

Refereed Proceedings

The 13th International Conference on

Fluidization - New Paradigm in Fluidization

Engineering

Engineering Conferences International

Year 2010

CONFERENCE PROGRAM

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Program

Fluidization XIII: New Paradigm in Fluidization Engineering

May 16-21, 2010

Hotel Hyundai, Gyeong-ju, Korea

Conference Co-Chairs

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Korea Advanced Institute of Science and Technology, Korea

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Sunday, May 16, 2010.

16:00 – 18:00	Conference Registration Diamond Lobby (B1F)
16:30 – 17:30	Organizing Committee Meeting Sapphire (2F)
18:00 – 19:00	Welcome Reception Convention Hall (B1)
19:00 – 20:30	Opening Remarks & Dinner Convention Hall (B1)
20:30 – 21:30	Chairperson Meeting Sapphire (2F)

NOTES

- Plenary talks will be held in Convention B (Level B1).
- Technical Sessions will be held in Convention A (Level B1) and Convention C (Level B1).
- Poster Sessions will be held in Convention B (Level B1).
- Breakfast will be in SARA (Level 1F) – coupons will be given at hotel check-in.
- Meals locations are listed in the program.
- Taping and photography of any presentations are prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected electronic copy will be sent to all participants after the conference.

Monday, May 17, 2010

07:00 – 8:30	Breakfast – SARA - Coffee Shop (1F)	
	PLENARY SESSION 1 Convention B (B1) Chair: Jamal Chaouki, Ecole Polytechnique Montreal, Canada	
08:30 – 09:30	P-1: A PERSPECTIVE ON DEVELOPMENT OF NOVEL FLUIDIZED BED PROCESSES FOR A MORE SUSTAINABLE GLOBAL FUTURE John R. Grace, University of British Columbia, Canada	
09:30 – 10:00	COFFEE BREAK Convention Lobby (B1)	
	SESSION 1: DENSE FLUIDIZATION: BUBBLING AND SLUGGING I	SESSION 2: MEASUREMENT AND INSTRUMENTATION
	Convention A (B1)	Convention C (B1)
	Co-chairs Ray Cocco, Particulate Solid Research Inc., USA Wei Fei, Tsinghua University, China	Co-chairs Ernst-Ulrich Hartge, Hamburg University, Germany Chang Keun Yi, KIER, Korea
10:00 – 10:15	1-1: BUBBLE-FREE FLUIDIZATION OF PARTICLES IN THE VOIDS OF A PACKING OF COARSE SPHERES Brunello Formisani, Rossella Girimonte, Patrizia Bafaro, Vincenzino Vivacqua Università della Calabria, Italy	2-1: COMPARISON OF VARIOUS MEASUREMENT TECHNIQUES FOR CHARACTERIZING THE HYDRODYNAMICS OF GAS-SOLID FLUIDIZED BEDS Mojgan Abbasi, Nasim Salehi-Nik, Reza Zarghami, Rahmat Sotude-Gharebagh, Navid Mostoufi University of Tehran, Iran
10:15 – 10:30	1-2: PARTICLE CLUSTERS IN FLUIDIZED BEDS Ray Cocco, S.B. Reddy Karri, Roy Hays, Ted Knowlton Particulate Solid Research, Inc., USA Frank Shaffer, National Energy Technology Laboratory, USA	2-2: UNDERSTANDING CAPTURE EFFICIENCY IN FLUIDIZED BEDS Kok-Seng Lim, Jonian Nikolov, Trevor D. Hadley VIC, Australia
10:30 – 10:45	1-3: GAS AND SOLID MIXING IN THREE PARTITIONED FLUIDIZED BED Gyoung Tae Jin, Seung-Yong Lee, Young-ju Seo, Solim Kang, Ho-Jung Ryu KIER, Korea	2-3: DYNAMIC ELUTRIATION MEASUREMENT IN A CONTINUOUSLY OPERATED BUBBLING FLUIDIZED BED W. de Vos, E. du Toit, W. Nicol University of Pretoria, South Africa

Monday, May 17, 2010 (continued)

<p>10:45 – 11:00</p>	<p>1-4: INVESTIGATION OF THE SHIFTING-PARAMETER AS A FUNCTION OF PARTICLE SIZE DISTRIBUTION IN A FLUIDIZED BED TRAVERSING FROM ONE REGIME TO ANOTHER</p> <p>C. Rautenbach, M.C. Melaaen, B.M. Halvorsen Telemark University College, Norway</p>	<p>2-4: NUMERICAL INVESTIGATION OF GAS SAMPLING FROM FLUIDIZED BEDS</p> <p>Tingwen Li, Yongmin Zhang, John Grace, Xiaotao Bi University of British Columbia, Canada China University of Petroleum, China</p>
<p>11:00 – 11:15</p>	<p>1-5: MOTION OF A LARGE OBJECT IN A 2D BUBBLING FLUIDIZED BED</p> <p>A. Soria-Verdugo, L. M. García-Gutiérrez, S. Sánchez-Delgado, U. Ruiz-Rivas Carlos III University of Madrid, Spain</p>	<p>2-5: FIBRE-OPTIC PROBE FOR THE SIMULTANEOUS MEASUREMENT OF GASEOUS SPECIES COMPOSITION AND SOLIDS VOLUME FRACTION</p> <p>Jean-Philippe Laviolette, Gregory S. Patience, Jamal Chaouki École Polytechnique de Montréal, Canada</p>
<p>11:15 – 11:30</p>	<p>1-6: MULTIPLE ORIFICE BUBBLE GENERATION IN GAS-SOLID FLUIDIZED BEDS: THE ACTIVATION REGION APPROACH</p> <p>S.Sánchez-Delgado, J.V. Briongos, A. Acosta-Iborra , D. Santana Carlos III University of Madrid, Spain</p>	<p>2-6: MAGNETIC RESONANCE (MR) MEASUREMENTS OF THE MASS FLUX IN GAS-SOLID FLUIDIZED BEDS</p> <p>C.R. Muller, D.J. Holland, A.J. Sederman, L.F. Gladden, J.S. Dennis University of Cambridge, UK; ETH Zurich, Switzerland.</p>
<p>11:30 – 11:45</p>	<p>1-7: PREDICTION AND VERIFICATION OF EFFECT OF BED LENGTH ON RTD OF COAL IN A BUBBLING FLUIDIZED BED</p> <p>Zhihong Liu, Masahiro Narukawa, Makoto Takafuji, Toshiyuki Suda IHI Corporation, Japan</p>	<p>2-7: AN ELECTRICAL CAPACITANCE TOMOGRAPHY STUDY OF PRESSURIZED FLUIDIZED BEDS</p> <p>Niels G. Deen, Willem Godlieb, Sander Gorter, J.A.M. Kuipers University of Twente, Dutch Polymer Institute, The Netherlands</p>
<p>11:45 – 12:00</p>	<p>1-8: PARTICLE ATTRITION MEASUREMENTS USING A JET CUP</p> <p>Ray Cocco, S.B. Reddy Karri, Yeook Arrington, Roy Hays, John Findlay, Ted Knowlton Particulate Solid Research, Inc. USA</p>	<p>2-8: FAST X-RAY TOMOGRAPHY OF A BUBBLING FLUIDIZED BED</p> <p>R.F. Mudde Delft University of Technology, The Netherlands</p>

Monday, May 17, 2010 (continued)

12:00 – 12:15	1-9: MIXING BEHAVIOR AND HYDRODYNAMIC STUDY OF GAS-SOLID-SOLID FLUIDIZATION SYSTEM: CO-FLUIDIZATION OF FCC AND COURSE PARTICLES Zeeshan Nawaz, Yujian Sun, Yue Chu, Fei Wei Tsinghua University, China	2-9: DIGITAL IMAGE ANALYSIS OF BUBBLE FLOW DISTRIBUTION-INFLUENCE OF OPERATIONAL PARAMETERS Johanna Olsson, David Pallarès, Filip Johnsson Chalmers University of Technology, Sweden
12:15 – 12:30	1-10: EFFECTS OF IMPOSED SOLIDS FLUX AND PRESSURE ON GAS BYPASSING IN DEEP FLUIDIZED BEDS OF GROUP A MATERIALS A. S. Issangya, S. B. Reddy Karri, T. M. Knowlton Particulate Solid Research, Inc., USA	2-10: GELDART GROUP INDICATION FROM POWDER MEASUREMENTS WITH A ROTATING DRUM INSTRUMENT Emile S. Webster, Clive E Davies, Massey University, New Zealand
12:30 – 14:30	LUNCH & FREE TIME Diamond Hall (B1)	
	SESSION 3: DENSE FLUIDIZATION: BUBBLING AND SLUGGING II	SESSION 4: LIQUID AND THREE-PHASE FLUIDIZATION
	Convention A (B1)	Convention C (B1)
	<u>Co-chairs</u> Ah-Hyung Alissa Park, Columbia University, USA Joachim Werther, Hamburg University, Germany	<u>Co-chairs</u> Norman Epstein, University of British Columbia, Canada Dong Hyun Lee, Sungkunkwan University, Korea
14:00 – 14:15	3-1: PARTICLE BREAKAGE IN THE CYCLONES OF FLUIDIZED BED SYSTEMS Anja Püttmann, Marvin Kramp, Andreas Thon, Ernst-Ulrich Hartge, Joachim Werther Hamburg University of Technology, Germany	4-1: A STUDY ON DENITRIFICATION IN A FLUIDIZED BED BIOREACTOR K. Vimala, L. Prasanna Lakshmi, P. S. Yelamarthi, National Institute of Technology, India
14:15 – 14:30	3-2: STUDY OF SOLIDS ENTRAINMENT INTO ATTRITION JETS IN FLUIDIZED BEDS Feng Li, Cedric Briens, Franco Berruti, University of Western Ontario, Canada Jennifer McMillan Edmonton Research Centre Syncrude, Canada	4-2: IMPACT BEHAVIOUR OF PARTICLES WITH LIQUID FILMS: ENERGY DISSIPATION AND STICKING CRITERIA Sergiy Antonyuk, Stefan Heinrich Hamburg University of Technology, Germany Stefan Palzer Nestlé Research Center Lausanne, Switzerland

Monday, May 17, 2010 (continued)

<p>14:30 – 14:45</p>	<p>3-3: EVALUATION OF THE MINIMUM VELOCITY OF POLYDISPERSE BED FLUIDIZATION COMPOUNDED OF BIOMASS PELLETS AND THEIR MIXTURES WITH FINE PARTICLES OF COAL</p> <p>Zorin Alexander, Isemin Rafail, Viryasov Dmitriy, Kuzmin Sergey Tambov State Technical University, Russia</p>	<p>4-3: PROCESSING OF PURE VEGETABLE OILS IN A CONTINUOUS FCC PILOT PLANT</p> <p>Peter Bielansky, Alexander Reichhold, Christoph Schönberger Vienna University of Technology, Austria</p>
<p>14:45 – 15:00</p>	<p>3-4: PREDICTION OF CATALYST ATTRITION IN AN INDUSTRIAL FLUIDIZED BED PLANT BASED ON LAB SCALE ATTRITION TESTS</p> <p>Andreas Thon, Anja Püttmann, Ernst-Ulrich Hartge, Stefan Heinrich, Joachim Werther Hamburg University, Germany Ecole Polytechnique, Canada Richard Bockrath, USA</p>	<p>4-4: HYDRODYNAMIC CHARACTERISTICS OF LIQUID-SOLID FLUIDIZATION OF BINARY MIXTURES IN TAPERED BEDS</p> <p>J. S. N. Murthy, S. Nandana, Phani Kiran S. V. G. R., V Ramesh, V. V. Basava Rao, T. Sankarshana University College of Technology, Osmania University, India</p>
<p>15:00 – 15:15</p>	<p>3-5: THE TRANSPORT DISENGAGEMENT HEIGHT (TDH) IN A BUBBLING FLUIDIZED BED (BFB)</p> <p>Chian W. Chan, Jonathan P.K. Seville, Jan Baeyens University of Warwick, UK</p>	<p>4-5: EFFECTS OF LIQUID SWIRLING ON THE GAS HOLDUP AND OXYGEN TRANSFER IN THREE-PHASE FLUIDIZED BEDS</p> <p>Myun-Jae Seo, Hyun-Oh Lim, Sung-Mo Son, Yong Kang, CNU Yong-Jun Cho, Hi-Chul Yang, KAERI Sang-Done Kim, KAIST Heon Jung, Ho-Tae Lee, KIER Korea</p>
<p>15:15 – 15:30</p>	<p>3-6: EFFECTS OF PARTICLE SIZE AND FLUIDIZING VELOCITY ON THE CHARGE DENSITY OF ENTRAINED FINES</p> <p>Muammar Omar, Kwang Seok Choi, Xiaotao T. Bi, John R. Grace University of British Columbia, Canada</p>	<p>4-6: ELECTRICITY GENERATION CHARACTERISTICS OF AN ANAEROBIC FLUIDIZED BED MICROBIAL FUEL CELL</p> <p>Qingjie Guo, Shuju Zhao, Xuyun Wang, Xuehai Yue, Liangyu Hou Qingdao University, China</p>
<p>15:30 – 15:45</p>	<p>3-7: AGGLOMERATION DURING FLUIDIZED-BED COMBUSTION OF BIOMASS</p> <p>Teng Haipeng, Li Shiyuan, Lu Qinggang Chinese Academy of Science, China</p>	

Monday, May 17, 2010 (continued)

15:45 – 16:00	<p>3-8: INVESTIGATION OF THE EFFECT OF FLUIDIZATION TIME ON ELECTROSTATIC CHARGE GENERATION IN GAS-SOLID FLUIDIZED BEDS</p> <p>Amanda Giffin, Andrew Sowinski, Poupak Mehrani University of Ottawa, Canada</p>	
16:15 – 16:45	<p align="center">COFFEE BREAK Convention Lobby (B1)</p>	
17:00 – 19:00	<p align="center">INDIVIDUAL MEETING & DISCUSSION Convention Lobby (B1)</p>	
19:00 – 21:00	<p align="center">DINNER Convention Hall (B1)</p>	
21:00 – 23:00	<p align="center">POSTER SESSION 1 & SOCIAL HOUR (ORAL SESSION 1, 2, 3 & 4 PAPERS) Convention B (B1) Co-Chairs: Woo Hyun Kim, KIMM, Korea Bung Ho Song, Kunsan National University, Korea</p>	

Tuesday, May 18, 2010

07:00 – 8:30	Breakfast – SARA - Coffee Shop (1F)	
	PLENARY SESSION 2 Convention B (B1) Chair: Xiaotao Bi, University of British Columbia, Canada	
08:30 – 09:30	P-2: A SINGLE PARTICLE VIEW OF FLUIDIZATION Jonathan Seville, University of Warwick, UK	
09:30 – 10:00	COFFEE BREAK Convention Lobby (B1)	
	SESSION 5: NOVEL FLUIDIZED-BED REACTORS I	SESSION 6: CIRCULATION AND FAST FLUIDIZATION
	Convention A (B1)	Convention C (B1)
	Co-chairs Hans Kuipers, University of Twente, Netherland Qingjie Guo, Qingdao University, China	Co-chairs Atsushi Tsutsumi, University of Tokyo, Japan Piero Salatino, Università degli Studi di Napoli Federico II, Italy
10:00 – 10:15	5-1: A NOVEL CONSTRUCTION OF A LOW-PRESSURE-DROP AIR NOZZLE WORKING WITH A 535MWE CFB BOILER Pawel Mirek, Wojciech Nowak Czestochowa University of Technology Poland Marcin Klajny FW Energia OY, Finland Janusz Jabłoński PGE Elektrownia Turow S.A. Poland	6-1: THE EFFECTS OF DISTRIBUTOR DESIGN ON THE SOLIDS DISTRIBUTION IN A CFB RISER Jing Xu, Botao Peng, Chao Zhang, Jesse Zhu University of Western Ontario, Canada
10:15 – 10:30	5-2: CHEMICAL-LOOPING STEAM METHANE REFORMING FOR HYDROGEN PRODUCTION IN A CIRCULATING FLUIDIZED BED REACTOR Kang Seok Go, Young Wook Jeon, Sang Done Kim, KAIST Chu Sik Park, KIER Korea	6-2: DECAY FACTOR WITH EXPERIMENTAL VARIABLES IN TWO CIRCULATING FLUIDIZED BED (CFB) RISERS Hyun Suk Lee, Jong Hun Lim, Dong Hyun Lee SungKyunKwan University Sang Soon Park, Ho Jeong Chae, Soon Yong Jeong KRICT Korea

Tuesday, May 18, 2010 (continued)

10:30 – 10:45	<p>5-3: DEVELOPMENT OF A CONTINUOUS NANOPARTICLE COATING WITH ELECTROSPRAYING</p> <p>N. Ellis University of British Columbia, Canada C.U. Yurteri, J.R. van Ommen Delft University of Technology, The Netherlands</p>	<p>6-3: EFFECT OF DISTRIBUTOR DESIGN ON SOLIDS CIRCULATION AND GAS BYPASS IN AN INTERNAL CIRCULATING FLUIDIZED BED REACTOR</p> <p>Terris T. Yang, Honeywell International, USA Xiaotao T. Bi, University of British Columbia, Canada</p>
10:45 – 11:00	<p>5-4: SPINNING STRAW INTO GOLD: TURNING ACADEMIC PAPERS INTO COMMERCIAL FLUIDIZED BED REACTOR DESIGNS</p> <p>Charles O. Bolthrunis, Michael Hagan, Waheed A. Mukaddam Cambridge Chemical Technology Inc., USA</p>	<p>6-4: RADIAL DISTRIBUTION OF PARTICLE CLUSTERS IN A DOWNER REACTOR UNIT</p> <p>Mohammad Ashraful Islam, Stefan Krol, Hugo I. de Lasa University of Western Ontario, Canada</p>
11:00 – 11:15	<p>5-5: THE HOT GAS DESULFURIZATION IN A COMPACT TWO BEDS SYSTEM INTEGRATED WITH COAL GASIFICATION AND FISHER-TROPSCH SYSTEM</p> <p>Young Cheol Park, Sung-Ho Jo, Seung-Yong Lee, Chang-Keun Yi KIER, Korea</p>	<p>6-5: FLOW BEHAVIORS IN A HIGH SOLID FLUX CIRCULATING FLUIDIZED BED COMPOSED OF A RISER, A DOWNER AND A BUBBLING FLUIDIZED BED</p> <p>Guoqing Guan, Chihiro Fushimi, Masahiro Ikeda, Yu Nakamura, Atsushi Tsutsumi University of Tokyo, Japan Toshiyuki Suda, IHI Corporation, Japan Masanori Ishizuka, Hiroyuki Hatano, Satoru Matsuda, Yoshizo Suzuki AIST, Japan</p>
11:15 – 11:30	<p>5-6: REACTION CHARACTERISTICS OF TWO WATER GAS SHIFT CATALYSTS IN A BUBBLING FLUIDIZED BED REACTOR FOR SEWGS PROCESS</p> <p>Ho-Jung Ryu Sung-Ho Jo, Young Cheol Park, Chang-Keun Yi KIER, Korea</p>	

11:30 – 11:45	<p>5-7: EXPERIMENTAL AND COMPUTATIONAL STUDY ON THE BUBBLE BEHAVIOR IN A 3-D FLUIDIZED BED WITH A VERTICAL-AXIS, ROTATING DISTRIBUTOR</p> <p>A. Acosta-Iborra, F. Hernández-Jiménez, C. Sobrino, M. de Vega Carlos III University of Madrid, Spain</p>	<p>6-7: CHARACTERIZATION OF TURBULENT REGIME BEHAVIOR IN THE DILUTE ZONE OF A CIRCULATING FLUIDIZED BED RISER</p> <p>Abdelghafour Zaabout, Hervé Bournot, René Occelli IUSTI Technopôle de Château, France Bousselham Kharbouch Faculté des Sciences Tétouan, Morocco</p>
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Tuesday, May 18, 2010 (continued)

11:45 – 12:00	<p>5-8: A NOVEL CHEMICAL LOOPING COMBUSTION PROCESS: PRESSURE DROP AND SOLID CIRCULATION RATE MODELLING</p> <p>Yazdanpanah Mohammad-Mahdi, Hoteit Ali, Forret Ann, Gauthier Thierry IFP-Lyon, France; Delebarre Arnaud Université Henri Poincaré, France</p>	<p>6-8: THE INFLUENCE OF PARTICLE ATTRITION ON SORBENT INVENTORY AND PARTICLE SIZE DISTRIBUTION IN AIR-BLOWN CIRCULATING FLUIDIZED BED COMBUSTORS</p> <p>Piero Salatino, Fabio Montagnaro, Università degli Studi di Napoli Federico II, Italy; Fabrizio Scala, Massimo Urciuolo Consiglio Nazionale delle Ricerche, Italy</p>
12:00 – 12:15	<p>5-9: HYDRODYNAMICS ON CHEMICAL LOOPING COMBUSTION USING MULTIPHASE CFD WITH KINETIC THEORY OF GRANULAR FLOW</p> <p>Jonghwun Jung POSCO, South Korea; Isaac K. Gamwo U.S. Department of Energy, USA</p>	<p>6-9: CO-COMBUSTION OF KOREAN ANTHRACITE WITH VARIOUS FUELS IN A COMMERCIAL CIRCULATING FLUIDIZED BED BOILER</p> <p>Jong-Min Lee, Dong-Won Kim, Pyeong-Ki Seon, Jae-Sung Kim KEPCO, Korea</p>
12:15 – 12:30		<p>6-10: THE SOLIDS FLOW IN THE RISER OF A CFB VIEWED BY POSITRON EMISSION PARTICLE TRACKING (PEPT)</p> <p>Chian W. Chan, Jonathan P.K. Seville, Jan Baeyens, University of Warwick, UK</p>
12:30 – 19:00	<p>LUNCH & SK ENERGY, POSCO TOUR Diamond Hall (B1)</p>	
19:00 – 21:00	<p>BANQUET Convention Hall (B1)</p>	

Tuesday, May 18, 2010 (continued)

21:00 – 23:00	<p style="text-align: center;">POSTER SESSION 2 & SOCIAL HOUR (ORAL SESSION 5 & 6 PAPERS) Convention B (B1) Co-Chairs Uen Do Lee, Korea Institute of Industrial Technology, Korea Ho Jung Ryu, KIER, Korea</p>
PM 2	<p>DEVELOPMENT OF A FLUIDIZED BED REACTOR FOR WATER GAS SHIFT REACTION See-Hoon Lee, KIER, Korea</p>
PM 4	<p>EXPERIMENTAL STUDY ON DENSE PHASE PNEUMATIC CONVEYING OF PULVERIZED COAL Wei Wang, Tsinghua University, China</p>
PM 7	<p>STEADY-STATE LONG-TERM OPERATION EXPERIENCE IN A 50 KWTH CHEMICAL LOOPING COMBUSTOR WITH NATURAL GAS SYNGAS AS FUELS Ho-Jung Ryu, KIER, Korea</p>
PM 10	<p>FLUIDIZATION CHARACTERISTICS OF GROUP A/C POWDERS UNDER MECHANICAL VIBRATING CONDITION Yoshihide Mawatari, KIT, Japan</p>
PM 15	<p>HYDRODYNAMIC AND MIXING CHARACTERISTICS OF A CIRCULATING FLUIDIZED BED GASIFIER Uen do Lee, KIIT, Korea</p>
PM 16	<p>AN EXPERIMENTAL STUDY OF AIR-BLOWN BIOMASS GASIFICATION IN A BUBBLING FLUIDIZED Young Doo Kim, KIIT, Korea</p>
PM 17	<p>TAR REDUCTION OF BIO-SYNGAS WITH VARIOUS SOLID MATERIALS IN A SOLID BED REACTOR Hyo Jae Jeong, Yonsei University, Korea</p>
PM 19	<p>DIGITAL IMAGE ANALYSIS OF BUBBLING FLOW DISTRIBUTION - INFLUENCE OF OPERATIONAL PARAMETERS Johanna Olsson, Chalmers University, Sweden</p>
PM 21	<p>ONE-DIMENSIONAL MODELING OF OXY-FUEL FLUIDIZED BED COMUSTION FOR CO₂ CAPTURE Sadegh Seddighi, Chalmers University, Sweden</p>
PM 22	<p>FLUIDIZED BED MEMBRANE REACTOR FOR HIGH-PURITY HYDROGEN PRODUCTION UTILIZING IN-SITU CO₂ CAPTURE Andres Mahecha-Botero, University of British Columbia, Canada</p>

PM 24	HYDRODYNAMICS OF A MEMBRANE ASSISTED FLUIDIZED BED-COMPARISON BETWEEN EXPERIMENT AND A CONTINUUM MODEL Jelle f. De Jong, University of Twente, The Netherlands
PM 25	MEASUREMENT TECHNIQUE FOR ELECTROSTATIC CHARGE GENERATION IN GAS-SOLID FLUIDIZED BEDS Andrew Sowinski, University of Ottawa, Canada
PM 26	DETERMINATION OF BUBBLE CHARACTERISTICS IN A FLUIDIZED BED BY ARTIFICIAL NEURAL NETWORKS (ANN) M. A. Izquierdo, RERI, Spain

Wednesday, May 19, 2010

07:00 – 08:30	Breakfast – SARA - Coffee Shop (1F)	
	PLENARY SESSION 3 Convention B (B1) Chair: Ted Knowlton, Particulate Solid Research, Inc., USA	
08:30 – 09:30	P-3: FLUIDIZATION OF NANOPOWDERS: EXPERIMENTS, MODELING, AND APPLICATIONS J.Ruud van Ommen, Delft University of Technology, The Netherlands	
09:30 – 10:00	COFFEE BREAK Convention Lobby (B1)	
	SESSION 7: NOVEL FLUIDIZED-BED REACTORS	SESSION 8: REACTOR PERFORMANCE I
	Convention A (B1)	Convention C (B1)
	Co-chairs Karl Ernst Wirth, University of Erlangen-Nuremberg, Germany Yongseung Yun, IAE, Korea	Co-chairs Christoph Pfeifer, Vienna University of Technology, Austria Jeong Hoo Choi, Konkuk University, Korea
10:00 – 10:15	7-1: GAS-SOLID FLUIDIZATION IN A MICROFLUIDIC CHANNEL Fei Wang, Liang-Shih Fan Ohio State University, USA	8-1: A MODEL ON AN ENTRAINED BED-BUBBLING BED PROCESS FOR CO₂ CAPTURE FROM FLUE GAS Jeong-Hoo Choi, Konkuk University, Korea Chang-Keun Yi, Sung-Ho Jo, KIER, Korea
10:15 – 10:30	7-2: NOVEL TWO-INTERCONNECTED FLUIDIZED BED SYSTEM FOR SELECTIVE SOLID CIRCULATION Ho-Jung Ryu, Jaehyeon Park, Dowon Shun, Seung-Yong Lee KIER, Korea	8-2: CO-GASIFICATION OF COAL AND WOOD IN A DUAL FLUIDIZED BED GASIFIER VARIATION OF FLUIDIZATION CONDITIONS AND LOAD RATIO Isabella Aigner, Christoph Pfeifer, Hermann Hofbauer Vienna University of Technology, Austria
10:30 – 10:45	7-3: MULTIPLE-LOOP CHEMICAL REACTOR DESIGN WITH PRESSURE	8-3: INVESTIGATION OF CHANGE OF VOLUMETRIC FLOW IN FLUIDIZED-BED

	BALANCE CONSIDERATION Trevor D. Hadley, Ken Chiang, Nick R. Burke, Kok-Seng Lim CSIRO, Australia	REACTORS Andrés Mahecha-Botero, Alexander Nguyen, John R. Grace University of British Columbia, Canada; Franz Haseidl Technische Universität München, Germany; Tingwen Li National Energy Technology Laboratory, USA
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Wednesday, May 19, 2010 (continued)

10:45 – 11:00	7-4: AERATION AND MIXING BEHAVIOURS OF BINARY MIXTURES OF NANO-SIZED POWDERS UNDER SOUND VIBRATION P. Ammendola, R. Chirone Istituto di Ricerche sulla Combustione – CNR Italy	8-4: STEAM GASIFICATION OF LOW RANK COAL CHAR IN A THERMOBALANCE REACTOR AND A FLUIDIZED BED REACTOR Byungho Song, Xueyan Zhu Kunsan National University; Woongsig Moon Micro Science Tech Co., Ltd.; Won Yang Korea Inst. Ind. Technology Korea
11:00 – 11:15		8-5: INFLUENCE OF PROCESS PARAMETERS ON FLUIDISED BED DRYING OF POWDERED MATERIALS Piero Bareschino, Antonio Marzocchella Università degli Studi del Sannio, Italy; Piero Salatino Università degli Studi di Napoli 'Federico II', Italy
11:15 – 11:30	7-6: EXPERIMENTS AND MODELLING OF MICRO-JET ASSISTED FLUIDIZATION OF NANOPARTICLES J. Ruud van Ommen Delft University of Technology, The Netherlands; David M. King, Alan Weimer University of Colorado, USA; Robert Pfeffe, Arizona State University, USA; Berend G.M. van Wachem Imperial College London, UK	8-6: HEAVY METAL VAPORIZATION IN FLUIDIZED BED COMBUSTION OF SOLID WASTE AND COAL Q. Falcoz, D. Gauthier, G. Flamant, S. Abanades Laboratoire Procédés Matériaux et Energie Solaire, France J. Liu Huazhong University of Science & Technology, China

11:30 – 11:45	<p>7-7: DESIGN OF NEW FLUIDIZED BED REACTORS FOR CVD – PROCESSES</p> <p>T. Strer, M. Schober, K.-E. Wirth University of Erlangen-Nuremberg, Germany</p>	<p>8-7: COMBUSTION CHARACTERISTICS AND EMISSION OF HAZARDOUS AIR POLLUTANTS IN COMMERCIAL FLUIDIZED BED COMBUSTORS FOR SEWAGE SLUDGE</p> <p>Ha-Na Jang, Seong-Bum Park, Hansol EME Co. Ltd, Korea; Jeong-Hun Kim, Yong-Chil Seo, Yonsei University, Korea</p>
11:45 – 12:00	<p>7-8: PLASMA-ENHANCED CHEMICAL VAPOUR DEPOSITION ON PARTICLES IN AN ATMOSPHERIC CIRCULATING FLUIDIZED BED</p> <p>J. Ruud van Ommen, Delft University of Technology Elena Abadjieva, Yves L.M. Creyghton TNO Defence, Security and Safety, The Netherlands</p>	<p>8-8: ATTRITION OF BED MATERIALS AND FUEL PELLETS FOR FLUIDIZED BED GASIFICATION APPLICATION</p> <p>P. Ammendola, R. Chirone, F. Miccio, G. Ruoppolo, F. Scala Istituto di Ricerche sulla Combustione, Italy</p>

Wednesday, May 19, 2010 (continued)

12:00 – 12:15	<p>7-9: CHALLENGES WITH THE COUPLING OF FLUIDIZED BEDS FOR CHEMICAL LOOPING COMBUSTION</p> <p>Marvin Kramp, Andreas Thon, Ernst-Ulrich Hartge, Stefan Heinrich, Joachim Werther Hamburg University of Technology, Germany</p>	<p>8-9: SHEAR-ASSISTED FLUIDIZED BED POWDER-COATING</p> <p>Piero Bareschino, Francesco Pepe Università degli Studi del Sannio, Italy; Piero Salatino Università degli Studi di Napoli Federico II, Italy</p>
12:15 – 12:30	<p>7-10: CHARACTERISTICS AND KINETICS OF BIOMASS PYROLYSIS IN A MICRO FLUIDIZED BED REACTOR</p> <p>Jian Yu, Qiang Li, , Shiqiu Gao, Guangwen Xu Chinese Academy of Science, Jianhong Zhu, Zhengkang Duan Xiangtan University, China</p>	
12:30 – 14:00	<p>LUNCH & FREE TIME Diamond Hall (B1)</p>	
	<p>SESSION 9: HEAT AND MASS TRANSFER</p>	<p>SESSION 10: SPOUTED BEDS AND ROTATING FLUIDIZATION</p>
	<p>Convention A (B1)</p>	<p>Convention C (B1)</p>
	<p>Co-chairs Shigekatsu Mori, Nagoya University, Japan Anton Larsson, Chalmers University of Technology, Sweden</p>	<p>Co-chairs Satoru Watano, Osaka Prefecture University, Japan Yi Cheng, Tsinghua University, China</p>

14:00 – 14:15	<p>9-1: NUMERICAL EXPERIMENT ON EFFECT OF SURFACE ROUGHNESS FOR HEAT AND FLOW AROUND TWO CONTACTING PARTICLES</p> <p>Azri bin Alias, Kuwagi K, Bin Mokhtar M.A., Takami T. Okayama University of Science, Horio M. Tokyo University of A&T, Japan</p>	<p>10-1: STUDY OF THE MINIMUM SPOUTING VELOCITY IN A DRAFT-TUBE CONICAL SPOUTED BED</p> <p>Haritz Altzibar, Gartzen Lopez, Martin Olazar, Javier Bilbao University of the Basque Country, Spain</p>
14:15 – 14:30	<p>9-2: HEAT TRANSFER TO IMMERSSED COOLING TUBES AND PARTICLES IN A FLUIDIZED BED REACTOR</p> <p>Y. Kobayashi, Y. Mori, A. Goto Sumitomo Chemical Company, Japan H.T. Bi , J.R. Grace University of British Columbia, Canada</p>	<p>10-2: FILM COATING ONTO COHESIVE FINE PARTICLES BY A NOVEL ROTATING FLUIDIZED BED COATER</p> <p>Tetsufumi Kondo, Hideya Nakamura, Tomohiro Iwasaki, Satoru Watano, Osaka Prefecture University Daisuke Iwamoto Nara Machinery Co., Ltd., Japan</p>

Wednesday, May 19, 2010

14:30 – 14:45	<p>9-3: RELATIONSHIP BETWEEN STRUCTURE AND HEAT TRANSFER COEFFICIENT IN FAST FLUIDIZED BEDS</p> <p>Baolin Hou, Qingshan Zhu, Hongzhong Li Chinese Academy of Science, China</p>	<p>10-3: A CONICAL SPOUTED BED REACTOR FOR THE VALORISATION OF WASTE TIRES</p> <p>Gartzen Lopez, Maider Amutio, Gorka Elordi, Maite Artetxe, Haritz Altzibar, Martin Olazar Universidad del País Vasco, Spain</p>
14:45 – 15:00	<p>9-4: MODELING OF MASS LOSS OF CHAR PARTICLES DURING COMBUSTION AND INTERACTION WITH INERT MATERIAL</p> <p>Piotr Pelka, Jacek Leszczynski Czestochowa University of Technology, Poland</p>	
15:00 – 15:15	<p>9-5: HEAT RECOVERY FROM MELTED BLAST FURNACE SLAG USING FLUIDIZED BED</p> <p>Tadaaki Shimizu, Daisuke Haga, Go Mikami, Takayuki Takahashi, Kenji Horinouchi Niigata University, Japan</p>	<p>10-5: HYDRODYNAMICS OF A SPOUT-FLUID BED WITH AN ENLARGED COLUMN FOR FINE PARTICLES</p> <p>Jian Xu, Lei Gong, Xiaojun Bao, Weisheng Wei China University of Petroleum, China</p>
15:15 – 15:30	<p>9-6: BASIC STUDY FOR COAL MOISTURE CONTROL INTEGRATING PNEUMATIC CLASSIFICATION TECHNIQUE</p>	<p>10-6: BIOMASS GASIFICATION IN ROTATING FLUIDIZED BED</p>

	Zhou-en Liu, Yin Wang, Yajun Tian, Wenfeng Ji, Guangwen Xu Chinese Academy of Science Yimin Xie, Shenyang Institute of Chemical Technology, China	Mania Abdollahi-Neisiani, Christophe Guy, Jamal Chaouki Ecole Polytechnique, Canada
15:30 – 15:45		10-7: NUMERICAL AND EXPERIMENTAL STEADY STATE FLOW AND HEAT TRANSFER IN A CONTINUOUS SPOUTED BED Cezar A. Rosa, José T. Freire, Federal University of São Carlos, Brazil; Hamid Arastoopour, IIT, USA
15:45 – 16:00		10-8: PARTICLE SEGREGATION IN TAPERED FLUIDIZED BEDS T. M. Gernon, Trinity College, Ireland R.S.J.Sparks, University of Southampton, UK M.A.Gilbertson, University of Bristol, UK

Wednesday, May 19, 2010 (continued)

16:00 – 19:30	INDIVIDUAL MEETING & DISCUSSION Convention Lobby (B1)
19:30 – 21:00	DINNER Convention Hall (B1)
21:00 – 23:00	POSTER SESSION 2 & SOCIAL HOUR (ORAL SESSION 7, 8, 9 & 10 PAPERS) Convention B (B1) Co-Chairs Heon Jung, KIER, Korea Hee Chul Yang, KAERI, Korea

Thursday, May 20, 2010

07:00 – 8:30	Breakfast – SARA - Coffee Shop (1F)	
	PLENARY SESSION 4 Convention B (B1) Chair: David Pallares, Chalmers University of Technology, Sweden	
08:30 – 09:30	P-4: FLUIDIZATION—PAST & FUTURE Masayuki Horio, Tokyo University of A&T, Japan	
09:30 – 10:00	COFFEE BREAK Convention Lobby (B1)	
	SESSION 11: REACTOR MODELING & SIMULATION I	SESSION 12: REACTOR PERFORMANCE II
	Convention A (B1)	Convention C (B1)
	Co-chairs Madhava Syamlal, NETL/DOE, USA Jong Hwun Jung, POSCO, KOREA	Co-chairs Jelle De Jong, University of Twente, The Netherlands Mark Gilbertson, University of Bristol, UK
10:00 – 10:15	11-1: NUMERICAL STUDY OF BUBBLING FLUIDIZED BEDS: INFLUENCE OF IMMERSSED TUBES, EXTRACTION METHODS AND AVERAGING PERIODS Matthias Schreiber, Teklay Weldeabzgi Asegehegn, Hans Joachim Krautz Brandenburg University of Technology Cottbus, Germany	12-1: THE EFFECT OF GAS TEMPERATURE AND VELOCITY ON COAL DRYING IN FLUIDIZED BED DRYER Jaehyeon Park, Dowon Shun, Dal-Hee Bae, Sihyun Lee, Jeong Hak Seo, KIER Jae Hyeok Park Hanyang University, Korea
10:15 – 10:30	11-2: NUMERICAL STUDY OF BUBBLE HYDRODYNAMICS FOR GAS-SOLID FLUIDIZED BEDS WITH AND WITHOUT HORIZONTAL TUBES Teklay Weldeabzgi Asegehegn, Hans Joachim Krautz Brandenburg University of Technology Cottbus, Germany	12-2: PERFORMANCE COMPARISON OF SYNGAS METHANATION ON FLUIDIZED AND FIXED BED REACTORS Yingli Wang, Jiao Liu, Qiang Li, Jian Yu, Fabing Su, Guangwen Xu Chinese Academy of Science, China

<p>10:30 – 10:45</p>	<p>11-3: DIRECT NUMERICAL SIMULATION OF FLUIDIZED BED WITH IMMERSED BOUNDARY METHOD</p> <p>Kuwagi K., Utsunomiya H., Shimoyama Y., Hirano H., Takami T. Okayama University of Science, Japan</p>	<p>12-3: FLUIDIZATION TECHNOLOGY FOR STABLE STARTUP OF COMMERCIAL FCC UNIT</p> <p>Sung Won Kim, Gyung Rok Kim, Jae Wook Shin SK Energy Institute of Technology; Ik Sang Yoo, Hun Sik Kang SK Energy Ulsan Complex; Sang Hoon Park SK Energy, Korea</p>
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Thursday, May 20, 2010 (continued)

<p>10:45 – 11:00</p>	<p>11-4: TIME-AVERAGED MODELLING OF CFBS – ANALYSIS OF THE TERMS IN THE MOMENTUM EQUATIONS</p> <p>Sirpa Kallio, Maiju Seppälä, Veikko Taivassalo VTT, Finland</p>	<p>12-4: ONE-DIMENSIONAL MODELING OF OXY-FUEL FLUIDIZED BED COMBUSTION FOR CO₂ CAPTURE</p> <p>Sadegh Seddighi, David Pallarès, Filip Johnsson Chalmers University of Technology, Sweden</p>
<p>11:00 – 11:15</p>		<p>12-5: FLUIDIZED BED COMBUSTION OF C₁-C₄ N-ALKANES</p> <p>Jean-Philippe Laviolette, Gregory S. Patience, Jamal Chaouki École Polytechnique de Montréal, Canada</p>
<p>11:15 – 11:30</p>	<p>11-6: DEM-CFD MODELLING OF A FLUIDIZED BED SPRAY GRANULATOR</p> <p>Lennart Fries, Sergiy Antonyuk, Stefan Heinrich Hamburg University of Technology, Germany; Stefan Palzer Nestlé Research Center Vers-Chez-Les-Blanc, Switzerland</p>	<p>12-6: SYNGAS PRODUCTION WITH A DUAL FLUIDIZED BED GASIFIER FOR POLYGENERATION</p> <p>Uen Do Lee, Young Doo Kim, Hyo Jae Jeong, In Soo Choi, Yeon Kyung Sung, Tae U Yoo Korea Inst. Ind. Technol., Korea Jae Hun Song SeenTec Co., Ltd., Korea</p>
<p>11:30 – 11:45</p>	<p>11-7: CFD SIMULATION OF THE REACTING FLOW PROCESS OF COAL PYROLYSIS TO ACETYLENE IN HYDROGEN PLASMA DOWNER REACTORS</p> <p>Binhang Yan, Changning Wu, Yong Jin, Yi Cheng Tsinghua University, China</p>	<p>12-7: FLUIDIZED BED GASIFICATION OF BIOMASS: A SUBSTANCE FLOW ANALYSIS</p> <p>Umberto Arena, Fabrizio Di Gregorio, Lucio Zaccariello, M.Laura Mastellone Second University of Naples, Italy</p>

11:45 – 12:00	<p>11-8: CFD-DEM SIMULATION OF SYNGAS-TO-METHANE PROCESS IN A FLUIDIZED-BED REACTOR</p> <p>Changning Wu, Dayong Tian, Yi Cheng Tsinghua University, China</p>	<p>12-8: HIGH PERFORMANCE COMPUTING: CLEAN COAL GASIFIER DESIGNS USING HYBRID PARALLELIZATION</p> <p>M Syamlal, C Guenther, A Gel National Energy Technology Laboratory; S Pannala Oak Ridge National Lab., USA.</p>
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Thursday, May 20, 2010 (continued)

12:00 – 12:15	<p>11-9: CFD SIMULATION OF A LIQUID-FLUIDIZED BED OF BINARY PARTICLES</p> <p>Long Fan, John R. Grace, Norman Epstein University of British Columbia, Canada</p>	<p>12-9: TAILORED SYNTHESIS OF PRECIPITATED MAGNESIUM CARBONATES AS CARBON-NEUTRAL FILLER MATERIALS DURING CARBON MINERAL SEQUESTRATION</p> <p>Huangjing Zhao, Nathan Dadap, Ah-Hyung Alissa Park Columbia University, USA</p>
12:15 – 12:30	<p>11-10: COMPUTATIONAL STUDY OF LAYER INVERSION IN TWO-COMPONENT LIQUID-FLUIDIZED BEDS BY DEM-CFD</p> <p>Alberto Di Renzo, Fernando Cello, Francesco Paolo Di Maio Università della Calabria, Italy</p>	
12:30 – 14:30	<p>LUNCH & FREE TIME Diamond Hall (B1)</p>	
	<p>SESSION 13: REACTOR MODELING & SIMULATION II</p>	<p>SESSION 14: NON-CONVENTIONAL FLUIDIZED BEDS</p>
	<p>Convention A (B1)</p>	<p>Convention C (B1)</p>
	<p>Co-chairs Hamid Arastoopour, IIT, USA Yong-Chil Seo, Yonsei University, Korea</p>	<p>Co-chairs Cedric Briens, University of Western Ontario, Canada Alberto Di Renzo, University of della Calabria, Italy</p>

14:30 – 14:45		<p>14-1: HYDRODYNAMICS OF UNCONVENTIONAL FLUIDIZED BEDS: SOLIDS FLOW PATTERNS AND THEIR INFLUENCE ON MIXING/SEGREGATION OF A LARGE FLOTSAM PARTICLE IN A BED OF FINER SOLIDS</p> <p>Roberto Solimene, Paola Ammendola, Giovanna Ruoppolo, Riccardo Chirone Istituto di Ricerche sulla Combustione – CNR, Italy</p>
14:45 – 15:00	<p>13-2: MODELING OF THE SOLIDS INVENTORY IN CFB BOILERS</p> <p>David Pallarès, Filip Johnsson Chalmers University of Technology, Sweden; Marko Palonen Metso Power Oy, Finland</p>	<p>14-2: EVALUATION OF FLUID DYNAMICS IN A HOT AND A COLD SYSTEM OF INTERCONNECTING FLUIDISED BEDS</p> <p>Fredrik Lind, Martin Seemann, Henrik Thunman Chalmers University of Technology, Sweden.</p>

Thursday, May 20, 2010 (continued)

15:00 – 15:15	<p>13-3: TOWARDS A THEORETICAL MODEL OF SEGREGATING FLUIDIZATION OF TWO-SOLID BEDS</p> <p>Brunello Formisani, Rossella Girimonte, Vincenzino Vivacqua Università della Calabria, Italy</p>	<p>14-3: DEM FLUIDIZATION OF SMART PARTICLES</p> <p>Amit Suri, Masayuki Horio Tokyo University of A&T, Japan</p>
15:15 – 15:30	<p>13-4: ZERO-DIMENSIONAL MODELLING OF INDIRECT FLUIDIZED BED GASIFICATION</p> <p>Anton Larssona, David Pallares, Daniel Nevesa, Martin Seemann, Henrik Thunman Chalmers University of Technology, Sweden</p>	<p>14-4: EXPERIMENTAL QUANTIFICATION OF THE SOLIDS FLUX IN AN INTERNALLY CIRCULATING FLUIDIZED BED</p> <p>Trevor D. Hadley, Christian Doblin, José Orellana, Kok-Seng Lim CSIRO, Australia</p>
15:30 – 15:45		<p>14-5: PENETRATION OF HIGH VELOCITY HORIZONTAL GAS JETS INTO A FLUIDIZED BED AT HIGH TEMPERATURE</p> <p>Feng Li, Cedric Briens, Franco Berruti University of Western Ontario, Canada; Jennifer McMillan Edmonton Research Centre, Canada</p>

15:45 – 16:00	13-6: CFD SIMULATION OF PHARMACEUTICAL PARTICLE DRYING IN A BUBBLING FLUIDIZED BED REACTOR Jungkee Jang, Cezar Rosa, Hamid Arastoopour IIT, USA	14-6: INVESTIGATION OF REFORMING ACTIVITY AND OXYGEN TRANSFER OF OLIVINE IN A DUAL CIRCULATING FLUIDISED BED SYSTEM WITH REGARD TO BIOMASS GASIFICATION Stefan Koppatz, Tobias Pröll, Christoph Pfeifer, Hermann Hofbauer Vienna University of Technology, Austria
15:45 – 17:00	ORGANIZING COMMITTEE & ECI MEETING Sapphire (2F)	
17:00 – 19:00	POSTER SESSION 4 & SOCIAL HOUR (Oral Session 11, 12, 13 & 14 Papers) Convention B (B1) Co-chairs: Jong Min Lee, KEPCO, Korea Sung Won Kim, SK Energy Int. Technology, Korea	
19:00 – 21:00	FAREWELL PARTY Convention Hall (B1)	

Friday, May 21, 2010

07:00 – 8:30	Breakfast – SARA - Coffee Shop (1F)
08:30 – 10:30	Departure of Buses
10:30 – 13:00	LOCAL ORGANIZING COMMITTEE MEETING & LUNCH Diamond Hall (B1)