



TWENTY - NINTH ANNUAL INTERNATIONAL PITTSBURGH COAL CONFERENCE

FINAL PROGRAM

COAL - ENERGY, ENVIRONMENT AND
SUSTAINABLE DEVELOPMENT



October 15- 18, 2012

Pittsburgh, PA USA

The David L. Lawrence Convention Center

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WELCOME!

On behalf of the Conference Advisory Board, Conference Committees, and the University of Pittsburgh we welcome you to the Twenty-Ninth Annual International Pittsburgh Coal Conference held October 15 - 18, 2012 at the David L. Lawrence Convention Center in Pittsburgh PA. The Conference is hosted by the University of Pittsburgh.

The theme of this year's conference is "Coal - Energy, Environment and Sustainable Development" which covers a wide spectrum of important topics on coal technology, synfuel and environmental issues. The topics cover energy and environmental issues and technologies related to coal and its byproducts. Over 300 technical papers and posters are presented throughout the conference. The Poster Sessions are held on Wednesday, October 17 from 18:00 - 21:00. For detailed information on technical sessions, papers and speakers, please turn to page 6 in the Technical Program.

The invited Plenary Speakers include: The Honorable Sherwood L. Boehlert, U.S. House of Representatives (1983 – 2007); John Hofmeister, Founder and CEO Citizens for Affordable Energy and Former President Shell Oil Company; Ke Liu, Vice President & Chief Technology Officer, National Institute of Clean and Low-Carbon Energy (NICE), CHINA; Chris Hobson, Senior Vice President, Research & Environmental Affairs, Southern Company; Johan van Dyk, Chief Scientist, Sasol Technology, SOUTH AFRICA; and Thomas J. Grahame, Senior Policy Analyst, U.S. Department of Energy.

We express our sincere gratitude to the contributors for their support and involvement, to all the authors and co-authors of the technical papers and to all the members of the Program Committee, Awards Committee, International Committee and Membership Committee. Special thanks go to our Technical Program Chairs, Evan Granite of NETL-DOE, USA, and Jim Hower of the University of Kentucky, CAER, USA as well as to all session chairs, speakers and international delegates for their contributions to the 2012 technical program.

As the chair and vice chair of the Advisory Board of the Conference, we deeply appreciate your participation and interest in this year's Conference and we invite you to join us next year for the Thirtieth Annual International Pittsburgh Coal Conference, which will be held in Beijing, China from September 16 - 19, 2013.

Sincerely,



Robert Beck, Chair
The National Coal Council, Inc., Washington, DC, USA



Richard Winschel, Vice-Chair
CONSOL Energy Inc., Pittsburgh, PA, USA

CONFERENCE REGISTRATION

On-Site Registration will begin Monday, October 15, from 15:00 - 19:00 and continues Tuesday, Wednesday, and Thursday from 7:00 until 17:00.

Please check in even if you have Pre-Registered!

Gateway Clipper Dinner Cruise Tuesday, October 16

5:45 - Meet in Westin Hotel lobby to walk to cruise boarding dock

6:00 - 6:30 PM - Boarding at the dock by the David L. Lawrence Convention Center

6:30 PM - 9:00 PM - Dinner and cruising

9:00 PM - Return to dock

This cruise is complimentary for paid conference attendees, but there is a charge of \$45 to bring a spouse or friend. Please RSVP to the conference secretary.

The International Pittsburgh Coal Conference

EXECUTIVE DIRECTOR:
Dr. Badie I. Morsi

CONFERENCE ORGANIZER:
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PITT AWARD

The Award for Innovation in Coal Conversion was founded by the Chemical and Petroleum Engineering Department, University of Pittsburgh in 1983 with industrial support. Since 1992, it has been fully funded by CONSOL Energy Inc.

CONFERENCE OVERVIEW

MONDAY, OCTOBER 15, 2012

Technical Tour	11:00 - 16:00
Capital Investment Workshop	08:00 - 12:00
GARP Workshop	13:00 - 17:00
Registration	15:00 - 19:00
Reception	18:30 - 20:30

TUESDAY, OCTOBER 16, 2012

Registration	07:00 - 17:00
Opening Ceremony	08:00 - 08:20
Plenary Session – 1	08:20 - 10:05
Concurrent Tech. Sessions	10:20 - 12:00
Conference Luncheon	12:00 - 13:30
Concurrent Tech. Sessions	13:30 - 17:25
Gateway Clipper Dinner Cruise	18:00 - 21:00

WEDNESDAY, OCTOBER 17, 2012

Registration	07:00 - 17:00
Plenary Session – 2	08:20 - 10:05
Concurrent Tech. Sessions	10:20 - 12:00
Conference Luncheon	12:00 - 13:30
Concurrent Tech. Sessions	13:30 - 17:25
Poster Session	18:00 - 21:00

THURSDAY, OCTOBER 18, 2012

Registration	07:00 - 17:00
Plenary Session – 3	08:20 - 10:05
Concurrent Tech. Sessions	10:20 - 12:00
Awards Luncheon	12:00 - 13:30
Concurrent Tech. Sessions	13:30 - 17:25
Advisory Board Meeting	18:00 - 20:00

PLENARY SPEAKERS

TUESDAY, OCTOBER 16, 2012

Energy Production/Policy Speakers

The Honorable Sherwood L. Boehlert

U.S. House of Representatives (1983 – 2007)

“Future of Carbon Capture and Sequestration”

John Hofmeister

Founder and CEO, Citizens for Affordable Energy

Former President Shell Oil Company, USA

**“Producing Hydrocarbons in an Anti-Hydrocarbon Age:
Risks, Opportunities and Solutions”**

WEDNESDAY, OCTOBER 17, 2012

International Issues

Chris Hobson

Senior Vice President, Research & Environmental Affairs
Southern Company, USA

**“CURC-EPRI Roadmap and the Industry Perspective on
Clean Coal RD & D”**

Johan van Dyk

Chief Scientist

Sasol Technology, SOUTH AFRICA

**“Sasol Technology Coal R&D – A Diamond in the Global
World of Carbon”**

THURSDAY, OCTOBER 18, 2012

Environmental Issues

Thomas J. Grahame

Senior Policy Analyst

U.S. Department of Energy, USA

**“Health Effects of Airborne Black Carbon Particles:
Why Did it Take So Long to Find Out?”**

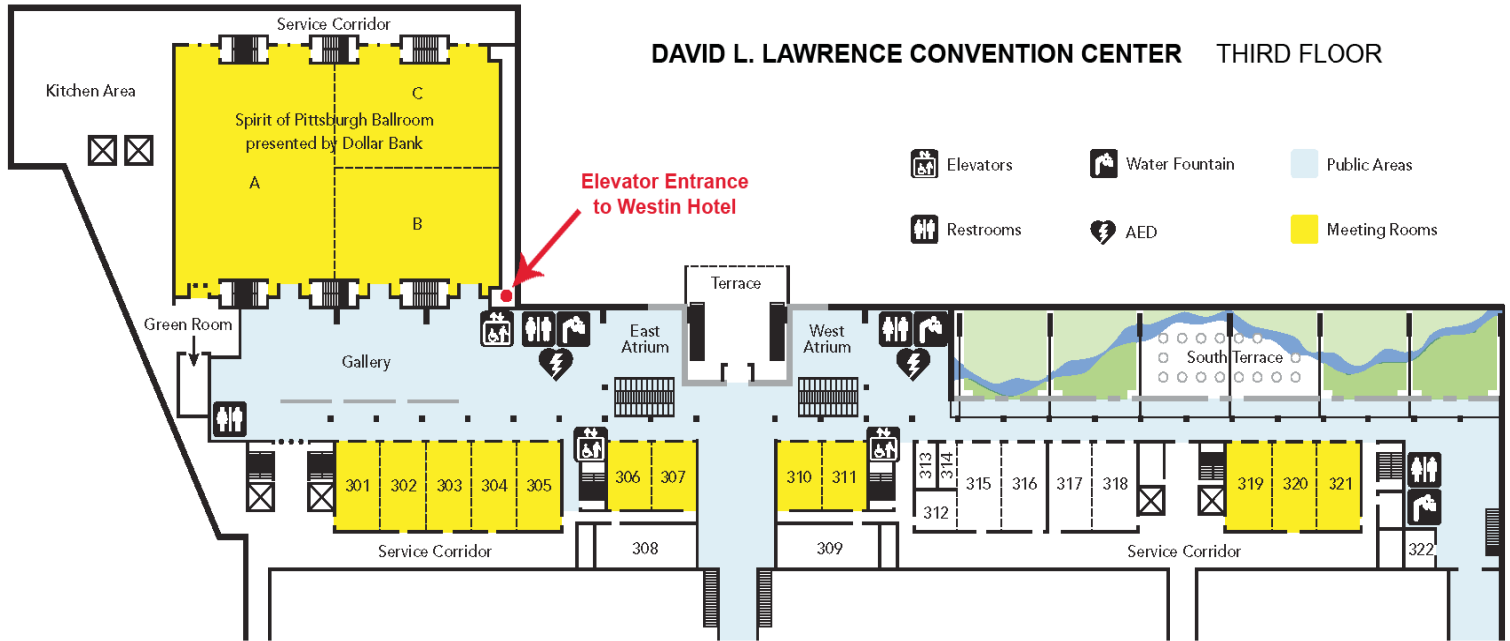
Ke Liu

Vice President & Chief Technology Officer
National Institute of Clean & Low-Carbon Energy (NICE),
CHINA

**“The Current Status of Coal Conversion Industry in
China, and the Future Picture of Coal and Energy – A
View from NICE”**

Monday, October 15, 2012						
8:00-12:00	Capitol Investment Workshop - Room 305					
11:00-16:00	Technical Tour – Cardinal Plant					
13:00-17:00	GARP Half-Day Risk Workshop - Room 305					
15:00-19:00	Registration – Room 306					
18:30-20:30	Reception – Rooftop Terrace					
Tuesday, October 16, 2012						
7:00-17:00	Registration – Room 306					
8:00-8:20	Opening Ceremony – Ballroom					
8:20-10:05	Plenary Session – Ballroom					
10:05-10:20	Coffee Break					
ROOM	301	302	303	304	305	310/311
	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6
10:20-12:00	Clean Coal Demonstration and Commercial Projects: Financial	Sustainability and Environment: General - 1	Gasification: General - 1	Combustion: Chemical Looping and Oxy-Combustion - 1	Carbon Management: Carbon Management Policy	Coal Mining and Coal Gas: General - 1
12:00-13:30	Conference Luncheon - Ballroom					
	Session 7	Session 8	Session 9	Session 10	Session 11	Session 12
13:30-15:10	Clean Coal Demonstration and Commercial Projects: Financial Risk Management	Sustainability and Environment: General - 2	Gasification: General - 2	Combustion: Chemical Looping and Oxy-Combustion - 2	Carbon Management: CO ₂ Capture - 1	Coal Mining and Coal Gas: General - 2
15:10-15:25	Coffee Break					
	Session 13	Session 14	Session 15	Session 16	Session 17	Session 18
15:25-17:25	Clean Coal Demonstration and Commercial Projects: Path Forward for CCUS	Gasification: General - 3	Gasification: Gas Cleaning	Combustion: Chemical Looping and Oxy-Combustion - 3	Carbon Management: CO ₂ Capture - 2	Coal-Derived Products: General - 1
18:00-21:00	Gateway Clipper Dinner Cruise					
Wednesday, October 17, 2012						
7:00-17:00	Registration – Room 306					
8:20-10:05	Plenary Session – Ballroom					
10:05-10:20	Coffee Break					
ROOM	301	302	303	304	305	310/311
	Session 19	Session 20	Session 21	Session 22	Session 23	Session 24
10:20-12:00	Clean Coal Demonstration and Commercial Projects: Technical - 1	Coal-Derived Products: General - 2	Gasification: Modeling - 1	Combustion: Ash and Combustion - 1	Carbon Management: CO ₂ Capture - 3	Coal Science: General - 1
12:00-13:30	Conference Luncheon - Ballroom					
	Session 25	Session 26	Session 27	Session 28	Session 29	Session 30
13:30-15:10	Clean Coal Demonstration and Commercial Projects: Technical - 2 (Polygeneration)	Coal-Derived Products: General - 3	Gasification: General - 4	Combustion: Ash and Combustion - 2	Carbon Management: CO ₂ Capture - 4	Coal Science: General - 2
15:10-15:25	Coffee Break					
	Session 31	Session 32	Session 33	Session 34	Session 35	Session 36
15:25-17:25	Clean Coal Demonstration and Commercial Projects: Technical - 3 (CCUS)	Coal-Derived Products: General - 4	Gasification: Coal and Biomass - 1	Combustion: Ash and Combustion - 3	Carbon Management: CO ₂ Capture - 5	Coal Science: General - 3
18:00-21:00	Poster Session - Room 319/320/321					
Thursday, October 18, 2012						
7:00-17:00	Registration – Room 306					
8:20-10:05	Plenary Session – Ballroom					
10:05-10:20	Coffee Break					
ROOM	301	302	303	304	305	310/311
	Session 37	Session 38	Session 39	Session 40	Session 41	Session 42
10:20-12:00	Clean Coal Demonstration and Commercial Projects: Technical - 4 (Polygeneration)	Coal-Derived Products: General - 5	Gasification: Coal and Biomass - 2	Combustion: Mainly Mercury	Carbon Management: CO ₂ Storage - 1 (Coal)	Coal Science: General - 4
12:00-13:30	Awards Luncheon - Ballroom					
	Session 43	Session 44	Session 45	Session 46	Session 47	Session 48
13:30-15:10	Clean Coal Demonstration and Commercial Projects: Technical - 5	Coal-Derived Products: General - 6	Gasification: Modeling - 2	Gasification: Low Rank Coal	Carbon Management: CO ₂ Storage - 2 (Coal)	Coal Science: General - 5
15:10-15:25	Coffee Break					
	Session 49	Session 50	Session 51	Session 52	Session 53	Session 54
15:25-17:25	Clean Coal Demonstration and Commercial Projects: Technical - 6	Coal-Derived Products: General - 7	Gasification: Modeling - 3	Carbon Management: CO ₂ Use and Methane Abatement	Carbon Management: CO ₂ Storage - 3	Coal Science: General - 6
18:00-20:00	Advisory Board Meeting					

The David L. Lawrence Convention Center



Registration
Room 306

Monday Evening Reception
Rooftop Terrace

Opening Ceremony
Spirit of Pittsburgh Ballroom

Plenary Sessions
Spirit of Pittsburgh Ballroom

Conference Luncheons
Spirit of Pittsburgh Ballroom

Poster Presentations
Rooms 319, 320, 321

Exhibits
Ballroom Gallery

A/V & Speaker Preparation Room
Room 307

SESSION MEETING ROOMS

Room 301
Sessions 1, 7, 13, 19, 25, 31, 37, 43, 49

Room 302
Sessions 2, 8, 14, 20, 26, 32, 38, 44, 50

Room 303
Sessions 3, 9, 15, 21, 27, 33, 39, 45, 51

Room 304
Sessions 4, 10, 16, 22, 28, 34, 40, 46, 52

Room 305
Sessions 5, 11, 17, 23, 29, 35, 41, 47, 53

Room 310/311
Sessions 6, 12, 18, 24, 30, 36, 42, 48, 54

ORAL SESSIONS

Tuesday, October 16, 2012

SESSION 1 CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS: FINANCIAL

Tom Sarkus and Tina Vital

Future Opportunities for Clean Energy Power Projects, Tom Fogarty, Co-author of "Investing in The Renewable Power Market", USA

The Financial Side of Combustion: How Do Coal and Natural Gas Compete on the Margin as Fuels for Electricity?, John M. Hynes, Excidian, LLC, USA

A View From Wall Street on U.S. Debt Financings, Hans L. Christensen, MJX Asset Management LLC, USA

Project Financing Insights – Texas Clean Energy Project, Jeffrey D. Brown, Summit Power Group, USA

SESSION 2 SUSTAINABILITY AND ENVIRONMENT: GENERAL – 1

Jim Hower and Darrell Taulbee

Chemistry Modeling of Dry Sorbent Injection for Acid Gas Removal, Guisu Liu, Liming Shi, Lewis Benson, Nalco Mobotec, USA

Ferromagnetic Properties of Pyrite From the Southern Brazil Coal Mining Industry at Different Heating Temperatures, Michael Peterson, Márcio Antônio Fiori, Adilson Oliveira da Silva, Universidade do Extremo Sul Catarinense; Regina de Fátima Peralta Muniz Moreira, Paula Hahn Concer, Engenharia Química – UFSC; Cíntia Máximo Cardoso, Curso de engenharia química – UNESC, BRAZIL

Co-Briquetting of Coal and Biomass, Darrell Taulbee, Robert Hodgen, Nicholas Aden, University of Kentucky Center for Applied Energy Research, USA

Evaluation of Methods Used to Quantify the Durability of Coal-Biomass Briquettes, Erich Dohm, Gerald Luttrell, Robert Bratton, Nino Rippepi, Virginia Polytechnic Institute and State University; Darrell Taulbee, University of Kentucky, Center for Applied Energy Research, USA

SESSION 3 GASIFICATION: GENERAL – 1

Massood Ramezan and James Bennett

ITM Oxygen Technology: Scale-Up Toward Clean Energy Applications, John M. Repasky, Lori L. Anderson, VanEric E. Stein, Phillip A. Armstrong, Edward P. (Ted) Foster, Air Products and Chemicals, Inc., USA

Dry Solids Pump Development and Commercial-Scale Testing, Timothy W. Saunders, Scott McVey, Craig Tang, Alex Olaguez, Pratt & Whitney Rocketdyne, USA

Material Issues in Slagging Gasifiers Caused by Carbon Feedstock, James P. Bennett, David E. Alman, Kyei-Sing Kwong, DOE/NETL, USA

Testing Optical Gasifier Sensor at Wabash River Gasifier, Serguei Zelepouga, Vitaly Gnatenko, Gas Technology Institute; Alexei Savelyev, North Carolina State University, USA

PWR Compact Gasifier Development Status, Steven Fusselman, Alan Darby, Pratt & Whitney Rocketdyne, USA

SESSION 4 COMBUSTION: CHEMICAL LOOPING AND OXY-COMBUSTION - 1

John Wheeldon and Evan Granite

Char Burnout of U.S. and Chinese Coals Under Oxy-Combustion Conditions, Shengteng Hu, Hamid Sarv, Alan N. Sayre, Babcock & Wilcox Research Center, USA; Xiaohong Huang, Zhao-Hui Liu, Huazhong University of Science and Technology, CHINA

3D CFD Simulation of Chemical Looping Combustion with Interconnected Air and Fuel Reactors, Yong Liu, Michael J. Gallagher, Jr., Stephen P. Carpenter, DOE/NETL/URS; E. David Huckaby, DOE/NETL, USA

Reducible Supports for Oxygen Carriers in Chemical Looping Combustion, Saurabh Bhavsar, Götz Vesper, DOE/NETL/University of Pittsburgh, USA

CFD Study of Oxy Coal Combustion in a 100kW Downfired Furnace, Albio Gutierrez, Alejandro Posada, Ismail Celik, West Virginia University, USA

Syngas Chemical Looping Process: Design and Continuous Performance of 25 kW_{th} Sub-Pilot Scale System for Gaseous Fuel Conversion and 99.99% Purity Hydrogen Generation, Mandar V. Kathe, Andrew Tong, Deepak Sridhar, Liang Zeng, Rae Kim, Elena Chung, Liang-Shih Fan, The Ohio State University, USA

SESSION 5 CARBON MANAGEMENT: CARBON MANAGEMENT POLICY AND LEGISLATION/REGULATION

Richard Winschel and Daniel Connell

Carbon Capture and Sequestration (CCS) Technology, Frank Princiotto, U.S. Environmental Protection Agency, USA

Development of the First Internationally Accepted Standard for Geologic Storage of Carbon Dioxide: – Update from the Public Comment Period & Initiation of the ISO Process, Steven M. Carpenter, Advanced Resources International, USA

The Development of a State-Based Legal and Regulatory Program for the Geologic Sequestration of CO₂, David M. Flannery, Jackson Kelly PLLC, USA

New Precombustion Carbon Capture Process, Arnold Keller, London Management, Inc., USA

GHG Emission Reduction Measurement and Monitoring Methodology for CCS Projects, Mahesh Gundappa, Ray Hattenbach, Blue Strategies, USA

SESSION 6 COAL MINING AND COAL GAS: GENERAL - 1

C. Ozgen Karacan

Pre-Mining Drainage of Coal Seams – US Practices and Applicability to Worldwide Coal Mine Methane Drainage Projects, Felicia A. Ruiz, Coalbed Methane Outreach Program, US EPA; Jon Kelafant, Richard Lawrence, Clark Talkington, Advanced Resources International, Inc., USA

Methodology for the Economic Assessment of Enhanced Coal Mine Methane Drainage (ECMM) as a Fugitive Emissions Reduction Strategy, Regina Sander, Luke Connell, CSIRO Earth Science and Resource Engineering, AUSTRALIA

Effectiveness of Coal Mine Methane Drainage in Polish Mines, Dariusz Obracaj, Nikodem Szlazak, Marek Borowski, Marek Korzec, Justyna Swolkien, AGH University of Science and Technology, POLAND

Numerical Modeling of Nitrogen Injection in Longwall Gob Area to Prevent Spontaneous Heating, Liming Yuan, Alex C. Smith, Office of Mine Safety and Health Research, National Institute of Occupational Safety and Health, USA

Reducing Explosion Based Shocks in Open Mines Through Parameter Optimization Using Taguchi Methods, Bahadır Uygur, Ahmet Albayrak, Iffet Ugur Kombe, Seçil Çolpan, Ümit Çepni, Turkish Coal Enterprises, TURKEY

SESSION 7 CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS: FINANCIAL RISK MANAGEMENT

Marty Webler and Tom Sarkus

EPA and Coal-Fired Power Plant Emission Regulation, Peter B. Trick, Victoria I. Adams, David S. Wilson, Booz Allen Hamilton, Inc., USA

Carbon Capture and Storage – How to Manage Your Risks, Patrick Maguire, McGriff Seibels & Williams, Inc., USA

Building an Organizational Risk Management Framework, Michael Sell, Global Association of Risk Professionals, USA

Toward a Common Method of Cost Estimation for Power Plants with CO₂ Capture and Storage, Edward S. Rubin, Carnegie Mellon University, USA

SESSION 8 SUSTAINABILITY AND ENVIRONMENT: GENERAL – 2

Jim Hower and Daniel Connell

The Pittsburgh Aerosol Research and Inhalation Epidemiology Study (PARIES): A Retrospective Evaluation of Fine Particulate Matter, its Chemical Components, and Human Health in Southwestern Pennsylvania, Daniel P. Connell, CONSOL Energy Inc.; Richard A. Bilonick, Evelyn O. Talbot, Judith R. Rager, University of Pittsburgh, USA

Comparison and Recommendations Between Thermal Power Plants in Türkiye by Carbon Emissions and Coal Quality, Iffet Ugur Kombe, Ahmet Albayrak, Seçil Çolpan, Bahadır Uygur, Ümit Çepni, Turkish Coal Enterprises; Mahmut Yavuz, Eskisehir Osmangazi University, TURKEY

Life Cycle Analysis of Electricity From Coal Fired Thermal Power Plants and a Comparative Study of the Efficient Combustion Technologies in India, Binita Shah, Seema Unnikrishnan, Neelima Naik, National Institute of Industrial Engineering, INDIA

Mechanism, Kinetics and Thermodynamics of Adsorption of Aqueous Chromic Ion on HNO₃ Treated Mesoporous Activated Carbon, Shitang Tong, Lei Mao, Liu Wan, Mingxia Fan, Wuhan University of Science and Technology, CHINA; Charles Q. Jia, University of Toronto, CANADA

SESSION 9 GASIFICATION: GENERAL - 2

Jenny Tennant and Stewart Clayton

Toward a Technology to Mitigate Syngas Cooler Plugging and Fouling, Mike Bockelie, Kevin Davis, Andrew Fry, Martin Denison, Randy Pummill, Tim Shurtz, Huaifeng "Dave" Wang, Reaction Engineering International; Kevin Whitty, Mustafa Can Celebi, Cristina Jaramillo, University of Utah; Jost Wendt, Reaction Engineering International and University of Utah, USA

Application of Tunable Diode Laser Absorption Diagnostics and Gas Composition Analysis towards Quantification of Reaction Progress in a Fixed-Bed Gasifier, Anup Sane, Indraneel Sircar, Weichao Wang, Robert P. Lucht, Jay P. Gore, Purdue University, USA

Coal Ash Behavior in Reducing Environments (CABRE) III, Joshua J. Stanislawski, Donald P. McCollier, Alexander Azenkeng, Robert R. Jensen, University of North Dakota Energy & Environmental Research Center, USA

Effect of Operating Conditions on Gas Composition in Atmospheric and Bubbling Fluidized Bed Gasification of Coal, Emir Aydar, Serhat Gul, Namik Unlu, Fehmi Akgun, Haydar Livatyali, TUBITAK Marmara Research Center, TURKEY

Palladium Sorbents for High Temperature Capture of Mercury, Arsenic, Selenium and Phosphorus from Fuel Gas, Evan J. Granite, Henry W. Pennline, Erik Rupp, Dennis C. Stanko, John P. Baltrus, DOE/NETL; Wilson Chu, Johnson Matthey; Tony Wu, Subhash Datta, Bob Lambrecht, John Wheelton, National Carbon Capture Center, USA; Hugh Hamilton, Liz Rowsell, Stephen Poulston, Andrew Smith, Johnson Matthey Technology Centre, UNITED KINGDOM

SESSION 10 COMBUSTION: CHEMICAL LOOPING AND OXY-COMBUSTION - 2

John Wheelton and Evan Granite

Three-Dimensional Calculation of a Chemically Reacting Coal Particle Agglomerate Moving in a Hot O₂/CO₂ Atmosphere, Andreas Richter, Petr A. Nikrityuk, TU Bergakademie Freiberg, GERMANY

Evaluation of Reduction Kinetics of Copper Oxide on Various Supports for Chemical-Looping with Oxygen Uncoupling, Christopher K. Clayton, Kevin J. Whitty, University of Utah, USA

Chemical Looping Combustion of Syngas Derived from Steam Gasification of Coal with Iron and Copper Oxygen Carriers, Ewelina Ksepko, Marek Sciazko, Institute for Chemical Processing of Coal, POLAND; Ranjani V. Siriwardane, DOE/NETL; Hanjing Tian, Thomas Simonyi, DOE/NETL/URS, USA

Development of the Coal Direct Chemical Looping Process at Ohio State, Samuel Bayham, Ray Kim, Liang Zeng, Siwei Luo, Dawei Wang, Liang-Shih Fan, The Ohio State University, USA

SESSION 11 CARBON MANAGEMENT: CO₂ CAPTURE - 1

Steve Carpenter and Deborah Kosmack

Validation of Proposed Mechanism Towards In-Situ CO₂ Capture During Gasification by Simulating

a High Si/Al and Low Ca Content Coal Source, Johan van Dyk, Sasol Technology; FB Waanders, North West-University, SOUTH AFRICA

Babcock & Wilcox Power Generation Group, Inc.'s RSAT™ Process and Field Demonstration of the OptiCap™ Advanced Solvent at the National Carbon Capture Center, Christopher W. Poling, Jeb W. Gayheart, Ted R. Parsons, Stephen A. Moorman, Babcock & Wilcox Power Generation Group, USA

Advanced Technology Testing at the National Carbon Capture Center, John Northington, Frank Morton, Ruth Ann Yongue, Southern Company Services, USA

Lab-Scale Assessment of a Post-Combustion Carbon Dioxide Capture Process Enabled by a Combination of Enzymes and Ultrasonics, Sonja Salmon, Alan House, Novozymes North America, Inc.; Charles Freeman, Kayte Denslow, Pacific Northwest National Laboratory; Joe Remias, Balraj Ambedkar, University of Kentucky, Center for Applied Energy Research, USA; Vinay Mulgundmath, Saravanan Swaminathan, Doosan Power Systems, UNITED KINGDOM

SESSION 12 COAL MINING AND COAL GAS: GENERAL - 2

C. Ozgen Karacan

Local Geology and Hydrology Effects Promoting Methane Emissions in an Indiana Co., Pennsylvania, Coal Mine, C. Özgen Karacan, Office of Mine Safety and Health Research, National Institute of Occupational Safety and Health, USA

Henry Fayol Who is a Mining Engineer in Administration Science, Ümit Çepni, Ahmet Albayrak, İffet Ugur Kombe, Seçil Çolpan, Bahadır Uygur, Turkish Coal Enterprises, TURKEY

Thar Coal: Dig or Skip, Farid A. Malik, EMR - Consult; Abid Aziz, Pak motors (Pvt.) Ltd., PAKISTAN

SESSION 13 CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS: PATH FORWARD FOR CCUS

Tina Vital and Marty Weblor

Commercialization of Carbon Sequestration Projects; Scaling from Research to Reality, The Honorable Sherwood L. Boehlert, The Accord Group, USA

Roundtable Discussion

SESSION 14 GASIFICATION: GENERAL - 3

Sam Tam and Ting Wang

Raman Spectroscopic Investigations into Links between Intrinsic Reactivity and Char Chemical Structure, Daniel Roberts, Mark Kochanek, David Harris, Meijun Wang, CSIRO; Chun-Zhu Li, Curtin University of Technology, AUSTRALIA; Liping Chang, Taiyuan University of Technology, CHINA

Catalytic Coal Gasification with In Situ Capture of CO₂ and H₂S, Nicholas Siefert, Dushyant Shekhawat, David Berry, DOE/NETL; Shawn Litster, Carnegie Mellon University, USA

Technological and Economic Evaluation of Large-Scale Coal-Based Polygeneration Concepts for Load Flexible Electricity Generation, Robert Pardemann,

Kristin Boblenz, Lars-Erik Gärtner, Bernd Meyer, TU Bergakademie Freiberg, GERMANY

Cleaner-Coal Technology to Reduce Climate Change, Alex Wormser, Wormser Energy Solutions, Inc., USA

The Pilot Trial of Air-Blown Entrained Flow Coal Gasification, Haifeng Liu, Qingfeng Liang, Xiaolei Guo, Xin Gong, Zhenghua Dai, Jianliang Xu, East China University of Science and Technology, CHINA

SESSION 15 GASIFICATION: GAS CLEANING

Steve Zitney and Susan Maley

State Estimation of an Acid Gas Removal (AGR) Plant as Part of an Integrated Gasification Combined Cycle (IGCC) Plant with CO₂ Capture, Prokash Paul, Debansu Bhattacharyya, Richard Turton, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

Poison Resistant Water-Gas-Shift Catalyst, Girish Srinivas, Steven C. Gebhard, William Spalding, Mike Looker, TDA Research Inc., USA

Advanced Acid Gas Separation Technology for the Utilization of Low Rank Coals, Jeffrey R. Hufton, Robert Quinn, Amy Fabrice, Jeffrey W. Kloosterman, Ellen M. O'Connell, Air Products and Chemicals; Grant Dunham, Michael Swanson, University of North Dakota Energy and Environmental Research Center, USA

Advanced Gasification Process Demonstration: Fuel Upgrading, Warm-Gas Cleanup, and Hydrogen Separation Membranes, Joshua J. Stanislawski, Michael L. Swanson, Tyler J. Curran, Scott G. Tolbert, University of North Dakota Energy & Environmental Research Center; Al Bland, University of Wyoming; Kumar Sellakumar, ETAA Energy, Inc., USA

On the Use of Zinc Oxide Absorbent for Sulfur Emissions Control in GT's Pilot-Scale Gasification Facilities, Rachid B. Slimane, Bruce G. Bryan, Andrew Kramer, James Aderhold, Patrick Bishop, Gas Technology Institute, USA

Integrated Hot and Cold Synthesis Gas Clean-Up, Parvana Aksoy, Isil Isik-Gulsac, Orcun Er, Alper Sarioglan, Siringul Ay, Ersin Uresin, Aykut Argonul, Yeliz Cetin, Fehmi Akgun, TUBITAK Marmara Research Center; Husnu Atakul, Istanbul Technical University, TURKEY

SESSION 16 COMBUSTION: CHEMICAL LOOPING AND OXY-COMBUSTION - 3

John Wheelton and Evan Granite

Direct Power Extraction with Oxy-Combustion: An Overview of Magnetohydrodynamic Research Activities at the NETL-Regional University Alliance (RUA), C. Rigel Woodside, Kent H. Casleton, E. David Huckaby, Thomas Ochs, Danylo Oryshchyn, George Richards, Peter A. Strakey, Jeremy Pepper, DOE/NETL; Ismail B. Celik, Jose Escobar-Vargas, West Virginia University; Daniel C. Haworth, NETL-RUA and The Pennsylvania State University; Osama A. Marzouk, DOE/NETL and WVURC; Xinyu Zhao, The Pennsylvania State University, USA

Challenges of Naturally-Occurring Ilmenite for Chemical Looping Processes, Elena Chung, Deepak Sridhar, Siwei Luo, Zhenchao Sun, Ankita Majumder, Liang Zeng, Liang-Shih Fan, The Ohio State University, USA

Near Field Aerodynamics Effects of Pure O₂ Injection in Co-Axial Oxy-Coal Turbulent Diffusion Flames, Dadmehr M. Rezaei, Eric G. Eddings, Kerry E. Kelly, Jost O.L. Wendt, University of Utah, USA

Effect of SO₂ and Steam on Chemical Looping Combustion of Coal with Iron and Copper Oxygen Carriers, Hanjing Tian, Tom Simonyi, URS/DOE/NETL; Ranjani Siriwardane, DOE/NETL, USA

**SESSION 17
CARBON MANAGEMENT:
CO₂ CAPTURE - 2**

Richard Winschel and Steve Carpenter

Pre-Combustion Carbon Capture by a Nanoporous, Superhydrophobic Membrane Contactor Process, S. James Zhou, Howard Meyer, Gas Technology Institute; Ben Bikson, Yong Ding, PoroGen Corporation, USA

Separation Work and the Thermodynamics of CO₂ Capture, Hugo S. Caram, Lehigh University and ExxonMobil Research and Engineering; Hans Thomann, Ramesh Gupta, Walt Weissman, ExxonMobil Research and Engineering, USA

Performance and Cost Analysis of Post-Combustion CO₂ Capture Using Calcium Looping Process for Coal-Fired Power Plants, Hari Chandan Mantripragada, Edward S. Rubin, Carnegie Mellon University, USA

Advanced CO₂ Capture Technology for IGCC Systems, Gökhan Alptekin, Ambalavanan Jayaraman, Michael Cesario, Amanda Parker, TDA Research, Inc., USA

Development of ReaxFF Force Field for Carbon Dioxide Capture with Ionic Liquids: A Combined First Principles and Classical Simulation, Bo Zhang, J. Karl Johnson, University of Pittsburgh/DOE/NETL, USA

Mg-CaCO₃ Double Salt Absorbents for CO₂ Removal at 300-500°C, Xiaohong Shari Li, David King, Liyu Li, Pacific Northwest National Laboratory; Haobo Chen, Arizona State University; Keling Zhang, Prabhakar Singh, University of Connecticut; Yuhua Duan, DOE/NETL, USA

**SESSION 18
COAL-DERIVED PRODUCTS:
GENERAL - 1**

Mingsheng Luo and Rachid Oukaci

A Truly Green and Achievable Energy Policy, Scott Montgomery, Catholic University of America; Robert L. Freerks, Rentech, Inc., USA

Two-Stage Conversion of Low-Rank Coal and Biomass into Liquid Fuel Under Mild Condition, Xian Li, Dedy Eka Priyanto, Ryuichi Ashida, Kouichi Miura, Kyoto University, JAPAN

Adding Value to Coke Oven Gas, Christian Wix, Martin Skov Skjøth-Rasmussen, Berit Hinnemann, Thoa Thi Minh Nguyen, Casper Funk Jacobsen, Haldor Topsøe A/S, DENMARK; Niels Richard Udengaard, Haldor Topsøe Inc, USA

Impact of Co-Gasifying Coal and Agricultural Wastes on Condensate Production in Updraft Gasifiers, Akinwale Aboyade, University of Cape Town; Marion Carrier, Johannes Knoetze, Johann Görgens, Stellenbosch University; JC van Dyk, Sasol Technology R&D, SOUTH AFRICA

The Effect of Particle Size and Pressure on Coal-Tar Quality for a Typical Permian-Aged South African Inertinite-Rich Coal, Daniel van Niekerk, Rudi Coetzer, Sasol Technology, SOUTH AFRICA

Effect of Mineral Distribution on the Coking Properties of Coal, Yong-Jian Bai, Shu Zhang, De-Ping Xu, Yong-Gang Wang, China University of Mining and Technology (Beijing), CHINA

**ORAL SESSIONS
Wednesday, October 17, 2012**

**SESSION 19
CLEAN COAL DEMONSTRATION AND
COMMERCIAL PROJECTS: TECHNICAL - 1
(COMMERCIAL PROJECTS)**

Tom Sarkus and Stewart Clayton

Prairie State Energy Campus: Next Generation of Coal-Fueled Power, Peter DeQuattro, Ashlie Keener Kuehn, Prairie State Generating Company, LLC, USA

Dominion's New Virginia City Hybrid Energy Center: How State Incentives and Clean Coal Technology Combine for a Successful Project, Mark D. Mitchell, Herbert Wheary, Dominion Resources Services, Inc., USA

GE Technology Update - Duke Edwardsport IGCC, Norman Shilling, Larry Duke, Jeffrey Goldmeier, GE Power & Water, USA

Update on the Kemper County IGCC Project Using Transport Integrated Gasification (TRIGTM), Randall E. Rush, Tim Pinkston, Matt Nelson, Guohai Liu, Southern Company; Diane Revay Madden, DOE/NETL, USA

**SESSION 20
COAL-DERIVED PRODUCTS:
GENERAL - 2**

Ke Liu and Rachid Oukaci

Tar and Gas Evolution From the Devolatilization of Large South African Coal Particles, Burgert B. Hattingh, Raymond C. Everson, Hein W.J.P. Neomagus, North West University; John R. Bunt, Daniel van Niekerk, Sasol Technology (Pty) Ltd., SOUTH AFRICA

Analysis of Low-Temperature Pyrolysis Oil of Low Rank Coal, Yinhua Long, Xiaofen Guo, Li Wang, National Institute of Clean-and-Low-Carbon Energy; Quan Shi, China University of Petroleum, CHINA

Liquid Transportation Fuels from Coal and Natural Gas, Harold A. Rosen, National Academy of Engineering, USA

Coal-To-Liquids: Viability as a Peak Oil Mitigation Strategy, Mikael Höök, Uppsala University, SWEDEN; Dean Fantazzini, Lomonosov Moscow State University, RUSSIA; Simon Snowden, University of Liverpool, UNITED KINGDOM; André Angelantoni, Post Peak Living, USA

Upgrading of Oils Derived from Thermal Processing of Coal, John Duddy, Eric Peer, James MacArthur, Axens North America Inc., USA

**SESSION 21
GASIFICATION:
MODELING - 1**

Guido DeHoratis and Steve Markovich

Investigation of Two-Stage Oxygen Feeding in a Downdraft Entrained-Flow Coal Gasifier, Ting Wang, Xijia Lu, University of New Orleans, USA; Heng-Wen Hsu, Cheng-Hsien Shen, Industrial Technology Research Institute, TAIWAN

Dynamic Maximization of Oxygen Yield in an Elevated-Pressure Air Separation Unit Using Linear Multiple Model Predictive Control (MMPC) Framework, Priyadarshi Mahapatra, Stephen E. Zitney, AVESTARTM Center/DOE/NETL, USA

On the Dynamic Modeling of an Entrained Gasifier Using Aspen Custom Modeler, Job Kasule, Richard Turton, Debansu Bhattacharyya, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

CFD Simulation of Brazilian Coal Gasification on a Circulating Fluidized Bed Reactor, Daniel Augusto Kesterling, Thiago Fernandes de Aquino, Júlio Cesar Spillere Ronchi, Beneficent Association of the Santa Catarina Coal Industry - SATC, BRAZIL; Ronald W. Breault, DOE/NETL, USA

CFD Results of Siemens Gasifier During Commissioning at Shenhua Ningxia Coal Industry, Achim Moser, Frank Hannemann, Tino Just, Siemens Fuel Gasification Technology GmbH, GERMANY

**SESSION 22
COMBUSTION: ASH AND COMBUSTION - 1**

John Wheeldon and Evan Granite

One Dimensional Simulation of the Reducer in Syngas Chemical Looping Process, Qiang Zhou, Liang Zeng, Liang-Shih Fan, The Ohio State University, USA

Ash Deposition during Oxycoal Combustion under High Inlet O₂ Concentration Conditions, Zhonghua Zhan, Jost O.L. Wendt, University of Utah; Andrew Fry, Reaction Engineering International; Lawrence E. Bool, Praxair Inc., USA; Weidong Fan, Shanghai Jiaotong University, CHINA

Influence of Reactant Temperature on Coal-Particle Methane-Air Hybrid Flames, Minkyu Lee, Ali S. Rangwala, Worcester Polytechnic Institute, USA

Effect of Excess Air Ratio on Flue Gas Emissions for Co-Combustion of a Lignite Coal and Woodchips in a Circulating Fluidized Bed Combustor, Murat Varol, Aysel T. Atimtay, Middle East Technical University; Hayati Olgun, TUBITAK-MRC; Hüsnü Atakül, Istanbul Technical University, TURKEY

**SESSION 23
CARBON MANAGEMENT:
CO₂ CAPTURE - 3**

Richard Winschel and Deborah Kosmack

Investigation of Sorbents for Warm CO₂ Capture by Pressure Swing Adsorption, Zan Liu, William H. Green, Massachusetts Institute of Technology, USA

Thermodynamic Properties of CO₂ Capture Reaction by Solid Sorbents: Theoretical Predictions and Experimental Validations, Yuhua Duan, David Luebke, Henry W. Pennline, DOE/NETL; Keling Zhang, David King, Xiaohong Shari Li, Liyu Li, Pacific Northwest National Laboratory, USA; Lifeng Zhao, Yunhan Xiao, Chinese Academy of Sciences, CHINA

Evaluation of Advanced Solvents and Other Technologies for CO₂ Capture from Fossil Fuel-Fired Systems, Nathan J. Fiala, Brandon M. Pavlish, Joel G. Downs, John P. Kay, University of North Dakota Energy & Environmental Research Center, USA

Novel Solvent-Gas Contactor for CO₂ Capture Cost Reductions, Joel G. Downs, Brandon M. Pavlish, John P. Kay, Nathan J. Fiala, University of North Dakota Energy & Environmental Research Center, USA

Process Simulation of Iron-Based Chemical Looping Schemes with CO₂ Capture for Hydrogen and Electricity Production from Coal, Daniel P. Connell, CONSOL Energy Inc.; Liang Zeng, Liang-Shih Fan, The Ohio State University; David A. Lewandowski, Robert M. Statnick, Clean Energy Engineering, USA

**SESSION 24
COAL SCIENCE:
GENERAL - 1**

Jim Hower and Mehmet Maral

Evaluation of the Performance of a Two-Stage, Warm Air Dryer for Fine Coal Particles, Steven Rowan, Eric Johnson, Bruce Kang, West Virginia University, USA

Thermal and Mechanical Analysis of Briquetted Coal Fines Using Municipal Solid Waste (MSW) Plastics, Matthew Massaro, Lori Groven, Steven Son, Purdue University, USA

**SESSION 25
CLEAN COAL DEMONSTRATION AND
COMMERCIAL PROJECTS: TECHNICAL - 2
(POLYGENERATION)**

Stewart Clayton and John Rockey

Progress Update of the Air Blown IGCC and Gasification Plant, Koichi Sakamoto, Hiromi Ishii, Mitsubishi Heavy Industries, Ltd.; Tetsuya Fujino, Yasunori Ishizu, Mitsubishi Power Systems Americas, Inc., JAPAN

Compact Gasification System Demonstration Program Status, Alan Darby, Pratt & Whitney Rocketdyne, USA

Coal-Water Slurry Gasification Technology of Opposed Multi-Burner and Its Application Progress, Guangsu Yu, Jianliang Xu, Zhijie Zhou, Zhenghua Dai, Xueli Chen, Yifei Wang, Haifeng Liu, Fuchen Wang, Xin Gong, East China University of Science and Technology, CHINA

RTI Warm Syngas Clean-Up and Carbon Capture Sequestration Project, Ben Gardner, Raghubir Gupta, Brian Turk, David Denton, RTI International, USA

**SESSION 26
COAL-DERIVED PRODUCTS:
GENERAL - 3**

Ke Liu and Rachid Oukaci

Structural Features of Chars and Tars Derived from South African Large Coal Particles, Burgert B. Hattingh, Raymond C. Everson, Hein W.J.P. Neomagus, Johan H.L. Jordaan, Andre Joubert, North West University; John R. Bunt, Daniel van Niekerk, Sasol Technology (Pty) Ltd., SOUTH AFRICA

Importance of the Ni/W Ratio in NiW/Alumina Catalysts for Hydrotreating of Model Compounds and Low Temperature Coal Tar, Hai-Yong Zhang, Shu Zhang, Pei-Zhong Zhang, Yong-Gang Wang, De-Ping Xu, China University of Mining & Technology (Beijing), CHINA

Study on the Preparation of Activated Carbon from Macerals in Shenfu Coals Separated by Flotation, Wei Zhao, Zhen Li, Anning Zhou, Xian University of Science and Technology, CHINA

**SESSION 27
GASIFICATION:
GENERAL - 4**

Jenny Tennant and Sam Tam

Production of Substitute Natural Gas Using Steam Hydrogasification Configured with a Water Gas Shift Reaction, Yoothana Thanmongkhon, Chan S. Park, Joseph Norbeck, University of California, Riverside, USA

Coal Char-CO₂ Gasification Measurements and Modeling in a Pressurized Flat-Flame Burner, Thomas H. Fletcher, Randy C. Shurtz, Brigham Young University, USA

Investigation of Low Rank Coal Gasification in a Two-Stage Downdraft Entrained-Flow Gasifier, Ting Wang, Xjia Lu, University of New Orleans, USA

Development of a Slag Submodel for an Entrained-Flow Gasifier, Pratik Pednekar, Debangsu Bhattacharyya, Richard Turton, West Virginia University; Raghunathan Rengaswamy, Texas Tech University, USA

**SESSION 28
COMBUSTION: ASH AND COMBUSTION - 2**

John Wheelton and Evan Granite

Kinetic Study on Combustion of Pulverized Coal Blended with Bottom Ash Using Thermo-gravimetric Analysis (TGA) Reactor, Sang Shin Park, Hyo Jae Jeong, Jungho Hwang, Yonsei University; Myung-chul Shin, Korea Institute of Industrial Technology, KOREA

Investigation of the Effect of Biomass-Limestone Interaction on the Ash Composition for Co-Combustion of a Lignite Coal and Olive Cake in a Circulating Fluidized Bed Combustor, Murat Varol, Aysel T. Atimtay, Middle East Technical University, TURKEY

Analysis of Turbulent Hybrid Methane-Air-Coal Dust Flames, Ali S. Rangwala, Scott R. Rockwell, Worcester Polytechnic Institute, USA

Influence Factors on Particle Size of Fly Ash from Pulverized Coal Combustion, Kenji Tanno, Hiromi Shirai, Michitaka Ikeda, Central Research Institute of Electric Power Industry, JAPAN

**SESSION 29
CARBON MANAGEMENT:
CO₂ CAPTURE - 4**

Steve Carpenter and George Koperna

Amine-Silica "Nanobubbles" for CO₂ Sorption, Karen Uffalussy, Götz Vesper, University of Pittsburgh/DOE/NETL; Craig Stevenson, University of Pittsburgh, USA

Dynamic Modeling and Transient Studies of a Solid-sorbent Adsorber for CO₂ Capture, Srinivasarao Modekurti, Debangsu Bhattacharyya, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

Nanoclay-Based Solid-Amine Sorbents for Carbon Dioxide Capture, Elliot Roth, Sushant Agarwal, Rakesh K. Gupta, West Virginia University, USA

Carbon Capture-Promoted Syngas Utilization for Production of Fuels and Chemicals, Keling Zhang, Prabhakar Singh, University of Connecticut; David King, Xiaohong Shari Li, Rob Dagle, Liyu Li, Pacific Northwest National Laboratory; Yuhua Duan, DOE/NETL, USA

**SESSION 30
COAL SCIENCE:
GENERAL - 2**

Allan Kolker and Leslie Ruppert

Advances in Coal Analyses and Simulations 1989-2012, Jonathan P. Mathews, The Pennsylvania State University; Randal Winans, Argonne National Laboratory; Ryan P. Rodgers, National High Magnetic Field Laboratory and Florida State University, USA; Atul Sharma, National Institute of Advanced Industrial Science and Technology, JAPAN

Kinetic Aspects of Coal Classification, Marek Sciazko, Institute for Chemical Processing of Coal, POLAND

Gaseous Product Formation during CO₂ Heat Treatment of Char Produced from an Inertinite-rich Bituminous Coal Doped with Potassium Salt Catalysts, Kelebogile Leeuw, C.A. Strydom, J.R. Bunt, North-West University; D. van Niekerk, J.C. van Dyk, Sasol Technology Pty (Ltd), SOUTH AFRICA

Fractal Characteristics of Coal Powders in Different Grinding Technologies under a Planetary Mill, Zhiyuan Yang, Liang Gong, Anning Zhou, Xi'an University of Science & Technology, CHINA

**SESSION 31
CLEAN COAL DEMONSTRATION AND
COMMERCIAL PROJECTS: TECHNICAL - 3
(CCUS)**

John Rockey and Venkat Venkataraman

The Global Status of CCS: 2012, Holger Bietz, Global CCS Institute, AUSTRALIA

Lessons Learned from EPRI'S CCS Demonstration Program, Jeff Phillips, Andrew Maxson, Electric Power Research Institute, USA

Proposed New EPA GHG Emissions Standards for Coal-fired Power Plants - Determining the Applicability of Carbon Capture and Storage under Best Available Control Technologies (BACT) for Any New or Modified Prevention of Significant Deterioration (PSD), Steven M. Carpenter, Advanced Resources International, USA

China's Coal Sector Outlooks, A New Phase Development, Huaibin Lu, 3E Information Development & Consultants, USA

**SESSION 32
COAL-DERIVED PRODUCTS:
GENERAL - 4**

Ke Liu and Rachid Oukaci

Improvement of Coal De-ashing Process by Sorting Coal by Particle Size, Koji Sakai, Shigeru Kinoshita, Takuya Yoshida, Noriyuki Okuyama, Maki Hamaguchi, Naoki Kikuchi, KOBE STEEL, Ltd., JAPAN

Progress of Shenhua Proprietary FT Technology Development, Mingsheng Luo, Yulin Shi, Yijun Lv, Yunjian Hu, Hai Chang, National Institute of Clean-&-Low-Carbon Energy, CHINA

Study on De-oiling Process and Kinetics of Spent Catalyst, Hui Ma, Yunjian Hu, Huannian Jin, Yulin Shi, Zhi Guo, National Institute of Clean-&-Low-Carbon Energy, CHINA

Analysis of Pyrolysis Oils of Coal By High Performance Analytical Methods, Philipp Rathasack, Marius Kroll, Matthias Otto, TU Bergakademie Freiberg, GERMANY

SESSION 33
GASIFICATION:
COAL AND BIOMASS – 1
Stewart Clayton and Arun Bose

Gasification Kinetics of Char From Coal and Biomass Mixtures in CO₂, Nicholas C. Means, DOE/NETL/URS; Nathan T. Weiland, DOE/NETL/West Virginia University; Chris Guenther, DOE/NETL, USA

Integration of Coal and Biomass Gasification Process with Fuel Cell System for Small Scale Industrial CHP Applications, Alberto Pettinau, Francesca Ferrara, Carlo Amorino, Mario Porcu, Sotacarbo S.p.A.; Simonetta Palmas, University of Cagliari, ITALY

The Activity of the Lignite Hydro-Gasification with Potassium Catalyst for Production of Methane, Xingjun Wang, Bingqing Hong, Guangsuo Yu, Hai Feng Liu, Fuchen Wang, East China University of Science and Technology, CHINA

SESSION 34
COMBUSTION: ASH AND COMBUSTION - 3
John Wheeldon and Evan Granite

Single-Step Process for Simultaneous Removal of CO₂, SO_x and NO_x from Coal Combustion Flue Gas, Niranjani Deshpande, Nihar Phalak, L. S. Fan, The Ohio State University, USA

CCSEM Investigation of Respirable Quartz in Air Samples Collected During Power Plant Maintenance Activities, Gerald P. Huffman, Naresh Shah, Frank E. Huggins, Nick Cprek, University of Kentucky; Gary Casuccio, Everett Ramer, RJ Lee Group, Inc.; Jeffrey B. Hicks, Exponent, Inc., USA

Detailed Investigation of Pyrolysis Modeling for Pulverized Coal Mild Combustion, Michele Vascellari, Christian Hasse, Martin Pollack, ZIK Virtuhcon – Technische Universität Freiberg, GERMANY

Image Analysis Techniques for Particle Air Flames – A Review, Sreenivasan Ranganathan, Brian Elias, Ali Rangwala, Worcester Polytechnic Institute, USA

SESSION 35
CARBON MANAGEMENT:
CO₂ CAPTURE - 5
Daniel Connell and Deborah Kosmack

Current and Future Technologies for Power Generation with Post-Combustion Carbon Capture, Robert W. Stevens, Jr., DOE/NETL; Dale Keairns, Richard Newby, Vasant Shah, Marc Turner, Mark Woods, Booz Allen Hamilton, Inc., USA

A Novel Gas Pressurized Stripping Based Process for CO₂ Capture from Post-Combustion Flue Gases, Shiaoquo (Scott) Chen, Zijiang Pan, Zhiwei Li, Kevin O'Brien, Carbon Capture Scientific, LLC; Timothy Fout, DOE/NETL, USA

Techno-Economic Analysis of a CO₂ Capture-Ready Supercritical Pulverized Coal Unit, Eric Grol, DOE/NETL; Paul Myles, Steve Herron, WorleyParsons Inc./DOE/NETL, USA

The Decision-Tree: How Cleaner-Coal Technology Links to Climate Change, Alex Wormser, Wormser Energy Solutions, Inc., USA

SESSION 36
COAL SCIENCE:
GENERAL – 3
Allan Kolker and Leslie Ruppert

Halogens in Coal: Review of Geologic Variation and Influence on Mercury Capture, Allan Kolker, U.S. Geological Survey; Jeffrey C. Quick, Utah Geological Survey; Connie L. Senior, ADA Environmental Solutions, USA

Lanthanides in Coal Combustion Fly Ash, James C. Hower, University of Kentucky Center for Applied Energy Research, USA; Shifeng Dai, China University of Mining and Technology, CHINA; Irena Kostova, Sofia University, BULGARIA; Luis F.O. Silva, Institute of Environmental Research and Human Development – IPADHC, BRAZIL

The Genesis and Evolution of Neogene Achlada Lignite Deposits (NW Greece), Ioannis K. Oikonomopoulos, Thomas Gentsis, Core Laboratories LP, USA; Maria Perraki, National Technical University of Athens, GREECE; Nikolaos Tougiannidis, University of Cologne, GERMANY

Distribution of Major Oxides and Trace Elements Concentration of Mancilik (Gönen – Balıkesir) Coal Deposit, Mehmet Maral, Fikret Suner, Didem (Maral) Temel, Istanbul Technical University, TURKEY; James C. Hower, University of Kentucky Center for Applied Energy Research; Jennifer M.K. O'Keefe, Morehead State University; Cortland F. Eble, Kentucky Geological Survey, USA

ORAL SESSIONS
Thursday, October 18, 2012

SESSION 37
CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS: TECHNICAL - 4 (POLYGENERATION)
Jeff Hoffman and Anthony Zinn

Global Perspective on Coal Gasification for Polygeneration, Alison Kerester, Gasification Technologies Council (GTC), USA

The Benefits of Co-producing Electric Power, Chemicals, and Fuels from IGCC Polygeneration Plants, Charles E. Miller, Gary Stiegel, Thomas Sarkus, John Rockey, Jason Lewis, DOE/NETL; William Ellis, KeyLogic, USA

Texas Clean Energy Project Update, Karl Mattes, Summit Power Group, USA

Hydrogen Energy California Solutions for a Low Carbon World while Utilizing America's Most Abundant Energy Resource, Tim Bauer, Hydrogen Energy California, USA

SESSION 38
COAL-DERIVED PRODUCTS:
GENERAL - 5
Ke Liu and Rachid Oukaci

Elimination of All CO₂ Emissions During the Production of Liquid Fuels from Coal and Natural Gas by Combining Fischer-Tropsch Synthesis with Catalytic Dehydrogenation, Gerald P. Huffman, Naresh Shah, Shi Xuepei, Frank E. Huggins, Wenqin Shen, University of Kentucky, USA

Development of Dense Membranes for Hydrogen Production and Purification from Coal with CO₂ Capture, U. (Balu) Balachandran, T. H. Lee, C. Y. Park, S. E. Dorris, Argonne National Laboratory, USA

Modes of Fixation of Radioactive Metal Cations by Bituminous Coal Fly Ash, Roy Nir Lieberman, Ariel University Center of Samaria and Bar-Ilan University; Haim Cohen, The Ariel University Center and The Ben-Gurion University of the Negev; Yitzhak Mastai, Bar-Ilan University, ISRAEL

Deformation-deterioration Phenomenon of Marine Concrete by Chloride Penetration and the Effect of Silica Fume, Nguyen Viet Quang Hung, Nguyen Viet Cuong, Vietnam Academy of Science and Technology, VIETNAM; Masakatsu Nomura, Osaka University, JAPAN

SESSION 39
GASIFICATION:
COAL AND BIOMASS – 2
Arun Bose and Ron Breault

Bloodwood Creek UCG Pilot 2010-2012, Burl E. Davis, Carbon Energy Pty Ltd, USA; Cliff Mallet, Carbon Energy Pty. Ltd., AUSTRALIA

Performance Analysis of Entrained-Flow Bed Co-Gasification of Biomass and Coal, Xueli Chen, Jianliang Xu, Guangsuo Yu, East China University of Science and Technology, CHINA

An Experimental Study on Co-Gasification of Coal-Biomass Blended Chars with CO₂, Hyo Jae Jeong, Sang Shin Park, Jungho Hwang, Yonsei University, KOREA

SESSION 40
COMBUSTION: MAINLY MERCURY
John Wheeldon and Evan Granite

Particulate Carbon Emissions from ESPs During Injection of Powdered Mercury Sorbents: Updated Estimates Based on the U.S. EPA Report to Congress on Black Carbon, Herek L. Clack, University of Michigan, USA

Economic Mercury Emission MATS Compliance, Bruce A. Keiser, John Meier, Rebecca L. Stiles, Nalco Company, USA

Suppression of Self-Ignition Tendency of Low Rank Coals Using Degradative Solvent Extraction at Around 350°C, Kouichi Miura, Hiroyasu Fujitsuka, Ryuichi Ashida, Kyoto University, JAPAN

Investigation of Catalytic Mercury Oxidation Kinetics on Supported Gold, Kyoungjin Lee, Erik C. Rupp, Dong-Hee Lim, Jennifer Wilcox, Stanford University, USA

SESSION 41
CARBON MANAGEMENT:
CO₂ STORAGE - 1 (COAL)
Richard Winschel and Steve Carpenter

Assessment of Factors Influencing Effective CO₂ Storage Capacity and Enhanced Gas Recovery in the Marcellus Shale, Michael L. Godec, Advanced Resources International, USA

Development of ECBMR Simulator for Coal-Bearing Formation and Its Application, Sohei Shimada, Yukiya Sakou, The University of Tokyo, JAPAN

Comparison of High-Pressure CO₂ Sorption Isotherms on Eastern and Western US Coals, Vyacheslav Romanov, Bret Howard, DOE/NETL; James Fazio, ORISE/DOE/NETL; Tae-Bong Hur, University of Pittsburgh, USA

An Examination of MVA Techniques Applicable for CCUS in Thin, Stacked Coals of the Central Appalachian Basin. Ellen Gilliland, Nino Ripepi, Michael Karmis, Virginia Tech; Matthew Conrad, Cardno-MM&A, USA

**SESSION 42
COAL SCIENCE:
GENERAL – 4**

Jim Hower and Jonathan Mathews

CO₂ Adsorption During Weathering of Coal Piles: Effect of Coal Rank. Uri Green, The Ariel University Center and The Hebrew University of Jerusalem; Zeev Aizenshtat, The Hebrew University of Jerusalem; Haim Cohen, The Ariel University Center and The Ben-Gurion University of the Negev; Franz Geldmeister, The Ariel University Center and The TU Bergakademie Freiberg, ISRAEL

Gaseous Emissions and Sublimates from the Truman Shepherd Coal Fire, Floyd County, Kentucky. James C. Hower, Kevin R. Henke, Gregory Copley, Samuel Morton, Trent Garrison, University of Kentucky Center for Applied Energy Research; Jennifer M.K. O'Keefe, Morehead State University; Donald R. Blake, University of California at Irvine, USA; Nicola J. Wagner, University of Witwatersrand, SOUTH AFRICA; Carlos H. Sampaio, Universidade Federal do Rio Grande do Sul; André Jasper, Luis F.O. Silva, Centro Universitário UNIVATES, BRAZIL

ReaxFF Molecular Dynamics Pyrolysis Simulations of a Large-Scale Model of Illinois no. 6 Coal Including the Role of Organic Sulfur. Fidel Castro-Marciano, Adri C.T. van Duin, Jonathan P. Mathews, The Pennsylvania State University, USA

Radical Formation in Coals Undergoing Weathering: Effect of Coal Rank. Uri Green, The Ariel University Center and The Hebrew University of Jerusalem; Sharon Ruthstein, The Bar Ilan University; Zeev Aizenshtat, The Hebrew University of Jerusalem; Haim Cohen, The Ariel University Center and The Ben-Gurion University of the Negev, ISRAEL

Elution Control of Toxic Ions from Ashes. Takahiro Kato, Katsuyasu Sugawara, Akita University; Yukio Enda, Akita Industrial Technology Center, JAPAN

**SESSION 43
CLEAN COAL DEMONSTRATION AND
COMMERCIAL PROJECTS: TECHNICAL - 5
(INDUSTRIAL CCUS)**

Charles Miller and Jeff Hoffmann

The US Economic and Energy Outlooks and the Implications for Domestic Coal. Augustine Faucher, PNC Financial Services Group, USA

Port Arthur CCS: Demonstration of Carbon Capture and Sequestration of Steam Methane Reforming Process Gas Used for Large-Scale Hydrogen Production. Anthony Zinn, DOE/NETL; Ken Welch, Bob Hutchison, Kurt Metzler, Kent Kisenbauer, Keith Adams, Air Products and Chemicals, Inc., USA

Illinois Industrial Carbon Capture and Storage Project. Scott McDonald, Archer Daniels Midland Company, USA

Lake Charles Industrial Scale Carbon Capture, Transport and Sequestration. Thomas J. Leib, Leucadia Energy, USA

**SESSION 44
COAL-DERIVED PRODUCTS:
GENERAL - 6**

Ke Liu and Rachid Oukaci

Using Coal Ash as the Layer onto the Steel Tank Protecting its Walls and Bottom when Steel Bars being Dipped in Hot-Melt Zn in it. Nguyen Viet Quang Hung, Nguyen Viet Cuong, Vietnam Academy of Science and Technology, VIETNAM; Masakatsu Nomura, Osaka University, JAPAN

The Effect of Aqueous Solutions Interactions with Bituminous Coal Fly Ashes on the Surface of the Particles Treated with Aqueous Solutions (Acidic and Neutral). Roy Nir Lieberman, Ariel University Center of Samaria and Bar-Ilan University; Haim Cohen, The Ariel University Center and The Ben-Gurion University of the Negev; Yitzhak Mastai, Bar-Ilan University, ISRAEL

Application of a Three Phase Reactor for the Production of SNG. Manuel Götz, Rainer Reimert, Siegfried Bajohr, Karlsruhe Institute of Technology (KIT), GERMANY

**SESSION 45
GASIFICATION:
MODELING – 2**

Steve Markovich and Ting Wang

Case Studies for Various IGCC Parameters Using Blended Coal/Biomass with Supercritical Steam Bottom Cycles. Henry A. Long, III, Ting Wang, University of New Orleans, USA

AVESTAR™ Center: Dynamic Simulation-Based Collaboration Toward Achieving Operational Excellence for IGCC Plants with Carbon Capture. Stephen E. Zitney, Eric A. Liese, Priyadarshi Mahapatra, AVESTAR Center/DOE/NETL; Richard Turton, Debangsu Bhattacharyya, AVESTAR Center/West Virginia University; Graham T. Provost, Fossil Consulting Services, Inc., USA

Economic Analysis of Fossil Fuel Power Plants Meeting Future GHG Regulations. Nicholas Siefert, DOE/NETL; Shawn Litster, Carnegie Mellon University, USA

Control System Design for Maintaining CO₂ Capture in IGCC Power Plants While Load-Following. Debangsu Bhattacharyya, Richard Turton, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

Investigation of the Gasification Performance of Lignite Feedstock and the Injection Design of an E-Gas Like Gasifier. Yan-Tsan Luan, Yau-Pin Chyow, Institute of Nuclear Research, Atomic Energy Council, TAIWAN; Ting Wang, University of New Orleans, USA

**SESSION 46
GASIFICATION:
LOW RANK COAL**

Susan Maley and Massood Ramezan

Small Scale Coal-Biomass to Liquids Production Using Highly Selective Fischer-Tropsch Synthesis. Santosh Gangwal, Southern Research Institute; Arun Bose, DOE/NETL, USA

Pyrolysis Behaviour of Brown Coal in a Pressurized Drop Tube Reactor. Denise Reichel, Stephan Siegl, Kevin Günther, Steffen Krzack, Bernd Meyer, TU Bergakademie Freiberg, GERMANY

Recent Development in Carbonaceous Chemistry for Computational Modeling (C3M). Kiran Chaudhari, Richard Turton, Nathan Weiland, West Virginia University;

Chris Guenther, Mehrdad Shahnam, Dirk VanEssendelft, DOE/NETL; Tingwen Li, Phil Nicoletti, URS; Aytekin Gel, ALPEMI Consulting, LLC, USA

The Study on Kinetics of LRC Mild Pyrolysis. Lijuan Gao, Xianglong Zhao, Zhe Cui, Li Weng, Ke Liu, National Institute of Clean-and-Low-Carbon Energy, CHINA

**SESSION 47
CARBON MANAGEMENT:
CO₂ STORAGE - 2 (COAL)**

Steve Carpenter and Daniel Connell

New Interpretations of Micropore Diffusion of CO₂ and CH₄ in Bituminous Coals. Gregory Staib, Richard Sakurovs, Stephen Weir, CSIRO; Evan Gray, Griffith University, AUSTRALIA

The Application of Constitutive Laws to Model the Dynamic Evolution of Permeability in Coal Seams for the Case of CO₂ Geologic Sequestration and Enhanced Coal Bed Methane Recovery. Foteini Vasilikou, Nino Ripepi, Zach Agioutantis, Michael Karmis, Virginia Center for Coal and Energy Research, Virginia Tech, USA

CoalSeq III Consortium: Advancing the Science of CO₂ Sequestration in Coal Seam and Gas Shale Reservoirs. George Koperina, Anne Oudinot, Advanced Resources International; Satya Harpalani, Southern Illinois University; Khaled Gasem, Oklahoma State University; Ian Palmer, Higgs-Palmer Technologies, USA

The Dynamic Permeability of Propped and Non-Propped Artificial Fracture in Granite and Bituminous Coal with Changes in Effective Stress. Hemant Kumar, Derek Elsworth, Jonathan P. Mathews, Pennsylvania State University; Denis Pone, ConocoPhillips, USA; Jishan Liu, University of Western Australia, AUSTRALIA

Environmental Monitoring for CO₂ Gas Sequestered in Underground Coal Associated with the CONSOL Energy Research Project, Marshall County, West Virginia, USA. Henry W. Rauch, Brad D. Hega, Katherine Felton, Richard A. Bajura, Thomas H. Wilson, West Virginia University; James E. Locke, Richard A. Winschel, CONSOL Energy, Inc.; Arthur W. Wells, J. Rodney Diehl, DOE/NETL, USA

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Jim Hower and Frans Waanders

Development of Dry a Beneficiation Scheme for Soma-Imbat Lignite by Allair Jig and Akafflow. F. Boylu, T. Çetinel, K. Çinku, Ö. Kurulu, N. Yalçın, M.S. Çelik, Istanbul Technical University, TURKEY

Transported Fine Wet Coal, in Contact with Steel, Causes Corrosion. Frans Waanders, North-West University, SOUTH AFRICA

Effect of Charring Temperature on the Physical Structure Properties of Large Particles of Typical Vitrinite-Rich South African Coals. Rufaro Kaitano, Hein WJP Neomagus, Joachim HC du Plooy, Raymond C Everson, North-West University, SOUTH AFRICA

Self-Heat Recuperative Fluidized Bed Drying of Low Rank Coal. Yuping Liu, Yasuki Kansa, Atsushi Tsutsumi, The University of Tokyo; Muhammad Aziz, Tokyo Institute of Technology, JAPAN

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**CLEAN COAL DEMONSTRATION AND
COMMERCIAL PROJECTS: TECHNICAL - 6
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Anthony Zinn and Charles Miller

CCUS Demonstration Project at WA Parish Station - Results of FEED Study, David J. Stopek, Roger Smith, Sean McHone, Sargent & Lundy LLC; Anthony Armprister, PetraNova, LLC, USA

FutureGen 2.0 – Project Status Update, Jeff Hoffmann, Nelson Rekos, DOE/NETL; Ken Humphreys, FutureGen Alliance, USA

Flameless Pressurized Oxy-Combustion Technology Development Projects Review, Massimo Malavasi, ITEA Spa, ITALY

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**COAL-DERIVED PRODUCTS:
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Ke Liu and Rachid Oukaci

Comparison of Corrosion of Cu-Pd and Cu-Pd-M (M=Y or Mg) Hydrogen Separation Membrane Alloys in Simulated Syngas Containing H₂S, Ben Nielsen, URS/DOE/NETL; Omer Dogan, DOE/NETL; Eileen Nall, ORISE/DOE/NETL, USA

Bimetallic Gold-Platinum Nanocatalysts in Water-Gas Shift, Yungchieh Lai, Götz Vesper, University of Pittsburgh, USA

MTO Catalyst Development and Application, Weiping Zhu, National Institute Clean-And-Low-Carbon Energy, USA

Influence of Reduction Temperature on the Performance of Ni-SiO₂ Catalysts for Methanation in Slurry Bed Reactor, Long He, Shu Zhang, Weibo Gong, Deping Xu, Yong-Gang Wang, China University of Mining and Technology (Beijing), CHINA

Effect of Syngas Composition on Productivity of Fischer-Tropsch Synthesis Over Iron Catalyst at Low Temperatures, Heon Jung, Dong-Hyun Chun, Korea Institute of Energy Research, KOREA

Dimethyl Ether Synthesis From CO/CO₂/H₂ Mixtures Over CuO-ZnO-Al₂O₃/γ-Al₂O₃, Faen Song, Yisheng Tan, Yizhuo Han, State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, CHINA

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Ron Breault and Steve Zitney

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Novel Subgrid Model for Calculation of a Char Particle Gasification, Petr A. Nikrityuk, Sebastian Schulze, Matthias Kestel, Dmitry Safronov, Bernd Meyer, TU Bergakademie Freiberg, GERMANY

Steady-State Simulation of a Sour Water Gas Shift Reactor, Parham Mobed, Jeevan Maddala, Raghunathan Rengaswamy, Texas Tech University; Debangsu Bhattacharyya, Richard Turton, West Virginia University, USA

CFD Modeling of Entrained-Flow Coal Gasifiers with Improved Physical and Chemical Sub-Models, Jinliang Ma, URS/DOE/NETL; Stephen E. Zitney, DOE/NETL, USA

Optimal Control System Design for IGCC Power Plants with CO₂ Capture, Dustin Jones, Debangsu Bhattacharyya, Richard Turton, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

Mass Transfer Effects in Low Temperature Gasification Simulations, Ronald W. Breault, DOE/NETL; Phillip Nicoletti, URS Corporation, USA

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CO₂ USE AND METHANE ABATEMENT**
Richard Winschel and Scott Chen

First U.S. Full-Scale Coal Mine Ventilation Air Methane Abatement System Operational on CONSOL Energy's McElroy Mine, Deborah A. Kosmack, Richard A. Winschel, Christian Warfield, CONSOL Energy Inc.; Santosh Lakhan, Jeff Liebert, Verdeo, USA

Electric Power Generation From Waste Methane at a Coal Bed Methane Processing Plant, Deborah A. Kosmack, Richard A. Winschel, CONSOL Energy Inc.; Kevin Ellison, CNX Gas, USA

Utilization Technologies for CO₂ Derived from North Dakota Lignite, Jason D. Laumb, Robert M. Cowan, Alexander Azenkeng, Loreal V. Heebink, Laura J. Raymond, Melanie D. Jensen, Peter A. Letvin, University of North Dakota Energy & Environmental Research Center, USA

CO₂ Conversion and O₂ Generation Using ODF-Based SOEC, Bruce S. Kang, Huang Guo, West Virginia University, USA

Using the Low-Rank Coal as Photocatalysts for Conversion of CO₂ to Methanol, Yating Zhang, Anning Zhou, Rui Yang, Xi'an University of Science and Technology; Jieshan Qiu, Dalian University of Technology, CHINA

Preliminary Study on CO₂ Utilization Supply Chain, Xinglei Zhao, Li Weng, Ke Liu, Guotao Li, National Institute of Clean-and-Low-Carbon Energy (NICE), CHINA

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CARBON MANAGEMENT:
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Steve Carpenter and Daniel Connell

U.S. DOE's Carbon Storage R&D Program: DOE Sponsored Field Projects Utilizing Carbon Dioxide for Storage during Enhanced Oil and Coalbed Methane Recovery, John Litynski, DOE/NETL; Derek Vikara, Ram Srivastava, Keylogic Inc., USA

NETL CO₂ Injection and Storage Cost Model, Tim Grant, Dave Morgan, DOE/NETL; Jason Valenstein, Andrea Poe, Marta Milan, Booz Allen Hamilton, Inc.; Richard Lawrence, Advanced Resources International, Inc., USA

Monitoring and Verification for Carbon Capture Utilization and Storage (CCUS), Dwight Peters, Schlumberger Carbon Services, USA

Opportunities for Utilizing Anthropogenic CO₂ for Enhanced Oil Recovery (EOR), Michael L. Godec, Advanced Resources International, USA

CO₂ Sequestration at AEP's Mountaineer Plant – Storage, Post Injection Monitoring and Verification, Indrajit Bhattacharya, Daniel M. Duellman, Gary O. Spitznogle, American Electric Power, USA

Initial Lessons Learned From the SECARB Anthropogenic Test: The First U.S. Integrated CO₂ Capture, Transportation and Storage Test, George Koperna, Jr., David Riestenberg, Vello Kuuskraa, Advanced Resources International, Inc.; Richard Rhudy, Robert Trautz, EPRI; Gerald R. Hill, Southern States Energy Board; Richard Esposito, Southern Company, USA

**SESSION 54
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Jim Hower and Leslie Ruppert

Chinese Coal-in-Title Journal Articles in Chinese and English, Jonathan P. Mathews, Chunshan Song, Wenting Yue, The Pennsylvania State University; Robert Finkelman, University of Texas at Dallas, USA

Study on the Volatilization of O-Containing Functional Groups During the Mild Pyrolysis Using Shengli Brown Coal, Yong-Gang Wang, Jian-Lin Zhou, Min Xu, De-Ping Xu, Shu Zhang, China University of Mining and Technology (Beijing), CHINA

Influence of Interaction between Coal and Caking Additive on Thermoplasticity of Coal Blends, Noriyuki Okuyama, Takahiro Shishido, Koji Sakai, Maki Hamaguchi, Naoki Kikuchi, KOBE STEEL, Ltd.; Haruo Kumagai, Hokkaido University, JAPAN

Recent Trend in Fines Coal Beneficiation – Indian Perspective, T. N. Das, A. Datta, M. N. Dastur & Company (P) Ltd.; S. Mukherjee, Bengal Engineering and Science University, INDIA

Release Behavior of Boron During Heat Treatments of Coals, Katsuyasu Sugawara, Yuuki Mochizuki, Takahiro Kato, Akita University; Yukio Enda, Akita Industrial Technology Center, JAPAN

Optimizing Coal Flotation Control Based on an On-Stream Analyzer, Xiao-ping Yang, Yan-ru Chen, Xiao-qiang Wang, China University of Mining & Technology, CHINA

**POSTER SESSIONS
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COMBUSTION**

Effective Direct Chemical Looping Coal Combustion with Using of Bi-Metallic Supported Fe₂O₃-CuO Oxygen Carriers, Ewelina Ksepko, Grzegorz Labojko, Marek Sciazko, Institute for Chemical Processing of Coal, POLAND

Mercury Emission from Co-Combustion of Coal and Sludge in a Drop Tube Furnace, Sang-Sup Lee, Sin-Wook Kang, Chungbuk National University; Sang-Hyun Jeong, Sung-Hoon Shim, Korea Institute of Machinery and Materials, KOREA

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GASIFICATION**

Review of Techniques for Oxygen Separation from Air, Karen J. Uffalussy, Evan J. Granite, Henry W. Pennline, DOE/NETL, USA

A Brief History of Oxygen Separation from Air, Michael Hajduk, Karen J. Uffalussy, Evan J. Granite, DOE/NETL, USA

Numerical Simulation of Coal Gasification in OMB Coal Gasifier, Jianliang Xu, Xueli Chen, Guangsuo Yu, Zhenhua Dai, Haifeng Liu, East China University of Science and Technology, CHINA

Iron Mineral Changes of Two Coal Types Occurring During Gasification, F.B. Waanders, North-West University, SOUTH AFRICA

A Laboratory-Scale Entrained-Flow Reactor for Parameter Studies of Coal and Biomass Pyrolysis and Gasification, Micah S. Jakulewicz, Jason M. Porter, Terence E. Parker, Colorado School of Mines, USA

A Parametric Study of Sorption Enhanced Steam Hydrogasification of Coal for In Situ Removal of CO₂ with Self-Sustained Hydrogen Supply, Zhongzhe Liu, Chan S. Park, Joseph M. Norbeck, Center for Environmental Research and Technology (CE-CERT), University of California, Riverside, USA

Small Scale Coal-Biomass to Liquids Production Using Highly Selective Fischer-Tropsch Synthesis, Santosh Gangwal, Southern Research Institute; Arun Bose, DOE/NETL, USA

**POSTER SESSION 3
SUSTAINABILITY AND ENVIRONMENT**

Desulfurization Behavior of Turkish Lignite by Hydrogenation and Hydrothermal Processes, Arzu Kanca, Deniz Uner, Middle East Technical University, TURKEY

**POSTER SESSION 4
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A Field Study on Simulation of CO₂ Injection-ECBM Production and Prediction of CO₂ Storage Capacity in Un-Mineable Coal Seam, Qin He, Shahab D. Mohaghegh, Vida Gholami, West Virginia University, USA

Modeling Analysis of CO₂ Sequestration in Saline Formation Using Artificial Intelligence Technology, Vida Gholami, Shahab D. Mohaghegh, West Virginia University, USA

Influence of Temperature and Moisture on Gas Permeability of Matrix Coal, Jun Zhang, Jianli Yang, Yunmei Li, Hongxian Niu, State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences; Feng Gao, Taiyuan University of Technology, CHINA

Characterization and CO₂ Sorption Properties of Materials for CCS Applications, Jiajun He, Erik C. Rupp, Jennifer Wilcox, Stanford University, USA

Fracture Model, Ground Displacements and Tracer Observations: Fruitland Coals, San Juan Basin, New Mexico, CO₂ Pilot Test, Tom Wilson, Matt Weber, Hema

Siriwardane, West Virginia University/DOE/NETL; Art Wells, DOE/NETL; Bill Akwari, ConocoPhillips; George Koperna, Advanced Resources International; Jim Bennett, Schlumberger, USA

Recent Advances in Carbon Dioxide Capture with Sorbents for Power Generation Point Sources, Henry W. Pennline, DOE/NETL, USA

U.S. Geological Survey Geologic Sequestration Assessment – 2012 Project Update, Margo D. Corum, Peter D. Warwick, U.S. Geological Survey, USA

Results of USGS Workshop on CO₂ Sequestration in Unconventional Reservoirs, Kevin B. Jones, Margo D. Corum, U.S. Geological Survey, USA

**POSTER SESSION 5
COAL-DERIVED PRODUCTS**

Preliminary Study of Hydrothermal Extraction of Direct Coal Liquefaction Residue, Xingjia Jiang, Jianli Yang, Wenzhong Shen, State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, CHINA; Hong Cui, University of Hawaii at Manoa, USA

Coal-Derived Humic Acid Intercalated Zn-Mg-Al Layered Double Hydroxides: Preparation and Application in Coal Fire Prevention, Anning Zhou, Bo Liu, Xuemei Jia, Xi'an University of Science and Technology, CHINA

Performance of Coal/Polyaniline Composites in Epoxy for Corrosion Resistant Coatings, Anning Zhou, Kun Zhang, Shanxin Xiong, Jia Chu, Xi'an University of Science and Technology, CHINA

Integrated Process of Coal Pyrolysis and Methane Activation for Improving Tar Yield, Haoquan Hu, Lijun Jin, Jiahe Liu, Xinfu He, Pengfei Wang, Xun Zhou, Shengwei Zhu, Dalian University of Technology, CHINA

Catalytic Hydrogenation of the Various Coals with Hydrogen over Molybdenum-Contained Catalyst for the Production of Liquefied Hydrocarbon Fuels, Cheol Jin Jeong, Gi Bo Han, Jung Hee Jang, Changsik Choi, Yongseung Yun, Institute for Advanced Engineering; Tae Jin Lee, Yeungnam University, KOREA

Simulation of a Commercial-Scale Slurry Bubble Column Reactor for Fischer-Tropsch Synthesis using Cobalt Catalyst, Laurent Sehabiague, Badie I. Morsi, University of Pittsburgh; Rachid Oukaci, Energy Technology Partners, LLC, USA

Storage of Volatile Renewable Energy in the Gas Grid Applying 3-Phase Methanation, Manuel Götz, Rainer Reimert, Siegfried Bajohr, Karlsruhe Institute of Technology (KIT), GERMANY

**POSTER SESSION 6
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Chemometric Studies on Relationship Between Fly Ash Elemental Composition and Collecting Equipment Rows, Bruno Valentim, Helena Ribeiro, Universidade do Porto, PORTUGAL; James C. Hower, University of Kentucky Center for Applied Energy Research, USA

Effects of Nitrogen and Sulfur on Coal Fluidity During Carbonization, Yuuki Mochizuki, Naoto Tsubouchi, Hokkaido University; Yohei Ono, Mitsubishi Chemical Corporation; Kazuya Uebo, Sumitomo Metal Industries, Ltd., JAPAN

Dynamic Swelling Behavior of Pretreated Coal in Solvent, Lei Chen, Hang Gao, State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, CHINA

Effect of the MagMill on Coal Grindability and Coal Abrasiveness, R. R. Oder, EXPORTech Company, Inc., USA

Predictions of Voidage in a Packed Bed of Large Coal Particles, Gavin S. Deas, Roelof Coetzer, Adam Luckos, Sasol Technology, SOUTH AFRICA

Flotation of Fine Coal Using Cavitation Venture Tube for Pico and Nanobubble Generation to Improve Collision/Attachment, Felicia Peng, Yu Xiong, West Virginia University, USA

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