

### 3. 12<sup>th</sup> Annual Green Chemistry & Engineering Conference

6月24日から26日まで、“Using Green chemistry & Engineering to Advance Sustainable Solutions”のタイトルの元、ワシントンのCapital Hilton Hotelで開催された。

<http://acs.confex.com/acs/green08/techprogram/MEETING.HTM>

企業業績悪化により産から学への資金提供が減少した影響を受け、参加者は約370名と、例年より100名近い減少となった。講演・発表件数は以下の通り。口頭発表のプログラムを以下に記す。

基調講演：	3件
招待講演：	3件
Presidential Green Chemistry Challenge Awards 受賞者講演：	5件
一般口頭発表：	164件
Luncheon Speech：	1件
Banquet Speech：	1件
ポスター発表：	42件

<6月24日>

- 基調講演 “製薬工業における環境面の課題と成果” Skip Volante, Vice President, Merck & Co. Inc.  
開発初期からグリーンケミストリーの考え方を導入している  
反応のマイクロ化、酵素反応、不整合成、Fischer-Indole 合成、酸触媒、等  
グリーンケミストリー は収益向上につながる

○分析方法と技術

- A Green Chemistry Assessment for Analytical and Chemical Processes  
Julee Driver, South Dakota State University
- Instructional Resources for the Teaching of Green Analytical Chemistry  
Douglas Raynie, South Dakota State University
- Micro-Scale HPLC Generates < 1% of the Solvent Waste of Conventional Analytical LC  
Justin E. Kittell, Eksigent Technologies
- Direct Analysis in Real Time (DART)/ High Resolution Mass Spectrometry: Green Chemistry Applications  
Ted H. E. Mendum, Warner Babcock Institute for Green Chemistry
- Green Product Design of Temperature Sensors  
Maria Nydia Ruiz Felix, Rowan University

○バイオベース材料 (I)

- Rapid Evaluation and Functional Design of SMB Chromatography for Separation of Vegetable Oil-Derived Hydroxy Methyl Esters  
Shawn D. Feist, The Dow Chemical Company
- Fractionation of Lignocellulosic Biomass Feedstocks  
Lisette Ngo Tenlep, South Dakota State University
- System for Bioremediation of Effluents  
John R. Roheim, NCH Corporation
- Liquid Carbon Dioxide-Based Production of Leather  
Doug Raynie, South Dakota State University

○連邦の規準と政策

- "Green" Comparisons for Functionally Equivalent Products in Federal Supply Catalogs  
George R. Thompson, Chemical Compliance Systems, Inc
- The Importance of Chemical Ranking Systems: A Department of Defense Study

Carole A. LeBlanc, Office of the Deputy Under Secretary of Defense

- Characterizing and Addressing Policy Barriers to Green Chemistry in the United States

Michael P. Wilson, University of California, Berkeley

- Pulling down the Barriers: Lessons from Local and International Variations in Green Chemistry Policy

Kira JM Matus, Harvard University

○招待講演

- 温室効果ガス削減と北米地域の貿易：化学産業部門はどのように関与できるか？

Kellee James, Chicago Climate Exchange

○イオン液体

- Ionic Liquids for Absorption Refrigeration

Joan F. Brennecke, University of Notre Dame

- Industrial Use of Ionic Liquids - Challenges and Opportunities

Peter FH Schwab, Evonik Degussa

- Water-in-Ionic Liquid Microemulsions: A New Medium for Biocatalytic Reactions

Muhammad Moniruzzaman, Kyushu University

- Surface Structure and Green Chemistry in the Organic Solid State

John C. Warner, Warner Babcock Institute for Green Chemistry

○バイオベース材料（II）

- Characteristics and Performance of a Wood Preservative Produced from Pyrolysis Oil

Philip H. Steele, Mississippi State University

- Bio-Based Composites: Design for Commercialization

Richard P. Wool, University of Delaware

- Natural Oil Polythiols and Their Utility in Polymeric Systems

Chad W. Brown, Chevron Phillips Chemical Company

- L'OREAL's Commitment to Green and Sustainable Chemistry

Michel D. Philippe, L'OREAL

- Recent Advances in Green Chemistry Research & Development as Sources for New Eco-Friendly Materials Protection Agents

Walter Bogaerts, University of Leuven

- Fatty Acid-Based Monomer as a Replacement for Styrene in the Production of Triglyceride-Based Polymers

Alejandrina Campanella, University of Delaware

- Bioplastic Blends and Nanocomposites: New Green Materials

John R. Dorgan, Colorado School of Mines

○評価方法論と持続可能性

- Comparative Assessment of Chemicals Impacts on Ecosystems and Human Health Using the USEtox Model

Olivier Jolliet, University of Michigan

- A Methodology for Driving Environmental Improvements in the Process Development of Active Pharmaceutical Ingredients

James A. Baird, AstraZeneca

- Developing Proactive Design Strategies in Nanoscience to Reduce Uncertainty, Enhance Performance and Minimize Hazard

Bettye L.S. Maddux, Safer Nanomaterials and Nanomanufacturing Initiative

- BASF's Socio-Eco-Efficiency Analysis: A Method for Evaluating the Economic, Environmental and Social Impacts of Products

Christopher A. Bradlee, BASF Corporation

- Benchmarking Sustainability

Darlene Schuster, AIChE Institute for Sustainability

- Environmental Decision Making & Metrics: Methodologies for Assessment & Sustainability

Sharon Austin, US EPA

○合成手法

- Metal and Organic Solvent Free Green Oxidation of Alkyl Substituted Aromatics to Ketones and Carboxylic Acids with Aqueous Tert-Butyl Hydroperoxide Under Microwave Irradiation

Albert W. M. Lee, Hong Kong Baptist University

- Greener and Rapid Synthesis of Bio-Active Heterocycles

Vivek Polshettiwar, US EPA

- The “Greener” Leuckart Reaction

Mikhail M. Bobylev, Minot State University

- Fluorous Separation and Recycling Technologies for Green Organic Synthesis

Wei Zhang, University of Massachusetts

- Developing "Greener" Synthesis through Mechanochemistry

James Mack, University of Cincinnati

- Stabilized Alkali Metals for Safer, Sustainable Synthesis

Paul Vogt, SiGNa Chemistry, Inc

- Clean, Benign and Aqua Mediated Synthesis of Pharmacologically Active Spiro Heterocycles

Subhash C. Jain, University of Delhi

○代替溶媒

- Terephthalic Acid Synthesis at Higher Concentrations in High-Temperature Liquid Water

Mitsumasa Osada, Ichinoseki National College of Technology

- Piperylene Sulfone: A Fully Recyclable Smart Solvent to Couple Reactions and Separations

Veronica Llopis-Mestre, Georgia Institute of Technology

- Novel Biomimetic Catalysts for Green Polymerization in Water

Kei Saito, Monash University

< 6月25日 >

○基調講演 "オスの苦境"

Theo Colborn, The Endocrine Disruption Exchange

化学物質の汚染が健康、気候に影響している

汚染と健康被害について、特に男性が影響を受けやすいことをデータに基づき説明

○バイオベース材料 (III)

- Novel Biocomposites from the Fibers of Poultry Feather and Biopolymer

Masud Huda, Horticultural Research Institute

- Bio-Based Dielectric Materials for Printed Circuit Boards

Mingjiang Zhan, University of Delaware

- Hydrogen Storage on Carbonized Chicken Feather Fibers

Erman Senoz, University of Delaware

- Renewable CARBON Nanospheres for Applications in Polymer Nanocomposites

Margaret Sobkowicz, Colorado School of Mines

- Cellulosic Nanowhiskers: One-Step Functionalization and Use in Ecologically Benign Nanocomposites

Birgit Braun, PolyNew Inc

- DuPont(TM) Cerenol(TM) - a New Family of Sustainable and Environmentally Friendly Materials

Hari B. Sunkara, E. I. du Pont de Nemours and Company

○工業プロセスの設計

- Elimination of Hexavalent Chromium Used in Hydraulic & Pneumatic Tubing  
Robert R. Rick, Commercial Fluid Power
- Improved Control of Organic Sulfur  
Stephen A. Bedell, The Dow Chemical Company
- A Novel Solid Catalyst Process for Biodiesel Production  
Dheeban Kannan, The Pennsylvania State University
- Developments in REACTOR Engineering: MODELING of Gas –Phase Catalytic Channel Reactors  
Alex Omo Ibadon, University of Hull
- Extension of the Environmentally Benign Catecholate Method to the Synthesis of Barium-Based Perovskites and Environmentally Benign Synthesis of Doped Barium Titanate  
Anne E. Marteel-Parrish, Washington College
- Biomass-to-Liquids (BTL): The Green Fuel of the Future?  
Jeff McDaniel, Velocys, Inc.

○教育と奉仕活動 (I)

- Greening Analytical Chemistry Education: Expanding the Green Revolution  
Liz Gron, Hendrix College
- Development of a Green Inorganic Chemistry Laboratory: Principles, Practices and Procedures  
Indu Tucker Sidhwani, Gargi College, University of Delh
- An Undergraduate Research Experience in Green Chemistry: Exploring An Immobilization Strategy for a Heterogeneous Catalyst  
Corey A. Mocka, Suffolk University
- "Greening up" Organic Reactivity in the Undergraduate Laboratory: Aqueous Horner-Wadsworth -Emmons, Heck and Suzuki Reactions  
Andrew P. Dicks, University of Toronto
- Green Chemistry Networking in India  
R. K. Sharma, University of Delhi
- Infusing Sustainability and Additional Green Chemistry into Chemistry in Context  
Michael C. Cann, University of Scranton

○Luncheon “温室効果ガスについて、化学者、化学技術者は何ができるか？”

Bill Banholzer, Chief Technology Officer, The Dow Chemical Company  
バイオマス(cane)ポリエチレン、大豆ポリオールなどを商品化  
CO<sub>2</sub>の固定化なども実施している

○招待講演

- 天然資本主義  
Stuart A. Jones, Interface Americas, Inc.

○合成プロセス

- Convergent Green Synthesis of Linezolid (Zyvox)  
William R. Perrault, Pfizer
- A Practical and Green Chemical Approach for the Manufacture of NK1 Antagonist LY686017  
Michael E. Kopach, Eli Lilly and Company
- Synthesis of Amino Functionalised 2,4,6-Triarylpyridines and 1,5-Diketones Via Process Intensification on Rotating Surfaces  
Nicole M. Smith, University of Western Australia

○環境への意思決定のためのアプリケーションとツール

- LCA and EHS Comparison of Biocatalytic and Chemical Pharmaceutical Synthesis: 7-ACA  
Concepción Jiménez-González, GlaxoSmithKline
- Natural Oil Polythiols and Polyols—a Life Cycle Comparison  
Thomas A. Upshaw, Chevron Phillips Chemical Co LP
- Clean and Green: Progress in the Development of Environmentally-Friendly Lubricants  
Alan C. Eachus, Independent Consultant
- Automated Ammunition Design for Demil Utilizing Web-Based "Green" Capabilities  
George R. Thompson, Chemical Compliance Systems, Inc.
- Sustainability Framework for Process and Product Development  
Carol English, Cytec Industries Inc
- CleanGredients(SM) as a Consensus-Based Tool  
Alec Gosse, GreenBlue
- Chemical Product Evaluation and Screening - Tools for Real World Decision Making  
Marilyn Johnson, Dolphin Software, Inc.

○触媒 (I)

- Siliceous Mesocellular Foam (MCF) Supported Catalysts for Green Chemistry  
Jaehong Lim, Institute of Bioengineering and Nanotechnology
- The Use of Transparent Colloidal Titania Sol for Degradation of MTBE and Nitrophenol  
Shyam S. Shukla, Lamar University
- Multifunctional Binary METAL Oxide Composite Nanostructures  
Alex Ibhaddon, University
- Adsorption and Reaction of Multifunctional Oxygenates on Transition Metal Surfaces  
J. Will Medlin, University of Colorado
- Development of An Enzymatic Process for Lipitor  
Michael P. Burns, Pfizer
- Biocatalytically Synthesized Polypyrrole  
Ramaswamy Nagarajan, University of Massachusetts Lowell
- Biocatalytic Production of Unnatural Cyclic Secondary Amino Acids for Peptidomimetic Pharmaceuticals  
John Grate, Codexis, Inc.
- Asymmetric Aldol Reaction Between Benzaldehyde and 2-Butanone in Coordinated Ionic Liquids  
Dishun Zhao, Hebei University of Science and Technology

○招待講演 “KeLa Energy 社のクリーン石炭技術” Larry Moot, KeLa Energy LLC

○ファインケミカルのプロセス設計

- Solvent and Copper Free Sonogashira Reactions Utilizing High-Speed Ball Milling  
Dennis A. Fulmer, University of Cincinnati
- A Collaborative Partnership to Develop Strategies for Waste Minimization and Solvent Recovery for the Celecoxib Process  
Mariano J. Savelski, Rowan University
- Palladium Removal from Reaction Mixtures by Fixed Bed Adsorption  
Michael J. Girgis, Novartis Pharmaceuticals Corporation
- Process Improvement of a Crystallization Using a Green Engineering Approach  
Daniel Sujo N., Siegfried (USA), Inc.
- Developments toward a Green Stille Reaction  
Nicole M. Torres, Michigan State University

○Banquet with Speaker “持続可能な地球、現実的な解決策”

Jonathan Lash, President, World Resources Institute

2050までにCO<sub>2</sub>50%削減するためには生活スタイルを変える必要がある  
しかし、その具体的姿は想像しにくい

<6月26日>

○基調講演 “エネルギー問題、われわれは何ができるか”

Steven Chu, Director, Lawrence Berkeley National Laboratory

気候変動の予測は難しい  
生活レベルの向上と電力消費増加は不可分  
バイオマスや自然エネルギーの利用が必要、風力、太陽光で50%まで可能  
石炭はCO<sub>2</sub>分離のコストが高い  
将来は自然模倣、水の電気分解などに期待

○触媒 (II)

- Environmentally Attractive Metal-Catalyzed Reduction of Alkyl Halides  
Jian Yang, UNC-Chapel Hill
- The Greening of the Aerobic Oxidation of p-Xylene to Terephthalic Acid  
Walt Partenheimer, Consultant, DuPont (retired)
- Highly Efficient Copper Mediated Atom Transfer Radical Addition in the Presence of Reducing Agents  
Tomislav Pintauer, Duquesne University
- Novel Metal Oxide Catalysts and Process for Methacrylic Acid Production Using Isobutane as the Feedstock  
Manhua Mandy Lin, EverNu Technology LLC
- Catalytic Reforming of n-Heptane on Platinum-Zinc Supported on Gamma-Alumina  
Mehdi Vadi, Islamic Azad University Fasa Branch
- Catalytic Reforming of n-Heptane on Platinum-Copper Supported on Gamma-Alumina  
Mehdi Vadi, Islamic Azad University Fasa Branch
- Catalytic Reforming of n-Heptane on Platinum-Rhenium Supported on Gamma-Alumina  
Marjan Bazargane, Islamic Azad University Firozabad Branch

○新規材料 (I)

- Future Designs of Pressure Sensitive Adhesives  
Steven J. Severtson, University of Minnesota
- Powder Coatings Based on Seed Oils  
Jim D. Earls, The Dow Chemical Company
- Photo Polymer Systems for Environmentally Benign Preparation of Films and Coatings  
Emily Stoler, Warner Babcock Institute for Green Chemistry
- Synthesis and Properties of a New Seed Oil-Based Thermoplastic  
Jerry E. White, The Dow Chemical Company
- New Value-Added Materials from Ethanol by-Products  
George E. Inglett, USDA-ARS-NCAUR

○教育と奉仕活動 (III)

- Integrating Green Engineering Concepts across Disciplines  
Sean P. McGinnis, Virginia Tech
- Making It Easier to Be Green -- a Green Online Curriculum Free to the World  
Terrence Collins, Carnegie Mellon University
- Beyond Green Engineering: Fostering the Ethic That Powers the Action  
Linda Vanasupa, California Polytechnic State University
- Learning Materials and Teaching Strategies for Sustainability Integration in Engineering Education

Qiong Zhang, Michigan Technological University

- Building the Capacity of Green Chemistry Educators

Julie Haack, University of Oregon

- Students Game to Learn about Green Supply Chains

Jacqueline A. Isaacs, Northeastern University

- Connecting Industry to K-12 Education through Green Chemistry

Rachel Pokrandt, Beyond Benign

#### ○触媒 (III)

- Gas Phase Conversion of Sugar/sugar Alcohol to Valuable C3 Chemicals

Wei Yan, University of Missouri-Columbia

- Improved Immobilization of Chiral Bisoxazolines on Silica: Application to Circulating Flow-Type Pack Bed Reactor

SuSeong Lee, Institute of Bioengineering and Nanotechnology

- Catalytic Borylation for Efficient Elaboration of Aromatic Compounds

Ghayoor A. Chotana, Michigan State University

- Decarboxylative Coupling of Aromatic Carboxylic Acids with Aryl Iodides and Unfunctionalized Arenes

Adelina M. Voutchkova, Yale University

#### ○新規材料 (II)

- Phase Behavior and Rheological Analysis of Cellulose Nanocrystal Aqueous Suspensions

Esteban E. Ureña-Benavides, Clemson University

- “Green” and Size-Controlled Synthesis and Seed-Mediated Growth of Pd Nanoparticles

Juncheng Liu, Auburn University

- Synthesis of Nanophase Mn(VII) Oxide Using Green Technology and Its Applications

R. K. Vempati, Southern Methodist University

- Expanding the Horizons of Green Battery and Capacitor Chemistries with Nano-Porous Carbon

Bryan D. Sawyer, University of Missouri-Columbia

- Novel Green Chemistries to Extend Automobile Catalytic Converter Useful Life While Reducing Exhaust Gaseous Emissions

Ewa Bardasz, The Lubrizol Corporation

- Polymer-Filled Composite Membranes

Xiangwu Zhang, North Carolina State University

#### ○教育と奉仕活動 (IV)

- Providing Real-Life Experience While Learning Green Chemistry Principles

Dalila G. Kovacs, Grand Valley State University

- Towards the Greening of Our Minds: A New Course Offered at Washington College, Chestertown, MD

Anne E. Marteel-Parrish, Washington College

- Teaching Students about Consumer Exposure to Hazardous Chemicals

Shonali Laha, Florida International University

- Using the Rowan University Engineering Clinic Model to Implement Green Engineering Partnerships with the Pharmaceutical Industry

C. Stewart Slater, Rowan University

- Understanding and Implementing the Principles of Green Chemistry in Industry

Amy S. Cannon, Beyond Benign: A Warner Babcock Foundation

- C2B2 - a Biorefining Collaboratory

John R. Dorgan, Colorado School of Mines