

Munkerupgaard, August 24-25, 2017

Topsoe Catalysis Forum

Electrocatalysis



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HALDOR TOPSØE 

Program

The Topsoe Catalysis Forum is organized as a two-day topical meeting. The first day is devoted to overview lectures that 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 organized around a specific subtopic.

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

Thursday, August 24

- 08:30 - 09:00 **Arrival and light breakfast**
- 09:00 - 09:10 **Welcome address**
Jesper Nerlov, Haldor Topsoe
- Plenary morning session** - chairman: Martin Skov Skjøth-Rasmussen, Haldor Topsoe
- 09:10 - 10:00 **Electrochemical chemicals production**
Günter Schmid, Siemens AG
- 10:00 - 10:50 **Commercialization of electrocatalysts for energy applications**
Thomas J. Schmidt, Swiss Federal Institute of Technology Zurich and Paul Scherrer Institut, Electrochemistry Laboratory
- Coffee break
- 11:10 - 12:00 **Systems integration of electro and thermal catalytic processes**
Robert Braun, Colorado School of Mines
- Lunch break
- Plenary afternoon session** - chairman: Ib Chorkendorff, Technical University of Denmark
- 13:30 - 14:20 **Materials for Electrocatalysis**
Jan Rossmeisl, University of Copenhagen
- 14:20 - 15:10 **Electrochemical systems engineering**
Matthew M. Mench, The University of Tennessee, Knoxville
- Coffee break
- 15:30 - 16:20 **Redox flow batteries for energy storage**
Hubert Girault, Ecole Polytechnique Fédérale de Lausanne
- 19:00 Conference dinner



Friday, August 25

08:45 - 09:00 **Introduction to group discussions**

Fei Chen, Haldor Topsoe

09:00 - 11:55 **Group discussions**

Grp. 1: Materials for electrocatalysis

- chairman: *Poul Georg Moses, Haldor Topsoe*

- **Metal nanoparticles or single sites confined in two-dimensional materials**
Dehui Deng, Dalian Institute of Chemical Physics
- **Metal alloys**
Ifan Stephens, Technical University of Denmark
- **Oxides**
Aleksandra Vojvodic, University of Pennsylvania

Grp. 2: Flow batteries

- chairman: *Søren Dahl, Haldor Topsoe*

- **Organic flow batteries**
Anders Bentien, Aarhus University
- **Challenges and chances for Redox flow batteries**
Ulrich Stimming, Newcastle University
- **Semi-solid flow batteries**
Joan Ramón Morante, Catalonia Institute for Energy Research

Grp. 3: Electrochemical chemicals production

- chairman: *Peter Blennow, Haldor Topsoe*

- **Value-added C2 chemicals from CO₂ by electrocatalysis**
Paul J. A. Kenis, University of Illinois at Urbana-Champaign
- **Technology improvements in water electrolysis and CO₂ conversion to chemicals and fuels**
Jerry J. Kaczur, Dioxide Materials
- **From CO₂ to building blocks for polymers, technical status and outlook**
Stefanie Eiden, Covestro

Closing session - chairman: *Jesper Nerlov, Haldor Topsoe*

12:00 - 13:00 **The global energy challenge and technical solutions**

George W. Crabtree, Argonne National Laboratory

13:00 - 13:10 Closing remarks

Lunch between 13:10 - 14:30

The TOPSOE CATALYSIS FORUM was created as a framework for an open exchange of views on catalysis in the fields of interest to Haldor Topsoe. 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 TOPSOE CATALYSIS FORUM works through individual contacts and biennial meetings focusing on a single topic.

The topic of the 13th TOPSOE CATALYSIS FORUM is:

Electrocatalysis

The world's energy consumption is increasing steadily, and electrification is accelerating while renewable sources are taking market shares from fossil consumption. Photovoltaics and wind turbines are in particular gaining market shares as the commercial cost continues to decrease for these technologies. The next logical large-scale challenge may very well be as evident as improved storage and transportation of energy from the windy and sunny production sites to the established consumer markets. Electrocatalysis seems a very promising technology to this end. Development of electrolysis with high product yields will be essential in order to meet the future demand, while the environmental impact and energy consumption need to be at acceptable levels. The development of new as well as optimization of existing electrocatalytic processes for conversion of electricity to chemicals is not trivial, either due to limited maturity or lack of short-term profitable applications. Selection of technologies and combinations of these are quite open challenges. Thus, all in all it is a daunting as well as a potentially rewarding task that lies ahead of us.

At the Topsoe Catalysis Forum 2017, we will focus on various aspects of electrochemistry applied in energy conversion, energy storage, and synthesis of value-added chemicals, including fuels, bulk chemicals, and monomers, as well as novel materials. Focus is on reviewing state-of-the-art knowledge as well as discussing future trends and new combinations of processes. The main focus of the forum is on scientific and technical presentations and discussions; however, to give a more holistic view of what will be expected of industry in the future, the program also includes contributions of a more market-oriented and commercial nature.

The aim of the forum is to establish an open-minded and informal atmosphere where knowledge, thoughts, and ideas are shared. Thus, we believe the forum provides a basis for gaining new understanding and will contribute to moving the industry forward.

Scientific committee

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