

Curriculum Vitae

KYUNG C. KWON

Professor
Chemical Engineering Department
School of Engineering and Architecture
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EDUCATION:

COLORADO SCHOOL OF MINES, Golden, Colorado, Ph.D. Ch.E., 1974
UNIVERSITY OF DENVER, Denver, Colorado, M.S. Ch.E., 1970
HANYANG UNIVERSITY, Seoul, Korea, B.S. Ch.E., 1968
LICENSED PROFESSIONAL ENGINEER, Alabama State Certificate No.14815

RESEARCH INTERESTS AND EXPERTISE

- o coal liquefaction.
- o coal surface properties.
- o removal of heavy metals from wastewater with ion exchanging adsorbents.
- o formulations of bio-mass adsorbents for removal of heavy metals from wastewater.
- o formulations of metal oxide sorbents for desulfurization of hot coal gases.
- o infinitesimal interactions between probe compounds and solids with flow micro-calorimetry or inverse liquid chromatography.
- o high-temperature and high-pressure reactions.
- o adsorption separation.
- o non-Newtonian fluids.
- o reaction kinetics and models.
- o catalytic conversion of liquid biomass into hydrocarbon fuels
- o liquefaction of Southern pine wood with water, hydrogen, and catalysts
- o conversion of vegetable oils to biofuels in a solid catalyst-packed flow reactor

EXPERIENCE:

1982 to present CHEMICAL ENGINEERING DEPARTMENT, Tuskegee University, Tuskegee, AL 36088. (205) 727-8089/8942/8976

Professor

-Responsible for teaching students, developing research programs, advising students and serving as a member of committees. Courses taught include: Chemical Reaction Engineering (CE 360), Transport Phenomena (CE 410), Chemical Engineering Thermodynamics I (CE 250), Thermodynamics II (CE 350), Fluid Mechanics (CE 220), Heat Transfer (CE 310), Senior Unit Operations Lab. (CE 420), Junior Unit Operations Lab. (CE 320), Senior Engineering Analysis and Design (CE 490) and Process Control (CE 430).

1980 to COAL LIQUEFACTION LABORATORY, AUBURN UNIVERSITY, Auburn,
1982 AL 36830
Research Associate

1975 to GULF OIL CORP., GULF MINERAL CO., SYNTHETIC FUEL DIVISION, THE
1980 PITTSBURGH AND MIDWAY COAL MINING CO., SOLVENT REFINED COAL
(SRC) PILOT PLANT, North Fort Lewis, Washington
Process Engineer

1973 to SUPERIOR OIL CO., Commerce City, Colorado
1974 Part-time Research Engineer

1968 to SAMGSUNG GROUPS, KOREA FERTILIZER CO, Ulsan, Korea
1968 Production/Process Engineer

Summers PITTSBURGH ENERGY TECHNOLOGY CENTER, Pittsburgh, PA 15236-0940
83/84/ Oak Ridge Associated Universities Faculty Research Participant
88/89

Summer U.S. ARMY CHEMICAL RESEARCH, DEVELOPMENT AND
1987 ENGINEERING CENTER, Aberdeen Proving Ground, Maryland 21010-5423.
Summer Faculty Research Participant

Summer U. S. AIR FORCE ENGINEERING AND SERVICE CENTER, Tyndall AFB,
1990 Panama City, Florida 32403-6001
2008 Summer Faculty Research Participant

Summer Oak Ridge National Laboratory, Chemical Technology Division, Oak Ridge, TN 37831
1991 Summer Faculty Research Participant

Summer MORGANTOWN ENERGY TECHNOLOGY CENTER, Morgantown,
1994 WV 26507-0880
ORISE Summer Faculty Research Participant

Summer Oak Ridge National Laboratory, Environmental Division, Oak Ridge, Tennessee 37831
1998 ORISE Summer Faculty Research Participant

Summer NASA Glenn Research Center, Cleveland, OH 44135
2011 NASA Summer Glenn Faculty Fellow

PUBLICATIONS:

-"Study on Hot Solvent-Coal Mixing", Solvent Refined Coal Process Research & Development No. 53 (Interim Report No. 22), FE/496-T13, Energy Research & Development Administration.

-"SRC Agglomeration Study", Solvent Refined Coal Process Research & Development No. 53 (Interim Report No. 22), FE/496-T13, Energy Research & Development Administration.

-"Coal Slurry Preheater Study", Solvent Refined Coal Process Quarterly Technical Progress Report for April-June, 1977, FE/496-141, U.S. Department of Energy.

- "Viscosity Study on Kentucky Coal Slurry", Solvent Refined Coal Process Quarterly Technical Progress Report for April-June, 1977, FE/496-141, U.S. Department of Energy.
- "Specific Volume of Recycle Coal Solution Slurry", Solvent Refined Coal Process Quarterly Technical Progress Report for January-December, 1977, FE/496-149, U.S. Department of Energy.
- "Viscosity Model of SRC II Coal Slurry for Blacksville No. 2 Coal", Solvent Refined Coal Process Quarterly Technical Progress Report for March-June, 1978, FE/496-157, U.S. Department of Energy.
- "Pyrite Catalyzed Coal Liquefaction, Using Quinoline/Tetrahydroquinoline as H-Donor System", James A. Guin, Christine W. Curtis and K. C. Kwon, Fuel, Vol 62, p. 1412, London, England, 1983.
- "Selectivity of Coal Minerals, Using Cyclohexene as a Probe Reactant", Christine W Curtis, James A. Guin, and K.C. Kwon, Fuel, Vol. 62, p. 1341, London, England, 1983.
- "Coal Solvolysis in a Series of Model Compound Systems", James A. Guin, Christine W. Curtis and K. C. Kwon, Fuel, Vol. 63, p. 1404, London, England, 1984.
- "A Comparison of Anthracene and Phenanthrene in Coal Liquefaction", K.C. Kwon, Fuel, Vol. 64, p. 747, London, England, 1985.
- "Chemical Reaction Experiment for the Undergraduate Laboratory", K.C. Kwon, N. Vahdat and W. Ayers, Chemical Engineering Education, Vol. 21, No. 1, p. 30, 1987.
- "Determination of Heat of Adsorption on Activated Carbons by Flow Microcalorimetry", K.C. Kwon, Gas Separation & Purification, Vol.3, p. 13, England, 1989.
- "Study on Surface Properties of Coal, Using Various Probe Compounds", K.C. Kwon, D.H. Finseth, and R.W. Lai, Separation Science and Technology, Vol. 25, New York, 1990.
- "Kinetics of Removal of Heavy Metals by a Chelating Ion Exchange Resin, and Regeneration of the Resin by NH₄OH Solution", K. C. Kwon, Helen Jermyn, and Howard Mayfield, in Environmental Remediation, edited by G. F. Vandegrift, D.T. Reed, and I. R. Tasker, ACS Symposium Series book 509, Chapter 12, Pg. 161-179, ACS, Washington D.C., 1992.
- "Adsorption of Sr on *Micrococcus luteus* Microorganism", written with experimental data obtained as an ORAU summer faculty research participant, was submitted to the Oak Ridge National laboratory.
- "Adsorption of Various Alcohols on Illinois #6 Coal in Aqueous Solutions", Proceedings of the 18th International Technical Conference on Coal Utilization & Fuel Systems, Pg. 563-574, Florida, April 26-29, 1993.
- "Floatabilities of Treated Coal in Water at Room Temperature", Separation Science and Technology, V. 30, No. 7-9, Pg. 1997-2020, 1995.

-“Removal of Hydrogen Sulfide from Simulated Coal Gases, Using Metal Oxide Sorbents at High Temperature and High Pressure “, Pages 123 - 128, The Proceedings for The Fourth Annual HBCU/Private Sector-Energy Research and Development Technology Transfer Symposium, Greensboro, North Carolina, April 2-4, 1996.

-Reaction Kinetics on Removal of Hydrogen Sulfide with Metal Oxide Sorbents at High Temperature and Pressure”, Separation Science and Technology, V. 32, No. 1-4, Pg. 775-792, 1997.

-“Reactivity of Metal Oxide Sorbents for Removal of Wet Hydrogen Sulfide at High Temperatures”, The proceedings for the Fifth Annual HBCU/Private Sector-Energy Research and Development Technology Transfer Symposium, Baton Rouge, Louisiana, March 4-5, 1997

-“Experiments on Viscosity of Aqueous Glycerol Solutions using a Tank-Tube Viscometer”, Chemical Engineering Education, Pg. 232-237, Summer 1999.

-“Soil Carbon Sequestration and Land-Use Change: Processes and Potential”, Wilfred. M. Post, and K. C. Kwon, Global Change Biology Journal, 6, 317-327, 2000.

-“Reactivity of Metal Oxide Sorbents in the Removal of Hot Hydrogen Sulfide”, K. C. Kwon, Jennifer T. Pinder and Santosh K. Gangwal, Recent Developments in Air Pollution Control, edited by Mark P. Cal, Topical Conference Proceedings for Spring AIChE National Meeting, March 5-9, 2000, Atlanta, GA.

-“Chemical Reaction Engineering Education at Tuskegee University”, Peer-Reviewed Proceedings, Chemical Engineering Education in the New Millennium, Page 568- 576, Edited by David J. Dixon, Topical Conference Proceedings for the AIChE Annual Meeting, November 12-17, Westin Bonaventure/Marriott Downtown Los Angeles, CA.

-“ Viscosity of Glycerol and its Aqueous Solutions Measured by a Tank-Tube Viscometer”, Chemical Engineering Communications, Vol. 183, pp. 71-97, 2000.

- “Reactivity of Formulated Metal Oxide Sorbents with Hot Hydrogen Sulfide”, Peer-Reviewed Proceedings of 11th Symposium, Separation Science and Technology Volume 36, no. 5 & 6, PP 1375, 2001.

-“ Inexpensive and Simple Binary Molecular Diffusion Experiments, K. C. Kwon, T. H. Ibrahim, YoonKook Park, and C. M. Simmons, Chemical Engineering Education, Vol. 36, Number 1, 68-73, 2002.

Kinetics of Hot-Gas Desulfurization Sorbents for Transport Proceedings, pg 19, University Coal Research, Historically Black Colleges and Universities and Other Minority Institutions Contractors Review Conference, June 5-6, 2001, Pittsburgh Marriott City Center Reactors

Reactivity of AHI-5 Sorbent with Hot Hydrogen Sulfide in the Presence of Moisture and Hydrogen Separation Technology Topical Conference Proceedings, 2001 AIChE Annual Meeting, November 4-9, Reno, NV, pg 867 – 872

Reactivity of Sorbents with Hot Hydrogen Sulfide in the Presence of Moisture and Hydrogen, Separation Science and Technology , Volume 38, No. 12 & 13, pp. 3287 -3310, 2003.

Molecular Diffusion of Volatile-Liquid Vapors into Air”, K. C. Kwon, YoonKook Park, C. M. Simmons, G. L. Tibere, and T. H. Ibrahim, Chemical Engineering Communications, Vol. 190, Number 11, Pg 1449 – 1467, 2003

Pseudo-Binary Molecular Diffusion of Vapors into Air”, K. C. Kwon, YoonKook Park, C. M. Simmons, G. L. Tibere, and T. H. Ibrahim, Advances in Environmental Research, 8(2004), Pg. 667 – 678, 2004

-"A Simple Viscosity Experiment for High School Science", Chemical Engineering Education, Tamara Floyd Smith, K. C. Kwon, and Paul Jones, Summer 2006.

-" Characterizing Rheological Behavior of Fluid Milk with the Novel Non-Newtonian Equation for a Tank-tube Viscometer", K. C. Kwon, YoonKook Park, and Paul .Jones, Journal of Chemical Engineering of Japan, VoI. 40, No.9, pp 711 -717, 2007

-" Rheological Characterization of Shear- Thinning Fluids with a Novel Viscosity Equation of a Tank-tube Viscometer", K. C. Kwon, YoonKook Park, and Paul Jones, Applied Rheology, Vol. 17, No.5, pp. 51413-1 – 51413-9, 2007

_" Rheological Characterization of Non-Newtonian Fluids with a Novel Viscometer", Chemical Engineering Communications, Kyung C. Kwon, YoonKook Park, Tamara Floyd-Smith, Nader Vahdat, Erica Jackson, Claudell Burnell, Tikia Allen, and Paul Jones, Vol. 195, No 6, pp 687 – 705, 2008

-Kwon, K. C., Howard Mayfield, Ted Marolla, and Mike Mashburn, Catalytic Deoxygenation of Liquid Biomass for Hydrocarbon Fuels, Renewable Energy, Vol. 36, Issue 3, pp 907 – 915, 2011.

PRESENTATIONS:

-"Coal Solvolysis in a Series of Model Compound Systems", James A. Guin, Christine W. Curtis and K. C. Kwon, Presented to the AIChE Annual Meeting, November, Los Angeles 1982.

-"A Comparison of Anthracene and Phenanthrene in Coal Liquefaction", K.C. Kwon, Presented to the 188th ACS National Meeting, Philadelphia, August, 1984.

-"A Comparison of Anthracene and Phenanthrene in Catalyzing coal Liquefaction", K.C. Kwon, Presented to the AIChE Annual Meeting, San Francisco, November, 1984.

-"Thermal Effects on Coal Liquefaction", Presented to the World Congress III of Chemical Engineering, September, 1986, Tokyo, Japan.

-"Thermal Effects on Catalytic Activities in Coal Liquefaction", Presented to the AIChE Annual Meeting, Miami, November, 1986.

-"Thermal Effects on Liquefaction of Kentucky #9 Coal with NiMo/Al₂O₃ Catalyst", Presented to the ACS Annual Meeting, Anaheim, 1986.

-"Coal Liquefaction Study under the Nonisothermal Reaction Temperature", Presented to the Pittsburgh Energy Technology Center Contractors' Annual Meeting, 1986.

-"Determination of Heats of Adsorption on Activated Carbons by Flow Microcalorimetry",

Presented to the U.S. Army Chemical Research, Development and Engineering Center Scientific Conference on Chemical Defense Research, Aberdeen Proving Ground, Maryland, 1987.

- "Effects of Moisture on Heats of Adsorption on Activated Carbons", Presented to the AIChE National Meeting, New Orleans, March, 1988.

- "Properties of Coal Surface by Inverse Chromatography", Presented to the 6th Symposium on Separation Science and Technology for Energy Application, Knoxville, October 22-26, 1989.

- "Utilization of Ion Exchange Resin for the Purification of Plating Baths", Presented to the U.S. Air Force Engineering and Service Center, Tyndall AFB, Panama City Florida, July 16, 1990.

- "Kinetics of Adsorption and Desorption of Heavy Metals, Using Dowex XFS 4195.02 Ion Exchange Resin as an Adsorbent", presented at the Multiphase Reactors session, AIChE National Meeting, Houston, April 7-11, 1991.

- "Kinetics of the Removal of Heavy Metals by Dowex XFS 4195.02 Ion Exchange Resin and the Regeneration of the Resin by NH_4OH Solution", Presented at the ACS National Meeting, Atlanta, April 14-19, 1991.

- "Effects of Ca^{2+} on Adsorption on Bone-Gelatin Beads", presented at the Seventh Symposium on Separation Science and Technology for Energy Applications, 20-24, 1991, Knoxville, Tennessee.

- "Effects of Alkaline Cations on Strontium Adsorption by *Micrococcus luteus*", presented at the 14th Symposium on Biotechnology for Fuels and Chemicals, Gatlinburgh, Tennessee, May 11-15, 1992.

- "Effects of Ca^{2+} on Adsorption of Sr^{2+} on Ca-Alginate Beads", presented at the Summer AIChE National Meeting, Mineapolis, August 9-12, 1992.

- "Adsorption of Alcohols on Coal in Aqueous Solutions", presented at the AIChE Annual Meeting, Miami, November 1-6, 1992.

- "Analysis of Surface Properties of Coal by Inverse Liquid Chromatography", was presented at the 18th International Technical Conference on Coal Utilization & Fuel Systems, Clearwater, Florida, April 26 - 29, 1993.

- "Mechanisms on Equilibrium Adsorption of Probe Compounds on Coal", presented at the 1993 University Coal Research (UCR) Annual Contractors' Review conference, Westin William Penn Hotel, Pittsburgh, June 23 - 25, 1993.

- "Investigation of Surface Properties of Coal with Probe Compounds in Aqueous Solutions", presented for presentation at the Eighth Symposium on Separation Science and Technology for Energy Applications", Getlinburg, Tennessee, October 24 - 28, 1993.

- "Adsorption of Various Probe Compounds on Coal in Aqueous Solutions", presented at the 1993 AIChE Annual Meeting, St. Louis, Missouri, November 7 - 12, 1993.

- "Removal of Hydrogen Sulfide from Simulated Coal Gases, Using Metal Oxide

Sorbents at High Temperature and High Pressure “, was accepted for presentation at The Fourth Annual HBCU/Private Sector-Energy Research and Development Technology Transfer Symposium, Greensboro, North Carolina, April 2-4, 1996.

-”Reaction Kinetics on Removal of Hydrogen Sulfide with Metal Oxide Sorbents at High Temperatures and Pressures”, was presented at the Ninth Symposium on SEPARATION SCIENCE AND TECHNOLOGY FOR ENERGY APPLICATIONS, Park Vista Hotel & Convention Center, Gatlinburg, Tennessee, October 22-26, 1995.

-“Removal of Hydrogen Sulfide from Simulated Coal Gases, Using Metal Oxide Sorbents at High Temperature and High Pressure “, was presented at The Fourth Annual HBCU/Private Sector-Energy Research and Development Technology Transfer Symposium, Greensboro, North Carolina, April 2-4, 1996.

-”Reactivity of Metal Oxide Sorbents”, was accepted for presentation at the Advanced Coal-Fired Power Systems ‘96 Review Meeting, Morgantown Energy technology Center, Morgantown, WV, July 16-18, 1996.

-“Reactivity of Promising Metal Oxide Sorbents for Removal of Hydrogen Sulfide from Hot Coal Gases”, presented for the Session 110-Reactive Separation Processes I at 3:35 PM, November 13, 1996, the 1996 Annual AIChE Meeting, Chicago, November 10 -15, 1996.

-“Formulation of Metal Oxide Sorbents for Removal of Wet Hydrogen Sulfide”, was accepted for presentation at the 1997 Spring National AIChE Meeting, Houston, March 9 - 13, 1997.

-“Reactivity of Sorbents with Hot Hydrogen Sulfide in the Presence of Moisture and Hydrogen”, K. C. Kwon and Santosh K. Gangwal, presented at the Eleventh Symposium on Separation Science and Technology for Energy Applications, Park Vista Hotel & Convention Center, Gatlinburg, Tennessee, October 17 -21, 1999.

-“Reactivity of Metal Oxide Sorbents in the Removal of Hot Hydrogen Sulfide”, K. C. Kwon, Jennifer T. Pinder and Santosh K. Gangwal, presented at Spring AIChE National Meeting, March 5-9, 2000, Atlanta, GA.

-“Initial Reactivity of Metal Oxide Sorbents with H₂S at High Temperatures”, K. C. Kwon , Jennifer T. Pinder and Santosh K. Gangwal, presented at the DOE Annual Contractors’ Review Meeting, the National Energy Technology Laboratory, Pittsburgh, Pennsylvania, June 8 – 9, 2000.

-“Initial Reaction Kinetics of Solid Sorbents with H₂S at High Temperatures”, K. C. Kwon , Jennifer T. Pinder and Santosh K. Gangwal, presented at the AIChE Annual Meeting, November 12-17, 2000, Westin Bonaventure/Marriott Downtown, Los Angeles, CA

Molecular Diffusion Coefficients of Volatile-Liquid Vapors into Air Paper # 115h, Thermodynamics and Transport Properties Session, AIChE’s 2001 Annual Meeting, Reno Hilton, Reno, Nevada

Viscosity of Viscous Liquids Measured with a Novel Viscometer Paper # 186i, Viscous (Low-Reynolds-Number) Flows, AIChE’s 2001 Annual Meeting, Reno Hilton, Reno, Nevada

Reactivity of AHI-5 Sorbent with Hot Hydrogen Sulfide in the Presence of Moisture and Hydrogen
Paper # 263b, Novel Adsorbents for Pollution Prevention, AIChE's 2001 Annual Meeting, Reno
Hilton, Reno, Nevada

Kinetics of Direct Oxidation of Hydrogen Sulfide in Coal Gas to Elemental Sulfur, November 3 - 8,
Indianapolis, AIChE 2002 Annual Meeting

Reactivity of MCRH-67 Sorbent with Hot Hydrogen Sulfide in the Presence of Moisture and
Hydrogen, November 3 - 8, Indianapolis, Indiana AIChE 2002 Annual Meeting

Kinetics of Direct Oxidation of Hydrogen Sulfide in Coal Gas to Elemental Sulfur Historically Black
Colleges and Universities and Other Minority Institutions Contractors Review Meeting, Pittsburgh
Marriott City Center, June 4 -5, 2002

Measuring Viscosity of Carboxymethylcellulose With a Tank-Tube Viscometer, November 3 - 8,
Indianapolis, Indiana AIChE 2002 Annual Meeting

Molecular Diffusion Experiments, November 3 - 8, Indianapolis, Indiana, AIChE 2002 Annual
Meeting.

Conversion of H₂S in Coal Gases to Liquid Elemental Sulfur in a Micro Bubble Reactor
Engineered Particle Systems: Synthesis, Processes and Application Topical Proceedings, AIChE
Annual Meeting, San Francisco, CA, 2003

Characterization of Pseudo-plastic Fluids with a Novel Viscometer Incorporating New
Technology into Chemical Engineering Education (session 500), AIChE 2003 Annual Meeting
November 16 -21, 2003, San Francisco, California

Reactivity of EXSO₃ Sorbent with Hot Hydrogen Sulfide in the Presence of Moisture and
Hydrogen, AIChE 2003 Annual Meeting November 16 -21, 2003, San Francisco, California.

Conversion of H₂S in Coal Gas to Liquid Elemental Sulfur in a Micro Bubble Reactor, Novel
Fluidized Bed Application (session 53), AIChE 2003 Annual Meeting November 16 -21, 2003,
San Francisco, California

A novel Viscometer and Its Viscometer Equation Characterizing Pseudoplastic Liquids, AIChE
2003 Annual Meeting November 16 -21, 2003, San Francisco, California

Kinetics of Direct Oxidation of Hydrogen Sulfide in Coal Gas to Elemental Sulfur, Historically
Black Colleges and Universities and Other Minority Institutions DOE Annual Contractors'
Review Meeting Pittsburgh Marriott City Center Pittsburgh, PA, June 3 - 4, 2003

Catalytic Hydrodeoxygenation of Liquid Biomass for Hydrocarbon Fuels, Kwon, K. C., Howard
Mayfield, Ted Marolla, and Mike Mashburn, 2008 AIChE National Meeting, Philadelphia, November
20, 2008.

Liquefaction of Solid Southern Pine Wood with Water, Hydrogen, and Catalysts at High Temperature
and Pressure, Kyung C. Kwon and Valerie Gordon, presented at 2009 AIChE National Meeting,
Nashville, November 2009.

Formulation of monolithic catalysts for biodiesel fuels from vegetable oils via transesterification, Kyung C. Kwon, Michael J. Kulis, and Aloysius F. Hepp, presented at 2011 HBCU/OMI Collaboration Symposium, Cleveland State University, July 26 – 27, 2011

Formulation of honeycomb heterogeneous monolithic catalyst for the production of biodiesel from vegetable oils, Jonathan Mbah, Kyung C. Kwon, and Nader Vahdat, presented at 2011 AIChE Annual Meeting, Minneapolis, MN, October 16 – 21, 2011

PATENTS, COPYRIGHTS, AND SOFTWARE SYSTEMS

K. C. Kwon, Nader Vahdat, Tamara M. Floyd-Smith, Legand L. Burge, and Paul Jones, US Patent 7730769, Novel Capillary Viscometers for Use with Newtonian and Non-Newtonian Fluids, June 2010

The computer programs, entitled as Calculation of Friction Factors for Newtonian Fluids, Calculations of Vapor-liquid Equilibrium Constants for Hydrocarbons, and Calculations of Flash Pressures, Vapor/liquid Fractions, and their Compositions of Multi-Component Hydrocarbon Mixtures, were listed in the 1998 CEP (Chemical Engineering Progress) Journal. These computer programs were developed for the mass transfer, thermodynamics, and fluid mechanics classes

Kinetics of Removal of Heavy Metals by a Chelating Ion Exchange Resin, and Regeneration of the Resin by NH_4OH Solution", K. C. Kwon, Helen Jermyn, and Howard Mayfield, in Environmental Remediation, edited by G. F. Vandegrift, D.T. Reed, and I. R. Tasker, ACS Symposium Series book 509, Chapter 12, Pg. 161-179, ACS, Washington D.C., 1992.

SYNERGETIC ACTIVITIES:

- Served as a co-chairman for one of the reaction kinetics sessions for the World Congress III of Chemical Engineering, Tokyo, Japan, 1986.
- Served as a panelist on the Coal Reaction Chemistry Panel to review proposal applications submitted to the U. S. Department for consideration by the University Research Program, 1992
- The Proposals in the response to the Energy Efficiency Science Solicitation DE-PS36-00G010500, U. S. Department of Energy, National Energy Technology Center, Morgantown, WV, were reviewed in May 2000.
- A proposal for SBIR/STTR Phase 1 Grant was reviewed in May 2005

PROFESSIONAL AFFILIATIONS:

Licensed Professional Engineer, Alabama State Certificate No.14815
AIChE
ACS

RECENT TEACHING ACTIVITIES:

CENG 420, Senior Unit Operations Laboratory II
CENG 490, Capstone Design
CENG 380, Mass Transfer
CENG 360, Chemical Reaction Engineering

