TECHNICAL PROGRAMME IN DETAIL

MONDAY, AUGUST 17 — 13:30-17:20

TECHNICAL SUMMARY LECTURES
Room 411+412

13:30 **TSL-Mo-a-1**
PIONEERING CHALLENGE ON THERMODYNAMIC PROPERTIES RESEARCH ON REFRIGERANTS
WATANABE K.
Professor Emeritus, Keio University, Japan

14:30 **TSL-Mo-a-2**
IMPORTANCE OF SURFACE TENSION EFFECT IN ENHANCING CONDENSATION IN REFRIGERANT CONDENSERS
HONDA H.
Professor Emeritus, Kyushu University, Japan

15:30 **TSL-Mo-a-3**
COMPRESSOR TECHNOLOGIES FOR A/C AND REFRIGERATION SCROLL COMPRESSORS PAST, PRESENT AND FUTURE
TOJO K.
Professional Engineer, TOJO R&D Design Office
Waseda University, Japan

16:30 **TSL-Mo-a-4**
HEAT PUMP TECHNOLOGIES FOR A SUSTAINABLE SOCIETY
KAWAI S.
Professor Emeritus, Waseda University, Japan

TECHNICAL SUMMARY LECTURES
Room 414+415

13:30 **TSL-Mo-b-1**
DESIGN OF SOLAR BUILDINGS
– BASIC THEORY AND APPLICATION OF SOLAR HEATING AND COOLING SYSTEMS –
UDAGAWA M.
Professor Emeritus, Kogakuin University, Japan

14:30 **TSL-Mo- b-2**
CFD VISUALIZATION OF VENTILATION EFFECTIVENESS IN ROOM
KATO S.
Professor, Institute of Industrial Science, The University of Tokyo, Japan

15:30 **TSL-Mo- b-3**
DEVELOPMENT OF QUALITY CONTROL TECHNOLOGIES BASED ON ICE CRYSTAL MORPHOLOGY FORMED IN FROZEN FOODS
SAGARA Y.
FOOD KANSEI COMMUNICATIONS, CORP. (FKC)
Professor Emeritus, The University of Tokyo, Japan

16:30 **TSL-Mo-b-4**
CRYO-BIOLOGY AND -MEDICINE IN THE 21ST CENTURY
SUMIDA S.
MD, D Sci. Sajio Sumida Clinic
Honorary Member IIR & F Soc Cryobiology, Japan

TUESDAY, AUGUST 18 — 9:00-12:20

MAIN HALL

9:00 **OPENING CEREMONY**

10:50 **PLENARY LECTURE**
WORLD ENERGY SITUATION AND JAPAN'S ENERGY STRATEGY
TANAKA N.
Former Executive Director, The International Energy Agency (IEA)
Global Associate for Energy Security and Sustainability,
The Institute of Energy Economics, Japan (IEEJ)

12:00 **AWARD CEREMONY**

TUESDAY, AUGUST 18 — 13:30-15:10

MEASUREMENT TECHNIQUES
B1-Tu-3a Room 301

13:30 612 **NEUTRON IMAGING CALIBRATION TO MEASURE VOID FRACTION**
GEOGHEGAN P., BILHEUX H., SHARMA V., FRICKE B.
Oak Ridge National Laboratory, United States

13:50 230 **A NOVEL MEASUREMENT SYSTEM FOR DENSE FOAM USING A SINGLE-TIP OPTICAL FIBER PROBE**
NIHEI A.(*), MIZUSHIMA Y.(**), SAITO T.(***)
(*) Graduate School of Engineering, Shizuoka University, Japan, (**) Graduate School of Science and Technology, Shizuoka University, Japan, (***) Research Institute of Green Science and Technology, Shizuoka University, Japan

14:10 313 **DETERMINATION OF THE ICE CONCENTRATION OF ICE SLURRIES USING IMPEDANCE MEASUREMENT**
T'JOLLYN I., DE KERPEL K., DE PAEPE M.
Ghent University, Belgium

14:30 267 **QUALITY MEASUREMENT OF TWO-PHASE FLOW IN PLUG FLOW REGION**
SHINOHARA Y.(*), FUKUTA M.(**), MOTOZAWA M.(**), NISHIKAWA M.(***), KAWANO H.(***), KOBAYASHI H.(***)
(*) Graduate School of Engineering, Shizuoka University, Japan, (**) Shizuoka University, Japan, (***) DENSO CORP., Japan

CYCLE / SYSTEM ANALYSIS (1)
B1-Tu-3b Room 303

13:30 97 **APPLICABILITY OF GLOBAL TEMPERATURE CHANGE POTENTIAL (GTP) METRIC TO REPLACE GWP IN TEWI ENVIRONMENTAL ANALYSIS OF HEAT PUMP SYSTEMS**
MAKHNATCH P., KHODABANDEH R.
Royal Institute of Technology, Department of Energy Technology, Division of Applied Thermodynamics and Refrigeration, Sweden

13:50 607 **FORTY YEARS OF COURTING R32: PERSONAL RETROSPECTIVE ON ITS PROPERTIES AND DESIGN CONSIDERATIONS IN REFRIGERATION, AIR-CONDITIONING, AND HEAT PUMPING**
KAZACHKI G.
Dayton Phoenix Group, United States

14:10 748 **WHOLE LIFE EMISSION FOR AIR TO WATER HEAT PUMPS: AN INVESTIGATION**
COLOMBO I., MAIDMENT G. G, COWAN D.
School of the Built Environment and Architecture, London South Bank University, United Kingdom

14:30 312 **CRITICAL TEMPERATURE AND PERFORMANCE OF REFRIGERANTS -APPLICATION TO CHILLERS**
DE LARMINAT P.
Johnson Controls Industries, France

14:50 283 **A COMPARATIVE STUDY ON THE OPTIMUM PERFORMANCE OF R410A AND R32 REFRIGERATION CYCLES**
SHIH Y.-C.(*), SHIAH Y.-S.(*), HOUNG Y.-H.(*), SHIAH S.-W.(**), YU W.-L.(***), SHIH S.-H.(*)
(*) 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

AIR-SIDE / SINGLE-PHASE HEAT TRANSFER
B1-Tu-3c Room 304

13:30 245 **HEAT TRANSFER AND PRESSURE DROP CHARACTERSTICS OF WET AIR FLOW IN METAL FOAM UNDER DEHUMIDIFYING CONDITIONS**
HU H., DING Y., WENG X., ZHUANG D., WU K., XU X.
Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University, China

13:50 463 **EFFECT OF HEAT CONDUCTION THROUGH THE FINS ON THE AIR SIDE PERFORMANCE OF MINICHANNEL EVAPORATORS UNDER DEHUMIDIFYING CONDITIONS**
HASSAN A. H., MARTÍNEZ-BALLESTER S., GONZÁLVEZ-MACIÁ J.
Institute for Energy Engineering, Universitat Politècnica de València, Spain

14:10 554 **HEAT AND MASS TRANSFER TO AIR IN A CROSS FLOW HEAT EXCHANGER WITH SURFACE DELUGE COOLING**
DIANI A.(*), DALL'OLIO R.(**), DE ZEN D.(**), MASETTO F.(**), ROSSETTO L.(*)
(*) Università di Padova, Dipartimento di Ingegneria Industriale, Italy, (**) Emerson Network Power srl, Italy

14:30 631 **INVESTIGATION OF THE STEADY-STATE TEMPERATURE FIELD CHARACTERISTICS INSIDE A THERMAL CYCLING TEST CHAMBER OF TURBULENT MIXED CONVECTION**
YANG G., WU J.
Shanghai Jiao Tong University, China

14:50 87 **COIL SIDE HEAT TRANSFER CHARACTERISTICS STUDY FOR A HELICAL-COIL HEAT EXCHANGER**
LIN J.-Y.(*), LIN J.-W.(**), SHIH Y.-C.(**)
(*) Department of Energy and Refrigerating, Air-conditioning Engineering, Tungnan University, Taiwan, (**) JSRAE, Japan, Department of Energy and Refrigerating Air-Conditioning Engineering, National Taipei University of Technology, Taiwan

ABSORPTION
E1-Tu-3 Room 411+412

13:30 KEYNOTE **NEW DEVELOPMENTS IN MICROCHANNEL HEAT EXCHANGERS**
HRNJAK P.
University of Illinois (ACRC) and CTS, USA

14:10 109 **OPTIMAL DESIGN OF A HYBRID AIR CONDITIONING SYSTEM UNDER ELECTRICAL GRID CONSTRAINT**
SALAME S.(*), SAAB J.(**), ZOUGHAIB A.(*), MAATOUK C.(**)
(*) MINES ParisTech, PSL Research University, CES - Center for Energy efficiency of Systems, France, (**) Saint Joseph University, Lebanon

14:30 516 **OPTIMIZATION OF ADSORPTION ISOTHERM TAXONOMY FOR OPEN-CYCLE DESICCANT AIR-CONDITIONING APPLICATIONS**
SULTAN M.(*), MIYAZAKI T.(**), SAHA B. B.(*), KOYAMA S.(**)
(*) Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan, (**) Faculty of Engineering Sciences, Kyushu University, Japan

14:50 836 **THE EFFECT OF HOT WATER FLOW RATE IN THE SOLAR COLLECTOR FLOW LOOP AT SOLAR THERMAL COOLING SYSTEM**
NASRUDDIN (*), ARNAS (**), ALHAMID M. I.(*), SAITO K.(***), YABASE H.(****)
(*) Department of Mechanical Engineering, Faculty of Engineering, University of Indonesia, Indonesia, (**) Graduate School of Fundamental Science and Engineering, Waseda University, Japan, (***) Faculty of Science and Engineering, Waseda University, Japan, (****) Energy Solution Engineering Department, Kawasaki Thermal Engineering Co., Ltd., Japan

COMPRESSOR(1)
B2-Tu-3a Room 413

13:30 26 **DEVELOPMENT OF HYDROCARBON SCROLL COMPRESSOR FOR HIGH TEMPERATURE HEAT PUMP**
OKU T., SATOH H., SHIGA M., NISHIO T., SONOBE T., MATSUI A.
Mayekawa MFG. Co., Ltd., Japan

13:50 334 PREDICTION OF GAS LEAKAGE THROUGH CLEARANCES IN SCROLL COMPRESSORS
PEREIRA E. L. L., DESCHAMPS C. J.
POLO Research Labs for Emerging Technologies in Cooling and Thermophysics, Federal University of Santa Catarina, Brazil

14:10 670 NUMERICAL STUDY ON THE LEAKAGE CHARACTERISTICS OF A SCROLL COMPRESSOR
KIM D.(*), CHUNG H.(*), JUNG J.(*), KIM Y.(**)
(*) Graduate School of Mechanical Engineering, Korea University, South Korea, (**) School of Mechanical Engineering, Korea University, South Korea

14:30 423 DESIGN AND CONTROL OPTIMIZATION OF R32 TWO-PHASE INJECTION SYSTEM USING SCROLL COMPRESSOR ORIENTED TO DISCHARGE REMPERATURE AND SYSTEM PERFORMANCE
YANG M., SHI W., LI X., WANG B.
Department of Building Science, School of Architecture, Tsinghua University, China

14:50 344 COMPARATIVE ANALYSIS OF A VAPOUR-INJECTION SCROLL COMPRESSOR AND A TWO-STAGE RECIPROCATING COMPRESSOR BASED ON ITS APPLICATION RANGE
TELLO-OQUENDO F., NAVARRO-PERIS E., GONZÁLVEZ-MACIA J., CORBERÁN J. M.
Institute for Energy Engineering, Universitat Politècnica de València, Spain

ABSORPTION & ADSORPTION(1)
B2-Tu-3b Room 414+415

13:30 KEYNOTE CO_2 ABSORPTION/DESORPTION PERFORMANCE ENHANCEMENT BY NANOABSORBENTS
KANG Y. T.
Korea University, South Korea

14:10 159 EXPERIMENTAL STUDY ON SYSTEM PERFORMANCE OF A NOVEL AIR-COOLED TYPE NH3-LiNO3 ABSORPTION REFRIGERATION CYCLE
CAI D., HE G., TIAN Q.
School of Energy and Power Engineering, Huazhong University of Science and Technology, China

14:30 438 THEORETICAL AND EXPERIMENTAL STUDY OF IMPROVED CYCLE FOR LARGE TEMPERATURE LIFTS APPLICATION IN AMMONIA WATER ABSORPTION SYSTEM
CHEN X., WANG R. Z., DU S.
Institute of Refrigeration and Cryogenics, Key Laboratory for Power Machinery and Engineering of M.O.E., Shanghai Jiao Tong University, China

14:50 508 A REVIEW OF THE EXPERIMENTAL PERFORMANCES AND CHALLENGES OF THE ABSORPTION SYSTEM TECHNOLOGIES
WANG Y., RULLIERE R., REVELLIN R., HABERSCHILL P.
Université de Lyon, CNRS, INSA-Lyon, CETHIL, UMR 5008, France, Université Lyon 1, France

SOLAR ENERGY / SORPTION SYSTEMS (ABSORPTION, ADSORPTION, DEC) (1)
E2-Tu-3 Room 416+417

13:30 214 ANALYSIS ON THE SUITABLE WORKING TEMPERATURE RANGE OF NANOFLUID-BASED DIRECT ABSORPTION SOLAR COLLECTION
ZHAO S., XU G., CHEN W., ZHANG X.
School of Energy and Environment, Southeast University, China

13:50 359 EXPERIMENTAL STUDY OF A SOLAR STORAGE PACKED BED USING PCM CAPSULES HAVING DIFFERENT MELTING POINTS
YANG L.(*), ZHANG X.(**), WANG T.(*)
(*) Hefei University of Technology, China, (**) Southeast University, China

14:10 382 DEVELOPMENT OF A SOLAR ASSISTED HIGH EFFICIENCY SINGLE/DOUBLE EFFECT ABSORPTION AIR CONDITIONING SYSTEM
NISHIMURA N.(*), MATSUBARA T.(**), NAKAGAWA H.(*), YAMAGA Y.(*)
(*) Department of Mechanical and Physical Engineering, Graduate School of Engineering, Japan, (**) Energy Engineering Department, Osaka Gas Co., Japan

14:30 363 EXPERIMENT AND PREDICTIONS OF ABSORBED SOLAR IRRADIATION DISTRIBUTION ON THE NARROW CHANNEL WALL OF DESICCANT ROTOR
LI J., HAMAMOTO Y., MORI H.
Kyushu University, Japan

14:50 920 BEHAVIOUR OF A RECTANGULAR ADSORBER OF SOLAR ADSORPTION COOLING MACHINE
CHEKIROU W.(*), CHIKOUCHE A.(**), BOUKHEIT N.(*), KARAALI A.(*)
(*) Laboratoire de thermodynamique et traitement de surface de matériaux, Université Constantine 1, Algeria, (**) UDES, Unit of Development of the Solar Equipment, Algeria

FOOD SCIENCE AND ENGINEERING
C2-Tu-3 Room 418

13:30 KEYNOTE FOOD TECHNOLOGY AND FOOD PRESERVATION : AN OLD NECESSITY WITH A PROMISING FUTURE
GUILPART J.
IIR President of Section C, France

14:10 113 A DSC METHOD FOR DETERMINATION THE QUALITY OF FISH OILS DURING STORAGE OR AFTER PROCESSING
TOLSTOREBROV I.(*), EIKEVIK T. M.(*), BANTLE M.(**), NORDTVEDT T. S.(***), STAVSET O.(**)
(*) Norwegian University of Science and Technology (NTNU), Institute for eEnergi- og Prosessteknikk, Norway, (**) SINTEF Energy Research Ltd., Norway, (***) SINTEF Fisheries and Aquaculture Ltd., Norway

14:30 685 X-RAY MICRO-TOMOGRAPHY TO QUANTIFY FROZEN ICE CREAM STRUCTURE
ALVAREZ G.(*), CANTRE D.(**), VERBOVEN P.(**), NDOYE F. T.(*), WARREN M.(***), HARTEL W. R.(***), NICOLAI B.(**)
(*) Irstea, Refrigeration Process Engineering Research Unit, France, (**) BIOSYST-MeBioS, KU Leuven, Belgium, (***) University of Wisconsin, United States

14:50 573 A DISCRIMINATING MICROSCOPY TECHNIQUE FOR THE MEASUREMENT OF ICE CRYSTALS AND AIR BUBBLES SIZE DISTRIBUTION IN SORBETS
HERNANDEZ O.(*,**,***), NDOYE F.(*), BENKHELIFA H.(**,***), FLICK D.(**,***), ALVAREZ G.(*)
(*) IRSTEA, France, (**) AgroParisTech, UMR1145 Ingénierie Procédés Aliments, France, (***) INRA, UMR1145 Ingénierie Procédés Aliments, France

TUESDAY, AUGUST 18 15:30-17:10

LUBRICANTS
B1-Tu-4a Room 301

15:30 338 MAKING THE RIGHT REFRIGERANT LUBRICANT CHOICES
KARNAZ J., KULTGEN D.
CPI Fluid Engineering, United States

15:50 138 EXPERIMENTAL INVESTIGATION OF HEAT TRANSFER AND PRESSURE DROP DURING CONDENSATION OF R134A-LUBRICANT-MIXTURES IN A MULTI-PORT FLAT TUBE
KNIPPER P., BERTSCHE D., WETZEL T.
Karlsruhe Institute of Technology, Germany

16:10 935 DEVELOPMENT OF REFRIGERATION OIL FOR USE WITH R32
TOMITA H., TAKAHASHI H., OKIDO T.
JX Nippon Oil & Energy Corporation, Japan

16:30 23 MISCIBLITY CHARACTERISTICS OF SEVERAL LOW GWP REFRIGERANTS AND TYPICAL LUBRICATING OILS
YANG Z., WU X., TIAN T.
Key Laboratory of Efficient Utilization of Low and Medium Grade Energy, MOE, School of Mechanical Engineering, Tianjin University, China

16:50 696 EVALUATIONS OF PVE LUBRICANTS FOR A/C SYSTEM WITH THE LOW GLOBAL WARMING POTENTIAL REFRIGERANTS
MATSUMOTO T.(*), KANEKO M.(*), KAWAGUCHI Y.(**)
(*) Idemitsu Kosan Co.,Ltd., Lubricants Research Laboratory, Japan, (**) Idemitsu Kosan Co.,Ltd., Lubricants Department, Japan

CYCLE / SYSTEM ANALYSIS (2)
B1-Tu-4b Room 303

15:30 563 EVALUATION OF CYCLE PERFORMANCE OF R448A AND R449A AS R404A REPLACEMENTS IN SUPERMARKET REFRIGERATION SYSTEMS
MAKHNATCH P., KHODABANDEH R.
Royal Institute of Technology, Department of Energy Technology, Division of Applied Thermodynamics and Refrigeration, Sweden

15:50 82 VAPOR COMPRESSION CYCLE MODEL CAPABLE OF SIMULATING WELL-DESCRIBED AND NOT-SO-WELL-DESCRIBED REFRIGERANTS
BRIGNOLI R., BROWN J. S.
Department of Mechanical Engineering, The Catholic University of America, United States

16:10 601 THEORETICAL ANALYSIS OF A NEW HYBRID SYSTEM WITH TWO EJECTORS
LANDOULSI H., ELAKHDAR M., NEHDI E., KAIROUANI L.
UR Energetic and Environment – ENIT, Tunisia

16:30 220 THERMODYNAMIC MODELING AND OPTIMIZATION OF REFRIGERANT MIXTURE FOR SINGLE STAGE VERY LOW TEMPERATURE SYSTEM USING PC-SAFT EQUATION OF STATE
JEROME S., VENKATARATHNAM G
Refrigeration and Air-conditioning Lab, Department of Mechanical Engineering, Indian Institute of Technology Madras, India

16:50 143 SURVEY ON NONFLAMMABLE LOW GWP REFRIGERANT MIXTURES BASED ON CARBON DIOXIDE FOR APPLICATIONS BELOW 220 K
GÖPFERT T., HESSE U.
Technische Universität Dresden, Bitzer Chair of Refrigeration, Cryogenics and Compressor Technology, Germany

DESICCANT
E1-Tu-4 Room 411+412

15:30 100 PERFORMANCE EVALUATION OF WATER SOURCE MAKEUP AIR UNIT APPLIED DESICCANT ROTOR DEHUMIDIFIED AT LOW-TEMPERATURE ON AIR CONDITIONING SYSTEMS USING WATER SOURCE HEAT PUMP UNITS
TANINO M.(*), MASUDA M.(*), SAITOU T.(**), KIKUCHIHARA M.(**), HATAKEYAMA M.(**)
(*) Takasago Thermal Engineering Co.,Ltd, R&D Center, Japan, (**) Nippon PMAC Co.,Ltd., R&D Department, Japan

15:50 128 STUDY ON ENERGY- EFFICIENCY OF DESICCANT OUTDOOR AIR-CONDITIONING UNIT FOR A DEDICATED AIR- CONDITIONING SYSTEM
KAWAMOTO K.(*), CHO W.(**), KOHNO H.(***), IWAMOTO S.(**), KOGANEI M.(****), OOKA R.(*****), KATO S.(*****)
(*) Kawamoto Engineering, Japan, (**) Department of Architecture, Faculty of Engineering, Kanagawa University, Japan, (***) Asahi Kogyosha Co. Ltd., Japan, (****) Division of Perceptual Sciences and Design Engineering, Yamaguchi University, Japan, (*****) Institute of Industrial Science, The University of Tokyo, Japan

16:10 518 DESICCANT DEWPOINT COOLING SYSTEM INDEPENDENT OF EXTERNAL WATER SOURCES
BELLEMO L.(*), ELMEGAARD B.(*), MARKUSSEN W. B.(*), KÆRN M. R.(*), REINHOLDT L. O.(**)
(*) Technical University of Denmark, Denmark, (**) Danish Technological Institute, Denmark

16:30 229 EXPERIMENTAL INVESTIGATIONS ON HYBRID SOLID DESICCANT – VAPOR COMPRESSION AIR-CONDITIONING SYSTEM FOR INDIAN CLIMATE
JANI D. B., MISHRA M., SAHOO P. K.
Department of Mechanical & Industrial Engineering, Indian Institute of Technology, India

16:50 813 STUDY OF THE DYNAMIC CHARACTERISTICS OF LIQUID DESICCANT DEHUMIDIFICATION PROCESSES
WANG L.(*), XIAO F.(*), NIU X.(**)
(*) Department of Building Services Engineering, The Hong Kong Polytechnic University, Hong Kong, (**) College of Urban Construction and Safety Engineering, Nanjing University of Technology, China

COMPRESSOR(2)
B2-Tu-4a Room 413

15:30 917 EVALUATION OF THE SYSTEM AND COMPRESSOR RELIABILITY
TANAKA M., MATSUURA H., TAIRA S., NAKAI A.
Daikin Industries, Ltd., Japan

15:50 345 EVALUATION OF THE INFLUENCE OF THE SUBCOOLING ON THE PERFORMANCE OF VAPOR INJECTION SCROLL COMPRESSORS
PITARCH M., NAVARRO-PERIS E., GONZALVEZ-MACIA J., CORBERAN J. M.
Instituto de Ingeniería Energética, Universitat Politècnica de València., Spain

16:10 411 CAVITATION EFFECTS AND HEAT TRANSFER OF SATURATED WATER-LUBRICATED JOURNAL BEARINGS FOR A TURBO MACHINE
SHOYAMA T.
Panasonic Corporation, Japan

16:30 789 R718 TURBO CHILLERS AND VACUUM ICE GENERATION – TWO APPLICATIONS OF A NEW GENERATION OF HIGH SPEED, HIGH CAPACITY R718 CENTRIFUGAL COMPRESSORS
HONKE M., SAFARIK M., HERZOG R.
Institute of Air Handling and Refrigeration (ILK Dresden), Germany

16:50 12 A HEAT PUMP FOR SPACE APPLICATIONS WITH A LIGHTWEIGHT 200,000 RPM CENTRIFUGAL THREE-STAGE COMPRESSOR SYSTEM
VAN GERNER H. J.(*), VAN DONK G.(*), PAUW A.(*), KRÄHENBÜHL D.(**), ZWYSSIG C.(**), LAPENSÉE S.(***)
(*) National Aerospace Laboratory (NLR), Netherlands, (**) Celeroton AG, Switzerland, (***) European Space Agency, ESA/ESTEC, Netherlands

ALTERNATIVE REFRIGERANT
B2-Tu-4b Room 414+415

15:30 231 A THEORETICAL AND EXPERIMENTAL STUDY ON THE VARIABLE EVAPORATING TEMPERATURE REFRIGERATION PERFORMANCE OF NON-AZEOTROPIC REFRIGERANT MIXTURES
YU P.(*,**), ZHANG X.(*), LIU J.(*)
(*) School of Energy and Environment, Southeast University, China, (**) College of Energy and Power Engineering, Nanjing Institute of Technology, China

15:50 182 ENVIRONMENTAL IMPACT OF POSSIBLE REPLACEMENTS FOR R22
DRUGHEAN L., ILIE A., GIRIP A., TEODORESCU D.
Technical University for Civil Engineering, Romania

16:10 603 NON-FLAMMABLE, LOWER GWP ALTERNATIVES TO R-404A
KIM S.(*), ABBAS L.(*), RACHED W.(**), BOUSSAND B.(**)
(*) Arkema Inc., United States, (**) Arkema France, France

16:30 204 EVALUATION OF R-449A IN FIELD RETROFITS OF R-404A SUPERMARKET SYSTEMS
MINOR B.(*), GERSTEL J.(**), ROBERTS N.(***)
(*) Chemours Company, United States, (**) Chemours Company, Germany, (***) Chemours Company, United Kingdom

16:50 837 EXPERIMENTAL COMPARISON OF DROP-IN PROCESS OF R22, HYDROCARBONS AND HYDROFLUOROCARBONS IN A REFRIGERATION SYSTEM
ANTUNES A., SOUZA L., MENDOZA O., BANDARRA FILHO E.
Faculty of Mechanical Engineering, Federal University of Uberlandia, Brazil

ENERGY EFFICIENCY(1)
E2-Tu-4 Room 416+417

15:30 52 CFD STUDY ON THE OPTIMAL NOZZLE EXIT POSITION IN A CO_2 TWO-PHASE EJECTOR
HE Y.(*), DENG J.(**), ZHANG Z.(**), ZHENG L.(**)
(*) State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, China, (**) School of Chemical Engineering and Technology, Xi'an Jiaotong University, China

15:50 53 A COMPARATIVE STUDY ON REGULATION METHODS FOR TRANSCRITICAL CO_2 EJECTOR EXPANSION REFRIGERATION SYSTEM
ZHENG L.(*), DENG J.(*), HE Y.(**)
(*) School of Chemical Engineering and Technology, Xi'an Jiaotong University, China, (**) State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, China

16:10 207 INFLUENCE OF INPUT VARIABLES ON THE IRREVERSIBILITIES OF A CO_2 HEAT PUMP
MAINA P., HUAN Z.
Tshwane University of Technology, South Africa

16:30 244 INFLUENCE OF AMBIENT CONDITIONS, REFRIGERANT CHARGE AND CONDENSER FAN SPEED ON THERMAL PERFORMANCE OF AN AIR SOURCE HEAT PUMP FOR DRYING FRUITS
KIVEVELE T., HUAN Z.
Department of Mechanical Engineering, Mechatronics and Industrial Design, Tshwane University of Technology, South Africa

16:50 295 ENHANCED TECHNICAL AND ECONOMIC WORKING DOMAINS OF INDUSTRIAL HEAT PUMPS OPERATED IN SERIES
OMMEN T., JENSEN J. K., MARKUSSEN W. B., ELMEGAARD B.
Technical University of Denmark, Department of Mechanical Engineering, Denmark

FREEZING PROCESS AND SYSTEMS
C2-Tu-4 Room 418

15:30 863 FREEZING UNDER ELECTRICAL AND MAGNETIC DISTURBANCES; A REVIEW
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
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
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
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
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

WEDNESDAY, AUGUST 19 — 8:30-10:10

THERMODYNAMIC PROPERTIES(1)
B1-We-1a Room 301

8:30 KEYNOTE HITTING THE BOUNDS OF CHEMISTRY: LIMITS AND TRADEOFFS FOR LOW-GWP REFRIGERANTS
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))
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
FUKUSHIMA M., HAYAMIZU H., HASHIMOTO M.
ASAHI GLASS CO., LTD., Japan

9:50 752 THERMODYNAMIC PROPERTY MEASUREMENTS FOR HYDROFLUOROBUTENES BY A MAGNETIC LEVITATION DENSIMETER
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

8:30 512 NUMERICAL MODELLING AND EXPERIMENTAL INVESTIGATIONS OF LOW-TEMPERATURE DRIVEN EJECTION REFRIGERATION SYSTEM
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
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
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
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

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

9:10 219 NUMERICAL ANALYSIS ON THERMAL PERFORMANCE OF TRAILER HOUSE COMPOSITE ENVELOPE USING VACUUM INSULATION PANELS
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
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
HUANG Y., NIU J. L.
Department of Building Service Engineering, The Hong Kong Polytechnic University, China

OTHERS(1)
E1-We-1 Room 411+412

8:30 KEYNOTE FLOW DISTRIBUTION OF TWO-PHASE REFRIGERANT IN PLATE HEAT EXCHANGERS
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
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
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
HAIKAWA T., NUNO H., TAIRA S.
Daikin Industries, Ltd., Japan

COMPRESSOR(3)
B2-We-1a Room 413

8:30 301 FLOW DEVELOPMENT IN THE DISCHARGE OF A COMPRESSOR
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
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
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
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
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

8:30 706 RESEARCH ON ENHANCING FALLING-FILM PERFORMANCE OF A NEW SOLAR LIBR ABSORPTION REFRIGERATION SYSTEM
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
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
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
MEYER T., KÜHN R., RICART C., ZEGENHAGEN T., ZIEGLER F.
Technische Universität Berlin, Germany

9:50 931 TEMPERATURE EFFICIENCY ANALYSIS OF ABSORPTION HEAT EXCHANGERS
XIE X., JIANG Y.
Building Energy Research Center, Tsinghua University, China

ENERGY EFFICIENCY(2)
E2-We-1 Room 416+417

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

8:30 487 DEVELOPMENT OF SUPERCOOLING AS A STORAGE TECHNIQUE FOR PORK
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
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
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
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
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

WEDNESDAY, AUGUST 19 — 10:30-12:10

THERMODYNAMIC PROPERTIES(2)
B1-We-2a Room 301

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

10:50 111 SURFACE TENSION OF LOW GWP REFRIGERANTS R1234ZE(Z) AND R1233zd(E)
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)
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
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
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

10:30 67 VISUALIZATION AND MEASUREMENT OF ADSORPTION AND DESORPTION PROCESS IN ACTIVATED CARBON/ETHANOL PAIR ADSORBER
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
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
SEILER J., HACKMANN J., LANZERATH F., BARDOW A.
Chair of Technical Thermodynamics, RWTH Aachen University, Germany

11:30 385 NON EQUILIBRIUM ADSORPTION PERFORMANCE ANALYSIS OF THE ADSORPTION CYCLE FOR THE REFRIGERATING VEHICLES
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

11:50 425 TEMPERATURE–HEAT DIAGRAM ANALYSIS METHOD FOR MULTI-STAGE HEAT REGENERATION PHYSICAL ADSORPTION REFRIGERATION CYCLE
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

10:30 KEYNOTE THE FIRST ZERO-CARBON ARCHITECTURE IN TAIWAN THE MAGIC SCHOOL OF GREEN TECHNOLOGY, NCKU
LIN H.
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
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
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
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

10:30 223 PERFORMANCE ANALYSIS AND OPTIMIZATION OF HEAT PUMP DRIVEN LIQUID DESICCANT HYBRID AIR-CONDITIONING SYSTEMS
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
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
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
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
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

10:30 329 CO-ROTATING SCROLL MACHINERY APPLIED TO VAPOR POWER AND VAPOR COMPRESSION CYCLES
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
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
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
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
HOU F., ZHAO Z., HE Z., XING Z.
Xi'an Jiaotong University, China

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

10:30 241 ADSORPTION-BASED AIR-CONDITIONING FOR BATTERY-DRIVEN ELECTRIC BUSSES
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
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
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
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
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

10:30 24 HIGH-TEMPERATURE HEAT PUMP-ASSISTED SOFTWOOD DRYER: SIZING AND CONTROL REQUIREMENTS & ENERGY PERFORMANCE
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
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
BERGLAND M., EIKEVIK T. M., TOLSTOREBROV I.
Norwegian University of Science and Technology (NTNU), Norway

11:30 242 INDUSTRIAL HEAT PUMP USING FLUID MIXTURE
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
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

10:30 136 CHILLING OF SALMON IN REFRIGERATED SEA WATER
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*
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
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
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
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

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
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
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
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
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
ZHAO Y., DANG H., GAO Z., BAO D., ZHANG L., TAN J.
Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China

A2-We-P

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

B1-We-P

158 BOILING HEAT TRANSFER PERFORMANCE OF THREE INTERNALLY ENHANCED TUBES USING R22
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
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
CHEN X., YANG L., DU K.
School of Energy and Environment, Southeast University, China

340 THERMODYNAMIC PROPERTIES OF FLUOROCARBONS: SIMULATIONS AND EXPERIMENT
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
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
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
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

698 EFFECT OF FIN GEOMETRY ON CONDENSATION HEAT TRANSFER AND CONDENSATE FLOW MODES OF R245fa ON HORIZONTAL ENHANCED SURFACE TUBES
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
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
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
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

B2-We-P

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

422 MULTIVARIATE OPTIMIZATION OF A HEAT EXCHANGER WITH MICROCHANNEL COIL
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
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
TARLEA G.(*), VINCERIUC M.(**), ZABET I.(**), TARLEA A.(**)
(*) Technical University of Civil Engineering, Romania, (**) Romanian General Association of Refrigeration, Romania

C2-We-P

110 GENERATION OF GAMMA-AMINOBUTYRIC ACID (GABA) IN SOYBEAN BY FREEZING AND SUBSEQUENT STORAGE
UENO S.(*), IRYO N.(*), SASAO S.(**), ARAKI T.(**), KIMIZUKA N.(***)
(*) 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
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
LÓPEZ-GÓMEZ A., BOLUDA-AGUILAR M., SOTO-JOVER S.
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
UENO S.(*), HAYASHI M.(**), IGUCHI A.(**), SHIGEMATSU T.(**)
(*) 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
HOANG H. M.(*), LEDUCQ D.(*), BROWN T.(**), MAIDMENT G.(**), INDERGARD E.(***), ALVAREZ G.(*)
(*) 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
LÓPEZ GÓMEZ A., BOLUDA AGUILAR M., SOTO JOVER S., ANTOLINOS LÓPEZ V., MARTÍNEZ HERNÁNDEZ G. B.
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
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
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

D2-We-P

538 DIMENSIONNEMENT DES ENGINS MULTI TEMPERATURES : CALCUL, METHODOLOGIE, EXEMPLES, IMPACT SUR LE DIMENSIONNEMENT
SUQUET T., CAVALIER G. DEVIN E.
Cemafroid, France

E1-We-P

62 PERFORMANCE EVALUATION OF A SOLAR EJECTOR-VAPOUR COMPRESSION CYCLE FOR COOLING APPLICATION USING CARBON DIOXIDE AS WORKING FLUID
MEGDOULI K(*), ELAKHDAR M(**), NAHDI E(**), KAIROUANI L(**), MHIMID A(*)
(*) Laboratoire d'Études des Systèmes Thermiques et Énergétiques, Tunisia, (**) Unité de Recherche Energétique et Environnent, Tunisia

184 BIVALENT AIR-CONDITIONING SYSTEM FOR A SUPERMARKET
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
NAGAMINE R.(*), OKAMURA T.(*), HIRANO N.(**), TAKAHASHI M.(***), TANAKA K.(***)
(*) 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
HANNA R., ORTEGO E., ZOUGHAIB A.
MINES ParisTech, PSL Research University, France

494 NUMERICAL METHOD ON PREDICTING DISTRIBUTION OF LEAKED REFRIGERANT IN INDOOR SPACE AND ITS EXPERIMENTAL OBSERVATION
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
LIN E., NIU Y., HUO H., ZOU G., LIN Y., DING Z.
Honeywell Integrated Technology, China

738 COMPARISION ANALYSIS OF MASS DIFFUSIVITY EFFECT ON A DAMPER-CONTROLLED DESICCANT DEHUMIDIFIER
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

E2-We-P

10 SIMULATION OF A DOUBLE EFFECT H2O-LIBR ABSORPTION CHILLER DRIVEN BY SOLAR CONCENTRATING PARABOLIC TROUGH COLLECTORS
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
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
SU C., PALM B.
Department of Energy Technology, KTH, Sweden

256 HEAT PUMP OPERATING WITH NH_3 OR CO_2 – A COMPARATIVE STUDY
DOBROVICESCU A.(*), SERBAN A.(**), FILIPOIU C.(*), NASTASE G.(**)
(*) 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
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
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
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
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
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
DOBROVICESCU A.(*), SERBAN A.(**), PRISECARU T.(*), APOSTOL V.(*)
(*) 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
HU P., ZHU W., CHEN Z.
Department of Thermal Science and Energy Engineering, University of Science and Technology of China, China

S1-We-P

22 ENERGY-SAVING POTENTIAL OF BUILDING ENVELOPE DESIGNS IN RESIDENTIAL HOUSES IN TROPICAL CLIMATE REGION
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
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
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
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
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
YAMADA K.(*), NISHIMURA Y.(**), SAKAI K.(*)
(*) School of Science & Technology, Meiji University, Japan, (**) Technical Research Institute, HASEKO Corporation, Japan

WEDNESDAY, AUGUST 19 — 13:30-15:10

ADSORPTION(2)
B1-We-3 Room 303

13:30 940 MEASUREMENTS OF ADSORPTION/DESORPTION RATE OF A FILM ADSORBENT SYNTHESIZED ON HEAT TRANSFER PLATE CONTROLLED BY ADSORBENT TEMPERATURE IN WATER VAPOR
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
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
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
YAMASHITA K., DAIGUJI H.
Department of Mechanical Engineering, The University of Tokyo, Japan

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

13:30 14 EVALUATING NATURAL VENTILATION EFFECTS OF ATRIUM IN A SUBTROPICAL VERNACULAR STREET-HOUSE IN TAIWAN
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-
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
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
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
SERBAN A.(*), DOBROVICESCU A.(**), DRUGHEAN L.(***), NASTASE G.(*)
(*) Transylvania University of Brasov, Romania, (**) University POLITEHNICA of Bucharest, Romania, (***) Technical University of Civil Engineering Bucharest, Romania

EVAPORATIVE COOLING
E1-We-3 Room 411+412

13:30 76 CRITIQUE OF IMPROVED PERFORMANCE OF AIR-COOLED CHILLERS WITH EVAPORATIVE COOLING
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
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
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)
IM P.(*), MUNK J.(*), SONG K.(**)
(*) Oak Ridge National Laboratory, United States, (**) Samsung Electronics, South Korea

CONDENSOR(1)
B2-We-3a Room 413

13:30 6 DISTRIBUTION FUNCTION FOR REVERSIBLE MICROCHANNEL HEAT EXCHANGER WITH VERTICAL HEADERS – CONSIDERING THE EFFECTS OF INLET CONDITIONS, GEOMETRIES AND FLUID PROPERTIES
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
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)
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
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
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

13:30 3 THE MODIFIED FRICTIONAL LOSS EFFICIENCY CORRELATION IN AN EJECTOR 1-D NUMERICAL MODEL
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
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
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
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
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

13:30 KEYNOTE THE ROLE OF HEAT PUMPS IN THE SMART ENERGY SYSTEMS
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
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
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
YAMADA K., MURASAWA I.
TONETS Corporation, Japan

FREEZING AND CHILLING OF BOTANICAL PRODUCTS
C2-We-3 Room 418

13:30 153 THE IMPACT OF SLOW STEAMING ON REFRIGERATED EXPORTS FROM NEW ZEALAND
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
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
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
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
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

WORKSHOP: IEA HPP ANNEX 41 – COLD CLIMATE HEAT PUMPS
WS5-We-3/WS5-We-4 Room 304

WEDNESDAY, AUGUST 19 15:30-17:10

ADSORPTION(3)
B1-We-4 Room 303

15:30 430 EFFECT OF ACOUSTIC WAVE ON ENHANCEMENT OF MOISTURE ADSORPTION RATE OF SILICA-GEL
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
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
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
CHOI S., HONG K., LEE D.-Y.
Center for Urban Energy, Korea Institute of Science and Technology, South Korea

CFD SIMULATION
S1-We-4 Room 313+314

15:30 63 CFD SIMULATIONS AND MEASUREMENTS OF CARBON DIOXIDE TRANSPORT IN A PASSIVE HOUSE
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
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
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
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

15:30 227 A GENERAL STEADY STATE MATHEMATICAL MODEL FOR MULTI-UNIT AIR CONDITIONER SYSTEM BASED ON GRAPH THEORY
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
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.(*)
(*) Sinhgad College of Engineering, India, (**) Flora Institute of Technology, India

16:30 886 EXPERIMENTAL INVESTIGATION OF DOUBLE ROWS LIQUID-VAPOR SEPARATION MICROCHANNEL CONDENSER
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
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

15:30 930 EFFECT OF GEOMETRY ON THE PERFORMANCE OF CO_2 GAS COOLER/CONDENSER AND ITS ASSOCIATED REFRIGERATION SYSTEM
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 DEVELOPMENTOFA MICRO-CHANNEL CONDENSER MODEL USING R1234YFAS WORKING FLUIDAND COMPAREDWITH R134A
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
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
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
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

15:30 321 DESIGN-THEORETICAL STUDY OF HYBRID CO_2 TRANSCRITICAL MECHANICAL COMPRESSION-EJECTOR COOLING CYCLE
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
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
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
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
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

15:30 20 EXPERIMENTAL VALIDATION OF ON-FIELD MEASUREMENT METHOD FOR A HEAT PUMP SYSTEM WITH INTERNAL HEAT EXCHANGER
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
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
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
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
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

WORKSHOP: IEA HPP ANNEX 41 – COLD CLIMATE HEAT PUMPS
WS5-We-3 / WS5-We-4 Room 304

THURSDAY, AUGUST 20 8:30-10:10

TRANSPORT PROPERTIES
B1-Th-1a Room 301

8:30 684 VISCOSITY MEASUREMENT OF LOW GWP REFRIGERANTS WITH A TANDEM CAPILLARY TUBES METHOD
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)
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
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
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
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

8:30 25 HEAT TRANSFER CHARACTERISTIC IN A VERTICAL RISER TUBE AT SUB-ATMOSPHERIC PRESSURE
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
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
TAKAHASHI H., IWAMOTO H.
Kobelco & Materials Copper Tube, LTD., Japan

9:30 745 STUDY ON CO_2 BUBBLE ABSORPTION AND VISUALIZATION IN NANOFLUIDS
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
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

8:30 254 MEMBRANE ENERGY EXCHANGERS, EVALUATION OF A FROST-FREE DESIGN AND ITS PERFORMANCE FOR VENTILATION IN COLD CLIMATES
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
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
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
CAPDEVILA R.(*), CHIVA J.(*), LÓPEZ J.(*), RIGOLA J.(*), LEHMKUHL O.(*,**)
(*) Universitat Politècnica de Catalunya-BarcelonaTech, Spain

9:50 13 DESIGN STUDIES ON BUILDING-INTEGRATED WIND ENERGY USING CFD SIMULATIONS
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

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

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

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

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

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

8:30 27 PLATE HEAT EXCHANGER USED AS EVAPORATORS
ILIE A.(*), DRUGHEAN L.(*), ŞERBAN 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
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
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
FAYSSAL I., MOUKALLED F.
American University of Beirut, Riad El-Solh, Lebanon

9:50 459 INVESTIGATION OF R32 SPOT-EVAPORATORS
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

8:30 471 ANALYSIS OF AN EJECTOR VAPOUR COMPRESSION CYCLE FOR HOUSEHOLD REFRIGERATOR
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
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
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
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
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

8:30 KEYNOTE ABSORPTION HEAT PUMPS AS THERMAL TRANSFORMER FOR LONG DISTANCE HEAT TRANSPORTATION
JIANG Y.
Tsinghua University, China

9:10 259 HIGH TEMPERATURE HEAT PUMPS FOR SEASONAL THERMAL ENERGY STORAGE AND DISTRICT HEATING SYSTEMS
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
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
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

THURSDAY, AUGUST 20 10:30-12:10

BOILING(1)
B1-Th-2a Room 301

10:30 112 POOL BOILING HEAT TRANSFER OF LOW GWP REFRIGERANTS R1234ze(E), R1234ze(Z) AND R1233zd(E) ON A HORIZONTAL PLANE TUBE
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
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
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
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

10:30 49 COMPARISON OF A NEW DESIGNED RESORPTION REFRIGERATION SYSTEM WITH CONVENTIONAL ABSORPTION SYSTEMS
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
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
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
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

10:30 114 REDUCTION METHOD OF AIR CONDITIONING LOAD OF PLANT FACTORY BASED ON LIGHTING EXPERIMENT AND PLANT MODEL ANALYSIS
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
URANO K.(*), SUMITA A.(**)
(*) General Manager of R&D Department, Engineering Division, Japan, (**) Spreme Adviser, Japan

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

VRF
E1-Th-2 Room 411+412

10:30 51 EVALUATION OF VRF SYSTEM WITH MULTI INDOOR UNITS BY EXPERIMENTAL STUDY AND SIMULATION ANALYSIS
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
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
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
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

10:30 542 ESTABLISHMENT OF AN EXPERIMENTAL DESIGN IN THE CONTEXT OF WATER VAPORIZATION OCCURING ON A PLATE CROSS SECTION
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
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
JENSEN J. K.(*), KÆRN M. R.(*), OMMEN T.(*), MARKUSSEN W. B.(*), REINHOLDT L.(**), ELMEGAARD B.(*)
(*) 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
KAYA A., LAZOVA M., LECOMPTE S., DE PAEPE M.
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
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

10:30 609 AN EXPERIMENTAL STUDY OF EJECTORS SUPPORTED BY CFD
HAKKAKI-FARD A., POIRIER M., AIDOUN Z., OUZZANE M., GIGUÈRE D.
CanmetENERGY-Varennes, Natural Resources Canada, Canada

10:50 421 PERFORMANCE ANALYSIS OF A SOLAR DESICCANT AIR CONDITIONING SYSTEM
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
ZEGENHAGEN M. T., KÜHN R., MEYER T., RICART C., ZIEGLER F.
Technische Universität Berlin, Germany

RESIDENTIAL AND COMMERCIAL HEAT-PUMP SYSTEMS(3)
E2-Th-2 Room 416+417

10:30 330 OPTIMIZATION OF CO_2 HEAT PUMP SYSTEM FOR SIMULTANEOUS HEATING AND COOLING APPLICATIONS
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
SHEN B., RICE C. K., ABDELAZIZ O., SHRESTHA S.
Building Technologies Research and Integration Center, Oak Ridge National Lab, United States

11:10 561 CASCADE CYCLE HIGH-TEMPERATURE HEAT PUMP: MODELLING AND VALIDATION
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
IM P., LIU X.
Oak Ridge National Laboratory, United States

11:50 584 TEST CASES FOR HARDWARE IN THE LOOP TESTING OF AIR TO WATER HEAT PUMP SYSTEMS IN A SMART GRID CONTEXT
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

WORKSHOP: DATABASE AND SIMULATION TOOLS FOR REFRIGERATION ON COLD CHAIN: FRISBEE DATABASE AND TOOLS
WS8-Th-2 Room 418

THURSDAY, AUGUST 20 12:10-13:30

POSTER SESSION
Room 315
A1-Th-P

19 APPLICATION OF ENVIRONMENT MIXED REFRIGERANTS IN A SMALL CRYOGENIC DEVICE
QU Y., WANG F., YU D., OU J., MENG Z., ZHANG Z.
University of Shanghai for Science and Technology, Institute of Refrigeration and Cryogenic Technology, China

239 CREATION OFCRYOGENIC TESTING BENCH FOR SUPERCONDUCTING MAGNETS OF NICA AND SIS100 PROJECTS
NIKIFOROV D., GALIMOV A., KOSTROMIN S., KHODZHIBAGIYAN H., EMELIANOV N.
Joint institute for Nuclear Research, Russia

371 EFFECTS ON THE COOLING PERFORMANCE OF THE GAS DISTRIBUTION IN THE TWO-STAGE THERMAL-COUPLED PULSE TUBE CRYOCOOLER
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

417 THEORETICAL STUDIES ON THE REGENERATOR OF A SINGLE-STAGE STIRLING-TYPE PULSE TUBE CRYOCOOLER WORKING AT 20–35 K
BAO D.(*,**), DANG H.(*), ZHAO Y.(*,**), GAO Z.(*,**)
(*) National Laboratory for Infrared Physics, Shanghai Institute of Technical Physics, Chinese Academy of Sciences, China, (**) University of Chinese Academy of Science, China

B1-Th-P

39 EXPERIMENTAL INVESTIGATION INTO POOL BOILING HEAT TRANSFER PERFORMANCE OF TiO_2-R141b NANOFLUID FOR A HORIZONTAL LOW-FINNED U-tube
CHEN R.- H., CHANG T.-B.
Department of Mechanical and Energy Engineering, National Chiayi University, Taiwan

65 EFFECTS OF PVE OIL ON THE POOL NUCLEATE BOILING HEAT TRANSFER COEFFICIENT OF R410A
TAKAISHI Y., SATO T.
Kanagawa Institute of Technology, Japan

281 THEORETICAL AND EXPERIMENTAL STUDY ON *PRESSURE DROP IN TWO-PHASE FLOW* OF AMMONIA IN A FORCED EVAPORATIVE CONDENSER
FILIP A., ILIE A., BALTAREȚU F., DRUGHEAN L., DAMIAN R.-M.
Technical University for Civil Engineering, Romania

293 PERFORMANCE ANALYSIS AND CYCLE TIME OPTIMIZATION OF A SINGLE EVAPORATOR THREE-BED SOLID-SORPTION REFRIGERATION SYSTEM DRIVEN BY LOW-TEMPERATURE HEAT SOURCE
ZAJACZKOWSKI B.
Wroclaw University of Technology, Faculty of Mechanical and Power Engineering Wyb., Poland

317 PROMISING RATIONAL ENHANCEMENT OF HEAT EXCHANGE BY SECTION OF LONG SMOOTH DUCTS OF PLATE-FIN SURFACES WITH PURPOSES OF CREATION OF HIGHLYEFFECTIVE COMPACT HEAT EXCHANGERS
VASILEV V., ZHATKIN A.
Astrakhan State Technical University, Russia

349 DEVELOPMENT OF HUMIDITY MEASURING DEVICE USING POROUS CERAMIC BASED ON PRINCIPLE OF PSYCHROMETER
MIURA K.(*), IYOTA H.(*), MATSUMOTO T.(*), TSUJIOKA T.(*), MORIKAWA A.(*), TANAKA M.(**), UESUGI N.(**)
(*) Osaka City University, Japan, (**) Miyagawa Kasei Industry Co., Ltd., Japan

387 NUMERICAL ANALYSIS ON THE PERFORMANCE OF A MAGNETIC REFRIGERATOR WITH MULTIPLE MATERIALS
ARITA S.(*), OKAMURA T.(*), NOGUCHI Y.(*), HIRANO N.(**), BAE S.(***)
(*) Tokyo Institute of Technology, Japan, (**) Chubu Electric Power Co., Inc., Japan, (***) Sanden Corporation, Japan

627 SPEED OF SOUND MEASUREMENTS OF HFO-1234ze(E) IN THE LIQUID PHASE
GAO L., ASOU H., HONDA T.
Fukuoka University, Japan

657 PREPARATION AND THERMOPHYSICAL PROPERTIES OF MWCNTS/PARAFFIN COMPOSITE PHASE CHANGE MATERIAL
WU W.(*), ZHANG C.(**), TANG H.(*), ZHANG H.(*)
(*) School of Power and Power Engineering, University of Shanghai for Science and Technology, China, (**) Jiexiu Zhiye Zhongxue, China

697 EFFECTS OF BOILING HYSTERESIS ON METASTABLE TWO-PHASE FLOW OF REFRIGERANT IN A STRAIGHT ADIABATIC CAPILLARY TUBE
GAO L.(*), EGUCHI H.(**), TATARA Y.(**), TAKAKUSHI S.(**), HONDA T.(*)
(*) Fukuoka University, Japan, (**) Graduate School of Engineering, Fukuoka University, Japan

809 COMPARATIVE STUDY ON THE PERFORMANCE OF CASCADE SUPERCRITICAL CARBON DIOXIDE POWER CYCLES FOR WASTE HEAT RECOVERY
LEE J. S., KIM M. S.
Department of Mechanical Engineering, Seoul National University, South Korea

905 INVESTIGATION OF RUNBACK ICE PHENOMENON DURING ELECTROTHERMAL DEICING PROCESS AND THE CORRESPONDING SCHEME FOR SYSTEM OPTIMIZATION
LIANG D., SHINAN C., BO Y.
School of Aeronautic Science and Engineering, Beihang University, China

B2-Th-P

513 A NEW FORMATION KINETICS STUDY METHOD OF TBPB AND CO_2 HYDRATES BASED ON DTA
CLAIN P.(*), OSSWALD V.(**), SPIGA O.(**), DELAHAYE A.(**), FOURNAISON L.(**)
(*) Leonard de Vinci Pôle Universitaire, Technology Lab, France, (**) Irstea GPAN, France

543 NEW CORRELATIONS OF SOME THERMOPHYSICAL PROPERTIES OF ALKALI NITRATE/NITRITE AQUEOUS SOLUTIONS FOR ABSORPTION HEAT PUMPS AND REFRIGERATION SYSTEMS ACTIVATED AT HIGH TEMPERATURE
VARGAS P.(*), FITO J.(**), SALAVERA D.(**), CORONAS A.(**)
(*) Department of Chemical Engineering, Universidad de Antofagasta, Chile, (**) CREVER-Group of Applied Thermal Engineering, Universitat Rovira i Virgili, Spain

585 COMPARATIVE ANALYSIS OF THE PERFORMANCE OF AN OFFSET-STRIP FIN HEAT EXCHANGER AS EVAPORATOR IN A REFRIGERATION SYSTEM WITH R22 AND R417A
DIZ R., FERNÁNDEZ-SEARA J., PARDIÑAS Á. Á.
Área de Máquinas y Motores Térmicos, Universidad de Vigo, Spain

907 EXPERIMENTAL INVESTIGATION ON REFRIGERANT FLOW DISTRIBUTION OF MICROCHANNEL EVAPORATOR
LIU X., WANG F., WU Q.
ZheJiang DunAn Artificial Environment Co., LTD, China

C1-Th-P

121 MODELING THE PROCESSES OF PNEUMATIC CRYOELECTROSEPARATION OF A DISPERSED RAW MATERIAL OF BIOLOGICAL ORIGIN
SEMENOV E.(*), BABAKIN B.(*), BELOZEROV G.(**), VYGODIN V.(**), VORONIN M.(*), BABAKIN S.(*)
(*) Moscow State University of Food Production, Russia, (**) FGBNU Russian Scientific Research Institute for Refrigeration Industry (VNIKHI), Russia, (***) OAO "Rosmyasomoltorg", Russia

277 CRYOPROTECTIVE EFFECT OF CARBOXYLATED POLY-L-LYSINE ON THE NEMATODE *CAENORHABDITIS ELEGANS*
HAYASHI M.(*), MURASE N.(*), MATSUMURA K.(**)
(*) School of Science and Engineering, Tokyo Denki University, Japan, (**) School of Materials Science, Japan Advanced Institute of Science and Technology, Japan

437 EFFECT OF GAP-JUNCTIONAL CELL-TO-CELL COMMUNICATION ON INTRACELLULAR ICE PROPAGATION AND CONSEQUENT CELL VIABILITY
FUKUNAGA T.(*), KUBO H.(**), KURATA K.(*), HIRAHARA H.(**), WANG H.-D.(*), TAKAMATSU H.(*)
(*) Department of Mechanical Engineering, Kyushu University, Japan, (**) Graduate School of Engineering, Kyushu University, Japan

473 MITOCHONDRIAL REACTIVE OXYGEN SPECIES INVOLVED IN COLD STRESS IN HACAT CELLS
YAZAWA T., SEKINE H., MURASE N., NAGAHARA Y.
College of Science and Engineering, Tokyo Denki University, Japan

491 DESIGN OF CLOSED-LOOP MIXED REFRIGERANT JOULE-THOMSON CRYOSURGICAL PROBE WITH PRECOOLING STAGE
LEE C., YOO J., PARK I., JEONG S.
Cryogenic Engineering Laboratory, KAIST, South Korea

503 ESTIMATION OF DMSO CONCENTRATION FOR CELL CRYOPRESERVATION ON ADHESION STATE
SEKINE H., OTAKI M., HAYASHI M., MURASE N., NAGAHARA Y.
College of Science and Engineering, Tokyo Denki University, Japan

C2-Th-P

589 SURVIVAL OF *SACCHAROMYCES CEREVISIAE* IN REFRIGERATED FRESH ORANGE JUICE TREATED WITH CINNAMON LEAF ESSENTIAL OIL AND THERMO-SONICATION
SÁNCHEZ-RUBIO M.(*), TABOADA-RODRÍGUEZ A.(**), CAVA-RODA R.(**), GUERROUJ K.(***), MARÍN-INIESTA F.(*)
(*) 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

593 MODIFIED ATMOSPHERE PACKAGING TO EXTEND SHELF LIFE OF READY TO EAT FRESH CUT TOMATOES
TABOADA-RODRIGUEZ A.(*), SANCHEZ-RUBIO M.(**), CAVA-RODA R.(*), MARÍN-INIESTA F.(**)
(*) 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

843 THE INFLUENCE OF WAITING PERIOD BEFORE FREEZING ON THE SENSORY QUALITY DETERIORATION OF FISH MEAT CAUSED BY FREEZING
KOBAYASHI T., KOMINAMI Y., WATANABE M., SUZUKI T.
Department of Food Science and Technology, Graduate School of Tokyo University of Marine Science and Technology, Japan

D1-Th-P

427 THERMAL PROTECTION OF ICE CREAM DURING STORAGE AND TRANSPORTATION
LEDUCQ D., NDOYE F. T., CHARRIAU C., ALVAREZ G.
Irstea, UR GPAN, France

429 ENERGY SAVINGS POTENTIAL USING THE THERMAL INERTIA OF A LOW TEMPERATURE STORAGE
LEDUCQ D.(*), PIRANO M.(**), ALVAREZ G.(*)
(*) Irstea, UR GPAN, France, (**) SPES scpa, Italy

509 NUMERICAL SIMULATIONS OF HEAT AND MASS TRANSFER IN A CHINESE CABBAGE COLD STORE
KOLODZIEJCZYK M., BUTRYMOWICZ D., ŚMIERCIEW K., GAGAN J.
Bialystok University of Technology, Poland

519 INVESTIGATIONS OF VEGETABLES COLD STORE WITH INDIRECT COOLING SYSTEM OF THE VARIABLE CAPACITY
MIZERA G.(*), BUTRYMOWICZ D.(**), GAGAN J.(**), ŚMIERCIERW K.(**), SZCZEŚNIAK A.(***)
(*) Institute of Fluid-Flow Machinery of Polish Academy of Sciences, Poland, (**) Bialystok University of Technology, Poland, (***) REMSTAT, Poland

873 REFRIGERATED DISPLAY CASE DEFROSTING USING INFERENTIAL ICE SENSING
NUTARO J.(*), FUGATE D.(*), KURUGANTI T.(*), FRICKE B.(*), WALLACE J.(**)
(*) Oak Ridge National Laboratory, United States, (**) Emerson Climate Technologies, United States

879 DUCTLESS AIR-CONDITIONING SYSTEM USING A COANDA EFFECT AND A HORIZONTAL PANEL FOR HERB MEDICINE STORAGE IN YUBARI PROJECT
YOKOI M., SHIBUYA D.
Taisei Corporation, Japan

883 INFLUENCE OF GRAVITY LEVEL ON THE SELF-PRESSURIZATION PERFORMANCE OF LARGE SCALE CRYOGENIC STORAGE TANK
LIU Z.(*), LI Y.(*,**)
(*) Xi'an Jiaotong University, China, (**) State Key Laboratory of Technologies in Space Cryogenic Propellants, China

D2-Th-P

41 ATP-APPROVED EQUIPMENT FOR REFRIGERATED ROAD TRANSPORT – SERBIA'S EXPERIENCES
STAMENKOVIĆ D.(*), POPOVIĆ V.(**), VOROTOVIĆ G.(***)
University of Belgrade, Faculty of Mechanical Engineering, CIAH Laboratory, Serbia

85 ACTIVE COOLING AND THERMAL MANAGEMENT OF A DOWNHOLE TOOL ELECTRONICS SECTION
SOPRANI S., ENGELBRECHT K., NØRGAARD A. J.
Department of Energy Conversion and Storage, Technical University of Denmark, Denmark

E1-Th-P

175 APPLICATION INVESTIGATION ON A PUMPED LOOP HEAT PIPEHEAT EXCHANGER UNIT FORASMALL DATA CENTER
WEI C., MA G., ZHOU F., XU S., ZHANG S.
Beijing University of Technology, China

183 OPTIMAL DESIGN OF HEAT EXCHANGERS OF THE HEAT PIPE COMBINED EVAPORATIVE COOLING ROOM AIR CONDITIONER
ZHANG Y.(*), HAN Z.(*), LIU Q.(*), QU L.(*), HAN Y.(**), LIN J.(***)
(*) School of Materials & Metallurgy, Northeastern University, China, (**) Xinjiang Solar Technology Development Company, China, (***) The 70 Middle School in Urumqi, China

185 STUDY ON THE COMPUTER ROOM AIR CONDITIONER WITH SEPARATE TYPE HEAT PIPE AND EVAPORATIVE COOLING
ZHANG Y.(*), HAN Z.(*), MENG X.(*), LIU Q.(*), LI W.(*), HAN Y.(**), ZHANG Y.(**)
(*) School of Materials & Metallurgy, Northeastern University, China, (**) Xinjiang Solar Technology Development Company, China

357 A EVALUATION OF THERMAL ENVIRONMENT ON NON-UNIFORM RADIANT FIELDS
SAITO N.(*), SAKAI K.(*), ONO H.(**)
(*) Meiji University, Japan, (**) Central Research Institute of Electric Power Industry, Japan

455 NOVEL ABSORPTION REFRIGERATION SYSTEM WITH A HOLLOW FIBER MEMBRANE-TYPE GENERATOR
HONG S. J., DANG C., OKAMOTO H., WANG Z., HIHARA E.
Institute of Environmental Studies, Graduate School of Frontier Sciences, The University of Tokyo, Japan

461 ENERGY SAVING PERFORMANCE OF THE WET-AIR-CONDITIONING SYSTEM
TATEIWA K., MURASAWA I., WATANABE T.
TONETS Corporation, Japan

613 INFLUENCE OF REFRIGERANT CHARGE AND AIR INLET TEMPERATURES ON THE PERFORMANCE OF AN AUTOMOTIVE AIR CONDITIONING SYSTEM
MACAGNAN M. H., COPETTI J. B.
LETEF, Universidade do Vale do Rio dos Sinos, Brazil

801 INLET-AIR COOLING SYSTEM WITH CENTRIFUGAL-CHILLER MODULE
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

811 NUMERICAL INVESTIGATION OF FLOW AND HEAT TRANSFER FOR A SPLIT AIR CONDITIONER INDOOR UNIT
LAI X., LIU N., YAN K. ZHANG H.
College of Energy and Power Engineering, University of Shanghai for Science and Technology, China

889 PERFORMANCE EVALUATION OF FAN COIL UNITS WITH INCREASED CHILLED WATER SUPPLY TEMPERATURES
CHIANG H.-C., WU J.-R., CHUNG J.-C., LIAW J.-S., JENG M.-S.
Green Energy and Environment Research Laboratories, Industrial Technology, Taiwan

897 ENERGY SAVING ANALYSIS OF THE CENTRAL AIR-CONDITIONING CHILLER SYSTEM FOR A SHOPPING CENTER
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

E2-Th-P

43 EXPERIMENTAL BENCH DESIGN FOR HEAT PUMP USING CO_2 BASED MIXTURES DEVELOPPEMENT D'UN BANC EXPERIMENTAL POUR POMPE A CHALEUR UTILISANT DES MELANGES A BASE DE CO_2
BOUTEILLER P., TOBALY P., TERRIER M.-F., TOUBLANC C.
CNAM Laboratory CMGPCE, France

243 OPTIMAL TEMPERATURE DIFFERENCES IN THE EVAPORATOR AND CONDENSER OF A REFRIGERATION OR ORGANIC RANKINE CYCLE SYSTEM BASED ON EXERGOECONOMIC ANALYSIS
ALEXANDRU A., APOSTOL V., PRISECARU M., DOBRE C., DOBROVICESCU A.
University Politehnica of Bucharest, Faculty of Mechanical Engineering and Mechatronics, Department of Thermodynamics, Romania

279 CONSIDERATIONS FOR THE USE OF HEAT PUMPS WITH COMBINED THERMAL STORAGE AS A DSM TOOL IN A DOMESTIC RETROFIT SETTING
WILSON C., SHAH N., HEWITT N., HAUNG M.
Ulster University, United Kingdom

285 USING PSO-SMITH CASCADE CONTROL ALGORITHM FOR WATER SOURCE HEAT PUMP SYSTEMS
TSAI K.-I.
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
LI S., LI S., ZHANG X.
School of Energy and Environment, Southeast University, China

451 OPTIMIZATION OF THERMAL PERFORMANCE IN HEAT PUMP'S BOREHOLE HEAT EXCHANGER
BIALKO B., SANDLER S., KROLICKI Z., ZAJACZKOWSKI B.
Wroclaw University of Technology, Poland

453 DIESEL COMBUSTION OF OIL AND REFRIGERANT MIXTURE DURING PUMP-DOWN OF AIR CONDITIONERS
HIGASHI T.(*), SAITOH S.(**), DANG C. B.(*), HIHARA E.(*)
(*) 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
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
XING M., YU J.
Department of Refrigeration & Cryogenic Engineering, School of Energy and Power Engineering, Xi'an Jiaotong University, China

757 MEASUREMENT OF WATER VAPOUR DIFFUSION COEFFICIENT IN THE PACKED BED OF ZEOLITE PARTICLES FOR THE ADSORPTION HEAT PUMP
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
SHIKICHI K.(*), ASANO H.(**)
(*) The Kansai Electric Power Co., Inc., Japan, (**) Department of Mechanical Engineering, Kobe University, Japan

S1-Th-P

21 EXPERIMENTAL INVESTIGATIONS ON THE THERMAL PERFORMANCE OF THE VENTILATED BIPV WALL
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
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
LING Y.-Z., ZHANG X.-S.
School of Energy and Environment, Southeast University, China

659 A MEASUREMENT OF VELOCITY FIELDS IN A FLOOR HEATING ROOM FOR VALIDATION OF CFD
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
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
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

13:30 282 HEAT TRANSFER CHARACTERISTICS OF R32, R410A AND R1234YF DURING EVAPORATION INSIDE HORIZONTAL MINICHANNEL
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
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
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
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
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

13:30 347 MAGNETOCALORIC EFFECT IN $Nd_{0.7}Sr_{0.3}MnO_3$:CuO COMPOSITES
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
LEI Z., ECKERT K.
Institute of Fluid Mechanics, Technische Universitaet Dresden, D-01069 Dresden, Germany

14:10 202 ANSWERS TO THE REVIEWERS REMARKS AND QUESTIONS
EGOLF P. W.
University of Applied Sciences of Western Switzerland, Switzerland

14:30 383 EXPERIMENTAL STUDY OF ROOM TEMPERATURE MAGNETIC REFRIGERATOR USING MULTILAYERED MAGNETOCALORIC MATERIALS
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

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
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
ROHDE D.(*), BANTLE M.(**), ANDRESEN T.(**), NORD N.(*)
(*) Norwegian University of Science and Technology, Norway, (**) SINTEF Energy Research, Norway

14:10 740 PERFORMANCE STUDY OF A DC REFRIGERATOR POWERED BY DIFFERENT SOLAR PV MODULAR SETS, PAPER II
HAMMAD M., TARAWNEH T.
University of Jordan, Jordan

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

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

13:30 885 NUMERICAL PERFORMANCE OF A NOVEL AIR SIDE FIN USED IN HEAVEY DUTY ENGINE
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
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

13:30 492 PARTICLE SIZE DISTRIBUTION IN ICE SLURRY SYSTEMS - SETUP AND ANALYSIS
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
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
FUMOTO K.(*), KAWANAMI T.(**), INAMURA T.(*)
(*) Hirosaki University, Japan, (**) Kobe University, Japan

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

14:50 893 ICE SLURRY PROPERTIES OF SEAWATER
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

13:30 817 NUMERICAL STUDY FOR DETECTION OF REFRIGERANT LEAKAGE IN VAPOR COMPRESSION REFRIGERATION CYCLE
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
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
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
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
MADANI H.
KTH Royal Institute of Technology, Sweden

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

WORKSHOP: SIRACH
WS10-Th-3 Room 418

THURSDAY, AUGUST 20 15:30-17:10

BOILING(3)
B1-Th-4a Room 301

15:30 682 HEAT TRANSFER COEFFICIENT OF TWO-PHASE FLOW BOILING WITH LOW VAPOR QUALITY
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
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
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
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
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

15:30 488 DEVELOPMENT OF A NOVEL ROTARY MAGNETIC REFRIGERATOR
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
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
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
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
PLAZNIK U., KITANOVSKI A., POREDOŠ A.
University of Ljubljana, Faculty of Mechanical Engineering, Slovenia

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

15:30 32 OPTIMIZATION OF COMPRESSOR LOAD SHARING IN MULTIPLE FIXED SPEED COMPRESSORS HEAT PUMP
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
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
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?
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
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

15:30 205 PERFORMANCE OF AN AIR CONDITIONING SYSTEM HEAT RECOVERY UNIT WITH PULSATING HEAT PIPES HEAT EXCHANGER
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
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
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
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
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

15:30 394 FABRICATION OF SILICA HARD-SHELL MICROCAPSULE CONTAINING INORGANIC PHASE-CHANGE MATERIALS
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
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
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
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
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

15:30 90 ENHANCEMENT OF GENERATION OF HIGH-TEMPERATURE STEAM FROM A NOVEL ADSORPTION HEAT PUMP ASSISTED BY THERMAL ENERGY STORAGE MATERIAL
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
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
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
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
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

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

16:10 681 CALCULATION OF THE EFFECTIVE CONCENTRATION FOR NITROGEN AND KRYPTON IN THE SURFACE LAYER OF THE CRYOGENIC LIQUIDS SOLUTIONS (N_2/Ar) AND (Kr/Xe)
ZHELEZNY V., SEVASTIANOVA T., PODDUBNA M.
Odessa National Academy of Food Technologies, Ukraine

16:30 720 PARAMETER OPTIMIZATION OF SUCCESSIVE STAGES OF THE TECHNOLOGY FOR OBTAINING ^{3}HE ISOTOPE FROM NATURAL HELIUM
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

FRIDAY, AUGUST 21 8:30-10:10

CONDENSATION(1)
B1-Fr-1a Room 301

8:30 165 CONDENSATION HEAT TRANSFER OF LOW GWP REFRIGERANTS R1234ZE(E), R1234ZE(Z) AND R1233ZD(E) ON A HORIZONTAL PLAIN TUBE
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
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
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
GAGAN J., BUTRYMOWICZ D., DUDAR A., ŁUKASZUK M., ŚMIERCIEW K.
Bialystok University of Technology, Poland

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

8:30 77 STATE-OF-THE ART OF FROST DEPOSITION ON FLAT SURFACES
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
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-
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
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
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

8:30 252 DIESEL ENGINE HEAT PUMP PERFORMANCE ANALYSIS FOR A DOMESTIC RETROFIT APPLICATION
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
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
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
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
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

8:30 137 AN EXPERIMENTAL COMPARISON BETWEEN PERFORMANCES OF MODULAR SILICON EXPASION VALVE AND THERMAL EXPANSION VALVE IN MOBILE AC SYSTEM
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
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
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

8:30 199 DRY-BULB AND WET-BULB TEMPERATURE ALLOWANCES CORRECTION BASED ON WEIGH ANALYSIS
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
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
PFEIL H. V.
BITZER Kühlmaschinenbau GmbH, Germany

9:30 145 APPLYING VARIABLE FREQUENCY DRIVES TO AIR UNITS IN INDUSTRIAL REFRIGERATION SYSTEMS
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
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

8:30 565 ETHYL AND ISOPROPYL ALCOHOL BLENDS AS ALTERNATIVE SECONDARY FLUIDS
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
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
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
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
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

8:30 KEYNOTE EXPERIENCES IN RENEWAL OF COLD STORAGE FACILITIES FROM R22 TO NH_3/CO_2 IN JAPAN
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
DUSEK J.(*), MASSON N.(*), SKACANOVA K.(**)
(*) Shecco Japan K.K., Japan, (**) Shecco, Belgium

9:30 900 RECENT ADVANCES IN AMMONIA DRY EXPANSION APPLICATIONS
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
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

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

FRIDAY, AUGUST 21 10:30-12:10

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

10:30 711 TWO PHASE HEAT TRANSFER AND FLOW REGIMES OF R134A AND R410A DURING CONDENSATION IN HORIZONTAL MICRO-FIN TUBES
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
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
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
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
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

10:30 18 LUMPED HEAT AND MASS TRANSFER MODEL OF THE FROST FORMATION PROCESS
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
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
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
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
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

10:30 848 INFLUENCE OF GROUNDWATER FLOW ON IMPLEMENTATION OF DISTRIBUTED THERMAL RESPONSE TEST
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
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
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
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
CHOROWSKI M., PYRKA P.
Wroclaw University of Technology, Department of Cryogenic, Aviation and Process Engineering, Poland

OTHERS(2)
E1-Fr-2 Room 411+412

10:30 94 THE TEMPERATURE CONTROL OF CHILLED WATER FOR THE CENTRAL AIR CONDITIONING SYSTEMS
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
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
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
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
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

10:30 759 FAULT DETECTION AND DIAGNOSIS OF A REFRIGERATION SYSTEM USING PROBABILISTIC NEURAL NETWORK
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
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
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
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
BOUZRARA A.(*), KAIRAOUANI L.(**), NEHDI E.(**)
(*) ISPA, Tunisia, (**) ENIT, Tunisia

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

10:30 15 CO_2 AS A REFRIGERANT – START RIGHT AWAY!
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
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
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
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

10:30 272 LOW TEMPERATURE HEAT STORAGES IN CO_2 SUPERMARKET REFRIGERATION SYSTEMS
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
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
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
POLZOT A., D'AGARO P., GULLO P., CORTELLA G.
DIEG - University of Udine, Italy

11:50 652 PERFORMANCE INDICATORS FOR ENERGY EFFICIENT SUPERMARKET BUILDINGS
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

10:30 KEYNOTE **DEVELOPMENT FOR ENERGY CARRIER WITH LIQUID HYDROGEN FROM OVERSEAS**
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**
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**
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

FRIDAY, AUGUST 21 13:30-15:10

CONDENSATION(3)
B1-Fr-3a Room 301

13:30 361 **CONDENSATION OF R1234ze(Z) INSIDE A VERTICAL PLATE-FIN HEAT EXCHANGER**
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**
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**
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**
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**
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

13:30 384 **NUMERICAL SIMULATION ON THE FLOW BEHAVIOR OF ICE SLURRY IN PIPING SYSTEMS**
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**
ASAOKA T., ENDO Y., HUANG C.
Shinshu University, Japan

14:10 694 **CONTROL OF SUPERCOOLING DEGREE DUE TO SURFACTANT**
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**
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**
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

13:30 431 **SIMULATION ANALYSIS OF SOLUTION TRANSPORTATION ABSORPTION CHILLER WITH THE CAPACITY FROM 25RT TO 1000RT**
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**
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**
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**
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**
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

13:30 KEYNOTE **EXPANDING MARKET OF 4KGM CRYOCOOLER**
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**
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**
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**
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

13:30 275 **CHARACTERIZATION OF HEAT TRANSFER IN R134-A SPRAY COOLING**
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**
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**
HEERUP C.
Danish Technological Institute, Denmark

14:30 299 **VORTEX TUBE HEAT BOOSTER TO IMPROVE PERFORMANCE OF HEAT DRIVEN COOLING CYCLES**
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**
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

13:30 276 **DEVELOPMENT OF AN INNOVATIVE RAW MILK DISPENSER BASED ON NANOFLUID TECHNOLOGY**
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
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)
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
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)
FAVERO C.
Hiross Zander Division, Parker Hannifin Manufacturing Srl, Italy

GLASS DISP / CABINET
D1-Fr-3 Room 416+417

13:30 749 A NOVEL PASSIVE DEFROST SYSTEM FOR A FROZEN RETAIL DISPLAY CABINET WITH A LOW EVAPORATOR
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
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
VALLÉE C.
Carrier Kältetechnik Deutschland GmbH, Germany

14:30 50 OPTIMAL CONFIGURATION OF COMPRESSORS IN INDUSTRIAL REFRIGERATION SYSTEMS BASED ON PART-LOAD
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

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

14:10 324 MODELLING AND DEVELOPMENT OF SUSTAINABLE REFRIGERATED ROAD TRANSPORT SYSTEMS
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
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
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

FRIDAY, AUGUST 21 — 15:30-17:10

PLATE HEAT EXCHANGER(1)
B1-Fr-4a Room 301

15:30 687 FLOW CHARACTERISTICS OF AIR-WATER TWO PHASE FLOW IN A PLATE HEAT EXCHANGER
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)
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)
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
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
KAWAZOE A., KARIYA K., MIYARA A.
Department of Mechanical Engineering, Saga University, Japan

CO2
B1-Fr-4b Room 303

15:30 225 EXPERMENTAL INVESTIGATION ON HEAT TRANSFER AND PRESSURE DROP CHARACTERISTICS OF SUPERCRITICAL CO_2 IN CIRCULAR TUBE
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
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)
FAVERO C.
Hiross Zander Division, Parker Hannifin Manufacturing Srl, Italy

16:30 390 OPTIMIZATION ANALYSIS ON R290 /CO2 CASCADE REFRIGERATION SYSTEM
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

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)
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
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
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
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
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

15:30 661 PERFORMANCE INVESTIGATIONS ON 10W/60 K HIGH-CAPACITY, LIGHT-WEIGHT SINGLE-STAGE PULSE TUBE CRYOCOOLERS FOR SPACE APPLICATIONS
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
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
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
ZHU S.
School of Mechanical Engineering, Tongji University, China

16:50 263 INVESTIGATION ON THE MATCHING PERFORMANCE OF A SMALL CRYOGENIC AIR TURBOEXPANDER
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

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
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
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
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
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

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
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
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
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
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
LI Z., SHAO L., YANG L., ZHANG C.
School of Mechanical Engineering, Tongji University, China

FOOD
D1-Fr-4 Room 416+417

15:30 173 ENERGY ANALYSIS AND HEAT LOADS CALCULATION APPROACH: APPLICATION TO AGRIFOOD INDUSTRIAL PREMISES
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
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
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
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

15:30 132 STUDY ON THE CAPACITY CONTROL OF A NEWLY-DEVELOPED REFRIGERATION UNIT FOR MARINE CONTAINERS
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
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
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
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
KACIMI A., LABRANQUE G.
SOFRIGAM, France

WORKSHOP: MAGNETIC REFRIGERATION: MATERIALS & SYSTEMS FOR COMMERCIALIZATION
WS14-Fr-4 Room 304

SATURDAY, AUGUST 22 8:30-10:10

PLATE HEAT EXCHANGER(2) / TWO-PHASE FLOW DISTRIBUTION
B1-Sa-1a Room 301

8:30 74 DEVELOPMENT OF POLYMER PLATE HEAT EXCHANGERS FOR OUTDOORS TELECOM CABINET COOLING SYSTEMS
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
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
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
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
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

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

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

8:30 728 FLOW CHARACTERISTICS OF TETRA-N-BUTYL AMMONIUM BROMIDE CLATHRATE HYDRATE SLURRY IN 90° ELBOW PIPE
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
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
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
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
LAZOVA M., KAYA A., HUISSEUNE H., DE PAEPE M.
Ghent University, Belgium

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

8:30 150 A PRELIMINARY STUDY OF THE PERFORMANCE ENHANCEMENT OF A DUAL-MODE HEAT PUMP USING AN EJECTOR
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
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
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
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
LIANG Y., LI S.
School of Energy and Environment, Southeast University, China

CRYOGENIC SYSTEM
A1-Sa-1 Room 411+412

8:30 288 STATUS OF THE NICA CRYOGENICS AT JINR
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
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
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
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

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

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

OTHERS(4)
B2-Sa-1 Room 414+415

8:30 46 EXPERIMENTAL AND NUMERICAL INVESTIGATION ON A NEW TYPE DISTRIBUTOR FOR R410A AIR CONDITIONER
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
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
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
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

8:30 360 EFFECT OF FORCED-AIR COOLING, LOW TEMPERATURE STORAGE AND TRANSPORTATION, FOUR RETAILING METHODS ON QUALITY OF PEARS
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
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
GUILPART J.
IIR, MF Conseil, France

OTHERS
D2-Sa-1 Room 418

8:30 688 EXPERIMENTAL INVESTIGATION OF ENERGY BALANCE DURING THE DOOR OPENING OF A REFRIGERATED TRUCK
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
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
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
CAVALIER G., BOUDET N., BONED M.
Cemafroid, France

SATURDAY, AUGUST 22 10:30-11:30

NANOFLUIDS
B1-Sa-2a Room 301

10:30 802 EXPERIMENTAL RESEARCH ON VISCOSITY OF AL2O3 - H2O NANOFLUIDS
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
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
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

10:30 904 SIMULATION OF THE DROPLET PARAMETERS CHANGING ALONG THE FLOW
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
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 90° BENDS OF THERMOACOUSTIC DEVICES
ILORI O. M., MAO X., JAWORSKI A. J.
Faculty of Engineering, University of Leeds, United Kingdom

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

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

10:30 172 ENERGY PERFORMANCE OF CO_2 HYBRID GROUND-COUPLED HEAT PUMPING SYSTEM FOR HOTEL APPLICATION
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
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
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

10:30 271 EXPERIMENTAL STUDY ON LIQUID NITROGEN SPRAY IN ATMOSPHERIC ENVIRONMENT
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
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

10:30 614 CRYO-SEM AS A SUITABLE TOOL TO STUDY VITRIFICATION IN CRYOPRESERVED TISSUE
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
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

10:30 215 PREPARATION AND PROPERTIES OF LAURIC ACID-DECANOIC ACID/TETRADECYL ALCOHOL-DEDECANE COMPOSITE AS PCMS FOR THERMAL ENERGY STORAGE
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
JIN S., BU G.
College of Energy, Nanjing University of Technology, China

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

INSULATION
D2-Sa-2 Room 418

10:30 575 LOW GWP INSULATION BLOWING AGENTS AND METHODS OF MEASUREMENT OF EFFICIENCY
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
SUQUET T., CAVALIER G.
Cemafroid, France

11:10 911 REFRIGERATION EQUIPMENT PULL DOWN TESTS: A TOOL FOR ENERGY SAVING
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