

Sustainable Engineering Forum 2019

Held at the 2019 AIChE Annual Meeting

Orlando, Florida, USA
10 - 15 November 2019

ISBN: 978-1-7138-0544-1

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2019) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2020)

For permission requests, please contact AIChE
at the address below.

AIChE
120 Wall Street, FL 23
New York, NY 10005-4020

Phone: (800) 242-4363
Fax: (203) 775-5177

www.aiche.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

(23A) MECHANICAL PROPERTIES AND BULK FLOW CHARACTERIZATION OF LOBLOLLY PINE	1
<i>Tiasha Bhattacharjee, Jordan Klinger, Tyler L. Westover, Aaron D. Wilson, Yidong Xia, Wencheng Jin, Hai Huang</i>	
(23B) EXPERIMENTAL STUDY OF INTERMEDIATE STORAGE AND DISCHARGE OF COMPRESSIBLE BIOMASS PARTICULATE SOLIDS IN A WEDGE-SHAPED HOPPER OF CHANGING GEOMETRY	2
<i>Jordan Klinger, Tyler L. Westover, Wencheng Jin, Tiasha Bhattacharjee, Yidong Xia, Hai Huang</i>	
(23C) AN OVERVIEW OF STORAGE-RELATED CHANGES OCCURRING IN CELLULOSIC BIOMASS UNDER COMMERCIALY RELEVANT CONDITIONS	3
<i>William A. Smith, Lynn M. Wendt, Carlos E. Quiroz Arita, Mitchell A. Plummer</i>	
(23D) OPTIMIZATION OF NATIONAL AND REGIONAL BIOENERGY FEEDSTOCK SUPPLIES AS FUNCTIONS OF PRICE AND BIOREFINERY SCALE	4
<i>Damon Hartley, David N. Thompson, L. Michael Griffel, Yingqian Lin</i>	
(23E) QUANTIFYING VARIABILITY IN LIFE CYCLE ENVIRONMENTAL FOOTPRINTS OF BIOFUEL PRODUCED FROM FOREST RESIDUES IN THE UNITED STATES	5
<i>Kai Lan, Longwen Ou, Stephen S. Kelley, Sunkyu Park, Hoyoung Kwon, Hao Cai, Michael Wang, Yuan Yao</i>	
(23F) WEAR AND WHY? THE ROLE OF ASH IN BIOMASS PROCESSING EQUIPMENT WEAR	6
<i>Vicki S. Thompson, Jeffrey A. Lacey, John E. Aston, Kyungjun Lee, Jun Qu, Mary Intwan</i>	
(23G) FACTORS INFLUENCING NUTRIENT SOLUBILIZATION FROM BIOMASS DURING HYDROTHERMAL CARBONIZATION	7
<i>Saeed Vahed Qaramaleki, John Villamil, Charles J. Coronella, Angel Fernandez Mohedano</i>	
(39A) SUPERCRITICAL WATER GASIFICATION OF SHOCHU RESIDUE IN A 1 T/D PILOT PLANT	8
<i>Yukihiko Matsumura, Shuhei Inoue, Takahito Inoue, Yoshifumi Kawai, Takashi Noguchi, Hiroaki Tanigawa</i>	
(39B) ALKYL LACTATE FORMATION FROM THE DEPOLYMERIZATION OF POST-CONSUMER POLYLACTIC ACID BY METAL COMPLEX CATALYSTS	9
<i>Luis Antonio Roman-Ramirez, Paul McKeown, Fabio Lamberti, Matthew Jones, Joseph Wood</i>	
(39C) KINETIC STUDIES ON THE CO₂ GASIFICATION OF BIOCHAR FOR USE WITH SOFCS AS A BIOENERGY WITH CARBON CAPTURE AND SEQUESTRATION (BECCS) PROCESS	12
<i>Derek Ni, Amanda Simson</i>	
(39D) KINETIC MODELING OF THE THERMAL DECOMPOSITION OF PINE SAWDUST WITH THE DYNAMIC OPTIMIZATION METHOD	13
<i>Andrew Seeger, Hui Liu, Chandana Jayasooriya, Matthew Feeney</i>	
(39E) HEAT AND MASS TRANSFER DURING TORREFACTION IN THE PACKED BED OF BIOMASS	14
<i>Ken-ichiro Tanoue, Kentaro Hikasa, Akihiro Hiden, Miki Taniguchi, Ken-ichi Sasauchi</i>	
(39F) THE PRODUCTION OF LONG CHAIN HYDROCARBONS THROUGH THE CATALYTIC UPGRADE OF BIOMASS-BASED ACETONE, BUTANOL AND ETHANOL (ABE)	15
<i>Elham Ketabchi, Laura Pastor-Perez, Tomás Ramirez-Reina, Harvey Arellano-Garcia</i>	
(39G) DEVELOPMENT AND ECONOMIC ASSESSMENT OF A BIPHASIC PROCESS FOR 5-HYDROXYMETHYLFURFURAL PRODUCTION	16
<i>Jonathan C. Overton, Abigail S. Engelberth, Nathan S. Mosier</i>	
(39H) SCALE-UP OF A CATALYTIC MEMBRANE REACTOR FOR THE PRODUCTION OF 5-HYDROXYMETHYLFURFURAL FROM LIGNOCELLULOSIC BIOMASS	17
<i>Tammoy Patra, Bob Beitle Jr., Richard J. Ciora, S. Ranil Wickramasinghe, Xianghong Qian</i>	
(43A) FRACTIONATION AND PURIFICATION OF BIOREFINERY LIGNINS USING AQUEOUS RENEWABLE SOLVENTS	18
<i>Graham W. Tindall, Mark C. Thies, David Hodge</i>	
(43B) EVALUATING ENDOCARP BIOMASS AS POTENTIAL FEEDSTOCKS FOR BIOREFINERY	19
<i>Makua Vin-Nnajifor, Jian Shi, Seth Debolt</i>	
(43D) SANDBOX (HURA CREPITANS) OIL METHYL ESTERS SYNTHESIS: PROCESS MODELING, OPTIMIZATION, KINETICS AND THERMODYNAMICS STUDIES	20
<i>Jennifer C. Oraegbunam, Babatunde Oladipo, Olayomi A. Falowo, Eriola Betiku</i>	
(43E) COMPUTATIONAL FLUID DYNAMICS SIMULATION OF COMPRESSIBLE NON-NEWTONIAN BIOMASS IN A COMPRESSION-SCREW FEEDER	21
<i>Mohammad J. Rahimi, Hariswaran Sitaraman, James J. Lischeske, David A. Sievers, Jonathan J. Stickel</i>	

(43F) EVALUATION OF CO-PYROLYSIS OF LIGNIN AND PLASTICS THROUGH THERMOGRAVIMETRIC ANALYSIS.....	22
<i>Chang Dou, Jie Chen, Sunkyu Park, Stephen S. Kelley</i>	
(51B) APPLYING MACHINE LEARNING TO ESTIMATE RELEASES FROM NEW USES OF EXISTING CHEMICALS	23
<i>Raymond L. Smith, Jose D. Hernandez-Betancur, David E. Meyer, Gerardo J. Ruiz-Mercado, William M. Barrett, Michael A. Gonzalez, John P. Abraham</i>	
(51C) SUPPLY CHAIN MANAGEMENT OF LIVESTOCK WASTE FOR SPATIO-TEMPORAL CONTROL OF NUTRIENT POLLUTION IN WATER BODIES.....	24
<i>Yicheng Hu, Apoorva Sampat, Gerardo J. Ruiz-Mercado, Victor M. Zavala</i>	
(51D) INTRODUCING A NEW QUANTITATIVE LIFE CYCLE ASSESSMENT MODULE FOR BIOFUELS AND BIOPRODUCTS	26
<i>Rui Shi, Yoel Cortes-Pena, Jeremy Guest</i>	
(51E) A DATA-DRIVEN FRAMEWORK FOR BIOMASS SELECTION AND PROCESS OPTIMIZATION OF ACTIVATED CARBON PRODUCTION	27
<i>Mochen Liao, Steve Kelley, Yuan Yao</i>	
(51F) A PERSONAL EXPOSURE AGENT BASED MODEL (ABM) WITH THE CAPACITY OF AGGREGATION AT VARIOUS LEVELS OF POPULATION SIZE	29
<i>Dimitrios Chapizanis, Spyros Karakitsios, Dimosthenis Sarigiannis</i>	
(62A) SUPPLY NETWORK OPTIMIZATION OF CARBON CAPTURE, SEQUESTRATION AND UTILIZATION FROM POINT SOURCES	32
<i>Tina Kegl, Lidija Cucek, Anita Kovac Kralj, Zdravko Kravanja</i>	
(62B) LARGE SCALE DEPLOYMENT OF LOW CARBON HYDROGEN AND CCS VALUE CHAINS FOR THE DECARBONISATION OF HEAT: NOVEL METHODS AND INSIGHTS.....	33
<i>Nixon Sunny, Niall Mac Dowell, Nilay Shah</i>	
(62C) COST-EFFECTIVENESS OF CONTINUOUS H₂ PRODUCTION USING INTEGRATED PV-ELECTROLYSIS-STORAGE SYSTEMS	35
<i>Dharik Mallapragada, Patrick Insinger, Emre Gençer</i>	
(62D) ECONOMIC ANALYSIS OF INTEGRATED SOLAR POWER, HYDROGEN PRODUCTION, AND ELECTRICITY MARKETS.....	36
<i>Omar J. Guerra, Mariya N. Koleva, Joshua Eichman, Jennifer Kurtz, Bri-Mathias Hodge</i>	
(62E) SIMULTANEOUS DESIGN AND OPERATION OF RENEWABLE ENERGY CARRIER PRODUCTION.....	38
<i>C. Doga Demirhan, William W. Tso, Clara F. Heuberger, Joseph B. Powell, Efstratios N. Pistikopoulos</i>	
(70A) STRATEGIES FOR ASSESSING AND IMPROVING MICROBIAL UTILIZATION OF LIGNIN-DERIVED MONOMERS.....	39
<i>Kirsten Davis, Marge Rover, Davinia Salvachua, Ryan G. Smith, Gregg T. Beckham, Zhiyou Wen, Robert C. Brown, Laura Jarboe</i>	
(70B) DEVELOPING BACTERIAL PELLETIZED CULTURE TO ENHANCE YIELD AND SIMPLIFY HARVEST FOR LIGNIN BIOCONVERSION.....	40
<i>Bing Xu, Zhihua Liu, Furong Lin, Joshua Yuan</i>	
(70C) UNLOCKING THE GENETIC POTENTIAL OF RHODOPSEUDOMONAS PALUSTRIS CGA009 FOR LIGNIN VALORIZATION	41
<i>Cheryl Immethun, Taity Changa, Rajib Saha</i>	
(70D) IMPROVING RESISTANCE OF HYPERTHERMOPHILIC LACCASE TO IONIC LIQUIDS FOR IN SITU LIGNIN VALORIZATION	42
<i>Joseph Stevens, Jameson Hunter, Claire Dumon, David Rodgers, Jian Shi</i>	
(70E) COMPUTATIONAL PATHWAY DESIGN FOR FUNNELING LIGNIN INTERMEDIATES TO AROMATIC PRODUCTS	43
<i>Lin Wang, Costas D. Maranas</i>	
(70F) ENHANCEMENT OF POLYHYDROXYALKANOATE PRODUCTION BY CO-FEEDING LIGNIN DERIVATIVES WITH GLYCEROL IN PSEUDOMONAS PUTIDA KT2440	44
<i>Zhangyang Xu, Xiaolu Li, Naijia Hao, Arthur J. Ragauskas, Bin Yang</i>	
(70G) CONVERSION OF LIGNIN INTO BIODEGRADABLE PLASTIC BY RHODOPSEUDOMONAS PALUSTRIS	45
<i>Brandi Brown, Mark R. Wilkins, Rajib Saha</i>	
(80B) MODEL BASED PLANT-WIDE OPTIMIZATION OF AN INDUSTRIAL SCALE CONTINUOUS TANK CRYSTALLIZER NETWORK FOR DEXTROSE MONOHYDRATE CRYSTALLIZATION	46
<i>Botond Szilagyi, Kanjakha Pal, Iman Beheshti Tabar, Zoltan K. Nagy</i>	

(80C) SYSTEMATIC DESIGN AND INTENSIFICATION OF SHALE GAS UTILIZATION PROCESSES	48
<i>Mohammed Sadaf Monjur, Jianping Li, Salih E. Demirel, M. M. Faruque Hasan</i>	
(80D) EVALUATION OF HELIUM EXTRACTION TECHNOLOGIES WHILE CONSIDERING OPTIMIZATION AND INTEGRATION WITH NITROGEN REJECTION.....	50
<i>Homa Hamed, Iftekhar A. Karimi, Truls Gundersen</i>	
(80E) KINETIC MODELING AND PROCESS CONTROL FOR THE PREPARATION OF GRAPHENE OXIDE.....	52
<i>Chang Li, Liming Shen, Ningzhong Bao</i>	
(80F) HIGH-FIDELITY MODELING AND OPTIMIZATION OF NATURAL GAS DEHYDRATION AND LIQUID RECOVERY PLANTS.....	53
<i>Dara Satyadileep, Yasser Al Wahedi, Abdallah S. Berrouk, Simon Leyland</i>	
(80G) BAYESIAN OPTIMIZATION APPROACH TO OPERATION RECIPE OPTIMIZATION OF SEMI-CONTINUOUS PROCESS	54
<i>Dongwoo Lee, Seongeon Park, Damdae Park, Jong Min Lee</i>	
(80H) OPTIMAL SCHEDULING OF MULTI-PRODUCT PIPELINE DISTRIBUTION WITH CONSIDERATION OF COMPREHENSIVE TRANSMIX HANDLING FOR PETROLEUM REFINERIES.....	55
<i>Li Yu, Qiang Xu</i>	
(82A) BIOCONVERSION OF WHEY LACTOSE TO ACETATE AND PROPYLENE GLYCOL DEICERS	56
<i>Alexander P. Mathews, Sathyanarayanan Sevilimedu Veeravalli</i>	
(82B) PROCESS DESIGN, TECHNO-ECONOMIC ASSESSMENT AND ENVIRONMENTAL IMPACTS OF SUCCINIC ACID PRODUCTION FROM THE ORGANIC FRACTION OF MUNICIPAL SOLID WASTE	57
<i>Dimitrios Ladakis, Eleni Stylianou, Sofia Maria Ioannidou, Chrysanthi Pateraki, Carol Sze Ki Lin, Apostolis Koutinas, Ioannis Kookos</i>	
(82C) BIOPROCESS DESIGN AND TECHNO-ECONOMIC EVALUATION OF 2,3-BUTANEDIOL PRODUCTION FROM CRUDE GLYCEROL AND SUGAR-BASED FEEDSTOCKS.....	58
<i>Apostolis Koutinas, Sofia Maina, Eleni Stylianou, Olga Psaki, Aline Machado de Castro, Endrit Dheskali, Ioannis Kookos</i>	
(82D) DESIGN AND ANALYSIS OF THE INTEGRATED PROCESS FOR ALGAE CONVERSION TO MIX ALCOHOLS.....	59
<i>Yue Zhang, Abhay Athaley, Marianthi Ierapetritou</i>	
(82E) PRODUCTION OF VALUE ADDED CO-PRODUCTS FROM THE HYDROTHERMAL LIQUEFACTION OF UNHYDROLYZED SOLIDS	61
<i>Vinod S. Amar, Bharat Maddipudi, Anuj Thakkar, Katelyn Shell, Dylan Rodene, Tylor Westover, Sandeep Kumar, Ram B. Gupta, Rajesh Shende</i>	
(82F) HYDROXYL GROUP STABILIZATION FOR INCREASED YIELDS OF LOW MOLECULAR WEIGHT PRODUCTS IN THE CO-PYROLYSIS OF CELLULOSE AND THERMOPLASTICS.....	62
<i>Melisa Nallar, Hsi-Wu Wong</i>	
(128A) DESIGN OF SUSTAINABLE BIOFUEL SUPPLY CHAINS WHILE ACCOUNTING FOR SPATIAL VARIABILITY OF NUTRIENT RUNOFF AND ECOSYSTEM SERVICES	63
<i>Tapajyoti Ghosh, Bhavik R. Bakshi</i>	
(128B) THREE-STAGE DESIGN OF MICROALGAE-BASED BIOFUEL SUPPLY CHAIN USING GIS	65
<i>Seongwhan Kang, Seongmin Heo, Matthew Realf, Jay H. Lee</i>	
(128C) GIS-BASED TWO-STAGE STOCHASTIC FACILITY LOCATION PROBLEM CONSIDERING PLANTING PLAN UNCERTAINTY.....	66
<i>Neng Fan, Ou Sun</i>	
(128D) AN INTEGRATED DEMAND AND SUPPLY MODELING APPROACH FOR THE ENERGY SYSTEM DESIGN OF A NEW URBAN AREA.....	67
<i>Zhihao Chen, Styliani Avraamidou, Pei Liu, Zheng Li, Weidou Ni, Efstratios N. Pistikopoulos</i>	
(128E) MULTI-LEVEL LIFE CYCLE ANALYSIS TOOL FOR SUSTAINABLE ENERGY SYSTEMS MODELING	68
<i>Emre Gençer, Sarah Torkamani, Francis O'Sullivan</i>	
(157B) BIO-BASED BENZOXAZINE MONOMERS AND POLYMERS BASED ON DIFURAN DIAMINE(DFDA)	69
<i>Mengwen Yu, John La Scala, Giuseppe Palmese</i>	

(157C) OVERCOMING THE INFLUENCE OF HMF REACTION MIXTURE CONSTITUENTS ON EXTRACTION SOLVENT PERFORMANCE	70
<i>Andre De Haan</i>	
(157D) THE CHEMICAL PROPERTIES ALLOWING THE TETRABUTYLPHOSPHONIUM CHLORIDE-WATER MIXTURE TO EFFICIENTLY DISSOLVE CELLULOSE IN HIGH WATER CONCENTRATIONS VIA MOLECULAR DYNAMICS	71
<i>Brad Crawford, Ahmed E. Ismail</i>	
(157E) MARTINI COARSE-GRAINED MODEL FOR POLY-E-CAPROLACTONE IN ACETONE-WATER MIXTURES.....	73
<i>Daniele Marchisio, Alessio D. Lavino, Paola Carbone</i>	
(157F) LIGNIN-BASED FUNCTIONAL POLYMERS	74
<i>Hailing Liu, Hoyong Chung</i>	
(157G) UNCERTAINTY AND SENSITIVITY ANALYSIS ASSESSING THE ROBUSTNESS OF MODELS EMPLOYED IN SUPERSTRUCTURE OPTIMIZATION FOR THE DOWNSTREAM PROCESS DESIGN OF A BIOREFINERY	75
<i>Nikolaus I. Vollmer, Celina K. Yamakawa, Krist V. Gernaey, Solange I. Mussatto, Gürkan Sin</i>	
(157H) TECHNO-ECONOMIC ANALYSIS FOR RAPID COMMERCIALIZATION OF CHITIN NANOFIBER SUSPENSIONS FOR BARRIER APPLICATIONS	77
<i>Chimmay C. Satam, Riley K. Geran, Cameron J. Coffey, Matthew J. Realf, J. Carson Meredith</i>	
(164B) INTEGRATED BIOREFINERY APPROACH TO PRODUCE BIOSUGAR FROM LIGNOCELLULOSIC BIOMASS.....	78
<i>Sunky Park</i>	
(164C) CARBOXYLATE PLATFORM – LESSONS FROM THE COW	79
<i>Mark Holtzaple</i>	
(164E) CELF PRETREATMENT OF CELLULOSIC BIOMASS ACHIEVES HIGH YIELDS OF REACTIVE INTERMEDIATES FOR BIOLOGICAL OR CATALYTIC CONVERSION TO FUELS AND CHEMICALS	80
<i>Charles E. Wyman</i>	
(165A) THE CHEMICAL ENGINEERING PROFESSION AND ITS INFINITE POSSIBILITIES.....	81
<i>Tayo Femi-Fowode</i>	
(165B) DIRECT CONTACT MEMBRANE DISTILLATION (DCMD) MEMBRANE DISTILLATION TECHNIQUES FOR DESALINATION.....	82
<i>Lydia N. Rodrigues</i>	
(165C) MY CAREER PATH	83
<i>Trebor Gainwell</i>	
(165D) SUSTAINABLE ENERGY DRIVERS: A PERSPECTIVE FROM A CAREER IN THE NUCLEAR SECTOR	84
<i>Harold Conner Jr.</i>	
(165E) A CHEMICAL ENGINEER IN THE ENERGY JOURNEY	85
<i>Quinta Nwanosike Warren</i>	
(166A) UNDERSTANDING FORMATION OF NITROGEN HETEROCYCLES DURING CATALYTIC HYDROTHERMAL LIQUEFACTION	86
<i>Michael T. Timko, Richard H. West, Rasha Atwi</i>	
(166B) BIOCHAR AND ACTIVATED CARBONS DERIVED FROM FOOD WASTE: PROPERTIES AND APPLICATIONS	87
<i>Lei Yu, David P. Gamliel, Katherine M. Saltzgeber, Brianna Markunas, Julia A. Valla</i>	
(166C) A FRAMEWORK FOR ASSESSING SOLID WASTE ENERGY RECOVERY SYSTEMS FOR SMALL-SCALE ON-SITE APPLICATIONS	89
<i>Andrew Pfluger, Pamela L. Sheehan, Enoch Nagelli, Corey James, Harry L. Moore, Preston Haney</i>	
(166D) MICROPLASTIC ENVIRONMENTAL EFFECT ON THE AQUATIC ECOSYSTEM OF THE THERMAIC GULF	90
<i>Marianthi Kermenidou, Irini Moschoula, Dimitris Kousis, Spyros Karakitsios, Dimosthenis Sarigiannis</i>	
(166E) STUDY AND OPTIMIZATION OF THE SUPPLY CHAIN OF THE RECOLLECTION AND HARNESING OF USED COOKING OIL IN THE CITY OF BOGOTÁ.....	92
<i>Juan Sebastián Rodríguez Flórez, Alvaro Orjuela</i>	
(166F) ECONOMIC FEASIBILITY OF EVAPORATION-BASED LIQUID DIGESTATE TREATMENT FOR BIOGAS PLANTS	93
<i>Michal Touš, Marek Vondra</i>	
(166G) STRATEGIES FOR IMPROVEMENT OF ANAEROBIC DIGESTION FROM AGRICULTURAL WASTE: A CRITICAL REVIEW	94
<i>Safenaz Shaaban, Doaa Bassuney, Mahmoud Nasr</i>	

(197A) CONVERSION OF CELLULOSE AND AMINO ACIDS TO HIGH-VALUE-ADDED CHEMICALS USING SATURATED STEAM.....	100
<i>Seiichiro Yoshida, Keiichiro Matsushima, Tohru Joboji</i>	
(197B) NON-THERMAL, ATMOSPHERIC PLASMA CONVERSIONS OF BIOMASS INTO VALUE-ADDED CHEMICALS: SOLVENT-PLASMA BASED CONVERSION	101
<i>Lusi A, Xianglan Bai, Hui Hu</i>	
(197C) TREATMENT OF BIOMASS GASIFICATION TARS WITH NON-THERMAL PLASMAS	102
<i>Faisal Saleem, Kui Zhang, Adam P. Harvey</i>	
(197D) UPGRADING OF BIORENEWABLE THERMAL DEOXYGENATION OILS TO AVIATION FUEL RANGE HYDROCARBONS	103
<i>Sampath A. Karunarathne, Matthew J. Kline, M. Clayton Wheeler</i>	
(197F) MESOPOROUS METAL OXIDE AEROGELS FOR SUSTAINABLE FUELS GENERATION	104
<i>Ashley M. Pennington, Catherine L. Pitman, Paul A. DeSario, Jeremy J. Pietron, Todd H. Brintlinger, Debra R. Rolison</i>	
(200A) INCORPORATION OF NETWORK TOPOLOGY FOR RESILIENT DESIGN AND OPTIMAL OPERATION IN THE FRAMEWORK OF WATER-ENERGY NEXUS	106
<i>Spyridon D. Tsolas, M. Nazmul Karim, M. M. Faruque Hasan</i>	
(200B) INNOVATIVE PROCESSES DESIGN FOR VALUE-ADDED PRODUCTS FROM NATURAL GAS LIQUIDS IN SHALE GAS.....	108
<i>Yiru Li, Zewei Chen, Edwin Andres Rodriguez Gil, Rakesh Agrawal</i>	
(200C) OPTIMAL DESIGN OF FLOWSHEETS VIA SURROGATE-BASED SUB-PROCESS MODELS: A CASE STUDY OF CO₂ CAPTURE AND UTILIZATION.....	109
<i>Zhimian Hao, Polina Yaseneva, Alexei A. Lapkin</i>	
(200D) TECHNO-ECONOMIC ANALYSIS (TEA) OF CO₂ ELECTROLYSIS SYSTEMS FOR ETHYLENE PRODUCTION	110
<i>Wenqin Li, Victor Beck, Jeremy T. Feaster, Sarah E. Baker, Eric B. Duoss</i>	
(200E) NUTRIENT POLLUTION PREVENTION BY IMPLEMENTING NUTRIENT RECOVERY TECHNOLOGIES IN LIVESTOCK FACILITIES	111
<i>Edgar Martín-Hernández, Apoorva Sampat, Mariano Martín, Victor M. Zavala, Gerardo J. Ruiz-Mercado</i>	
(211A) CREATION OF A CHEMICAL SYNTHESIS WEB APPLICATION BASED UPON A CHEMICAL REACTION ONTOLOGY	112
<i>William M. Barrett, Sudhakar Takkellapati, Kidus Tadele, Michael A. Gonzalez</i>	
(211B) A COMPARISON OF POLARCLEAN, GAMMA-VALEROLACTONE AND THEIR MIXTURE AS BIO-DERIVED SOLVENTS FOR POLYSULFONE MEMBRANE FABRICATION	113
<i>Xiaobo Dong, Halle Shannon, Caleb Parker, Isabel Escobar</i>	
(211C) NOVEL APPLICATION OF WASTE CONCRETE TO CLEAN UP THE AIR AND IMPROVE THE RELIABILITY OF CIVIL INFRASTRUCTURE	114
<i>Alexander Orlov, Shrish Patel, Erandi Ariyachandra, Sulapha Peethamparan</i>	
(211D) DIRECT FECO₃ REDUCTION WITH H₂	115
<i>Astrid Loder, Susanne Lux, Matthaeus Siebenhofer</i>	
(211E) RECOVERY OF METALS FROM CATHODE OF LITHIUM-ION BATTERIES: A CLOSED-LOOP APPROACH USING OXALATE CHEMISTRY	116
<i>Ankit Verma, Grant Johnson, Rajkumar Kore, David R. Corbin, Mark B. Shiflett</i>	
(211F) DIRECT REGENERATION OF DEGRADED CATHODES TO REDUCE LI-ION BATTERY COST AND ENHANCE MATERIALS SUSTAINABILITY	117
<i>Zheng Chen, Yang Shi</i>	
(215A) SCALABLE PRODUCTION OF NANOSTRUCTURED ELECTROCATALYSTS FOR THE E-REFINERY	118
<i>J. Ruud van Ommen</i>	
(215C) MACHINE LEARNING OF CARBON ELECTRODES FOR ELECTRIC DOUBLE LAYER CAPACITORS.....	119
<i>Musen Zhou, Alejandro Gallegos, Kun Liu, Jianzhong Wu</i>	
(215D) APPLICATIONS OF A-NICKEL HYDROXIDE CATALYST FOR ELECTROCHEMICAL WATER SPLITTING	120
<i>Anirudh Balram, Hanfei Zhang, Sunand Santhanagopalan</i>	
(215E) STRONGLY COUPLED 3D TERNARY FE₂O₃@Ni₂P/Ni(PO₃)₂ HYBRID FOR ENHANCED ELECTROCATALYTIC OXYGEN EVOLUTION AT ULTRA-HIGH CURRENT DENSITIES.....	121
<i>Xiaodi Cheng Sr.</i>	
(215G) NICKEL NANOPARTICLES EMBEDDED N-DOPED CARBON NANOTUBES AS BIOCOMPATIBLE ELECTROCATALYSIS FOR CO₂ CONVERSION	128
<i>Zhongjian Li, Yang Hou, Siyuan Xiu, Gang Li</i>	

(251A) CARBON NEGATIVE BIOFUEL AND POWER SYSTEMS VIA HYBRID PYROLYSIS AND ANAEROBIC DIGESTION BIOREFINERIES	130
<i>Alvina Aui, Arna Ganguly, Irene Mas-Martin, Mark Mba Wright</i>	
(251B) SYNTHESIS AND ANALYSIS OF BIOREFINERY SYSTEMS WITH NOVEL LIGNIN AND STILLAGE VALORIZATION TECHNOLOGIES	132
<i>Kefeng Huang, Peyman Fasahati, Rex T. L. Ng, Christos T. Maravelias</i>	
(251C) BIOMASS-DERIVED LIQUID FUELS VIA FISCHER-TROPSCH PROCESS AS A POTENTIAL REPLACEMENT FOR MARINE FUELS	134
<i>Eric CD Tan, Ling Tao, Mary Bidy</i>	
(251D) EXPLORING SUSTAINABLE N-BUTANOL PRODUCTION BY RHODOPSEUDOMONAS PALUSTRIS TIE-1	135
<i>Wei Bai, Tahina Ranaivoarisoa, Karthikeyan Rengasamy, Rajesh Singh, Arpita Bose</i>	
(251E) PROCESS DESIGN AND ECONOMIC ANALYSIS OF ETHANOL AND DIESEL PRODUCTION FROM GENETICALLY MODIFIED LIPID-ACCUMULATING SORGHUM	136
<i>Peyman Fasahati, J. Jay Liu, Christopher M. Saffron</i>	
(257A) EXPERIMENTAL INVESTIGATION OF YMNO₃ PEROVSKITES WITH SR A-SITE AND AL B-SITE DOPING FOR SOLAR THERMOCHEMICAL FUEL PRODUCTION	137
<i>Richard Carrillo, Jonathan R. Scheffe</i>	
(257B) UNDERSTANDING THE OXIDATION KINETICS MECHANISM OF CERIA BASED MATERIALS IN SOLAR THERMOCHEMICAL GAS SPLITTING	138
<i>Steven Wilson, Bennett Mandal, Christopher L. Muhich</i>	
(257C) FUNCTIONAL CERAMICS FOR SOLAR THERMOCHEMICAL STORAGE, HYDROGEN AND LIQUID FUEL PRODUCTION	139
<i>Dorotyia Guban, Josua Vieten, Stefan Brendelberger, Martin Roeb, Christian Sattler</i>	
(257D) A COMPARISON OF SOLID-GAS THERMOCHEMICAL ENERGY STORAGE REACTIONS AND PROCESS CONFIGURATIONS FOR CSP APPLICATIONS	141
<i>Xinyue Peng, Thatcher W. Root, Christos T. Maravelias</i>	
(257E) FLEXIBLE HEAT INTEGRATION TO ENHANCE SOLAR ENERGY UTILIZATION IN A HYBRID CSP PLANT	143
<i>Kevin Ellingwood, Kody M. Powell</i>	
(294A) EVALUATING ENERGY-WATER NEXUS TRADEOFFS FOR U.S RICE PRODUCTION	144
<i>Nemi Vora, Colin P Gillen, Oleg A Prokopyev, Vikas Khanna</i>	
(294B) COOLING TOWER DESIGN FOR THE WATER – ENERGY NEXUS: EFFECT OF WEATHER CONDITIONS ON WATER CONSUMPTION AND TOWER SIZING	145
<i>Lidia S. Guerras, Mariano Martín</i>	
(294C) SCENARIO REDUCTION FOR POWER SYSTEM PLANNING AND SCHEDULING PROBLEMS UNDER ENERGY-WATER NEXUS CONSIDERATIONS	146
<i>R. Cory Allen, Styliani Avraamidou, Efstratios N. Pistikopoulos</i>	
(294D) MODELING AND TECHNO-ECONOMIC OPTIMIZATION OF DESALINATION TECHNOLOGIES FOR PRODUCED WATER TREATMENT	147
<i>Elmira Mohammadi Shamlou, Radisav Vidic, Vikas Khanna</i>	
(294E) USING SOLAR POWERED MIXING DEVICES TO REDUCE DISSOLVED IRON IN A DRINKING WATER RESERVOIR	148
<i>Jason A. Heberling</i>	
(304A) CHEMICAL ENGINEERING INNOVATIONS FOR A RENEWABLE ECONOMY	149
<i>Rakesh Agrawal</i>	
(304C) ENGINEERING MATERIALS FOR CLINICAL APPLICATION	150
<i>Christine Schmidt</i>	
(321A) GASIFICATION OF ORGANIC SOLID WASTE UNDER HIGH-FLUX SOLAR IRRADIATION: THERMODYNAMICS, KINETICS, AND FIXED-BED REACTOR EVALUATION	151
<i>Xian Li, Ye Shen, Wojciech Lipinski, Yanjun Dai, Chi-Hwa Wang</i>	
(321B) ANALYSIS OF THE EFFECT OF SOLAR PYROLYSIS PARAMETERS ON THE PHYSICO-CHEMICAL PROPERTIES OF BIOCHAR	152
<i>Alejandro Ayala-Cortés, Diego R. Lobato-Peralta, Carlos E. Arreola-Ramos, Diana C. Martínez-Casillas, Daniella E. Pacheco-Catalán, Ana K. Cuentas-Gallegos, Heidi I. Villafán-Vidales, Camilo A. Arancibia-Bulnes</i>	
(321C) NUMERICAL DESIGN AND EXPERIMENTAL EVALUATION OF A DIRECT SOLAR REACTOR FOR THE CATALYTIC DRY REFORMING OF METHANE	153
<i>Tayseir Mohammed, Jawad Sarwar, Konstantinos E. Kakosimos</i>	
(321D) ECONOMIC AND DYNAMIC PERFORMANCE SOLAR-DRIVEN THERMOCHEMICAL PRODUCTION OF HYDROGEN USING CERIA	154
<i>Alicia Bayon, Alberto de la Calle</i>	

(321E) DISH-STARS™ SOLAR THERMOCHEMICAL PRODUCTION OF HYDROGEN	156
<i>Richard Zheng, Robert Wegeng, Paul Humble, Johnny Saavedra-Lopez, Timothy Veldman</i>	
(325A) RESOURCE-CIRCULAR MANUFACTURING SYSTEMS OPTIMISATION	159
<i>Miao Guo</i>	
(325B) NOVEL APPROACH TO MATERIAL SELECTION: A JOINT VENTURE OF MULTISCALE SIMULATIONS AND LCA	161
<i>Andrea Mio, Domenico Marson, Suzana Aulic, Erik Laurini, Sabrina Priel, Maurizio Fermeglia</i>	
(325C) CIRCULAR ECONOMY SYSTEMS ENGINEERING	162
<i>Styliani Avraamidou, Efstratios N. Pistikopoulos</i>	
(325D) A DECISION-MAKING TOOL FOR THE DESIGN AND EVALUATION OF WASTE MANAGEMENT SYSTEMS IN LIVESTOCK FACILITIES	163
<i>Edgar Martín-Hernández, Mariano Martín, Gerardo J. Ruiz-Mercado</i>	
(325E) CAPE: A CIRCULAR ECONOMY PERSPECTIVE	165
<i>Edlira Kalemi, Linsey Koo, Nikolaos Trokanas, Franjo Cecelja</i>	
(361A) SPATIAL OPTIMIZATION FOR LAND USE ALLOCATION UNDER FOOD-ENERGY-WATER NEXUS CONSIDERATIONS	167
<i>Yaling Nie, Styliani Avraamidou, Xin Xiao, Efstratios N. Pistikopoulos, Jie Li</i>	
(361B) MANAGING TECHNOLOGICAL AND ECOLOGICAL SYSTEMS IN A WATERSHED WHILE CONSIDERING THE FEW NEXUS, ECOLOGICAL CARRYING CAPACITY, AND THE EFFECTS OF CLIMATE CHANGE	168
<i>Kyuha Lee, Sami Khanal, Bhavik R. Bakshi</i>	
(361C) ABFEWS: AN AMMONIA-BASED SYSTEM FOR FOOD-ENERGY-WATER SUSTAINABILITY	170
<i>Matthew J. Palys, Anatoliy Kuznetsov, Andrew Allman, Joel Tallaksen, Michael Reese, Prodrimos Daoutidis</i>	
(361D) COMPARING THE ENVIRONMENTAL IMPLICATIONS OF NATIONAL FOOD SUPPLIES USING DATA ENVELOPMENT ANALYSIS	172
<i>Elysia Lucas, Gonzalo Guillén-Gosálbez, Miao Guo, Carlos Pozo Fernández, Ángel Galán Martín</i>	
(361E) SYSTEMATIC DESIGN AND OPTIMIZATION OF WATER-ENERGY NEXUS FOR SUSTAINABLE REGIONAL PLANNING	175
<i>Spyridon D. Tsolas, M. Nazmul Karim, M. M. Faruque Hasan</i>	
(361F) A COMPUTATIONAL PLATFORM FOR ASSESSING ORGANIC WASTE MANAGEMENT STRATEGIES IN THE FOOD-ENERGY-WATER NEXUS	177
<i>Yicheng Hu, Gerardo J. Ruiz-Mercado, Rebecca Larson, Victor M. Zavala</i>	
(362A) INCORPORATION OF A PHASE CHANGE MATERIAL INTO FIBERS FOR THERMAL MODULATION AND ENERGY STORAGE	179
<i>Yun-Ho Ahn, Ryan Lively</i>	
(362B) LATENT HEAT TRAPPING IN PHASE SWITCHING LIQUIDS	180
<i>Rukmava Chatterjee, Daniel Beysens, Sushant Anand</i>	
(362C) HIGH PRESSURE HIGH TEMPERATURE THERMAL ENERGY STORAGE SYSTEMFOR CONCENTRATED SOLAR POWER (CSP) PLANTS	181
<i>Masahiro Kawaji</i>	
(362D) FLAME-RETARDANCY AND THERMAL PROPERTIES OF A NOVEL PHOSPHORUS MODIFIED PCM FOR THERMAL ENERGY STORAGE	182
<i>Renjie Chen, DeLong Xie, Dedong He, Xinzhi Chen, Yuanzhi Zhu, Yanping He, Yi Mei</i>	
(362F) EXPERIMENTAL STUDY ON THERMAL PERFORMANCE OF A LATENT HEAT THERMAL STORAGE CELL UNIT UTILIZING FINNED METAL FOAM	183
<i>Yongping Huang, Ying Yang, Liangyu Wu, Chengbin Zhang</i>	
(390A) UNDERSTANDING THE ROLE OF PARTIAL OXIDATION REACTIONS DURING AUTOTHERMAL PYROLYSIS	188
<i>Chad Peterson, Jake K. Lindstrom, Joseph Polin, Preston A. Gable, Robert C. Brown</i>	
(390B) STRUCTURAL AND CHEMICAL CHANGES IN PLANT CELL WALLS DURING EARLY STAGES OF THERMAL DECONSTRUCTION	189
<i>Jake K. Lindstrom, Chad Peterson, Peter N. Ciesielski, John Ralph, Mingjie Chen, Joseph Jakes, Preston A. Gable, Robert C. Brown</i>	
(390C) MULTISCALE SIMULATION OF AUTOTHERMAL PYROLYSIS OF BIOMASS	190
<i>Peter N. Ciesielski, Brennan Pecha, Hariswaran Sitaraman, Gavin Wiggins, Charles E. A. Finney, Jim Parks, Xi Gao, Deepthi Chandramouli, Bill Rogers</i>	
(390D) SIGNIFICANT INCREASE IN THE PRODUCTION OF SUGARS FROM PYROLYSIS OF AGRICULTURAL RESIDUES BY APPLICATION OF IRON SULFATE PRETREATMENT	191
<i>Sean A. Rollag, Joseph Polin, Preston A. Gable, Andrew Friend, Jake K. Lindstrom, Robert C. Brown</i>	
(390E) A NOVEL FLUIDIZED BED MODEL FOR FAST PYROLYSIS APPLICATIONS	192
<i>Benjamin Caudle, Maxmilian Gorenssek, Chau-Chyun Chen</i>	

(390F) CFD INVESTIGATION OF AUTOTHERMAL BIOMASS PYROLIZERS	193
<i>Barlev Nagawkar, Venkata S. P. Kotrike, Shankar Subramaniam, Alberto Passalacqua</i>	
(396A) PERFORMANCE CHARACTERISTICS OF A DIRECTLY-IRRADIATED WINDOWLESS SOLAR VORTEX PARTICLE RECEIVER	195
<i>Alfonso Chinnici, Dominic Davis, Woei L. Saw, Zhao Tian, Graham J. Nathan</i>	
(396B) NON-THERMAL EQUILIBRIUM HEAT TRANSFER MODEL OF A THERMOCHEMICAL SOLAR REACTOR BASED ON POROUS MEDIA	196
<i>Aldo J. Guadarrama-Mendoza, Carlos E. Arreola-Ramos, Heidi I. Villafán-Vidales, Camilo A. Arancibia-Bulnes, Patricio J. Valadés-Pelayo, Juan D. Macías</i>	
(396C) ATTENUATION OF ABSORBER END LOSS IN PARABOLIC TROUGH COLLECTORS	197
<i>Mohammad Abutayeh</i>	
(396E) MODAL SWITCHING FOR CONTINUOUS SOLAR REFORMING OF METHANE	207
<i>Lucas Freiberg, Fuqiong Lei, Nick AuYeung</i>	
(396F) SUSTAINABLE STEAM ON DEMAND FOR THE BAYER PROCESS	208
<i>Andrew Beath, Alicia Bayon</i>	
(459A) SIMULTANEOUS PRODUCT AND PROCESS DESIGN FOR TAILOR-MADE BIOFUELS	209
<i>Andrea Köning, Lisa Neidhardt, Jörn Viell, Alexander Mitsos, Manuel Dahmen</i>	
(459B) IMPROVING THE LOCATION ROBUSTNESS OF SPATIALLY DISTRIBUTED VARIABLES FOR BIOMASS SUPPLY CHAINS UNDER SUPPLY UNCERTAINTY	211
<i>Nathanial J. Cooper, Nilay Shah</i>	
(459C) PROCESS INTENSIFICATION IN BY-PRODUCT RECOVERY FROM BIOBASED EFFLUENTS	213
<i>Daniela Painer, Susanne Lux, Matthaeus Siebenhofer</i>	
(459D) JET FUELS PRODUCTION FROM WASTE COOKING OIL VIA CATALYTIC TRANSFER HYDROGENATION	214
<i>Elena Barbera, Alexander Asiedu, Eleazer Resurreccion, Alberto Bertucco, Sandeep Kumar</i>	
(459E) THE CONCEPTUAL FRAMEWORK AND MODELING ANALYSIS OF COMPACT ENERGY SYSTEMS	215
<i>Sampath Gunukula, Dat T. Tran, Ivan C. Lee</i>	
(459F) SYNTHESIS AND EVALUATION OF DIPICOLINIC ACID (DPA) – BASED INTERWELL TRACERS FOR RESERVOIR SURVEILLANCE	216
<i>Rena Shi, Gawain Thomas, Sehoon Chang, Hooisweng Ow</i>	
(459G) DESIGN DEVELOPMENT OF A NOVEL SOUR WATER STRIPPER	217
<i>Umer Zahid, Ali Al-Qadri</i>	
(487A) SUSTAINABLE DEVELOPMENT FOR THE CHEMICAL INDUSTRY THROUGH PROCESS INTENSIFICATION	219
<i>David R. Shonard</i>	
(487B) EDUCATION FOR ENABLING SUSTAINABLE DEVELOPMENT: ROLE OF CHEMICAL ENGINEERING AND OF THE CAMPUS AS A LIVING LABORATORY	220
<i>Bhavik R. Bakshi</i>	
(487C) DATA-DRIVEN OPTIMIZATION FOR SUSTAINABLE ENERGY SYSTEMS	221
<i>Chao Ning, Fengqi You</i>	
(497A) INTEGRATING DIRECT AIR CARBON CAPTURE AND ALGAL-BASED BIOENERGY PRODUCTION	222
<i>Maria Camila Caceres Falla, Hector De la Hoz Siegler Jr.</i>	
(497B) EFFECTS OF IMPURITIES IN TWO-STEP VS. ONE-STEP HYDROPROCESSING OF ALGAE OILS	225
<i>Jacob S. Kruger, Earl Christensen, Tao Dong, Gina Fioroni, Nicholas J. Nagle, Philip Pienkos, Robert McCormick</i>	
(497C) INTEGRATED MICROALGAL BIOREFINERY: OPTIMIZATION OF PROCESS CONDITIONS FOR ENHANCED BIOFUEL AND ANTIOXIDANT PRODUCTION	226
<i>Safina Ujan, Hector De la Hoz Siegler Jr.</i>	
(497D) SYNTHESIS OF VALUE CHAINS TOWARDS FLEXIBLE ALGAE BIOREFINERIES UNDER UNCERTAINTY	229
<i>Melina Psycha, Antonis C. Kokossis</i>	
(497E) EVALUATING THE EFFECTIVENESS OF PLANTAIN PEEL ASH EXTRACT AS BIO-BASED ALKALI FOR INDUCING FLOCCULATION OF MICROALGAE	230
<i>Sheriff Ajala, Matthew L. Alexander</i>	
(511A) EFFECT OF PARAMETERS ON SWEET POTATO DUST EXPLOSION	236
<i>Chunyan Chen</i>	

(511B) RISK CHARACTERIZATION OF CADMIUM BASED ON HUMAN BIOMONITORING DATA	237
<i>Spyros Karakitsios, Ioannis Petridis, Dimosthenis Sarigiannis</i>	
(511C) RISK ASSESSMENT OF PHTHALATES AND DINCH STARTING FROM HUMAN BIOMONITORING DATA	239
<i>Spyros Karakitsios, Ioannis Petridis, Dimosthenis Sarigiannis</i>	
(511D) AEROSOL EXPLOSION STUDIES USING MODIFIED DUST EXPLOSION APPARATUS	241
<i>Shuai Yuan, Joseph Sang-Il Kwon, Chad Mashuga</i>	
(511E) A NOVEL QUANTITATIVE CHEMICAL REACTIVITY RATING SYSTEM DESIGN BY MACHINE LEARNING METHODOLOGY	242
<i>Lin Zhao, Wen Zhu, Shuai Yuan, Mustafa Akbulut</i>	
(511F) IMMERSIVE DIGITAL EXPERIENCES FOR PROCESS SAFETY DECISION MAKING	243
<i>Cheryl A. Bodnar, Matthew Cooper, Daniel D. Burkey, Daniel Anastasio</i>	
(525A) HYDROGEN EXPORT INDUSTRY IN AUSTRALIA: REQUIREMENTS OF FURTHER TECHNICAL RESEARCH	244
<i>Saif al Ghafri, Eric F. May</i>	
(525B) THE ROLE AND VALUE OF NEGATIVE EMISSIONS TECHNOLOGIES IN DECARBONISING THE ENERGY SYSTEM	245
<i>Habiba A. Daggash, Niall Mac Dowell, Clara F. Heuberger</i>	
(525C) ENVIRO-ECONOMIC ASSESSMENT OF ELECTROCHEMICAL ROUTES TO SYNGAS PRODUCTION	247
<i>Andrea Bernardi, Daniel F. Rodriguez-Vallejo, Gonzalo Guillén-Gosálbez, Benoit Chachuat</i>	
(525F) COMPARISON OF PROCESSES FOR PRODUCING OME₁ – AN EFFICIENT, ECONOMIC, AND SUSTAINABLE E-FUEL?	249
<i>Jannik Burre, Dominik Bongartz, Sarah Deutz, André Bardow, Alexander Mitsos</i>	
(561A) MODAL SWITCHING FOR CONTINUOUS SOLAR REFORMING	251
<i>Lucas Freiberg, Fuqiong Lei, Nick AuYeung</i>	
(561B) EXPERIMENTAL STUDY ON A SOLAR FALLING-FILM PHOTOCHEMICAL HYBRID SYSTEM FOR THE DECOLORIZATION OF AZO DYES	252
<i>Miao Chen, Hongxun Hao</i>	
(565A) RELATING LIGNIN SOURCE AND PROCESSING HISTORY TO SOLUBILITY IN DIVERSE SOLVENTS	253
<i>Ville E. Bécsy-Jakab, David Hodge</i>	
(565B) MECHANICAL PROPERTIES AND BULK FLOW CHARACTERIZATION OF LOBLOLLY PINE.	254
<i>Tiasha Bhattacharjee, Jordan Klinger, Tyler L. Westover, Aaron D. Wilson, Yidong Xia, Wencheng Jin, Hai Huang</i>	
(565C) PRODUCTION OF (BIO) BUTANOL BY MEANS OF A DESIGN FOR SUSTAINABILITY METHODOLOGY	255
<i>Jessica Sanchez-Ramirez, David Vargas-Lopez, Lilia Arteaga-Espinoza, Edgar Ramirez-Jimenez</i>	
(565D) METABOLIC RESPONSE OF SACCHAROMYCES CEREVISIAE AND CLOSTRIDIUM SACCHAROBUTYLICUM TO CARBONYL INHIBITION	256
<i>Yu Zhang, Maobing Tu</i>	
(565E) SITE-SPECIFIC COVALENT IMMOBILIZATION OF β-AGARASE ONTO MAGNETIC NANOPARTICLES FOR THE CONVERSION OF GELIDIUM AMANSII INTO BIOLOGICALLY-ACTIVE SUGARS	257
<i>Teklebrhan G. K. Weldemhret, Grace M. Nisola, Kristine Rose M. Ramos, Kris Niño G. Valdehuesa, Won-Keun Lee, Wook-Jin Chung</i>	
(565G) ROLE OF OXALATE IN METAL SEPARATION AND RECOVERY	258
<i>Ankit Verma, Rajkumar Kore, David R. Corbin, Mark B. Shiflett</i>	
(565H) EVALUATING VARIABILITY OF ENERGY CONSUMPTION AND CARBON EMISSIONS OF ACTIVATED CARBON PRODUCTION FROM WOOD USING ARTIFICIAL NEURAL NETWORK INTEGRATED PROCESS SIMULATIONS	259
<i>Mochen Liao, Steve Kelley, Yuan Yao</i>	
(745F) MULTI-PERIOD OPTIMIZATION APPROACH TO OCEAN THERMAL ENERGY CONVERSION SYSTEMS FOR CLOSED POWER CYCLE	260
<i>Ilse María Hernández-Romero, Fabricio Nápoles-Rivera, Luis Fabian Fuentes-Cortes, Antonio Flores-Tlacuahuac</i>	
(565J) WELL TO WAKE ANALYSIS OF SWITCHGRASS TO BUTANOL VIA CO-FERMENTATION OF SUGAR AND GAS WITH SUBSEQUENT CONVERSION TO JET FUEL	261
<i>Abhiram Pamula, David J. Lampert, Hasan K. Atiyeh</i>	

(565K) NOVEL APPROACH FOR WEIGHTING IN GEOGRAPHIC INFORMATION SYSTEM FOCUSED ON A MULTI-STAKEHOLDER PROBLEM- CASE FOR RESIDUAL BIOMASS PROCESSING SYSTEM	262
<i>José Ezequiel Santibañez Aguilar, Diego Fabián Lozano-García, Antonio Flores-Tlacuahuac, Francisco José Lozano</i>	
(565L) QUANTIFYING VARIABILITY IN LIFE CYCLE ENVIRONMENTAL FOOTPRINTS OF BIO-FUEL PRODUCED FROM FOREST RESIDUES IN THE UNITED STATES	263
<i>Kai Lan, Longwen Ou, Stephen S. Kelley, Sunkyu Park, Hoyoung Kwon, Hao Cai, Michael Wang, Yuan Yao</i>	
(197E) A COMPARATIVE STUDY ON CHEMICAL KINETIC MODELS FOR THE BIOMASS PYROLYSIS REACTIONS	264
<i>Karen A Izumida, Joao G. R. Poco, Ronaldo Santos</i>	
(587A) A COMPARISON OF TWO BIOCONVERSION PROCESSES FOR THE PRODUCTION OF COMMERCIALY IMPORTANT C4 STREAMS	265
<i>Chinmay Satam, Manuel Daub, Matthew J. Realf</i>	
(587B) AN INTEGRATED TOOL FOR RAPID ASSESSMENT OF CHEMICAL MANUFACTURING PROCESS EMISSIONS, TREATMENT AND SUSTAINABILITY PERFORMANCE	266
<i>Selorme Agbleze, Shuyun Li, Gerardo J. Ruiz-Mercado, Fernando V. Lima</i>	
(587C) EXPLORING THE POTENTIAL OF CHEMICAL LOOPING SYSTEMS TO PROVIDE ALTERNATIVE H₂ PRODUCTION SYSTEMS SOLUTIONS USING PROCESS SIMULATIONS AND TECHNO-ECONOMIC ANALYSIS	267
<i>Mandar Kathe, Melanie Gross, Fanhe Kong, Deven Baser, William K. Wang, Peter Sandvik, L.-S. Fan</i>	
(587D) ECONOMIC ANALYSIS OF BATTERY (NMC) CATHODE MATERIAL PRODUCTION IN FLAME SPRAY PROCESS WITH SUSTAINABLE SOLVENTS	268
<i>Guiyan Zang, Jianan Zhang, Siqi Xu, Yangchuan Xing</i>	
(587E) SOYBEAN OIL AS A BIO-SOLVENT TO SWEETEN SOUR NATURAL GAS	269
<i>Emma C. Brace, Abigail S. Engelberth</i>	
(587F) REDUCING ENERGY, SOLVENT, AND RESIN DEMAND OF SORPTION-BASED PROCESSES FOR CARBOXYLIC ACID RECOVERY	270
<i>Patrick Saboe, Lorenz Manker, Hanna Monroe, William Michener, Stefan Haugen, Gregg T. Beckham, Eric M. Karp</i>	
(587G) STORAGE OF EXCESS WIND ENERGY AND UTILIZATION OF WASTE FLUE GAS CO₂ THROUGH SUSTAINABLE METHANOL PRODUCTION	271
<i>Bjartur Máni Sigurðarson, Hsi Tsao, Ingrid Ammitzbøll Helgeland, Gürkan Sin</i>	
(587H) TOWARDS A NOVEL ENERGY FINANCIAL SECURITY: THE TEXAS A & M ENERGY SPOT PRICE INDEX	272
<i>Stefanos G. Baratsas, Alexander M. Nizjolek, Onur Onel, Logan R. Matthews, Christodoulos A. Floudas, Detlef R. Hallermann, Sorin M. Sorescu, Efstratios N. Pistikopoulos</i>	
(587I) TECHNO-ECONOMIC ANALYSIS OF SEPTIC TANK WASTE TREATMENT IN A CENTRALIZED HYDROTHERMAL TREATMENT FACILITY	273
<i>Kyle McGaughy, Akbar Saba, Nepu Saha, M.Toufiq Reza</i>	
(587J) TURNING A HAZARD INTO SUSTAINABLE REVENUE STREAMS: H₂S VALORIZATION IN OFFSHORE OIL AND GAS PRODUCTIONS THROUGH PROCESS INTENSIFICATION	274
<i>Abhimanyu Pudi, Vahid Shadravan, Louise la Cour Freiesleben, Adam Karcz, Martin Andersson, Seyed Soheil Mansouri</i>	
(587K) CRITICAL CO₂ CARNOT ENGINE FOR INDUSTRIAL WASTE HEAT RECOVERY AND UTILIZATION	275
<i>Sarah Makuc, Eldred Chimowitz</i>	
(587L) INDUSTRIAL SYMBIOSIS AT AN INDUSTRIAL PARK IN TRINIDAD AND TOBAGO: A FOCUS ON CARBON DIOXIDE	276
<i>Thérèse G. Lee Chan, David A. Janes</i>	
(622A) CARBON DIOXIDE REMOVAL FROM BIOGAS USING AMINE BASED SILICA SORBENTS	283
<i>Umadevi Gopalakrishnan, J. N. Kuhn, Babu Joseph</i>	
(622B) PROMOTED EFFECT OF D-MANNITOL ON THERMAL DEHYDROGENATION OF AMMONIA BORANE	284
<i>Geo-Jong Kim, Alisha Boone, Hyun-Tae Hwang</i>	
(622C) TECHNO-ECONOMIC FEASIBILITY OF THERMOCATALYTIC CONVERSION OF CO₂ INTO RENEWABLE NATURAL GAS (RNG)	285
<i>Sogol Mottaghi-Tabar, David Simakov</i>	

(622D) HIGH-PRESSURE HYDROGEN PRODUCTION FROM BIO-ETHANOL FEEDSTOCK WITH FIXED-BED CHEMICAL LOOPING	287
<i>Robert Zacharias, Sebastian Bock, Karin Malli, Viktor Hacker</i>	
(622E) BIOHYDROGEN PRODUCTION FROM GAMMA IRRADIATION DISINTEGRATED SEWAGE SLUDGE: EFFECT OF FERROUS IONS	289
<i>Yanan Yin</i>	
(624A) ROLLER BOTTLE METHOD TO GENERATE HIGH-SOLIDS, FERMENTABLE ENZYMATIC HYDROLYSATES AND RAPIDLY SCREEN PLANT MATERIALS	290
<i>Emily Burke, Meena Chandrasekar, Leela Joshi, Rebecca Ong</i>	
(624B) EFFECT OF CARBONYL INHIBITORS ON THE INTRACELLULAR METABOLISM IN MICROBIAL FERMENTATION	291
<i>Yu Zhang, Maobing Tu</i>	
(624C) SUPPLEMENTATION OF GROWTH MEDIUM WITH BIOCHAR ENHANCES PRODUCTION OF ACETONE-BUTANOL-ETHANOL FROM SWITCHGRASS BY CLOSTRIDIUM BEIJERINCKII	292
<i>Xiao Sun, Hasan K. Atiyeh, Yinka Adesanya, Hailin Zhang, Christopher Okonkwo, Thaddeus Ezeji</i>	
(624D) MASS BALANCE BASED SEMI-QUANTIFICATION OF ADIPIC ACID PRODUCING ENZYME CASCADE	293
<i>Nicholas S. Krueyer, Andreas S. Bommarius, Pamela Peralta-Yahya</i>	
(624E) PRODUCTION OF OPTICALLY PURE L-LACTIC ACID FROM PAPER SLUDGE BY BACILLUS COAGULANS	294
<i>Jing Li, Zhihua Jiang</i>	
(624F) DESIGN AND MODIFICATION OF THE UPSTREAM PROCESS IN A BIOREFINERY BY MODELING AND COMBINED UNCERTAINTY AND SENSITIVITY ANALYSIS	295
<i>Nikolaus I. Vollmer, Celina K. Yamakawa, Krist V. Gernaey, Solange I. Mussatto, Gürkan Sin</i>	
(637A) BUILDING MOMENTUM FOR SUSTAINABLE BEHAVIORS IN DEVELOPING REGIONS USING LOCALLY MANAGED DECENTRALIZED CIRCULAR ECONOMY PRINCIPLES	297
<i>Jeffrey R. Seay, Chandni Joshi</i>	
(637E) SUPPLY CHAIN OPTIMIZATION OF A LOCALLY-MANAGED DECENTRALIZED SOLUTION FOR CONVERSION OF WASTE PLASTIC TO FUEL IN DEVELOPING REGIONS	298
<i>Chandni Joshi, Jeffrey R. Seay</i>	
(637C) THERMOCHEMICAL ENERGY STORAGE INTEGRATION WITH THERMOELECTRIC POWER GENERATION	299
<i>Renuka Bhatt, Griffin S. Drake, Nick AuYeung</i>	
(637D) TECHNO-ECONOMIC ANALYSIS AND LIFE CYCLE ASSESSMENT OF DECENTRALIZED PREPROCESSING SYSTEM FOR FAST PYROLYSIS BIOREFINERIES WITH BLENDED FEEDSTOCKS IN THE SOUTHEASTERN USA	300
<i>Kai Lan, Longwen Ou, Sunkyu Park, Stephen S. Kelley, Burton C. English, Yuan Yao</i>	
(637B) AMMONIA DECOMPOSITION TO PRODUCE HYDROGEN USING CHEMICAL LOOPING APPROACHES: CONSIDERATIONS AND RESULTS FOR HIGH PRESSURE OPERATION	302
<i>Mandar Kathe, Deven Baser, Michael Petrecca, L.-S. Fan</i>	
(661A) SYNTHESIS AND PERFORMANCE EVALUATION OF NEW BLEACH ACTIVATORS	303
<i>Xue (Ida) Chen, Ziyuan Song, Jianjun Cheng, Steve King</i>	
(661B) SUSTAINABLE PRODUCT DESIGN: A LIFE-CYCLE APPROACH	304
<i>Xiang Zhang, Lei Zhang, Ka Y Fung, Bhavik R. Bakshi, Ka Ming Ng</i>	
(661C) COMBINED LIFE CYCLE ANALYSIS AND ENVIRONMENTAL RISK ASSESSMENT AS A TOOL TO EVALUATE THE CIRCULAR ECONOMY OF PLASTICS	305
<i>Rachael H. Rothman, Rukayya Ibrahim Muazu, Jonathan Howse, Lorraine Maltby</i>	
(661D) SUSTAINABILITY POTENTIAL OF MELAMINE NON-WOVEN PREPARED AS A HIGH-PERFORMANCE MATERIAL FOR THERMAL AND ACOUSTIC APPLICATIONS	306
<i>Annamaria Vujanovic, Lidija Cucek, Damjan Murn, Marjan Ješelnik, Christoph Kindler, Igor Mihelic, Simona Lavric</i>	
(661E) SHAPING TECHNOLOGY INNOVATION: A MULTISTAGE, MULTISCALE SUSTAINABILITY ASSESSMENT AND DECISION SUPPORT FRAMEWORK	307
<i>Raha Gerami, Yinlun Huang</i>	
(687A) A PROCESS SYSTEMS INTEGRATION TOOL TO BUILD ENERGY EFFICIENCIES IN BIOREFINERIES: SELECTION OF PROCESSES TO SAVE ENERGY AND BOOST COGENERATION	308
<i>Konstantinos A. Pyrgakis, Antonis C. Kokosis</i>	

(687B) GEOSPATIAL ASSESSMENT OF WASTE HEAT FROM UNCONVENTIONAL OIL AND GAS PRODUCTION	310
<i>Elmira Mohammadi Shamlou, Radisav Vidic, Vikas Khanna</i>	
(687C) NOVEL APPROACH FOR WEIGHTING IN GEOGRAPHIC INFORMATION SYSTEM FOCUSED ON A MULTI-STAKEHOLDER PROBLEM: CASE FOR RESIDUAL BIOMASS PROCESSING SYSTEM	311
<i>José Ezequiel Santibañez Aguilar, Diego Fabián Lozano-García, Antonio Flores-Tlacuahuac, Francisco José Lozano</i>	
(687D) LIQUID ORGANIC HYDROGEN CARRIER AND THEIR APPLICATION AT MODERATE TEMPERATURES	312
<i>Karsten Müller</i>	
(687E) PRODUCTION OF (BIO)BUTANOL BY MEANS OF A DESIGN FOR SUSTAINABILITY METHODOLOGY	313
<i>Jessica Sanchez-Ramirez, David Vargas-Lopez, Lilia Arteaga-Espinoza, Edgar Ramirez-Jimenez</i>	
(695A) MODELING THE IMPACT OF SOLAR TRACKING ON LIFE CYCLE GREENHOUSE GAS EMISSIONS FROM PHOTOVOLTAIC POWER	314
<i>Emre Gençer, Ian Miller, Sarah Torkamani, Francis O'Sullivan</i>	
(695B) LIFE CYCLE CARBON FOOTPRINT OF RENEWABLE ELECTRICITY GENERATION FROM ASPEN FOREST HARVEST IN WISCONSIN, USA	315
<i>Olumide Winjobi, Ulises R. Gracida-Alvarez, Michelle Cisz, Rod Chimner, Sigrid Resh, David Shonnard</i>	
(695C) MISCANTHUS SACCHARIFLORUS BIOENERGY PRODUCTION	316
<i>Peter Zhao, Benjamin J. Davis, Dave Chun, Amanda Simson</i>	
(695D) EVALUATING VARIABILITY OF ENERGY CONSUMPTION AND CARBON EMISSIONS OF ACTIVATED CARBON PRODUCTION FROM WOOD USING ARTIFICIAL NEURAL NETWORK INTEGRATED PROCESS SIMULATION	317
<i>Mochen Liao, Steve Kelley, Yuan Yao</i>	
(695E) UNDERSTANDING THE UNCERTAINTIES IN ENVIRONMENTAL LIFE CYCLE ENERGY AND CARBON ANALYSIS FOR BIOFUEL FROM FOREST RESIDUE IN THE UNITED STATES	319
<i>Kai Lan, Longwen Ou, Stephen S. Kelley, Sunkyu Park, Hoyoung Kwon, Hao Cai, Michael Wang, Yuan Yao</i>	
(695F) WELL-TO-WAKE ANALYSIS OF SWITCHGRASS TO BUTANOL VIA CO-FERMENTATION OF SUGAR AND GAS WITH SUBSEQUENT CONVERSION TO JET FUEL	321
<i>Abhiram Pamula, David J. Lampert, Hasan K. Atiyeh</i>	
(706A) SUSTAINABLE DMC PRODUCTION FROM CO₂ AND RENEWABLE AMMONIA AND METHANOL	322
<i>Antonio Sánchez, Luis M. Gil, Mariano Martín</i>	
(706B) OPPORTUNITY COST-BASED SYSTEMATIC PROCESS INTENSIFICATION UNDER MULTIPLE OBJECTIVES	324
<i>Akhilesh Gandhi, Salih E. Demirel, Jianping Li, M. M. Faruque Hasan</i>	
(706C) DYNAMIC OPTIMIZATION TO LEVERAGE FLEXIBLE HEAT INTEGRATION WITHIN A HYBRID CSP PLANT	326
<i>Kevin Ellingwood, Kody M. Powell</i>	
(706E) THERMODYNAMIC ASSESSMENT OF INNOVATIVE ROUTES FOR ACRYLIC ACID PRODUCTION FROM CARBON DIOXIDE	327
<i>Jonas Laedson Marinho da Silva Santos, Alessandra de Carvalho Reis, Antonio Esio Bresciani, Rita M. B. Alves</i>	
(706D) DESIGNING CLIMATE-RESILIENT CHEMICAL PROCESSES AND SUPPLY CHAINS	328
<i>Kyuha Lee, Sami Khanal, Bhavik R. Bakshi</i>	
(706F) QUANTIFICATION OF PHYSICAL AND MONETARY BENEFITS OF FOREST ECOSYSTEM: A CASE STUDY FOR NET POSITIVE IMPACT MANUFACTURING	330
<i>Utkarsh Shah, Bhavik R. Bakshi</i>	
(724A) INTEGRATED DESIGN, ANALYSIS AND OPTIMIZATION OF CHEMICAL PRODUCTION FROM BIOMASS FEEDSTOCKS CONSIDERING PROCESS AND MARKET UNCERTAINTY	332
<i>Abhay Athaley, Marianthi Ierapetritou</i>	
(724B) MULTI-STREAM INTEGRATED BIOREFINERY (MIBR) FOR SUSTAINABLE AND COST-EFFECTIVE BIOFUELS AND BIOPRODUCTS	334
<i>Joshua Yuan</i>	
(724C) VALORIZATION OF THE ORGANIC FRACTION OF MUNICIPAL SOLID WASTE: IMPROVING PROCESS EFFICIENCY VIA BIOMASS REFINING AND IN SITU ELECTROCHEMICAL SEPARATION OF BIO BASED PRODUCTS	335
<i>Chrysanthi Pateraki, Eleni Stylianou, Korneel Rabaey, Apostolis Koutinas</i>	

(724D) CHARACTERIZATION OF NEW SYNGAS-FERMENTING ACETOGENS FOR BIOFUEL PRODUCTION	336
<i>Xiao Sun, Hasan K. Atiyeh, Raymond L. Huhnke, Ralph S. Tanner</i>	
(724E) MICROBIAL FUEL CELLS FOR PRODUCTION OF BIOPOWER AND BIOPRODUCTS	337
<i>Jacob LeBlanc, Emmanuel Revellame, Gholam Massiha, Dhan Lord Fortela, Wayne Sharp, Shelton Houston</i>	
(724F) CATALYTIC STEAM GASIFICATION OF BIOMASS FOR HYDROGEN PRODUCTION USING PROMOTED NI ON G-ALUMINA CATALYSTS WITH LOW LOADS OF METALS: CATALYST STABILITY AND TAR REDUCTION	338
<i>Benito Serrano Rosales, Daniel Gibran Gonzalez Castañeda Sr., Adriana Sanchez, Ivan Cruz Reyes, Alan Ruben Calzada Hernandez Sr., Hugo de Lasa, Mario Alberto Gomez Gallardo Jr.</i>	
(733A) IMPROVING SUSTAINABILITY OF CNT/POLYMER COMPOSITES: TRACKING CNTS RELEASE	341
<i>Alexander Orlov, Yue Zhao, David Goodwin, Li Piin Sung, Girish Ramakrishnan, Elijah Petersen</i>	
(733B) GREEN SOLVENT FOR CONJUGATION OF IRON NANOPARTICLES (Fe₃O₄) AND GRAPHENE OXIDE (GO) NANOSHEETS TO REMOVE WATER CONTAMINANTS	342
<i>Novin Mehrabi, M.Toufiq Reza, Nirupam Aich</i>	
(733C) CONTINUOUS IN SITU SENSING OF MARINE POLLUTANTS USING SURFACE ENHANCED RAMAN SPECTROSCOPY (SERS)	343
<i>Timo Küster, Geoffrey D. Bothun</i>	
(733D) ELECTROCATALYSTS FOR THE SIMULTANEOUS REMOVAL OF NITRATE AND AMMONIA FROM WASTEWATER	344
<i>Mohiedin Bagheri Hariri, Gerardine G. Botte</i>	
(733E) BIOGENIC METALLIC NANOPARTICLES. FROM MICRO-BIOFACTORIES TO A NANOMETRIC TROJAN HORSE APPROACH	345
<i>David Medina, Junjiang Chen, Thomas J. Webster</i>	
(739A) SUPERSTRUCTURE OPTIMIZATION APPROACH FOR THE OPTIMIZATION OF BIOGAS UPGRADING INTO BIOMETHANE	346
<i>Edgar Martín-Hernández, Lidia S. Guerras, Mariano Martín</i>	
(739B) ANALYSIS, DESIGN AND OPERATION OF COMPLEX AGRICULTURE BASED PROCESS SYSTEMS BY PROGRAMMABLE STRUCTURES	348
<i>Monika Varga, Bela Csukas</i>	
(739C) OPTIMAL PROCESS DESIGN FOR A SUSTAINABLE METHANOL PRODUCTION USING RENEWABLE ENERGIES BY APPLYING THE FLUXMAX APPROACH	349
<i>Dominik Schack, Georg S. Liesche, Kai Sundmacher</i>	
(739D) A GENERAL EVALUATION FRAMEWORK FOR DIRECT NONOXIDATIVE CONVERSION STRATEGIES OF METHANE TO AROMATICS	351
<i>Kefeng Huang, Christos T. Maravelias</i>	
(739E) MATHEMATICAL OPTIMIZATION OF MEMBRANE-FREE DESALINATION SYSTEMS THAT UTILIZE LOW-GRADE HEAT	352
<i>Alejandro Garcíadiago, Tengfei Luo, Alexander W. Dowling</i>	
(739G) SPATIALLY-EXPLICIT SITE DESIGN FOR SUSTAINABLE MANUFACTURING WITH ECOSYSTEMS AS UNIT OPERATIONS	354
<i>Michael Charles, Bhavik R. Bakshi</i>	
(739H) A NOVEL BACK-OFF ALGORITHM FOR INTEGRATING DYNAMIC OPTIMIZATION AND SCHEDULING OF BATCH PROCESSES UNDER UNCERTAINTY	355
<i>Yael Izamal Valdez-Navarro, Luis A. Ricardez-Sandoval</i>	
(745A) OPTIMAL START-UP POLICIES FOR A NANOFLUID BASED SOLAR THERMAL POWER PLANT	357
<i>Angel Omar López-Bautista, Antonio Flores-Tlacuahuac, K. D. P. Nigam</i>	
(745B) TWO-CELL PHOTOELECTROCHEMICAL WATER SPLITTING PROTOTYPE DEMONSTRATION SYSTEM	358
<i>Avigail Landman, Avner Rothschild, Gideon S. Grader, Rawan Halabi, Gennady E. Shter, Hen Dotan</i>	
(745D) IRON-NICKEL ALLOY FILMS FOR NEUTRAL ELECTROLYTE ELECTROCHEMICAL REACTIONS	359
<i>Sergio I. Perez Bakovic, Prashant Acharya, Lauren F. Greenlee</i>	
(745E) FRESH LOOK ON WIND POWER GENERATION-UPGRADED, 25/02/2019	360
<i>David Judbarovski</i>	
(752A) A DYNAMIC GENOME-SCALE METABOLIC NETWORK MODEL FOR A NOVEL METHANOTROPH-CYANOBACTERIA COCULTURE	361
<i>Kiumars Badr, Q. Peter He, Jin Wang</i>	

(752B) KINETICS AND REACTOR DESIGN FOR PYROLYTIC TREATMENT OF PETROLEUM-CONTAMINATED SOILS	363
<i>Ye Gao, Kyriacos Zygourakis</i>	
(752C) WELL PLACEMENT OPTIMISATION IN A HETEROGENEOUS PETROLEUM RESERVOIR WITH GEOLOGICAL UNCERTAINTY	366
<i>Emmanuel I. Epelle, Dimitrios I. Gerogiorgis</i>	
(752D) MODELING OF THERMAL CRACKING OF NATURAL GAS LIQUIDS: OPTIMIZATION WITH SUPPORT VECTOR MACHINE-BASED CONSTRAINT HANDLING SCHEME FOR STIFF ODES	368
<i>Burcu Beykal, Melis Onel, Onur Onel, Efstratios N. Pistikopoulos</i>	
(752E) TOWARDS A NOVEL ENERGY PRICE PREDICTIVE FRAMEWORK: THE TEXAS A & M ENERGY PRICE INDEX	370
<i>Stefanos G. Baratsas, Alexander M. Niziolek, Onur Onel, Logan R. Matthews, Christodoulos A. Floudas, Detlef R. Hallermann, Sorin M. Sorescu, Efstratios N. Pistikopoulos</i>	
(752F) INTENSIFICATION OF BIOREFINERY OPERATIONS USING BUILDING BLOCKS.....	372
<i>Srinikhita Vankadari, Salih E. Demirel, Jianping Li, M. M. Faruque Hasan</i>	
(752G) HYPERBOLICITY OF HEAT TRANSPORT PROCESSES.....	374
<i>Guilherme Ozorio Cassol Sr., Stevan Dubljevic</i>	
(752H) CONSTRUCTING EFFICIENT SURROGATE MODELS FOR HIGH-DIMENSIONAL FIRST PRINCIPLES SYSTEMS UNDER UNCERTAINTY	375
<i>George Makrygiorgos, Giovanni Maria Maggioni, Ali Mesbah</i>	
Author Index	