



TWENTY - EIGHTH ANNUAL INTERNATIONAL PITTSBURGH COAL CONFERENCE

FINAL PROGRAM

COAL - ENERGY, ENVIRONMENT AND
SUSTAINABLE DEVELOPMENT



September 12 - 15, 2011

Pittsburgh, PA USA

The David L. Lawrence Convention Center



Sponsors



北京低碳清洁能源研究所
NATIONAL INSTITUTE OF CLEAN-AND-LOW-CARBON ENERGY

Hosted By:
University of Pittsburgh
Swanson School of Engineering



WELCOME!

On behalf of the Conference Advisory Board, Conference Committees, and the University of Pittsburgh we welcome you to the Twenty-Eighth Annual International Pittsburgh Coal Conference held September 12 - 15, 2011 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 will be presented throughout the conference. The Poster Sessions will be held on Wednesday, September 14 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: Charles McConnell, Chief Operating Officer, Fossil Energy, Department of Energy, USA; Thomas J. Bonner, President, Cogentrix Energy, LLC, USA; Steve Herman, Managing Director, Energy Capital Partners, USA; Yuzhuo Zhang, CEO, Shenhua Group, CHINA; Steve Orlins, President, National Committee on US-China Relations, USA; Mustafa Ziyapak, Head of Research and Development Department, Turkish Coal Enterprise (TKI), TURKEY; Anthony Cugini, Director, Department of Energy, USA; Steven E. Winberg, Vice President, R&D, CONSOL Energy Inc., USA; and Frank Princiotta, Director, Air Pollution Prevention and Control Division, USEPA, USA.

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 2011 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 Twenty-Ninth Annual International Pittsburgh Coal Conference, which will be held in Pittsburgh, PA, USA at the David L. Lawrence Convention Center from October 15-18, 2012.

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, September 12, 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, September 13, 2011

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, SEPTEMBER 12, 2011

Technical Tour	11:00 - 16:00
Registration	15:00 - 19:00
Reception	18:30 - 20:30

TUESDAY, SEPTEMBER 13, 2011

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, SEPTEMBER 14, 2011

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, SEPTEMBER 15, 2011

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, SEPTEMBER 13, 2011

Energy Production/Policy Speakers

Charles McConnell

Chief Operating Officer, Fossil Energy
Department of Energy, USA

“Coal in a Carbon-Constrained Future”

Thomas J. Bonner

President
Cogentrix Energy, LLC, USA

“Consideration of Coal and other Fuels in the Development and Operation of a Power Generation Portfolio in the United States”

Steve Herman

Managing Director
Energy Capital Partners, USA

“Private Equity and Coal Infrastructure”

WEDNESDAY, SEPTEMBER 14, 2011

International Issues

Yuzhuo Zhang

CEO
Shenhua Group, CHINA

“The Cleaner Coal Conversion & Utilization Technologies in Shenhua and China”

Steve Orlins

President
National Committee on US-China Relations, USA

“U.S.-China Relations: A Vision for the Future”

Mustafa Ziypak

Head of Research and Development Department
Turkish Coal Enterprise (TKI), TURKEY

“Development of Gasification and Activities in Turkish Coal Enterprises”

THURSDAY, SEPTEMBER 15, 2011

Environmental Issues

Anthony Cugini

Director
Department of Energy, USA

“Emerging Fossil Energy Technologies”

Steven E. Winberg

Vice President, R & D
CONSOL Energy Inc., USA

“The Future of Coal - It Is Up To Us!”

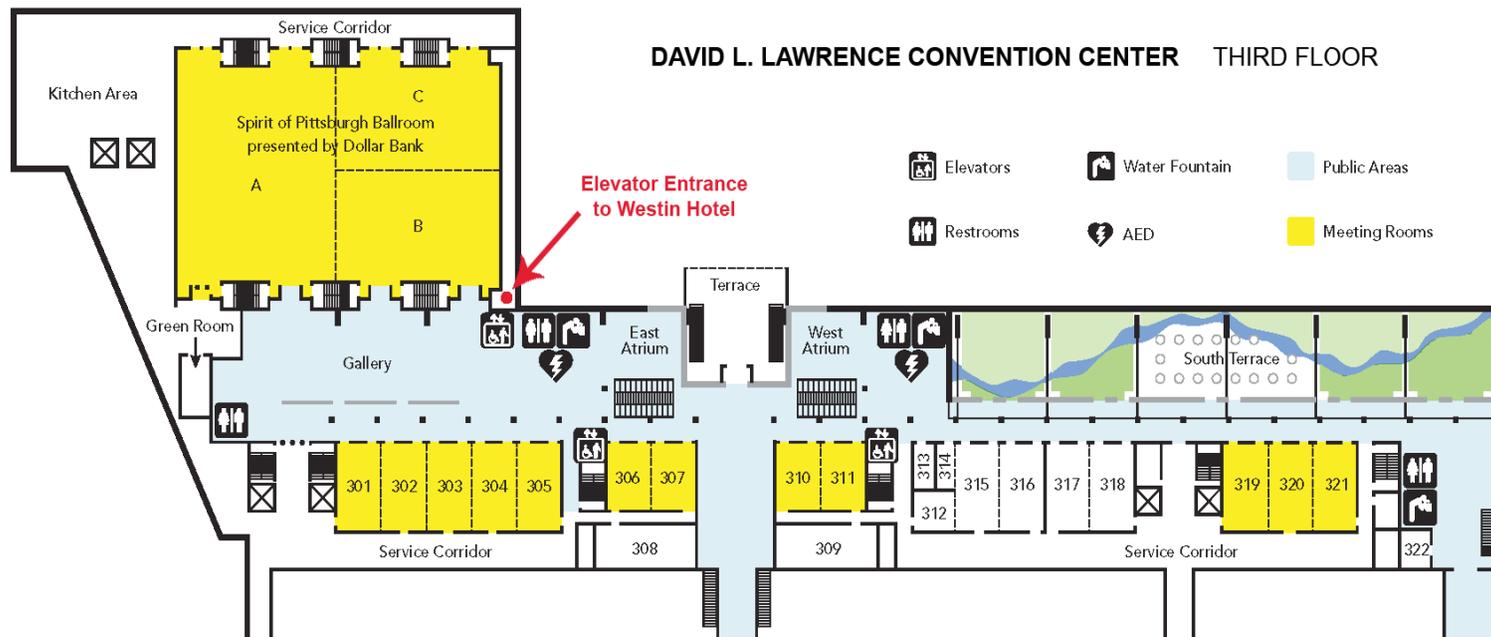
Frank Princiotta

Director, Air Pollution Prevention and Control
Division, USEPA, USA

“The Role of Coal in a Carbon Constrained World”

Monday, September 12, 2011						
11:00-16:00	Technical Tour – Cardinal Plant					
15:00-19:00	Registration – Room 306					
18:30-20:30	Reception – Rooftop Terrace					
Tuesday, September 13, 2011						
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	Major CCS Demo Projects: Financing of CCT and CCS Projects	Gasification: General Session – 1	Coal-Derived Products: General – 1	Carbon Management: CO ₂ Capture – Sorbents – 1	Combustion: Emission Controls	Mining
12:00-13:30	Conference Luncheon – Ballroom					
	Session 7	Session 8	Session 9	Session 10	Session 11	Session 12
13:30-15:10	Major CCS Demo Projects: Financial Risk Management Strategies for CCT	Gasification: Economics	Coal-Derived Products: General – 2	Carbon Management: CO ₂ Capture – Sorbents – 2	Combustion: Oxy-Combustion – 1	Coal Science: Beneficiation
15:10-15:25	Coffee Break					
	Session 13	Session 14	Session 15	Session 16	Session 17	Session 18
15:25-17:25	Major CCS Demo Projects: Insurance and Risk Management Strategies for CCS	Gasification: Modeling – 1	Coal-Derived Products: General – 3	Carbon Management: CO ₂ Capture – Sorbents – 3	Combustion: Oxy-Combustion – 2	Coal Science: Coal Geochemistry
18:00-21:00	Gateway Clipper Dinner Cruise					
Wednesday, September 14, 2011						
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	Major CCS Demonstration Projects: General – 1	Gasification: Low Rank coal	Coal-Derived Products: General – 4	Carbon Management: CCS and GHG Abatement – 1	Combustion: Combustion Studies – 1	Coal Science: Coal Geology
12:00-13:30	Conference Luncheon – Ballroom					
	Session 25	Session 26	Session 27	Session 28	Session 29	Session 30
13:30-15:10	Major CCS Demonstration Projects: General – 2	Gasification: Coal & Biomass	Coal-Derived Products: General – 5	Carbon Management: SECARB-ED CCS Training Session – 1	Combustion: Chemical Looping – 1	Coal Science: Coal Science – 1
15:10-15:25	Coffee Break					
	Session 31	Session 32	Session 33	Session 34	Session 35	Session 36
15:25-17:25	Major CCS Demonstration Projects: General – 3	Gasification: Modeling – 2	Coal-Derived Products: General – 6	Carbon Management: SECARB-ED CCS Training Session – 2	Combustion: Chemical Looping – 2	Coal Science: Coal Science – 2
18:00-21:00	Poster Session – Room 319/320/321					
Thursday, September 15, 2011						
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	Major CCS Demonstration Projects: General – 4	Gasification: Fundamentals	Gasification: General – 2	Carbon Management: CCS and GHG Abatement – 2	Combustion: Combustion Studies – 2	Sustainability and Environment: General – 1
12:00-13:30	Awards Luncheon – Ballroom					
	Session 43	Session 44	Session 45	Session 46	Session 47	Session 48
13:30-15:10	Major CCS Demonstration Projects: General – 5	Gasification: Gas Cleanup	Gasification: General – 3	Carbon Management: CCS and GHG Abatement – 3	Carbon Management: CO ₂ Geologic Sequestration – Coal	Sustainability and Environment: General – 2
15:10-15:25	Coffee Break					
	Session 49	Session 50	Session 51	Session 52	Session 53	Session 54
15:25-17:25	Major CCS Demonstration Projects: General – 6	Gasification: Underground Coal Gasification	Gasification: General – 4	Carbon Management: CCS and GHG Abatement – 4	Carbon Management: CO ₂ Capture – Solvents	Sustainability and Environment: General – 3
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, September 13, 2011

SESSION 1

MAJOR CCS DEMONSTRATION PROJECTS: FINANCING OF CCT AND CCS PROJECTS

Tom Sarkus and Tina Vital

Opening Remarks - Tom Sarkus, DOE/NETL, USA

Carbon Markets: Unlocking Value Through Political Risk Insurance, Antonio Barbalho, The World Bank Group, USA

Financing Energy Sustainability – Efficiency and Conversion to Reduce GHG, Robert A. Payne, Cate Street Capital, Inc., USA

Roundtable Discussion

SESSION 2

GASIFICATION: GENERAL – 1

Jenny Tennant and Sam Tam

An Overview of U.S. DOE's Advanced Gasification Technologies Program, Jenny B. Tennant, DOE/NETL, USA

Dispatchable Operation of IGCC, Donald J. Chmielewski, Benjamin Omell, Ming Wei Yang, Illinois Institute of Technology, USA

Advanced Virtual Energy Simulation, Training, and Research: IGCC with CO₂ Capture Power Plant, Stephen E. Zitney, Eric A. Liese, Priyadarshi Mahapatra, Richard Turton, Debangsu Bhattacharyya, DOE/NETL/AVESTAR Center; Graham T. Provost, Fossil Consulting Services, Inc., USA

Enabling Clean Coal Power Generation: ITM Oxygen Technology, Lori L. Anderson, Phillip A. Armstrong, John M. Repasky, VanEric E. Stein, Air Products and Chemicals, Inc., USA

SESSION 3

COAL-DERIVED PRODUCTS: GENERAL – 1

Rachid Oukaci and Steve Xiao

Development of a Fluidizable Catalyst and Transport Reactor-Based Methanation Process for the Conversion of Syngas into Pipeline Quality Natural Gas, Jason Trembly, Brian S. Turk, Jon McCarty, Maruthi Pavani, Jian-Ping Shen, Raghubir P. Gupta, RTI International, USA

SESSION 4

CARBON MANAGEMENT: CO₂ CAPTURE - SORBENTS – 1

Richard Winschel and Steve Carpenter

A Rigorous Yet Scalable Kinetic Model for the Uptake of CO₂ By Silica-Supported, PEI-Impregnated Sorbents, David S. Mebane, Daniel Fauth, McMahan Gray, DOE/NETL, USA

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

A Model for the Adsorption Kinetics of CO₂ on Amine-Impregnated Mesoporous Sorbents in the Presence of Water, Andrew Lee, David Mebane, David C. Miller, Dan Fauth, DOE/NETL, USA

Investigation of High Temperature Steam Hydration of Calcium Oxide for Improved Carbon Dioxide Capture Over Multiple Cycles, Nihar Phalak, Niranjani Deshpande, L. S. Fan, The Ohio State University, USA

SESSION 5

COMBUSTION: EMISSION CONTROLS

John Wheeldon and Evan Granite

Deactivation of Selective Catalytic Reduction (SCR) Catalyst by Phosphorus: Proposed Mechanism and Solution, Mandar Gadgil, Babcock & Wilcox, USA

Development of Repetitive Pulsed Electron Beam Technology for Removing NO_x and SO_x from Flue Gas, John D. Sethian, Matt Wolford, Laser Plasma Branch, Naval Research Laboratory, USA

Modeling Secondary Coal Pyrolysis and NO_x Release for Pulverized Coal Combustion, Dong Zeng, Alan N. Sayre, Shengteng Hu, Hamid Sarv, Babcock & Wilcox, USA

Prediction of Emissions and Performance of a 650 MW Coal-Fired Boiler Using CFD, Alejandro Posada, Ismail Celik, West Virginia University, DOE/NETL; Benjamin Chorpening, DOE/NETL; Nathan Jakinovich, Detroit Edison Belle River Power Plant, USA

Mercury Emission Control by Wet Scrubber with Super Static Mixer, Shinji Kambara, Hiroshi Moritomi, Gifu University; Eiichiro Makino, Sojitz Corporation; Hisao Kojima, Mu Company Ltd., JAPAN

SESSION 6

MINING: GENERAL

Francois Botha

The Corrosion Potential of Rock Bolts on Coal Mines, A.J.S. Spearing, K. Mondal, G. Bylapudi, J. Weber, Southern Illinois University Carbondale; J. Hirschi, Illinois Clean Coal Institute, USA

Characterization of Coal and Quartz Dust from an Indiana Mine, Y. P. Chugh, K. Mondal, V.K. Kollipara, H. Gurley, D.D. Relangi, Southern Illinois University Carbondale; Joe Hirschi, Illinois Clean Coal Institute, USA

An Integrated Model for Predicting Atmospheric Status in a Sealed Mine Area, J.W.Cheng, Y. Luo, West Virginia University, USA

Assessment of SIUC Engineered Cribbs for Mine Support, Harrold Gurley, Y. P. Chugh, Southern Illinois University Carbondale; Joseph Hirschi, Illinois Clean Coal Institute, USA

A Numerical Analysis of a Four-Way Coal Mine Intersection with Primary and Secondary Supports: Additional Analyses, Y. P. Chugh, Behrooz Abbasi, Southern Illinois University Carbondale; Joseph Hirschi, Illinois Clean Coal Institute, USA

SESSION 7

MAJOR CCS DEMONSTRATION PROJECTS: FINANCIAL RISK MANAGEMENT STRATEGIES FOR CCT

Marty Webler and Tina Vital

Project Financing & the Texas Clean Energy Project (TCEP), Eric Redman, Summit Power Group Inc., USA

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

Investment and Risk Transfer in Energy Markets, Glen Swindle, Eleven Madison, USA

Roundtable Discussion

SESSION 8

GASIFICATION: ECONOMICS

Pete Rozzell and Massood Ramezan

Cost Comparisons of Coal-Fired Power Plants with Carbon Capture, Norman Z. Shilling, GE Power & Water; James R. Y. Rawson, GE Global Research; Jeffrey S. Goldmeier, GE Energy, USA

Load-Following Control of an IGCC Plant with CO₂ Capture, Debangsu Bhattacharyya, Richard Turton, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

Economic Evaluation of the UCSRP-HP Process in IGCC Applications, S. James Zhou, Arun Basu, Ajay Makkuni, Howard Meyer, Gas Technology Institute, USA

Exergy & Economic Analysis of an IGCC-CSS Power Plant using H₂ and O₂ Separation Membranes, Nicholas Siefert, Carnegie Mellon University, DOE/NETL; Dhruv Bhatnagar, Shawn Litster, Carnegie Mellon University, USA

Polygeneration Added Value to Coal Gasification, Aleksander Sobolewski, Institute for Chemical Processing of Coal, POLAND

SESSION 9

COAL-DERIVED PRODUCTS: GENERAL – 2

Rachid Oukaci and Steve Xiao

Direct Hydrogen Production from Warm Coal and Biomass Syngas, Liyu Li, Chris J. Howard, Baowei Chen, Shari X. Li, Haobo Chen, David L. King, Pacific Northwest National Laboratory; Yuhua Duan, James C. Fisher II, DOE/NETL; Keling Zhang, Prabhakar Singh, University of Connecticut, USA; Yunhan Xiao, Research Center for Clean Energy and Power of Chinese Academy of Sciences, CHINA

Catalytic CO₂ Char Gasification for Commercial Materials Production, Hua Song, Jason Trembly, Nandita Akunuri, Brian S. Turk, Raghubir P. Gupta, RTI International, USA

Determination of the Effect of Coal/Biomass-Derived Syngas Contaminants on the Performance of Fischer-Tropsch and Water-Gas-Shift Catalysts, Jason Trembly, Justin Farmer, Brian S. Turk, Raghubir P. Gupta, RTI International, USA

Effects of a Real Syngas on Pd-Alloy Hydrogen Separation Membranes, Bret H. Howard, Bryan D. Morreale, DOE/NETL; John M. Wheeldon, National Carbon Capture Center, USA

Temperature Influence on the By-Products from Pyrolyses Processes of Coal and Comparison to the Theoretical Balance Model, Dagmar Juchelková, Veronika Sassmanová, Jaroslav Frantík, Stanislav Honus, Marek Večeř, VSB-Technical University of Ostrava, CZECH REPUBLIC

SESSION 10
CARBON MANAGEMENT:
CO₂ CAPTURE - SORBENTS – 2
Richard Winschel and Steve Carpenter

Implications of Flue Gas Components on the Performance of Sorbents, James S. Hoffman, McMahan L. Gray, Daniel J. Fauth, Henry W. Pennline, DOE/NETL, USA

Modelling of Circulating Fluidised Beds for Post-Combustion Carbon Capture, Andrew Lee, David C. Miller, Larry Shadle, DOE/NETL, USA

Efficient Theoretical Screening of Solid Sorbents for CO₂ Capture Applications, Yuhua Duan, Dan C. Sorescu, David Luebke, DOE/NETL, USA

Design and Characterization of Low Lifetime Cost Adsorbents for Carbon Capture, Steven R. Lustig, Dennis Redder, Mark Scialdone, Ke Li, Hing Yim, Anne Marie Niehaus, Beth Cheney, Megan Quigley, Mark Shiflett, DuPont, USA

Postcombustion CO₂ Capture Using Some Nanocomposite Amine Functionalized Sorbents, An Zhao, Arunkumar Samanta, Rajender Gupta, University of Alberta, CANADA

SESSION 11
COMBUSTION:
OXY-COMBUSTION – 1
John Wheeldon and Evan Granite

Oxy-Fired Flue-Gas Recycle Pilot-Plant Demonstration, Thomas K. Gale, John T. Cover, Southern Research Institute; Timothy Fout, DOE/NETL, USA

Effect of Pure O₂ Injection on Flame Stability in Co-Axial Oxy-Fuel Turbulent Diffusion Flames, Dadmehr Rezaei, Eric G. Eddings, Kerry E. Kelly, Jost O.L. Wendt, University of Utah, USA

Idea for Use of ASU Waste Nitrogen for Coal Pre-Drying within Oxy-Fuel Power Unit, Marcin Liszka, Grzegorz Szapajko, Grzegorz T. Nowak, Silesian University of Technology, POLAND

SESSION 12
COAL SCIENCE:
BENEFICIATION
Jim Hower and Leslie Ruppert

Fe-minerals and Multiple Implications in Coal Cleaning Rejects, Frans Waanders, North West University, SOUTH AFRICA; Luis F. O. Silva, Marcos L. S. Oliveira, Kátia da Boit, Catarinense Institut of Environmental Research and Human Development – IPADHC, BRAZIL

The Determination of Drying Properties of High Moistured Turkish Lignites, H. Dincer Atesok, G. Atesok, M. Ozer, O. Kangal, Istanbul Technical University, TURKEY

Single Particle Impact Breakage of Coal, Jacob Viljoen, Quentin P. Campbell, North- West University, SOUTH AFRICA

SESSION 13
MAJOR CCS DEMONSTRATION PROJECTS:
INSURANCE AND RISK MANAGEMENT
STRATEGIES FOR CCS
Tom Sarkus and Marty Webler

Risk Management and Insurance: A Utility Perspective on CCS Deployment, Gary O. Spitznogle, American Electric Power, USA

The Insurance Industry Perspective: Characterizing, Evaluating and Insuring CCS Risk, Robert P. Hallenbeck, Jr., XL Insurance - Environmental, USA

Risk Management Approach to Coal Utilization, Bob Percopo, AIG Chartis, USA

Managing the Risks Related to CCS, Hans A Bratfos, DNV, USA

Roundtable Discussion

SESSION 14
GASIFICATION:
MODELING – 1

Larry Duke and Steve Zitney

Pressurized Entrained Flow Coal Gasifier Performance: A Parametric Study, Kevin J. Whitty, Travis Waind, David R. Wagner, University of Utah, USA

Experimental and Modeling Studies of Pressurized Coal Gasification Behavior, Daniel G. Roberts, San Shwe Hla, David J Harris, AUSTRALIA; JS Ravichandra, Jayesh Jain, GE Global Research, INDIA; Ian Fengguo, Lv Jing, GE Global Research, CHINA; Greg Laskowski, GE Global Research; Shi Shaoping, GE Energy Gasification, USA

Steady-State Modeling of a Single-Stage, Downward-Firing, Entrained-Flow Gasifier, Job Kasule, Richard Turton, Debansu Bhattacharyya, West Virginia University; Stephen E. Zitney, DOE/NETL, USA

Experimental Validation of Syngas Composition of an Entrained Flow Gasifier Model Under Different Operating Conditions, Arnab Roy, Srinath Ekkad, Uri Vandsburger, Virginia Tech, USA

Using Fundamental Data to Model Entrained Flow Gasification: Impacts of Coal Type on Gasifier Performance, San Shwe Hla, Daniel Roberts, David Harris, CSIRO Energy Technology, AUSTRALIA

SESSION 15
COAL-DERIVED PRODUCTS:
GENERAL – 3

Rachid Oukaci and Steve Xiao

Upgrading of Low Grade Carbon Resources through Solvent Treatment to Produce Solid Fuels and Precursors for Chemicals and Materials, Xian Li, Ryuichi Ashida, Kouichi Miura, Kyoto University, JAPAN; Janewit Wannapeera, Nakorn Worasuwannarak, King Mongkut's University of Technology Thonburi, THAILAND

High Yield Coal and Biomass Liquefaction by Hydrolysis with CO₂ Capture, Xin Xiao, Savannah River National Laboratory, USA

Liquefaction of Lower Rank Coal Under Mild Condition and the Structure Characteristics of Corresponding Heavy Products, Jianli Yang, Yuliang Hao, Muxin Liu, Yong Yang, Institute of Coal Chemistry, Chinese Academy of Sciences, CHINA

Coal Gasification with Methane Reforming: A Novel Environmentally Benign CTL Process, Ripudaman Malhotra, Jin-Ping Lim, Diego del Rio Diaz-Jara, Donald J. Eckstrom, Daniel Steele, Robert B. Wilson, SRI International; Stephen J. Niksa, Niksa Energy Associates, USA

SESSION 16
CARBON MANAGEMENT:
CO₂ CAPTURE - SORBENTS – 3
Deborah Kosmack and James Locke

Effect of Surface Functionality for CO₂ Adsorption in Microporous Carbon, Yangyang Liu, Jennifer Wilcox, Stanford University, USA

Effect of Additives on the Decomposition of Calcium Carbonate for Enhanced Steam Reforming of Methane Sorbent Regeneration, Duane D. Miller, Thomas Simonyi, URS/DOE/NETL; Ranjani Siriwardane, DOE/NETL, USA

Mesoporous Silica Hybrid Adsorbents for CO₂ Capture By Vacuum Swing Adsorption, Alan. L. Chaffee, Greg Knowles, Zhijian Liang, Dirgarini JN Subagyono, Monash University, AUSTRALIA

SESSION 17
COMBUSTION:
OXY-COMBUSTION – 2

John Wheeldon and Evan Granite

Effects of Moisture on Char Burnout During Warm-Recycle Oxy-Coal Combustion, Shengteng Hu, Dong Zeng, Hamid Sarv, Alan N. Sayre, Babcock & Wilcox, USA

Combustion of Solid Fuels in High Pressure Oxygen Environments under Different Firing Scenarios, Paul Cairns, Bruce Clements, Edward J. Anthony, CanmetENERGY, Natural Resources Canada; Arturo Macchi, University of Ottawa, CANADA

Kinetics Rate Parameters for an Extended Single-Film Char Consumption Model Proposed for CFD Simulations of Oxy-Combustion of Pulverized Coal, M. Geier, C. R. Shaddix, Sandia National Labs, USA

Effect of Biomass Blending on Oxy-Fuel Coal Combustion, Ping Wang, Kent Casleton, Sheila Hedges, DOE/NETL, USA

Reactivity Comparison of German Lignite and Victorian Brown Coal Chars Under Oxy-Fuel Conditions, Luguang Chen, Sankar Bhattacharya, Monash University, AUSTRALIA; Thomas Ried, Technical University of Munich, GERMANY

Particulate Formation from Pulverized Coal under Oxy-fuel Combustion Conditions, Yunlu Jia, JoAnn S. Lighty, University of Utah, USA

SESSION 18
COAL SCIENCE:
COAL GEOCHEMISTRY

Jim Hower and Leslie Ruppert

Review of Minor Element Distribution in Iron Disulfides in Coal, Allan Kolker, U.S. Geological Survey, USA

Development of an Improved CCSEM Technique for Quantitative Coal Mineralogy, Alexander Azenkeng, Donald P. McCollor, Joshua J. Stanislawski, University of North Dakota Energy & Environmental Research Center, USA

Geological Framework and Economic Potential of Newly Discovered Coal Prospect in Midwest Tenement, Moatize Coalfield, Tete Province, Mozambique, G. Lakshminarayana, G. Raghavendra, Y. Arun Kumr, M. Hari Krishna, G. Vijaykumar, K. Raghava Reddy, Midwest Coal, MOZAMBIQUE

Analysis of Trace Hazardous Elements in Flue Gas Desulfurization Water and the Removal of These

Elements from the Water, Akira Ohki, Tsunenori Nakajima, Hirokazu Takanashi, Kagoshima University, JAPAN

ORAL SESSIONS

Wednesday, September 14, 2011

SESSION 19
MAJOR CCS DEMONSTRATION PROJECTS:
GENERAL – 1
J. Lewis and D. Madden

U.S. Department of Energy's Major Demonstration Program, Michael Knaggs, DOE/NETL, USA

Alberta's CCS Programs and the Role of New Technologies, Duke du Plessis, Alberta Innovates: Energy and Environment Solutions, CANADA

The Case for Carbon Capture & Storage (CCS) as a Clean Development Mechanism (CDM), Steven M. Carpenter, Advanced Resources International, Inc., USA

Monitoring Large Volume of CO₂ Injection at Cranfield: Early Field Test of SECARB Phase III, Changbing Yang, Susan Hovorka, Gulf Coast Carbon Center, Bureau of Economic Geology the University of Texas at Austin, USA

SESSION 20
GASIFICATION:
LOW RANK COAL
Jenny Tennant and Pete Rozell

Coal Fired IGCC Power Plants in Wyoming, William C. Schaffers, David Bell, University of Wyoming, USA

Gasification of High-Ash Chinese Coals Utilizing KBR's Oxygen-Blown TRIG Technology, Michael L. Swanson, UNDEERC; Peter Smith, Ron Gualy, KBR Technology Coal Monetization, USA

SESSION 21
COAL-DERIVED PRODUCTS:
GENERAL – 4
Ke Liu and Steve Xiao

Robust Nanostructured Noble Metal/ Ceria/Lanthana Catalysts for Water-Gas-Shift, Shuang Liang, Götz Vesper, University of Pittsburgh/DOE/NETL, USA

High Performance Sour Water Gas Shift Catalyst, Girish Srinivas, Steven Gebhard, Will Spalding, Mike Looker, TDA Research, Inc., USA

Glutaraldehyde Crosslinked Humic Acid and Use for the Adsorption of 4-Tert Butyl Phenol, Hacer Dogan, Tulay Inan, Murat Koral, TUBITAK Marmara Research Center; Selahattin Anaç, Zeki Olgun, TKI, TURKEY

SESSION 22
CARBON MANAGEMENT:
CCS AND GHG ABATEMENT – 1
James Locke and Jack Pashin

Carbon Capture and Storage Through the Integration of a Chemically and Biologically Catalyzed Mineral Weathering Process with Coal Fired Power Production, Edward J. Swanson, Tushar Patel, Scott Banta, Ah-Hyung Alissa Park, Columbia University; Patrick V. Brady, Sandia National Labs, USA

Ventilation Air Methane Abatement Projects at CONSOL Energy, Deborah Kosmack, Richard A. Winschel, William P. Fertall, Ryan Blackwell, CONSOL Energy Inc.; Santosh Lakhan, Verdeo, USA; Jerry Gureghian, Green Holdings Corporation, UNITED KINGDOM

SESSION 23
COMBUSTION:
COMBUSTION STUDIES – 1
John Wheelton and Evan Granite

Circulating Fluidized Bed Combustion as a Near-Term CO₂ Mitigation Strategy, Eric Grol, DOE/NETL, USA

Sensitivity Analysis of Models for Particle Air Flames, Scott Rockwell, Ali S. Rangwala, Worcester Polytechnic Institute, USA

Effect of Swirl on Unburned Carbon and NO_x Emission of Blending Coal Combustion in a Drop Tube Furnace, Byoung-Hwa Lee, Ho-Lim, Da-Yeon Yu, Ju-Hun Song, Young-June Chang, Chung-Hwan Jeon, Pusan National University, KOREA

Experimental Studies of Spontaneous Combustion Propensity of Coal, X.Y. Wang, Y. Luo, West Virginia University, USA

1-D Dynamic Modeling for Moving Bed Reducer in Chemical Looping Process, Qiang Zhou, Liang Zeng, Hui Yang, Zhao Yu, Dawei Wang, Fanxing Li, Liang-Shih Fan, The Ohio State University, USA

SESSION 24
COAL SCIENCE:
COAL GEOLOGY
Jim Hower and Leslie Ruppert

Geochemistry of Mineral and Carbon Nanotube Sublimate Assemblages in Coal Fire Soot, Ruth Mullins Fire, Perry County, Kentucky, James C. Hower, Shelley G. Hopps, Kevin R. Henke, University of Kentucky CAER; Jennifer M.K. O'Keefe, Morehead State University; Christopher S. Romanek, University of Kentucky, USA; Luis F. O. Silva, Marcos L. S. Oliveira, Vivian Philippi, Catinense Institute of Environmental Research and Human Development – IPADHC, BRAZIL; Carmen Serra, Universidad de Vigo, SPAIN; Shifeng Dai, Weifeng Xue, Wenmei Chen, China University of Mining & Technology, CHINA

Effect of Weathering of Coal and Organic Dusts on their Spontaneous Ignition, K. A. Joshi, A. S. Rangwala, Fire Protection Engineering, Worcester Polytechnic Institute, USA; V. Raghavan, Indian Institute of Technology Madras, INDIA

Fe-Nanominerals in Sediments from Coal Mine Drainage, Frans Waanders, North West University, SOUTH AFRICA; Luis F. O. Silva, Marcos L. S. Oliveira, Kátia da Boit, Catinense Institut of Environmental Research and Human Development – IPADHC, BRAZIL

Organic Petrology of the Springfield Coal Marine Shale Roof Rock (Turner Mine Shale) in Western Kentucky, Cortland F. Eble, University of Kentucky, USA

SESSION 25
MAJOR CCS DEMONSTRATION PROJECTS:
GENERAL – 2
D. Madden and Sai Gollakota

China's CCS Actions, Initiation and Reservation, Huaibin Lu, 3E Information Development & Consultants, USA

Fluidized Bed Low Rank Coal Drying: Great River Energy's Coal Creek Station Experience, Charles Bullinger, Great River Energy, USA

Overview of the Kemper County and TMEP IGCC Projects Using Transport Integrated Gasification (TRIG™), Randall E. Rush, Tim Pinkston, Matt Nelson, Guohai Liu, Southern Company, USA

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

SESSION 26
GASIFICATION:
COAL & BIOMASS
Massood Ramezan and Tim Skone

Reaction Kinetics and Product Distributions from Pyrolysis of Coal and Biomass Mixtures, Nicholas C. Means, URS/DOE/NETL; Nathan T. Weiland, West Virginia University/DOE/NETL; Goetz Vesper, University of Pittsburgh/DOE/NETL; Ronald Breault, Chris Guenther, DOE/NETL, USA

Enhanced Methane Production by Co-Gasification of Potassium-Rich Biomass and Coal, Mike Bockelie, Kevin Davis, Andrew Fry, Adel Sarofim, Reaction Engineering International; Kevin Whitty, Chris Claxton, University of Utah, USA

Thermodynamic Modeling of Coal and Biomass Co-Gasification, Aime H. Tchpada, Sarma V. Pisupati, Pennsylvania State University, USA

SESSION 27
COAL-DERIVED PRODUCTS:
GENERAL – 5
Ke Liu and Steve Xiao

Development of Thar Coal: Putting the Pieces Together, Farid A. Malik, Munawar Baseer Ahmad, EMR-Consult, PAKISTAN

The Technical and Economic Feasibility of Siting Synfuels Plants in Wyoming, Anastasia Gandrik, Richard D. Boardman, Rick Wood, Idaho National Laboratory; David Bell, William Schaffers, Thomas Foulke, University of Wyoming, USA

Scale-Up of Hydrogen Transport Membranes for Carbon Capture Applications, John Faull, Doug Jack, Carl Evenson, Richard Mackay, Jason Stotter, Eltron Research and Development Inc, USA

Modeling Fine Particle Pollution From Aircraft Using JP8, Fischer-Tropsch and Blend Fuels, Shantanu Jathar, Marissa Miracolo, Ngoc Nguyen, Albert Presto, Greg Drozd, Allen Robinson, Center for Atmospheric Particle Studies (CAPS), Carnegie Mellon University, USA

SESSION 28
CARBON MANAGEMENT:
SECARB-ED CCS TRAINING SESSION – 1
Jack Pashin and Steve Carpenter

Why Carbon Sequestration?, Steven M. Carpenter, Advanced Resources International, USA

Carbon Capture and Storage (CCS) - Examples From the Field, Timothy R Carr, West Virginia University, USA

Fundamentals of Carbon Sequestration in Coal and Shale, Jack Pashin, Geological Survey of Alabama, USA

**SESSION 29
COMBUSTION:
CHEMICAL LOOPING – 1**

John Wheeldon and Evan Granite

Thermogravimetric Analysis of CuO Chemical Looping by Oxygen Uncoupling (CLOU): Dependence on Sample Size and Oxygen Content, Blake R. Wilde, Edward M. Eyring, Gabor Konya, The University of Utah, USA

Application of Natural Ores as Oxygen Carriers in Chemical-Looping Combustion, Hanjing Tian, Tom Simonyi, Ranjani Siriwardane, URS/DOE/NETL, USA

Instrumentation for Solids Transport Level and Mass Flow Rate, Joe Quinn, Majid Chaudhry, Alstom Power Inc., USA

Bench-Scale Testing of Char Conversion Using a Countercurrent Moving Bed Reducer in the Coal Direct Chemical Looping Process, Samuel Bayham, Liang Zeng, Siwei Luo, Ray Kim, Dawei Wang, Fanxing Li, Liang-Shih Fan, The Ohio State University, USA

**SESSION 30
COAL SCIENCE:
COAL SCIENCE – 1**

Jim Hower and Leslie Ruppert

Fine Structure Evaluation of the Pair Correlation Function with Molecular Slice Models of the Argonne Premium Coals, Fidel Castro-Marcano, Jonathan P. Mathews, The Pennsylvania State University; Randall E. Winans, Peter Chupas, Karena Chapman, Argonne National Laboratory; Joseph M. Calo, Brown University, USA

Proper Blending Through PGNA Analysis, Nichelle Worthington, April Montera, SABIA Inc.; David Burton, John Hudspeth, Limestone Electric Generating Station, USA

Adsorption Potential of Coals and Carbon to Phenol – Thermodynamic Aspects, Boleslav Taraba, Petra Veselá, Roman Maršálek, Ostrava University, CZECH REPUBLIC

Alkylation Of Brown Coals and Peat by Alcohols, S. I. Zherebtsov, Z.R. Ismagilov, Institute of Coal Chemistry and Material Science of the Siberian Branch of the RAS, RUSSIA

**SESSION 31
MAJOR CCS DEMONSTRATION PROJECTS:
GENERAL – 3**

J. Rokey and J. Lewis

Texas Clean Energy Project Update, Barry Cunningham, Summit Power Group Inc., USA

The Purgen One Project; A Method for Full Utilization of Capital, Tim Bauer, SCS Energy, USA

The Medicine Bow Industrial Gasification and Liquefaction Project --- Project Update, Robert Kelly, Jon Doyle, DKRW Advanced Fuels LLC, USA

Building a Cleantech USA “The New U.S. Synthetic Fuel Industry”, H. H. Graves, USA Synthetic Fuel Corporation, USA

Demonstrating Fuel Flexibility in Commercial Operation, Fawad Khan, Francis Lau, Synthesis Energy Systems Inc., USA

**SESSION 32
GASIFICATION:
MODELING – 2**

Kristin Gerdes and Mehrdad Shahnam

Development of Advanced Gasification Kinetics Models for CFD (and Process Simulation) Codes, Kiran Chaudhari, Richard Turton, West Virginia University; Chris Guenther, Mehrdad Shahnam, DOE/NETL; Aytekin Gel, ALPEMI Consulting, LLC; Philip Nicoletti, Tingwen Li, URS/DOE/NETL, USA

Numerical Analysis of Gasification Performance via Finite-Rate Model in a Cross-Type Two-Stage Gasifier, Yau-Pin Chyou, Yan-Tsan Luan, Institute of Nuclear Research, Atomic Energy Council, TAIWAN; Ting Wang, University of New Orleans, USA

Development of a Devolatilization Model In Eulerian-Eulerian Method for a Hybrid Entrained-Flow and Fluidized Bed Mild Gasifier, Jobaidur R. Khan, Ting Wang, University of New Orleans, USA

Progress on a New Integrated 3D UCG Simulator and Its Initial Application to Modeling Previous Field Tests, John J. Nitao, David W. Camp, Joshua A. White, Gregory C. Burton, Mingjie Chen, Thomas A. Buscheck, Lawrence Livermore National Laboratory, USA

**SESSION 33
COAL-DERIVED PRODUCTS:
GENERAL – 6**

Ke Liu and Steve Xiao

A Sustainable and Reliable Approach to Ash Monofills Closures Using Structured Membrane and Synthetic Turf, Lindsey A. Turtle, Agru America; Mike Ayers, ClosureTurf; Jose Urrutia, Riley, Park, Hayden and Associates, Inc., USA

Rapid Coal Pyrolysis to Acetylene in Multi-Stage Thermal Plasma Reactor, Yi Cheng, Binhang Yan, Yong Jin, Tsinghua University; Cliff Y. Guo, Xuan Li, Changning Wu, National Institute of Clean-and-low-carbon Energy, CHINA

**SESSION 34
CARBON MANAGEMENT:
SECARB-ED CCS TRAINING SESSION – 2**

Jack Pashin and Steve Carpenter

Water in Carbon Capture and Sequestration: Challenges and Opportunities, James W. Castle, John H. Rodgers, Jr., John R. Wagner, Clemson University; Gerald R. Hill, Southern States Energy Board, USA

Clean Coal Technology Development and its Impact on the Energy Industry in the Southeastern United States, Jack Pashin, Geological Survey of Alabama, USA

CO₂ Sequestration in Unmineable Coal with Enhanced Coal Bed Methane Recovery: The Marshall County Project, James E. Locke, Richard A. Winschel, CONSOL Energy Inc.; Richard A. Bajura, Thomas H. Wilson, Hema J. Siriwardane, Raj Gondle, Henry Rauch, Brad Hega, Shahab D. Mohaghegh, West Virginia University, USA

China Coal and Carbon Capture and Storage (CCS), Timothy R Carr, West Virginia University, USA

Public Outreach and CCS: A Critical Analysis, Brad Kelley, Nino S. Ripepi, Virginia Center for Coal and Energy Research at Virginia Tech, USA

**SESSION 35
COMBUSTION:
CHEMICAL LOOPING – 2**

John Wheeldon and Evan Granite

Alstom’s Calcium Oxide Chemical Looping Prototype, Program Update, Paul R. Thibeault, Herbert E. Andrus, Jr., John H. Chiu, Carl D. Edberg, Alstom Power Inc.; Bruce Lani, DOE/NETL, USA

Iron Based Chemical Looping Processes Developed at The Ohio State University, Deepak Sridhar, Liang Zeng, Andrew Tong, Rae Kim, Zhenchao Sun, Siwei Luo, Liang-Shih Fan, The Ohio State University, USA

Comparative Investigation on Chemical Looping Combustion of Coal-Derived Synthesis Gas Containing H₂S Over Supported Bimetallic Fe₂O₃-MnO₂ and Fe₂O₃-CuO Oxygen Carriers, Ewelina Ksepko, Marek Sciazko, Institute for Chemical Processing of Coal, POLAND; Hanjing Tian, Thomas Simonyi, Parsons; Ranjani V. Siriwardane, DOE/NETL, USA

Quantitative Rate Analysis of Experimental Data Relevant to Chemical Looping with Oxygen Uncoupling, JoAnn S. Lighty, Asad H. Sahir, Adel F. Sarofim, Hong Yong Sohn, University of Utah, USA

Modeling, Simulation and Advanced Controls for Prototype Chemical Looping Process, Abhinaya Joshi, Xinsheng Lou, Carl Neuschaefer, Alstom Power Inc., USA

Study the Effects of Hydration on the CO₂ Adsorption Capacity of Calcium-Based Sorbents with Density Functional Theory Calculation, Siwei Luo, Fuchen Yu, L.-S. Fan, The Ohio State University, USA

**SESSION 36
COAL SCIENCE:
COAL SCIENCE – 2**

Jim Hower and Leslie Ruppert

Influence of Discard Mineral Matter on Slag-Liquid Formation and Ash Melting Properties of Coal - A Factsage™ Simulation Study, JC van Dyk, MJ Keyser, Sasol Technology R&D, SOUTH AFRICA

Coal It’s Elementary My Dear Watson, Jonathan P. Mathews, Vijayaragavan Krishnamoorthy, Enette Louw, Aime H. N. Tchapda, Fidel Castro-Marcano, Vamsi Karri, Dennis A. Alexis, Gareth D. Mitchell, The Pennsylvania State University, USA

Full-Scale Mercury Control Demonstrations: ICR Sampling with Mercury Control, Jason Laumb, John Kay, Energy & Environmental Research Center, University of North Dakota; Mark Thoma, Otter Tail Power Company, USA

Mercury Speciation and Emission from Pilot-scale PC Furnaces under Air- and Oxy-fired Conditions, Brydger Van Otten, Andrew Fry, Brad Adams, Reaction Engineering International; Larry Bool, Praxair Inc., USA

The Effect of the Boudouard-reaction on Reaction Rates of Coal Chars in CO₂/O₂- and N₂/O₂-Atmospheres at Oxygen Contents from 0% to 30%, Dominik Christ, Malte Förster, Reinhold Kneer, M. Habermehl, O. Hatzfeld, RWTH Aachen University, GERMANY

ORAL SESSIONS

Thursday, September 15, 2011

SESSION 37

MAJOR CCS DEMONSTRATION PROJECTS: GENERAL – 4

J. Hoffman and C. Miller

FutureGen 2.0 Oxy-Combustion Repowering at Meredosia, Steve Moorman, Babcock & Wilcox, USA

Air Liquide's Global Roadmap Toward the Industrialization of Oxy-Combustion, Roger Gilchrist, Mark Estopinal, Etienne Sturm, Jerry Oliver, Air Liquide Engineering & Construction, USA

FutureGen 2.0 CO₂ Pipeline and Storage Site Project, Steve Winberg, CONSOL Energy Inc., USA

ITEA-ENEL Isotherm Flameless Pressurized Oxy-Combustion for Coal Fired Zero Emission Plant: Recent Results and Technology Development Update, Massimo Malavasi, ITEA S.p.A.; Nicola Rossi, ENEL S.p.A., ITALY

SESSION 38

GASIFICATION: FUNDAMENTALS

Jenny Tennant and Pete Rozell

Mineralogical Analysis of Coal Chars Obtained by High Temperature Gasification of Gravity and Size Separated Fractions of a High Volatile Bituminous Coal, Nari Soundararajan, LaTosha M. Gibson, Nandakumar Krishnamurthy, Sarma V. Pisupati, Pennsylvania State University; Lawrence J. Shadle, DOE/NETL, USA

Particle Deposition Predictions by Critical Viscosity and Mechanistic Particle Deposition Models, John M. Kuhlman, Weiguo Ai, West Virginia University, USA

Coal Ash Behavior in Reducing Environments (CABRE) III, Joshua J. Stanislawski, Donald P. McCollor, Kevin C. Galbreath, Daniel H. Schwitalla, University of North Dakota, USA

Toward a Technology to Mitigate Syngas Cooler Fouling, Mike Bockelie, Kevin Davis, Adel Sarofim, Reaction Engineering International; Kevin Whitty, Ignacio Precadio, University of Utah, USA

Multi-Scale Approach to Validate Ash Fate Models in Entrained-Flow Slagging Gasifiers, Marc A. Duchesne, Arturo Macchi, University of Ottawa; Robin Hughes, David McCalden, Dennis Lu, Ben Anthony, CanmetENERGY, CANADA

SESSION 39

GASIFICATION: GENERAL – 2

Massood Ramezan and Ting Wang

Development of Novel Spinel Refractories for Use in Coal Gasification Environments, James Hemrick, Beth Armstrong, Oak Ridge National Laboratory; Angela Rodrigues-Schroer, Dominick Colavito, Minteq International, Inc.; Jeffrey Smith, Kelley O'Hara, Missouri University of Science and Technology, USA

Evaluation of Viscosity Models for Slagging Entrained Gasifiers Using Bituminous Coals, Thiago Fernandes de Aquino, Brazilian Coal Association - SATC/DOE/NETL, BRAZIL; LaTosha Gibson, The Pennsylvania State University/DOE/NETL; John Kuhlman, West Virginia

University/DOE/NETL; Esmail R. Monazam, James Spenik, Lawrence J. Shadle, DOE/NETL, USA

Temperature Measurements in an Entrained-Flow, Slagging, Coal Gasifier Using Laser Absorption of Water Vapor, Jay B. Jeffries, Kai Sun, Rito Sur, Ronald K. Hanson, Xing Chao, Stanford University; Randy J. Pummill, David A. Wagner, Kevin J. Whitty, University of Utah; Robert C. Steele, Electric Power Research Institute, USA

Impact of Coal-Derived Impurities on the Performance of Hydrogen Separation Membranes, Joshua J. Stanislawski, University of North Dakota, USA

SESSION 40

CARBON MANAGEMENT: CCS AND GHG ABATEMENT – 2

Richard Winschel and Steve Carpenter

Integration of Rankine and Brayton Cycles Reduces Penalty Due to Post-Combustion CO₂ Capture, Nenad Sarunac, Carlos E. Romero, Lehigh University; Barry Liebowitz, New York State Energy Research and Development Authority, USA

Current and Future Technologies for Power Generation with Post-Combustion Carbon Capture, Robert W. Stevens, Jr., DOE/NETL, USA

Facilitating CO₂ Capture and Storage for Arizona Coal-Fired Power Plants, Elizabeth Burton, John H. Beyer, Lawrence Berkeley National Laboratory; Robert Trautz, Richard Rhudy, Electric Power Research Institute; Rich Myhre, Bki, USA

Optimization of Coal-Fired Power Unit Location in Case of CCS, Marcin Liszka, Silesian University of Technology; Marek Symik, Eurol Innovative Technology Solutions Sp z o.o., POLAND

Use of Waste Heat and CO₂ Compression Heat to Reduce Penalty Due to Post-Combustion CO₂ Capture, Nenad Sarunac, Carlos E. Romero, Lehigh University; Barry Liebowitz, New York State Energy Research and Development Authority, USA

SESSION 41

COMBUSTION: COMBUSTION STUDIES – 2

John Wheelon and Evan Granite

Development and Demonstration of Laser-Induced Breakdown Spectroscopy for In-Situ, On-Line Coal Analysis, Carlos E. Romero, Zheng Yao, Lehigh University; Robert De Saro, Joseph Craparo, Sam Lam, Energy Research Company; Richard Silfies, Kenneth Quinty, Robert Plangemann, Frank Lyter, PPL Corporation, USA

Pyrolysis and Gasification Reactivity of Brown Coal-Algae Blends, Kawnish Kirtania, Sankar Bhattacharya, Luguang Chen, Monash University, AUSTRALIA

A Petrographic Explanation for Conversion Differences in Two South African Lump Coals, NJ Wagner, N Malumbazo, University of the Witwatersrand, SOUTH AFRICA

SESSION 42

SUSTAINABILITY AND ENVIRONMENT: GENERAL – 1

Jim Hower

Feeding the Fire: How Coal Technology in Developing Countries May Require More Diversification of Inputs than Initially Argued, Catherine A. McGanily, USA

An Example Simulation of Development of Correction Factors for IGCC Power Plant Test Code PTC47.4, Ashok Anand, Michael Gross, M. Mahendhra, Richard Depuy, General Electric Company; Walter Shelton, DOE/NETL; Youssef M Zadeh, Bechtel Power Corp, USA

Economics of Water Capture from Flue Gas using Condensing Heat Exchangers, Harun Bilirgen, Edward K. Levy, Daniel Hazell, Lehigh University, USA

Groundwater and Ecological Protection for Sustainable Development Under Modern Mining Technologies, Case Study of Shendong Region, West China, J. M. Zhang, D.Z. Gu, Shenhua Group Corporation Limited; Z.W. Shen, China University of Mining & Technology, CHINA

SESSION 43

MAJOR CCS DEMONSTRATION PROJECTS: GENERAL – 5

T. McMahon and J. Hoffmann

Carbon Capture Demonstration Project at WA Parish Station Status Update, David J. Stopek, Roger Smith, Sargent & Lundy LLC; John Klumppan, NRG Energy; Satish Reddy, Jeffrey Scherffius, Fluor, USA

AEP's CCS Activities at Mountaineer Plant - 20MW Demonstration and Future Activities, Gary O. Spitznogle, American Electric Power, USA

The SECARB Anthropogenic Test: The First U.S. Integrated Capture, Transportation and Storage Test, George J. Koperna, Jr., Vello Kuuskraa, David Riestenberg, Advanced Resources International, Inc.; Richard Rhudy, Robert Trautz, Electric Power Research Institute; Jerry Hill, Southern States Energy Board; Richard Esposito, Southern Company, USA

SESSION 44

GASIFICATION: GAS CLEANUP

Ragubir Gupta and Dave Lyons

Experimental Development of the Sour PSA Process, Jeffrey R. Hufton, Robert Quinn, Timothy C. Golden, Fei Chen, Jeffrey W. Kloosterman, Air Products and Chemicals; Grant Dunham, Michael Swanson, Ann Henderson, Energy and Environmental Research Center, USA

Crystal Defects and Ionic Diffusion in Calcium Oxide Capture of Acidic Gases from Synthesis Gas and Flue Gas, Zhenchao Sun, Siwei Luo, Liang-Shih Fan, The Ohio State University, USA

Pilot-Plant Evaluations for Timely and Cost-Effective Development of Integrated Gasification-Based Processes, Jim Aderhold, Bruce Bryan, Andrew Kramer, Michael Roberts, Gas Technology Institute, USA

Selectivity Matters, Olaf von Morstein, Johannes Menzel, Uhde GmbH, GERMANY; Dennis Leppin, Gas Technology Institute, USA

**SESSION 45
GASIFICATION:
GENERAL – 3**

Francis Lau and Kristin Gerdes

Water Shift Modeling in Coal Gasification in an Entrained-flow Gasifier, Xijia Lu, Ting Wang, University of New Orleans, USA

Investigation of the Performance of a Syngas Quench Cooling Design in a Downdraft Entrained Flow Gasifier, Ting Wang, Xijia Lu, University of New Orleans, USA; Heng-Wen Hsu, Cheng-Hsien Shen, Industrial Technology Research Institute, TAIWAN

Impact of the Water Quench on the Syngas Composition Obtained from Entrained Flow Gasification of Carbonaceous Fuels, Christian Goersch, Frank Hannemann, Siemens Fuel Gasification Technology GmbH & Co.KG; Thomas Hammer, Siemens AG, Corporate Research and Technologies; Bernd Meyer, TU Bergakademie Freiberg, GERMANY

Molten Catalytic Coal Gasification for Methane Rich Syngas, Nicholas Siefert, Carnegie Mellon University / DOE/NETL; Tristan McQuain, West Virginia University/DOE/NETL/ORISE; Jack R. Ferrell III, DOE/NETL/ORISE; Shawn Litster, Carnegie Mellon University; Dushyant Shekhawat, David Berry, DOE/NETL, USA

**SESSION 46
CARBON MANAGEMENT:
CCS AND GHG ABATEMENT – 3**

Steve Carpenter and Deborah Kosmack

Pipeline Environmental Constraints Analysis to Deliver CO₂ From a Coal Gasification Plant, Frank M. Kranik, Gordon Ferguson, Ecology & Environment, Inc., USA

CO₂ Capture at the National Carbon Capture Center, Tony Wu, Ruth Ann Yongue, Southern Company Services, USA

Analysis of Warm Membrane - and Adsorbent - Based Technologies for CO₂ Capture in IGCC, David J. Couling, Kshitij Prakash, William H. Green, MIT, USA

Gas Permeation Carbon Capture – Process Modeling and Optimization, Juan E. Morinelly, David C. Miller, DOE/NETL, USA

**SESSION 47
CARBON MANAGEMENT:
CO₂ GEOLOGIC SEQUESTRATION – COAL**

Richard Winschel and James Locke

Modeling of Enhanced Coal Bed Methane Recovery and CO₂ Sequestration in Coal Seams, D. N. Saulov, A. Y. Klimenko, V. Rudolph, University of Queensland, AUSTRALIA

An Experimental Study to Investigate the Effective Factors for the Performance of Coal Mass Natural Cleat System upon CO₂ Sequestration Process in Deep Coal Seams, M.S.A. Perera, P.G. Ranjith, Monash University; S.K. Choi, CSIRO, AUSTRALIA

An Objective Method to Distinguish Between Adsorption and Dissolution of CO₂ on Wet Coal, Elisa Battistutta, Karl-Heinz Wolf, Hans Bruining, Ali Akbar Eftekhari, Delft University of Technology, THE NETHERLANDS

Understanding the Significance of In Situ Coal Properties on CO₂ Sequestration, P.N.K. De Silva, P.G. Ranjith, Monash University, AUSTRALIA

**SESSION 48
SUSTAINABILITY AND ENVIRONMENT:
GENERAL – 2**

Jim Hower

Applying Learning Curves to Modeling Future Coal Power Generation Technologies, Ripudaman Malhotra, John Chase, Chris Ordowich, Daniel Steele, SRI International, USA; Michiaki Harada, Keiji Makino, Japan Coal Energy Center (Jcoal), JAPAN

Techno-Thermal Recycling: A Novel System for Treating Waste Heat as an Energy Resource, Catherine A. McGanity, USA

Integrated BTL Process as Potential Solution for Coal Power Greenhouse Gases, Jacobus Brink, Frans Waanders, Sanette Marx, North-West University, SOUTH AFRICA

Environmental and Economic Impacts of Increased Efficiency in Coal Power Plants, Roger H. Bezdek, Robert M. Wendling, Management Information Services, Inc., USA

**SESSION 49
MAJOR CCS DEMONSTRATION PROJECTS:
GENERAL – 6**

G. O'Neill and A. Zinn

Illinois Basin CCS: Lessons Learned & Future Plans, Scott McDonald, Archer Daniels Midland Company, USA

Port Arthur Project Update: Demonstration of CO₂ Capture & Sequestration for Steam Methane Reforming Process for Large Scale Hydrogen Production, DOE Cooperative Agreement Number: DE-FE-0002381, Ken Welch, Bob Hutchison, Keith Adams, Kurt Metzler, Kent Kisenbauer, Air Products and Chemicals Inc., USA

The Lake Charles CCS Project, Thomas Leib, Leucadia Energy, LLC, USA

**SESSION 50
GASIFICATION:
UNDERGROUND COAL GASIFICATION**

Mike Mosser and Burl Davis

Characterization of the Harmon Lignite for Underground Coal Gasification, Peng Pei, Zhengwen Zeng, Jun He, University of North Dakota, USA

Bloodwood Creek UCG Pilot 2010-2011, Burl E Davis, Cliff Mallett, Carbon Energy Ltd., AUSTRALIA

Wildhorse Energy's UCG Technology Provide Clean Independent Energy for Hungary, Johan Brand, Wildhorse Energy Ltd, HUNGARY

Electrical Resistance Tomography for Monitoring of Underground Coal Gasification, Xianjin Yang, J. Wagoner, A. Ramirez, S. Hunter, R. Mellors, D. Camp, S. J. Friedmann, Lawrence Livermore National Laboratory; Feng Chen, ENN, CHINA

Background, Status, and Future of ENN UCG Program, Feng Chen, ENN Sci.& Tech. Co.Ltd., CHINA

**SESSION 51
GASIFICATION:
GENERAL – 4**

Ting Wang and Johan van Dyk

Dissipation of Translational Energy During Non-Spherical Particle Wall Collisions as Related to Entrained Coal Gasifiers, LaTosha Gibson, Sarma V.

Pisupati, The Pennsylvania State University/DOE/NETL; Balaji Gopalan, Lawrence J. Shadle, DOE/NETL, USA

High Pressure Gasification of Coal Under ISO-Thermal Conditions Using Bench Scale HP-TGA, Abhishek Bhargava, Patrick J.Masset, Freiberg University of Mining and Technology, GERMANY

Measurement of CO₂ Gasification Rate of Coal Char Under High Temperature and High Pressure for Optimum Design of CO₂ Recycled IGCC, Kouichi Miura, Syunsuke Imai, Mitsunori Makino, Eiji Sasaoka, Ryuichi Ashida, Kyoto University, JAPAN

**SESSION 52
CARBON MANAGEMENT:
CCS AND GHG ABATEMENT – 4**

Richard Winschel and James Locke

Carbon Mineralization via Carbonation of Calcium and Magnesium-Bearing Minerals as Permanent Storage of Anthropogenic CO₂, Greeshma Gadikota, Huangjing Zhao, Peter Kelemen, Ah-Hyung Alissa Park, Columbia University, USA

Carbon Dioxide Mineralization of Industrial Products, W.K. O'Connor, G.E. Rush, C.A. Verba, DOE/NETL, USA

Turbomachinery Development for Oxy-Combustion, Coal-Based Power Systems, Rebecca Hollis, Roger Anderson, Keith Pronske, Clean Energy Systems, Inc., USA

Use or Renewable Energy Sources for Fulfilling the Obligations to the European Union, Petr Ruzicka, Jaromir Tauber, Pavel Sedlacek, Lubomir Chytko, Brown Coal Research Institute; Tomáš Lorenz, Czech Coal; Peter Fecko, VSB-TU Ostrava, CZECH REPUBLIC

**SESSION 53
CARBON MANAGEMENT:
CO₂ CAPTURE – SOLVENTS**

Deborah Kosmack

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

An Improved SELEXOL™ Processing Scheme that Reduces CO₂ Capture and Compression Costs, Stanislav Milidovich, Raj Palla, UOP LLC (A Honeywell Company), USA

Role of Double Salt Structure and Formulation on Warm Temperature CO₂ Capture, Prabhakar Singh, Keling Zhang, University of Connecticut; Liyu Li, David L. King, Pacific Northwest National Laboratory, USA

Extension of Reversible Carbon Dioxide Binding by Frustrated Lewis Pairs to Other Phosphine and Amine Bases, Robert L. Thompson, URS/DOE/NETL; Sheila W. Hedges, DOE/NETL; Krishnan Damodaran, University of Pittsburgh, USA

First Principles and Classical Simulations of Ionic Liquids for Carbon Dioxide Capture, Bo Zhang, J. Karl Johnson, University of Pittsburgh/DOE/NETL, USA

Using Novel Phase Change Solvents or High Molecular Weight Silicone Oil for the Pre-Combustion Capture of CO₂, Matthew B. Miller, Robert M. Enick, University of Pittsburgh; David R. Luebke, DOE/NETL, USA

SESSION 54
SUSTAINABILITY AND ENVIRONMENT:
GENERAL – 3
Jim Hower

The 3rd Assessment of Pennsylvania's ACT 54 – Protecting Structures, Land and Water Supplies from Underground Coal Mine Subsidence Damages, 2003 to 2008, Anthony Iannacchione, Stephen J. Tonsor, William Harbert, University of Pittsburgh, USA

Projection of Australian Coal Production - Comparisons of Four Models, Mikael Höök, Uppsala University, SWEDEN; Steve Mohr, Geoffrey Evans, The University of Newcastle; Gavid Mudd, University of New South Wales, AUSTRALIA

EPA Mandatory Reporting Rule and PSD BACT: Effects on Coal, ECBM and Lessons Learned from the First Year of Implementation, Steven M. Carpenter, Advanced Resources International, Inc., USA

Minimizing Water Discharge and Maximizing Re-Use in Coal Combustion and Conversion Processes, William A. Shaw, HPD, a Veolia Water Solutions & Technologies Company, USA

POSTER SESSIONS
Wednesday, September 14, 2011

POSTER SESSION 1
COMBUSTION

Attrition as a Key Parameter for Evaluation of Usefulness the Oxygen Carriers in Chemical Looping Process, Ewelina Ksepko, Marek Sciazko, Olaf Piotrowski, Institute for Chemical Processing of Coal, POLAND

Simultaneous NO_x/SO₂ Removal by Ammonia Gas Excited by Atmospheric Plasma, Shinji Kambara, Yukio Hayakawa, Kazuhiro Kumabe, Hiroshi Moritomi, Gifu University; Megumi Masui, Actree Corporation, JAPAN

Application of Sewage Sludge Ashes in Chemical Looping Combustion of Solid and Gaseous Fuels, Ewelina Ksepko, Grzegorz Labojko, Marek Sciazko, Institute for Chemical Processing of Coal, POLAND

W2 Wobble Plate Prime Mover - Sealed Unit, Jerry Willis, Admiral Air, Inc., USA

Morphologies, X-ray Parameters, and Burnout Comparisons of Inertinite-Rich and Vitrinite-Rich South African Bituminous Coal Derived Chars, Enette Louw, Gareth D. Mitchell, Jonathan P. Mathews, The Pennsylvania State University, USA

POSTER SESSION 2
GASIFICATION

The Design and Operational Behaviour of a Laboratory Scale Fixed-Bed Gasifier, Frikkie Conradie, FB Waanders, North West University, SOUTH AFRICA

Analyses of an Entrained-Bed Coal Gasifier Using a CFD Model Coupled with Chemical Reaction Kinetics, Tsung Leo Jiang, Tai-Ping Wu, National Cheng Kung University; Ming-Hong Chen, Po-Chung Chen, Yau-Pin Chyou, Institute of Nuclear Energy Research Atomic Energy Council, TAIWAN

Process Modeling of H₂S Removal from Brazilian Coal Gasification Syngas with MDEA, Michael Crocetta,

Thiago Fernandes de Aquino, Beneficent Association of the Santa Catarina Coal Industry - SATC, BRAZIL; Juan Morinelly, DOE/NETL, USA

Comparison Study on CO₂-Gasification Reactivity of Different Chars, Liwei Ren, Jianli Yang, Institute of Coal Chemistry, Chinese Academy of Sciences; Feng Gao, Taiyuan University of Technology, CHINA

Determination of Kinetics of Char Gasification with Carbon Dioxide Using Thermogravimetry, Thinesh Vittee, S. Kauchali, N. Wagner, University of the Witwatersrand, SOUTH AFRICA

Application of Pyrolytic Brown-Coal Tars in the Flootation of Black Coal, Peter Fecko, Eva Pertile, Monika Podesvova, Josip Isek, Konstantin Babic, Lukas Koval, Lukas Pjura, Tien Pham Duc, VŠB – TU Ostrava; Josef Vales, Jaroslav Kusy, Brown Coal Research Institute, CZECH REPUBLIC

Design of an Atmospheric Bubbling Fluidized Bed for Co-Gasification of Coal and Paper Sludge, Giovanna de Simone, Stefano Cordiner, Vincenzo Mulone, University of Rome "Tor Vergata", ITALY

Carbon Dioxide Reforming of Methane Over Nanostructured Co-Ni Catalysts, N.V. Shikina, Z.R. Ismagilov, S.A. Yashnik, V.V. Kuznetsov, I.Z. Ismagilov, Borekov Institute of Catalysis SB RAS, RUSSIA; G.B. Aldashukurova, Z. A. Mansurov, Institute for Problems in Combustion of the Kazakh Committee of Science, KAZAKHSTAN

Methane Reforming with Carbon Dioxide Over Nickel-Uranium Catalysts, Z.R. Ismagilov, S.V. Lazareva, N.V. Shikina, V.V. Kuznetsov, M.A. Kerzhentsev, Borekov Institute of Catalysis of the Siberian Branch of the RAS, RUSSIA

New Technologies for Monitoring UCG, R. J. Mellors, X. Yang, S. Hunter, J. Wagoner, W. Foxall, D. Camp, S. J. Friedmann, Lawrence Livermore National Laboratory, USA

POSTER SESSION 3
SUSTAINABILITY AND ENVIRONMENT

A CUBIC MILE OF OIL: Realities and Options for Averting the Looming Global Energy Crisis, Ripudaman Malhotra, SRI International, USA

Some Abandoned Mine Land Reclamations Practices in Turkey, Seyfi Kulaksiz, Hacettepe University; Mehmet Tombul, Pinar Bozkurt Huyuktepe, Nusret Gungor, General Directorate on Mining Affairs; Yuksel Akin, Hakki Duran, TKI; Necati Atay, Lignite Pits of Aydin, TURKEY

Characterization of Noise Generated by Selected Underground Mining Equipment, Marek L. Szary, Yoginder P. Chugh, Southern Illinois University; Joseph C. Hirschi, Illinois Clean Coal Institute, USA

The Activity of the Water Gas Shift Reaction over Copper Based Catalysts with Different Support, Dong-Hyeok Choi, Joong Beom Lee, Tae Hyoung Eom, Jeom In Baek, Seong Jegarl, Seug-Ran Yang, Keun Woo Park, Chong Kul Ryu, KEPCO Research Institute, KOREA

POSTER SESSION 4
CARBON MANAGEMENT

A Solid Sorbent Technique to Capture CO₂ From Flue Gas, H.W. Pennline, J.S. Hoffman, M.L. Gray, D.J. Fauth, L.S. Shadle, DOE/NETL; K.P. Resnik, S. Hammache, URS/NETL, USA

Comparison of CO₂ from Coal Capture Processes and Valorisation Technologies to Enhance Energy Supply, Mercedes Martín-González, Carmen Clemente-Jul, Universidad Politécnica de Madrid (UPM), SPAIN

Carbon Capture Using Amine-Functionalized Carbon Nanotubes, Abby Kirchofer, Jennifer Wilcox, Stanford University, USA

Modeling CO₂ Adsorption in Micro- and Mesoporous Carbons, Yangyang Liu, Jennifer Wilcox, Stanford University, USA

Neutron Scattering Characterization of the Structure and Adsorption of Carbon Dioxide and Methane in Coals, Lilin He, Yuri B. Melnichenko, Oak Ridge National Laboratory; M. Mastalerz, Indiana University, USA; T. Blach, Andrzej P. Radlinski, Griffith University; R. Sakurovs, CSIRO Energy Technology, AUSTRALIA

Modeling of In-Situ CO₂ Sorption in a Fluidized Bed Coal/Biomass Gasifier, D. N. Saulov, M. J. Cleary, A. Y. Klimenko, The University of Queensland, AUSTRALIA

A Study on Permeability of CH₄ Pre-Adsorbed Yangquan Coal Matrix-Plug to CO₂ and He, Jianli Yang, Fangxin Tang, Jun Zhang, Yunmei Li, Hongxian Niu, State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences; Zhenyu Liu, Beijing University of Chemical Technology, CHINA; Andreas Busch, Niels van Wageningen, Shell International Exploration & Production B.V., THE NETHERLANDS

CO₂/NO_x Decomposition via ODF Electrodes using Solid Oxide Electrolyser Cell, Bruce Kang, Huang Guo, Gulfam Iqbal, West Virginia University; Ayyakkanna Manivannan, DOE/NETL, USA

A Detailed Well Log and 3D Seismic Based Interpretation of the Fruitland Formation: San Juan Basin Carbon Sequestration Pilot Site, Matthew Weber, Thomas H. Wilson, West Virginia University; Bill Akwari, ConocoPhillips; Arthur W. Wells, DOE/NETL; George Koperma, Advanced Resources International, USA

Development of a 3D Grid, Fracture and Property Models for the Upper Freeport Coal and Overburden Using 3D Seismic: Marshall County West Virginia Pilot Sequestration Site, Tom Wilson, Lierong Zhu, Richard A. Bajura, West Virginia University; Richard A. Winschel, James E. Locke, CONSOL Energy Inc., USA

Development of Highly Efficient Absorbents for Post-Combustion Capture, Jae Goo Shim, Ji Hyun Lee, In Young Lee, Jun-Han Kim, No-Sang Kwak, Young-Seok Ehom, Kyung Ryong Jang, Green Growth Laboratory, KEPCO Research Institute, KOREA

Screening of Sulfur Resistant Solid Sorbent for CO₂ Capture from Coal Power Plant, Joong Beom Lee, Tae Hyoung Eom, Dong-Hyeok Choi, Bok Suk Oh, Jeom In Baek, Kyeongsook Kim, Young Ho Wi, Chong Kul Ryu, KEPCO Research Institute, KOREA

Solid Sorbents for Sorption Enhanced Water Gas Shift (SEWGS) Reaction to Capture CO₂ from Syngas, Tae Hyoung Eom, Joong Beom Lee, Dong-Hyeok Choi, Keun Woo Park, Jeom In Baek, Seong Jegarl, Chong Kul Ryu, KEPCO Research Institute, KOREA

Investigation of Sorption Enhanced Steam Hydrogasification of Coal for In Situ Removal of CO₂ and 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

POSTER SESSION 5
COAL-DERIVED PRODUCTS

Study to Direct Liquefaction of Mongolian Brown Coal Samples, B. Battengel, J.Oyunjargal, D.Rentsenmyadag, National University of Mongolia, MONGOLIA

Modifying Petroleum Paving Asphalt by Coal Liquefaction Residues, Mengmeng Wu, Jianli Yang, Institute of Coal Chemistry, Chinese Academy of Sciences; Yuzhen Zhang, State Key Laboratory of Heavy Oil Processing, Petroleum University (East China), CHINA

Viscosity Characteristic of Coal-Oil Slurry with High Inertinite Content, Ke Zheng, Shansong Gao, Ke Wu, Dexiang Zhang, East China University of Science and Technology, CHINA

Fischer-Tropsch Process: Impact of Hydrocracker Model Rigor, Seethamraju Srinivas, Randall Field, Howard J. Herzog, MIT Energy Initiative, USA

Calcium Looping Process (CLP) for Clean H₂ and Electricity Production from Coal: Design and Operation of the Sub-Pilot Scale Carbonator, Nihar Phalak, Shwetha Ramkumar, Niranjani Deshpande, Yao Wang, William Wang, L. S. Fan, The Ohio State University, USA

The Possibility of Utilization of Carbon Black from Pyrolysis of Municipal Waste, Dagmar Juchelková, Helena Raclavská, Adela Cizkova, Ondrej Zajonc, VSB-Technical University of Ostrava, CZECH REPUBLIC

POSTER SESSION 6
COAL SCIENCE

Pyrite and Trace Element Associations in Waterberg Coals, South Africa, NJ Wagner, University of the Witwatersrand, SOUTH AFRICA

Briquetting of Tuncbilek Lignite, Ufuk Gunduz, Ozkan Murat Dogan, Bekir Zuhtu Uysal, Gazi University; Selahaddin Anac, Mustafa Ozdingis, TKI, TURKEY

Swelling Behavior of Coal in Solvent under Elevated Temperature and Pressure by a Linear Variable Differential Transformer Deformation Transducer, Jianli Yang, Lei Chen, Yongwang Li, Institute of Coal Chemistry, Chinese Academy of Sciences, CHINA

Characterization of Reacted Coal Chars using Ion Beam Techniques (PIXE and STIM), Abhishek Bhargava, Patrick J.Masset, Freiberg University of Mining and Technology, GERMANY

Mercury Oxidation, Transformation and Removal in Flue Gas of Five Chinese Coal-Fired Power Plants, Yufeng Duan, Liguang Yang, Yunjun Wang, Xianghua Yang, Southeast University; Yuqun Zhuo, Lei Chen, Liang Zhang, Tsinghua University, CHINA

Synthesis of Nanoporous Carbon Materials from Modified Coals and Cokes, A.V. Samarov, Ch.N. Barnakov, A.P. Kozlov, Z.R. Ismagilov, Institute of Coal Chemistry and Material Science; M.A. Kerzhentsev, Boreskov Institute of Catalysis, RUSSIA

The Waste Rock Application in Hydric Reclamation, Czech Republic, Eva Pertile, Peter Fecko, Martina Brezinova, Michal Guziurek, Lucie Nezvalova, Barbora Molinova, Vojtech Dimer, VŠB – TU Ostrava, CZECH REPUBLIC

Influence of the Graphitization Degree and Presence of 3D Metals of Iron Subgroup on the Reactivity of Carbon Materials, Ch.N. Barnakov, G.P. Khokhlova,

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Transmutation of Free Radical During Coal Pyrolysis Process, Ruimin Liu, Dexiang Zhang, Aiping Wu, Tiejing Pan, Weiping Xia, East China University of Science and Technology; Shengchun Wang, Hebei United University, CHINA

The Efficient Energy – Assessment of Influence of Ash Content in Coal on Moisture Bonding, Dagmar Juchelková, Helena Raclavská, Konstantin Raclavsky, VSB-Technical University of Ostrava, CZECH REPUBLIC

The Coal Resources of Vietnam and Its Current Coal Utilization Technologies, Nguyen Viet Quang Hung, Vietnam Academy of Science and Technology, VIETNAM; Masakatsu Nomura, Osaka University, JAPAN

Effect of the Burning Profile on the Reactivity of Lignite, Gündüz Ateşok, Mustafa Özer, Istanbul Technical University; Jale Gülen, Yıldız Technical University, TURKEY

Influence of Binderless Briquetting Process with Dried Low Rank Coal Having the Various H₂O Contents on the Physical and Chemical Properties of Coal, Changsik Choi, Jung Hee Jang, Gi Bo Han, Yongseung Yun, Institute for Advanced Engineering; Jaehyeon Park, Dowon Shun, Sihyun Lee, Korea Institute of Energy Research, KOREA

Influence of Surface Treatment on Dispersion and Solubility of Coal in Solvent and Ionic Liquid, Gi Bo Han, Jung Hee Jang, Changsik Choi, Yongseung Yun, Institute for Advanced Engineering; Tae Jin Lee, No-Kuk Park, Yeungnam University, KOREA

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