

## Chunshan SONG

Director, EMS Energy Institute  
Professor of Fuel Science and Chemical Engineering, Department of Energy & Mineral Engineering  
The Pennsylvania State University;  
C211 CUL, University Park, PA 16802-2303, USA  
Tel: 814-863-4466 // Fax: 814-865-3573 // E-mail: csong@psu.edu

### WORK EXPERIENCE

- 2008-Present **Professor** of Chemical Engineering (Courtesy), Dept of Chemical Engineering, Pennsylvania State University
- 2008-Present **Associate Director**, Penn State Institutes of Energy and the Environment (PSIEE)
- 2007-Present **Director**, EMS Energy Institute, Pennsylvania State University
- 2006-Present **Chang Jiang Chair Professor** in Energy and Chemical Engineering (Distinguished Visiting Professorship), School of Chemical Engineering, Dalian University of Technology, Dalian, China
- 2005-2005 **Invited Professor**, Laboratory of Research on Surface, University of Pierre & Marie Curie, Paris, France
- 2004-2005 **Visiting Professor** in Chemical Engineering, Imperial College London, UK
- 2003-2007 **Associate Director**, Hydrogen Energy Center, Pennsylvania State University
- 2003-Present **Professor** of Fuel Science, Dept of Energy & Mineral Engineering, Pennsylvania State University
- 1998-2003 **Associate Professor** of Fuel Science (1998-2003), Dept of Energy & Geo-Environmental Engineering, Pennsylvania State University
- 1995-Present **Coordinator**, Clean Fuels and Catalysis Program (2000-Present); **Director**, Applied Catalysis in Energy Laboratory (1998-2000); **Associate Director**, Laboratory for Hydrocarbon Process Chemistry (1995-1998), EMS Energy Institute, Pennsylvania State University
- 1989-1998 **Associate Professor** of Fuel Science (1998), **Senior Research Associate** (1997), **Assist. Professor** (1994-1997)/**Research Associate** (1989-1997), Dept of Materials Science & Engineering, Pennsylvania State University
- 1989-1989 **Research Associate**, Research Center, Osaka Gas Company, Osaka, Japan

### EDUCATION

- 1986-1989 **Ph.D.** in Applied Chemistry, Faculty of Engineering, Osaka University, Osaka, Japan
- 1984-1986 **M.S.** in Applied Chemistry, Faculty of Engineering, Osaka University, Osaka, Japan
- 1983-1983 **Diploma** in Japanese, Northeast Normal University, Changchun, China
- 1978-1982 **B.S.** in Chemical Engineering, Dalian University of Technology, Dalian, China

### RESEARCH

- Interest.** Catalysis in fuel processing for ultra-clean fuels and fuel cells; Reforming of hydrocarbon and alcohol fuels for syngas and H<sub>2</sub> production; Shape-selective catalysis for synthesis of organic chemicals; Capture, conversion & utilization of CO<sub>2</sub>; Catalysis & reaction chemistry for energy conversion; Synthesis & applications of nano-porous catalytic and sorbent materials.
- Funding.** Research funds total over \$15 million USD. Established over 60 research projects funded by government agencies and industries as PI or Co-PI totalling over \$10.9 million USD. Contributed to 19 multi-faculty projects as a senior investigator for a share of funding totalling over \$4.1 million USD as of Sept 2009.
- Publications.** 160 refereed publications in journals; 25 book chapters; edited 6 books and 10 journal special issues; over 260 conference papers.
- Invited Lecture.** Delivered 40 plenary or keynote lectures at international/national conferences. Gave over 180 invited lectures at universities and research organizations worldwide in 19 countries.
- Patent Invention.** 20 patents and patent applications.
- Technical Reports.** Over 150 technical reports to U.S. government agencies and industries.
- Awards & Recognition.** Herman Pines Award in Catalysis; Fulbright Distinguished Scholar Award; Chang Jiang Scholar Award; Wilson Award for Outstanding Research; NEDO Fellowship and AIST Fellowship Awards; Outstanding Scholars Overseas Award; Outstanding Service Award from International Pittsburgh Coal Conf in Australia; Inventor Incentive Awards; Faculty Mentoring Award; Materials

Science and Engineering Service Award; UNDP Senior Technical Advisor award from United Nations; Who's Who in Science and Engineering; Who's Who in America; Who's Who in the World; Media coverage in 55 news articles.

### **SERVICES TO PROFESSION**

Chair and Treasurer of American Chemical Society Petroleum Chemistry Division; Chair and Program Chair of ACS Fuel Chemistry Division; Chair of Advisory Board and Program Chair for International Pittsburgh Coal Conference; Editorial Advisory Board member for ACS journal Energy & Fuels, and international journals Applied Catalysis B: Environmental, Catalysis Today, Research on Chemical Intermediates, Catalysis-RSC, Journal of Fuel Chemistry and Technology, Acta Petrolei-Petroleum Processing, and Coal Conversion; Co-chair of over 35 international symposia; Visiting Professorship at 7 overseas institutions in UK, France and China.

### **TEACHING AND ADVISING**

**Interest.** Industrial Organic Chemistry (FSc 435/ChE 435), Fuel Chemistry (FSc 431), Catalytic Materials (MatSE 570), Problems in Fuel Science (FSc 503), Design Engineering of Energy and Geo-Environmental Systems (EGEE 580), and Hydrogen and Fuel Cells (EGEE 410).

**Courses Taught.** 8 courses at graduate (4), undergraduate (3) and general education (1) level, including Materials Science 570 (Catalytic Materials); Fuel Science 503 (Problems in Fuel Chemistry); Fuel Science 501 (Coal Structure); Energy and Geo-Environ Eng 580 (Design Engineering); Fuel Science 435/Chem. Eng. 435 (Industrial Organic Chemistry); Fuel Science 431 (Chemistry of Fuels); Energy and Geo-Environ Eng 410 (Hydrogen and Fuel Cell Technologies); Materials Science 101 (Energy & Environment).

**Teaching Effectiveness.** Earned an average SRTE rating of 6.15/7.00 for teaching; Earned a departmental award for teaching; Received training on College Teaching.

**Advising.** Advised 34 graduate students in M.S. and Ph.D. programs. Supervised over 25 postdoctoral scholars and research associates from 10 countries, 20 visiting scientists from 6 countries, and 23 summer undergraduate research students.

### **PROFESSIONAL MEMBERSHIPS**

American Chemical Society (ACS)

- Division of Fuel Chemistry;

- Division of Petroleum Chemistry

American Institute of Chemical Engineers (AIChE)

- Division of Fuels and Petrochemicals;

- Division of Catalysis & Reaction Engineering

North American Catalysis Society

- Catalysis Club of Philadelphia;

- Pittsburgh-Cleveland Catalysis Society

International Zeolite Association (IZA)

Sigma Xi – The Scientific Research Society

### **LIST OF AWARDS AND HONORS**

“Top Cited Authors 2003-2007” in catalysis, Elsevier, Netherlands, 2008.

“Most Cited Author 2003-2007” in Applied Catalysis B: Environmental, Elsevier, Netherlands, 2008.

“Most Cited Author 2003-2007” in Catalysis Today, Elsevier, Netherlands, 2008.

“Distinguished Service Award”, American Chemical Society Petroleum Chemistry Division, 2008.

“Herman Pines Award” for Outstanding Research in Catalysis, Catalysis Club of Chicago/North American Catalysis Society and UOP, 2007.

“D. R. Robinson Distinguished Lectureship” in Chemical and Materials Engineering, University of Alberta, Canada, 2007.

“Top Cited Authors 2002-2006” in catalysis, Elsevier, Netherlands, 2007.

“Most Cited Author” in Applied Catalysis B: Environ. 2001-2005 & 2002-2006, Elsevier, Netherlands, 2007.

“Most Cited Author” in Catalysis Today 2001-2005 & 2002-2006, Elsevier, Netherlands, 2007.

“Chang Jiang Scholar” Award, Ministry of Education, Beijing, China, 2006.

“Top Cited Article Award” in Catalysis Today in 2003, Elsevier, Netherlands, 2006.

“Top Cited Authors 2001-2005” in catalysis, Elsevier, Netherlands, 2006.

“Distinguished Service Award”, 23<sup>rd</sup> International Pittsburgh Coal Conference, Pittsburgh, PA, 2006.

“Faculty Mentoring Award”, College of Earth and Mineral Sciences, Pennsylvania State University, 2006.

“Distinguished Catalysis Researcher Lectureship”, Pacific Northwest National Laboratory, WA, 2005

“Haitian Scholar” and “Visiting Professor”, Dalian University of Technology, Dalian, China, 2005.

Invited Professor at University of Pierre and Marie Curie (University of Paris VI), Jan-Feb 2005

Visiting Professor in Chemical Engineering, Imperial College London, University of London, 2004-2005  
"Fulbright Distinguished Scholar" Award, U.S. Department of State and US-UK Fulbright Commission, 2004.  
"Outstanding Scholar Overseas Award", Chinese Academy of Sciences, China, 2003.  
"Outstanding Service Award", American Chemical Society Fuel Chemistry Division, 2003.  
"Outstanding Service Award", 18<sup>th</sup> International Pittsburgh Coal Conference, Newcastle, Australia, 2001.  
"Wilson Award for Outstanding Research", The Pennsylvania State University, 2000.  
"Senior Technical Advisor Award", United Nations Development Program, United Nations, 1999.  
"NEDO Fellowship Award", New Energy Development Organization (NEDO), Japan, 1998.  
"AIST Fellowship Award", Agency of Industrial Science and Technology (AIST), Japan, 1995.  
"Materials Science and Engineering Service Award", Pennsylvania State University, 1995.  
Guest Professor at State Key Laboratory Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian, China, 2003-2007.  
Guest Professor at School of Chemical Engineering, Dalian University of Technology, Dalian, China, 1999-present.  
Guest Professor at Taiyuan University of Technology, Taiyuan, China, June 2002-present.  
Guest Professor at Anshan University of Science and Technology, Anshan, China, 2003-2008.  
Guest Professor at State Key Laboratory for Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, China, 1997-present.  
Guest Professor at State Key Laboratory for C1 Chemical Technology, Tsinghua University, Beijing, China, 1997-2003.  
Guest Professor at State Key Laboratory for C1 Chemical Technology, Tianjin University, Tianjin, China, 2002-2003.  
"Inventor Incentive Award", The Penn State Research Foundation, PSU IDN 2005-3129, 2009.  
"Inventor Incentive Award", The Penn State Research Foundation, PSU IDN 2006-3226, 2008.  
"Inventor Incentive Award", The Penn State Research Foundation, PSU IDN 2005-3128, 2008.  
"Inventor Incentive Award" by The Penn State Research Foundation, PSU IDN 2002-2598, 2003.  
"Inventor Incentive Award" by The Penn State Research Foundation, PSU IDN 1998-1948, 2001.  
"Inventor Incentive Award" by The Penn State Research Foundation, PSU IDN 1998-1947, 2000.  
"Inventor Incentive Award", The Penn State Research Foundation, PSU IDN 1993-1281, 1994.  
Selected for "International Who's Who of Professionals", 1997.  
Selected for "Outstanding People of the 20th Century", 1998.  
Selected for "Who's Who in Science and Engineering", 1998.  
Selected for "Who's Who in America", 1999.  
Selected for "Who's Who in the World", 1999.  
Research Fellowship, the Ministry of International Trade and Industry of Japan at The Research Center, Osaka Gas Co., Apr - Dec 1989.  
Monbusho Scholarship, the Ministry of Education of Japan, for graduate study in Ph.D. program at Osaka University, Japan, Apr 1986 - Mar 1989.  
Monbusho Scholarship, the Ministry of Education of Japan, for graduate study in M.S. program at Osaka University, Japan, Apr 1984 - Mar 1986.  
Received media coverage for research and inventions at PSU on clean fuels and catalysis research by over 50 news articles in professional society bulletins (such as Am. Chem. Soc.'s CEN, Am. Inst. Chem. Engr.'s CEP, MRS, etc.), technical magazines (such as Scientific American, World Fuels Today, Clean Air Today, Fuel Cell Today, Fuel Cell Technology, Chemical Engineering Magazine, etc.).

## **LIST OF PROFESSIONAL LEADERSHIP APPOINTMENTS**

### **Leadership Positions in Professional Organizations:**

Chair, American Chemical Society Division of Fuel Chemistry, 2008.  
Chair, American Chemical Society Division of Petroleum Chemistry, 2004.  
Program Chair, American Chemical Society Division of Fuel Chemistry, 2003.  
Treasurer, American Chemical Society Division of Petroleum Chemistry, 2000-2001.  
Judge, ConocoPhillips Energy Prize (national energy award) Program, 2008, 2009.  
Chair, Advisory Board for International Pittsburgh Coal Conference, 2005-2006.  
Treasurer, 19<sup>th</sup> North American Catalysis Society Biennial Meeting, Philadelphia, PA, USA, May 22-28, 2005.  
Co-chair, Advisory Board for International Pittsburgh Coal Conference, 2003-2004.  
Program Co-chair, for the 18<sup>th</sup> International Pittsburgh Coal Conference, Newcastle, Australia, Dec 3-7, 2001.  
Program Co-chair, for the 17<sup>th</sup> International Pittsburgh Coal Conference, Pittsburgh, PA, Sept 11-15, 2000.  
Chair-Elect, Division of Fuel Chemistry, American Chemical Society, 2007.  
Chair-Elect, Division of Petroleum Chemistry, American Chemical Society, 2003.  
Member, Long-Range Planning Committee, ACS Division of Petroleum Chemistry, 2005-2007.

Award Committee, 21<sup>st</sup> International Pittsburgh Coal Conference, Osaka, Japan, Sept 12-17, 2004.  
Program Committee Member, International Pittsburgh Coal Conference, 1997-2004.  
Program Committee (1996-present), Executive Committee (1997-2007) and Chair of Website Committee (1997-1999) of American Chemical Society Division of Petroleum Chemistry.

#### **Advisory Boards for Research Journals**

Editorial Advisory Board, "Applied Catalysis B: Environmental", journal by Elsevier, Netherlands, 2009-present  
Editorial Advisory Board, "Catalysis Today", international journal by Elsevier, Netherlands, 2006-present  
Editorial Advisory Board, "RSC Catalysis Book Series", Royal Society of Chemistry, UK, 2007-present  
Editorial Advisory Board, "Energy & Fuels", American Chemical Society journal, 2001-present  
Editorial Advisory Board, "Research on Chemical Intermediates", international journal, 2004-present  
Editorial Advisory Board, "Journal of Fuel Chemistry and Technology", China, 2005-present  
Editorial Advisory Board, "Acta Petrolei Sinica – Petroleum Processing", China, 2003-present  
Editorial Advisory Board, "Coal Conversion", China, 2006-present  
Editorial Advisory Board, "SciencePaper Online - Chem & Chem Eng", MOE, China, 2007-present

#### **Advisory Committees/Boards for International Conferences and Organizations**

Scientific Advisory Board, NSF ERC/Center for Environmentally Beneficial Catalysis, University of Kansas and 3 Other Universities, Lawrence, Kansas, 2008-present.  
Advisor, Technical Advisory Council, Research & Development Center, Saudi Aramco, Saudi Arabia, 2008-present.  
Decision Review Board, Chevron-Penn State Alliance on Coal Conversion Technology, 2007-present.  
International Scientific Advisory Committee member for International Symposium on Molecular Aspects of Catalysis Sulfides (MACS-V) Conference to be held in Denmark from May 30 - June 3, 2010.  
International Advisory Board member for International Symposium on Catalyst Deactivation, Delft, Netherlands, Oct 21-24, 2009.  
International Scientific Committee Member for International Symposium on Advances in Hydroprocessing of Oil Fractions, IXTAPA-ZIHUATANEJO, Guerrero, Mexico, June 14-18, 2009.  
International Advisory Committee, State Key Laboratory on Fine Chemicals, Dalian University of Technology, 2009-present.  
International Advisory Board Member for International Conference on Coal Science and Technology Nottingham, UK, 2007.  
International Scientific Committee, International Conference on Carbon Dioxide Utilization, 2003-present.  
International Scientific Committee, 18<sup>th</sup> North American Catalysis Society Meeting, Cancun, Mexico, June 1-6, 2003.  
Advisory Board Member for International Pittsburgh Coal Conference, 1998-present.

#### **Chair/Co-chair/Vice-Chair of Symposia/Conferences**

Vice Chair, Gordon Research Conference on Hydrocarbon Resources, Ventura, CA, Jan 2011.  
Co-chair of International Symposium on Design of Zeolite Catalyst for Clean Synthesis of Chemicals. International Chemical Congress of Pacific Basin Societies (Pacifichem-2010), Honolulu, Hawaii, USA, Dec 15-20, 2010.  
Chair and Organizer of the ACS Symposium Honoring Henrik Topsoe for Distinguished Researcher Award, 240th American Chemical Society National Meeting, Division of Petroleum Chemistry, Boston, MA, Aug 22-26, 2010.  
Co-chair of Session Series on Coal-derived Products, 26th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, Sept 20-24, 2009  
Co-chair of Symposium on Fuel Processing for Fuel Cells. American Chemical Society National Meeting, Division of Fuel Chemistry, Washington, DC, Aug 16-20, 2009.  
Discussion Leader and Session Chair, Hydrogen Production, Gordon Research Conference on Hydrocarbon Resources, Venture, CA, Jan 11-16, 2009.  
Co-chair and Co-Organizer of International Symposium on Catalysis for Ultra Clean Fuels. Sponsored by three research institutions and professional societies in China and US. Dalian, China, July 21-24, 2008.  
Co-chair of International Symposium on Zeolite Catalysis for Green Chemistry in Synthesis of Chemicals and Fuels. American Chemical Society National Meeting, New Orleans, LA, Apr 6-10, 2008.  
Co-chair of Symposium on Hydrogen from Renewable Sources and Refinery Applications. American Chemical Society National Meeting, New Orleans, LA, Apr 6-10, 2008.  
Co-Chair and Organizer, a series of oral and poster sessions on "Catalysis for the Protection of Environment", 20<sup>th</sup> North American Catalysis Society Meeting, Houston, TX, June 17-22, 2007.  
Co-chair of Symposium on Chemistry of Sulfur and Desulfurization, American Chemical Society National Meeting, Chicago, IL, Mar 25-29, 2007.

Co-chair of Symposium on Hydrogen from Renewable Sources and Refinery Applications, American Chemical Society National Meeting, Atlanta, GA, Mar 26-30, 2006.

Chair and Organizer of a series of oral and poster sessions on "Hydrogen from Alternate Sources" at 19<sup>th</sup> North American Catalysis Society Meeting, Philadelphia, PA, May 22-26, 2005.

Co-chair of Symposium on Advances in Petroleum Processing and Clean Energy Technology. American Chemical Society National Meeting, Philadelphia, PA, Aug 21-26, 2004.

Co-chair of Symposium on Ultra Clean Transportation Fuels. American Chemical Society National Meeting, Philadelphia, PA, Aug 21-26, 2004.

Co-chair of Symposium on Fuel Cell Systems and Fuel Processing for Fuel Cell Applications. American Chemical Society National Meeting, New York, NY, Sept 7-11, 2003.

Co-chair of Symposium on Catalysts and Processes for Environmentally Cleaner Gasoline and Diesel Fuels. American Chemical Society National Meeting, New York, NY, Sept 7-11, 2003.

Chair of Symposium on Chemistry of Fuels and Emerging Technology. American Chemical Society National Meeting, New York, NY, Sept 7-11, 2003.

Co-chair for Session Series on Catalysis in Hydrotreating and Heavy Oil Upgrading at 18<sup>th</sup> North American Catalysis Society Meeting, Mexico, June 1-6, 2003.

Co-chair of Symposium on Advances in Hydrogen Energy for the 21<sup>st</sup> Century. American Chemical Society National Meeting, New Orleans, LA, Mar 23-27, 2003.

Co-chair of Symposium on Environmental Catalysis by Metal Sulfides, Carbides, Nitrides and Phosphides for Ultra-Clean Fuels, American Chemical Society National Meeting, New Orleans, LA, Mar 23-27, 2003.

Chair of Symposium on Chemistry of Fuels and Emerging Technology. American Chemical Society National Meeting, New Orleans, LA, Mar 23-27, 2003.

Co-Chair of Symposium on Catalytic Fuel Processing for Fuel Cell Applications, American Chemical Society National Meeting, Chicago, IL, Aug 26-31, 2001.

Co-Chair of Symposium on Greenhouse Gas Control and Utilizations, American Chemical Society National Meeting, San Diego, CA, Apr 1-5, 2001.

Co-Chair of Symposium on CO<sub>2</sub> Conversion and Utilization in Refinery and Chemical Processing. American Chemical Society National Meeting, San Francisco, CA, Mar 26-31, 2000.

Co-Chair of 3 Sessions on Chemicals from Coal, on Materials from Coal, and on Coal Processing for Chemicals and Materials. 16th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, Oct11-15, 1999

Chair of 3 Sessions on Chemicals from Coal, on Materials from Coal, and on Coal Processing for Chemicals and Materials. 15th Annual International Pittsburgh Coal Conference, Pittsburgh, PA, Sept 14-18, 1998

Co-Chair of Symposium on Chemistry of Diesel Fuels, American Chemical Society National Meeting, Boston, MA, Aug 23-27, 1998

Co-Chair of Symposium on Shape-Selective Catalysis in Hydrocarbon Processing and Chemicals Synthesis, American Chemical Society National Meeting, Dallas, TX, Mar 29-Apr 3, 1998

Co-Chair for the Session on General Petroleum Refining, 5th Chemical Congress of North America, Cancun, Mexico, Nov 11-15, 1997

Co-Chair for the Session on Heavy Crude Oil Production, Processing, and Chemistry, 5th Chemical Congress of North America, Cancun, Mexico, Nov 11-15, 1997

Co-Chair of Symposium on Catalysis in Fuel Processing and Environmental Protection, American Chemical Society National Meeting, Las Vegas, NV, Sept 7-11, 1997

Co-Chair of International Symposium on Advances in Catalysis and Processes of Heavy Oil Conversion, American Chemical Society National Meeting, San Francisco, CA, Apr 13-17, 1997

Co-Chair for Two Sessions on Non-fuel Use of Coal, 14th Annual International Pittsburgh Coal Conference, Taiyuan, Shanxi, China, Sept 23-27, 1997

Co-Chair for the Session on Coal Liquefaction, 13th U.S./Japan Joint Technical Workshop, State College, PA, Sept 30-Oct2, 1996.

Co-Chair of Symposium on Removal of Aromatics, Sulfur and Olefins from Gasoline and Diesel, American Chemical Society National Meeting, Orlando, FL, Aug 25-29, 1996

Co-Chair of International Symposium on Catalytic Conversion of Polycyclic Aromatic Hydrocarbons, American Chemical Society National Meeting, Chicago, IL, Aug 20-25, 1995

## **LIST OF PUBLICATIONS**

### **I. Refereed Journal Articles [as Song CS or Song C in SCI: <http://www.researcherid.com/rid/B-3524-2008>]**

- Ma, X.L., X.X. Wang, and C.S. Song. "Molecular Basket" Sorbents for Separation of CO<sub>2</sub> and H<sub>2</sub>S from Various Gas Streams. Journal of American Chemical Society, **2009**, 131 (16), 5777–5783.
- Zhou, A.N., X.L. Ma, and C.S. Song. Effects of Oxidative Modification of Carbon Surface on the Adsorption of Sulfur Compounds in Diesel Fuel. Applied Catalysis B: Environmental, **2009**, 87 (3-4), 190-199.
- Watanabe, S., X.L. Ma and C.S. Song. Characterization of Structural and Surface Properties of Nanocrystalline TiO<sub>2</sub>-CeO<sub>2</sub> Mixed Oxides by XRD, XPS, TPR and TPD. Journal of Physical Chemistry C, **2009**, 113 (32), 14249-14257.
- Wang X.X, V. Schwartz, J. C. Clark, X.L. Ma, S. Overbury, X.C. Xu, C.S. Song. Infrared Study of CO<sub>2</sub> Sorption over "Molecular Basket" Sorbent Consisting of Polyethylenimine-Modified Mesoporous Molecular Sieve. Journal of Physical Chemistry C, **2009**, 113 (17), 7260–7268.
- Li, Y., X.X. Wang, C. Xie, C.S. Song. Influence of Ceria and Nickel Addition to Alumina-Supported Rh Catalyst for Propane Steam Reforming at Low Temperatures. Applied Catalysis A: General, **2009**, 357, 213-222.
- Almarri, M., X.L. Ma, and C.S. Song. Selective Adsorption for Removal of Nitrogen Compounds from Liquid Hydrocarbon Streams over Carbon- and Alumina-Based Adsorbents. Industrial and Engineering Chemistry Research, **2009**, 48 (2), 951-960.
- Wang, X.X., X.L. Ma, S. Zhao, B. Wang, C.S. Song. Nanoporous Molecular Basket Sorbent for NO<sub>2</sub> and SO<sub>2</sub> Capture Based on Polyethylene Glycol-Loaded Mesoporous Molecular Sieve. Energy & Environmental Science, **2009**, 2, 878-882.
- Shalaby, C., X.L. Ma, A.N. Zhou, and C.S. Song. Preparation of Organic Sulfur Adsorbent from Coal for Adsorption of Dibenzothiophene-Type Compounds in Diesel Fuel. Energy & Fuels, **2009**, 23 (5), 2620–2627.
- Almarri, M., X.L. Ma, and C.S. Song. Role of Surface Oxygen-containing Functional Groups in Liquid-Phase Adsorption of Nitrogen Compounds on Carbon-Based Adsorbents. Energy and Fuels, **2009**, 23 (8), 3940-3947.
- Yoosuk, B., C.S. Song, J.H. Kim, C. Ngamcharussrivichai, P. Prasassarakich. Effects of Preparation Conditions in Hydrothermal Synthesis of Highly Active Unsupported NiMo Sulfide Catalysts for Simultaneous Hydrodesulfurization of Dibenzothiophene and 4,6-Dimethyldibenzothiophene. Catalysis Today, **2009**, in press.
- Guo, J.H., S. Watanabe, X.L. Ma, C.S. Song. Density Functional Theory Study on Adsorption of Thiophene on TiO<sub>2</sub> Anatase (001) Surfaces. Catalysis Today, **2009**, in press.
- Zhang, C. X.W. Guo, C.S. Song, and X.S. Wang. Effects of Steam and TEOS Modifications of H-ZSM-5 Zeolite Catalyst on Shape-Selective Methylation of 2-Methylnaphthalene with Methanol for Synthesis of 2, 6-Dimethylnaphthalen. Catalysis Today, **2009**, in press.
- Pan, W. and C.S. Song. Using Tapered Element Oscillating Microbalance for In-situ Monitoring of Carbon Deposition on Nickel Catalyst during CO<sub>2</sub> Reforming of Methane. Catalysis Today, **2009**, in press.
- Nie, X.W., X. Liu, C.S. Song, and X.W. Guo. Theoretical Study on Alkylation of Benzene with Ethanol and Ethylene over H-ZSM-5. Chinese Journal of Catalysis, **2009**, 30 (5), 453-458.
- Zhai, L.J., M. Liu, X.M. Dong, C.S. Song, and X.W. Guo. Dehydration of 2-(4'-Ethylbenzoyl)benzoic Acid to 2-Ethylantraquinone over HB Zeolite Modified with Organic Acids. Chinese Journal of Catalysis, **2009**, 30 (1), 9-13.
- Fox, E.B., S. Velu, M. H. Engelhard, Y.-H. Chin, J. T. Miller, J. Kropf and C.S. Song. Characterization of CeO<sub>2</sub>-Supported Cu-Pd Bimetallic Catalyst for the Oxygen-Assisted Water-Gas Shift Reaction. Journal of Catalysis, **2008**, 260 (2), 358-370.
- Li, X., M.H. Lu, A.J. Wang, C.S. Song, and Y.K. Hu. Promoting Effect of TiO<sub>2</sub> on Hydrodenitrogenation Performance of Nickel Phosphide. Journal of Physical Chemistry C, **2008**, 112 (42), 16584–16592.
- Yoosuk, B., J.H. Kim, C.S. Song, C. Ngamcharussrivichai, P. Prasassarakich. Highly Active MoS<sub>2</sub>, CoMoS<sub>2</sub> and NiMoS<sub>2</sub> Unsupported Catalysts Prepared by Hydrothermal Synthesis for Hydrodesulfurization of 4,6-Dimethyldibenzothiophene. Catalysis Today, **2008**, 130 (1), 14-23.
- Song, C.S. Recent Advances in Catalysis for Hydrogen Production and Fuel Processing for Fuel Cells. Topics in Catalysis, **2008**, 49 (1-2), 1-3.
- Fox, E.B., A. Lee, K. Wilson and C.S. Song. In-situ XPS Study on the Reducibility of Pd-Promoted Cu/CeO<sub>2</sub> Catalysts for the Oxygen-Assisted Water-Gas-Shift Reaction. Topics in Catalysis, **2008**, 49 (1-2), 89-96.
- Wang, X.X., X.L. Ma, L. Sun, and C.S. Song. Developing a Novel Supported Polyethylenimine Sorbent for Removing H<sub>2</sub>S from Gas Streams at Ambient Temperature. Topics in Catalysis, **2008**, 49 (1-2), 108-117.
- Zheng, J., J. J. Strohm, and C.S. Song. Steam Reforming of Liquid Hydrocarbon Fuels for Micro-Fuel Cells. Prereforming of Model Jet Fuels over Supported Metal Catalysts. Fuel Processing Technology, **2008**, 89 (4), 440-448.
- Zheng, J., M. Guo, and C.S. Song. Characterization of Pd Catalysts Supported on USY Zeolites With Different SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> Ratios for the Hydrogenation of Naphthalene in the Presence of Benzothiophene. Fuel Processing Technology, **2008**, 89 (4), 467-474.

- Liu, X.M., J.X. Zhou, X.W. Guo, M. Liu, X.L. Ma, C.S. Song, and C. Wang. SO<sub>3</sub>H-Functionalized Ionic Liquids for Selective Alkylation of *p*-Cresol with *tert*-Butanol. Industrial and Engineering Chemistry Research, **2008**, 47, 5298–5303.
- Zhao, L., H.B. Wang, M. Liu, X.W. Guo, X.S. Wang, C.S. Song, and H.M. Liu. Shape-selective Methylation of 2-Methylnaphthalene with Methanol over Hydrothermal Treated HZSM-5 Zeolite Catalysts. Chemical Engineering Science, **2008**, 63(21), 5298-5303.
- Zhai, L.J., M. Liu, X.M. Dong, C.S. Song, and X.W. Guo. Dehydration of 2-(4'-Ethylbenzoyl)benzoic Acid to 2-Ethylanthraquinone over H-B Zeolite Impregnated with Citric Acid. Chinese Journal of Catalysis, **2008**, 29 (8), 701-704.
- Dong, X.M., M. Liu, J.L. Shi, C.S. Song and X.W. Guo. Effects of Acidity and Crystal Size of H $\beta$  Zeolite on Dehydration of 2-(4'-Ethylbenzoyl) Benzoic Acid. Acta Petrolei Sinica (Petroleum Processing Section), **2008**, 24 (3), 288-292.
- Yang, Y.H., M. Liu, C.S. Song, and X.W. Guo. Performance of Adsorptive Desulfurization over Modified Zeolites. Acta Petrolei Sinica (Petroleum Processing Section), **2008**, 24 (4), 383-387.
- Wang, X.X., X.L. Ma, L. Sun and C.S. Song. A Nanoporous Polymeric Sorbent for Deep Removal of H<sub>2</sub>S from Gas Mixtures for Hydrogen Purification. Green Chemistry, **2007**, 9 (6), 695 - 702.
- Ma, X.L., A.N. Zhou and C.S. Song. A Novel Method for Oxidative Desulfurization of Liquid Hydrocarbon Fuels Based on Catalytic Oxidation Using Molecular Oxygen Coupled with Selective Adsorption. Catalysis Today, **2007**, 123, 276–284.
- Chen, H.L., C.S. Song, and W.S. Yang. Effects of Aging on the Synthesis and Performance of Silicalite Membranes on Silica Tubes without Seeding. Microporous and Mesoporous Materials, **2007**, 102, 249–257.
- Lu, M.H. A.J. Wang, X. Li, X. Duan, Y. Teng, Y. Wang, C.S. Song, and Y.K. Hu. Hydrodenitrogenation of Quinoline Catalyzed by MCM-41-Supported Nickel Phosphides. Energy & Fuels, **2007**, 21, 554-560.
- Song C.S., J. J. Strohm, J. Zheng, M. Hoehn, and X.L. Ma. Recent Advances in Reforming Catalysis and Adsorption Desulfurization of Liquid Hydrocarbon Fuels for Fuel Cell Applications. Studies in Surface Science and Catalysis, **2007**, 172, 67-72.
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## **LIST OF INVITED LECTURES WORLDWIDE**

\*\* Indicates invited or plenary/keynote lectures at international or national conferences.

- 1\*\*. Plenary Lecture. Old but New Opportunities for High Value Chemicals and Materials from Coals and Oil Shale. 1993 Eastern Oil Shale Symposium, Proceedings, p.23, Lexington, Kentucky, Nov 16-19, 1993.
2. Seminar. New Catalytic Reactions for Synthetic Fuels and Industrial Organic Chemicals. Warrensville Research and Environmental Science Center, BP Oil Company, Cleveland, OH, Dec 20, 1994.
3. Seminar. Overview of U.S. Energy Utilization and Coal Conversion Technologies. Hokkaido National Industrial Research Institute, Sapporo, Japan, Mar 3, 1995.
4. Seminar. Novel Low-Severity Catalytic Coal Liquefaction Using Water and Dispersed Mo Catalyst. Resources and Energy Division, Hokkaido National Industrial Research Institute, Sapporo, Japan, Mar 10, 1995.
5. Seminar. Shape-Selective Conversion of Polycyclic Aromatic Hydrocarbons over Large-Pore Zeolite Catalysts. Division of Energy and Hydrocarbon Chemistry, Kyoto University, Kyoto, Japan, Mar 14, 1995.
6. Seminar. Recent Progress in Catalytic Coal Liquefaction and Shape-Selective Conversion of Coal-derived PAHs. Department of Applied Chemistry, Osaka University, Osaka, Japan, Mar 17, 1995.
7. Invited Lecture. Current Status and Future Prospects of Coal Utilization in the U.S. Japan Society of Energy & Resources, Nakatsu, Osaka, Japan, Mar 17, 1995.
8. Seminar. Shape-Selective Alkylation of Naphthalene over Molecular Sieve catalysts. Amoco Research Center, Amoco Chemicals Company, Naperville, IL, Aug 21, 1995.
9. Invited Lecture. Shape-Selective Hydrogenation of Naphthalene over Zeolite-Supported Noble Metal Catalysts. International Precious Metal Institute Catalysis Seminar, Houston, TX, Oct 21-23, 1996.

10. Seminar. Recent Advances in Shape-Selective Catalysis. Department of Chemical Engineering, Pennsylvania State University, University Park, PA, Nov 14, 1996.
- 11\*\*. Invited Lecture. Synergism between H<sub>2</sub>O and Dispersed MoS<sub>2</sub> Catalyst for Hydrocracking of Polyaromatic Hydrocarbons. Gordon Research Conference on the Science of Hydrocarbon Resources. Ventura, CA, Jan 12-17, 1997.
12. Seminar. Synthesis and Catalytic Applications of Novel Mesoporous Aluminosilicate Molecular Sieves. Department of Chemical Engineering, Florida Institute of Technology, Melbourne, Florida, Jan 27, 1997.
13. Seminar. Shape-Selective Zeolite Catalysis for Environmentally-Benign Synthesis of Specialty Organic Chemicals and Monomers for Polymers. Department of Chemical and Environmental Engineering, University of Toledo, Toledo, Ohio, Mar 14, 1997.
14. Seminar. Novel Catalysts for Hydroprocessing Reactions Related to Heavy Oil Upgrading. Fuels and Lubricants Technology Department, Texaco R&D Center, Beacon, New York, May 6, 1997.
15. Seminar. Catalysis for Fuels and Chemicals Processing and Environmental Protection. Chemistry Division, Argonne National Laboratory, Chicago, IL, May 23, 1997.
16. Seminar. Non-fuel Uses of Coal and Catalytic Synthesis of Chemicals and Materials. Research Institute for Coal Chemical Engineering and Department of Chemical Engineering, Taiyuan University of Technology, Taiyuan, China, Sept 25, 1997.
17. Seminar. Recent Advances in Shape-selective Catalysis. State Key Laboratory for C1 Chemical Technology and Department of Chemistry, Tsinghua University, Beijing, China, Sept 29, 1997.
18. Seminar. Synthesis and Catalytic Applications of Novel Mesoporous Aluminosilicate Molecular Sieves. State Key Laboratory for C1 Chemical Technology and Department of Chemistry, Tsinghua University, Beijing, China, Sept 30, 1997.
19. Seminar. A Novel Method for Preparing Highly Active Molybdenum Sulfide Catalyst and Its Applications. State Key Laboratory for C1 Chemical Technology and Department of Chemistry, Tsinghua University, Beijing, China, Oct7, 1997.
20. Seminar. Recent Advances in Shape-selective Catalysis for Environmentally Benign Synthesis of Specialty Chemicals. Institute of Physical Chemistry and Department of Chemistry, Peking University, Beijing, China, Oct8, 1997.
21. Seminar. Zeolite Catalysts for CO<sub>2</sub> Reforming of Methane to Synthesis Gas. State Key Laboratory for C1 Chemical Technology and Department of Chemistry, Tsinghua University, Beijing, China, Oct9, 1997.
- 22\*. Invited Lecture. Novel Mesoporous Zeolite-Based Catalysts for Hydroprocessing Reactions Related to Heavy Oil Upgrading. 5th Chemical Congress of North America, Cancun, Mexico, Nov 11-15, 1997.
- 23\*. Invited Lecture. Sulfur-Resistant Noble Metal Catalysts for Low-Temperature Hydrotreating of Liquid Fuels. 5th Chemical Congress of North America, Cancun, Mexico, Nov 11-15, 1997.
24. Seminar. Recent Progress in Shape-Selective Zeolite Catalysis and a New Concept for Design of Sulfur-Resistant Noble Metal Catalysts for Low-Temperature Hydrotreating. Corporate Research Laboratories, Exxon Research and Engineering Company, Clinton, New Jersey, Dec 18, 1997.
25. Seminar. Shape-Selective Zeolite Catalysis for Conversion of Polycyclic Hydrocarbons. Department of Applied Chemistry, Waseda University, Tokyo, Japan, Mar 7, 1998.
26. Seminar. Coal Utilization and Environmental Issues in the U.S. Hokkaido National Industrial Research Institute, Sapporo, Japan, Mar 9, 1998.
27. Seminar. Catalysis and Fuel Chemical Research at PSU Energy Institute. Energy and Resources Division, Hokkaido National Industrial Research Institute, Sapporo, Japan, Mar 9, 1998.
28. Seminar. Shape-selective Catalytic Synthesis of Specialty Chemicals from Coal-derived Liquids. Department of Applied Chemistry, Osaka University, Osaka, Japan, Mar 14, 1998.
29. Seminar. Shape-Selective Catalytic Conversion of Polycyclic Hydrocarbons for Specialty Chemicals and Polymer Materials. Department of Chemical Engineering, Virginia Polytechnic and State University, Blacksburg, Virginia, Apr 16, 1998.
30. Seminar. Selective Alkylation and Isomerization of Polycyclic Hydrocarbons over Zeolite Catalysts. Corporate Research Laboratory, Air Products and Chemicals Inc., Allentown, PA, May 19, 1998.
31. Seminar. Shape-Selective Catalysis for Chemicals and New Catalytic Materials. Mobil Technology Company, May 28, 1998.
32. Seminar. Zeolite-Based Catalysts for Fuel Hydrodesulfurization. Technology Development Center, ABB Lummus Global Inc., Bloomfield, New Jersey, Nov 9, 1998.
33. Seminar. Recent Progress in Shape-Selective Catalysis for Conversion of Polycyclic Hydrocarbons. Catalysis Division, Indian National Chemical Laboratory, Pune, India, Dec 14, 1998.

- 34\*\*. Plenary Lecture. Synthesis, Characterization and Catalytic Applications of Novel Mesoporous Aluminosilicate Molecular Sieves. 15th National Catalysis Symposium, Indian Catalysis Society, Anna University, Madras, India, Abstract IL-02, Dec 16-18, 1998.
35. Seminar. A Proposed New Concept for Design of Sulfur-Resistant Noble Metal Catalysts. Indian Institute of Petroleum, Dehra Dun, India, Dec 21, 1998.
36. Seminar. Introduction to Applied Catalysis Research Related to Petroleum Processing at the Pennsylvania State University. Research and Development Center, Indian Oil Corporation, Faridbad, India, Dec 22, 1998.
- 37\*\*. Invited Lecture (Keynote). A New Approach for Catalytic Liquefaction of Coal Using Dispersed MoS<sub>2</sub> Catalyst Generated In-Situ with Added H<sub>2</sub>O. 1999 International Symposium on Fundamentals for Innovative Coal Utilization, Sapporo, Japan, Feb 2-4, 1999.
38. Invited Lecture. High-pressure CO<sub>2</sub> Reforming of CH<sub>4</sub> Using Supported Ni and Rh Catalysts. Corporate Science and Technology Center, Air Products and Chemicals Inc., Allentown, PA, May 18, 1999.
39. Seminar. Shape-Selective Catalysis for Synthesis of Specialty Chemicals from Polycyclic Hydrocarbons over Zeolites. Central Research and Development Department and Corporate Catalysis Center, Du Pont, Wilmington, DE, July 26, 1999.
40. Seminar. Shape-selective Catalysis for Conversion of Polycyclic Hydrocarbons over Zeolites. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 7, 1999.
41. Seminar. Synthesis and Catalytic Applications of Novel Mesoporous Molecular Sieves Al-MCM-41. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 8, 1999.
42. Seminar. Novel Zeolite-Based Sulfur-Resistant Noble-Metal Catalysts for Environmentally Cleaner Transportation Fuels. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 8, 1999.
43. Seminar. A Novel Catalytic Process for Converting Coal to Liquid Fuels and Chemical Feedstocks Using Dispersed MoS<sub>2</sub> Catalyst. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 9, 1999.
- 44\*\*. Plenary Lecture. Chemicals and Materials from Coal. State of the Art and New Opportunities for Research. 10<sup>th</sup> International Conference on Coal Science, International Energy Agency, Taiyuan, China, Sept. 12-17, 1999.
45. Seminar. A Novel Catalytic Process for Converting Coal to Liquid Fuels and Chemical Feedstocks. State Key Laboratory for Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, Shanxi, China, Sept 20, 1999.
46. Seminar. Shape-selective Catalysis for Conversion of Coal-derived Polycyclic Hydrocarbons into Specialty Chemicals. State Key Laboratory for Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, Shanxi, China, Sept 21, 1999.
47. Seminar. A New Concept for Design of Sulfur-Resistant Noble Metal Catalysts for Environmentally Cleaner Transportation Fuels. State Key Laboratory for Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan, Shanxi, China, Sept 21, 1999.
48. Seminar. Shape-Selective Isopropylation of Naphthalene over Dealuminated Mordenite Catalysts. Department of Chemistry and Institute of Physical Chemistry, Peking University, Beijing, China, Sept 27, 1999.
49. Seminar. A New Concept for Design of Sulfur-Resistant Noble-Metal Catalysts for Environmentally Cleaner Transportation Fuels. State Key Laboratory for C1 Chemistry and Technology and Department of Chemistry, Tsinghua University, Beijing, China, Sept 28, 1999.
50. Seminar. Synthesis and Catalytic Applications of Novel Mesoporous Molecular Sieves Al-MCM-41. Research Institute of Petroleum Processing, SINOPEC, Beijing, China, Sept 28, 1999.
51. Invited Lecture. Shape-selective Catalysis for Conversion of Polycyclic Hydrocarbons into Specialty Chemicals. Pittsburgh-Cleveland Catalysis Society Fall 1999 Symposium, Pittsburgh, PA, Dec 4, 1999.
- 52\*\*. Plenary Lecture. Shape-Selective Catalysis over Molecular Sieves for Environmental-Friendly Synthesis of 2,6-Dialkyl-naphthalene. International Symposium on Clean Processes and Environment: The Catalytic Solution. Sponsored by French Academy of Sciences and French Chemical Society, Lyon, France, Dec 6-8, 1999.
53. Invited Lecture. Carbon Deposition during High-Pressure Steam Reforming of Methane over Ni-Based Catalysts. Corporate Science and Technology Center, Air Products and Chemicals Inc., Allentown, PA, May 18, 2000.
54. Seminar. A New Concept for Design of Sulfur-Resistant Noble Metal Catalysts for Low-Temperature Hydrotreating. Corporate Research Center, Engelhard Corporation, Iselin, NJ, June 7, 2000.
55. Seminar. Novel Supported and Unsupported MoS<sub>2</sub>-Based Catalysts for Fuel Processing. Department of Kinetics and Catalysis, Institut Francais du Petrole, Paris, France, July 17, 2000.
56. Seminar. Introduction to Research at Applied Catalysis in Energy Laboratory of Pennsylvania State University. Laboratoire de Reactivite de Surface, Universite Pierre et Marie Curie, Paris, France, July 18, 2000.

57. Seminar. A New Process for Synthesis of 2,6-Dimethylnaphthalene by Shape-Selective Methylation. Research Center, BP Amoco, Naperville, IL, Oct 11, 2000.
- 58\*. Invited Lecture. Shape-Selective Catalysis for Synthesis of Specialty Chemicals from Coal-Derived Liquids in the 21st Century. Area 06-032. 2000 International Chemical Congress of Pacific Basin Societies, Honolulu, Hawaii, Dec 14-19, 2000.
- 59\*. Invited Lecture. Molecular Probing for Catalytic Functionalities of MoS<sub>2</sub> Prepared by Different Methods Using 4-(1-Naphthylmethyl)bibenzyl. Second International Symposium on the Molecular Aspects of Catalysis by Sulfides, Porquerolles, France, May 14-18, 2001.
60. Invited Lecture. Chemical Conversion and Utilization of CO<sub>2</sub> from Fossil Fuel Combustion. NETL Workshop on Carbon Sequestration Sciences, National Energy Technology Laboratory, US Department of Energy, Pittsburgh, PA, May 22-24, 2001.
61. Invited Lecture. Tri-reforming: A New Process Concept for Conversion and Utilization of CO<sub>2</sub> in Flue Gas without Pre-separation. NETL Workshop on Carbon Sequestration Sciences, National Energy Technology Laboratory, U.S. Department of Energy, Pittsburgh, PA, May 22-24, 2001.
62. Seminar. Shape-Selective Conversion of Polycyclic Hydrocarbons over Zeolite Catalysts. Universite de Montpellier and Laboratoire de Matériaux Catalytiques et Catalyse en Chimie Organique, Ecole Nationale Supérieure de Chimie, Montpellier, France, July 6, 2001.
63. Seminar. Synthesis and Application of Acidic Al-MCM-41 with High Stability as Support of Co-Mo Sulfide Catalyst for Deep Hydrodesulfurization. Laboratoire de Reactivite de Surface, Université Pierre et Marie Curie, Paris, France, July 16, 2001.
64. Seminar. Carbon Formation during High-Pressure Steam Reforming of Methane. Science and Technology Center, Air Products and Chemicals Inc., Allentown, PA, July 19, 2001.
65. Seminar. Design Approaches to Ultra-Clean Diesel Fuels by Deep Desulfurization. UOP Research Center, UOP, Des Plaines, IL, Aug 31, 2001.
66. Invited Lecture. Catalytic Fuel Processing for High- and Low-Temperature Fuel Cells. Challenges and Opportunities. Catalysis Club of Chicago, Oak Brook, IL, Oct 8, 2001.
67. Seminar. Synthesis of Fine Chemicals from Selective Conversion of Polycyclic Hydrocarbons over Zeolite Catalysts. BP Research Center, BP, Naperville, IL, Oct 9, 2001.
68. Short Course. Desulfurization of Petroleum Products: Chemistry & Processes. Short Course for the US Navy and US DOE on "Petroleum Refining and Ultra-Clean Fuels", Department of Energy and Geo-Environmental Engineering, Pennsylvania State University, University Park, PA, Nov 13-16, 2001.
69. Short Course. Ultra-Clean Fuels: Specifications and Novel Heteroatom Removal processes. Short Course for the US Navy and US DOE on "Petroleum Refining and Ultra-Clean Fuels", Department of Energy and Geo-Environmental Engineering, Pennsylvania State University, University Park, PA, Nov 13-16, 2001.
70. Short Course. Thermally Stable Jet Fuels: JP-8+100 and JP-900. Short Course for the US Navy and US DOE on "Petroleum Refining and Ultra-Clean Fuels", Department of Energy and Geo-Environmental Engineering, Pennsylvania State University, University Park, PA, Nov 13-16, 2001.
- 71\*\*. Invited Lecture (Keynote). Design Approaches to Ultra-Clean Diesel Fuels by Deep Desulfurization and Deep Hydrogenation at Low Temperatures. 3<sup>rd</sup> International Conference on Environmental Catalysis, Tokyo, Japan, Dec 10-13, 2001.
72. Invited Panelist with Oral Presentation. Panel Discussion on "Environmental Catalytic Technologies of Industrial Importance", 3<sup>rd</sup> International Conference on Environmental Catalysis, Tokyo, Japan, Dec 10-13, 2001.
73. Invited Lecture. Catalytic Fuel Processing for High- and Low-Temperature Fuel Cells. Challenges and Opportunities. National Meeting of 148 Committee, Japan Society for Promotion of Science, Tokyo, Japan, Dec 11, 2001.
- 74\*\*. Plenary Lecture. Tri-reforming: A Novel Process Concept for Making Syngas for Synthetic Ultra-Clean Fuels. 2<sup>nd</sup> International Symposium on Synthesis of Ecologically High Quality Transportation Fuels. Osaka, Japan, Jan 21-23, 2002.
- 75\*\*. Keynote Lecture. Catalysis and Chemistry for Deep Desulfurization of Gasoline and Diesel Fuels. 5<sup>th</sup> International Conference on Refinery Processing, Session on Advances in Desulfurization, in conjunction with Spring 2002 National Meeting, American Institute of Chemical Engineers, New Orleans, LA, Mar 10-14, 2002.
- 76\*. Invited Lecture. Shape-Selective Catalysis for Specialty Chemicals from Coal-Derived Polycyclic Hydrocarbons. American Chemical Society (ACS) Henry Storch Award Symposium Honoring Burt Davis. ACS Spring 2002 National Meeting, Orlando, FL, Apr 7-11, 2002.
77. Seminar. New Approaches to Deep Desulfurization for Ultra-Clean Gasoline and Diesel Fuels. Washington Research Center, W. R. Grace, Columbia, MD, Apr 19, 2002.

78. Seminar. New Approaches to Deep Desulfurization for Ultra-Clean Gasoline and Diesel Fuels. Center for Energy Research, Research Triangle Institute, Durham, NC, May 15, 2002.
79. Seminar. New Approaches to Deep Desulfurization for Ultra-Clean Gasoline and Diesel Fuels. Global Alternative Propulsion Center, General Motors Corporation, Honeoye Falls, NY, May 29, 2002.
80. Seminar. Catalytic Fuel Processing for High-Temperature and Low-Temperature Fuel Cell Applications. Challenges and Opportunities. Taiyuan University of Technology, and State Key Laboratory of C1 Chemistry and Technology, Taiyuan, Shanxi, China, June 27, 2002.
81. Seminar. Shape-Selective Catalysis for Specialty Chemicals from Polyaromatic Hydrocarbons over Molecular Sieves. Taiyuan University of Technology, and State Key Laboratory of C1 Chemistry and Technology, Taiyuan, Shanxi, China, June 27, 2002.
82. Seminar. Introduction to Research at Clean Fuels and Catalysis Program of Pennsylvania State University. Institute of Coal Chemistry and State Key Laboratory for Coal Conversion, Chinese Academy of Sciences, Taiyuan, Shanxi, China, June 28, 2002.
83. Seminar. Novel Mesoporous Molecular Basket as High-Capacity Adsorbent for CO<sub>2</sub> Capture. Institute of Coal Chemistry and State Key Laboratory for Coal Conversion, Chinese Academy of Sciences, Taiyuan, Shanxi, China, June 28, 2002.
84. Seminar. Tri-reforming: A Novel Catalytic Process Concept for Producing Synthesis Gas Using Flue Gas from Fossil Fuel-based Electric Power Plants. Department of Chemistry, Tsinghua University, and State Key Laboratory of C1 Chemistry and Technology, Beijing, China, July 1, 2002.
85. Seminar. Catalytic Fuel Processing for High-Temperature and Low-Temperature Fuel Cell Applications. Challenges and Opportunities. Department of Chemistry, Tsinghua University, and State Key Laboratory of C1 Chemistry and Technology, Beijing, China, July 1, 2002.
86. Seminar. Dynamic in-situ Characterization for Carbon Formation During CO<sub>2</sub> and Steam Reforming of Hydrocarbon over Supported Metal Catalysts. Department of Chemistry, Tsinghua University, and State Key Laboratory of C1 Chemistry and Technology, Beijing, China, July 1, 2002.
87. Seminar. Mesoporous Molecular Sieve MCM-41-Supported Co-Mo Catalysts for Deep Hydrodesulfurization of Diesel Fuels. Research Institute of Petroleum Processing, SINOPEC, Beijing, China, July 2, 2002.
88. Seminar. Selective Adsorption Desulfurization for Making Ultra-Clean Transportation Fuels. Department of Chemistry, Tsinghua University, and State Key Laboratory of C1 Chemistry and Technology, Beijing, China, July 3, 2002.
89. Seminar. Tri-reforming: A Novel Catalytic Process Concept for Producing Synthesis Gas Using Flue Gas from Fossil Fuel-based Electric Power Plants. Tianjin University, and State Key Laboratory of C1 Chemistry and Technology, Tianjin, China, July 11, 2002.
90. Seminar. Introduction to Research at Clean Fuels and Catalysis Program of Pennsylvania State University. Dalian University of Technology, and State Key Laboratory of Fine Chemicals, July 15, 2002.
91. Seminar. Shape-Selective Catalysis for Specialty Chemicals from Polyaromatic Hydrocarbons over Molecular Sieves. Dalian University of Technology, and State Key Laboratory of Fine Chemicals, July 15, 2002.
92. Seminar. Mesoporous Molecular Sieve MCM-41-Supported Co-Mo Catalysts for Deep Hydrodesulfurization of Diesel Fuels. Dalian University of Technology, and State Key Laboratory of Fine Chemicals, July 16, 2002.
93. Seminar. Selective Adsorption Desulfurization for Making Ultra-Clean Transportation Fuels. Dalian University of Technology, and State Key Laboratory of Fine Chemicals, July 17, 2002.
94. Seminar. Introduction to Research at Clean Fuels and Catalysis Program of Pennsylvania State University. Dalian Institute of Chemical Physics and State Key Laboratory of Catalysis, Dalian, China, July 18, 2002.
95. Seminar. Mesoporous Molecular Sieve MCM-41-Supported Co-Mo Catalysts for Deep Hydrodesulfurization of Diesel Fuels. Dalian Institute of Chemical Physics and State Key Laboratory of Catalysis, Dalian, China, July 18, 2002.
96. Seminar. Adsorption Desulfurization and Catalytic Fuel Processing for Fuel Cell Applications. Research and Development, Plug Power Inc., Latham, NY, Aug 6, 2002.
- 97\*\*. Keynote Lecture. New Approaches to Deep Desulfurization for Ultra-Clean Gasoline and Diesel Fuels: An Overview. ACS Symposium on Ultra Clean Transportation Fuels, 224th American Chemical Society National Meeting, Boston, MA. Aug 18-22, 2002.
98. Seminar. Some New Approaches in Research on Ultra-Clean Fuels and Value-Added Chemicals from Refinery Streams. Research and Development Center, Conoco Phillips Corp., Bartlesville, OK, Nov 13-14, 2002.
99. Seminar. Some New Approaches in Research on Clean Fuels, Chemicals and Fuel-Cell Fuel Processing. Research and Development Center, Corning Corporation, Corning, New York, Jan 7, 2003.
100. Seminar. Fuel Processing for Hydrogen and Fuel Cell Applications. Department of Engineering Science and Mechanics, Pennsylvania State University, University Park, PA, Apr 2, 2003.

101. Seminar. Fuel Processing for Hydrogen Production and Fuel Cell Applications. Department of Energy and Geo-Environmental Engineering, Pennsylvania State University, University Park, PA, Oct2, 2003.
- 102\*\*. Invited Lecture (Keynote). Tri-reforming of Methane: A Novel Concept for CO<sub>2</sub> Conversion to Syngas with Desired H<sub>2</sub>/CO Ratios Using Flue Gas of Power Plants Without CO<sub>2</sub> Separation. 7<sup>th</sup> International Conference on Carbon Dioxide Utilization, Seoul, Korea, Oct12-16, 2003.
103. Seminar. Selective Adsorption Desulfurization for Making Ultra-Clean Transportation Fuels. Korea Institute of Energy Research, Daejeon, Korea, Oct16, 2003.
- 104\*\*. Invited Lecture (Keynote). Shape-Selective Catalysis in Nanoporous Materials. International Symposium on Nano-Catalysis. Seoul National University, Seoul, Korea, Oct17, 2003.
105. Seminar. Catalytic Fuel Processing for Hydrogen Production and Fuel Cell Applications. State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Dalian, China, Oct 28, 2003.
106. Seminar. Introduction to Clean Fuels and Catalysis Research at Pennsylvania State University. Fuel Processing for Hydrogen Production and Fuel Cell Applications. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Oct30, 2003.
107. Seminar. Recent Research on Clean Fuels and Catalysis in Hydrocarbon Processing at Pennsylvania State University. Institute of Applied Energy, Tokyo, Japan, Nov 6, 2003.
- 108\*\*. Keynote Lecture. Tri-reforming of Methane: A Novel Concept for Synthesis of Industrially Useful Synthesis Gas with Desired H<sub>2</sub>/CO Ratios Using CO<sub>2</sub> in Flue Gas of Power Plants without CO<sub>2</sub> Separation. Fuel Chemistry Division Symposium, American Chemical Society (ACS) Spring 2004 National Meeting, Anaheim, CA, Mar 28-Apr 1, 2004.
- 109\*\*. Keynote Lecture. Sulfur-Selective Adsorption for Ultra-Deep Desulfurization of Hydrocarbon Fuels for Fuel Cell Applications. Topical Conference on Fuel Cell Technology, American Institute of Chemical Engineers (AIChE) Spring 2004 National Meeting, New Orleans, LA, Apr 25-29, 2004.
110. Seminar. Shape-Selective Catalysis for Synthesis of Specialty Chemicals from Polycyclic Hydrocarbons. Department of Applied Chemistry, Osaka Prefecture University, Osaka, Japan, May 7, 2004.
111. Seminar. Selective Adsorption Desulfurization for Making Ultra-Clean Transportation Fuels. Research Center, Taiyo Oil Corporation, Kikuma, Ehime, Japan, May 12, 2004.
- 112\*. Invited Lecture. Catalytic Reforming and Deep Desulfurization of Hydrocarbon Fuels for High-Temperature and Low-Temperature Fuel Cell Applications. Catalysis Club of Philadelphia, University of Delaware, Newark, DE, May 20, 2004.
113. Invited Lecture. Kinetic Study of 4,6-Dimethyldibenzothiophene Hydrodesulfurization over Transition Metal Sulfide and Phosphide Catalysts. 3<sup>rd</sup> International Symposium on Molecular Aspects of Catalysis by Sulfides (MACS-III), Ascona, Switzerland, May 22-26, 2004.
114. Seminar. Catalytic Reforming and Desulfurization for Hydrogen Production and Fuel Cell Applications. State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Dalian, China, June 23, 2004.
115. Seminar. Art of Scientific Research. State Key Laboratory of Fine Chemicals, School of Chemical Engineering, Dalian University of Technology, Dalian, China, June 24, 2004
116. Seminar. Recent Advances in Catalysis for Hydrocarbon Processing for Clean Fuels and Chemicals. Department of Chemical Technology, Chulalongkorn University, Bangkok, Thailand, June 25, 2004.
117. Seminar. Catalysis in Deep Desulfurization for Making Ultra Clean Fuels. Department of Chemical Technology, Chulalongkorn University, Bangkok, Thailand, June 28, 2004.
118. Seminar. Catalysis in Fuel Processing for Hydrogen Production and Fuel Cell Applications. Department of Chemical Technology, Chulalongkorn University, Bangkok, Thailand, June 29, 2004.
119. Seminar. Shape-Selective Catalysis for Synthesis of Specialty Chemicals from Aromatics in Fuel Streams. Department of Chemical Technology, Chulalongkorn University, Bangkok, Thailand, June 29, 2004.
120. Seminar. Personal Perspectives on Advancing DUT to World Class Research University. Dalian University of Technology (DUT), Dalian, China, July 3, 2004
121. Seminar. Personal Perspectives on Effective Learning and Study in University. School of Chemical Engineering, Dalian University of Technology (DUT), Dalian, China, July 3, 2004
122. Seminar. Catalytic Processing of Hydrocarbon Fuels for Hydrogen Production and Fuel Cell Applications, Anshan University of Science and Technology, Anshan, China, July 6, 2004.
123. Seminar. Catalysis for Reforming and Desulfurization of Hydrocarbon Fuels for Fuel Cell Applications. Key Laboratory of Green Chemistry, School of Chemical Engineering, Tianjin University, Tianjin, China, July 8, 2004.
124. Invited Lecture. Sulfur-Resistant Noble Metal Catalysts for Steam Reforming of Liquid Hydrocarbon Fuels for Micro-Fuel Cell Application. 13<sup>th</sup> International Congress on Catalysis, Paris, France, July 11-17, 2004.

- 125\*\*. Invited Lecture (Plenary). Recent Advances in Hydrocarbon Processing for Ultra-Clean Fuels and Hydrogen Energy Development in the US. 20<sup>th</sup> National Symposium of Applied Energy, Institute of Applied Energy, Tokyo, Japan, Sept 10, 2004.
- 126\*\*. Invited Lecture (Keynote). Overview of Hydrocarbon Processing Options and Proposed Concepts of Gasification for Hydrogen Production with Carbon Dioxide Capture. Paper #9-1, 21st International Pittsburgh Coal Conference, Osaka, Japan, Sept 12-16, 2004.
- 127\*\*. Keynote Lecture. Overview of Chemicals and Materials from Coal and Coal-Derived Liquids. Paper #30-1, 21st International Pittsburgh Coal Conference, Osaka, Japan, Sept 12-16, 2004.
- 128\*. Seminar. Introduction to Catalytic Hydrocarbon Processing Research at the Pennsylvania State University. Energy Seminar Series, Department of Chemical Engineering, Imperial College, University of London, London, UK, Oct 12, 2004.
- 129\*. Seminar. Catalysis in Fuel Processing for Hydrogen Production and Fuel Cells. Clean Technology Centre, Department of Chemistry, University of York, York, UK, Oct 20, 2004.
- 130\*\*. Invited Lecture (Keynote). Shape-Selective Conversion of Polycyclic Hydrocarbons to Specialty Chemicals over Molecular Sieve Catalysts. 2<sup>nd</sup> International Symposium on Giant Molecules and Complex Systems. Tohoku University, Sendai, Japan, Nov 21-23, 2004.
- 131\*. Seminar. Tri-reforming of Methane: A Novel Concept for Synthesis of Industrially Useful Syngas with Desired H<sub>2</sub>/CO Ratios Using CO<sub>2</sub> in Flue Gas of Power Plants without CO<sub>2</sub> Separation. Energy Seminar Series, Department of Chemical Engineering, Imperial College London, University of London, London, UK, Dec 14, 2004.
- 132\*. Seminar. Fuel Processing for Hydrogen Energy and Fuel Cells Towards Sustainable Energy Development. Department of Chemical Engineering, Imperial College, University of London, London, UK, Jan 19, 2005.
- 133\*. Seminar. Catalytic Processing of Hydrocarbon and Alcohol Fuels for Hydrogen Energy and Fuel Cells Towards Sustainable Development in the 21<sup>st</sup> Century. Department of Chemistry, University of Pierre and Marie Curie (University of Paris VI), Paris, France, Feb 7, 2005
- 134\*. Seminar. Synthesis and Application of Mesoporous Molecular Sieve Al-MCM-41 for Hydrodesulfurization Catalysis. Research Center, Haldor-Topsoe A/S, Denmark, Feb 9, 2005
- 135\*. Seminar. Catalysis in Fuel Reforming and Desulfurization for Hydrogen Production and Fuel Cells. Institute of Research on Catalysis (IRC, CNRS), Lyon, France, Feb 14, 2005
- 136\*. Seminar. Synthesis and Application of Mesoporous Molecular Sieve Al-MCM-41 for Hydrodesulfurization Catalysis Towards Ultra-Clean Fuels. University of Pierre and Marie Curie (University of Paris VI), Paris, France, Feb 21, 2005
- 137\*. Seminar. Synthesis and Application of Mesoporous Molecular Sieve Al-MCM-41 for Hydrodesulfurization Catalysis Towards Ultra-Clean Fuels. Schuit Institute of Catalysis, Eindhoven University of Technology, Eindhoven, the Netherlands, Feb 22, 2005
- 138\*. Seminar. Catalytic Fuel Processing for Hydrogen Energy and Fuel Cells Towards Sustainable Energy Development. Delft Chem Tech, Delft University of Technology, Delft, the Netherlands, Feb 23, 2005
- 139\*. Seminar. Catalysis in Fuel Processing for Hydrogen Production and Fuel Cells. Chemical Engineering Program, Department of Engineering Science, University of Oxford, Oxford, UK, Mar 1, 2005.
- 140\*\*. Invited Lecture (Keynote). An Overview of Catalytic Fuel Processing for Hydrogen Production and Fuel Cell Applications. ACS Symposium on Catalysis in Fuel Chemistry. American Chemical Society Spring 2005 National Meeting, San Diego, CA, Mar 13-17, 2005.
- 141\*. Seminar. Shape-Selective Conversion of Polycyclic Hydrocarbons to Specialty Chemicals over Molecular Sieve Catalysts. Department of Chemical Engineering, University of Cambridge, Cambridge, UK, Apr 14, 2005.
- 142\*. Seminar. Shape-Selective Synthesis of Specialty Chemicals Using Polycyclic Hydrocarbons over Modified Molecular Sieve Catalysts. Davy Faraday Research Laboratory, The Royal Institution of Great Britain, London, UK, Apr 22, 2005.
- 143\*. Seminar. Shape-Selective Synthesis of Polycyclic Specialty Chemicals over Molecular Sieve Catalysts. Department of Chemical Engineering, Imperial College, University of London, London, UK, May 3, 2005.
- 144\*\*. Plenary Lecture. Global Strategy and Potential of CO<sub>2</sub> Conversion and Utilization for Sustainable Development. 8<sup>th</sup> International Conference on Carbon Dioxide Utilization (ICCDU VIII), University of Oslo, Oslo, Norway, June 20-23, 2005.
145. Lecture. Adsorption Desulfurization and Reforming of Logistic Fuels for Fuel Cell Applications. Advanced Power and Propulsion Machinery Branch, NAVSEA, US Navy, Philadelphia, PA, July 12, 2005.
146. Invited Lecture. Liquid-Phase Adsorption for Desulfurization and Sulfur-Tolerant Catalysts for Reforming of Logistic Fuels for Fuel Cell Applications. ARL Workshop on Logistic Fuel Desulfurization Technology for Power and Energy Applications. US Army Research laboratory, Adelphi, MD, Sept 14, 2005.

147. Seminar. Art of Scientific Research. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 27, 2005.
148. Seminar. Some Perspectives on Research and Education at Universities in Europe and America. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 27, 2005.
149. Seminar. Art of Scientific Research. State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Dalian, China, Sept 28, 2005.
150. Seminar. Fuel Processing for Hydrogen Energy and Fuel Cell Applications. Department of Chemistry and Chemical Engineering, Xian University of Science and Technology, Xian, China, Oct 2, 2005.
- 151\*\*. Keynote Lecture. Advances in Catalysis and Processes in Deep Desulfurization for Ultra Clean Transportation Fuels. 4<sup>th</sup> USA/Japan/China Joint Chemical Engineering Conference, Beijing, China, Oct 10-13, 2005.
152. Seminar. Global Energy Challenges and Role of Catalysis in Hydrogen Energy Development. Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China, Oct 11, 2005.
153. Invited Lecture. Understanding Energy Crisis and Global Energy Challenges. Leadership Centre County, State College, PA, Oct 26, 2005.
- 154\*\*. Keynote Lecture. Value-Added Organic Chemicals and Carbon Materials from Coal. Consortium for Premium Carbon Products from Coal. US Department of Energy-Pennsylvania State University-West Virginia University, Fall 2005 CPCPC Meeting, State College, PA, Nov 9-10, 2005.
- 155\*\*. Distinguished Catalysis Researcher Lecture Series. Global Energy Challenges and Role of Catalysis in Hydrogen Energy Development. Pacific Northwest National Laboratory, Richland, WA, Nov 17, 2005.
- 156\*. Invited Lecture. Recent Advances in Adsorption Desulfurization and Reforming Catalysis in Hydrocarbon Fuel Processing for Fuel Cells. Southwest Catalysis Society, Houston, TX, Mar 17, 2006.
157. Seminar. Recent Advances in Adsorption Desulfurization of Hydrocarbon Fuels. Technical Department, Sud Chemie, Louisville, KY, May 9, 2006.
- 158\*\*. Keynote Lecture. Global Energy Challenges and Role of Catalysis in Fuel Processing for Fuel Cells. 15<sup>th</sup> Canadian Catalysis Symposium, Saskatoon, Canada, May 14-17, 2006.
159. Seminar. Role of Catalysis in Fuel Processing for Hydrogen Energy and Fuel Cells Towards Sustainable Energy Development. Osaka Prefecture University, Osaka, Japan, July 21, 2006.
- 160\*\*. Invited Lecture (Keynote). Advances in Reforming Catalysis and Adsorption Desulfurization of Liquid Fuels for Fuel Cell Applications. Fifth Tokyo International Conference on Advanced Catalytic Science and Technology (TOCAT 5), Tokyo, Japan, July 23 - 28, 2006.
161. Seminar. Recent Advances in Hydrocarbon Processing Research at the Pennsylvania State University. Fushun Research Institute of Petroleum Processing, Fushun, China, Aug 24-25, 2006.
162. Seminar. Art of Chemical Research and Oral Presentation. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Aug 28, 2006.
163. Seminar. Towards Oxygen-Assisted Water Gas Shift Reaction over Non-pyrophoric Catalysts. State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Dalian, China, Sept 1, 2006.
164. Seminar. Some Perspectives on Research and Education at Universities. School of Chemical Engineering, Dalian University of Technology, Dalian, China, Sept 5, 2005.
- 165\*\*. Plenary Lecture. Challenges for Hydrogen Production from Hydrocarbons and Renewable Sources. ACS Symp on Hydrogen Energy, American Chemical Society Fall 2006 National Meeting, San Francisco, CA, Sept 10-14, 2006.
- 166\*\*. Keynote lecture. Oxygen-Assisted Water Gas Shift Reaction over Non-pyrophoric Catalysts for More Efficient Hydrogen Production. ACS Symp on Hydrogen Production, American Chemical Society Fall 2006 National Meeting, San Francisco, CA, Sept 10-14, 2006.
- 167\*\*. Keynote Lecture. Advances in Selective Adsorption for Removing Sulfur at Ambient Conditions without Using Hydrogen for Producing Ultra-Clean Hydrocarbon Fuels. ACS Symp on Green Chemistry in Synthesis of Fuels, American Chemical Society Fall 2006 National Meeting, San Francisco, CA, Sept 10-14, 2006.
- 168\*\*. Keynote Lecture. Challenges in Liquid Hydrocarbon Fuel Processing for Fuel Cells Involving Desulfurization Adsorbents and Reforming Catalyst Developments. ACS Symp on Fuel Processing for Hydrogen Production, American Chemical Society Fall 2006 National Meeting, San Francisco, CA, Sept 10-14, 2006.
169. Panelist and Coordinator. Hydrogen Energy Research at Penn State. Corporate Energy Workshop, State College, PA, Oct 5, 2006.
170. Invited Lecture. Shape-Selective Catalysis for Synthesis of Value-Added Chemicals Using Polycyclic Hydrocarbons. Lyondell Symposium, Newton Square, PA, Oct 12, 2006.
- 171\*\*. Plenary Lecture. Some New Approaches and Future Perspectives in Catalysis for Hydrocarbon Processing and Value-Added Chemicals Synthesis. ExxonMobil Symposium, Hershey, PA, Oct 15-16, 2006.

- 172\*. Invited Lecture. Nano-Porous Molecular-Basket Concept for Novel High-Capacity CO<sub>2</sub> Adsorbent Development and CO<sub>2</sub> Utilization. Fall 2006 Annual Meeting, Pittsburgh-Cleveland catalysis Society, Pittsburgh, PA, Oct 26, 2006.
173. Seminar. Art of Effective Scientific Research. Department of Energy and Geo-Environmental Engineering, Pennsylvania State University, University Park, PA, Nov 9, 2006.
174. Panelist and Speaker. Clean Hydrogen from Hydrocarbon Fuels. 3<sup>rd</sup> Hydrogen Day at Penn State, University Park, PA, Nov 14, 2006.
175. Invited Lecture. Advances in Selective Adsorption for Removing Sulfur from Liquid Fuels Without Using Hydrogen. Institute of Chemical and Engineering Sciences (ICES), Singapore, Dec 5, 2006.
- 176\*\*. Keynote Lecture. Global Energy Challenges and Role of Catalysis for Clean Fuels and Hydrogen Energy Development. 4<sup>th</sup> Asia Pacific Congress on Catalysis (APCAT 4), Singapore, Dec 6-8, 2006.
- 177\*\*. Plenary Lecture. Global Challenges for CO<sub>2</sub> Control and Nano-Porous Molecular-Basket Concept for Novel High-Capacity CO<sub>2</sub> Sorbent Development. 4<sup>th</sup> International Symposium on Practical Nano-Chemistry. 21<sup>st</sup> Century-Center of Excellence, Waseda University, Tokyo, Japan, Dec 11-12, 2006.
178. Invited Presentation. Catalysis for Ultra Clean Fuels and Hydrogen from Hydrocarbons and Bio-ethanol. ADM Research Center, Decatur, IL, Mar 7, 2007.
179. Seminar. Global Energy Challenges and Role of Catalysis in Clean Energy Development. Dalian University of Technology, Dalian, China, Mar 16, 2007.
180. Seminar. Challenges in Developing Catalysts and Sorbents for Liquid Fuel Processing for Fuel Cells. Department of Chemical Engineering, Louisiana State University, Baton Rouge, LA, Mar 30, 2007.
- 181\*. Invited Lecture. Clean Fuels and Hydrogen from Coal for Sustainable Energy Development. Whitney Symposium on Sustainability. GE Global Research Center, General Electric Corporation, Niskayuna, NY, Apr 1-2, 2007.
- 182\*\*. Plenary Lecture. Catalysis in Fuel Processing for Fuel Cells. Challenges and Opportunities for Sustainable Energy Development. 18<sup>th</sup> Indian National Catalysis Symposium, Indian Institute of Petroleum, Dehradun, India, Apr 14-18, 2007.
- 183\*\*. Herman Pines Award lecture. Challenges in Developing Catalysts and Sorbents for Liquid Fuel Processing for Fuel Cells. Catalysis Club of Chicago-UOP/North American Catalysis Society, Chicago, IL, May 16, 2007.
184. Invited Lecture. Challenges in Developing Sulfur-Tolerant Catalysts for Low-Temperature Reforming of Liquid Hydrocarbon Fuels. Technology Center, ABB Lummus Global, May 23, 2007.
185. Seminar. Role of Catalysis in Fuel Processing for Hydrogen Energy and Fuel Cell. Department of Chemical Technology, Chulalongkorn University, Bangkok, Thailand, July 19, 2007.
- 186\*. Invited Lecture (Keynote). Shape-selective Catalysis for Synthesis of 2,6-Dimethylnaphthalene by Methylation with Methanol over Modified Zeolites. ACS Symp on Catalytic Synthesis of Chemicals and Fuels, American Chemical Society Fall 2007 National Meeting, Boston, MA, Aug 19-23, 2007.
187. Invited Lecture. Catalysis for Ultra Clean Fuels and Hydrogen from Hydrocarbons and Bio-ethanol. CrossOver 2007, Pennsylvania State University, University Park, PA, Sept 4-5, 2007.
188. Invited Lecture. Nano-porous "Molecular Basket" CO<sub>2</sub> Sorbent for Capture and Regeneration of CO<sub>2</sub>. Workshop on Carbon Dioxide Capture and Regeneration, Office of Naval Research, US Navy, Arlington, VA, Sept 26, 2007.
- 189\*\*. Robinson Distinguished Lecture. Global Energy Challenges and Role of Catalysis for Clean Fuels and Fuel Cells. Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Canada, Nov 8, 2007.
190. Seminar. Global Energy Challenges and Role of Catalysis for Clean Fuels and Fuel Cells. National Center for Upgrading Technology, Canada, Nov 9, 2007.
191. Invited Lecture. Introduction to Clean Energy Research at EMS Energy Institute. Energy Summit, Technology Council of Central Pa (TCCP), State College, PA, Nov 30, 2007.
- 192\*. Invited Lecture (Keynote). CO<sub>2</sub> Conversion and Utilization: Challenges and Opportunities. DECHEMA Symposium on CO<sub>2</sub> Capture, Utilization and Sequestration. DECHEMA (Society for Chemical Engineering and Biotechnology), Frankfurt, Germany, Jan 21-22, 2008.
193. Seminar. CO<sub>2</sub> Capture, Conversion and Utilization for Sustainable Development. Fakultät für Chemie und Mineralogie, Universität Leipzig, Leipzig, Germany, Jan 24, 2008.
194. Seminar. Overview of PSU Clean Energy Research and a Novel Approach to CO<sub>2</sub> Capture by Molecular Basket Sorbent Concept. National Energy Technology Laboratory, US Department of Energy, Pittsburgh, PA, Mar 5, 2008.

195. Invited Lecture. Novel Dispersed Bimetallic Sulfide Catalysts for Deep Hydrodesulfurization. Saudi Arabian International Chemical Sciences Chapter of the American Chemical Society, Dhahran, Saudi Arabia, Mar 11, 2008.
196. Invited Lecture. Global Clean Fuels Challenge and Opportunities for Catalysis and CO<sub>2</sub> Capture and Utilization Research. Catalysis Society of Metropolitan New York, Seton Hall University, South Orange, NJ, March 25, 2008.
197. Invited Lecture. Molecular Basket Sorbents as a Novel Approach to CO<sub>2</sub> Capture and Separation. Spring 2008 Symposium, Catalysis Club of Philadelphia, University of Delaware, DE, May 22, 2008.
- 198\*. Invited Lecture (Keynote). CO<sub>2</sub> Conversion and Utilization. Challenge and Opportunities. Innovation Day Catalysis, Evonik Degussa Catalysts, Hanau, Germany, May 27-28, 2008.
199. Seminar. Molecular Basket Sorbents as a Novel Approach to CO<sub>2</sub> Capture and Separation. Corporate Research and Development, Air Products and Chemicals Inc., Allentown, PA, June 30, 2008.
- 200\*. Invited Lecture. Novel Design Concepts for Sulfur-Tolerant Noble Metal Catalysts. 13<sup>th</sup> International Catalysis Congress, Seoul, Korea, July 12-17, 2008.
- 201\*\*. Keynote Lecture. Molecular Basket Sorbents as a Novel Approach to CO<sub>2</sub> Capture and Separation for Clean Energy. 12<sup>th</sup> Asia Pacific Confederation of Chemical Engineers (APCCChE) Congress to be held in Dalian, China, August 4-6, 2008.
- 202\*\*. Plenary Lecture. Design of Catalysts and Sorbents at Nano-scale in Fuel Processing for H<sub>2</sub> Production and Fuel Cells. Italian Chemical Society – Inorganic Chemistry Division. XXXVI Congresso Nazionale, Lecce, Italy, Sept 1-5, 2008.
- 203.\* Panel Discussion on CO<sub>2</sub> Control. Recent Advances in CO<sub>2</sub> Capture and Separation for Clean Energy. Italian Chemical Society – Inorganic Chemistry Division. XXXVI Congresso Nazionale, Lecce, Italy, Sept 4, 2008.
204. Seminar. Highly Active MoS<sub>2</sub>, CoMoS<sub>2</sub> and NiMoS<sub>2</sub> Unsupported Catalysts Prepared by Hydrothermal Synthesis. Center for Energy Technology, Research Triangle Institute, Durham, NC, Oct 23, 2008.
205. Invited Lecture. Maximizing Ways of Capturing CO<sub>2</sub> and Analyzing the Latest Technologies. Global Refining Strategies 2008, Houston, TX, Oct 27-28, 2008.
- 206\*. Invited Lecture. Clean Fuels and Chemicals from Coal with CO<sub>2</sub> Capture for Sustainable Energy Development. China-US Joint Energy Research Frontier Symposium, the First Chinese Chemical Society- American Chemical Society Bilateral Symposium, Dalian Institute of Chemical Physics, Dalian, China, Nov 4-6, 2008.
- 207\*. Invited Lecture. Novel Design Concepts for Sulfur-Tolerant Noble Metal Catalysts for Hydrocarbon Processing. Petrochemicals Conference. The Commemorative International Symposium on the 50<sup>th</sup> Anniversary of Japan Petroleum Institute, Tokyo, Japan, Nov 4-7, 2008.
208. Seminar. Molecular Basket Sorbents as a Novel Approach to CO<sub>2</sub> Capture. Department of Chemical Engineering, West Virginia University, Morgantown, WV, Feb 20, 2009.
209. Invited Lecture. Global Energy Challenges and Role of Catalytic Chemical Research. Dalian University of Technology, Dalian, China, March 1, 2009.
210. Seminar. Clean Fuels and Chemicals from Coal with CO<sub>2</sub> Capture. Department of Chemical Engineering, Case Western Reserve University, Cleveland, OH, Apr 16, 2009.
211. Seminar. Carbon-Resistant and Sulfur-Tolerant Bimetallic Catalysts for Low-Temperature Steam Reforming of Hydrocarbon Fuels for Fuel Cells. Department of Chemical Engineering, Carnegie Mellon University, Pittsburgh, PA, Apr 22, 2009.
212. Seminar. Molecular Basket Sorbents as a Novel Approach to CO<sub>2</sub> Capture. Department of Chemical Engineering, Tsinghua University, Beijing, China, May 13, 2009.
- 213\*\*. Plenary Lecture. Recent Advances in CO<sub>2</sub> Capture and Utilization. 10<sup>th</sup> International Conference on Carbon Dioxide Utilization (ICCDU-X). Tianjin, China, May 17-21, 2009.
- 214\*. Invited Lecture. Recent Advances in CO<sub>2</sub> Capture and Separation. Post-ICCDU Workshop on CO<sub>2</sub> Capture and Utilization. Tianjin, China, May 22-23, 2009.
- 215\*. Invited Lecture. How to Write Research Papers. Post-ICCDU Workshop on CO<sub>2</sub> Capture and Utilization. Tianjin, China, May 22-23, 2009.
- 216\*\*. Keynote Lecture. Global Energy Challenges and Role of Catalysis for Sustainable Energy Development. 21<sup>st</sup> North American Catalysis Society Meeting, San Francisco, CA, June 7-12, 2009.
217. Seminar. Global Energy Challenges and Role of Catalysis and Adsorption for CO<sub>2</sub> Capture and Utilization. School of Environmental Engineering, Shandong University, Jinan, China, June 20, 2009.
218. Seminar. Art of Writing for Scientific Research Publication. School of Chemical Engineering, Dalian University of Technology, Dalian, China, July 7, 2009.
219. Seminar. Role of Catalysis and Adsorption for CO<sub>2</sub> Capture and Utilization. Zhejiang Normal University, Jinhua, Zhejiang, China, July 13, 2009.

220. Seminar. Future Perspectives on Energy Chemical Engineering. For freshman class in School of Chemical Engineering, Dalian University of Technology, Dalian, China, July 16, 2009.
221. Invited Lecture. Global Energy Challenges and Role of Catalysis for Sustainable Energy Development. 60<sup>th</sup> Anniversary Celebration Forum. Dalian Institute of Chemical Physics, Dalian, China, July 23, 2008.
222. Invited Lecture. Integrated Fuel Processor-SOFC for Alternative and Renewable Fuels. Novel Sorbents, Catalysts and Integration with Solid oxide Fuel Cells. Open Innovation Forum. Siemens Energy Inc., Pittsburgh, Aug 13, 2009.
- 223\*. Invited Lecture. Nanosized Unsupported Metal Sulfide Catalysts by Hydrothermal Synthesis for Simultaneous Hydrodesulfurization of Dibenzothiophene and 4,6-Dimethyldibenzothiophene. Symposium Honoring Roel Prins. Division of Petroleum Chemistry, American Chemical Society Fall 2009 National Meeting, Washington DC, August 16, 2009.
- 224\*\*. Plenary Lecture. Clean Fuels and Chemicals from Coal with CO<sub>2</sub> Capture for Sustainable Energy Development. Symposium on Energy and Globalization. Division of Fuel Chemistry, American Chemical Society Fall 2009 National Meeting, Washington DC, August 17, 2009.
- 225\*\*. Invited Lecture (Keynote). Overview of Current Technologies and New Approaches for CO<sub>2</sub> Capture. Sino-US New Energy Forum, Shanghai, China, Sept 14, 2009.
226. Seminar. Molecular Basket Sorbents as a Novel Approach to CO<sub>2</sub> Capture. GE China Technology Center, Shanghai, China, Sept 15, 2009.
- 227\*\*. Keynote Lecture. Coal Conversion to Clean Fuels and Chemicals with CO<sub>2</sub> Capture. Symposium on Energy and Globalization. 5<sup>th</sup> Sino-US Chemical Engineering Conference, Beijing, China, Oct 13-16, 2009.
228. Invited Lecture. Shape-selective Catalysis for Synthesis of 2,6-Dimethylnaphthalene by Methylation with Methanol over Acidic Molecular Sieves. 5<sup>th</sup> Sino-US Chemical Engineering Conference, Beijing, China, Oct 13-16, 2009.
229. Seminar. Selective Adsorption for Removing Sulfur for Ultra-Clean Fuels. Department of Chemical Engineering, University of Waterloo, Waterloo, Ontario, Canada, Oct 22, 2009.
230. Seminar. Selective Adsorption for Removing Sulfur from Hydrocarbon Streams for Ultra-Clean Fuels (Tentative title). Refining Technology, BP, Naperville, IL, Nov 18, 2009.
231. Seminar. Sulfur-Tolerant and Carbon-Resistant Catalysts for Low-Temperature Reforming of Liquid Fuels for Fuel Cells. Department of Chemical Engineering, Northwestern University, Evanston, IL, Nov 19, 2009.
232. Seminar. Novel Approaches to CO<sub>2</sub> Capture and Utilization by Adsorption and Catalysis. Argonne National Laboratory, Nov 20, 2009.

#### **NEWS ARTICLES REPORTING ON RESEARCH BY SONG GROUP**

1. Coal & Synfuels Technology, Vol.13, No.16, Apr 20, 1992, p.1, "Coal Should Be Feedstock for Making Plastics".
2. Intercom, PSU, Vol.22, No.2, Aug 27, 1992, p.1, "Coal Seen as Excellent Source for Manufacturing Certain Plastics".
3. Penn State Football, Oct 17, 1992, p.30, "Coal May Be Source for Certain Plastics".
4. Chemtech, Vol.24, No.1, Jan 1994, p.6, "Jet Fuels of the Future".
5. Business Week, No.3389, Sept 12, 1994, p.78, "A Breakthrough in Wringing out Liquid Fuel from Coal".
6. Coal & Synfuels Technology, Vol.15, No.35, Sept 12, 1994, p.4, "Water Could Reduce Coal Liquefaction Costs".
7. Coal Outlook, Supplement, Vol.18, No.37, Sept 26, 1994, p.1, "Water in Coal Good for Liquefaction".
8. Coal, Vol. 99, No.10, Oct 1994, p.98, "Water Improves Catalytic Coal Liquefaction".
9. Earth & Mineral Sciences, PSU, Vol.63, No.3, 1994, p.71, "Advances in Coal Liquefaction".
10. Earth & Mineral Sciences, PSU, Vol.64, No.1, 1995, p.23, "Song Receives Japanese Award".
11. Intercom, PSU newspaper, Vol.25, No.15, Nov 30, 1995, p.19, "Research Roundup-Polymer Research".
12. Futuristic Magazine, New York, Mar 1996, "Liquid Fuel from Coal".
13. Industrial Catalysis News, Vol. 1, No. 7, July 1998, pp. 6-7, "Shape-Selective Catalysis".
14. CHEMTECH, C.S. Song's article "Designing Sulfur-resistant, Noble-metal Hydrotreating Catalysts" was selected as the "hot article of the month" in Mar 1999: <http://pubs.acs.org/hotartcl/chemtech/99/mar/sulfur.html>
15. Engine Technology (Japan), Vol. 1, No.2, May 1999, pp.52-55, "Gas to Liquids Technology".
16. GIC (Italian Group of Catalysis), "News on Designing sulfur-resistant, noble-metal hydrotreating catalysts", <http://www.fci.unibo.it/gic/news.html>, July 21, 1999.
17. Environmental Health Perspectives, Vol. 107, No. 9, Sept 1999, p. A450C, "Nanotechnology: Thinking Small".

18. California Hydrogen Business Council Industrial News on-line, "Designing Sulfur-Resistant Noble-Metal Hydrotreating Catalysts by Chunshan Song". <http://www.wmrs.edu/ricksweb/ch2bcweb/industrial.htm> Date: Jan 4, 2000.
19. ACS – Chem Center, news article "Supersonic Transport Could Be Powered by Coal, Coal-Derived Jet Fuels Less Likely to Form Engine Deposits at High Speeds" <http://center.acs.org/applications/news//story.cfm?story=343>, Mar 29, 2000
20. Chicago Tribune, news article "Inside Technology. Coal's Future," Apr 3, 2000.
21. MSNBC, Science News on-line article "Could Coal Be a Fuel of the Future? High-Powered jets May Run Better Using Coal-Based Systems," [http://www.msnbc.com/news/science\\_front.asp](http://www.msnbc.com/news/science_front.asp), Apr 10, 2000
22. CTRL The Mail, News article "Coal-Powered Supersonic Jets", By William Shannon, <http://www.mail-archive.com/ctrl@listserv.aol.com/msg39730.html> , Apr 12, 2000
23. Science Daily, on-line news article "Supersonic Transport Could Be Powered by Coal," <http://www.sciencedaily.com/releases/2000/04/000410084650.htm> Apr 12, 2000
24. The Times of India, India, World Headlines "Coal Powered Jets", Apr 17, 2000.
25. Science News, Vol. 157, Apr 8, 2000, p.230 news article "Coal: The Cool Fuel for Future Jets."
26. Galaxy Online, "Coal Could Be Answer to Supersonic Engine Clogging", [http://www.galaxyonline.com/News/Science/Sci\\_82.htm](http://www.galaxyonline.com/News/Science/Sci_82.htm) Apr 17, 2000.
27. Scientific Papers - California Hydrogen Business Council on-line, "Designing Sulfur-Resistant Noble-Metal Hydrotreating Catalysts by Chunshan Song". <http://www.ch2bc.org/scientific.htm>, viewed Sept 1, 2001.
28. Catalysts & Catalysis" (Shokubai - Journal of the Catalysis Society of Japan), 1999, Vol. 41, No. 5, pp. 306-307, "From Song's Paper on a Novel Concept of Catalyst Design for Dearomatization of Light Oils".
29. Cattech, Vol. 6, No. 2, Apr 2002, pp. 79-80, "Meeting Report: 3<sup>rd</sup> International Conference on Environmental Catalysis, Tokyo, Japan, Dec 10-13, 2001".
30. Gas-to-Liquids News, Vol. 5, No.4, Apr 2002, Hart Publications, pp. 7-8, "Tri-Reforming Process Generates Syngas Using CO<sub>2</sub>-Rich Natural Gas".
31. Phillips Publishing International On-line News, Apr 1, 2002, "Tri-Reforming process Generates Syngas Using CO<sub>2</sub>-Rich Natural Gas", <http://library.northernlight.com/FE20020405940000052.html?cb=0&dx=1006&sc=, ID:FE20020405940000052>.
32. Scientific American, Apr 9, 2002, News in Brief Chemistry: "Researchers Unveil New Approaches to Cleaning Fuel". <http://www.sciam.com/techbiz/040902/2.html>
33. EurekaAlert Online, Apr 8, 2002, "Ultra Clean Transportation Fuels by Deep Desulfurization", [http://www.eurekaalert.org/pub\\_releases/2002-04/ps-uct040802.php](http://www.eurekaalert.org/pub_releases/2002-04/ps-uct040802.php)
34. Space Daily, Apr 15, 2002, "Ultra Clean Transportation Fuels by Deep Desulfurization". <http://www.spacedaily.com/news/fuel-02e.html>
35. EV World: The World of Electric, Hybrid & Fuel Cell Vehicles, Apr 9, 2002, "Cleaner Fuels Created by Desulfurization", <http://www.evworld.com/databases/shownews.cfm?pageid=news090402-04>
36. U.P.I. – Stories of Modern Science, Apr 9, 2002, "Desulfurization of Fuels at Low Temps".
37. Clean Air Today, Apr 11, 2002, "SARS Process Removes Sulfur from Liquid Fuels".
38. Diesel Fuel News, Apr 15, 2002, "New Process Could Compete with Desulfurization Technologies", by Jack Peckham, [http://www.findarticles.com/p/articles/mi\\_m0CYH/is\\_8\\_6/ai\\_85046006](http://www.findarticles.com/p/articles/mi_m0CYH/is_8_6/ai_85046006) .
39. Fuel Cells Today, EIN Publishing Daily Newsletter, Apr 12, 2002, "SARS Technology Produces Low-Sulfur Diesel".
40. Penn State Science and Technology Newswire, Apr 12, 2002, "Ultra Clean Transportation Fuels at Low Temperatures and Atmospheric Pressure By Deep Desulfurization". <http://www.psu.edu/ur/2002/sulfurremoval.html>
41. India Today, India, Apr 22, 2002, p.49, "Another Way to Clean Fuels".
42. World Fuels Today, Apr 26, 2002, Hart Publications, "New Process Could Compete with Desulfurization Technologies".
43. Chemical Week Newswire, May 8, 2002, p.25, "Getting Sulfur Out of Fuels".
44. PT Industrial Management. Netherlands, May 2002, page 13 (Dutch), "Sulfur Catcher Alternative for Hydrotreater".
45. Waste Treatment Technology News, Vol. 17, No.9, May 2002, "Sorbent Create Ultra Clean Fuels".
46. Materials Today, June 2002, "Focus on the Small and Green". p.6.
47. Chemical Engineering Progress, Vol. 98, No. 6, June 2002, "Process Removes Sulfur from Fuels", p.19.
48. Diesel Fuel News, June 2002, Hart Publications, "Selective Adsorption for Removing Sulfur".
49. Chemical Engineering, Vol. 109, No. 5, May 1, 2002, p.21, Fuels Desulfurization".

50. Process Engineering, Cambridge, UK, May 31, 2002, p.15, "Fuelling Progress in Desulfurization".
51. Fuel Cell Technology News, Vol. 4, No.9, June 2002, "Desulfurization Cuts Odors".
52. Radio Show, Earth & Sky, July 17, 2002, "Cleaner Fuel", <http://www.earthsky.com/2002/es020717.html>.
53. EcoISP Online, "New Technology Removes Sulfur for Ultra-Clean Fuels", <http://www.ecoisp.com/goodnews14.asp>, Sept 30, 2002.
54. Penn State Blue, White and Green, "Process removes sulfur from liquid fuels at low temperature", <http://www.psu.edu/ur/psugreen/>, Sept 30, 2002.
55. Bizspace Petrochem, "Ultra clean transportation fuels by deep desulfurization", [http://www.bizspacepetrochem.com/Q0104/ultra\\_clean\\_transportation\\_fuels.htm](http://www.bizspacepetrochem.com/Q0104/ultra_clean_transportation_fuels.htm), Sept 30, 2002.
56. Intercom, PSU Newspaper, "Desulfurization Process Works at Low Temperatures", Oct 3, 2002.
- 57\*. Chemical & Engineering News, American Chemical Society, Vol. 80, No. 2, pp. 30-32, Oct 7, 2002, "Cleaner Future for Fossil Fuels".
58. American Chemical Society website, Capturing Carbon Dioxide in a Molecular Basket. Chemistry.org. , [http://www.chemistry.org/portal/a/c/s/1/feature\\_pro.html?id=e191c6fafaed11d6ede66ed9fe800100](http://www.chemistry.org/portal/a/c/s/1/feature_pro.html?id=e191c6fafaed11d6ede66ed9fe800100), Nov 18, 2002.
59. The Alchemist, Sept 8, 2003, "Chemical Technology for Producing Ultra-low Sulfur Content Diesel Oil".
- 60\*. Chemical & Engineering News, American Chemical Society, "Targeting Sulfur in Fuels for 2006", Vol. 81, No. 43, pp. 40-41, Oct 27, 2003.
61. Penn State Faculty/Staff Newswire, Aug 18, 2004, "Professor Earns Fulbright Award".
62. Centre Daily Times, PA, Aug 19, 2004, "Penn State Professor Receives Fulbright Award".
63. North American Catalysis Society Website, Interesting Catalysis Articles. "Fuel Processing for Low-temperature and High Temperature Fuel Cells, Challenges and Opportunities for Sustainable Development in the 21st Century". <http://www.nacatsoc.org/pubs.asp?Type=A>, Viewed Aug 20, 2004.
65. The Science of "Air Pharmacology" or "Chemtrails". Containing discussion of PSU adsorption desulfurization by Jim Phelps, <http://members.aol.com/doewatch/chemtrails.html>, viewed on-line, Apr 25, 2005.
66. Profiles, Clean Coal Centre, International Energy Agency, "Premium Carbon Products and Organic Chemicals from Coal, PF 05-05, Oct2005.
67. TV News Report, Alternative Energy Research at Penn State. WTAJ 10 News at Eleven, Channel 10, Central Pennsylvania, 11 pm, Feb 2, 2006.
68. Top25 Hottest Articles, within Catalysis Today. Song, C. Fuel processing for low-temperature and high-temperature fuel cells - Challenges, and opportunities for sustainable development in the 21st century. *Catalysis Today*, Vol. 77, Issue 1-2, 1 Dec 2002, pp 17-49 [http://top25.sciencedirect.com/index.php?subject\\_area\\_id=5&journal\\_id=09205861](http://top25.sciencedirect.com/index.php?subject_area_id=5&journal_id=09205861), Viewed Feb 20, 2006; remains on the list as of June 30, 2008.
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