

IMRET 9

9th International Conference on Microreaction Technology



September 6 – 8, 2006
Potsdam/Berlin, Germany



DECHEMA e.V.
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DECHEMA e.V.

<http://events.dechema.de/imret9>

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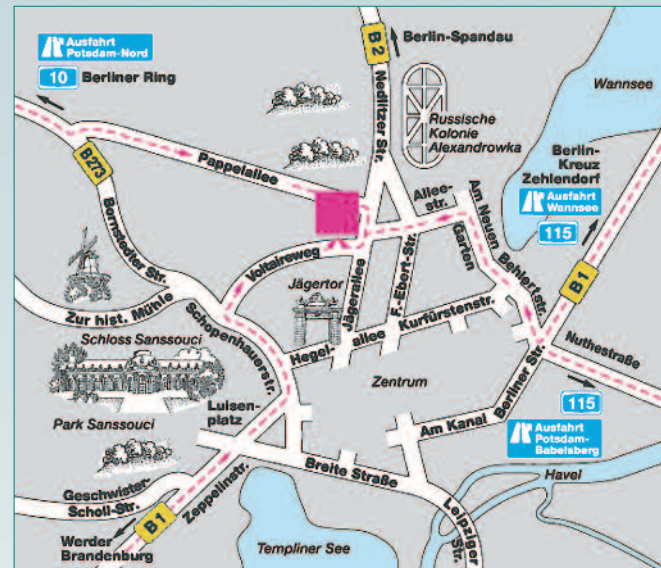
P R O G R A M M E

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| | |
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| J.J. Lerou | Plain City, OH/USA |
| H. Löwe | Mainz/D |
| A. Manz | Dortmund/D |
| S.G. Maroldo | Bristol, PA/USA |
| L. Mleczo | Leverkusen/D |
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| J. Roeraade | Stockholm/S |
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| T. Schwalbe | Brookline, MA/USA |
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| P. Tabeling | Paris/F |
| R.S. Wegeng | Richland, WA/USA |
| D. Wehle | Sulzbach/D |
| J.-I. Yoshida | Kyoto/J |

ORGANIZING COMMITTEE

| | |
|--------------------------|-----------------------------------|
| R. Schütte (Chair) | Degussa AG, Hanau/D |
| M. Matlosz (Co-chair) | LSGC-ENSIC, Nancy/F |
| A. Renken (Co-chair) | EPF-Lausanne/CH |
| M. Liaw (Co-chair) | RWTH Aachen/D |
| O.-U. Langer (Secretary) | DECHEMA e.V., Frankfurt am Main/D |



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Further information:

www.vbb-online.de
www.havelbus.de
www.vip-potsdam.de
www.vmbzberlin.de

INVITATION

The series of International Conferences on Microreaction Technology (IMRET) started in 1997 with IMRET 1 in Frankfurt am Main, Germany. Since then eight IMRET conferences have been organized alternately in Europe by DECHEMA and in North America by AIChE.

It gives us great pleasure to announce the ninth event, IMRET 9, which is living proof of the tremendous development that microreaction technology has achieved in chemical/biochemical engineering in both research and industrial applications over the last decade.

IMRET 9 will be held in Potsdam, Germany. The city of Potsdam, with its unique situation on an island, its three-hundred year old castles and parks offers a wide variety of cultural highlights, in particular the world famous Palace of Sanssouci, situated at its heart. This former residence of the Kings of Prussia is complemented by the historical Weavers Quarter, Dutch Quarter and a Russian Colony. The historical location of the Potsdam Conference, Cecilienhof, where the fate of Europe after World War II was decided, is just a short walk away from the IMRET 9 venue.

But Potsdam is also the gateway to Berlin. For many years Berlin, and especially the Brandenburg Gate, was a symbol of the partition of Germany and of the hope that the country would one day be reunited in peace and freedom. It is presently developing into a metropolis of science and culture, media and business.

We look forward to welcoming you to Potsdam to the 9th International Conference on Microreaction Technology in September 2006.

The meeting will take place at the **Dorint Novotel Sanssouci**, Potsdam, which offers excellent conference facilities. The hotel is only a few minutes away from shopping areas in Potsdam and half an hour away from the center of Berlin. Special room rates will be available for participants. Other accommodation is available through the local tourist offices.

▼ JOINT CONFERENCE ISCRE 19

IMRET 9 will be held in conjunction with

ISCRE 19

19th International Symposium on Chemical Reaction Engineering

September 3 – 6, 2006, Dorint Novotel Sanssouci, Potsdam/Berlin, Germany, with a common lecture session on Wednesday, September 6, 2006 featuring presentations of mutual interest. Combined tickets with reduced fees for attendance at both conferences will be offered.

Information about ISCRE 19 is available at <http://events.dechema.de/iscre>

Wednesday, September 6, 2006

| | | |
|-------|--|------------------|
| 08.30 | ISCRE PLENARY LECTURE L. Gladden | |
| 09.25 | M.J.M. Mies | M. Rajabi-Hamane |
| 09.50 | N. Dupont | G. Bohner |
| 10.15 | M.N. Kashid | C. Rosenfeld |
| 10.40 | M.T. Kreutzer | J.C.B. Lopes |
| 11.05 | CLOSING REMARKS ISCRE 19 INTRODUCTION IMRET 9 | |
| 11.25 | COMMON PLENARY LECTURE K. Mae | |
| 12.10 | LUNCH | |
| 14.00 | KEYNOTE LECTURE J. Lerou | |
| Chair | A. Gavriilidis | J.C. Schouten |
| | TOPIC 6 | TOPIC 3 |
| 14.40 | M. Chapela | R.S. Besser |
| 15.00 | C. De Bellefon | T. Aicher |
| 15.20 | O. Stange | T. Maki |
| 15.40 | COFFEE BREAK | |
| | TOPIC 1 | TOPIC 5 |
| 16.10 | B. Pieters | S. Lohse |
| 16.30 | A. Lohf | T. Tominari |
| 16.50 | T. Bieber | D. Boskovic |
| 17.10 | A. Tonkovich | N. Shao |
| 17.30 | POSTER DISCUSSION (BEER PARTY) | |
| 21.00 | End of 1st Conference Day | |

Thursday, September 7, 2006

| | | |
|-------|---|----------------|
| 09.00 | KEYNOTE LECTURE L. Falk | |
| Chair | R.S. Besser | T. Bayer |
| | TOPIC 1 | TOPIC 4 |
| 09.40 | B.S. Haynes | E. Klemm |
| 10.00 | D.W. Agar | W.Y. Lee |
| 10.20 | F. Meschke | M. Bouquey |
| 10.40 | COFFEE BREAK | |
| | TOPIC 3 | TOPIC 5 |
| 11.10 | S.R. Deshmukh | B. Yang |
| 11.30 | T. Conant | M.J.F. Warnier |
| 11.50 | G. Kolb | V. van Steijn |
| 12.10 | I.Z. Ismagilov | D. Malsch |
| 12.30 | N.S. Kaisare | M. Kielpinski |
| 12.50 | LUNCH | |
| 14.20 | KEYNOTE LECTURE A. Stankiewicz | |
| Chair | E. Klemm | M. Joanicot |
| | TOPIC 1 | TOPIC 6 |
| 15.00 | J.P. Brouwer | S. Jensen |
| 15.20 | C. Minnich | W.P. Bula |
| 15.40 | D. Kralisch | G. Groß |
| 16.00 | COFFEE BREAK | |
| | TOPIC 4 | TOPIC 6 |
| 16.30 | S. Mukai | C. Rosenfeld |
| 16.50 | S. Roos | S. Körsten |
| 17.10 | J.M. Köhler | T. Henning |
| 17.30 | N. Kockmann | M. Luther |
| 17.50 | End of 2nd Conference Day | |
| 19.30 | CONFERENCE DINNER | |

Topic 1

Microstructured Devices for Process Intensification
 a) Reactors
 b) Unit Operations
 Topic 2: Structured Multiscale Devices (integrated in Topic 1)

Topic 3

Microsystems for Energy Generation and Distribution

Topic 4

Materials Aspects, Nanostructures and Nanoparticles

Topic 5

Characterization and Simulation of Microstructured Devices

Topic 6

Microstructured Devices as Tools in Chemical Research and Analytics

Friday, September 8, 2006

| | | |
|-------|--|----------------|
| 09.00 | KEYNOTE LECTURE H. Meyer | |
| Chair | J.-I. Yoshida | K.J. Caspary |
| | TOPIC 6 | TOPIC 1 |
| 09.40 | C.H. Hornung | R. de Graaf |
| 10.00 | C. Amador | S. Löbbcke |
| 10.20 | P. Watts | T. Dietrich |
| 10.40 | COFFEE BREAK | |
| | TOPIC 6 | TOPIC 1 |
| 11.10 | R. Kraehnert | D.M. Roberge |
| 11.30 | P. Eberhardt | J. Choe |
| 11.50 | K.-P. Zeyer | T. Westermann |
| 12.10 | POSTER AWARDS – CLOSING REMARKS | |
| 12.20 | End of the Conference Programme | |

Common Lecture Session of ISCRE 19 and IMRET 9

Wednesday, 6 September 2006

- 08.30 **ISCRE PLENARY LECTURE** Lecture Hall 1
Characterisation of multi-phase flows using MRI
 L. Gladden, University of Cambridge/UK
- ISCRE Topic 8: Microstructured Systems** Lecture Hall 1
- 09.25 **The screening of zeolitic catalytic coatings in a high throughput micro reactor**
 M.J.M. Mies, E.V. Rebrov, M.H.J.M. de Croon, J.C. Schouten, Eindhoven University of Technology/NL
- 09.50 **Methanol steam reforming in self-supporting micro-structured reactors: enhanced performance and kinetic analysis**
 N. Dupont, CNRS, Villeurbanne/F; G. Schäfer, Atotech Deutschland GmbH, Berlin/D; Y. Schuurman, A.C. van Veen, C. Mirodatos, CNRS, Villeurbanne/F
- 10.15 **CFD modelling of mass transfer with and without chemical reaction in the liquid-liquid slug flow capillary microreactor**
 M.N. Kashid, D.W. Agar, S. Turek, University of Dortmund/D
- 10.40 **Mass transfer in three-phase micro-structured systems**
 M.T. Kreutzer, F. Kapteijn, J.A. Moulijn, Delft University of Technology/NL
- ISCRE Topic 11: Polymer Reaction Engineering** Lecture Hall 2
- 09.25 **Time optimal production of a specified particle size distribution in emulsion polymerization**
 M. Rajabi-Hamane, S. Engell, University of Dortmund/D
- 09.50 **A novel, multiphase continuous-flow process for the synthesis of conjugated polymers for PLED applications**
 G. Bohner, D. Hürtgen, O. Laus, O. Köchel, T. Zech, hte Aktiengesellschaft, Heidelberg/D; N. Schulte, Merck OLED Materials GmbH, Frankfurt am Main/D
- 10.15 **High temperature nitroxide-mediated radical polymerization in a continuous microtube reactor: towards a better control of the polymerization reaction**
 C. Rosenfeld, C. Serra, C. Brochon, G. Hadziioannou, University of Strasbourg/F
- 10.40 **Mixing dynamics control in RIM machines**
 E. Erkoç, Universidade do Porto/P; R.J. Santos, Universidade do Porto/P and ESTG/IPVC - Instituto Politécnico de Viana do Castelo/P; M.I. Nunes, Universidade do Porto/P and Universidade de Aveiro/P; J.C.B. Lopes, Universidade do Porto/P and FluidInova, SA, Maia/P
- 11.05 **Closing Remarks ISCRE 19 – Introduction IMRET 9**
- 11.25 **COMMON PLENARY LECTURE** Lecture Hall 1
Advanced chemical processing using micro space
 K. Mae, Kyoto University/J
- 12.10 LUNCH

Wednesday, 6 September 2006

14:00 **KEYNOTE LECTURE** **Lecture Hall 1**
Microchannel process technology: past, present and future
 J. Lerou, Velocys Inc., Plain City, OH/USA

Lecture Hall 1

Chair: A. Gavriilidis, University College London/UK

**Topic 6: Microstructured Devices as Tools in
Chemical Research and Analytics**

14:40 **Advantages of microsystems technology in lead discovery**
 M. Chapelá, E. Garcia-Egido, M. Montebault, M. Fernandez-Suarez,
 S. Wong-Hawkes, D. Pardoe, GlaxoSmithKline Pharmaceuticals, Harlow/UK

15:00 **A micro-structured mesh contactor as a tool for screening
of G/L/S asymmetric hydrogenations**
 R. Abdallah, V. Meille, B. Fumey, C. De Bellefon, CNRS ESCPE Lyon,
 Villeurbanne/F

15:20 **Modular microchemical engineering – new aspects for
process intensification**
 O. Stange, A. Azzawi, M. Kroschel, F. Schael, Ehrfeld Mikrotechnik BTS
 GmbH, Wendelsheim/D; H.-E. Gasche, M. Grünewald, L. Mleczko,
 Bayer Technology Services GmbH, Leverkusen/D

15:40 COFFEE BREAK

**Topic 1: Microstructured Devices for
Process Intensification**

16:10 **Technologies and market trends in microreaction**
 B. Pieters, G. Andrieux, J.C. Eloy, Yole Development, Lyon/F

16:30 **A modular open and automated microprocess system
for process development and production**
 A. Lohf, Siemens AG, Fürth/D; T. Bayer, M. Kinzl, Siemens AG,
 Frankfurt am Main/D

16:50 **New multifunctional microstructured reactor for challenging
syntheses**
 T. Bieber, R. Dahlbeck, M. Dierselhuis, Syntics GmbH, Bochum/D;
 S. Wirtz, O. Narin, University of Bochum/D

17:10 **Methanol production FPSO plant concept using multiple
microchannel unit operations**
 A. Tonkovich, K. T. Jarosch, R. Arora, J. McDaniel, L. Silva,
 F. Daly, R. Litt, Velocys, Inc., Plain City, OH/USA

17:30 **POSTER DISCUSSION**

21:00 **End of the 1st Conference Day**

Wednesday, 6 September 2006

14:00 **KEYNOTE LECTURE** **Lecture Hall 1**
Microchannel process technology: past, present and future
 J. Lerou, Velocys Inc., Plain City, OH/USA

Lecture Hall 2

Chair: J.C. Schouten, Eindhoven University of Technology/NL

**Topic 3: Microsystems for Energy Generation
and Distribution**

14:40 **Thermal management in microscale fuel processing:
demonstration of an integrated silicon microreactor
based methanol steam reformer**
 K. Shah, R.S. Besser, Stevens Institute of Technology, Hoboken, NJ/USA

15:00 **Development of a micro reformer for PEM fuel cells
with a few hundred watts power output**
 L. Rochlitz, T. Aicher, Fraunhofer ISE, Freiburg/D

15:20 **A new compact microreactor without CO shift converter for
producing hydrogen in high yield by steam reforming of
methanol**
 T. Maki, S. Kudo, N. Kitao, K. Mae, Kyoto University/J

15:40 COFFEE BREAK

**Topic 5: Characterization and Simulation
of Microstructured Devices**

16:10 **Novel techniques for determination of residence time
distributions in microreactors**
 S. Lohse, University of Dortmund/D; I. Gerlach, Kyoto University/J;
 D. Janasek, P.S. Dittrich, Institute for Analytical Sciences, Dortmund/D;
 D.W. Agar, University of Dortmund/D

16:30 **Operation policy and blockage diagnosis for micro
chemical plants with external/internal numbering-up**
 T. Tominari, T. Fujioka, O. Tomomura, M. Kano, S. Hasebe,
 Kyoto University/J

16:50 **Modelling of the residence time distribution in microreactors**
 D. Boskovic, S. Loebbecke, FHI for Chemical Technology, Pfinztal/D

17:10 **Overcoming mass transfer limitations in Taylor flow microreactors**
 N. Shao, A. Gavriilidis, P. Angeli, University College London/UK

17:30 **POSTER DISCUSSION**

21:00 **End of the 1st Conference Day**

Thursday, 7 September 2006

09:00 **KEYNOTE LECTURE** **Lecture Hall 1**
Microstructured systems for industrial chemical production
 L. Falk, CNRS, Nancy/F

Lecture Hall 1

Chair: R.S. Besser, Stevens Institute of Technology, Hoboken, NJ/USA

Topic 6: Microstructured Devices as Tools in Chemical Research and Analytics

09:40 **Scaleable, microstructured plant for steam reforming of methane**
 E. Seris, G. Abramovitz, University of Sydney/AUS; A.M. Johnston, Optint, Sydney/AUS; B.S. Haynes, University of Sydney/AUS

10:00 **Ceramic catalytic plate heat exchanger for heterogeneously catalysed gas phase reactions**

C. Schmitt, D.W. Agar, F. Platte, University of Dortmund/D; B. Pawlowski, HITK e.V., Hermsdorf/D; M. Duisberg, Umicore AG & Co. KG, Hanau/D

10:20 **Ceramic gas-tight microreactors with catalytic coatings**

F. Meschke, ESK Ceramics GmbH, Kempten/D; V. Hessel, J. Schürer, Institut für Mikrotechnik Mainz GmbH/D; D.W. Agar, S. Lohse, University of Dortmund/D

10:40 COFFEE BREAK

Topic 3: Microsystems for Energy Generation and Distribution

11:10 **Hierarchical modelling of integrated microdevices for hydrogen production**

S.R. Deshmukh, N.S. Kaisare, D.G. Vlachos, University of Delaware, Newark, DE/USA

11:30 **Catalyst coatings in ceramic microreactors for steam reforming of methanol**

T. Conant, A. Karim, A. Datye, University of New Mexico, Albuquerque, NM/USA

11:50 **Partial oxidation of propane performed in microstructured reactor systems**

G. Kolb, H. Pennemann, R. Zapf, V. Hessel, H. Löwe, Institut für Mikrotechnik Mainz GmbH/D

12:10 **Study of oxidation of organic compounds in a microstructured catalytic reactor**

I.Z. Ismagilov, E.M. Michurin, L.T. Tsikoza, E.V. Matus, M.A. Kerzhentsev, Z.R. Ismagilov, Boreskov Institute of Catalysis, Novosibirsk/RUS; E.V. Rebrov, M.H.J.M. de Croon, J.C. Schouten, Eindhoven University of Technology/NL

12:30 **Stability limits of homogeneous combustion in a reverse-flow microreactor**

N.S. Kaisare, D.G. Vlachos, University of Delaware, Newark, DE/USA

12:50 LUNCH

Thursday, 7 September 2006

09:00 **KEYNOTE LECTURE** **Lecture Hall 1**
Microstructured systems for industrial chemical production
 L. Falk, CNRS, Nancy/F

Lecture Hall 2

Chair: T. Bayer, Siemens AG, Frankfurt am Main/D

Topic 4: Materials Aspects, Nanostructures and Nanoparticles

09:40 **Catalyst coating in lab- and technical-scale for microreactors of the DEMiS®-type**

E. Klemm, T. Schwarz, H. Döring, Chemnitz University of Technology/D; G. Markowz, F. Becker, A. Geißelmann, Degussa AG, Hanau/D; S. Schirrmeyer, K. Büker, Uhde GmbH, Dortmund/D

10:00 **Layer-by-layer self-assembly of catalyst particles as a catalyst integration method for microreactor applications**

L. Bednarova, Ultracell Corporation, Livermore, CA/USA; H. Qiu, W.Y. Lee, Stevens Institute of Technology, Hoboken, NY/USA

10:20 **Microfluidic synthesis and assembly of reactive polymer beads to form new structured polymer materials**

M. Bouqey, C. Serra, ECPM, Strasbourg/F; L. Prat, INPT, Toulouse/F; G. Hadziioannou, ECPM, Strasbourg/F

10:40 COFFEE BREAK

Topic 5: Characterization and Simulation of Microstructured Devices

11:10 **Multi-scale modelling of microstructured reactors for the oxidative dehydrogenation of ethane to ethylene**

B. Yang, T. Yuschak, T. Mazanec, A.L. Tonkovich, Velocys Inc., Plain City, OH/USA

11:30 **The influence of mixer geometry on the hydrodynamics of gas/liquid flows in rectangular micro channels**

M.J.F. Warnier, E.V. Rebrov, M.H.J.M. de Croon, V. Hessel, J.C. Schouten, Eindhoven University of Technology/NL

11:50 **Stability and Reynolds number dependence of Taylor flow in a micro chemical reactor**

V. van Steijn, M.T. Kreutzer, C.R. Kleijn, Delft University of Technology/NL

12:10 **μ PIV-analysis of Taylor flow in micro channels**

D. Malsch, M. Kielpinski, R. Merthan, J. Albert, G. Mayer, IPHT e.V., Jena/D; J.M. Köhler, Technical University of Ilmenau/D; H. Süße, M. Stahl, University of Jena/D; T. Henkel, IPHT e.V. Jena/D

12:30 **Self controlled droplet fusion of segmented sample streams**

M. Kielpinski, G. Mayer, J. Albert, D. Malsch, J. Felbel, Th. Henkel, IPHT e.V., Jena/D

12:50 LUNCH

Thursday, 7 September 2006

14:20 **KEYNOTE LECTURE** **Lecture Hall 1****Can microreactors be intensified? Alternative sources and forms of energy for process intensification**

A. Stankiewicz, DSM Research, Geleen and Delft University of Technology/NL

Lecture Hall 1

Chair: E. Klemm, Chemnitz University of Technology/D

Topic 1: Microstructured Devices for Process Intensification15:00 **Ionic liquid synthesis and polymerisation in a helix reactor**J.P. Brouwer, E. van Soest-Vercammen, S. Masuku, TNO Science and Industry, Apeldoorn/NL15:20 **Towards the re-design of industrial batch syntheses: microreactors for ionic liquid synthesis**C. Minnich, M.A. Liauw, RWTH Aachen/D15:40 **Life cycle assessment of microreaction technology versus conventional batch technology**

D. Kralisch, University of Jena/D

16:00 COFFEE BREAK

Topic 4: Materials Aspects, Nanostructures and Nanoparticles16:30 **Development of a high performance microdevice for solid phase dynamic extraction using the ice templating method**S. Mukai, Kyoto University/J; H. Nishihara, Tohoku University, Sendai/J; M. Wakabayashi, N. Fujiwara, H. Tamon, Kyoto University/J16:50 **Miniemulsion polymerization as a tool for the production of nano PMMA particles**S. Roos, A. Hüther, M. Braum, Degussa AG, Hanau/D17:10 **Microfluidic generation of nanoparticles by borohydride reduction**J. Wagner, Technical University of Ilmenau/D; T.R. Tshikhudo, University of Liverpool/UK; J.M. Köhler, Technical University of Ilmenau/D17:30 **Reactive particle precipitation in liquid microchannel flow**N. Kockmann, J. Kastner, P. Woias, University of Freiburg/D17:50 **End of the 2nd Conference Day**

19:30 Meeting time "Conference Dinner"

Thursday, 7 September 2006

14:20 **KEYNOTE LECTURE** **Lecture Hall 1****Can microreactors be intensified? Alternative sources and forms of energy for process intensification**

A. Stankiewicz, DSM Research, Geleen and Delft University of Technology/NL

Lecture Hall 2

Chair: M. Joanicot, Rhodia Laboratoire du Future, Pessac/F

Topic 6: Microstructured Devices as Tools in Chemical Research and Analytics15:00 **Response surface modelling of rate enhancement during fast temperature cycling of catalytic reactions in microreactors**S. Jensen, S. Thorsteinsson, O. Hansen, U.J. Quaade, Technical University of Denmark, Lyngby/DK15:20 **Multichannel quench-flow microreactor for high-throughput reaction kinetics monitoring on a chip**W.P. Bula, A. Kristianto, A. van den Berg, D.N. Reinhoudt, W. Verboom, J.G.E. Gardeniers, University of Twente, Enschede/NL15:40 **High throughput experimentation using the anhydrous segmented flow principle**G. Groß, C. Hamann, P.M. Günther, J.M. Köhler, Technical University of Ilmenau/D

16:00 COFFEE BREAK

Topic 6: Microstructured Devices as Tools in Chemical Research and Analytics16:30 **Use of micro mixers to control the molecular weight distribution in continuous two-stage nitroxide-mediated copolymerizations**C. Rosenfeld, C. Serra, C. Brochon, G. Hadziioannou, Université de Strasbourg/F16:50 **The purification of ionic liquids using aqueous liquid / liquid extraction in a micro mixer**S. Körsten, A. Stark, B. Ondruschka, G. Kreisel, University of Jena/D17:10 **Selective adsorption of solvents in a multiscale device**T. Henning, J.J. Brandner, L. Eichhorn, K. Schubert, Forschungszentrum Karlsruhe GmbH/D; M. Schreiber, M. Guengerich, H. Guenther, P.J. Klar, University of Marburg/D; V. Rebbin, M. Froeba, University of Giessen/D17:30 **Microstructure reactors for forced temperature oscillations of catalytic chemical reactions**M. Luther, J.J. Brandner, Forschungszentrum Karlsruhe GmbH/D; L. Kiwi-Minsker, A. Renken, EPF Lausanne/CH; K. Schubert, Forschungszentrum Karlsruhe GmbH/D17:50 **End of the 2nd Conference Day**

19:30 Meeting time "Conference Dinner"

Friday, 8 September 2006

09.00 **KEYNOTE LECTURE** **Lecture Hall 1**
Economical, industrial scale production of micro-structured components for electronic, automotive and chemical applications
 H. Meyer, HMTc, Berlin/D

Lecture Hall 1

Chair: J.-I. Yoshida, Kyoto University/J

Topic 6: Microstructured Devices as Tools in Chemical Research and Analytics

09:40 **The evaluation of plastic microcapillary films as a continuous flow compact disc microreactor**
 C.H. Hornung, I.R. Baxendale, S.V. Ley, M.R. Mackley, University of Cambridge/UK

10:00 **Design of a mesh microreactor for even flow distribution and narrow RTD to increase sequential kinetic screening capacity**
 C. Amador, P. Angeli, A. Gavriilidis, University College London/UK; E.A. Shaw, D.A. Wenn, CRL Ltd., Hayes/UK

10:20 **Conjugate addition of amines to unsaturated compounds in micro reactors**
 P. Watts, C. Wiles, The University of Hull/UK; H.H van den Vlekkart, A. Prak, Lionix BV, Enschede/NL

10:40 COFFEE BREAK

Topic 6: Microstructured Devices as Tools in Chemical Research and Analytics

11:10 **A novel micro-structured quartz reactor for kinetic and in-situ spectroscopic studies in heterogeneous catalysis**
 R. Kraehnert, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D; P. Beato, Fritz-Haber-Institut der MPG, Berlin/D; T. Frank, Little Things Factory GmbH, Ilmenau/D; G. Weinberg, R. Schlögl, Fritz-Haber-Institut der MPG, Berlin/D; M. Baerns, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D

11:30 **Development of a magnetic force driven ratchet like bioreactor-chip**
 P. Eberhardt, T. Rogge, M. Franzreb, S. Berensmeier, Forschungszentrum Karlsruhe GmbH/D

11:50 **Feasibility studies and the dynamics of catalytic liquid phase esterification reactions in a micro plant**
 A.A. Kulkarni, National Chemical Laboratory, Pune/IND; K.-P. Zeyer, T. Jacobs, M. Kasperleit, MPI für Dynamik komplexer technischer Systeme, Magdeburg/D; A. Kienle, MPI für Dynamik komplexer technischer Systeme and University of Magdeburg/D

12:10 **Poster Awards – Closing Remarks**

12:20 End of the Conference

Friday, 8 September 2006

09.00 **KEYNOTE LECTURE** **Lecture Hall 1**
Economical, industrial scale production of micro-structured components for electronic, automotive and chemical applications
 H. Meyer, HMTc, Berlin/D

Lecture Hall 2

Chair: K.J. Caspary, Uhde GmbH, Dortmund/D

Topic 1: Microstructured Devices for Process Intensification

09:40 **Inherently safe reactor design using micro reactors – experiments and simulations performed by Akzo Nobel safety services**
 R. de Graaf, Akzo Nobel, Deventer/NL

10:00 **Synthesis and purification of trinitroglycerin in microfluidic devices**
 D. Boskovic, T. Türcke, S. Lößbecke, FhI for Chemical Technology, Pfinztal/D; J. Haase, C. Ruloff, Dynamit Nobel GmbH Explosivstoff- u. Systemtechnik, Leverkusen/D

10:20 **New microreaction modules to perform reactions with aggressive chemicals**
 T. Dietrich, A. Freitag, R. Scholz, mikroglass chemtech GmbH, Mainz/D

10:40 COFFEE BREAK

Topic 1: Microstructured Devices for Process Intensification

11:10 **Microreactors as efficient devices to control autocatalytic reactions**
 D.M. Roberge, S. van Nispen, L. Ducry, Lonza Ltd, Visp/CH

11:30 **Lithium-halogen exchange reaction using microreaction technology**
 J. Choe, J.H. Seo, Y. Kwon, LG Chem Research Park, Daejeon/ROK; K.H. Song, Korea University, Seoul/ROK

11:50 **Novel catalytic membrane microchannel reactor**
 T. Westermann, T. Melin, RWTH Aachen/D

12:10 **Poster Awards – Closing Remarks**

12:20 End of the Conference

Poster no.

Topic 1: Microstructured Devices for Process Intensification

- 1 **Synthesis of bisphenol F using micromixers based on collision of fluid segments**
N. Daito, The Research Association of Micro Chemical Process Technology, Kyoto/J; N. Aoki, J. Yoshida, K. Mae, Kyoto University/J
- 2 **Multi parallel high pressure reactions in MTP format – the HPMR 50-96 advance**
A. Allwardt, University of Rostock/D; S. Holzmüller-Laué, C. Wendler, CELISCA, Rostock/D; N. Stoll, University of Rostock/D
- 3 **Development and design of catalytic microreactors for heterogeneous oxidation**
K. Yube, M. Furuta, K. Mae, Kyoto University/J
- 4 **A new micromixer for instant mixing and heating under high pressure and high temperature**
K. Mae, Kyoto University/J; A. Syzuki, National Institute of Advanced Industrial Science and Technology, Sendai/J; T. Maki, H. Sato, Kyoto University/J; K. Arai, Tohoku University, Sendai/J
- 5 **A numerical study on a macroscopic Stokes number based on shear-induced particle collision in a micro-separator/classifier**
S. Ookawara, Tokyo Institute of Technology/J; D. Street, Fluent Asia Pacific, Tokyo/J; K. Ogawa, Tokyo Institute of Technology/J
- 6 **Miniaturized process for industrial production**
R. Abdallah, U. Budde, R. Braun, Schering AG, Berlin/D; K. Jähnisch, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D; T. Dietrich, F. Freitag, mikroglas chemtech GmbH, Mainz/D; L. Küpper, Infrared Fiber Sensors, Aachen/D
- 7 **Continuous flow manipulation of microparticles within microfluidic devices**
X. Zhang, S.J. Haswell, The University of Hull/UK
- 8 **Microtube and microchannel devices for continuous supercritical water chemical synthesis**
Y. Wakashima, K. Hatakeda, A. Suzuki, National Institute of Advanced Industrial Science and Technology(AIST), Sendai/J
- 9 **Microfluidic device for single distillation system**
Y. Iwatsubo, Osaka Prefecture University/J; M. Yamada, University of Tokyo/J; M. Yasuda, M. Seki, Osaka Prefecture University/J
- 10 **Formation of biphasic organic droplets in microchannels for producing geometrically anisotropic polymer particles**
T. Nisisako, J. Tatsu, T. Torii, University of Tokyo/J
- 11 **Synthesis of 3-methyl-2-cyclopentenone using a microreactor**
J. Choe, LG Chem Research Park, Daejeon/ROK; Y.J. Kim, K.H. Song, Korea University, Seoul/ROK
- 12 **Performance evaluation of deep microchannel reactor by using flow visualization technique and an enzyme reaction**
K. Sotowa, K. Takagi, S. Sugiyama, University of Tokushima/J
- 13 **Multi-phase enzymatic synthesis in microchannels**
K. Koch, R.J.F. Van den Berg, P.J. Nieuwland, J.C.M. Van Hest, F.P.J.T. Rutjes, Radboud University Nijmegen/NL

Poster no.

- 14 **Process intensification in electroorganic synthesis using a segmented microstructured device**
A. Attour, Laboratoire des Sciences de Génie Chimique, Nancy/F; S. Rode, F. Lapique, LSGC, Nancy/F; A. Ziogas, Institut für Mikrotechnik Mainz GmbH/D; M. Matlosz, LSGC, Nancy/F
- 15 **Dehydrodimerization of isobutene to 2,5-dimethyl-1,5-hexadiene in a microstructured reactor**
T. Taubert, P. Scholz, B. Ondruschka, University of Jena/D
- 16 **Micro process engineering in the two-phase hydroformylation of 1-octene using a water-soluble catalyst**
E. Dietzsch, J. Müller, N. Völkel, E. Klemm, Chemnitz University of Technology/D
- 17 **Multistep process for synthesis of pharmaceutical intermediates by ozonation and hydrogenation using micro chemical engineering with integrated miniaturized fiber-optical diamond ATR sensor**
K. Jähnisch, U. Dingerdissen, U. Benstrup, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D; L. Küpper, Infrared fiber sensors, Aachen/D; U. Budde, K. Lovis, R. Abdallah, Schering AG, Berlin/D; T. Dietrich, A. Freitag, mikroglas chemtech GmbH, Mainz/D
- 18 **Gas-liquid two-phase flow in meandering microchannels**
D.M. Fries, ETH Zurich/CH; S. Waelchli, ABB Turbo Systems, Baden/CH; P. Rudolf von Rohr, ETH Zurich/CH
- 19 **A combined theoretical and experimental approach for the improvement of a nitration process using microreaction technology**
H. De Meyer, A. Gottschalk, Process Design Center, Breda/NL; U. Brändli, G. Weingärtner, Dottikon Exclusive Synthesis/CH; A. Freitag, T. Dietrich, mikroglas chemtech GmbH, Mainz/D; W. Ferstl, M. Schwarzer, S. Löbbbecke, FhI für Chemische Technologie, Pfinztal (Berghausen)/D
- 20 **Process intensification of an industrial β -blocker synthesis**
C.B. Minnich, RWTH Aachen/D; A. Aigner, Noveon Pharma GmbH & Co. KG, Raubling/D; M.A. Liauw, RWTH Aachen/D
- 21 **Geometry optimization of a microstructured falling film absorber used for VOC absorption**
N. Mhiri, H. Monnier, L. Falk, LSGC-CNRS, Nancy/F
- 22 **Mixed metal sputtering for catalytic microreactor fabrication**
A. Iles, National Institute for Materials Science, Tsukuba, Ibaraki/J; N. Pamme, University of Hull/UK; R.C.R. Wootton, John Moores University, Liverpool/UK
- 23 **Scaled-up production of monodisperse droplets by multiple-channel integration on-a-chip**
T. Nisisako, T. Torii, University of Tokyo/J
- 24 **Fischer-Tropsch synthesis in microstructured reactors: the importance of flow distribution on both the process and coolant streams**
K. Jarosch, A.L.Y. Tonkovich, S.P. Fitzgerald, Velocys Inc., Plain City, OH/USA
- 25 **Development of new type of plate static mixer combined with splitting, rotation and recombination**
Y. Hirata, Osaka University, Toyonaka/J; K. Ohkawa, Astellas Pharma Co., Ltd., Osaka/J; Y. Inoue, Osaka University, Toyonaka/J
- 26 **Development of a pilot plant using the numbering up of microreactors**
S. Togashi, T. Miyamoto, T. Sano, M. Suzuki, HITACHI, Ltd., Ibaraki/J

Poster no.

- 27 **Feasibility of high-throughput modular fabrication of glass lab-on-chips and plant-on-chips without photolithography by automated microcontact printing**

B. Hannes, E. Bou Chakra, M. Cabrera, CNRS, Ecully/F

Topic 3: Microsystems for Energy Generation and Distribution

- 28 **Reforming of Diesel fuel in a micro reactor for APU systems**

J. Thormann, P. Pfeifer, K. Schubert, Forschungszentrum Karlsruhe GmbH/D; U. Kunz, Technische Universität Clausthal, Clausthal-Zellerfeld/D

- 29 **Microchannel-based fuel processors for portable power applications**

D. Palo, Pacific Northwest National Laboratory, Corvallis, OR/USA; R. Dagle, J. Holladay, Pacific Northwest National Laboratory, Richland, WA/USA; D. Howe, Pacific Northwest National Laboratory, Corvallis, OR/USA

- 30 **Hydrogen generation in micro-structured reactors by reformation of bioethanol**

H. Ehrich, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D; G. Kolb, Institut für Mikrotechnik Mainz GmbH/D; K. Jähnisch, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D

- 31 **Biodiesel production in multi-channel microreactor**

G. Jovanovic, J. Parker, B. Paul, K. Drost, Oregon State University, Corvallis, OR/USA

- 32 **MEMS-enabled processing of liquid fuels for fuel cell applications**

A. Fedorov, L. McLeod, M. Varady, J.M. Meacham, F.L. Degertekin, Georgia Institute of Technology, Atlanta, GA/USA

Topic 4: Materials Aspects, Nanostructures and Nanoparticles

- 33 **Fabrication and mechanical testing of high-pressure glass microreactor chips**

R. Tiggelaar, F. Benito-Lopez, D. Hermes, R. Egberink, H. Gardeniers, W. Verboom, D.N. Reinhoudt, A. van den Berg, University of Twente, Enschede/NL

- 34 **Production of various fine metallic soap particles using a microreactor**

H. Nomura, The Research Association of Micro Chemical Process Technology, Kyoto/J; K. Mae, Kyoto University/J

- 35 **Control of nuclei formation and aggregation processes for nano-particles using a microreactor with same axle dual pipe**

T.T. Tsujiuchi, Kyoto University/J; H.N. Nagasawa, Fuji Photo Film Co., Ltd., Kanagawa/J; T.M. Maki, K.M. Mae, Kyoto University/J

- 36 **Mesoporous silica films as catalyst support for microstructured reactors: preparation and characterization**

Q. Muraza, Eindhoven University of Technology/NL; P.J. Kooyman, U. Lafont, Delft University of Technology/NL; P.A. Albouy, Université Paris-Sud, Orsay/F; T. Khimyak, University of Cambridge/UK; E. Rebrov, M.H.J.M. de Croon, J.C. Schouten, Eindhoven University of Technology/NL

- 37 **Synthesis zeolite beta coatings on ALD-modified borosilicate glass for application in microstructured reactors**

Q. Muraza, E.V. Rebrov, J. Chen, Eindhoven University of Technology/NL; M. Putkonen, L. Niinisto, Helsinki University of Technology/FIN; M.H.J.M. de Croon, J.C. Schouten, Eindhoven University of Technology/NL

Poster no.

- 38 **Control of particle size distribution through polymerization using a micromixer/tube reactor system**

T. Maki, F. Nakanishi, T. Hayashi, Y. Okubo, K. Mae, Kyoto University/J

- 39 **A continuous flow microreactor for chemical bath deposition**

P.H. Mugdur, Y.J. Chang, S.Y. Han, Oregon State University, Corvallis, OR/USA; A.A. Morrone, Seagate Technology, Minneapolis, MN/USA; S.O. Ryu, Oregon State University, Corvallis, OR/USA; T.J. Lee, Yeungnam University, Kyongsan/ROK; C.-H. Chang, Oregon State University, Corvallis, OR/USA

- 40 **Aerosol generation and handling in microchannels**

N. Kockmann, S. Dreher, M. Engler, P. Woias, University of Freiburg/D

- 41 **Preparation of inorganic-organic hybrid particles in microreactors**

A. Koenig, M. Bouquey, C. Brochon, LIPHT-UPL, Strasbourg/F; L. Prat, LGC-INPT, Toulouse/F; C. Serra, G. Hadziioannou, LIPHT-UPL, Strasbourg/F

- 42 **Introduction of surface-modified Au-nanoparticles into the micro flow-through polymerization of styrene**

P.M. Günther, G.A. Grob, J. Wagner, Technical University of Ilmenau/D; F. Jahn, IPHT e.V., Jena/D; J.M. Köhler, Technical University of Ilmenau/D

- 43 **A special micromixer for the continuous precipitation of particles**

A. Azzawi, K. Nagy, F. Herbstritt, O. Stange, Ehrfeld Mikrotechnik BTS GmbH, Wendelsheim/D

- 44 **Synthesis of functionalized nanoparticles using microreactor**

Y.F. Su, H. Kim, H. Qiu, R. Halder, S. Koven, W.Y. Lee, Stevens Institute of Technology, Hoboken, NJ/USA

Topic 5: Characterization and Simulation of Microstructured Devices

- 45 **Experimental determination of flow distribution in microreactors by hot wire anemometry**

P. Pfeifer, K. Schubert, Forschungszentrum Karlsruhe GmbH/D

- 46 **Applications of refrigeration using micro heat exchangers**

G. Rinke, A. Ewinger, S. Kerschbaum, Forschungszentrum Karlsruhe GmbH/D; H. Holpe, Biowerk Sohland GmbH/D

- 47 **Micro process engineering for industrial production of biodiesel**

G. Rinke, S. Kerschbaum, A. Wenka, Forschungszentrum Karlsruhe GmbH/D; H. Holpe, Biowerk Sohland GmbH/D

- 48 **Heat transfer in a micro-exchanger in convection and boiling mode**

P. Font, V. Duchene, C. Boyer, J.M. Schweitzer, Institut Français du Pétrole, Vernaison/F

- 49 **Numerical study of mixing in a staggered herringbone mixer**

S. Kee, A. Gavriilidis, University College London/UK

- 50 **Testing and simulation of ceramic micro heat exchangers**

B. Alm, U. Imke, R. Knitter, U. Schygulla, S. Zimmermann, Forschungszentrum Karlsruhe GmbH/D

- 51 **Numerical simulation of interfacial mass transfer accompanied by a first order chemical reaction in segmented gas-liquid flow within a mini-channel**

A. Onea, M. Wörner, Forschungszentrum Karlsruhe GmbH/D; D.G. Cauci, Universität Karlsruhe/D

Poster no.

- 52 **Evaluation of microstructure profiles on polymer substrates**
H. Payer, T. Haschke, University of Siegen/D; K. Graf, E. Bonaccorso, MPI for Polymer Research, Mainz/D; W. Wiechert, University of Siegen/D
- 53 **Effect of reactor size and choice of fuel on the stability of homogeneous and catalytic microburners**
S.R. Deshmukh, N.S. Kaisare, D.G. Vlachos, University of Delaware, Newark, DE/USA
- 54 **Reactor performance of a microreactor with rectangular microchannels**
H. Nagamoto, J. Sato, Y. Kobayashi, J. Otomo, Kogakuin University, Tokyo/J; E. Oshima, High Pressure Gas Safety Institute of Japan, Tokyo/J
- 55 **Hydrodynamic regimes of gas-liquid flow in a microreactor channel**
R. Pohorecki, P. Sobieszuk, K. Kula, W. Moniuk, M. Zieliński, Warsaw University of Technology/PL
- 56 **Two-phase pressure drop in thin-gap microreactor with electrochemically generated bubbles**
J. Kristal, J. Havlica, V. Jiricny, ICPF CAS CZ, Prague/CZ
- 57 **Development and testing of a fast sensor for residence time distribution of gas flow through microreactors**
T. Stief, DECHEMA e.V., Frankfurt am Main/D; U. Schygulla, Forschungszentrum Karlsruhe GmbH/D; H. Geider, O.-U. Langer, DECHEMA e.V., Frankfurt am Main/D; E. Anurjew, J. Brandner, Forschungszentrum Karlsruhe GmbH/D
- 58 **Design and flow analysis of passive micromixers**
T. Takase, O. Tonomura, M. Kano, S. Hasebe, Kyoto University/J
- 59 **Micro-fluidic devices in chemical sensing of flavour and fragrances**
M. Schimmelpfennig, M. Bannert, K.-H. Feller, K. Dornbusch, University of Applied Sciences Jena/D
- 60 **Active micro mixer for dispersing two liquid phases with high viscosities**
T. Seemann, N. Salk, A. Rota, Fhl IFAM, Bremen/D; M. Schlüter, Institut für Umweltverfahrenstechnik, Bremen/D
- 61 **Heat-transfer measurements in a falling-film microreactor**
J.M. Commenge, T. Obein, J. Raig Colon, G. Genin, X. Framboisier, S. Rode, LSGC-ENSIC, Nancy/F; V. Schanen, P. Pitiot, Rhodia Research Center, Lyon/F; M. Matlosz, L. Falk, LSGC-ENSIC, Nancy/F
- 62 **CFD and kinetic methods for mass transfer determination in a mesh micro-structured gas-liquid-solid reactor**
R. Abdallah, P. Magnico, B. Fumey, C. De Bellefon, CNRS ESCPE Lyon, Villeurbanne/F
- 63 **Evaluation of static micro mixers for flow-through extraction by emulsification**
T. Sprogies, G.A. Groß, J.M. Köhler, Technical University of Ilmenau/D
- 64 **Electric potential profiles in microsystems with a narrow acid-base boundary**
M. Svoboda, Z. Slouka, J. Lindner, D. Snita, Institute of Chemical Technology, Prague/CZ
- 65 **Modelling and simulation of nonreactive and reactive liquid phase mixing in a T-shaped microreactor**
D. Bothe, C. Stemich, RWTH Aachen/D; H.-J. Warnecke, University of Paderborn/D

Poster no.

- 66 **Toolkit for computational fluidic simulation and interactive parametrization of segmented flow based fluidic networks**
N. Gleichmann, D. Malsch, M. Kieplinski, G. Mayer, T. Henkel, IPHT e.V., Jena/D
- 67 **Design of tubular microreactors with desired product distribution**
O. Tonomura, S. Nagahara, M. Kano, S. Hasebe, Kyoto University/J
- 68 **Desulfurization of fuels in continuous flow photo microreactor**
G. Jovanovic, A. Alraie, Oregon State University, Corvallis, OR/USA
- 69 **Numerical and experimental investigations on liquid mixing in T-type micromixers**
A. Soleymani, E. Kolehmainen, I. Turunen, Lappeenranta University of Technology/FIN
- 70 **CFD-based optimization of standard slit interdigital micromixers**
I. Turunen, A. Soleymani, E. Kolehmainen, Lappeenranta University of Technology/FIN
- 71 **Micromixer based on thin metal foam plates**
I. Yuranov, P. Nihan, A. Renken, L. Kiwi-Minsker, EPF Lausanne/CH
- 72 **Gas-liquid micro-structured contactors in-silico**
A. Leclerc, C. De Bellefon, D. Schweich, CNRS-ESCE Lyon, Villeurbanne/F; P. Pouteau, C. Delattre, CEA-LETI, Grenoble/F

Topic 6: Microstructured Devices as Tools in Chemical Research and Analytics

- 73 **Enhancement of product selectivity of electrophilic aromatic substitution reactions using micromixing**
J. Yoshida, S. Suga, A. Nagaki, Kyoto University/J; K. Midorikawa, Nippon Chemicals, Chiba/J
- 74 **Synthesis of photochromic diarylethenes using a microflow system**
Y. Ushijogi, T. Hase, Y. Iinuma, Yamada Chemical, Kyoto/J; J. Yoshida, Kyoto University/J
- 75 **Controlled/living cationic polymerization using microsystems initiated by trifluoromethanesulfonic acid**
T. Iwasaki, Idemitsu Kosan Co. Ltd., Sodegaura/J; J. Yoshida, Kyoto University/J
- 76 **Electronically programmable membranes for improved biomolecule handling in micro-compartments on chip**
S. Chemnitz, U. Tangen, P.F. Wagler, T. Maeke, J.S. McCaskill, University of Bochum, Dortmund/D
- 77 **Chemistry under supercritical CO₂ conditions in a glass chip**
F. Benito-Lopez, R. Tiggelaar, R. Egberick, D. Hermes, W. Verboom, H. Gardeniers, A. van den Berg, D.N. Reinhoudt, University of Twente, Enschede/NL
- 78 **Micro-enzyme-membrane reactor – process intensification, screening, education**
D.H. Müller, M.A. Liauw, L. Greiner, RWTH Aachen/D
- 79 **Continuous classification of droplets in microchannels**
H. Maenaka, Osaka Prefecture University/J; M. Yamada, University of Tokyo/J; M. Yasuda, M. Seki, Osaka Prefecture University/J
- 80 **Immobilised crown ethers as in situ protecting groups within flow reactors**
G.P. Wild, C. Wiles, P. Watts, S.J. Haswell, The University of Hull/UK

POSTER PROGRAMME

Poster no.

- 81 **Chemoselective synthesis in continuous flow reactors**
C. Wiles, P. Watts, S.J. Haswell, The University of Hull/UK
- 82 **The use of solid-supported reagents for the multi-step synthesis of analytically pure compounds in a miniaturised flow reactor**
C. Wiles, P. Watts, S. J. Haswell, The University of Hull/UK
- 83 **Electrochemical synthesis in flow reactors**
P. Watts, P. He, T. Nayyar, S. J. Haswell, The University of Hull/UK
- 84 **A miniaturized calorimeter for the determination of the calorific value of combustible gases**
J. Lerchner, H.-J. Schneider, G. Wolf, TU Bergakademie Freiberg/D; S. Sarge, D. Hansen, PTB Braunschweig/D
- 85 **Droplets manipulation in micro-channels**
N. Di Miceli, L. Prat, P. Cagnet, C. Gourdon, CNRS, Toulouse/F
- 86 **Enhancement of reaction rates by segmented flow technique**
 T. Wirth, D.A. Barrow, B. Ahmed, Cardiff University/UK
- 87 **Integrated IR laser system for microfluidic detection and analysis**
Y. Sarov, T. Ivanov, K. Ivanova, B. Volland, University of Kassel/D; I. Capek, Polymer Institute, Bratislava/SK; I.W. Rangelow, University of Kassel/D
- 88 **Conformational and hybridization reactivity changes of DNA molecules in a microchannel laminar flow device**
K. Yamashita, T. Honda, M. Miyazaki, Y. Yamaguchi, H. Nakamura, H. Maeda, National Institute of Advanced Science and Technology (AIST), Saga/J
- 89 **Homogeneous catalyzed oxidation reaction for the production of functionalized aldehydes using microreaction technology**
W. Ferstl, M. Schwarzer, S. Loebbecke, FHI für Chemische Technologie, Pfinztal (Berghausen)/D; E. Fritz-Langhals, J. Stohrer, Consortium für Elektrochemische Industrie GmbH, Munich/D
- 90 **RT-PCR in flow-through micro reactors: thermal and fluidic concepts**
 J. Felbel, A. Reichert, M. Kielpinski, M. Urban, T. Henkel, IPHT e.V., Jena/D; N. Häfner, M. Dürst, University of Jena/D; J. Weber, Analytik Jena AG/D
- 91 **Photocatalytic reaction in microreactors**
Y. Matsushita, M. Iwasawa, N. Ohba, S. Kumada, K. Sakeda, T. Suzuki, T. Ichimura, Tokyo Institute of Technology/J
- 92 **Transparent silicon/glass microreactor for high pressure and high temperature applications**
F. Trachsel, C. Hutter, P. Rudolf von Rohr, ETH Zurich/CH
- 93 **New tools for teaching: homogeneous catalysis using microflow reactors**
M. Giménez-Pedrés, P.W.N.M. van Leeuwen, Institute of Chemical Research of Catalonia, Tarragona/E
- 94 **A microstructured reaction calorimeter for the measurement of strong exothermic reactions**
J. Antes, D. Schifferdecker, S. Löbbecke, H. Krause, Fraunhofer ICT, Pfinztal/D
- 95 **Online analysis as a suitable tool for process screening and optimization**
W. Ferstl, W. Schweikert, M. Schwarzer, S. Loebbecke, FHI für Chemische Technologie, Pfinztal (Berghausen)/D

POSTER PROGRAMME

Poster no.

- 96 **Enhancing surface activity in silicon microreactor: use of black silicon as catalyst support for chemical and biological applications**
 M. Roumanie, C. Pijolat, Ecole des Mines de Saint Etienne/F; F. Mittler, M. Cochet, P. Pouteau, C. Delattre, CEA-LETI, Grenoble/F
- 97 **Modular microreaction system – a powerful platform for product and process development**
M. Kroschel, O. Stange, F. Herbstritt, K. Nagy, Ehrfeld Mikrotechnik BTS GmbH, Wendelsheim/D
- 98 **Ozonation of olefins in micro-structured reactors**
 N. Steinfeldt, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D; R. Abdallah, Schering AG, Berlin/D; U. Dingerdissen, K. Jähnisch, Leibniz-Institut für Katalyse e.V. an der Universität Rostock, Berlin/D
- 99 **LTCC-technology for microreaction devices**
G. Groß, P.M. Günther, M. Hinz, T. Theleman, M. Fischer, H. Bartsch de Tores, C. Koch, H. Thust, J.M Köhler, Technical University of Ilmenau/D
- 100 **Micro fluidic arrangement with integrated micro spot array for characterization of pH and solvent polarity**
A. Thete, G.A. Gross, Technical University of Ilmenau/D; T. Henkel, IPHT e.V., Jena/D; J.M. Köhler, Technical University of Ilmenau/D
- 101 **Progress towards an integrated microchemical system for high-throughput dendrimer synthesis**
 B. Abhinkar, Y. Tennico, S.-H. Liu, J.T. Rundel, T. Tseng, V.T. Remcho, B.K. Paul, C.-H. Chang, Oregon State University, Corvallis, OR/USA
- 102 **Microreactors applied to stereoselective photoreactions**
K. Sakeda, K. Wakabayashi, T. Suzuki, Tokyo Institute of Technology/J; T. Wada, Y. Inoue, Osaka University/J; Y. Matsushita, T. Ichimura, Tokyo Institute of Technology/J
- 103 **“Syn & Sort”: a chip based tool for combinatorial synthesis and biological screening**
 M. Gebinoga, A. Albrecht, T. Lübeck, G.A. Groß, Technical University of Ilmenau/D; T. Henkel, P. Hoffmann, U. Klemm, G. Schlingloff, IPHT e.V., Jena/D; T. Frank, Little Things Factory, Ilmenau/D; A. Schober, Technical University of Ilmenau/D
- 104 **Hydrogenation of a pharmaceutical intermediate and flow regimes in a catalyst trap microreactor**
 S. McGovern, H. Gadre, R.S. Besser, Stevens Institute of Technology, Hoboken, NJ/USA

▼ POSTER SESSION

The Poster Session with discussions with the contributors at the posters will take place on Wednesday, 6 September from 17.30h until 21.00h. The authors are also requested to be present at their poster(s) for discussions during the coffee breaks.

The posters will be displayed continuously throughout the conference.

A prize will be awarded for the two best posters.

The conference will be accompanied by an exhibition showing recent developments in miniaturization for chemical, pharmaceutical and biotechnological applications. This is a good opportunity for companies and research institutions to present their latest results, products and equipment.

Located in an area adjacent to the lecture rooms and poster sessions, the exhibition will give all participants an outstanding opportunity to inform and communicate.

The registration fee for a netto exhibition space of 6sq metres is 1,600.00 € plus 7% VAT including one free ticket for the scientific programme. For further details concerning application for stands and the organization of the exhibition please contact the conference secretariat (geiling@dechema.de).

LIST OF EXHIBITORS

(as of 24 April 2006)

cetoni GmbH, Korbussen/D
CPC – Cellular Process Chemistry Systems GmbH, Mainz/D
Ehrfeld Mikrotechnik BTS GmbH, Wendelsheim/D
HNP Mikrosysteme GmbH, Parchim/D
mikroglas chemtech GmbH, Mainz/D
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CONFERENCE DINNER

Thursday, 7 September 2006

19:30 – 23:30 h

What better way to begin the evening than to join in a short tour of the historical city of Potsdam before the Conference Dinner. Once you arrive at the Kutschstall Ensemble (stables complex) you will be given a truly royal reception.

The Kutschstall Ensemble, the former royal stables with the stable yard behind and the surrounding historical buildings, is situated in the centre of the baroque Old City of Potsdam. It forms part of the important listed buildings area at the NEUER MARKT (new market), one of the few historical sites whose structure and form have almost been completely preserved intact.

The Conference Dinner will take place in the Arena which was originally built as the royal exercise course and later served as the stables until the beginning of the 20th century. It was fully restored in April 2006. Welcome to a charming historical location dating from the time of FREDERICK THE GREAT, King of Prussia, where you will enjoy the culinary delights and an eventful evening among your friends and colleagues under the motto "PRUSSIAN POMP AND SPLENDOR".

Ticket: 72,00 € (incl. VAT)
Registration necessary

Meeting Point: Dorint Novotel Sanssouci
Time: 19.30 h

POTSDAM – A TRULY EUROPEAN CITY

Without any doubt, Potsdam is one of the most beautiful cities in Germany. Integrated into the attractive cultural ambience, the capital city of the State of Brandenburg is a natural destination to satisfy the most varied interests and demands.

Potsdam's most popular sight is the Schloß Sanssouci palace located in the park to which it gives its name. However, there are far more than the former summer residency of Frederick the Great and the Sanssouci park to make your visit worthwhile. The Alexandrowka, the Holländisches Viertel (the Dutch quarter) and the Weaver's quarter – the historic sections of the city – provide the flair of a city steeped in European tradition.



The Babelsberg Filmpark, the Biosphäre nature experience exhibition, the National Horticulture Show park, known as the BUGA park, built for the National Horticulture Show in 2001, the tourist cruise ships and the crown estate, the Krongut Bornstedt, are all special attractions which will make your visit to Potsdam a very pleasurable experience.

Walking Tours through Potsdam

Sightseeing tour including a guided tour of Sanssouci Palace
Tuesday through Sunday
11 a.m. to 2.30 p.m./ Starting at Luisenplatz in Potsdam
per person 26,00 €

Walking tour of the old city

Walking tour of the city centre including the New Market,
Old Market and the Dutch Quarter
Daily 3 p.m. to 5 p.m.
per person 8,00 €

Tickets are available at the Tourist Info Office
or by phone: +49 (0) 331-27558 0

Detailed information will be given by

Potsdam Tourismus Service
Attn. Mrs. M. Müller
Am Neuen Markt 1
D-14467 Potsdam
Phone: +49 (0) 331-27558 54
Fax: +49 (0) 331-27558 79
E-mail: tourismus-service@potsdam.de
Internet: www.potsdamtourismus.de

All sightseeing tours are accompanied by an English-speaking guide.
Some more tours will be available on the conference website later on.

Websites of interest

www.potsdam.de
www.berlin.de



CONFERENCE LOCATION

Dorint Novotel Sanssouci
Berlin-Potsdam
Jägerallee 20

www.tagungshotel.com/hotel_1070879246.htm
(please note the map on the back of the conference programme for information on how to get there)



LANGUAGE

The conference language is English.

CONFERENCE OFFICE

DECHEMA e.V.
Ms. Heike Geiling
Theodor-Heuss-Allee 25
D-60486 Frankfurt am Main
Phone: +49 (0) 69 7564 280
Fax: +49 (0) 69 7564 176
E-mail: geiling@dechema.de

PUBLICATIONS

A list of participants who have registered by **13 August 2006** will be available at the conference secretariat in Potsdam.

The book of abstracts will be distributed at the beginning of the conference.

A special issue of CEJ containing the manuscripts selected by the CEJ guest editors will be published by Elsevier after the conference. It will be mailed directly to participants by Elsevier (except holders of student tickets).

REGISTRATION

Please complete all appropriate sections of the enclosed registration form and return it to DECHEMA e.V. as soon as possible or use the online registration at the website <http://events.dechema.de/imret9> to facilitate the organization.

Confirmation of registration will be sent after receipt of the registration form. Conference ticket, name tag, book of abstracts and list of participants will be available at the conference office in Potsdam.

REGISTRATION FEES

Registration Fees for IMRET 9 only

Conference ticket for

| | |
|--------------------------------------|----------|
| Participant from academia | 350.00 € |
| Participant from industry | 660.00 € |
| Student (with Student identity card) | 60.00 € |

In accordance with German tax law (4.22 UStG), VAT is not applicable.

The fee includes the coffee and soft drinks during breaks, lunch, snacks during the poster discussion on Wednesday, 6 September 2006, list of participants, book of abstracts, and a special issue of Chemical Engineering Journal (CEJ) with selected papers to be published by Elsevier after the conference (except holders of student tickets).

Registration Fees for ISCRE 19 and IMRET 9 (Combi Ticket)

| | |
|--------------------------------------|----------|
| Participant from academia | 610.00 € |
| Participant from industry | 820.00 € |
| Student (with Student identity card) | 310.00 € |

REMITTANCE OF FEES

Fees should be remitted on receipt of the invoice in favour of DECHEMA e.V., stating the invoice number, the name of the participant and the keyword IMRET9, to one of the DECHEMA accounts as stated on the invoice. Payment by credit card is also possible (see registration form).

CANCELLATIONS AND REFUNDS

A fee of 30.00 € for administration costs will be charged for cancellations received by **13 August 2006**. Thereafter 80% of the registration fee will be invoiced; however the book of abstracts and the Special Issue will be mailed. Only written cancellations will be accepted.

VISA FORMALITIES

Participants from a number of countries may need an entry visa for the Federal Republic of Germany. It is recommended that this be applied for well in advance of the conference. If a formal invitation letter is needed please contact the Congress Office at DECHEMA e.V. in good time.

ACCOMMODATION

Reservation of accommodation in different price categories will be made by

Potsdam Tourismus Service
 Attn. Ms. M. Müller
 Am Neuen Markt 1
 D-14467 Potsdam
 Phone: +49 (0)331 - 27558 54
 Fax: +49 (0)331 - 27558 79
 E-mail: tourismus-service@potsdam.de
 Internet: www.potsdamtourismus.de

Please download the registration form for accommodation from the conference website and return it to above given address

or make your reservation directly at the conference venue:

Dorint Novotel Sanssouci
 Jägerallee 20
 D-14467 Potsdam
 Phone: +49 (0)331 274 0
 Fax: +49 (0)331 274 1000
 E-mail: Daniela.Dreessen@dorint.com
 Internet: www.tagungshotel.com/hotel_1070879246.htm

The price per single room and night is 108.00 € plus 16.00 € for breakfast.

Due to the fact that Potsdam attracts many visitors we highly recommend you to book your accommodation at your earliest convenience.

Reservations are binding. Charges for rooms which are not taken or are cancelled too late must be paid by the participant. Participants who do not receive confirmation before their departure should contact Potsdam Tourismus Service or the Dorint Novotel Sanssouci.

HOW TO REACH THE DORINT NOVOTEL SANSSOUCI

By car

- from Hamburg: A 10 (Berliner Ring) – Ausfahrt (Exit) Potsdam Nord
- from Munich/Dresden: A 115 – Ausfahrt (Exit), Potsdam-Babelsberg
- The quickest way to find the Congress-Venue when you are in Potsdam, is to follow the green signs "Hotelroute" or "Sanssouci". The Hotel is situated at the B 2 to Berlin-Spandau.

Public transportation

From Airport Berlin/Tegel

- take the Bus X9 to Bahnhof Zoologischer Garten
- transfer into RE 1, direction Brandenburg Hauptbahnhof
- get off at Potsdam Hauptbahnhof
- duration approximately 45 minutes

From Airport Berlin/Tempelhof

- take the bus no. 104, direction Berliner Str.
- get off at Platz der Luftbrücke
- transfer into subway U 6, direction Alt-Tegel
- get off at Friedrichstr. Bhf
- transfer into train RE 1, direction Brandenburg
- get off at Potsdam Hauptbahnhof
- duration approximately 1 hour

From Airport Schönefeld

- after a 6 min. walk you reach the station Flughafen Berlin-Schönefeld Hbf
- take the train RB 14, direction Potsdam Hauptbahnhof, where you get off
- duration approximately 1 hour

From Potsdam Hauptbahnhof

- take the bus no. 695
- get off Reiterweg/Jägerallee
- directly on your left hand side you will see the Dorint Novotel Sanssouci
- duration approximately 15 minutes