Topsoe Catalysis Forum
Future catalyst productions

August 23-24, 2018
Frydenlund

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HALDOR TOPSOE

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The Topsoe Catalysis Forum is organized 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 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 23

09:15-09:30 Welcome address, *Jesper Nerlov, Haldor Topsoe*

Plenary morning session *- chairman: Henrik Guldberg Pedersen, Haldor Topsoe*

09:30-10:20 **Cognitive inspiration**
Kim Escherich, IBM

10:20-11:10 **Design for six sigma**
Per Vase, NNE

Coffee break

11:40-12:30 **Multi materials additive manufacturing**
Alexander Michaelis, Fraunhofer IKTS

Lunch

Plenary afternoon session *- chairman: Martin Skov Skjøth-Rasmussen, Haldor Topsoe*

14:00-14:50 **Continuous manufacturing and dynamic flowsheet modeling**
Fernando Muzzio, Rutgers University

14:50-15:40 **Sasol´s world of alumina and the challenge of scale up of new products**
Andreas Prien, Sasol Performance Chemicals

Coffee break

16:10-17:00 **Trends in solids processing/Industrial furnaces**
Professor Dr.-Ing. Herbert Pfeifer, RWTH Aachen University

18:00 **Conference dinner**

Friday, August 24

08:45-09:00 **Introduction to group discussions, Henrik Guldberg Pedersen, Haldor Topsoe**

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

Grp. 1: ***Tools and processes for improvement***

- chairman: Henrik Guldberg Pedersen, Haldor Topsoe

- **Factory of the future – AR/VR in production**
  Ulrich Hedegaard Brorson, Grundfos
- **The Future of manufacturing**
  Guarav Garg, IBM
- **The digital road map to the Golden Batch and the Perfect Hour**
  Finn Hunneche, Emendo

Grp. 2: ***Industrial knowledge sharing***

- chairman: Ninna Halberg Jokil, Haldor Topsoe

- **More right first time**
  Søren Pehrson and Martin Jelsted, Haldor Topsoe
- **Solids handling at Novozymes**
  Kåre Jørgensen Engsted, Novozymes
- **Digital service opportunities and concerns**
  Henrik Schwartzbach, GEA

Grp. 3: ***Production and simulation***

- chairman: Anders Gabrielsson, Haldor Topsoe

- **Using sensors and large data to understand, improve and monitor production**
  Rasmus Bro, University of Copenhagen
- **Extrusion of catalysts**
  Frank Händle, Frank Händle Transfer
- **Reduce product complexity and get a better performance in production**
  Lars Hvam, Technical University of Denmark

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

12:00-13:00 **Smart factory and Industry 4.0**
Nigel Edmondson, MADE

13:00-13:10 Closing remarks

Lunch between 13:10 and 14:30

Background

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 annual meetings focusing on a single topic. The topic of the 14th TOPSOE CATALYSIS FORUM is:

Future catalyst productions

The world population is increasing, leading to an increasing demand for food, products, clean air to breathe and clean water to drink. Energy consumption is increasing steadily as well as production of materials. This global development demands a more efficient use of resources and renewables are introduced both in the energy pool and as feedstock for production of materials. In general, the world is transforming the ways of producing food and products; and the energy systems are changing significantly as well. Industrial heterogeneous catalysis – and therefore solid catalysts – are crucial in this global transformation.

Catalysts are advanced materials and their function and properties are highly dependent on the manufacturing processes. Minute impurities can poison the catalytic activity and an uncontrolled variation in mixing or calcination can jeopardize the critical properties.

Most heterogeneous catalysts are prepared through processing of solid materials, in particular powder and slurry processes are widely used. Anyone experienced in this area will know about the vast complexity of feeding, mixing, shaping and heating of powder materials. For example, “hammer rash” is commonly seen on powder process equipment, where production operators help powders to flow in the process by hitting the equipment. As in the surrounding society, efficient use of resources is important in the production of catalysts. At the same time, rapid changes in market demands call for an efficient and effective launch of new products, while keeping an eye on inventories, operating efficiency and supply chain security.

Traditionally, the chemical industry is lacking a little behind other manufacturing industries in the use of “big data” and machine learning and since production know-how is a core and key element of the companies and therefore subject to some level of secrecy, this may limit innovation in this area.

The objective of the conference is to inspire the participants with state-of-the-art lectures within some of the most important areas of solids production:

- Modeling & unit operations: How can we better understand what is happening in the solids processes and optimize the operation – and improve how we design new solids processes?
- Scale up processes and methods improvement: How can we improve the link between research & development and production in particular in relation to launch of new products in full scale and in relation to the optimization of existing product lines
- Industry experience: Strengthen the professional network of companies and institutions with practical experience of full-scale solids processing
- Data: How can better use of data in production and development improve production of solid materials as catalysts?

Scientific committee

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