

Forest and Plant Bioproducts Division 2020

Held at the 2020 AIChE Annual Meeting

Online
16 - 20 November 2020

ISBN: 978-1-7138-2311-7

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© (2020) by AIChE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

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

(19A) CATALYTIC REACTION PATHWAYS AND PROCESS SYNTHESIS FOR BIOMASS CONVERSION TO HIGH-VALUE CHEMICALS FOR ORGANIC DYE AND POLYMER APPLICATIONS.....	1
<i>Hochan Chang, Ishan Bajaj, George W. Huber, Christos T. Maravelias, James A. Dumesic</i>	
(19B) SUPERACID POLYMER CATALYSTS FOR HYDROXYMETHYLFURFURAL PRODUCTION.....	2
<i>Ibeh S. Omodolor, Sarah A. Walz, Subhash Kalidindi, Vimantha Bamunuarachchi, Ravikumar Gogar, Sridhar Viamajala, Dr. Maria R. Coleman, Ana Alba-Rubio</i>	
(19C) RATES OF LEVOGLUCOSANOL HYDROGENOLYSIS OVER BRØNSTED AND LEWIS ACID SITES ON PLATINUM SILICA-ALUMINA CATALYSTS SYNTHESIZED BY ATOMIC LAYER DEPOSITION.....	3
<i>Siddarth Krishna, Lifeng Zhang, Ive Hermans, George W. Huber, Thomas F. Kuech, James A. Dumesic</i>	
(19D) TUNING PERFORMANCE OF KETONE PARTIAL OXIDATION OVER SUPPORTED VOX AND ITS UTILIZATION: SELECTIVE MALEIC ANHYDRIDE PRODUCTION FROM LEVULINIC ACID OXIDATIVE SCISSION.....	4
<i>Ran Zhu, Anargyros Chatzidimitriou, Bowei Liu, Siwen Wang, Jesse Bond</i>	
(19E) SELECTIVE REDUCTION OF CARBOXYLIC ACIDS TO ALDEHYDES OVER PROMOTED MOO ₃ CATALYST.....	5
<i>Laura A. Gomez, Mallikharjuna R. Komarneni, Jennifer A. Gutierrez, Steven Crossley</i>	
(19F) NOBLE METAL CATALYZED KETONE HYDROGENATION WITH MICROKINETIC MODELING.....	6
<i>Xin Gao, Andreas Heyden, Omar Abdelrahman, Jesse Bond</i>	
(19H) BIFUNCTIONAL RU@N-DOPED MESOPOROUS CARBON CATALYSTS FOR CATALYTIC TRANSFER HYDROGENOLYSIS OF BIO-DERIVED POLYOLS.....	7
<i>Wenxiang Zhang, Mingyu Zhao, Quanxing Zhang, Yurou Song, Jinyao Wang, Chaohe Yang, Xin Jin</i>	
(38A) ENHANCED HARDNESS AND STRENGTH OF ZERO-COALESCENT WATERBORNE ACRYLIC COATINGS WITH CELLULOSE NANOCRYSTALS.....	8
<i>Ezgi M. Dogan-Guner, Stan Brownell, Gregory Schueneman, Meisha L. Shofner, J. Carson Meredith</i>	
(38B) A STUDY ON CHEMISTRY AND FRACTIONATION OF GUAYULE RESIN AS A SOURCE OF SECONDARY METABOLITES AND ENERGY.....	9
<i>Mostafa Dehghanizadeh, Catherine E. Brewer</i>	
(38D) SIMULTANEOUS PLANNING, DESIGN AND OPERATION OF MULTI-PRODUCT JATROPHA VALUE CHAINS USING MULTI-OBJECTIVE SPATIO-TEMPORAL OPTIMISATION.....	10
<i>Stephen S. Doliente, Sheila Samsatli</i>	
(38F) EXTRUSION 3D PRINTING OF IMPACT MODIFIED NYLON 6 BLENDS: A STUDY ON THE EFFECT OF PRINTING PARAMETERS ON PERFORMANCE.....	12
<i>Akhilesh K. Pal, Gareth Chapman, Manju Misra, Amar K. Mohanty</i>	

(38G) ECO-FRIENDLY HYBRID BIOCOMPOSITES OF NATURAL RUBBER, CARBON BLACK AND DRIED DISTILLERS' GRAIN WITH SOLUBLES (DDGS) DERIVED BIOCARBON	13
<i>Drupitha M. Paleri, Arturo Rodriguez-Urbe, Manju Misra, Amar K. Mohanty</i>	
(50A) A TUNEABLE PROCESS FOR THE CONVERSION OF LIGNIN TO JET FUEL OVER MOLYBDENUM CARBIDE CATALYSTS.....	14
<i>Michael Stone, William P. Mounfield III, Ana R. C. Morais, Eric Anderson, Gregg T. Beckham, Yuriy Román-Leshkov</i>	
(50C) INVESTIGATING THE ROLE OF SOLID ACID SITES IN SURFACE REACTIONS OF A MODEL SUGAR	15
<i>Sean Najmi, Andrew Medford, Carsten Sievers</i>	
(50D) MECHANISM OF POLYOL HYDRODEOXYGENATION ON MOLYBDENUM CARBIDE SUPPORTED COPPER CATALYST: A COMBINED DFT AND MICROKINETIC MODELING STUDY	16
<i>Kyung-Eun You, Salai C. Ammal, Zhexi Lin, Weiming Wan, Jingguang G. Chen, Andreas Heyden</i>	
(50E) STRUCTURE-SENSITIVE CATALYTIC GLYCEROL OXIDATION ON LATE TRANSITION METALS	17
<i>Geet Gupta, Luke Roling</i>	
(50G) SELECTIVE HYDRODEOXYGENATION OF 1,4-ANHYDROERYTHRITOL TO TETRAHYDROFURAN OVER MOOX-PD/TIO2 CATALYSTS.....	18
<i>Sandra Albarracín-Suazo, Blake Macqueen, Jochen Lauterbach, Yomaira J. Pagan-Torres</i>	
(50H) LOW-TEMPERATURE HYDRODEOXYGENATION BY POLYOXOMETALATE-SUPPORTED PD1 SINGLE-ATOM CATALYSTS	19
<i>Max J. Hülsey, Geng Sun, Philippe Sautet, Ning Yan</i>	
(272A) TEA OF THE PRODUCTION OF ADVANCED MARINE BIOFUELS THROUGH HTL OF SEWAGE SLUDGE.....	20
<i>Eliana Lozano, Thomas H. Pedersen, Lasse Rosendahl</i>	
(272B) MONOMER RECOVERY OPTIMIZATION FROM HYDROTHERMAL PROCESSING OF CONDENSATION POLYMERS AT SUBCRITICAL AND SUPERCRITICAL CONDITIONS.....	21
<i>Antonio Jaime, Thomas H. Pedersen</i>	
(272C) HTL AND HTL UPGRADING PROCESS FOR A VARIETY OF WET WASTE FEEDSTOCKS.....	22
<i>Michael R. Thorson, Justin M. Billing, Andrew J. Schmidt, Daniel Santosa, Richard T. Hallen, Igor Kutnyakov</i>	
(272D) SOLVOTHERMAL CONVERSION: CRUDE OIL PRODUCTION FROM WASTE PLASTICS	23
<i>Nepu Saha, M. Toufiq Reza</i>	
(272E) UNDERSTANDING MOLECULAR FRACTIONATION OF FOOD WASTE HYDROTHERMAL BIO-CRUDE PRODUCTS	24
<i>Heather O. Leclerc, Geoffrey Tompsett, Feng Chang, Huan Chen, Amy M. McKenna, Michael T. Timko, Andrew R Teixeira</i>	

(272F) HIGH TEMPERATURE ELECTROLYSIS OF WATER FOR HYDROGEN PRODUCTION AND SIMULTANEOUS HYDROTREATING OF DISSOLVED ORGANICS IN HTL-AQUEOUS PHASE – THERMODYNAMIC ANALYSIS	25
<i>Meshack A Audu, Geoffrey Tompsett, Michael T. Timko</i>	
(289A) HOMOGENOUS HYDROLYSIS OF CELLULOSE CATALYZED BY SOLID ACID IN INORGANIC IONIC LIQUID	26
<i>Tao Wu, Ning Li, Sheng-Li Chen, Xuejun Pan</i>	
(289B) DISC MILLING OF FERMENTED CORN STOVER TO INCREASE ITS ACCESSIBILITY TO FERMENTATION BY CLOSTRIDIUM THERMOCELLUM.....	27
<i>Sanchari Ghosh, Evert K. Holwerda, Lee R. Lynd</i>	
(289C) ENZYME ADSORPTION EQUILIBRIA AND KINETICS FOR RECYCLING - EXPERIMENTAL AND MODELING STUDIES	28
<i>Surya Jampana, Linjing Jia, Deepak Kumar, Bandaru V. Ramarao</i>	
(289D) NOVEL DEEP EUTECTIC SOLVENT FOR NATIVE LIGNIN EXTRACTION THROUGH HETEROCYCLE INDUCED INTERACTION	29
<i>Kuan-Ting Lin, Ruoshui Ma, Xiao Zhang</i>	
(289E) PRODUCTION OF POLYHYDROXYALKANOATES FROM BREWER'S SPENT GRAINS: BIODEGRADABLE BIOPLASTICS FROM AGRO-INDUSTRIAL WASTE.....	30
<i>Christopher M. Thomas, Ryan A. Scheel, Christopher Nomura, Bandaru V. Ramarao, Deepak Kumar</i>	
(289F) VALORIZATION OF PAPER SLUDGE TO FURAN CHEMICALS.....	31
<i>Hyeonji Park, David Cruz Rios, David Johnson, Hasan Jameel, Sunkyu Park</i>	
(357A) CHARACTERIZATION OF FEEDSTOCK PREPROCESSING OF ENERGYCANE AND LIPIDCANE FOR EFFECTIVE CONVERSION OF CELLULOSIC BIO-OIL INTO HIGH-QUALITY BIODIESEL.....	32
<i>Shraddha Maitra, Fredy Altpeter, Stephen P. Long, Vijay Singh</i>	
(357B) THE COMPOSITION OF INDUSTRIAL HEMP AND ITS ECONOMIC POTENTIAL AS A RAW MATERIAL FOR ETHANOL AND BIODIESEL CO-PRODUCTION	34
<i>Mothi Bharath Viswanathan, Ming-Hsun Cheng, Kiyoul Park, Edgar Cahoon, Thomas Clemente, Ismail Dweikat, Vijay Singh</i>	
(357C) ALGINATE EXTRACTION FROM SARGASSUM SEAWEED IN THE CARIBBEAN REGION: OPTIMIZATION USING RESPONSE SURFACE METHODOLOGY.....	37
<i>Akeem Mohammed, Arianne Rivers, Keeran Ward, David C Stuckey</i>	
(357D) DEVELOPING A HIGH-THROUGHPUT REDUCTIVE CATALYTIC FRACTIONATION METHOD FOR LIGNIN CHARACTERIZATION IN THE GENOME WIDE ASSOCIATION STUDY OF POPLAR.....	38
<i>Michael Stone, David G. Brandner, Ivan Kumaniaev, William P. Mounfield III, Renee Happs, Richard J. Giannone, Robert L. Hettich, Daniel Jacobson, Wellington Muchero, Gerald A. Tuskan, Gregg T. Beckham, Yuriy Román-Leshkov</i>	
(357E) EFFECTS OF BIOMASS ASH AND ASH-FORMING ELEMENTS ON BIOMASS PRETREATMENT AND ENZYMATIC HYDROLYSIS	39
<i>Fitria Fitria, Jian Liu, Bin Yang</i>	

(357F) SELECTIVE SEPARATION AND RECOVERY OF IONIC LIQUIDS (ILS) AS PRETREATMENT SOLVENTS FOR AN EFFECTIVE RECYCLING APPROACH	40
<i>Ezinne Achinivu, Mood Mohan, Nawa Baral, Corinne D. Scown, Anthe George, Blake A. Simmons, Seema Singh, John M. Gladden</i>	
(357G) THE WETLAND BIOREFINERY CONCEPT	41
<i>Anton E. J. Firth, Paul Fennell, Jason P. Hallett</i>	
(357H) EXTRACTION AND CHARACTERIZATION OF SODIUM ALGINATE EXTRACT FROM SARGASSUM NATANS	43
<i>Akeem Mohammed, Rakesh Bissoon, Elisheba Bajnath, Kristy Mohammed, Therese Lee, Meera Bissram, Nigel John, Nigel Jalsa, Koon-Yang Lee, Keeran Ward</i>	
(357I) EXTRACTION OF LIGNIN FROM LIGNOCELLULOSIC BIOMASS BY FORMIC ACID	44
<i>Xiao-Yu Li, Mingfei Li, David Hodge</i>	
(104A) ADVENTURES IN AUTOTHERMAL PROCESSING	45
<i>Robert C. Brown</i>	
(104B) NEW MONOMERS FROM BIOMASS FOR THE POLYMER INDUSTRY	46
<i>George W. Huber, Siddarth Krishna, Hochan Chang, Jiayue He, Mario De Bruyn, James A. Dumesic</i>	
(104C) RECYCLING CARBON- INNOVATING FOR A CARBON SMART FUTURE.....	47
<i>Jennifer Holmgren</i>	
(104D) GREEN RESEARCH AND THE CIRCLE OF LIFE.....	48
<i>Arthur J. Ragauskas</i>	
(111A) TRACKING THE ELEMENTARY KINETICS AND DYNAMIC EVOLUTION OF MOLECULAR STRUCTURES DURING BIOMASS PYROLYSIS	49
<i>Ziwei Wang, Matthew Neurock</i>	
(111B) EVOLUTION OF CELLULOSE STRUCTURE THROUGHOUT BIOMASS DECONSTRUCTION IN GAMMA-VALEROLACTONE	50
<i>Elise B. Gilcher, Theodore Walker, Nathaniel Kuch, Catherine F. M. Clewett, Brian G. Fox, Thatcher W. Root, James A. Dumesic</i>	
(111C) THEORETICAL ANALYSIS OF THE PERIODIC TRENDS IN THE ALDOL CONDENSATION OF ACETALDEHYDE OVER ISOLATED METAL SITES	51
<i>Branden Leonhardt, Alexis T. Bell</i>	
(111D) ALDOL CONDENSATION OF CYCLOPENTANONE AND ACETONE ON MGO: A MECHANISM STUDY BY DFT	52
<i>Yu Yan, Duong T. Ngo, Daniel E. Resasco, Bin Wang</i>	
(111E) COMPUTATIONAL ANALYSIS OF KINETICS OF KETONIZATION AND ALDOL CONDENSATION ON ISOLATED ZIRCONIUM SITES.....	53
<i>Lance A. Bettinson, Shylesh Sankaranarayananapilla, Alexis T. Bell, Martin Head-Gordon</i>	
(111F) OXYGENATE REACTIONS OVER PDCU/PDAG CATALYST: ROLE OF SYNERGISTIC EFFECTS	54
<i>Tanmayi Bathena, Truc Phung, Scott Ryan Svadlenak, Konstantinos Goulas</i>	

(111G) COMPUTATIONAL INSIGHTS INTO THE DIRECT ACYLATION OF 2-METHYLFURAN WITH ACETIC ACID OVER PHOSPHOTUNGSTIC ACID AND H-BEA ZEOLITE	55
<i>Tso-Hsuan Chen, Stavros Caratzoulas, Omar Abdelrahman, Dionisios G. Vlachos</i>	
(111H) UNDERSTANDING SOLVENT AND PRETREATMENT EFFECTS ON THE SURFACE CHEMISTRY OF SMALL OXYGENATES ON MOLYBDENUM TRIOXIDE.....	56
<i>Sean Najmi, Mathew Rasmussen, Chaoyi Chang, Giada Innocenti, Eli Stavitski, James Medlin, Andrew Medford, Carsten Sievers</i>	
(397A) KINETIC ANALYSIS OF AQUATIC BIOMASS-DUCKWEED PYROLYSIS USING A HYBRID SCHEME OF ISOCONVERSIONAL METHODS, DAEM, AND A PARALLEL-REACTION MECHANISM	57
<i>Hui Liu, Sajjad Ahmad, Hesham Alhumade, Ali Elkamel, Shervin Sammak</i>	
(397D) THE EFFECT OF WOOD COMPOSITION AND SUPERCRITICAL CO ₂ EXTRACTION ON FAST PYROLYSIS PRODUCTS.....	58
<i>Anna Trubetskaya, Kaan Gürel, Feyza Kazanc, Duarte Magalhaes, Jacek Grams, Andrew Hunt, Thomas Attard, Vitaliy Budarin</i>	
(397E) FAST PYROLYSIS OF TORREFIED BIOMASS AND LIGNOCELLULOSIC COMPOUNDS FROM FRACTIONATED OLIVE STONES	59
<i>Anna Trubetskaya, Kaan Gürel, Feyza Kazanc, Italo Pissano, Duarte Magalhaes, Paul Christakopoulos, Leonidas Matsakas</i>	
(636A) EXTENDING THE ALPHA PROCESS TO HYBRID POPLAR AND CORN STOVER: PRODUCING LIGNIN FRACTIONS OF CONTROLLED MOLECULAR WEIGHT AND PURITY	60
<i>Graham W. Tindall, Villo E. Bécsy-Jakab, David Hodge, Mark Thies</i>	
(636C) DEVELOPING LIGNIN-BASED POLYELECTROLYTES FOR APPLICATIONS AS ECO-FRIENDLY FLOCCULANTS	61
<i>James D. Sheehan, Elvis Ebikade, Dionisios G. Vlachos, Raul F. Lobo</i>	
(636D) NOVEL LIGNIN-PROPICONAZOLE NANOCAPSULES ARE AN EFFECTIVE BIO-BASED WOOD PRESERVATIVE	63
<i>Raisa Carmen Andeme Ela</i>	
(636E) NEW SUPERTOUGH BIOCOMPOSITES FROM POLY(LACTIC ACID) AND LIGNIN: FABRICATION AND PERFORMANCE EVALUATION.....	64
<i>Mohamed Abdelwahab, Sinto Jacob, Manju Misra, Amar K. Mohanty</i>	
(665A) DEVELOPING A STABLE CATALYST FOR MODEL WASTE OIL UPGRADING IN SUPERCRITICAL WATER	65
<i>Jeffrey Page, Joseph Esposito, Douglas Theberge, Philip Smolitsky, Azadeh Zaker, Sanket Sabnis, Wei Fan, Michael T. Timko</i>	
(665B) GENETIC MECHANISMS ENABLING FAST BIOMASS DECOMPOSITION IN BROWN ROT WOOD-DECAYING FUNGI.....	66
<i>Jiwei Zhang, David Hibbert, Igor Grigoriev, Jonathan S Schilling</i>	
(665C) RENEWABLE ACTIVATED CARBONS DERIVED FROM FOOD WASTE: APPLICATION ON PHENOL ADSORPTION	67
<i>Lei Yu, Julia A. Valla</i>	

(665D) CONTINUOUS HYDROTREATMENT OF BIOCRUDE OBTAINED FROM HYDROTHERMAL LIQUEFACTION OF SEWAGE SLUDGE: SYNERGISTIC EFFECT OF NITROGEN AND ORGANOMETALLICS.....	68
<i>Muhammad Salman Haider, Daniele Castello, Thomas H. Pedersen, Lasse Rosendahl</i>	
(665E) CATALYTIC HYDROTHERMAL LIQUEFACTION OF WET MUNICIPAL SOLID WASTE.....	69
<i>Komeil Kohansal, Lasse Rosendahl, Thomas H. Pedersen</i>	
(175A) ENABLING SELECTIVE CATALYTIC CONVERSION OF BIOMASS-DERIVED SATURATED FURANS TO C4-C5 DIENES.....	70
<i>Gaurav Kumar, Limin Ren, Sha Li, Anatoliy Kuznetsov, Omar Abdelrahman, Michael Tsapatsis, Paul Dauenhauer</i>	
(175B) THEORETICAL INSIGHTS INTO THE SELECTIVE CONVERSION OF TETRAHYDROFURAN TO 1,3-BUTADIENE ON ZRO ₂	71
<i>Sai Praneet Batchu, Yichen Ji, Stavros Caratzoulas, Raymond J. Gorte, Dionisios G. Vlachos</i>	
(175C) ACTIVE AND SELECTIVE ZRO ₂ BASED CATALYSTS FOR DIENE MONOMER PRODUCTION FROM BIOMASS.	72
<i>Yichen Ji, Ajibola Lawal, Raymond J. Gorte, Omar Abdelrahman</i>	
(175D) THE CASCADE REACTION OF ETHANOL TO BUTADIENE OVER SILICA-SUPPORTED SILVER-ZIRCONIA CATALYSTS.....	73
<i>Naomi Miyake, Gordon Brezicki, Robert J. Davis</i>	
(175E) ETHANOL CONVERSION TO BUTADIENE OVER ISOLATED ZINC AND YTTRIUM SITES IN DEALUMINATED BETA ZEOLITE.....	74
<i>Liang Qi, Alexis T. Bell</i>	
(175G) KINETIC AND MECHANISM OF ACETONE CONVERSION TO ISOBUTENE OVER HF/SILICALITE-1 AND HF/SIO ₂	75
<i>Yanfei Zhang, Alexis T. Bell</i>	
(175H) VAPOR PHASE ETHANOL SELECTIVE OXIDATION TO ACETALDEHYDE AND ACETIC ACID ON GOLD CATALYSTS.....	76
<i>Priya D. Srinivasan, Hongda Zhu, Hashim A. Alzahrani, Juan J. Bravo-Suárez</i>	
(400A) SEPARATION OF FREE FATTY ACIDS FROM CRUDE OIL/LIPID.....	77
<i>Ramkrishna Singh, Vijay Singh</i>	
(400B) TUNABLE AND ROBUST GRAPHENE OXIDE MEMBRANES FOR FRACTIONATION AND RECYCLE OF KRAFT BLACK LIQUOR COMPONENTS.....	78
<i>Zhongzhen Wang, Chen Ma, Scott A. Sinquefield, Meisha L. Shofner, Sankar Nair</i>	
(400C) THERMODYNAMICS OF LIGNIN DIMERS AND β-CYCLODEXTRIN COMPLEXES.....	79
<i>Mahsa Moradipour, Xinjie Tong, Poorya Kamali, Bert C. Lynn, Dorel Moldovan, Stephen E. Rankin, Barbara L. Knutson</i>	
(400D) UNDERSTANDING THE TRANSPORT AND REACTION KINETICS IN PLANT BIOMASS PRETREATMENT PROCESSES USING RAMAN SPECTROSCOPY IMAGES AND MODELING.....	80
<i>Sahana Ramanna, Bandaru V. Ramarao, Feng Xu, Shri Ramaswamy</i>	
(400E) DEPTH FILTRATION OF LIGNIN AND PROTEIN SUSPENSIONS IN FIBROUS MEDIA WITH STIMULUS RESPONSIVE SURFACES.....	81
<i>Thomas D. Stuart, Bandaru V. Ramarao</i>	

(400F) PROCESS INTENSIFICATION IN BIOFUELS MANUFACTURING INTEGRATING MEMBRANE SOLVENT EXTRACTION (MSE) WITH BIOPROCESSING AND CONVENTIONAL DISTILLATION SYSTEMS	82
<i>Edward Joice, Sabrina Hang, Heidi Le, Lauren Smith, Hua-Jiang Huang, Dan Fanselow, Shri Ramaswamy</i>	
(455B) DEMETHYLATION OF LIGNIN IN INORGANIC IONIC LIQUID.....	83
<i>Zheng Li, Xiao Zhang, Xuejun Pan</i>	
(455C) COMPUTATIONAL KINETIC ANALYSIS OF THE THERMAL DEGRADATION OF A MODEL LIGNIN TETRAMER BY DENSITY FUNCTIONAL THEORY	84
<i>Ross Houston, Nourredine Aboulmoumine</i>	
(455D) THEORETICAL STUDIES ON THE BOND DISSOCIATION ENTHALPY VALUES FOR β -O-4 BOND CLEAVAGE IN MODEL LIGNIN OLIGOMERS UNDER PYROLYSIS CONDITIONS.....	85
<i>Tanzina Azad, Jonathan Schuler, Hazl Faith Q. Torres, Maria Auad, Thomas Elder, Andrew Adamczyk</i>	
(455E) ALKALINE OXIDATION OF LIGNIN USING REVERSIBLY-SOLUBLE BASES.....	86
<i>Jacob S. Kruger, Daniel Wilcox, David G. Brandner, Gregg T. Beckham</i>	
(455F) MODULATING THE STRUCTURE OF ALDEHYDE-STABILIZED LIGNIN TO ENHANCE ITS SOLUBILITY AND HYDROGENOLYSIS.....	87
<i>Graham R. Dick, Jeremy S. Luterbacher</i>	
(507A) USING NATURE BUILDING BLOCKS FOR ADVANCED NANOMANUFACTURING	89
<i>Benedetto Marelli</i>	
(507B) UNDERSTANDING GLYCOLALDEHYDE FORMATION FROM VARIOUS MONOSACCHARIDES	90
<i>Ankush Jain, Arnab Bose, Phillip R. Westmoreland</i>	
(507C) CATALYTIC FAST CO-PYROLYSIS OF WASTE GREENHOUSE PLASTIC FILMS AND RICE HUSK OVER AN HZSM-5/MCM-41 CATALYST.....	91
<i>Zhaoying Li, Zhaoping Zhong, Bo Zhang, Wei Wang, Fernando Resende</i>	
(507D) EX-SITU CATALYTIC FAST PYROLYSIS OF WOOD CHIPS USING LAMELLAR MFI AND NI-SUPPORTED LAMELLAR MFI ZEOLITES	92
<i>Sampath Gunukula, Laleh Emdadi, Dat T. Tran</i>	
(507E) HYDROPHOBIC BEHAVIOR OF HYDROTHERMALLY CARBONIZED BIOMASS.....	93
<i>Md Tahmid Islam, Sergio Hernandez, Jordan Klinger, M. Toufiq Reza</i>	
(507F) A THERMODYNAMICS STUDY OF METHYLENE BLUE ADSORPTION ON HYDROCHARS PRODUCED FROM ORANGE PEEL AND GRAPE SKIN	94
<i>Nepu Saha, Maurizio Volpe, Luca Fiori, Roberto Volpe, Antonio Messineo, Toufiq Reza</i>	
(507G) SIGNIFICANCE OF OXYGEN FUNCTIONAL GROUPS ON PELLETIZATION OF HYDROCHAR.....	95
<i>Md Tahmid Islam, Sergio Hernandez, Jordan Klinger, M. Toufiq Reza</i>	
(555A) DOWNSTREAM PROCESS WITH COUNTERCURRENT CHROMATOGRAPHY TO RECOVER BIOPRODUCTS FROM SUSTAINABLE FEEDSTOCKS	96
<i>Hoon Choi, Patrick Saboe, Brenna Black, Dong Xueming, Stefan Haugen, Eric M. Karp</i>	

(555B) SEPARATION OF LIGNOCELLULOSIC SUGARS FROM PYROLYTIC BIO-OIL USING SIMULATED MOVING BED.....	97
<i>Arpa Ghosh, John P. Stanford, Ryan G. Smith, Robert C. Brown</i>	
(555C) BLACK LIQUOR GASIFICATION CHEMICAL RECOVERY AND COMBINED CYCLE POWER AT PULP AND PAPER MILLS BIOREFINERY	98
<i>Tapas K. Das</i>	
(555D) FROM BIOMASS TO POWER USING INTEGRATED COMPACT PYROLYSIS, COMBUSTOR, AND STIRLING ENGINE.....	99
<i>Sampath Gunukula, Dat T. Tran</i>	
(555E) TECHNO-ECONOMIC ANALYSIS AND LIFE-CYCLE ASSESSMENT OF EMERGING TECHNOLOGIES FOR BIOPROCESSING SEPARATIONS	100
<i>Lauren Valentino, Jennifer B. Dunn, Eric Tan, Charles J. Freeman, William L. Kubic Jr., Alex Rosenthal</i>	
(167A) HYBRID BIOCOMPOSITES OF POLYPROPYLENE REINFORCED WITH PYROLYZED SOYHULL MEAL MICRO-PARTICLES AND GRAPHENE NANOPATELETS	101
<i>Ethan Watt, Mohamed Abdelwahab, Michael Snowdon, Amar K. Mohanty, Hamdy Khalil, Manju Misra</i>	
(167B) MULTI-OBJECTIVE OPTIMISATION OF MULTI-PRODUCT RICE VALUE CHAINS: A WHOLE-SYSTEMS ANALYSIS OF THE ENVIRONMENT-FOOD-ENERGY-WATER NEXUS.....	102
<i>Stephen S. Doliente, Sheila Samsatli</i>	
(167C) EVALUATION OF HYDROTHERMAL PRETREATMENT AND FERMENTATION PROCESSES TO IMPROVE LIPID AND ETHANOL PRODUCTION FROM CORN GERM MEAL, A MODEL FOR LIPID PRODUCING ENERGY CROPS	104
<i>Yuyao Jia, Deepak Kumar, Jill Moser, Bruce S. Dien, Vijay Singh</i>	
(167D) FUNCTIONAL PROPERTIES AND PHYSICOCHEMICAL CHARACTERIZATION OF NATIVE STARCH FROM ANDEAN CROPS FOR THE PRODUCTION OF SUSTAINABLE BIOPLASTICS.....	106
<i>Sandra Arroyave, Liliana Avila-Martín, Elma Naranjo, Jairo E. Perilla</i>	
(167G) EFFECT OF AN ANTIOXIDANT ON THE GAS-PHASE REACTIVITY:AN EXPERIMENTAL STUDY OF 2,4-XYLENOL	107
<i>Minh Duy Le, Mickaël Matrat, Arij Ben Amara, Fabrice Foucher, Bruno Moreau, Yi Yu, Matieyendou Goussougli, Pierre-Alexandre Glaude</i>	
(167H) FABRICATION AND CHARACTERIZATION OF GREEN COMPOSITES OF AGAVE FIBER AND BIODEGRADABLE POLY(3-HYDROXYBUTYRATE) (PHB) MATRIX.....	110
<i>Drupitha M. Paleri, Megan Smith, Mohamed Abdelwahab, Manju Misra, Amar K. Mohanty</i>	
(60A) FINDING OUR WAY TO DRIVE SUSTAINABILITY FORWARD THROUGH A GLOBAL PANDEMIC	111
<i>Debbie F Mielewski, Alper Kiziltas</i>	
(60B) CREATING NEW BIOPRODUCTS TARGETING “ZERO WASTE” PRODUCTION	112
<i>William J. Orts, Lennard Torres, Delilah F. Wood, William Hart-Cooper, Zachariah McCaffrey, Artur P. Klamczynski, Gregory M. Glenn</i>	
(60C) CAN BIOPLASTICS ALLEVIATE PLASTIC WASTE ISSUES?	113
<i>Ramani Narayan</i>	

(60D) CIRCULAR ECONOMY AND SUSTAINABLE MATERIALS.....	114
<i>Amar K. Mohanty</i>	
(694A) LIGNIN-BASED CARBON FIBERS FROM HYBRID POPLAR AND CORN STOVER: RENEWABLE AQUEOUS SOLVENTS FOR LIGNIN FRACTIONATION AND SOLVATION	115
<i>Graham W. Tindall, Sagar Kanhere, Villo E. Bécsy-Jakab, Amod Ogale, David Hodge, Mark Thies</i>	
(694B) PARTIAL SUBSTITUTION OF PHENOL IN PHENOL-FORMALDEHYDE (PF) RESIN BY PLANT BIOMASS FOR WOOD ADHESIVES.....	116
<i>Archana Bansode, Mehul Barde, Osei Asafu-Adjaye, John Hinkle, Vivek Patil, Brian Via, Sushil Adhikari, Thomas Elder, Ramsis Farag, Maria Auad</i>	
(694C) HAIRY CELLULOSE NANOCRYSTALS: AN EMERGING CLASS OF NANOCELLULOSES FOR ADVANCED INDUSTRIAL APPLICATIONS	117
<i>Amir Sheikhi</i>	
(694D) NOVEL DOUBLE-SHELL LIGNIN NANOCAPSULES ARE A STABLE VEHICLE FOR FUNGICIDE ENCAPSULATION AND RELEASE.....	118
<i>Raisa Carmen Andeme Ela</i>	
(694E) THE EFFECT OF NATURAL FILLERS ON THE MARINE BIODEGRADATION BEHAVIOUR OF POLY(3-HYDROXYBUTYRATE-CO-3-HYDROXYVALERATE) (PHBV).....	119
<i>Kjeld Meereboer, Akhilesh K. Pal, Erick O. Cisneros-López, Manju Misra, Amar K. Mohanty</i>	
(703B) HYDROTHERMAL LIQUEFACTION FOR CO-VALORIZATION OF PLASTICS AND BIOPOLYMERS.....	120
<i>Seshasayee Mahadevan Subramanya, Phillip E. Savage</i>	
(703C) POLYSTYRENE SULFONIC ACID AS A RECOVERABLE CATALYST FOR THE HYDROLYSIS OF PET.....	122
<i>Hossein Abedsoltan, Dr. Maria R. Coleman, Ana Alba-Rubio</i>	
(703E) CONVERSION OF WASTE SOLIDS TO MONOMERS AND INTERMEDIATES	123
<i>Gennaro Maffia, Anne M. Gaffney</i>	
(703F) VALORIZATION OF PLASTIC WASTE USING HOT PRESSURIZED WATER.....	124
<i>Seshasayee Mahadevan Subramanya, Phillip E. Savage</i>	
(728B) A HIGH-THROUGHPUT METHOD FOR ANALYZING STRUVITE FORMATION AND MORPHOLOGY: EXPLORING THE EFFECT OF PEPTIDE ADDITIVES.....	126
<i>Jacob Hostert, Olivia Kamlet, Zihang Su, Julie Renner</i>	
(728C) A TECHNO-ECONOMIC ANALYSIS OF GREENHOUSE WASTE AND WATER RECYCLING USING ANAEROBIC DIGESTION: A CASE STUDY IN FOOD-ENERGY- WATER NEXUS	127
<i>Babu Joseph, José Luis Guzmán</i>	
(728D) ENGINEERING A PURPLE NON-SULFUR BACTERIUM TO EXPAND SYMBIOTIC NITROGEN FIXATION.....	129
<i>Cheryl Immethun, Rajib Saha</i>	
(728E) A MICROALGAE-METHANOTROPH COCULTURE PLATFORM FOR FUELS AND CHEMICAL PRODUCTION FROM WASTEWATER.....	130
<i>Nathan Roberts, Matthew Hilliard, Q. Peter He, Jin Wang</i>	

(728F) AUXIN DEGRADATION BY VARIOVORAX MAINTAINS STEREOTYPIC PLANT ROOT DEVELOPMENT WITHIN THE COMPLEX PLANT MICROBIOME	131
<i>Jonathan M. Conway, Isai Salas-González, Omri M. Finkel, William G. Walton, Matthew R. Redinbo, Jeffery L. Dangel</i>	
(752A) CELLULOSE NANOCRYSTALS/POLYVINYL ALCOHOL NANOCOMPOSITE FILMS FOR HUMIDITY AND ACID VAPOR SENSING APPLICATIONS.....	132
<i>Mahesh Parit, Jiachen Liu, Zhongyang Cheng, Zhihua Jiang</i>	
(752B) CELLULOSE NANOCRYSTAL FILMS - EFFECT OF ELECTROLYTES AND LIGNIN ADDITIONS ON OPTICAL AND MECHANICAL PROPERTIES	134
<i>Mahesh Parit, Zhihua Jiang</i>	
(752C) GLYCEROL-BASED INTELLIGENT COPOLYMER FILM FOR REAL-TIME MONITORING OF FOOD SPOILAGE	136
<i>Zhaohui Tong, Karyn Moses, Hanxi Bao, Yifei Lou, Guanghui Lan</i>	
(752D) SIMULTANEOUS EXTRACTION AND CONTROLLED CHEMICAL MODIFICATION OF LIGNIN FROM HARDWOOD	137
<i>Stefania Bertella, Jeremy S. Luterbacher</i>	
(752E) UTILIZATION OF AUTOHYDROLYSIS AS A PATHWAY TO VALUE-ADDED PRODUCTS AND SUSTAINABLE MATERIALS FROM BIOMAS	138
<i>Griffin Miller, Richard Venditti, Sunkyu Park</i>	

Author Index