NGCS 11 Tromsø 2016

The 11th Natural Gas Conversion Symposium

Natural Gas Conversion Board

Photo: Bård Løken Destinasjon Tromsø

5 – 9 June 2016
Clarion Hotel *the Edge*
Tromsø, Norway

ExxonMobil

The Research Council of Norway

HALDOR TOPSØE

NTNU

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 reduceing 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

The Award for Excellence in Natural Gas Conversion

Professor Xinhe Bao
State Key Laboratory of Catalysis
Dalian Institute of Chemical Physics
Chinese Academy of Sciences

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 Rostrup-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.

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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 DepartmentUniversity 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 CO_2 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

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

Dr. Gordon Kelly *
Johnson Matthey Catalysts, United Kingdom

Prof. Alexis T. Bell (ISAB Chair)
University of California, Berkeley, United States

Mr. Per Bakkerud (NGCB Treasurer) *
Haldor Topsøe, Denmark

Mr. Anton Punt (IFC Chair) *
ORYX GTL, Qatar

Prof. Claude Mirodatos
IRCELYON, France

Mr. Ad Punt *
Shell, The Netherlands

Dr. José Santiesteban *
ExxonMobil R&E, United States

Mr. Robert Saxton *
Chevron, United States

Prof. Reinhard Schomäcker
Technische Universität Berlin, Germany

Dr. Wataru Ueda
Kanagawa University, Japan

NGCS 11 Schedule overview Tromsø 2016

From	To	SUNDAY JUNE 5	MONDAY JUNE 6	TUESDAY JUNE 7	WEDNESDAY JUNE 8	THURSDAY JUNE 9
08:00	08:30		**Registration**			
08:30	09:00		**Clarion Hotel the Edge**			
09:00	08:30		Plenary 1 Rekoske	Plenary 2 Jacobs	Plenary 3 Bao	Plenary 4 Olsbye
08:30	10:00		**Margarinfabrikken, Clarion the Edge**	**Margarinfabrikken, Clarion the Edge**	**Margarinfabrikken, Clarion the Edge**	**Margarinfabrikken, Clarion the Edge**
10:00	**10:30**		**Coffee break**	**Coffee break**	**Coffee break**	**Coffee break**
10:30	10:50		Parallell sessions.	Parallell sessions.	Parallell sessions.	Parallell sessions.
10:50	11:10		M1 M2 M3	M1 M2 M3	M1 M2 M3	M1 M2 M3
11:10	11:30		Topic 1 Topic 2 Topic 3	Topic 1 Topic 2 Topic 3	Topic 1 Topic 2 Topic 3	Topic 5 Topic 2 Topic 1-6
11:30	11:50					
11:50	12:10					
12:10	12:30					Closing ceremony
12:30	**13:00**		**Lunch**	**Lunch**	**Lunch**	
13:00	**13:30**		**Clarion Hotel the Edge**	**Clarion Hotel the Edge**	**Clarion Hotel the Edge**	**Lunch**
13:30	13:50		Parallell sessions.	Parallell sessions.	Parallell sessions.	**Clarion Hotel the Edge**
13:50	14:10		M1 M2 M3	M1 M2 M3	M1 M2 M3	
14:10	14:30		Topic 1 Topic 2 Topic 4	Topic 1 Topic 2 Topic 1-6	Topic 1 Topic 2 Topic 5	
14:30	14:50					
14:50	15:10			**Coffee break**		
15:10	15:40	**Registration 15:00**	**Coffee break**	Parallell sessions.	**Coffee break**	**Post-conference social activities**
15:40	16:00	**Clarion Hotel the Edge**	Parallell sessions.	M1 M2 M3	Parallell sessions.	
16:00	16:20		M1 M2 M3	Topic 1 Topic 2 Topic 6	M1 M2 M3	**Option 1 | Snøhvit LNG Site Visit**
16:20	16:40		Topic 1 Topic 2 Topic 5		Topic 5 Topic 2 Topic 4	**Option 2 | Boat / fishing excursion**
16:40	17:00					**Option 3 | Mountain hike w/NGCS chairs**
17:00	17:20			**Excursion &dinner**	**Poster session**	
17:20	18:00			**Departure hotel 17:00**	**Quality Hotel Saga**	**Booking required**
18:00	18:30		**Poster session**	**Sommarøy fishing village & island**	**With refreshments**	**- see NGCS11 website for details**
18:30	19:00		**Quality Hotel Saga**	**Return starts from approx. 22:00**		
19:00	19:30	**Welcome reception &**	**With refreshments** / **NGCB**			
19:30	20:00	**opening ceremony**	**meeting**			
20:00	20:30	**Polaria Arctic Museum & Aquarium**	**the Egde**		**Conference Gala Dinner**	
20:30	21:00	**Drinks and light meal served**			**Clarion Hotel the Edge**	
21:00	21:30					
21:30	22:00					
22:00	22:30					
22:30	23:00					

Social Program

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 CO_2 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

1000-1030	COFFEE BREAK		
	Topic 1 - Dry reforming **Session chairs:** Fabio Noronha, Nat. Inst. Techn., Brazil De Chen, NTNU, Norway	**Topic 2 - MTO and MTH** **Session chairs:** Olaf Hinrichsen, TU München, Germany Stian Svelle, Univ. Oslo, Norway	**Topic 3 - CH_4 to aromatics** **Session chairs:** Yongdan Li, Tianjin U., China Edd Blekkan, NTNU, Norway
1030-1050	1172 CH_4 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 CH_4 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, Pullack, 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 CH_4 dehydro-aromatization under periodic CH_4-H_2 switching operation mode *Y. Song, AIST, Tsukuba, Japan*
1110-1130	1153 Catalytic dry reforming of methane over Ni/β-Mo_2C 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. Goetze, U. Utrecht, The Netherlands*	1068 Acetylene, an intermediate for methane conversion to C_4 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-Huei (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		

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 Klaus-Joachim Jens,U. Coll. S.-E. Norw.	**Topic 4 - Dehydro C_2H_6** **Session chairs:** Wataru Ueda, Kanagawa U., Japan Steinar Kvisle, Inovyn, Norway
1330 1350	1183 Shell impregnation of steam reforming catalyst *C.V. Ovesen, Haldor Topsøe A/S, Lyngby, Denmark*	1018 CNTs-Ni-Mo-K hybrid catalysts with enhanced performance for synthesis of higher alcohols from syngas *X. L. Liang, Xiamen University, China*	1103 Simulation-aided effective design of a catalytic reactor for ethane oxidative dehydrogenation *E. Heracleous, International Hellenic U., Thessaloniki-Moudania, Greece*
1350-1410	1339 Towards active and stable Ni based bimetallic catalysts for steam methane reforming *S.E. Liland, NTNU, Norway*	1059 Direct synthesis of dimethyl ether from mixture of carbon oxides over copper alumina catalysts prepared using the sol-gel method *Kaoru Takeishi, Shizuoka U., Japan*	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*
1410-1430	1249 Compact Inexpensive Reformers for Natural Gas *J. Carpenter, RTI International, Durham, US*	1263 Impact of the catalyst synthesis of bifunctional catalysts on syngas to DME formation *D. Wendt, Max-Planck Institut fur Kohlenforschung, Mülheim, Germany*	1176 Design and performance of alternative-type ZrO_2-based catalysts for non-oxidative dehydrogenation of light alkanes *T. Otroshchenko, Leibniz Katalyze, Rostock U, Germany*
1430-1450	1262 Catalyst performance assessment for low temperature steam reforming of methane via comprehensive microkinetic modelling *P.N. Kechagiopoulos, U. Aberdeen, UK*	Keynote 2 (1061) Roles of ZnO in methanol and methanol-dimethyl ether-combi catalysts *Sebastian Kuld, Haldor Topsøe A/S, Lyngby, Denmark*	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*
1450-1510	1020 Modeling Development for a Combined Methane Fixed Bed Reactor Reformer *M. Elbashir, Texas A&M U. at Qatar, Qatar.*		1016 Low temperature, selective oxidative upgrading of ethane to value-added products, over Fe- and Cu-ZSM-5 catalysts *R.D. Armstrong, Cardiff U, UK*
1510-1540	COFFEE BREAK		

Monday June 6, Continued

	Topic 1- Partial oxidation **Session chairs:** Alessandra Beretta, P. Milano, Italy Bjørn Chr. Enger, SINTEF, Norway	**Topic 2 – Co FT charact.** **Session chairs:** Andrei Khodakov, Univ. Lille, France Magnus Rønning, NTNU, Norway	**Topic 5 – CO_2 to SNG** **Session chairs:** Fabio Ribeiro, Purdue University., US Hilde Venvik, NTNU, Norway
1540-1600	1302 CPO of C_1-C_8 hydrocarbons: Kinetic analysis, Raman surface characterization and adiabatic testing *G. Groppi, Politecnico di Milano, Italy*	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 *C. Meny, IPCMS,U. Strasbourg, France*	Keynote 3 (1308) Development of methanation catalysts for the process chain Power to Gas *Anne-Cécile Roger, ICPEES, U Strasbourg, France*
1600-1620	1297 On the control of the properties of electrosynthesized Rh-based syngas production catalyst *P.H. Ho, U. Bologna, Italy*	1030 Hydrocarbon chemistry on cobalt: surface science investigations of the FT chain growth mechanism *C.J. Weststrate, Syngaschem BV, Eindhoven, The Netherlands*	
1620-1640	1235 Novel $NiAl_2O_4$-based catalysts supported on ceria and ceria-zirconia for partial oxidation of methane. *R. Lopez-Fonseca, U. Basque Country, Spain*	1173 New insights on the aggregates of cobalt nanoparticles by electron tomography and anomalous X-ray scattering *S. Humbert, IFPEN, Solaize, France*	1312 Catalytic conversion of CO_2 to Synthetic Natural Gas (SNG) on Ru-based catalysts *L. Falbo, Politecnico di Milano, Italy*
1640-1700	1253 Study of Perovskites $LaNi_{1-x}Co_xO_3$ Catalysts in the Partial Oxidation of Methane *S.T, Brandao, U. Federal da Bahia, Brazil*	1192 *In situ* monitoring of supported cobalt catalysts for FTS under realistic conditions; what have we learned *N. Tsakoumis, NTNU, Norway*	1198 Production of synthetic natural gas by CO_2 methanation: Synthesis and characterization of highly active catalysts *O. Hinrichsen, TU München, Germany*
1700-1720	1289 Role of oxygen activation in the production of syngas by catalytic partial oxidation of methane over dual $LaMnO_3$-Pd/YSZ beds *M. Richard, U. Poitiers, France*	1237 Co single crystal surfaces as FT model systems: STM investigations of alkali metal on Co single crystal surface *M.D. Strømsheim, NTNU, Norway*	1217 Highly active NiO/CeO_2 catalysts for Synthetic Natural Gas production by CO_2 methanation *E. Rombi, U. Cagliari, Monserrato, Italy*
1800-2000	POSTER SESSION w/refreshments Quality Hotel Saga		

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)

1000-1030	COFFEE BREAK		
	Topic 1 – Deactivation **Session chairs:** Cathy Chin, U. Toronto, Canada Rune Lødeng, SINTEF, Norway	**Topic 2 – FT mechanisms** **Session chairs:** Michael Claeys, U. Cape Town, S-Africa Anders Holmen, NTNU, Norway	**Topic 3 – OCM , Direct CH_4** **Session chairs:** Dae-Hoon Lee, KIMM, Rep. of Korea Magnus Rønning, NTNU, Norway
1030-1050	1038 Dry reforming of methane on Ni-based pyrochlore catalysts: Understanding carbon deposition mechanism *J. Spivey, LSU, Baton Rouge, US*	0992 Effect of CO coverage on the product slate in FTS. *H. Oosterbeek, Shell Global Solutions, Amsterdam, The Netherlands*	1105 The chemical looping concept in oxidative coupling of methane on the $Na_2WO_4/Mn/SiO_2$ catalyst: challenges and opportunities for catalyst investigation without gas phase O_2 *V. Fleischer, TU Berlin, Germany*
1050-1110	1098 Understanding the Effects of Support Chemical Composition on the Origin and Reactivity of Carbon Formed During Dry Reforming of CH_4 over $Ni/Ce_{1-x}M_xO_{2-\delta}$ (M=Zr4+, Pr3+) via Transient Isotopic Techniques *A. Efstathiou, U. Cyprus Nicosia*	1154 Spontaneous formation of cobalt nano-islands and kinetic role of hydroxyl species during Fischer-Tropsch synthesis *M. Saeys, U. Ghent, Belgium*	1292 Evaluation of the combination of oxidative coupling of methane with COx hydrogenation to increase production of C_2+ hydrocarbons *M. Albrecht, Leibniz Katalyse, Rostock U., Germany*
1110-1130	1058 Improving the sintering resistance of Ni/Al_2O_3 steam reforming catalysts *F. Morales Cano, Haldor Topsøe A/S, Lyngby, Denmark*	1075 Fischer-Tropsch synthesis on cobalt catalyst: A combined transient kinetic and mechanistic study *W. Chen, U. Eindhoven, The Netherlands*	1003 Partial oxidation of methane in gas phase at very short residence time: influence of NO and NO_2 on the yield and selectivity of formaldehyde *V. Burkle-Vitzthum, CNRS-U Lorraine, Nancy, France*
1130-1150	1006 Industrial scale reforming of CO_2-rich gas. *P. Mortensen, Haldor Topsøe A/S, Lyngby, Denmark*	1125 Microkinetic model validation for the FTS based on transient experiments *J. Van Belleghem, U. Ghent, Belgium*	1236 C to H effective ratio as a descriptor for dehydroaromatization of methane with light oxygenates on Mo/HZSM-5 catalyst *D.-Y. Hong, Korea Research Institute Chemical Technol., Rep. of Korea*
1150-1210	Keynote 4 (1340) Ni based steam reforming catalysts: from molecular understanding to catalyst design *De Chen, Department of Chemical Engineering, Norwegian University of Science and Technology (NTNU), Norway*	1112 Kinetics of methane formation and 1-olefin hydrogenation in FTS over cobalt catalyst *D.B. Bukur, Texas A&M U at Qatar, Doha, Qatar.*	1144 Direct Conversion of CH_4 to Methanol on ZSM-5 from First-principles. *A. Arvidsson, Chalmers U., Sweden*
1210 1230		1328 Identification of deactivation mechanisms of supported nickel and cobalt catalysts for syngas conversion using transient kinetic methods *A Carvalho, U. Lille, France*	1079 Direct conversion of methane over NiO and MgO catalysts supported on SBA-15 *T. Kim, Chosun U. Gwangju, Republic of Korea.*
1230-1330	LUNCH		

Tuesday June 7, Continued

	Topic 1-Dry reforming **Session chairs:** Charlotte Ovesen, H. Topsøe, Denmark Estelle Vanhaecke, NTNU, Norway	**Topic 2 – FT Co catalysts** **Session chairs:** Dragomir Bukur, Texas A&M, Qatar Edd Blekkan, NTNU, Norway	**Gas Hydrates, new concepts** **Session chairs:** Holli Garrett, Clariant, USA Hilde Venvik, NTNU, Norway
1330 1350	1168 Catalytic methane steam reforming at low temperature over Pd/CeO_2 in an electric field *R. Manabe, Univ. Waseda, Japan*	1234 The effect of thermal treatments on the characteristics of supported Cobalt FT catalysts *G. Kelly, Johnson Matthey, Billingham UK.*	Keynote 5 Arctic gas hydrates as unconventional energy *Jürgen Mienert, Centre for Arctic Gas Hydrate, UiT- The Arctic University of Norway, Tromsø*
1350- 1410	1048 Dry reforming of CH_4 on different supported Co catalysts *A. Erdöhelyi U. Szeged, Hungary*	1304 SMSI effects in CoRu/TiO_2 catalysts and consequences on the catalytic performance for FTS *A Martinez, ITQ, Valencia, Spain.*	
1410- 1430	1288 Knowledge extraction for dry reforming of methane from past publications using data mining tools *R. Yildirim, Bogazici U. Istanbul, Turkey*	1100 CO hydrogenation on cobalt-based FT catalysts: chlorine poisoning reveals the nature of the most active sites. *A Paredes-Nunez, U. Lyon-CNRS, France*	1295 The Internal Combustion Engine as a Natural Gas Reformer: Operating Conditions Proposed by Numerical Optimization. *H. Gossler, KIT, Karlsruhe, Germany*
1430- 1450	1259 Chemical loop dry reforming of methane with Ni-Ceria based catalysts *A. Löfberg, U. Lille - CNRS, France*	1317 Fischer-Tropsch Synthesis: Poisoning Studies for Co and Fe catalysts *B. Davis, U. Kentucky, US*	1027 Preparation of Co-Mn/TiO_2 catalysts for C_2-C_4 olefins production *F. Shayegh, RIPI, Tehran, Iran*
1450- 1520	COFFEE BREAK		
	Topic 5 – Energy , H_2 **Session chairs:** Peter Pfeifer, KIT, Germany Maria Victoria Gil Matellanes, NTNU	**Topic 2 – FT light olefins** **Session chairs:** Sebastian Kuld, H. Topsøe, Denmark Selene H. Morejudo, Coorstek, Norway	**Topic 6 – Techno-Economic** **Session chairs:** Mikhail Sinev, Semenov Institute, Russia Tronn Hansen, Research Council of Norway
1520- 1540	1231Production of Hydrogen and Graphene by Methane Decomposition on Ni-Cu/Biomorphic Carbon Catalysts *A Monzón Bescos, U. Zaragoza, Spain*	1171 Size and Promoter Effects in Supported Iron Fischer-Tropsch Catalysts: Experiment and Theory *J. Xie, Utrecht University, the Netherlands*	1002 New potentialities for utilization of associated petroleum gases in power generation and chemicals production *V. Arutyunov, Semenov Institute of Chemical Physics, Moscow, Russia*
1540- 1600	1239 Photocatalytic steam reforming of methane over platinum-loaded lanthanum-doped sodium tantalate photocatalysts prepared by a flux method *A Yamamoto, Kyoto U. Japan*	1110 Catalytic synthesis of light olefins and alkanes over FeOx/Anodic Alumina Oxide/Aluminum cartridges *R. Lødeng, SINTEF, Norway*	Keynote 6 (1311) Techno-economic Analysis of Individual and Integrated Oxidative Coupling of Methane processes *H.R. Godini, Berlin TU, UniCat BASF, Berlin, Germany*
1600- 1620	1145 Chemical looping steam reforming with *in-situ* CO_2 capture over CaO-based sorbents and NiO-based oxygen transfer materials: Generation of high-purity H_2 in a single step *A Lemonidou, Aristotle U. Thessaloniki, Greece*	1258 Carbon Deposition in Iron Catalyzed Production of Lower Olefins from Synthesis Gas: Effect of Activation Conditions *A.C.J. Koeken, Dow, The Netherlands*	
1700- ...	**EXCURSION TO SOMMARØY DEPARTURE 17:00**		

Wednesday June 8 09:00 – 10:00, Award Lecture:

Professor Xinhe Bao,

Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China

New horizons in C_1 chemistry

Session Chairs
Krijn de Jong, Utrecht University, The Netherlands
Anders Holmen, NTNU, Norway

1000-1030	COFFEE BREAK		
	Topic 1 - Biosyngas **Session Chairs** Victor Texeira, U. Federal Rio de J., Brazil Bjørnar Arstad, SINTEF, Norway	**Topic 2 - FT catalysis** **Session Chairs** Philip Gibson, Sasol, South-Africa Rune Myrstad, SINTEF, Norway	**Topic 3 – OCM, plasma** **Session Chairs** Claude Mirodatos, IRCELYON, France Unni Olsbye, Univ. Oslo, Norway
1030-1050	1132 Steam reforming of toluene, methane and mixtures over Pt/Al_2O_3 and $Pt/CeO_2/Al_2O_3$ catalysts *F. Noronha, National Institute of Tecnology, Rio de Janeiro, Brazil*	1182 Structure–Performance Relationships for Carbon Deposition in Iron Fischer-Tropsch Catalysts *J. Xie, U. Utrecht, The Netherlands*	Keynote 7 (1177) Effective Plasma Process for Methane Direct Conversion to Acetylene. *D.H. Lee, Korea Institute of Machinery and Materials, Daejeon, Republic of Korea*
1050-1110	1026 Catalytic reforming of biomass gasification tars with bi- and trimetallic catalysts optimized with organosilane precursorss *V. Claude, U. Liege, Belgium*	1280 Development of nitrogen-rich mesoporous carbon supported iron-based catalysts for highly efficient FT *N, Tsubaki, U Toyama, Toyama, Japan*	
1110-1130	1207 Syngas production by means of biogas oxy-CO_2 reforming using Pt and Rh catalysts *F. Bimbela, U Navarra, Pamplona, Spain*	1320 Process intensification and simplification as key element towards decentral fuel production *P. Pfeifer, KIT Karlsruhe, Germany*	1169 Dry reforming of methane by the combination of non-thermal plasma and catalysis *C. Batiot-Dupeyrat, U. Poitiers, France*
1130-1150	1149 Structured nanocomposite catalysts of biofuels reforming into syngas: design and performance. *V. Sadykov, Boreskov Institute of Catalysis, Novosibirsk, Russia*	1000 Commercial roll-out of a smaller scale GTL technology. *N. Hargreaves, Velocys, Milton Park, UK*	1136 Oxidative coupling of methane over polyoxometalate supported catalysts in an electric field at low T. *S. Ogo, Waseda U., Tokyo, Japan*
1150-1210	1260 A kinetic study of Catalytic Partial Oxidation and Steam Reforming of Acetic Acid over Rh-supported catalysts *A Beretta, Politecnico di Milano, Italy*	1313 Intensification of the FTS through an highly conductive structured packed-bed reactor: a pilot-scale *C. Visconti, Politecnico di Milano, Italy*	1264 RedOx Behaviour and Catalytic Performance of $NaWMn/SiO_2$ Mixed Oxide in OCM *M. Sinev, Semenov Institute of Chemical Physics, Moscow, Russia*
1210 1230	1299 Synthesis gas production from glycerol with low steam/carbon ratio. *M. Menéndez, U. Zaragoza, Spain*	1064 Hydrocracking under Fischer-Tropsch conditions: on the distinct reactivity of paraffin and α-olefin primary products N. *Duyckaerts, Max Planck Institut für Kohlenforschung, Mülheim, Germany*	1037 Way to Improve Performance of OCM with Catalysts of Different Properties *W. Liang, SABIC, Houston, US*
1230-1330	**LUNCH**		

Wednesday June 8, Continued

	Topic 1 – Steam ref., CPO **Session Chairs** James J Spivey, LSU, US Evgeniy Redekop, Univ. Oslo, Norway	**Topic 2 – FT catalysis** **Session Chairs** Heiko Oosterbeek, Shell, the Netherlands Erling Rytter, NTNU/SINTEF, Norway	**Topic 6 – NG processes** **Session Chairs** Hamid Reza Godini, TU Berlin, Germany Jannike Solsvik, NTNU, Norway
1330 1350	1151 Production of Hydrogen Enriched Syngas by Combined CO_2-Steam Reforming of Methane Over The Polymetallic Co-based Catalysts. *S. Itkulova, Sokolsky Institute, Almaty, Kazakhstan*	1088 Advances in Fischer-Tropsch technology at Shell *G.L. Bezemer, Shell Global Solutions, Amsterdam, The Netherlands*	990 Economically feasible small-scale GTL technology by INFRA Technology. Journey from laboratory to an industrial plant *V.Z. Mordkovich, INFRA Tech., Russia*
1350-1410	1180 Steam Reforming of LPG over $Ni/CeZrO_2/Al_2O_3$ catalysts *F. Noronha, Instituto Nacional de Tecnologia. Rio de Janeiro, Brazil*	1256 Metal-support interactions in Co-Al_2O_3 model catalysts for FTS *A Petersen, U. Cape Town, South-Africa*	1303 Global solution for mercury removal in saturated wet gas streams: from rational material design to innovative process issues. *A Hugon, IFPEN, Solaize, France*
1410-1430	1205 Co-Mn catalysts for Fischer-Tropsch production of light olefins E. Østbye Pedersen, NTNU, Norway	1341 *In-situ* thermal stability and reactivity investigation of Co-based nanostructures by environmental TEM *S. Moldovan, IPCMS, Strasbourg U, France*	1162 Synthesis and characterization of advanced nanomaterials for hydrogen sulfide removal in gas processing. *V. Vicentini, Clariant, Brazil*
1430-1450	1228 Catalyst Development and Reactor Design for Catalytic Partial Oxidation of Natural Gas to Produce Synthesis Gas *S. Kado, Chiyoda Corporation, Japan*	Keynote 8 Stability of CO hydrogenation catalysts *M. Claeys, U. Cape Town, South Africa.*	1221Membrane-Integrated Systems for biogas separation *G. Barbieri, ITM-CNR, Rende, Italy*
1450-1510	1167 Steam CO_2 Reforming of CH_4 over $La_{1-x}Sr_xNiO_3$ Perovskite Catalysts *G.H. Hong, KIST, Republic of Korea*		1319 Novel ionic liquid technology for mercury removal *H. Garrett, Clariant, Louisville, US*
1510-1540	COFFEE BREAK		
	Topic 5 – SNG, combust., H_2 **Session chairs** Anne-Cécile Roger, U Strasbourg, France Jia Yang, SINTEF, Norway	**Topic 2 – FT Co catalysis** **Session chairs** Burtron Davis, U. Kentucky, US Nikos Tsakoumis, NTNU, Norway	**Topic 4 – Ethane , propane** **Session chairs** Randall Meyer, ExxonMobil, USA Anders Holmen, NTNU, Norway
1540-1600	1174 Understanding Aging Processes during Bio-Syngas Methanation for Synthetic Natural Gas Production *C. Mirodatos, IRCELYON-CNRS-UCBL Lyon, France*	0993 Fischer-Tropsch catalyst deactivation in commercial operations *A P Steynberg, Velocys, Plain City, US*	1063 Molecular level insight of selective oxidation of ethane using a micropore of crystalline $Mo_{29}V_{11}O_{112}$ as a catalysis field *W. Ueda, U. Kanagawa, Yokohama, Japan*
1600-1620	1031 Methane light-off simulation for catalytic converter application *N. Sadokhina, Chalmers U., Göteborg, Sweden*	1005 Effects of ordered mesoporous Co_3O_4 structures incorporated with irreducible metal oxides for an enhanced activity of FTS *J.W. Bae, U. Sungkyunkwan, Rep. of Korea*	1238 Influence of promotors in defining catalytic activity and stability quantitatively for oxychlorination process *E. Fenes, NTNU, Trondheim, Norway*
1620-1640	1143 Low-Temperature Catalytic Combustion of Methane Studied by *In Situ* XAFS *J. Nilsson, Chalmers U., Sweden*	1071 Steric effects in the Fischer-Tropsch synthesis over cobalt nanoreactors *V. Ordomsky, U. Lille, France*	Keynote 9 (1247) Selective C-H Bond Activation by Supported Pt_1Zn_1 Nanoparticle Alloys during the Catalytic Dehydrogenation of Ethane *F. H. Ribeiro, Purdue U, West Lafayette, US*
1640-1700	1318 Production of pure H_2 through CH_4 oxy-reforming process coupled with Pd-dense membrane reactor *F. Basile, U. Bologna, Bologna, Italy*	1223 Hydrothermal resistance of alumina-supported FT catalysts: mechanism of the alumina transformation and identification of sensitive sites *J. Abi Aad, IFPEN-UPNC, France*	
1700-1900	POSTER SESSION w/refreshments		
2000	**CONFERENCE DINNER**		

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

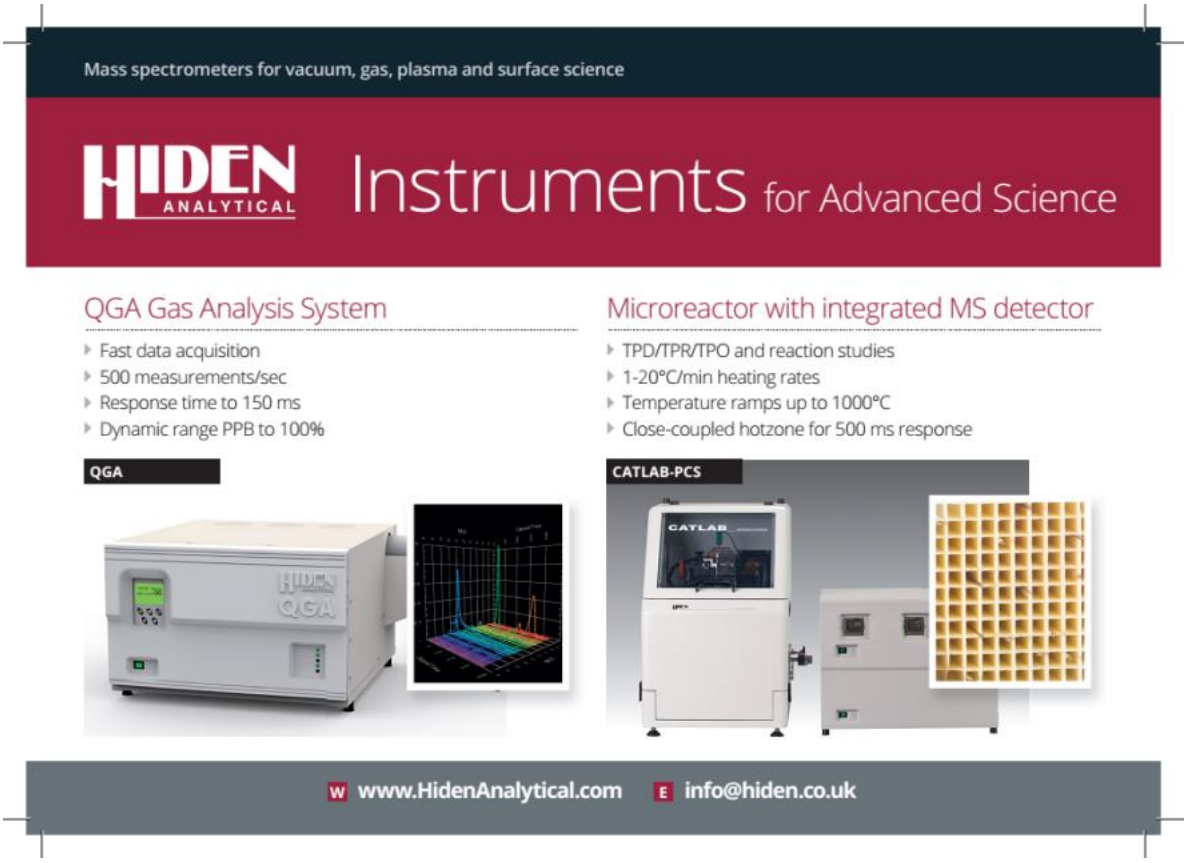
Session Chairs

Gabor Kiss, ExxonMobil

De Chen, NTNU, Norway

1000-1030	COFFEE BREAK		
	Topic 5 – SNG, combust., H_2 **Session chairs** Reinhard Schomäcker TU Berlin, Germany Ingeborg-H. Svenum, SINTEF, Norway	**Topic 2 – MTX, FTS** **Session chairs** Gary Jacobs, U. Kentucky, US Eleni Patanou, NTNU, Norway	**Topic 4 – Olefins, SSITKA** **Session chairs** Olaf Deutschmann, KIT, Germany Yanying Qi, NTNU, Norway
1030-1050	1067 First-principles microkinetic modeling of CH_4 oxidation over PdO(101) *M. Van den Bossche, Chalmers U, Göteborg, Sweden*	1023 Influence of post-synthetic treatments on unidirectional ZSM-22 zeolite catalyst: Towards improved clean gasoline catalytic process *P. del Campo, Univ. Oslo, Norway*	1250 Supported metal oxide catalysts for natural gas upgrading: Synergistic effect at sub-monolayer coverage to boost productivity toward olefins *Joseph Grant, UW Madison, US*
1050-1110	1187 Upgrade of substitute natural gas (SNG) via CO_2 hydrogenation – an *in situ* perspective *N. Fischer, U. Cape Town, South-Africa*	1141 Characterization and studies of Si and Brønsted site developments in SAPO-18 and SAPO-34 during and after hydrothermal treatment. *B.Arstad, SINTEF*	1099 Direct 1,3-butadiene production out of n-butane and butenes in a two-zone fluidized bed reactor with Mo based catalysts. *J. Rischard, KIT, Karlsruhe, Germany*
1110-1130	1191 Improve the Stability of Ni-$Ce_{0.8}$ $Sm_{0.2}$ $O_{1.9}$ as the anode of a CH_4 fuelled solid oxide fuel cell by Sn doping *Yongdan Li, Tianjin U. Tanjin, China*	1074 Highly active and stable Fischer-Tropsch catalysts obtained through unconventional Metal-Organic Framework mediated synthesis *F. Kapteijn, TU Delft, The Netherlands*	1322 Multi scale kinetics for the selective oxidation of propane to acrylic acid: Multi-route mechanism *C. Sprung, Fritz-Haber Institut, Germany*
1130-1150	1209 The effect of catalyst pellet size on nickel carbonyl-induced particle sintering under low temperature CO methanation. *J. Barrientos, KTH, Stockholm, Sweden*	*Keynote 10* (1092) Development of commercial type cobalt Fischer-Tropsch catalysts. *P. Gibson, Sasol Group Technology, Sasolburg, South Africa*	1307 Oligomerization of ethene with nickel containing beta zeolite at high pressure. *M. Kømurcu,. Oslo U., Norway*
1150-1210	1291 Catalytic Hydrogenation of Carbon Dioxide over Supported Nickel on Macro-/Mesoporous Titania-Alumina *S. Ernst, TU Kaiserslautern. Germany*		1332 The Use of Multicomponent SSITKA as a Tool to Study the Reaction Mechanism in CO hydrogenation over Cobalt Catalysts *Jia Yang, NTNU/SINTEF, Norway*
1220-1250	***CLOSING CEREMONY***		
1300-1410	LUNCH		

NGCS11 Exhibitors – located just outside the conference rooms



Poster session I - Monday June 6 18:00 at Quality Hotel Saga

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. Hettel[1], C. Antinori[2], O. Deutschmann[1,2]
[1]Karlsruhe Institute of Technology (KIT), Institute for Chemical Technology and Polymer Chemistry, Engesserstr. 20, 76128 Karlsruhe, Germany
[2]Karlsruhe Institute of Technology (KIT), Institute of Catalysis Research and Technology, Kaiserstr. 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-CO_2 reforming of methane
S. Jo[1], Y. Park[2], Y.C. Kim[3]
[1] Department of Advanced Chemicals Engineering, Chonnam National University, 77 Yongbong-ro Gwangju 61186 Republic of Korea
[2] Faculty 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. Kulchakovsky[1], Eduard B. Mitberg[1, 2],Vadim S. Ermolaev[1, 2], Ilya S. Ermolaev[1, 2], Igor S. Solomonik[1, 2], Vladimir Z. Mordkovich[1, 2]
[1]Technological Institute for Superhard and Novel Carbon Materials, Tsentralnaya ul. 7a, 142190 Troitsk, Moscow, Russia
[2]NFRATechnology Ltd., Mokhovaya ul. 11 bld. 3, 125009 Moscow, Russia

1077 Study of the performance of catalysts derived from hydrotalcite in dry reforming of methane
Débora M. Bezerra[1], Alessandra F. Lucrédio[1], Elisabete M. Assaf[1]
[1]Universidade 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. Dossumov[1], G.Y.Yergazyieva[1], L.K.Myltykbayeva[2], D.H.Churina[2], Z.A. Mansurov[1]
[1]The Institute of Combustion Problems, 172 Bogenbai batyr str., Almaty 050012, Kazakhstan
[2]Al-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 CeO_2
Ananda Vallezi Paladino Lino[1], Elisabete Moreira Assaf[2] José Mansur Assaf[1]
[1]Universidade Federal de São Carlos- Engenharia Química, Via Washington Luis, km 235, São Carlos- São Paulo, Brazil
[2]Instituto de Química de São Carlos - USP

1085 A highly dispersed and anti-coking Ni/SiO_2 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]
[1]Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-8601, Japan
[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-Díez[1,2], C. Pevida[2], F. Rubiera[2], D. Chen[1]
[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. Avci
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. Neto2, F.B. Noronha[2], L.V. Mattos[1]
[1]Fluminense Federal University, Rua Passo da Pátria 156, Niterói, 24210-240, Brazil
[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[3], A.-C. Roger[3], O. Smorygo[4],
[1] Boreskov Institute of Catalysis SB RAS, Lavrentieva, 5, 630090, Novosibirsk, Russia
[2] Novosibirsk State University, Pirogova, 2. 630090, Novosibirsk, Russia
[3]Unversity of Strasbourg, Strasbourg, France
[4] Institute of Powder Metallurgy, Minsk, Belarus

1137 Catalytic biomass gasification
Yu. Kosivtsov, Yu. Lugovoy, K. Chalov, E.Sulman, A. Stepacheva*
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 Enviroments, 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. Nurmakanov[1], S.S. Itkulova[1]
[1] D.V. Sokolsky Institute of Fuel, Catalysis and Electrochemistry, 142, Kunayev str., Almaty, Kazakhstan

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. Ordomsky,[1] A. Y. Khodakov,[1] D. Curulla-Ferre,[2] C. Drouilly[2]
[1]. Unité de catalyse et de chimie du solide, UMR 8181 CNRS, Université Lille 1, Sciences et Technologies, Bât. C3, Cité Scientifique, 59655 Villeneuve d'Ascq, France
[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

Jia Yang[2], Sara Boullosa Eiras[2,3], Rune Myrstad[2] , Peter Pfeifer[4], Hilde J. Venvik[1], Anders Holmen[1]
[1]Department of Chemical Engineering, Norwegian University of Science and Technology (NTNU), NO-7491, Trondheim, Norway.
[2]SINTEF Materials and Chemistry, N-7463 Trondheim, Norway.
[3]Present address: Yara International ASA, Innovation and R&D, PO Box 1130, N-3905 Porsgrunn, Norway.
[4]Forschungszentrum Karlsruhe, D-76344 Eggenstein-Leopoldshafen, Germany.

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

K. Dossumov, G.Y. Yergazyieva, Z.A. Mansurov, E.Tulibayev, O. Ahmet, Z.
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 Choi[1], Yong Hee Lee[1], Kwan-Young Lee[1,2]
[1]Department of Chemical & Biological Engineering, Korea University, Anam-dong, Seongbuk-gu, Seoul 02841, Republic of Korea
[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/SiO_2 Catalysts

Ranjia Li, Changchun Yu, Xiaosheng Wang, Lizheng 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, Beiijing 102249, China

1057 Zeolite deactivation by coking in the Methanol to Hydrocarbons process.

Daniel Rojo-Gama[1,2], Stian Svelle[1],Unni Olsbye[1], Pablo Beato
[1]Center for Material, Science and Nanotechnology (SMN), Chemistry Dpt. 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 Yang[1], Qihang Lin[2], Yoshiharu Yoneyama[1], Huilin Wan[2], Noritatsu Tsubaki[1]
[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. Glushenkov[1], G. Fuite[2], Th vd Meer[2], A. Kronberg[1]
[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. Marcos[1], Ana M. Mouad[1], Jose M. Assaf[2], Elisabete M. Assaf[1]**
[1]São Carlos Institute of Chemistry, University of São Paulo, Av. Trabalhador São Carlense, 400, 13560-970, São Carlos, São Paulo, Brazil.
[2]Department of Chemical Engineering, Federal University of São Carlos, São Carlos, SP, Brazil

1089 Kinetics of reduction of the Co-Ru-Al_2O_3 Fischer-Tropsch catalysts investigated by thermogravimetric method

O.A. Kungurova [1,2,3], N.V. Shtertser[1,2], E.G. Koemets [1,2], S.V. Cherepanova[2], A.A. Khassin [1,2]
[1]Research and Educational Center for Energy Efficient Catalysis in Novosibirsk National Research University, 2, Pirogova Str., Novosibirsk, 630090, Russia
[2]Boreskov Institute of Catalysis, 5, Pr. Lavrentieva, Novosibirsk, 630090, Russia
[3]Tomsk State University, 36 Lenina Ave., Tomsk, 634050, Russia

1095 Behaviour of lower strontium substituted $La_{1-x}Sr_xCoO_3$ perovskite catalyst during syngas conversion

M. Ao[1,2], G. H. Pham[1], V. Sage[2] and V. Pareek[1]
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1097 Effect of preparation variables on bimetallic Pt-Ir catalysts for the hydroisomerization of Fischer-Tropsch waxes

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1101 Determination of formate decomposition rates and relation to product formation during CO hydrogenation over supported cobalt.

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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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1126 Pore filled Co/Al_2O_3 catalysts exhibit higher C5+ and lower light gas selectivities

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1130 Structural Characterization and Long-term Performance Understanding of SAPO Industrial Catalyst Materials

***G**.N.Kalantzopoulos[1], F.Lundvall[1], A.Hill[3], A.Lind[2], D.Wragg[1], B.Arstad[2] M.Attfield[3] and H.Fjellvåg[1].*
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1135 GtL process integration and intensification in microchannel reactors

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1140 Liquid-phase methanol synthesis using a polymer stabilized catalysts

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1185 Formation of nitrogen containing compounds from ammonia co-fed to the Fischer-Tropsch synthesis

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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

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1022 Study on the Conversion of Methane to Acetylene using Rotating Arc Technology

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1034 Activation of methane with N_2O on M/Ga/H-ZSM-5 (M-transition metal) catalysts: influence of acidity on the formation of complex active sites

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1043 Complementary effect of non-thermal plasma-catalysis hybrid system on methane complete oxidation over various catalysts

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1087 Identifying and limiting the main source of the carbon oxide during OCM in the presence of $Mn_xO_y - Na_2WO_4/SiO_2$ catalyst

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1107 Oxidative coupling of methane on thermostable $NaWO_4$-Mn supported on hydroxyapatite – coated SiO_2 catalyst

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1108 Characterization of Metal-Exchanged Zeolites for Direct Conversion of Methane to Methanol (DCMM)

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1114 Plasma-Assisted Methane Direct Conversion over Metal Oxides

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1203 The Effects of Process Parameter Variations in Direct Non-oxidative Conversion of Methane (non-OCM) by RF Plasma

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1224 The effect of surface basicity on the C_2^+ formation yield over an equimolecular mixture of MgO and rare earth M_2O_3 (M=La, Nd, Sm, Gd, and Fe)

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1225 Single Bubble Dynamics in Hydraulic Ram Reactor

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1269 Catalytic Methane Partial Oxidation in Supercritical Water

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

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1310 Reaction and Reactor Engineering for an Individual and Integrated Oxidative Coupling of Methane process

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1327 Low-temperature oxidative coupling of methane using carbon dioxide in an electric field over Ca-doped $LaAlO_3$ catalysts

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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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Topic 6 - Techno-Economic Aspects

1062 An Experimentally Verified Approach to Design Efficient Gasoline and Diesel Fuels Surrogates via Computation and Property Integration Methods

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1164 Economic Analysis of GTL-FPSO Process *via* Fischer-Tropsch Synthesis Reactor with Iron and Cobalt based Catalysts

Gi Hoon Hong[1,2], Sung Soo Lim[1,3], Jae-sun Jung[1,2], Jae-suk Lee[1,2], Eun-hyeok Yang[1,2], Youg Su Noh[1,2], and Dong Ju Moon[1,2,3,4]*
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1218 Mid-temperature H_2S removal with nanostructured MeO_x/SBA-15 sorbents (Me: Zn and/or Fe)

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1293 Low-scale syngas production in volumetric matrix reformers

O.V. Shapovalova, A.I. Tarasov, K.A. Timofeev, V.S. Arutyunov, V.M. Shmelev
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1346 The Flarecatcher: A Mobile Associated Gas Processing System for Flare Mitigation

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1344 Ionic Liquidic Zeolites for Methane Capture from Low Grade Sources

Gang (Kevin) Li[1], Jin Shang[2], Qinfen Gu[3], Thomas Saleman[1], Jeffrey Z. Liu[4], Paul A. Webley[2], Eric F. May[1].
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1345 Feasibility analysis of dimethyl ether (DME) derived from natural gas as a diesel substitute in compression ignition (CI) engine

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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*
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1206 Catalytic partial oxidation of methane to syngas using Co-based catalysts
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Grupo Reactores Químicos: Catalíticos y de Polimerización, Departamento de Química Aplicada, Universidad Pública de Navarra, Edificio de Los Acebos. Planta 2, Campus de Arrosadía, 31006 Pamplona, Spain

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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State Key Laboratory of Physical Chemistry of Solid State Surfaces, National Engineering Laboratory for Green Chemical Productions of Alcohols-Ethers-Esters, Fujian Province Key Laboratory of Theoretical and Computational Chemistry, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen, Fujian 361005, P. R. China

1232 Preparation and characterization of sinter-resistant Rh-CeO_2/SiO_2 catalyst for methane partial oxidation to syngas
Wei-Zheng Weng, Yi-Hua Xie, Fang-Fang Zheng, Ji-Chun Wan, Yan-Ping Zheng, Chuan-Jing Huang, Hui-Lin Wan
State Key Laboratory of Physical Chemistry of Solid Surfaces, National Engineering Laboratory for Green Chemical Productions of Alcohols, Ethers and Esters, Department of Chemistry, College of Chemistry and Chemical Engineering, Xiamen University, Xiamen 361005, P. R. China

1244 Material degradation by metal dusting corrosion on instrumentation used in natural gas conversion technologies
X. Guo[1], *P.V.D.S. Gunawardana*[1], *J. Hwang*[1], *J.C. Walmsley*[2], *D. Chen*[1], *H.J. Venvik*[1]
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1246 Intermetallides as the Catalysts for Carbon Dioxide Reforming of Methane
L. Arkatova[1], *N.G. Kasatsky*[1], *Yu.M. Maximov*[1], *O.V. Pakhnutov*[2], *A.N. Shmakov*[3]
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1252 LaNiO3 perovskite as catalytic precursor for Partial Oxidation of Methane: Effect of synthesis route
Roberto B. S. Jr[1]*., Raimundo C. R. Neto*[2], *Fábio B. Noronha*[2], *Soraia T. Brandão*[1]
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1278 Dry reforming of methane over hydrotalcite-derived catalyst: Effect of Ni loading
A.L.A. Marinho[1], *R.C.R. Neto*[2], *E.L. Schultz*[3], *I.P. Soares*[3], *F.B. Noronha*[2], *L.V. Mattos*[1]
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1283 Dry and Combined CO_2 –Steam Conversion of Methane into Syngas over Co-Based Catalysts Promoted with Rare-Earth Metals
A.I.Tumabaeva, S.S. Itkulova, S.K. Kussanova, Y.A.Boleubayev, Zh.Y. Kenzhebulatov
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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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Catalysis, Molecular Separations and Reactor Engineering Group (CREG)
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1314 Tracking of carbon species during dry reforming of methane on different Ni/ZrO_2 catalysts

M. Németh[1], J. Károlyi[1], D. Srankó[1], F. Somodi[1], Gy. Sáfrán[2], I. Sajó[3], A. Horváth[1]
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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 Brønsted 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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hte GmbH – the high throughput experimentation company, 69123 Heidelberg, Germany

1163 R&D Status on KIST GTL-FPSO Process for the Production of Offshore Clean Fuels

Dong Ju Moon[1,2], Jae-Sun Jung[1,2], Eun-hyeok Yang[1,2], Jae Suk Lee[1,2], Gi Hoon Hong[1,2]*
Sung Soo Lim[1], Yang Su Noh[1], Sang Yong Lee[1], Na Yang Kim[1], Ji In Park[1], Janardhan L. Hodala[1], Jong Tae Chung[3], and Young Sik Moon[4]
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1166 Hydrotalcite supported Co catalyst with bimodal structure for Fischer-Tropsch Synthesis (FTS)

Jae-Sun Jung[1,2], Jae Suk Lee[1,2], Gi Hoon Hong[1,2], Eun-hyeok Yang[1,2], Sung Soo Lim[1,3], Young Su Noh[1,4] and Dong Ju Moon[1,2,3]*
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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-Al_2O_3 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 CO_2-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 ZrO_2-promoted Co/Al_2O_3 catalysts. Comparison between ZrO_2-Al_2O_3 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-Al_2O_3

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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_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_2/Al_2O_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_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 CO_2 to methane in a pressurized fluidized bed reactor

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1032 Catalytic combustion of methane over Pd/Al_2O_3 modified with alkaline metals

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1051 Methane combustion activity of Pd nanoparticle supported on microporous TiO_2: Effect of strong metal support interaction

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1070 Ag/SiO_2 and Cu/SiO_2 cogelled xerogel catalysts for benzene combustion and 2-butanol dehydrogenation

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1072 Copper-calcium phosfate 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-Al_2O_3 catalyst for synthetic natural gas production
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1122 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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1251 Effect of sulfur poisoning of alumina supported noble metal catalysts for steam reforming of methane
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1281 Aluminium open cell foams as efficient support for CO_2 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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