Netherlands conference on Electrochemical Conversion & Materials (ECCM)

Friday 29 June 2018, The Hague – NH Hotel

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Electrochemical Conversion & Materials

Towards a CO₂-neutral energy supply in 2050



Ministry of Economic Affairs and Climate Policy

Prof. Richard van de Sanden, chair ECCM committee

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Holland High Tech





Holland Chemistry Global Challenges, Smart Solutions

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Today's programme

Conference programme

Time Activity

- 9:00 Reception and registration
- 9:30 Opening conference by Dr. Bertholt Leeftink (Director-General Enterprise and Innovation at Ministry of Economic Affairs & Climate Policy) and Prof. Dr Richard vd Sanden (chair of the Dutch committee for Electrochemical Conversion & Materials)
- 9:45 Opening lecture by Ir. Diederik Samsom (former politician, advisor in green energy supplies, negotiator for the Dutch Climate and Energy Agreement, Netherlands)
- 10:15 Keynote: Dr. Behnam Taebi (Delft University of Technology)
- 10:45 Keynote: Prof. Dr Ib Chorkendorff (Technical University of Denmark, Denmark)
- 11:15 Coffee break and change rooms for parallel tracks
- 11:30 Parallel tracks part 1 (1x 30 min + 3x20 min)

	Room: Rotterdam 1 (2nd floor)	Room: Rotterdam 2 (2nd floor)	Room: Rotterdam 3 (2nd floor)
	Materials & Catalysis	Innovative electrochemistry	System integration, business & governance
11:30 - 12:00 (30min)	Keynote: DiplIng. Thomas Burgler (voestalpine Stahl)	Keynote: Prof. Dr. Annick Hubin (Vrije Universiteit Brussel)	Keynote: Dr. Pieter Boot (PBL Netherlands Environmental Assessment Agency)
12:00 - 12:20 (20 min)	Dr Vera Smulders (UT)	Prof. Dr Emiel Hensen (TU/e)	Rob Terwel, MSc (Kalavasta)
12:20- 12:40 (20 min)	Dr Shiju Raveendran (UvA)	Dr Anja Bieberle-Hütter (DIFFER)	Ing. Rob van der Sluis (MTSA)
12:40- 13:00 (20 min)	Dr Ruud Kortlever (TUD)	Dr Thijs de Groot (Akzo)	Guy Verkoeyen, MBA (Hydrogenics)

13:00 Lunch

- 13:45 Keynote: Dr. Ajay Mehta (Shell Long Range Research and New Energy Technologies, United States)
- 14:15 Keynote: Dr. Günter Schmid (Siemens, Germany)
- 14:45 Coffee break and change rooms for parallel tracks
- 15:00 Parallel tracks part 2 (4x 20 min)

	Room: Rotterdam 1 (2nd floor)	Room: Rotterdam 2 (2nd floor)	Room: Rotterdam 3 (2nd floor)
	Materials & Catalysis	Innovative electrochemistry	System integration, business & governance
15:00 - 15:20 (20 min)	Leon Jacobse, MSc (UL)	Dr Roman Latsuzbaia (TNO)	Dr Andreas ten Cate (ISPT)
15:20 - 15:40 (20 min)	Dr Maarten Biesheuvel (Wetsus)	Dr Waldo Bongers (DIFFER)	Drs. Toon van Harmelen (TNO)
15:40 - 16:00 (20 min)	Prof. Joost Reek (UvA)	Dr Thomas Burdyny (TUD)	Dr Frits van Hout (ASML)
16:00 - 16:20 (20 min)	Dr Frans van Berkel (TNO)	Dr Klaas Jan Schouten (Avantium)	Prof. Gert-Jan Kramer (UU)

16:20 Change room for closing lecture

- 16:30 Keynote: closing lecture: Prof. Dr. Robert Schlögl (Max-Planck-Institut für Chemische Energiekonversion, Germany)
- 17:15 Drinks
- 18:00 End of programme

Key note speakers

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 Ir. Diederik Samsom, former politician, advisor in green energy supplies, negotiator for the Dutch Climate Agreement, The Netherlands

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- Prof. Dr. Robert Schlögl, Max-Planck-Institut f
 ür Chemische Energiekonversion, Germany
- Dr. Ajay Mehta, Shell Long Range Research and New Energy Technologies, United States
- Prof. Dr. Ib Chorkendorff, Technical University of Denmark, Denmark
- Dr. Günter Schmid, Siemens, Germany
- Prof. Dr. Annick Hubin, Vrije Universiteit Brussel, Belgium
- Dr. Pieter Boot, PBL Netherlands Environmental Assessment Agency, Netherlands
- Dipl.-Ing. Thomas Bürgler voestalpine Stahl, Head of Research and Development Ironmaking, Linz, Austria
- Dr. Behnam Taebi, Delft University of Technology, Netherlands



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The energy landscape is changing.....



"However, the real milestone is reached when an offshore hydrogen electrolysis system is built utilising the growing surplus **electrons** from those wind farms...."

Renewable electricity supply will drastically increase...

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- Accellerating increase of power from Wind at Sea.
- Electricity will not necessarily be cheaper on average, but more volatile energy supply causes price fluctuations.





TOPSECTOR ENERGIE



Highly integrated industry clusters are located at the different ports and in the mainland:

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- 1. Port of Rotterdam and Port of Moerdijk
- 2. Chemelot
- 3. South West Brabant & Zeeland Seaports
- 4. Groningen Seaports & Emmtec Industry & Business park
- 5. East Netherlands & Twente

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6. Tata Steel IJmuiden



Dutch Climate Challenge

- 49% CO2 reduction in 2030 (reference 1990). Towards 95% reduction in 2050.
- Climate Agreement and Climate Law.
- To be agreed in summer 2018.



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ECCM





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ECCM: one umbrella

- Representatives from:
 - Academia
 - Applied research
 - Private sector
- Endorsed by the Topsectors Energy, High-Tech and Chemistry.
- Coupled into the climate policy of the government, confederation of Netherlands industry and employers, strategies of national fundamental and applied research organizations.
- And adviced by an expert group on governance & transition.

High-level aims:

- By 2030, hydrogen will be produced in a CO₂-poor manner at a price of no more than € 2/kg, and by 2050 at a price of € 1/kg.
- By 2030, at least 20% of the hydrogen and ammonia will be produced without CO₂ emissions.
- By 2050, at least 40% of the industrially produced CO₂ will be used as a resource in the transition to a circular carbon cycle.
- Mobility: by 2050, the entire transport sector will be CO₂-neutral.

Timeline

- Spring 2016 Top sectors Energy, HTSM and Chemistry jointly identify ECCM as a mission
- 27 januari 2017 1st ECCM theme day: overview ongoing activities
- February 2017 Appointment ECCM committee by government and top sectors
- 16 June 2017
 2nd ECCM theme day towards an advisory report and roadmap towards a national approach
- June 2017
- 11 September 2017
- 29 June 2018

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- Introduction of ECCM as Key Enabling Technology
- ECCM report handed over to top sectors and government
- National ECCM conference: platform and community

TOPSECTOR ENERGIE

Empowering the new economy



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Electrochemical conversion & materials committee

- Prof. dr Richard van de Sanden (DIFFER), chair
- Prof. dr. Bernard Dam (TU Delft)
- Dr. Earl Goetheer (TNO)
- Prof. dr. Gert-Jan Gruter (Avantium)
- Prof. dr. Petra de Jongh (Universiteit Utrecht)
- Prof. dr. Marc Koper (Universiteit Leiden)
- Ir. Geert Laagland (Vattenfall)
- Prof. dr. Guido Mul (Universiteit Twente)
- Dr. Alexander van der Made (Shell)
- Dr. John van der Schaaf (TU/e)
- Drs. Marco Waas (AkzoNobel)
- Dr. Hans van der Weijde (Tata Steel)
- Dr. Ellart de Wit (HyGear)

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TOPSECTOR ENERGIE Holland C Empowering the new economy Global Challenge

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Kick-off initiatives under ECCM embrella

- ECCM Tenure Track programme (TRL 1-3)
 - NWO call (M€ 7) for tenure track (TT) positions in ECCM with start-up packages (1 PhD position, investment budget) - min. 1 M€ per position; matching from host institute required.
 - Launch October 2018 (tentative)
- Faraday lab (TNO/ECN/VoltaChem) (TRL 3-5)
 - Pilot facilities for PEM and Solid Oxide fuel cell development.
- MW test center under development (ISPT) (TRL 4-7)
 - The MW test center aims to support technology development of water electrolysis.
 - The technology development at the MW test center should lead to a cost prize for the electrolyzer stack of 50-100 €/kW* at an efficiency of >80% (for first 5 years of operation) and a pressure of 30 bara by 2030.
- Consortia under development (TRL 1-7) National coordinator on behalf of the ECCM committee, Paulien Herder (TU Delft).
- National innovation programme: mission (TRL 1-9)