



Thirty-Fifth Annual INTERNATIONAL PITTSBURGH COAL CONFERENCE

University of Pittsburgh · Swanson School of Engineering

FINAL TECHNICAL PROGRAM

Clean Coal-based Energy/Fuels and the Environment



October 15-18, 2018

New Century Grand Hotel Xuzhou



Hosted by:



中国矿业大学
CHINA UNIVERSITY OF MINING AND TECHNOLOGY



**University of
Pittsburgh**

Co-hosted by:



兖矿集团
YANKUANG GROUP

The conference acknowledges the support of
K. C. Wong Education Foundation, Hong Kong

WELCOME!

On behalf of the Conference Advisory Board, Conference Committees, and the University of Pittsburgh we welcome you to the Thirty-Fifth Annual International Pittsburgh Coal Conference, which will be held October 15-18, 2018 at the New Century Grand Hotel Xuzhou, Xuzhou, Jiangsu Province, P. R. China. The Conference is hosted by China University of Mining Technology (CUMT) and University of Pittsburgh (PITT).

The theme of this year's conference "Clean Coal-based Energy/Fuels and the Environment" covers wide spectrum of important topics on energy and environmental issues and technologies, which are directly related to coal extraction and utilization and its byproducts. Over 350 technical papers and posters will be presented at the conference. The Poster Sessions will be held on Tuesday, October 16, 2017 from 17:15 to 20:30. For detailed information about the technical sessions, please turn to page 6 in the Technical Program.

This year's invited Plenary Speakers include: Prof. LI Yang, Chinese Academy of Engineering, China; Mr. Zhai Hong, Shanxi Yangquan Coal Industry (Group) Co., Ltd. China; Prof. GE Shirong, China University of Mining and Technology, China; Ms. Diane Madden, DOE-NETL, USA; Dr. LI Quansheng, Office for 2030 Project, China Energy Group, China; Dr. LI Wei, Yankuang Group Co., Ltd., China; Dr. Aleksander Sobolewski, Institute of Chemical Processing of Coal, Poland; and Mr. Francis Lau, Synthesis Energy Systems, USA.

We express our sincere gratitude to the Plenary Speakers and Moderators for their support and involvement, to all the authors and co-authors of the technical papers and to all the members of the International Technical Program Committee. Special thanks go to the session speakers and co-chairs, and to the international delegates for their invaluable contributions to the 2018 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 we invite you to join us next year for the Thirty-sixth Annual International Pittsburgh Coal Conference, which will be held at the Westin Convention Center Hotel in Pittsburgh, PA, USA, September 3-6, 2019.

Sincerely,



Massood Ramezan, Chair

CONFERENCE

REGISTRATION

On-Site Registration will begin Sunday, October 14 from 12:00 - 20:00 and will continue Monday, Tuesday, and Wednesday, from 08:00 - 20:00, and Thursday from 08:00 until 10:30.

**Please check in even if you have
Pre-Registered!**

THE INTERNATIONAL PITTSBURGH COAL CONFERENCE

EXECUTIVE DIRECTOR:

Dr. Badie I. Morsi

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GENERAL INFORMATION

TECHNICAL TOURS

October 15 (Monday) 09:00-10:30

Route A: CUMT Campus Tour

Including University Museum,
State Key Laboratory for Coal Resources and
safe Mining,
State Key Laboratory for Geomechanics and
Deep Underground Engineering

October 15 (Monday) 13:00-17:00

Route B: Pan'an Lake, Excursion

Land reclamation site, roughly 25 KM
northeast of Xuzhou city center

SIGHTSEEING TOURS

October 15 (Monday) 09:00-11:30

Route A: Han Dynasty Relics

Lion Hill Han Tomb and Terra-cotta
Warriors and Horses

October 15 (Monday) 14:00-16:00

**Route B: Xuzhou Folklore Museum and
Residential Quarter in Ming and Qing
Dynasty**

ACCOMMODATIONS

New Century Grand Hotel Xuzhou

Address: 1 Huxi Rd, Quanshan District,
Xuzhou City, Jiangsu Province,
China, 221006

International Attendees

- Reserve before October 9, 2018
- Reduced rates for conference Attendees.
- 2 guests per room maximum.
- Payment will be collected by the hotel at check-in.
- You can use Visa or Master Card.
- Make your reservation here:
<http://sesaf.cumt.edu.cn/Pcc/register?flag=en>

National Attendees

(from mainland China, Hong Kong,
Macao and Taiwan):

- Please make your hotel reservations here: <http://pcc2018.cumt.edu.cn/>

GENERAL INFORMATION

CONFERENCE OVERVIEW

SUNDAY, OCTOBER 14, 2018

Registration 12:00-20:00

MONDAY, OCTOBER 15, 2018

Registration 08:00 - 20:00

Technical Tours (Route A) 09:00 - 10:30

Technical Tours (Route B) 13:00 - 17:00

Spouses Sightseeing Tours 09:00 - 16:00

Reception 18:30 - 20:30

TUESDAY, OCTOBER 16, 2018

Registration 08:00 - 20:00

Opening Ceremony 08:30 - 09:15

Plenary Session - 1 09:15 - 10:30

Concurrent Tech. Sessions 10:50 - 12:30

Conference Lunch 12:30 - 13:30

Concurrent Tech. Sessions 13:30 - 17:10

Poster Sessions 17:15 - 20:30

Buffet Dinner 18:00 - 19:30

WEDNESDAY, OCTOBER 17, 2018

Registration 08:00 - 17:00

Plenary Session - 2 08:45 - 10:30

Concurrent Tech. Sessions 10:50 - 12:30

Conference Lunch 12:30 - 13:30

Concurrent Tech. Sessions 13:30 - 17:10

Banquet and Awards Program 18:00 - 21:00

THURSDAY, OCTOBER 18, 2018

Registration 08:00 - 10:30

Plenary Session - 3 08:45 - 10:30

Concurrent Tech. Sessions 10:50 - 12:30

Conference Lunch and Closing Ceremony 12:30 - 13:30

Concurrent Tech. Sessions 13:30 - 16:30

PLENARY SPEAKERS

TUESDAY, OCTOBER 16, 2018

Prof. GE Shirong

China University of Mining and Technology
*"Robotic Mining Technology for
Underground Mines"*

Mr. ZHAI Hong

Yangquan Coal Industry (Group) Co. Ltd., China
"TBD"

WEDNESDAY, OCTOBER 17, 2018

Dr. LI Quansheng

Office for 2030 Project, China Energy Group, China
*"Innovations and Practices in Green
Development of Coal Resources"*

Ms. Diane Madden

DOE-NETL, USA
*"Overview of U.S. DOE Coal Research
Program"*

Prof. LI Yang

Chinese Academy of Engineering
*"CCUS Technology and its Industrial
Development in China"*

THURSDAY, OCTOBER 18, 2018

Dr. LI Wei

Yankuang Group Co., Ltd., China
*"Yankuang Group Implements 'Five Pathways' for
Transformation and Upgrading with the Goal of
Establishing a World-class Green
Energy Supplier and an International Mining
Group"*

Dr. Aleksander Sobolewski

Institute of Chemical Processing of
Coal, Poland
"Future of Coal - The Case Study from Poland"

Mr. Francis Lau

Synthesis Energy Systems, USA
*"SES Gasification Technology from R&D to
Commercialization"*

PROGRAM SCHEDULE

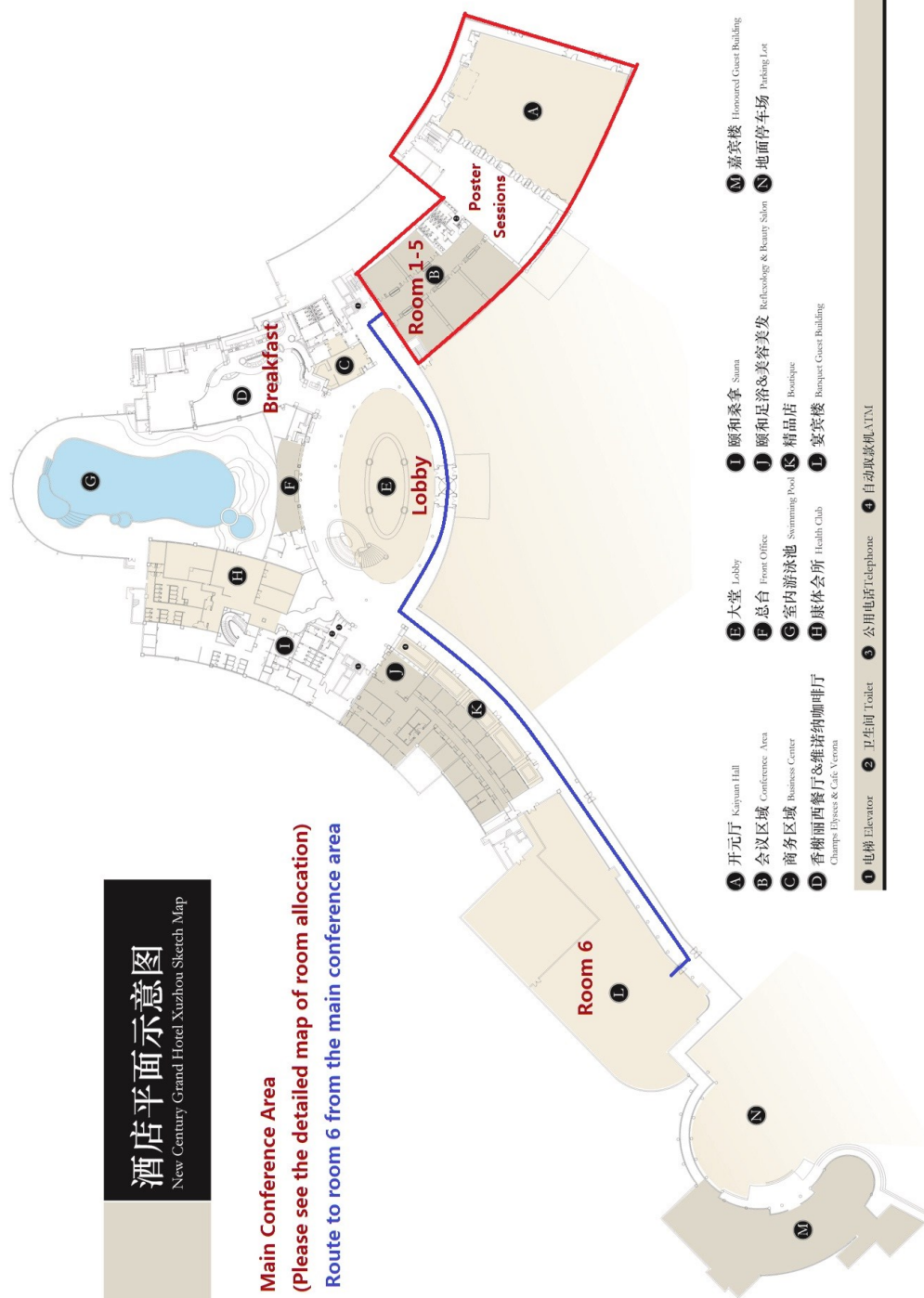
		Room 1	Room 2	Room 3	Room 4	Room 5	Room 6
Tuesday (10-16-2018)	8:30	Opening Ceremony					
	9:15	Plenary Speaker - 1					
	9:45	Plenary Speaker - 2					
	10:30	Morning Break					
	10:50	Power Plants - 1 (Session 1)	Combustion Technologies - 1 (Session 2)	Rare Earth Elements - 1 (Session 3)	Value-Added Products from Coal - 1 (Session 4)	Gasification Technologies - 1 (Session 5)	Coal Science - 1 (Session 6)
	11:10						
	11:30						
	11:50						
	12:10	Lunch					
	12:30	Power Plants - 2 (Session 7)	Combustion Technologies - 2 (Session 8)	Clean Coal Demonstration and Commercial Projects - 1 (Session 9)	Value-Added Products from Coal - 2 (Session 10)	Gasification Technologies - 2 (Session 11)	Coal Science - 2 (Session 12)
	13:30						
	13:50						
	14:10						
	14:30	Afternoon Break					
	14:50	Power Plants - 3 (Session 13)	Combustion Technologies - 3 (Session 14)	Clean Coal Demonstration and Commercial Projects - 2 (Session 15)	Value-Added Products from Coal - 3 (Session 16)	Gasification Technologies - 3 (Session 17)	Coal Science - 3 (Session 18)
	15:10						
	15:30						
	15:50						
16:10	POSTER SESSIONS						
16:30	Plenary Speaker - 1						
16:50	Plenary Speaker - 2						
17:15	Plenary Speaker - 3						
Wednesday (10-17-2018)	8:45	Plenary Speaker - 1					
	9:15	Plenary Speaker - 2					
	9:45	Plenary Speaker - 3					
	10:30	Morning Break					
	10:50	Carbon Management - 1 (Session 19)	Combustion Technologies - 4 (Session 20)	Coal Bed and Shale Gas - 1 (Session 21)	Value-Added Products from Coal - 4 (Session 22)	Gasification Technologies - 4 (Session 23)	Coal Science - 4 (Session 24)
	11:10						
	11:30						
	11:50						
	12:10	Lunch					
	12:30	Carbon Management - 2 (Session 25)	Combustion Technologies - 5 (Session 26)	Coal Bed and Shale Gas - 2 (Session 27)	Value-Added Products from Coal - 5 (Session 28)	Gasification Technologies - 5 (Session 29)	Coal Science - 5 (Session 30)
	13:30						
	13:50						
	14:10						
	14:30	Afternoon Break					
	14:50	Carbon Management - 3 (Session 31)	Clean Coal and Gas to Fuels - 1 (Session 32)	Coal Bed and Shale Gas - 3 (Session 33)	Value-Added Products from Coal - 6 (Session 34)	Gasification Technologies - 6 (Session 35)	Coal Science - 6 (Session 36)
	15:10						
	15:30						
	15:50						
16:10	BANQUET and AWARDS PROGRAM						
16:30	Plenary Speaker - 1						
16:50	Plenary Speaker - 2						
18:00	Plenary Speaker - 3						
Thursday (10-18-2018)	8:45	Plenary Speaker - 1					
	9:15	Plenary Speaker - 2					
	9:45	Plenary Speaker - 3					
	10:30	Morning Break					
	10:50	Sustainability and Environment - 1 (Session 37)	Clean Coal and Gas to Fuels - 2 (Session 38)	Coal Bed and Shale Gas - 4 (Session 39)	Coal Mining and Beneficiation - 1 (Session 40)	Gasification Technologies - 7 (Session 41)	Coal Science - 7 (Session 42)
	11:10						
	11:30						
	11:50						
	12:10	Lunch and Closing Ceremony					
	12:30	Sustainability and Environment - 2 (Session 43)	Clean Coal and Gas to Fuels - 3 (Session 44)	Coal Science - 10 (Session 45)	Coal Mining and Beneficiation - 2 (Session 46)	Gasification Technologies - 8 (Session 47)	Coal Science - 8 (Session 48)
	13:30						
	13:50						
	14:10						
	14:30	Afternoon Break					
	14:50	Sustainability and Environment - 3 (Session 49)	Clean Coal and Gas to Fuels - 4 (Session 50)	Coal Science - 11 (Session 51)	Coal Mining and Beneficiation - 3 (Session 52)	Gasification Technologies - 9 (Session 53)	Coal Science - 9 (Session 54)
	15:10						
	15:30						
	15:50						
16:10	POSTER SESSIONS						
16:30	Plenary Speaker - 1						
	Plenary Speaker - 2						
	Plenary Speaker - 3						

New Century Grand Hotel Xuzhou Sketch Map

Area A and B: Main Conference Area

(Please see the detailed map of room allocation)

The Blue Line: Route to room 6 from the main conference area



- A** 开元厅 Kaiyuan Hall
 - B** 会议区域 Conference Area
 - C** 商务区域 Business Center
 - D** 香格里拉餐厅及维诺斯咖啡厅
Charme D'Elises & Cafe Verona
 - E** 大堂 Lobby
 - F** 总台 Front Office
 - G** 室内游泳池 Swimming Pool
 - H** 康体会所 Health Club
 - I** 颐和桑拿 Sauna
 - J** 颐和足浴&美容美容 Reflexology & Beauty Salon
 - K** 精品店 Boutique
 - L** 宴宾楼 Banquet Guest Building
 - M** 嘉宾楼 Honoured Guest Building
 - N** 地面停车场 Parking Lot

- 1 电梯 Elevator 2 卫生间 Toilet 3 公用电话 Telephone 4 自动取款机 ATM

GENERAL INFORMATION

Map of the New Century Grand Hotel - Main Conference Area



The route to Room 6 on the second floor of Banquet Guest Building

- Main venue (Kaiyuan Hall) : Opening Ceremony; Plenary Sessions
- Room 1 (Qingyang Hall) : Sessions 1, 7, 13, 19, 25, 31, 37, 43, 49
 - Room 2 (Taihe Hall) : Sessions 2, 8, 14, 20, 26, 32, 38, 44, 50
 - Room 3 (Linde Hall) : Sessions 3, 9, 15, 21, 27, 33, 39, 45, 51
- Entrance Hall of Kaiyuan Hall: Poster Presentations
- Room 4 (Hanyuan Hall) : Sessions 4, 10, 16, 22, 28, 34, 40, 46, 52
 - Room 5 (Daming Hall) : Sessions 5, 11, 17, 23, 29, 35, 41, 47, 53
 - Room 6 (Huaihai Hall) : Sessions 6, 12, 18, 24, 30, 36, 42, 48, 54
- Note: Rooms 1-5 are on the first floor of Welcome Guest Building. Room 6 is on the second floor of Banquet Guest Building.

TECHNICAL PROGRAM

ORAL SESSIONS

Tuesday, October 16

10:50 - 16:50

SESSION 1

POWER PLANTS - 1

Laihong Shen and Ting Wang

10:50 **Case Studies of Biomass Co-Firing in Full-Scale Pulverized Coal-Fired Power Plants in China**, Wang Xuebin, Xi'an Jiaotong University, CHINA.

11:10 **Pilot Test of Urea hydrolysis to Ammonia with Steam Stripping**, Lu Xu, Zhang Xiangyu, Zhang Bo, Xu Hongjie, Xi'an Thermal Power Research Institute Co., LTD, PR-CHINA.

11:30 **Impact of Flue Gas Recycle On the Efficiency of Oxy-Fuel Combustion Systems**, Richard L. Axelbaum, Piyush Verma, Akshay Gopan, Zhiwei Yang, Washington University in St. Louis, USA.

11:50 **Preparation of Low Ash Coal by A Green Chemical Method**, Lijun Zhao, National Institute of Clean-and-Low-Carbon Energy, PR CHINA.

12:10 **Hybrid Eulerian-Lagrangian Simulation of Gas-Solid Fluidized Bed**, Chen Yang, Haochuang Wu, Chongqing University., PR CHINA.

SESSION 2

COMBUSTION TECHNOLOGIES - 1

Fubao Zhou and Massood Ramezan

10:50 **Effect of CO₂ On the Characteristics of Soot Derived from Coal Rapid Pyrolysis**, Qinghua Chang, Rui Gao, Fuchen Wang, East China University of Science and Technology, PR CHINA.

11:10 **Flue Gas Effects On Ditomite-Based Adsorbents for Elemental Mercury Removal**, Huan Liu, Zhuo Xiong, Yongchun Zhao, Junying Zhang, Huazhong University of Science & Technology, PR CHINA.

11:30 **Experimental Analysis of Moisture Re-Adsorption of Dried Coal Using a Superheated Steam**, Geunyeong Park, Korea Institute of Industrial Technology and Sungkyunkwan University; Yongwoon Lee, Tae young Chae, Won Yang, Korea Institute of Industrial Technology; Donghyun Lee, Sungkyunkwan University; Ikhwon Na,

Nakkgyun Kim, Hankook Technology; SOUTH KOREA.

11:50 **Study on the Migration of Chlorine in Co-Combustion Process of Medicine Dregs and Coal**, Guo Yang, Sun Shaojie, Wu Jianjun, China University of Mining and Technology, PR CHINA

12:10 **Mercury Removal by Biochar Prepared Under Biomass Reburning in a Simulated Flue Gas**, Ximing Hu, Jiateng Shi, Ping Lu, School of Energy and Mechanical Engineering, Nanjing Normal University, PR CHINA.

SESSION 3

RARE EARTH ELEMENTS IN COAL AND COAL BYPRODUCTS

Shifeng Dai and Andreas Richter

10:50 **Rare Earth Elements in the Lignite from Mile Basin, Yunnan, China: Implication for Seawater Influence During Peat Accumulation**, Jingjing Liu, Shifeng Dai, China University of Mining and Technology, PR CHINA.

11:10 **Extraction of Rare Earth Element (REE) from Coal Ash in Korea**, Sungyoon Park, Yejee Lim, Nway Oo Khin, Minsoo Kim, Sangwoon Woo, Han S. Kim, Konkuk University, SOUTH KOREA.

11:30 **Characteristics of Rare Earth Elements in Entrained Flow Gasification Residues, Ningdong, China**; Xin Guo, Yuegang Tang, Yafeng Wang, Binbin Huan, Xi Pan, China University of Mining and Technology (Beijing), PR CHINA; Cortland F. Eble, Kentucky Geological Survey, USA.

11:50 **Critical Elements in Changhsingian Coals of the Shugentian Coalfield, East Yunnan, China**; Xue Zheng, Shifeng Dai, China University of Mining and Technology, PR CHINA.

12:10 **Rare Earth Elements in the Coal Fly Ash of Qianxi Power Plant, Guizhou Province, Southwest of China**, Lun Wu, School of Chemical & Environmental Engineering, China University of Mining & Technology (Beijing), PR CHINA; Jinhong Zhang, Associate Professor, Department of Mining and Geological Engineering, The University of Arizona, USA; Liqiang Ma, China University of Mining and Technology, PR CHINA.

SESSION 4

VALUE-ADDED PRODUCTS FROM COAL - 1

Hesheng Yu and Chunshan Song

10:50 **Thermogravimetry Mass Spectrometry (TG-MS) Study of Pyrolytic Characteristics of Two Different-maturation Lignites**, Haibo Yan, Jie Wang, East China University of Science and Technology, PR CHINA.

11:10 **The Influence of Coal Characteristics on Coal-based Graphene**, Xuan Huan, Yuegang Tang, Jingjie Xu, Miaoxin Xu, China University of Mining and Technology (Beijing), PR CHINA.

11:30 **Effect of Turbostratic Carbon On Microstructure and Hydrogen Absorption Performance of Mg-C Composite from Mechanical Milling**, Pei Liu, Xinyuan Li, Ruiqian Jiang, Xiaojing Liu, Yuanli Chen, Shixue Zhou, Shandong University of Science and Technology, PR CHINA.

11:50 **Preparation and Lithium Storage Performance of C-GQDs/a-Fe₂O₃ Nanocomposites**, Yating Zhang, Kaibo Zhang, Kaili Jia, Guoyang Liu, Shaozhao Ren, Xi'an University of Science and Technology; Jieshan Qiu, Dalian University of Technology, Beijing University of Chemical Technology; PR CHINA.

12:10 **Hollow Spherical Nano-ZnO/Coal-based Graphene Macro Porous Aerogels for Photocatalytic Conversion of Carbon Dioxide**, Keke Li, Jing Zhang, Kaibo Zhang, Kaili Jia, Guoyang Liu, Yating Zhang, Xi'an University of Science and Technology; Jieshan Qiu, Dalian University of Technology, Beijing University of Chemical Technology; PR CHINA.

SESSION 5

GASIFICATION TECHNOLOGIES - 1

Zuotang Wang and Francis Lau

10:50 **Thermodynamic Analysis of Chemical Looping Gasification Coupled with Lignite Pyrolysis**, Zhang Kun, Demin He, Jun Guan, Dalian University of Technology; Xueqiang Li, Jianxuan Shang, Shanxi Coal and Chemical Industry Group Co. Ltd; Qiumin Zhang, Dalian University of Technology; PR CHINA.

11:10 **Experimental Study on Coal Pyrolysis in a Fluidized Bed Reactor by Using Char as Heat Carriers**, Kaikun Li, Qinhui Wang, Chunjiang Yu, Mengxiang Fang, Zhongyang Luo, Zhejiang University, PR CHINA.

TECHNICAL PROGRAM

11:30 **Influence of Temperature and Heating Rate on Product Distribution of Low-rank Coal Pyrolysis**, Yu Hong, Demin He, Jun Guan, Dalian University of Technology; Xueqiang Li, Jianxuan Shang, Shanxi Coal and Chemical Industry Group Co. Ltd.; Qiumin Zhang, Dalian University of Technology; PR CHINA.

11:50 **Oxygen Migration and Regulation in the Process of Lignite Pyrolysis**, Hai-jie Li, Xiao-hong Li, Wen-ying Li, Taiyuan University of Technology, PR CHINA.

SESSION 6

COAL SCIENCE - 1

Junying Zhang and Atsushi Ishihara

10:50 **Effect of Particle Size on the Enrichment of Slime Coals of Western Lignite Corporation (Turkey) by Spiral**, Ali Ucar, Sevgi Karaca, Nezahat Ediz, Oktay Şahbaz, I.Goktay Ediz, Cem Sensogut, Dumlupinar University, TURKEY.

11:10 **Time-Of-Flight Mass Spectrometric Study on In-Situ Pyrolysis of Coal-Based Model Compounds-Phenyl benzyl ketone (PBK)**, Fanggang Liu, Dalian University of Technology/ Xiamen University; Gang Li, Chinese Academy of Sciences; Jun Chen, Jing Yang, Xiamen University; Lijung Jin, Dalian University of Technology; Zichao Tang, Xiamen University; Haoquan Hu, Dalian University of Technology; PR CHINA.

11:30 **Effect of Inorganics in Liquid Waste from Hydrothermal Treatment on Pyrolysis Behavior of a Vitrinite-Rich Coal**, Chuan Zhu, China Coal Research Institute, State Key Laboratory of Coal Mining and Clean Utilization, China University of Mining and Technology; Qiang Xie, China University of Mining and Technology; Jinlong Zhong, China Coal Research Institute, State Key Laboratory of Coal Mining and Clean Utilization; Hao Guo, China University of Mining and Technology; Yuhong Zhang, China Coal Research Institute, State Key Laboratory of Coal Mining and Clean Utilization; PR CHINA.

11:50 **Investigation into the Association Characteristics of Coal Tar Derived from Low and Medium Temperature Pyrolysis of Low Rank Coal by Means of Column Chromatography**, Guangsheng Li, Lei Bi, Qiang Xie, Xianglan Zhang, Haiyong Zhang, China University of Mining and Technology, PR CHINA.

12:10 **Pyrolysis Behavior of Briquette Coal from a Typical Chinese Brown Coal**,

Weiwei Xie, Yang Chen, Baoshi Guo, Huiya Guo, Lingmei Zhou, China University of Mining and Technology (Beijing), PR CHINA.

SESSION 7

POWER PLANTS - 2

Zhengchang Song and Ting Wang

13:30 **Study on the Denitration Performance of Mn-Fe Based Catalystist Under Low Temperature Conditions**, Wang Cuiping, Qingdao University, PR CHINA.

13:50 **Mathematical Modeling and Controller Design for a 1000MW Ultra-Supercritical Coal Red Unit**, He Fan, Peihong Wang, Zhi-gang Su, Southeast University, PR CHINA.

14:10 **1-D Analysis of a 560 MWe Power Plant Boiler Performing Under Different Coal Specifications**, Hamed Jafari, Won Yang., Korea Institute of Industrial Technology; Changkook Ryu, Professor, Sungkyunkwan University, Suwon; SOUTH KOREA.

14:30 **Operation Guide System for Taean 300MW IGCC Plant**, Bongkeun Kim, Senior Research Engineer, Doosan Heavy Industries & Construction; Youseok Kim, Seongwoo Hon*, Doosan Heavy Industries & Construction; Jikhwon Kim, Korea Western Power Co., Ltd; Jeongseok-Yoo, Doosan Heavy Industries & Construction; SOUTH KOREA.

14:50 **Latest Development of International Cofiring Biomass Technology Application**, Xing Zhang, IEA Clean Coal Centre, UK.

SESSION 8

COMBUSTION TECHNOLOGIES - 2

Fubao Zhou and Wenhua Li

13:30 **Development of Oxy-Fuel Combustion Technology in a 0.1 MWth Circulating Fluidized Bed**, Jihong Moon, Tae-Young Mun, Sung-Ho Jo, Myung Won Seo, Sung Jin Park, Nguyen Hoang Khoi, Gunung Oh, Ho Won Ra, Sang Jun Yoon, Sung Min Yoon, Jae-Goo Lee, FEP Convergence Research Center / Clean Fuels Laboratory, Korea Institute of Energy Research, SOUTH KOREA.

13:50 **The Role of K₂CO₃ on Structural Changes of Coal, Biomass and Coal/Biomass Blends During Pre-Treatment Using N₂ and CO₂. Differences in the Reactivity Under Oxy-Combustion Conditions**, Yuli Betancur,

Taiyuan University of Technology, PR CHINA; Diana López, Universidad de Antioquia, UdeA, COLOMBIA; Zhen-yi Du, Wen-ying Li, Taiyuan University of Technology, PR CHINA.

14:10 **Performance Analysis for a Retrofitted Oxy-Fuel Boiler**, Kai Yan, Xiaojiang Wu, Xiang Zhang, Jianwen Zhang, Shanghai Boiler Works Co Ltd., PR CHINA.

14:30 **Integrated Flue Gas Purification for Staged, Pressurized Oxy-Combustion**, Benjamin M. Kumfer, David Stokie, Piyush Verma, Young-Shin Jun, Washington University in St. Louis, USA; Gregory Yablonsky, Saint Louis University, USA; A. K. Suresh, Indian Institute of Technology Bombay, INDIA; Richard L. Axelbaum, Washington University, USA.

14:50 **Integrated Process of Coal pyrolysis with Low Alkanes Reforming of CO₂ over Modified Ni-Based Catalysts**, Jiannan Lv, Yang Li, Lijun Jin, Haoquan Hu, Dalian University of Technology, PR CHINA

SESSION 9

CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS - 1

Jianguo Yang and Diane Madden

13:30 **Study on Process Optimization and Upgrading of Power Coal Preparation Plant in China**, Zhang Zhen, China National Energy Group Ningxia Coal Group Coal Preparation Center, PR CHINA.

13:50 **Numerical Investigation on Combustion and NO_x Emission Characteristics in a 600 MW Tangentially Coal-fired Boiler Co-firing with Semi-coke**, Zichen Tao, Chang'an Wang, Pengqian Wang, Qinqin Feng, Maobo Yuan, Defu Che, Xi'an Jiaotong University, PR CHINA.

14:10 **A CFD Modeling of Biomass Combustion in the Retrofit Boiler**, Yu Jiang, Pusan National University; Byeong-Cheol Sim, Korea South-East Power CO.; Chung-Hwan Jeon, Pusan National University; KOREA

14:30 **Hotspots and Technical Requirements on Coal Preparation in China**, Jianguo Yang, You Zhou, Lixi Zhou, China University of Mining and Technology, Xuzhou, PR CHINA.

TECHNICAL PROGRAM

SESSION 10

VALUE-ADDED PRODUCTS FROM COAL - 2

Hesheng Yu and Chunshan Song

13:30 **A Promising and Feasible Method to Enhance Oil Yield During Large-Scale Direct Liquefaction of Sodium-Rich Zhundong Coals**, Xiao Li, China University of Mining and Technology, PR CHINA.

13:50 **Preparation of Coal-based Conductive Carbon Membrane for Waste Water Treatment**, Pan Zonglin, Yang Jiawei, Dalian University of Technology; Song Chengwen, Dalian Maritime University; Pan Yanqiu, Wang Tonghua, Dalian University of Technology; PR CHINA.

14:10 **Solvent Recovery and Recycling from Coal Pretreatment to Enable Zero-Waste Processes**, Jiashi Yin, Shuai Tan, Phuoc Hoang-Hanh Duong, Ian Hammontree, Dongmei Li, University of Wyoming, USA..

14:30 **Fabrication of Oxygen-Enriched Carbon Nanofibers (OECNFs) from Wyoming PRB Coal for Supercapacitor Applications**, Shuai Tan, Dongmei Li, University of Wyoming, USA.

14:50 **Construction of Coal-based Activated Carbons by Physical-Chemical Activation for High Performance Supercapacitor Electrodes**, Xiaoming Yue, Zhaoyang An, Shengfan Xue, Jing Xu, Yajun Wu, Zijing Liu, Cuicui Xiao, Mei Ye, Shuangquan Zhang, China University of Mining and Technology, PR CHINA.

SESSION 11

GASIFICATION TECHNOLOGIES - 2

Zuotang Wang and Francis Lau

13:30 **Release of Sodium in Typical Shanxi High Ash Anthracite with Na-Flux Under Fast Pyrolysis Conditions**, Rui Rao, Yongchun Zhao, Gaolei Li, Hongyue Wang, Junying Zhang, Huazhong University of Science & Technology; Jin Bai, Wen Li, Chinese Academy of Sciences, PR CHINA.

13:50 **Investigation on Effect of Functional Groups on Volatile Evolution in Coal Pyrolysis with in situ Py-PI-TOFMS**, Yang Zhou, Haoquan Hu, Lijun Jin, Yang Li, Jian Zhou, Zhiwei Shi, Dalian University of Technology, PR CHINA.

14:10 **The Characteristics of Tar Quality in the Process of Pyrolysis and Gasification of Naomahu Subbituminous Coal**, Huan Wang, Qian Wang, Quan Wang, Jiao Kong, Meijun Wang, Taiyuan University

of Technology, PR CHINA.

14:30 **Interactions Between CO₂ and H₂O on Char Structure Evolution During Coal Char Gasification**, Yajie Zhou, Shenghua Zhu, Liang Ren, Lunjing Yan, Yonghui Bai, Taiyuan University of Technology, PR CHINA.

14:50 **Experimental Study of the Flat-Flame Pulverized Coal Gasification Technology**, Haiquan AnLiu Zhen, Baozai Peng, Qingliang Guan, Ziyang Feng, Bing Liu, Xinhui Fang, Ya Suo, Xin Cui, Feng Huang, Wenhua Li, National Institute of Clean-and-Low-Carbon Energy, PR CHINA.

SESSION 12

COAL SCIENCE - 2

Junying Zhang and Atsushi Ishihara

13:30 **Study On the Emission and Transformation Behavior of As, Hg, Pb and Se During Coal Gangue Combustion in O₂/CO₂ Atmosphere**, Fangqin Cheng, Hao Peng, Baofeng Wang, Fengling Yang, Shanxi University, PR CHINA

13:50 **The Transformation Characteristic of Sulfur Species during Thermal Extraction of Typical Low Rank Coal**, Jianan Yin, Xiongchao Lin, Yonggang Wang, Zhen gang Xu, China University of Mining & Technology (Beijing), PR CHINA.

14:10 **Volatilization Characteristics of Mercury in Coal During Conventional and Microwave Drying Process**, Ningning Zhang, Xi'an University of Science and Technology; Changchun Zhou, China University of Mining and Technology; PR CHINA.

14:30 **Process Development of Making High Efficiency Silicon-Calcium Fertilizer with the White Mud**, Aiguo Chen, Huidong Liu, Xiaohuan Wang, Yongfeng Xiao, National Institute of Clean-and-Low-Carbon Energy, PR CHINA.

14:50 **The Behavior of the Sulfur Transformation in Semi-Coke During Catalytic Depolymerization of Zaozhuang Coal**, Zeyu Peng, Taiyuan University of Technology, PR CHINA.

SESSION 13

POWER PLANTS - 3

Laihong Shen and Ting Wang

15:30 **Study on the Combustion Characteristics of Blue-Coke and Its Application in Pulverized Coal-Fired Boilers**, Zhichao Wang, Wei Yao, Xi'an Thermal Power

Research Institute Co., Ltd; Yingyan Wang, Shaanxi Coal and Chemical Industry Group Co., Ltd; Zhongcan Yang, Jiali Liu, Xi'an Thermal Power Research Institute Co., Ltd; PR CHINA.

15:50 **NSGA-II Based Multi-objective Optimization of NOX Emission and Reheat Steam Temperature**, Xian-hua Gao, Zhi-gang Su, Southeast University, PR CHINA.

16:10 **Analysis of an Integrated Mild-Partial Gasification Combined Cycle (IMPGC) Power Plant**, Ting Wang, Henry A. Long, III, Energy Conversion & Conservation Center, USA.

16:20 **Progress in Commissioning a Pilot-Scale Staged, Pressurized Oxy-Combustion System**, Zhiwei Yang, Dishant Khatri, Adewale Adeosun, Tianxiang Li, Akshay Gopan, Benjamin M. Kumfer, Richard L. Axelbaum, Washington University in St. Louis; Ismail Celik, Department of Mechanical and Aerospace Engineering, West Virginia University, USA.

16:50 **Parallel Optimization Based on Artificial Bee Colony Algorithm**, Debo Li, Yongxin Feng, Jieliang Zhou, Electric Power Research Institute of Guangdong Power Grid Corporation, PR CHINA.

SESSION 14

COMBUSTION TECHNOLOGIES - 3

Fubao Zhou and Wenhua Li

15:30 **Investigation on the Effect of Kaolin and Ammonium Sulfate as Additive to Melting Behavior: The Korean Rice Straw Co-Firing Case**, Yumi Park, Ho Lim, Tae young Chae, Yongwoon Lee, Jae wook Lee, Korea Institute of Industrial Technology; Dae hong Ko, Yonsei University; Won Yang, Korea Institute of Industrial Technology; SOUTH KOREA.

15:50 **Ash Deposition and Slagging Behavior of Blended Coal with Xinjiang High-Alkali Coal in 3 MWth Test Facility**, Xiaojiang Wu, Xiang Zhang, Jianwen Zhang, Kai Yan, Nan Chen, Shanghai Boiler Works. Co., Ltd, PR CHINA.

16:10 **Influence of SO₄²⁻ and Cl⁻ on Minerals Condensation and Slagging Characteristics**, Shenghui Yu, Cheng Zhang, Xiao-pei Zhang, Xin Li, Qing-yan Fang, Gang Chen, Huazhong University of Science and Technology, PR CHINA.

16:30 **Development and Evaluation of**

TECHNICAL PROGRAM

an Innovative Wet Electrostatic Precipitator Based on Ion Jet Technology in View of Coal-Burning Pollutants on Pilot Scale, Pingyuan Liu, Liang Zhao, Qiliang Lu, Shanghai Power Equipment Research Institute Co., Ltd. PR CHINA.

16:50 Experimental Study on Cyclone Combustion of High-Alkali Coal, Zhang Xiangyu, Zhang Bo, Lu Xu, Xu Hongjie, Xi'an Thermal Power Research Institute Co., LTD, PR CHINA.

SESSION 15

CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS - 2

Jianguo Yang and Diane Madden

15:30 TDS Intelligent Dry Sorting Machine's Application and Benefit, Xiaodong Ge, Tianjin Meiteng Technology Co., Ltd., PR CHINA.

15:50 TRIGTM CORE Technology of the Kemper IGCC Project, WanWang Peng, Guohai Liu, Pannalal Vimalchand, Matt Nelson, Tim Pinkston, Gasification Technology; Diane Madden, U. S. Department of Energy/National Energy Technology Laboratory; USA.

16:10 A Closer Look at Large-Scale Coal Research Projects Sponsored by the National Energy Technology Laboratory, Thomas A. Sarkus, National Energy Technology Laboratory/ U.S. Department of Energy, USA.

16:30 Novel Nanocomposite Surface Treatment for High Efficiency Low Emission Coal Power, Vinod Veedu, Matthew Nakatsuka, Erika Brown, Ganesh Arumugam, Oceanit, USA.

16:50 Development of Coal-to-Synthetic Natural Gas (SNG) Technologies in China, Jianwei, Li, Xin Xin, Jiaojiao Lei, Feng Bai, Xi'an University of Science and Technology, PR CHINA.

SESSION 16

VALUE-ADDED PRODUCTS FROM COAL - 3

Hesheng Yu and Chunshan Song

15:30 Reducing Alkali Species from High-Alkali Coal by Hydrothermal Pretreatment, Yang Mingshun, China University of Mining and Technology, Datang International Chemical Technology Research

Institute CO., LTD.; XieQiang, China University of Mining and Technology; Li Chunqi, Datang International Chemical Technology Research Institute CO., LTD.; Liang Dingcheng, Li Guangsheng, China University of Mining and Technology, PR CHINA.

15:50 Montan Wax Extraction from Baoqing Lignite and Its Characterization, Zhonghua Zhang, Cuiqing Zhang, Xin Cui, Shuang Lang, Congyun Liu, Wenhua Li, Future Science & Technology City, PR CHINA.

16:10 Extraction of Polar Materials from Low Rank Coals, Seth T. Bassham, Ying Wang, and David A. Bell, University of Wyoming, USA.

16:30 Preparation of Carbon Fibers with Highspecific Surface Area by Degradativesolvent Extraction product from Biomass Wastes, Chao Wu, Huazhong University of Science and Technology; Xian Lia, Huazhong University of Science and Technology, Xinjiang University; Xianqing Zhu, Kai Xu, Zhenzhong Hu, Weixiang Qian, Guangqian Luo, Huan Liu, Hongyun Hu, Hong Yao, Huazhong University of Science and Technology; PR CHINA.

16:50 Upgrading of Lignite Pyrolysis Tar by Catalytic Cracking over Different Mo-loaded HZSM-5 Catalysts, Feng Mao, Jie Wang, East China University of Science and Technology, PR CHINA.

SESSION 17

GASIFICATION TECHNOLOGIES - 3

Zuotang Wang and Francis Lau

15:30 The Behavior of Volatiles' Reaction at Different Temperatures During Pyrolysis of Naomaoahu Subbituminous Coal, Xiaorong Li, Xin Jin, Tianzhou Du, Jiao Kong, Meijun Wang, Weiren Bao, Taiyuan University of Technology, PR CHINA.

15:50 Hydrogenation of Pinewood Hydropyrolysis Volatile Matter over Iron-Loaded Charcoal for Producing Light Hydrocarbons, Nan Zheng, Jie Wang, East China University of Science and Technology, PR CHINA.

16:10 Pyrolysis of Peat in the Presence of Phosphoric Acid, Feng Deng, China University of Mining and Technology (Beijing), Guizhou University of Engineering Science; Qiang Xie, Dingcheng Liang, Deqian Liu, China University of Mining and Technology (Beijing); PR CHINA.

16:30 Effects of Inherent Alkali and Alkaline Earth Metals and Externally Loaded Na on Production of NH₃ and HCN During the Pyrolysis / Steam Gasification of Shengli Lignite, Panpan Zheng, Yonggang Wang, China University of Mining and Technology (Beijing), PR CHINA; Lei Bai, West Virginia University, USA; Chen Liu, Weijie Guo, Xiongchao Lin, China University of Mining and Technology (Beijing), PR CHINA.

16:50 Experimental Study On Electrostatic Precipitation Under Coal Pyrolysis Gas at High Temperatures, Quanlin Chen, Jianmeng Cen, Mengxiang Fang, Qinhui Wang, Zhejiang University, PR CHINA.

SESSION 18

COAL SCIENCE - 3

Junying Zhang and Atsushi Ishihara

15:30 Differentiation of Enriched Organically-Associated Trace Elements in The Macerals of High-Ge Coals from China, Qiang Wei, Shifeng Dai, China University of Mining and Technology, China University of Mining and Technology (Beijing), PR CHINA.

15:50 Interpretation of Element Release Under Process Gas Atmosphere by Means of Etv-Icp Oes, Caroline Hommel, D. Vogt, S. Guhl, B. Meyer, TU Bergakademie Freiberg, GERMANY.

16:10 Migration and Removal of Minerals and Hazardous Trace Elements in Coal During Coal Washing, Chengwei Yang, Yuegang Tang, Chengwei Yang, Kangnan Feng, Xingyuan Li, Wenqiang Ma, China University of Mining and Technology (Beijing), PR CHINA.

ORAL SESSIONS

Wednesday, October 17

10:50 - 17:10

16:30 Partitioning and Migration of Pb and Cr in an Ultra-Low Emission Pulverized Coal Boiler, Lin Chang, Huan Liu, Shibo Zhang, Yongchun Zhao, Junying Zhang, Huazhong University of Science & Technology, PR CHINA.

16:50 Arsenic Distribution and Speciation of High-Arsenic Ashes from a Lignite Fired Power Plant in Inner Mongolia, China, Bengon Gong, Qirun Yong, Zhuo Xiong, Yongchun Zhao, Junying Zhang, Huazhong University of Science & Technology, PR CHINA.

TECHNICAL PROGRAM

SESSION 19

CARBON MANAGEMENT - 1

Wenjun Zhang and Omar Basha

10:50 **Analysis of the Application Potential of CCUS in Four Major Industries in China**, Xiaochun Li, Chinese Academy of Sciences, PR CHINA.

11:10 **Commissioning and Completion of the Wyoming Integrated Test Center**, Jason Begger, Wyoming Infrastructure Authority; William J. Morris, Wyoming Integrated Test Center; USA.

11:30 **Research Status of Carbon Dioxide Utilization Technology**, Jianwei Li, Jiaojiao Lei, Xing Xin, Feng Bai, Xi'an University of Science and Technology, PR CHINA.

11:50 **CO₂ Capture from Flue Gas Using Membranes: Current Status and the Next Steps**, Richard Baker, Ivy Huang, Tim Merkel, Membrane Technology and Research, Inc., USA.

SESSION 20

COMBUSTION TECHNOLOGIES - 4

Huaichun Zhou and Andreas Richter

10:50 **Synergistic Mercury Removal with a Medium and Low Temperature SCR Catalyst of Fe-Modified MnO_x/TiO₂ from Coal Combustion Flue Gas**, Shibo Zhang, Yongchun Zhao, Junying Zhang, Huazhong University of Science & Technology, PR CHINA.

11:10 **Numerical Investigation On Co-Firing with Ammonia And Pulverized Coal in A 10MWth Combustion Facility**, Juwei Zhang, Takamasa Ito, Sakiko Ishihara, Toshiro Fujimori, IHI Corporation, Ltd., JAPAN.

11:30 **Evolution of Organically Bound Metals During Zhundong Sub-Bituminous Coal Combustion**, Xianpeng Zeng, Dunxi Yu, Huazhong University of Science and Technology, PR CHINA.

11:50 **Migration and Transformation of Mercury in Coal Gangue Fired Power Plant with FF and WFGD**, Yuming Zhou, Binbin Zhu, Bengen Gong, Yongchun Zhao, Junying Zhang, Huazhong University of Science & Technology, PR CHINA.

SESSION 21

COAL BED AND SHALE GAS - 1

Yanming Zhu and Leslie Ruppert

10:50 **Impact of Tectonic Deformation on Coal Methane Adsorption Capacity**, Wu LI, China University of Mining & Technology, PR CHINA.

11:10 **The Feasible Discussion of Gas Recovery about Coal bed methane, Tight gas and Shale gas "Three gases" Commingling**, Haiquan Zhong, Mengqi Hu, Pengbo He, Southwest Petroleum University at Chengdu, PR CHINA.

11:30 **Experiences in the Capture and Utilization of Methane from the Coal Seam in Polish Mines**, Marek Borowski, Agh University of Science and Technology; Artur Badylak, Joanna Berger-Kirszt, Exme Berger Group; POLAND.

11:50 **Experimental Study On Adsorption and Permeability of Coal Rock Under the Action of Artificial Electric Field**, Shao Xianjie, Li Feng, Oyaka Dickens, Peng Yingming, Li Mingfeng, Liu Zeheng, Yanshan University, PR CHINA.

12:10 **Study on Adsorption Capacity and Influencing Factors of Middle-High-Order Coal-Rocks in China**, Ma Pinghua, Wang Xixi, Yan Yi, Li Feng, Shao Xianjie, Yanshan University, PR CHINA.

SESSION 22

VALUE-ADDED PRODUCTS FROM COAL - 4

Dongping Tao and John Duddy

10:50 **Experimental Research of the effect of Properties of coal charge on Ferrocoke Properties**, Shi-Zhuang Shi, Zhen Xu, Jin-Hui Zhou, Yong-Hui Luo, Gong-Er Wang, Yan-Gao Mao, Qi Zheng, Qing-Wen Dong, Shuai Lu, Wuhan University of Science and Technology, PR CHINA.

11:10 **Study on Properties of Indonesian Coal and its Compatibility with Domestic Coal for Coking**, Shi-Zhuang Shi, Zhen XU, Jin-Hui ZHOU, Yan-Gao MAO, Qi ZHENG, Yong-Hui LUO, Gong-Er WANG, Qing-Wen DONG, Zhi-Long LIN, University of Science and Technology, PR CHINA.

11:30 **The Relationship between the Improvement of Tamping Coke Quality and Quality of Coal Charge**, Shi-Zhuang Shi, Zhen Xu, Jin-Hui Zhou, Qi Zheng, Yan-Gao Mao, Yong-Hui Luo, Gong-Er Wang, Zhi-Long Lin, Shuai Lu, Wuhan University of Science and Technology, PR CHINA.

11:50 **Contribution to the Briquetting and Coking Behaviour of Non-Baking Coals**

of Different Rank, Franz Fehse, Hans-Werner Schröder, TU Bergakademie Freiberg; Ronald Kim, ThyssenKrupp Industrial Solutions AG; GERMANY.

12:10 **Understanding the Contribution of Component Coals in Coke Oven Blend**, Philip Bennett, CoalTech Pty. Ltd.; Adrian Reifenstein, ALS Coal; AUSTRALIA.

SESSION 23

GASIFICATION TECHNOLOGIES - 4

Fuchen Wang and Johan van Dyk

10:50 **Establishment and Application of Two-Step Reaction Equilibrium Calculation Model for UCG (Underground Coal Gasification)**, Tianhong Duan, China University of Mining and Technology (CUMT), PR CHINA.

11:10 **Applying Spontaneous Adiabatic Test Procedure to Determine CO₂ Gasification Reactivity and Kinetics of Coal for UCG Applications**, JC van Dyk, North-West University; J Brand, African Carbon Energy; FB Waanders, North-West University; SOUTH AFRICA.

11:30 **Role of Solids in Viscosity of Brown Coal Slags: How It Affects Tcv and Transition to Non-Newtonian Flow**, Alexander Ilyushechkin, San Shwe Hla, Daniel Roberts, CSIRO Energy, AUSTRALIA; Alex Kondratiev, National University of Science & Technology MISIS, RUSSIA.

11:50 **Experimental Study On Liquid Hydrocarbon Formation During Pressurized Underground Coal Gasification Conditions**, JC van Dyk, JF Brand, FB Waanders, North-West University, SOUTH AFRICA; M Nguyen, D Scheithauer, TU Bergakademie Freiberg; B Meyer, DBI-Virtuhcon GmbH & TU Bergakademie Freiberg, GERMANY.

12:10 **Investigation the Shape of Cavity and Pollutants Migration Behavior After Underground Coal Gasification**, Maofei Niu, Shuqin Liu, China University of Mining and Technology (Beijing), PR CHINA.

SESSION 24

COAL SCIENCE - 4

Junying Zhang and Alexander Ilyushechkin

10:50 **Adsorption of Pure CH₄ and CO₂ on the Crushing Coal Under Different Temperatures: Experiment and**

TECHNICAL PROGRAM

Modelling, Tongqiang Xia, China University of Mining and Technology, Liaoning Technical University and North China Institute of Science and Technology; Youpai Wang, Qiangqiang Zhang, Pengjun Zhang, Hao Ren, China University of Mining and Technology; PR CHINA.

11:10 **Production and Oxidation of Active Sites During Low Temperature Oxidation of Coal**, Jinhu Li, Zenghua Li, China University of Mining and Technology, PR CHINA.

11:30 **Theoretical Investigation on the Distribution of Hydroxyl Group in Coal Structure**, Hongjun Fan, Lu Li, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, PR CHINA.

11:50 **Sulfur Transformation during Pyrolysis of Maceral Concentrates Derived from Density Classification of High Organic Sulfur Coking Coal**, Shaolin Liu, Yangfeng Shen, Jiao Kong, Xiaobao Duan, Meijun Wang, Taiyuan University of Technology, PR CHINA.

12:10 **Study on FTIR of High-Organic-Sulfur Coal and the Structure of Sulfur-Containing Compounds of its Extracts**, Yuegang Tang, Cong Chen, Xiaolong Li, Yewei Sun, China University of Mining and Technology (Beijing), PR CHINA.

SESSION 25

CARBON MANAGEMENT - 2

Wenjun Zhan and Omar Basha

13:30 **Progress and Outlook of Yanchang Full-Chain CCUS Project**, Ruiming Gao, Research Institute of Yanchang Petroleum (Group) Co. LTD, PR CHINA.

13:50 **Numerical Simulation of Enhanced Gas Recovery from Homogeneous and Heterogeneous Formations**, Ramesh K. Agarwal, Washington University in St. Louis, USA.

14:10 **Preparation and CO₂ Adsorption of Amine Modified Titanate Nanotubes**, Xiaohua Wang Yao Zhou, Xi 'An University of Science & Technology, PR CHINA.

14:30 **Synthesis Optimization and Performance of Nanocomposite Sodalite/Ceramic Membranes for Pre-Combustion CO₂ Capture**, Orevaoghene Eterigho-Ikelegbe, University of the Witwatersrand, Johannesburg, SOUTH AFRICA.

14:50 **Energy Efficiency Improvement and Debottlenecking for IGCC-CCS**,

Presenting Author: Omar M. Basha, North Carolina A&T State University; Co-Authors: Nicholas Siefert, Isaac Gamwo, National Energy Technology Laboratory, U.S. Department of Energy; : Badie I. Morsi, University of Pittsburgh; USA

SESSION 26

COMBUSTION TECHNOLOGIES - 5

Huaichun Zhou and Andreas Richter

13:30 **Effect of Natural and Forced Convection on Ignition and Soot Yields for Single Coal Particle Combustion**, Lele Feng, Yuxin Wu, Tsinghua University; Kailong Xu, CAEP Software Center for High Performance Numerical Simulation; Hai Zhang, Tsinghua University; PR CHINA.

13:50 **Kinetic Study of the Pore Development for Solid Fuel Reactivity Using FERPM**, Kyung-won Park, Gyeong-Min Kim, Chung-Hwan Jeon, Pusan National University, KOREA.

14:10 **A Transient Process Simulation on Thermal Explosion of Propylene Recovery Reactor Linked with Calorimetric Techniques**, Chi-Min Shu, Yi-Hong Chung, Zhao-Min Jiang, Yunlin University of Science and Technology, TAIWAN, ROC .

14:30 **Method for Improving Power Efficiency of Coal Fired Power Plants Fitted with CCUS**, Geoffrey D Bongers, Gamma Energy Technology P/L; Nikolai K Kinaev, Strategic Energy Consulting P/L; Zvonko Pregelj, Altaprom International P/L; AUSTRALIA.

SESSION 27

COAL BED AND SHALE GAS - 2

Yanming Zhu and Richard Bajura

13:30 **Paleotectonic Stress Field Reconstruction and Prediction of Natural Fractures in the Longmaxi Shale Reservoir, Nanchuan Region, South China**, Wei Ju, China University of Mining & Technology, PR CHINA.

13:50 **CSIRO Ventilation Air Methane Abatement Research**, Shi Su, Xin Yu, Jon Yin, Jun-Seok Bae, Yonggang Jin, Michael Cunningham, Ramesh Thiruvengkatachari, CSIRO, AUSTRALIA.

14:10 **Numerical Simulation of Multi-Fracture Propagation Characteristics in Hydraulic Fracturing of Coal Seam**, Yingying Guo, Shuheng Tang, Songhang Zhang, China University of Geosciences

(Beijing), PR CHINA

14:30 **Optimization of Technology for Development of Thin Interbedded Coalbed Methane in Western Guizhou Province of China**, Shao Xianjie, Liu Zeheng, Li Feng, Oyaka Dickens, Yanshan University; Jin Liuqing, Guizhou Shale Gas Co., Ltd; Li Mingfeng, Yanshan University; PR CHINA.

14:50 **Experiment on Improving Gas Diffusion rate of Coal Petrography by Vibration Waves**, Shao Xianjie, Oyaka Dickens, Li Feng, Li Mingfeng, Liu Zeheng, Peng Yingming, Yanshan University, PR CHINA.

SESSION 28

VALUE-ADDED PRODUCTS FROM COAL - 5

Dongping Tao and John Duddy

13:30 **Effect of Straw Addition to Coal on Coal-Based Activated Carbon for Methane Decomposition**, YaJie Wang, Lijun Jin, Yang Li, He Yang, Haoquan Hu, Dalian University of Technology, PR CHINA.

13:50 **Effect of Carbon from Anthracite Coal on the Hydrogen Absorption and Desorption Performance of Magnesium Based Hydrogen Storage Materials**, Xiaojing Liu, Co-Authors: Xiaojing Liu, Shixue Zhou, Shandong University of Science and Technology, PR CHINA.

14:10 **Preparation of Micro-Mesoporous Composite Sieves Catalyst and Its Catalytic Cracking Performance of Coal Tar**, He Xiaoxiao, Meng Zhuoyue, Xue Wenying, Zhaojingjing, Xi'an University of Science and Technology, PR CHINA.

14:30 **Hydrogenation of Aromatic Components Over NiMo/Mesoporous Alancime Carbide Catalyst**, Chenguang Jiang, Haiyong Zhang, Yonggang Wang, Ning Chang, China University of Mining & Technology (Beijing), PR CHINA.

14:50 **Partial Oxidation Cracking of Coal Tar Over Fe-Ni Mixed Metal Oxides for Production of Light Fuels and Hydrogen Rich Gas**, Dechao Wang, Lijun Jin, Yang Li, Haoquan Hu, Dalian University of Technology, PR CHINA.

SESSION 29

GASIFICATION TECHNOLOGIES - 5

Fuchen Wang and Alexander Ilyushechkin

13:30 **Development of New Technology**

TECHNICAL PROGRAM

for Controlled Underground Coal- Coalbed Gas Fluidized Co-Mining, Zuotang Wang, China University of Mining and Technology (CUMT), PR CHINA.

13:50 Effects of Microwave Irradiation and Hydrothermal Treatment on the Gasification Characteristics of Brown Coal, Lichao Ge, College of Energy and Electrical Engineering and Zhejiang University; Hongcui Feng, HUATIAN Engineering & Technology Corporation, MCC; Jingyu Guan, Harbin Boiler Company Limited; Chang Xu, College of Energy and Electrical Engineering; Yanwei Zhang, Zhihua Wang, Zhejiang University; PR CHINA.

14:10 A Novel and Yet Simple Methodology Based on the use of Inclined Plane for the Measurement of Slag Viscosity, Baiqian Dai, Lian Zhang, Monash University, AUSTRALIA.

14:30 Mechanism for Calcium Species Enhancing Hydrogen Production during Steam Gasification of Modified Coke from Calcium Carbide Slag Added Coal Blending Coking, Jiang Guo, Haili Jiao, Dong Yan, Meijun Wang, Jiao Kong, Weiren Bao, Taiyuan University of Technology, PR CHINA.

14:50 The Impact of Coal Seam Methane in Underground Coal Gasification, Cliff Mallett, Jianmin Zhang, CUMT International UCG Research Centre, PR CHINA.

SESSION 30

COAL SCIENCE - 5

Junying Zhang and Johan van Dyk

13:30 Correction Method of Mercury Intrusion Test Result on Coals, Danguy Song, Henan Polytechnic University, PR CHINA.

13:50 Study on Surface Structure and Drying Characteristics of Semi-Coke, Shiyong Zhao, Xiao Liang, Shaopeng Gao, Shuzhan Lv, Xi'an University of Science and Technology, PR CHINA.

14:10 The Effects of Supercritical CO₂ on Pore Structure in High-rank Coal, Shiqi Liu, China University of Mining and Technology and CUMT National University Science Park; Shuxun Sang, China University of Mining and Technology; Tian Wang, Yi Du, Huihuang Fang, China University of Mining and Technology and CUMT National University Science Park; PR CHINA.

14:30 Impact of Interaction between Coals on Coking Property of Blends, Haili Jiao, Meijun Wang, Jiao Kong, Jiang Guo, Dong Yan, Liping Chang, Professor, Taiyuan University of Technology, PR CHINA.

14:50 Study on Ash Fusion Behaviors and Physico-Chemical Characteristics of Semi-coke and its Blended Fuel with Coal, Maobo Yuan, Chang'an Wang, Pengqian Wang, Zichen Tao, Yongbo Du, Defu Che, Xi'an Jiaotong University, PR CHINA.

SESSION 31

CARBON MANAGEMENT - 3

Xiaochun Li and Omar Basha

13:30 Enhanced CO₂ Sorption Performance of CaO/Ca₃Al₂O₆ Sorbent with Steam Addition, Qing Li, Jieying Jing, Xuewei Zhang, Zehua Wei, Wenying Li, Taiyuan University of Technology, PR CHINA.

15:50 Molecular Basket Sorbents for CO₂ and NO_x/SO_x Capture from Flue Gas of Power Plants and CO₂ Utilization for Fuels and Chemicals, Chunshan Song, Pennsylvania State University, USA and Dalian University of Technology, PR CHINA; Xinwen Guo, Dalian University of Technology, PR CHINA; Xiaoxing Wang, Pennsylvania State University, USA.

16:10 High Efficiency Injection Technology in Deep Anthracite During CO₂-ECBM Process, Sang Shuxun, China University of Mining and Technology; Wu Jianguang, Zhang Shouren, China United Coalbed Methane Co., Ltd; Zhou Xiaozhi, Liu Shiqi, Huang Huazhou, Wang Ran, China University of Mining and Technology; Zhang Bing, China United Coalbed Methane Co., Ltd; Jia Jinlong, Wuhan Institute of Technology; Han Sijie, China University of Mining and Technology; PR CHINA.

16:30 Enhanced CO₂ Photocatalytic Reduction Through Simultaneously Accelerated H₂ Evolution and CO₂ Hydrogenation in A Twin Photoreactor, Zhuo Xiong, Yongchun Zhao, Junying Zhang, Huazhong University of Science & Technology, PR CHINA.

16:50 Preparation and Photocatalytic Properties of Bracts Like Ti/Li/Al-LDHs Using Chitosan Guiding Agent, Zhao Xiaoling, Zhou An-ning, Wang Jia-xin, Lei Dong-qiang, Dong Yi-fan, Xi'an University of Science and Technology; Li Wen-Ying, Taiyuan University of Technology; Zhang Yangang, Xi'an University of Science and Technology; PR CHINA.

SESSION 32

CLEAN COAL AND GAS TO FUELS - 1

Hesheng Yu and Leslie Ruppert

15:30 Study on the Coating Internal Filtration Technology for Slurry Bed Fischer-Tropsch Reactor, Peiqian Yu, Peng Gao, Yifeng Bu, Ming Xu, Xuedong Jiang, National Institute of Clean-and-Low-Carbon Energy, PR CHINA.

15:50 A Single-phase Study on the Turbulence Models of Cyclonic-static Micro-bubble Flotation Column by CFD and PIV, Shiqi Meng, Xiaokang Yan, China University of Mining and Technology, PR CHINA.

16:10 Low Temperature Synthesis of Ni₂P/Al₂O₃ Catalysts for Naphthalene Hydrogenation, ZhiQiang Qie., Jieying Jing, Zhifen Yang, Ziyi Zhang, Wenying Li, Taiyuan University of Technology, PR CHINA.

16:30 Integrated Process of Coal Pyrolysis and Steam Reforming of Methanol Over Ni Based Catalysts, Xin-Fu He, Xiao-Qin Zhang, Jun Zhou, Hong-Ju Wu, An-ning Zhou, Xi'an University of Science and Technology, PR CHINA.

16:50 Hydrodeoxygenation of Dibenzofuran over Ni/ordered Mesoporous SiO₂-Al₂O₃ Catalysts, Ru Wang, Zhen-yi Du, Hua-wei Peng, Jie Feng, Wen-ying Li, Taiyuan University of Technology, PR CHINA.

SESSION 33

COAL BED AND SHALE GAS - 3

Yanming Zhu and Richard Bajura

15:30 Origin of High and Variable Heavy Hydrocarbon Gases of Coal in Enhong Syncline of Yunnan Province in China, Fengjuan Lan, China University of Mining & Technology, PR CHINA.

15:50 Characterization of Multi-Scale Microfractures of Coals Related to Coal Rank, Xinghua Shi, Jienan Pan, Henan Polytechnic University, PR CHINA.

16:10 The Applicability Analysis of Determination Model in Nanometer Pore Using Low Pressure CO₂ and N₂ Adsorption in Coal, Yunbo Li, Danguy Song, Henan Polytechnic University, PR CHINA.

16:30 Prediction and Validation of Organic Carbon Content in Shale Reserves Based on Back Propagation Neural Network, Zhen Zhang, Shuheng Tang, Songhang Zhang, Zhaodong Xi, China University of Geosciences (Beijing), PR CHINA.

16:50 Hot Coal Gas Desulfurization

TECHNICAL PROGRAM

Under Microwave Irradiation Over Modified Semi-Coke-Supported Iron Oxide, Mengmeng Wu, Enhui Guo, Jie Mi, Taiyuan University of Technology, PR CHINA.

SESSION 34

VALUE-ADDED PRODUCTS FROM COAL - 6

Dongping Tao and John Duddy

15:30 **Study On Adsorption Properties of HZSM-5 Modified by Chemical Liquid Phase Deposition in Separating of M-Cresol and P-Cresol,** Meng-yao Li, Yi Luo, Wen-jun Fan, Jie Feng, Wen-ying Li, Taiyuan University of Technology, PR CHINA.

15:50 **Preparation and Capacitive Properties of Carbon Materials from Direct Coal Liquefaction Residue and Phenolic Resin,** Jiangtao Cai, Yating Zhang, Guoyang Liu, Anning Zhou, Xi'an University of Science and Technology; Jieshan Qiu, Beijing University of Chemical Technology and Dalian University of Technology; PR CHINA.

16:10 **Study on Competition Relationship and Influencing Factors of Cresol - Butylated Products,** Yi Luo, Meng-yao Li, Wen-jun Fan, Jie Feng, Wen-ying Li, Taiyuan University of Technology, PR CHINA.

16:30 **Prediction of Metallurgical Coke Thermal Properties and Analysis of Influencing Factors,** Shi-Zhuang SHI, Zhen XU, Jin-Hui ZHOU, Gong-Er WANG, Yong-Hui LUO, Yan-Gao MAO, Qi ZHENG, Shuai LU, Zhi-Long LIN, Wuhan University of Science and Technology, PR CHINA.

16:50 **Effect of N- and O-compounds on the Performance of NiWCx Catalysts for Hydrogenation of Naphthalene,** Haiyong Zhang, Ning Chang, Chenguang Jiang,, Genwei Chen, Longyin Liu, China University of Mining & Technology (Beijing), PR CHINA

SESSION 35

GASIFICATION TECHNOLOGIES - 6

Fuchen Wang and Alexander Ilyushechkin

15:30 **Intensification of the Underground Coal Gasification Through Electromagnetic Microwave Radiation,** Danilov O.S., Belov A.V., Grebenyuk I.V., Far Eastern Federal University, RUSSIA.

15:50 **Characteristics of Coal Gasification Using Chemical-Looping with MoO₃ as Gaseous Oxygen Carrier,** Jing-xian Kang, Qun Yi, Taiyuan University of Technology; Guo-qiang Wei, Chinese

Academy of Sciences (CAS); Yi Huang, Wen-ying Li, Jie Feng, Taiyuan University of Technology; PR CHINA.

16:10 **Char Conversion in A Drop Tube Reactor: Numerical Modeling and Detailed Validation,** Andreas Richter, Fengbo An, Bernd Meyer, TU Bergakademie Freiberg, GERMANY.

16:30 **Carbon Footprint of the Exergy UCG™ Technology:** Unminable Coal to Products, Michael S. Blinderman, Ergo Exergy Technologies Inc.; Simon I. Maev, Cvicus Inc.; CANADA

16:50 **Development of a New Dynamic Reduced Order Model for a Shell Coal Gasifier Integrating the Slag Flow Model,** Mukyeong Kim, Insoo Ye, Geun Sohn, Changkook Ryu, Sungkyunkwan University; Bongkeun Kim, Doosan Heavy Industries & Construction; SOUTH KOREA.

SESSION 36

COAL SCIENCE - 6

Junying Zhang and Johan van Dyk

15:30 **Toward the Advanced Coal Science –Strategic Production of Fine Chemicals,** Masakatsu Nomura, Faculty of Engineering, Osaka University; Satoru Murata, University of Toyama; JAPAN.

15:50 **Geochemistry and Mineralogy of Coal and Gasification By-Products from Two Entrained-Flow Coal Gasification Plants in Ningdong, China,** Yafeng Wang, Yuegang Tang, Baolin Wang, Xin Guo, Xi Pan, Binbin Huan, China University of Mining and Technology (Beijing), CHINA; Robert B. Finkelman, University of Texas at Dallas, USA.

16:10 **Behavior of Trace Amount of Crystalline Minerals in Coal by TEM, TG-DTA and XRD,** Atsushi Ishihara, Karin Uemura, Shunsuke Koyabu, Tadanori Hashimoto and Hiroyuki Nasu, Mie University, JAPAN.

16:30 **Research on Methods to Differentiate Coal and Gangue Using Image Processing and Machine Learning,** Weidong Wang, Ziqi Lv, Hengrun Lu, Hequn Li, China University of Mining and Technology (Beijing), PR CHINA.

16:50 **Classification of Water Forms in Lignite and Energy Consumption Analyses During Microwave Drying Technology,** Junjie Liao, Chao Li, Liping Chang, Weiren Bao, Taiyuan University of Technology, PR CHINA.

ORAL SESSIONS

Thursday, October 18

10:50 - 17:10

SESSION 37

SUSTAINABILITY AND ENVIRONMENT - 1

Shikui Dong and Massood Ramezan

10:50 **Air Pollution and Coal Consumption in China: A Perspective from Space,** Kai Qin, China University of Mining and Technology, PR CHINA.

11:10 **A Novel Application of Palm Kernel Shell Derived Carbon to Magnesium-Based Hydrogen Storage Materials,** Yeboah Martin Luther, Zongying Han , Xinyuan Li , Ruiqian Jiang , Shixue Zhou, Shandong University of Science and Technology, PR CHINA.

11:30 **Ti1Li3Al4-LDHs@Activated Carbon with Enhanced Photocatalytic CO₂ Reduction Performance,** Dong-Qiang Lei, An -Ning Zhou, Xiao-Ling Zhao, Wen-Ying Li, Xi'an University of Science and Technology, PR CHINA.

11:50 **Pyrolysis Behaviors of Five Agricultural Wastes with a Focus on Liquid Product,** Shiqi Wan, Nan Zheng, Jie Zhang, Jie Wang, East China University of Science and Technology, PR CHINA.

12:10 **Preparation of Activated Carbons from Anthracite by CO₂ Activation Coupled with KNO₃ Catalyst for CO₂ Adsorption,** Zhang Shuangquan, Sun Cong, Yang Xiaoqin, China University of Mining & Technology, PR CHINA.

SESSION 38

CLEAN COAL AND GAS TO FUELS - 2

Hesheng Yu and Vann Bush

10:50 **Candle Soot as a Novel Collector for Coal Flotation,** Wencheng Xia, China University of Mining & Technology, PR CHINA.

11:10 **Methanol Synthesis Over Cu/**

TECHNICAL PROGRAM

ZnO/Al₂O₃ Catalysts Prepared Using Reverse Microemulsion Method, Panpan Yang, Yulong Zhang, National Institute of Clean-and-Low-Carbon Energy(NICE), PR CHINA.

11:30 The Application of Gas Separation Membranes to Coal Gasification Process, Ivy Huang, Richard Baker, Tim Merkel, Membrane Technology and Research, Inc., USA.

11:50 High Demand Ethylene Formation from CO₂ Hydrogenation over Efficient and Stable Fe-Co-K/ZrO₂ Catalysts: Promotional Mechanisms of Oxygen Vacancies, Jie Ding, University of Wyoming, USA and Nanjing University of Science and Technology, PR CHINA; Liang Huang, Wuhan University of Science and Technology, PR CHINA; Maohong Fan, University of Wyoming, USA and Georgia Institute of Technology, USA; Qin Zhong, University of Wyoming, USA; Armistead G. Russell, Georgia Institute of Technology, USA; Hao Gu, University of Wyoming, USA; Haijun Zhang, Wuhan University of Science and Technology, PR CHINA.

12:10 Impact of Nanobubbles on Mechanical Coal Flotation Process, Ahmed Sobhy, Dongping Tao, University of Science and Technology Liaoning, PR CHINA.

SESSION 39

COAL BED AND SHALE GAS - 4

Yanming Zhu and Leslie Ruppert

10:50 Pore Characterization and Its Impact On Methane Adsorption Capacity for Organic-Rich Marine Shales, Yang Wang, China University of Mining & Technology, PR CHINA.

11:10 Geochemistry of Coal Seam Gas Co-produced Water and its Potential Effects on the Ecosystem in southern Junggar Basin, China, Meng Li, Jienan Pan, Xinghua Shi, Yawen Wu, Henan Polytechnic University, PR CHINA.

11:30 Moisture Occurrence and Its Influence on Methane Adsorption Capacity of Coal, Feng Wang, Yanbin Yao, Xuehao Yuan, China University of Geosciences and Beijing Key Laboratory of Unconventional Natural Gas Geological Evaluation and Development Engineering, PR CHINA.

11:50 Research on Key Techniques for Improving Coal Bed Methane Recovery by Combustion of Coal Seam, Shao Xianjie, Peng Yingming, Li Feng, Oyaka Dickens, Li

Mingfeng, Liu Zeheng, Yanshan University, PR CHINA.

12:10 Coalbed Methane Enrichment Pattern and Screening of Favorable Areas in Western Guizhou, China, Chu Qingzhong, Yan Yi, Peng Yingming, Yanshan University; Jin Liuqing, Guizhou Shale Gas Co, Ltd; PR CHINA.

SESSION 40

COAL MINING AND BENEFICIATION -1

Nong Zhang and Qingyun Sun

10:50 Scientific Coal Mining and Education, Jiachen Wang, China University of Mining and Technology (Beijing), PR CHINA.

11:10 Detection and Monitoring of Underground Coal Mine Gases at Lakhra Coal Mines, Pakistan, Niaz Muhammad Shahani, Zhijun Wan, Muhammad Ali, Barkat Ullah, China University of Mining & Technology, PR CHINA.

11:30 An Evaluation of Coal Seam Gas Content and Porosity Based On Field and Laboratory Measurements, Ata Ramazani-Rend, Masoud Teymourfami, Anil Soylu, Olgun Esen, Abdullah Fişne, Istanbul Technical University, TURKEY.

11:50 Indian Coal Industry and Its Future Strategies, Bodapati Prasad, AKS University, INDIA.

12:10 Flow Field Evolution during Gas Depletion with Consideration of Creep Deformation, Yang Zhao, Baiquan Lin, Ting Liu, Qingzhao Li, Yuannan Zheng, China University of Mining and Technology, PR CHINA.

SESSION 41

GASIFICATION TECHNOLOGIES - 7

Shoujian Wang and Aleksander Sobolewski

10:50 Evaluation Method of the Energy Conversion Efficiency of Coal Gasification and Related Applications, Duan Tianhong, Wang Zuotang, China University of Mining and Technology, PR CHINA.

11:10 Designing of Intelligent Flexible Gasification Unit Using Excel and Aspen Simulation Workbook, Jianwei Li, Bai Feng, Jiaojiao Lei, Xingxin, Xi'an University of Science and Technology, PR CHINA.

11:30 Process Analysis of RDF Gasification Integrated with Coal Boiler,

Aleksander Sobolewski, Marek Sciazko, Institute for Chemical Processing of Coal; Tomasz Chmielniak, AGH University of Science and Technology and Institute for Chemical Processing of Coal; Joanna Bigda, Institute for Chemical Processing of Coal; POLAND.

11:50 3D TFM-Tracer Approach to Simulate a Lab Scale Fixed Bed Gasifier, Massoud Massoudi Farid, Sebastian Kriebitzsch, Andreas Richter, Bernd Meyer, Technische Universität Bergakademie Freiberg, GERMANY.

12:10 Kinetic Study of High-Temperature Co-Gasification of Petroleum Coke and Coal, Xin Yu, Dunxi Yu, Professor, Huazhong University of Science and Technology, PR CHINA.

SESSION 42

COAL SCIENCE - 7

Junying Zhang, and Alan Kolker

10:50 Optimization of Illinois Basin (USA) Coals by Coal Preparation, Allan Kolker, U.S. Geological Survey; Liliana Leticariu, Southern Illinois University; Maria Mastalerz, Agnieszka Drobnik, Indiana Geological and Water Survey; Anne Scott, Clint Scott, U.S. Geological Survey; USA.

11:10 Removal of Toxic Elements from High-Uranium Coals of Rongyang Mine by Stepped Release Flotation, Piaopiao Duan, Wenfeng Wang, Shuxun Sang, China University of Mining and Technology, PR CHINA.

11:30 The Study on Inter-Particle Interaction and Its Effect on Coal Flotation, Yuexian Yu, Xi'an University of Science and Technology; Liqiang Ma, China University of Mining & Technology (Beijing); Zhen Li, Anning Zhou, Xi'an University of Science and Technology; PR CHINA.

11:50 Mechanism of Influence of High Intensity Conditioning on the Interaction between Coarse and Fine Coal Slime During Flotation, Chao Deng, China University of Mining & Technology (Beijing); Liqiang Ma, China University of Mining & Technology; PR CHINA.

SESSION 43

SUSTAINABILITY AND ENVIRONMENT

- 2

Shaoliang Zhang, and Wenhua Li

13:30 Effect of Size and Surface

TECHNICAL PROGRAM

Chemistry of AuENPs on the Uptake of the ENPs into the Sediment-Dwelling Lumbriculus Variegatus, Ping LUO, China University of Mining and Technology, PR CHINA.

13:50 **TGA-FTIR Study on Co-Pyrolysis of Coal and Herb Dregs**, Zhou Lu, Sun Shaojie, Wu Jianjun, China University of Mining and Technology, PR CHINA.

14:10 **Study on Water Reduction of Coal Pyrolysis Product Over Perovskite Catalysts**, Wang Qingyu, Demin He, Jun Guan, Dalian University of Technology; Xueqiang Li, Jianxuan Shang, Shanxi Coal and Chemical Industry Group Co. Ltd; Qiumin Zhang Dalian University of Technology, Dalian; PR CHINA.

14:30 **A Research on Problems and Corresponding Strategies in Application of Integrated Membrane Techniques to Advance treatment and Recycling of Coking Wastewater**, Shuguang Ouyang, Guanghua Wang, Wuhan University of Science and Technology, PR CHINA.

14:50 **Comparison of Air Pollutant Dispersion Around Buildings Using Computational Fluid Dynamics**, Hesheng Yu, China University of Mining and Technology, PR CHINA; Jesse Thé, University of Waterloo and, Lakes Environmental Software, CANADA.

SESSION 44

CLEAN COAL AND GAS TO FUELS - 3

Dongping Tao and Vann Bush

13:30 **Effect of Pretreatment Methods on Oil Agglomeration Performance**, Jie Sha, China University of Mining & Technology, PR CHINA.

13:50 **Concentrations and Modes of Occurrence of Some Potentially Valuable Elements in High-aluminum Coals from Yanzishan Mine**, Northern Datong Coalfield, China: in Comparison to the Junger Coalfield and the Ningwu Coalfield, Yue Yuan, Shuheng Tang, Songhang Zhang, China University of Geosciences, PR CHINA.

14:10 **Internal Heat Transfer Characteristics of Pulverized Coal During Pyrolysis**, Hongzhi Ni, Demin He, Jun Guan, Associate Professor, Dalian University of Technology; Xueqiang Li, Jianxuan Shang, Shaanxi Coal and Chemical Industry Group Co. Ltd; Qiumin Zhang, Dalian University of Technology; PR CHINA.

14:30 **Development of The Integrated Gasification Fuel Cell Power Generation**

System with CO₂ Near Zero Emission, Dong Binqi, Shenhua Group Corporation Limited; Li Pingping, Li Chufu, National Institute of Clean and-Low-Carbon Energy; Yang Zhibin, China University of Mining and Technology (Beijing); Yuan Ming, Shenhua Group Corporation Limited; Wei Chang, National Institute of Clean and-Low-Carbon Energy; Peng Suping, China University of Mining and Technology (Beijing); PR CHINA.

14:50 **Structural Features and Pyrolysis Behaviors of Extracts from Microwave-Assisted Extraction of a Low Rank Coal with Different Solvents**, Yankun Xiong, Haoquan Hu, Lijun Jin, Yang Li, He Yang, Dalian University of Technology; PR CHINA.

SESSION 45

COAL SCIENCE - 10

Francis Lau and Diane Madden

13:30 **Research on the Motion Characteristics of Fine Coal in Centrifugal Force Field**, Zhang Jun, Tao Youjun, Shi Zhengxiang, Wang Yipeng, Zhao Younan, China University of Mining and Technology, PR CHINA

13:50 **Response Optimization Study of High Sulphur Tipong Coals of Assam**, Amritanshu Kumar, Theem College of Engineering; S.K. Srivastava, Central Institute of Mining and Fuel Research, INDIA.

14:10 **The Effect of Particle Size on the Recovery of Fine Coals from the Slime Pond of Western Lignite Corporation (Turkey) By Knelson Concentrator**, Ali Ucar, Nezahat Ediz, Oktay Şahbaz, Sevgi Karaca, I. Goktay Ediz, Cem Sensogut, Dumlupinar University, TURKEY.

14:30 **Hydrogen Sorption Properties of MG-C Composites Prepared by Nickel Ball Milling**, Ruiqian Jiang, Ruiqian Jiang, Xinyuan Li, Xiaojing Liu, Shixue Zhou, Shandong University of Science and Technology, PR CHINA.

14:50 **Study on the Preparation of Coal Slurry by Ultra Low Ash Pure Coal**, Shaopeng Gao, Shiyong Zhao, Xiao Liang, Xi'an University of Science and Technology, PR CHINA.

SESSION 46

COAL MINING AND BENEFICIATION -2

Nong Zhang and Qingyun Sun

13:30 **High-Efficient-Fast Driving of**

Roadway by Bolting System in Practice, Guichen Li, China University of Mining and Technology, PR CHINA.

13:50 **A New Canister Design for the Determination of Methane Content of Coal Seams by Direct Method**, I. Goktay Ediz, Cem Sensogut, Sahin Yuvka, Ahmet Ozgur, Sunay Beyhan, Dumlupinar University, Turkey.

14:10 **Prevalence of Musculoskeletal Disorders and Assessment of Workplace Factors: A Case of Coal Mine in Pakistan**, Izhar Mithal Jiskani, Zhou Wei, China University of Mining and Technology, PR CHINA; Saleem Raza Chalgri, Mehran University of Engineering and Technology, PAKISTAN; Cai Qingxiang, China University of Mining and Technology, PR CHINA; Paras Behrani, Universiti Teknologi PETRONAS, MALAYSIA; Raheel Aziz, Balochistan University of Information Technology, PAKISTAN.

14:30 **Study On Utilization of Mine Drainage Water from Abandoned Coal Mines in Jiawang as Urban Water Source**, Xiangdong Li, Bo Fei, Qiyang Feng, Ping Lu, China University of Mining and Technology, PR CHINA.

14:50 **Producing Synthetic Natural Gas (Sng) From Thar Coal in Pakistan**, Farid A Malik, FC College, PAKISTAN.

SESSION 47

GASIFICATION TECHNOLOGIES - 8

Shoujian Wang and Aleksander Sobolewski

13:30 **Progressive Reaction between Na/Ca and Silica during Gasification of Low Rank Coal**, Ge Yu, Yu, Huazhong University of Science and Technology, PR CHINA.

13:50 **U.S. DOE's Gasification Systems Program – An Overview**, K. David Lyons, National Energy Technology Laboratory; Massood Ramezan, KeyLogic Systems; USA.

14:10 **R-GASTM Coal Gasification Technology Development and Demonstration**, Zhiwu Feng, Yangquan Coal Chemical Group, PR CHINA; Zhong Eric Zhou, Gas Technology Institute, USA.

14:30 **Design Basis of 1 MWth Calcium Looping Gasification Pilot Unit**, Zekun Jia, Haibing Li, Bingfei He, Bin Xu, Limin Shao, Haozhe Chen, Kezhong Li, ENN Group Co., Ltd.; Liang Zeng, Tianjin University and Collaborative Innovation Center of Chemical Science and Engineering; PR CHINA.

14:50 **Dry Solids Pump – Full-scale Development and Testing at 500 psi**

TECHNICAL PROGRAM

Timothy W. Saunders, Joseph Caravella, Gas Technology Institute; Greg Weber, University of North Dakota; USA.

SESSION 48

COAL SCIENCE - 8

Shifeng Dai and Alan Kolker

13:30 **New Direction of High Efficient Utilization of Coal-Research Process of All Group Component Separation and Applied Technology**, Zhihong Qin, Xiaoqin Yang, China University of Mining and Technology, PR CHINA.

13:50 **Model Research on the Main Process Parameters of Heavy Medium Separation**, Deng Jianjun, Chen Ming, China University of Mining & Technology; Guo Congtao, Huaibei Mining Group; Sun Qingfang, Wang Chuanzhen, China University of Mining & Technology; PR CHINA.

14:10 **Experiment and Mechanism Study on Flotation of Fine Coal by Nano Bubble Flotation Column**, Fangyuan Ma, Doctoral Student, China University of Mining and Technology; Doping Tao, Liaoning University of Science and Technology; Youjun Tao, China University of Mining and Technology; PR CHINA.

14:30 **Process Factors for Preparing Ultra-low-ash Low-rank Coal using Oil Bubble Flotation**, Jinzhou Qu, Quan An, Li An, Anning Zhou, Zhen Li, Wei Yu, Lijun Liu, Meili Du, Chao Yang, Xi'an University of Science and Technology, PR CHINA.

14:50 **Exploration on the Process Characteristics of Oily-Bubble Flotation of Low Rank Coal**, Tao Xiu-xiang, Chen Song-jiang, Yang Zhao, Li Lu-lu, China University of Mining and Technology, PR CHINA.

SESSION 49

SUSTAINABILITY AND ENVIRONMENT - 3

Shaoliang Zhang and Massood Ramezan

15:30 **Indonesia's Coal Production Forecast using System Dynamics: The Impact to the Environment**, Firly R. Baskoro, Katsuhiko Takahashi, Katsumi Morikawa, Keisuke Nagasawa, Hiroshima University, JAPAN.

15:50 **Product Distribution Control and Reaction Mechanism Study of Isobutanol Conversion Into Aromatics**, Wen-yi Yang, Bin-bin Zhang, Zhen-yi Du, Wenying Li, Taiyuan University of Technology,

PR CHINA.

16:10 **Measurements of Toxic Heavy Metals Contamination in Drinking Water of Islamabad, Lahore, Jung, Multan and Khushab and Their Damages to Human Health**, Muhammad Sarfraz, Yang Li, Dalian University of Technology, PR CHINA; Zahid Gulfray, Bahria University, PAKISTAN; Javed AAwan, University of the Punjab, PAKISTAN; Waseem Raza, Haoquan Hu, Dalian University of Technology, PR CHINA.

16:30 **Insight into Ce-Fe Binary Oxides for Oxidative Dehydrogenation of Ethylbenzene to Styrene with CO₂**, Kechen Song, Xueqi Guo, Deping Xu, China University of Mining & Technology (Beijing), PR CHINA.

SESSION 51

COAL SCIENCE - 11

Francis Lau and Diane Madden

15:30 **Energy-Efficient and Wear Reduced Hydraulic Piston Press for Agglomeration of Coal, Waste and Renewable Resources**, André Schmidt, Franz Fehse, Felix Stöhr, Thomas Müller, Hans-Werner Schröder, TU Bergakademie Freiberg, GERMANY.

15:50 **Effect of Additives on Semi-Coke Water Slurry Property and Quantum Chemistry Study**, Meng Zhuoyue, Yang Zhiyuan, He Xiaoxiao, Xue Wenying, Xi'an University of Science and Technology, PR CHINA.

16:10 **Adsorption and conversion of thiophene on the modified NaY zeolites in the atmospheres containing H₂, CH₄ and CO**, Fanjing Wei, Junjie Liao, Xiaoqin Guo, Liping Chang, Weiren Bao, Taiyuan University of Technology, PR CHINA.

16:30 **The Macromolecular Characteristics and Model Construction of Baode Coal by 13c-Nmr Analysis**, Wenying Xue, Zhiyuan Yang, Zhuoyue Meng, Xiaoxiao He, Xiaoyu Song, Xi'an University of Science and Technology, PR CHINA.

SESSION 52

COAL MINING AND BENEFICIATION - 3

Nong Zhang and Qingyun Sun

15:30 **Progress of Rock Burst Monitoring and Pre-warning in Underground Coal Mining in China**, Anye Cao, China University of Mining and

Technology, PR CHINA.

15:50 **Mining Sector Carbon Linkage of USA, China, Japan, Germany, United Kingdom, India, Brazil, France, Italy and Canada Via Hypothetical Extraction Method**, M. Jawad Sajid, Li Xinchun, Qingren Cao, Niaz Muhammad Shahani, China University of Mining & Technology, PR CHINA.

16:10 **Influence of Temperature on Adsorption Selectivity: Coal-based Activated Carbon for CH₄ Enrichment from Coal Mine Methane**, Yuannan Zheng, Qingzhao Li, Professor, Chuangchuang Yuan, Qinglin Tao, Yang Zhao, Guiyun Zhang, Junfeng Liu, China University of Mining and Technology, PR CHINA.

16:30 **Preparation of Activated Carbon @ MOFS Materials and Its Potential Application for Coal Mine Methane Enrichments**, Qingzhao Li, Chuangchuang Yuan, Yuannan Zheng, Qinglin Tao, Yang Zhao, Guiyun Zhang, Junfeng Liu, China University of Mining and Technology, PR CHINA.

SESSION 53

GASIFICATION TECHNOLOGIES - 9

Shoujian Wang and Aleksander Sobolewski

15:30 **Effect of Lignite Support Precursor on Desulfurization Performance of Semicoke Supported Zinc Oxide Sorbent in Medium Temperature Coal Gas**, Ting Li, LiuXu Bao, Jiao Kong, MeiJun Wang, XiuRong Ren, LiPing Chang, Taiyuan University of Technology, PR CHINA

15:50 **Solid Hydrogen in MGH₂ for Hydrodesulfurization of Carbonyl Sulfide: A Density Functional Theory Study**, Xinyuan Li, Xinyuan Li, Ruiqian Jiang, Xiaojing Liu, Shixue Zhou, Shandong University of Science and Technology, PR CHINA.

16:10 **Highly-Efficiency Adsorption of Hexavalent Chromium on Low Rank Coals**, Xing-Yun Zou, Lin Li, Xiao-Fang You, Peng Wang, Jun Qiu, Jun-Xiang Wang, Shandong University of Science and Technology; Xiao-Qiang Cao, Shandong University of Science and Technology and Peking University; Weiling Sun, Peking University; Qing-Jian Zhang, Shandong Entry-exit Inspection and Quarantine Bureau; Xian-jun Lyu, Shandong University of Science and Technology; PR CHINA.

16:30 **Turbulence Model Development**

TECHNICAL PROGRAM

and Validation for Gasification Applications, Omar M. Basha, North Carolina A&T State University; Nicholas Siefert, Isaac Gamwo, National Energy Technology Laboratory/U.S. Department of Energy; Badie I. Morsi, University of Pittsburgh; USA.

SESSION 54

COAL SCIENCE - 9

Shifeng Dai and Alan Kolker

15:30 Incidence Degree of the Operation and Structure Factors for the Performance of Three Products Hydrocyclone Screen (TPHS), C. Wang, J. Chen, L. Shen, Y. Huang, Q. Nie, China University of Mining & Technology, PR CHINA.

15:50 Effects of Hydrothermal Dewatering on Lignite Physico-Chemical Structures and Analysis of Moisture Removal Mechanism, Qiong Mo, Junjie Liao, Liping Chang, Weiren Bao, , Taiyuan University of Technology, PR CHINA.

16:10 Study on the Coal Rock Microstructure Separation of Low-Rank Coal in Enhanced Gravity Field, Yushuai Xian, Youjun Tao, China University of Mining and Technology, PR CHINA.

16:30 Experimental Study of CO₂-Water-Mineral Interactions and Their Influence on the Pore Structure of High Rank Coal, Yi Du, Huazhong University of Science & Technology; Shuxun Sang, China University of Mining and Technology; Junying Zhang, Huazhong University of Science & Technology; Changqing Fu, , Xi'an University of Science & Technology; PR CHINA.

GASIFICATION TECHNOLOGIES

POSTER SESSIONS

Tuesday, October 16

17:15

P1-1 The Effect of Steam on Biomass Wastes Torrefaction, Shan Tong, Feng Wang, Huazhong University of Science and Technology; Xian Li, Huazhong University of Science and Technology and College of Chemistry and Chemical Engineering, Xinjiang University; Hong Yao, Huazhong University of Science and Technology; PR CHINA.

P1-2 Study of Catalytic Steam Reforming of Toluene in Molten Salt, Quan Yuan,

Taiyuan University of Technology, PR CHINA.

P1-3 Components and Formation Path of Tar from Lignite Gasification at Different Steam Concentration, Tian Shen, Haiyong Zhang, Deping Xu, Yonggang Wang, China University of Mining & Technology (Beijing), PR CHINA.

P1-4 A Coal Blending Model for Entrained-flow Gasifiers, Bing Liu, National Institute of Clean-and-Low-Carbon Energy, PR CHINA

P1-5 Modelling of Hot Flow Field in an Entrained-Flow Gasifier with Single or Flat Flame Burner, Feng Ziyang, National Institute of Clean and Low-Carbon Energy, Beijing, CHINA, Liu Zhen, Guan Qingliang, Liu Bing, Peng Baozai, Fang Xinhui, An Haiquan, Suo Ya, Li Wenhua National Institute of Clean and Low-Carbon Energy, Beijing, CHINA

P1-6 Study on Pipe Pressure Drop in Pneumatic Conveying Using Aspen Plus, Xinhui, Fang, Qingliang, Guan, Zhen, Liu, Baozai, Peng, Liu, Bing, Ya, Suo, Ziyang, Feng, National Institute of Clean and Low Carbon Energy, PR CHINA.

P1-7 Study on The Stability of High-Pressure Dense-Phase Pneumatic Transport of Pulverized Coal, Baozi Peng, Qingliang, Guang, Zhen, Liu., Xinhui, Fang, Liu, bing, Ya, Suo, Ziyang, Feng, National Institute of Clean and Low Carbon Energy, PR CHINA.

P1-8 Using Inexpensive Sodium/Iron Bimetallic Catalyst in Steam Gasification of Coal Char, Yiwei Jiang, Haibo Yan, Jie WANG, East China University of Science and Technology, PR CHINA.

CLEAN COAL DEMONSTRATION AND COMMERCIAL PROJECTS

P2-1 Novel Nanocomposite Surface Treatment to Reduce Drag and Corrosion in Transport Pipelines, Vinod Veedu, Erika Brown, Matthew Nakatsuka, Ganesh Arumugam, Oceanit, USA.

COMBUSTION TECHNOLOGIES

P3-1 Multiform Sulfur Adsorption Centers and Copper-Terminated Active Sites of Nano-CuS for Efficient Elemental Mercury Capture from Coal Combustion Flue Gas, Zequn Yang, The University of Hong Kong, HONG KONG SAR; Hailong Li, Shihao Feng, Central South University, PR CHINA; Pu Li, The University of Hong Kong, HONG KONG SAR; Chen Liao, Xi Liu, Jiexia Zhao, Jianping Yang, Central South University, PR CHINA;

Kaimin Shih, The University of Hong Kong, HONG KONG SAR.

P3-2 Mechanism Analysis and Experimental Study of Ammonia Denitrification Technology in High Temperature Reduction Zone of Coal-Fired Boiler, Bo Zhang, Xiangyu Zhang, Ning Gao, Xu Lu, Xiaofeng Xiang, Hongjie Xu, Xi'an Thermal Power Research Institute Co., Ltd., PR CHINA.

P3-3 Multiple Roles of Nano-Sulfide in an Efficient Removal of Elemental Mercury from Coal Combustion Flue Gas, Jiexia Zhao, Hailong Li, Kaimin Shih, Zequn Yang, Lei Zhu, Xi Liu, Wenbing Zhu, Jianping Yang, , CHINA

P3-4 Study on Removal of Hg from Flue Gas by Modified Activated Carbon, Yang Li, Xiangyang Li, Pang Huang, Lijun Jin, Haoquan Hu, School of Chemical Engineering, Dalian University of Technology, PR CHINA.

CLEAN COAL AND GAS TO FUELS

P4-1 Superior Lattice Oxygen Reactivity over Ni Modified WO₃-based Redox Catalysts for Chemical Looping Partial Oxidation of Methane, Sai Chen, Liang Zeng, Hao Tian, Xinyu Li, JinlongGong, Tianjin University, PR CHINA.

P4-2 Application Study of Direct Coal Liquefaction Asphalt (DCLA) Used as Paving Material, Shengzhen Zhang, Jianming Wei, Cuiqing Zhang, National Institute of Clean-and-Low-Carbon Energy, PR CHINA.

P4-3 Development of Advanced Technology for Indirect Coal to Liquid and Products Processing, Li Chufu, Men Zhuowu, National Institute of Clean and-low-carbon Energy; Yuan Ming, Li Jingfeng, Hao Xinghui, Shenhua Group Corporation Limited; Xu Ming, National Institute of Clean and-low-carbon Energy; PR CHINA.

P4-4 Effect of Precursors on the Active Site Formation of Cu/Zn/Al Methanol Synthesis Catalyst, Yulong Zhang, Fan Zhang, Xiaoying Xu, National Institute of Clean and-low-Carbon Energy, PR CHINA.

P4-5 Fe-modified Nickel-Based Catalyst for CO₂ Reforming of Methane, Peipei Wang, Lijun Jin, Haoquan Hu, Dalian University of Technology, PR CHINA.

P4-6 Cleaning of Bitumen Streams by Hydrothermal Treatment and In-Situ Hot Filtration, Qiang Chen, China University of Mining and Technology, PR CHINA.

TECHNICAL PROGRAM

CARBON MANAGEMENT

P5-1 A Viable Path Forward to Carbon Capture and Storage in Wyoming, USA, Erin H. Phillips, Kipp Coddington, Scott Quillinan, J. Fred McLaughlin, University of Wyoming; Nick Bosshart, Energy and Environmental Research Center; Anne Oudinot, Advanced Resources International, Inc.; Yuri Ganshin, Heng Wang, Matthew Johnson, Zunsheng Jiao, Tom Moore, Davin Bagdonas, Charles Nye, University of Wyoming; USA.

P5-2 Incorporation of Heterocycles in Metal Organic Frameworks for Enhancing CO₂ Capture, Chenkai Gu, Jing Liu, University of Science and Technology, PR CHINA.

P5-3 Enhanced CO₂ Adsorption Capacity of Porous Carbons Treated with Non-thermal Plasma, Dawei Wu, Jing Liu, Huazhong University of Science and Technology, PR CHINA.

P5-4 Enhancement of CO₂ Adsorption in Trialkoxide Functionalized Metal Organic Frameworks, Jianbo Hu, Jing Liu, Chenkai Gu, Huazhong University of Science and Technology, PR CHINA.

P5-5 Adhesion Force Study of Particles on CO₂ Absorption Membrane Based on Atomic Force Microscope, Ying Sun, China University of Mining and Technology; Linjun Yang, Southeast University; PR CHINA.

COAL SCIENCE

P6-1 Drying and Stabilization of Powder River Basin Coal Using Heat from a NuScale Nuclear Reactor, Ying Wang, Dr., William C. Schaffers, David A. Bell, University of Wyoming; Jong Suk Kim, Richard D. Boardman, Idaho National Laboratory; USA.

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P6-3 Model Construction and Dynamics Simulations of Water/Surfactant Adsorption on Coal, Haiyun Lu, Xiaofeng Li, Cuiqing Zhang, Wenhua Li, National Institute of Clean-and-Low-Carbon Energy, PR CHINA.

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