøe. The forum is conceived as a platform for discussions of new reactions and new principles of catalysis in an attempt to jointly look beyond the horizon. In order to facilitate an open debate and to enable all participants to make use of the information received during the meetings in their future work, the forum is held on a non-confidential basis. The TOPSØE CATALYSIS FORUM works through individual contacts and annual meetings focusing on a single topic.

The topic of the 5th TOPSØE CATALYSIS FORUM is:

### The role of catalysis in conversion of biomass

The growing climate concerns as well as the concern over the decrease in accessible oil reserves have sparked the development of new fuels and chemicals based on biorelated materials, such as sugars, vegetable oils and bio-waste. While biodiesel and bioethanol based on 1st generation processes are mature, more sustainable processes should be sought in the future to avoid affecting the availability of food for the population of our planet. Gasification of biomass and waste into syngas and further production of both energy and fuels are obvious possibilities that will require further insight into these materials. The potential market for chemicals, based on sustainable feedstocks replacing petroleum based products in the future, is large. Not only can a substantial amount of current commodity chemicals be made from renewables, but new products with environment-friendly properties may replace current products as well. To reach these future goals, new catalysts and processes are required which are able to work under different conditions than the present petroleum based. Instead of adding chemical functionalities, the initial steps are the opposite: Removing functionalities to obtain the new building blocks for other products. This is not only in an overall aqueous environment giving rise to quite harsh conditions for catalysts, but also the separation of products may become increasingly difficult due to the hydrogen bonding systems leading to complex phase behaviour. It is clear that the area of biomass utilisation for both energy and chemicals currently and in the future will require large efforts in research and development to obtain efficient processes, which will have to compete with crude oil based products in many years to come. The aim of this seminar is to discuss current and future practices of biomass conversion using catalysis. It should be done with an open mind in order not just to review current knowledge but also to provide a basis for new innovations within the area.



# Topsøe Catalysis Forum

## The role of catalysis in conversion of biomass

21 - 22 August 2008

RESEARCH | TECHNOLOGY | CATALYSTS

### Scientific committee

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### Organising committee

Poul Erik Højlund Nielsen	(pehn@topsoe.dk)
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## Programme

The TOPSØE CATALYSIS FORUM is organised as a two-day topical meeting. The first day is devoted to overview lectures which set the scene and form the basis for the discussions. On the second day, the discussions and exchange of views will take place in three groups, each organised around a specific sub-topic.

Participation is by invitation only. Besides the presenters, representatives from industrial collaboration partners are invited, but the majority of the participants is Haldor Topsøe staff. On the first day of the meeting, up to 75 participants will be present whereas about 50 will take part in the discussions on the second day. The meeting is held on a non-confidential basis.

### Wednesday, 20 August

12:00-15:30 Visit to the Haldor Topsøe Headquarters

19:00 Buffet at Havreholm Castle

### Thursday, 21 August

07:30-09:00 Breakfast and arrival of local participants

09:00-09:10 Welcome address, Bjerne S. Clausen, Haldor Topsøe

**Plenary morning session** - chairman: Kim G. Knudsen, Haldor Topsøe

09:10-10:00 **Production alternatives of biocomponents for diesel**  
Outi Krause, Helsinki University of Technology

10:00-10:50 **Gasification of biomass, waste and coal**  
Bernd Meyer, Technische Universität Bergakademie Freiberg

*Coffee break*

11:10-12:00 **Gasification of biomass - Biomass CHP Güssing**  
Reinhard Rauch, Vienna University of Technology

*Lunch*

**Plenary afternoon session** - chairman: Henrik Topsøe, Haldor Topsøe

13:30-14:20 **Chemicals from wood**  
Dmitry Yu. Murzin, Åbo Akademi

14:20-15:10 **The use of renewable feedstocks as a contribution for environmental protection**  
Wolfgang Hölderich, University of Technology, RWTH Aachen

*Coffee break*

15:30-16:20 **Value added chemicals from biomass**  
Jim Dumesic, University of Wisconsin-Madison

19:00 **Conference dinner**

### Friday, 22 August

07:30-08:45 Breakfast

08:45-09:00 Introduction to group discussions

09:00-12:30 Group discussions

#### Grp. 1: **Thermochemical conversion**

- chairman: Poul Erik Højlund Nielsen, Haldor Topsøe

- **Coproduction of power and fuel (ReneScience) from biomass, waste and coal**  
Martin Møller, DONG Energy A/S
- **Biomass gasification applications**  
Kari Salo, Carbona
- **Well to wheel studies**  
Patrik Klintbom, Volvo Powertrain Corp.

#### Grp. 2: **Chemicals from carbohydrates**

- chairman: Søren Dahl, Haldor Topsøe

- **Chemicals from sugars**  
Sven Pedersen, Novozymes
- **Heterogeneous catalysis for value added chemicals from biomass**  
Claus Hviid Christensen, Haldor Topsøe
- **Catalytic conversion of sugar to HMF in ionic liquid solvents**  
Conrad Zhang, Pacific Northwest National Lab

#### Grp. 3: **Value added chemicals from C2/C3 bio-resources**

- chairman: Simon Ivar Andersen, Haldor Topsøe

- **Selective oxidation and hydrogenolysis of glycerol over supported metal catalysts**  
Robert J. Davis, University of Virginia
- **Amoxidation of renewables: Glycerol to acrylonitrile**  
Miguel A. Bañares, Instituto de Catálisis y Petroleoquímica, CSIC
- **One-pot catalytic transformation of biomass and derivatives to valuable chemicals**  
Pierre Gallezot, Institut de Recherches sur la Catalyse-CNRS

Lunch between 12:30 and 14:00

Closing session - chairman: Bjerne S. Clausen, Haldor Topsøe

14:00-15:00 **The cloud mystery and the human influence**  
Henrik Svensmark, Danish National Space Center