

ECI International Conference on Boiling Heat Transfer

*Il Chioistro di San Nicolò
Spoleto, Italy
7-12 May 2006*

PRELIMINARY PROGRAM

SUNDAY, MAY 7, 2006

- 16:30 - 19:00 Registration (at Hotel Clitunno, Piazza Sordini 6)
19:00 – 20:00 Welcome reception (at Hotel Clitunno, Piazza Sordini 6)

MONDAY, MAY 8, 2006

Breakfast at your hotel

- 08:20 - 08:50 Welcome & Introduction
Dr. Massimo Brunini, Mayor of Spoleto
Dr. Gian Piero Celata, Conference Chair
Prof. Frank Schmidt, ECI Liaison Officer
- 08:50 - 09:30 Keynote lecture: **UNDERSTANDING BOILING: A REVIEW OF THE BASIC MECHANISMS, NEEDS AND PERSPECTIVES**
L. Tadrif
IUSTI UMR CNRS, Marseille, France
Keynote chair: J. Klausner

- 09:30 - 10:30 Session: **FLOW BOILING 1 – FB1**
Session chair: J. Klausner

EXPERIMENTAL INVESTIGATION ON TWO PHASE FLOW PRESSURE DROPS IN HELICAL COIL STEAM GENERATOR TUBE

L. Santini, C. Lombardi and M. Ricotti
Nuclear Engineering Department, Politecnico di Milano, Italy

VOID FRACTION VARIATIONS IN A FRACTAL-LIKE BRANCHING MICROCHANNEL NETWORK

R. Cullion*, D.V. Pence**, J.A. Liburdy** and V. Narayanan**
*Directed Energy Solutions, Colorado Springs, CO, USA, **Oregon State University, Corvallis, OR, USA

ASSESSMENT OF BOILING HEAT TRANSFER CORRELATIONS IN A REFRIGERATION EVAPORATOR

J.R. Garcia-Cascales*, F. Vera-Garcia*, J.M. Corberan-Salvador**, J. Gonzalez-Macia** and D. Fuentes-Diaz**
*Thermal and Fluid Engineering Department, Universidad Politécnica de Cartagena, Spain, **Applied Thermodynamics Department, Universidad Politécnica de Valencia, Spain

10:30 - 11:00 Coffee

11:00 - 12:20 Session: **FLOW BOILING 2 – FB2**
Session chair: *J.C. Passos*

THE METHOD OF EXPERIMENTAL DETERMINATION OF LOCAL HEAT TRANSFER COEFFICIENT AT BOILING IN ONE -SIDE HEATED TUBES

A.N. Varava, A.T. Komov and A.V. Dedov
Moscow Power Engineering Institute (Technical University), Russia

BOILING HEAT TRANSFER IN SWIRL FLOW OF SUBCOOLED WATER AT ONE-SIDED HEATING

A.V. Dedov, A.T. Komov, A.N. Varava, V.V. Yagov and E.M. Zakharov
Moscow Power Engineering Institute (Technical University), Russia

FLOW PATTERN ANALYSIS OF FLOW BOILING IN MICROGRAVITY

G.P. Celata*, M. Cumo**, M. Gervasi* and G. Zummo*
**ENEA, Institute of Thermal-Fluid Dynamics, Rome, Italy, **DINCE, Università degli Studi di Roma "La Sapienza", Italy*

THE INTERNAL CHARACTERISTICS OF BOILING AT HEATED SURFACES

N.I. Kolev
AREVA NP, Erlangen, Germany

12:20 - 13:00 Session: **MICROSCALE BOILING 1 – MB1**
Session chair: *L. Tadrast*

A FLOW BOILING MICROCHANNEL EVAPORATOR PLATE FOR FUEL CELL THERMAL MANAGEMENT

P. Garrity, J.F. Klausner and R. Mei
Department of Mechanical & Aerospace Engineering, University of Florida, Gainesville, USA

EVALUATION OF DIFFERENT MICROCHANNEL ARRAY EVAPORATOR DESIGNS

T. Henning*, J.J. Brandner*, K. Schubert*, M. Lorenzini**, G.L. Morini**
**Forschungszentrum Karlsruhe, Institute for Micro Process Engineering IMVT, Germany, **DIENCA, Università degli Studi di Bologna, Bologna, Italy*

13:00 - 14:30 Lunch

14:30 - 15:10 Session: **MICROSCALE BOILING 1 (cont.) – MB1**
Session chair: *L. Tadrast*

HEAT TRANSFER IN CONFINED FORCED-FLOW BOILING

L. Consolini*, G. Ribatski*, W. Zhang**, J.L. Xu** and J.R. Thome*
**Laboratory of Heat and Mass Transfer, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, **Micro Energy System Laboratory, Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, Guangzhou, P.R. China*

TRANSITION FROM BOILING ONSET TO FULLY DEVELOPED NUCLEATE BOILING IN A NARROW VERTICAL CHANNELS

E. Daniel, D.K. Hollingworth and L.C. Witte
Department of Mechanical Engineering, University of Houston, TX, USA

15:10 - 15:50 Keynote lecture: **CRITICAL HEAT FLUX INDUCED BY FLOW INSTABILITY IN BOILING CHANNELS**

M. Ozawa
Department of Mechanical Engineering, Kansai University, Japan
Keynote chair: *G.P. Celata*

15:50 – 16:30 Coffee

16:30 - 18:30 Session: **CRITICAL HEAT FLUX – CHF**
Session chair: *M. Ozawa*

BURNOUT AND FLOW INSTABILITY IN SUBCOOLED FLOW BOILING AT ATMOSPHERIC PRESSURE

J. Aharon*, V. Gal** and I. Shai*

**Ben Gurion University of the Negev, Beer-Sheva, Israel, **NRCN, Beer – Sheva, Israel*

BOILING HEAT TRANSFER UNDER TRANSIENTS WITH REFERENCE TO VOID WAVE PROPAGATION

M. Hirayama, T. Ami, H. Umekawa and M. Ozawa

Department of Mechanical Engineering, Kansai University, Osaka, Japan

EXPERIMENTAL STUDY ON THE CHARACTERISTICS AND MECHANISM OF POOL BOILING CHF ENHANCEMENT USING NANO-FLUIDS

H.D. Kim*, J.B. Kim**, M.H. Kim*

**Department of Mechanical Engineering, Pohang University of Science and Technology, Korea,*

***Korea Institute of Energy Research, Taejon, Korea*

IS CHF TRIGGERED BY THE VAPOR RECOIL EFFECT?

V.S. Nikolayev***, D. Chatain* and D. Beysens***

**ESEME, Service des Basses Temperatures, DRFMC/DSM/CEA-Grenoble, France, **CEA-ESEME, ESPCI-PMMH, Paris, France*

BOILING CRISIS AS A SADDLE-NODE BIFURCATION

D.N. Gerasimov, V.A. Kondratyeva, M.N. Rudavina and O.A. Sinkevich

Moscow Power Engineering Institute (Technical University), Russia

ABOUT DETERMINATION OF BOILING CURVE AND CHF FOR EXTREMELY HIGH HEAT FLUX DENSITY

M. Gotovsky

Polzunov Institute, S.-Petersburg, Russia

20:00 Dinner

TUESDAY, MAY 9, 2006

Breakfast at your hotel

08:30 - 09:10 Keynote lecture: **SPRAY COOLING HEAT TRANSFER: THE STATE OF THE ART**
J.H. Kim
Department of Mechanical Engineering, University of Maryland, College Park, MD, USA
Keynote chair: P. Tartarini

09:10 – 10:10 Session: **SPRAY-JET COOLING 1 – SJC1**
Session chair: P. Tartarini

THEORETICAL INVESTIGATION OF SPRAY COOLING HEAT TRANSFER USING A MICRO MODEL FOR SINGLE DROPLETS

M. Nacheva and J. Schmidt
Institute of Fluid Dynamics and Thermodynamics, Otto-von-Guericke-University Magdeburg, Germany

CHARACTERISTICS OF WETTING TEMPERATURE DURING SPRAY COOLING

Y. Mitsutake, M. Monde and S. Hidaka
Department of Mechanical Engineering, Saga University, Japan

TWO-PHASE FLOW IN JETS AND SPRAYS

A.B. Rahimi
Faculty of Engineering, Ferdowsi University of Mashhad, Iran

10:10 - 10:40 Coffee

10:40 – 11:20 Session: **SPRAY-JET COOLING 2 – SJC2**
Session chair: J.H. Kim

TWO-PHASE STRUCTURE ABOVE HOT SURFACES IN JET IMPINGEMENT BOILING

L. Bogdanic, H. Auracher and F. Ziegler
Technische Universität Berlin, Germany

JET IMPINGING QUENCHING OF HOT SURFACES WELL ABOVE THE LIMITING TEMPERATURE FOR SOLID-LIQUID CONTACT

M.A. Islam, M. Monde, Y. Mitsutake, P.L. Woodfield and A.K. Mozumder
Department of Mechanical Engineering, Saga University, Japan

11:20 – 12:40 Session: **REWETTING & QUENCHING – RQ**
Session chair: M. Monde

AN ORIGINAL EXPERIMENTATION ON THE COOLING OF PARTS PER QUENCHING PROCESS

J. Gilles and B. Bourouga
Laboratoire de Thermocinétique de Nantes, Polytech' Nantes, France

PERFORMANCE OF CURRENT HEAT TRANSFER CORRELATIONS IN PREDICTING THE HEAT TRANSFER DURING CRYOGENIC CHILDDOWN

J. Jackson, J.F. Klausner and R. Mei
Department of Mechanical & Aerospace Engineering, University of Florida, Gainesville, USA

REWETTING OF HOT SURFACE: A COMPARISON BETWEEN SPRAY COOLING AND FILM FLOW COOLING

G.P. Celata*, M. Cumo**, A. Mariani* and L. Saraceno*
**ENEA, Institute of Thermal-Fluid Dynamics, Rome, Italy, **DINCE, Università degli Studi di Roma "La Sapienza", Italy*

PROPAGATION OF THE WETTING FRONT DURING JET IMPINGEMENT BOILING ON A HORIZONTAL FLAT SURFACE

V. Prodanovic and M. Wells
Centre for Metallurgical Process Engineering, University of British Columbia, Vancouver, BC, Canada

13:00 - 14:30 Lunch

14:30 – 15:10 Session: **REWETTING & QUENCHING (cont.) – RQ**
Session chair: *M. Monde*

BOILING CURVE IN TEMPERATURE WAVE AREAS

S.L. Soloviev

Research and Development Institute of Engineering, Moscow, Russia

QUENCHING EXPERIMENTS OF HOT TUBES IN MICROGRAVITY

G.P. Celata*, M. Cumo**, M. Gervasi* and G. Zummo*

**ENEA, Institute of Thermal-Fluid Dynamics, Rome, Italy, **DINCE, Università degli Studi di Roma "La Sapienza", Italy*

15:10 - 15:50 Keynote lecture: **LOCAL HEAT FLOW AND TEMPERATURE FLUCTUATIONS IN WALL AND FLUID IN NUCLEATE BOILING SYSTEMS**

P. Stephan and T. Fuchs

Chair of Technical Thermodynamics, Darmstadt University of Technology, Germany

Keynote chair: *H. Auracher*

15:50 – 16:30 Session: **ENHANCEMENT OF BOILING HEAT TRANSFER 1 – EB1**

Session chair: *J.R. Thome*

EXPERIMENTAL AND THEORETICAL INVESTIGATION OF CRITICAL HEAT FLUX INCLUDING EHD ENHANCEMENT

D. Zhao*, Y. Hristov**, D.B.R. Kenning*, K. Sefiane** and T.G. Karayiannis*

**Brunel University, Uxbridge, UK, **The University of Edinburgh, UK*

FLOW BOILING INSIDE MICROFIN TUBES: PREDICTION OF THE HEAT TRANSFER COEFFICIENT

A. Cavallini, D. Del Col and L. Rossetto

Dipartimento di Fisica Tecnica, University of Padova, Italy

16:30 – 17:00 Coffee

17:00 – 17:40 Session: **ENHANCEMENT OF BOILING HEAT TRANSFER 1 (cont.) – EB1**

Session chair: *J.R. Thome*

ENHANCED NUCLEATE BOILING BY SUPERHYDROPHOBIC COATING WITH CHECKERED AND SPOTTED PATTERNS

Y. Takata, S. Hidaka and M. Kohno

Department of Mechanical Engineering Science, Kyushu University, Fukuoka, Japan

STUDY OF BOILING HEAT TRANSFER ON DOUBLE-EXTENDED SURFACES WITH JOINED HORIZONTAL AND VERTICAL TUNNELS

R. Pastuszko and M.E. Poniewski

Chair of Thermodynamics and Fluid Mechanics, Kielce University of Technology, Poland

17:40 – 19:00 Session: **ENHANCEMENT OF BOILING HEAT TRANSFER 2 – EB2**

Session chair: *T.G. Karayiannis*

FLOW BOILING OF R - 141B INSIDE PLAIN AND MICROFIN TUBES

M.A. da Silva Picanço and J.C. Passos

Department of Mechanical Engineering, Federal University of Santa Catarina, Florianopolis, SC, Brazil

ENHANCED HEAT TRANSFER IN MICROSCALE BOILING

C.M. Rops*, R. Lindken**, J. Westerweel** and J.F.M. Velthuis*

**TNO Science & Industry, Delft, The Netherlands, **Delft University of Technology, The Netherlands*

BOILING OF LIQUID NITROGEN ON GEOMETRICALLY MODIFIED SURFACES AT THE PRESENCE OF AN ELECTRIC FIELD

A.A. Eronin, V.I. Borzenko and S.P. Malysenko

Institute for High Temperatures, Russian Academy of Sciences, Moscow, Russia

NUCLEATE BOILING OF ISOPROPANOL ON MILD STEEL COPPER COATED HEATING TUBE SURFACE

L. Prasad*, S. C. Gupta**, V. K. Agarwal** and P. Prasad***

Mechanical Engineering Department , NIT, Jamshedpur, Jharkhand, India, **Department of Chemical Engineering, I.I.T., Roorkee, India, *Department of Production Engineering, NIT, Jamshedpur, Jharkhand, India*

20:00

Dinner

WEDNESDAY, MAY 10, 2006

Breakfast at your hotel

08:30 - 09:10 Keynote lecture: **FORCES ON A BUBBLE IN CONVECTIVE BOILING**
C.W.M. van der Geld
Technische Universiteit Eindhoven, The Netherlands
Keynote chair: V.V. Yagov

09:10 – 10:30 Session: **BUBBLES 1 – BB1**
Session chair: P. Di Marco

MODEL-BASED EXPERIMENTAL ASSESSMENT OF THE FORCES ON A BUBBLE WITH DIFFUSION CONTROLLED GROWTH

M. Kovacevic and C.W.M. van der Geld
Eindhoven University of Technology, The Netherlands

BUBBLE GROWTH IN FLASH EVAPORATION OF VISCOUS, HIGH SOLID CONTENT BLACK LIQUOR

M.P. Järvinen, A.P. Kankkunen and P.H. Miikkulainen
Helsinki University of Technology, Laboratory of Energy Engineering and Environmental Protection, Sähkötehtäminen Finland

BUBBLE GROWTH AND HEAT TRANSFER IN NUCLEATE POOL BOILING OF AQUEOUS SDS AND TRITON X-100 SOLUTIONS

V.M. Wasekar
Tata Steel R&D, India

LIQUID CRYSTAL STUDIES OF SLIDING VAPOUR BUBBLES

D.B.R. Kenning* and O.E. Bustnes**
**Brunel University, School of Engineering and Design, Uxbridge, UK, **Rocky Mountain Institute, Snowmass, CO, USA*

10:30 – 10:50 Coffee

10:50 – 13:10 Session: **BUBBLES 2 – BB2**
Session chair: D. Kenning

VAPOR BUBBLE GROWTH AND DETACHMENT AT THE WALL OF SHEAR FLOW

G. Duhar and C. Colin
Institut de Mécanique des Fluides de Toulouse, France

EXPERIMENTAL DETERMINATION OF TRANSIENT WALL TEMPERATURE DISTRIBUTIONS CLOSE TO GROWING VAPOUR BUBBLES

I. Golobic*, J. Petkovsek*, M. Baselj*, A. Papez* and D.B.R. Kenning**
**University of Ljubljana, Faculty of Mechanical Engineering, Slovenia, **Brunel University, School of Engineering and Design, Uxbridge, UK*

HEAT TRANSFER AND BUBBLE FORMATION ON HORIZONTAL COPPER TUBES WITH DIFFERENT DIAMETERS AND ROUGHNESS STRUCTURES

D. Gorenflo and S. Kotthoff
University of Paderborn, Thermodynamics and Energy Technologies, Germany

PREPARATION AND ANALYSIS OF DIFFERENT ROUGHNESS STRUCTURES FOR EVAPORATOR TUBES

A. Luke
Institut für Thermodynamik, Universität Hannover, Germany

HYDRODYNAMICS OF PARTIAL NUCLEATE BOILING BY PIV TECHNIQUE

S. Basic*, L. Skerget* and S. Hozjan**
**Faculty of Mechanical Engineering, Maribor, Slovenia, **Nafta Strojna, Lendava, Slovenia*

ELUCIDATION OF MECHANISM OF MICRO BUBBLE EMISSION BOILING IN AN IMPINGING DROP BOILING SYSTEM

S. Inada, K. Shinagawa and H. Sumiya

Department of Mechanical System Engineering, Gunma University, Maebashi, Japan

OSCILLATION MODE TRANSITION OF BUBBLES UNDER LARGE AMPLITUDE PRESSURE FIELD

T. Kojo* and I. Ueno**

**Graduate School at Tokyo University of Science, Noda, Japan, **Tokyo University of Science, Noda, Japan*

13:10 - 14:30 Lunch

14:30 - 15:10 Keynote lecture: **EFFECT OF RESTRICTION ON BOILING IN WATER AND SURFACTANTS**

G. Hetsroni, A. Mosyak, E. Pogrebnyak, R. Rozenblit and Z. Segal

Department of Mechanical Engineering Technion, Haifa, Israel

Keynote chair: J.R. Thome

15:10 – 16:30 Session: **MICROSCALE BOILING 2 – MB2**

Session chair: T. Henning

SCALEUP OF MICROCHANNEL BOILING SYSTEMS FOR INDUSTRIAL APPLICATIONS

D.M. Qiu, A.L.Y. Tonkovich, and S.P. Fitzgerald

Velocys, Inc., Plain City, OH, USA

ADIABATIC FLOW BOILING IN FRACTAL-LIKE MICROCHANNELS

B. Daniels, J.A. Liburdy and D. Pence

Department of Mechanical Engineering, Oregon State University, Corvallis, OR, USA

ON THE PREDICTION OF HEAT TRANSFER IN MICRO-SCALE FLOW BOILING

G. Ribatski*, Z. Wei**, L. Consolini*, J.L. Xu** and J.R. Thome*

**Laboratory of Heat and Mass Transfer (LTCM), École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, **Guangzhou Institute of Energy Conversion, Guangzhou City, P.R. China*

A VISUALIZATION STUDY OF BUBBLE BEHAVIOUR IN SATURATED FLOW BOILING THROUGH A VERTICAL MINI - TUBE

W. Owhaib, B. Palm and C. Martin-Callizo

Royal Institute of Technology, Department of Energy Technology, Stockholm, Sweden

16:30 – 17:00 Coffee

17:00 – 18:50 Session: **BOILING OF MIXTURES – MX**

Session chair: H. Auracher

MASS TRANSPORT EFFECT ON THE HEAT TRANSFER COEFFICIENT DURING BOILING OF MULTICOMPONENT MIXTURE

R. Krupiczka, A. Rotkegel and Z. Ziobrowski

Institute of Chemical Engineering, Polish Academy of Sciences, Gliwice, Poland

HEAT TRANSFER IN POOL BOILING OF BINARY AND TERNARY NON-AZEOTROPIC MIXTURES

Z. Nagra and E. Næss

Department of Energy and Process Engineering, Norwegian University of Science and Technology, Trondheim, Norway

FLOW BOILING OF AMMONIA AND OF THE MIXTURE R723 (AMMONIA/DIMETHYLETHER) IN SMOOTH HORIZONTAL TUBES

T. Boyman and C. Kuhn

Lucerne School of Engineering and Architecture (HTA Luzern), University of Applied Sciences of Central Switzerland, Horw, Switzerland

EXPERIMENTAL STUDY OF THE AMMONIA -WATER BOILING IN PLATE HEAT EXCHANGERS FOR ABSORPTION REFRIGERATION MACHINES

F. Táboas, M. Vallés, M. Bourouis and A. Coronas

CREVER - Universitat Rovira i Virgili, Tarragona, Spain

NUCLEATE BOILING OF FC-87/FC-72 ZEOTROPIC MIXTURES ON A HORIZONTAL COPPER DISC

A.R. Schlindwein*, F.O. Martin Jr.* , M. Misale** and J.C. Passos*

**Departamento de Engenharia Mecânica, Universidade Federal de Santa Catarina, Florianópolis, Brazil,*

***DITEC, Università di Genova, Italy*

THURSDAY, MAY 11, 2006

Breakfast at your hotel

08:30 - 09:10 Keynote lecture: **MICROBUBBLE EMISSION AND HIGH HEAT FLUX OBSERVED IN SUBCOOLED BOILING**
K. Suzuki
Department of Mechanical Engineering, Faculty of Science and Technology, Tokyo University of Science, Noda-City, Japan
Keynote chair: M. Monde

09:10 – 10:30 Session: **PHASE CHANGE – PC**
Session chair: G. Hetsroni

GENERATION OF EFFECT OF HEATING OF A LIQUID BY MEANS OF CONTROLLED CAVITATION

K.M. Dyussenov* and E.D. Sergievskiy**

**Pavlodar State University, Kazakhstan, **Moscow Power Engineering Institute (Technical University), Russia*

EXPLOSIVE DISINTEGRATION OF THE VAPOR FILM UNDER INFLUENCE OF HIGH HEAT FLUX

O.A. Sinkevich*, V.V. Glazov**, Yu.P. Ivochkin* and Yu.A. Zeigarnik*

**Institute of High Temperature, Russia Academy of Sciences, Moscow, Russia, **Moscow Power Engineering Institute (Technical University), Russia*

EXPERIMENTAL STUDIES OF EVAPORATION FROM FREE SURFACES

V.K. Badam and F. Durst

Institute of Fluid Mechanics, Friedrich-Alexander-Universitaet Erlangen-Nuernberg, Erlangen, Germany

A PHOTOGRAPHIC STUDY OF FLASHING LIQUID JETS

M.M. Vieira* and J.R. Simões-Moreira**

**SISEA – Alternative Energy Systems Laboratory - Mechanical Engineering Department at Escola Politécnica, Brazil, **Universidade de São Paulo, Brazil*

10:30 - 11:00 Coffee

11:00 – 12:10 Session: **NUMERICAL MODELLING – NM**
Session chair: M. Poniewski

FALSE CHAOS IN BOILING

D.N. Gerasimov, V.A. Kondratyeva, M.N. Rudavina and O.A. Sinkevich

Moscow Power Engineering Institute (Technical University), Russia

SIMULATION OF THE FLUCTUATIONS IN A BUBBLE-LADEN LAYER USING A MICROSCOPIC MODELLING APPROACH

L.I. Kiss and S. Poncsák

Département des Sciences Appliquées, Université du Québec à Chicoutimi, Québec, Canada

RECENT DEVELOPMENTS ON THE CFD-MODELLING OF SUBCOOLED BOILING IN FUEL ASSEMBLIES OF WATER COOLED REACTORS

F. Moretti and F. D'Auria

Department of Mechanical, Nuclear and Production Engineering, University of Pisa, Italy

THEORETICAL ANALYSIS OF HEAT AND MASS TRANSFERS IN AN EXTENDED MENISCUS

V. Serin, B. Médéric, P. Lavieille and M. Miscovic

Laboratoire d'Energétique, Université Paul Sabatier, Toulouse, France

12:10 – 13:10 Session: **NATURAL CIRCULATION - NC**
Session chair: G. Zummo

CIRCULATION RATIO IN NATURAL CIRCULATION BOILER

A.M. Elgandelwar*, R.S. Jha** and J.V. Bhanadri***

Department D.Y. Patil, Engineering College, Akurdi, India, **Thermax Ltd, Chinchwad MIDC, Pune, India, *Department of Mechanical Engineering, Vishwakarma Institute of Technology, Pune, India*

UNSTEADY NATURAL CONVECTIVE BOILING IN A NARROW VERTICAL CHANNEL

M.A. Ameer, B. Stutz and M. Lallemand
Centre de Thermique de Lyon, INSA, Villeurbanne Cedex, France

CIRCULATION RATES OF BOILING LIQUIDS IN A VERTICAL TUBE

S. Zaidi*, M. Idrees* and S.S. Alam**
**Department of Chemical Engineering, Aligarh Muslim University, India, **Azad Institute of Engineering and Technology, Lucknow, India*

13:10 - 14:20 Lunch

14:20 – 16:00 Session: **HEAT EXCHANGERS – HE**
Session chair: C.W.M. van der Geld

STUDY ON THREE-PHASE CIRCULATING FLUIDIZED BED WHEAT STRAW BLACK LIQUOR EVAPORATOR

Y.Y. Jia
School of Material Science and Chemical Engineering, Tianjin University of Science & Technology, PR China

HIGH-SPEED VISUALIZATION OF TWO-PHASE FLOW IN A MICRO-SCALE PIN-FIN HEAT EXCHANGER

T.J. Cognata, D.K. Hollingsworth and L.C. Witte
Department of Mechanical Engineering, University of Houston, TX, USA

ARTIFICIAL NEURAL NETWORK BASED PREDICTION OF WALL SUPERHEAT IN A VERTICAL THERMOSIPHON REBOILER

M. Kamil* and M.A. Hekeem**
**Department of Petroleum Studies, A.M.U., Aligarh, India, **Department of Chemical Engineering, A.M.U., Aligarh, India*

A STEAM CONDENSER WITH COOLING THROUGH LIQUID CO₂ BOILING FOR A NEW HEAT RECOVERY SYSTEM

K. Nikitin, Y. Kato, T. Ishizuka and L. Ngo
Research Laboratory for Nuclear Reactors, Tokyo Institute of Technology, Japan

COMPUTER AIDED DESIGN OF A VERTICAL THERMOSIPHON REBOILER

M.A. Hakeem* and M. Kamil**
**Department of Chemical Engineering, Aligarh Muslim University, India, **Department of Petroleum Studies, Aligarh Muslim University, India*

16:00 – 17:00 Session: **FALLING FILM – FF**
Session chair: P. Stephan

EXPERIMENTAL STUDY ON FALLING FILM FLOW PATTERN MAP AND INTERCOLUMN DISTANCE WITH R236fa

M. Habert, G. Ribatski and J.R. Thome
Laboratory of Heat and Mass Transfer (LTCM), Faculty of Engineering Science, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

EFFECTS OF ENHANCED WAVE DEVELOPMENT AND VARYING WALL SUPERHEAT ON THE BOILING OF PURE LIQUIDS WITH INCREASED VISCOSITY IN A FALLING FILM EVAPORATOR

F. Weise and S. Scholl
Institute for Chemical and Thermal Process Engineering, TU Braunschweig, Germany

FORTY YEARS OF DE-FACTO MAJOR LINE OF BOILING HEAT TRANSFER RESEARCH

I.G. Shekriladze
Laboratory of Hydrodynamics and Heat Transfer, Georgian Technical University, Tbilisi, Georgia

17:00 – Coffee and free time

20:30 Banquet

FRIDAY, MAY 12, 2006

Breakfast at your hotel

08:30 - 09:10 Keynote lecture: **NUCLEATE BOILING HEAT TRANSFER: POSSIBILITIES AND LIMITATIONS OF THEORETICAL ANALYSIS**

V.V. Yagov

Moscow Power Engineering Institute (Technical University), Russia

Keynote chair: D. Gorenflo

09:10 – 11:10 Session: **POOL BOILING 1 – PB1**

Session chair: D. Gorenflo

EXPERIMENTAL STUDY OF NUCLEATE BOILING HEAT TRANSFER UNDER LOW GRAVITY CONDITIONS USING TLCS FOR HIGH RESOLUTION TEMPERATURE MEASUREMENTS

C. Sodtke, N. Schweizer, E. Wagner and P. Stephan

Chair of Technical Thermodynamics, Darmstadt University of Technology, Germany

SUBCOOLED POOL BOILING ON A HEATED WIRE WITH MICROBUBBLE EMISSION

M. Shoji*, M. Tange**, M. Watanabe**, J. Kamoshida*** and K. Sasaki***

National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan, **The University of Tokyo, Japan, *Shibaura Institute of Technology, Saitama, Japan*

EFFECT OF FORCE FIELDS ON POOL BOILING FLOW PATTERNS

P. Di Marco and W. Grassi

University of Pisa, Department of Energetics, Italy

NUCLEATE BOILING HEAT TRANSFER ON A MICROHEATER ARRAY: EFFECTS OF JAKOB NUMBER

H. Sakamoto and J.H. Kim

Department of Mechanical Engineering, University of Maryland, College Park, MD, USA

POOL BOILING HEAT TRANSFER FROM TUBULAR MICROSTRUCTURED SURFACES IN SATURATED FC-72

F. Wondra and P. Stephan

Darmstadt University of Technology, Chair of Technical Thermodynamics, Germany

NUCLEATE AND TRANSITION BOILING IN NARROW HORIZONTAL SPACES

B. Stutz*, M. Lallemand*, F. Raimbault* and J.C. Passos**

**Centre de Thermique de Lyon, INSA, Villeurbanne Cedex, France, **LABSOLAR -CNTS, Universidade Federal de Santa Catarina, Florianopolis, S.C., Brazil*

11:10 – 11:30 Coffee

11:30 – 12:50 Session: **POOL BOILING 2 – PB2**

Session chair: W. Grassi

INVESTIGATING POOL BOILING USING A NOVEL TEMPERATURE DISTRIBUTION SENSOR

G. Anderson*, J.H. Kim**, Z. Dilli** and N. Goldsman**

**Naval Surface Warfare Center, Philadelphia, PA, USA, **Department of Mechanical Engineering, University of Maryland, College Park, MD, USA*

EXPERIMENTAL STUDY AND MODELING OF BOILING HEAT TRANSFER HYSTERESIS ON POROUS SURFACES

T.M. Wojcik, M.E. Poniewski and R. Kaniowski

Chair of Thermodynamics and Fluid Mechanics, The Kielce University of Technology, Poland

EFFECT OF CONFINEMENT ON FC-72 AND FC-87 NUCLEATE BOILING

E.M. Cardoso*, B. Stutz**, M. Lallemand** and J.C. Passos*

**LABSOLAR-CNTS, Universidade Federal de Santa Catarina, Florianopolis, S.C., Brazil, **Centre de Thermique de Lyon, INSA, Villeurbanne Cedex, France*

NEW CORRELATION FOR POOL BOILING OF AMMONIA/WATER MIXTURE

F. Táboas, M. Vallès, M. Bourouis and A. Coronas

CREVER - Universitat Rovira i Virgili, Tarragona, Spain

12:50 – 13:00 Closure

13:00 - 14:30 Lunch