



THIRTY - SECOND - ANNUAL
INTERNATIONAL PITTSBURGH
COAL CONFERENCE

University of Pittsburgh - Swanson School of Engineering

FINAL PROGRAM

**COAL - ENERGY, ENVIRONMENT AND
SUSTAINABLE DEVELOPMENT**



October 5 - 8, 2015
Pittsburgh, PA USA
The David L. Lawrence Convention Center



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 Thirty-Second Annual International Pittsburgh Coal Conference held October 5 - 8, 2015 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, October 7 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: Dr. Grace M. Bochenek, Director, National Energy Technology Laboratory (NETL), USA; Mr. Richard A. Winschel, Director of Research and Development, CONSOL Energy, USA; Mr. Vann Bush, Managing Director of Energy Supply and Conversion, Gas Technology Institute, USA; Mr. Norman Kettenbauer, Vice President - Engineering & Contracting, Longview Power, LLC, USA; Dr. Lesley Sloss, Principal Environmental Consultant, IEA CCC, and Lead of the Coal Partnership area at the UN Environmental Programme, UK; Prof. Frans Waanders, Professor and Director, School of Chemical and Minerals Engineering, North-West University, SOUTH AFRICA; Prof. Farid A. Malik, Forman Christian College (American University), PAKISTAN; Mr. James Van Nostrand, Director, Center for Energy and Sustainable Development, USA; Mr. John Pippy, CEO, Pennsylvania Coal Alliance, USA; and Dr. Daman S. Walia, President and CEO, ARCTECH Inc., 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; Jim Hower of the University of Kentucky, CAER, USA; and Gary Stiegel, Consultant, USA, as well as to all session chairs, speakers and international delegates for their contributions to the 2015 technical program.

As the chair of the Advisory Board of the Conference, I deeply appreciate your participation and interest in this year's Conference and invite you to join us next year for the Thirty-Third Annual International Pittsburgh Coal Conference, which will be held in Cape Town, SOUTH AFRICA from August 8 - 12, 2016.



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

CONFERENCE REGISTRATION

On-Site Registration will begin Monday, October 5, 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 6**

5:45 PM - Meet in Westin Hotel lobby for a short walk to the 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:
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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 5, 2015

Technical Tour	07:15 - 16:00
Registration	15:00 - 19:00
Reception	18:30 - 20:30

TUESDAY, OCTOBER 6, 2015

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

WEDNESDAY, OCTOBER 7, 2015

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 - 17:05
Poster Session	18:00 - 21:00

THURSDAY, OCTOBER 8, 2015

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 - 17:05
Advisory Board Meeting	18:00 - 20:00

PLENARY SPEAKERS

TUESDAY, OCTOBER 6, 2015

Dr. Grace M. Bochenek
Director

National Energy Technology Laboratory, USA
“Backbone of the Energy Future”

Mr. Richard A. (Dick) Winschel

Director, Research & Development
CONSOL Energy Inc., USA

“U.S. Coal – An Industry in Transition”

Mr. Vann Bush

Managing Director, Energy Supply and Conversion
Gas Technology Institute, USA

“Finding Coal’s Future”

Mr. Norman Kettenbauer

Vice President - Engineering & Contracting
Longview Power, LLC, USA

“Longview Power – Reliable, Economic, Clean Coal”

WEDNESDAY, OCTOBER 7, 2015

Dr. Lesley Sloss

Principal Environmental Consultant IEA CCC, UK
Lead - Coal Partnership area at UN Environment Programme
Advisory Board – Center for International Energy Policy,
SCOTLAND

“Coal - Its Future in an Increasingly Legislated Environment”

Prof. Frans Waanders

Professor and Director

School of Chemical and Minerals Engineering
North-West University, SOUTH AFRICA

“Coal Utilization in an Uncertain Economic World”

Prof. Farid A. Malik

Professor

Forman Christian College (American University)
Lahore, PAKISTAN

“Use of Coal in the Energy Mix of Pakistan”

THURSDAY, OCTOBER 8, 2015

Prof. James Van Nostrand

Director, Center for Energy and Sustainable Development
West Virginia University College of Law, USA

“Response of the Coal Industry to the EPA’s Clean Power Plan:
Litigate, Legislate, Retaliate, or Innovate?”

Mr. John Pippy

CEO

Pennsylvania Coal Alliance, USA

“The State of the PA Coal Industry Under Federal Regulations”

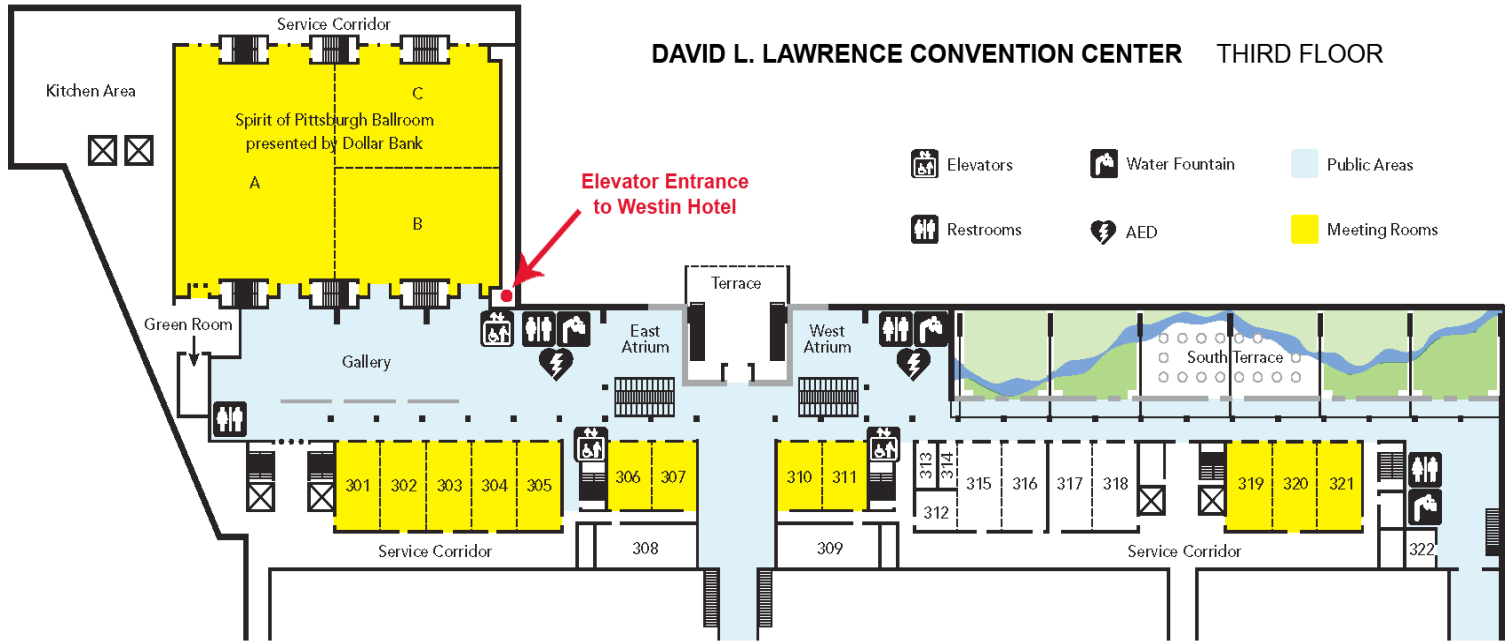
Dr. Daman S. Walia

President and CEO, ARCTECH Inc., USA

“Coal Biotechnology: a Creative Approach for Carbon
Reduction, Environmental Footprint, While Moving Coal Up the
Value Chain”

Monday, October 5, 2015						
7:15-16:00	Technical Tour – Longview Power					
15:00-19:00	Registration – Room 306					
18:30-20:30	Reception – Rooftop Terrace					
Tuesday, October 6, 2015						
7:00-17:00	Registration – Room 306					
8:00-8:10	Opening Ceremony – Ballroom					
8:10-10:05	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: DOE Projects	Coal Mining: Optimization of Mining Operations	Gasification Technologies: Advanced Technologies	Combustion Technologies: Flue Gas Cleanup	U.S. EPA CMOP General - 1	Coal Science: 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: Combustion Projects	Coal Mining: Environmental Technologies for Mining	Gasification Technologies: General - 1	Combustion Technologies: Mercury Removal	U.S. EPA CMOP General - 2	Coal Science: Rare Earth Elements - 1
15:10-15:25	Coffee Break					
	Session 13	Session 14	Session 15	Session 16	Session 17	Session 18
15:25-17:05	Clean Coal Demonstration and Commercial Projects: Industrial Processes	Coal Mining: Gas Management in Mining Operations	Gasification Technologies: General - 2	Combustion Technologies: Oxy Combustion- 1	U.S. EPA CMOP General - 3	Coal Science: Rare Earth Elements - 2
18:00-21:00	Gateway Clipper Dinner Cruise					
Wednesday, October 7, 2015						
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: Gasification and Combustion	Coal Mining: Geological Characterization and Ground Control	Gasification Technologies: Biomass Co-Gasification	Combustion Technologies: Oxy Combustion- 2	U.S. EPA CMOP General - 4	Coal Science: General - 2
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: Clean Coal and CBTL	Coal Mining: Mining Technology	Gasification Technologies: Modeling - 1	Combustion Technologies: Co-Firing	U.S. EPA CMOP General - 5	Coal Science: General - 3
15:10-15:25	Coffee Break					
	Session 31	Session 32	Session 33	Session 34	Session 35	Session 36
15:25-17:05	Sustainability and Environment: General - 1	Carbon Management: Post Combustion Capture	Gasification Technologies: General - 3	Combustion Technologies: General	U.S. EPA CMOP General - 6	Coal Science: General - 4
18:00-21:00	Poster Session - East Atrium					
Thursday, October 8, 2015						
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	Gasification Technologies: Bio-Conversion	Carbon Management: CO ₂ Storage	Gasification Technologies: General - 4	Shale and Coal Bed Gas: General - 1	Coal Science: General - 5	Coal Science: General - 6
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 and Gas to Fuels - 1	Carbon Management: Conversions, Post Utilization or Heat Recovery	Gasification Technologies: Slag Analysis	Shale and Coal Bed Gas: General - 2	Coal Science: General - 7	Coal Science: General - 8
15:10-15:25	Coffee Break					
	Session 49	Session 50	Session 51	Session 52	Session 53	Session 54
15:25-17:05	Clean Coal and Gas to Fuels - 2	Carbon Management: Other Topics on CO ₂ Capture	Gasification Technologies: Modeling - 2	Shale and Coal Bed Gas: General - 3	Coal Science: General - 9	Coal Science: General - 10
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
East Atrium

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 6, 2015

10:20 - 17:05

SESSION 1

CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS: DOE DEMONSTRATIONS OVERVIEW, FINANCIAL CONSIDERATIONS & POLYGENERATION WITH EOR

Jason Lewis and Marty Weblor

10:20 - **Overview & Status Update of U.S. DOE Major Fossil Energy Carbon Capture & Geologic Storage Demonstration Projects**, Thomas A. Sarkus, Nelson F. Rekos, Michael Knaggs, DOE/NETL, USA

10:40 - **Considered Insights into Successful Financings of Clean Coal Demonstration and Commercial Projects with Governmental Financial Incentives**, Martin Weblor, DOE/NETL, USA

11:00 - **Financing Innovative Advanced Fossil Technology Deployment through the Title XVII Program**, Andreas Marcotty, DOE/NETL, USA

11:20 - **Texas Clean Energy Project Update**, Karl E Mattes, Summit Power Group, USA

11:40 - **Clean Coal Power Initiative Update: Texas Clean Energy Project, 400 MW Integrated Gasification Combined Cycle Poly-Generation with 90 Percent Carbon Capture**, Jason Lewis, DOE/NETL, USA

SESSION 2

COAL MINING: OPTIMIZATION OF MINING OPERATIONS

Aaron Noble and Richard Bajura

10:20 - **Maximum Value from Coal Resources: Investigation into the Application of Net Present Value Optimization for Mining Seam Selection**, Wynand Botes, B.W. Botha, D. Campbell, W. Heenop, VBKOM Consulting Engineers, SOUTH AFRICA

10:40 - **Industrial Engineering and Productivity Management in Coal Mining and Utilization: A Study with Special Reference to India**, Venkata Satya, Surya Narayana, Rao Kambhampati, National Institute of Industrial Engineering, INDIA

11:00 - **Indonesian Coal Production Forecasting Using Logistic Curve: Evaluation Based on Coal Basin**, Fadhila A Rosyid, Tsuyoshi Adachi, Akita University, JAPAN

11:20 - **Optimizing a Coal Mining and Beneficiation Plant through Simplification**, Brendan Botha, VBKOM Consulting Engineers; Z. Botha, Exxaro Resources; J de Korte, CSIR, SOUTH AFRICA

11:40 - **Design and Optimization of Closed Distance Seam Group Floor Drainage Borehole**, Pi Xi-yu, Li Tie, University of Science and Technology Beijing, CHINA

SESSION 3

GASIFICATION TECHNOLOGIES: ADVANCED TECHNOLOGIES

Massood Ramezan and Daniel Roberts

10:20 - **Feasibility Analysis of Combined IGCC and Syngas Chemical Looping for Power Generation**, James C. Fisher, DOE/NETL; John E. Plunkett, Noblis, Inc., USA

10:40 - **Flame Spectroscopy in a High Pressure Gasifier during Petroleum Coke Gasification**, Thangam Parameswaran, Robin Hughes, Marc Duchesne, CanmetENERGY Natural Resources Canada, CANADA

11:00 - **Optimization of a Novel CO Conversion Quench Reactor**, Philip Roessger, Konrad Uebel, Bernd Meyer, Institute of Process Engineering and Chemical Engineering, GERMANY

11:20 - **Preparation and Properties of Coal Tar Distillates Collector for Xinjiang Oil Shale Flotation**, ZhiYuan Yang, Xiaoning Zhang, Jiangjiang Ren, Xi'an University of Science and Technology, CHINA

SESSION 4

COMBUSTION TECHNOLOGIES : FLUE GAS CLEANUP

John Wheeldon and Evan Granite

10:20 - **Pulsed Electron Beams Removal of NO_x and SO_x From Flue Gas**, Matthew F. Wolford, John D. Sethian, Matthew C. Myers, Frank Hegeler, John Giuliani, Tzvetelina B. Petrova, Brian T. Fisher, H. Douglas Ladouceur, Naval Research Laboratory, USA

10:40 - **Specification of NO_x Emissions From Combustion of Lignites in a BFBC**, Jan Hrdlicka, Pavel Skopec, Jan Opatril, Czech Technical University in Prague, CZECH REPUBLIC

11:00 - **Submicrometer Particle Capture in a Pressurized Electrostatic Precipitator (ESP)**, Zhichao Li, He Jing, Pratim Biswas, Washington University in St. Louis, USA

11:20 - **Cross-Flow Wet Precipitator**, Muhammad Ali, Hajrudin Pasic, Khairul Alam, Ohio University, USA

11:40 - **Removal of Fine Particles from Flue Gas by Heterogeneous Condensation in WFGD System**, Hao Wu, Danping Pan, Yezheng Jiang, Linjun Yang, Southeast University, CHINA

SESSION 5

U.S. EPA'S COALBED METHANE OUTREACH PROGRAM (CMOP) COAL MINE METHANE CONFERENCE TRACK GENERAL - 1

Felicia Ruiz and Steve Carpenter

10:20 - **Keynote Address: U.S. Climate Action Plan: Strategy to Reduce Methane Emissions – Approach for the Coal Mines Sector**, Pamela Franklin, Environmental Protection Agency, USA

11:00 - **California Cap-and-Trade Panel Session #1: Coal Mine Methane Destruction In The California Compliance Offset Market: Introduction to the California Compliance Offset Program**, David Antonioli, Verified Carbon Standard (VCS); Michael Coté, Ruby Canyon Engineering, USA

SESSION 6

COAL SCIENCE: GENERAL - 1

Jim Hower and Frans Waanders

10:20 - **De-Sulfurization of Some Brazilian Power-Coals by Low Energy Ultrasonication**, Matheus S. Civeira, Luis F.O. Silva, Centro Universitário La Salle, BRAZIL; Frans Waanders, North-West University, SOUTH AFRICA; Binoy K. Saikia, CSIR-North East Institute of Science & Technology, INDIA

10:40 - **Briquetting of Non- and Poor-Baking Hard Coals for its Usage in Smelting Reduction Processes under Consideration of Blending and Curing Effects**, Reinhard

Lohmeier, Hans-Werner Schröder, Jens-Uwe Repke, TU Bergakademie Freiberg, GERMANY; Hado Heckmann, Primetals Technologies Austria GmbH, AUSTRIA

11:00 - **Manufacturing of Briquettes from Typical Highveld Coal Fines Using Various Binders**, Frans Waanders, Nthabiseng Modiri, John Bunt, Hein Neomagus, North-West University, SOUTH AFRICA

11:20 - **Briquetting of Chamalang Coal (Baluchistan) Fine Wastes Using Molasses Binder**, Javaid Akhtar, Shahid Munir, Khurram Shahzad, Naseer Sheikh, Sadaf Naz, Mariyam Hakim, University of the Punjab, PAKISTAN

11:40 - **The Influence of Lignin Sulfonate as a Binder for Fine Coal Pellets**, Christien A Strydom, T.S. Mthombo, J.R. Bunt, North-West University, SOUTH AFRICA

SESSION 7

CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS: CCS PROCESSES: PRE-COMBUSTION, POST-COMBUSTION & OXY-COMBUSTION

Diane Madden and Ted McMahon

13:30 - **Polish Way of Managing Coal-Based Energy Sector alongside EU Policy**, Jan Antończyk, ENERGOPROJEKT-KATOWICE SA and AGH University of Science and Technology, POLAND

13:50 - **Update on the Kemper County IGCC Project**, Diane Revay Madden, DOE/NETL; Tim Pinkston, Southern Company, USA

14:10 - **Petra Nova Carbon Capture & Sequestration Project Construction Update**, Ted McMahon, DOE/NETL; Tony Armprister, USA

14:30 - **Pre-, Post- and Oxy-Combustion Approaches to Mitigate CO₂ Emissions: Techno-Economic Comparison**, Giorgio Cucca, Francesca Ferrara, Alberto Pettinau, Sotacarbo S.p.A.; Giorgio Cau, Vittorio Tola, University of Cagliari, ITALY

14:50 - **Advanced Super-Critical Coal Generation with Carbon Capture & Storage: Location Comparisons in the Eastern Interconnect**, Joel Theis, DOE/NETL, USA

SESSION 8

COAL MINING: ENVIRONMENTAL TECHNOLOGIES FOR MINING

Aaron Noble and Richard Bajura

13:30 - **International Standards Development Under ISO TC-82 Mining with a Focus on Equipment, Safety, Mine Reclamation, & Reserve Estimation**, Steven M Carpenter, Advanced Resources International, Inc., USA

13:50 - **Risk Mapping and Rehabilitation of Emalahleni Municipal Area with Focus on Coal Mining Impacts**, Adele Schoeman, North West University, SOUTH AFRICA

14:10 - **An Analysis of Scientific Investigations Related to Reclamation of Coal Mines with Coal Combustion By-Products**, Kimery C. Vories, E-Ternion: Energy, Environment & Economy, USA

14:30 - **Reclamation and Reforestation Works of Turkish Coal Enterprises**, Metin Aktan, Mustafa Aktas, Turkish Coal Enterprises; Nevzat Kavakli, Ministry of Energy & Natural Resources, TURKEY

14:50 - **Experimental Study on Preparation Method for High-Performance Catalyst Applied in the Catalytic Combustion of Coal Mine Ventilation Air Methane**,

JianDong Kang, JingYu Ran, Chongqing University; Chen Hui, Chongqing Research Institute, CHINA

SESSION 9 GASIFICATION TECHNOLOGIES: GENERAL - 1

Daniel Roberts and Joshua Stanislawski

13:30 - **Pilot-Scale Demonstration of Advanced Hydrogen and CO₂ Separation Membrane Technology**, Joshua J. Stanislawski, Scott G. Tolbert, Tyler J. Curran, Michael L. Swanson, Energy & Environmental Research Center, University of North Dakota, USA

13:50 - **Technologies to Mitigate Syngas Cooler Plugging and Fouling**, Mike Bockelie, Kevin Davis, Rand Pummill, Martin Denison, Tim Shurtz, Reaction Engineering International; Kevin Whitty, Mustafa Can Celebi, Andrew Fry, Cristina Jaramillo, Zhonghua Zhan, University of Utah; Jost Wendt, Reaction Engineering International and University of Utah, USA

14:10 - **Aspects of Chemical Quenching of Raw Gas from Entrained Flow Gasification**, Patrick Fertl, Rainer Reimert, Karlsruhe Institute of Technology, GERMANY

14:30 - **Microwave-Assisted Steam Gasification of Low Rank Sub-Bituminous Coal**, Victor Abdelsayed, Richard Bergen, DOE/NETL/AECOM; Dushyant Shekhawat, DOE/NETL, USA

14:50 - **Sub-Liquidus Rheology of Coal Slags Under Gasification Conditions**, Sören Seebold, Guixuan Wu, Michael Müller, Institute of Energy and Climate Research (IEK-2), Forschungszentrum Jülich, GERMANY

SESSION 10 COMBUSTION TECHNOLOGIES: MERCURY REMOVAL

John Wheeldon and Evan Granite

13:30 - **Measurements of Fly Ash Optical Properties and the Effects of Powdered Activated Carbon Addition**, Herek L. Clack, Tian Xia, James C. Hower, University of Kentucky, USA

13:50 - **Dry Sorbent Injection with Hydrated Lime for Acid Gas Control to Achieve Regulatory Compliance While Burning Various Coals**, Gerald Hunt, Lhoist North America, USA

14:10 - **Startup Lessons Learned from Dry Sorbent Injection and Activated Carbon Injection Systems**, David Park, S. Glesmann, ADA Carbon Solutions; R. Chang, EPRI; M. Lund, Nol-Tec Systems, USA

14:30 - **Mercury Adsorption Forms and Removal on Surface of Bio-Char Sorbent**, Min She, Yufeng Duan, Chun Zhu, Qiang Zhou, Jun Zhang, Hongfei Du, Southeast University, CHINA

SESSION 11 U.S. EPA'S COALBED METHANE OUTREACH PROGRAM (CMOP) COAL MINE METHANE CONFERENCE TRACK GENERAL - 2

Felicia Ruiz and Steve Carpenter

13:30 - **CMM Development in the U.S. – Where are the Sweet Spots?**, James S. Marshall, Candice L. M. Tello, Raymond C. Pilcher, Raven Ridge Resources Incorporated, USA

13:50 - **Where's the VAM Abatement Project Opportunity in the U.S.?**, Michael M. Cote, Ronald C. Collings, Ruby Canyon Engineering, USA

14:10 - **California Cap-and-Trade Panel Session #2: Coal Mine Methane Projects, Carbon Offsets, and their Role in California Cap-and-Trade**, Teresa Lang, Derik Broekhoff, Max DuBuisson, Climate Action Reserve, USA

SESSION 12 COAL SCIENCE: RARE EARTH ELEMENTS -1

Jim Hower and Alan Kolker

13:30 - **Uncertainties and Optimum Detection Modes for Rare Earth Analysis in Coal and Coal Ash using Inductively Coupled Plasma Mass Spectrometry (ICP-MS)**, Elliot Roth, Evan Granite, DOE/NETL; Tracy Bank, AECOM, USA

13:50 - **Analytical Approaches for Determining Rees in Coal and Coal Ash**, Allan Kolker, Clint Scott, Nick Geboy, Ruth Wolf, Jamie McCord, U.S. Geological Survey, USA

14:10 - **Synthesis of Layered Double Hydroxides Intercalated with Chelating Agents for Rare Earth Element Capture from Aqueous Streams**, Ashley LeDonne, Elliot Roth, Evan Granite, DOE/NETL; Jonathan Lekse, AECOM, USA

14:30 - **Leaching of Uranium from Coal Using Samples from the Springbok Flats Coalfield: Acid Leaching**, Malumbazo Nandi, M. Ndhlalose, Council for Geoscience; N. J. Wagner, University of Johannesburg, SOUTH AFRICA

14:50 - **The Content of Toxic Elements in Mining Wastes in the Fields of Kuzbass**, Zinifer Ismagilov, Institute of Coal Chemistry and Materials Science; Natalia Zhuravlyova, Roza Potokina, O.V. Ivanykina, JSC West-Siberian Test Center, RUSSIA

SESSION 13 CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS : INDUSTRIAL PROCESSES

Samuel Tam and Venkat Venkatraman

15:25 - **CO₂ Capture from Industrial Processes: Opportunities & Gaps**, V Pradeep Indrakanti, William Bender, John Huston, Sr., Leonardo Technologies Inc.; John Litynski, U.S. Department of Energy, USA

15:45 - **Port Arthur CCUS: Demonstration of CO₂ Capture & Sequestration of Steam Methane Reforming Process Gas Used for Large-Scale Hydrogen Production**, Gloria Power, Nile R. Bolen, Air Products and Chemicals, Inc.; Anthony Zinn, DOE/NETL, USA

16:05 - **Illinois Industrial Carbon Capture & Storage Project**, Scott McDonald, Archer Daniels Midland Company, USA

16:25 - **Dust Suppression in Coal Handling Applications**, Carl Harr, Dust Control Technology, USA

SESSION 14 COAL MINING: GAS MANAGEMENT IN MINING OPERATIONS

Aaron Noble and Richard Bajura

15:25 - **Coal Mine and Coal Mine Methane/Gas Management in Coal Mine**, Nitin Agrawal, N. Kaarmegan, NTPC LTD, INDIA

15:45 - **CO₂ Fracturing: An Advanced Coalmine Methane Drainage Technology in Low Permeability Gassy Coals**, Yunxing Cao, Hong Zhai, Guoting Fu, Gangfei Zhao, Junsheng Zhang, Lin Tian, Henan Polytechnic University, CHINA

16:05 - **Theory and Modelling of Explosion Scenarios in Coal Mines**, Sinan Demir, Hayri Sezer, V'yacheslav Akkerman, West Virginia University; Ali S. Rangwala, Worcester Polytechnic Institute, USA

16:25 - **Improvement and Application of Three-dimension Numerical Model for Flammable Gas Explosions in Confined Space**, Wang Hua, Wang Lianhua, Qufu Normal University, CHINA

16:45 - **Modelling of Gas and Ventilation Flow Characteristics at an Underground In-Seam Drilling Site**, Ting Ren, Zhongwei Wang, Jian Zhang, Frank Hungerford, University of Wollongong and Valley Longwall International Pty Ltd; Yuanping Cheng, China University of Mining and Technology, CHINA

SESSION 15 GASIFICATION TECHNOLOGIES: GENERAL - 2

Massood Ramezan and James Fisher

15:25 - **Pilot Scale Studies on CO₂-Enhanced Coal Gasification in a Circulating Fluidized Bed Reactor**, Grzegorz Tomaszewicz, Andrzej Czaplicki, Aleksander Sobolewski, Tomasz Chmielniak, Marek Sciazko, Krzysztof Slowik, Institute for Chemical Processing of Coal, POLAND

15:45 - **Kinetic Studies for CO₂ Gasification of HOK Cokes Using Thermogravimetric Analyzers at High Pressures**, Ziad Abosteif, Stefan Guhl, TU Bergakademie Freiberg, GERMANY

16:05 - **In-situ Analysis and Mechanism Study of Char-Ash/Slag Transition in Pulverized Coal Gasification**, Lu Ding, Guangsu Yu, East China University of Science and Technology, CHINA

16:25 - **Regeneration Behavior of Iron Oxide Desulfurization Sorbent in an Atmosphere with SO₂-O₂**, Ju Shangguan, Yukun Gao, Huiling Fan, Jie Mi, Taiyuan University of Technology, CHINA

SESSION 16 COMBUSTION TECHNOLOGIES: OXY- COMBUSTION -1

John Wheeldon and Evan Granite

15:25 - **Chemical Looping Combustion by Using Iron-Based Oxygen Carrier in Moving Bed Reactor System for Hydrogen Generation**, Ping-Chin Chiu, Chien-Hua Chen, Cheng-Hsien Shen, Jieh-Yn Sheu, Kuo-En Huang, Industrial Technology Research Institute, TAIWAN

15:45 - **Advanced Pressurized Oxy-Combustion: Towards Higher Plant Efficiency through Near-Zero Flue Gas Recycle and Boiler Designs**, Adewale Adeosun, Fei Xia, Zhiwei Yang, Akshay Gopan, Benjamin M. Kumfer, Richard L. Axelbaum, Washington University in St. Louis, USA

16:05 - **A Standardized Method for the Characterization of Coal Ignition Under Oxyfuel Conditions**, Martin Schiemann, Anna Becker, Sebastian Heuer, Nikita Vorobiev, Viktor Scherer, Ruhr-University; Daniel Haxter, Anna Havekost, Johannes Mayer, E.ON Technologies GmbH, GERMANY

16:25 - **An Experimental and Numerical Study of Volatile Combustion of Single Coal Particles in an Oxygen Enriched Atmosphere**, Jan Köser, Robert Knappstein, Lukas G. Becker, Benjamin Böhm, Johannes Janicka, Andreas Dreizler, Technische Universität Darmstadt, GERMANY

16:45 - **Coal Combustion Characteristics in a 1MWth Pilot-scale Circulating Fluidized Bed under Oxy-fuel Conditions with High Oxygen Concentration**, Haoyu Li, Shiyuan Li, Qiangqing Ren, Jingzhang Liu, Chinese Academy of Sciences, CHINA

11:00 - **Advances in Flameless Oxy-Combustion Technology**, Peter Reineck, ITEA S.p.A., UNITED KINGDOM; Massimo Malavasi, ITEA S.p.A., ITALY

11:20 - **CCS Flameless Pressurized Oxy-Combustion: Emphasis on "large scale pilot" facility, as the key step for process & equipment validation, before demo projects launching, and the new opportunity "ready for CCS" introduction**, Massimo Malavasi, ITEA S.p.a., ITALY

11:40 - **Design of a Commercial-Scale Oxy-Coal Supercritical CO₂ Power Cycle**, Nathan T. Weiland, Walter W. Shelton, DOE/NETL; Charles W. White, Noblis, Inc., USA

SESSION 17
U.S. EPA'S COALBED METHANE OUTREACH PROGRAM (CMOP) COAL MINE METHANE CONFERENCE TRACK
GENERAL - 3
Felicia Ruiz and Steve Carpenter

15:25 - **California Cap-and-Trade Panel Session #3: Coal Mine Methane Destruction in California: Understanding the Market for California Compliance Offsets**, David Antonioli, Verified Carbon Standard (VCS); Michael Coté, Ruby Canyon Engineering, USA

16:05 - **Market for Carbon Offsets – Trading, Risks and the Current State of Play**, John Battaglia, Evolution Markets, Inc., USA

16:25 - **Legal and Regulatory Developments Impacting Mine Methane Emissions and Projects in the U.S.**, Collon Kennedy, Attorney at Law, USA

SESSION 20
COAL MINING: GEOLOGICAL CHARACTERIZATION AND GROUND CONTROL
Brijes Mishra and Richard Bajura

10:20 - **Geology of the Newly Discovered Alpu – Eskisehir (Turkey) Coal Basin and Seismic Reflection Studies**, Ilker Senguler, Y. Ziya Cosar, General Directorate of Mineral Research and Exploration, TURKEY

10:40 - **Numerical Modeling of Top Coal Caving by Using Discrete Element Method**, N. Erhan Yasitli, Fatih Bayram, Aksaray University, TURKEY

11:00 - **Prevention Rock Burst by Pre-split Blasting in Xiezhuang Coal Mine**, Xia Yongjun, China Coal Technology Engineering Group Chongqing Research Institute, CHINA

11:20 - **Study on Dynamic Instability Mechanism of Gas-Filled Coal Body Being Loaded of Based on Complete Stress-Strain**, Pi Xi-yu, Li Tie, University of Science and Technology Beijing, CHINA

11:40 - **Study of the Time Effect Coupling on the Coal and Gas Outburst**, Yuliang Wu, Wang Shouquan, Sichuan Coal Industry Group Limited Liability Company, CHINA

SESSION 21
GASIFICATION TECHNOLOGIES: BIOMASS CO-GASIFICATION
Ting Wang and Jose Benitez

10:20 - **Synergy and Inhibition during Co-Gasification of Biomass-Coal Blends**, Pradeep K. Agrawal, Gautami Newalkar, Carsten Sievers, Georgia Institute of Technology; Kristiina Iisa, National Renewable Energy Laboratory, USA

10:40 - **Poison Resistant Water-Gas-Shift Catalyst for Coal and Biomass Co-Gasification**, Girish Srinivas, Steven C. Gebhard, Jeff Martin, Mike Looker, TDA Research Inc., USA

11:00 - **An Experimental Investigation on Woodchips Gasification in Throat Type Downdraft Gasifier**, Salih Çamur, Tübitak Mam, TURKEY

11:20 - **Techno-Economic Evaluation of a Low-Temperature CO₂ Capture Unit for IGCC Plants**, Simon Roussanly, David Berstad, Rahul Anantharaman, Petter Nekså, Jana Jakobsen, SINTEF Energy Research, NORWAY

11:40 - **Thermal Behaviors and Interactions of Petroleum Coke, Coal and Biomass in Air / CO₂ Atmosphere**, Ashak Mahmud Parvez, Tao Wu, The University of Nottingham Ningbo China, CHINA; Iqbal M Mujtaba, University of Bradford, UNITED KINGDOM

SESSION 22
COMBUSTION TECHNOLOGIES: OXY-COMBUSTION - 2
John Wheelton and Evan Granite

10:20 - **Emissions Control by Monitoring Total Excess Air and O₂**, Dario DiMaggio, Kurz Instruments, Inc., USA

10:40 - **Investigation of Temperature Uniformity during High Oxygen Concentration Combustion in 1MWt Circulating Fluidized Bed**, Jingzhang Liu, Shiyuan Li, Qiangqing Ren, Haoyu Li, Wei Li, Institute of Engineering Thermophysics, Chinese Academy of Sciences, CHINA

11:00 - **Examination of Changing Char Reactivity with Isothermal Oxy-Combustion Conversion by a Simplified Atomistic Simulation**, Haihui Xin, Deming Wang, China University of Mining and Technology; Chang'an Wang, Xi'an Jiatong University, CHINA; Jonathan P. Mathews, Penn State, USA

11:20 - **Numerical Simulation of Oxy-Coal MILD Combustion with High-Velocity Oxygen Jets**, Ruochen Liu, Enke An, Kun Wu, Tongji University, CHINA

11:40 - **Simultaneous Conversion of NO_x and SO₂ from Flue Gas to Fertilizer Using Organic Catalyst**, Zhipeng Xue, Shiqi Jin, Huadian Electric Power Research Institute, CHINA

SESSION 23
U.S. EPA'S COALBED METHANE OUTREACH PROGRAM (CMOP) COAL MINE METHANE CONFERENCE TRACK
GENERAL - 4
Felicia Ruiz and Steve Carpenter

10:20 - **Gob Gas Production during Mining of Blue Creek Coal Seam, Alabama, and Production Analysis of Ventholes**, C. Özgen Karacan, NIOSH-OMSHR, USA

10:40 - **PA Coal Mine Methane Recovery**, Steven E. Winberg, Battelle, USA

11:00 - **Lessons Learned in Developing Mine Methane Capture Projects across the U.S.**, Tom Vessels, Vessels Coal Gas, Inc., USA

11:20 - **CMM Recovery & Utilization Amidst Low Gas Prices & Abundant Shale Gas**, Joseph S. D'Amico, D'Amico Technologies Corp., USA

11:40 - **Overview of Global CMM and CBM Activity**, Jonathan Kelafant, Advanced Resources International, Inc., USA

SESSION 24
COAL SCIENCE: GENERAL - 2
Allan Kolker and Solomon Nyathi

10:20 - **Fullerene Functionalized Fullerenes Aggregates on Surface Soils and River Sediments from Santa Catarina Coal Mining Area**, Matheus S. Civeira, Luis F.O. Silva, Centro Universitário La Salle, BRAZIL; Frans Waanders, North-West University, SOUTH AFRICA

10:40 - **Nature and Origin of the Variation in Coke Strength after Reaction in Heat-Recovery Coke Making Technology**, Mhlwazi Solomon Nyathi, Richard Kruse, ArcelorMittal USA; Maria Mastalerz, Indiana Geological Survey, USA

11:00 - **Mössbauer and Other Spectroscopic Analyses of North-East Indian Coals and Tailings Products**, Frans Waanders, North-West University, SOUTH AFRICA;

ORAL SESSIONS

Wednesday, October 7, 2015
10:20 - 17:05

SESSION 19
CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS : COAL GASIFICATION & COMBUSTION PROCESSES
Nelson Rekos and Greg O'Neil

10:20 - **Application Progress of ECUST OMB Gasification Process**, Guangsuo Yu, Zhijie Zhou, Xueli Chen, Zhenghua Dai, Yifei Wang, Haifeng Liu, Fuchen Wang, Xin Gong, East China University of Science and Technology, CHINA

10:40 - **China's 600 Mwe CFB Boiler - Some Issues in the Development and its Operation**, Leming Cheng, Zhongyang Luo, Mengxiang Fang, Qinhui Wang, Mingjiang Ni, Kefa Cen, Zhejiang University; Li Nie, Qi Zhou, Dongfang Boiler Group Co. Ltd., CHINA

Binoy K Saikia, CSIR-North East Institute of Science & Technology, INDIA

11:20 - **Evaluation of Coking Characteristics of Bituminous Coals by Thermogravimetric Analysis**, J.V.S. Murty, C.V. Nageswara Rao, E. Sathwik Reddy, G.V.P. College of Engineering (Autonomous); A. Srinivasa Rao, Neelu Kumar, Visakhapatnam Steel Plant; Ch. V. Ramachandra Murthy, Andhra University, INDIA

11:40 - **Experimental Research of the Influence of Properties of Coal Charge on Ferro-Coke Properties**, Shi-zhuang Shi, Yong-hui Luo, Gong-er Wang, Yan-gao Mao, Qi Zheng, Zhi-long Lin, Wuhan University of Science and Technology, CHINA

**SESSION 25
CLEAN COAL DEMONSTRATION AND
COMMERCIAL PROJECTS : CLEAN COAL
& COAL/BIO MASS-TO-LIQUID FUELS
PROCESSES**

John Rockey and Anthony Zinn

13:30 - **Clean Coal Demonstration in the World & Best Example for Lignites in Turkey**, Hasan Hüseyin Erdogan, Murat Misir, Ministry of Energy and Natural Resources, TURKEY

13:50 - **A New Coal Refining Technology & its Demonstration**, Cliff Y. Guo, Qiang Qin, Changning Wu, National Institute of Clean-and-low-carbon Energy, CHINA

14:10 - **Overview & Status Update of U.S. DOD/DOE Joint Greenhouse Gas Emissions Reductions Research & Development Leading to Cost-Effective Coal-to-Liquids (CTL) Based Jet Fuel Production**, John M. Rockey, Thomas A. Sarkus, DOE/NETL; Robert Allen, AFRL/RQTF, USA

14:30 - **Design/Cost Study & Commercialization Analysis for Synthetic Jet Fuel Production at a Mississippi Site from Lignite and Woody Biomass with CO₂ Capture & Storage via Enhanced Oil Recovery**, Eric D. Larson, Tom Kreutz, Hans Meerman, Robert H. Williams, Princeton University; Steven Baxley, Southern Company Services, USA; Chris Grieg, University of Queensland, AUSTRALIA

14:50 - **Direct Coal-to-Liquids (CTL) for Jet Fuel using Biomass-Derived Solvents**, Satya P. Chauhan, Dan Garbark, Herman Benecke, Nick Conkle, Rachid Taha, Battelle; Jason T. Lewis, DOE/NETL, USA

**SESSION 26
COAL MINING:
MINING TECHNOLOGY**
Brijes Mishra and Richard Bajura

13:30 - **Research on the Space-Time Deformation Mechanism of Soft Coal Roadway Under Mining Activity Influence and its Coupled Supporting Technology**, Zhong-guang Sun, Jiang-tao Guo, China Coal Technology Engineering Group, Chongqing Research Institute; Shao-gang Li, China Coal Research Institute, CHINA

13:50 - **High Performance Water Powered DTH-Percussion Drilling for Degassification**, Peter Johansson, LKAB Wassara AB, USA

14:10 - **Experimental Study on Foam Dust Suppression Agent in Underground Coal Mine**, ZhiYuan Yang, ShuiJing Cao, MinBo Zhai, Xi'an University of Science and Technology, CHINA

14:30 - **Determination of Incubation Period for Ascertaining the Size of the Panel for Safety of Coal**

Mines with Respect to Spontaneous Heating, R. V. K. Singh, CSIR-Central Institute of Mining & Fuel Research, INDIA

14:50 - **Study of Adding Surfactant to Coal Seam Water Injection**, Huan Yuan, Tian-liang Li, Xi'an University of Science and Technology, CHINA

**SESSION 27
GASIFICATION TECHNOLOGIES:
MODELING - 1**

James Fisher and Ting Wang

13:30 - **Analysis of Sub Models for CFD Simulation of Industrial Coal-Water Slurry Entrained Flow Gasifier**, Andreas Richter, Bernd Meyer, TU Bergakademie Freiberg, GERMANY; Yu Zhang, Jian Xu, Yong Yang, Synfuels China Technology Co., Ltd., CHINA

13:50 - **Low Cost, High-H₂ Syngas Production for Power, Hydrogen, and Liquid Fuels**, Wei Yan, Arunabha Basu, Joseph Masin, S. James Zhou, Razima Souleimanova, Timothy Tamale, Naomi Klinghoffer, Howard S. Meyer, Gas Technology Institute, USA

14:10 - **Development and Application of a New Structure Based Viscosity Model for Oxide Melts Relevant to Fuel Slags**, Guixuan Wu, Sören Seebold, Elena Yazhenskikh, Michael Müller, Institute of Energy and Climate Research (IEK-2), Forschungszentrum Jülich GmbH; Klaus Hack, GTT Technologies, GERMANY

14:30 - **Performance Analysis of Power Generation and Synthetic Natural Gas (SNG) Production from Coal Gasification with Integrated versus Non-Integrated Configuration**, Hsiu-Mei Chiu, Po-Chuang Chen, Yau-Pin Chyou, Institute of Nuclear Energy Research, Atomic Energy Council, TAIWAN; Ting Wang, University of New Orleans, USA

14:50 - **Coal Hydrogasification for Aromatics and Methane**, Guoqing Wang, Yongguang Nie, Zhichao Ma, San Zhou, Xuliang Jing, ENN Science & Technology Development Co., Ltd., CHINA

**SESSION 28
COMBUSTION TECHNOLOGIES: CO-FIRING**

John Wheeldon and Evan Granite

13:30 - **Evaluating the Effect of Microalgae Biomass on the Combustion of Coal**, Vitus Ejesieme, Nelson Mandela Metropolitan University, SOUTH AFRICA

13:50 - **Estimating Biomass Yield and Co-Combustion of Coal Discard/Middling with Different Biomasses**, S. O. Bada, R. M. S. Falcon, L. M. Falcon, University of the Witwatersrand, SOUTH AFRICA

14:10 - **Preliminary Studies on Biomass Co-Firing Targeted to Demonstration in a Commercial Pulverized Coal Power Plant**, Won Yang, Tefera Zelalem Tumsa, Seuk Cheun Choi, Korea Institute of Industrial Technology; Junho Oh, Changkook Ryu, Sungkyunkwan University; Ik Hwan Na, Nak Kyun Kim, Hankook Technology Co., SOUTH KOREA

14:30 - **A Study on Yunnan Coal and Oat Straw Synergy during Co-Firing**, Jumoke Mojisola Oladejo, Stephen Adegbite, Tao Wu, The University of Nottingham Ningbo China, CHINA

14:50 - **Mineral Migration Under Co-Firing Conditions**, Jumoke Mojisola Oladejo, Stephen Adegbite, Tao Wu, The University of Nottingham Ningbo China, CHINA

**SESSION 29
U.S. EPA'S COALBED METHANE OUTREACH
PROGRAM (CMOP) COAL MINE METHANE
CONFERENCE TRACK
GENERAL - 5**

Felicia Ruiz and Steve Carpenter

13:30 - **Development and Implementation of Ventilation Air Methane (VAM) Projects**, Clark Talkington, Advanced Resources International, Inc., USA

13:50 - **Estimating VAM Concentration Based on Coal Tonnage Forecast and Ventilation Flow Rate**, Dominique Kay, Guy Drouin, Biothermica Technologies, CANADA

14:10 - **Addressing the Technology and Standards Gaps for VAM Abatement in Australia and Elsewhere**, David Cork, Rod Peet, Corky's Sustainable Energy; Peter Yallamas, Aerison Pty Ltd, AUSTRALIA

14:30 - **COMET TM – A Versatile Economic Low Temperature Catalytic Solution For Ventilation Air Methane Abatement**, Ian Mitchell, David Watson, Suzanne Ellis, Peter Hinde, Alec Miller, Johnson Matthey Davy Technologies Limited, USA

14:50 - **VAM with CMM Injection and Power Generation Update**, Jason Schroeder, Karl Walby, Durr Systems, Inc., USA

**SESSION 30
COAL SCIENCE:
GENERAL - 3**

Michael Trippi and Allan Kolker

13:30 - **Hazardous Elements in Agricultural Soils Surrounding a Coal Power Plant from Santa Catarina (Brazil)**, Matheus S. Civeira, Luis F.O. Silva, Centro Universitário La Salle, BRAZIL; Frans Waanders, North-West University, SOUTH AFRICA

13:50 - **Unique Distribution of HGI Values with Respect to Mineral Matter & Petrographic Composition of Rajmahal Coals, India**, Ashok K. Singh, Priya Kumari, Neelam Kumari, Prabal Boral, Basudeb Ghosh, CSIR-Central Institute of Mining and Fuel Research, INDIA

14:10 - **The Experiment Research of Sulfur Distribution and Screening and Floating and Sinking Tests for High-Sulfur Coal Desulfurization**, Doudou Wang, Meili Du, Xi'an University of Science and Technology, CHINA

**SESSION 31
SUSTAINABILITY AND ENVIRONMENT:
GENERAL - 1**

Frans Waanders and Roy Lieberman

15:25 - **Effects of Cotton Waste Addition on the Oxidation Characteristics of High Sulfur Turkish Lignites**, Arzu Kanca, Ataturk University, TURKEY

15:45 - **Research on the Synthetic Process Conditions of Nanometer Calcium Carbonate**, Yu Feng, Mei Li Du, Xi'an University of Science and Technology, CHINA

16:25 - **Performance and Carbon Footprint of a Coal-To-Methanol Plant Using Pinch Analysis Combined with Life Cycle Assessment**, Zaoxiao Zhang, Zhen Qin, Xiaomei Wu, Xi'an Jiaotong University, CHINA

SESSION 32

CARBON MANAGEMENT: POST COMBUSTION CAPTURE

Gary Stiegel and Henry Pennline

15:25 - **Optimization of Amine-Based Solid Sorbent Chemistry for Post-Combustion Carbon Capture**, Qianwen Gao, David C. Miller, DOE/NETL, USA

15:45 - **Membrane Properties Required for Post-Combustion CO₂ Capture at Coal-Fired Power Plants**, Simon Roussanaly, Rahul Anantharaman, Karl Lindqvist, Jana Jakobsen, SINTEF Energy Research, NORWAY; Haibo Zhai, Edward Rubin, Carnegie Mellon University, USA

16:05 - **Experimental Study of the CO₂ Absorption Performance in a New Type Spray Tower**, Zaoxiao Zhang, Xiaomei Wu, Yunsong Yu, Zhen Qin, Xi'an Jiaotong University, CHINA

16:25 - **Aspen Modeling for MEA-CO₂ System: Solution Approach for Rate-Based Column Model**, Zhen Fan, Kun Liu, Heather Nikolich, Reynolds Frimpong, Guojie Qi, Kunlei Liu, University of Kentucky, USA

16:45 - **Advanced Solid Sorbents for CO₂ Capture from Flue Gas**, Xiaoxing Wang, Chunshan Song, EMS Energy Institute, Pennsylvania State University, USA

SESSION 33

GASIFICATION TECHNOLOGIES: GENERAL - 3

Massood Ramezan and Daniel Roberts

15:25 - **Economic Evaluation of Dry Solids Feeding an Entrained Flow Gasifier**, Timothy W. Saunders, Aerojet Rocketdyne Inc., USA; Christopher A. Higman, Higman Consulting GmbH, GERMANY

15:45 - **Comparison of Simulating NGCC/IGCC Power Plants between Using Thermoflex and Aspen Plus**, Henry A. Long, Ting Wang, Energy Conversion & Conservation Center, University of New Orleans, USA

16:05 - **Investigation of Pyrolysis Yields from a Small-Scale Fluidized Bed Reactor**, S. Pielsticker, B. Gövert, T. Kreitzberg, R. Kneer, RWTH Aachen University, GERMANY

16:25 - **Gasification of PRB Coal Liquefaction Residue**, William C. Schaffers, David Bell, University of Wyoming, USA

16:45 - **ENN's Underground Coal Gasification Introduction**, Feng Chen, ENN Science & Technology Co. Ltd., CHINA

SESSION 34

COMBUSTION TECHNOLOGIES: GENERAL

John Wheeldon and Evan Granite

15:25 - **Determination of Devolatilization Kinetics in Inert and CO₂-Enriched Atmospheres in a Plug Flow Reactor**, Sebastian A. Heuer, Martin Schiemann, Viktor Scherer, Ruhr-University, GERMANY

15:45 - **A Critical Review of Numerical Models and Variables on Self-Heating of Coal Stockpiles and Their Practical Implications**, Jian Zhang, Ting Ren, Zhongwei Wang, University of Wollongong, AUSTRALIA; Yuntao Liang, Shenyang Branch of China Coal Research Institute, CHINA

16:05 - **Effects of Pore Diffusion on Kinetics Rate and NO Release during Char Combustion**, Jie Xu, Rui Sun, Haerbin Institute of Technology, CHINA

16:25 - **Influence of Different Steam Concentration on Carbonation Reaction of the Carbide Slag**, Zirui He, Yingjie Li, Shandong University, CHINA

16:45 - **Slagging Characteristic of Easy to Slagging Coal, Zhundong Coalfield, China**, Heng Chen, Yungang Wang, Haidong Ma, Qinxin Zhao, Xi'an Jiaotong University, CHINA

SESSION 35

U.S. EPA'S COALBED METHANE OUTREACH PROGRAM (CMOP) COAL MINE METHANE CONFERENCE TRACK GENERAL - 6

Felicia Ruiz and Steve Carpenter

15:25 - **Preliminary Results of Coal Methane Resources Assessment in Mongolia**, Ochirsukh Badarch, Mongolian Nature and Environment Consortium, MONGOLIA

15:45 - **Coal Mine Methane Projects in Southwest China: Opportunities and Barriers to Development**, Raymond C. Pilcher, Candice L. M. Tello, James S. Marshall, Boni Jang, Raven Ridge Resources Incorporated, USA

16:05 - **Coal Mine Methane Development in Indian Scenario: Opportunities and Challenges**, V K Sinha, CMPDI; T K Sinha, Coal India Ltd, INDIA

16:25 - **VAM at Russian Coal Mines**, Oleg V. Tailakov, Institute of Coal of SB RAS/KuzSTU; Peet M. Sööt, CMM Energy LLC, RUSSIA

16:45 - **MEXICO CMM Project from Design to Reality, Who to Implement and Operate Flaring**, Mario Santillan, Adrian Huerta, Brenda Soto, Minera del Norte, MEXICO

SESSION 36
COAL SCIENCE:
GENERAL - 4

Allan Kolker and Michael Trippi

15:25 - **Coal Mining Residues and Sulphide Oxidation by Fenton's Reaction**, Adilson C. Dalmora, Luis F.O. Silva, Centro Universitário La Salle, BRAZIL; Frans Waanders, North-West University, SOUTH AFRICA

15:45 - **The Influence of Drying Conditions on Processing Properties of Lignite**, Albrecht Matthes, Hans-Werner Schröder, Jens-Uwe Repke, TU Bergakademie Freiberg; Bastian Lehmann, RWE Power AG, GERMANY

16:05 - **Coal Drying Characteristics in Fluidized Bed Dryer**, Wonjae Lee, Dongmin Jang, Jaehoon Choi, POSCO, SOUTH KOREA

16:25 - **Study on Preparation and Mechanical Properties of Carbon Black/Ultra-Pure Coal Filled SBR**, Shiyong Zhao, Yang Wu, Bo Li, Xi'an University of Science and Technology, CHINA

ORAL SESSIONS
Thursday, October 8, 2015
10:20 - 17:05SESSION 37
GASIFICATION TECHNOLOGIES:
BIO-CONVERSION

Arun Bose and Steve Markovich

10:20 - **Biostimulation for Bio-Gasification for Converting Coal to Methane**, Yanna Liang, Ji Zhang, Stephen Park, Rohit Pandey, Satya Harpalani, Southern

Illinois University Carbondale, USA

10:40 - **Biodegradation of Subbituminous Coal by Fungus**, Jing Wang, Xiangrong Liu, Xi'an University of Science and Technology, CHINA

11:00 - **HUMAXX MicGAS™ Coal Bio Refinery Techno-Economic Analysis for Deployment in Wyoming**, Daman S. Walia, ARCTECH Inc., USA

11:20 - **Thermogravimetric Assessment of Coal, Biomass and Their Blends to Support Pilot-Scale Gasification Tests**, Alberto Pettinau, Alessandro Orsini, Mauro Mureddu, Francesca Ferrara, Sotacarbo S.p.A, ITALY

11:40 - **Synthesis of Polymer Encapsulated Porous Kaolinite Proppant for Microbially Enhanced Coalbed Methane Recovery**, Taylor D. Sparks, Kyu Bum Han, John Fuertez, John McLennan, University of Utah, USA

SESSION 38

CARBON MANAGEMENT: CO₂ STORAGE

Gary Stiegel and Henry Pennline

10:20 - **Comparing Adsorption Behavior of Carbon Dioxide, Methane and Nitrogen on Coal and Shale: Particle Size Effect on Pore Characterization of Coal from Low Temperature Nitrogen Adsorption Test**, Xu Tang, Nino Ripepi, Virginia Polytechnic Institute and State University, USA

10:40 - **Development of the First Internationally Accepted Standard for Geologic Storage of Carbon Dioxide Utilizing Enhanced Oil Recovery (EOR) Under the International Standards Organization (ISO) Technical Committee TC-265**, Steven M Carpenter, Advanced Resources International, Inc., USA

11:00 - **Pressure Data and Interference Testing at the Citronelle SECARB Phase III Site, Alabama USA**, Hunter Jonsson, George Koperna, Jr., Advanced Resources International, Inc.; Rob Trautz, EPRI; Barry Friefeld, Lawrence Berkeley National Laboratory, USA

11:20 - **Post Injection Site Care (PISC) at the SECARB Anthropogenic Test**, David Riestenberg, George Koperna, Jr., Advanced Resources International, Inc.; Richard Rhudy, Rob Trautz, Electric Power Research Institute, USA

11:40 - **Potential for the Use and Adsorption of Power Plant CO₂ in the Appalachian Basin and Other Triassic Rift Basins in Maryland**, Paul Petzrick, State of Maryland Department of Natural Resources; Jennifer Gunnulfsen, Environmental Resources Management, USA

SESSION 39
GASIFICATION TECHNOLOGIES:
GENERAL - 4

Daniel Roberts and Ting Wang

10:20 - **High Pressure, Entrained Flow Studies of Gasification of Rhenish Lignite**, Daniel G. Roberts, Lucio N. Fogliari, Matthew J. Langley, David J. Harris, CSIRO Energy Technology, AUSTRALIA; Christian Schneider, Markus Walter, Technical University Bergakademie, GERMANY

10:40 - **The new coal conversion technologies developed at University of Wyoming** Lei Bai, Xin He, Tuo Tang, Deping Xu, Yonggang Wang, China University of Mining and Technology (Beijing), CHINA; Fan Zhang, National Institute of Clean-and-Low-Carbon Energy, CHINA; Maohong Fan, University of Wyoming, USA

11:00 - **The Preparation of Spherical Activated Carbon Based on Pitch of Coal Poly-Generation**, Shao-peng Wang, Zhong-yang Luo, Meng-xiang Fang, Qin-hui Wang, Hao Wang, Zhejiang University, CHINA

11:20 - **Effects of Pyrolysis Atmosphere and Temperature on Coal Char Characteristics and Gasification Reactivity**, Rui Zhang, Dong Liu, Nanjing University of Science & Technology, CHINA

**SESSION 40
SHALE AND COAL BED GAS:
GENERAL - 1**

Richard Winschel and Leslie Ruppert

10:20 - **Regulation of Methane Emissions from Coal Bed Methane and Shale Gas Operations**, Stephen C. Smith, Steptoe & Johnson PLLC, USA

10:40 - **From Venting Skyward to Moving Forward: A Historical Perspective on the Regulation of Coal Bed Methane Development**, Jon C. Beckman, Steptoe & Johnson PLLC, USA

11:00 - **Study and Application of Mosaic and Temporary Plugging Drilling Fluid System on CBM Wells**, Ping Zhang, Xiang Wu, Jianguang Wu, Jingluan Zuo, China United Coalbed Methane Co., Ltd., CHINA

11:20 - **ICBM Development from Gob Areas in China: A Theoretical and Experimental Investigation**, Jinhua Chen, Chongqing Research Institute of China Coal Technology & Engineering Group Corporation; Qianting Hu, Shandong University of Science and Technology; Yüwen Xi, CHINA

11:40 - **Technology Status of Coalbed Methane Development in China and Problems to Be Solved Urgently**, Shao Xianjie, Jie Jingtao, Qiao Yupeng, Xie Qihong, Zhang Min, Li Shicai, Yanshan University, CHINA

**SESSION 41
COAL SCIENCE:
GENERAL - 5**

Frans Waanders and Solomon Nyathi

10:20 - **Response Optimization Study for Distribution of Organic Sulphur Forms in Tipong Coal of Assam Using Design of Experiment**, Amritanshu Kumar, Theem College of Engineering; S.K. Srivastava, Central Institute of Mining and Fuel Research, INDIA

10:40 - **Modification of Shenfu Semi-Coke for Water-Coke Slurry Preparation**, ZhiYuan Yang, Sitong Wang, Minjie Zhao, Xi'an University of Science and Technology, CHINA

11:00 - **Preparation and Properties of Coal Tar Distillates Collector for Fine Coal Flotation**, Zhiyuan Yang, Xiaoning Zhang, Xi'an University of Science and Technology, CHINA

11:20 - **Influence of Needle Coke and Crystallitic Carbon on Hydrogen Storage Capacity of Magnesium Under Hydrogen Atmosphere by Ball Milling**, Pei Liu, Bogu Liu, Qianqian Zhang, Lihua Zhang, Shixue Zhou, Shandong University of Science and Technology, CHINA

**SESSION 42
COAL SCIENCE:
GENERAL - 6**

Frans Waanders and Greg O'Neil

10:20 - **Detailed Characteristics of Coal Ash from the Largest Coal-Fired Power Plant in South America**, Adilson C. Dalmora, Luis F.O. Silva, Centro Universitário La Salle, BRAZIL; Frans Waanders, North-West University, SOUTH AFRICA

10:40 - **The Fixation Capabilities of Fly Ashes Formed in Spanish Facilities Compared to that in the Israeli Facilities**, Roy Nir Lieberman, Oriol Font, Xavier Querol, Institute of Environmental Assessment and Water Research (ID/EA) Consejo Superior de Investigaciones Científicas (CSIC), SPAIN; Haim Cohen, Ariel University, ISRAEL

11:00 - **Recycling of Fly Ash in Construction Projects Using Modifiers for Trace Metal Attenuation**, Matthew M. Bernacki, Cody W. Barnes, Brandon P. Goold, Kevin T. Fitzgerald, Gautham P. Das, Wentworth Institute of Technology, USA

11:20 - **Evaluation of Strength of Subgrade Treated with Fly Ash & Calcium Stearate**, Devin Howe, Ryan Marshall, Michael Mooney, Gautham Das, Wentworth Institute of Technology, USA

11:40 - **Geotechnical Behavior of Fly Ash as a Backfilling Material under Seismic Environment**, VRK Vadapalli, S. Gcasamba, G.Rathod, Council for Geoscience, SOUTH AFRICA

**SESSION 43
CLEAN COAL AND GAS TO FUELS - 1**

Vann Bush and Ting Wang

13:30 - **Advanced Process Intensification Approaches for Production of JP-8 Jet Fuel from Coal with High Productivity and Selectivity**, Andrew Lucero, August Meng, Brittany Koob, Kelly Mastro, Kevin McCabe, Santosh Gangwal, Southern Research, USA

13:50 - **Conversion of Coal and Biomass to Liquid Hydrocarbons Using Molten Salt Gasification and a Hybrid Fischer Tropsch Catalyst**, Lyman Frost, Joseph Hartvigsen, S. Elangovan, Jessica Elwell, Ceramatec; Paul Dimick, Hongyun Yang, IntraMicron, Inc.; Neil Camarta, Western Hydrogen, USA

14:10 - **Development of a One Barrel per Day Coal to Liquids Pilot Research Facility and the Lessons Learned**, Andrew Placido, Rodney Andrews, Don Challman, University of Kentucky – Center for Applied Energy Research, USA

14:30 - **Comparison of Iron-Based Fischer Tropsch Catalysts Prepared Using a Simple, Inexpensive, Solvent Deficient Preparation Method**, William C. Schaffers, University of Wyoming; William Hecker, Morris Argyle, Brigham Young University; Kyle Brunner, Sasol North America, USA

14:50 - **Catalyst Improvement in Coal to Liquids Process**, Baoshan Wu, Yong Yang, Yong-Wang Li, Synfuels China Technology Co., Ltd., CHINA

**SESSION 44
CARBON MANAGEMENT: COVERSIONS,
UTILIZATION OR HEAT RECOVERY
FROM CO₂ CAPTURE**

Gary Stiegel and Henry Pennline

13:30 - **Functionalized Metal Organic Frameworks for CO₂ Capture and Conversion**, Jingyun Ye, Karl Johnson, University of Pittsburgh, USA

13:50 - **Advances on Carbon Dioxide (CO₂) Capture on Alkaline Ceramics and its Catalytic Conversion to Added Value Products**, Heriberto Pfeiffer, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, MEXICO

14:10 - **Assessment of the Use of CO₂ Injection for Heat Mining in Geothermal Reservoirs in Mexico**, Carlos E. Romero, Chunjian Pan, Pavel Ramírez, Edward K. Levy, Lehigh University, USA; Alicia Aguilar Corona, Oscar

Chávez, Carlos Rubio Maya, Universidad Michoacana de San Nicolás de Hidalgo, MEXICO

14:30 - **Simulation and Evaluation of Heat Recovery Exchangers for Solid Sorbent Carbon Capture Systems**, Olukayode Ajayi, David C. Miller, DOE/NETL; Benjamin Omell, Debangsu Bhattacharyya, West Virginia University, USA

14:50 - **Synthesis of Zeolites from Fly Ash for CO₂ Capture**, Zhang Zhonghua, Wang Baodong, Sun Qi, National Institute of Clean-and-Low-Carbon Energy, USA

**SESSION 45
GASIFICATION TECHNOLOGIES:
SLAG ANALYSIS**

Steve Markovich and Arun Bose

13:30 - **New Slag Management Models for Coal Gasification**, Kyei-Sing Kwong, James P. Bennett, Peter Hsieh, DOE/NETL, USA

13:50 - **Prediction of Slag Formation during a UCG Process, Christian A Strydom**, Jackie Collins, Romanus Uwaoma, North West-University; Johan C van Dyk, African Carbon Energy, SOUTH AFRICA

14:10 - **Slagging Characteristics of Australian Brown Coal Ashes**, Alexander Y. Ilyushechkin, Daniel G. Roberts, David J. Harris, CSIRO Energy Flagship, AUSTRALIA

14:30 - **Mechanism of Coal Char Gasification Derived from Chinese Western Lignite in Mixture CO₂ and H₂O**, Chao Ye, Qinhui Wang, Zhongyang Luo, Mengxiang Fang, Zhejiang University, CHINA

14:50 - **Study on Difference of Viscosity-Temperature Characteristic between Coal Ash and Slag**, Qinfeng Liang, Jianliang Xu, Xin Gong, Haifeng Liu, East China University of Science and Technology, CHINA

**SESSION 46
SHALE AND COAL BED GAS:
GENERAL - 2**

Richard Winschel and Steve Carpenter

13:30 - **The Corrosion and Degradation of Amine Solution in the Coal Bed Methane Decarburation Process**, Jinhua Chen, Juan Wen, Chongqing Research Institute of China Coal Technology & Engineering Group Corporation, CHINA

13:50 - **A Flowback Simulator Tool for Horizontal Well Drilling**, Mike Bockelie, Rand Pummill, Martin Denison, Reaction Engineering International; John McLennan, Ian Walton, Jim Guilkey, University of Utah, USA

14:10 - **Coalbed Methane Enrichment Process of Medium-High Rank Coal in China**, Yiwen Ju, University of Chinese Academic of Sciences; Mingming Wei, Guangzhou Institute of Geochemistry, CHINA

14:30 - **The Study of the System Gas-Coal of Pechora Coal Basin**, Zinifer Ismagilov, Valentina Malysheva, Institute of Coal Chemistry and Materials Science; Natalia Zhuravlyova, Roza Potokina, JSC West-Siberian Test Center, RUSSIA

**SESSION 47
COAL SCIENCE:
GENERAL - 7**

Frans Waanders and Diane Madden

13:30 - **Effect of Bituminous Coal on Activation Energy of Hydrogen Adsorption and Desorption of Magnesium**

Based Hydrogen Storage Material, Bogu Liu, Qianqian Zhang, Lihua Zhang, Pei Liu, Shixue Zhou, Shandong University of Science and Technology, CHINA

13:50 - **Mathematical Model of Lignite Devolatilization with Solid Heat Carrier**, Fang-Zhou Li, Jie Feng, Wen-Ying Li, Taiyuan University of Technology, CHINA

14:10 - **The Study of the Distribution of Toxic Elements in the Ash Waste of Power Stations and Boilers in Kemerovo Regio**, Zinifer Ismagilov, Institute of Coal Chemistry and Materials Science; Natalia Zhuravlyova, Roza Potokina, JSC West-Siberian Test Center, RUSSIA

**SESSION 48
COAL SCIENCE:
GENERAL - 8**

Leslie Ruppert and Anthony Zinn

13:30 - **High-Resolution Transmission Electron Microscopy and Time of Flight Secondary Ion Mass Spectrometry: An Initial Study of the Distribution of Hazardous Elements and Rare Earth Elements in Coal Combustion Product**, Adilson C. Dalmora, Luis F.O. Silva, Centro Universitário La Salle, BRAZIL; Frans Waanders, North-West University, SOUTH AFRICA

13:50 - **Strategies for Modeling and Simulation Aided Design of a Coal Washing Plant for Gasifier Feed Preparation**, E. Caner Orhan, Ergin Gulcan, Ozcan Gulsoy, Levent Ergun, Metin Can, Hacettepe University; Mücella Ersoy, Turkish Coal Enterprises, TURKEY

14:10 - **Study on Dispersed Cuticles in Jurassic Coal of Northern Shaanxi**, Du Meili, Fan Jinwen, Cai Yuchu, Xi'an University of Science and Technology, CHINA

14:30 - **Triboelectrostatic Separation of Reactive Macerals and Inert Coal Macerals**, Xinxi Zhang, Haisheng Li, Rongtao Zhu, Xin He, Chaoyong Li, Yang Jiao, China University of Mining & Technology, CHINA

14:50 - **Study Of The Preparation Conditions to the Electrochemical Performance of Anthracite Based Activated Carbon Electrode Material**, Guo Ming, Shuili Wang, Xi'an University of Science and Technology, CHINA

**SESSION 49
CLEAN COAL AND GAS TO FUELS - 2**

Yann Bush and Omar Basha

15:25 - **Production of Petrochemicals and ULSD Via Direct Coal Liquefaction Technology**, Eric Peer, John Duddy, Axens North America Inc., USA

15:45 - **Increasing the Rate and Extent of Microbial Coal to Methane Conversion through Optimization of Microbial Activity**, Matthew W. Fields, Katie Davis, Hannah Schweitzer, Robin Gerlach, Al B. Cunningham, Montana State University; Elliott Barnhart, U.S. Geological Survey, Wyoming-Montana Water Science Center, USA

16:05 - **Direct Natural Gas-Fueled Hybrid Fuel Cell System for Producing Liquid Fuel and Power**, U. (Balu) Balachandran, T. H. Lee, S. E. Dorris, D. J. Myers, T. R. Krause, Argonne National Laboratory; A. S. Hock, C. U. Segre, Illinois Institute of Technology; Argonne National Laboratory, USA

16:25 - **Thermodynamic Analysis of Methane Reforming**, Chong Chen, Jan Wei Li, Xi'an University of Science and Technology, CHINA

16:45 - **Syngas Generation Via Chemical Looping Dry Reforming**, Amey More, Götz Vesper, University of Pittsburgh, USA

**SESSION 50
CARBON MANAGEMENT: OTHER TOPICS ON
CO₂ CAPTURE**

Gary Stiegel and Henry Pennline

15:25 - **Evaluation of Ionic Liquids for Supported Ionic Liquid Membranes: Application in Pre-Combustion Carbon Capture**, Alexander Horn, Elliot Roth, DOE/NETL; Megan K. Macala, AECOM, USA

15:45 - **Warm Gas Precombustion CO₂ Capture Using Hydrophobic Solvents**, Nicholas Siefert, DOE/NETL and Carnegie Mellon University; Hunaid Nulwala, Carnegie Mellon University; Wei Shi, Fan Shi, Jeffrey Culp, URS/AECOM/DOE/NETL; Elliot Roth, Victor Kusuma, ORISE/DOE/NETL; David Hopkinson, DOE/NETL, USA

16:05 - **Co Oxidation and Subsequent CO₂ Capture on Alkaline Ceramics**, Brenda Alcántar-Vázquez, Heriberto Pfeiffer, Instituto de Investigaciones en Materiales, Universidad Nacional Autónoma de México, MEXICO

16:25 - **Li- and K- Doped Na₂ZrO₃ Sorbents for CO₂ Capture**, Yuhua Duan, DOE/NETL, USA

16:45 - **Advanced Process Control of Bubbling Fluidized Bed Adsorber-Regenerator Processes for Efficient Transient Operation**, Priyadarshi Mahapatra, Jinliang Ma, AECOM / National Energy Technology Laboratory; Debansu Bhattacharyya, Benjamin Omell, West Virginia University; Stephen E. Zitney, David Miller, DOE/NETL, USA 16:45 -

**SESSION 51
GASIFICATION TECHNOLOGIES:
MODELING - 2**

Ting Wang and Massood Ramezan

15:25 - **Dynamic Simulation of Opposed Multi-Burner Coal-Water Slurry Gasification System**, Zhenghua Dai, Junyu Yang, Chao Li, Qinfeng Liang, Guangsu Yu, East China University of Science and Technology, CHINA

15:45 - **Optical Experimental Study on the Characteristics of Impinging Reaction Region in Opposed Multiburner Gasifier**, Xudong Song, Yan Gong, Guangsu Yu, Qinghua Guo, East China University of Science and Technology, CHINA

16:05 - **Use of Coal in the Energy Mix of Pakistan**, Farid A Malik, FC College, PAKISTAN

16:25 - **Numerical Analysis of the Particle Residence Time Distribution and Flow Characters of the Opposed Multi-Burner Gasifier**, Chao Li, Zhenghua Dai, Guangsu Yu, Jianliang Xu, Fuchen Wang, East China University of Science and Technology, CHINA

16:45 - **Modeling, Simulation and Analysis for the Coal Gasification Coupled with Methane**, Jianwei Li, Weiguo Yao, Tingting Wang, Chong Chen, Sanli Zhang, Xi'an University of Science and Technology, CHINA

**SESSION 52
SHALE AND COAL BED GAS:
GENERAL - 3**

Leslie Ruppert and Steve Carpenter

15:25 - **Chloride and Bromide in Waters Associated With Production of Shale Gas, Coal Bed Methane, and Coal in the Northern Appalachian Basin**, Paul F. Ziemkiewicz, West Virginia University, USA

15:45 - **Study and Application of New CBM Clean Fracturing Fluid**, Wangang Chen, Qi Yang, Jianguang Wu, Ping Zhang, China United Coalbed Methane Co., Ltd., CHINA

16:05 - **The Treatment of Coal Seam Gas Co-Produced Water Using Natural Ion Exchange Material**, Oscar Santiago, Kerry Walsh, James Chapman, CQ University; Edward Gardner, CQ University & Arris Pty Ltd, AUSTRALIA

16:25 - **Synthesis of a Novel Gemini Surfactant Used for Coal-Bed Methane Fracturing Fluid**, Zhiyuan Yang, Shuijing Cao, Xi'an University of Science and Technology, CHINA

**SESSION 53
COAL SCIENCE:
GENERAL - 9**

Frans Waanders and Jim Hower

15:25 - **Comparison of Determined and Calculated GCV Values in Indian Coals**, Ashok K. Singh, Neelam Kumari, Priya Kumari, N. K. Shukla, Basudeb Ghosh, CSIR-Central Institute of Mining and Fuel Research, INDIA

15:45 - **Release Behavior and Formation Mechanism of Polycyclic Aromatic Hydrocarbons during Coal Pyrolysis**, Meiqi Gao, Yulong Wang, Jie Dong, Liping Chang, Fan Li, Taiyuan University of Technology, CHINA

16:05 - **Influence of Milling Time in Structure and Hydrogen Desorption Performances of Magnesium-Carbon Hydrogen Storage Materials**, Lihua Zhang, Qianqian Zhang, Bogu Liu, Pei Liu, Shixue Zhou, Shandong University of Science and Technology, CHINA

16:25 - **Prediction of Metallurgical Coke Thermal Properties and Analysis of Influencing Factors**, Shizhuang Shi, Gong-er Wang, Yong-hui Luo, Yan-gao Mao, Qi Zheng, Shuai Lu, Wuhan University of Science and Technology, CHINA

**SESSION 54
COAL SCIENCE:
GENERAL - 10**

Jim Hower and Felicia Peng

15:25 - **Analysis of Relationships of Optimal Design Parameters of Cavitation Venturi Tube and Pico-Nano Bubble Size Distributions and Process Parameters of Column Flotation of Coal**, Felicia Peng, Yu Xiong, West Virginia University, USA

15:45 - **Determination of Coal Ash Emissivity and its Application to Ash Deposition Model for Coal-Fired Boilers**, Miki Shimogori, Mitsubishi Hitachi Power Systems, LTD., JAPAN

16:05 - **The Study of the Interaction of Copper Ions with Coal Substances**, S. I. Zhrebtsov, N.V. Malyshenko, L.V. Bryukhovetskaya, Z.R. Ismagilov, Institute of Coal Chemistry and Material Science; S.Yu. Lyrshchikov, Kemerovo Scientific Center of the Siberian Branch of the RAS, RUSSIA

16:25 - **Performance Evaluation of Omerler Coal Washing Plant**, Ayse Ozer, Mustafa Ziyapak, Turkish Coal Enterprises, TURKEY

16:45 - **The Mode of Occurrence of Mercury in Lignite Deposits of Sindh, Pakistan**, Imdadullah Siddiqui, University of Sindh, PAKISTAN

POSTER SESSIONS

Wednesday, October 7, 2015

18:00 - 21:00

POSTER SESSION 1 GASIFICATION

P1-1 - **Numerical Analyses of Coal Gasification in a Bubbling Fluidized-Bed Gasifier**, Hsien-Chi Tsui, Yu-Der Lin, Tsung Leo Jiang, National Cheng Kung University; Po-Chuang Chen, Yau-Pin Chyou, Institute of Nuclear Energy Research, Atomic Energy Council, TAIWAN

P1-2 - **A Study on Gasification Behavior of Soma Lignite in a Bubbling Fluidized Bed Gasifier**, Ayşe Tarakçıoğlu, Mustafa Zıypak, Zeki Olgun, Abdullah Akça, Selin Özercan Bayo, General Directorate of Turkish Coal Enterprises (TKI), TURKEY

P1-3 - **A Quantitative and Qualitative Assessment of Turkish Lignite Fields for Ucg Suitability**, Kıvanç Het, Şahika Yürek, General Directorate of Turkish Coal Enterprises, TURKEY; David W. Camp, J.L. Wagoner, Lawrence Livermore National Laboratory, USA

P1-4 - **Radical Reactors - Using Multiphase Models to Automate Optimal Gasifier Design**, William A. Rogers, Jenny Tennant, DOE/NETL, USA

POSTER SESSION 2 CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS

P2-1 - **Pulverized Fuel Production from Coal Slimes of Hema Kandilli Washing Plant under 0.5mm with Reichert Spiral**, Gunduz Atesok, Mustafa Ozer, Firat Burat, Onur Guven, Huseyin Basturkcü, Istanbul Technical University, TURKEY

POSTER SESSION 3 COMBUSTION

P3-1 - **A Study on Ash Deposit Characteristics for Biomass Co-Firing in a Pilot Scale Pulverized Coal Combustion System**, Seuk Cheun Choi, Yeong Seok Jang, Taeyoung Chae, Jae Wook Lee, Won Yang, Korea Institute of Industrial Technology, SOUTH KOREA

P3-2 - **Comparative Performance Evaluation of Oxy-Fuel Combustion at Elevated and Atmospheric Pressure through Process Simulation**, Tae-Young Mun, Tefera Zelalem Tumsa, Uendo Lee, Won Yang, Korea Institute of Industrial Technology, SOUTH KOREA

P3-3 - **Exploration, Mining and Energy Generation in Nigeria; Exposure to Organo-Chlorinated Compound, Poly-Chlorinated Biphenyl (PCB): Environmental and Public Health Implications**, Michael P. Okoh, University of Abuja, NIGERIA; Chux U. Daniels, University of Sussex, UNITED KINGDOM; Chux U. Daniels, Human Sciences Research Council (HSRC), SOUTH AFRICA

P3-4 - **Combustion Characteristic of Ultra-Fine and Ultra-Low Volatile Waste in Circulating Fluidized Bed**, Qiangqiang Ren, Fucheng Sun, Shaolin Bao, Institute of Engineering Thermophysics, Chinese Academy of Sciences, CHINA

P3-5 - **Experimental Studies on Slagging and Fouling Characteristics during Zhundong Coal Combustion**,

Haidong Ma, Yungang Wang, Qinxin Zhao, Heng Chen, Xi'an Jiaotong University, CHINA

POSTER SESSION 4 CLEAN COAL AND GAS TO FUELS

P4-1 - **Hydrogenation of Phenanthrene Over NiW/Al₂O₃ Catalyst and the Influences of Sulfide**, Ying Zhou, Jun Guan, Demin He, Kun Wang, Qiumin Zhang, Dalian University of Technology, CHINA

P4-2 - **Oligomerization Over Solid Phosphoric Acid: The Limitation of Reaction Mechanism for Carbon Chain Growth**, Yaru Yan, Jichang Zhang, William A. Turmel, Jie Feng, Wenying Li, Taiyuan University of Technology, CHINA

P4-3 - **The Prediction of Pyrolysis Products Distribution from Coal Molecular Structure**, Lan Yi, Jie Feng, Yuhong Qin, Qun Yi, William A. Turmel, Wenying Li, Taiyuan University of Technology, CHINA

P4-4 - **Clean and Economic Conversion of Coal into Chemicals and High-Value Char at Small-Scale With Wave Liquefaction™**, James J Strohm, Evan Musselman, John Snyder, Julia Atwood, George Skoptsov, H Quest Vanguard, Inc, USA

POSTER SESSION 5 SUSTAINABILITY

P5-1 - **Synthesis of Activated Carbon/CoFe₂O₄ Composites as Well as the Removal of Gentian Violet From Water**, Yaodong Liang, Yongjun He, Tingting Wang, Dongbo Tian, Qing Wang, Xi'an University of Science and Technology, CHINA

P5-2 - **Flame Retardation of Polypropylene via a Intumescent Flame Retardant: Hydrophobic Modification of Ammonium Polyphosphate**, Yongjun He, Dongbo Tian, Tingting Wang, Qing Wang, Xi'an University of Science and Technology, CHINA

POSTER SESSION 6 CARBON MANAGEMENT

P6-1 - **Post-Polymerization Modification of Commercially Available Polymers for Post-Combustion Gas Separation Membranes**, Michael LeClaire, Mickey Leland Energy Fellowship / DOE/NETL; Lawrence Hill, ORISE Postdoctoral Fellow / DOE/NETL, USA

P6-2 - **Synthesis and Characterization of Novel Immobilized Amine Sorbent Pellets Utilizing Fly Ash and Poly (Vinyl Chloride)**, Walter Christopher Wilfong, ORISE Postdoctoral Researcher / DOE/NETL; Yee Soong, McMahan L. Gray, DOE/NETL; Brian W. Kail, AECOM, USA

P6-3 - **Reaction of Carbon Dioxide and Magnesium from Dehydrogenation of Magnesium-Carbon Hydrogen Storage Materials**, Javaid Akhtar, Shahid Munir, Khurram Shahzad, Naseer Sheikh, Sadaf Naz, Mariyam Hakim, University of the Punjab, PAKISTAN

POSTER SESSION 7 COAL SCIENCE

P7-1 - **An Experimental Research on Desulfurization of Fine Coal of China Using an Enhanced Centrifugal Gravity Separator**, Tao Youjun, Song Ao, Man Zhongpei, Zhu Xiangnan, China University of Mining & Technology, CHINA

P7-2 - **A New Map of Metallurgical Coal of the United States with New Geochemical, Rheological, and Petrological Data**, Michael H. Trippi, Leslie F. Ruppert, U.S. Geological Survey; Cortland F. Eble, Kentucky Geological Survey; James C. Hower, University of Kentucky Center for Applied Energy Research, USA

P7-3 - **Experiment Study on the Pneumatic Classification of Wet Fine Coal**, Xinxi Zhang, Yang Jiao, Chaoyong Li, Xin He, China University of Mining & Technology, CHINA

P7-4 - **Study on Properties of Indonesian Coal and its Compatibility with Domestic Coal for Coking**, Shizhuang Shi, Yan-gao Mao, Qi Zheng, Yong-hui Luo, Gong-er Wang, Qing-wen Dong, Wuhan University of Science and Technology, CHINA

P7-5 - **The Relationship Between the Improvement of Tamping Coke Quality and Properties of Coal Charge**, Shizhuang Shi, Qi Zheng, Yan-gao Mao, Yong-hui Luo, Gong-er Wang, Shuai Lu, Wuhan University of Science and Technology, CHINA

P7-6 - **Catalytic Pyrolysis of Liushuhe Oil Shale Using HZSM-5 and HY**, Jun Guan, Demin He, Defa Zhang, Qiumin Zhang, Dalian University of Technology, CHINA

P7-7 - **Pretreatment and Cosolvent on the Influence of Swelling Rate**, Xiaohua Wang, Fuyao Zhang, Donghua Wang, Yonglin Chang, Xi'an University of Science and Technology, CHINA

P7-8 - **The Separation and Enrichment of Dispersed Cuticles in Jurassic Coal of Xinjiang**, Du Meili, Fan Jinwen, Cai Yuchu, Xi'an University of Science and Technology, CHINA

P7-9 - **Food Waste Oil Preparation Coal Slime Flotation Collector and Application Research**, Du Meili, Cai Yuchu, Fan Jinwen, Xi'an University of Science and Technology, CHINA

P7-10 - **Study on Preparation of Shenfu Coal-Based CMS for the Separation of CH₄/N₂ Using PSA and its Performance**, ZhiYuan Yang, DeChao Wang, JiaoPing Liu, Xi'an University of Science and Technology, CHINA

P7-11 - **Insights into the Effects of CeO₂ in the Ethylbenzene Dehydrogenation to Styrene with CO₂**, Hongxia Fan, Jie Feng, Xiaohong Li, Yunpeng Guo, Wenying Li, Taiyuan University of Technology, CHINA

P7-12 - **Research in Magnesium Based Hydrogen Storage Material with Carbon Doped by Ball-Milling**, Qianqian Zhang, Lihua Zhang, Bogu Liu, Pei Liu, Haipeng Chen, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-13 - **Thermodynamics Change of Magnesium-Carbon Composite Material for Hydrogen Storage by Nickel Doping**, Qianqian Zhang, Bogu Liu, Pei Liu, Lihua Zhang, Haipeng Chen, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-14 - **Preparation of Magnesium-Carbon Composites with Catalyst Nickel by Ball-Milling for Hydrogen Storage**, Qianqian Zhang, Pei Liu, Lihua Zhang, Bogu Liu, Haipeng Chen, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-15 - **Role of Crystallitic Carbon in Carbon Disulfide Fixation by Magnesium-Carbon Composite during Ball-Milling**, Bogu Liu, Lihua Zhang, Qianqian Zhang, Tao Li, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-16 - **Effect of Crystallitic Carbon on Morphology and Hydrogen Desorption Performance of Magnesium Hydride Prepared by Ball-Milling**, Bogu Liu, Pei Liu,

Haipeng Chen, Lihua Zhang, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-17 - Effect of Apricot Shell Activated Carbon on Hydrogen Storage Performance of Magnesium, Pei Liu, Lihua Zhang, Qianqian Zhang, Bogu Liu, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-18 - Effect of Needle Coke on Desorption Enthalpy Change and Heat Absorption of Magnesium-Based Hydrogen Storage Material, Pei Liu, Qianqian Zhang, Bogu Liu, Lihua Zhang, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-19 - Kinetic Study on the Pyrolysis Behavior of Xinjiang Coal Based on Multi-Stage Parallel Reaction Model, Xiaobin Li, Xiangrong Liu, Xi'an University of Science and Technology, CHINA

P7-20 - Synthesis of N-Butanol with Calcium Carbide and Ethanol as the Feedstock, Dong Wang, Zhenyu Liu, Qingya Liu, Beijing University of Chemical Technology, CHINA

P7-21 - Preparation of Magnetic $Fe_{2.95}La_{0.05}O_4/AC$ Composites and investigation on its Adsorption of Alizarin Red from Aqueous Solution, Qing Wang, Yaodong Liang, Yongjun He, Tingting Wang, Dongbo Tian, Xi'an University of Science and Technology, CHINA

P7-22 - Effect of Molybdenum Additive on Hydrodesulfurization of Carbon Disulfide by Solid Hydrogen In Magnesium-Carbon Hydrogen Storage Material, Lihua Zhang, Pei Liu, Bogu Liu, Qianqian Zhang, Shixue Zhou, Shandong University of Science and Technology, CHINA

P7-23 - The Experiment Research of Desulfurization Feasibility for Heyang No.1 Mine High-Sulfur Coal, Doudou Wang, Meili Du, Xi'an University of Science and Technology, CHINA

P7-24- Experimental Study on Bioconversion of Shenfu Coal, Jiantao Li, Shuying Pi, Xiangrong Liu, Xi'an University of Science and Technology, CHINA

P7-25 - Application and Research on Coal Slime Flotation with a New Micro-Emulsion, Wei-wei Xie, Huiyun Chen, China University of Mining and Technology, CHINA

P7-26- Technology of Humic Acid Extracted from Slime, Wu Deng, Shui Li Wang, Xi'an University of Science and Technology, CHINA

P7-27 - Matching Relationship between Microorganisms and Sub-Bituminous in the Process of Biosolubilization, Zilin Yue, Xiangrong Liu, Xi'an University of Science and Technology, CHINA

P7-28 - Activated Carbon as a Potential Char Surrogate in Char Kinetics Studies, Madison Kelley, Jason Porter, Colorado School of Mines, USA

P7-29 - Study of the Preparation Conditions to the Electrochemical Performance of Anthracite Based Activated Carbon Electrode Material, Guo Ming, Shuili Wang, Xi'an University of Science and Technology, CHINA

P7-30 - Characterization of Pore Structure in Baode Coals Treated with Saturated Water and Drilling Fluid, Fusheng Yang, Minqun Lin, Anning Zhou, Zhiyuan Yang, Benlong Wei, Huijun Zhang, Xi'an University of Science and Technology, CHINA

P7-31 - Prediction of Coal Ash Fusion Characteristics of Blended Coals for Gasification Based on Genetic Algorithm and BP Neural Network, Benlong Wei,

Fusheng Yang, Anning Zhou, Xi'an University of Science and Technology, CHINA

P7-32 - Experimental Study on Co-pyrolysis of Huangling Coal with Different Kinds of Waste Plastics, Liping Cui, Huiwu Cai, Gairui Qiao, Xi'an University of Science and Technology, CHINA

P7-33 - The Characteristics of Gasification Fly Ash and the Research of its Comprehensive Utilization in East Ningxia Coal Chemical Industry, Huiwu Cai, Kai Liu, Xi'an University of Science and Technology, CHINA

POSTER SESSION 8 COAL MINING

P8-1 - Comparison Experiment of the Safe Oxygen Content of Mono-Component and Multi-Component Flammable Gas in the Coal Mine, Wang Hua, Wang Lian-hua, Qufu Normal University, CHINA

P8-2 - Experimental Research on the CO Impact on the Explosion Characteristics of CH_4 , Wang Hua, Wang Lian-hua, Qufu Normal University, CHINA

P8-3 - The Application of Ordinary Kriging Interpolation Method in the Mine Area Coal Quality Prediction Technology, Gairui Qiao, Huiwu Cai, An-ning Zhou, Xi'an University of Science and Technology, CHINA

POSTER SESSION 10 U.S. EPA'S COALBED METHANE OUTREACH PROGRAM (CMOP) COAL MINE METHANE CONFERENCE TRACK

P10-1 - Invalidation Risk and Transfer Methods Mine Methane Capture Offsets Developed for the CA Compliance Marketplace, Matt Wallace, ISU Environmental Insurance Brokers, Inc., USA

P10-2 - Estimate The Optimum Horizontal Well Depth For Gas Drainage Using Numerical Method Case Study Tabas Coal Mine, Iran, Adel Taheri, Farhang Sereshki, Shahrood University of Technology, IRAN

2015 Session Chairs

Gasification

Massood Ramezan,
Leonardo Technologies, Inc. (LTI), USA

Clean Coal Demonstration and Commercial Projects

Thomas Sarkus, DOE/NETL, USA

Combustion

John Wheeldon, EPRI, USA

Clean Coal and Gas to Fuels

Vann Bush, Gas Technology Institute, USA

Sustainability and Environment

Jim Hower, University of Kentucky, USA

Carbon Management

Evan Granite, DOE/NETL, USA

Coal Science

Jim Hower, University of Kentucky, USA

Coal Mining

Richard Bajura, West Virginia University,
USA

Coal Bed and Shale Gas

Richard Winschel, CONSOL; Steve Carpenter, Advanced Resources International, Inc., and Leslie Ruppert. U.S. Geological Survey, USA

U.S. EPA's Coalbed Methane Outreach Program (CMOP) Coal Mine Methane Conference Track

Felicia Ruiz, U.S. Environmental Protection Agency, USA

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