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ISBN: 978-1-63439-400-0
Opening Ceremony (May 19, 9:00~9:10), Crystal ballroom
Opening ceremony

Plenary Lecture (May 19, 13:30~14:10), Crystal ballroom
Chairman: Xianting Li (Tsinghua University)
Visualization and measurement of refrigerant flow by neutron radiography, Hitoshi Asano (Kobe University)

A1: Air Conditioning (May 19, 10:10~12:10), Crystal room
Chairman: Saha Baran Bidyut (Kyushu University) / Jeong Kyun Seo (Korea Institute of Machinery and Materials)
241 Development of parallel flow heat exchanger for air conditioner indoor unit, Gaku Hayase, Yonghwa Choi, Youngmin Kim (Samsung Electronics Co. Ltd)
264 Multiple parameters statistical analysis for energy efficiency of building air-conditioning systems, Yew Khoy Chuah (National Taipei University of Technology), Yoong Pin Ch'ng (Teco Electric and Machinery)
265 Performance verification of sub-cooling system in Thailand, Shuichi Ishii, Takamasa Ooyama, Yoshihiko Mikami, Nagato Hoshi, Satoru Kaneoya, Naoto Koyasu (Takasago Thermal Engineering Co. Ltd)
281 Experimental investigation on the performance characteristics of the partitioned tank applied to the solar air conditioning, Jin Su-min, Wang Aihui, Sun Shu-hua (Nanjing University of Technology)
286 A study on the optimization of the louver guide for an outdoor unit of air-conditioner, Minsung Kim (Pusan National University), Jinhan Park, Sungyoon Kim (LG Electronics), Man Yeong Ha (Pusan National University), Inkyu Kim, Jinhan Park, Sungyoon Kim (LG Electronics)
289 Experimental performance investigation and economic analysis of small solar air-conditioning systems with different kinds of collectors and chillers, Z.S Lu (Shanghai Jiao Tong University), H.B Wang (Lucy New Energy Technology Co. Ltd)
413 Numerical analysis of the heat and mass transfer for a plate heat exchanger type dehumidifier, Sanghun Mun, Byung Ha Kang, Young Soo Chang (Kookmin University)

B1: Refrigeration (May 19, 10:10~12:10), Jade room
Chairman: Jianlin Yu (Xi’an Jiaotong University) / Joon Ahn (Kookmin University)
607 Performance of an oil-separator with an oleophobic lower cup, Seongil Jang, Joon Ahn, Si Hyung Lim (Kookmin University)
613 Dynamic simulation of a chiller for a semiconductor fabrication process, Joongbeom Lee, Syoung Jeong, Doyoung Jeon (Sogang University), Byung Chul You, Gwanghoon Seong (Fine Semitech Corp.)
268 Theoretical study of an internal auto-cascade refrigeration cycle using mixture R290/R600, Hui Hu, Gang Yan, Jianlin Yu (Xi’an Jiaotong University)
287 A refrigeration system using air as the working fluid, Nobuya Ishitsuka, Nelson Mugabi (Mayekawa Mfg. Co. Ltd.)
314 Performance analysis of R32 refrigeration cycle by using taguchi method, Yang-Cheng Shih, Wen-Shan Wang, Yu-Shien Shiah (National Taipei University of Technology), Derrick Shih (Electronics Testing Center), Sheau-Wen Shiah (Taiwan Boiler Association), Wei-Lung Yu (Army Academy)
518 Study on the performance enhancement of cascade heat pumps, Samuel Boahen, Kwangmoo Jeong, Seung Byung Park, Jong Min Choi (Hanbat National University), Jongryul Kim (Tea Co.)
C1 : Thermal Fluid (May 19, 10:10~12:10), Amethyst A
Chairman : Yang-Cheng Shih (National Taipei University) / Chang Yong Park (Seoul National University of Science and Technology)

212 Thermal conductivity and convection heat transfer changer for water-Al2O3 nanofluid with elapse of time, Man Bae Kim, Hong Gen Park, Han Ryu, Chang Yong Park (Seoul National Univ. of Science & Technology)

536 Analysis on thermal performance of polymer heat exchanger, Dong-Wook Oh, Chan Ho Song, Seok Ho Yoon, Sang Jin Park (Korea Institute of Machinery and Materials)

273 Effect of wall suction on entropy generation rate in laminar condensate layer on horizontal tube, Rong-Horng Chen, Tong-Bou Chang (National Chiayi University)

279 Flow boiling of R1234ze(Z) and R1234ze(E) in horizontal micro-fin tubes for high temperature application, Fumiya Mishima, Shigeru Koyama, Jinfan Liu, Chieko Kondou (Kyushu University)

288 Condensation mode transition on metal-based hydrophobic micro textured surfaces, Ki Wook Kim, Ji Hwan Jeong (Pusan National University)

291 Single-phase and two-phase frictional pressure drops in horizontal 90° bends, Ing Youn Chen, Chien-Min Chyu, Rong-Zhi Li (National Yunlin University of Science and Technology), Chi-Chuan Wang (National Chiao Tung University)

402 Development of a compact torsionally oscillating crystal viscometer and viscosity measurements of R1234ze(Z), Atsuhi Matsuguchi, Oota Yousuke, Noboru Kagawa (National Defense Academy)

407 Condensation heat transfer of R-410a flowing inside the multiport minichannels, Pham Quang Vu, Kwang-II Choi, Jong-Teak Oh (Chonnam National University), Honggi Cho, Taehun Kim, Jungho Kim, Changseon Lee (Samsung Electronics)

D1 : HVAC&R Control / Ventilation (May 19, 10:10~12:10), Amethyst B
Chairman : Kuei Tsai (National Chin-Yi University) / Dae-Young Lee (Korea Institute of Science & Technology)

635 Dehumidification performance of a damper-controlled desiccant dehumidifier, Choong-Sub Lee, Byung Ha Kang (Kookmin University), Dae-Young Lee (Korea Institute of Science & Technology)

408 PWM algorithm in compressor speed and refrigerant flow rate control for water source heat pumps, Kuei-I Tsai, Wen-Kai Wu, Jyun-Ming Tsai (National Chin-Yi University)

426 The artificial neural networks applied to temperature control for variable refrigerant flow air-conditioning systems, Ming Huei Chu, Yi Wei Chen (Tungnan University), Yu-Shi Zhai, Chao-Ming Lai (National Taipei University)

438 Controlling the evaporation pressure of a heat pump to improve thermal comfort at low cooling load condition, Young Sung Park, Ji Hwan Jeong (Pusan National University)

465 Experiment on indoor air quality and energy consumption depending on ventilation control modes, Junyong Lee, Kyung-Jin Jang, Jung-kyung Kim, Hwataik Han (Kookmin University)

510 Speed optimization of parallel-connected variable speed pumps, Yun Chuang Dai, Zi Yan Jiang, Pei Zhang Chen, Shan Xin (Tsinghua University), Sheng Li (UTRC China)

570 Effects of the axial-conduction on the performance of a regenerative evaporative cooler, Sung-Gyun Son (Korea Institute of Science & Technology), Yongchan Kim (Korea University), Dae-Young Lee (Korea Institute of Science & Technology)
E1 : Automotive HVAC (May 19, 10:10~12:10), Ruby room
Chairman : Atsushi Akisawa (Tokyo University of Agriculture and Technology) / Youn Cheol Park (Jeju National University)

364 Consideration of noise caused by gas pulsation in the design of automotive electric compressor, Agustinus Oey, Ik-Seo Park, Ju-Hyun Kim, Je-Seung Yu (LG Electronics)

388 A theoretical model for a gas injection heat pump used in electric vehicles, Jongho Jung, Dongwoo Kim, Jae Hwan Ahn, Yongchan Kim (Korea University)

428 The intelligent temperature control for electric vehicle A/C cooling subsystem, Cheng Kuang Huang, Ming Huei Chu (Tungnan University), Yew Khoy Chuah (National Taipei University), Yi Wei Chen, Yi Sheng Chung (Tungnan University)

453 Battery saving ways during cabin heating on electric vehicle, Yi Cheol Choi, Ohyoung Kwon, Wonsuk Lee, Beomyong Chung (Doowon Climate Control Co., Ltd.)

455 Development of HVAC system for electric vehicle, Chulmin Kim, Kangwoo Nam, Wonsuk Lee, Beomyong Chung (Doowon Climate Control Co., Ltd.)

566 Recent R&D trends on HVAC system for xEV, Byung Ha Kang, Hyung Bum Kim, Sung Jin Kim (Kookmin University)

574 Optimum charge test for water and air source hybrid heat pump system, Gwang-Soo Ko, Taehyung Kim, Wonbin Ko, Youn Cheol Park (Jeju National University)

575 Heating and cooling test of urban transit cabin using a real-scale climatic chamber, Youngmin Cho, Choong-Hee Lee, Duck-Shin Park, Soon-Bark Kwon, Woo-Sung Jung (Korea Railroad Research Institute), Dong-Jin Son, Chung-Yeol Lee (Hyundai Rotem)

Plenary Lecture (May 19, 13:30~14:10), Crystal ballroom
Chairman : Hitoshi Asano (Kobe University)

Research and development of energy efficient equipment and system for cooling and heating, Xianting Li (Tsinghua University)

A2 : Air Conditioning (May 19, 14:30–16:00), Crystal room
Chairman : J.Y. Lin (Tungnan University)

316 Numerical simulation for the performance of a heat pump – gas water heater hybrid system, Hansaem Park, Min Soo Kim (Seoul National University)

319 Energy-saving evaluation of a district air conditioning system incorporated with ground heat exchangers used in an employee’s cafeteria, Pei-Yu Yu, Yuan-Ching Chiang, Hsiao-Chi Hsu, Yu-Choung Chang (Industrial Technology Research Institute)

328 The energy saving retrofit implements and analysis of a chiller plant in ITRI, Jane-Sunn Liaw (Industrial Technology Research Institute), Bo-Ren Chen, Yi-Chun Lu (Jun-Yuan Energytech Engineering Co., LTD), Chung-Szu Wei, Hsu-Cheng Chiang, Yu-Choung Chang (Industrial Technology Research Institute)

376 Modeling for system simulation and cop optimization of a heat pump water heater, Jian-Yuan Lin, Yi-Wei Chen (Tungnan University), Ling-Yu Chao, Wei-Da Tu (Industrial Technology Research Institute)

380 Comparative performance of U-tube and spiral-tube ground heat exchangers for ground-source heat pump, Jalaluddin (Hasanuddin University), Akio Miyara (Saga University), Hairul Arsyad (Hasanuddin University)

457 Development of simulation tool for system multi-air conditioner with modular outdoor unit, Tae-Hun Kim (Samsung Electronics), Hyun-Yeon Park (CI Soft), Jung-Ho Kim, Chang-Seon Lee, Seon-Tae Kim, Hong-Gi Cho, Soon-Cheol Hong (Samsung Electronics)
B2 : Refrigeration (May 19, 14:30~16:00), Jade room
Chairman : Ji Hwan Jeong (Pusan National University)

318 Performance of a commercial heat pump system with low GWP refrigerants, Sungjin In, Younghoon Yang, Keumnam Cho (Sungkyunkwan University), Byunghan Lim, Kyungrok Kim, Donggyu Lee (Samsung Electronics)

330 Comparison study on the Korea industrial standard of absorption chiller with other country’s industrial standards, Jongug Jeon, Jungtae Woo, Heejeong Kang (Korea Refrigeration & Air-conditioning Assessment Center)

332 Targeting the French versus German heat pump market by Korean manufacturers, Evgenia Sikorski (Offenburg University of Applied Sciences), Yongchan Kim (Korea University)

357 Simulation and experimental study on performance of air cycle refrigeration system, Zhang Senlin, Guo Xianunin, Ling Rui, Zhao Shuo (Tianjin University)

359 Experimental study on the performance of the auto-cascade refrigeration system, Lu Dong, Zhongbin Fu, Bingxi Li, Yaning Zhang (Harbin Institute of Technology)

604 Parametric study on the fin-tube type adsorption chiller by design of experiments, Sang Woo Hong, Sang Hyeok Ahn (Sejong University), Oh Kyung Kwon (Korea Institute of Industrial Technology), Jae Dong Chung (Sejong University)

C2 : Thermal Fluid (May 19, 14:30~16:00), Amethyst A
Chairman : Jun Young Choi (Korea Testing Laboratory)

449 Experimental study on two-phase pattern and liquid film thickness in microchannels, Yuki Yoshinaga, Chaobin Dang, Eiji Hihara (The University of Tokyo)

317 Condensation and pool boiling of low gwp refrigerants on a horizontal plane tube, Ryuichi Nagata, Chieko Kondou, Nobuo Takata, Shigeru Koyama (Kyushu University)

320 Experimental research on the lower flammability limits of several refrigerants with lower climate change effects, Xi Wu, Zhao Yang (Tianjin University)

630 Comparison of CNT grease and graphene grease for cooling performance enhancement of the LED, Jung Hun Lee, Chan Min Kim, Chung Woo Jung, Yong Taek Kang (Kyung Hee University)

638 The effect of triangular plate fins on thermal performance of natural convection, Myoungwoo Lee, Hyun Jung Kim, Jaisuk Yoo, Dong-Kwon Kim (Ajou University)

506 The experiment and CFD simulation of boiling heat transfer of water in microchannel, Nguyen Ba Chien, Kwang Il Choi, Jong-Taek Oh (Chonnam National University), Honggi Cho, Jungho Kim, Changseon Lee (Samsung Electronics)

D2 : HVAC&R Control / Ventilation (May 19, 14:30~16:00), Amethyst B
Chairman : Lei Zhao (Xi’an University)

634 Study on the performance of pitch controller for wind turbine system by using fast program, Sung Kil Ann (Kunsan National University), Han Shik Chung (Gyeongsang National University), Sung Ho Kim (Kunsan National University), Chul Su Kim (KTEG)

336 Dynamic characteristics and control strategy optimization on a ground source heat pump system aided by cooling tower, Lidong Zhu, Lei Zhao (Xi’an University)

229 Effects of ventilation flow speed in rectangular tunnel on fire size of subway car, Won-Hee Park (Korea Railroad Research Institute)
608 Development of a heat pump system for high temperature application, Kazuaki Shikichi, Shinichi Doi (The Kansai Electric Power Co., Inc.), Hitoshi Asano (Kobe University)

642 Fault detection of improper refrigerant charge for heat pump system, Dong Won Han (Korea University), Young Soo Chang (Kookmin University), Seo Young Kim (Korea Institute of Science and Technology), Youngchan Kim (Korea University)

E2 : Automotive HVAC (May 19, 14:30~16:00), Ruby room
Chairman: Tong-Bou Chang (National Chiayi University)

577 Experimental evaluation of thermal insulation performances of urban transit train coach, Youngmin Cho, Choong-Hee Lee, Soon-Bark Kwon, Duck-Shin Park, Woo-Sung Jung, Tae-Wook Kim (Korea Railroad Research Institute)

581 Heating performance characteristics for the inner condenser of air-sourced mobile heat pump, Hoseong Lee, Jongphil Won, Choongwon Cho, Taekkyu Lim, Youngki Chang (Korea Automotive Technology Institute), Sangtaek Oh (Seoul industry engineering), Yongchan Kim (Korea University)

600 Impact of thermal comfort and fuel economy on applying cold storage evaporator to automotive HVAC, Youngha Jeon, Kwanghun Oh, Sunan Jeong, Yoonho Wang (Halla Visteon Climate Control)

605 Study on the comparison of performance test result between R134a and R744 for automotive air conditioning, Haejun Lee, Seung-sik Won, Yongnam Ahn, Yoonho Wang (Halla Visteon Climate Corp.)

641 A low energy consumption air-condition system for light electric vehicle, Rong-Horng Chen, Tong-Bou Chang (National Chiayi University)

655 Recent air-conditioning technologies for environment-friendly vehicles, Masaaki Kawakubo, Yukio Uemura (Denso Corporation)

A3 : Air Conditioning (May 19, 16:10~17:40), Crystal room
Chairman: Takahiko Miyazaki (Kyushu University)

392 Condensation and evaporation heat transfer performance by using HFO-1234yf refrigerant in flat-tube - the effect of projection on flat-tube inner wall and lubrication oil on heat transfer, Ryo Sato, Yuhei Niki, Masafumi Katsuta (Waseda University)

395 A new dynamic VRF heat pump simulation including frosting and defrosting models, Noma Park, Jeongseob Shin, Baikyoung Chung (LG Electronics)

498 Refrigerant distribution in a combining/dividing header, Ho-Won Byun, Kang-Jong Lee, Naehyun Kim (Incheon National University)

503 Performance simulation of adsorption refrigeration/heat pump with silica gel-water and activated carbon-ethanol combinations, Takahiko Miyazaki, Bidyut B. Saha, I.I. El-Sharkawy, Shigeru Koyama (Kyushu University)

527 Experimental study of vapor injection heat pump, Byoungjin Ryu, Beomchan Kim, Byoungsu Kim, Baikyoung Chung (LG Electronics)

587 Experimental investigation of the effect of generator temperature on the performance of solution transportation absorption chiller, Koji Enoki, Fumi Watanabe, Marlinda, Seigo Tanaka, Yuki Ueda, Atushi Akisawa, Toshitaka Takei, Kazumichi Araki (Tokyo University)
B3 : Refrigeration (May 19, 16:10~17:40), Jade room
Chairman : Chi-Chuan Wang (National Chiao Tung University)

367 Study on vacuum flash ice-making under adsorption, Zhao Qunzhi, Zhang Xuelai, Gan Wei, Li Chunlei, Munyalo Jotham Muthoka, Meng Xianglai (Shanghai Maritime University)

401 Modeling and simulation of DX ground heat exchanger considering pressure drop, Haroon Bashir (University of Science & Technology), Gilbong Lee, Jea Chul Jang, Minsung Kim (Korea Institute of Energy Research)

386 Experimental analysis on the performance characteristics of an ejector applied to refrigerators, Jaejun Lee, Yongseok Jeon, Yongchan Kim (Korea University)

400 Study on calculation method of ammonia-water absorber area with heat and mass transfer process, Wenji E, Kai Du (Southeast University)

372 A study on the performance testing method of direct exchange type geothermal heat pump of a residential size, Jeachul Jang, Gilbong Lee, Haroon Bashir, Ho-Sang Ra, Minsung Kim (Korea Institute of Energy Research)

C3 : Thermal Fluid (May 19, 16:10~17:40), Amethyst A
Chairman : Yew K. Chuah (National Taipei University)

337 Performance improvement of an air-cooled bare tube bundle using “partial bypass” concept, Ling-Chia Weng (Industrial Technology Research Institute), Neng-Chieh Chang (National Chiao Tung University), Pen-Chang Tseng (Industrial Technology Research Institute), Chi-Chuan Wang (National Chiao Tung University)

339 Evaluation of head loss coefficient of open cell metal foams in low Reynolds number condition, Tae Hyeon Kim, Won Jun Lee, Ji Hwan Jeong (Pusan National University)

344 Flashing flow characteristics of CO2 through a capillary Tube, Daisuke Mizota, Hitoshi Asano, Kenta Kobayashi (Kobe University), Abo-Elfadl Saleh (Assiut University), Toshiaki Tuchiya, Shin Ishida, Koji Takiguchi, Yujiro Kitaide (Fuji Electric Co. Ltd.)

351 Numerical simulation of thermal performance for horizontal slinky-loop ground heat exchanger, Salsuwanda Selamat, Akio Miyara (Saga University)

352 The thermal systems of ultra high voltage underground power cables, Jin Taung Lin (Nextek Engineering), Yew Khoy Chuah, Han T. Hsin (National Taipei University of Technology)

382 Time-varying flow characterization of a cross-flow fan, Yang-Cheng Shih, An-Shik Yang, Jin-Da La, Huan-Hua, Chin-Tin Kuo (National Taipei University of Technology), Yea-Hao Cheng (Taiwan Hitachi)

D3 : HVAC&R Control / Ventilation (May 19, 16:10~17:40), Amethyst B
Chairman : Jong Min Choi (Hanbat National University)

464 Hygroscopic efficiency analysis of desiccant coating heat exchangers with different solid desiccants, Win-Jet Luo, Chi-Wun Lu, Wei-Jyum Lia, Jhih-Hua Lin (National Chin-Yi University)

496 A study on the oil flow characteristics for improving the operating performance of inverter rotary compressor, Hak-Jun Kim, Youn Jea Kim (Sungkyunkwan University)

537 An experiment study on regeneration of LiCl aqueous solution for a plate heat exchanger type dehumidifier, Lei Yun, Byung Ha Kang, Young Soo Chang (Kookmin University)

609 Performance test of an automobile thermoelectric battery cooler, Seo Young Kim (Korea Institute of Science and Technology), Keunhee Lee, Sunghoon Park (MISJ, Inc.), Jaehoon Kim (KB Auto Tech)
E3 : Cryogenics (May 19, 16:10~17:40), Ruby room
Chairman : A. Chakraborty (Nanyang Technological University)

347 Dual mixed refrigerant Joule-Thomson refrigerator for cooling HTS power cable, Jisung Lee, Cheonkyu Lee, Sangkwon Jeong (Korea Advanced Institute of Science and Technology)

564 Design and development of cryo-adsorption chamber for the measurement of methane uptakes on activated carbons and MOFs, Anutosh Chakraborty, Baichuan Sun, Syed Muztuza Ali, Wu Fan (Nanyang Technological University)

571 Effect of surface roughness on interfacial contact conductance at low temperature, Myung Su Kim, Yeon Suk Choi (Korea Basic Science Institute)


647 Development of a 1L/hr scale liquid hydrogen system, Sarng Woo Kang, Nathanie Garceau (Korea Institute of Science and Technology), Jong Hoon Baik (University of Central Florida), Chang Mu Lim, Seo Young Kim, In-Hwan Oh (Korea Institute of Science and Technology)

660 Flow characteristics of n-flow type radial flow adsorbers used in air separation units, Y. Chen, X.J. Zhang, J.L. Lu, L.M. Qiu, X.B. Zhang (Zhejiang University)

Plenary Lecture (May 20, 9:00~9:40), Crystal ballroom
Chairman : Keumnam Cho (Sungkyunkwan University)

A comparative study of R-1234yf and R-134a air-conditioning system-recent progress, Chi-Chuan Wang (National Chiao Tung University)

A4 : Air Conditioning (May 20, 10:00~12:00), Crystal room
Chairman : Kiyoshi Saito (Waseda University) / Minsung Kim (Korea Institute of Energy Research)

421 Cycle performance of low GWP refrigerant mixtures R-32/1234ze(E) and R-744/32/1234ze(E), Sho Fukuda, Chieko Kondou, Nobuo Takata, Shigeru Koyama (Kyushu University)

431 Development and operation of turbo heat pump, Taejin Kang, Jinhee Jeong (LG Electronics)

433 Air-side heat transfer characteristics of compact heat exchangers for air conditioners, Chikashi Niiyama, Chobin Dang, Eiji Hihara (Tokyo University)

440 Using Hooke–Jeeves algorithm to optimize chilled water system, Te-Ang Cheng, Kuei-Peng Lee (National Taipei University of Technology)

444 A numerical study on the oil retention in the VRF multi heat pump system, Hak Soo Kim, Min Soo Kim (Seoul National University)

454 Transient analysis for predicting inverter air-conditioning performance of housing environment by cycle coupled CFD simulation, SoonCheol Hong, Taehun Kim, JungHo Kim, ChangSeon Lee, Baek Youn, HyunYeon Park, SuHan Lee (Samsung Electronics)
B4 : Refrigeration (May 20, 10:00~12:00), Jade room  
Chairman : Xianting Li (Tsinghua University) / Honghyun Cho(Chosun University)

309 Research and development of R290 low-oil-charging rotary compressor, Bin Gao, Zhenhua Chen, Shuangjian Liang (GMCC)

409 Comparison of energy consumption of different technologies for brine solution regeneration, Ning Li, Baolong Wang, Wenxing Shi, Xianting Li (Tsinghua University)

429 The study on the performance characteristic of the automobile air-conditioner system applying the R134a and R1234yf, Yunchan Sin, Honghyun Cho, Chasik Park (Chosun University)

459 Prediction of refrigerant leakage for discharge valve system in a rolling piston compressor, Byung-chae Min, Ki-Youl Noh, Gyung-Min Choi, Jang-Sik Yang, Duck-Jool Kim (Pusan National University)

C4 : Thermal Fluid (May 20, 10:00~12:00), Amethyst A  
Chairman : Liang-Han Chein (National Taipei University) / Rin Yun (Hanbat National University)

247 Numerical study of heat and moisture transfer in a human body-clothing-environment system, Yang-Cheng Shih, Che-Yung Kao, Zi-Yi Yang (National Taipei University of Technology), Li-Chu Wang (Taiwan Textile Research Institute)

308 Analysis of CHP and trigeneration with RETscreen, Jun won Choi (Choongnam City Gas Co), Rin Yun (Hanbat National University)

397 Study on control of frost crystal formation and growth, Hidetoshi Ohkubo, Sho Matsushita (Tamagawa University)

422 Heat transfer performance variation of condenser due to non-uniform air flow distribution, Won-Jong Lee, Ji Hwan Jeong (Pusan National University)

425 Performance evaluation of the offset strip fin with a gap between rows using CFD analysis, Seongwon Hwang, Ji Hwan Jeong (Pusan National University)

447 A design of centrifugal-compressor for large head using a CFD analysis, Ki Tae Kim, Han Young Kim, Si Hyuk Jang, In Gyu Yoon (Shinsung Engineering)

315 A study of droplet entrainment in falling-film evaporators, Liang-Han Chien, Yung-Jen Chen, Chien-Wei Chen (National Taipei University), Kuo-Shu Hung (Industrial Technology Research Institute)

456 Air-water flow behavior through corrugated channel of plate heat exchanger, Muh. A. Mustaghirin, Akio Miyara, Yamato Eshi (Saga University)
D4 : Thermal Fluid (May 20, 10:00~12:00), Amethyst B
Chairman : C.N.Hsu (National Chin-Yi University) / Youngjin Baek (Korea Institute of Energy Research)

331 Numerical modeling of oil-free air scroll-compressor with experimental corrections, Yangguang Liu, Kun-Yi Liang, Shu-Er Huang, Yu-Choung Chang (Industrial Technology Research Institute), Yi-Chao Huang (Fusheng Industrial CO., LTD.)

334 Analysis of effect of air channel configuration of the closed type display cabinet on temperature distribution and energy-saving performance, Yu-Lieh Wu, Chia-Min Chu, Po-Han Lin, Ruei-Yan Lin (National Chin-Yi University of Technology)

327 Experiments on two-phase flow of R1234ze(E), R134a and R32 in horizontal mini-channels, Daisuke Jige (Tokyo University), Yuta Komiya, Hongcheng Zhang, Chieko Kondo, Shigeru Koyama (Kyushu University)

668 Sea water heat pump systems for ice rink energy saving, Gilbong Lee, Kichang Chang, Kibong Kim, Youngjin Baek, Ho-sang Ra (Korea Institute of Energy Research)

669 An empirical study on the operation of a heat pump system using seawater in Jeju, Kibong Kim, Ki-Chang Chang, Ho-Sang Ra, Gilbong Lee, Hyung-Kee Yoon (Korea Institute of Energy Research)

675 Numerical analysis for actual droplet movement on hydrophilic/hydrophobic surfaces, Y.H. Kwon, H.K. Myong (Kookmin University)

681 Effect of temperature and structure stress of high power InGaN light emitting diode, Chih Neng Hsu, Chun-Chieh Huang (National Chin-Yi University), Yu-Hsuan Wu (Minghsin University)

E4 : Food Technologies and Cold Chain (May 20, 10:00~12:00), Ruby room
Chairman : Tetsuya Araki (Tokyo University) / Seok Ho Yoon (Korea Institute of Machinery and Materials)

418 Development of test hybrid dryer, Hyunju Lee, Seungtae Park, Kyoungsoo Hong (Air Tech Engineering Co. Ltd.), Youngil Kim (Seoul National University of Science and Technology), Dohyoung Lee (Air Tech Engineering Co. Ltd.)

435 Quality change during the storage of strawberry and bell-pepper applied with phase change material and thermoelement based on peltier effect, Byeong Sam Kim, Jong Hoon Kim, Ji Young Kim, So Hee Kim, Ki Hyun Kwon (Korea Food Research Institute)

556 Cold chain of frozen food and its consumer acceptance of younger generations in China, Meihua Zhu, Tetsuya Araki (The University of Tokyo)

580 Cold chain trends in Asia: socioeconomic perspective, Tetsuya Araki, Meihua Zhu (The University of Tokyo)

610 Smart quality monitoring during distribution of fresh food materials using RFID/WSN technology, Byeong Sam Kim, Ji-Young Ki-Hyun Kwon, Hwan-So So Cha (Korea Food Research Institute), Junemo Koo, Jae-Yoon Jung (Kyung Hee University)

679 Thermophysical properties in freezing process to determine optimal freezing conditions for preservation of Sporothalli of the Genus Porphyra seriata, Undaria pinnatifida, Sargassum fulvellum, Min-Yong Kim, Jeong-Duk Kim, Jong-Alun Shin (Chonnam National University)

Plenary Lecture (May 20, 13:30~14:10), Crystal ballroom
Chairman : Chi-Chuan Wang (National Chiao Tung University)

Frosting on fin-tube heat exchanger for heat pump, Keumnam Cho (Sungkyunkwan University)
A5 : HVAC&R Control / Ventilation (May 20, 14:30~16:00), Crystal room
Chairman : Fu-Jen Wang (National Chin-Yi University)

310 Performance analysis and energy modeling of HVAC system for a library building, Fu-Jen Wang (National Chin-Yi University of Technology), Hao-Chung Lee (Southern Taiwan University of Technology), Wei-Da Tu (Industrial Technology Research Institute), Cheng-Han Shiau (National Chin-Yi University of Technology)

387 Cooling energy saving system of EHP control at the university lecture room, Kybum Jeong (Yuhan University)

399 Induction performance design of chilled beam system, Sang Hyun Joo, Hyun-Jun Shin, Jung-yup Kim, ji-Suk Kim (Korea Institute of Construction Technology)

404 A general three-dimensional model of closed circuit cooling tower integrated with packing, Minghong Yang, Baolong Wang, Wenxing Shi, Xianting Li (Tsinghua University)

415 Comparison of simplified prediction methods for building thermal energy, Kwang-Mo Kim, Young Soo Chang, Byung Ha Kang (Kookmin University)

461 A Study of quantification scheme on dew condensation analysis and its application, Byung Woo Jeon, Dong-Gi Han, Tae-Hun Kim, Eung Ryeol Seo, Yong-Jong Park (Samsung Electronics Co., Ltd.), Jung Hyeon Ahn (CD-Adapco)

B5 : Refrigeration (May 20, 14:30~16:00), Jade room
Chairman : Chan Go Song (Korea Institute of Machinery and Materials)

302 Effect of fin horizontal pitch on performance of fin-tube heat exchanger of heat pump under frosting condition, Jeongkeun Kim, Wonkeol Park, Keunnam Cho (Sungkyunkwan University)

365 Simulation results for the effect of fin geometry on the performance of a concentric heat exchanger, Honggi Cho, Taehun Kim, Jungho Kim, Changseon Lee (Samsung Electronics)

551 Thermodynamic analysis of R1234yf as replacement of R134a in domestic heat pump water heater, Qiu Jinyou, Zhang Hua, Yu Xiaoming, Lou jiangfeng (University of Shanghai)

601 Numerical study of interfacial friction in NaBH4 solution in microchannel dehydrogenation reactor, Seok Hyun Choi, Myoung Jun Kim, Moon Sun Chung, Hee Joon Lee (Kookmin University)

645 Thermodynamic properties of mixed refrigerants R407c and R410a, R. Djeffal (Unit of Applied Research in Renewable Energy), Z. Triki (Laboratory of Biomaterials and Transport Phenomena), M.K. Cherier (Unit of Applied Research in Renewable Energy)

C5 : Thermal Fluid (May 20, 14:30~16:00), Amethyst A
Chairman : Yean-Der Kuan (National Chin-Yi University)

467 Study on the heat transfer and flow characteristics in a single channel plate-fin evaporator, Kazuhisa Maruyama (Kobe University), Hitoshi Asano (Kobe University), Kazuaki Shikichi (The Kansai Electric Power Co., Inc.)

251 Experimental study of interfacial friction in NaBH4 solution in microchannel dehydrogenation reactor, Seok Hyun Choi, Myoung Jun Kim, Moon Sun Chung, Hee Joon Lee (Kookmin University)

475 Comparison of thermal characterization of the thermal chip with non-uniform heat source using different fan models in CFD simulation, Yean-Der Kuan (National Chin-Yi University), Jing-Yi Chang (Ho Tai Develoment Co., Ltd), Yun-Hsiang Weng, Chun-Ching Lan (National Chin-Yi University)

501 Measurements of vapor pressures and critical parameters for 1,1,1,3,3-pentafluoropropane (R-245fa), Yukihiro Higashi (Iwaki Meisei University), Ryo Akasaka (Kyushu Sangyo University)
639 The study for imaging method using photothermal for the stainless steel pattern in copper, Moojoong Kim, Hyun Jung Kim, Dong-Kwon Kim, Jaisuk You (Ajou University)

534 A study on adsorption of water onto carbon based adsorbents, Muhammad Sultan, Ibrahim I. El-Sharkawy, Takahiko Miyazaki, Bidyut B. Saha, Shigeru Koyama (Kyushu University)

D5 : HVAC&R Control / Ventilation (May 20, 14:30~16:00), Amethyst B
Chairman : Afshin Afshari (Masdar Institute)

549 Comparing performance characteristics of air source heat pump water heater across test standards, J. S. Kim (Korea University), K. W. Lee (Hanyang University), J. Y. Choi (Korea Testing Laboratory)

568 CFD study of air-side heat transfer and pressure drop characteristics of multi-louvered fin and flat tube heat exchangers, Ehsan Gholamalizadeh, Man-Hoe Kim (Kyungpook National University)

512 Airflow and ventilation characteristics of underground network road junctions, Nam-Young Kim, Hwataik Han, Young-Kwang Jung, Choon-Bum Choi (Kookmin University)

628 The study on the performance of plate type dehumidifier with lithium chloride aqueous solution, Jaehyun Lee, Guhyun Ro (Kyung Hee University), Seonchang Kim, Younghyoul Kim (Korea Institute of Industrial Technology), Yongtae Kang (Kyung Hee University)

512 Model-based predictive maintenance of chillers, Yan Ke, Timothy Mulumba, Wen Shen, Afshin Afshari (Masdar Institute)

E5 : Environmental Engineering (May 20, 14:30~16:00), Ruby room
Chairman : Cha Sik Park (Hoseo University)

458 Waste heat operated hybrid (MEDAD) desalination plant: an experimental investigation, Muhammad Wakil Shahzad, Kyaw Thu (National University of Singapore), Won Gee Chun (Cheju National University), Kim Choon Ng (National University of Singapore)

363 Catalytic oxidation of acetaldehydes in indoor air using UVC and Mn/TiO2 honeycomb-catalyst, Minsu Kim, Eunseuk Park, WooJoon Cha (Korea Institute of Science and Technology), Hyounduk Jung (Korea University), Jongsoo Jurng (Korea Institute of Science and Technology)

432 CFD assessments of installation sites of wind power on an urban building, Wei-Siang Wang, An-Shik Yang, Yu-Hsuan Juan, Jhih-Yun Jheng (National Taipei University)

A6 : Special Lecture (May 20, 16:10~16:50), Crystal room
Chairman : Yong Tae Kang (Korea University)

Energy and ecology, Karel Kabele (Czech Technical University)
**B6 : Refrigeration (May 20, 16:10~17:25), Jade room**  
*Chairman : Ibrahim El-Sharkawy (Kyushu University)*

226 The maximum practical cooling performance forecast and analysis of thermoelectric module according to the datasheet, Limei Shen, Huanxin Chen (Huazhong University of Science and Technology), Fu Xiao, Shengwei Wang (The Hong Kong Polytechnic University)

697 Falling film evaporation heat transfer on MWCNT/Cu composite coating surface, Eun-Seok Wang, Won-Seok Choi, Byung Lyun Kim, Chan-Woo Park (Chungbuk National University)

258 Characterization of adsorbent/refrigerant pairs for developing high performance adsorption cooling systems, Ibrahim I. El-Sharkawy, Kutub Uddin, Takahiko Miyazaki, Bidyut Baran Saha, Shigeru Koyama (Kyushu University), Stefan K. Henninger (Fraunhofer Institute for Solar Energy Systems)

597 A numerical study on the two-phase refrigerant distribution characteristics of refrigerant distributor inside an air-conditioner, Soohyun Bahn, Nahmkeon Hur (Sogang University), Beomsoo Seo (LG Electronics)

617 Condensation heat transfer of R410a in horizontal tubes, Yuanyuan Zhou, Hui Li (Tsinghua University), Kai Wang (Shanghai Longyang Precision Composite Copper Pipe Co. Ltd), Hu Wang, Lin Shi, Jucuan Zhang (Tsinghua University)

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**C6 : Thermal Fluid (May 20, 16:10~17:25), Amethyst A**  
*Chairman : Seong Hyuk Lee (Chung-Ang University)*

511 Experimental study on condensation of the azeotropic mixture R32/R1270 inside a horizontal internally helical-grooved small-diameter tube, Junya Ichinose (National Fisheries University), Mami Tanahashi, Daisuke Jige, Norihiro Inoue (Tokyo University of Marine Science and Technology)

530 Experimental study on condensation characteristics of R245fa on enhanced surface tubes, Daisuke Jige (Tokyo University), Tomonobu Matsuno (Tokyo University), Norihiro Inoue (Tokyo University), Hiroyuki Takahashi (Kobelco & Materials Copper Tube, LTD)

471 Improvement of adsorbent embedded heat transfer through introduction of binder, Ang Li, Kyaw Thu, Muhammad Wakil Shahzad, Kim Choon Ng (National University of Singapore), Wongee Chun (Jeju National University)

559 Dynamic characteristics of a non-newtonian impinging droplet on a heated copper surface, Joo Hyun Moon, Seong Hyuk Lee (Chung-Ang University)

618 Manifold in storage tank applied to solar combi-system with return piping, Hyo Seok Son, Chul Kim, Hiki Hong (Kyung Hee University)

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**D6 : HVAC&R Control / Ventilation (May 20, 16:10~17:25), Amethyst B**  
*Chairman : Young-Deuk Kim (Hanyang University)*

398 Development of a high efficiency reversible axial fan for ventilation in the deep and long transverse tunnel, Cheol-Young Jeong, Hee-Hwan Ko (Kiturami-Bumyang Airconditioning Co. Ltd), Jun-Young Park (Korea Institute of Machinery & Materials), Bong-Soo Lee, Oh-Young Kwon (Korea Testing Certification)

606 Performance of a liquid desiccant cooling system under various operating conditions, Jungtack Lee, Siyoung Jeong (Sogang University), Saikee Oh, Deok Huh, Dongsoo Moon (LG Electronics)

552 A new generation cooling device employing MOF, Syed Muztuza Ali, Anutosh Chakraborty (Nanyang Technological University)

691 Usage of air-conditioning systems in Nigeria, Collins Ugochukwu Anorue, Franklin Ndubuisi Dialia, Ikechukwu Chibueze Alakwe, Ikechukwu Nichodemus Uzoma (Federal Ministry of Works)

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**E6 : Environmental Engineering (May 20, 16:10~17:25), Ruby room**  
*Chairman : Taesung Kim (Sungkyunkwan University)*
441 Optical monitoring of radon aerosols at building construction sites, Soohyun Ha, Atul Kulkarni, Taesung Kim (Sungkyunkwan University)

442 Novel environmental monitoring sensor technologies with fiber optics and various sensing layers, Jang Ah Kim, Hongyi Qin, Taehyun Hwang, Hyeong U Kim (Sungkyunkwan University), Kulkarni Atul (BIO-FD&C Co), Taesung Kim (Sungkyunkwan University)

445 A discussion on the color filter industry VOCs removal efficiency of organic emission processing equipment improvement, Yean-Der Kuan, Chung-Shu Wang (National Chin-Yi University), Jing-Yi Chang (Ho Tai Development Co. Ltd), Yun-Hsiang Weng, Chun-Ching Lan (National Chin-Yi University)

485 Performance investigation of an advanced multi-effect adsorption desalination cycle, Kyaw Thu (National University of Singapore), Young-Deuk Kim (Hanyang University), Muhammad Wakil Shahzad (National University of Singapore), Jayaprakash Saththasivam (King Abdullah University), Kim Choon Ng (Hanyang University)

**Technical Tour (May 21, 09:00–12:00)**

9:00              Departure from Jeju Grand Hotel
10:00 - 10:40   Jeju Global Research Center of Korea Institute of Energy Research
10:50 - 11:30   Smart Grid Information Center of Korea Electric Power Corporation
12:00            Return to Jeju Grand Hotel