Production of Synthesis Gas
Synthesis Gas to Fuels and Chemicals
Direct Conversion of Methane
Conversion of Light Paraffins
Natural Gas in Energy Conversion
Techno-Economic Aspects
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Welcome to the Gateway to the Arctic!

Dear Natural Gas Conversion Colleagues!

It is a great pleasure to welcome you all to the 11th Natural Gas Conversion Symposium in Tromsø - 69°40′58″N! This edition of the premier NGC symposia series brings delegates close to abundant sources of natural gas, only partially discovered to date, in the Arctic. These resources are located far from the market, and their exploration, production and transport are associated with considerable challenges related to the conditions and climate.

Tromsø may be the northernmost place you will ever visit - the city’s location and ice-free harbor are central to its long history as the gateway to the Arctic for hunters, fishermen and explorers. More recently, Tromsø has served as a gateway for those exploring Arctic oil and gas resources and home to the world's most northerly university. Tromsø has also become a tourist hotspot for experiencing the midnight sun or the northern lights. Well above the Arctic Circle, the sun does not set between May 21 and July 21. We hope that our social program enables you to connect with colleagues from around the world while enjoying the stunning scenery.

The ever changing resource and market situation around natural gas has brought about impressive changes, but also insecurity, in the natural gas based industries and markets. In addition, we must endeavour to show how natural gas conversion can contribute to a solution with respect to reducing emissions and climate change. The only answer to this is research and development, with industry and academia working hand in hand. It is therefore appropriate that we can gather here together to explore natural gas conversion science and technology day and night!

We would like to express our appreciation to all that have contributed to NGCS 11. The Research Council of Norway, ExxonMobil, Haldor Topsoe, and Shell are providing generous support, demonstrating a consistent commitment to natural gas conversion R&D. The Local Organizing Committee has involved representatives from the main academic and industrial groups involved in natural gas conversion in Norway, i.e. the University of Oslo, SINTEF, Statoil, and Inovyn, in addition to the Norwegian University of Science and Technology (NTNU). Envoy Limited, TromsøEvent, Clarion, and VisitTromsø have all contributed to providing the best possible arrangements, venue and experience. The LOC has worked closely with the Natural Gas Conversion Board and its International Scientific Advisory Board, but also relied on contributions from a large number of external reviewers to produce a high-quality program and an inspiring environment for talented young researchers aspiring to a career in natural gas conversion!

With best wishes for an exciting and productive week in Tromsø,

Hilde Venvik
Anders Holmen

www.ngcb.org
Professor Xinhe Bao has been chosen as the recipient of the 2016 Award for Excellence in Natural Gas Conversion. The Award is presented every three years during the International Natural Gas Conversion Symposium to recognize enduring and significant contributions to science and technology for conversion of natural gas to valuable products. The previous award recipients are Krijn de Jong (2013), Anders Holmen (2010), David Trimm (2007), Enrique Iglesia (2004), Lanny Schmidt (2001), Jens Røstrup-Nielsen (1998), and Jack Lunsford (1993).

Professor Bao is recognized for his contributions to the fundamental understanding of the chemistry and engineering of gas conversion. His ability to combine theory, model catalysts, and technical catalysis in a very original manner has led to a number of breakthrough developments with both scientific and industrial impact. As specific contributions to the field of natural gas conversion three topics are highlighted. Firstly, the direct conversion of methane to aromatics using bifunctional Mo/ZSM-5 catalysts has been studied extensively by Professor Bao with important new structure-performance relationships that have enabled higher aromatic yields. Secondly, CO hydrogenation to fuels and chemicals has been investigated with special reference to the role of confinement of nanoparticles in catalysis. Thirdly, direct conversion of methane to lower olefins has been realized for the first time using a catalyst with isolated iron sites, with interest in this finding noted from both the scientific community and industry.

Professor Bao has been a long-standing leader in research programs on natural gas conversion related research in China. He is a member of the Chinese Academy of Sciences, the Academy of Sciences for the Developing world and a fellow of the Royal Society of Chemistry. He acts as chair and board member of international scientific conferences and was the chair of the 7th Natural Gas Conversion Symposium in Dalian. He serves on the editorial boards of a wide range of journals and book series relevant to natural gas conversion.
NGCS11 Plenary Lecturers

Jim Rekoske, Vice President & Chief Technology Officer, UOP

Jim Rekoske has global responsibility for general management of the research and development function at Honeywell’s UOP, a leading developer and licensor of technologies for the oil, gas and petrochemical industry. Over nearly two decades with UOP, he has held positions of increasing responsibility in areas ranging from research and development, marketing, customer service and sales support, and technology strategy. He earned bachelor’s and master’s degrees in chemical engineering at the University of Wisconsin, a doctorate in chemical engineering from the University of Delaware, and an MBA degree from the University of Chicago’s Booth School of Business.

Rekoske is the (co-)inventor to more than 30 U.S. patents, and the author of more than 20 peer-reviewed scientific articles. He was awarded the 2010 Herman Pines Award from the Chicago Catalysis Club in recognition of his numerous technical breakthroughs in catalysis science.

Gary Jacobs, Principal Research Engineer, Clean Fuels & Chemicals, University of Kentucky Center for Applied Energy Research

Dr. Jacobs’s research is focused on heterogeneous catalysis of syngas conversion for the production of ultra-clean fuels and chemicals, with an aim to link catalyst performance parameters (activity, selectivity, and stability) with electronic and geometric structure. His research relies heavily on the application of synchrotron techniques to develop insights at the atomic scale.

He received a B.S. in chemical engineering from University of Texas and a Ph.D. in chemical engineering from University of Oklahoma. He then joined the Clean Fuels & Chemicals research group of Prof. Burtron H. Davis at the University of Kentucky’s Center for Applied Energy Research. The group has strong relationships with industry as well as state, federal, and international agencies. Jacobs has co-authored over 185 refereed publications and received, with Davis, four Elsevier top-50 most-cited-author awards for articles on Fischer-Tropsch synthesis and fuel processor catalysts for fuel cells.

Unni Olsbye, Professor, Chemistry Department, University of Oslo

Professor Olsbye's field of expertise is heterogeneously catalysed processes, with an emphasis on structure-composition-function correlations and mechanistic studies on microporous catalysts (zeolites, MOFs), in parallel with activity related to reactions promoted by supported metal catalysts. Processes studied include methanol to hydrocarbons (olefins and gasoline), methane reforming and partial oxidation to syngas, light alkane dehydrogenation, methyl halide conversion, ethene oxychlorination and CO₂ conversion.

She graduated as a Chemical Engineer from the Norwegian University of Science and Technology (NTNU) and proceeded to work with Elf Aquitaine on a project which earned her a Ph.D. degree in chemistry at the University of Oslo (UiO). From 2007 – 2015 she was Managing Director of the inGAP (Innovative Natural Gas Processes and Products) National Excellence Centre. Olsbye has authored more than 100 scientific papers, holds several patents, and is an elected member of the Norwegian Academy of Science and Letters and the Norwegian Academy of Technical Sciences.
Local Organizing Committee (LOC)

Professor, Hilde J. Venvik, Dept. of Chemical Engineering, Norwegian University of Science and Technology (NTNU)

Professor Em. Anders Holmen, Dept. of Chemical Engineering, Norwegian University of Science and Technology (NTNU)

Professor De Chen, Dept. of Chemical Engineering, Norwegian University of Science and Technology (NTNU)

Erling Rytter, Special Advisor/Professor SINTEF/NTNU (prev Statoil)

Professor Unni Olsbye, Department of Chemistry, University of Oslo

Duncan Akporiaye, Vice President Research, SINTEF Materials and Chemistry

Steinar Kvisle, Director of Technology and Production Support, INOVYN

Tronn Hansen, Special Advisor, Research Council of Norway

NGCS 11 Tromsø 2016
The 11th Natural Gas Conversion Symposium

Natural Gas
Conversion Board

NGCB
International Finance Committee (IFC)*
International Scientific Advisory Board (ISAB)

Prof. Krijn de Jong (NGCB Chair)
Utrecht University, The Netherlands

Prof. Dragomir Bukur (NGCB Vice-Chair)
Texas A&M University at Qatar, Qatar

Dr. Fabio Bellot Noronha (NGCB Secretary)
National Institute of Technology, Brazil

Prof. Xinhe Bao
Dalian Institute of Chemical Physics, China

Prof. Michael Claeys
University of Cape Town, South Africa

Dr. Theo Fleisch *
IGP Energy, United States

Mr. Philip Gibson *
Sasol Technology, South Africa

Prof. Anders Holmen
NTNU, Norway

Prof. Zinfer Ismagilov
Institute of Coal Chemistry and Material Science, Boreskov Institute of Catalysis, Russia

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Johnson Matthey Catalysts, United Kingdom

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University of California, Berkeley, United States

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Mr. Robert Saxton *
Chevron, United States

Prof. Reinhard Schomäcker
Technische Universität Berlin, Germany

Dr. Wataru Ueda
Kanagawa University, Japan

Natural Gas Conversion Board
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- NGCS 11 Schedule overview
- Tromsø 2016
- From To
- SUNDAY JUNE 5
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- TUESDAY JUNE 7
- WEDNESDAY JUNE 8
- THURSDAY JUNE 9
- Registration
- Clarion Hotel the Edge
- Coffee break
- Lunch
- Relaxation and Nature
- Coffee break
- Poster session
- Quality Hotel Saga
- Excursion & dinner
- Sommarøy fishing village & island
- Poster session
- Conference Gala Dinner
- NGCB
- Welcome reception & opening ceremony
- Polaria Arctic Museum & Aquarium
- Drinks and light meal served
- Option 1 | Snøhvit LNG Site Visit
- Option 2 | Boat / fishing excursion
- Option 3 | Mountain hike with NGCS chairs
- Booking required
- - see NGCS11 website for details
- Option 4 | Post-conference social activities
The social program developed by the NGCS 11 Local Organizing Committee provides delegates and those accompanying them with numerous opportunities to experience the best of Tromsø, Norway, and life north of the Arctic Circle, while providing time to build and maintain international networks with colleagues from academia, science, and industry involved in natural gas conversion. The program includes three parts.

**Part 1 | Symposium Social Program**

**Sunday, June 5 19:00 | Evening welcome reception and exhibition**
Polaria Arctic Museum & Aquarium
Drinks and light meal served
Suggested attire: Business casual

**Tuesday, June 7 17:00 | Evening excursion and dinner**
Bus trip to Sommarøy fishing village, including visits to the Skavberget rock carvings and Viking graves at Greipstad.
Drinks and dinner served
Suggested attire: Casual, including sweater and windproof jacket/coat

**Wednesday, June 8 20:00 | Gala Dinner at Clarion Hotel the Edge**
Margarinfabrikken Ballroom
Drinks and dinner served
Suggested attire: Business

**Part 2 | A Taste of Local Art, Food, Culture and Nature**
Optional short excursions and tours primarily intended for accompanying persons (spouse / partner), with a limited number of places available by pre-registration. Any remaining places offered onsite. See registration desk for program and cost.
Official Tromsø visitor's guide: visittromso.no

**Part 3 | Post-Symposium Program open to all delegates by pre-registration.**

**Option 1 | Snøhvit LNG Site Visit June 9 -10**
Statoil hosts a limited number of NGCS 11 delegates at the world’s northernmost LNG plant, located on Melkøya island just outside Hammerfest. The Snøhvit (“Snow White”) gasfield is located 143 km from shore and was developed using only subsea installations with the multiphase flow sent through a pipeline to the LNG installation, where CO₂ in the gas is separated and returned to an underground reservoir.

**Option 2 | Boat / fishing excursion June 9, 15.00 - 21.00**
Enjoy Tromsø and the spectacular scenery from offshore aboard the N/S Caroline Mathilde, a classic wooden boat built in 1939 that can travel by motor or sail. And maybe catch your own dinner! A small meal will be served (fish soup or similar).
Please note! Warm clothing must be brought as the weather feels colder at sea. Water-/windproof jacket, sweater (wool or fleece) and boots or trainers as a minimum.

**Option 3 | Mountain hike with symposium chairs! 9 June, 15.00 - late.**
Register within June 8 at Conference desk. NOK 100 for transportation to starting point. The target for the trip will be adapted to the weather conditions, but we aim for a local peak of 800-1000 m. Hence, reasonable fitness level and good knees required, but no need for climbing equipment/experience. Important! Everyone must wear good hiking shoes or trainers and bring their own food/drink/snack in a backpack. In good weather, we may opt for midnight sun and sea views at the top.
**Monday June 6 09:00 – 10:00 Plenary Lecture:**

*Dr. Jim Rekoske, Vice President & Chief Technology Officer UOP*

**Technoeconomic Impacts of Abundant Natural Gas Liquids on the Chemical Industry**

**Session Chairs**

Steinar Kvisle, INOVYN

Hilde Venvik, Department of Chemical Engineering, NTNU

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<tr>
<th>Time</th>
<th>Topic 1 - Dry reforming</th>
<th>Topic 2 - MTO and MTH</th>
<th>Topic 3 - CH₄ to aromatics</th>
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<td>1000-1030</td>
<td><strong>COFFEE BREAK</strong></td>
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</table>
| 1030-1050 | 1172 CH₄ Conversion to Synthesis Gas over Supported Well-defined Pt, Rh, and Ru Nanoparticles: Effect of Metal, Nanoparticle Size and Support  
V.A. Kondratenko, Leibniz Katalyse, Rostock U., Germany. | 0994 Methanol to Propylene (MTP™): A proven technology for on-purpose propylene production (and how we got there…)  
M. Rothaemel, Air Liquide, Frankfurt am Main, Germany | 1007 Non-oxidative catalytic conversion of CH₄ to benzene with continuous catalyst regeneration in a dual circulating fluidized bed reactor system at 1073 K  
Z.-G. Zhang, AIST, Tsukuba, Japan |
| 1050-1110 | 1155 New routes for Syngas production – Dry Reforming at elevated pressure  
A Behrens, Linde AG, Pulrack, Germany | 1091 Conclusive evidence for two unimolecular pathways to zeolite-catalyzed de-alkylation of the heptamethylbenzenium cation  
M. Mortén, U. Oslo, Norway | 1008 Coke accumulation and removal behaviors of Mo/HZSM-5 in the non-oxidative CH₄ dehydro-aromatization under periodic CH₄-H₂ switching operation mode  
Y. Song, AIST, Tsukuba, Japan |
| 1110-1130 | 1153 Catalytic dry reforming of methane over Ni/β-Mo₂C catalysts  
V. Teixeira da Silva, Universidade Federal do Rio de Janeiro, Brazil | 1175 Mechanistic Insight in the Methanol-to-Olefins Reaction over Small-Pore Zeolite Catalysts using Operando UV/Vis Spectroscopy  
J. Goetz, U. Ulrecht, The Netherlands | 1068 Acetylene, an intermediate for methane conversion to C₄ products  
I.-T. Trotus, Max Planck Institut für Kohlenforschung, Mülheim, Germany |
| 1130-1150 | 1265 Handling of metal dusting at the Statoil Tjeldbergodden methanol plant  
E. Edwin, Statoil Trondheim, Norway | 1227 Insights into Reaction Pathways in Methanol to Hydrocarbons using Synchrotron Infrared Microspectroscopy  
R. Howe, U. Aberdeen, UK | 1204 Direct non-oxidative methane coupling over modified gallium oxide photocatalyst  
H. Yoshida, Kyoto U. Japan |
| 1150-1210 | **Keynote 1 (1214)** Catalytic Consequences of Reactive Intermediates for Methane Dry Reforming Reactions on First Row Transition Metal and Alloy Clusters  
Ya-Huai (Cathy) Chin, U. Toronto, Canada. | 1277 Mechanism of coke formation in the conversion of methanol to olefins over H-ZSM-5  
Y. Liu, TU München, Germany. | 1233 A Fluidized Bed Natural Gas to Aromatics Process  
F. Wei, Tsinghua U. Beijing, China |
| 1210-1230 | 1296 High throughput testing of catalyst with different time scales of deactivation for MTH  
A. Haas, hte GmbH, Heidelberg, Germany | 1294 Direct conversion of methane to aromatics in a catalytic membrane reactor  
S. Hernández Morejudo, Coorstek Membrane Sciences, Oslo, Norway |
| 1230-1330 | **LUNCH**  
Restaurant Clarion Hotel the Edge |                        |                          |
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<td>D. Wendt, Max-Planck Institut fur Kohlenforschung, Mülheim, Germany</td>
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<td>R.D. Armstrong, Cardiff U, UK</td>
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**Monday June 6, Continued**

**Topic 1 - Steam reforming**
*Session chairs:*
A. Monzón Bescos, U. Zaragoza, Spain
Zhixin Yu, Univ. Stavanger

**Topic 2 – Alcohols, DME**
*Session chairs:*
Krijn de Jong, U. Utrecht

**Topic 4 - Dehydro C₂H₆**
*Session chairs:*
Wataru Ueda, Kanagawa U., Japan
Steinar Kvisle, Inovyn, Norway

**Keynote 2** (1061)
Roles of ZnO in methanol and methanol-dimethyl ether-combi catalysts
J. M. Lopez Nieto, ITQ, Valencia, Spain

1103 Simulation-aided effective design of a catalytic reactor for ethane oxidative dehydrogenation
E. Heracleous, International Hellenic U., Thessaloniki-Moudania, Greece

1305 Temporal Analysis of Products (TAP) – an advanced tool for time-resolved kinetic characterization of industrially-relevant microporous materials
E. A. Redekop, U. Oslo, Norway

1249 Porous clay heterostructures with columns made of titania as supports of NiO for the oxidative dehydrogenation of ethane
J. M. Lopez Nieto, ITQ, Valencia, Spain

1245 Porous clay heterostructures with columns made of titania as supports of NiO for the oxidative dehydrogenation of ethane
J. M. Lopez Nieto, ITQ, Valencia, Spain

**Coffee Break**
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<td>1540-1550</td>
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<td>Partial oxidation</td>
<td>Alessandra Beretta, P. Milano, Italy</td>
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<td>Bjørn Chr. Enger, SINTEF, Norway</td>
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<td>Co FT charact.</td>
<td>Andrei Khodakov, Univ. Lille, France</td>
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<td>Topic 5 – CO₂ to SNG</td>
<td>Fabio Ribeiro, Purdue University, US</td>
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<td>Hilde Venvik, NTNU, Norway</td>
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<td>Development of methanation catalysts for the process chain Power to Gas</td>
<td>Anne-Cécile Roger, ICPEES, U Strasbourg, France</td>
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<td>1302 CPO of C₃-C₈ hydrocarbons: Kinetic analysis, Raman surface characterization and adiabatic testing</td>
<td>G. Groppi, Politecnico di Milano, Italy</td>
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<td>1025 Mapping the structure and chemical composition of nanoparticles with wide size distributions: a Ferromagnetic Nuclear Resonance study of Cobalt based nanoparticles for producing synthetic fuel</td>
<td>C. Meny, ICPMS, U Strasbourg, France</td>
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<td>1635-1650</td>
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<td>1297 On the control of the properties of electrosynthesized Rh-based syngas production catalyst</td>
<td>P.H. Ho, U. Bologna, Italy</td>
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<td>1650-1660</td>
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<td>1030 Hydrocarbon chemistry on cobalt: surface science investigations of the FT chain growth mechanism</td>
<td>C.J. Weststrate, Syngaschem BV, Eindhoven, The Netherlands</td>
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<td>1660-1670</td>
<td></td>
<td>1235 Novel NiAl₂O₄-based catalysts supported on ceria and ceria-zirconia for partial oxidation of methane.</td>
<td>R. Lopez-Fonseca, U. Basque Country, Spain</td>
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<td>1670-1680</td>
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<td>1173 New insights on the aggregates of cobalt nanoparticles by electron tomography and anomalous X-ray scattering</td>
<td>S. Humbert, IFPEN, Solaize, France</td>
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<td>1192 In situ monitoring of supported cobalt catalysts for FTS under realistic conditions; what have we learned</td>
<td>N. Tsakoumis, NTNU, Norway</td>
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<td>1198 Production of synthetic natural gas by CO₂ methanation: Synthesis and characterization of highly active catalysts</td>
<td>O. Hinrichsen, TU München, Germany</td>
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<td>1253 Study of Perovskites LaNi₁₋ₓCoₓO₃ Catalysts in the Partial Oxidation of Methane</td>
<td>S.T. Brandao, U. Federal da Bahia, Brazil</td>
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<td>1192 In situ monitoring of supported cobalt catalysts for FTS under realistic conditions; what have we learned</td>
<td>N. Tsakoumis, NTNU, Norway</td>
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<td>1198 Production of synthetic natural gas by CO₂ methanation: Synthesis and characterization of highly active catalysts</td>
<td>O. Hinrichsen, TU München, Germany</td>
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<td>1289 Role of oxygen activation in the production of syngas by catalytic partial oxidation of methane over dual LaMnO₃-PdYSZ beds</td>
<td>M. Richard, U. Poitiers, France</td>
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<td>1237 Co single crystal surfaces as FT model systems: STM investigations of alkali metal on Co single crystal surface</td>
<td>M.D. Stromsheim, NTNU, Norway</td>
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<td>1217 Highly active NiO/CoO₂ catalysts for Synthetic Natural Gas production by CO₂ methanation</td>
<td>E. Rombi, U. Cagliari, Monserrato, Italy</td>
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<td>POSTER SESSION w/refreshments Quality Hotel Saga</td>
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**Monday June 6, Continued**
## Tuesday June 7 09:00 – 10:00, Plenary lecture:

**Dr. Gary Jacobs Principal Research Engineer**  
**Center for Applied Energy Research, University of Kentucky, USA**  
**Fischer-Tropsch synthesis: use of hard and soft X-rays in the characterization of catalysts and contaminants**  
**Session Chairs:**  
Gordon Kelly, Johnson Matthey Catalysts, UK, Erling Rytter, NTNU/SINTEF (prev. Statoil)

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<td><strong>Session chairs:</strong> Dae-Hoon Lee, KIMM, Rep. of Korea Magnus Rønning, NTNU, Norway</td>
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<td>1030-1050</td>
<td>1038 Dry reforming of methane on Ni-based pyrochlore catalysts: Understanding carbon deposition mechanism</td>
<td>J. Spivey, LSU, Baton Rouge, US</td>
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<td>0992</td>
<td>Effect of CO coverage on the product slate in FTS.</td>
<td><strong>H. Oosterbeek, Shell Global Solutions, Amsterdam, The Netherlands</strong></td>
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<td>1105</td>
<td>The chemical looping concept in oxidative coupling of methane on the Na₂WO₄/Mn/SiO₂ catalyst: challenges and opportunities for catalyst investigation without gas phase O₂</td>
<td>V. Fleischer, TU Berlin, Germany</td>
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<td>1003</td>
<td>Partial oxidation of methane in gas phase at very short residence time: influence of NO and NO₂ on the yield and selectivity of formaldehyde</td>
<td>V. Burkle-Vitzthum, CNRS-U Lorraine, Nancy, France</td>
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<td>1058</td>
<td>Improving the sintering resistance of Ni/Al₂O₃ steam reforming catalysts F. Morales Cano, Haldor Topsøe A/S, Lyngby, Denmark</td>
<td><strong>W. Chen, U. Eindhoven, The Netherlands</strong></td>
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<td>1075</td>
<td>Fischer-Tropsch synthesis on cobalt catalyst: A combined transient kinetic and mechanistic study</td>
<td><strong>J. Van Belleghem, U. Ghent, Belgium</strong></td>
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<td>1112</td>
<td>Microkinetic model validation for the FTS based on transient experiments</td>
<td><strong>J. Van Belleghem, U. Ghent, Belgium</strong></td>
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<td>1144</td>
<td>Direct Conversion of CH₄ to Methanol on ZSM-5 from First-principles.</td>
<td><strong>A. Arvidsson, Chalmers U., Sweden</strong></td>
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<td>1201</td>
<td>Identification of deactivation mechanisms of supported nickel and cobalt catalysts for syngas conversion using transient kinetic methods</td>
<td><strong>A Carvalho, U. Lille, France</strong></td>
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<td>De Chen, Department of Chemical Engineering, Norwegian University of Science and Technology (NTNU), Norway</td>
<td><strong>T. Kim, Chosun U. Gwangju, Republic of Korea</strong></td>
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<td>1236</td>
<td>C to H effective ratio as a descriptor for dehydroaromatization of methane with light oxygenates on Mo/HZSM-5 catalyst</td>
<td><strong>V. Barke-Vitzthum, CNRS-U Lorraine, Nancy, France</strong></td>
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<td>1115</td>
<td>Ni based steam reforming catalysts: from molecular understanding to catalyst design</td>
<td><strong>A Carvalho, U. Lille, France</strong></td>
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<td>1210</td>
<td>Kinetics of methane formation and 1-olefin hydrogenation in FTS over cobalt catalyst</td>
<td><strong>A Carvalho, U. Lille, France</strong></td>
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<td>1079</td>
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<td>Time</td>
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<td>1330</td>
<td>Catalytic methane steam reforming at low temperature over Pd/CoO&lt;sub&gt;2&lt;/sub&gt; in an electric field</td>
<td>The effect of thermal treatments on the characteristics of supported Cobalt FT catalysts</td>
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<td>R. Manabe, Univ. Waseda, Japan</td>
<td>G. Kelly, Johnson Matthey, Billingham UK</td>
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<td>Dry reforming of CH&lt;sub&gt;4&lt;/sub&gt; on different supported Co catalysts</td>
<td>1304 SMSI effects in CoRu/TiO&lt;sub&gt;2&lt;/sub&gt; catalysts and consequences on the catalytic performance for FTS</td>
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<td>Knowledge extraction for dry reforming of methane from past publications using data mining tools</td>
<td>1100 CO hydrogenation on cobalt-based FT catalysts: chlorine poisoning reveals the nature of the most active sites.</td>
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<td>Photocatalytic steam reforming of methane over platinum-loaded lanthanum-doped sodium tantalate photocatalysts prepared by a flux method</td>
<td>1110 Catalytic synthesis of light olefins and alkenes over FeOx/Anodic Alumina Oxide/Aluminum cartrdges</td>
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<td>Chemical looping steam reforming with in-situ CO&lt;sub&gt;2&lt;/sub&gt; capture over CuO-based sorbents and NiO-based oxygen transfer materials: Generation of high-purity H&lt;sub&gt;2&lt;/sub&gt; in a single step</td>
<td>1258 Carbon Deposition in Iron Catalyzed Production of Lower Olefins from Synthesis Gas: Effect of Activation Conditions</td>
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### 1000-1030 COFFEE BREAK

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<td>Victor Texeira, F. Federal Rio de J., Brazil</td>
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<td>Bjørnar Arstad, SINTEF, Norway</td>
<td>Rune Myrstad, SINTEF, Norway</td>
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<th>1280 Development of nitrogen-rich mesoporous carbon supported iron-based catalysts for highly efficient FT</th>
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<td><strong>F. Noronha, National Institute of Tecnology, Rio de Janeiro, Brazil</strong></td>
<td><strong>J. Xie, U. Utrecht, The Netherlands</strong></td>
<td><strong>N. Tsubaki, U Toyama, Toyama, Japan</strong></td>
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<th>1026 Catalytic reforming of biomass gasification tars with bi- and trimetallic catalysts optimized with organosilane precursors</th>
<th>1280 Development of nitrogen-rich mesoporous carbon supported iron-based catalysts for highly efficient FT</th>
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<td><strong>V. Claude, U. Liege, Belgium</strong></td>
<td><strong>V. Claude, U. Liege, Belgium</strong></td>
<td><strong>V. Claude, Boreskov Institute of Catalysis, Novosibirsk, Russia</strong></td>
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<th>1320 Process intensification and simplification as key element towards decentral fuel production</th>
<th>1169 Dry reforming of methane by the combination of non-thermal plasma and catalysis</th>
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<td><strong>S. Ogo, Waseda U., Tokyo, Japan</strong></td>
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<th>1136 Oxidative coupling of methane over polyoxometalate supported catalysts in an electric field at low T.</th>
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<td><strong>V. Sadykov, Boreskov Institute of Catalysis, Novosibirsk, Russia</strong></td>
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<th>1313 Intensification of the FTS through an highly conductive structured packed-bed reactor: a pilot-scale</th>
<th>1264 RedOx Behaviour and Catalytic Performance of NaWMn/SiO₂ Mixed Oxide in OCM</th>
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<td><strong>A Beretta, Politecnico di Milano, Italy</strong></td>
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<th>1299 Synthesis gas production from glycerol with low steam/carbon ratio.</th>
<th>1064 Hydrocracking under Fischer-Tropsch conditions: on the distinct reactivity of paraffin and α-olefin primary products</th>
<th>1037 Way to Improve Performance of OCM with Catalysts of Different Properties</th>
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<td><strong>M. Menéndez, U. Zaragoza, Spain</strong></td>
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<td><strong>W. Liang, SABIC, Houston, US</strong></td>
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<td>James J Spivey, LSU, US Evgeniy Redekop, Univ. Oslo, Norway</td>
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<td>1151 Production of Hydrogen Enriched Syngas by Combined CO₂-steam Reforming of Methane Over The Polymetallic Co-based Catalysts. S. Ikalova, Sokolsky Institute, Almaty, Kazakhstan</td>
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<td>1350</td>
<td>1180 Steam Reforming of LPG over Ni/CoZr/zAl₂O₃ catalysts F. Noronha, Instituto Nacional de Tecnologia, Rio de Janeiro, Brazil</td>
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<td>1205 Co-Mn catalysts for Fischer-Tropsch production of light olefins E. Østbye Pedersen, NTNU, Norway</td>
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<td>1430</td>
<td>1228 Catalyst Development and Reactor Design for Catalytic Partial Oxidation of Natural Gas to Produce Synthesis Gas S. Kado, Chiyoda Corporation, Japan</td>
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**Topic 5 – SNG, combust., H₂**

**Session chairs**
Anne-Cécile Roger, U Strasbourg, France Jia Yang, SINTEF, Norway

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<td>Jia Yang, SINTEF, Norway</td>
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**Topic 2 – FT Co catalysis**

**Session chairs**
Burtron Davis, U. Kentucky, US Nikos Tsakoumis, NTNU, Norway

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<td>Nikos Tsakoumis, NTNU, Norway</td>
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**Topic 4 – Ethane, propane**

**Session chairs**
Randall Meyer, ExxonMobil, USA Anders Holmen, NTNU, Norway

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**Poster Session**

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**Conference Dinner**

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**Wednesday June 8, Continued**
Thursday June 9 09:00 – 10:00, Plenary lecture:
Professor Unni Olsbye,
Department of Chemistry, University of Oslo, Norway
*MTH revisited, status and prospects from fundamental studies*

**Session Chairs**
Gabor Kiss, ExxonMobil
De Chen, NTNU, Norway

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<td>1050-1110</td>
<td><strong>Topic 2 – MTX, FTS</strong> &lt;br&gt;Session chairs: Gary Jacobs, U. Kentucky, US, Eleni Patanou, NTNU, Norway</td>
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<td>1130-1150</td>
<td><strong>1191 Improve the Stability of Ni-Ce₀.8 Sm₀.2 O₁.9 as the anode of a CH₄ fuelled solid oxide fuel cell by Sn doping</strong>&lt;br&gt;Yongdan Li, Tianjin U. Tianjin, China</td>
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<td>1150-1210</td>
<td><strong>1074 Highly active and stable Fischer-Tropsch catalysts obtained through unconventional Metal-Organic Framework mediated synthesis</strong>&lt;br&gt;F. Kapteijn, TU Delft, The Netherlands</td>
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<td>1210-1230</td>
<td><strong>1322 Multi scale kinetics for the selective oxidation of propane to acrylic acid: Multi-route mechanism</strong>&lt;br&gt;C. Sprung, Fritz-Haber Institut, Germany</td>
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<td>1230-1250</td>
<td><strong>1209 The effect of catalyst pellet size on nickel carbonyl-induced particle sintering under low temperature CO methanation.</strong>&lt;br&gt;J. Barrientos, KTH, Stockholm, Sweden</td>
</tr>
<tr>
<td>1250-1270</td>
<td><strong>Keynote 10 (1092)</strong> Development of commercial type cobalt Fischer-Tropsch catalysts.**&lt;br&gt;M. Van den Bossche, Chalmers U, Göteborg, Sweden</td>
</tr>
<tr>
<td>1290-1310</td>
<td><strong>1301 The Use of Multicomponent SSITKA as a Tool to Study the Reaction Mechanism in CO hydrogenation over Cobalt Catalysts</strong>&lt;br&gt;Jia Yang, NTNU/SINTEF, Norway</td>
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Topic 1 - Production of Synthesis Gas

1004 Catalyst development for dry reforming of methane: a review
Dori Kalai, Zhixin Yu
Department of Petroleum Engineering, University of Stavanger, 4036 Stavanger, Norway

1029 Effect of reducing agent nature on catalytic activity of polyoxide catalysts
A.V. Mironenko, Z.A. Mansurov, A.B. Kazieva, Zh. B. Kudyarova
Institute of Combustion Problems, Kazakhstan

1033 CFD simulation of a structured catalytic methane reformer including detailed chemistry
M. Hettel1, C. Antinori2, O. Deutschmann1,2
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2Karlsruhe Institute of Technology (KIT), Institute of Catalysis Research and Technology, Kaiserrstr. 12, 76128 Karlsruhe, Germany

1039 LPG enriched Natural Gas for Low-Temperature Steam Reforming
R. Dragomirova, S. Kreft, G. Georgi, D. Seeburg, S. Wohlrab
Leibniz Institute for Catalysis, Albert-Einstein-Str. 29a, 18059 Rostock, Germany

1042 Kinetic study over Ni-based catalysts in steam-CO2 reforming of methane
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2Faculty of Applied Chemical Engineering and the Research Institute for Catalysis, Chonnam National University, 300 Yongbong-ro Gwangju 61186 Republic of Korea

1047 Investigation of undiluted non-catalytic partial oxidation of methane in a flow tube reactor.
Petr I. Kulchakovsky1, Eduard B. Mitberg1,2, Vadim S. Ermolaev1,2, Ilya S. Ermolaev1,2, Igor S. Solomonik1,2
1Technological Institute for Superhard and Novel Carbon Materials, Tsentalnaya ul. 7a, 142190 Troitsk, Moscow, Russia
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1077 Study of the performance of catalysts derived from hydrotalcite in dry reforming of methane
Débora M. Bezerra1, Alessandra F. Lucrédio1, Elisabete M. Assaf1
1Universidade de São Paulo, Instituto de Química de São Carlos, Av. Trabalhador São Carlense 400, São Carlos, SP CEP: 13560-970, Brazil.

1083 Conversion of methane to synthesis gas over the oxide catalysts
K. Dossumov1, G.Y. Yergazyieva1, L.K. Mylykybayeva2, D.H. Churina2, Z.A. Mansurov1
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2Al-Farabi Kazakh National university, Centre of Physical and Chemical Methods of Investigation and Analysis, 95 A Karasai batyr str., Almaty 050012, Kazakhstan

1084 Syngas production from biogas reforming using hydrotalcites mixed oxides catalysts promoted with CeO2
Ananda Vallezi Paladino Lino1, Elisabete Moreira Assaf2, Josè Mansur Assaf2
1Universidade Federal de São Carlos- Engenharia Química, Via Washington Luis, km 235, São Carlos- São Paulo, Brazil
2Instituto de Química de São Carlos - USP

1085 A highly dispersed and anti-coking Ni/SiO2 catalyst for partial oxidation of methane to synthesis gas
Meihua Yang, Peng Jin, Chuanjing Huang, Weizheng Weng, Mingshu Chen, Huilin Wan
State Key Laboratory of Physical Chemistry of Solid Surfaces, National Engineering Laboratory for Green Chemical Productions of Alcohols, Ethers and Esters, and Department of Chemistry, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen 361005, PR China
1104 Steam CO$_2$ reforming of methane on the perovskite type catalyst synthesized by Polyol method

D. Park$^1$, D. J. Moon$^2$, T. Kim$^3$

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$^2$Clean Energy Research Center, Korea Institute of Science and Technology, Seoul, Republic of Korea
$^3$Chosun University, 375 Seosuk-dong, Dong-gu, Gwangju 501-759, Republic of Korea

1119 H$_2$ production by sorption enhanced steam reforming of biomass-derived bio-oil

M.V. Gil$^1$, G. Esteban-Diez$^2$, C. Pevida$^2$, F. Rubiera$^2$, D. Chen$^3$

$^1$Norwegian University of Science and Technology, Sem Sælands vei 4, 7491 Trondheim, Norway
$^2$Instituto Nacional del Carbón, INCAR-CSIC, Apartado 73, 33080 Oviedo, Spain

1121 Synthesis Gas Production by Glycerol Reforming in Microchannel Reactors

S. Koc, A. K. Ayaz

Department of Chemical Engineering, Bogazici University, Bebek 34342 Istanbul, Turkey

1123 Hydrogen production through biogas reforming over CeSiO$_2$ supported LaNiO$_3$ perovskite type oxides. Effect of preparation method.

H.B.E. Sales$^1$, R.C.R. Neto$^2$, F.B. Noronha$^2$, L.V. Mattos$^1$

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$^2$National Institute of Technology, Av. Venezuela 82, Rio de Janeiro 20081-312, Brazil

1124 Steam reforming of ethanol over functionally graded catalysts based on nickelates: from grain to structured catalysts

M. Arapova$^{1,3}$, S. Pavlova$^1$, V. Sadykov$^2$, T. Larina$^1$, T. Glazneva$^1$, K. Parkhomenko$^1$, A.-C. Roger$^3$, O. Smorygo$^4$

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$^3$University of Strasbourg, Strasbourg, France
$^4$Institute of Powder Metallurgy, Minsk, Belarus

1137 Catalytic biomass gasification


Tver Technical University, A. Nikitin str., 22, Tver, 170026, Russia

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**Topic 2 – Synthesis Gas to Fuels and Chemicals**

0991 Effect of water in secondary reactions of the Fischer-Tropsch process

V.Z. Mordkovich$^{1,2}$, L.V. Sineva$^{1,2}$

$^1$Technological Institute for Superhard and Novel Carbon Materials, Tsentralnaya ul. 7a, 142190 Troitsk, Moscow, Russia
$^2$INFRATechnology Ltd., Mokhovaya ul. 11 bld. 3, 125009 Moscow, Russia

1001 Superior catalytic performance for Fischer-Tropsch synthesis with modified eggshell cobalt-based catalyst

Chun Chen, Ting Ma, Hiroyuki Imai, Xiaohong Li

Department of Chemical Processes and Environments, Faculty of Enviromental Engineering, The University of Kitakyushu, 1-1, Hibikino, Wakamatsu, Kitakyushu, Japan

1009 Effects of hydrophilicity of Al-modified SBA-15 to cobalt dispersion and product distribution for Fischer-Tropsch synthesis reaction

Jae Min Cho, Chang Il Ahn, Jong Wook Bae*

School of Chemical Engineering, Sungkyunkwan University (SKKU), 2066 Seobu-ro, Suwon-si, Gyeonggi-do, 440-746, Republic of Korea

1017 Fischer-Tropsch Synthesis Of Liquid Hydrocarbons Over The Polymetallic Supported Catalysts

Y.Y. Nurmanakov$^1$, S.S. Iktulova$^2$

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1019 Highly efficient CO$_2$-based Fischer-Tropsch synthesis for generating hydrocarbon fuels

S.S. Geng, F. Jiang, X.H. Liu*

Jiangnan University, No. 1800 Lihu Avenue, Wuxi, Jiangsu 214122, P.R.China
1021 Control of Product Distribution over Bi-functional Fe and ZSM-5 Catalytic Systems for Fischer-Tropsch Synthesis
Y. Luo,1 V. V. Ordomsy,1 A. Y. Khodakov,1 D. Curulla-Ferre,2 C. Drouilly2
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2. Total Research & Technology Feluy, Zone Industrielle C, B-7181 Feluy, Belgium

1028 Low temperature methanol synthesis over copper nanoparticles.
Christian Ahoba-Sam, Klaus-Joachim Jens
University College of Southeast Norway, Kjølnes ring 56, 3918 Porsgrunn, Norway.

1044 Fischer-Tropsch Synthesis on Co-Based Catalysts in a Microchannel Reactor. Effect of Temperature and Pressure on Selectivity and Stability
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1049 Support effects on potassium promotion for Iron-based Fischer-Tropsch synthesis
Feng Jiang, Min Zhang, Yuebing Xu, Xiaohao Liu*
Jiangnan University, Wuxi 214122, China

1050 Synthesis of cobalt catalysts by “solution-combustion” method
The Institute of Combustion Problems, 172 Bogenbay batyr str., Almaty 050012, Kazakhstan

1053 Methanol synthesis via the hydrogenation of carbon dioxide over Pd-Cu catalysts
Eun Jeong Choi1, Yong Hee Lee2, Kwan-Young Lee2,3
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2. KU-KIST School of Converging Science & Technology, Korea University, Anam-dong, Seongbuk-gu, Seoul 02841, Republic of Korea

1054 Effect of Support Pellet Size and Active Component Distribution on the Fisher-Tropsch Synthesis (FTS) over Co/SiO2 Catalysts
Ranjia Li, Changchun Yu, Xiaosheng Wang, Licheng Sun, Hongjun Zhou
China University of Petroleum. Beijing, 18 Fuxue Road, Changping, Beijing 102249, China

1055 Higher Alcohol Synthesis (HAS) over Cu/Zn/Al/Fe Catalysts via Hydrotalcite-like Precursors
Xiao-sheng Wang, Ran-jia Li, Chang-chun Yu, Ke-hong Ji, Hong-jun Zhou*, Chun-ming Xu
China University of Petroleum, Beijing, 18th Fuxue Road, Changping, Beijing 102249, China

1057 Zeolite deactivation by coking in the Methanol to Hydrocarbons process.
Daniel Rojo-Gamal1,2, Stian Svelle1, Unni Olsbye1, Pablo Beato1
1. Center for Material, Science and Nanotechnology (SMN), Chemistry Dept. University of Oslo. 0371 Oslo, Norway
2. Haldor Topsøe A/S DK-2800 Kgs. Lyngby, Denmark

1065 Designing zeolite capsule catalyst for one-step middle isoparaffin synthesis via Fischer-Tropsch synthesis: Growth of H-MOR shell encapsulating fused iron core
Guohui Yang1, Qihang Lin1, Yoshiharu Yoneyama1, Huaian Wan1, Noritatsu Tsubaki1
1. University of Toyama, Gofuku 3190, Toyama City, Japan
2. Xiamen University, No. 422, Siming South Road, Xiamen City, China

1073 Bubbly Mixture Compression and Capturing in Liquid Compression Reactor
M. Glushenkov1, G. Fuite2, Th vd Meer2, A. Kronberg1
1. Encontech B.V. CTW/ThW, P.O. Box 217, 7500 AE Enschede, The Netherlands
2. Twente University, P.O. Box 217, 7500 AE Enschede, The Netherlands
1078 Cu-Zn/V-Al PILC bifunctional catalysts for the direct conversion of syngas to methanol, DME and olefins
Francielle C. F. Marcos1, Ana M. Mouad1, Jose M. Assaf2, Elisabete M. Assaf1,*
1São Carlos Institute of Chemistry, University of São Paulo, Av. Trabalhador São Carlense, 400, 13560-970, São Carlos, São Paulo, Brazil.
2Department of Chemical Engineering, Federal University of São Carlos, São Carlos, SP, Brazil

1089 Kinetics of reduction of the Co-Ru-Al2O3 Fischer-Tropsch catalysts investigated by thermogravimetric method
O.A. Kungurova1,2,3, N.V. Shertser1,2, E.G. Koemets1,2, S.V. Cherepanova2, A.A. Khassin1,2
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2Boreskov Institute of Catalysis, 5, Pr. Lavrentieva, Novosibirsk, 630090, Russia
3Tomsk State University, 36 Lenin Ave., Tomsk, 634050, Russia

1095 Behaviour of lower strontium substituted La1−xSrxCoxO3 perovskite catalyst during syngas conversion
M. Ao1,2, G. H. Pham1, V. Sage3 and V. Pareek1
1Curtin University, GPO Box U1987, Perth, WA 6845, Australia
2CSIRO Energy, ARRC, 26 Dick Perry Avenue, Kensington, WA 6151, Australia

1097 Effect of preparation variables on bimetallic Pt-Ir catalysts for the hydroisomerization of Fischer-Tropsch waxes
E. Heracleous1,2, I. Eleftheriou1, E.F. Ilipoulos2, A.A. Lappas2
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2Chemical Process and Energy Resources Institute (CPERI), Centre for Research and Technology Hellas (CERTH), 6th km Charilaou-Thermi road, POBox 361, 57001 Thessaloniki, Greece

1101 Determination of formate decomposition rates and relation to product formation during CO hydrogenation over supported cobalt.
D. Lorito1,2, A. Paredes-Nunez1, C. Mirodatos1, Y. Schuurman1, F.C. Meunier1
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1102 Determination of the most active sites for CO hydrogenation over supported cobalt by selective poisoning with tin.
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1113 3D model of a single catalyst particle for the Fischer-Tropsch Synthesis: Influence of process conditions and particle shape and size on the catalyst effectiveness
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2Texas A&M Univesity at Qatar, PO Box 23874, Doha, Qatar
3Texas A&M University, 3122 TAMU, College Station, Texas 77843, United States

1126 Pore filled Co/Al2O3 catalysts exhibit higher C5+ and lower light gas selectivities
C. Bertaux, G. Jacobs, V.R.R. Pendyala, W.D. Shafer, B.H. Davis
University of Kentucky CAER, 2540 Research Park Dr., Lexington, Kentucky 40511, United States

1130 Structural Characterization and Long-term Performance Understanding of SAPO Industrial Catalyst Materials
G.N. Kalantzopoulos1, F. Lundvall1, A. Hill1, A. Lund2, D. Wragg3, B. Arstad4, M. Attfield1 and H. Fjellvåg1
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1135 GtL process integration and intensification in microchannel reactors
C. Sun1, P. Pfeifer1, R. Dittmeyer2
1Karlsruhe Institute of Technology (KIT), Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen, Germany

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1140 Liquid-phase methanol synthesis using a polymer stabilized catalysts
A Sidorov1, E. Sulma1*, Yu. Kosivtsov1, M. Rubin1, D. Murzin2, J. Warna1, A. Stepacheva1
1Tver Technical University, A.Nikitin str., 22, Tver, 170026, Russia
2Åbo Akademi University, Domkyrkotorget 3, Turku, Finland

1185 Formation of nitrogen containing compounds from ammonia co-fed to the Fischer-Tropsch synthesis
M. Claey1, N. Fischer, R. Henkel, H. Kotzé, M. Furst, T. Sango
Centre for Catalysis Research and e-change (DST-NRF Centre of Excellence in Catalysis), University of Cape Town, Cape Town, Private Bag X3, Rondebosch 7701, South Africa

Topic 3 – Direct conversion of methane

1012 Non-oxidative coupling of methane to higher hydrocarbons: Control over kinetics of methyl radical interactions by non-thermal plasma-catalysis synergy
Mohammadreza Taheraslani, Leon Lefferts
Catalytic Processes and Materials, Mesa+Institute for Nanotechnology, Faculty of Science and Technology, University of Twente, PO Box 217, 7500AE, Enschede, The Netherlands

1022 Study on the Conversion of Methane to Acetylene using Rotating Arc Technology
S. Jo1, H. S. Kang1, D. H. Lee1, K.-T. Kim1, Y.-H. Song1
1Plasma Engineering Laboratory, Korea Institute of Machinery and Materials, 156 Gajeongbuk-ro, Yusong-gu, Daejeon 34103, Republic of Korea

1034 Activation of methane with N2O on M/Ga/H-ZSM-5 (M-transition metal) catalysts: influence of acidity on the formation of complex active sites
L. Bork1, N.V. Vlasenko2, A. M. Puciy1, A. Beck1, P.E. Strizhak2
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2L.V. Pisarzhevsky Institute of Physical Chemistry, NASU, Prospect Nauki 31, 03039 Kyiv, Ukraine

1043 Complementary effect of non-thermal plasma-catalysis hybrid system on methane complete oxidation over various catalysts
Heesoo Lee, Tae Hwan Lim, Do Heui Kim*
School of Chemical and Biological Engineering, Institute of Chemical Processes, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul, 151-742, Republic of Korea

1087 Identifying and limiting the main source of the carbon oxide during OCM in the presence of MnOx – Na2WO4/SiO2 catalyst
S. Parasihan, R. Schomäcker
Institute für Chemie, Technische Universität Berlin, Straße des 17. Juni 124, 10623 Berlin, Germany

1107 Oxidative coupling of methane on thermostable NaWO4-Mn supported on hydroxyapatite – coated SiO2 catalyst
Byung Jin Lee1, Yong Hee Lee1, Kwon-Young Lee1,2
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1108 Characterization of Metal-Exchanged Zeolites for Direct Conversion of Methane to Methanol (DCMM)
Xueting Wang1, Magnus Skoglundh1, Anders Hellman1, Johan Gustafson2 and Per-Anders Carlsson1
1Competition Centre for Catalysis, Chalmers University of Technology, 412 96 Göteborg, Sweden
2Division of Synchrotron Radiation Research, Lund University, 221 00 Lund, Sweden
1114 Plasma-Assisted Methane Direct Conversion over Metal Oxides

Do-Young Hong1,2, Parajj Kashinathan,1 Sungyoung Park, 1 Yong Ki Park, 1 Yong Kyu Hwang1,2
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1203 The Effects of Process Parameter Variations in Direct Non-oxidative Conversion of Methane (non-OCM) by RF Plasma

Jongyoon Bae1, Sungyoung Park1, Myung-Geun Jeong2, Yong-Ki Park1, Yong Kyu Hwang3,4
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1224 The effect of surface basicity on the C2+ formation yield over an equimolecular mixture of MgO and rare earth M2O3 (M=La, Nd, Sm, Gd, and Fe)

F. Papa1, R. State1, G. Dobrescu1, C. Brada1, G. Postole1, D. Gingsasu1, L. Patron1, I. Balint1
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1225 Single Bubble Dynamics in Hydraulic Ram Reactor

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1269 Catalytic Methane Partial Oxidation in Supercritical Water

M. Hassan, B. Wijenayake, M. Komiyama
University of Yamanashi, 4-3-11 Takeda, Kofu, Yamanashi 400-8511, Japan

1286 A more efficient Cu-containing zeolite catalyst for direct conversion of methane to methanol

Ha Vu Le1, Samitra Parisihan1, Caren Göbel1, Annette Trunschke1, Reinhard Schomäcker2, Arne Thomas1
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1310 Reaction and Reactor Engineering for an Individual and Integrated Oxidative Coupling of Methane process

H.R. Godini1, S. Sadjadi1, M. Khadivi1, H. Dousti1, L. Thum2, O. Görke3, G. Vetter2, S.M. Jazayeri1, U. Simon3, S. Salehi1, M. Askarishahi1, M. Kim1, R. Schomäcker2, A. Gurlo3, F. Rosowski3, J.-U. Repke3, G. Wozny3
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1327 Low-temperature oxidative coupling of methane using carbon dioxide in an electric field over Ca-doped LaAlO3 catalysts

T. Yabe, K. Sugiuira, Y. Kamite, K. Oshima, S. Ogo, Y. Sekine
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1330 Effect of Single and Double Dielectric Barrier on the Direct Conversion of Methane on the Catalyst under the Dielectric Barrier Discharge

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2 Korea Institute of Machinery and Materials, 156 Gajeongbuk-ro, Yuseong-gu, Daejeon 305-343, Republic of Korea
Topic 6 - Techno-Economic Aspects

1062 An Experimentally Verified Approach to Design Efficient Gasoline and Diesel Fuels Surrogates via Computation and Property Integration Methods
S. Intikhab*, S. Kalakul†, H. A. Choudhury*, R. Gani‡ and N.O. Elbashir*§
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1164 Economic Analysis of GTL-FPSO Process via Fischer-Tropsch Synthesis Reactor with Iron and Cobalt based Catalysts
Gi Hoon Hong1,2, Sung Soo Lim1, Jae-sun Jung1,2, Jae-suk Lee1,2, Eun-hyeok Yang1,2, Youg Su Noh1,2, and Dong Ju Moon1,2,3,4*
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1218 Mid-temperature H2S removal with nanostructured MeOx/SBA-15 sorbents (Me: Zn and/or Fe)
M.G. Cutrufello, M. Mureddu, E. Rombi, I. Ferino, A. Musinu, A. Ardu, C. Cannas
Dipartimento di Scienze Chimiche e Geologiche, Università di Cagliari, Italy

1293 Low-scale syngas production in volumetric matrix reformers
O.V. Shapovalova, A.I. Tarasov, K.A. Timofeev, V.S. Arutyunov, V.M. Shmelev
Semenov Institute of Chemical Physics, Russ. Acad. of Sci., 4 Kosygina street, Moscow, 119991, Russia

1346 The Flarecatcher: A Mobile Associated Gas Processing System for Flare Mitigation
J. Palaia, R. Zubrin
Pioneer Energy, Inc, 11111 W. 8th Ave., Lakewood, CO 80215, United States

1344 Ionic Liquidic Zeolites for Methane Capture from Low Grade Sources
Gang (Kevin) Li1, Jin Shang2, Qinfen Gu1, Thomas Saleman1, Jeffrey Z. Liu1, Paul A. Webley2, Eric F. May1.
1 Centre for Energy, School of Mechanical and Chemical Engineering, The University of Western Australia, 6009 Australia;
2 Department of Mechanical and Aerospace Engineering, Monash University, Clayton, Victoria 3800 Australia

1345 Feasibility analysis of dimethyl ether (DME) derived from natural gas as a diesel substitute in compression ignition (CI) engine
A. Lerner1, M. Brear2, P. Webley1, R. Gordon1, J. Patel2
1 University of Melbourne, Parkville, Victoria, 3010, Australia
2 CSIRO, Clayton, Victoria, 3168, Australia
Poster session II Wednesday June 8 17:00 at Quality Hotel Saga

Topic 1- Production of Synthesis Gas

1184 Sintering of a supported nickel catalyst as a function of temperature and steam captured in-situ
M. Claeys1, N. Fischer1, M. Maputha1, R. Henkel1
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1206 Catalytic partial oxidation of methane to syngas using Co-based catalysts
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1215 Carbon Deposition/Removal on Ni-based Catalysts in Partial Oxidation of Methane into Syngas: A Joint Theoretical and Experimental Study
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1232 Preparation and characterization of sinter-resistant Rh-CeO2/SiO2 catalyst for methane partial oxidation to syngas
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1244 Material degradation by metal dusting corrosion on instrumentation used in natural gas conversion technologies
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1246 Intermetallides as the Catalysts for Carbon Dioxide Reforming of Methane
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1252 LaNiO3 perovskite as catalytic precursor for Partial Oxidation of Methane: Effect of synthesis route
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1278 Dry reforming of methane over hydrotalcite-derived catalyst: Effect of Ni loading
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1283 Dry and Combined CO2–Steam Conversion of Methane into Syngas over Co-Based Catalysts Promoted with Rare-Earth Metals
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1300 Hydrogen production by catalytic dry reforming of natural gas in a Two Zone Fluidized Bed Reactor with membranes
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1314 Tracking of carbon species during dry reforming of methane on different Ni/ZrO$_2$ catalysts
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1323 Coking Problems during Natural Gas Conversion into Synthesis Gas over Intermetallides
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1326 Effect of Ba addition to Ni/perovskite catalyst on steam reforming of toluene for syngas/hydrogen production
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1338 Synthesis of Ni@ZrO$_2$ Catalyst for Dry Reforming – a Polymer Assisted Dispersion and Encapsulation Method.
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**Topic 2 – Synthesis Gas to Fuels and Chemicals**

1141 Characterization and studies of Si and Bronsted site developments in SAPO-18 and SAPO-34 during and after hydrothermal treatment.
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1147 Mechanism research of of light olefin formation in Fischer-Tropsch synthesis over cobalt catalysts by combination of DFT calculations and microkinetic analysis
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1148 Quality Control Program for Fischer-Tropsch catalyst testing by employing high throughput methods
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1163 R&D Status on KIST GTL-FPSO Process for the Production of Offshore Clean Fuels
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1166 Hydrotalcite supported Co catalyst with bimodal structure for Fischer-Tropsch Synthesis (FTS)
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1170 A 1D-heterogeneous model with detailed kinetics of Fischer-Tropsch synthesis in a Fixed-Bed
Reactor
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1171 Size and Promoter Effects in Supported Iron Fischer-Tropsch Catalysts: Experiment and Theory
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1186 FTS activity and selectivity as function of Co crystallite size and water partial pressure
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1194 Effect of Promoter, Precursor and Support on the Selectivity of Carbon Monoxide Hydrogenation
on Molybdenum Sulphide Catalysts
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1205 Co-Mn catalysts for Fischer-Tropsch production of light olefins
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1208 Influence of potassium species on Co based Fischer-Tropsch catalyst
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1210 Effect of Phosphorus Addition on Reducibility and Fischer-Tropsch Synthesis Activity of Cobalt
Supported on silica
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1211 The effect of CO pre-treatment on a Co/Re/γ-Al₂O₃ catalyst for Fischer-Tropsch synthesis
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1212 Urchin-shaped cobalt nanoparticles as stable active phase for FT synthesis
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1213 On the Support in Cobalt Fischer-Tropsch Synthesis—Emphasis on Alumina and Aluminates
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1226 Mechanistic insights into olefin selectivity on cobalt-catalyzed Fischer-Tropsch synthesis
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1230 Design and engineering of iron-based composite catalysts for the Fischer-Tropsch synthesis of lower olefins
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1261 The effect of copper loading on carbide phase formation in iron based catalysts during CO₂-rich Fischer-Tropsch synthesis: In-situ X-ray absorption spectroscopy/high-resolution X-ray powder diffraction studies
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1268 Sulphur exposure on a Co/Mn based catalyst for syngas conversion to chemicals
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1290 Fischer-Tropsch synthesis using ZrO₂-promoted Co/Al₂O₃ catalysts. Comparison between ZrO₂-Al₂O₃ carriers prepared different methods.
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1306 An investigation of the water effect on the performances of a Co-based Fischer-Tropsch catalyst supported on modified γ-Al₂O₃
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1309 Valorization of biogas via combined dry methane reforming and Fischer-Tropsch synthesis over promoted molybdenum carbides catalysts
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1315 Direct dimethyl ether synthesis from synthesis gas: the mutual influences of the methanol synthesis and the methanol dehydration reactions on each other

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1325 Noble metal free K/Co-oxide catalyst for water gas shift reaction

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1333 Gas-liquid equilibrium computations: Application to the Fischer-Tropsch synthesis

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1336 Co/TiO\textsubscript{2} based catalysts for Fischer–Tropsch synthesis

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1338 Potassium adsorption behaviors on hcp cobalt: A density functional theory calculation

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1343 Effect of SiO\textsubscript{2}/Al\textsubscript{2}O\textsubscript{3} Ratio on the Performance of Nanocrystal ZSM-5 Zeolite Catalysts in Methanol to Gasoline Conversion

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1348 Methanol-to-Aromatics conversion on Zn modified H-ZSM5 Zeolites

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1349 Compact Technology in Application for Small Scale Gas to Liquid

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1350 Production of long-chained alcohols from synthesis gas using iron catalysts


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**Topic 4 – Conversion of Light Paraffins**

1010 Reactions of hydrocarbons with CO\textsubscript{2} over supported Au

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1120 Scale-up and Operational Optimization of Oxychlorination Process by Multi-dimensional Fixed bed Reactor Modelling
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1158 Kinetic and Mechanistic Aspects of Dehydrogenation of Propane and Isobutane Elucidated by High-Throughput Tools
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1272 Improvement of stability and ethylene selectivity in nonoxidative conversion of ethane on modified catalyst Mo/HZSM5-Si-P
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1287 Transient and Steady State kinetic study of the catalytic cycle of the oxychlorination of ethylene
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1305 Temporal Analysis of Products (TAP) – an advanced tool for time-resolved kinetic characterization of industrially-relevant microporous materials
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Topic 5 - Natural Gas in Energy Conversion

1013 Catalytic conversion of CO2 to methane in a pressurized fluidized bed reactor
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1032 Catalytic combustion of methane over Pd/Al2O3 modified with alkaline metals
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1051 Methane combustion activity of Pd nanoparticles supported on microporous TiO2: Effect of strong metal support interaction
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1070 Ag/SiO2 and Cu/SiO2 cogelled xerogel catalysts for benzene combustion and 2-butanol dehydrogenation
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1072 Copper-calcium phosphate sorbents for elemental mercury removal from simulated natural gas
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1086 Thermally stable core-shell type Ni catalyst for SNG production
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1090 Study on DBD plasma enhanced carbon dioxide methanation over Ru/γ-Al2O3 catalyst for synthetic natural gas production
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1112 A Parametric Study of Low Temperature Water-Gas Shift Reaction over MOF-Supported Catalysts
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1131 Catalytic combustion of methane on Pd and Pt based catalysts for exhaust-gas after-treatment
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1125 Effect of sulfur poisoning of alumina supported noble metal catalysts for steam reforming of methane
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1251 Aluminium open cell foams as efficient support for CO2 methanation catalyst: pilot scale reaction results
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1284 High purity hydrogen production with SESR of bio-oil model compounds
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1301 Microreactors for methanation – detailed analysis of performance at technical scale
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1316 Development of innovative catalysts for methanation of syngas from biomasses gasification
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1334 Modelling of membrane reactors: Application to hydrogen production
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The Board's International Scientific Advisory Board (ISAB) is charged with assuring the technical excellence of the symposia and administering the Award for Excellence in Natural Gas Conversion, while its International Finance Committee (IFC) is responsible for encouraging corporate support for the symposia.

See you at NGCS 12 in 2019!