Advances in Sustainability

Topical Conference at the 2012 AIChE Spring Meeting and 8th Global Congress on Process Safety

Houston, Texas, USA
1-5 April 2012

ISBN: 978-1-62276-563-8
# TABLE OF CONTENTS

Biomass to Oil: Fast Pyrolysis and Subcritical Hydrothermal Liquefaction .......................................................... 1
Nicolas Daoassans-Carrere, Guillaume Mauviel, Jean-Henry Ferrasse, Jacques Lévé, Olivier Boutin

Pyrolysis Oil and Its Applications .................................................................................................................. 6
Rajeswar R. Gattipalli, Stanley Frey, Lance Baird

Catalytic Performance of Mn-promoted Ni/MgO Catalysts in CO₂ Reforming of Toluene Used As Model Compound of Tar Produced from Biomass: Influence of Preparation Methods .................................................. 7
Meng Kong, Jinhua Fei, Xiaoming Zheng

Direct Inter-Processes Integration for Energy Efficiency Optimization and GHG Emissions Reduction in Oil Refining .................................................................................................................. 17
Mahmoud Baby Naureldin, Faisal Almousa

Energy Efficient Control Strategy to Operate Post-Combustion CO₂ Capture in Response to Power Plant Load Reduction .................................................................................................................. 18

Study on Cascade Refrigerant and Mixed-Refrigerant Systems for Ethylene Plants ........................................... 20
Hu Dinh, Jian Zhang, Qiang Xu

Operations Optimization of Concentrating Solar Power Plants. I: Challenges and Opportunities .................. 21
Ravi Nath, Ibn Salbiadegotaita, Inaki Mendicute, Gioroziana Deiu, Andrew Trenchard, Jo Visschers

Numerical Simulations and Experiments on a Photovoltaic Solar Wall ............................................................ 35
Himanshu Delva

DFT Study on Hydrogen Desorption From NaMgH₃ (001) Surface ............................................................... 36
Fernando A. Soto, Daniela S. Mainardi

The Reaction Pathways of Glycerin in Supercritical Water ........................................................................ 37
Jared S. Bouquet, Ryan E. Tschannen, Aaron C. Gonzales, Sunggyu Lee

Glycerol to Oxygenates and Chemicals in Supercritical Fluids ....................................................................... 38
Maoqi Feng, Chee Kai Tan

Autothermal Reforming of Glycerol in a Dual Layer Monolith Catalyst ......................................................... 39
Yujia Liu, Adeniyi Lawal

Simulation, Optimization and Costing of a Fully Integrated Multi-Product Biorefinery .................................. 40
Aryan Geralli Nejadfomeshi, Paritosh K. Sharma, Jose Romagnoli

A Life Cycle-Based Analysis and Optimization Framework for Designing Sustainable, Multi-Product Biomass-to-Bioproducts Value Chains .................................................................................. 41
Paritosh K. Sharma, Jose A. Romagnoli

Using System Dynamics to Support Consequential Life Cycle Analysis: The Forest Based "Drop-in"
Biofuel Supply Chain Example .................................................................................................................. 43
Nana Awuah Bortsie Aryee, Anthony Halog

Optimizing the Sustainability of Thermochemical and Biochemical Production of Cellulosic Ethanol .......... 44
Eric C. D. Tan, Daniel Inman

Advancing Computational Modeling and Analysis for Assessing Sustainability of Large Scale Bioenergy Production .......................................................................................................................... 45
Anthony Halog, Nana Bortsie-Aryee

Jojoba (Jojoba Oil and Jojoba Rest) As An Alternative Energy Source in Jordan .............................................. 46
Zayed Al-Hamamre

Cationic Polyelectrolytes Decrease Gelatinization Temperature of Cornstarch ............................................. 47
Sandeep Mora, Kendra E. Maxwell, Sujit Banerjee

Cloud Point Studies for Diesel and Jet Fuel Bio-Derived Fuels ....................................................................... 48
Anne Lown, Lars Peerrebom, Dennis J. Miller, Carl T. Liva

Process Development and Demonstration of Biomass to Liquid (BTL) Fuels Via Gasification and Catalytic Conversion .................................................................................................................. 49
Qiangu Tan, Fei Yu

Global Optimization of Oil Production in Microalgae Bioreactor .................................................................... 50
Javad Abdollahi, Stevan Dubljevic

Sustainable Biodiesel Production From Waste Cooking Oil and Animal Fats Under Supercritical Methanol ................................................................................................................................. 51
Maoqi Feng, Chee Kai Tan, Cary Wong, Laura Harris

Unlimited Power From Continental Drift ........................................................................................................ 60
Donald I. Garnett

Author Index