

PROGRAMME

27 – 29 May 2019

Festung Marienberg, Würzburg/Germany

Jahrestreffen Reaktionstechnik 2019 gemeinsam mit der **Fachgruppe Mehrphasenströmungen**

Annual Meeting on Reaction Engineering 2019
in cooperation with the subject division
Multiphase Flows

www.processnet.org/REAKT2019



GENERAL INFORMATION

VENUE

Tagungszentrum
Festung Marienberg
97082 Würzburg

INTERNET ACCESS

WiFi access is available for free throughout the conference venue. As WiFi can be used by all participants, a loss of efficiency is possible.

Network: **Tagung 2**
Password: **a24kn7b19o**

BOOK OF ABSTRACTS

Book of Abstracts (lectures and posters) is available online for participants of the meeting "Jahrestreffen Reaktionstechnik 2019 gemeinsam mit der Fachgruppe Mehrphasenströmungen": www.processnet.org/REAKT2019_BOA

SOCIAL PROGRAMME

Tuesday, 28 May 2019

19:00 Conference Dinner at Würzburg City Beach (Würzburger Stadtstrand)

Address: Ludwigkai, near Löwenbrücke, directly situated at the Main river.

A delicious barbecue and some chilled music awaits you. For special entertainment, a magician will enchant you. Enjoy the summer feeling while you have further interesting discussions with your peers.

Last minute dinner tickets can be bought at the conference desk for 65,- EUR.

The ticket includes all food and beverages as well as entertainment.



OFFICE HOURS CONFERENCE DESK

Monday, 27 May 2019 09:00 – 20:00
Tuesday, 28 May 2019 08:30 – 18:00
Wednesday, 29 May 2019 08:30 – 14:30

CONTACT

Chereén Semrau
DECHEMA e.V.
Phone: +49 (0)69 7564-651
E-mail: chereen.semrau@dechema.de

Andrea Köhl
DECHEMA e.V.
Phone: +49 (0)69 7564-235
E-mail: andrea.koehl@dechema.de

CONTENTS

PLENARY LECTURES	4
SCIENTIFIC COMMITTEE	4
SPONSORS	5
EXHIBITORS	5
EXHIBITION AND POSTER PLAN	7
PROGRAMME AT A GLANCE	8
LECTURE PROGRAMME	10
Monday, 27 May 2019	10
Tuesday, 28 May 2019	12
Wednesday, 29 May 2019	16
POSTER PROGRAMME	18
LIST OF PARTICIPANTS	30

PLENARY LECTURES

Energetic efficiency of drop breakup and mass transfer accompanied by chemical reactions in liquid-liquid systems

Prof. Jerzy Baldyga, Warsaw University of Technology/PL

Solid oxide steam-CO₂ co-electrolysis: from theoretical analysis to the cell design aspects

Prof. Karel Bouzek, University of Chemistry and Technology Prague/CZ

Contribution of reaction engineering to the long-term reduction of CO₂- emissions by process innovation

Dr. Kai Ehrhardt, BASF SE, Ludwigshafen/D

Micro- and macrokinetics in electrochemical cells

Prof. Ulrike Krewer, University of Technology Braunschweig/D

SCIENTIFIC COMMITTEE

Prof. David W. Agar	TU Dortmund
Dr. Oliver Bey	BASF SE, Ludwigshafen
Dr. Jonathan Bloh	DECHEMA-Forschungsinstitut (DFI), Frankfurt am Main
Prof. Markus Busch	TU Darmstadt
Prof. Roland Dittmeyer	Karlsruhe Institute of Technology (KIT), Karlsruhe
Dr. Kai Erhardt	BASF SE, Ludwigshafen
Prof. Udo Fritsching	University of Bremen
Prof. Olaf Hinrichsen	TU München
Prof. Elias Klemm	University of Stuttgart
Maximilian Kotzur	DECHEMA e.V., Frankfurt am Main
Dr. Ricarda Leiberich	Lanxess Deutschland GmbH, Leverkusen
Prof. Jörg Sauer	Karlsruhe Institute of Technology (KIT), Karlsruhe
Prof. Thomas Turek	TU Clausthal
Dr. Olaf Wachsen	CLARIANT Produkte Deutschland GmbH, Frankfurt am Main
Prof. Gregor Wehinger	Representative of NaWuReT, TU Clausthal

SPONSORS

GOLD SPONSOR

CLARIANT

Clariant is a globally leading specialty chemicals company, based in Muttens near Basel/Switzerland. On 31 December 2017 the company employed a total workforce of 18 135. In the financial year 2017, Clariant recorded sales of CHF 6.377 billion for its continuing businesses. The company reports in four Business Areas: Care Chemicals, Catalysis, Natural Resources, and Plastics & Coatings. Clariant's corporate strategy is based on five pillars: focus on innovation and R&D, add value with sustainability, reposition portfolio, intensify growth, and increase profitability.

www.clariant.com

BRONZE SPONSOR



Fluitec mixing + reaction solutions AG is an established company specialized in in-line mixing and reaction technology. The recent developed reactor concept enables a safe scale-up of fast and highly exothermic reactions from laboratory to production scale. In addition to static mixers and static mixer heat exchangers, Fluitec's product range also includes calculations and simulations (mass transfer, reaction control, CFD calculations, etc.) as well as the construction of more complex reactor assemblies with dosing technology.

www.fluitec.ch

EXHIBITORS



We are specialists for measuring technologies and analytical instruments, contract analyzes and method developments for comprehensive characterization of dispersions, particles, powders and porous solids: particle size 0.01 3500 µm and dynamic image analysis, BET surface area and pore size distribution, chemisorption and temperature programmed reaction, breakthrough sorption experiments (see: dynamicsorption.com), porosity, density, water vapor sorption, zeta potential, stability of original dispersions and more.

Magritek is leader in the design, manufacture and supply of benchtop NMR spectroscopy instruments. We will present the Spinsolve, a revolutionary multinuclear NMR benchtop spectrometer with a low weight of about 50 kg, which offers the highest sensitivity, resolution and stability. Spinsolve systems allow to quantify and identify sample composition, confirm reaction completions and determine molecular structure. The Spinsolve family comes with models at 43 MHz, 60 MHz and 80 MHz that are ideal for chemists in academia and industry.

www.magritek.com



Micromeritics Instrument Corporation (Georgia, USA) is a global provider of solutions for material characterization with market-leading instrumentation and application expertise in five core areas: density; surface area and porosity; particle size and shape; powder characterization; and catalyst characterization and process development. Contract testing is offered via the Particle Testing Authority.

www.micromeritics.de



Nanalysis Corp. manufactures compact, multinuclear bench-top Nuclear Magnetic Resonance (NMR) spectrometers aimed at proliferating the use of NMR in a number of fields, including pharmaceuticals, and reaction monitoring process control, etc.. Currently Nanalysis manufactures two products and fitting accessories: The NMRReady-60e and the NMRReady-60PRO. Accessories like the Flow-Kit, the Autosampler and many more are available. For more information on accessible, affordable and automatable high performance qualitative and quantitative NMR analysis please visit

www.nanalysis.com



Pressure Control Solutions B.V. is a young and innovative trading company with a continuously growing customer base in Northwestern Europe.

We specialize in pressure control products for the most demanding application requirements, such as reactors, catalysis or electrolysis, even with multi-phase or supercritical media.

Pressure Control Solutions is the authorized distributor for Equilibar®, LLC (US) products in Northwestern Europe and is located centrally in the Netherlands. For optimal service delivery in the German speaking markets, we have a dedicated and knowledgeable sales representative located in Germany. Matthias Bogar is looking forward to meet you in booth no. 4.

www.pressurecontrolsolutions.nl



REACNOSTICS is modeling, constructing and building chemical research reactors for the spatially resolved investigation of catalytic processes.

Our methodology comprises simulations and operando measurements of concentration & temperature profiles in combination with spectroscopic catalyst characterization.

By applying patented methods we provide insight in catalytic reactors during time on stream required for knowledge based optimization.

www.reacnostics.com



We are a leading company in the area of south Germany for measuring and control engineering founded in 1964. Our strength is measuring and controlling of gasses, liquids and steams in all pressure and temperature ranges. Our 45 competent and motivated employees with a high degree of reliability and flexibility will find out, together with our partners, the best solution for your requirements in research, development and industry. We support our innovative, high tech customers from the vacuum and semiconductor-, chemical and motor industry in the mechanical engineering as well as in the complete Research and development area. At our accredited DAkkS calibration laboratory nearly all instruments can be calibrated according to DIN17025.

www.wagner-msr.de



We are specialists for measuring technologies and analytical instruments, contract analyzes and method developments for comprehensive characterization of dispersions, particles, powders and porous solids: particle size 0.01 3500 µm and dynamic image analysis, BET surface area and pore size distribution, chemisorption and temperature programmed reaction, breakthrough sorption experiments (see: dynamicsorption.com), porosity, density, water vapor sorption, zeta potential, stability of original dispersions and more.

www.3p-instruments.com



- | | |
|---------------------------------|------------------|
| 1 CLARIANT | 5 REACNOSTICS |
| 2 Wagner Mess- und Regeltechnik | 6 3P Instruments |
| 3 Magritek | 7 Micromeritics |
| 4 Pressure Control Solutions | 8 Nanalysis GmbH |

PROGRAMME AT A GLANCE

Monday, 27 May 2019	
12:00	Registration
Room:	Wolfskeelstube
13:00	Welcome Address
13:10	Plenary Lecture Jerzy Baldyga
Chair:	E. Klemm
14:00	D. Hellmann
14:25	S. Gast
14:50	Coffee Break in Exhibition Area
Chair:	U. Fritsching
15:20	M. Weber
15:45	M. Grünwald
16:10	T. Wucherpfennig
Chair:	G. Wehinger
16:35	Short Presentations by the Exhibitors
17:00	Short Introduction of Poster Programme
17:15 – 19:30	Poster Party

Tuesday, 28 May 2019		
	Reaction Engineering	Multiphase Flows
Room:	Wolfskeelstube	Egloffsteinstube
09:00	Plenary Lecture Karel Bouzek	
Chair:	T. Turek	
09:50	Break for Room Change	
Session	Electrochemical Engineering I	Droplets and Sprays I
Chair:	T. Turek	U. Janoske
09:55	L. Wehrle	F. Preiss
10:20	Short Presentations of the Research Fellows	P. Ehrhard
10:45	Coffee Break in Exhibition Area	
Session	Methods and Dynamics	Particles
Chair:	R. Dittmeyer	H.J. Schmid
11:15	S. Wild	F. Rhein
11:40	M. Felischak	L. Pasternak
12:05	K. Rätze	J.F. May
12:30	S. Palkovits	J. Gomez Bonilla
12:55	Lunch Break in Exhibition Area	
Session	Electrochemical Engineering II	Droplets and Sprays II
Chair:	B. Etzold	P. Ehrhard
14:00	A. Ziogas	M. Stodt
14:25	E. Klemm	A. Graftschafter
14:50	T. Turek	B. Barwari
15:15	Break for Room Change	
15:30	Plenary Lecture Ulrike Krewer	
Chair:	B. Etzold	
16:20 – 17:35	Poster Discussions with Coffee and Snacks in Exhibition Area	
17:00 – 18:30	General Assembly of the Working Group Reaction Engineering	Member Assembly of the Working Group Multiphase Flows
19:00 – 23:00	Conference Dinner	

PROGRAMME AT A GLANCE

Wednesday, 29 May 2019		
	Reaction Engineering	Multiphase Flows
Room:	Wolfskeelstube	Egloffsteinstube
Session	Reactors and Monitoring	Bubbles
Chair:	H. Freund	M. Schlüter
09:00	B. Etzold	K. Haase
09:25	S. Bettermann	A. von Kameke
09:50	R. Hom	P. Kemper
10:15	H. Ridder	M. Neumann
10:40	Coffee Break in Exhibition Area	
Session	Processes	Bubbles
Chair:	G. Wehinger	O. Bey
11:10	A. Weiner	D. Merker
11:35	J. Eigenseer	S. Rüttinger
12:00	J. Fernengel	C. Bliatsiou
12:25	Break for Room Change	
12:30	Poster and Presentation Awards	
12:45	Plenary Lecture Kai Ehrhardt	
Chair:	O. Bey	
13:35	Closing	
13:45	End of Meeting and Lunch	

Monday, 27 May 2019

Conference Room: Wolfskeel

Session Chair: E. Klemm, University of Stuttgart/D

13:00 Welcome Address

13:10 **PLENARY LECTURE**
Energetic efficiency of drop breakup and mass transfer accompanied by chemical reactions in liquid-liquid systems
 J. Baldyga, Warsaw University of Technology/PL

KEYNOTE LECTURES

Session Chair: E. Klemm, University of Stuttgart/D

14:00 **Heterogeneously catalysed gas-liquid reaction in a novel gas-liquid-liquid slug flow capillary reactor**
 D. Hellmann¹; D. Agar²; ¹ TU Dortmund, Dortmund/D; ² TU Dortmund, Lehrstuhl für Chemische Verfahrenstechnik, Dortmund/D

14:25 **Investigation of gas-liquid reaction kinetics in homogeneous phase at the example of the oxidation of toluene**
 S. Gast¹; U. Tuttlies¹; U. Nieken¹; ¹ University of Stuttgart - Institute of Chemical Process Engineering, Stuttgart/D

14:50 Coffee Break in Exhibition Area

KEYNOTE LECTURES

Session Chair: U. Fritsching, University of Bremen/D

15:20 **Oxidation of cumene in bubble columns – Modeling fluid dynamics based on power input**
 M. Weber¹; ¹ INEOS Phenol GmbH, Gladbeck/D

15:45 **Modeling and simulation studies on the design and dimensioning of bubble column reactors**
 I. Rieth¹; M. Grünewald¹; ¹ Ruhr-Universität Bochum, Lehrstuhl für Fluidverfahrenstechnik, Bochum/D

16:10 **A Control strategy for production of biologics – From risk assessment to process validation**
 T. Wucherpfennig¹; ¹ Boehringer Ingelheim Pharma GmbH & Co. KG, Biberach/D

Session Chair: G. Wehinger, TU Clausthal/D

16:35 Short Presentations of the Exhibitors

17:00 Short Introduction of Poster Programme

17:15 Poster Party in Exhibition Area (17:15 – 19:30)

Our energy source for the future: APPRECIATION.



THIS IS CLARIANT: SPECIALTY CHEMICALS CREATING VALUE

We engage with the issues of the future. This approach is deeply rooted in our brand: we focus on appreciation – in all areas in which we are active. The result is innovative solutions to lower emissions, reduce raw material consumption, and create sustained added value. This is precious to us.

LECTURE PROGRAMME

Tuesday, 28 May 2019

Conference Room: Wolfskeel

Session Chair: T. Turek, TU Clausthal/D

09:00 **PLENARY LECTURE**
Solid oxide steam-CO₂ co-electrolysis: from theoretical analysis to the cell design aspects
 K. Bouzek, University of Chemistry and Technology Prague/CZ

09:50 Short Break for Room Change

Conference Room: Wolfskeel

ELECTROCHEMICAL ENGINEERING I

Session Chair: T. Turek, TU Clausthal/D

09:55 **Dynamic modeling of reversible solid oxide cells (rSOCs)**
 L. Wehrle¹; Y. Wang²; A. Banerjee³; N. Brandon³; O. Deutschmann¹; ¹ Karlsruhe Institute of Technology (KIT), Karlsruhe/D; ² Beijing Institute of Technology, Beijing/CN; ³ Imperial College London, London/UK

10:20 Short Presentations of the Research Fellows

10:45 Coffee Break in Exhibition Area

METHODS AND DYNAMICS

Session Chair: R. Dittmeyer, Karlsruhe Institute of Technology/D

11:15 **Catalyst performance studies for the direct DME synthesis from variable CO/CO₂/H₂ feeds**
 S. Wild¹; N. Delgado Otalvaro¹; D. Guse²; H. Karla¹; M. Kind²; S. Pitter¹; J. Sauer¹; ¹ Institute of Catalysis Research and Technology (IKFT), Karlsruhe Institute of Technology (KIT), Karlsruhe/D; ² Karlsruhe Institute of Technology, Institute of Thermal Process Engineering, Karlsruhe/D

11:40 **Forced Periodic Operation: Effect of shapes for two simultaneously imposed modulations**
 M. Felischak¹; D. Nikolic²; M. Petkovska²; C. Hamel³; A. Seidel-Morgenstern⁴; ¹ Otto-von-Guericke-Universität Magdeburg, Magdeburg/D; ² University of Belgrade, Belgrade/SRB; ³ Hochschule Anhalt, Köthen/D; ⁴ Otto-von-Guericke University and Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg/Germany, Magdeburg/D

12:05 **Analysis of a cyclically operated semi-batch reactor for the hydroformylation of long-chain olefins in a continuous production process under uncertain feed composition**
 K. Rätze¹; K. Sundmacher²; ¹ Otto-von-Guericke-Universität Magdeburg, Magdeburg/D; ² Max Planck Institute for Dynamics of Complex Technical Systems; Otto von Guericke University, Magdeburg/D

12:30 **Machine learning approaches for the prediction of oxygen evolution catalysts**
 S. Palkovits¹; ¹ RWTH Aachen University, Aachen/D

12:55 Lunch Break in Exhibition Area

LECTURE PROGRAMME

Tuesday, 28 May 2019

Conference Room: Wolfskeel

Session Chair: T. Turek, TU Clausthal/D

09:00 **PLENARY LECTURE**
Solid oxide steam-CO₂ co-electrolysis: from theoretical analysis to the cell design aspects
 K. Bouzek, University of Chemistry and Technology Prague/CZ

09:50 Short Break for Room Change

Conference Room: Egloffsteinstube

DROPLETS AND SPRAYS I

Session Chair: U. Janoske, University of Wuppertal (BUW)/D

09:55 **Comparison of μ -PIV flow pattern measurements and CFD simulation of high-pressure homogenizer orifices**
 P. Walzel¹; A. Bisten²; G. Schaldach¹; F. Preiss²; H. Karbstein²; ¹ TU Dortmund University - Department of Biochemical and Chemical Engineering, Dortmund/D; ² Karlsruhe Institute of Technology (KIT), Institute of Process Engineering in Life Sciences Chair of Food Process Engineering, Karlsruhe/D

10:20 **Zur flüssig/flüssig Pfropfenströmung und zum Stofftransport im Mikrokapillarreaktor**
 P. Ehrhard¹; I. Dittmar¹; C. Heckmann¹; ¹ TU Dortmund/D

10:45 Coffee Break in Exhibition Area

PARTICLES

Session Chair: H.J. Schmid, University of Paderborn/D

11:15 **Multidimensional separation by magnetic-seeded filtration: Modelling and experiment**
 F. Rhein¹; ¹ Karlsruher Institut für Technologie (KIT), Institut für Mechanische Verfahrenstechnik und Mechanik (MVM), Karlsruhe/D

11:40 **Analyse der Beschichtung freifallender Partikel**
 L. Pasternak¹; M. Sommerfeld²; ¹ Otto-von-Guericke-Universität Magdeburg, Halle/D; ² Otto von Guericke Universität Magdeburg/D

12:05 **Euler-Lagrange/DEM Model for the Simulation of Carbonate- Looping Process**
 F. Alobaid¹; J. May¹; A. Stroth¹; A. Daikeler¹; J. Ströhle¹; B. Eppel¹; ¹ TU Darmstadt/D

12:30 **CFD characterization of an improved design of downer reactor for particle rounding**
 J. Gomez Bonilla¹; Z. Jiang¹; A. Bück¹; J. Schmidt¹; W. Peukert¹; ¹ Institute of Particle Technology (LFG), Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen/D

12:55 Lunch Break in Exhibition Area

LECTURE PROGRAMME

Tuesday, 28 May 2019

Conference Room: Wolfskeel

ELECTROCHEMICAL ENGINEERING II

Session Chair: B. Etzold, TU Darmstadt/D

- 14:00 **Novel flexible electrochemical microreactor and its application to Kolbe electrolysis and Cation Pool / Flow method**
A. Ziogas¹; C. Hofmann¹; S. Baranyai²; P. Löb¹; G. Kolb¹; ¹ Fraunhofer IMM, Mainz/D; ² Hochschule Konstanz Technik Wirtschaft und Gestaltung (HTWG), Konstanz/D
- 14:25 **Optimizing Gas Diffusion Electrodes for High-Rate CO₂/H₂O Co-Electrolysis towards Formic Acid / Formate**
A. Löwe¹; D. Kopljar²; F. Bienen²; N. Wagner²; E. Klemm¹; ¹ University of Stuttgart - Institute of Chemical Technology, Stuttgart/D; ² German Aerospace Center (DLR), Stuttgart/D
- 14:50 **Experimental and Model-Based Characterization of Gas-Diffusion Electrodes for Oxygen Reduction**
T. Turek¹; U. Krewer²; I. Manke³; M. Paulisch³; P. Kunz⁴; U. Nieken⁴; C. Roth⁵; W. Schuhmann⁶; T. Vidakovic-Koch⁷; ¹ TU Clausthal, Clausthal-Zellerfeld/D; ² TU Braunschweig/D; ³ Helmholtz-Zentrum Berlin/D; ⁴ Universität Stuttgart/D; ⁵ Freie Universität Berlin/D; ⁶ Ruhr-Universität Bochum/D; ⁷ Max-Planck-Institut für Dynamik komplexer technischer Systeme, Magdeburg/D

15:15 Break for Room Change

Conference Room: Wolfskeel

Session Chair: B. Etzold, TU Darmstadt/D

- 15:30 **PLENARY LECTURE**
Micro- and macrokinetics in electrochemical cells
U. Krewer, University of Technology Braunschweig/D
- 16:20 **Poster Discussions with Coffee and Snacks in Exhibition Area (16:20 – 17:35)**

Conference Room: Wolfskeel

- 17:00 **General Assembly of the Working Group Reaction Engineering (17:00 – 18:30)**
- 19:00 **Conference Dinner at Würzburg City Beach (19:00 – 23:00)**

LECTURE PROGRAMME

Tuesday, 28 May 2019

Conference Room: Egloffsteinstube

DROPLETS AND SPRAYS II

Session Chair: P. Ehrhard, TU Dortmund/D

- 14:00 **Spray Characteristics of the SpraySyn-nozzle**
M. Stodt¹; L. Buss¹; J. Kiefer²; U. Fritsching³; ¹ Leibniz-Institut für Werkstofforientierte Technologien Bremen/D; ² Technische Thermodynamik, Universität Bremen/D; ³ Mechanische Verfahrenstechnik, Universität Bremen/D
- 14:25 **Continuous multiphase flow: Heterogeneously catalysed reactions combined with liquid-liquid extraction**
A. Graftschafter¹; M. Siebenhofer²; ¹ Graz University of Technology, Graz/A; ² Graz University of Technology, Institute of Chemical Engineering and Environmental Technology, Graz/A
- 14:50 **Displacement of adhering liquid droplets by air flow in a channel-flow and a flat plate boundary layer flow configuration**
B. Barwari¹; S. Burgmann¹; N. Janssen¹; M. Rohde¹; U. Janoske¹; ¹ Bergische Universität Wuppertal/D

15:15 Break for Room Change

Conference Room: Wolfskeel

Session Chair: B. Etzold, TU Darmstadt/D

- 15:30 **PLENARY LECTURE**
Micro- and macrokinetics in electrochemical cells
U. Krewer, University of Technology Braunschweig/D
- 16:20 **Poster Discussions with Coffee and Snacks in Exhibition Area (16:20 – 17:35)**

Conference Room: Egloffsteinstube

- 17:00 **Member Assembly of the Working Group Multiphase Flows (17:00 – 18:30)**
- 19:00 **Conference Dinner at Würzburg City Beach (19:00 – 23:00)**

(Programme is subject to change)

(Programme is subject to change)

Wednesday, 29 May 2019

Conference Room: Wolfskeel

REACTORS AND MONITORING

Session Chair: H. Freund, FAU Erlangen-Nürnberg/D

- 09:00 **Liquid core waveguide membrane microreactor in situ studies of V-substitution in heteropoly acid catalysts in biomass oxidation**
S. Ponce¹; B. Etzold¹; ¹ TU Darmstadt/D
- 09:25 **Digital Development and Application of 3D-printed Reactionware and Reactors for Emulsion Copolymerizations**
S. Bettermann¹; H. Moritz¹; W. Pauer¹; ¹ University of Hamburg/D
- 09:50 **Investigating Ethylene Epoxidation under Industrial Conditions in a Compact Profile Reactor**
V. Berg¹; O. Korup¹; M. Geske²; M. Schmidt³; F. Rosowski⁴; R. Horn¹; ¹ TU Hamburg/D; ² BasCat - UniCat BASF JointLab, TU Berlin/D; ³ REACNOSTICS GmbH, Hamburg/D; ⁴ BASF SE, Ludwigshafen/D
- 10:15 **Spatial characterization of heterogeneously catalyzed gas phase reactions via operando NMR imaging methods**
H. Ridder¹; M. Mirdrikvand²; M. Sadeghi¹; J. Ulpts¹; W. Dreher²; J. Thöming¹; ¹ University of Bremen - Faculty of Production Engineering, Chemical Process Engineering, Bremen/D; ² University of Bremen - Faculty of Chemistry, in-vivo MR group, Bremen/D

10:40 Coffee Break in Exhibition Area

PROCESSES

Session Chair: G. Wehinger, TU Clausthal/D

- 11:10 **Experimental and numerical investigation of reactive species transport around a small rising bubble**
A. Weiner¹; J. Timmermann²; C. Pesci¹; M. Hoffmann³; M. Schlüter³; D. Bothe¹; ¹ TU Darmstadt/D; ² Sasol Germany GmbH, Brunsbüttel/D; ³ TU Hamburg/D
- 11:35 **Correlation of Process Conditions and Polymer Properties in Continuous Solution Polymerization**
J. Eigenseer¹; M. Al-Haj Ali²; N. Ajella²; M. Busch¹; ¹ TU Darmstadt/D; ² Borealis Polymers Oy, Porvoo/FIN
- 12:00 **Numerical Parameter Study on Single Pellet String Reactors – a Reactor Concept for Heterogeneous Catalysis**
J. Fernengel¹; L. Bolton²; K. Hinrichsen¹; ¹ TU München, Lehrstuhl I für Technische Chemie, Garching b. München/D; ² BP, Sunbury-on-Thames/UK

12:25 Short Break for Room Change

Conference Room: Wolfskeel

12:30 Awarding of Poster and Presentation Prizes

Session Chair: O. Bey, BASF SE, Ludwigshafen/D

- 12:45 **PLENARY LECTURE**
Contribution of reaction engineering to the long-term reduction of CO₂- emissions by process innovation
K. Ehrhardt, BASF SE, Ludwigshafen/D

13:35 Closing

13:45 End of Meeting and Lunch (13:45 – 14:40)

Wednesday, 29 May 2019

Conference Room: Egloffsteinstube

BUBBLES

Session Chair: M. Schlüter, Hamburg University of Technology/D

- 09:00 **Measurement of MNIC and DNIC in a free rising bubble**
K. Haase¹; C. Kähler²; ¹ Universität der Bundeswehr München, Neubiberg/D; ² Universität der Bundeswehr München/D
- 09:25 **Lagrangian Coherent Structures to Understand Dynamics in Multiphase Flows with Chemical Reactions**
A. von Kameke¹; ¹ TUHH, Hamburg University of Technology, Hamburg/D
- 09:50 **Magnetic Resonance Imaging: Spatially resolved experimental analyses of mass transfer on Taylor bubbles by means of NMR**
P. Kemper¹; ¹ University of Bremen - Faculty of Production Engineering, Chemical Process Engineering, Bremen/D
- 10:15 **Experimentelle Untersuchung dreidimensionaler disperser Zweiphasenströmungen**
M. Neumann¹; U. Hampel²; ¹ TU Dresden, Institut für Energietechnik, Professur für Bildgebende Messverfahren, Dresden/D; ² Helmholtz-Zentrum Dresden-Rossendorf/ TU Dresden/D

10:40 Coffee Break in Exhibition Area

BUBBLES

Session Chair: O. Bey, BASF SE, Ludwigshafen/D

- 11:10 **Mass transfer at rising single bubbles in reacting iron ligand systems**
D. Merker¹; L. Böhm¹; M. Kraume¹; ¹ Technische Universität Berlin / Fachgebiet Verfahrenstechnik, Berlin/D
- 11:35 **Does the wake structure in bubbly flows affect yield and selectivity of a competitive consecutive reaction? – A Taylor-Bubble study**
S. Rüttinger¹; S. Kastens¹; M. Hoffmann¹; A. von Kameke¹; M. Schlüter¹; ¹ TU Hamburg/D
- 12:00 **Untersuchungen der hydromechanischen Beanspruchung von Partikeln in gerührten Reaktoren**
C. Bliatsiou¹; R. Panckow²; P. Waldherr²; L. Böhm²; M. Kraume²; ¹ TU Berlin, FG Verfahrenstechnik, Berlin/D; ² TU Berlin, Fachgebiet Verfahrenstechnik, Berlin/D

12:25 Short Break for Room Change

Conference Room: Wolfskeel

12:30 Awarding of Poster and Presentation Prizes

Session Chair: O. Bey, BASF SE, Ludwigshafen/D

- 12:45 **PLENARY LECTURE**
Contribution of reaction engineering to the long-term reduction of CO₂- emissions by process innovation
K. Ehrhardt, BASF SE, Ludwigshafen/D

13:35 Closing

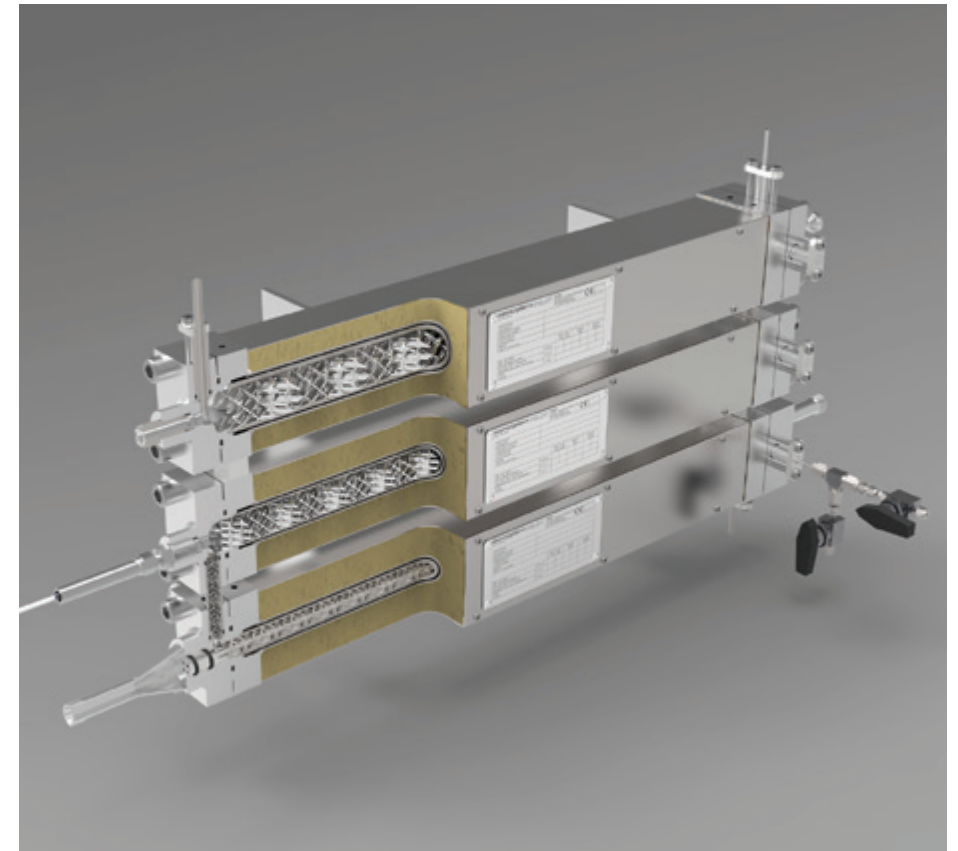
13:45 End of Meeting and Lunch (13:45 – 14:40)

MULTIPHASE FLOWS

- P 1.01 **Hybrid field-flow fractionation using acoustic resonance in an electrostatic precipitator**
K. Sandmann¹; ¹ Leibniz-Institute for Materials Engineering, Bremen/D
- P 1.02 **Investigations on selectivity of gas-liquid reactions in capillaries**
J. Grünh¹; I. Burke¹; N. Kockmann¹; ¹ TU Dortmund, Dortmund/D
- P 1.03 **Modellierung und Simulation des Stressverweilzeitverhaltens an flüssig/flüssig Phasengrenzen in mikroporösen Strukturen**
T. Wollborn¹; L. Luhede¹; U. Fritsching²; ¹ Leibniz-Institut für Werkstofforientierte Technologien - IWT, Bremen/D; ² Leibniz-Institut für Werkstofforientierte Technologien - IWT / Particles and Process Engineering Universität Bremen, Bremen/D
- P 1.04 **Influence of the micro structure onto the multiphase flow of hydrocarbons in horizontal tubes**
S. Fries¹; A. Luke²; ¹ Universität Kassel, Kassel/D; ² University of Kassel, Kassel/D
- P 1.05 **Centrifugal Pumps as extractors**
P. Schmitt¹; H. Bart¹; ¹ TU Kaiserslautern, Lehrstuhl für Thermische Verfahrenstechnik, Kaiserslautern/D
- P 1.06 **Cutting of rising bubbles by a wire without contact**
M. Börnhorst¹; T. Homan²; P. Rohlf¹; N. Deen²; O. Deutschmann¹; M. Wörner¹; ¹ Karlsruhe Institute of Technology, Karlsruhe/D; ² Eindhoven University of Technology, Eindhoven/NL
- P 1.07 **Measurement of bubble size in a vertical pipe using Wire-Mesh Sensor and optical probe**
C. Theßeling¹; P. Biessey¹; M. Grünewald¹; ¹ Ruhr-Universität Bochum, Bochum/D
- P 1.08 **The motion of non-spherical particles in a pseudo-2D fluidized bed: PTV measurement and CFD-DEM simulation**
Z. Jiang¹; A. Bück¹; E. Tsotsas²; J. S. Gomez Bonilla¹; ¹ Institute of Particle Technology (LFG), Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen/D; ² Thermal Process Engineering, Otto-von-Guericke University Magdeburg, Magdeburg/D
- P 1.09 **Continuous Flow Production of the Bio Fuel Butyltetrahydrofuran from Lignocellulose-Derived Furfuralacetone**
M. Strohm¹; A. Vorholt¹; W. Leitner¹; ¹ Max Planck Institute for Chemical Energy Conversion, Mülheim an der Ruhr/D
- P 1.10 **Experimental Flow Structure Analysis in a 1 MWth Fluidized Bed Pilot Plant**
A. Daikeler¹; J. Ströhle¹; B. Epple¹; J. May¹; ¹ Technische Universität Darmstadt - Institute for Energy Systems and Technology, Darmstadt/D
- P 1.11 **Investigation of upstream and downstream flow conditions in a swirling inline fluid separator**
B. Sahovic¹; U. Hampel²; ¹ Helmholtz-Zentrum Dresden-Rossendorf, Dresden/D; ² Helmholtz-Zentrum Dresden - Rossendorf, Dresden/D
- P 1.12 **Separation efficiency and design optimization of continuous gravity settlers**
E. Charlafti¹; J. Steinhoff²; D. Leleu³; L. Reinecke⁴; A. Pfennig³; H. Bart²; M. Kraume¹; ¹ TU Berlin, Fachgebiet Verfahrenstechnik, Berlin/D; ² TU Kaiserslautern, Lehrstuhl für Thermische Verfahrenstechnik, Kaiserslautern/D; ³ Université de Liège - Sart-Tilman, Liège/B; ⁴ Franken Filtertechnik KG, Hürth/D

contiplantPILOT

by fluitec



Continuous flow milli-reactors with static mixers

- modular
- scalable
- reliable

 **fluitec**
mixing + reaction solutions
www.fluitec.ch

MULTIPHASE FLOWS

- P 1.13 **Influence of microbubble aeration on hydrodynamics and mass transfer in a 3 L Stirred Tank Reactor**
S. Matthes¹; S. Kastens¹; B. Thomas¹; D. Ohde¹; P. Bubenheim¹; A. Liese¹; K. Terasaka²; M. Schlüter¹; ¹ Technische Universität Hamburg, Hamburg/D; ² Keio University, Tokyo/J
- P 1.14 **Qualification of a photometer probe for local concentration measurement in dense bubbly flows**
U. Hampel¹; H. Kryk²; R. Kipping¹; ¹ Technische Universität Dresden, Dresden/D; ² Helmholtz-Zentrum Dresden-Rossendorf, Dresden/D
- P 1.15 **A generalised bouncing boundary line for the modelling of droplets collision outcomes**
M. Sui¹; M. Sommerfeld¹; L. Pasternak¹; ¹ The multi-phase flow working group (Halle), Otto-von-Guericke University Magdeburg, Halle/D
- P 1.16 **Experimental investigation of the multiphase flow in oil injected multiphase twin screw pumps**
M. Lottis¹; M. Deeb²; A. Luke²; ¹ Universität Kassel - Technische Thermodynamik, Kassel/D; ² Universität Kassel - Technische Thermodynamik, Kassel/D
- P 1.17 **Effect of Surfactants on the Flow Patterns of Horizontal Tube Bundles with a Falling Film**
F. Lonardi¹; M. Olbricht²; A. Luke¹; ¹ Universität Kassel - Technische Thermodynamik, Kassel/D; ² Schmidtsche Schack (ARVOS GmbH), Kassel/D
- P 1.18 **Modeling of transport of rheological complex multiphase fluids in porous membranes**
A. Schulz¹; ¹ Universität Bremen, Bremen/D
- P 1.19 **Breakup Behavior of a Capillary Bridge on a Hydrophobic Stripe Separating two Hydrophilic Stripes**
M. Hartmann¹; M. Fricke¹; D. Bothe¹; S. Hardt¹; ¹ TU Darmstadt, Darmstadt/D
- P 1.20 **Challenges in the design and scale up of multiphase reactors – report on the Campus Multiphase Reactors –**
M. Schlüter¹; ¹ TU Hamburg, Hamburg/D
- P 1.21 **Characterization of the gas input during Aqueous Two-Phase Flotation (ATPF) for enzyme purification**
L. Jakob¹; ¹ Karlsruhe Institute of Technology (KIT), Karlsruhe/D
- P 1.22 **3D-Konzentrations-Bestimmungen in Blasensäulen mittels UV/Vis-Tomographie**
J. Guhathakurta¹; R. Günter²; M. Kraut²; S. Simon¹; ¹ Universität Stuttgart, Stuttgart/D; ² Karlsruher Institut für Technologie, Karlsruhe/D
- P 1.23 **Nozzle tip wetting during coaxial atomization in the context of nanoparticle spray flame synthesis**
M. Bieber¹; M. A. Reddemann¹; R. Kneer¹; ¹ RWTH Aachen University/D
- P 1.24 **A thorough analysis of the dispersion of glycerol in dimethyl carbonate with video microscopy**
J. Esteban¹; H. Murasiewicz²; ¹Max-Planck-Institut für Chemische Energiekonversion, Mülheim an der Ruhr/D; ²Faculty of Chemical Technology and Engineering, West Pomeranian University of Technology, Szczecin/P

ELECTROCHEMICAL REACTION ENGINEERING

- P 2.01 **Improved Operating Parameters for Hydrogen Peroxide Generating Gas Diffusion Electrodes**
T. Muddemann¹; D. Haupt²; M. Sievers²; U. Kunz¹; ¹ Clausthal University of Technology, Institute of Chemical and Electrochemical Process Engineering, Clausthal-Zellerfeld/D; ² CUTEC Clausthaler Umwelttechnik Forschungszentrum, Clausthal-Zellerfeld/D
- P 2.02 **A Simulative Approach for Linking Electrode and Electrolyte Properties to Supercapacitor Performance**
K. Krois¹; L. Hüfner¹; J. Gläsel¹; B. Etzold¹; ¹ Technische Universität Darmstadt, Darmstadt/D
- P 2.03 **Assessing catalytic activity of oxygen reduction catalysts at high current densities**
N. Schmitt¹; G. Zhang¹; B. Etzold¹; ¹ TU Darmstadt, Darmstadt/D
- P 2.04 **Robot assisted ultrasonic spray coating as key towards high current density fuel cell MEA for catalyst testing**
K. Jeschonek¹; ¹ TU Darmstadt, Ernst-Berl-Institut für Technische und Makromolekulare Chemie, Darmstadt/D
- P 2.05 **Electrochemical and spectroscopic investigations on heteropolyacids as homogeneous catalysts**
J. Albert¹; D. Lüders²; M. Mendt³; M. Mozer²; D. Voss²; ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen/D; ² FAU Erlangen-Nürnberg, Erlangen/D; ³ Universität Leipzig, Leipzig/D
- P 2.06 **Development of Gas Diffusion Electrodes for the non-aqueous Electrochemical CO₂ Reduction to Oxalic Acid**
M. König¹; D. Pant²; E. Klemm¹; ¹ Universität Stuttgart, Institut für Technische Chemie, Stuttgart/D; ² VITO, Unit of Separation and Conversion Technology, Mol/B
- P 2.07 **Silver-based gas diffusion electrodes for oxygen reduction reaction in alkaline electrolyte: Influence of PTFE content on pore system and electrochemical performance**
D. Franzen¹; B. Ellendorff¹; M. Paulisch²; I. Manke²; T. Turek¹; ¹ TU Clausthal - Institute of Chemical and Electrochemical Process Engineering, Clausthal-Zellerfeld/D; ² Helmholtz-Zentrum Berlin for Materials and Energy, Berlin/D
- P 2.08 **eForFuel – Acidic CO₂-Electrolysis to Formic Acid for Microbial Conversion**
M. Stoll¹; A. Löwe¹; E. Klemm¹; ¹ Universität Stuttgart, Stuttgart/D
- P 2.09 **Molecular Electroreduction of CO₂ to Formate**
P. Röbner¹; E. Klemm¹; ¹ Universität Stuttgart, Stuttgart/D
- P 2.10 **Feasibility of demand response in the chemical industry on the example of electrochemical synthesis of Adiponitrile**
N. Milojevic¹; M. Neumann¹; R. Schomäcker¹; ¹ Technische Universität Berlin, Berlin/D

IN-SITU MONITORING

- P 3.01 **Model-based Scale-up Predictions: From Micro- to Millireactors using Inline FT-IR Measurements**
V. Fath¹; S. Szmaiz²; P. Lau²; P. Weller³; N. Kockmann⁴; T. Röder³; ¹ TU Dortmund University - Department of Biochemical and Chemical Engineering, Equipment Design; Mannheim University of Applied Sciences - Institute of Chemical Process Engineering, Mannheim/D; ² Merck KGaA, Darmstadt/D; ³ Hochschule Mannheim/D; ⁴ TU Dortmund, Arbeitsgruppe Apparatedesign, Dortmund/D

POSTER PROGRAMME

- P 3.02 **Non-invasive sensors and analysis techniques for two-phase flow in capillaries**
W. Krieger¹; L. Kaiser¹; M. Hörbelt¹; A. Kufner¹; C. Tewes¹; J. Muckermann¹; G. Wiese²; S. zur Horst-Meyer²; N. Kockmann¹; ¹ TU Dortmund / BCI, Equipment Design, Dortmund/D; ² SONOTEC Ultraschallsensorik Halle GmbH, Halle/D
- P 3.03 **Vergleich zwischen einem wellendurchmischten und einem gerührten Bioreaktor hinsichtlich der Partikelbeanspruchung in einem Flüssig/flüssig-Modellstoffsystem**
 R. Panckow¹; C. Bliatsiou¹; L. Böhm¹; M. Kraume¹; ¹ TU Berlin, FG Verfahrenstechnik, Berlin/D
- P 3.04 **In situ studies on the preparation, stability and application of well-defined isolated Co nanoparticles supported on exfoliated graphite**
M. Wolf¹; N. Fischer¹; M. Claeys¹; ¹ Catalysis Institute and DST-NRF Centre of Excellence in Catalysis c*change, University of Cape Town, Cape Town/ZA

KINETICS

- P 4.01 **Investigation of gas transport through PECVD-SiO₂ protection layers**
F. Knaus¹; F. Utzmann²; P. Michaelis¹; F. Eder²; B. Etzold¹; A. Drochner¹; ¹ Technische Universität Darmstadt, Darmstadt/D; ² Siemens AG, Erlangen/D
- P 4.02 **Kinetics of the reductive amination of long chain olefins in different solvent systems**
S. Kirschtowski¹; C. Kadar²; A. Seidel-Morgenstern³; C. Hamel⁴; ¹ Otto von Guericke University Magdeburg, Magdeburg/D; ² Nuremberg Institute of Technology, Faculty of applied Chemistry, Nuremberg/D; ³ Otto-von-Guericke University and Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg/D; ⁴ Anhalt University of Applied Sciences, Processing Engineering, Köthen/D
- P 4.03 **Activity based kinetic modeling of solvent effects for the hydroformylation of 1-dodecene**
M. Gerlach¹; F. Huxoll²; A. Seidel-Morgenstern³; C. Hamel⁴; G. Sadowski¹; ¹ Otto von Guericke University, Institute of Process Engineering, Magdeburg/D; ² Technical University Dortmund, Laboratory of Thermodynamics, Dortmund/D; ³ Otto-von-Guericke University, Institute of Process Engineering and Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg/D; ⁴ Otto von Guericke University, Institute of Process Engineering and Anhalt University of Applied Sciences, Process Engineering, Magdeburg and Köthen/D
- P 4.04 **Kinetic investigation of polyurethane rubber formation from CO₂-containing polyols**
G. Buchner¹; M. Rudolph¹; J. Norwig²; V. Marker²; C. Gürtler²; R. Schomäcker¹; ¹ Technische Universität Berlin / Institut für Chemie, Berlin/D; ² Covestro Deutschland AG / Catalysis and Technology Incubation, Leverkusen/D
- P 4.05 **Kinetic investigations on olefin interconversion and hydrogen transfer reactions over an H-ZSM-5 catalyst**
F. Warnecke¹; L. Lin²; S. Haag²; H. Freund³; ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen/D; ² Air Liquide Forschung und Entwicklung GmbH, Frankfurt am Main/D; ³ Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen/D
- P 4.06 **Modelling of enzymatic reaction kinetics in multiphase systems**
S. Rusli¹; M. Kraume¹; ¹ TU Berlin, Department of Chemical and Process Engineering, Berlin/D

POSTER PROGRAMME

- P 4.07 **Reaction kinetics of Ni/MgO catalyzed CO₂ methanation**
A. Loder¹; S. Lux²; G. Baldauf-Sommerbauer²; M. Siebenhofer²; ¹ Institute of Chemical Engineering and Environmental Technology, University of Technology Graz, Graz/A; ² Graz University of Technology, Institute of Chemical Engineering and Environmental Technology, Graz/A
- P 4.08 **A Case Study for Mechanistic Kinetic Modelling of Biocatalytic Reactions: Formation of Galacto-Oligosaccharides**
 I. Mueller¹; K. Kowalski²; S. Kirschtowski²; A. Seidel-Morgenstern²; C. Hamel³; ¹ Anhalt University of Applied Sciences, Koethen (Anhalt)/D; ² Otto von Guericke University, Magdeburg/D; ³ Otto von Guericke University and Anhalt University of Applied Sciences, Magdeburg/D
- P 4.09 **Kinetic Modeling and Optimization of Photocatalytic Reactions**
 J. Patzsch¹; F. Guba²; D. Ziegenbalg²; J. Bloh¹; ¹ DECHEMA-Forschungsinstitut, Frankfurt am Main/D; ² Ulm University, Ulm/D

- P 4.10 **Influence of thermophysical properties of the saturated liquid and the heating surface on the heat transfer in boiling**
N. Buchholz¹; A. Luke¹; ¹ University of Kassel, Kassel/D

HETEROGENEOUS CATALYSIS

- P 5.01 **Simulation of the transient CO₂ methanation - Are steady-state kinetics sufficient?**
B. Kreitz¹; J. Martin¹; S. Fleischlen¹; G. Wehinger¹; T. Turek¹; ¹ Clausthal University of Technology, Institute of Chemical and Electrochemical Process Engineering, Clausthal-Zellerfeld/D
- P 5.02 **Aromatization of bio-derivable isobutyraldehyde over HZSM-5 zeolite catalysts in a continuous fixed bed reactor**
J. Deischer¹; K. Schute¹; R. Palkovits¹; ¹ RWTH Aachen University - Institut für Technische und Makromolekulare Chemie (ITMC), Aachen/D
- P 5.03 **Suppression of Carbon Formation during CO₂ Hydrogenation by Fe@SiO₂ Core-Shell Catalyst**
 C. Zambrzycki¹; J. Kirchner²; Z. Baysal²; S. Kureti²; R. Güttel¹; ¹ Universität Ulm, Ulm/D; ² TU Bergakademie Freiberg, Freiberg/D
- P 5.04 **Hierarchical Open Cellular Raney® Copper Foams for CO Hydrogenation to Methanol**
C. Heßelmann¹; ¹ Lehrstuhl für Chemische Reaktionstechnik der Universität Erlangen-Nürnberg, Erlangen/D
- P 5.05 **From Carboxylic Acids to Sustainable Polymers: Novel Catalytic Processes for the Valorization of Biomass**
M. Haus¹; Y. Louven¹; R. Palkovits¹; ¹ RWTH Aachen University, Aachen/D
- P 5.06 **Experimental Investigation of the Unsteady-State Operated co-Methanation of CO/CO₂ mixtures using Ni/Al₂O₃ Catalysts**
D. Meyer¹; J. Schumacher¹; J. Friedland¹; R. Güttel¹; ¹ Ulm University, Ulm/D
- P 5.07 **Cobalt-Based Core-Shell Catalysts for CO_x Hydrogenation: Investigation of Stability under Reaction Conditions**
A. Straß-Eifert¹; C. Zambrzycki¹; R. Güttel¹; ¹ Ulm University, Institute of Chemical Engineering, Ulm/D

POSTER PROGRAMME

- P 5.08 **Conditioning of coke oven gas: catalytic conversion of oxygen traces on platinum catalyst**
T. Wiesmann¹; S. Kaluza²; H. Lohmann¹; ¹ Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT, Oberhausen/D; ² Hochschule Düsseldorf - University of Applied Sciences, Düsseldorf/D
- P 5.09 **A study on the dehydrogenation of loaded liquid organic hydrogen carriers (LOHC) with heterogeneous catalysts**
X. Chen¹; R. Palkovits¹; ¹ RWTH Aachen Universität, Aachen/D
- P 5.10 **Reaction kinetic modeling of the direct synthesis of dimethylether from CO₂-rich synthesis gas, model-based reactor optimization and experimental validation**
N. Delgado Ojalvaro¹; M. Kaiser²; K. Herrera Delgado¹; S. Wild¹; J. Sauer¹; H. Freund²; ¹ Karlsruhe Institute of Technology (KIT), Karlsruhe/D; ² Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen/D
- P 5.11 **Catalysts for the conversion of dimethyl ether to low-aromatic gasoline**
B. Niethammer¹; U. Arnold¹; J. Sauer¹; ¹ Karlsruher Institut für Technologie (KIT), Institut für Katalyseforschung und -technologie (IKFT), Eggenstein-Leopoldshafen/D
- P 5.12 **Regeneration of supported catalytically active liquid metal solutions (SCALMS) for propane dehydrogenation**
M. Wolf¹; N. Raman¹; N. Taccardi¹; M. Haumann¹; P. Wasserscheid²; ¹ University of Erlangen-Nuremberg (FAU), Erlangen/D; ² University of Erlangen-Nuremberg (FAU), Helmholtz Institute Erlangen-Nürnberg for Renewable Energy (HI ERN), Erlangen/D
- P 5.13 **Aerosol synthesis of metal catalyst particles with tunable pore sizes, defined metal crystallite sizes and different loadings.**
A. Martinez Arias¹; M. Bierwirth¹; A. Weber¹; ¹ Institut für Mechanische Verfahrenstechnik, TU-Clausthal, Clausthal-Zellerfeld/D
- P 5.14 **Selective Oxidation of n-Butane to Maleic Anhydride: Kinetic Investigation in a Milli-structured Reactor**
M. Müller¹; G. Mestl²; T. Turek¹; ¹Institute of Chemical and Electrochemical Process Engineering, Clausthal University of Technology/D; ²Clariant Produkte Deutschland GmbH, Bruckmühl/D

NEW REACTOR CONCEPTS

- P 6.01 **Modelling of Integrated Membrane Reactors for the Selective Dehydrogenation of Propane**
A. Brune¹; A. Seidel-Morgenstern²; C. Hamel³; ¹ Otto-von-Guericke University, Magdeburg/D; ² Otto-von-Guericke University and Max-Planck Institute for Dynamics of Complex Technical Systems, Magdeburg/Germany, Magdeburg/D; ³ Anhalt University of Applied Sciences, Köthen, and Otto von Guericke University, Magdeburg, Magdeburg/D
- P 6.02 **Benefits of Actinometry for Systematic Photoreactor Development**
B. Wriedt¹; M. Sender¹; F. Huber²; S. Rau²; D. Ziegenbalg¹; ¹ Ulm University, Institute of Chemical Engineering, Ulm/D; ² Ulm University, Institute for Inorganic Chemistry I, Ulm/D

POSTER PROGRAMME

- P 6.03 **Optimal „Egg-Yolk“ Catalyst Particle Design for Thermal Sensitivity Reduction of Industrial Scale Fixed-Bed CO₂ Methanation Reactors**
R. Zimmermann¹; J. Bremer²; K. Sundmacher³; ¹ Otto-von-Guericke-Universität Magdeburg, Magdeburg/D; ² Max-Planck-Institut für Dynamik komplexer technischer Systeme, Magdeburg/D; ³ Otto-von-Guericke-Universität Magdeburg/Max-Planck-Institut für Dynamik komplexer technischer Systeme, Magdeburg/D
- P 6.04 **Reactor concept for scale-up of hazardous flow chemistry**
M. Moser¹; E. Rosasco¹; A. Georg¹; ¹ Fluitec mixing + reaction solutions AG, Neftenbach/CH
- P 6.05 **New reactor concept for continuous milli-reactors**
M. Moser¹; E. Rosasco¹; A. Georg¹; ¹ Fluitec mixing + reaction solutions AG, Neftenbach/CH
- P 6.06 **Development of reactors for the plasma-catalytic removal of oxygen traces in steel mill gases**
T. Nitsche¹; ¹ Fraunhofer UMSICHT, Oberhausen/D
- P 6.07 **Bridging the gap by printing a gap: Metallic porous-dense composites by selective laser melting**
D. Xie¹; E. Hansjosten¹; M. Hofheinz¹; M. Klumpp¹; R. Dittmeyer¹; ¹ Karlsruhe Institute of Technology (KIT), Eggenstein-Leopoldshafen/D
- P 6.08 **Design Concepts for Increasing the Photonic Efficiency in Photomicroreactors**
M. Sender¹; B. Wriedt¹; D. Ziegenbalg¹; ¹ Ulm University, Institute of Chemical Engineering, Ulm/D
- P 6.09 **Novel approaches in rapid prototyping for the development of reactors for photocatalytic applications**
F. Guba¹; D. Ziegenbalg¹; ¹ Ulm University, Ulm/D
- P 6.10 **Dehydrogenation of LOHC in a reactive plate heat exchanger**
T. Solymosi¹; ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen/D
- P 6.11 **Scale-up of a Heterogeneous Reactive Extraction with Structured Packing from Laboratory-Scale to a Pilot-Plant**
F. Schwering¹; U. Hoffmann¹; U. Kunz¹; ¹ TU Clausthal - Institute of Chemical and Elektrochemical Process Engineering, Clausthal-Zellerfeld/D
- P 6.12 **Plasma driven fluidized bed reactor concept to reduce metal powders with oxidized surfaces**
M. Bierwirth¹; M. Seipenbusch²; A. Weber¹; ¹ TU Clausthal - Institute of Particle Technology, Clausthal-Zellerfeld/D; ² ParteQ GmbH, Kuppenheim/D
- P 6.13 **Power-to-Gas: CO₂ Methanation concepts for SNG production at the Engler-Bunte-Institut**
M. Held¹; S. Sauer¹; D. Schollenberger¹; S. Bajohr¹; T. Kolb¹; ¹ Karlsruher Institut für Technologie (KIT), Karlsruhe/D
- P 6.14 **Methanol synthesis in fixed-bed and slurry bubble column reactors**
R. Becka¹; F. Nestler²; ¹ Engler-Bunte-Institut des KIT, Karlsruhe/D; ² Fraunhofer-Institute for Solar Energy Systems ISE, Freiburg/D

MODELLING AND SIMULATION

- P 7.01 **Dynamic operation strategies for alkaline water electrolyzers powered by renewable energies**
 J. Brauns¹; T. Turek¹; ¹ Clausthal University of Technology, Institute of Chemical and Electrochemical Process Engineering, Clausthal-Zellerfeld/D
- P 7.02 **Limiting Processes in Oxygen Depolarized Cathodes: A Dynamic Model-Based Analysis**
 M. Röhe¹; F. Kubannek²; U. Krewer²; ¹ TU Braunschweig, Braunschweig/D; ² TU Braunschweig, Institut für Energie- und Systemverfahrenstechnik, Braunschweig/D
- P 7.03 **A dual-grid method for dense gas-solid flow using CFD-DEM**
 D. Hirche¹; K. Hinrichsen¹; ¹ Technische Universität München, Lehrstuhl I für Technische Chemie, Garching b. München/D
- P 7.04 **In Operando Adjustable Mass Transport and Flow Characteristics in Additively Manufactured Periodic Open Cellular Structures**
 S. Trunk¹; G. Do¹; W. Schwieger¹; H. Freund¹; ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg, Lehrstuhl für Chemische Reaktionstechnik, Erlangen/DE, Erlangen/D
- P 7.05 **Stochastic Modeling of the Molecular Weight Distribution by Conceiving a Virtual GPC**
 P. Peikert¹; M. Busch¹; ¹ TU Darmstadt, Darmstadt/D
- P 7.06 **Influence of Catalyst Bed Packing Density and Gas Velocity Distribution on the Performance of Multi-Tubular Fixed Bed Reactors**
 A. Kubicka¹; G. Mestl²; T. Turek¹; ¹ Technische Universität Clausthal, Clausthal-Zellerfeld/D; ² Clariant Produkte (Deutschland) GmbH, Bruckmühl/D
- P 7.07 **Numerical characterization of open-cell ceramic foams**
 G. Ganzer¹; W. Beckert¹; C. Freytag¹; J. Schöne¹; A. Füssel¹; ¹ Fraunhofer IKTS, Dresden/D
- P 7.08 **Dynamic CO₂ Methanation in a Wall-Cooled Fixed Bed Reactor: Comparative Evaluation of Reactor Models**
 K. Fischer¹; M. Langer¹; H. Freund¹; ¹ Lehrstuhl für Chemische Reaktionstechnik, FAU Erlangen-Nürnberg, Erlangen/D
- P 7.09 **Compartmentalization of a Hybrid-Stochastic LDPE Model to Describe Mixing Effects on the Polymeric Microstructure**
 O. Salman¹; M. Busch¹; ¹ TU Darmstadt, Ernst-Berl-Institut für Technische und Makromolekulare Chemie, Darmstadt/D
- P 7.10 **Equilibrium Modelling Insights to Process Tolerance and Operational Capabilities of Plasma Gasification in Waste to Value Concepts**
 M. Hungsberg¹; C. Dreiser²; S. Brand²; A. Drochner¹; B. Etzold¹; ¹ Technische Universität Darmstadt, Darmstadt/D; ² Clariant, Frankfurt/D
- P 7.11 **Evaluating New Multi-Phase Reactors - a Detailed CFD-based Model**
 A. Rathgeb¹; B. Weber¹; A. Jupke¹; ¹ RWTH Aachen University - Fluid Process Engineering (AVT, FVT), Aachen/D
- P 7.12 **Modelling and Simulation of Porous Catalyst Pellets for Unsteady-State Methanation: Comparison of Diffusion Models**
 J. Schumacher¹; D. Meyer¹; J. Friedland¹; R. Güttel¹; ¹ Universität Ulm, Institut für Chemieingenieurwesen, Ulm/D

- P 7.13 **Process Design for the Production of Oxymethylene Ether via Adsorption on Hypercrosslinked Polymers**
 C. Gierlich¹; I. Delidovich¹; R. Palkovits¹; ¹ ITMC, RWTH Aachen University, Aachen/D
- P 7.14 **Model-based determination of axial dispersion coefficients for liquid-liquid multiphase reactors**
 D. Roth¹; J. Rußkamp¹; M. Aigner¹; A. Jupke¹; ¹ RWTH Aachen University - Fluid Process Engineering (AVT.FVT), Aachen/D
- P 7.15 **Modeling Rheological Properties of HDPE and LLDPE**
 M. Dernbach¹; M. Busch¹; ¹ TU Darmstadt, Darmstadt/D
- P 7.16 **Entropic Analysis in Tubular Reactor Design**
 M. Silva¹; W. Araújo¹; D. Rosa¹; J. Manzi¹; ¹ Federal University of Campina Grande, Campina Grande/BR
- P 7.17 **Modeling the effect of exothermic reactions on conjugate heat transfer in open-cell foams through uniform heat sources using CFD**
 C. Sinn¹; G. Pesch¹; J. Thöming¹; L. Kiewidt²; ¹ University of Bremen - Faculty of Production Engineering, Chemical Process Engineering, Bremen/D; ² Wageningen University & Research - Biobased Chemistry & Technology, Wageningen/NL
- P 7.18 **CFD Simulation of Spray Formation Combining the Volume of Fluid (VOF) and the Discrete Phase Model (DPM)**
 G. Schaldach¹; D. Pieloth²; M. Thommes¹; ¹ TU Dortmund, Lehrstuhl Feststoffverfahrenstechnik, Dortmund/D; ² Hochschule Anhalt, Köthen/D
- P 7.19 **Full-field assessment of gaseous flow within open-cell foams: comparison of μ CT based CFD simulations and magnetic resonance velocimetry results**
 M. Sadeghi¹; M. Mirdrikvand²; G. R. Pesch¹; W. Dreher²; J. Thöming¹; ¹ University of Bremen, Faculty of Production Engineering, Chemical Process Engineering, Bremen/D; ² University of Bremen, Faculty of Chemistry, in-vivo MR group, Bremen/D
- P 7.20 **Simulation der CO₂ Verteilung im durchströmten Photobioreaktor basierend auf Lattice-Boltzmann Methoden**
 A. Mink¹; H. Nirschl²; M. Krause³; ¹ Karlsruher Institut für Technologie (KIT), Karlsruhe/D; ² Institut für Mechanische Verfahrenstechnik und Mechanik Karlsruher Institut für Technologie (KIT), Karlsruhe/D; ³ Karlsruhe Institute of Technology (KIT), Lattice Boltzmann Research Group, Karlsruhe/D
- P 7.21 **Multi-Objective Reactor Design Under Uncertainty**
 J. Maußner¹; H. Freund¹; ¹ Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen/D
- P 7.22 **On Pore-Scale Simulations of Reactive Transport for Complex Reaction Networks**
 T. Prill¹; O. Iliev¹; ¹ Fraunhofer ITWM, Kaiserslautern/D
- P 7.23 **Synthetic packed beds for CFD-simulations Rigid body vs. soft body approach**
 Steffen Flaischlen^{1,2}; Prof. Dr.-Ing. Gregor D. Wehinger^{1,2}; ¹Institute of Chemical and Electrochemical Process Engineering, Clausthal University of Technology, Clausthal-Zellerfeld/D; ²Research Center Energy Storage Technologies (EST), Clausthal University of Technology, Goslar/D

PROCESSES

- P 8.01 **APPtec – a new generation of spray pyrolysis technology to produce advanced powder materials**
 T. Jähnert¹; M. Jacob¹; ¹ Glatt Ingenieurtechnik GmbH, Weimar/D
- P 8.02 **Continuous heterogeneous di-N-Alkylation of 1H-benzimidazole in a fixed bed reactor**
 T. Sauk¹; L. Henke¹; C. Xiao¹; S. Scholl¹; ¹ TU Braunschweig, Institut für Chemische und Thermische Verfahrenstechnik, Braunschweig/D
- P 8.03 **Design and optimization of a continuous Krapcho dealkoxy-carbonylation process within the scope of Paullone synthesis**
 M. Rehbein¹; J. Wolters¹; L. Priess¹; S. Scholl¹; C. Kunick²; ¹ TU Braunschweig, Institut für Chemische und Thermische Verfahrenstechnik, Braunschweig/D; ² TU Braunschweig, Institut für Medizinische und Pharmazeutische Chemie, Braunschweig/D
- P 8.04 **Solvent Regeneration via Transesterification in Reactive Distillation**
 A. Toth¹; S. Lux¹; D. Painer¹; M. Siebenhofer¹; ¹ Institute of Chemical Engineering and Environmental Technology, University of Technology Graz, Graz/A
- P 8.05 **Coupled extraction and partial synthesis for the production of an antimalarial: Solvent and acid dependences**
 S. Triemer¹; K. Gilmore²; A. Seidel-Morgenstern¹; ¹ Max-Planck-Institut für Dynamik komplexer technischer Systeme, Magdeburg/D; ² Max-Planck-Institut für Kolloid und Grenzflächenforschung, Potsdam/D
- P 8.06 **Model-based performance analysis and optimization approach of an industrial methacrylic acid reactor**
 T. Bürger¹; B. Kraushaar-Czarnetzki¹; ¹ Karlsruhe Institute of Technology (KIT), Karlsruhe/D
- P 8.07 **Reactive separations for downstream processing in the biorefinery**
 D. Painer¹; S. Lux¹; M. Siebenhofer¹; ¹ Graz University of Technology, Institute of Chemical Engineering and Environmental Technology, Graz/A
- P 8.08 **Der Power-to-Liquid Prozess – Alternative Prozesse zur Produktion von (Poly-) Oxymethylendimethylethern basierend auf Methanol**
 L. Theiss¹; O. Salem¹; F. Mantei¹; A. Schaadt¹; R. Güttel²; ¹ Fraunhofer Institut für Solare Energiesysteme ISE, Freiburg/D; ² Universität Ulm, Institut für Chemieingenieurwesen, Ulm/D
- P 8.09 **Development of an optimization routine for chemical reactions under dynamic process conditions using inline-spectroscopy**
 D. Trunina¹; M. Liauw¹; ¹ RWTH Aachen University - Institut für Technische und Makromolekulare Chemie (ITMC), Aachen/D
- P 8.10 **High-temperature co-electrolysis – a key step for CO₂ emission mitigation in industrial processes**
 G. Herz¹; N. Müller¹; E. Reichelt¹; S. Megel¹; M. Jahn¹; ¹ Fraunhofer IKTS, Dresden/D
- P 8.11 **Fischer-Tropsch to higher alcohols – In-situ XRD studies on iron-based catalysts**
 M. Schaller¹; E. Reichelt¹; N. Fischer²; M. Jahn¹; M. Claeys²; ¹ Fraunhofer IKTS, Dresden/D
² Catalysis Institute and c*change (DST-NRF Centre of Excellence in Catalysis), University of Cape Town, Cape Town/ZA

- P 8.12 **Process development for the sustainable production of valuable products from CO₂**
 M. Jahn¹; M. Schaller¹; G. Herz¹; E. Reichelt¹; ¹ Fraunhofer IKTS, Dresden/D
- P 8.13 **Applying biogas upgrading membranes for hydrogen recycle in Power-to-Methane processes**
 A. Gantenbein¹; J. Witte¹; T. Schildhauer¹; S. Biollaz¹; ¹ Paul Scherrer Institut (PSI), Villigen/CH
- P 8.14 **Reductive Amination with Subsequent Catalyst Recovery via Thermomorphic Multiphase Systems: From Laboratory to Miniplant**
 K. Künnemann¹; D. Vogt¹; J. Dreimann¹; ¹ TU Dortmund, Dortmund/D

MISCELLANEOUS

- P 9.01 **Additive manufacturing and hydrodynamic characteristics of 3D structured monoliths with hierarchical porosity**
 S. Hock¹; M. Rose¹; ¹ TU Darmstadt, Ernst-Berl-Institute, Darmstadt/D
- P 9.02 **Development of Ceramic Composites for Electrically Heated Catalytic Converters**
 V. Schallhart¹; H. Berthold²; T. Endlich²; H. Gottschalk²; L. Möltner¹; I. Worschischek²; E. Klemm³; ¹ MCI Management Center Innsbruck, Innsbruck/A; ² CoorsTek Advanced Materials Lauf GmbH, Lauf a. d. Pegnitz/D; ³ Institut für Technische Chemie, Universität Stuttgart, Stuttgart/D
- P 9.03 **Ultra-low temperature methanol reforming using immobilized Ru-Pincer complexes**
 C. Schwarz¹; M. Haumann²; ¹ FAU Erlangen-Nürnberg, Erlangen/D; ² Lehrstuhl für Chemische Reaktionstechnik der Universität Erlangen-Nürnberg, Erlangen/D
- P 9.04 **Investigation of polymer depositions during the synthesis in a heat exchanger**
 A. Hohlen¹; W. Augustin¹; S. Scholl¹; ¹ Technische Universität Braunschweig / Institut für Chemische und Thermische Verfahrenstechnik, Braunschweig/D

Contribution titles and authors as specified by the submitter. No correction by DECHEMA.

EuropaCat 2019

AACHEN · GERMANY · 18 – 23 AUGUST

14th EuropaCat – European Congress on Catalysis

“Catalysis without Borders”

A joint event of the catalysis communities from
Germany, the Netherlands and Belgium

www.europacat2019.eu

ORGANISER



DECHEMA e.V. · Theodor-Heuss-Allee 25 · 60486 Frankfurt am Main · Germany

+49 (0)69 7564-333

ORGANISER

DECHEMA e.V.
Theodor-Heuss-Allee 25
60486 Frankfurt am Main