



ICP 2019
INTERNATIONAL
CONFERENCE ON
POLYGENERATION



5th International Conference on Polygeneration (ICP 2019), May 15–17, 2019

Venue: I²CNER, Kyushu University, Fukuoka, Japan

Final Program

Day 1, May 15, 2019

Venue: 1st Floor Lobby, I²CNER Building 1

14:00 – 15:00 Registration

Venue: Room A, 1st Floor, I²CNER Building 1

15:00 – 15:20 Opening Remarks

15:20 – 16:00 Keynote 1

Prof. Fu Lin

Title: A Novel Approach of Thermo-Electric Coordination for CHP System

Session Chair: Prof. S. Srinivasa Murthy

16:00 – 16:40 **Panel Discussion 1**

Title: Polygeneration Technologies: Present Status and Future Perspectives

Panel members: *Prof. T. Kashiwagi, Prof. A. Coronas,
Prof. Tingxian Li, , Dr. Angelo Freni, Prof. Y. Hamamoto*

Session Chair: Prof. Bidyut Baran Saha

Venue: 1st Floor Lobby, I²CNER Building 1

16:40 – 17:00 Coffee break

Venue: 1st Floor Lobby, I²CNER Building 1

17:00 – 19:00 Poster session

Session Chairs: Dr. Sivasankaran Harish, Dr. Kazushi Miyata

List of Posters

1. LES/Flamelet Simulation of Turbulent Partially Premixed Hydrogen-nitrogen Lifted Jet Flame, *Hu Y, Murakami T, Li J, Kurose R.*
2. The Electrochemical Properties of ZnO-loaded Carbon Nanotube Electrode for Zinc -Air Battery, *Nakabayashi K, Ikeda M, Miyawaki J, Yoon S-H.*
3. Innovation Engineering Design, Experimental Characterization Comparison, Calculation Simulation and Economic Analysis of Adsorption Cooling-Expanding Power Generation Systems Driven by Waste Heat and Solar Energy, *Lu Z.Z.*
4. Modelling of Photovoltaic based Peltier Air-Conditioners for Remote Shelter Bases, *Raiker G A, Umanand L, Subba Reddy B*
5. An Experiment on Flow Boiling Heat Transfer of R410A Heated Non-Uniformly Between Two Parallel Mini-Channels, *Noboritae W, Kurose K, Miyata K, Hamamoto Y.*
6. Effect of Mass Flux on Condensation Heat Transfer of a Refrigerant Flowing in a Rectangular Mini-Channel in Low Mass Flux Region, *Kutsunoya K, Arata Y, Miyata K, Hamamoto Y.*
7. Heat and Mass Transfer Characteristics of Ionic Liquid based Working Fluids in an Absorber of Absorption Cooling Machines, *Ariyadi H.M, Yamaguchi S, Saito K.*
8. Measurement of Time Constants for Water Vapor Adsorption Rate to Silica-gel Micro Particles Below Atmospheric Pressure by Using a Quartz Crystal Microbalance, *K. Furuya, Y. Hamamoto, K. Miyata*
9. Measurement of Water Vapor Adsorption Rate of Consolidated Silica-gel Particle Layer on a Commercially Available Heat Exchanger, *Adachi Y, Hamamoto Y, Miyata K.*
10. Performance Evaluation of a Loop Heat Pipe using Different Wick Materials, *K. Z. Htoo, H. P. Hien, K. Kariya, A. Miyara*
11. Simulation for the Steam Flow Meter Using a Circumferential Heater, *Okamura M, Miyata K, Hamamoto Y, Mori H, Umezawa S, Sugita K.*
12. Study on Heat and Mass Transfer Enhancement by CO₂ Nanoemulsion Absorbents, *Lee W, Xu. R, Kim S, Kang Y. T.*

13. Low-carbon Power Generation from Geothermal Resources in Japan, a Techno-economic Analysis by TIMES-Japan Framework, *Farabi-Asl H, Chapman A, Itaoka K, Jalilinasrabady S, Kato E, Kurosawa A.*
14. Temperature Elevation of Carbon Materials during Magic-angle-spinning Solid-state NMR, *K. Hata, K. Ideta, S. Toda, R. Harada, K. Nakabayashi, I. Mochida, S.-H. Yoon, J. Miyawaki*
15. Measurement and Evaluation of the Specific Heat Capacity of Silica Gels for Adsorption Heat Pump Applications, *Islam M. A, Uddin K, Pal A, Thu K, Nasruddin, Alhamid M. I, Saha B. B.*
16. Operation of an Ammonia-Water Absorption Refrigeration System for Food Preservation, Air Conditioning and Seawater Desalination Applications, *F. Hernandez-Tamayo, R. Best y Brown, I. Pilatowsky*
17. Comparison of Heating Performance of Heat pump using Electronic and Thermostatic Expansion Valve, *J.H. Lee, J.I. Yoon, K. H. Choi, S. J. Ha, M. J. Jeon, D. H. Choi, C. H. Son*
18. Experimental Study of Mixed Refrigerant Joule-Thomson Cycle Using R600a, R23 and R14, *K. S. Lee, C. H. Son, K. H. Choi, C. G. Moon, J. I. Yoon*
19. Game Theory as a Tool for Improving Operation and Durability of a Central Air-Conditioning System, *Rupa M. J, Islam M. A, Pal A, Uddin K, Thu K, Saha B. B.*
20. Performance Analysis of a Dual Component Generator - Condenser of an Absorption Heat Transformer for Water Desalination, *J. Delgado-Gonzaga, R. Saravanan, D. Juárez-Romero, A. Huicochea-Rodriguez, I. Ortiz*
21. Development of Thermal Conductive Composite Adsorbents for Cooling Applications, *Kaiser Ahmed Rocky, Animesh Pal, Kutub Uddin, Kyaw Thu, Bidyut Baran Saha*
22. Dynamic Simulation of a CO₂ Refrigeration System with Outdoor Temperature Fluctuation in Simscape, *J. Ko, T. Miyazaki*
23. Exergetic Analysis of a Vapour Compression Chiller using R410A, *Perera C. U. A, Higashi Y, Miyazaki T, Takata N, Saha B.B, Thu K.*
24. Heat Pump Cycle using Refrigerant Mixtures of HFC32 and HFO1234yf, *K. Takezato, S. Senba, K. Thu, T. Miyazaki, N. Takata, Y. Higashi*
25. Measurement of Thermodynamic Properties of New Low-GWP Working Fluids for High-Temperature Heat Pump Systems, *Sakoda N, Nagaoka M, Oono T, Higashi Y, Takata Y.*

26. A Statistical Approach Employing Bootstrap Sample to Determine Optimum Models for IUPAC Type-I and Type-V Isotherms, *Rahman M. M, Pal A, Muttakin M, Uddin K, Thu K, Saha B. B.*
27. Study on Surface Characteristics of Various Adsorbents using Inverse Gas Chromatography, *Palash M. L, Pal A, Thu K, Saha B. B.*
28. Thermoelectric Properties of Graphene Nanoplatelets Reinforced Cement Composites for Energy Harnessing, *Sampad Ghosh, Sivasankaran Harish, Kyaw Thu, Bidyut Baran Saha*
29. Influence of Air Flow Velocity on Equivalent Mass Transfer Coefficient for A Desiccant Rotor Regenerated by Concentrated Solar Irradiation, *Nakamura Y, Hamamoto Y, Miyata K.*
30. Experimental Investigation on the Performance of An Aluminium Honeycomb Solar Air Heaters, *X. H. Meng , C. J. Jing, T. Miyazaki*
31. Theoretical Analysis of a Thermal Pump for Solar Water Pumping Application, *Y. T. Abirham, T. Miyazaki, N.Takata , K. Thu*
32. Thermal Management of Concentrated Photovoltaics using Graphene based Nanocomposites, *Sivashankar M, Manikandan S, Selvam C, Sivasankaran Harish*
33. Study on Quasi-Two-Dimensional Flamelet Model for a Three-Feed Non-Premixed Combustion System, *Panlong Yu, Watanabe Hiroaki, Ryoichi Kurose, Toshiaki Kitagawa*
34. Unconventional Mass Market Applications in Low Grade Heat Recovery, Storage and Pumping: Industrial Gas-Fired Tumble Dryers, *Bachir El Fil, Srinivas Garimella*
35. Adsorption Thermodynamics for Different Adsorbent/Refrigerant Pairs for Cooling Applications, *T. H. Rupam, M. A. Islam, A. Pal, K. Uddin, K. Thu, B. B. Saha*
36. Potential Evaluation of Heat Exchange and Prediction of Water Absorbing Rate of a Fin Tube Heat Exchanger Flocked by Rayon Fibers, *Yamashita Y, Hamamoto Y, Miyata K.*
37. Vapor Absorption into Hygroscopic Liquid Desiccant Droplets and Guidance for Packed Tower Design, *Wang Z, Orejon D, Takata Y, Sefiane K.*
38. Solar Collector and Cascade Heat Pump Combi Water Heating Systems for Continental Climates, *A. Kaltayev, Ye. Belyayev, Ye. Yerdesh, M. Mohanraj, Ye. Shakir, A. Aliuly*

39. Solar-Assisted Auto-Cascade Heat Pump for Space Heating and Domestic Hot Water Application in Continental Climates, *Ye. Belyayev, Z. Abdulina, A. Rattner, Ye. Yerdesh, M. Mohanraj, A. Kaltayev*
40. Numerical Investigation of Gasification Characteristics on an Oxy-fuel Gasifier, *Ahn S, Tanno K, Watanabe H.*
41. Dynamic Simulation of a Novel Thermal Driven Integrated Adsorption-Absorption Cooling System, *Nikbakhti R, Wang X.*
42. Performance Evaluation of Ejector Based CO₂ System for Simultaneous Heating and Cooling Application in an Indian Dairy Industry, *Dasi Koti, Simarpreet Singh, Guruchethan A.M, M.P. Maiya, Armin Hafner, Krzysztof Banasiak, Petter Neksa.*

18:00 – 19:40 Welcome reception

Day 2, May 16, 2019

Venue: 1st Floor Lobby, I²CNER Building 1

9:00 – 9:30 Registration

Venue: Room A, 1st Floor, I²CNER Building 1

9:30 – 10:10 Keynote 2, On the memory of Prof. Shigeru Koyama
Prof. Akio Miyara
Title: Expanded Study on Heat Pump and Refrigeration Systems for Low GWP Refrigerants
Session Chair: Prof. Bidyut Baran Saha

Venue: 1st Floor Lobby, I²CNER Building 1

10:10 – 10:30 Coffee Break

Parallel Sessions

Session 1: Materials for Electric and Thermal Energy Conversion and Storage

Session Chair: Prof. Masamichi Kohno

Venue: Room A, 1st Floor, I²CNER Building 1, Hall (2/3)

- 10.30 – 10.50 Effect of ZrO₂ Nano Particle Coated Heater Surface on Heat Transfer Coefficient under Pool Boiling, *Bhaumik S, Bandurkar A, Gajghate S. S, Das S.*
- 10.50 – 11.10 Experimental Investigation of Pool Boiling Heat Transfer over Different Thickness of Graphene Layers on Heater Surface, *Gajghate S. S, Vashistha S, Das S, Bhaumik S.*
- 11.10 – 11.30 Methyl-Functionalised Fumarate-based MOFs for Heat Transmission Applications: Fabrication, Characterisation and Water Adsorption Performances, *Bo Han, Anutosh Chakraborty.*
- 11.30 – 11.50 Tuning Sorption Characteristics of Metal-organic Framework for High Efficient Sorption Thermal Energy Storage, *Xu JX, Li TX, Wang RZ.*
11. 50 – 12.10 Ultrafast Charging/discharging of Highly Conductive Phase Change Composites for Electrothermal Conversion and Storage, *Wu S, Li T.X, Wu M.Q, Wang R.Z.*
12. 10 – 12.30 Water Adsorption on Parent and Alkali-ions Doped Aluminium Fumarate MOFs and Al-Fumarate-Zeolite Composites Employing Grand Canonical Monte Carlo (GCMC), *Han B, Chakraborty A.*

Session 2: Heat and Mass Transfer Analysis

Session Chair: Prof. Yoshinori Hamamoto

Venue: Room B, 1st Floor, I²CNER Building 1, Hall (1/3)

- 10.30 – 10.50 Analytical Model for Sorber Bed Heat Exchangers of Sorption Cooling Systems, *Bahrehamand, H, Bahrami, M.*
- 10.50 – 11.10 Condensation Heat Transfer and Pressure Drop Characteristics of a Low GWP Refrigerant in a Plate Heat Exchanger, *J. H. Jung, O. J. Kwon, Y. T. Kang*

- 11.10 – 11.30 Temperature- and Pressure-Initiated Adsorptive Cycles for Heat Conversion, *Yu. I. Aristov, I. S. Girnik, A. Sapienza*
- 11.30 – 11.50 Mapping of Heat Gains from a Flat Heater Measured Using Telescopic Multi-Axis Heat Flux Sensor on Various Orientation, *Sigalingging J. A, Ratnasari N.G, Fauzan A, Ega H. M, Nugroho Y.S.*
11. 50 – 12.10 Numerical Simulation of the Multi-Region Coupled Heat Transfer in a Shell and Tube Reactor for CO₂ Methanation, *W. Zhang, H. Machida, H. Takano, K. Izumiya, K. Norinaga.*
12. 10 – 12.30 Heat Recovery Ventilators for Dehumidification of Greenhouses: Analytical Modelling, *N. Mohammadaliha, S. Foroushani, M. Bahrami.*

Session 3: District Heating and Cooling

Networks Session Chair: Prof. P. Muthukumar

Venue: Room 2F, 2nd Floor, I²CNER Building 1

- 10.30 – 10.50 Enhancement of District Heating Networks Performance using Sorption Heat Pumps and Chillers, *A. Coronas, J.C. Bruno, J. Prieto, D.S. Ayou*
- 10.50 – 11.10 Integration of Micro-Cogeneration into a Solar Heating Network Operating with a Seasonal Borehole Thermal Energy Storage while Serving a Small-Scale Italian Residential District, *Ciervo A, Rosato A, Sibilio S, Ciampi G, Scorio M.*
- 11.10 – 11.30 Thermal Modelling of District Heating Networks: A Data-Driven Approach, *Foroushani S, Lapczak I, Owen J, Bahrami M.*

Session 4: Heat Pumps

Session Chair: Prof. Khairul Habib

Venue: Room 2F, 2nd Floor, I²CNER Building 1

- 11.30 – 11.50 The Effect of Heat Exchanger Geometry on Adsorption Chiller Performance, *Wojciech Nowak, Marta Wesolowska, Marcin Sosnowski, Karolina Grabowska, Jarosław Krzywański*
- 11.50 – 12.10 Combinations of Halide Salts for Heat-Recovery Resorption System, *Jivrakh K. B, Sharma R, Anil Kumar E.*
- 12.30 – 12.50 Experimental Studies on Endothermic Reversible Reaction of Salts for Cooling, *Desai F.J, A. Atayo A, Muthukumar P, Rahman M*
- 12.30 – 13.30 Lunch Break, Venue: Building 1, Lobby (Lunch will be provided)

Venue: Room A, 1st Floor, I²CNER Building 1

- 13:30 – 14:10 Keynote 3
Prof. Pradip Dutta
Title: Multi-Scale Approach Towards Development of a Two-Stage Air Cooled Water/Silica Gel Adsorption System
Session Chair: Prof. Yuri Aristov

Venue: 1st Floor Lobby, I²CNER Building 1

- 14:10 – 14:30 Coffee Break

Parallel Sessions

Session 5: Energy Storage Systems

Session Chair: Prof. M. Prakash Maiya

Venue: Room A, 1st Floor, I²CNER Building 1, Hall (2/3)

- 14.30 – 14.50 Concrete based Sensible Heat Storage System: Experimental Investigations, *Vigneshwaran K, Sodhi G. S, Muthukumar P, Senthilmurugan S.*
- 14.50 – 15.10 A Review on the Numerical Studies to Predict the Transient Thermal Behaviours of the Latent Heat Thermal Energy Storage Systems, *G. Shen, X. Wang, A. Chan*

- 15.10 – 15.30 Thermodynamic Studies on Metal Hydride based Tri-generation System for Cooling, Thermal Storage and Thermal Upgradation, *Sunku Prasad J, Sayantan Jana, Muthukumar P.*
- 15.30 – 15.50 Numerical Investigation of Thermal Behaviour of a Shell-and-Tube Latent Heat Thermal Energy Storage System, *Zhishun Yang, Lihua Chen, Zhenhua Xia, Xiaolin Wang.*
15. 50 – 16.10 Performance Evaluation of Adsorption Cooling System: A Comparative Study, *Singh V. K, Anil Kumar E, B. B. Saha.*
16. 10 – 16.30 Studies on Magnesium and Lanthanum based Composite for Metal Hydride based Thermal Energy Storage, *Anil Kumar E, Yogesh Madaria, Srinivasa Murthy S.*

Session 6: Solar Thermal Applications

Session Chair: Prof. Sanjeev Jain

Venue: Room B, 1st Floor, I²CNER Building 1, Hall (1/3)

- 14.30 – 14.50 Design and Performance Evaluation of a Wall Mounted Solar Concentrating Collector, *Mboup A, Nakayama M, Akisawa A.*
- 14.50 – 15.10 Solar-LP gas Hybrid Plant for Dehydration of Food, *García-Valladares O, Pilatowsky-Figueroa I, Ortiz-Rodríguez N, Menchaca-Valdez, C.*
- 15.10 – 15.30 Experimental Investigations of the Dehumidifier Performance Evaluation using Aqueous LiBr-HCOOK Blends, *Bhowmik M, Naik B.K, Anandalakshmi R, Muthukumar P*
- 15.30 – 15.50 Experimental Study on the Performance of Heat Pump Water Heating System coupled with Air Type PV/T, *Choi H. U, Son C. H, Yoon J. I, Kim Y. B, Kim E. C, An B. H, Choi K. H.*

15. 50 – 16.10 Performance Evaluation of a Modified CPC Collector with Variable Concentration ratio along the Length, *Akhter, J, Gilani, S. I, Al Kayiem, H, Ali, M.*

16. 10 – 16.30 Determination of Heat Transfer Coefficient and Drying Kinetics of Red Chilli Dried in a Mixed Mode Forced Convection Solar dryer, *Jasinta P.K, Muthukumar P.*

Session 7: Thermal Energy Utilization

Session Chair: Prof. Majid Bahrami

Venue: Room C, 2nd Floor, I²CNER Building 1

14.30 – 14.50 Comparative Evaluation on the Thermal Conductivity and Stability of a MWCNT Nanofluid with Conventional Surfactants and Ionic Liquid, *Balaji, B, Habib. K, Cecilia, D.W, Saidur, R, Irshad. K.*

14.50 – 15.10 Effect of Steam Addition on Coal Tar Reforming under the Presence of Char, *Hosokai S, Matasuoka K, Kuramoto K.*

15.10 – 15.30 Experimental Investigation of a Domestic Adsorption Refrigerator Driven by Hot Water, *Hurtig K, Düwel K, Jäger M, Kühn R.*

15.30 – 15.50 Modelling and Performance Assessment of a Cascade Adsorption Cycle Suitable for Cooling Applications Driven by Industrial Waste Heat, *Aprile M, Freni A, Toppi T, Motta M.*

15. 50 – 16.10 Performance Efficiency of Ionic Liquid Polymer Composites in CO₂ Separation, *A. Vijaya Bhaskar Reddy, Muhammad Moniruzzaman, Azmi Bustam, Bidyut Baran Saha*

16. 10 – 16.30 Waste Cold Recovery from LNG-Regasification in Satellite Plants, *Atienza-Márquez A, Bruno J. C, Coronas A.*

16:30 – 16:40 Break

16.40 – 18.00 Transportation to Hakata port for the Banquet

18.30 Boarding the cruise MARIERA

19.00 – 21.00 Banquet Cruising on the MARIERA

Day 3, May 17, 2019

Venue: 1st Floor Lobby, I²CNER Building 1

9:00 – 9:30 Registration

Venue: Room A, 1st Floor, I²CNER Building 1

9:30 – 10:10 Keynote 4

Prof. Christos Markides

Title: Solar Hybrid PV-Thermal Combined Cooling, Heating and Power Systems.

Session Chair: Prof. Kim Choon Ng

Venue: 1st Floor Lobby, I²CNER Building 1

10:10 – 10:30 Coffee Break

Parallel Sessions

Session 8: Trigeneration Systems for Energy Services and Water - Desalination and Water Treatment Process/ Technologies

Session Chair: Prof. Anutosh Chakraborty

Venue: Room A, 1st Floor, I²CNER Building 1, Hall (2/3)

10.30 – 10.50 A Novel Absorption Refrigeration System with Membrane Dehumidifier for Air Conditioning, Refrigeration and Freshwater, *A. Gurubalan, M.P. Maiya, Patrick J Geoghegan*

10.50 – 11.10 Evaluation of a Novel Hollow Fiber Module Design for Air Gap Membrane Distillation, *Alpatova, A, Alsaadi A.S, Alharthi, M, Lee J.-G, Ghaffour, N.*

- 11.10 – 11.30 Fresh Water Extraction from the Atmosphere Employing MOFs as the Adsorbents, *L. G. Gordeeva, M. V. Solovyeva, Yu. I. Aristov.*
- 11.30 – 11.50 Parametric Studies and Performance Investigation on Novel Multipurpose Liquid Desiccant Drying/Desalination System, *Naik B.K, Muthukumar P.*
11. 50 – 12.10 Symmetric Feed Spacer Design for Enhanced Membrane Filtration, *Adnan Qamar, Sarah Kerdi and Noredine Ghaffour*

Session 9: Advanced Cogeneration Technologies

Session Chair: Prof. Takahiko Miyazaki

Venue: Room B, 1st Floor, I²CNER Building 1, Hall (1/3)

- 10.30 – 10.50 Analysis of a Hybrid CO₂ Vapor Compression and Vapor Ejector Refrigeration System, *Gupta H.K, Kumar K, Kumar P.*
- 10.50 – 11.10 Combined Cold, Heat and Power (CCHP) Systems with Exergy Recovery from LNG-Regasification, *Atienza-Márquez A, Bruno J. C, Akisawa, A, Coronas A.*
- 11.10 – 11.30 Experimental Analysis of a Novel Multi-ejector CO₂ Cooling System for Supermarkets, *Simarpreet Singh, M.P. Maiya, Armin Hafner, Krzysztof Banasiak, Petter Neksa*
- 11.30 – 11.50 Multi-objective Optimization: Exergetic Efficiency, Exergoeconomic and Exergoenvironment Analysis for Geothermal Binary Cycle Power Plant at Ampallas West Sulawesi, Indonesia, *N. Nasruddin, I. D. Saputra, T. Mentari, L. C. Bunnenberg, O. Marcelina, S. Berlin*
11. 50 – 12.10 Steady and Dynamical Analysis of a Combined Cooling and Power Cycle, *Voeltzel N, Phan H.T, Gonzalez N, Tauveron N.*

Session 10: Energy Systems in Buildings

Session Chair: Prof. Kyaw Thu

Venue: Room C, 2nd Floor, I²CNER Building 1

- 10.30 – 10.50 Experiment of Adsorption Cooling Module's Performance with Variant Adsorbents (Natural zeolite, Silica Gel Type RD, and Silica Gel Type A), *Djubaedah E, Alius Q.H, Gurky R, Nasruddin.*
- 10.50 – 11.10 Experimental Study of Thermoelectric Air Duct Dehumidification System for Tropical Climate, *Irshad K, Habib K, Saha B.B, Islam S.*
- 11.10 – 11.30 Study of an Adsorption Chiller that Incorporates Mass and Heat Recovery Schemes, *Muttakin M, Uddin K, Thu K, Ito K, Saha B. B.*
- 11.30 – 11.50 Thermal comfort analysis of A Room Equipped with Photo Thermoelectric Air Duct System Under Tropical Climate Condition, *K. K. Looi, K. Habib, Aklilu T B*
11. 50 – 12.10 High-efficiency Air-conditioning Systems for Hot and Humid Climates, *Anurag Goyal, Srinivas Garimella.*
- 12.10 – 13.10 Lunch Break, Venue: Building 1, Lobby (Lunch will be provided)

Venue: Room A, 1st Floor, I²CNER Building 1

- 13:10 – 13:50 **Panel Discussion 2**
Title: Research Trends in Sorption for Heat Pump Applications
Panel members: *Prof. S. Srinivasa Murthy, Prof. Y. Aristov, Prof. Y.T. Kang, Prof. S. Garimella, Prof. M. Brahmi, Prof. Kim Choon Ng*
Session Chair: Prof. Alberto Coronas
- 13:50 – 14:10 Coffee break

Parallel Sessions

Session 11: Trigeneration Systems for Energy Services and Water - Desalination and Water Treatment Process/ Technologies

Session Chair: Prof. Muhammad Aziz

Venue: Room A, 1st Floor, I²CNER Building 1, Hall (2/3)

- 14.10 – 14.30 Pressure Swing Adsorption Cycle Integration with Combined Power and Desalination, *Muhammad Wakil Shahzad, Doskhan Ybyraiymkul, Muhammad Burhan and Kim Choon Ng*
- 14.30 – 14.50 Small-Scale Renewable Polygeneration System for Off-Grid Applications: Desalination, Power Generation and Space Cooling, *Ayou D. S, Zaragoza G, Coronas A.*
- 14.50 – 15.10 Thermodynamic Analysis of a Green Multiple Effect Evaporator- A Holistic Approach, *Soundaram Ramanathan, Dibakar Rakshit.*
- 15.10 – 15.30 The Fallacy of Energy Efficiency for Seawater Desalination Processes for Sustainable Development, *Kim Choon Ng, Muhammad Wakil Shahzad, Muhammad Burhan*

Session 12: Polygeneration of Energy and Energy Integration

Session Chair: Prof. Larisa Gordeeva

Venue: Room B, 1st Floor, I²CNER Building 1, Hall (1/3)

- 14.10 – 14.30 A Solar Biomass Hybrid System for Cooking and Cooling Applications, *Sai Yagnamurthy, Dibakar Rakshit, Sanjeev Jain, Ravi Kumar*
- 14.30 – 14.50 Coproduction of Power and Ammonia: Energy-Efficient Recovery from Black Liquor, *Arif Darmawan, Muhammad W. Ajiwibowo, Koji Tokimatsu, Muhammad Aziz.*
- 14.50 – 15.10 Integrated Polygeneration System for Coastal Areas, *G. Praveen Kumar, R.Saravanan, Joan Carles Bruno, Alberto Coronas*

15.10 – 15.30 Performance Analysis of a Renewable Energy Polygeneration Plant in a Rural Hotel aimed towards the nZEB Standard, *Pulido T, Bruno J. C.*

Session 13: Low Carbon Technologies - 1

Session Chair: Prof. MD. Akhtaruzzaman

Venue: Room C, 2nd Floor, I²CNER Building 1

14.10 – 14.30 Drying Technology of Wood Chips for using Bamboo as Biomass Fuel, *Hiroyuki Asou, Yukito Kawakami*

14.30 – 14.50 Numerical Study on NO Production of NH₃/City Gas Flameless Combustion, *Honzawa T, Kurose R.*

14.50 – 15.10 Online Process Analysis of Phase Separation Solvent for Carbon Dioxide Capture, *Tran K.V.B, Sato M, Yamaguchi T, Machida H, Norinaga K.*

15.10 – 15.30 Strategy Development of Methanol Vehicles in China based on Life-Cycle Assessment of Greenhouse Gas Emissions, *C.Li, M. Negnevitsky, X Wang*

15.30 – 15.40 Break

Parallel Sessions

Session 14: Low Carbon Technologies - 2

Session Chair: Prof. Hiroaki Watanabe

Venue: Room A, 1st Floor, I²CNER Building 1, Hall (2/3)

15.40 – 16.00 Toward Efficient Hydrogen Utilization: Combined Dehydrogenation of Methylcyclohexane and Power Generation, *Aziz, M, Juangsa, F.B, Oda, T, Kashiwagi, T.*

16.00 – 16.20 Performance Evaluation of ANN Techniques in Daily Net Radiation Modelling Based on Climatic Data in Semi-Arid Region Abha, *Islam S, Abdullah R.A.B, Irshad K, Saha B.B.*

16.20 – 16.40 Societal Penetration of Hydrogen in a Carbon-Constrained World: A Techno-Economical Analysis of Global Hydrogen Economy Scenarios, *Chapman, A. Farabi-Asl, H. Itaoka, K.*

Session 15: Polygeneration of Energy and Energy Integration

Session Chair: Prof. Rajagopal Saravanan

Venue: Room B, 1st Floor, I²CNER Building 1, Hall (1/3)

15.40 – 16.00 Performance Analysis of a Stand-alone Polygeneration Microgrid, *Rao B. Murthy S. S., Dutta P.*

16.00 – 16.20 The Behaviour of an Ejector Cooling System Operating at its Critical Mode and using Secondary Heat Exchangers, *Hernandez J, Best R, Roman R.*

16.20 – 16.40 Efficiency of the Reversible Honigmann Energy Storage, *Thiele E, Jahnke A, Ziegler F.*

Session 16: Energy and Environmental Studies

Session Chair: Prof. Swapan Bhaumik

Venue: Room C, 2nd Floor, I²CNER Building 1

15.40 – 16.00 A Comprehensive Study of Solution and Vacuum Processed NiO_x as Hole Transport Material for Perovskite Solar Cell, *Hasan A. K. M, Raifuku I, Chowdhury T. H, Jamal M.S, Ishikawa Y, Uraoka Y, Sopian K, Akhtaruzzaman MD.*

16.00 – 16.20 Exery Destruction Comparison Between Pumped Hydro Compressed Air Energy Storage System and Compressed Air Energy Storage System, *Mozayeni H, Wang X, Negnevitsky M*

16.20 – 16.40 Effect of Substrate Temperature on the Structural and Electrical Properties of Un-doped NiO Thin Film by Vacuum Deposition Technique, *Jamal M. S, Shahahmadi S. A, Chelvanathan Puvaneswaran, Hasan A. K. M, Sopian K, Tiong S.K, Amin Nowshad, Akhtaruzzaman Md.*

16.40 – 17.20 Closing ceremony