

SCEJ The Society of Chemical Engineers, Japan

1st International Symposium on Multiscale Multiphase Process Engineering (MMPE)

*In continuation of 1st to 7th Japanese/German Symposium
on Bubble Columns*

Second Circular



**October 4-7, 2011
Kanazawa Culture Hall
Kanazawa City, Ishikawa Prefecture
Japan**

Website: www.MMPE.jp

Invitation

Dear Colleagues,

It is our great pleasure to host the 1st international Symposium on Multiscale Multiphase Process Engineering (MMPE) held in Kanazawa, Japan on October 4-7, 2011. This symposium intends to extend and strengthen the scientific basis and network which have been built up since 1988 through the former 1st to 7th Japanese/German Symposium on Bubble Columns (JGSBC).

The MMPE offers a forum on modern nano-, micro- and macro-scale aspects of multiphase process engineering. The MMPE conceives to organize unique and tight network among participants, which potentially leads to an international research project on a challenging and rewarding issue. We sincerely welcome participants from every country and with wide range of academic and professional backgrounds related to the fields.

On March 11, the North-East region of Japan was hit by the huge earthquake and tsunami. We would like to offer our deepest condolences to the persons affected by the catastrophe. We fervently hope and pray that the people in the region will return to their normal lives. The damaged nuclear power plant is getting better step by step to be controlled state. Today(June 29th), we had a good news that they have started a stable cooling of the reactors at Fukushima No. 1 nuclear power plant by using a system to recycle purified water. Furthermore, we would like to confirm that the symposium venue is not affected by the power plant since Kanazawa is located about 400 km distance from the plant. MMPE is planned as scheduled.

We have accepted 93 abstracts, and arranged 22 full-oral presentations and 71 posters with 5-min oral presentations. Special lectures will be given by Prof. Akio Tomiyama, Kobe University and Prof. Dieter Bothe, Technical Univ. of Darmstadt. The international joint work is currently under examination by the scientific committee based on the proposals and abstracts submitted.

We look forward to welcoming you all in Kanazawa, a beautiful city remaining ancient Japanese culture and tradition.

Korekazu Ueyama
Chair of MMPE

Venue

The symposium will be held at Kanazawa Culture Hall (15-1 Takaoka-cho, Kanazawa-city, Ishikawa 920-0864, Japan, Fax: +81-76-223-1299).

In the Kanazawa City, the Japanese traditional culture and the essence of the old castle town remain strongly in evidence. Kanazawa is also known to have special food products like rice, sushi, Japanese sake and a Japanese-style

confection. There are many noted places such as the Kanazawa castle and the Kenroku-en that counted as one of the three noted gardens in Japan. For further information, please visit the website:
http://www.city.kanazawa.ishikawa.jp/index_e.html.

Organization

The symposium will be organized by the Research Group of Bubble, Drop, and Particle Dispersion Engineering in Fluid and Particle Processing Division, the Society of Chemical Engineers, Japan.

Organizing Committee

Chair

Prof. Dr. Korekazu Ueyama
Kogakuin University
E-mail: ueyama@cc.kogakuin.ac.jp

Vice Chair

Prof. Dr. Koichi Terasaka
Keio University
E-mail: terasaka@aplc.keio.ac.jp

Committee Members

Prof. Dr. Katsumi Tsuchiya, Doshisha University
Prof. Dr. Shunji Honma, Saitama University
Prof. Dr. Mitsuhiro Ohta, Muroran Institute of Technology
Prof. Dr. Hiroshi Umakoshi, Osaka University
Prof. Dr. Shuichi Iwata, Nagoya Institute of Technology
Dr. Kei Mizuta, Kagoshima University
Dr. Daisuke Kobayashi, Tokyo University of Science
Dr. Hiroshi Takeda, R-flow Co., Ltd.
Dr. Naoki Shimada, Sumitomo Chemical Co., Ltd.

Chair for Germany

Prof. Dr. Michael Schlüter
Technical Univ. of Hamburg-Harburg
E-mail: michael.schlueter@tuhh.de

Vice Chair for Germany

Prof. Dr. Dieter Bothe
Technical University of Darmstadt
E-mail: bothe@csi.tu-darmstadt.de

Scientific Committee

Prof. Dr. Korekazu Ueyama, Kogakuin University
Prof. Dr. Koichi Terasaka, Keio University
Prof. Dr. Katsuhiko Muroyama, Kansai University
Prof. Dr. Takami Kai, Kagoshima University
Prof. Dr. Hidehiro Kamiya, Tokyo Univ. of Agricul. & Technol.
Prof. Dr. Naoto Ohmura, Kobe University
Prof. Dr. Yosuke Matsukuma, Kyushu University
Prof. Dr. Shunji Honma, Saitama University
Prof. Dr. Mitsuhiro Ohta, Muroran Institute of Technology
Dr. Naoki Shimada, Sumitomo Chemical Co., Ltd.
Prof. Dr. Michael Schlüter, Technical Univ. of Hamburg-Harburg
Prof. Dr. Dieter Bothe, Technical University of Darmstadt

Scientific Topics

Multiscale multiphase process engineering involving bubble, drop and particle dispersion systems related to

- Fundamentals including hydrodynamics and mass and heat transfer properties,
- Advanced measurement and experimental techniques,
- Computational fluid dynamics (CFD) and simulation,
- Micro- and nano-dispersion systems, microreactors and nanotechnology,
- Multiphase reaction, catalytic reaction engineering and bioreactors,
- Multiphase flow aspects of bubble columns, extraction columns, loop reactors, fluidized beds, and so on.
- Applications including innovative reactor design, novel reactor configurations and advanced energy and environmental systems etc.

Contact Information

Secretariats

Dr. Makoto Yoshimoto, Yamaguchi University

E-mail: yosimoto@yamaguchi-u.ac.jp

Fax: +81-836-85-9201

Dr. Satoko Fujioka, Keio University

E-mail: fujioka@applc.keio.ac.jp

Fax: +81-45-566-1575

Language

The official language of the symposium is English.

Registration Fees

	Advanced (until August 20, 2011)	Regular (after August 21, 2011)
Regular participation	35,000 JPY	45,000 JPY
Students including post-doctoral fellows	10,000 JPY	13,000 JPY
Accompanying person	5,000 JPY	6,500 JPY

Participants are strongly encouraged to complete registration in advance on our website (<http://www.mmpe.jp/registration/>) by August 20, 2011. The registration fee includes registration, preprints/USB, coffee breaks, lunches, welcome party on Tuesday, banquet on Thursday, and tour and farewell party on Friday. On Wednesday, participants will freely enjoy local foods in Kanazawa around venue or participate an optional dinner tour with the additional fee of 3,000 JPY (please apply the optional tour at the registration on the web site). Please note that fees for accommodation and insurance are NOT included.

The welcome party, banquet and farewell party will be held at Kanazawa New Grand Hotel which is located at the front of the symposium venue. For details of the accommodations and the reservation of hotels with special rates, please visit our web site; <http://www.mmpe.jp/registration/>.

Important Dates

- July 20, 2011 Deadline for receipt of full-length manuscripts. Manuscripts should be prepared using a template that is available on our web site and submitted through the web site.
- August 20, 2011 Deadline for advanced registration (see above)
- September 20, 2011 Deadline for receipt of the power point data for 5-min introduction of posters (see next page)
- October 4, 2011 Registration and publication of proceedings at MMPE

Symposium Preprints

All accepted contributions will appear in the preprints of the symposium. The preprints including its USB will be made available to participants during the registration at the symposium. A limited number of original contributions will be later published in the special issue of the *Journal of Chemical Engineering of Japan* after peer-review process.

Instruction of Full-Oral Presentations

The lecture room is equipped with a note PC with a power point projection system. Please install and check your presentation data before your session starts. In the case you prefer to use your own PC, please contact the staffs and check the PC connection before the session starts. Each lecture consists of introduction of speaker, 15 minutes of presentation and about 5 minutes of discussion (20 minutes in total for each lecture).

Instruction of Poster Presentation

The plenary poster session will be held 16:40-17:40 on October 5th and 6th. Before the poster discussion starts, each poster will be introduced in the lecture room by the presenter within 5 min without discussion. Please note that the presentation time is strictly limited to be less than 5 minutes for each poster.

Please display your poster on a board before each afternoon session starts and detach it from the board by yourself after the poster session closed. The poster board is 120 cm in width and 210 cm in height. Materials for holding the posters will be provided at the poster room.

Important: Please send the data for 5-minutes presentations by September 20, 2011 to the secretariat of MMPE Dr. Satoko Fujioka, Keio University with your abstract number by e-mail (fujioka@applc.keio.ac.jp). The data should be prepared by using power point (not exceed **10 MB**). The file should be one power point file and please do NOT include movie file. Please be sure to bring the data with you for backup at MMPE. If you have any problem or difficulty in sending the data, please contact the secretariat.

Tour on October 7, 2011

At the end of the conference, we will have a tour in Kanazawa city. The tour includes Kenroku-en garden and Higashi Chaya. These are strolling-style sightseeing areas. Kenroku-en garden is one of the three most beautiful gardens in Japan. Higashi Chaya has many green tea shops and stores selling souvenirs. Our mode of transportation between these places will be by bus. After the tour, we will have a farewell party.

Schedule

	Oct. 4, 2011	Oct. 5	Oct. 6	Oct. 7
8:00				
		Opening remarks	L-10: 8:20-8:40	
		Special lecture-1 8:40-9:20	L-11: 8:40-9:00	
9:00		L-1: 9:20-9:40	L-13: 9:00-9:20	
		L-2: 9:40-10:00	L-14: 9:20-9:40	
10:00		Coffee break	Coffee break	Tour
		L-3: 10:20-10:40	L-16: 10:20-10:40	
		L-4: 10:40-11:00	L-17: 10:40-11:00	
11:00		L-5: 11:00-11:20	L-18: 11:00-11:20	
		L-6: 11:20-11:40	L-19: 11:20-11:40	
		L-7: 11:40-12:00		
12:00		Lunch 12:00-13:20	Lunch 12:00-13:20	
13:00				
	Poster presentations (5-min Oral presentations)	Poster presentations (5-min Oral presentations)		
14:00	P-1-20 13:20-15:00	P37-56 13:20-15:00		
15:00	Coffee break	Coffee break		
	Poster presentations (5-min Oral presentations)	Poster presentations (5-min Oral presentations)		
16:00	Registration at Kanazawa New Grand Hotel	P-21-36 15:20-16:40	P-57-71 15:20-16:40	
17:00		Poster viewing P-1-36 16:40-17:40	Poster viewing P-37-71 16:40-17:40	
		Special lecture-2 17:40-18:20	L-20: 17:40-18:00	
18:00	Welcome party	L-8: 18:20-18:40	L-21: 18:00-18:20	Farewell party
		L-9: 18:40-19:00	L-22: 18:20-18:40	
19:00		Free time / Optional dinner tour	Banquet	

October 4, 2011

Registration at Kanazawa New Grand Hotel 16:00-

Welcome Party at Kanazawa New Grand Hotel 18:00 -

October 5, 2011

Opening Remarks

8:20 – 8:40

Korekazu Ueyama, Chair of MMPE
Kogakuin University, Japan

Special Lecture

8:40 – 9:20 (including discussion)

Chair: Katsumi Tsuchiya

Multiscale Simulation of Dispersed Flow in Bubble Columns

Akio Tomiyama

Kobe University, Japan

Lectures

Chair: Shunji Homma

9:20 - 9:35 - 9:40

L-1 **Liquid Mixing in a Bubble Column**

Naoki Shimada¹, Rina Saiki^{1*}, Abhinav Dhar¹, Kei Mizuta² and Akio Tomiyama³

¹Process and Production Technology Center, Sumitomo Chemical Co. Ltd., Japan

²Faculty of Engineering, Kagoshima University, Japan

³Faculty of Engineering, Kobe University, Japan

9:40 – 9:55 – 10:00

L-2 **Scaling of Taylor Flow in Small Square Channels of Different Size**

Martin Wörner^{*}

Karlsruhe Institute of Technology, Karlsruhe, Germany

Coffee Break 10:00 – 10:20

10:20 – 10:35 – 10:40

L-3 **Numerical Simulation of Multiscale Two-Phase Flows using a Hybrid Interface-Resolving Two-Fluid Model (HIRES-TFM)**

Holger Marschall^{1*} and Olaf Hinrichsen²

¹Center of Smart Interfaces, Technische Universität Darmstadt, Germany

²Catalysis Research Center and Chemistry Department, Technische Universität München, Germany

10:40 – 10:55 – 11:00

L-4 **Study on the Interaction Term in the Two-fluid Model Equation**

Korekazu Ueyama^{*}

Kogakuin University, Japan

Chair: Dieter Bothe

11:00 – 11:15 – 11:20

L-5 **Application of Evaluation Method of Surface Tension with Geometrical Condition**

to Three-Dimension Simulation of Droplet Deformation and Breakup

Susumu Fujioka¹ and Satoru Ushijima^{2*}

¹Public Works Research Institute, International Center for Water Hazard and Risk Management, Japan

²Academic Center for Computing and Media Studies, Kyoto University, Japan

11:20 – 11:35 – 11:40

L-6 Experimental and Numerical Investigations of Drop Breakage Mechanism

S. Hermann^{1*}, S. Maaß¹, D. Zedel¹, A. Walle², M. Schäfer² and M. Kraume¹

¹Chair of Chemical and Process Engineering, Technische Universität Berlin, Germany

²Institute of Numerical Methods in Mechanical Eng., Technische Universität Darmstadt, Germany

11:40 – 11:55 – 12:00

L-7 Numerical Calculations of Pattern Formation of Compound Drops Detaching from a Compound Jet in a Co-flowing immiscible Fluid

Truong V. Vu^{*}, H. Takakura and John C. Wells

Graduate School of Science and Engineering, Ritsumeikan University, Japan

Lunch 12:00 – 13:20

Introduction of Posters 13:20-15:00 (Each poster: 5 min)

Chair: Mitsuhiro Ohta

P-1 Direct Numerical Simulation for Free-surface Flows through Porous Media with Multiphase Modeling

S. Ushijima¹, K. Kishimoto^{2*}, H. Yamashita² and K. Nagai²

¹ACCMS, Kyoto University, Japan

²CERE, Kyoto University, Japan

P-2 Numerical Evaluation of the Virtual Force Term for Some Practical Cases

Korekazu Ueyama^{*}

Kogakuin University, Japan

P-3 Numerical Simulations and Experimental Investigations of Two-phase Flows in an Y-Y-shaped Microreactor

S. Mosler¹, M. Schlueter¹, S. Fujioka^{2*} and K. Terasaka²

¹Institute of Multiphase Flows, Technical University Hamburg-Harburg, Germany

²Chemical Engineering Lab., Department of Applied Chemistry, Keio University, Japan

P-4 Numerical Simulation of Gas-Liquid Two Phase Flow by Finite Point-set Method

Kei Sakakura^{1*} and Tomoyuki Ide¹

¹Process Development Center, Idemitsu Kosan Co.,Ltd., Ichihara Chiba, Japan

P-5 Innovative Multiphase Fluid Visualization for Droplet Column Simulations

Fang Chen^{1*}, Mark W. Hlawitschka², Hans-Jörg Bart² and Hans Hagen¹

¹Computer Science and HCI Group, TU Kaiserslautern

²Chair of Separation Science and Technology, TU Kaiserslautern

P-6 Simulation of the Formation of Compound Droplets by Three-fluid Front Tracking Method

Kota Moriguchi, Shunji Homma^{*} and Jiro Koga

Division of Materials Science, Graduate School of Sci. and Eng., Saitama University, Japan

P-7 Three-Dimensional Simulations of a Drop Rising in Immiscible Polymeric Liquids

Tomohiro Furukawa¹, Mitsuhiro Ohta^{1*}, Yutaka Yoshida¹ and Mark Sussman²

¹Division of Applied Sciences, Graduate School of Eng., Muroran Institute of Technol., Japan

²Department of Mathematics, Florida State University, USA

P-8 A simple yet Powerful Technique to Detect the Pierced Position by Using a

Pre-Signal in Bubble Measurement with a Single-Tip Optical Fiber Probe

Yuki Mizushima¹ and Takayuki Saito^{2*}

¹Graduate School of Engineering, Shizuoka University, Japan

²Graduate School of Science and Technology, Shizuoka University, Japan

P-9 **The Influence of Viscosity and Interfacial Tension on the Rising Behavior of Bubbles under Swarm Conditions – Measurements and Model**

U. Miessner^{1*}, S. Scheid¹, M. Schlüter² and N. Räßiger¹

¹Institute of Environmental Process Engineering, University of Bremen, Germany

²Institute of Multiphase Flows, Hamburg University of Technology, Germany

P-10 **Quantitative Consideration of the Modulation of the Bubble and Liquid-phase Motions in Decaying Turbulence Formed by an Oscillating-grid**

Yasuyuki Nagami¹ and Takayuki Saito^{2*}

¹Graduate School of Engineering, Shizuoka University, Japan

²Graduate School of Science and Technology, Shizuoka University, Japan

P-11 **Flow Birefringence Measurement between Vertically Aligned Bubbles under Pressure-oscillating Field**

Shuichi Iwata^{1*}, Ayumi Aritake¹, Hideki Mori and Tsutomu Takahashi²

¹Nagoya Institute of Technology, Graduate School of Eng., Department of Material Eng., Japan

²Nagaoka University of Technology, Faculty of Technol., Department of Mechanical Eng., Japan

P-12 **Determination of Shear Stress Around Single Bubbles between Flat Sheet Membranes**

Lutz Böhm^{*}, Helmut Prieske and Matthias Kraume

Technische Universität Berlin, Germany

P-13 **An Experimental Study on Relations between the Mass Transfer and the Bubble-bubble Interaction of Zigzagging Bubbles**

Rintarou Tachibana¹ and Takayuki Saito^{2*}

¹Graduate School of Engineering, Shizuoka University, Japan

²Graduate School of Science and Technology, Shizuoka University, Japan

P-14 **The Dynamic Motion of a Single Drop Rising in Linear Shear Flows**

Taku Abe, Junji Takeda, Mitsuhiro Ohta^{*} and Yutaka Yoshida

Division of Applied Sciences, Graduate School of Eng., Muroran Institute of Technology, Japan

P-15 **Microchannel Evaporators – Evaporation of Water and Microstructure Design –**

Stefan Maikowski^{*}, Roland Dittmeyer and Juergen J. Brandner

Karlsruhe Institute of Technology (KIT), Institute for Micro Process Eng. (IMVT), Germany

P-16 **Heat Transfer Characteristics of Gas-liquid Slug Flow in Mini Channel**

Mai Mitsui¹, Satoko Fujioka^{2*}, Hidenori Yagi¹, Koichi Terasaka² and Daisuke Kobayashi²

¹Sch. of Science for Open and Environmental Systems, Graduate Sch. of Keio University, Japan

²Department of Applied Chemistry, Faculty of Science and Technology, Keio University, Japan

P-17 **Dynamic Behavior of Microbubbles Irradiated Ultrasound**

Ryota Akutsu¹, Yoshiyuki Hayashida², Koichi Terasaka^{1*}, Satoko Fujioka¹ and Daisuke Kobayashi¹

¹Department of Applied Chemistry, Faculty of Science and Technology, Keio University, Japan

²Sch. of Science for Open and Environmental Systems, Graduate Sch. of Keio University, Japan

P-18 **Transport Properties of Micro-bubbles in a Bubble Column**

Yuji Oka¹, Shohei Kubo, Ryota Fujiki and Katsuhiko Muroyama^{*}

Kansai University, Japan

P-19 **Laser Induced Quantitative Measurement of Nano-bubbles in Water**

Shigeo Maeda^{*}, Masakazu Kashiwa, Yoshiaki Ishida, Haruaki Kimura, Hideaki Kobayashi, Jun Tokuda and Toshihiro Fujita
IDEC Corporation, Japan

- P-20 **Wastewater Treatment for Bioethanol Production System by Using Ozone Micro-Bubbles**
Keiji Yasuda^{*} and Naoyuki Ban
Department of Chemical Engineering, Nagoya University, Japan

Coffee Break 15:00 – 15:20

Introduction of Posters 15:20-16:40 (Each poster: 5 min)

Chair: Daisuke Kobayashi

- P-21 **Development of a Novel Microbubble Aerator for Biochemical Waste Water Treatment**
Ai Hirabayashi¹, Koichi Terasaka^{2*}, Takanori Nishino¹, Satoko Fujioka² and Daisuke Kobayashi²
¹Sch. of Science for Open and Environmental Systems, Graduate Sch. of Keio University, Japan
²Department of Applied Chemistry, Faculty of Science and Technology, Keio University, Japan
- P-22 **Degradation Characteristics of Phenolic Compounds using Micro-bubbles of Ozonated Oxygen**
Katsuhiko Muroyama^{*}, Akihiro Kawabata, Yuji Yamaguchi, and Jun'ichi Hayashi
Kansai University, Japan
- P-23 **Sucrose Crystallization Utilizing Dissolution and Shrinkage of Microbubbles Generated by Electrolysis**
Takaaki Murase¹, Yori Sasaki², Koichi Terasaka^{2*}, Satoko Fujioka² and Daisuke Kobayashi²
¹Sch. of Science for Open and Environmental Systems, Graduate Sch. of Keio University, Japan
²Department of Applied Chemistry, Faculty of Science and Technology, Keio University, Japan
- P-24 **Environmental applications of GOLF (Gas Liquid Foam) Technology**
Shigeo Maeda^{*}, Yoshiaki Ishida, Masakazu Kashiwa, Haruaki Kimura, Jun Tokuda, Eitoku Tabuse, Kazutaka Awaka and Toshihiro Fujita
IDEC Corporation, 1-7-31, Nishimiyahara, Yodogawa-ku, Osaka 532-8550, Japan
- P-25 **Effect of Liquid Height to Diameter Ratio on Gas Holdup at High Gas Velocity in a Bubble Column**
Yoriko Uehara, Kiyoshi Naito^{*}, Hideharu Kuwamoto and Yasushi Mitome
Process Technology Center, Mitsui Chemicals, Inc., Japan
- P-26 **Multiphase Operations-The Influence of Solid Particle Inertia and the Calculation of the Relative Rising Velocity of Bubbles in a Swarm**
S. John^{1*}, U.-D. Kück², U. Mießner¹, M. Schlüter² and N. Rübiger¹
¹Institute of Environmental Process Engineering, University of Bremen, Germany
²Institute of Multiphase Flow, Hamburg University of Technology, Germany
- P-27 **Flow Regime Identification in a Bubble Column with a Conically-Shaped Inlet Based On Optical Probe Data and Different Entropies**
Stoyan Nedeltchev^{*}, Moses Kagumba and Muthanna Al-Dahhan
Missouri University of Science and Technol., Department of Chem. and Biological Eng., USA
- P-28 **Flow Regime Identification in a Bubble Column by Analysis of the Pressure Fluctuations**
Willy Tchowa Medjiade, Stoyan Nedeltchev and Adrian Schumpe^{*}
Institute of Technical Chemistry, TU Braunschweig, Germany

- P-29 **Hot CO₂ Recovery with Lithium Silicate in Slurry Bubble Column**
Yugo Kanai¹, Masato Suwabe¹, Koichi Terasaka^{2*}, Satoko Fujioka² and Daisuke Kobayashi²
¹Sch. of Science for Open and Environmental Systems, Graduate Sch. of Keio University, Japan
²Department of Applied Chemistry, Keio University, Japan
- P-30 **Separation of Oil from O/W Emulsion in Bubble Column Dispersed with Micro-Bubbles**
 Keiji Yasuda* and Koichi Haneda
 Department of Chemical Engineering, Nagoya University, Japan
- P-31 **Effects of Temperature and pH Changes on Submerged Culture of *Flammulina Velutipes* in Bubble Column Fermentors**
Mikio Kawagoe^{1*}, Masaki Ito¹ and Hideo Noda²
¹Nara National College of Technology, Japan
²Kansai Chemical Engineering Co. Ltd., Japan
- P-32 **Activity and Structural Change of Catalase-Bound Liposomes Containing Glucose Oxidase Suspended in an External Loop Airlift Bubble Column**
Makoto Yoshimoto*, Masahiro Inoue and Noriyuki Takaki
 Department of Applied Molecular Bioscience, Yamaguchi University, Japan
- P-33 **Effects of Bubble Interactions on Liquid Phase Mass Transfer Coefficients in Three Types of Bubble Columns**
Katsumi Nakao^{1*}, Keiji Furumoto² and Makoto Yoshimoto³
¹Faculty of Engineering, Yamaguchi University, Japan
²Oshima National College of Maritime Technology, Japan
³Graduate School of Medicine, Yamaguchi University, Japan
- P-34 **Effects of Bubble Interactions in Circulating Liquid Flow on Liquid Phase Mass Transfer Coefficient in an External Loop Airlift Bubble Column**
Makoto Yoshimoto¹, Keiji Furumoto² and Katsumi Nakao^{3*}
¹Graduate School of Medicine, Yamaguchi University, Japan
²Oshima National College of Maritime Technology, Japan
³Faculty of Engineering, Yamaguchi University, Japan
- P-35 **Fractal Variation of Heat Transfer Coefficients in Three-Phase Slurry Bubble Column**
Myung Jae Seo¹, Dae Ho Lim¹, Hyun Oh Lim², Yong Kang^{1,2*}
¹School of Chemical Engineering, Chungnam National University, Korea(Rep.)
²Graduate School of Green Energy Technology, Chungnam National University, Korea(Rep.)
- P-36 **Experimental Study of Multiphase Flow using Low-intrusive Wire-mesh Sensor (WMS) Technology**
M. Bothe*, G. Zheng and M. Grünewald
 Ruhr-University Bochum, Germany

Plenary Poster Discussion 16:40 – 17:40

Special Lecture

17:40 – 18:20 (including discussion)

Chair: Naoki Shimada

Mathematical Modeling and Direct Numerical Simulation of Transport Processes at Fluidic Interfaces

Dieter Bothe

Mathematical Modeling and Analysis, Center of Smart Interfaces, TU Darmstadt, Germany

Lectures

Chair: Matthias Kraume

18:20 – 18:35 – 18:40

L-8 **Numerical Simulation of Melting and Dropping of Phase Change Material Induced by Localized Thermal Input**

Yangkyun Kim^{1*}, Akter Hossain² and Yuji Nakamura²

¹Division of Mechanical and Space Engineering, Hokkaido University, Japan

18:40 – 18:55 – 19:00

L-9 **Three Dimensional Flow Structures in Microfluidic Two-Phase Flows**

U. Mießner^{1*}, N. Räßiger¹, R. Lindken² and J. Westerweel³

¹Institute of Environmental Process Engineering, University of Bremen, Germany

²Fuel cell research center ZBT, Duisburg, Germany

³Laboratory for Aero- and Hydrodynamics, University of Technology, Delft, Netherlands

Free Time / Dinner Tour around the symposium venue (optional) 19:00-

October 6, 2011

Lectures

Chair: Michael Schlüter

8:20 - 8:35 - 8:40

L-10 **Mass Transfer in Multistage Bubble Column and Slurry Bubble Column**

Hideki Tsuge^{*}

Faculty of Science and Technology, Keio University, Japan

8:40 – 8:55 – 9:00

L-11 **Relations of Void Fractions and Liquid Motions to Dissolved Gas Concentrations in a Large-Diameter Bubble Column**

Masahiro Yamada¹ and Takayuki Saito^{2*}

¹Department of Mechanical Engineering, Shizuoka University, Japan

²Graduate school of Science and Technology, Shizuoka University, Japan

9:00 – 9:15 – 9:20

L-13 **Correlation between the Instantaneous Mass-transfer Coefficient of a Zigzagging CO₂ Bubble and the Bubble Motions**

Masahiko Toriu¹ and Takayuki Saito^{2*}

¹Graduate School of Engineering, Shizuoka University, Japan

²Graduate School of Science and Technology, Shizuoka University, Japan

Chair: Shuichi Iwata

9:20 – 9:35 – 9:40

L-14 **Gas-Liquid Mass Transfer Studies with Superimposed Chemical Reaction**

Ulf Daniel Kück^{1*}, M. Schlüter¹ and N. Räßiger²

¹Institute of Multiphase Flow, Hamburg University of Technology, Germany

²Institute of Environmental Process Engineering, University of Bremen, Germany

9:40 – 9:55 – 10:00

L-15 **Absorption of CO₂ into Alkane/water Emulsions in a Stirred Tank**

Thanh Hai Ngo and Adrian Schumpe^{*}

Institute of Technical Chemistry, TU Braunschweig, Germany

Coffee Break 10:00 – 10:20

Chair: Adrian Schumpe

10:20 – 10:35 – 10:40

L-16 **Chaotic Analogies in the Operation of Churn-Turbulent Bubble Columns and Bubbling Fluidized Beds**

Stoyan Nedeltchev*

Missouri University of Science and Technol., Department of Chem. and Biological Eng., USA

10:40 – 10:55 – 11:00

L-17 **Analysis of Bubble Holdup Structure in Viscose Three-Phase Fluidized Bed for Heavy Oil Upgrading**

Hyun Oh Lim¹, Myung Jae Seo², Dae Ho Lim², Yong Kang^{1,2*}, Heon Jung³, Ho Tae Lee³ and Sang Don Kim⁴

¹Grad. Sch. of Green Energy Technol., Chungnam National University, Korea (Rep.)

²School of Chem. Engineering, Chungnam National University, Korea (Rep.)

³Korea Institute of Energy Research, Korea (Rep.)

⁴Korea Advanced Institute of Science and Technology, Korea (Rep.)

11:00 – 11:15 – 11:20

L-18 **Flow Regime Identification in Both Spouted and Fluidized Beds Based On Different Entropies Derived From Gauge Pressure Fluctuations**

Stoyan Nedeltchev*, Shreekanta Aradhya, Faraj Zaid and Muthanna Al-Dahhan

Missouri University of Science and Technol., Department of Chem. and Biological Eng., USA

11:20 – 11:35 – 11:40

L-19 **Effect of Particle-wall Collisions in Gas-solid Disperse Flows**

Yoichi Mito*

Kitami Institute of Technology, Japan

Lunch 11:40 – 13:20

Introduction of Posters 13:20-15:00 (Each poster: 5 min)

Chair: Hiroshi Umakoshi

P-37 **Experimental and Numerical Studies of Granular Flows in a Rotating Drum**

An-Ni Huang and Hsiu-Po Kuo*

Department of Chemical and Materials Engineering, Chang Gung University, Tao-Yuan, Taiwan

P-38 **Implementation of a coupled Discrete-Element-Method (DEM) into OpenFOAM®**

Astrid Mahrla and Olaf Hinrichsen*

Technische Universität München, Germany

P-39 **Agitation Induced Mechanical Stress in Stirred Tank Bioreactors – Linking CFD Simulations to Fungal Morphology**

Manely Eslahpazir, Thomas Wucherpennig and Rainer Krull*

Institute for Biochemical Engineering, Technische Universität Braunschweig, Germany

P-40 **Investigation of multiphase circulating flow in MBR**

Helmut Prieske* and Matthias Kraume

Technische Universität Berlin, Germany

P-41 **Temperature Measurement Technique with Single High-Speed Camera**

Kei Mizuta^{1*}, Yuzo Watanabe¹ and Naoki Shimada²

¹Dept. of Chem. Eng., Kagoshima University, Japan

²Sumitomo Chemical Co., Ltd., Japan

- P-42 **Observing In-Situ the Interaction of Flowing Fluids with Nanostructured Surfaces**
S.V. Roth^{1*}, G. Herzog^{1,2}, A. Buffet¹, G. Benecke^{1,3}, J. Perlich¹, M. Schwartzkopf¹, M. Rawolle⁴, V. Körstgens⁴, A. Neuhold⁵, R. Resel⁵, W. Wurth², F. de Jong⁶, M. Schlüter⁶ and P. Müller-Buschbaum³
¹Deutsches Elektronen-Synchrotron (DESY), Germany
²Inst. f. Exp. Physik, Universität Hamburg, Germany
³MPI f. Colloids and Interfaces Golm, Abt. Biomater., Germany
⁴Technische Universität München, Lehrstuhl f. Funktionelle Materialien, Physik-Dept. Germany
⁵Inst. Sol. Stat. Phys., Graz University of Technology, Austria
⁶Institute of Multiphase Flows, Hamburg University of Technology, Germany
- P-43 **An Experimental Study of Macromolecules in a Microchannel**
F.J. de Jong¹, A. Buffet^{2*}, S.V. Roth², M. Schlüter¹
¹Institute of Multiphase Flows, Hamburg University of Technology, Germany
²Deutsches Elektron Synchrotron (DESY), Germany
- P-44 **Overview of Measurement Techniques for Sizing Fluid Particles in Multi phase Systems**
Deniz Hülagu^{*}, Sebastian Maaß, Stephanie Hermann and Matthias Kraume
 Chair of Chemical and Process Engineering, Technische Universität Berlin, Germany
- P-45 **On-line Monitoring of Fluid Particle Size Distributions using Image Analysis**
Sebastian Maaß^{1*}, Stephanie Hermann¹, Jürgen Rojahn¹ and Matthias Kraume¹
¹Chair of Chemical and Process Engineering, Technische Universität Berlin, Germany
- P-46 **Enhancement of Gas Holdup with a Taylor Vortex Flow System Equipped with Ribs**
Hayato Masuda, Weibin Zheng, Takafumi Horie and Naoto Ohmura^{*}
 Department of Chemical Science and Engineering, Kobe University, Japan
- P-47 **Dynamic Analysis of Layer Formation under AC Electric Field in Liquid-liquid-liquid Three-phase System**
Kohei Ozawa, Hideyuki Matsumoto^{*}, Tetsushi Matsunami and Chiaki Kuroda
 Department of Chemical Engineering, Tokyo Institute of Technology, Japan
- P-48 **Key Factors for the Size Control of W/O Emulsion Droplets with an Electrostatic Atomization Technique**
Rumi Saito, Tomoki Takahashi^{*}, Katsuto Otake, Daisuke Kobayashi and Atsushi Shono
 Graduate School of Chemical Sciences and Technology, Tokyo University of Science, Japan
- P-49 **Effect of Sparger Geometry on Power Consumption and Mass Transfer in a Gas-Liquid Agitated Vessel with Disk Turbine**
 Noboru Kamei¹, Eiki Oda^{2*}, Yoshihito Kato², Yutaka Tada² and Yuichiro Nagatsu²
¹Daicel Chemical Industries, Ltd., Japan
²Department of Life and Materials Engineering, Nagoya Institute of Technology, Japan
- P-50 **Synthesis of Silica Particles with a Segmented Flow Tubular Reactor**
Yui Ohtsuka, Kazuya Tateishi, Takafumi Horie and Naoto Ohmura^{*}
 Department of Chemical Science and Engineering, Kobe University, Japan
- P-51 **Properties of N-F-Codoped Titanium Oxide Photocatalyst Powders Produced via Drip Pyrolysis in a Fluidized Bed under Reduction Conditions**
Tsutomu Nakazato^{*}, Ryusuke Shimobori and Takami Kai
 Department of Chemical Engineering, Kagoshima University, Japan
- P-52 **Electromagnetic-Absorption Properties of Magnetite Powders Prepared through Simultaneous Rapid Evaporation and Oxidization in a Fluidized Bed**
Youichi Iikuma, Tsutomu Nakazato^{*} and Takami Kai
 Department of Chemical Engineering, Kagoshima University, Japan

- P-53 **Calculation of Operating Conditions of Fluidized Catalyst Bed with Gas Recycle for Reactions Involving Gas-volume Reduction**
Akihiro Matsumura¹, Takami Kai^{1*}, Tsutomu Nakazato¹ and Mitsuyuki Nakajima²
¹Department of Chemical Engineering, Kagoshima University, Japan
²IHI Plant Engineering Corporation, Japan
- P-54 **Separation of Plastic Sheets by Density Difference in Solid-liquid Fluidized Bed**
Yuji Tatemoto^{1*}, Takuro Michikoshi¹, Yoshiyuki Bando² and Shogo Maeda²
¹Department of Materials Science and Chemical Engineering, Shizuoka University, Japan
²Division of Research and Development, Nippon Refine Co., Ltd., Japan
- P-55 **Removal of Tri-Chloro-Ethylene from Ground Water using Pressurized Carbon Dioxide**
 Hyongyon Kim, Kazuya Ishiguro, Takumi Omata, Shing Uchiyama, Diasuke Ebihara, D. Shanthana Lakshmi and Hiroimitsu Kojima^{*}
 Department of Applied Chemistry, Faculty of Eng., Kanagawa Institute of Technology, Japan
- P-56 **Evaluation of pH and Photocatalyst Concentration Effects on Reaction Rate for Water Purification using Taylor-Couette Flow**
Ning Jia, Takafumi Horie^{*} and Naoto Ohmura
 Graduate School of Eng., Dept. of Chem. Sci. and Eng., Kobe University, Japan

Coffee Break 15:00 – 15:20

Introduction of Posters 15:20-16:40 (Each poster: 5 min)

Chair: Kei Mizuta

- P-57 **Novel Air Cleaning Method using Photo-Fenton Reaction in Ultrasonic Mist**
Yuri Usami¹, Yuko Wada², Masahiro Tokumura^{1*}, Atsushi Mizukoshi³, Miyuki Noguchi¹ and Yukio Yanagisawa¹
¹Dept. of Environment Systems, Grad. Sch. of Frontier Sci., The Univ. of Tokyo, Japan
²Department of Chemical System Engineering, The University of Tokyo, Japan
³Tokyo Metropolitan Industrial Technology Research Institute, Japan
- P-58 **Removals of VOC from Indoor Environment using the Gas-liquid Two-phase Photoreactor**
Masahiro Tokumura^{1*}, Yuko Wada², Yuri Usami¹, Atsushi Mizukoshi³, Miyuki Noguchi¹ and Yukio Yanagisawa¹
¹Department of Environment Systems, Grad. Sch. of Frontier Sci., The Univ. of Tokyo, Japan
²Department of Chemical System Engineering, The University of Tokyo, Japan
³Tokyo Metropolitan Industrial Technology Research Institute, Japan
- P-59 **Development of Novel Gas-liquid Contactor for Ozone Treatment System**
Yoshihide Mawatari^{1*}, Jun Mukai¹, Masato Yamamura¹, Hiroyuki Kage¹ and Yoshihisa Ita²
¹Department of Applied Chemistry, Kyushu Institute of Technology, Japan
²ITAKEN Co. Ltd., Japan
- P-60 **Degradation of Persistent Organic Pollutants in Retuned Water Treatment by Photo Fenton Reaction**
Rurika Hatayama¹, Masahiro Tokumura^{2*}, Yoshinori Kawase¹ and Yukio Yanagisawa²
¹Research Center for Biochem. and Environmental Eng., Dept. of Appl. Chem., Toyo Univ., Japan
²Dept. of Environment Systems, Grad. Sch. of Frontier Sciences, The Univ. of Tokyo, Japan
- P-61 **Use “Emergent Interface” of Liposome, for Novel Bioseparation/Biocatalysis**
Hiroshi Umakoshi^{*} and Toshinori Shimanouchi
 Div. of Chemical Engineering, Grad. Sch. of Engineering Science, Osaka Univ., Japan

- P-62 **Bacterially Synthesized Cellulose: a Novel Biomaterial Suited for Lab-on-a-Chip Applications?**
Nadine Hessler^{*}, Dana Kralisch
 Institute of Technical Chemistry and Environmental Chem., Friedrich-Schiller-Univ., Germany
- P-63 **Nano-structured Biopolymer with High Potential for Innovative Reaction Engineering**
Dana Kralisch^{*} and Nadine Hessler
 Friedrich-Schiller Univ., Institute of Technical Chem. and Environmental Chem., Germany.
- P-64 **Effect of pH and Temperature on the Gelling Property of Silica Sols**
Aya Kaide^{1*}, Takashi Saeki¹ and Saori Kikuchi²
¹Graduate School of Science and Engineering, Yamaguchi University, Japan
²Mitsubishi Rayon Co., Ltd., Japan
- P-65 **The Gelling of Acid/alkaline Silica Sols and their Particle Bonding Models**
Takashi Saeki^{1*}, Aya Kaide¹ and Saori Kikuchi²
¹Graduate School of Science and Engineering, Yamaguchi University, Japan
²Mitsubishi Rayon Co., Ltd., Japan
- P-66 **Effect of Reaction Field on Characteristics of Polypyrrole Particle**
Hiroshi Nakada¹, Daisuke Kobayashi², Tomoki Takahashi², Katsuto Otake² and Atsushi Shono^{2*}
¹Graduate School of Chemical Science and Technology, Tokyo University of Science, Japan
²Department of Industrial Chemistry, Tokyo University of Science, Japan
- P-67 **Dispersion Properties of Water-soluble Gold Nanoparticles Prepared by Phase Transfer Method**
 Naoe, K.^{1*}, Yamanaka, K.¹, Nakagawa, K.¹, Takeuchi, S.¹, Kawagoe, M.¹, and Imai, M.²
¹Advanced Chem. Eng. Course, Faculty of Advanced Eng., Nara National College of Technol., Japan
²Department of Food Sci. & Technol., College of Bioresource Sci., Nihon University, Japan
- P-68 **Cell-free Protein Expression on Liposome Surface**
Keishi Suga, Hibiki Tomita, Seishiro Tanaka, Toshinori Shimanouchi, and Hiroshi Umakoshi^{*}
 Division of Chemical Engineering, Graduate School of Osaka University, Japan
- P-69 **Depth Filtration of Cell Suspensions of Agglomerated Streptobacteria by Biodegradable Membranes**
Masaharu Yoshida, Masayuki Taniguchi and Takaaki Tanaka^{*}
 Department of Materials Science and Technology, Niigata University, Japan
- P-70 **Fluid, Flexible, and "Wet" Surface of Span80 Vesicle, Compared with Phospholipid Liposomes**
Keita Hayashi¹, Toshinori Shimanouchi¹, Tsuyoshi Tatsui¹, Keiichi Kato², Tatsuhiko Miyazaki³ and Hiroshi Umakoshi^{1*}
¹Division of Chem. Eng., Graduate School of Eng. Science, Osaka University, Japan
²Dept. of Materials Sci. and Biotechnol., Graduate School of Sci. and Eng., Ehime Univ., Japan
³Department of Pathogenomics, Graduate School of Medicine, Ehime University, Japan
- P-71 **Dynamic Behavior of Lipid Membrane Interface: Effect of Proteins**
Toshinori Shimanouchi, Hiroshi Umakoshi^{*}, and Ryoichi Kuboi
 Grad. Sch. Of Engineering Science, Osaka University, Japan

Lectures

Chair: Martin Wörner

17:40 – 17:55 – 18:00

L-20 **Estimation on Capillary Force of Liquid Bridge Adhered to Four Spheres**
Kazuhiro Yabushita^{1*}, Takashi Kanno², Tetsuya Kyushima¹ and Kazuo Murase¹

¹Dept. of Applied Chem., Faculty of Science and Eng., Chuo University, Japan

²Graduate School of Engineering Osaka University, Japan

18:00 – 18:15 – 18:20

L-21 **Process Intensification for Coalescence Hindered Stirred Liquid-liquid Systems**
Sebastian Maab^{1*} and Matthias Kraume¹

¹Chair of Chemical and Process Eng., Technische Universität Berlin, Germany

18:20 – 18:35 – 18:40

L-22 **Microfluidic Split-and-Recombine Mixer based on Chaotic Advection**
Negar Rajabi^{1*}, Marko Hoffmann², Michael Schlüter² and Jörg Müller¹

¹Institute of Microsystems Technology, University of Technology Hamburg-Harburg, Germany

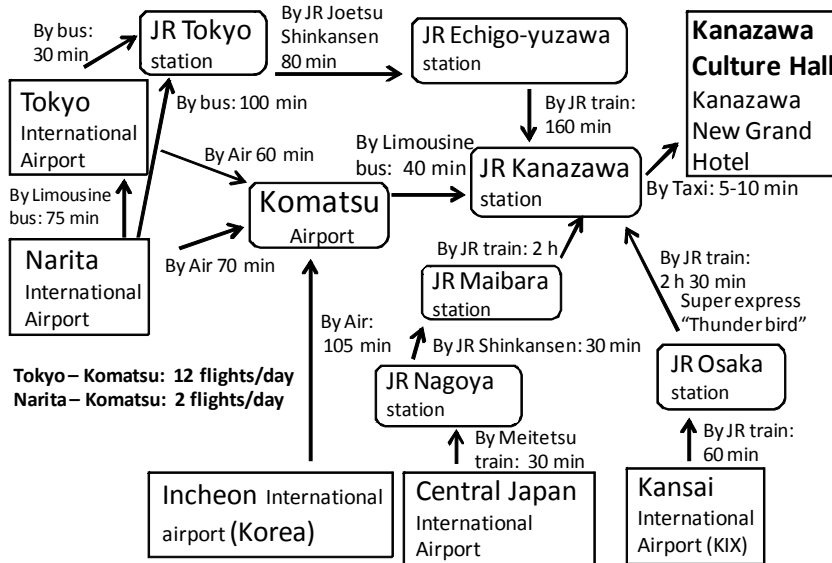
²Institute of Multiphase Flows, University of Technology Hamburg-Harburg, Germany

Banquet at Kanazawa New Grand Hotel 19:30-

October 7, 2011

Tour 9:00 –

Access to Kanazawa from International Airports in Japan and Korea



By Air: The way to get to the symposium venue is to take a flight to Komatsu airport from Narita, Tokyo or Incheon (Korea) International airport. From the Komatsu airport, the super express limousine bus will depart 10-15 min after the arrival of each flight. It takes 40 min by the bus from the airport to the west exit of the JR Kanazawa station (final stop). This costs 1,100 JPY one way per person. It takes about 5-10 min by taxi from the station to the symposium venue. Please note that the symposium venue (Kanazawa Culture Hall ("Kanazawa Bunka Hall" in Japanese) is located at the front of the Kanazawa New Grand Hotel.

By Train (costs one way per person):

JR Kansai airport sta. – JR Osaka sta. – JR Kanazawa sta.: about 9,500 JPY

JR Tokyo station – JR Echigo-yuzawa sta. – JR Kanazawa sta.: about 12,000 JPY

Central Japan airport sta. – JR Nagoya sta. – JR Maibara sta. – JR Kanazawa sta.: about 8,500 JPY

Map around the symposium venue is available at:

<http://www.kanazawa-tourism.com/eng/guide/guide1.php> (The venue can be found at the middle of the map no.02 on the web site.)



