



Programme

C1 Building Blocks for Future Chemistry

Petrochemistry Division

October 11 - 13, 2023, Dresden



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WELCOME

Dear ladies and gentlemen,

with great pleasure I welcome you, also in the name of the organizing committee and the board of the DGMK division of Petrochemistry, the Industrial Chemistry division of the Società Chimica Italiana (SCI) and the ÖGEW to the 31st edition of our Petrochemistry conference 2023, here in this wonderful location in the Dreikönigskirche in Dresden.

We are very glad to provide you with a great opportunity for networking and scientific exchange, in addition to a splendid scientific conference program. We are looking forward to 9 keynote lectures and 17 lectures, as well as 19 posters around this year's main topic "***C1 Building Blocks for Future Chemistry***".

We hope that you will enjoy this opportunity as much as we do and look forward to many lively discussions.

Prof. Dr. Dieter Vogt

Chairman DGMK-Division "Petrochemistry"

Scientific Chairpersons:

Dr. Michael Bender, BASF SE, Ludwigshafen

Dr. Axel Göhrt, INEOS, Köln

Dr. Harald Häger, Evonik Performance Materials GmbH, Marl

Prof. Dr. Andreas Jess, Universität Bayreuth, Bayreuth

Prof. Dr. Johannes A. Lercher, Technische Universität München, München

Dr. Mario Marchionna, Saipem S.p.A., San Donato Milanese

Prof. Dr. Jörg Sauer, Karlsruher Institute of Technology (KIT), Karlsruhe

Prof. Dr. Dieter Vogt, Technische Universität Dortmund, Dortmund

PROGRAM OVERVIEW

Wednesday, October 11, 2023	
13.00 - 13.30	Opening and Welcome Address
13.30 - 15.45	Reducing CO ₂
15.45 - 16.15	Coffee Break
16.15 - 18.00	Syngas I
Thursday, October 12, 2023	
08.30 - 10.30	Syngas II
10.30 - 11.00	Coffee Break
11.00 - 12.45	HyFo & Carbon I
12.45 - 13.45	Lunch Break
13.45 - 15.30	HyFo & Carbon II
15.30 - 16.45	Poster Session & Coffee
16.45 - 18.30	Fischer Tropsch I
20.00	Conference Dinner

Friday, October 13, 2023

08.30 - 10.15	Fischer Tropsch II
10.15 - 10.45	Coffee Break
10.45 - 13.00	Methanol-to-X
13.00 - 13.05	Concluding Remarks and Conference Summary
13.05	Lunch Break

WEDNESDAY, OCTOBER 11, 2023

OPENING AND WELCOME ADDRESS

13.00 h **Gesa Netzeband**
Managing Director, DGMK e.V.
Dieter Vogt
Chairman DGMK-Division Petrochemistry

SESSION: REDUCING CO₂

Chairperson: Dieter Vogt

13.30 h **Keynote Lecture: ChemCRAFT: A Gaming Approach towards a Sustainable Chemical Industry**
A. Bardow
ETH Zürich, Dep. Maschinenbau und Verfahrenstechnik, Zurich, Switzerland

14.15 h **A Comprehensive Strategy Towards Structure Elucidation of Hydroformylation Bottoms**
C. Loesche, R. Fels-Brendel, K.-H. Gunzelmann, R. Doetzer
BASF SE, Ludwigshafen, Germany

14.45 h **Optimisation of Platinum-based Catalysts for the Dehydrogenation of Perhydro Benzyltoluene as LOHC**
E. Herzinger¹, D. Strauch^{2,3}, P. Wasserscheid^{2,3}, M. Wolf¹
¹Karlsruhe Institute of Technology (KIT), Institute of Catalysis Research and Technology (IKFT), Eggenstein-Leopoldshafen, Germany, ²Forschungszentrum Jülich, Helmholtz-Institut Erlangen-Nürnberg (IEK-11), Erlangen, Germany, ³Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Lehrstuhl für Chemische Reaktionstechnik, Erlangen, Germany

WEDNESDAY, OCTOBER 11, 2023

15.15 h **Valorisation of CO₂ from Biogas Plants: Circularity in Agro-economy**

I. Rossetti¹, M. Tommasi¹, S. Naz Degerli¹, G. Ramis²

¹Chemical Plants and Industrial Chemistry Group, Dip.

Chimica, Università degli Studi di Milano, CNR-SCITEC and INSTM Unit Milano-Università, Milan, Italy, ²Dip. Ing. Chimica, Civile ed Ambientale, Università degli Studi di Genova and INSTM Unit Genova, Genoa, Italy

15.45 h **Coffee Break**



**She Drives Energy -
Network of Women in
Energy Technology**

SHE DRIVES ENERGY aims to increase the visibility of women in the industry by creating space for inspiration, exchange of ideas and knowledge transfer in technical areas to ensure a sustainable and successful industry.

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SESSION: SYNGAS I

Chairperson: Michael Bender

16.15 h **Keynote Lecture: Decarbonization of Syn-Gas and Hydrogen production: A “zero-carbon” Puzzle?**

M. Marchionna

Saipem, Milano, Italy

17.00 h **Joule-heated Structured Catalytic Reactors for CO₂ Valorization**

L. Zheng, M. Ambrosetti, A. Beretta, G. Groppi,

E. Tronconi

Laboratory of Catalysis and Catalytic Processes, Politecnico di Milano, Italy

17.30 h **Electrically Heated Reactor for Steam Methane Reforming**

M. Baumgärtl^{1,2}, S. Guffanti^{1,2}, H. Malburg²,

J. Lercher², G. Pauletto¹

¹SYPOX GmbH, Freising, Germany, ²Technische Universität München, Garching, Germany

THURSDAY, OCTOBER 12, 2023

SESSION: SYNGAS II

Chairperson: Mario Marchionna

08.30 h **Keynote Lecture: Syngas Production from Secondary Feedstock as a Key Element for a Circular Carbon Economy- Gasification Performance Enhancement via Plasma Integration**

M. Gräbner

Technische Universität Bergakademie und Fraunhofer-Institut für Keramische Technologien und Systeme IKTS, Freiberg, Germany

09.15 h **Keynote Lecture: Photocatalytic Synthesis Gas Chemistry: Industrial Potential or Scientific Playground?**

J. Strunk

Industrielle Chemie und Heterogene Katalyse, Technische Universität München, Garching, Germany

10.00 h **Award of the “Carl-Zerbe Preis”**

D. Vogt

Chairman DGMK-Division "Petrochemistry"

Lecture of the Award-winner: Deactivation in Syngas Chemistry: Water-induced Degradation of Cobalt-based Fischer-Tropsch Catalysts

M. Wolf

Karlsruhe Institute of Technology, Karlsruhe, Germany

10.30 h **Coffee Break**

SESSION: HYFO & CARBO I

Chairperson: Harald Häger

11.00 h **Keynote Lecture: Recent Developments in Hydroformylation and Related Carbonylations: An Academic Perspective**

M. Beller

Leibniz-Institut für Katalyse e. V., Rostock, Germany

11.45 h **But-1-ene Hydroformylation in a Continuous Gas-phase Membrane Reactor: Road to Industrial Application**

A. Al-Shaibani¹, M. Schörner¹, I. W. Panjikaran²,
C. Nentwich², F. Weigelt³, T. Brinkmann³, F. Stenger²,
R. Franke^{2,4}, M. Haumann¹

¹Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU),
Lehrstuhl für Chemische Reaktionstechnik (CRT), Erlangen,
Germany, ²Evonik Operations GmbH, Marl, Germany,
³Helmholtz-Zentrum Hereon GmbH, Geesthacht, Germany,
⁴Ruhr-Universität Bochum, Lehrstuhl für Theoretische
Chemie, Bochum, Germany

12.15 h **Continuous Processes for the Rh-catalyzed Carbonylation of Olefins and Unsaturated Esters Enabled by Cyclodextrin-mediated Aqueous Biphasic Systems**

T. Roth, K. Künnemann, D. Vogt, T. Seidensticker
TU Dortmund University, Department for Biochemical and
Chemical Engineering, Laboratory of Industrial Chemistry,
Dortmund, Germany

12.45 h **Lunch Break**

SESSION: HYFO & CARBO II

Chairperson: Harald Häger

13.45 h **Keynote Lecture: Recent Developments in Hydroformylation and Related Carbonylations: An Industrial Perspective**

R. Franke

Evonik Performance Materials GmbH, Marl, Germany

14.30 h **Carbon Chain Building Reactions from Synthesis Gas to Hydrocarbons via a Three-Step Reaction Cycle with Increased Selectivity**

J. T. Vossen^{1,2}, A. J. Vorholt¹, W. Leitner^{1,2}

¹Max Planck Institute for Chemical Energy Conversion, Mühlheim an der Ruhr, Germany, ²Institute for Technical and Macromolecular Chemistry, RWTH Aachen University, Aachen, Germany

15.00 h **Continuously Operated Hydroaminomethylation in Advanced Multiphase Systems for Efficient Recycling**

T. B. Riemer, A. Kampwerth, T. Sinnhoffer, D. Vogt, T. Seidensticker

TU Dortmund University, Department for Biochemical and Chemical Engineering, Laboratory of Industrial Chemistry, Dortmund, Germany

THURSDAY, OCTOBER 12, 2023

POSTERSESSION AND COFFEE

Chairperson: Andreas Jess

KLEINER SAAL

15.30 h - 16.45 h

A-01 Carbon Chain Building Reactions from Synthesis Gas to Hydrocarbons via a Three-Step Reaction Cycle with Increased Selectivity

J. T. Vossen^{1,2}, A. J. Vorholt¹, W. Leitner^{1,2}

¹Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr, Germany, ²Institute for Technical and Macromolecular Chemistry, RWTH Aachen University, Aachen, Germany

A-03 Mobile Small-Scale Methanol Synthesis Pilot-Plant with Internal Recycle Operated with CO_x from Waste Gasification

J. Reisch¹, T. Nowak¹, M. Siodlaczek², B. Epple², A. Drochner¹, B. J.M. Etzold¹

¹Technische Universität Darmstadt, Ernst-Berl-Institut für Technische und Makromolekulare Chemie, ²Energy Systems and Technology, Technische Universität Darmstadt, Germany

A-06 An In-Depth Investigation: Surprising Effect of the Second Liquid Phase in Homogeneously Ru-Catalyzed CO₂ Hydrogenation to Formic Acid

K. R. Ehm^{1,2}, K. Dinsing^{1,3}, C. Ribeiro Maier^{1,3}, A. J. Vorholt¹, W. Leitner^{1,2}

¹Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr, Germany, ²RWTH Aachen University, Aachen, Germany, ³TU Dortmund University, Germany

A-08 A Review of the Fischer-Tropsch and Methanol Pathways for the Production of Jet Fuel

R. Ali, L. Edenhofer, A. Schaadt, O. Salem

Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany

A-09 Liquid-phase Co-Reagent Free Hydrogenation of Carbon Monoxide to Methanol Using Molecular Manganese Catalysts

S. Stahl^{1,2}, A. J. Vorholt¹, W. Leitner^{1,2}

¹Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr, Germany, ²Institute for Technical and Macromolecular Chemistry, RWTH Aachen University, Aachen, Germany

A-10 Biogenic Residues as Potential Feedstock for Green Energy Carriers in Urban Areas - Gasification and Synthesis Demonstration in Vienna

T. Schubert, P. Krobath, S. Egger, M. Höller

Wien Energie GmbH, Vienna, Austria

A-17 The Influence of the Support on Pd-based Catalysts in Direct DME Synthesis

B. Wang, M. Zimmermann, S. Behrens

Institute for Catalysis Research and Technology, Karlsruhe Institute of Technology, Karlsruhe, Germany

A-19 Multiphasic Hydroformylations of Long Chain Alkenes and the Liquid-liquid Interface

K. E. NaBe¹, M. Schrimpf¹, F. S. Heinen¹, N. Pawlowsky¹,

A. J. Vorholt¹, W. Leitner^{1,2}

¹Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr, Germany, ²Institute of Technical and Macromolecular Chemistry, RWTH Aachen University, Aachen, Germany

A-20 Exfoliated g-C₃N₄ for CO₂ Conversion into Fuels and Chemicals

G. Ramis¹, M. Tommasi², S. Naz Degerli³, I. Rossetti^{2,3}

¹Dip. Ing. Chimica, Civile ed Ambientale, Università degli Studi di Genova and INSTM Unit Genova, Genoa, Italy, ²Chemical Plants and Industrial Chemistry Group, Dip. Chimica, Università degli Studi di Milano, ³INSTM Unit Milano-Università, Milan, Italy

A-22 The Change of Product Selectivity in the Electrochemical Methanol Oxidation Reaction with Decreasing Water Content in the Nafion Membrane

S. Lechler, M. Deitermann, Z. Huang, W. Schuhmann, M. Muhler
Ruhr University Bochum, Germany

A-23 Operando ATR-IR Assisted Mechanistic Study of the Electrocatalytic Methanol Oxidation over a Platinum Catalyst in Acidic Medium

Z. Huang, S. Lechler, S. Cychy, M. Muhler

Lehrstuhl für Technische Chemie, Ruhr-Universität Bochum, Germany

A-24 Improving the Selectivity to Liquefied Petroleum Gas by Combining Fischer-Tropsch Synthesis with Zeolite Cracking

N. Oppmann, A. Jess

Universität Bayreuth, Germany

A-27 Development and Enhancement of Iron-Based Catalysts to Boost the Conversion of CO₂ via Fischer-Tropsch-Synthesis

F. Maj, A. Jess

Universität Bayreuth, Germany

A-30 Hydrogen Production from Biomass via Formic Acid and Methyl Formate: An Economic Comparison of Different Process Routes

F. Kroll¹, M. Schörner¹, P. Schühle²

¹Chemical Hydrogen Storage, Helmholtz Institute Erlangen-Nürnberg for Renewable Energy (IEK-11), Fürth, Germany, ²Lehrstuhl für Chemische Reaktionstechnik, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen, Germany

A-31 Efficient Long Distance Hydrogen Transport Including DME as Hydrogen Vector and CO₂ Back-shipping

P. Schühle¹, R. Stöber¹, M. Semmel³, A. Schaadt³, R. Szolak³, S. Thill³, M. Alders², C. Hebling³, P. Wasserscheid^{1,2}, O. Salem³

¹Lehrstuhl für Chemische Reaktionstechnik, FAU Erlangen-Nürnberg, ²Forschungszentrum Jülich, Institute for a Sustainable Hydrogen Economy, ³Fraunhofer-Institute for Solar Energy Systems ISE

A-32 Photo-selective Methanol Synthesis over Supported Cu Catalysts

J. Huang¹, M. Klahn¹, J. Strunk^{1,2}

¹Leibniz Institute for Catalysis, Rostock, Germany, ²Industrial Chemistry and Heterogeneous Catalysis, Technical University of Munich, Garching, Germany

A-33 Fine-Tuning Texture of Highly Acidic HZSM-5 Zeolite for Efficient Ethanol Dehydration

P. Pornsetmetakul, S. Klinyod, C. Rodaum, S. Salakhum, P. Iadrat, E. J. M. Hensen, C. Wattanakit

School of Energy Science and Engineering, School of Molecular Science and Engineering, Vidyasirimedhi Institute of Science and Technology, Rayong, Thailand, Laboratory of Inorganic Materials and Catalysis, Department of Chemical Engineering, Eindhoven, The Netherlands

A-34 Photocatalytic Conversion of Methanol to Formaldehyde in a Continuous Laboratory Plant

F. Stubenrauch¹, M. Schörner¹, Y. Mahayni¹, A. Bösmann²,
P. Schühle², P. Wasserscheid^{1,2}

¹Forschungszentrum Jülich GmbH, Helmholtz-Institut Erlangen-Nürnberg for renewable Energy (IEK-11), ²Lehrstuhl für chemische Reaktionstechnik, Friedrich-Alexander-Universität Erlangen-Nürnberg

A-35 About the Dehydrogenation of Difformamides to Diisocyanates – A Greener Pathway for the Production of Polyurethanes

Paul P. Kossmann^{1,2}, Andreas J. Vorholt¹, Walter Leitner^{1,2}

¹Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr, Germany, ²Institute for Technical and Macromolecular Chemistry, RWTH Aachen University, Aachen, Germany

THURSDAY, OCTOBER 12, 2023

SESSION: FISCHER TROPSCH I

Chairperson: Jörg Sauer

16.45 h **Keynote Lecture: Carbon Dioxide from the Air as a Feedstock for Recyclable Fuels and Chemicals - Current Status and Perspectives**

R. Dittmeyer

Karlsruhe Institute of Technology, Institute for Micro Process Engineering, Karlsruhe, Germany

17.30 h **Co-electrolysis and its Integration into Power-to-X Concepts as a Key Step in a Renewable Energy System**

E. Reichelt, P. Adam, R. Näke, G. Herz, S. Megel

Fraunhofer IKTS, Fraunhofer Institute for Ceramic Technologies and Systems IKTS, Dresden, Germany

18.00 h **Combining Fischer Tropsch and Hydroformylation for Long Chain Alcohols from Syngas**

K. Jeske, T. Rösler, M. Belleflamme, W. Leitner,

A. J. Vorholt, G. Prieto

Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr, Germany

CONFERENCE DINNER

20.00 h Wenzel Prager Bierstuben Dresden
Königstraße 1, 01097 Dresden
Phone +49 0351-8 04 20 10

SESSION: FISCHER TROPSCH II

Chairperson: Enrico Tronconi

08.30 h **Keynote Lecture: Fischer-Tropsch Catalysis: An Old Technology for New Challenges**

D. Loudon

Sasol Energy Operations & Technology, South Africa

09.15 h **Promotor Effect on Fe-based Catalysts for CO₂-FTS: A XAS study**

E. Saraç¹, Q. Yang², E. Fedorova², D. Doronkin¹,
E. Kondratenko²

¹Institute for Catalysis Research and Technology (IKFT),
Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany,

²Leibniz Institute for Catalysis e.V. (LIKAT), Rostock,
Germany

09.45 h **Controlling the Complex Reaction Network of the Hydrogenation of CO to Higher Alcohols Using Co-based Catalysts Derived from Prussian Blue Analogues**

P. Diehl, P. Telaar, M. Muhler

Laboratory of Industrial Chemistry, Ruhr University Bochum,
Bochum, Germany

10.15 h **Coffee Break**

FRIDAY, OCTOBER 13, 2023

SESSION: METHANOL-TO-X

Chairperson: Dieter Vogt

- 10.45 h **Keynote Lecture: From Theory to Application: Reinventing and Scaling Up a New Methanol Synthesis Route**
M. Checinski
C1 Green Chemicals AG, Berlin, Germany
- 11.30 h **About the Art to Prepare Mixed SAPO-CHA/MFI Catalyst Materials for Methanol-to-olefins Reaction**
M. Seifert, L. A. Haufe, J. J. Weigand
Technische Universität Dresden, Faculty of Chemistry and Food Chemistry, Inorganic Molecular Chemistry, Dresden, Germany
- 12.00 h **Process Intensification Strategy Demonstrated by Innovative DME Synthesis**
M. Semmel, O. Salem, A. Schaadt
Fraunhofer Institute for Solar Energy Systems ISE, Freiburg, Germany
- 12.30 h **Directly Coupled Production of Methanol and Formaldehyde Based on CO²**
P. Münzer, U. Arnold, J. Sauer
Karlsruhe Institute of Technology (KIT), Institute of Catalysis Research and Technology (IKFT), Eggenstein-Leopoldshafen
- 13.00 h **Concluding Remarks and Conference Summary**
Dieter Vogt
- 13.05 h **Lunch**

subject to change

GENERAL INFORMATION

Venue

Haus der Kirche – Dreikönigskirche
Hauptstraße 23 | 01097 Dresden | Germany

Registration Desk

Opening Hours

Wednesday, October 11, 2023 12.00 h - 18.00 h

Thursday, October 12, 2023 08.00 h - 18.30 h

Friday, October 13, 2023 08.00 h - 13.00 h

Phone +49151 56005706

Conference Preprints

Lectures and posters presented at the DGMK-Conference are published in full length in the DGMK-Conference Proceedings. These publications are registered under ISBN and ISSN and are sold on the book market after the conference. The DGMK- Conference Proceedings will be given to each conference participant in a digital format.

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Organiser

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the
Date

General Assembly of DGMK
November, 9, 2023, Hamburg

