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Technical Programme in Detail

Monday, August 17 13:30-17:20

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WORLD ENERGY SITUATION AND JAPAN'S ENERGY STRATEGY
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Chief Economist and Managing Director, Institute of Energy Economics, Japan

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(*) Graduate School of Engineering, Shizuoka University, Japan, (**) Shizuoka University, Japan, (***) DENSO CORP., Japan

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(*) Department of Energy and Refrigerating Air-Conditioning Engineering, National Taipei University of Technology, Taiwan, (**) Taiwan Boiler Association, Taiwan, (***) Department of Vehicle Engineering, Army Academy, Taiwan

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C2-Tu-4 Room 418

Chairs: EVANS J. *(London South Bank University, United Kingdom)*
UENO S. *(Saitama University, Japan)*

15:30 863 FREEZING UNDER ELECTRICAL AND MAGNETIC DISTURBANCES; A REVIEW 754
LE-BAIL A.(*), XANTHAKIS E.(**), HAVET M.(*)
(*) LUNAM University, Oniris, UMR 6144 GEPEA, CNRS, France, (**) SP-Food and Bioscience, Sweden

15:50 816 FREEZEWAVE – INNOVATIVE AND LOW ENERGY MICROWAVE ASSISTED FREEZING PROCESS FOR HIGH QUALITY FOODS 762
XANTHAKIS E.(*), LE-BAIL A.(**), SHRESTHA M.(***), AHRNE L.(*), BERNARD J.-P.(****)
(*) SP-Food & Bioscience, Sweden, (**) LUNAM University, CNRS, ONIRIS, UMR 6144 GEPEA, France, (***) TTZ, Germany, (****) SAIREM, France

16:10 342 EXPLORING A NEW HETEROGENEITY INDEX TO QUANTIFY THE VARIATION OF COOLING RATES WITHIN SYSTEMS THAT UNDERGO THE FORCED-AIR COOLING PROCESS 769
JAMAL O. R., YOUNG S. M., LOVE R. J., FERRUA M. J., EAST A. R.
Centre for Postharvest and Refrigeration Research, Massey Institute of Food Science and Technology, Massey University, New Zealand

16:30 852 OPTIMIZING COMBINED CRYOGENIC AND CONVENTIONAL FREEZING WITH RESPECT TO MASS LOSS AND ENERGY CRITERIA 777
ROUAUD O., LE-BAIL A.
LUNAM, ONIRIS, GEPEA (UMR CNRS 6144), France

16:50 134 INFLUENCE OF CLIMATE CONDTIONS ON THE ENERGY CONSUMPTION OF REFRIGERATION SYSTEMS IN THE FOOD PROCESSING INDUSTRY 785
BANTLE M.(*), PETROVA I.(**), TOLSTOREBROV I.(**), KVALSVIK K.(*), NORDTVEDT T.(***), EIKEVIK T. M.(**)
(*) SINTEF Energy Research, Norway, (**) Norwegian University of Science and Technology, Norway, (***) SINTEF Fishery and Aquaculture, Norway

WORKSHOP: PROGRESS OF SORPTION SYSTEMS IN JAPAN
WS1-Tu-4 Room 304
Chairs: SAITO K. *(Waseda University, Japan)*
YAMAGUCHI S. *(Waseda University, Japan)*

Wednesday, August 19 8:30-10:10

THERMODYNAMIC PROPERTIES(1)
B1-We-1a Room 301
Chairs: AKASAKA R. *(Kyushu Sangyo University, Japan)*
KOBAYASHI T. *(Daikin Industries, Ltd., Japan)*

8:30 KEYNOTE **HITTING THE BOUNDS OF CHEMISTRY: LIMITS AND TRADEOFFS FOR LOW-GWP REFRIGERANTS 793**
MCLINDEN M. O.(*), BROWN J. S.(**), KAZAKOV A. F.(*), DOMANSKI P. A.(***)
(*) Applied Chemicals and Materials Division, National Institute of Standards and Technology, United States, (**) Department of Mechanical Engineering, The Catholic University of America, United States, (***) Energy and Environment Division, National Institute of Standards and Technology, United States

9:10 83 **SATURATED PRESSURE MEASUREMENTS OF *cis*-PENTAFLUOROPROP-1-ENE (R1225ye(Z)) 806**
FEDELE L.(*), DI NICOLA G.(**), BROWN J. S.(***), COLLA L.(*), BOBBO S.(*)
(*) Construction Technologies Institute, National Research Council, Italy, (**) Department of Industrial Engineering and Mathematical Sciences, Marche Polytechnic University, Italy, (***) Department of Mechanical Engineering, The Catholic University of America, United States

9:30 443 **THERMODYNAMIC PROPERTIES OF LOW-GWP ALTERNATIVE REFRIGERANTS 814**
FUKUSHIMA M., HAYAMIZU H., HASHIMOTO M.
ASAHI GLASS CO., LTD., Japan

9:50 752 **THERMODYNAMIC PROPERTY MEASUREMENTS FOR HYDROFLUOROBUTENES BY A MAGNETIC LEVITATION DENSIMETER 823**
KAYUKAWA Y.(*), KIMURA T.(**), KANO Y.(*), FUJITA Y.(*), SAITO K.(**)
(*) Fluid Properties Section, Material Properties Division, National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, AIST, Japan, (**) Department of Applied Mechanics and Aerospace Engineering, School of Fundamental Science and Engineering, Waseda University, Japan

CYCLE / SYSTEM ANALYSIS (3)
B1-We-1b Room 303
Chairs: COLOMBO I. *(IIR, France)*
DING G. *(Shanghai Jiao Tong University, China)*

8:30 512 NUMERICAL MODELLING AND EXPERIMENTAL INVESTIGATIONS OF LOW-TEMPERATURE DRIVEN EJECTION REFRIGERATION SYSTEM 829
ŚMIERCIEW K.(*), PIETROWICZ S.(**), GAGAN J.(*), BUTRYMOWICZ D.(*)
(*) Bialystok Technical University, Poland, (**) Wroclaw University of Technology, Poland

8:50 506 INVESTIGATIONS OF TWO-PHASE INJECTOR OPERATING WITH ISOBUTANE 837
ŚMIERCIEW K.(*), BUTRYMOWICZ D.(*), PRZYBYLIŃSKI T.(**)
(*) Bialystok Technical University, Poland, (**) The Szewalski Institute of Fluid-Flow Machinery of Polish Academy of Sciences, Poland

9:10 92 DESIGN, DEVELOPMENT AND TESTING OF A COMPRESSIVE THERMOELASTIC COOLING SYSTEM 845
QIAN S.(*), WU Y.(**), LING J.(*), MUEHLBAUER J.(*), HWANG Y.(*), TAKEUCHI I.(***), RADERMACHER R.(*)
(*) Department of Mechanical Engineering, University of Maryland, United States, (**) Division of Research and Development, Niron Magnetics Inc., United States, (***) Department of Materials Science and Engineering, University of Maryland, United States

9:30 212 A TRANSIENT REFRIGERATOR MODEL VALIDATION INCLUDING SYSTEM PERTUBATION 853
RHOADS A.(*), BORTOLETTO A.(**), MARTIN C.(*), LING J.(*)
(*) Optimized Thermal Systems, Inc., United States, (**) Sub-Zero, Inc., United States

INDOOR THERMAL ENVIRONMENT
S1-We-1 Room 313+314

Chairs: WANG F. *(National Chin-Yi University of Technology, Taiwan)*
AKIMOTO T. *(Shibaura Institute of Technology, Japan)*

8:30 KEYNOTE THERMAL COMFORT AND PRODUCTIVITY FOR THE FUTURE HVAC 862
TANABE S.
Waseda University, Japan

9:10 219 NUMERICAL ANALYSIS ON THERMAL PERFORMANCE OF TRAILER HOUSE COMPOSITE ENVELOPE USING VACUUM INSULATION PANELS 870
KAN A.(*), WANG F.(*), YU W.(**), CAO D.(*)
(*) Merchant Marine College, Shanghai Maritime University, China, (**) School of Urban Development and Environmental Engineering, Shanghai Second Polytechnic University, China

9:30 304 HOW HEAT WAVES INFLUENCE INDOOR TEMPERATURE DURING SUMMER IN OLD RENOVATED PARISIAN BUILDINGS 878
AZOS-DIAZ K.(*,**), TREMEAC B.(*), SIMON F.(**), CORGIER D.(**), MARVILLET C.(*)
(*) Laboratoire de Chimique Moleculaire, Genie des Procedes Chimique et Energetique, (CMPGCE, EA21), CNAM, France, (**) MANASLU Ing., Savoie Technolac, France

9:50 925 ENERGY PERFORMANCE OF THE SILICA AEROGEL GLAZING SYSTEM IN COMMERCIAL BUILDING OF HONG KONG 886
HUANG Y., NIU J. L.
Department of Building Service Engineering, The Hong Kong Polytechnic University, China

OTHERS(1)
E1-We-1 Room 411+412
Chairs: KATSUTA M. *(Waseda University, Japan)*
SHIH Y. *(National Taipei University of Technology, Taiwan)*

8:30 KEYNOTE **FLOW DISTRIBUTION OF TWO-PHASE REFRIGERANT IN PLATE HEAT EXCHANGERS 894**
YANG C.-Y., LIN Y.-H., MENG F.-Y., LI G.-C.
National Central University, Taiwan

9:10 125 **AHRI RESEARCH ACTIVITIES ON LOW GLOBAL WARMING POTENTIAL ALTERNATIVE REFRIGERANTS 906**
WANG X., AMRANE K.
Air-Conditioning, Heating, and Refrigeration Institute, United States

9:30 910 **PARAMETER OPTIMIZATION OF SOLAR-ASSISTED LIQUID DESICCANT COOLING SYSTEM: A CASE STUDY IN HONG KONG 914**
RONGHUI Q., LIN L., YU H.
Renewable Energy Research Group, Department of Building Services Engineering, the Hong Kong Polytechnic University, China

9:50 916 **EVALUATION OF PERFORMANCE OF HEAT PUMP SYSTEM USING R32 AND HFO-MIXED REFRIGERANT 921**
HAIKAWA T., NUNO H., TAIRA S.
Daikin Industries, Ltd., Japan

COMPRESSOR(3)
B2-We-1a Room 413
Chairs: FUKUTA M. *(Shizuoka University, Japan)*
TBD

8:30 301 **FLOW DEVELOPMENT IN THE DISCHARGE OF A COMPRESSOR 929**
WUJEK S.(*), HRNJAK P.(*,**)
(*) Creative Thermal Solutions, Inc., United States, (**) University of Illinois at Urbana-Champaign, Department of Mechanical Science and Engineering, United States

8:50 855 **COMPRESSIBLE 1D – 3D SIMULATION OF A MUFFLER WITH PSEUDOSOUND PREDICTION LEVELS 937**
LOPEZ J.(*), RUANO J.(*), LEHMKUHL O.(*,**), RIGOLA J.(*), OLIVA A.(*)
(*) Heat and Mass Transfer Technological Center (CTTC), Universitat Politècnica de Catalunya – BarcelonaTech (UPC) ETSEIAT, Spain, (**) Termo Fluids S.L., Spain

9:10 124 **ANALYSIS OF PRESSURE LOSSES IN THE REFRIGERANT FLOW THROUGH RECIPROCATING COMPRESSOR WITH CO_2 945**
RUMAN R.(*), ŠUSTEK J.(*), TOMLEIN P.(**)
(*) Faculty of Mechanical Engineering, Slovak University of Technology in Bratislava, Slovak (Republic), (**) Association for Cooling and Air Conditioning Technology, Slovak (Republic)

9:30 845 **DEVELOPMENT OF A WATER VAPOR COMPRESSOR FOR HIGH TEMPERATURE HEAT PUMP APPLICATIONS 953**
MADSBOELL H.(*), WEEL M.(**), KOLSTRUP A.(***)
(*) Danish Technological Institute, Denmark, (**) Weel & Sandvig, Scion-DTU, Denmark, (***) Rotrex A/S, Denmark

9:50 452 PERFORMANCE INVESTIGATION OF A LINEAR COMPRESSOR IN REFRIGERATION SYSTEM WITH ITS NATURAL FREQUENCY REAL-TIME MONITORED 961

TANG M., ZOU H., XU H., SHAO S., TIAN C.
Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China

ABSORPTION & ADSORPTION(2)

B2-We-1b Room 414+415

Chairs: DANG C. *(The University of Tokyo, Japan)*
YANG L. *(School of Energy and Environment, Southeast University, China)*

8:30 706 RESEARCH ON ENHANCING FALLING-FILM PERFORMANCE OF A NEW SOLAR LIBR ABSORPTION REFRIGERATION SYSTEM 968

GU Y., WANG T., ZHAO R., QU C.
School of Environmental Science and Engineering, Chang'an University, China, Key Laboratory of Subsurface Hydrology and Ecology in Arid Areas (Chang'an University), Ministry of Education, China

8:50 737 THERMODYNAMIC ANALYSIS OF A TWO-STAGE ABSORPTION THERMOCHEMICAL POWER CYCLE 976

SHI Y., CHEN G.
Institute of Refrigeration and Cryogenics, State Key Laboratory of Clean Energy Utilization, Zhejiang University, China

9:10 769 MODELING AND NUMERICAL SIMULATION OF A NOVEL TWO-STAGE ABSORPTION-TRANSCRITICAL HYBRID REFRIGERATION SYSTEM 983

HE Y.(*), JIANG Y.(*), LI R.(*), CHEN G.(**), WANG Y.(*)
(*) Institute of Refrigeration and Cryogenics, Zhejiang University, China, (**) Ningbo Institute of Technology, Zhejiang University, China

9:30 859 SIMULATION OF AN ABSORPTION REFRIGERATOR WORKING WITH IONIC LIQUIDS AND NATURAL REFRIGERANTS 991

MEYER T., KÜHN R., RICART C., ZEGENHAGEN T., ZIEGLER F.
Technische Universität Berlin, Germany

9:50 931 TEMPERATURE EFFICIENCY ANALYSIS OF ABSORPTION HEAT EXCHANGERS 1001

XIE X., JIANG Y.
Building Energy Research Center, Tsinghua University, China

ENERGY EFFICIENCY(2)

E2-We-1 Room 416+417

Chairs: JEONG J. *(Waseda University, Japan)*
UEDA K. *(Mitsubishi Heavy Industries, Ltd., Japan)*

8:30 632 EXPERIMENTAL STUDY ON PERFORMANCE OF ECONOMIZED VAPOR INJECTION HEAT PUMP SYSTEM USING REFRIGERANT R32 1009

ZHANG X., GUO X., ZHANG S.
Tianjin Key Laboratory of Refrigeration Technology, Tianjin University of Commerce, Tianjin, China

8:50 926 HIGH EFFICIENT HEAT PUMP SYSTEM USING STORAGE TANKS TO INCREASE COP BY MEANS OF THE ISEC CONCEPT – PART I: MODEL VALIDATION 1015
ROTHUIZEN E.(*), ELMEGAARD B.(*), MARKUSSEN W. B.(*), MADSEN C.(**), OLESEN M. F.(**), SØLVSTEN M. Ø.(*)
(*) Technical University of Denmark, Denmark, (**) Danish Technological Institute, Denmark

9:10 169 MODELING AND SIMULATION OF A TRANSCRITICAL CO_2 HEAT PUMP SYSTEM WITH AN INTERNAL HEAT EXCHANGER 1023
SIAN R., WANG C.-C.
Department of Mechanical Engineering, National Chiao Tung University, Taiwan

9:30 178 EXPERIMENTAL CHARACTERISTICS OF R744 EJECTORS FOR EXPANSION WORK RECOVERY IN HEAT PUMPING INSTALLATIONS 1032
BANASIAK K.(*), HAFNER A.(*), EIKEVIK T. M.(**)
(*) SINTEF Energy Research, Norway, (**) Norwegian University of Science and Technology, Norway

FREEZING AND CHILLING OF MEAT PRODUCTS
C2-We-1 Room 418

Chairs: GUILPART J. *(IIF-IIR, France)*
MURATA Y. *(National Research Institute of Fisheries Science, Fisheries Research Agency, Japan)*

8:30 487 DEVELOPMENT OF SUPERCOOLING AS A STORAGE TECHNIQUE FOR PORK 1040
EVANS J., STONEHOUSE G.
Faculty of Engineering, Science and the Built Environment, London South Bank University, United Kingdom

8:50 337 A NEW METHOD TO DESCRIBE THE COOLING PROCESS OF PACKAGED HORTICULTURE PRODUCE 1048
SHIM Y.-M., TAN Y. T., OLANTUNJI J., O'SULLIVAN J. L., LOVE R. J., FERRUA M. J., EAST A. R.
Centre for Postharvest and Refrigeration Research, Massey Institute of Food Science and Technology, Massey University, New Zealand

9:10 273 NUMERICAL AND EXPERIMENTAL ANALYSIS ON POULTRY FREEZING TIME 1055
RIGHETTI G., PERNIGOTTO G., ZILIO C., LONGO G. A.
University of Padova, Department of Management and Engineering, Italy

9:30 755 INVESTIGATIONS OF THE DYNAMICS OF MEAT FREEZING AT VARIOUS MODES OF CRYOTREATMENT 1063
SHINBAYEVA A.(*), ALDIYAROV A.(*), ARKHAROV I.(**), DROBYSHEV A.(*)
(*) al-Farabi Kazakh National University, Kazakhstan, (**) Bauman Moscow State Technical University, Russia

9:50 335 THE INFLUENCE OF TEMPERATURE MODES DURING SALTING AND RESTING STAGES ON THE MASS TRANSFER IN DRY-CURED HAM 1071
PETROVA I.(*), TOLSTOREBROV I.(*), EIKEVIK T. M.(*), BANTLE M.(**)
(*) Department of Energy and Process Engineering, Norwegian University of Science and Technology (NTNU), Norway, (**) Department of Energy Process, SINTEF Energy Research, Norway

WORKSHOP: HEATING AND POWER FROM LOW TEMPERATURE HEAT
WS2-We-1 Room 304
Chair: KONTOMARIS K. *(DuPont Fluorochemicals, United States)*

WEDNESDAY, AUGUST 19 10:30-12:10

THERMODYNAMIC PROPERTIES(2)
B1-We-2a Room 301
Chairs: BROWN J. *(The Catholic University of America, United States)*
KAYUKAWA Y. *(National Institute of Advanced Industrial Science and Technology, AIST, Japan)*

10:30 679 THERMOPHYSICAL PROPERTY MEASUREMENTS FOR R 1234yf + R 1234ze(E) MIXTURE 1078
HIGASHI Y.
Iwaki Meisei University, Japan

10:50 111 SURFACE TENSION OF LOW GWP REFRIGERANTS R1234ZE(Z) AND R1233zd(E) 1086
KONDOU C.(*), NAGATA R.(**), NII N.(**), KOYAMA S.(**,***), HIGASHI Y.(****)
(*) Nagasaki University, Graduate School of Engineering, Japan, (**) Kyushu University, Interdisciplinary Graduate School of Engineering Science, Japan, (***) Kyushu University, International Institute for Carbon-Neutral Energy Research, Japan, (****) Iwaki Meisei University, Department of Science and Engineering, Japan

11:10 792 A NEW EQUATION OF STATE FOR 1,1,1,3,3-PENTAFLUOROPROPANE (R-245fa) 1094
AKASAKA R.(*), ZHOU Y.(**), LEMMON E. W.(***)
(*) Faculty of Engineering, Department of Mechanical Engineering, Kyushu Sangyo University, Japan, (**) Honeywell Integrated Technology Co. Ltd., China, (***) Applied Chemicals and Materials Division, National Institute of Standards and Technology, United States

11:30 198 DETERMINATION OF THERMODYNAMIC PROPERTIES OF REFRIGERANTS BY USING MOLECULAR SIMULATION AND EXPERIMENT: APPLICATION TO DEVELOPMENT OF PREDICTIVE THERMODYNAMIC MODELS 1100
COQUELET C.(*), HOURIEZ C.(*), JAUBERT J. N.(**)
(*) MINES ParisTech, PSL Research University, CTP - Centre of Thermodynamic of Processes, France, (**) Université de Lorraine, Ecole Nationale Supérieure des Industries Chimiques, Laboratoire Réactions et Génie des Procédés (UMR CNRS 7274), France

11:50 353 LOWER GWP REFRIGERANTS FOR REFRIGERATION APPLICATIONS 1108
ARIMOTO H., TSUCHIYA T., YAMADA Y., ITANO M., SHIBANUMA T.
Chemical R&D Center, Daikin Industries, Ltd., Japan

ADSORPTION(1)
B1-We-2b Room 303
Chairs: DAIGUJI H. *(The University of Tokyo, Japan)*
TU Y. *(Shanghai Jiao Tong University, China)*

10:30 67 VISUALIZATION AND MEASUREMENT OF ADSORPTION AND DESORPTION PROCESS IN ACTIVATED CARBON/ETHANOL PAIR ADSORBER 1115
MURATA K.(*), ASANO H.(*), SAITO Y.(**)
(*) Department of Mechanical Engineering, Kobe University, Japan, (**) Kyoto University Research Reactor Institute, Japan

10:50 105 TRANSIENT SIMULATION OF FINNED TUBE TYPE ADSORBER EMPLOYING ACTIVATED CARBON-ETHANOL AS ADSORBENT-REFRIGERANT PAIR 1123
JRIBI S.(*,**), MIYAZAKI T.(*), SAHA B. B.(***), KOYAMA S.(*)
(*) Faculty of Engineering Sciences, Kyushu University, Japan, (**) Laboratory of Electro-Mechanical Systems, National Engineering School of Sfax, University of Sfax, Tunisia, (***) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan

11:10 261 ADSORPTION-BASED LOW TEMPERATURE REFRIGERATION USING WATER - ETHYLENE GLYCOL MIXTURES 1131
SEILER J., HACKMANN J., LANZERATH F., BARDOW A.
Technical Thermodynamics, RWTH Aachen University, Germany

11:30 425 TEMPERATURE–HEAT DIAGRAM ANALYSIS METHOD FOR MULTI-STAGE HEAT REGENERATION PHYSICAL ADSORPTION REFRIGERATION CYCLE 1139
XU S. Z., WANG L. W., WANG R. Z.
Institute of Refrigeration and Cryogenics, Key Laboratory for Power Machinery and Engineering of M.O.E, Shanghai Jiao Tong University, China

GREEN BUILDING(1)
S1-We-2 Room 313+314

Chairs: SU Y. *(National Taipei University of Technolpgy, Taiwan)*
IWAMOTO S. *(Kanagawa University, Japan)*

10:30 KEYNOTE THE FIRST ZERO-CARBON ARCHITECTURE IN TAIWAN THE MAGIC SCHOOL OF GREEN TECHNOLOGY, NCKU 1147
LIN H.-T.
Department of Architecture, National Cheng-Kung University, Taiwan

11:10 489 INNOVATIVE DESIGN AND COMMISSIONING OF A POSITIVE ENERGY BALANCE PLOT IN LYON (FRANCE): THE HIKARI PROJECT 1158
SIMON F.(*), PIRIOU C. (*), CORGIER D.(*), NISHIMURA N. (**), ASAKURA H.(**),USHIBA G.(***), NAKAMURA M.(***)
(*) MANASLU Ing., Savoie Technolac, France, (**) TOSHIBA Corporation, Japan, (***) TAKENAKA CORPORATION, Japan

11:30 825 DESIGNING A NEAR ZERO ENERGY SUPERMARKET – MINIMISING ENERGY USE AND ENSURING THE SUPPLY OF RENEWABLE ENERGY 1166
LINDBERG U., ROLFSMAN L., JENSEN S., RUUD S.
SP Technical Research Institute of Sweden, Sweden

11:50 881 A METHODOLOGY FOR ENERGY USE EVALUATION IN COMPLEX BUILDINGS – APPLIED IN A SHOPPING MALL CASE STUDY 1175
STENSSON S.(*), DAHLENBÄCK J.-O.(**)
(*) SP Technical Research Institute of Sweden, Sweden, (**) Chalmers University of Technology, Sweden

LIQUID SOLID DESICCANT
E1-We-2 Room 411+412
Chairs: XIAO F. L. *(The Hong Kong Polytechnic University, China)*
MASHIMO K. *(Waseda University, Japan)*

10:30 223 PERFORMANCE ANALYSIS AND OPTIMIZATION OF HEAT PUMP DRIVEN LIQUID DESICCANT HYBRID AIR-CONDITIONING SYSTEMS 1183
CHEN Y., ZHANG X., YIN Y.
School of Energy and Environment, Southeast University, China

10:50 640 ANALYSIS OF THE EFFECT ON THE SYSTEM PERFORMANCE BY THE REFLUX RATIO OF REGENERATION SOLUTION IN LIQUID DESICCANT SYSTEM 1191
NIU X., LI X., QIU W.
College of Urban Construction and Safety Engineering, Nanjing Tech University, China

11:10 403 EXPERIMENTAL RESEARCH ON DEHUMIDIFICATION PERFORMANCE OF A THERMOELECTRIC REFRIGERATOR 1199
LUO Z., ZHANG X., WANG S.
College of Mechanical Engineering, Tongji University, China

11:30 228 NUMERICAL SIMULATION OF ROTARY DESICCANT DEHUMIDIFIER FOR HYBRID SOLID DESICCANT – VAPOR COMPRESSION AIR-CONDITONING SYSTEM 1206
JANI D. B., MISHRA M., SAHOO P. K.
Department of Mechanical & Industrial Engineering, Indian Institute of Technology, India

11:50 396 EXPERIMENTAL INVESTIGATION ON SOLID DESICCANT COOLING SYSTEM BASED ON DESICCANT COATED HEAT EXCHANGER AND REGENERATIVE COOLER 1214
GE T. S.(*), WANG H. H.(**)
(*) Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, Key Laboratory of Power Mechanical Engineering, MOE China, China, (**) Merchant Marine College, Shanghai Maritime University, China

COMPRESSOR(4) / CYCLE
B2-We-2a Room 413
Chairs: TOJO K. *(TOJO R&D Design Office / Waseda University, Japan)*
HRNJAK P. *(University of Illinois - CTS, United States)*

10:30 329 CO-ROTATING SCROLL MACHINERY APPLIED TO VAPOR POWER AND VAPOR COMPRESSION CYCLES 1222
MENDOZA L., SCHIFMANN J.
Laboratory of Applied Mechanical engineering, Ecole Polytechnique Fédérale de Lausanne, EPFL, Switzerland

10:50 828 EXPERIMENTAL EVALUATION OF A CASCADE REFRIGERATION SYSTEM OPERATING WITH R744/R134a 1230
SOUZA L., ANTUNES A., MENDOZA O., BANDARRA FILHO E.
University Federal of Uberlândia, Brazil

11:10 746 DEVELOPMENT OF HIGH EFFICIENCY CYCLES FOR DOMESTIC REFRIGERATOR-FREEZER APPLICATION 1239
YANG M., JUNG C. W., KANG Y. T.
School of Mechanical Engineering, Korea University, South Korea

11:30 37 REFRIGERATION CYCLE EFFICIENCY IMPROVEMENT SUPPORTED ON DUAL RESPONSE OPTIMIZATION 1245
COSTA N. R.(*,**), GARCIA J.(*)
(*) Instituto Politécnico Setúbal, Escola Superior de Tecnologia de Setúbal, Campus do IPS, Portugal, (**) UNIDEMI/DEMI, Faculdade de Ciências e Tecnologia-Universidade Nova de Lisboa, Portugal

11:50 760 EXPERIMENTAL STUDY ON THE DYNAMIC CHARACTERISTICS OF TWIN SCREW REFRIGERATION COMPRESSOR 1252
HOU F., ZHAO Z., HE Z., XING Z.
Xi'an Jiaotong University, China

ABSORPTION & ADSORPTION(3)
B2-We-2b Room 414+415

Chairs: HAMAMOTO Y. *(Kyushu University, Japan)*
WANG L. *(Mechanical Engineering School, Shanghai Jiao Tong University, China)*

10:30 241 ADSORPTION-BASED AIR-CONDITIONING FOR BATTERY-DRIVEN ELECTRIC BUSSES 1260
BAU U., SCHREIBER H., LANZERATH F., BARDOW A.
Chair of Technical Thermodynamics, RWTH Aachen University, Germany

10:50 413 EXPERIMENT STUDY ON A RESORPTION REFRIGERATION AND ELECTRICITY SYTEM 1268
JIANG L., WANG L., LIU C., WANG R.
Institute of Refrigeration and Cryogenics, Key Laboratory for Power Machinery and Engineering of M.O.E, Shanghai Jiao Tong University, China

11:10 560 LITHIUM BROMIDE/R718 HYBRID SORPTION & COMPRESSION CYCLE 1276
ECKERT T., HELM M., GRASSEL A., SCHWEIGLER C.
University of Applied Sciences Munich, Cooperative Graduate Center "Building Services Engineering & Energy Efficiency", Germany

11:30 218 EXPERIMENTAL INVESTIGATION ON ENHANCEMENT OF AMMONIA-WATER FALLING FILM GENERATION BY ADDING $ZnFe_2O_4$ NANO-PARTICLES 1284
LI Y., DU K., HU H., E W., YANG L.
School of Energy and Environment, Southeast University, China

11:50 534 EXPERIMENTAL STUDY OF FALLING FILMS OVER TUBE BUNDLE DISTILLER IN AMMONIA-WATER LIQUID MIXTURES 1293
NARVÁEZ-ROMO B.(*), ZAVALETA-AGUILAR E. W.(*,**), SIMÕES-MOREIRA J. R.(*,**)
(*) SISEA – Alternative Energy Systems Laboratory, Mechanical Engineering Department, Escola Politécnica, University of São Paulo, Brazil, (**) Energy Graduate Program, University of São Paulo, Brazil

INDUSTRIAL HEAT PUMPS(1)
E2-We-2 Room 416+417

Chairs: ARNAS A. *(Waseda University, Japan)*
TSUCHIYA T. *(Fuji Electric, Japan)*

10:30 24 HIGH-TEMPERATURE HEAT PUMP-ASSISTED SOFTWOOD DRYER: SIZING AND CONTROL REQUIREMENTS & ENERGY PERFORMANCE 1301
MINEA V.
Hydro-Québec Research Institute, Laboratoire des technologies de l'énergie (LTE), Canada

10:50 135 HEAT PUMP DRYING: USE OF AMBIENT AIR AS ENERGY SOURCE FOR COOLING 1310
BANTLE M.(*), TOLSTOREBROV I.(**), NORDTVEDT T. S.(***), STAVSET O.(*), CLAUSSEN I. C.(*)
(*) SINTEF Energy Research, Norway, (**) Norwegian University of Science and Technology, Norway, (***) SINTEF Fishery and Aquaculture, Norway

11:10 237 OPTIMIZING THE COMPRESSION/ABSORPTION HEAT PUMP SYSTEM AT HIGH TEMPERATURES 1318
BERGLAND M., EIKEVIK T. M., TOLSTOREBROV I.
Norwegian University of Science and Technology (NTNU), Norway

11:30 242 INDUSTRIAL HEAT PUMP USING FLUID MIXTURE 1326
ENDO N., HIRANO S.
National Institute of Advanced Industrial Science and Technology (AIST), Japan

11:50 414 TRENDS IN INDUSTRIAL HEAT PUMP TECHNOLOGY IN JAPAN 1333
WATANABE C.(*), UCHIYAMA Y.(**), HIRANO S.(***), HIKAWA T.(****)
(*) Chubu Electric Power Co., Inc., Japan, (**) University of Tsukuba, Japan, (***) National Institute of Advanced Industrial Science and Technology, Japan, (****) Heat Pump & Thermal Storage Technology Center of Japan, Japan

FREEZING AND CHILLING OF FISHERIE PRODUCTS
C2-We-2 Room 418

Chairs: LE BAIL A. *(LUNAM University, Oniris, UMR 6144 GEPEA, CNRS, France)*
ARAKI T. *(The University of Tokyo, Japan)*

10:30 136 CHILLING OF SALMON IN REFRIGERATED SEA WATER 1341
BANTLE M.(*), STAVSET O.(*), NORDTVEDT T. S.(***), GULLSVÅG P. E.(*), EIKEVIK T. M.(**), TOLSTOREBROV I.(**)
(*) SINTEF Energy Research Ltd., Norway, (**) Norwegian University of Science and Technology (NTNU), Norway, (***) SINTEF Fishery and Aquaculture, Norway

10:50 310 EFFECT OF FREEZING CONDITIONS ON THE EXTRACTIVE COMPONENT IN OYSTER CRASSOSTREA GIGAS 1348
MURATA Y., TOUHATA K.
National Research Institute of Fisheries Science, Fisheries Research Agency, Japan

11:10 117 SIMULATION OF A FISH FREEZING TUNNEL USING MODELICA 1352
STAVSET O.(*), WIDELL K. N.(*), BANTLE M.(*), NORDTVEDT T. S.(**), TOLSTOREBROV I.(***)
(*) SINTEF Energy Research, Norway, (**) Norwegian University of Science and Technology (NTNU), Department of Energy and Process Engineering, Norway, (***) SINTEF Fishery and Aquaculture, Norway

11:30 115 CHALLENGES OF THE USAGE OF ULTRA-LOW TEMPERATURES FOR FISH FREEZING AND STORAGE 1360
EIKEVIK T. M.(*), TOLSTOREBROV I.(*), BANTLE M.(**), NORDTVEDT T. S.(***), STAVSET O.(**)
(*) Norwegian University of Science and Technology (NTNU), Norway, (**) SINTEF Energy Research Ltd., Norway, (***) SINTEF Fisheries and Aquaculture Ltd., Norway

11:50 831 COMPARISON OF SEVERAL CORRELATIONS INCLUDE ONE UTILIZING SORET BAND FOR SPECTROPHOTOMETRIC DETERMINATION OF METMYOGLOBIN IN TUNA MEAT EXTRACTS 1368
ZHAO L., SUZUKI T., WATANABE M., SUZUKI T.
Department of Food Science and Technology, Graduate School of Tokyo University of Marine Science and Technology, Japan

WORKSHOP: HEAT PUMP SYSTEMS R&D BY NEDO
WS3-We-2 Room 304
Chair: SHIMA M. *(NEDO, Japan)*

WEDNESDAY, AUGUST 19 12:10-13:30

POSTER SESSION
Room 315
A1-We-P

66 THERMAL COOLING MULTICHIP ULTRA HIGH POWER LED USING REFRIGERATION CYCLE SYSTEM 1374
HSU C.-N., WANG W.-C.
Department of Refrigeration, Air Conditioning and Energy Engineering, National Chin-Yi University of Technology, Taiwan

352 INVESTIGATIONS ON THE DRIVING VOLTAGE WAVEFORMS OF THE LINEAR COMPRESSOR FOR STIRLING-TYPE PULSE TUBE CRYOCOOLER 1382
TAN J.(*,**), DANG H.(*), ZHAO Y.(*,**), ZHANG L.(*,**), GAO Z.(*,**), BAO D.(*,**)
(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China

362 INVESTIGATION ON A J-T COOLER USED TO COUPLE WITH A PULSE TUBE CRYOCOOLER 1390
GAO Z.(*,**), DANG H.(*), ZHAO Y.(*,**), BAO D.(*,**), TAN J.(*,**), ZHANG L.(*,**)
(*) Shanghai Institute of Technical Physics of the Chinese Academy of Science, China, (**) University of Chinese Academy of Science, China

370 INVESTIGATION ON PULSE TUBE/J-T HYBRID CRYCOOLER CAPABLE OF FAST COOL DOWN 1398
GAO Z.(*,**), DANG H.(*), ZHAO Y.(*,**), BAO D.(*,**), TAN J.(*,**), ZHANG L.(*,**)
(*) Shanghai Institute of Technical Physics of the Chinese Academy of Science, China, (**) University of Chinese Academy of Science, China

420 INVESTIGATION ON A 130 Hz MINIATURE COAXIAL PULSE TUBE CRYOCOOLER 1406
ZHAO Y., DANG H., GAO Z., BAO D., ZHANG L., TAN J.
Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China

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894 A PRESSURE SWING ADSORPTION - CRYOGENERATOR HYBRID SYSTEM FOR LIQUEFACTION OF NITROGEN 1414
CHOWDHURY D. R., CHAKRABORTY N. R., SARKAR S. C.
Centre for Rural & Cryogenic Technologies, Jadavpur University, India

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158 BOILING HEAT TRANSFER PERFORMANCE OF THREE INTERNALLY ENHANCED TUBES USING R22 1422
OUYANG X.(*), CHEN J.(*), LI T.(**)
(*) Institute of Refrigeration and Cryogenics, University of Shanghai for Science and Technology, China, (**) DENSO (CHINA) INVESTMENT CO., LTD. Shanghai Technical Center, China

296 CALCULATION AND EXPERIMENTAL VERIFICATION OF HEAT TRANSFER COEFFICIENT FOR LOW PRESSURE METHANOL EVAPORATOR 1430
HAŁON T., ZAJĄCZKOWSKI B., KRÓLICKI Z., WOJTASIK K.
Wrocław University of Technology, Katedra Termodynamiki, Teorii Maszyn i Urządzeń Cieplnych, Poland

306 INVESTIGATION AND THEORETICALLY ANALYSIS OF DRAG REDUCTION NANOFLUIDS 1438
CHEN X., YANG L., DU K.
School of Energy and Environment, Southeast University, China

340 THERMODYNAMIC PROPERTIES OF FLUOROCARBONS: SIMULATIONS AND EXPERIMENT 1447
DOUBEK M., VACEK V.
Faculty of Mechanical Engineering, Department of Physics, Czech Technical University in Prague, Czech (Republic)

490 INVESTIGATIONS OF TWO-PHASE EJECTOR OPERATING WITH CARBON DIOXIDE IN SUBCRITICAL CYCLE 1455
ŚMIERCIEW K.(*), BUTRYMOWICZ D.(*), BAJ P.(**), KARWACKI J.(***), BERGANDER M.(****)
(*) Bialystok Technical University, Poland, (**) Institute of Aviation, Poland, (***) The Szewalski Institute of Fluid-Flow Machinery of Polish Academy of Sciences, Poland, (****) Nazarbayev University, Kazakhstan

648 EFFECT OF ABSORPTION CONDITIONS ON ENHANCEMENT OF AMMONIA/WATER BUBBLE ABSORPTION IN A BINARY NANOFLUID 1463
SU F.(*), ZHAO N.(*), DENG Y.(*), CUI W.(*), MA H.(**)
(*) Dalian Maritime University, China, (**) University of Missouri – Columbia, United States

690 HUMIDITY AND CYCLE PERIOD EFFECT ON HYGROSCOPIC EFFICIENCY OF DESICCANT COATING HEAT EXCHANGERS WITH DIFFERENT DESICCANTS 1471
LUO W.-J., LU C.-W., CHENG Y.-S., LIN Z.-H.
National Chin-Yi University of Technology, Department of Refrigeration, Air Conditioning and Energy Engineering, Taiwan

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AKADA I.(*), MATSUNO T.(**), NOGUCHI T.(***), JIGE D.(***), INOUE N.(***)
(*) Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology, Japan, (**) Kobelco & Materials Copper Tubes Co. LTD., Japan, (***) Tokyo University of Marine Science and Technology, Japan

700 PRESSURE DROP AND HEAT TRANSFER CHARACTERISTICS OF SINGLE-PHASE FLOW IN CORRUGATED TUBES FOR HOT-WATER SUPPLY SYSTEMS 1487
KURAYAMA S.(*), WATANABE K.(*), JIGE D.(**), INOUE N.(**), TAKAHASHI H.(***)
(*) Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology, Japan, (**) Tokyo University of Marine Science and Technology, Japan, (***) Kobelco & Materials Copper Tube, LTD., Japan

702 CONDENSATION HEAT TRANSFER AND PRESSURE DROP OF AZEOTROPIC MIXTURE REFRIGERANT R32/R1270 INSIDE HORIZONTAL SMALL-DIAMETER TUBES 1495
HIROSE M.(*), ICHINOSE J.(**), JIGE D.(***), INOUE N.(***)
(*) Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology, Japan, (**) National Fisheries University, Japan, (***) Tokyo University of Marine Science and Technology, Japan

726 PRESSURE DROP AND HEAT TRANSFER FOR FLOW BOILING INSIDE HORIZONTAL SMOOTH AND INTERNALLY HELICAL-GROOVED SMALL-DIAMETER TUBES 1503
SAGAWA K.(*), JIGE D.(**), INOUE N.(**), HABA T.(***)
(*) Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology, Japan, (**) Tokyo University of Marine Science and Technology, Japan, (***) Kobelco & Materials Copper Tube, LTD., Japan

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56 CHARACTERISTICS OF SCROLL COMPRESSOR REFRIGERATION/ HEAT PUMP SYSTEM WITH MULTI-VAPOR INJECTION 1511
XU S., MA G., WANG X.
Beijing University of Technology, Chaoyang District, China

422 MULTIVARIATE OPTIMIZATION OF A HEAT EXCHANGER WITH MICROCHANNEL COIL 1520
GLAZAR V., TRP A., LENIC K., FRANKOVIC B.
University of Rijeka, Faculty of Engineering, Croatia

586 ICE SLURRY AS SECONDARY COOLANT IN AIR COOLERS. MATHEMATICAL MODEL AND VALIDATION 1528
DIZ R., FERNÁNDEZ-SEARA J., PARDIÑAS Á. Á.
Área de Máquinas y Motores Térmicos, Universidad de Vigo, Spain

858 NATURAL REFRIGERANT MIXTURE ALTERNATIVES RETROFIT ECO EFICIENCY COMPARATIVE STUDY CASE 1536
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(*) Technical University of Civil Engineering, Romania, (**) Romanian General Association of Refrigeration, Romania

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(*) Saitama University, Japan, (**) The University of Tokyo, Japan, (***) Miyagi University, Japan

166 THE USE OF REFRIGERATED STORAGE, PRETREATMENT WITH VAPORS OF ESSENTIAL OILS, AND ACTIVE FLOW-PACKING, IMPROVES THE SHELF LIFE AND SAFETY OF FRESH DILL 1546
LÓPEZ-GÓMEZ A., BOLUDA-AGUILAR M., SOTO-JOVER S.
Department of Food Engineering and Agricultural Equipment, Universidad Politecnica de Cartagena, Spain

170 THE USE OF CARDBOARD TRAYS WITH SMART ACTIVE INTERNAL LINING FOR ENHANCING THE SHELF LIFE AND SAFETY OF FRESH TOMATOES 1553
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Department of Food Engineering and Agricultural Equipment, Universidad Politecnica de Cartagena, Spain

302 EFFECT OF FREEZING STORAGE ON INACTIVATION OF ESCHERICHIA COLI IN LIQUID WHOLE EGG WITH SUCROSE AND HIGH HYDROSTATIC PRESSURE TREATMENT 1561
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(*) Saitama University, Japan, (**) Niigata University of Pharmacy and Applied Life Sciences, Japan

440 LIFE CYCLE ASSESSMENT OF SALMON COLD CHAINS: COMPARISON BETWEEN CHILLING AND SUPERCHILLING TECHNOLOGIES 1566
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(*) Irstea, UR GPAN, France, (**) School of the Built Environment and Architecture, London South Bank University, United Kingdom, (***) SINTEF Energy Research, Norway

472 THE USE OF CARDBOARD BOX WITH SMART ACTIVE INTERNAL LINING AND WRAPPING WITH ACTIVE BIOPOLYMER FILM FOR ENHANCING THE SHELF LIFE AND SAFETY OF FRESH BROCCOLI 1574
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Department of Food Engineering and Agricultural Equipment, Universidad Politecnica de Cartagena, Spain

496 THE USE OF PRETREATMENT WITH ESSENTIAL OILS VAPOR AND ACTIVE ALVEOLUS TRAYS FOR IMPROVING THE SHELF LIFE AND SAFETY OF FRESH PEACHES 1581
LÓPEZ GÓMEZ A., BOLUDA AGUILAR M., SOTO JOVER S., MARTÍNEZ HERNÁNDEZ G. B.
Department of Food Engineering and Agricultural Equipment, Universidad Politecnica de Cartagena, Spain

D1-We-P

778 INVESTIGATION ON CRYSTALLIZATION PROPERTIES OF TITANIUM DIOXIDE NANOFLUIDS 1589
JIA L., CHEN Y., LIN G., MO S., YIN T.
Guangdong Province Key Laboratory on Functional Soft Matter, Soft Matter Center, Guangdong University of Technology, China

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538 DIMENSIONNEMENT DES ENGINS MULTI TEMPERATURES : CALCUL, METHODOLOGIE, EXEMPLES, IMPACT SUR LE DIMENSIONNEMENT 1597
SUQUET T., CAVALIER G., DEVIN E.
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62 PERFORMANCE EVALUATION OF A SOLAR EJECTOR-VAPOUR COMPRESSION CYCLE FOR COOLING APPLICATION USING CARBON DIOXIDE AS WORKING FLUID 1607
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(*) Laboratoire d'Études des Systèmes Thermiques et Énergétiques Ecole National d'ingénieur de Monastir, Tunisia, (**) Unité de Recherche Energétique et Environnent, Ecole National d'ingénieur de Tunis, Tunisia

184 BIVALENT AIR-CONDITIONING SYSTEM FOR A SUPERMARKET 1619
HERA D.(*), ILIE A.(*), GIRIP A.(*), ILIE G.(**), CUBLESAN V.(*)
(*) Technical University for Civil Engineering, Romania, (**) University College London, United Kingdom

232 BASIC STUDY ON HUMIDITY REGULATION SYSTEM BY USING MAGNETOCALORIC EFFECT 1625
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(*) Tokyo Institute of Technology, Japan, (**) Chubu Electric Power Co., Inc., Japan, (***) Takenaka Co., Japan

418 RETROFIT OF R-410A IN A WATER CHILLER: TEST OF FOUR LOW GWP CANDIDATES 1632
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MINES ParisTech, PSL Research University, France

494 NUMERICAL METHOD ON PREDICTING DISTRIBUTION OF LEAKED REFRIGERANT IN INDOOR SPACE AND ITS EXPERIMENTAL OBSERVATION 1639
HATTORI K., FUKUOKA M., MURATA K., TAIRA S., TOMIOKA K.
Daikin Industries, Ltd., Japan

680 EXPERIMENTAL STUDYING ON LOW GWP REFRIGERANT R446A AS AN ALTERNATIVE TO R410A IN RESIDENTIAL AIR CONDITIONER 1647
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Honeywell Integrated Technology, China

738 COMPARISION ANALYSIS OF MASS DIFFUSIVITY EFFECT ON A DAMPER-CONTROLLED DESICCANT DEHUMIDIFIER 1655
LEE C.-S.(*), LEE D.-Y.(**), KANG B. H.(***)
(*) Department of Mechanical Engineering, Graduate School, Kookmin University, South Korea, (**) Energy Mechanics Research Center, Korea Institute of Science & Technology, South Korea, (***) School of Mechanical Engineering, Kookmin University, South Korea

10 SIMULATION OF A DOUBLE EFFECT H2O-LIBR ABSORPTION CHILLER DRIVEN BY SOLAR CONCENTRATING PARABOLIC TROUGH COLLECTORS 1661
BORDOGNA P.(*), FERNÁNDEZ BENÍTEZ J. A.(**), MOLINAROLI L.(*), MUÑOZ-ANTÓN J.(**)
(*) Dipartimento di Energia - Politecnico di Milano, Italy, (**) Universidad Politécnica de Madrid - Departamento de Ingeniería Energética, Spain

40 MEASURED AND SIMULATED BEHAVIOR OF HEAT PUMP IN LOW ENERGY BUILDING: SHORT CYCLING AND STORAGE IMPACT 1669
SIMON F.(*), PIRIOU C.(*), CORGIER D.(*), TEMEAC B.(**)
(*) MANASLU Ing., Savoie Technolac, France, (**) Laboratoire Chimie Moléculaire, Genie des Procédés Chimiques et Energétiques (CMGPCE, EA7341), CNAM, France

78 HEAT PUMP APPLICATION IN THE CHINESE MARKET, A REVIEW OF THE RECENT TEN YEARS 1677
SU C., PALM B.
Department of Energy Technology, KTH, Sweden

256 HEAT PUMP OPERATING WITH NH_3 OR CO_2 – A COMPARATIVE STUDY 1685
DOBROVICESCU A.(*), SERBAN A.(**), FILIPOIU C.(*), NASTASE G.(**), CHIRIAC F.(**)
(*) University POLITEHNICA of Bucharest, Romania, (**) Faculty of Civil Engineering, University Transilvania Brasov, Romania

308 THERMOPHYSICAL PROPERTIES MEASUREMENTS AND NUMERICAL SIMULATION OF THE YEARLY YIELD OF A PARABOLIC TROUGH SOLAR COLLECTOR USING NANOFLUIDS 1693
COCCIA G.(*), COLLA L.(**), FEDELE L.(**), DI NICOLA G.(*), BOBBO S.(**)
(*) Department of Industrial Engineering and Mathematical Sciences, Marche Polytechnic University, Italy, (**) Construction Technologies Institute, National Research Council, Italy

448 AN EXPERIMENTAL STUDY ON THE FROSTING CHARACTERISTICS OF HEAT PUMP SYSTEM IN PURE ELECTRIC VEHICLE 1700
ZHANG W., LI H., CHENG R., ZHENG X.
Beijing University of Technology, China

468 FEASIBILITY STUDY OF A NOVEL DEFROSTING METHOD FOR AIR SOURCE HEAT PUMPS 1706
WANG F., LIANG C., YANG M., ZHANG X.
School of Energy and Environment, Southeast University, China

556 PERFORMANCE MODELING AND MONITORING OF A HIGH-TEMPERATURE AIR-TO-WATER HEAT PUMP WITH THREE DIFFERENT HEATING SYSTEMS 1714
DUMONT E., LEPORE R., FRERE M.
Research Institute for Energy – University of Mons, Belgium

642 DESIGN OF PHASE CHANGE THERMAL ENERGY STORES (PCM-TES) FOR RESIDENTIAL HEAT PUMP APPLICATIONS 1722
MINIĆ I., HEWITT N., HUANG M.-J., RAMIREZ M.
University of Ulster, Centre for Sustainable Technologies, United Kingdom

786 FUEL AND PRODUCT IN THE EXERGETIC ANALYSIS OF REFRIGERATION SYSTEMS 1731
DOBROVICESCU A.(*), SERBAN A.(**), PRISECARU T.(*), APOSTOL V.(*), CHIRIAC F.(**)
(*) University POLITEHNICA of Bucharest, Romania, (**) Faculty of Civil Engineering, University Transilvania Brasov, Romania

902 PERFORMANCE ANALYSIS OF HEAT PUMP WATER HEATING SYSTEM WITH CASCADE UTILIZATION OF WASTE HEAT FROM WASTEWATER 1739
HU P., ZHU W., CHEN Z.
Department of Thermal Science and Energy Engineering, University of Science and Technology of China, China

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22 ENERGY-SAVING POTENTIAL OF BUILDING ENVELOPE DESIGNS IN RESIDENTIAL HOUSES IN TROPICAL CLIMATE REGION 1745
SETIAWAN A. F.(*), LIU P.-F.(**), YU C.-W.(**), LAI C.-M.(*)
(*) Department of Civil Engineering, National Cheng-Kung University, Taiwan, (**) Department of Architecture, National Cheng-Kung University, Taiwan

42 ICE-STORAGE DEVICE APPLICATION IN COMMERCIAL BUILDINGS OF WUXI SINO-SWEDISH ECO-CITY 1751
SU C., SHAFQAT O., LUNDQVIST P.
Department of Energy Technology, KTH, Sweden

164 EFFECT OF INDOOR OPENING AREA ON CROSS-VENTILATION RATE IN APARTMENT BUILDING 1759
NISHIMURA Y.(*), SAKAI K.(**), YAMADA K.(**)
(*) Technical Research Institute, HASEKO Corporation, Japan, (**) School of Science & Technology, Meiji University, Japan

265 EVALUATION OF THE ELECTRICAL ENERGY CONSUMPTIONS FOR A LOW-ENERGY BUILDING 1764
DAMIAN A., POPESCU R., BĂJENARU N., NICHITA M. T., DUMITRESCU R.
Technical University of Civil Engineering Bucharest, Romania

546 ENERGY MANAGEMENT SYSTEM UTILIZING EXHAUST HEAT RECOVERY ON DISTRIBUTED GENERATION IN SUPERMARKET AND RESTAURANT 1772
WATANABE T., SHIKANO T., BAE S., KATSUTA M.
Waseda University, Department of Modern Mechanical Engineering, Japan

660 COMPARISON BETWEEN MEASUREMENT AND WIND TUNNEL EXPERIMENT INTENDED FOR APARTMENT HOUSE 1778
YAMADA K.(*), NISHIMURA Y.(**), SAKAI K.(*)
(*) School of Science & Technology, Meiji University, Japan, (**) Technical Research Institute, HASEKO Corporation, Japan

ADSORPTION(2)
B1-We-3 Room 303

Chairs: WANG R. *(Shanghai Jiao Tong University, China)*
JRIBI S. *(Kyushu University, Japan)*

13:30 940 MEASUREMENTS OF ADSORPTION/DESORPTION RATE OF A FILM ADSORBENT SYNTHESIZED ON HEAT TRANSFER PLATE CONTROLLED BY ADSORBENT TEMPERATURE IN WATER VAPOR 1784
OUCHI T., HAMAMOTO Y., MORI H.
Kyushu University, Japan

13:50 774 ADSORPTION KINETICS ANALYSIS OF WATER ON SILICA GEL IN TWO CONFIGURATIONS OF TUBULAR REACTORS 1792
MELO H.(*), VODIANITSKAIA P. J.(*), SANTOS J.(**), GURGEL J. M.(***)
(*) Graduate Program in Mechanical Engineering, Federal University of Paraiba, PPGEM/CT/UFPB, Brazil, (**) Department of Mechanical Production Engineering, Regional University of Cariri, Brazil, (***) Federal University of Paraiba, Brazil

14:10 938 CAPILLARY CONDENSATION AND EVAPORATION OF WATER IN TWO–DIMENSIONAL HEXAGONAL MESOPOROUS SILICA 1798
HWANG J.(*), SAKAMOTO K.(**), YANAGIHARA H.(**), YAMASHITA K.(**), KATAOKA S.(***), ENDO A.(***), DAIGUJI H.(*)
(*) Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo, Japan, (**) Department of Human and Engineered Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan, (***) National Institute of Advanced Industrial Science and Technology (AIST), Japan

14:30 939 MOLECULAR DYNAMICS SIMULATION OF CAPILLARY EVAPORATION OF WATER ADSORBED ON HYDROHILIC NANOPORES 1806
YAMASHITA K., DAIGUJI H.
Department of Mechanical Engineering, The University of Tokyo, Japan

14:50 385 NON EQUILIBRIUM ADSORPTION PERFORMANCE ANALYSIS OF THE ADSORPTION CYCLE FOR THE REFRIGERATING VEHICLES 1814
WANG L. W., ZHOU Z. S., GAO P., JIANG L., WANG R. Z.
Institute of Refrigeration and Cryogenics, Key Laboratory for Power Machinery and Engineering of M.O.E., Shanghai Jiao Tong University, China

GREEN BUILDING(2)
S1-We-3 Room 313+314

Chairs: DRUGHEAN L. G. *(Technical University for Civil Engineering, Romania)*
TANABE S. *(Waseda University, Japan)*

13:30 14 EVALUATING NATURAL VENTILATION EFFECTS OF ATRIUM IN A SUBTROPICAL VERNACULAR STREET-HOUSE IN TAIWAN 1822
SU Y.-M., HSIEH Y.- C., LIN Y.-C.
Department of Architecture, National Taipei University of Technology, Taiwan

13:50 796 A STUDY ON THE ENVIRONMENTAL PERFORMANCE INTO STANDARD SYSTEM OF ELEMENTARY SCHOOL BUILDING BY WOOD-FRAME CONSTRUCTION METHOD -OUTLINE OF MODEL PLAN AND FIELD MEASUREMENTS OF THERMAL ENVIRONMENT IN WINTER- 1830

YAMAGUCHI H.(*), KIMURA S.(**), MATSUO K.(***),
MURAKOSHI M.(****), KIMURA N.(*****)
(*) Kanto-Gakuin University, Japan, (**) Arakawa ward office, Japan, (***) Mitsui Home Components Co., Ltd., Japan, (****) Atelierson Limited Co., Japan, (*****) Showa Women's University, Japan

14:10 151 ROBUST OPERATION OF NET-ZERO AND POSITIVE ENERGY BUILDINGS WITH ENERGY COST MINIMIZATION 1838

OTAKE H., MURAI M., SAITO M., ASAKURA H., NOSAKA T., NISHIMURA N.
TOSHIBA Corporation, Japan

14:30 580 SMART METER ENABLED CONTROL FOR VARIABLE SPEED HEAT PUMPS TO INCREASE PV SELF-CONSUMPTION 1846

FISCHER D.(*,**), RAUTENBERG F.(*), WIRTZ T.(*),
WILLE-HAUSSMANN B.(*), MADANI H.(**)
(*) Fraunhofer ISE, Germany, (**) KTH Royal Institute of Technology, Sweden

14:50 69 DYNAMIC THERMAL BEHAVIOR OF DOUBLE-SKIN FAÇADE AND ADJACENT INTERIOR COMFORT 1854

SERBAN A.(*), DOBROVICESCU A.(**), DRUGHEAN L.(***),
NASTASE G.(*), ALEXANDRU A.(**)
(*) Transylvania University of Brasov, Romania, (**) University POLITEHNICA of Bucharest, Romania, (***) Technical University of Civil Engineering, Romania

EVAPORATIVE COOLING

E1-We-3 Room 411+412

Chairs: PADALKAR A. S. *(Flora Institute of Technology, Pune, India)*
MIYAZAKI T. *(Kyushu University, Japan)*

13:30 76 CRITIQUE OF IMPROVED PERFORMANCE OF AIR-COOLED CHILLERS WITH EVAPORATIVE COOLING 1862

YU F. W.(*,**), CHAN K. T.(**), YANG J.(**), SIT R. K. Y.(***)
(*) Hong Kong Community College, The Hong Kong Polytechnic University, China, (**) Department of Building Services Engineering, The Hong Kong Polytechnic University, China, (***) CSA(M&E) Ltd., China

13:50 590 EXPERIMENTAL INVESTIGATION OF NOCTURNAL COOLING ASSISTED EVAPORATIVE COOLING SYSTEM 1869

AGRAWAL N.(*), BABAR N.(*), SAWANT A.(**)
(*) Department of Mechanical Engineering, Dr.Babasaheb Ambedkar Technological University, India, (**) Aqua Therm System, India

14:10 60 PRIMARY ENERGY EFFICIENCY ANALYSIS OF DIFFERENT SEPARATE SENSIBLE AND LATENT COOLING TECHNIQUES 1877

ABDELAZIZ O.
Oak Ridge National Laboratory, United States

14:30 149 EVALUATION OF VARIABLE REFRIGERANT FLOW (VRF) SYSTEMS PERFORMANCE IN ORNL'S FLEXIBLE RESEARCH PLATFORM (FRP) 1885

IM P.(*), MUNK J.(*), SONG K.(**)
(*) Oak Ridge National Laboratory, United States, (**) Samsung Electronics, South Korea

CONDENSOR(1)
B2-We-3a Room 413
Chairs: HONDA T. *(Fukuoka University, Japan)*
RADERMACHER R. *(Univesity of Maryland, United States)*

13:30 6 DISTRIBUTION FUNCTION FOR REVERSIBLE MICROCHANNEL HEAT EXCHANGER WITH VERTICAL HEADERS – CONSIDERING THE EFFECTS OF INLET CONDITIONS, GEOMETRIES AND FLUID PROPERTIES 1893
ZOU Y.(*), HRNJAK P.(*,**)
(*) Creative Thermal Solutions, Inc, United States, (**) University of Illinois at Urbana-Champaign, United States

13:50 152 EXPERIMENTAL INVESTIGATION ON CONDENSATION HEAT TRANSFER OF R404A AND R407C OUTSIDE HORIZONTAL ENHANCED TUBES 1901
LIU C., OUYANG X.
Institute of refrigeration and cryogenics, University of Shanghai for Science and Technology, China

14:10 320 HEAT TRANSFER CHARACTERISTICS OF CONDENSING FLOW IN PLATE HEAT EXCHANGER (EFFECT OF CONDENSATE ON FLOW DISTRIBUTION) 1915
ASANO H.(*), HONDA K.(*), KAWAGUCHI T.(*), TAKEDA N.(**), KONDO M.(**), NISHIMURA K.(**)
(*) Department of Mechanical Engineering, Kobe University, Japan, (**) Noritz Corp., Japan

14:30 464 EXPERIMENTAL STUDY ON THE INFLUENCE OF THE AIR MALDISTRIBUTION ON THE PERFORMANCE OF A FINNED TUBE CONDENSER 1923
PISANO A.(*), MARTÍNEZ BALLESTER S.(*), CORBERÁN J. M.(*), HIDALGO MONPEÁN F.(**), ILLÁN GÓMEZ F.(**), GARCÍA CASCALES J-R.(**)
(*) Universitat Politècnica de València, Institute for Energy Engineering, Spain, (**) Technical University of Cartagena, Thermal and Fluid Engineering Department, Spain

14:50 629 POTENTIAL OF INTEGRATING THE AIR-BEARING HEAT EXCHANGER INTO A REFRIGERATOR CONDENSER 1931
LI M.(*), DU Y.(*), LEE H.(*), HWANG Y.(*), RADERMACHER R.(*), JOHNSON T.(**), KARIYA A.(**)
(*) Center for Environmental Energy Engineering, University of Maryland, United States, (**) Energy Systems Engineering and Analysis Group, Sandia National Laboratories, United States

EJECTOR(1)
B2-We-3b Room 414+415
Chairs: ICHIMIYA K. *(University of Yamanashi, Japan)*
YU J. *(Xi'an Jiaotong University , China)*

13:30 3 THE MODIFIED FRICTIONAL LOSS EFFICIENCY CORRELATION IN AN EJECTOR 1-D NUMERICAL MODEL 1939
QI Z.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

13:50 45 STATE OF THE ART IN THE IDENTIFICATION OF TWO-PHASE TRANSONIC FLOW PHENOMENA IN TRANSCRITICAL CO_2 EJECTORS 1944
BANASIAK K.(*), HAFNER A.(*), PALACZ M.(**)
(*) SINTEF Energy Research, Norway, (**) Silesian University of Technology, Poland

14:10 157 INVESTIGATION ON PERFORMANCE OF EJECTORS WITH ADJUSTABLE NOZZLES 1952
CHEN Z., DANG C., SHIMIZU A., HIHARA E.
Institute of Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan

14:30 195 STUDY ON THE USE OF EJECTORS FOR CAPACITY MODULATION AND PERFORMANCE IMPROVEMENT IN CO_2 COMMERCIAL REFRIGERATION SYSTEMS 1960
LAWRENCE N., ELBEL S.
Air Conditioning and Refrigeration Center, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, United States

14:50 787 ECOLOGICAL AND ENERGY EFFICIENCY ANALYSIS OF REASONABILITY APPLICATION OF EJECTOR AIR CONDITIONER COMPARED TO VAPOR COMPRESSION EQUIPMENT 1968
CHEN G.(*), ZHELEZNY V.(**), KHLIYEVA O.(**), SHESTOPALOV K.(*,**), IERIN V.(**)
(*) Ningbo Institute of Technology, Zhejiang University, China, (**) Odessa National Academy of Food Technologies, Ukraine

HEAT PUMPS AS PART OF THE ENERGY RECOVERY SYSTEM
E2-We-3 Room 416+417

Chairs: KAYUKAWA Y. *(National Institute of Advanced Industrial Science and Technology, AIST, Japan)*
ARNAS A. *(Waseda University, Japan)*

13:30 KEYNOTE THE ROLE OF HEAT PUMPS IN THE SMART ENERGY SYSTEMS 1976
LUNDQVIST P.
KTH, Department Energy Technology, Division Applied Thermodynamics and Refrigeration, Sweden

14:10 373 CFD SIMULATION AND EXPERIMENTAL INVESTIGATION PROCESS OF HEAT PUMP SYSTEM USING THERMOBANK AND EJECTOR FOR HEATING ROOM AND COLD STORAGE 1981
LE C. N.(*), CHOI G.-I.(**), OH J.(**)
(*) Graduate school, Chonnam National University, South Korea, (**) Department of Refrigeration and Air Conditioning Engineering, Chonnam National University, South Korea

14:30 689 FACADE-INTEGRATED MVHR WITH SPEED-CONTROLLED MICRO-HEAT PUMP 1989
OCHS F.(*), SIEGELE D.(*), DERMENTZIS G.(*), FEIST W.(**)
(*) University of Innsbruck, Austria, (**) PHI, Germany

14:50 754 DEVELOPMENT AND CASE STUDY ON TOTAL OPTIMAL CONTROL SYSTEM FOR HEAT SOURCES 1997
YAMADA K., MURASAWA I.
TONETS Corporation, Japan

FREEZING AND CHILLING OF BOTANICAL PRODUCTS
C2-We-3 Room 418
Chairs: ALVAREZ G. *(IRSTEA Refrigeration Research Unit, France)*
TOLSTOREBROV I. *(Norwegian University of Science and Technology, Norway)*

13:30 153 THE IMPACT OF SLOW STEAMING ON REFRIGERATED EXPORTS FROM NEW ZEALAND 2003
CARSON J. K.(*), KEMP R. M.(**), EAST A. R.(***), CLELAND D. J.(***)
(*) University of Waikato, New Zealand, (**) AgResearch Ltd., New Zealand, (***) Massey University, New Zealand

13:50 234 EFFECT OF DIFFERENT PACKAGING METHODS AND COLD STORAGE ON QUALITY AND SHELF LIFE OF RED SWEET PEPPER 2011
LIU S., WANG D., JIA L., ZHANG Z., JIN J.
Beijing Vegetable Research Center, Beijing Academy of Agriculture and Forestry Sciences, National Engineering Research Center for Vegetables, China

14:10 525 MINIMISING PRODUCT MOISTURE LOSS IN PROFESSIONAL SERVICE CABINETS 2016
MARQUES C.(*,**), HAMMOND E.(*), WOOD I.(**)
(*) Department of Engineering, London South Bank University, United Kingdom, (**) Adande Refrigeration, United Kingdom

14:30 505 MODELLING OF HEAT AND MASS TRANSFER PROCESSES IN REFRIGERATOR CRISPER FOR PREDICTING QUALITY AND SHELF LIFE OF VEGETABLES 2024
KOCATÜRK S.(*), MET A.(*), USLU I.(*), KUDDUSİ L.(**)
(*) Arçelik A.Ş. R&D Center, Turkey, (**) ITU – Istanbul Technical University Faculty of Mechanical Engineering, Turkey

14:50 841 PREDICTION OF DRYING RATE DURING FROZEN STORAGE OF COOKED RICE UTILIZING NOVEL METHOD OF MEASURING ADSORPTION ISOTHERM 2032
YAMADA R., FUKAZAWA T., WATANABE M., SUZUKI T.
Department of Food Science and Technology, Graduate School of Tokyo University of Marine Science and Technology, Japan

WORKSHOP: LOW GWP REFRIGERANTS: JOINT INTERNATIONAL RESEARCH OPPORTUNITIES
WS4-We-3/WS4-We-4 Room 301
Chair: AKASAKA R. *(Kyushu Sangyo University, Japan)*

WORKSHOP: IEA HPP ANNEX 41 – COLD CLIMATE HEAT PUMPS
WS5-We-3/WS5-We-4 Room 304
Chair: BAXTER V. *(Oak Ridge National Laboratory, United States)*

ADSORPTION(3)

B1-We-4 Room 303

Chairs: HAMAMOTO Y. *(Kyushu University, Japan)*
SEILER J. *(Institute of Technical Thermodynamics, RWTH Aachen University, Germany)*

15:30 430 EFFECT OF ACOUSTIC WAVE ON ENHANCEMENT OF MOISTURE ADSORPTION RATE OF SILICA-GEL 2038
OKUBO K., MATSUDA S., UEDA Y., ENOKI K., AKISAWA A.
Tokyo University of Agriculture and Techology, Japan

15:50 374 THEORETICAL INVESTIGATION OF A NOVEL UNITARY SOLID DESICCANT AIR CONDITIONER 2046
TU Y., GE T., WANG R., JIANG Y.
Institute of Refrigeration and Cryogenics, Shanghai Jiaotong University, China

16:10 364 PERFORMANCE PREDICATION OF DESICCANT COATED HEAT EXCHANGERS USING DIFFERENT COMPOSITE DESICCANT MATERIALS 2054
ZHENG X., WANG R. Z., HU. L. M., GE T. S.
Institute of Refrigeration and Cryogenics, Key Laboratory for Power Machinery and Engineering of M.O.E., Shanghai Jiao Tong University, China

16:30 934 DESIGN AND MODELLING OF A STUDY PLATFORM FOR SOLID DESICCANT- VAPOUR KINETICS 2063
CHOI S., HONG K., LEE D.-Y.
Center for Urban Energy, Green City Institute, Korea Institute of Science and Technology, South Korea

16:50 154 COUPLED HEAT AND MASS TRANSFER CHARACTERISTIC OF COMPRESSED AIR DEHUMIDIFICATION USING PRESSURIZED LIQUID DESICCANT 2070
YIN Y., ZHENG B., ZHANG X.
School of Energy and Environment, Southeast University, China

CFD SIMULATION

S1-We-4 Room 313+314

Chairs: YANG A. *(National Taipei University of Technology, Taiwan)*
SAKAI K. *(Meiji University, Japan)*

15:30 63 CFD SIMULATIONS AND MEASUREMENTS OF CARBON DIOXIDE TRANSPORT IN A PASSIVE HOUSE 2077
SZCZEPANIK N., SCHNOTALE J.
Cracow University of Technology, Poland

15:50 233 3D CFD ANALYSIS OF EXHAUST FAN SYSTEM IN PAPER MILL FOR ENERGY SAVING 2085
LEE K.-P.(*), WU B.-H.(**), YANG A.-S.(**), HSU T.-S.(**), LEE C.-L.(**)
(*) National Taipei University of Technology, Taiwan, (**) National Taipei University of Technology, Taiwan

16:10 213 STUDY ON COMPARISON AND EXAMINATION OF DIFFERENT HVAC SYSTEMS IN THE KITCHEN OF CENTERS PROVIDING SCHOOL LUNCH 2092
YAMADA T.(*), YOSHINO H.(*), OGITA S.(*), FUJITA M.(**)
(*) TONETS Corporation, Japan, (**) Chubu Electric Power Company, Japan

16:30 250 COMPARISON BETWEEN CONVENTIONAL AND LOCAL COMPUTER ROOM AIR-CONDITIONING SYSTEMS IN DATA CENTER BY CFD 2099
TAKEUCHI J.(*), KURABUCHI T.(**), YOSHINO H.(***), LEE S.(**), INOUE Y.(****)
(*) TONETS Corporation, Japan, Graduate School of Tokyo University of Science, Japan, (**) Tokyo University of Science, Japan, (***) TONETS Corporation, Japan, Tokyo City University, Japan, (****) Graduate School of Tokyo University of Science, Japan

EVAPORATOR / HX
E1-We-4 Room 411+412

Chairs: ABDELAZIZ O. *(Oak Ridge National Laboratory, United States)*
NAKAYAMA H. *(Chubu Electric Power Co., Inc., Japan)*

15:30 227 A GENERAL STEADY STATE MATHEMATICAL MODEL FOR MULTI-UNIT AIR CONDITIONER SYSTEM BASED ON GRAPH THEORY 2107
SUN H.(*), REN T.(*), DING G.(*), GAO Y.(**), SONG J.(**)
(*) Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China, (**) International Copper Association Shanghai Office, China

15:50 247 TOWARDS "NUMERICAL EXPERIMENTATION": THE DEVELOPMENT OF A FULL SCALE CFD MODEL OF A ROOF-TOP AIR CONDITIONING EVAPORATOR TO PREDICT THE TWO PHASE CONJUGATE HEAT AND MASS TRANSFER 2115
FAYSSAL I., MOUKALLED F.
American University of Beirut, Riad El-Solh, Lebanon

16:10 397 EXPERIMENTAL PERFORMANCE ASSESSMENT OF DC-INVERTER OPERATED SPLIT PACKAGED AIR CONDITIONER USING HC-290
MALI K.(*), PADALKAR A.(**), RANJAN R.(***) **2124**
(*) MAEER's MIT College of Engineering, India, (**) Flora Institute of Technology, India, (***) Sinhgad College of Engineering, India

16:30 886 EXPERIMENTAL INVESTIGATION OF DOUBLE ROWS LIQUID-VAPOR SEPARATION MICROCHANNEL CONDENSER 2130
ZHONG T. M., CHEN Y, YANG Q. C., ZHENG W. X., LUO X. L., MO S. P., JIA L. S.
Faculty of Material and Energy, Guangdong University of Technology, China

16:50 194 EXPERIMENTAL INVESTIGATION OF TWO-PHASE EJECTOR LIQUID RECIRCULATION CYCLES WITH R410A 2138
LAWRENCE N., ELBEL S.
Air Conditioning and Refrigeration Center, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, United States

CONDENSOR(2) / HEAT EXCHENGER
B2-We-4a Room 413
Chairs: ASANO H. *(Kobe University, Japan)*
HWANG Y. *(University of Maryland, United States)*

15:30 930 EFFECT OF GEOMETRY ON THE PERFORMANCE OF CO_2 GAS COOLER/CONDENSER AND ITS ASSOCIATED REFRIGERATION SYSTEM 2146
GE Y., TASSOU S., TSAMOS K., SANTOSA I. D.
RCUK National Centre for Sustainable Energy Use in Food Chains (CSEF), Institute of Energy Futures, College of Engineering, Design and Physical Sciences, Brunel University London, United Kingdom

15:50 880 DEVELOPMENT OF A MICRO-CHANNEL CONDENSER MODEL USING R1234YFAS WORKING FLUIDAND COMPAREDWITH R134A 2154
ZHAO L.(*), LIU W.(*), YANG Z.(*,**)
(*) Tongji University, China, (**) Shanghai Key Laboratory of Vehicle Aerodynamics and Vehicle Thermal Management System, Tongji University, China

16:10 346 MULTI-SCALE ANALYSIS AND OPTIMIZATION OF TUBE SHAPES FOR AIR-TO-REFRIGERANT HEAT EXCHANGERS 2162
BACELLAR D., AUTE V., RADERMACHER R.
University of Maryland, United States

16:30 348 CFD-BASED CORRELATION DEVELOPMENT FOR AIR SIDE PERFORMANCE OF SMALL DIAMETER TUBE-FIN HEAT EXCHANGERS WITH WAVY FINS 2170
BACELLAR D., AUTE V., RADERMACHER R.
University of Maryland, United States

16:50 502 DIMPLE PLATE HEAT EXCHANGERS FOR A SEA-WATER CHILLER USING CO_2 AS REFRIGERANT, DESIGN AND TESTING 2178
REKSTAD I. H.(*), EIKEVIK T. M.(*), JENSSEN S.(**)
(*) Department of Energy and Process Engineering, Norwegian University of Science and Technology (NTNU), Norway, (**) CADIO AS, Norway

EJECTOR(2)
B2-We-4b Room 414+415
Chairs: TBD
POLONARA F. *(Universita Politecnica delle Marche, Italy)*

15:30 321 DESIGN-THEORETICAL STUDY OF HYBRID CO_2 TRANSCRITICAL MECHANICAL COMPRESSION-EJECTOR COOLING CYCLE 2186
CHEN G.(*), IERIN V.(**), SHESTOPALOV K.(*,**), VOLOVYK O.(**)
(*) Ningbo Institute of Technology, Zhejiang University, China, (**) Ejector Refrigeration Technologies Center, Odessa National Academy of Food Technologies, Ukraine

15:50 410 CFD-BASED SHAPE OPTIMISATION OF TWO-PHASE EJECTOR FOR R744 2194
PALACZ M.(*), SMOLKA J.(*), FIC A.(*), BULINSKI Z.(*), NOWAK A. J.(*), BANASIAK K.(**), HAFNER A.(**)
(*) Institute of Thermal Technology, Silesian University of Technology, Poland, (**) SINTEF Energy, Norway

16:10 569 EXPERIMENTAL INVESTIGATION OF AN EJECTOR-COMPRESSION CASCADE SYSTEM ACTIVATED WITH LOW-GRADE WASTE HEAT 2202
NESREDDINE H.(*), BENDAOUD A.(*), AIDOUN Z.(**), OUZZANE M.(**), LE LOSTEC B.(*)
(*) Hydro-Québec, Canada, (**) CanmetENERGY, Natural Resources Canada, Canada

16:30 929 BINARY LIQUID-RING EJECTOR REFRIGERATION SYSTEM 2210
TANG J.(*,**), ZHANG Z.(*,***), LI L.(*,**), ZHOU Y.(*), WANG J.(*), LIU J.(*), ZHU W.(*)
(*) Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China, (***) Tianjin University of Commerce, China

16:50 98 EXPERIMENTAL STUDY OF AN EJECTOR-EXPANSION VAPOR COMPRESSION REFRIGERATION CYCLE APPLIED IN DOMESTIC REFRIGERATOR-FREEZERS 2218
WANG X.(*), YU J.(*), GANG Y.(*), BAI L.(**), WEI B.(**), CHEN K.(**), SHANG D.(**)
(*) Department of Refrigeration & Cryogenic Engineering, School of Energy and Power Engineering, Xi'an Jiaotong University, China, (**) Hefei Meiling Co., Ltd., China

RESIDENTIAL AND COMMERCIAL HEAT-PUMP SYSTEMS(1)
E2-We-4 Room 416+417

Chairs: JEONG J. *(Waseda University, Japan)*
UDAGAWA Y. *(NTT FACILITIES, INC., Japan)*

15:30 20 EXPERIMENTAL VALIDATION OF ON-FIELD MEASUREMENT METHOD FOR A HEAT PUMP SYSTEM WITH INTERNAL HEAT EXCHANGER 2225
GOOSSENS M.(*,**), RIVIERE P.(*), TEUILLIERES C.(**), MARCHIO D.(*), TRAN C.-T.(*)
(*) Ecole des Mines-ParisTech, Centre for Energy Efficiency Systems (CES), France, (**) EDF R&D, Energy in Buildings and Territories Department (ENERBAT), France

15:50 61 EXPERIMENTAL INVESTIGATION ON TRANSCRITICAL CO_2 HEAT PUMP SYSTEM WITH EJECTOR IN OFF-DESIGN CONDITIONS 2234
WEI J., CHEN Q., TANG L., CHEN G., QI H., LI T.
Institute of Refrigeration and Cryogenics, Zhejiang University, China

16:10 96 INTEGRATION OF HEAT PUMP AND HEAT RECOVERY OF CENTRAL AC SYSTEM FOR ENERGY USE REDUCTION OF HOTEL INDUSTRY 2242
SUAMIR I. N.(*), ARDITA I. N.(*), DEWI N. I. K.(**)
(*) Mechanical Engineering Department, Bali State Polytechnic, Indonesia, (**) Department of Business Administration, Bali State Polytechnic, Indonesia

16:30 104 THE REFRIGERANT TWO-PHASE FLOW VOID FRACTION IN THE VICINITY OF A SHARP RETURN BEND 2250
DE KERPEL K., DE SCHAMPHELEIRE S., KAYA A., BILLIET M., DE PAEPE M.
Ghent University - UGent, Belgium

16:50 95 TAGUCHI AND UTILITY CONCEPT OPTIMIZATION OF PARABOLIC SOLAR COLLECTOR ASSISTED GROUND COUPLED HEAT PUMP SYSTEM FOR SPACE HEATING APPLICATIONS 2258
VERMA V., MURUGESAN K.
Department of Mechanical and Industrial Engineering, Indian Institute of Technology Roorkee, India

WORKSHOP: LOW GWP REFRIGERANTS: JOINT INTERNATIONAL RESEARCH OPPORTUNITIES
WS4-We-3/WS4-We-4 Room 301
Chair: AKASAKA R. *(Kyushu Sangyo University, Japan)*

WORKSHOP: IEA HPP ANNEX 41 – COLD CLIMATE HEAT PUMPS
WS5-We-3/WS5-We-4 Room 304
Chair: BAXTER V. *(Oak Ridge National Laboratory, United States)*

Thursday, August 20 8:30-10:10

TRANSPORT PROPERTIES
B1-Th-1a Room 301
Chairs: YANG Z. *(Tianjin Univerity, China)*
MATSUMOTO T. *(Idemitsu Kosan Co.,Ltd., Japan)*

8:30 684 VISCOSITY MEASUREMENT OF LOW GWP REFRIGERANTS WITH A TANDEM CAPILLARY TUBES METHOD 2266
KARIYA K., MORI S., MIYARA A.
Department of Mechanical Engineering, Saga University, Japan

8:50 476 VISCOSITY MEASUREMENTS OF R 32, R 134A AND R 1234ZE(Z) 2273
MATSUGUCHI A., KAGAWA N.
Department of Mechanical Systems Engineering, National Defense Academy, Japan

9:10 428 ACCURATE DETERMINATION OF VISCOSITY AND SURFACE TENSION OF BINARY MIXTURES OF R1234YF AND R32 UNDER SATURATED CONDITIONS BY SURFACE LIGHT SCATTERING 2279
BI S., CHUI J., MA L., WU J.
Key Laboratory of Thermo-Fluid Science and Engineering, Ministry of Education, School of Energy and Power Engineering, Xi'an Jiaotong University, China

9:30 785 CORRELATE VISCOSITY AND SOLUBILITY OF LUBRICANT-REFRIGERANT MIXTURE BY USING PSEUDO-IDEAL-SOLUTION MODEL 2285
HUNG J.-T., TSAIH J.-S., TANG H.-H.
Patech Fine Chemicals Co., Ltd., Taiwan

9:50 683 THERMAL CONDUCTIVITY MEASUREMENT OF LOW GWP REFRIGERANTS WITH HOT-WIRE METHOD 2293
ISHIDA H.(*), MORI S.(*), KARIYA K.(**), MIYARA A.(**)
(*) Graduate School of Science and Engineering, Saga University, Japan, (**) Department of Mechanical Engineering, Saga University, Japan

ABSORPTION(1)
B1-Th-1b Room 303
Chairs: SAHA B. B. *(Kyushu University, Japan)*
YAMAGUCHI S. *(Waseda University, Japan)*

8:30 25 HEAT TRANSFER CHARACTERISTIC IN A VERTICAL RISER TUBE AT SUB-ATMOSPHERIC PRESSURE 2300
TRINH D. Q., ALBERS J., ZIEGLER F.
Technical University of Berlin, Institute of Energy Engineering, Germany

8:50 325 PREDICTION AND EXPERIMENTAL INVESTIGATION OF HEAT AND MASS TRANSFER CHARACTERISTICS OF A HORIZONTAL TUBE BUNDLE ABSORBER 2308
OLBRICHT M., LUKE A.
University of Kassel, Institute of Technical Thermodynamics, Germany

9:10 804 EFFECT OF CONCENTRATION ON FALLING FILM ABSORPTION HEAT AND MASS TRANSFER OF LIBR SOLUTION ON HORIZONTAL ENHANCED HEAT TRANSFER TUBE 2316
TAKAHASHI H., IWAMOTO H.
Kobelco & Materials Copper Tube, LTD., Japan

9:30 745 STUDY ON CO_2 BUBBLE ABSORPTION AND VISUALIZATION IN NANOFLUIDS 2325
LEE J. W., LEE J. H., KANG Y. T.
Korea University, South Korea

9:50 315 EFFECTS OF CNT ON IMPROVEMENT OF HEAT AND MASS TRANSFER CHARACTERISTICS OF LIBR AQUEOUS SOLUTION CONTAINING ALCOHOL ADDITIVES 2330
SUN H.(*), DANG C.(**), LI K.(*), MA G.(*)
(*) Department of Refrigeration and Cryogenics, College of Environmental and Energy Engineering, Beijing University of Technology, China, (**) Department of Human and Engineered Environmnental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan

BUILDING SIMULATIONS
S1-Th-1 Room 313+314
Chairs: RIGOLA J. *(Universitat Politècnica de Catalunya-BarcelonaTech, Spain)*
AKIMOTO T. *(Shibaura Institute of Technology, Japan)*

8:30 254 MEMBRANE ENERGY EXCHANGERS, EVALUATION OF A FROST-FREE DESIGN AND ITS PERFORMANCE FOR VENTILATION IN COLD CLIMATES 2337
LIU P.(*), ALONSO M. J.(**), MATHISEN H. M.(*)
(*) Department of Energy and Process Engineering, NTNU, Norway, (**) SINTEF Building and Infrastructure, Norway

8:50 676 COMPARISON OF HEAT EXCHANGE RATES BETWEEN STRAIGHT AND SLINKY HORIZONTAL GROUND HEAT EXCHANGER 2345
SELAMAT S.(*,***), MIYARA A.(**), KARIYA K.(**)
(*) Graduate School of Science and Engineering, Saga University, Japan, (**) Department of Mechanical Engineering, Saga University, Japan, (***) School of Environmental Engineering, University Malaysia Perlis, Malaysia

9:10 928 DEVELOPMENT AND APPLICATION OF GROUND HEAT EXCHANGER MODEL USING RESPONSE FACTOR METHOD 2353
ONO E., ARAI Y., SHIOYA M., MIURA K.
Kajima Technical Research Institute, Japan

9:30 862 ENERGY SIMULATION OF A SINGLE FAMILY DWELLING WITH A MODULAR OBJECT-ORIENTED TOOL 2361
CAPDEVILA R.(*), CHIVA J.(*), LÓPEZ J.(*), RIGOLA J.(*), LEHMKUHL O.(*,**)
(*) Universitat Politècnica de Catalunya-BarcelonaTech, Spain, (**) Termofluids S.L., Spain

9:50 13 DESIGN STUDIES ON BUILDING-INTEGRATED WIND ENERGY USING CFD SIMULATIONS 2369
YANG A.-S., WANG W.-S., WANG P.-C., WANG R.-J.
Department of Energy and Refrigerating Air-Conditioning Engineering, National Taipei University of Technology, Taiwan

REFRIGERANT
E1-Th-1 Room 411+412

Chairs: TAIRA S. *(Daikin Industries, Ltd., Japan)*
CHEN Y. *(Guangdong University of Technology, China)*

8:30 73 PERFORMANCE COMPARISON OF OPTIMIZED R410A REPLACEMENTS 2377
KUJAK S., SCHULTZ K.
Ingersoll Rand, United States

8:50 75 ASSESSMENT OF NEXT GENERATION REFRIGERANT R513A TO REPLACE R134A FOR CHILLER PRODUCTS 2385
SCHULTZ K., KUJAK S., MAJURIN J.
Ingersoll Rand, United States

9:10 400 PERFORMANCE ASSESSMENT OF AIR CONDITIONER USING HFC-161 2393
PADALKAR A.(*), MALI K.(**), KADAM A.(*), DEVOTTA S.(***)
(*) Flora Institute of Technology, India, (**) MAEER's MIT College of Engineering, India, (***) Chemical and Environmental Engineering Consultant, India

9:30 668 NOVEL REDUCED GWP REFRIGERANT COMPOSITIONS FOR STATIONARY AIR CONDITIONING 2398
HUGHES J., LECK T.
DuPont Chemicals and Fluoroproducts, United States

EVAPORATOR(1)
B2-Th-1a Room 413

Chairs: KOJIMA M. *(Tokyo University of Marine Science and Technology, Japan)*
KIM Y. *(Korea University, South Korea)*

8:30 27 PLATE HEAT EXCHANGER USED AS EVAPORATORS 2406
ILIE A.(*), DRUGHEAN L.(*), ȘERBAN A.(**), CHIRIAC F.(*), DOBROVICESCU A.(***)
(*) Technical University for Civil Engineering, Romania, (**) Transilvania University of Brasov, Romania, (***) Bucharest Politehnica University, Romania

8:50 36 EXPERIMENTAL INVESTIGATIONS ON PERFORMANCE OF EVAPORATOR AND CONDENSER OF R410A INSIDE A NOVEL BRAZED PLATE HEAT EXCHANGER 2412
WEI W., TUCKER J., XU Y.
Danfoss Heat Exchanger R&D Centre, China

9:10 216 EXPERIMENTAL STUDY ON PARRALLEL FLOW EVAPORATORS USED IN ROOF TOP BUS AIR CONDITIONINGS 2422
LIANG Y., CHEN J.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

9:30 264 FROM LUMPED TO FULL SCALE MODELING APPROACH: ON THE USE OF COMPUTATIONAL FLUID DYNAMICS TO MODEL HEAT AND MASS TRANSFER PROCESSES IN WATER COOLED EVAPORATOR 2429
FAYSSAL I., MOUKALLED F.
American University of Beirut, Riad El-Solh, Lebanon

9:50 459 INVESTIGATION OF R32 SPOT-EVAPORATORS 2437
KNIPPING T.(*), MUELLER T.(*), ARNEMANN M.(**), HESSE U.(***)
(*) Karlsruhe UAS, Institute of Materials and Processes (IMP), Germany, (**) Karlsruhe UAS, Institute of Refrigeration, Air Conditioning and Environmental Engineering (IKKU), Germany, (***) TU Dresden, BITZER Chair of Refrigeration, Cryo- and Compressor Technology, Georg-Schumann-Bau, Germany

EJECTOR(3)
B2-Th-1b Room 414+415

Chairs: TBD
ELBEL S. *(University of Illinois, United States)*

8:30 471 ANALYSIS OF AN EJECTOR VAPOUR COMPRESSION CYCLE FOR HOUSEHOLD REFRIGERATOR 2445
ARTECONI A.(*), CIRIACHI G.(**), ACAR M.(***), BILGIN N.(***), POLONARA F.(**)
(*) Università e-Campus, Italy, (**) Dipartimento di Ingegneria Industriale e Scienze Matematiche, Università Politecnica delle Marche, Italy, (***) Indesit Company, Italy

8:50 297 WASTE HEAT DRIVEN COOLING BY VAPOR JET EJECTOR 2453
ELBEL S.(*,**), WUJEK S.(*), HRNJAK P.(*,**)
(*) Creative Thermal Solutions, Inc., United States, (**) University of Illinois at Urbana-Champaign, Department of Mechanical Science and Engineering, United States

9:10 89 THEORETICAL ANALYSIS ON A NOVEL HYBRID REFRIGERATION CYCLE WITH TWO EJECTORS AND INTERNAL HEAT EXCHANGER FOR DOMESTIC REFRIGERATOR-FREEZERS 2461
BAI T., YAN G., YU J.
Department of refrigeration and Cryogenic engineering, School of Energy and Power Engineering, Xi'an Jiaotong University, China

9:30 909 OPERATION AND EXERGY ANALYSIS OF A SUPERSONIC R134A EJECTOR BY LOW-REYNOLDS NUMBER TURBULENCE MODEL 2469
CROQUER S.(*), PONCET S.(*), AIDOUN Z.(**)
(*) Université de Sherbrooke, Faculté de génie, Département de génie mécanique, Canada, (**) CETC-Varennes, Natural Resources Canada, Canada

9:50 768 NEXT GENERATION R744 REFRIGERATION TECHNOLOGY FOR SUPERMARKETS 2478
HAFNER A.(*), FREDSLUND K.(**), BANASIAK K.(*)
(*) SINTEF Energy Research, Kolbjørn Hejes vei 1D, 7465 Trondheim, Norway, (**) Danfoss A/S, Denmark

RESIDENTIAL AND COMMERCIAL HEAT-PUMP SYSTEMS(2)
E2-Th-1 Room 416+417
Chairs: SAITO K. *(Waseda University, Japan)*
NAKAYAMA H. *(Chubu Electric Power Co., Inc., Japan)*

8:30 KEYNOTE **ABSORPTION HEAT EXCHANGERS FOR LONG DISTANCE HEAT TRANSPORTATION 2486**
JIANG Y., Xie X.
Building Energy Research Center, Tsinghua University, China

9:10 259 **HIGH TEMPERATURE HEAT PUMPS FOR SEASONAL THERMAL ENERGY STORAGE AND DISTRICT HEATING SYSTEMS 2499**
HEWITT N., HUANG M., RAMIREZ M.
Centre for Sustainable Technologies, University of Ulster, United Kingdom

9:30 307 **AN EXPERIMENTAL STUDY ON THE OPERATING PERFORMANCES OF THE COUPLED RADIATION PANELS WITH HOUSEHOLD REPLACEMENT FRESH AIR SYSTEM 2507**
QU M., CHEN J., QIAN Y., PAN J.
School of Environment & Architecture, University of Shanghai for Science & Technology, China

9:50 316 **PERFORMANCE ASSESSMENT AND COMPARISON OF THERMALLY DRIVEN HEAT PUMPS SYSTEMS 2518**
MOUNIER V., MENDOZA L. C., SCHIFFMANN J.
Laboratory of Applied Mechanical Design (LAMD), Ecole Polytechnique Fédérale de Lausanne, EPFL, Switzerland

WORKSHOP: EVALUATING LOW-GWP REFRIGERANTS FOR AIR-CONDITIONING INDUSTRY IN HIGH AMBIENT TEMPERATURE COUNTRIES
WS6-Th-1 Room 304
Chair: ELTALOUNY A. *(UNEP, Bahrain)*

THURSDAY, AUGUST 20 10:30-12:10

BOILING(1)
B1-Th-2a Room 301
Chairs: HE G. *(Huazhong University of Science and Technology, China)*
INOUE N. *(Tokyo University of Marine Science and Technology, Japan)*

10:30 112 **POOL BOILING HEAT TRANSFER OF LOW GWP REFRIGERANTS R1234ze(E), R1234ze(Z) AND R1233zd(E) ON A HORIZONTAL PLANE TUBE 2528**
NAGATA R.(*), NII N.(*), KONDOU C.(**), KOYAMA S.(*,***)
(*) Kyushu University, Interdisciplinary Graduate School of Engineering Science, Japan, (**) Nagasaki University, Graduate School of Engineering, Japan, (***) Kyushu University, International Institute for Carbon-Neutral Energy Research, Japan

10:50 581 **TEST RIG FOR EXPERIMENTAL EVALUATION OF SPRAY EVAPORATION HEAT TRANSFER COEFFICIENTS 2536**
PARDIÑAS Á. Á., FERNÁNDEZ-SEARA J., DIZ R.
Área de Máquinas y Motores Térmicos, Universidade de Vigo, Spain

11:10 583 EXPERIMENTAL STUDY ON HEAT TRANSFER COEFFICIENTS OF SPRAY EVAPORATION AND POOL BOILING ON PLAIN TUBES 2544
PARDIÑAS Á. Á., FERNÁNDEZ-SEARA J., DIZ R.
Área de Máquinas y Motores Térmicos, Universidade de Vigo, Spain

11:30 776 A STUDY OF POOL BOILING HEAT TRANSFER ON HORIZONTAL TUBES IN R-245fa/OIL MIXTURE 2552
CHIEN L.-H., TSAI Y.-L., CHANG C.-H.
Department of Energy and Refrigerating Air-conditioning Engr., National Taipei University of Technology, Taiwan

ABSORPTION(2)
B1-Th-2b Room 303

Chairs: KANG Y. *(Korea University, South Korea)*
TAKAHASHI H. *(Kobelco & Materials Copper Tube, Ltd., Japan)*

10:30 49 COMPARISON OF A NEW DESIGNED RESORPTION REFRIGERATION SYSTEM WITH CONVENTIONAL ABSORPTION SYSTEMS 2560
GRUND M.(*), HESSE U.(*), WEIMER T.(**), RÜHLING K.(*)
(*) Technische Universität Dresden, Germany, (**) Engineering Services Dr.-Ing. Thomas Weimer, Germany

10:50 466 LOCAL ENTROPY GENERATION ANALYSIS OF WATER VAPOUR ABSORPTION IN A LiBr-H_2O SOLUTION FILM, OVER A HORIZONTAL COOLED TUBE 2568
GIANNETTI N.(*), ROCCHETTI A.(**), SAITO K.(*), YAMAGUCHI S.(*)
(*) Department of Applied Mechanics and Aerospace Engineering, Waseda University, Japan, (**) DIEF - Department of Industrial Engineering of Florence, Italy

11:10 578 ASSESSMENT OF VAPOR-LIQUID EQUILIBRIUM MODELS FOR IONIC LIQUIDS BASED ABSORPTION SYSTEMS 2576
WANG M., INFANTE FERREIRA C. A.
Delft University of Technology, Process and Energy Department, Netherlands

11:30 611 HYBRID COMPRESSION HEAT PUMPING CYCLES BASED PLANTS 2584
STAICOVICI M.-D. N.
S.C. Varia Energia S.R.L. & S.C. Incorporate Power-Absorption Engineering S.R.L., Romania

HVAC SYSTEM
S1-Th-2 Room 313+314

Chairs: HAMMAD M. A. *(University of Jordan, Jordan)*
NAGAI T. *(Tokyo University of Science, Japan)*

10:30 114 REDUCTION METHOD OF AIR CONDITIONING LOAD OF PLANT FACTORY BASED ON LIGHTING EXPERIMENT AND PLANT MODEL ANALYSIS 2592
MORIUCHI K.(*), UEDA Y.(*), YOSHIDA A.(**), KINOSHITA S.(**)
(*) Seiken Co., Ltd., Japan, (**) Osaka Prefecture University, Japan

10:50 732 HIGH-TEMPERATURE COOLING & LOW-TEMPERATURE HEATING AC SYSTEM EVALUATION OF ENERGY SAVING IN AN OFFICE IN TOKYO 2600
URANO K.(*), SUMITA A.(**)
(*) Engineering Division, KIMURA KOKI CO., LTD., Japan, (**) Spreme Adviser, KIMURA KOKI CO., LTD., Japan

11:10 699 THE EVALUATION OF RADIANT CONDITIONERS 2608
YAMAMOTO T.(*), NEMOTO K.(*), SHIMIZU K.(**), ONODA H.(*), NAGATA K.(*)
(*) Waseda University, Japan, (**) Environmental Reserch Institute, Japan

VRF
E1-Th-2 Room 411+412

Chairs: TBD
KANEKO A. *(SANDEN ADVANCED TECHNOLOGY CORPORATION, Japan)*

10:30 51 EVALUATION OF VRF SYSTEM WITH MULTI INDOOR UNITS BY EXPERIMENTAL STUDY AND SIMULATION ANALYSIS 2615
MATSUMOTO K.(*), OHNO K.(**), SAITO K.(**)
(*) Kansai Electric Power Co., Inc., Japan, (**)School of Fundamental Science and Engineering, Waseda University, Japan

10:50 298 SIMULATION AND APPLICATION STUDY OF VRV SYSTEM IN OFFICE BUILDING 2623
ZHAO D.(*), ZHONG M.(*,**), ZHANG X.(*)
(*) Institute of HVAC&Gas Engineering, Tongji University, Shanghai, 201804, China, (**) Daikin (China) Investment Co., Ltd, China

11:10 224 CAPACITY ALLOCATION STRATEGY FOR MULTI-MODULE OUTDOOR UNITS IN VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEM 2629
LI Z., SHI W., WANG B., LI X.
Department of Building Science, Tsinghua University, China

11:30 350 SIMULATION AND EXPERIMENTAL VALIDATION OF THE VARIABLE REFRIGERANT FLOW SYSTEM UNDER THE COOLING CONDITIONS 2640
HE C., JIN X., DU Z., ZHU Y., YOU T.
School of Mechanical Engineering, Shanghai Jiao Tong University, China

EVAPORATOR(2)
B2-Th-2a Room 413

Chairs: JIGE D. *(Tokyo University of Marine Science and Technology, Japan)*
TBD

10:30 542 ESTABLISHMENT OF AN EXPERIMENTAL DESIGN IN THE CONTEXT OF WATER VAPORIZATION OCCURING ON A PLATE CROSS SECTION 2648
GIRAUD F.(*,**), TOUBLANC C.(*), RULLIERE R.(**), BONJOUR J.(**), CLAUSSE M.(**)
(*) Laboratoire de Chimie moléculaire, génie des procédés chimiques et énergétiques (CMGPCE – EA 21), CNAM, ICENER, case 2D3P20, France, (**) Université de Lyon, CNRS, INSA-Lyon, CETHIL, UMR5008, France

10:50 548 PRELIMINARY EXPERIMENTAL INVESTIGATION ON WATER BOILING PHENOMENA IN A LIQUID LAYER AT SUBATMOSPHERIC PRESSURE 2656
GIRAUD F.(*,**), RULLIÈRE R.(*), TOUBLANC C.(**), CLAUSSE M.(*), BONJOUR J.(*)
(*) Université de Lyon, CNRS, INSA-Lyon, CETHIL, UMR5008, France, France, (**) Laboratoire de Chimie moléculaire, génie des procédés chimiques et énergétiques (CMGPCE – EA 21), CNAM, ICENER, case 2D3P20, France

11:10 550 EFFECT OF LIQUID/VAPOUR MALDISTRIBUTION ON THE PERFORMANCE OF PLATE HEAT EXCHANGER EVAPORATORS 2664
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(*) Department of Mechanical Engineering, Technical University of Denmark, Denmark, (**) Danish Technological Institute, Denmark

11:30 591 DESIGN SENSITIVITY ANALYSIS OF A DIRECT EVAPORATOR FOR LOW-TEMPERATURE WASTE HEAT RECOVERY ORCS USING VARIOUS FLOW BOILING HEAT TRANSFER CORRELATIONS 2672
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Ghent University, Department of Heat, Combustion and Fluid Dynamics, Belgium

11:50 830 A COMPARATIVE STUDY ON ROOM AIR CONDITIONER PERFORMANCE OF FINNED-TUBE EVAPORATOR AND THE MIRCO-CHANNEL EVAPORATOR UNDER OPTIMAL THROTTLING CONDITION 2679
ZHANG W., ZHANG Z., HUANG H., YAO Y.
Engineering Laboratory of Energy System Conversion and Emission Reduction of Jiangsu Province, School of Energy and Mechanical Engineering, Nanjing Normal University, China

EJECTOR(4) / DESICCANT
B2-Th-2b Room 414+415

Chairs: ENDO N. *(National Institute of Advanced Industrial Science and Technology, AIST, Japan)*
CHEN G. *(Ningbo Institute of Technology, Zhejiang University, China)*

10:30 609 AN EXPERIMENTAL STUDY OF EJECTORS SUPPORTED BY CFD 2687
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CanmetENERGY-Varennes, Natural Resources Canada, Canada

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FENG S.(*), WANG Z.(**), DANG C.(**), HIHARA E.(**)
(*) Nanjing University of Aeronautics and Astronautics, China, (**) The University of Tokyo, Japan

11:10 860 INVESTIGATION OF A LIQUID DESICCANT SYSTEM FOR AIR DEHUMIDIFICATION WORKING WITH AN IONIC LIQUID IN A TWO-STAGE REFRIGERATION SYSTEM FOR COLD STORES 2703
ZEGENHAGEN M. T., KÜHN R., MEYER T., RICART C., ZIEGLER F.
Technische Universität Berlin, Germany

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Chairs: TOJO K. *(TOJO R&D Design Office / Waseda University, Japan)*
TBD

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DHARKAR S., KURTULUS O., GROLL E., YAZAWA K.
School of Mechanical Engineering, Purdue University, 3071 Herrick Laboratories, Purdue University, United States

10:50 393 DEVELOPMENT OF A COLD CLIMATE HEAT PUMP USING TWO-STAGE COMPRESSION 2719
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Building Technologies Research and Integration Center, Oak Ridge National Lab, United States

11:10 561 CASCADE CYCLE HIGH-TEMPERATURE HEAT PUMP: MODELLING AND VALIDATION 2727
DUMONT E., LEPORE R., BOIVIN T., FRERE M.
Research Institute for Energy – University of Mons, Belgium

11:30 567 PERFORMANCE EVALUATION OF A GROUND SOURCE VARIABLE REFRIGERANT FLOW (VRF) SYSTEM FOR A UNIVERSITY BUILDING IN COLD CLIMATE 2735
IM P., LIU X.
Oak Ridge National Laboratory, United States

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FISCHER D.(*,**), WIRTZ T.(*), ZERBE K. D.(*), WILLE-HAUSSMANN B.(*), MADANI H.(**)
(*) Fraunhofer ISE, Germany, (**) KTH Royal Institute of Technology, Sweden

WORKSHOP: CURRENT GLOBAL STATUS OF TRANSITION TO LOWER GWP ALTERNATIVES BY LAWS AND REGULATIONS
WS7-Th-2 Room 304
Chair: SATO K. *(JRAIA, Japan)*

WORKSHOP: DATABASE AND SIMULATION TOOLS FOR REFRIGERATION ON COLD CHAIN: FRISBEE DATABASE AND TOOLS
WS8-Th-2 Room 418
Chair: ALVAREZ G. *(IRSTEA, France)*

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POSTER SESSION
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University of Shanghai for Science and Technology, Institute of Refrigeration and Cryogenic Technology, China

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(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China

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(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Science, China

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Department of Mechanical and Energy Engineering, National Chiayi University, Taiwan

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Technical University for Civil Engineering, Romania

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(*) Osaka City University, Japan, (**) Miyagawa Kasei Industry Co., Ltd., Japan

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(*) Tokyo Institute of Technology, Japan, (**) Chubu Electric Power Co., Inc., Japan, (***) Sanden Corporation, Japan

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(*) School of Power and Power Engineering, University of Shanghai for Science and Technology, China, (**) Jiexiu Zhiye Zhongxue, China

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(*) Fukuoka University, Japan, (**) Graduate School of Engineering, Fukuoka University, Japan

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Department of Mechanical Engineering, Seoul National University, South Korea

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(*) Department of Chemical Engineering, Universidad de Antofagasta, Chile, (**) CREVER-Group of Applied Thermal Engineering, Universitat Rovira i Virgili, Spain

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(*) Moscow State University of Food Production, Russia, (**) FGBNU Russian Scientific Research Institute for Refrigeration Industry (VNIKHI), Russia, (***) OAO "Rosmyasomoltorg", Russia

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(*) School of Science and Engineering, Tokyo Denki University, Japan, (**) School of Materials Science, Japan Advanced Institute of Science and Technology, Japan

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(*) Department of Mechanical Engineering, Kyushu University, Japan, (**) Graduate School of Engineering, Kyushu University, Japan

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(*) Group of Food Biotechnology, Food Technology, Nutrition and Bromatology Department, Faculty of Veterinary, University of Murcia, Spain, (**) Debiotec (Desarrollos Bio-Tecno Alimentarios), Spain, (***) Laboratoire de Biologie des Plantes et des Microorganismes, Faculté des Sciences, Université Mohamed Premier, Morocco

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(*) Desarrollos Bio-Tecno-Alimentarios Ltd., Spain, (**) Group of Food Biotechnology, Food Technology, Nutrition and Bromatology Department, Faculty of Veterinary, University of Murcia, Campus Espinardo, Spain

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(*) Irstea, UR GPAN, France, (**) SPES scpa, Italy

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(*) Institute of Fluid-Flow Machinery of Polish Academy of Sciences, Poland, (**) Bialystok University of Technology, Poland, (***) REMSTAT, Poland

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(*) Oak Ridge National Laboratory, United States, (**) Emerson Climate Technologies, United States

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(*) Xi'an Jiaotong University, China, (**) State Key Laboratory of Technologies in Space Cryogenic Propellants, China

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University of Belgrade, Faculty of Mechanical Engineering, CIAH Laboratory, Serbia

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Department of Energy Conversion and Storage, Technical University of Denmark, Denmark

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Beijing University of Technology, China

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(*) School of Materials & Metallurgy, Northeastern University, China, (**) Xinjiang Solar Technology Development Company, China, (***) The 70 Middle School in Urumqi, China

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(*) Meiji University, Japan, (**) Central Research Institute of Electric Power Industry, Japan

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Institute of Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan

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LETEF, Universidade do Vale do Rio dos Sinos, Brazil

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SAKAI M.(*), TSUJI K.(*), HIDAKA K.(**), KOGA J.(***)
(*) Mitsubishi Heavy Industries, LTD, Chiller & Heat Pump Engineering Department Air-Conditioning & Refrigeration Division Machinery, Equipment & Infrastructure, Japan, (**) Mitsubishi Hitachi Power Systems, LTD, Power Systems Service Headquarters, Japan, (***) Mitsubishi Heavy Industries, LTD, Takasago Research & Development Center Technology & Innovation Headquarters, Japan

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College of Energy and Power Engineering, University of Shanghai for Science and Technology, China

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Green Energy and Environment Research Laboratories, Industrial Technology, Taiwan

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KUAN Y.-D.(*), LIN H.-C.(*), CHANG J.-Y.(**), CIOU Y.-W.(*)
(*) Department of Refrigeration, Air-Conditioning and Energy Engineering, National Chin-Yi University of Technology, Taiwan, (**) Department of Marine Engineering, Taipei College of Maritime Technology, Taiwan

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(*) University Politehnica of Bucharest, Faculty of Mechanical Engineering and Mechatronics, Department of Thermodynamics, Romania, (**) Transylvania University of Brasov, Romania

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285 USING PSO-SMITH CASCADE CONTROL ALGORITHM FOR WATER SOURCE HEAT PUMP SYSTEMS 3141
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Department of Refrigeration, Air-Conditioning and Energy, National Chin-Yi University of Technology, Taiwan

309 COMPARATIVE ANALYSIS OF R134a, R744 AND R22 USED IN A HYBRID HEAT SOURCE HEAT PUMP WATER HEATER 3146
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School of Energy and Environment, Southeast University, China

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(*) Department of Human and Engineered Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan, (**) Department of Mechanical Engineering, The University of Tokyo, Japan

595 EMPIRICAL PLATFORM DATA ANALYSIS TO INVESTIGATE HOW HEAT PUMPS OPERATE IN REAL-LIFE CONDITIONS 3175
CARMO C.(*), ELMEGAARD B.(**), NIELSEN M. P.(*), DETLEFSEN N.(***)
(*) Aalborg University – Department of Energy Technology, Denmark, (**) DTU – Department of Mechanical Engineering, Thermal Energy, Denmark, (***) Insero Energy, Denmark

713 ASSESSMENT OF A TWO-STAGE COMPRESSION HEAT PUMP CYCLE USING MIXTURE R290/R744 FOR WATER HEATER APPLICATIONS 3184
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Department of Refrigeration & Cryogenic Engineering, School of Energy and Power Engineering, Xi'an Jiaotong University, China

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HIROTA Y., MIZUTANI Y., YAMAUCHI T., SHIMAZU T.
Toyota Central R&D Labs., Inc., Japan

807 DEVELOPMENT OF A HEAT PUMP SYSTEM FOR HIGH-TEMPERATURE HEAT SUPPLY WITH HEAT RECOVERY USING METHANOL AS THE REFRIGERANT 3199
SHIKICHI K.(*), ASANO H.(**)
(*) The Kansai Electric Power Co., Inc., Japan, (**) Department of Mechanical Engineering, Kobe University, Japan

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YU C.-W.(*), HOU S.-P.(**), TZENG C.-T.(*), LAI C.-M.(**)
(*) Department of Architecture, National Cheng-Kung University, Taiwan, (**) Department of Civil Engineering, National Cheng-Kung University, Taiwan

255 CONCEPT AND CALCULATION METHOD OF LOCAL COOLING/ HEATING LOAD APPLIED TO NON-UNIFORM INDOOR ENVIRONMENT 3213
LIANG C.(*,**), SHAO X.(*), LI X.(*,**)
(*) Department of Building Science, School of Architecture, Tsinghua University, China, (**) Key Laboratory of Eco Planning & Green Building, Ministry of Education, Tsinghua University, China

311 EVALUATION AND OPTIMIZATION OF THERMAL PERFORMANCE AND AIR DISTRIBUTION IN RAISED-FLOOR DATA CENTER 3221
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School of Energy and Environment, Southeast University, China

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OKAZAKI S.(*), SAKAI K.(*), ONO H.(**), KAJIYA R.(*)
(*) Meiji University, Japan, (**) Central Research Institute of Electric Power Industry, Japan

701 STUDY ON ENERGY SAVING SIMULATION FOR A FOOTBALL STADIUM 3244
AWAJI K., NEMOTO K., IMADA S., ONODA H., NAGATA K.
Waseda University, Japan

707 PERFORMANCE ANALYSIS AND CAPACITY SIZING FOR CHILLERS FOR THE HVAC SYSTEM IN A HOTEL BUILDING 3250
WANG F.-J.(*), LIN H.-W.(**), TU W.-D.(**), WANG Y.-Y.(*)
(*) Department of Refrigeration, Air Conditioning and Energy Engineering, National Chin-Yi University of Technology, Taiwan, (**) Green Energy and Environment Research Laboratories, Industrial Technology Research Institute, Taiwan

THURSDAY, AUGUST 20 13:30-15:10

BOILING(2)
B1-Th-3a Room 301
Chairs: CHIEN L. *(National Taipei University of Technology, Taiwan)*
KARIYA K. *(Saga University, Japan)*

13:30 282 HEAT TRANSFER CHARACTERISTICS OF R32, R410A AND R1234YF DURING EVAPORATION INSIDE HORIZONTAL MINICHANNEL 3256
CHIEN N. B.(*), VU P. Q.(*), CHOI K.-I.(**), OH J.-T.(**)
(*) Graduate School, Chonnam National University, South Korea, (**) Department of Refrigeration and Air Conditioning Engineering, Chonnam National University, South Korea

13:50 549 R1234ze(E) FLOW BOILING HEAT TRANSFER AND PRESSURE DROP INSIDE A 2.4 mm MICROFIN TUBE 3264
DIANI A.(*), MANCIN S.(**), CAVALLINI A.(*), ROSSETTO L.(*)
(*) Dipartimento di Ingegneria Industriale, Università degli Studi di Padova, Italy, (**) Dipartimento di Tecnica e Gestione dei Sistemi Industriali, Università degli Studi di Padova, Italy

14:10 628 EXPERIMENTAL INVESTIGATION ON FLOW BOILING PRESSURE DROP OF R600a IN MULTIPORT MINICHANNEL TUBE 3272
COPETTI J. B., MACCAGNAN M. H., DE SÁ BECKERLE B.
Mechanical Engineering Graduate Program, Universidade do Vale do Rio dos Sinos – UNISINOS, Brazil

14:30 703 EFFECT OF CHANNEL GEOMETRY ON BOILING HEAT TRANSFER AND PRESSURE DROP OF R32 INSIDE HORIZONTAL MULTIPORT TUBES 3280
JIGE D.(*), TERASHIMA Y.(**), INOUE N.(*), KOYAMA S.(***)
(*) Tokyo University of Marine Science and Technology, Japan, (**) School of Marine Electronics and Mechanical Engineering, Tokyo University of Marine Science and Technology, Japan, (***) Kyushu University, Japan

14:50 564 FLOW BOILING HEAT TRANSFER OF R1234yf ON A MICROPARTICLE COATED COPPER SURFACE 3288
MANCIN S.(*), DIANI D.(**), VEZZÙ S.(***), ROSSETTO L.(**)
(*) Department of Management and Engineering, University of Padova, Italy, (**) Department of Industrial Engineering, University of Padova, Italy, (***) Veneto Nanotech, Italy

MAGNETOCALORIC REFRIGERATION(1)
B1-Th-3b Room 303

Chairs: KAWANAMI T. *(Kobe University, Japan)*
ENGELBRECHT K. *(Technical University of Denmark, Denmark)*

13:30 347 MAGNETOCALORIC EFFECT IN $Nd_{0.7}Sr_{0.3}MnO_3$:CuO COMPOSITES 3296
EL MAALAM K.(*,**), MOUBARIK Y.(*,**), ALI M. B.(*,**), MOUNKACHI O.(*), MOUSSAOUI H. E.(*), HAMEDOUN M.(*), HLIL E.-K.(****), BENYOUSSEF A.(*,**,***)
(*) Materials-Nanomaterials Center, MAScIR Foundation, Morocco, (**) LMPHE Laboratory, Faculty of science-Mohammed V University, Morocco, (***) Hassan II Academy of Science and Technology, Morocco, (****) Institut Néel CNRS-UJF, France

13:50 890 INTERFEROMETRIC MEASUREMENT OF THE HEAT TRANSFER ENHANCEMENT DRIVEN BY A MAGNETOHYDRODYNAMIC FLOW AT A MAGNETIZED GADOLINIUM PLATE 3304
LEI Z., ECKERT K.
Institute of Fluid Mechanics, Technische Universitaet Dresden, D-01069 Dresden, Germany

14:10 202 A SECOND-ORDER MAGNETOCALORIC MODEL SUBSTANCE FOR STANDARDIZATION PURPOSES 3311
VUARNOZ D. (*), EGOLF P. W. (*), GAMA S. (**), COELHO A. A. (***)
(*)University of Applied Sciences of Western Switzerland Institute of Thermal Sciences and Engineering, Switzerland, (**)Universidade Federal de São Paulo UNIFESP – Campus DIADEMA, Brazil, (***)Universidade Estadual de Campinas, Brazil

14:30 383 EXPERIMENTAL STUDY OF ROOM TEMPERATURE MAGNETIC REFRIGERATOR USING MULTILAYERED MAGNETOCALORIC MATERIALS 3319
MIYAZAKI Y., IKEDA K.(*), WAKI K.(*), HIRANO N.(**), BAE S.(***), OKAMURA T.(****), KAWANAMI T.(*****)
(*) Railway Technical Research Institute, Japan, (**) Chubu Electric Power Co., Inc., Electric Power R&D Center, Japan, (***) Sanden Corporation, Department of Research and Development, R&D Division, Japan, (****) Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, Japan, (*****) Kobe University, Japan

ENERGY MANAGEMENT

S1-Th-3 Room 313+314

Chairs: YAN W. *(National Taipei University of Technology, Taiwan)*
SAKAI K. *(Meiji University, Japan)*

13:30 222 DEVELOPMENT OF AN INTEGRATED ENERGY SIMULATION TOOL FOR BUILDINGS AND MEP SYSTEMS, THE BEST SIMULATION STUDY OF COGENERATION SYSTEM IN HOTELS USING BEST PROGRAM 2013 3325

SATOH M.(*), TSUJIMARU N.(*), MURAKAMI S.(**), AKIMOTO T.(***), ISHINO H.(****), SASAJIMA K.(*****), NOHARA F.(******), NINOMIYA H.(******), FUJII T.(*******), KUZUKI R.(********), YUASA R.(********)

(*) Satoh Energy Research Co., Ltd., Japan, (**) Institute for Building Environment and Energy Conservation, Japan, (***) Shibaura Institute of Technology, Japan, (****) Tokyo Metropolitan University, Japan, (*****) Nihon Sekkei Co., Ltd., Japan,(******) Nikken Sekkei Co., Ltd., Japan, (*******) Hitachi, Ltd., Japan, (********) Tokyo Gas Co., Ltd., Japan

13:50 445 DOCUMENTATION OF AN INTEGRATED THERMAL ENERGY SYSTEM FOR A BUILDING COMPLEX 3332

ROHDE D.(*), BANTLE M.(**), ANDRESEN T.(**), NORD N.(*)

(*) Norwegian University of Science and Technology, Norway, (**) SINTEF Energy Research, Norway

14:10 Withdrawn

14:30 5 TRANSIENT THERMAL ENERGY STORAGE IN A PARTITIONED ENCLOSURE PACKED WITH MEPCM 3340

SIAO Y.-H.(*), YAN W.-M.(**), LAI C.-M.(***), LIN Y.-F.(**)

(*) Department of Mechanical Engineering, National Cheng-Kung University, Taiwan, (**) Department of Energy and Refrigerating Air-Conditioning Engineering, Taiwan, (***) Department of Civil Engineering, National Cheng-Kung University, Taiwan

14:50 146 PERFORMANCE OF UNDERFLOOR HEATING SYSTEM WITH PHASE CHANGE COVERING MATERIALS 3348

HUANG M. J., HEWITT N. J.

Centre for Sustainable Technologies, School of Built Environment, Ulster University, United Kingdom

A/C LARGE SPACE

E1-Th-3 Room 411+412

Chairs: NAGAI T. *(Tokyo University of Science, Japan)*
SATOH M. *(Satoh Energy Research Co., Ltd, Japan)*

13:30 54 AIR DISTRIBUTION IMPROVEMENT OF CLOSED TYPE SERVER CABINETS USING FLOW BAFFLES 3356

CHEN H. Y., CHUAH Y. K., HSIEH M. H., CHANG S. H.

National Taipei University of Technology, Taiwan

13:50 160 AN INTEGRATED CHILLER USING MAGNETIC-BEARING COMPRESSOR WITH THERMOSYPHON FOR YEAR-ROUND COOLING OF INTERNET DATA CENTRES: FEASIBILITY ANALYSIS 3364

ZHANG P., SHI W., WANG B., SHANG S., LI X.

Department of Building Science, Tsinghua University, China

14:10 181 EVALUATION METHOD OF OPERATION PERFORMANCE OF HVAC SYSTEM BASED ON CONCORDANCE RATIO ANALYSIS 3372
WANG Y., JIN X., FANG X., DU Z.
School of Mechanical Engineering, Shanghai Jiao Tong University, China

14:30 274 ENERGY-SAVING PERFORMANCE OF COMMERCIAL AIR-CONDITIONER WITH SPRAYING APPARATUS ATTACHED TO THE OUTDOOR UNIT 3380
MIYAOKA Y.(*), NAGAMATSU K.(*), NAMIWO T.(*), HIROTA M.(**)
(*) Chubu Electric Power Co., Inc., Japan, (**) Mie University, Department of Mechanical Engineering, Japan

14:50 936 IMPROVING BUILT ENVIRONMENTAL DESIGN IN LARGE-SPACE BUILDING BY NUMERICAL ANALYSIS METHOD AND STATE SPACE METHOD: A CASE STUDY 3388
LIANG N., MA X., XU H.
Beijing Engineering Research Center of Digital Architectural Design and Construction, Beijing Institute of Architectural Design, China

EVAPORATOR(3)
B2-Th-3a Room 413

Chairs: INOUE N. *(Tokyo University of Marine Science and Technology, Japan)*
DE PAEPE M. *(Ghent University, Belgium)*

13:30 885 NUMERICAL PERFORMANCE OF A NOVEL AIR SIDE FIN USED IN HEAVEY DUTY ENGINE 3396
QI Z.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

13:50 937 EVAPORATION HEAT TRANSFER OF WATER IN PLATE HEAT EXCHANGERS WITH OPERATION PARAMETERS AT HIGH TEMPERATURE CONDITIONS 3402
KIM S. W.(*), BAEK C.(**), LEE J. S.(*), KIM Y.(**)
(*) Graduate School of Mechanical Engineering, Korea University, South Korea, (**) Department of Mechanical Engineering, Korea University, South Korea

ICE SLURRY(1)
B2-Th-3b Room 414+415

Chairs: SUZUKI H. *(Kobe University, Japan)*
TBD

13:30 492 PARTICLE SIZE DISTRIBUTION IN ICE SLURRY SYSTEMS - SETUP AND ANALYSIS 3409
KOFFLER M., SCHAAF J., KAUFFELD M.
University of Applied Sciences Karlsruhe - Institute of Refrigeration, Air-Conditioning, and Environmental Engineering (IKKU), Germany

13:50 558 A STUDY OF ICE-SLURRY PRODUCTION PROCESS IN SCRAPED-SURFACE TYPE GENERATOR 3417
KOLESNIKOV A., BUZUKASHVILI I., KROTOV A., KLYACHKO L., UMANSKIY V., MAKAROV B.
Central Scientific-Research Institute ''Kurs'' (CSRI ''Kurs''), Russia

14:10 651 STUDY ON GENERATOR FOR ICE SLURRY USING THE PRESSURE SHIFT FEEZING METHOD 3425
FUMOTO K.(*), KAWANAMI T.(**), INAMURA T.(*)
(*) Hirosaki University, Japan, (**) Kobe University, Japan

14:30 869 ICE SLURRY PRODUCTION IN A TUBULAR HEAT EXCHANGER 3433
LE BAIL A., HAVET M.
LUNAM University, ONIRIS, UMR 6144 GEPEA, CNRS, France

14:50 893 ICE SLURRY PROPERTIES OF SEAWATER 3440
MELINDER Å., IGNATOWICZ M.
Department of Energy Technology, Royal Institute of Technology, Sweden

RESIDENTIAL AND COMMERCIAL HEAT-PUMP SYSTEMS(4)
E2-Th-3 Room 416+417

Chairs: OHNO K. *(Waseda University, Japan)*
ENOKI K. *(The University of Electro-Communications, Japan)*

13:30 817 NUMERICAL STUDY FOR DETECTION OF REFRIGERANT LEAKAGE IN VAPOR COMPRESSION REFRIGERATION CYCLE 3448
YOO J. W., HONG S. B., KIM M. S.
Department of Mechanical Engineering, Seoul National University, South Korea

13:50 853 FIELD MEASUREMENTS OF GROUND SOURCE HEAT PUMP SYSTEMS INSTALLED IN EXISTING SINGLE FAMILY HOUSES – EVALUATION AFTER SEVERAL YEARS OF OPERATION 3456
HAGLUND STIGNOR C., TILJANDER P., ALSBJER M.
SP Technical Research Institute of Sweden, Sweden

14:10 875 DEVELOPMENT OF CASCADE PID CONTROL FOR A AIR SOURCE HEAT PUMP IN COOLING MODE USING SYSTEM IDENTIFICATION EXPERIMENTAL STUDY 3464
HAN D.(*), CHANG Y.(**), KIM Y.(***)
(*) Graduate School of Mechanical Engineering, Korea University, South Korea, (**) School of Mechanical System Engineering, Kookmin University, South Korea, (***) Department of Mechanical Engineering, Korea University, South Korea

14:30 882 INVESTIGATION ON PERFORMANCE OF AIR SOURCE HEAT PUMP WATER HEATER COMBINED WITH LIQIUD-VAPOR SEPARATION CONDENSER 3470
ZHENG W., CHEN Y., YANG Q., ZHONG T., LUO X.
School of Material and Energy, Guangdong University of Technology, Guangzhou Higher Education Mega Center, China

14:50 108 SMART FAULT DETECTION AND DIAGNOSIS FOR HEAT PUMP SYSTEMS 3477
MADANI H.
KTH Royal Institute of Technology, Sweden

WORKSHOP: RISK ASSESSMENT OF MILDLY FLAMMABLE REFRIGERANTS
WS9-Th-3/WS9-Th-4 Room 304

Chairs: HIHARA E. *(The University of Tokyo, Japan)*
FUJIMOTO S. *(The Japan Refrigeration and Air Conditioning Industry Association (JRAIA), Daikin Industries, Ltd., Japan)*

WORKSHOP: SIRACH
WS10-Th-3 Room 418

Chair: MAIDMENT G. *(London South Bank University(LSBU), United Kingdom)*

BOILING(3)

B1-Th-4a Room 301

Chairs: OH J. *(Chonnam National University, South Korea)*
FUKUDA S. *(Kyushu University, Japan)*

15:30 682 HEAT TRANSFER COEFFICIENT OF TWO-PHASE FLOW BOILING WITH LOW VAPOR QUALITY 3485
PAMITRAN A. S., KHABIBAH U., ALHAMID M. I., NASRUDDIN N.
Department of Mechanical Engineering, University of Indonesia, Indonesia

15:50 704 EVAPORATION HEAT TRANSFER AND PRESSURE DROP OF R245fa INSIDE A HORIZONTAL SMOOTH TUBE 3493
WATANABE K.(*), JIGE D.(**), INOUE N.(**)
(*) Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology, Japan, (**) Tokyo University of Marine Science and Technology, Japan

16:10 709 EXPERIMENTAL STUDY ON SUBCOOLED FLOW BOILING CHARACTERISTICS OF R134a IN HORIZONTAL HELICALLY-COILED TUBES 3501
HAN J.(*), KONG L.(*), SHAO L.(*), CHEN C.(*), LU G.(**)
(*) School of Energy and Power Engineering, Shandong University, China, (**) Department of Thermal Engineering, Chengde Petroleum College, China

16:30 162 EXPERIMENTAL STUDY ON BOILING HEAT TRANSFER OF R32/R290 IN HORIZONTAL TUBES 3508
LIU F., HAN B., CAI D., TIAN Q., HE G.
Shool of Energy and Power Engineering, Huazhong University of Science and Technology, China

16:50 141 EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF LUBRICATING OIL ON THE FLOW BOILING HEAT TRANSFER AND PRESSURE DROP OF CO_2 INSIDE AN ENHANCED TUBE 3516
WEISE S., WETZEL M., HORNBERGER M., DIETRICH B., WETZEL T.
Institute of Thermal Process Engineering, Karlsruhe Institute of Technology (KIT), Germany

MAGNETOCALORIC REFRIGERATION(2)

B1-Th-4b Room 303

Chairs: EGOLF P. W. *(University of Applied Sciences of Western Switzerland, Switzerland)*
MIYAZAKI Y. *(Railway Technical Research Institute, Japan)*

15:30 488 DEVELOPMENT OF A NOVEL ROTARY MAGNETIC REFRIGERATOR 3524
LOZANO J. A., CAPOVILLA M. S., TREVIZOLI P. V., BARBOSA J. R.
POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Department of Mechanical Engineering, Federal University of Santa Catarina, Brazil

15:50 812 EXPERIMENTAL STUDIES WITH AN ACTIVE MAGNETIC REGENERATING REFRIGERATOR 3532
ERIKSEN D., ENGELBRECHT K., BAHL C., BJØRK R., NIELSEN K., INSINGA A., DALLOLIO S., PRYDS N.
DTU Energy, Technical University of Denmark, Denmark

16:10 171 EXPERIMENTAL STUDY ON THERMAL CHARACTERISTICS OF ROTATIONAL TYPE MAGNETOCALORIC DEVICE WITH DIFFERENT MAGNETOCALORIC MATERIAL PARTICLE BED ARRANGEMENTS 3540
HIRANO S.(*), KAWANAMI T.(**), TOBA A.(*), FUMOTO K.(***)
(*) Hokkaido Research Organization, Japan, (**) Graduate School of Kobe University, Japan, (***) Hirosaki University, Japan

16:30 262 PERFORMANCE PREDICTION OF MAGNETOCALORIC HEAT PUMP WITH MATERIAL LAYERED ACTIVE MAGNETIC REGENERATOR 3548
ASOU M.(*), KAWANAMI T.(*), HIRANO S.(**), SHIRAI K.(*), HIRASAWA S.(*)
(*) Department of Mechanical Engineering, Kobe University, Japan, (**) Hokkaido Research Organization, Japan

16:50 839 ELECTROCALORIC REFRIGERATION AND HEAT PUMPING: FROM THEORY TO APPLICATIONS 3556
PLAZNIK U., KITANOVSKI A., POREDOŠ A.
University of Ljubljana, Faculty of Mechanical Engineering, Slovenia

MODELING / SIMULATION
E1-Th-4 Room 411+412

Chairs: IM P. *(Oak Ridge National Laboratory, United States)*
OHNO K. *(Waseda University, Japan)*

15:30 32 OPTIMIZATION OF COMPRESSOR LOAD SHARING IN MULTIPLE FIXED SPEED COMPRESSORS HEAT PUMP 3564
BARELLA A., DE ANTONELLIS S., JOPPOLO C. M., MOLINAROLI L., PASINI A.
Dipartimento di Energia - Politecnico di Milano, Italy

15:50 235 A CONTROL-ORIENTED HYBRID MODEL FOR A DIRECT EXPANSION AIR CONDITIONING SYSTEM 3572
WANG X., XU X.
Institute of Refrigeration and Cryogenics, Zhejiang University, Key Laboratory of Refrigeration and Cryogenic Technology of Zhejiang Province, China

16:10 266 DEVELOPMENT OF AN OBJECT-ORIENTED MODEL FOR CHILLED-WATER THERMAL ENERGY STORAGE APPLICATIONS 3581
TERZIBACHIAN E.(*,**), TREMEAC B.(*), MARVILLET C.(*), ESPARCIEUX P.(**)
(*) Laboratoire de Chimie Moléculaire, Génie des Procédés Chimiques et Energétique (CMGPCE-EA21), CNAM, France, (**) Atisys Concept Sarl, France

16:30 236 CAN AIR CURTAINS BE USED TO BUILD A NON-UNIFORM INDOOR ENVIRONMENT AND SAVE ENERGY? 3589
SHEN C., SHAO X., LI X.
Department of Building Science, School of Architecture, Tsinghua University, China

16:50 156 THE IMPACT OF AN OSCILLATING AIR-SUPPLY GUIDE VANE ON THE THERMO-HYDRAULIC FIELD IN A SQUARE CAVITY WITH SINGLE INLET AND OUTLET PORTS 3597
SHIH Y.-C., NIEN S.-W., WUN C.-H., CHENG R.-C.
Department of Energy and Refrigerating Air-Conditioning Engineering, National Taipei University of Technology, Taiwan

HEAT PIPE / OTHERS(1)
B2-Th-4a Room 413
Chairs: HONDA T. *(Fukuoka University, Japan)*
KIM Y. *(Korea University, South Korea)*

15:30 205 PERFORMANCE OF AN AIR CONDITIONING SYSTEM HEAT RECOVERY UNIT WITH PULSATING HEAT PIPES HEAT EXCHANGER 3605
XIE G., AN L., ZHANG L.
Beijing University of Civil Engineering and Architecture, China

15:50 269 NUMERICAL MODELING OF HEAT TRANSFER IN A TWO-PHASE CLOSED THERMOSYPHON 3611
CAO J., LI M., LI B., HOU Y., ZHANG X.
State Key Laboratory of Multiphase Flow in Power Engineering Xi'an Jiaotong University, China

16:10 747 THERMOSYPHON PERFORMANCE IN TURFGRASS GREEN SEASON PROLONGATION WITH SHALLOW GEOTHERMAL SOURCE 3619
ZHOU F., MA G., ZHANG X., LIU Z.
College of Environmental and Energy Engineering, Beijing University of Technology, China

16:30 270 EXPERIMENTAL AND THEORETICAL ANALYSIS OF A HEAT PIPE HEAT EXCHANGER USING HFC-152a AS WORKING FLUID 3627
RIGHETTI G., MANCIN S., ZILIO C., LONGO G. A.
University of Padova, Department of Management and Engineering, Italy

16:50 365 EXPERIMENTAL STUDY ON CPU COOLING WITH THERMOELECTRIC INTERGRADED WITH HEAT PIPES 3635
HU H. M., GE T. S., ZHANG B. Y., DAI Y. J., WANG R. Z.
Institute of Refrigeration and Cryogenics, Key Laboratory for Power Machinery and Engineering of M.O.E, Shanghai Jiao Tong University, China

ICE SLURRY(2) / SECONDARY REFRIGERANT(1)
B2-Th-4b Room 414+415
Chairs: FUMOTO K. *(Hirosaki University, Japan)*
LE BAIL A. *(LUNAM University, Oniris, UMR 6144 GEPEA, CNRS, France)*

15:30 394 FABRICATION OF SILICA HARD-SHELL MICROCAPSULE CONTAINING INORGANIC PHASE-CHANGE MATERIALS 3643
TAMARU M.(*), SUZUKI H.(*), HIDEMA R.(**), KOMODA Y.(*)
(*) Department of Chemical Science and Engineering, Kobe University, Japan, (**) Organization of Advanced Science and Technology, Kobe University, Japan

15:50 467 ENERGY STUDY OF CO_2 HYDRATE SLURRIES FORMATION IN A TANK REACTOR 3654
OIGNET J.(*), DELAHAYE A.(*), DUFOUR T.(*), HOANG H. M.(*), CLAIN P.(**), FOURNAISON L.(*)
(*) Irstea, GPAN, France, (**) ESILV, France

16:10 2 THERMODYNAMIC ASSESSMENT OF WATER-ALUMINA NANOFLUIDS AS SECONDARY WORKING FLUIDS IN REFRIGERATION SYSTEMS AIMING AT THE EXTERNAL IRREVERSIBILITIES OF THE CYCLE 3662
PEREIRA R.(*,**), LOYOLA F. R.(*), DELIMA-SILVA JR. W.(*), CARDOSO R. P.(**), HERMES C. J. L.(*)
(*) Laboratory of Thermodynamics and Thermophysics, Federal University of Paraná, Brazil, (**) Laboratory of Plasma and Powder Technology, Federal University of Paraná, Brazil

16:30 493 INFLUENCE OF A HEAT FLUX TO ICE ADHESION FORCE 3670
SCHAAF J., KOFFLER M., KAUFFELD M.
University of Applied Sciences Karlsruhe - Institute of Refrigeration, Air Conditioning and Environmental Engineering, Germany

16:50 258 MELTING BEHAVIOR AND HEAT TRANSFER CHARACTERISTICS OF WATER-INSOLUBLE MATERIAL IMMERSED IN WATER 3676
HIRAI R.(*), KAWANAMI T.(*), SOTA G.(*), FUMOTO K.(**), SHIRAI K.(*), HIRASAWA S.(*)
(*) Department of Mechanical Engineering, Kobe University, Japan, (**) Department of Intelligent Mechanical and System Engineering, Hirosaki University, Japan

SORPTION SYSTEMS (ABSORPTION, ADSORPTION, DEC)(2)
E2-Th-4 Room 416+417

Chairs: VARELA R. J. *(Waseda University, Japan)*
ENOKI K. *(The University of Electro-Communications, Japan)*

15:30 90 ENHANCEMENT OF GENERATION OF HIGH-TEMPERATURE STEAM FROM A NOVEL ADSORPTION HEAT PUMP ASSISTED BY THERMAL ENERGY STORAGE MATERIAL 3683
NAKASO K.(*), KOBAYASHI S.(*), ESHIMA S.(*), KAWAKAMI Y.(**), TANINO M.(**), FUKAI J.(*)
(*) Kyushu University, Japan, (**) Takasago Thermal Engineering Co., Ltd., Japan

15:50 188 ADSORPTION CHARACTERISTICS OF ETHANOL ONTO PROMISING ADSORBENTS FOR ADSORPTION COOLING APPLICATIONS 3691
EL-SHARKAWY I. I.(*,***), MIYAZAKI T.(*), SAHA B. B.(*,**), KOYAMA S.(*,**)
(*) Faculty of Engineering Sciences, Kyushu University, Japan, (**) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan, (***) Mechanical Power Engineering Department, Faculty of Engineering, Mansoura University, Egypt, (*) International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, Japan

16:10 191 THEORETICAL COMPARISONS BETWEEN ABSORPTION HEAT PUMP AND ELECTRICAL HEAT PUMP FOR LOW TEMPERATURE HEATING 3699
WU W., SHI W., WANG B., LI X.
Department of Building Science, Tsinghua University, China

16:30 865 IMPROVING WATER AND ENERGY EFFICIENCY OF POWER PLANT THROUGH ABSORPTION HEAT PUMP 3707
QU M.(*), ABDELAZIZ O.(**)
(*) Purdue University, United States, (**) Oak Ridge National Laboratory, United States

16:50 402 PERFORMANCE PREDICTION OF A COMPACT SORPTION HEAT STORAGE PROTOTYPE USING LiCl/H_2O AS WORKING PAIR 3715
YU N., WANG R., WANG L.
Institute of Refrigeration and Cryogenics and Key Laboratory of Power Mechanical Engineering, MOE China, Shanghai Jiao Tong University, China

GAS PROCESSING AND PURIFICATION
A2-Th-4 Room 418
Chairs: BELADJINE B. M. *(Université des sciences et technologie d'Oran-USTO, Algeria)*
WU J. *(Xi'an Jiaotong University, China)*

15:30 103 PRODUCTION OF STABLE NEON ISOTOPE BY THE METHOD OF LOW TEMPERATURE RECTIFICATION 3723
BONDARENKO V.(*), PODDUBNA M.(**), SYMONENKO I.(***), ARKHAROV A.(*)
(*) Moscow State Technical University, Russia, (**) Institute of Refrigeration, Cryotechnology and Ecoenergetics, Ukraine, (***) Iceblick-Engineering, Ukraine

15:50 290 OPTIMIZATION OF ADSORBERS USED IN PURIFICATION TECHNOLOGIES OF RARE GASES 3730
BONDARENKO V.(*), BONDARENKO A.(**), PODDUBNA M.(**), SYMONENKO I.(***), ARKHAROV I.(*)
(*) Moscow State Technical University, Russia, (**) Institute of Refrigeration, Cryotechnology and Ecoenergetics, Ukraine, (***) Iceblick-Engineering, Ukraine

16:10 Withdrawn

16:30 720 PARAMETER OPTIMIZATION OF SUCCESSIVE STAGES OF THE TECHNOLOGY FOR OBTAINING ^{3}HE ISOTOPE FROM NATURAL HELIUM 3737
BONDARENKO V. L., GRAFOV A. P., KUPRIYANOV M. Y.
MSTU, Russia

WORKSHOP: RISK ASSESSMENT OF MILDLY FLAMMABLE REFRIGERANTS
WS9-Th-3/WS9-Th-4 Room 304
Chairs: HIHARA E. *(The University of Tokyo, Japan)*
FUJIMOTO S. *(The Japan Refrigeration and Air Conditioning Industry Association (JRAIA), Daikin Industries, Ltd., Japan)*

FRIDAY, AUGUST 21 8:30-10:10

CONDENSATION(1)
B1-Fr-1a Room 301
Chairs: DEL COL D. *(University of Padova, Italy)*
PENG H. *(The University of Tokyo, Japan)*

8:30 165 CONDENSATION HEAT TRANSFER OF LOW GWP REFRIGERANTS R1234ZE(E), R1234ZE(Z) AND R1233ZD(E) ON A HORIZONTAL PLAIN TUBE 3744
NAGATA R.(*), KONDOU C.(**), KOYAMA S.(***,****)
(*) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan, (**) Graduate School of Engineering, Nagasaki University, Japan, (***) Faculty of Engineering Sciences, Kyushu University, Japan, (****) International Institute for Carbon-Neutral Energy Research (WPI-I2CNER), Kyushu University, Japan

8:50 635 CONDENSATION HEAT TRANSFER CHARACTERISTICS OF LOW-GWP REFRIGERANTS IN HORIZONTAL SMOOTH MINI TUBE 3752
LI M.(*), LV J.(*), DANG C.(**), GU H.(*)
(*) Key Laboratory of Efficient Utilization of Low and Medium Grade Energy, MOE, Tianjin University, China, (**) Department of Human and Engineered Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan

9:10 368 AN EXPERIMENTAL STUDY OF CONDENSATION HEAT TRANSFER USING R410A IN A MULTIPORT EXTRUDED TUBE 3760
PHAM Q. V.(*), CHOI K.-I.(**), OH J.-T.(**), CHO H.(***), KIM T.(***), KIM J.(***), CHOI J.(***)
(*) Graduate School, Chonnam National University, South Korea, (**) Department of Refrigeration and Air Conditioning Engineering, Chonnam National University, South Korea, (***) Advanced R&D Team, Digital Appliances, Samsung Electronics, South Korea

9:30 515 EXPERIMENTAL INVESTIGATIONS OF PROPANE MINICHANNEL CONDENSER 3767
GAGAN J., BUTRYMOWICZ D., DUDAR A., ŁUKASZUK M., ŚMIERCIEW K.
Bialystok University of Technology, Poland

FROST(1)
B1-Fr-1b Room 303

Chairs: HERMES C. *(Federal University of Parana, Brazil)*
POPOVAC M. *(Austrian Institute of Technology, Austria)*

8:30 77 STATE-OF-THE ART OF FROST DEPOSITION ON FLAT SURFACES 3775
LEONI A.(*,**), MONDOT M.(**), DURIER F.(**), REVELLIN R.(*), HABERSCHILL P.(*)
(*) Université de Lyon, CNRS, INSA-Lyon, Université Lyon 1, CETHIL UMR5008, France, (**) Centre Technique des Industries Aérauliques et Thermiques (CETIAT), Domaine scientifique de la Doua, France

8:50 389 STUDY ON CONTROL AND INHIBITION OF FROST FORMATION ON A FLAT PLATE 3783
MATSUSHITA S.(*), KATO M.(*), OHKUBO H.(**), NISHIDA K.(*)
(*) MAYEKAWA MFG.CO., LTD., Japan, (**) Tamagawa University, Japan

9:10 462 STUDY ON THE FROSTING PHENOMENA BETWEEN CONCAVITY AND CONVEXITY PLATE UNDER FORCED CONVECTION -ANALYSIS OF FROST LAYER GROWTH- 3791
KANEKO A.(*), TAKANO Y.(**), MIYAHARA R.(**), MORITA K.(***), KATSUTA M.(***)
(*) Automotive Product Development Department, SANDEN ADVANCED TECHNOLOGY CORPORATION, Japan, (**) Graduate School of Environment and Energy Engineering, Waseda University, Japan, (***) Department of Modern Mechanical Engineering, Waseda University, Japan

9:30 656 EFFECTS OF WEAK MAGNETIC FIELDS ON FROSTING PROCESS ON SURFACE OF COPPER TUBE 3799
ZHAO H.(*), WANG L.(**), LAI Y.(*), HAN J.(*), LI W.(*)
(*) School of Power and Energy, Shandong University, China, (**) School of Control Science and Engineering, Shandong University, China

9:50 712 THERMAL PERFORMANCE OF LOUVERED FIN-TUBE HEAT EXCHANGER UNDER FROSTING CONDITION 3807
LIM J.(*), PARK W.(*), CHO K.(**)
(*) Graduate School of Mechanical Engineering, Sungkyunkwan University, South Korea, (**) School of Mechanical Engineering, Sungkyunkwan University, South Korea

HEAT-PUMP BASED ENERGY RECOVERY SYSTEM(1)

E2-Fr-1 Room 313+314

Chairs: GIANNETTI N. *(Department of Applied Mechanics and Aerospace Engineering, Waseda University, Japan)*
MIYAOKA Y. *(Chubu Electric Power Co., Inc., Japan)*

8:30 252 DIESEL ENGINE HEAT PUMP PERFORMANCE ANALYSIS FOR A DOMESTIC RETROFIT APPLICATION 3815
SHAH N., HUANG M., HEWITT N.
Centre for Sustainable Technologies, University of Ulster, United Kingdom

8:50 588 EJECTOR REFRIGERATION SYSTEMS FOR WASTE HEAT RECOVERY APPLICATIONS: EFFECTS OF CONDENSATION ON PERFORMANCE 3824
LITTLE A. B., GARIMELLA S.
George W. Woodruff School of Mechanical Engineering, Georgia Institute of Technology, United States

9:10 599 A R-32 TRANSCRITICAL HEAT PUMP FOR HIGH TEMPERATURE INDUSTRIAL APPLICATIONS 3833
BESBES K.(*,**), ZOUGHAIB A.(*), DE CARLAN F.(**), PEUREUX J.-L.(**)
(*) MINES ParisTech, PSL Research University, CES - Center for Energy efficiency of Systems, France, (**) EDF, Électricité de France, Laboratoire Les Renardières, France

9:30 784 DEVELOPMENT OF A HIGH TEMPERATURE HEAT PUMP FOR HEAT RECOVERY IN DYEING INDUSTRY 3841
WU X.(*), TANG H.(*), CHEN W.(**), WANG X.(***), XING Z.(*)
(*) School of Energy and Power Engineering, Xi'an Jiaotong University, China, (**) Suzhou Academy, Xi'an Jiaotong University, China, (***) School of Engineering & ICT, University of Tasmania, Australia

9:50 797 HEAT TRANSFER CHARACTERISTICS OF PLATE ABSORBER FOR COMPRESSION/ABSORPTION HYBRID HEAT PUMP APPLICATION 3849
JUNG C. W., LEE J. H., KANG Y. T.
School of Mechanical Engineering, Korea University, South Korea

A/C FOR MOBILE / EJECTOR

E1-Fr-1 Room 411+412

Chairs: ELBEL S. *(University of Illinois, United States)*
BAE S. *(Waseda University Environmental Research Institute, Japan)*

8:30 137 AN EXPERIMENTAL COMPARISON BETWEEN PERFORMANCES OF MODULAR SILICON EXPASION VALVE AND THERMAL EXPANSION VALVE IN MOBILE AC SYSTEM 3855
ZHANG Z., ZHU J., LI W., ZHANG C., CHEN J.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

8:50 93 THE STUDY OF FUZZY CONTROL APPLIED TO VARIABLE REFRIGERANT FLOW TEMPERATURE CONTROL FOR ELECTRIC VEHICLE AIR CONDITION SYSTEM 3863
HUANG C. K., CHEN J. L., LIN J. Y., CHU M. H., CHEN Y. W.
Department of Energy Refrigerating and Air-Conditioning Engineering, Tung Nan University, Taiwan

9:10 193 NUMERICAL INVESTIGATION OF EVAPORATOR DEISGN IN THE EJECTOR REFRIGERATION CYCLE WITH R134a AND CO_2 3871
LAWRENCE N., ELBEL S.
Air Conditioning and Refrigeration Center, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, United States

SYSTEM & CAPACITY CONTROL
B2-Fr-1a Room 413

Chairs: SEKITA M. *(Japan Society of Refrigerating and Air Conditioning Engineers, JSRAE, Japan)*
NAVARRO-PERIS E. *(Universidad Politecnica de Valencia, Spain)*

8:30 199 DRY-BULB AND WET-BULB TEMPERATURE ALLOWANCES CORRECTION BASED ON WEIGH ANALYSIS 3879
ZHANG Z.(*), HUANG H.(**), HUANG Y.(*), ZHANG J.(*), JIANG Y.(*), FENG Z.(**)
(*) Jiangsu Post and Telecommunications Planning and Designing Institute Co., Ltd, China, (**) Engineering Laboratory of Energy System Conversion and Emission Reduction of Jiangsu Province, School of Energy and Mechanical Engineering, Nanjing Normal University, China

8:50 834 EVALUATION OF CCHP SYSTEMS FUELLED BY MIXTURE OF BIOGAS AND LPG BASED ON DIFFERENT THERMALLY ACTIVATED CHILLERS 3888
LI C., WANG J., WU J.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

9:10 16 INTELLIGENT CAPACITY CONTROL POTENTIAL FOR SYSTEM EFFICIENCY IMPROVEMENTS & ENERGY SAVINGS 3897
PFEIL H. V.
BITZER Kühlmaschinenbau GmbH, Germany

9:30 145 APPLYING VARIABLE FREQUENCY DRIVES TO AIR UNITS IN INDUSTRIAL REFRIGERATION SYSTEMS 3904
REINDL D.(*), JEKEL T.(**), DAVIS J.(***)
University of Wisconsin-Madison, Industrial Refrigeration Consortium, United States

9:50 300 SUBCOOLING CONTROL: A WAY TO ENHANCE THE PERFORMANCE OF CONDENSERS FOR HOT WATER PRODUCTION WITH A HIGH WATER TEMPERATURE GLIDE 3911
CORBERÁN J. M., GONZÁLVEZ-MACIÁ J., NAVARRO-PERIS E., PITARCH-MOCHOLÍ M., LÓPEZ-NAVARRO A.
Universitat Politècnica de València, Institute for Energy Engineering, Spain

SECONDARY REFRIGERANT(2)
B2-Fr-1b Room 414+415

Chairs: KAWANAMI T. *(Kobe University, Japan)*
KAUFFELD M. *(Karlsruhe University of Applied Sciences, Germany)*

8:30 565 ETHYL AND ISOPROPYL ALCOHOL BLENDS AS ALTERNATIVE SECONDARY FLUIDS 3919
IGNATOWICZ M., MELINDER Å., PALM B.
KTH Royal Institute of Technology, Sweden

8:50 435 THERMODYNAMIC MODELLING OF FORMATION/DISSOCIATION CYCLES OF TWO-PHASE SLURRIES IN SECONDARY REFRIGERATION SYSTEM 3927
HOANG H. M.(*), DELAHAYE A.(*), FOURNAISON L.(*), OIGNET J.(*), DE ROMÉMONT C.(**), PONS M.(***)
(*) Irstea, UR GPAN, France, (**) École des Ponts ParisTech, France, (***) LIMSI-CNRS, UPR3251, France

9:10 892 IIR HANDBOOK ON INDIRECT REFRIGERATION AND HEAT PUMP SYSTEMS 3935
MELINDER Å., GRANRYD E.
Department of Energy Technology, Royal Institute of Technology, KTH, Sweden

9:30 116 USE OF COOLANTS AT PHASE TRANSITION FOR FOODSTUFFS REFRIGERATION 3943
BELOZEROV G.(*), MEDNIKOVA N.(*), PYTCHENKO V.(*), UMANSKIY V.(**), KOLESNIKOV A.(**), KROTOV A.(**), KLYACHKO L.(**)
(*) FGBNU Russian Scientific Research Institute for Refrigeration Industry (VNIKHI), Russia, (**) Central Scientific-Research Institute "Kurs" (CSRI "Kurs"), Russia

9:50 724 COMPARISON OF PERFORMANCES OF DRYING TECHNIQUES OF SURFACES IN AGRO FOOD PREMISES 3949
GUILPART J.(*), TCHAIKOWSKI A.(**), LECOQ L.(***)
(*) IIR, MF Conseil, France, (**) DESSICA, France, (***) IRSTEA – Refrigeration Processes Engineering Research Unit, France

NH3
D1-Fr-1 Room 416+417

Chairs: VALLEE C. *(Carrier Commercial Refrigeration, Germany)*
HOKAMURA T. *(Mitsubishi Heavy Industries Air-Conditioning & Refrigeration Corporation, Japan)*

8:30 KEYNOTE EXPERIENCES IN RENEWAL OF COLD STORAGE FACILITIES FROM R22 TO NH_3/CO_2 IN JAPAN 3957
KAWAMURA K.
Mayekawa Mfg, Co., Ltd., Japan

9:10 763 SECURING SAFETY, ENERGY EFFICIENCY AND LONG-TERM INVESTMENT ALONG THE FOOD COLD CHAIN BY USING NATURAL REFRIGERANTS: A COMPARATIVE MARKET, POLICY AND TECHNOLOGY ANALYSIS OF NORTH AMERICA, JAPAN, CHINA AND VIET NAM 3968
DUSEK J.(*), MASSON N.(*), SKACANOVA K.(**)
(*) Shecco Japan K.K., Japan, (**) Shecco, Belgium

9:30 900 RECENT ADVANCES IN AMMONIA DRY EXPANSION APPLICATIONS 3976
JENSEN S. S.
Scantec Refrigeration Technologies Pty. Ltd., Australia

9:50 412 DETECTION METHOD OF AMMONIA LEAKAGE FROM LIQUID LINE OF COLD STORAGE REFRIGERATION SYSTEM BASED ON PRESSURE AND FLOW RATE 3984

TIAN S.(*,**), DU J.(***), GAO Y.(*,**), SHAO S.(*), TANG M.(*), ZOU H.(*)

(*) Beijing Key Laboratory of Thermal Science and Technology, Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China, (***) Henan University of Animal Husbandry and Economy, China

GAS LIQUIFACTION

A2-Fr-1 Room 418

Chairs: SARKAR S. C. *(Centre for Rural & Cryogenic Technologies, Jadavpur University, India)*
PODDUBNA M. *(Institute of Refrigeration, Cryotechnology and Ecoenergetics, Ukraine)*

8:30 291 A SMALL-SCALE NATURAL GAS LIQUEFACTION PROCESS UTILIZING THE PRESSURE ENERGY OF THE HIGH-PRESSURE PIPELINES 3992

TAN H., ZHENG J., SUN N., LI Y.

Department of Refrigeration and Cryogenic Engineering, School of Energy and Power Engineering, Xi'an Jiaotong University, China

8:50 446 THE EXERGY ANALYSIS OF NGE-MR NATURAL GAS LIQUEFACTION PROCESS 3999

WANG X., WU J., MENG X., BI S.

Key Laboratory of Thermo-Fluid Science and Engineering, Ministry of Education, Xi'an Jiaotong University, China

9:10 553 EXERGY ANALYSIS OF AN ETHYLENE BOG RE-LIQUEFACTION SYSTEM 4007

OUADHA A., BELADJINE B. M.

Département de Génie Maritime, Faculté de Génie Mécanique, Université des Sciences et de la Technologie Mohamed BOUDIAF d'Oran (USTO-MB), Algeria

9:30 504 THE FEASIBILITY OF LIQUID BIOGAS (LBG) IN ITALY 4018

ARTECONI A.(*), SPITONI M.(**), POLONARA F.(**)

(*) Università Telematica e-Campus, Italy, (**) Dipartimento di Ingegneria Industriale e Scienze Matematiche, Università Politecnica delle Marche, Italy

WORKSHOP: IIR WORKING PARTY ON LIFE CYCLE CLIMATE PERFORMANCE EVALUATION

WS11-Fr-1 Room 304

Chair: HWANG Y. *(University of Maryland, IIR LCCP WP, United States)*

CONDENSATION(2)
B1-Fr-2a Room 301

Chairs: BUTRYMOWICZ D. *(Bialystok University of Technology, Poland)*
MIYARA A. *(Saga University, Japan)*

10:30 711 TWO PHASE HEAT TRANSFER AND FLOW REGIMES OF R134A AND R410A DURING CONDENSATION IN HORIZONTAL MICRO-FIN TUBES 4024
KUKREJA R.(*), JAIN S.(**), AGGARWAL R. S.(***)
(*) Department of Mechanical Engineering, National Institute of Technology, India, (**) Department of Mechanical Engineering, Indian Institute of Technology, India, (***) HCFC Phase-out, Project "Montreal Protocol" Ozone Cell, India Habitat Centre, India

10:50 163 EXPERIMENTAL STUDY ON CONDENSATION HEAT TRANSFER OF R32/R290 MIXTURE IN HORIZONTAL TUBES 4032
HAN B., LIU F., CAI D., TIAN Q., HE G.
School of Energy and Power Engineering, Huazhong University of Science and Technology, China

11:10 174 MODELLING OF IN-TUBE BINARY MIXTURES CONDENSATION IN ANNULAR-MIST FLOW WITH ENTRAINMENT AND DEPOSITION 4040
DENG H., FERNANDINO M., DORAO C. A.
Norwegian University of Science and Technology, Norway

11:30 246 NUMERICAL MODEL FOR WATER VAPOUR CONDENSATION ON HYDROPHILIC COATING ENHCANCED FIN SURFACE UNDER DEHUMIDIFYING CONDITION 4048
ZHUANG D.(*), YANG Y.(*), DING G.(*), HU H.(*), FUJINO H.(**), INOUE S.(**)
(*) Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China, (**) Daikin Industries, Ltd., Japan

11:50 260 NUMERICAL SIMUKATION OF NITROGEN CONDENSATION FLOW IN A CRYOGENI NOZZLE 4056
WAN S., GUOQING L., LU N., SHUANGTAO C., YU H.
State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, China

FROST(2)
B1-Fr-2b Room 303

Chairs: CHO K. *(Sungkyunkwan University, South Korea)*
ENOKI K. *(The University of Electro-Communications, Japan)*

10:30 18 LUMPED HEAT AND MASS TRANSFER MODEL OF THE FROST FORMATION PROCESS 4062
MOHS W. F.(*), KULACKI F. A.(**)
(*) SKOPE Ind Ltd., New Zealand, (**) Department of Mechanical Engineering, University of Minnesota, United States

10:50 35 THERMAL CONDUCTIVITY OF FROST: LITERATURE REVIEW AND CORRELATION OF DATA 4070
NEGRELLI S., HERMES C. J. L.
Laboratory of Thermodynamics and Thermophysics, Federal University of Paraná, Brazil

11:10 441 FLAT-TUBE HEAT EXCHANGER MODELING UNDER FROSTING CONDITIONS FOR AN ELECTRIC VEHICLE HEAT PUMP 4078
BREQUE F., NEMER M.
MINES ParisTech, PSL Research University, Center for energy Efficiency of Systems, France

11:30 28 NUMERICAL ANALYSIS OF THE FROSTING PERFORMANCE OF THE AIR-SIDE OF A HEAT PUMP 4086
POPOVAC M., SEICHTER S., BENOVSKY P., FLECKL T., REICHL C.
Austrian Institute of Technology, Energy Department, Austria

11:50 118 EXPERIMENTAL STUDY OF HEAT AND MASS TRANSFER IN MODIFIED ICE STRUCTURES RESULTED FROM DIFFUSION OF POLYMERIC COMPOUNDS USED FOR SPORTS ICE OBJECTS 4094
GONCHAROVA G.(*), USTUGOVA T.(*), NIKIFOROVA I.(*), RAZOMASOV N.(**)
(*) GP "Refrigerating - Engineering Center", Russia, (**) Moscow State Technical University, Russia

HEAT-PUMP BASED ENERGY RECOVERY SYSTEM(2) / SORPTION SYSTEMS (ABSORPTION, ADSORPTION, DEC)(3)

E2-Fr-2 Room 313+314

Chairs: YAMAGUCHI S. *(Waseda University, Japan)*
TBD

10:30 848 INFLUENCE OF GROUNDWATER FLOW ON IMPLEMENTATION OF DISTRIBUTED THERMAL RESPONSE TEST 4102
BOBAN L., LEPOŠA L., SOLDO V., GROZDEK M.
University of Zagreb - Faculty of Mechanical Engineering and Naval Architecture, Croatia

10:50 155 A NEW GROUND-COUPLED HEAT PUMP SYSTEM INTEGRATED WITH MULTI-MODE AIR-WATER HEAT EXCHANGER TO ELIMINATE THERMAL IMBALANCE 4110
YOU T., SHI W., WU W., WANG B., LI X.
Department of Building Science, School of Architecture, Tsinghua University, China

11:10 477 THERMAL PERFORMANCE OF GROUND SOURCE HEAT PUMPS THAT USE DIRECT EXPANSION SYSTEM 4118
TAKEDA T., TANAKA D., YOKOYAMA D., ISHIGURO S., FUNATANI S., ICHIMIYA K.
University of Yamanashi, Japan

11:30 764 ABSORPTION HEAT CONVERTER AND THE CHARACTERISTIC EQUATION METHOD 4128
CUDOK F., ZIEGLER F.
Technische Universität Berlin, Institute of Energy Conversion Engineering, Germany

11:50 719 MODELING AND EXPERIMENTAL INVESTIGATION OF A PILOT-SCALE ADSORPTION CHILLER USING LOW-TEMPERATURE HEAT FROM COGENERATION 4136
CHOROWSKI M., PYRKA P.
Wroclaw University of Technology, Department of Cryogenic, Aviation and Process Engineering, Poland

OTHERS(2)
E1-Fr-2 Room 411+412
Chairs: NAGAI T. *(Tokyo University of Science, Japan)*
MIYAOKA Y. *(Chubu Electric Power Co., Inc., Japan)*

10:30 94 THE TEMPERATURE CONTROL OF CHILLED WATER FOR THE CENTRAL AIR CONDITIONING SYSTEMS 4145
CHU M. H.(*), CHEN Y. W.(*), HUANG C. K.(*), YANG C. S.(**)
(*) TNU, Taiwan, (**) Far East University, Taiwan

10:50 415 RESEARCH ON DOMESTIC AIR CONDITIONERS LONG-TERM PERFORMANCE AND EVALUATION INDEX 4153
WU J., LIU C., LIANG Z., ZHANG C.
South China University of Technology, School of Mechanical and Automotive Engineering, China

11:10 597 EFFECT OF INSTALLATION FAULTS ON THE PERFORMANCE OF A SPLIT AIR CONDITIONER 4161
DOMANSKI P. A.(*), HENDERSON H. I.(**), PAYNE W. V.(*)
(*) National Institute of Standards and Technology, United States, (**) CDH Energy Corporation, United States

11:30 442 EFFECT OF ENERGY-SAVING LAMPS ON AIR-CONDITIONING LOAD BUSINESS-RELATED BUILDING 4169
MIYAOKA Y.(*), NAKAYAMA H.(*), HIROTA M.(**), ONISHI M.(**), YOSHIZAWA N.(***), TADOKORO T.(***)
(*) Chubu Electric Power Co., Inc., Japan, (**) Mie University, Department of Mechanical Engineering, Japan, (**) Tokyo University of Science, Department of Architecture, Japan

11:50 942 INVESTIGATION OF THE DISPERSION STABILITY CHARACTERISTICS OF NANO-COMPOSITE PCM FOR USE IN A STORAGE TANK OF CONVENTIONAL AIR-CONDITIONING SYSTEM 4176
LI X.-Y., ZHAO Q., QU D., LI T., LI K., MA B.
School of Energy and Building Engineering, Harbin University of Commerce, China

OTHERS(2)
B2-Fr-2a Room 413
Chairs: TAKAISHI Y. *(Kanagawa Institute of Technology, Japan)*
WU J. Y. *(Shanghai Jiao Tong University, China)*

10:30 759 FAULT DETECTION AND DIAGNOSIS OF A REFRIGERATION SYSTEM USING PROBABILISTIC NEURAL NETWORK 4183
LIANG Q., HAN H., CUI X., REN H.
Institute of Refrigeration and Cryogenics, School of Energy and Power Engineering, University of Shanghai for Science and Technology, China

10:50 294 STUDY ON THE SUPPORT VECTOR DATA DESCRIPTION (SVDD)-BASED CHILLER SENSOR FAULT DETECTION EFFICIENCIES 4191
LI G.(*), HU Y.(*), CHEN H.(*), LI H.(**)
(*) School of Energy and Power Engineering, Huazhong University of Science and Technology, China, (**) University of Nebraska-Lincoln, United States

11:10 498 ANALYSIS OF LEAKAGE OF REFRIGERANTS IN REFRIGERATED INSTALLATIONS 4202
DEVIN E.(*), MICHINEAU T.(*), FOURNAISON L.(**), DELAHAYE A.(**), LEDUCQ D.(**), HUNLEDE R.(**)
(*) Cemafroid, France, (**) Irstea, France

11:30 521 SOUND PREFERENCE DEVELOPMENT AND CORRELATION TO SERVICE INCIDENCE RATE 4209
HARDESTY T.(*), CERRATO G.(**), FREEMAN T.(**), FRANK E.(**)
(*) Sub-Zero Inc., United States, (**) Sound Answers, United States

11:50 868 SIMULATOR FAILURES OF REFRIGERATION SYSTEMS: INNOVATIVE TEACHING TOOL SIMULATEUR DES PANNES DES INSTALLATIONS FRIGORIFIQUES: OUTIL PEDAGOGIQUE INNOVANT 4215
BOUZRARA A.(*), KAIRAOUANI L.(**), NEHDI E.(**)
(*) ISPA, Tunisia, (**) ENIT, Tunisia

CO2 SYSTEM
B2-Fr-2b Room 414+415

Chairs: HIROTA M. *(Mie University, Japan)*
FIKIIN K. *(Technical University of Sofia, Bulgaria)*

10:30 15 CO_2 AS A REFRIGERANT – START RIGHT AWAY! 4223
JAVERSCHEK O.(*), CRAIG J.(**), XIAO A.(**)
(*) BITZER Kühlmaschinenbau GmbH, Germany, (**) BITZER Australia Pty. Ltd., Australia

10:50 168 R744 REFRIGERATION TECHNOLOGIES FOR SUPERMARKETS IN WARM CLIMATES 4234
HAFNER A., HEMMINGSEN A. K.
SINTEF Energy Research, Norway

11:10 530 THEORETICAL ANALYSIS OF CO_2 TRANS-CRITICAL SYSTEM WITH PARALLEL COMPRESSION FOR HEAT RECOVERY AND AIR CONDITIONING IN SUPERMARKETS 4242
KARAMPOUR M., SAWALHA S.
Royal Institute of Technology (KTH), Sweden

11:30 605 EXPERIMENTAL INVESTIGATION ON THE USE OF INTERNAL HEAT EXCHANGERS IN VARIABLE-CAPACITY CARBON DIOXIDE REFRIGERATING SYSTEMS 4250
DE CARVALHO B. Y. K.(*), MELO C.(*), PEREIRA R. H.(**)
(*) POLO – Research Laboratories for Emerging Technologies in Cooling and Thermophysics, Federal University of Santa Catarina, Department of Mechanical Engineering, Brazil, (**) The Coca-Cola Company, United States

CO2
D1-Fr-2 Room 416+417

Chairs: FOSTER A. M. *(London South Bank University, United Kingdom)*
KOJIMA S. *(Mitsubishi Heavy Industries Air-Conditioning & Refrigeration Corporation, Japan)*

10:30 272 LOW TEMPERATURE HEAT STORAGES IN CO_2 SUPERMARKET REFRIGERATION SYSTEMS 4258
FIDORRA N.(*), HAFNER A.(**), MINETTO S.(***), KÖHLER J.(*)
(*) University of Braunschweig, Germany, (**) SINTEF Energy Research, Norway, (***) National Research Council -Construction Technologies Institute, Italy

10:50 303 LOW-CHARGE PROPANE REFRIGERATION SYSTEM TECHNOLOGY FOR SINGLE AND MULTI-DOOR BOTTLE COOLERS 4266
PADILLA FUENTES Y.(*), HRNJAK P.(*,**), ELBEL S.(*,**)
(*) Creative Thermal Solutions, Inc., United States, (**) University of Illinois at Urbana-Champaign, Department of Mechanical Science and Engineering, United States

11:10 305 HIGH-EFFICIENCY, LOW-COST GLASS DOOR MERCHANDISERS USING TRANSCRITICAL CARBON DIOXIDE 4274
PADILLA FUENTES Y.(*), HRNJAK P.(*,**), ELBEL S.(*,**)
(*) Creative Thermal Solutions, Inc., United States, (**) University of Illinois at Urbana-Champaign, Department of Mechanical Science and Engineering, United States

11:30 339 WATER STORAGE TO IMPROVE THE EFFICIENCY OF CO_2 COMMERCIAL REFRIGERATION SYSTEMS 4282
POLZOT A., D'AGARO P., GULLO P., CORTELLA G.
DIEG - University of Udine, Italy

11:50 652 PERFORMANCE INDICATORS FOR ENERGY EFFICIENT SUPERMARKET BUILDINGS 4290
VAN DER SLUIS S.(*), LINDBERG U.(**), LANE A.-L.(**), ARIAS J.(***)
(*) Saint Trofee, Netherlands, (**) SP Technical Research Institute of Sweden, Sweden, (***) KTH Royal Institute of Technology, Sweden

LIQUID HYDROGEN AND AIR-SEPARETION
A2-Fr-2 Room 418

Chairs: OHIRA K. *(Institute of Fluid Science, Tohoku University, Japan)*
TAN H. *(Xi'an Jiaotong University, China)*

10:30 KEYNOTE DEVELOPMENT FOR ENERGY CARRIER WITH LIQUID HYDROGEN FROM OVERSEAS 4298
NISHIMURA M., KAMIYA S., HARADA E.
Kawasaki Heavy Industries, Ltd., Japan

11:10 395 MODELING OF CRYOGENIC AIR SEPARATION UNIT USING AN OBJECT-ORIENTED APPROACH AND MODELICA-BASED MODE 4307
TIAN Q.(*), HE G.(*), CAI D.(*), TANG W.(*), CHEN L.(**)
(*) School of Energy and Power Engineering, Huazhong University of Science and Technology, China, (**) CAD Center, Huazhong University of Science and Technology, China

11:30 819 A PARALLEL CONNECTION DEVICE TO REDUCE NONUNIFORM FLOW DISTRIBUTION IN THE LARGE-SCALE VERTICAL RADIAL FLOW ADSORBER 4315
RUI D., CHEN Y., ZHANG X., QIU L., ZHANG X.
Institute of Refrigeration and Cryogenics, Zhejiang University, China

WORKSHOP: ELICiT EU PROJECT
WS12-Fr-2 Room 304

Chairs: PASTORE A. *(CAMFRIDGE, United Kingdom)*
COULOMB D. *(IIR, France)*

CONDENSATION(3)

B1-Fr-3a Room 301

Chairs: ONAKA Y. *(Mitubishi Electric Corporation, Japan)*
OH J. *(Chonnam National University, South Korea)*

13:30 361 CONDENSATION OF R1234ze(Z) INSIDE A VERTICAL PLATE-FIN HEAT EXCHANGER 4323
FUKUDA S.(*), ZHANG H.(**), TAKATA N.(**), MATSUMOTO T.(***), KOYAMA S.(*,****)
(*) Faculty of Engineering Sciences, Kyushu University, Japan, (**) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan, (***) Faculty of Engineering, Kyushu University, Japan, (****) International Institute for Carbon-Neutral Energy Research, Kyushu University, Japan

13:50 547 PERFORMANCE OF NEW MICROCHANNEL EVAPORATORS AND CONDENSERS FOR AIR CONDITIONING EQUIPMENT 4331
ROSSATO M.(*), CHINELLATO F.(*), BERNARDINELLO S.(*), DEL COL D.(*)
(*) Department of Industrial Engineering, University of Padova, Italy, (**) Blue Box Group S.r.l. – Swegon Group, Italy

14:10 906 ANALYSIS OF LIQUID FILM CHARACTERISTICS FOR GAS-LIQUID ANNULAR FLOW IN MICRO-CHANNEL 4339
PENG H., YOSHINAGA Y., DANG C., HIHARA E.
Department of Human and Engineered Environment, Graduate School of Frontier Sciences, The University of Tokyo, Japan

14:30 287 EVALUATION OF SINGLE PHASE HEAT TRANSFER CHARACTERISTICS INSIDE MULTIPORT MINICHANNEL 4347
CHIEN N.-B.(*), CHOI K.-I.(**), OH J.-T.(**), CHO H.(***), KIM T.(***), KIM J.(***), LEE C.(***)
(*) Graduate School, Chonnam National University, South Korea, (**) Department of Refrigeration and Air Conditioning Engineering, Chonnam National University, South Korea, (***) Advanced R&D Team, Digital Appliances, Samsung Electronics, South Korea

14:50 780 HEAT TRANSFER PERFORMANCE OF PULSATING HEAT PIPE WITH WATER-ETHANOL MIXED WORKING FLUID 4353
SUI Y., CUI X., HAN H.
School of Energy and Power Engineering, University of Shanghai for Science & Technology, China

ICE SLURRY

B1-Fr-3b Room 303

Chairs: AKASAKA R. *(Kyushu Sangyo University, Japan)*
FUMOTO K. *(Hirosaki University, Japan)*

13:30 384 NUMERICAL SIMULATION ON THE FLOW BEHAVIOR OF ICE SLURRY IN PIPING SYSTEMS 4361
LIU S., HAO L.
Tianjin Key Laboratory of Refrigeration Technology, Tianjin University of Commerce, China

13:50 552 ICE SLURRY PRODUCTION SYSTEM WITH ABSORPTION TYPE VACUUM FREEZING PRINCIPLE 4368
ASAOKA T., ENDO Y., HUANG C.
Shinshu University, Japan

14:10 694 CONTROL OF SUPERCOOLING DEGREE DUE TO SURFACTANT 4374
FURUDATE Y., MATSUMOTO K., TSUBAKI D.
Chuo University, Japan

14:30 725 FLOW AND HEAT TRANSFER CHARACTERISTICS OF MICROENCAPSULATED PHASE CHANGE MATERIAL SLURRY IN HORIZONTAL TUBES 4381
ZHANG P., SHI X. J.
Institute of Refrigeration and Cryogenics, MOE Key Laboratory for Power Machinery and Engineering, Shanghai Jiao Tong University, China

14:50 529 THERMOPHYSICAL PROPERTIES OF PHASE CHANGE EMULSIONS PREPARED BY D-PHASE EMULSIFICATION METHOD 4389
MORIMOTO T., TOGASHI K., KUMANO H.
Department of Mechanical Engineering, Aoyama Gakuin University, Japan

SORPTION SYSTEMS (ABSORPTION, ADSORPTION, DEC)(4)
E2-Fr-3 Room 313+314

Chairs: TBD
SAITO K. *(Waseda University, Japan)*

13:30 431 SIMULATION ANALYSIS OF SOLUTION TRANSPORTATION ABSORPTION CHILLER WITH THE CAPACITY FROM 25RT TO 1000RT 4397
ENOKI K.(*), TANAKA S.(**), WATANABE F.(**), AKISAWA A.(**), UEDA Y.(**), TAKEI T.(**)
(*) The University of Electro-Communications, Japan, (**) Tokyo University of Agriculture and Technology, Japan

13:50 433 ANALYSIS OF A DIRECTLY FIRED SMALL-SCALE ABSORPTION HEAT PUMP WITH SOLUTION RECIRCULATION AND MULTIPLE FEED OF THE DESORBER 4405
WECHSLER R., RIEBERER R.
Institute of Thermal Engineering, Graz University of Technology, Austria

14:10 450 EXPERIMENTAL STUDY ON A THREE-BED TWO-STAGE ADSORPTION REFRIGERATION CYCLE USING FAM-Z01 AND Z05 ADSORBENTS 4413
TAKAHASHI F.(*), ENOKI K.(*), AKISAWA A.(*), KUBOKAWA S.(**), YOSHIE K.(**), YONEZAWA Y.(**)
(*) Tokyo University of Agriculture and Technology, Japan, (**) Mitsubishi Plastics, Japan

14:30 474 SORPTION AND DESORPTION OF WATER VAPOR ON CALCIUM CHLORIDE-ANODIZED ALUMINA COMPOSITE SORBENTS 4421
SUWA Y.(*), KUMITA M.(**), OTANI Y.(**)
(*) Graduate School of Natural Science and Technology, Kanazawa University, Japan, (**) College of Science and Engineering, School of Natural System, Kanazawa University, Japan

14:50 380 NUMERICAL AND SIMULATION ON NOZZLE PARAMETERS FOR HEAT PUMP SYSTEM USING THERMOBANK AND TWO-PHASE EJECTOR 4428
LE C. N.(*), CHOI G.(**), OH J.(**)
(*) Graduate school, Chonnam National University, South Korea, (**) Department of Refrigeration and Air Conditioning Engineering, Chonnam National University, South Korea

CRYOCOOLER
A1-Fr-3 Room 411+412

Chairs: ZHU S. *(Tongji University, China)*
HERZOG R. *(Institute of Air Handling and Refrigeration, ILK Dresden, Germany)*

13:30 KEYNOTE EXPANDING MARKET OF 4KGM CRYOCOOLER 4436
IKEYA Y.
Sumitomo Heavy Industries, Ltd., Japan

14:10 622 THERMODYNAMIC OPTIMIZATION OF A HELICALLY COILED HEAT EXCHANGER FOR JOULE-THOMSON REFRIGERATORS USING RESPONSE SURFACE METHODOLOGY 4448
LIU X.(*), LIU Y.(*), LI J.(**), CHEN J.(**)
(*) Key Laboratory of Thermo-Fluid Science and Engineering of MOE School of Energy and Power Engineering, Xi'an Jiaotong University, China, (**) Kunming Institute of Physics, China

14:30 139 STUDIES ON COILED WIRE FINNED HEAT EXCHANGERS OPERATING WITH WIDE BOILING MIXTURES 4455
KRUTHIVENTI S. S. H., VENKATARATHNAM G.
Refrigeration and Airconditioning Laboratory, Department of Mechanical Engineering, Indian Institute of Technology, India

14:50 850 NEW DESIGNS IN SPECIAL CRYO SYSTEMS AND MOBILE CRYOCOOLERS 4460
HERZOG R., KADE A., KLIER J., KLUPSCH M., SCHNEIDER M., SPOERL G.
Institut fuer Luft- und Kaeltetechnik gemeinnuetzige Gesellschaft mbH, Germany

VORTEX / HEAT EXCHANGE
B2-Fr-3a Room 413

Chairs: KOYAMA S. *(Kyushu University, Japan)*
TBD

13:30 275 CHARACTERIZATION OF HEAT TRANSFER IN R134-A SPRAY COOLING 4465
LIU J.(*), QIAN Y.(*), SHUANGTAO C.(**), HOU Y.(*), LIU X.(**)
(*) State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, China, (**) School of Energy and Power Engineering, Xi'an Jiaotong University, China

13:50 790 NEW TYPE OF ENERGY EFFICIENT HEAT EXCHAGNER FOR INDIRECTLY COOLED DISPLAY CABINETS 4473
HAGLUND STIGNOR C.(*), MARTIN SANTANA S.(**), LARSSON O.(*)
(*) SP Technical Research Institute of Sweden, Sweden, (**) Airec AB, Sweden

14:10 849 DEMONSTRATION OF FREE COOLING WITH CO_2 4481
HEERUP C.
Danish Technological Institute, Denmark

14:30 299 VORTEX TUBE HEAT BOOSTER TO IMPROVE PERFORMANCE OF HEAT DRIVEN COOLING CYCLES 4489
ZHU J., ELBEL S.
Air Conditioning and Refrigeration Center, Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign, United States

14:50 592 AN EXPERIMENTAL INVESTIGATION OF THE OPTIMUM GEOMETRY OF TWO NOZZLE COUNTER FLOW VORTEX TUBE 4497
VILHEKAR R., AGRAWAL N., NAIK S.
Department of Mechanical Engineering, Dr.Babasaheb Ambedkar Technological University, India

COOLING USE(1)
B2-Fr-3b Room 414+415

Chairs: NISHIMURA N. *(Osaka City University, Japan)*
RIGOLA J. *(Universitat Politècnica de Catalunya-BarcelonaTech, Spain)*

13:30 276 DEVELOPMENT OF AN INNOVATIVE RAW MILK DISPENSER BASED ON NANOFLUID TECHNOLOGY 4504
LONGO G. A., RIGHETTI G., ZILIO C.
University of Padova, Department of Management and Engineering, Italy

13:50 669 DEVELOPMENT OF THE CO_2 REFRIGERATED SHOWCASE 4512
ISHIKAWA T., TASHIRO Y.
Living Environment Systems Laboratory, Mitsubishi Electric Shizuoka Works, Japan

14:10 86 COMPREHENSIVE ASSESSMENT OF CENTRIFUGAL CHILLERS USING NEXT GENERATION REFRIGERANT R1233zd(E) 4515
KUJAK S., SCHULTZ K., MAJURIN J.
Ingersoll Rand, United States

14:30 788 CO_2 COOLING FOR PARTICLE DETECTORS: EXPERIENCES FROM THE CMS AND ATLAS DETECTOR SYSTEMS AT THE LHC, AND PROSPECTS FOR FUTURE UPGRADES 4523
BORTOLIN C.(*), CRESPO-LOPEZ O.(*), DAGUIN J.(*), GODLEWSKI J.(*), NOITE J.(*), OSTREGA M.(****), PAVIS S.(*), PETAGNA P.(*), POSTEMA H.(*), TROPEA P.(*), VERLAAT B.(**), VOGT S.(***), ZIMNY M.(****), ZWALINSKI L.(*)
(*) European Organization for Nuclear Research (CERN), Switzerland, (**) National Institute for Subatomic Physics (NIKHEF), Netherlands, (***) Max Planck Institute for Physics (MPI), Germany, (****) AGH University of Science and Technology, Poland

14:50 80 PERFORMANCES OF A REFRIGERATION COMPRESSED AIR DRYER USING A NATURAL REFRIGERANT (R-744) 4531
FAVERO C.
Hiross Zander Division, Parker Hannifin Manufacturing Srl, Italy

GLASS DISP / CABINET
D1-Fr-3 Room 416+417
Chairs: GIANNETTI N. *(Department of Applied Mechanics and Aerospace Engineering, Waseda University, Japan)*
HATTORI K. *(Mayekawa Mfg, Co., Ltd., Japan)*

13:30 749 A NOVEL PASSIVE DEFROST SYSTEM FOR A FROZEN RETAIL DISPLAY CABINET WITH A LOW EVAPORATOR 4540
FOSTER A.(*), CAMPBELL R.(**), DAVIES T.(**), EVANS J.(*)
(*) London South Bank University, United Kingdom, (**) Frigesco Ltd, Innovation Centre, University of Exeter, United Kingdom

13:50 486 USE OF PHASE CHANGE MATERIALS IN RETAIL DISPLAY CABINETS TO REDUCE THE EFFECT OF DEFROSTS 4548
FOSTER A.(*), ORLANDI M.(**), BROWN T.(*), EVANS J.(*)
(*) London South Bank University, United Kingdom, (**) Innovation Centre - Epta S.p.A, Italy

14:10 729 ENERGY SAVING POTENTIAL AT PARTIAL LOAD FOR VERTICAL GLASS DOOR REFRIGERATED DISPLAY CABINETS 4556
VALLÉE C.
Carrier Kältetechnik Deutschland GmbH, Germany

14:30 50 OPTIMAL CONFIGURATION OF COMPRESSORS IN INDUSTRIAL REFRIGERATION SYSTEMS BASED ON PART-LOAD 4562
ZHANG J.(*,**), WEI D.(***)
(*) Fujian Province Key Lab of Energy Cleaning Utilization and Development, Jimei University, China, (**) Cleaning Combustion and Energy Utilization Research Center of Fujian Province, Jimei University, China, (***) Fujian Snowman CO., LTD, China

TRUCK
D2-Fr-3 Room 418
Chairs: LAWTON R. *(Cambridge Refrigeration Technology, United Kingdom)*
OKU T. *(Mayekawa Mfg, Co., Ltd., Japan)*

13:30 PHARMACEUTICALS COLD CHAIN CHALLENGES 4567
KEYNOTE CAVALIER G.
Cemafroid, France

14:10 324 MODELLING AND DEVELOPMENT OF SUSTAINABLE REFRIGERATED ROAD TRANSPORT SYSTEMS 4587
FRANCIS C.(*), DAVIES G.(*), EVANS J.(*), MAUGHAN P.(**), SHERWOOD J.(**), MAIDMENT G.(*)
(*) London South Bank University, United Kingdom, (**) Hubbard Products Limited, United Kingdom

14:30 59 ASSESSMENT OF NEXT GENERATION REFRIGERANT R452A TO REPLACE R404A FOR TRANSPORT REFRIGERATION PRODUCTS 4595
KUJAK S.(*), BERGE J.(**), MAJURIN J.(*), KOLDA M., CROMBIE D.
(*) Ingersoll Rand, United States, (**) Thermo King, United States

14:50 436 NEW REFRIGERANT OPTIONS FOR R404A REPLACEMENT IN TRUCK REFRIGERATION SYSTEMS 4603
ZILIO C.(*), MANCIN S.(*), BROWN S. J.(**), LONGO G. A.(*)
(*) University of Padova, Department of Management and Engineering, Italy, (**) The Catholic University of America, School of Engineering, United States

WORKSHOP: MAGNETIC REFRIGERATION FOR COMMERCIAL REFRIGERATED APPLIANCES
WS13-Fr-3 Room 304
Chair: DELECOURT V. *(Cooltech Applications, France)*

FRIDAY, AUGUST 21 15:30-17:10

PLATE HEAT EXCHANGER(1)
B1-Fr-4a Room 301
Chairs: HIROTA M. *(Mie University, Japan)*
GARCÍA-CASCALES J. R. *(Technical University of Cartagena, Spain)*

15:30 687 FLOW CHARACTERISTICS OF AIR-WATER TWO PHASE FLOW IN A PLATE HEAT EXCHANGER 4611
MAHMUD M. S.(*), KAWAZOE A.(*), MUSTAGHFIRIN M. A.(**), KARIYA K.(*), MIYARA A.(*)
(*) Department of Mechanical Engineering, Saga University, Japan, (**) Surabaya Ship Building State Polythecnic, Indonesia

15:50 190 HFC32 VAPORISATION INSIDE A BRAZED PLATE HEAT EXCHANGER (BPHE) 4617
LONGO G. A., MANCIN S., RIGHETTI G., ZILIO C.
University of Padova, Department of Management and Engineering, Italy

16:10 189 A NEW MODEL FOR REFRIGERANT BOILING INSIDE A BRAZED PLATE HEAT EXCHANGER (BPHE) 4626
LONGO G. A., MANCIN S., RIGHETTI G., ZILIO C.
University of Padova, Department of Management and Engineering, Italy

16:30 551 FLOW BOILING OF R32 INSIDE A BRAZED PLATE HEAT EXCHANGER 4633
DEL COL D.(*), ROSSATO M.(*), CHINELLATO F.(*), MUZZOLON A.(**), ROSSETTO L.(*)
(*) Department of Industrial Engineering, University of Padova, Italy, (**) Alfa Laval SpA, Italy

16:50 847 MEASUREMENTS OF LOCAL HEAT TRANSFER COEFFICIENT DURING CONDENSATION AND EVAPORATION IN PLATE HEAT EXCHANGER 4641
KAWAZOE A., KARIYA K., MIYARA A.
Department of Mechanical Engineering, Saga University, Japan

CO2
B1-Fr-4b Room 303
Chairs: DANG C. *(The University of Tokyo, Japan)*
KONDOU C. *(Nagasaki University, Japan)*

15:30 225 EXPERMENTAL INVESTIGATION ON HEAT TRANSFER AND PRESSURE DROP CHARACTERISTICS OF SUPERCRITICAL CO_2 IN CIRCULAR TUBE 4648
XU X., WU Y., LIU C., WANG K.
Key Laboratory of Low-grade Energy Utilization Technologies and Systems, Chongqing University, Ministry of Education, China

15:50 326 EFFECTS OF INPUT PARAMETERS ON PRESSURE LOSS IN THE EVAPORATOR 4656
MAINA P., HUAN Z.
Tshwane University of Technology, South Africa

16:10 79 DESIGN AND TEST RESULTS OF A REFRIGERATION COMPRESSED AIR DRYER USING A NATURAL REFRIGERANT (R-744) 4664
FAVERO C.
Hiross Zander Division, Parker Hannifin Manufacturing Srl, Italy

16:30 390 OPTIMIZATION ANALYSIS ON R290 /CO2 CASCADE REFRIGERATION SYSTEM 4674
LIU S., CHEN Y., NING J.
Tianjin Key Laboratory of Refrigeration technology, Tianjin University of Commerce, China

INDUSTRIAL HEAT PUMPS(2) / RESIDENTIAL AND COMMERCIAL HEAT-PUMP SYSTEMS(5)

E2-Fr-4 Room 313+314

Chairs: KIMURA T. *(Japan Society of Refrigerating and Air Conditioning Engineers, Japan)*
SASAKI M. *(Tokyo Electric Power Company, Japan)*

15:30 824 HIGH EFFICIENT HEAT PUMP SYSTEM USING STORAGE TANKS TO INCREASE COP BY MEANS OF THE ISEC CONCEPT (PART II, THERMAL STORAGE SYSTEM) 4683
OLSEN L.(*), GAUNAA V.(**), MADSEN C.(*), OLESEN M. F.(*)
(*) Danish Technological Institute, Denmark, (**) Consultant, Denmark

15:50 851 PRELIMINARY STUDY ON ENERGY-SAVING PERFORMANCE OF A TRANSCRITICAL CO_2 HEAT PUMP FOR FOOD PROCESSING INDUSTRY 4691
LIU Y.(*,**), GROLL E. A.(**), YAZAWA K.(**), KURTULUS O.(**)
(*) University of Shanghai for Science & Technology, School of Energy and Power Engineering, China, (**) Purdue University, School of Mechanical Engineering, United States

16:10 822 GLOBAL TRENDS FOR CO_2 HEAT PUMPS – A STUDY OF MARKET, TECHNOLOGY AND POLICY DRIVERS IN JAPAN, CHINA, NORTH AMERICA AND EUROPE 4699
DUSEK J.(*), SKACANOVA K.(**), MASSON N.(*), MAO C.(**)
(*) shecco Japan K.K., Japan, (**) shecco, Belgium

16:30 943 EXPERIMENTAL STUDY ON SYSTEM PERFORMANCE OF ULTRA-LOW TEMPERATURE CASCADE REFRIGERATION SYSTEM USING CARBON DIOXIDE WITH TAPERED EVAPORATOR/SUBLIMATOR 4707
IWAMOTO Y.(*), YAMASAKI H.(*), NIU X.-D.(**), NEKSA P.(***), YAMAGUCHI H.(*)
(*) Department of Mechanical Engineering, Doshisha University, Japan, (**) Department of Mechatronics Engineering, Shantou University, China, (***) SINTEF Energy Research, Norway

16:50 944 THE ROLE OF HEAT PUMPS IN SMART GRIDS 4715
ZAMPOLLO M.(*), MADANI H.(**), LUNDQVIST P.(**)
(*) Politecnico di Milano, Italy, (**) KTH Royal Institute of Technology, Sweden

SMALL-SCALE CRYOCOOLER
A1-Fr-4 Room 411+412
Chairs: KURIYAMA T. *(TOSHIBA Corporation, Japan)*
XUE R. *(Xi'an Jiaotong University, China)*

15:30 661 PERFORMANCE INVESTIGATIONS ON 10W/60 K HIGH-CAPACITY, LIGHT-WEIGHT SINGLE-STAGE PULSE TUBE CRYOCOOLERS FOR SPACE APPLICATIONS 4724
DANG H. Z.(*), SONG Y. Y.(*), ZHOU B. L.(*), ZOU R. Q.(*), TAN J.(*,**), ZHANG L.(*,**), ZHAO Y. B.(*,**), GAO Z. Q.(*,**), BAO D. L.(*,**)
(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China

15:50 351 INVESTIGATIONS ON THE AUTOMATIC TEMPERATURE CONTROL ELECTRONICS OF THE SINGLE STAGE SPACE STIRLING-TYPE PULSE TUBE CRYOCOOLER 4732
TAN J.(*,**), DANG H.(*), ZHANG L.(*,**), ZHAO Y.(*,**), GAO Z.(*,**), BAO D.(*,**)
(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China

16:10 366 INVESTIGATIONS ON EFFECTS OF THE LINEAR COMPRESSOR'S OUTLET PHASE ANGLE ON THE PULSE TUBE CRYOCOOLER'S PERFORMANCE 4740
ZHANG L.(*,**), DANG H.(*), TAN J.(*,**), ZHAO Y.(*,**), GAO Z.(*,**), BAO D.(*,**)
(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Sciences, China

16:30 129 PULSE TUBE REFRIGERATOR WITH DISPLACER FOR NEAR ROOM TEMPERATURE OPERATION 4748
ZHU S.
School of Mechanical Engineering, Tongji University, China

16:50 263 INVESTIGATION ON THE MATCHING PERFORMANCE OF A SMALL CRYOGENIC AIR TURBOEXPANDER 4755
YANG S., LI B., LIU G., HOU Y., CHEN S.
State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, China

CYCLE CLIMATE
B2-Fr-4a Room 413
Chairs: WATANABE C. *(Chubu Electric Power Co., Inc., Japan)*
HAN H. *(University of Shanghai for Science and Technology, China)*

15:30 58 F-GAS II REGULATION AND REFRIGERANT EMISSION FORECASTS IN FRANCE LA F-GASII ET SON IMPACT SUR LES ÉMISSIONS DE FLUIDES FRIGORIGÈNES EN FRANCE À L'HORIZON 2035 4760
BARRAULT S., NEMER M.
MINES ParisTech, PSL Research University, CES - Center for Energy efficiency of Systems, France

15:50 424 LIFE CYCLE CLIMATE PERFORMANCE ANALYSIS OF SEWAGE SOURCE HEAT PUMP SYSTEMS 4768
CHEN X., ZHANG Z., ZHANG C., LI W., CHEN J.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

16:10 34 INNOVATIVE SELECTIVE CLIMATE CONTROL SYSTEM FOR HOUSEHOLD REFRIGERATING DEVICES 4775
BAIDAK Y.(*), BONDARENKO V.(**), KHMELNIUK M.(*), SMYK V.(***)
(*) Odessa national academy of food technologies, Ukraine, (**) Iceblick, Ltd., Ukraine, (***) Odessa Maritime Academy, Ukraine

16:30 932 COMPLIANCE WITH FLAMMABILITY REQUIREMENTS FOR AMMONIA REFRIGERATION SYSTEMS 4781
PEARSON A.(*), YOUNG M.(**)
(*) Star Refrigeration Ltd., United Kingdom, (**) Maurice Young Consulting, United Kingdom

COOLING USE(2) / OTHERS(3)
B2-Fr-4b Room 414+415

Chairs: ASAOKA T. *(Shinshu University, Japan)*
HAFNER A. *(SINTEF Energy Research, Norway)*

15:30 717 EXPERIMENTAL STUDY OF THE INFLUENCE OF CONSUMERS MOVEMENT PARALLEL TO THE FRONTAL OPENING OF MULTIDECK DISPLAY CASE ON THE EVAPORATOR'S THERMAL PERFORMANCE 4789
HEIDINGER G. G.(*), NASCIMENTO S. M.(*), GASPAR P. D.(**), SILVA P. D.(**)
(*) Eletrofrio Refrigeração Ltda, Brazil, (**) University of Beira Interior, Engineering Faculty, Department of Electromechanical Engineering, Portugal

15:50 221 COMPARATIVE ASSESSMENT OF HEAT PUMP CYCLE OPERATED WITH R32/R1234ze(E) AND R32/R1234yf MIXTURES 4797
KOJIMA H.(*), FUKUDA S.(**), KONDOU C.(**), TAKATA N.(**), KOYAMA S.(**,***)
(*) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan, (**) Faculty of Engineering Sciences, Kyushu University, Japan, (***) International Institute for Carbon-Neutral Energy Research, Kyushu University, Japan

16:10 532 MODELLING OF AMMONIA HEAT PUMP DESUPERHEATERS 4805
CHRISTENSEN S. W.(*), ELMEGAARD B.(*), MARKUSSEN W. B.(*), ROTHUIZEN E.(*), MADSEN C.(**)
(*) DTU Technical University of Denmark, Department of Mechanical Engineering, Denmark, (**) Danish Technological Institute, Denmark

16:30 857 NUMERICAL STUDIES ON PASSIVE VAPOR COMPRESSION CYCLE REGULATING ELEMENTS 4813
ABLANQUE N., OLIET C., RIGOLA J., PEREZ-SEGARRA C.-D.
Universitat Politècnica de Catalunya – BarcelonaTech (UPC), Heat and Mass Transfer Technological Center (CTTC), Spain

16:50 107 MODELING OF REFRIGERANT FLOW THROUGH ADIABATIC CAPILLARY TUBES USING NEURAL NETWORK AND RESPONSE SURFACE METHODOLOGY 4821
LI Z., SHAO L., YANG L., ZHANG C.
School of Mechanical Engineering, Tongji University, China

FOOD

D1-Fr-4 Room 416+417

Chairs: ELBEL S. *(University of Illinois, United States)*
JEONG J. *(Waseda University, Japan)*

15:30 173 ENERGY ANALYSIS AND HEAT LOADS CALCULATION APPROACH: APPLICATION TO AGRIFOOD INDUSTRIAL PREMISES 4829
GONÇALVES J.(*), NUNES J.(**), SILVA P. D.(*), GASPAR P. D.(*), PIRES L.(*)
(*) Engineering Faculty, University of Beira Interior, Portugal, (**) Agriculture School, Polytechnical Institute of Castelo Branco, Portugal

15:50 481 SPECIFIC ENERGY CONSUMPTION VALUES FOR VARIOUS REFRIGERATED FOOD COLD STORES 4836
EVANS J.(*), FOSTER A.(*), HUET J.-M.(**), REINHOLDT L.(**), FIKIIN K.(***), ZILIO C.(****), HOUSKA M.(*****), LANDFELD A.(*****), BOND C.(******), SCHEURS M.(*******), VAN SAMBEECK T.(********)
(*) Faculty of Engineering, Science and the Built Environment, London South Bank University, United Kingdom, (**) Danish Teknologisk Institut, Denmark, (***) Technical University of Sofia, Bulgaria, (****) University of Padova, Italy, (*****) Food Research Institute Prague, Czech (Republic), (******) Carbon Data Resources Ltd, United Kingdom, (*******) Catholic University College Limburg, Belgium, (********) Coldstore Expertise Center, Netherland

16:10 636 EVALUATION OF ENERGY SAVING SCHEMES IN AN APPLE COOL STORE USING COMPUTATIONAL FLUID DYNAMICS 4844
TSIGE A. A.(*), BESSEMANS N.(*), GWANPUA S. G.(*), SCHENK A.(**), DE ROECK A.(**), VERBOVEN P.(*), NICOLAI B. M.(*,**)
(*) BIOSYST-MeBioS, Katholieke Universiteit Leuven, Belgium, (**) Flanders Centre of Postharvest Technology, Belgium

16:30 177 OPPORTUNITIES FOR THE ENERGY EFFICIENCY IMPROVEMENT IN THE DAIRY FOOD SECTOR – THE CASE STUDY OF PORTUGUESE TRADITIONAL CHEESE INDUSTRIES 4852
NUNES J.(*), SILVA P. D.(**), ANDRADE L. P.(*), DOMINGUES C.(**), GASPAR P. D.(**)
(*) Agriculture School, Polytechnical Institute of Castelo Branco, Portugal, (**) Engineering Faculty, University of Beira Interior, Portugal

CONTAINER

D2-Fr-4 Room 418

Chairs: CAVALIER G. *(Cemafroid, France)*
HATTORI K. *(Mayekawa Mfg, Co., Ltd., Japan)*

15:30 132 STUDY ON THE CAPACITY CONTROL OF A NEWLY-DEVELOPED REFRIGERATION UNIT FOR MARINE CONTAINERS 4860
CHEN W.(*), HUA K.(*), YANG M.(*), ZHENG C.(**)
(*) School of Marine Engineering, Jimei University, China, (**) Fujian Provincial Key Laboratory of Naval Architecture and Ocean Engineering, China

15:50 540 CHILLING INJURY IN GREEN BANANAS DURING REFRIGERATED CONTAINER TRANSPORT 4866
LUKASSE L. J. S., BOER E. P. J.
Wageningen UR Food & Biobased Research, Netherlands

16:10 582 ALTERNATIVE LOWER GWP REFRIGERANTS FOR HFC-134A IN INTERMODAL REFRIGERATED CONTAINERS 4874
LAWTON A. R, RHODES C
Cambridge Refrigeration Technology, United Kingdom

16:30 314 MAPPING OF THE HEAT FLUX OF AN INSULATED SMALL CONTAINER BY INFRARED THERMOGRAPHY 4882
BISON P.(*), BORTOLIN A.(*), CADELANO G.(*), FERRARINI G.(*), LEI L.(**), MALDAGUE X.(**), ROSSI S.(*)
(*) ITC-CNR, Italy, (**) ECE Department, Université Laval, Canada

16:50 646 THERMAL REGULATING SYSTEM IN TEMPERATURE-CONTROLLED CONTAINERS 4889
KACIMI A., LABRANQUE G.
SOFRIGAM, France

WORKSHOP: MAGNETIC REFRIGERATION: MATERIALS & SYSTEMS FOR COMMERCIALIZATION
WS14-Fr-4 Room 304
Chair: RUSSEK S. L. *(Astronautics Corporation of America, United States)*

SATURDAY, AUGUST 22 8:30-10:10

PLATE HEAT EXCHANGER(2) / TWO-PHASE FLOW DISTRIBUTION
B1-Sa-1a Room 301
Chairs: LONGO G. A. *(University of Padova, Italy)*
KARIYA K. *(Saga University, Japan)*

8:30 74 DEVELOPMENT OF POLYMER PLATE HEAT EXCHANGERS FOR OUTDOORS TELECOM CABINET COOLING SYSTEMS 4895
YANG C.-Y., CHIANG L., LIN F.-C.
National Central University, Taiwan

8:50 356 LAYER ASSIGNMENT AND ARRANGEMENT OPTIMIZATION FOR MULTI-STREAM PLATE-FIN HEAT EXCHANGER DESIGN 4903
WANG Z.(*), LI Y.(*,**)
(*) Institute of Refrigeration and Cryogenics, Xi'an Jiaotong University, China, (**) State Key Laboratory of Multiphase Flow in Power Engineering, China

9:10 933 INVESTIGATION ON THE GAS-LIQUID TWO-PHASE FLOW CHARACTERISTICS OF HEADER DISTRIBUTION TYPE WITH USING THE R134a 4912
XIE P.(*), SATO R.(**), SAKAMOTO N.(**), KATSUTA M.(*)
(*) Waseda University, Graduate School of Environment and Energy Engineering, Japan, (**) Faculty of Science and Engineering, Waseda University, Japan

9:30 478 EXPERIMENTAL STUDY ON GAS-LIQUID FLOW DISTRIBUTIONS IN MULTI-PASS CHANNELS 4919
NODA N.(*), HIROTA M.(*), TSUCHIYA T.(**), KITAIDE Y.(**), MARUYAMA N.(*), NISHIMURA A.(*)
(*) Department of Mechanical Engineering, Mie University, Japan, (**) Fuji Electric Co. Ltd., Japan

9:50 840 COMPARATIVE STUDY OF THE USE OF COMPACT HEAT EXCHANGER OR A FIN-AND-TUBE COIL IN A HEAT PUMP 4927
GARCÍA-CASCALES J. R., HIDALGO-MOMPEÁN F., RAMÍREZ-BASALO M. A., ILLÁN-GOMÉZ F., VERA-GARCÍA F.
Universidad Politécnica de Cartagena, Spain

THERMOACOUSTIC REFRIGERATION
B1-Sa-1b Room 303

Chairs: INOUE N. *(Tokyo University of Marine Science and Technology, Japan)*
MOHS W. *(SKOPE Ind Ltd, New Zealand)*

8:30 528 DESIGN A TWO-STAGE LOOPED-TUBE THERMOACOUSTIC COOLER FOR THERMAL MANAGEMENT OF ENCLOSURES 4935
YAHYA S. G., MAO X., JAWORSKI A. J.
Faculty of Engineering, University of Leeds, United Kingdom

8:50 615 MODELING AND RSM OPTIMIZATION OF STANDING-WAVE THERMOACOUSTIC REFRIGERATOR 4943
YANG P., LIU X., LIU Y.
Key Laboratory of Thermo-Fluid Science and Engineering of MOE, School of Energy and Power Engineering, Xi'an Jiaotong University, China

9:10 522 NUMERICAL SIMULATION OF OSCILLATORY FLOW AND HEAT TRANSFER IN THE HEAT EXCHANGERS OF THERMOACOUSTIC SYSTEMS 4950
ILORI O. M., MAO X., JAWORSKI A. J.
Faculty of Engineering, University of Leeds, United Kingdom

9:30 514 OPTIMAL DESIGN OF A THERMOACOUSTIC SYSTEM COMPRISING OF A STANDING-WAVE ENGINE DRIVING A TRAVELLING-WAVE COOLER 4958
SAECHAN P.(*), MAO X.(**), JAWORSKI A. J.(**)
(*) Department of Mechanical and Aerospace Engineering, Faculty of Engineering, King Mongkut's University of Technology, Thailand, (**) Faculty of Engineering, University of Leeds, United Kingdom

9:50 526 CHARACTERIZATION OF INEXPENSIVE STACK MATERIALS FOR USE IN STANDING WAVE THERMOACOUSTIC REFRIGERATORS 4966
YAHYA S. G., MAO X., JAWORSKI A. J.
Faculty of Engineering, University of Leeds, United Kingdom

MISCELLANEOUS(1)
B1-Sa-1c Room 304

Chairs: VACEK V. *(Czech Technical University and Unicorn College in Prague, Czech (Republic))*
GASPAR P. O. *(University of Beira Interior, Portugal)*

8:30 728 FLOW CHARACTERISTICS OF TETRA-N-BUTYL AMMONIUM BROMIDE CLATHRATE HYDRATE SLURRY IN 90° ELBOW PIPE 4974
SHI X. J., ZHANG P.
Institute of Refrigeration and Cryogenics, MOE Key Laboratory for Power Machinery and Engineering, Shanghai Jiao Tong University, China

8:50 292 CO_2 HYDRATE SLURRY PRODUCTION IN A FLUIDIZED BED HEAT EXCHANGER 4982
ZHOU H., DE SERA I., INFANTE FERREIRA C.
Delft University of Technology, Netherlands

9:10 715 CONVECTIVE HEAT TRANSFER AND PRESSURE DROP OF CO_2 HYDRATE MIXTURE IN BURIED PIPELINES 4990
PRAH B., YUN R.
Hanbat National University, South Korea

9:30 378 INFLUENCE OF DIAMETER SIZE OF ALUMINUM FIBER MATERIALS ON HEAT STORAGE AND RELEASE ENHANCEMENT PROPERTIES OF LATENT HEAT STORAGE PARAFFIN WITH ALUMINUM FIBER MATERIALS 4998
HARUKI N., HORIBE A., SANO Y., HACHIYA K.
Graduate School of Natural Science and Technology, Okayama University, Japan

9:50 596 HEAT TRANSFER AT SUPERCRITICAL STATE FOR ORGANIC RANKINE APPLICATIONS 5006
LAZOVA M., KAYA A., HUISSEUNE H., DE PAEPE M.
Ghent University, Belgium

ENERGY EFFICIENCY(3)
E2-Sa-1 Room 313+314

Chairs: OHNO K. *(Waseda University, Japan)*
TBD

8:30 150 A PRELIMINARY STUDY OF THE PERFORMANCE ENHANCEMENT OF A DUAL-MODE HEAT PUMP USING AN EJECTOR 5014
LIU F.(*), GROLL E.(**)
(*) Shanghai University of Electric Power, China, (**) School of Mechanical Engineering, Ray W. Herrick Laboratories, Purdue University, United States

8:50 531 DESIGN OF TWO-STAGE THERMOACOUSTIC STIRLING ENGINE COUPLED WITH PUSH-PULL LINEAR ALTERNATOR FOR WASTE HEAT RECOVERY 5022
HAMOOD A., MAO X., JAWORSKI A. J.
Faculty of Engineering, University of Leeds, United Kingdom

9:10 647 THERMALLY DRIVEN HYBRID EJECTOR HEATING AND COOLING TECHNOLOGIES: AN INNOVATIVE SOLUTION BEYOND COMPARISON 5030
BUYADGIE O.(*,**), BUYADGIE D.(**), DRAKHNIA O.(**)
(*) V.S. Martynovsky Institute of Refrigeration, Cryogenic Technologies and Eco Energetics/WILSON, Ukraine, (**) WILSON/SRTC, Ukraine

9:30 913 STUDIES ON THE PERFORMANCE CHARACTERISTICS OF THE VAPOR INJECTION HEAT PUMP SYSTEM IN ELECTRIC VEHICLE 5037
CHOI Y. U., KIM M. S., KIM M. S.
Department of Mechanical Engineering, Seoul National University, South Korea

9:50 201 RESEARCH ON EJECTOR-ABSORPTION AMMONIA-WATER HEAT PUMP CYCLE 5045
LIANG Y., LI S.
School of Energy and Environment, Southeast University, China

CRYOGENIC SYSTEM
A1-Sa-1 Room 411+412

Chairs: DANG H. *(National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China)*
OKAMURA T. *(Tokyo Institute of Technology, Japan)*

8:30 288 STATUS OF THE NICA CRYOGENICS AT JINR 5052
EMELIANOV N., AGAPOV N., MITROFANOVA J., NIKIFOROV D., KONSTANTINOV A.
JINR, Russia

8:50 248 STATUS AND RECENT DEVELOPMENT OF THE NITROGEN CRYOGENIC SYSTEM FOR THE NICA ACCELERATOR COMPLEX AT JINR 5059
MITROFANOVA I.(*), AGAPOV N.(*), EMELIANOV N.(*), KRAKOVSKY B.(**), POPOV O.(**), UDUT V.(**)
(*) JINR, Russia, (**) JSC "NPO GELIYMASH", Russia

9:10 771 PRESSURE-DROP REDUCTION AND HEAT-TRANSFER DETERIORATION OF SLUSH NITROGEN IN TRIANGULAR PIPE FLOW 5067
OHIRA K.(*), OKUYAMA J.(*), TAKAHASHI K.(*), AOKI I.(**)
(*) Institute of Fluid Science, Tohoku University, Japan, (**) JECC Torisha Co., Ltd., Japan

9:30 620 NUMERICAL STUDY OF THE DYNAMIC PRESSURIZATION IN A CRYOGENIC STORAGE TANK 5075
WU R.(*), LIU Y.(*), WANG T.(**), WANG L.(**), YE W.(**), YANG P.(*)
(*) Key Laboratory of Thermo-Fluid Science and Engineering of MOE, School of Energy and Power Engineering, Xi'an Jiaotong University, China, (**) Key Laboratory of Vacuum Physics and Cryogenic Technology, Lanzhou Institute of Physics, China

CRYOBIOLOGY(1)
C1-Sa-1 Room 413

Chairs: TBD
WATANABE M. *(Toho University Omori Medical Center, Japan)*

8:30 333 INFRARED DIFFERENTIAL THERMAL ANALYSIS (IDTA) OF MULTIPLE FREEZING PROCESSES 5083
ZARAGOTAS D., LIOLIOS N. T., ANASTASSOPOULOS E.
TEI of Thessaly, Greece

8:50 372 EFFECTS OF ICE SEEDING TEMPERATURE ON INTRACELLULAR FREEZING OF CELLS 5090
WANG Y., ZHU K.
Tianjin Key Laboratory of Refrigeration Technology, Tianjin University of Commerce, China

9:10 375 EVALUATION OF EXTRACELLULAR ICE FORMATION AFFECTING CELLS IN SUSPENDED AND ATTACHED STATE 5095
ZHU K., WANG Y.
Tianjin Key Laboratory of Refrigeration Technology,Tianjin University of Commerce, China

OTHERS(4)
B2-Sa-1 Room 414+415
Chairs: KATSUTA M. *(Waseda University, Japan)*
HIRAO T. *(Mitsubishi Heavy Industries, Ltd., Japan)*

8:30 46 EXPERIMENTAL AND NUMERICAL INVESTIGATION ON A NEW TYPE DISTRIBUTOR FOR R410A AIR CONDITIONER 5103
ZHANG C., ZHU J., LI Z., NEW M., CHEN J.
Institute of Refrigeration and Cryogenics Shanghai Jiaotong University, China

8:50 144 MECHANICAL INTEGRITY FOR PIPING AND VESSELS IN INDUSTRIAL REFRIGERATION SYSTEMS 5111
REINDL D., DETTMERS D.
University of Wisconsin-Madison, Industrial Refrigeration Consortium, United States

9:10 376 INVESTIGATION ON EFFECTIVE THERMAL CONDUCTIVITY OF MH WITH ALUMINIUM FOAM SHEET AND ITS APPLICATION IN A METAL-HYDROGEN REACTOR 5118
LIN K.-T.(*), YANG Y.(*), BAE S.-C.(**), KATSUTA M.(*)
(*) Department of Modern Mechanical Engineering, Waseda University, Japan, (**) Environmental Research Institute, Waseda University, Japan

9:30 566 INTEGRATION OF A LATENT HEAT STORAGE IN VRF SYSTEMS FOR HEATING AND COOLING WITH ENHANCED FLEXIBILITY AND EFFICIENCY 5126
LOISTL F., SCHWEIGLER C.
University of Applied Sciences Munich, Cooperative Graduate Center "Building Services Engineering & Energy Efficiency", Germany

CYCLE
D1-Sa-1 Room 416+417
Chairs: CLELAND D. *(Massey University, New Zealand)*
IWAMOTO Y. *(Doshisha University, Japan)*

8:30 360 EFFECT OF FORCED-AIR COOLING, LOW TEMPERATURE STORAGE AND TRANSPORTATION, FOUR RETAILING METHODS ON QUALITY OF PEARS 5135
YAN C.(*,**), LIU S.(*,**), JIA L.(*), KAN Z.(*), WANG D.(*)
(*) Beijing Vegetable Research Center, Beijing Academy of Agriculture and Forestry Sciences, National Engineering Research Center for Vegetables, China, (**) College of Food Science and Technology, Shanghai Ocean University, China

8:50 179 CASCADE REFRIGERATION SYSTEM WITH INVERSE BRAYTON CYCLE ON THE COLD SIDE 5142
GIANNETTI N.(*), MILAZZO A.(**), ROCCHETTI A.(**)
(*) Waseda University, Department of Applied Mechanics and Aerospace Engineering, Japan, (**) University of Florence, Department of Industrial Engineering, Italy

9:10 667 USE OF ZEOTROPIC BLENDS IN FLOODED REFRIGERATION LOOPS : CONSEQUENCES AND LIMITS 5150
GUILPART J.
IIR, MF Conseil, France

OTHERS
D2-Sa-1 Room 418
Chairs: LUKASSE L. *(Wageningen University & Research, Netherlands)*
YOSHIDA Y. *(Hitachi Appliances, Inc., Japan)*

8:30 688 EXPERIMENTAL INVESTIGATION OF ENERGY BALANCE DURING THE DOOR OPENING OF A REFRIGERATED TRUCK 5158
LAFAYE DE MICHEAUX T., SARTRE V., BONJOUR J.
CETHIL UMR5008, Université de Lyon, CNRS, INSA-Lyon, University Lyon 1, France

8:50 426 NEW APPROACHES FOR THE ENVIRONMENTAL CONTROL SYSTEM IN AIRCRAFTS WITH THE APPLICATION OF A VAPOR COMPRESSION CYCLE 5166
GOLLE S.(*), HESSE U.(*), KLIMPEL F.(**)
(*) Technische Universität Dresden, Institut für Energietechnik, Bitzer-Stiftungsprofessur für Kälte-, Kryo- und Kompressorentechnik, Germany, (**) Airbus Operations GmbH, Germany

9:10 766 DEVELOPMENT OF A NOVEL REFRIGERATED TRANSPORT SYSTEM USING A COMBINATION OF LIQUID NITROGEN EXPANSION AND MECHANICAL VAPOUR COMPRESSION 5174
TEYSSANDIER E.(*), METCALF P.(*), OWEN N.(*), LAWTON R.(**), MYNOTT T.(**), L'HEUREUX Z.(***)
(*) The Dearman Engine co, United Kingdom, (**) Cambridge Refrigeration Technology, United Kingdom, (***) Lenfest Center for Sustainable Energy, Earth Institute, Department of Earth and Environmental Engineering, Columbia University, United States

9:30 533 MEASUREMENT OF TEMPERATURE HOMOGENEITY IN EQUIPMENT FOR PHARMACEUTICALS TRANSPORT UNDER CONTROLLED TEMPERATURE 5182
CAVALIER G., BOUDET N., BONED M.
Cemafroid, France

SATURDAY, AUGUST 22 10:30-11:30

NANOFLUIDS
B1-Sa-2a Room 301
Chairs: ROSSETTO L. *(Department of Ingegneria Industriale, University of Padova, Italy)*
JIGE D. *(Tokyo University of Marine Science and Technology, Japan)*

10:30 802 EXPERIMENTAL RESEARCH ON VISCOSITY OF AL2O3 - H2O NANOFLUIDS 5191
LIU B., MA X., CAI B.
Tianjin Key Lab of Refrigeration Technology, Tianjin University of Commerce, China

10:50 217 PREDICTION MODEL OF THE AVERAGE SIZE OF AGGREGATE IN NANOREFRIGERANT 5200
LIN L.(*), PENG H.(**), DING G.(*)
(*) Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, Shanghai, China, (**) Department of Energy and Power Engineering, Beijing University of Civil Engineering and Architecture, China

11:10 318 AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE COMPRESSOR OIL AND NANOPARTICLES ADMIXTURES INFLUENCE ON THE PERFORMANCE OF THE COMPRESSOR SYSTEMS 5208

CHEN G.(*), ZHELEZNY V.(**), SHESTOPALOV K.(*,**),
LUKIANOV N.(**), POLYUGANICH M.(**)
(*) Ningbo Institute of Technology, Zhejiang University, China, (**) Department of Thermophysics and Applied Ecology, Odessa National Academy of Food Technologies, Ukraine

CFD
B1-Sa-2b Room 303

Chairs: GARCÍA-CASCALES J. R. *(Technical University of Cartagena, Spain)*
HARUKI N. *(Okayama University, Japan)*

10:30 904 SIMULATION OF THE DROPLET PARAMETERS CHANGING ALONG THE FLOW 5216

CHANG S.(*), LENG M.(*), DANG C.(**), JIN J.(*)
(*) Beihang University, China, (**) The University of Tokyo, Japan

10:50 176 3D AND TRANSIENT NUMERICAL MODELING OF DOOR OPENING AND CLOSING PROCESSES AND ITS INFLUENCE ON THERMAL PERFORMANCE OF COLD ROOMS 5224

CARNEIRO R., GASPAR P. D., SILVA P. D.
University of Beira Interior, Edifício I das Engenharias Calçada Fonte do Lameiro nº 1, Portugal

11:10 523 CFD STUDY OF OSCILLATORY FLOW THROUGH 90º BENDS OF THERMOACOUSTIC DEVICES 5232

ILORI O. M., MAO X., JAWORSKI A. J.
Faculty of Engineering, University of Leeds, United Kingdom

MISCELLANEOUS(2)
B1-Sa-2c Room 304

Chairs: YUN R. *(Hanbat National University, South Korea)*
HIGASHI Y. *(Iwaki Meisei University, Japan)*

10:30 341 THE AIRCOOLER DEVICE – A FLEXIBLE AND MOBILE COOLING SOLUTION FOR LOWER LEVEL HEAT LOADS 5240

VACEK V.(*,**) , DOUBEK M.(*)
(*) Czech Technical University in Prague, Department of Physics, Czech (Republic), (**) Unicorn College, Czech (Republic)

10:50 579 EXPERIMENTAL STUDY OF THE WATER EVAPORATION RATE ON STAINLESS STEEL PLATE IN A WIND TUNNEL 5248

LECOQ L.(*,**), FLICK D.(**,***), LAGUERRE O.(*)
(*) Irstea, UR GPAN, France, (**) AgroParisTech, UMR1145 Ingénierie Procédés Aliments, France, (***) INRA, UMR1145 Ingénierie Procédés Aliments, France

11:10 572 SIMPLIFIED HEAT AND MASS TRANSFER MODELING IN A FOOD PROCESSING PLANT 5256

LECOQ L.(*,**,***), FLICK D.(**,***), DERENS E.(*), HOANG H. M.(*), LAGUERRE O.(*)
(*) Irstea, UR GPAN, France, (**) AgroParisTech, UMR1145 Ingénierie Procédés Aliments, France, (***) INRA, UMR1145 Ingénierie Procédés Aliments, France

OTHERS
E2-Sa-2 Room 313+314
Chairs: KIMURA T. *(Japan Society of Refrigerating and Air Conditioning Engineers, Japan)*
TBD

10:30 172 ENERGY PERFORMANCE OF CO_2 HYBRID GROUND-COUPLED HEAT PUMPING SYSTEM FOR HOTEL APPLICATION 5264
JIN Z.(*), EIKEVIK T. M.(*), NEKSÅ P.(**), HAFNER A.(**), DING G.(***)
(*) Norwegian University of Science and Technology, Norway, (**) SINTEF Energy Research, Norway, (***) Shanghai Jiao Tong University, China

10:50 4 A HYBRID MODEL FOR DYNAMIC SIMULATION OF AN AIR-COOLED HEAT PUMP SYSTEM COUPLED WITH A PCM STORAGE TANK 5271
WU J., COUENNE F., HAMROUN B., GAGNIERE E., JALLUT C.
Université de Lyon, Université Claude Bernard Lyon 1, Laboratoire d'Automatique et de Génie des Procédés, CNRS/UCBL, UMR 5007, France

11:10 323 INTERACTIONS OF GROUND SOURCE HEAT PUMPS WITH NEARBY UNDERGROUND RAILWAY TUNNELS IN AN URBAN ENVIRONMENT 5279
REVESZ A.(*), CHAER I.(*), THOMPSON J.(**), MAVROULIDOU M.(*), GUNN M.(*), MAIDMENT G.(*)
(*) London South Bank University, United Kingdom, (**) Parsons Brinckerhoff, United Kingdom

PROPERTIES OF MATERIALS AT LOW TEMPERATURES
A1-Sa-2 Room 411+412
Chairs: POLONARA F. *(Universita Politecnica delle Marche, Italy)*
HSU C. *(National Chin-Yi University of Technology, Taiwan)*

10:30 271 EXPERIMENTAL STUDY ON LIQUID NITROGEN SPRAY IN ATMOSPHERIC ENVIRONMENT 5288
XUE R.(*), LIU X.(*), CAO F.(*), HOU Y.(*,**)
(*) School of Energy and Power Engineering, Xi'an Jiaotong University, China, (**) State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, China

10:50 405 SUPPRESSION OF FROST FORMATION ON A CRYOGENICALLY COOLED CYLINDER USING AN OBSTACLE 5294
SATO S., FUKIBA K., SONOBE N., YOSHIMURA Y.
Department of Mechanical Engineering, Graduate School of Engineering, Shizuoka University, Japan

CRYOBIOLOGY(2)
C1-Sa-2 Room 413
Chairs: ANASTASSOPOULOS E. *(TEI OF THESSALY, Greece)*
MOTOMURA N. *(Toho University Sakura Medical Center, Japan)*

10:30 614 CRYO-SEM AS A SUITABLE TOOL TO STUDY VITRIFICATION IN CRYOPRESERVED TISSUE 5302
SCHNEIDER TEIXEIRA A.(*,**), MOLINA-GARCIA A. D.(*)
(*) ICTAN-CSIC, Spain, (**) CIDCA-CONICET, Fac. Cs. Exactas (UNLP), Argentina

10:50 520 LONG-TERM EXPERIENCE WITH OPERATION OF A CRYOBANK BASED ON COMBINATION OF CRYOGENIC AND CLEAN-ROOM TECHNOLOGY 5310
MERICKA P.(*), STRAKOVA H.(*), STERBA L.(*), HONEGROVA B.(*), SCHUSTR P.(**), VINS M.(**), BRANDEJS D.(*)
(*) Tissue Bank University Hospital Hradec Králové, Czech (Republic), (**) Ateko, Ltd. Hradec Králové, Czech (Republic)

OTHERS
D1-Sa-2 Room 416+417
Chairs: EVANS J. *(London South Bank University, United Kingdom)*
KAWAMURA K. *(Mayekawa Mfg, Co., Ltd., Japan)*

10:30 215 PREPARATION AND PROPERTIES OF LAURIC ACID-DECANOIC ACID/TETRADECYL ALCOHOL-DEDECANE COMPOSITE AS PCMS FOR THERMAL ENERGY STORAGE 5317
XU W.(*), ZHANG X.(*), LIU T.(*), LIANG X.(*), MUNYAL J. M.(**)
(*) Cooling Energy Storage Technology Institute,Shanghai Maritime University, China, (**) College of Engineering and Technology, Jomo Kenyatta University of Agriculture and Technology, Kenya

10:50 343 EXPERIMENT STUDY ON PERFORMANCE OF MULTISTAGE WATER TANKS HEAT STORAGE APPLIED TO SOLAR AIR CONDITIONING 5324
JIN S., BU G.
College of Energy, Nanjing University of Technology, China

11:10 751 AIR INFILTRATION INTO WALK-IN COLD ROOMS THROUGH DOORS 5330
CLELAND D. J., EAST A. R., JEFFERY P. B.
Centre for Postharvest & Refrigeration Research, Massey University, New Zealand

INSULATION
D2-Sa-2 Room 418
Chairs: ROSSI S. *(ITC-CNR, Italy)*
PIAO C. *(DAIKIN US Corporation, United States)*

10:30 575 LOW GWP INSULATION BLOWING AGENTS AND METHODS OF MEASUREMENT OF EFFICIENCY 5338
LAWTON R., MYNOTT T., MARSHALL N.
Cambridge Refrigeration Technology, United Kingdom

10:50 544 PERFORMANCES OF TRANSPORT REFRIGERATION UNITS AT PARTIAL LOAD; TESTING METHODOLOGY AND COMPARISON WITH PERFORMANCES AT FULL LOAD 5344
SUQUET T., CAVALIER G.
Cemafroid, France

11:10 911 REFRIGERATION EQUIPMENT PULL DOWN TESTS: A TOOL FOR ENERGY SAVING 5350
DEVIN E.(*), STUMPF A.(**), CAVALIER G.(*)
(*) Cemafroid SAS, France, (**) Carrier Corporation, Transicold Division, France

SATURDAY, AUGUST 22 11:30-12:30

Room 301

11:30 CLOSING CEREMONY