**Semih Eser**

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## a. Professional Preparation

Middle East Technical University Chemical Engineering B.S. 1976, Ankara, Turkey

Middle East Technical University Chemical Engineering M.S. 1978, Ankara, Turkey

Penn State University Fuel Science Ph.D. 1986

## b. Appointments

2014 Izmir Institute of Technology, Izmir, Turkey, Fulbright Scholarship

2010-present PSU, Director, Carbon Materials Program, EMS Energy Institute

2008 -2009 Universidad Autónoma de Madrid, Spain, Visiting Professor

2008 Universidad de Málaga, Spain, Visiting Professor

2007- PSU, Professor, Department of Energy and Mineral Engineering

2001-2006 PSU, Associate Department Head, Department of Energy and Geo-Environmental Engineering (now Department of Energy and Mineral Engineering)

2004 PSU, Acting Department Head, Department of Energy and Geo-Environmental

 Engineering (now Department of Energy and Mineral Engineering)

2003 Chulalongkorn University, Bangkok, Thailand, Visiting Professor

2002 University of Petroleum, Dongying City, Visiting Professor

2002 Dalian University of Technology, Dalian, China, Visiting Professor

2000-2010 PSU, EMS Energy Institute, Carbon Materials Program Coordinator

1998-2000 PSU, EMS Energy Institute, Director, Lab. for Hydrocarbon Proc. Chem.

1988-1998 PSU, Research Associate, Assistant Professor, Associate Professor, Department of Materials Science and Engineering

1987-1988 Auburn University, Research Associate, Department of Chemical Engineering

1978 -1981 Minerals Research and Exploration Institute of Turkey, Research Engineer

***c. Research Funding and Consulting Engagements***

Effects of Metal Surfaces on Solid Deposition from Jet Fuels – **U.S. Air Force**Inhibition of Solid Deposition on Metal Surfaces – **Rolls-Royce**

Characterization of Deposition in Engine Fuel Systems - **Continental Corporation**

Solid Deposit Characterization – **Allison Engine Company**

Characterization of Nozzle Deposits – **Parker Hannifin Corporation**

Degradation of Fuels and lubricant in Engine Tests – **Infineum USA LP**

Environmental Issues and Toxicology of AVGAS - **FAA**

Adsorption of VOC on Solid Carbon Surfaces – **Ford Motor Company**

Digital Image Analysis of Petroleum Cokes and Carbon Materials – **UNOCAL**Carbonization of Decant Oils in Flow and Batch Reactors – **The Carbide/Graphite Group, Inc., Seadrift Coke**

### *d. Research Contributions for Solving Technical Programs*

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1. *Mechanism and Inhibition of Carbonaceous Solid Deposition on Metal Surfaces from Heated Fuels in Internal Combustion Engines (1994-present)*
* Eser has carried out research on undesirable formation of *solid carbon deposits* from decomposition of *jet fuel*, diesel fuel, and gasoline as well as from lubricating oils. A particular concern with solid deposition relates to the operation of advanced aircraft.
* Eser’s research program has identified different *mechanisms* of solid carbon deposition on metal surfaces and led to strategies to prevent or inhibit deposit formation by judicious selection of stable *metal alloys* for manufacturing the fuel system components,and by *pre-oxidation,* or *coating* of metal surfaces to produce protective thin films.
* Research results have been disseminated in publications of refereed papers, conference presentations, and reports to the research sponsors, including DOE, DOD, and companies involved in manufacturing aircraft engines and fuel injector nozzles.

2. *Measurement of Critical Properties of Jet Fuels and Pyrolysis of Jet Fuels and Related Hydrocarbons under Supercritical Conditions (1994- 2012)*

* Eser’s research on *jet fuel pyrolysis* has focused on *supercritical-phase* decomposition of hydrocarbons with particular emphasis on the effects of the supercritical phase on *solid carbon deposition from pyrolysis*.
* Supercritical-phase hydrocarbon decomposition is particularly relevant to the development of high-speed aircraft and using fuel as coolant on board to protect hardware. In this study, the critical properties of commercial and military jet fuel samples have been measured and/or calculated.
* Laboratory experiments have been conducted on jet fuel samples and mixtures of hydrocarbons to study the effects of supercritical conditions on the mechanism of hydrocarbon decomposition. The results were published in refereed journals, presented at national and international conferences and in technical reports to the sponsors, including DOE, and DOD.

3.Temperature Programmed Oxidation (TPO) for Characterization of Relationships between Carbon Microstructure and Oxidative Reactivity (1998-present)

* One weak spot in the impressive portfolio of material properties for solid carbons is their low resistance to oxidation.
* Understanding oxidative reactivity of carbon materials in different environments is, therefore, critical.
* Eser’s research in this area has focused in studying the relationships between microstructure and reactivity of carbon materials using in-situ techniques, including environmental SEM and in-situ x-ray diffraction along with the use of microscopic characterization and TPO in tandem.
* The applications from this research program have ranged from clarifying the mechanism of carbon deposit formation on metal surfaces , understanding the failure of C-C composite aircraft breaks in the presence of de-icing fluids on airport runways to, the extent graphitization of carbon materials, and formation of spherulitic carbon particles from low-density polyethylene pyrolysis.
* The results from these studies have been presented in technical conferences and published in refereed journals.

4. *Relationship between Carbonaceous Mesophase Development and Molecular Composition of FCC Decant Oils for Needle Coke Production (1986-present)*

* Making graphite electrodes from petroleum- and coal-derived materials involves an exceedingly complex chemistry of forming an intermediate liquid crystalline phase, *carbonaceous mesophase* that hardensinto a graphitizable *needle coke* through *carbonization.*
* Understanding the *relationships* between the *chemical composition of petroleum* *feedstocks* and *mesophase* development enables the manufacture of high-quality graphite electrodes for significant energy and material savings.
* Three major petroleum/coke companies have adopted the procedures developed in Eser’s laboratory to produce better graphite electrodes for more efficient recycling of iron and steel.
* Eser has documented his research in refereed publications, conference presentations, and reports to the sponsors.

***e. List of Publications***

*Refereed Journal Publications*

1. S. Andreoli and S. Eser, “Relating Reactivity to Structure in Cokes and Carbon Materials: Temperature-Programmed Oxidation and Microscopy Techniques,” *Carbon* **168**, 362-371 2020.
2. C. Fernandez-Ruiz, J. Bedia, S. Andreoli, S. Eser, J. J. Rodríguez, “Selectivity to Olefins in the Hydrodechlorination of Chloroform with Activated Carbon-Supported Palladium Catalysts,” *Ind. Eng. Chem. Res*. **58**, 20592-20600, 2019.
3. J. A. Baeza, L. Calvo, N. Alonso-Morales, F. Heras, S. Eser, J.J. Rodriguez, M. A. Gilarranz, “Effect of structural ordering of the carbon support on the behavior of Pd catalysts in aqueous-phase hydrodechlorination,” *Chemical Engineering Science* **176**, 400-408, 2018.
4. J. P. Abrahamson, R. T. Wincek, S. Eser, “Scheme for Hydrotreatment of Fluid Catalytic Cracking Decant Oil with Reduced Hydrogen Consumption and High Needle Coke Yield upon Carbonization,” *Energy Fuels* **30**, pp. 8150-8155, 2016.
5. Ronald T. Wincek, Joseph P. Abrahamson, and Semih Eser, “Effects of Catalyst Properties on Hydrodesulfurization Activity for Sulfur Removal from Fluid Catalytic Cracking Decant Oils,” *Energy Fuels* **30**, 7173-7179, 2016.
6. Ronald T. Wincek, [Joseph P. Abrahamson](http://pubs.acs.org/author/Abrahamson%2C%2BJoseph%2BP), and Semih Eser, “Hydrodesulfurization of Fluid Catalytic Cracking Decant Oils in a Laboratory Flow Reactor and Effect of Hydrodesulfurization on Subsequent Coking,” *Energy Fuels* **30**, pp 6281–6289, 2016.
7. L. Briesemeister, A. Geißler, S. Halama, S. Herrmann, U. Kleinhans, M. Steibel, M. Ulbrich, A. W. Scaroni, M. R. Khan, S. Eser, L. R. Radovic, “Coal Pyrolysis,” Ullmann's Encyclopedia of Industrial Chemistry, 2016.
8. Elena Diaz, Angel F. Mohedano, Jose A. Casas, Cigdem Shalaby, Semih Eser, Juan J. Rodriguez, “On the performance of Pd and Rh catalysts over different supports in the hydrodechlorination of the MCPA herbicide,” *Applied Catalysis B: Environmental*, Volume **186**, 151-156, 2016.
9. M. Martin-Martinez, A. Álvarez-Montero, L.M. Gómez-Sainero, R.T.Baker, J. Palomar, S. Omar, S. Eser, J.J. Rodriguez, “Deactivation Behavior of Pd/C and Pt/C Catalysts in the Gas-Phase Hydrodechlorination of Chloromethanes: Structure–Reactivity Relationship,” Applied Catalysis B: Environmental **162**, 532-543, 2015.
10. N. Alonso-Morales, M. A. Gilarranz, F. Heras, J. J. Rodriguez, and S. Eser, “Oxidation

 Reactivity and Structure of LDPE-Derived Solid Carbons: A Temperature-Programmed Oxidation Study,” *Energy Fuels* **27**, 1151-1161, 2013.

1. S-D. B. Kouamea, J. Perez, S. Eser, A. Benesi, “1H-NMR Monitoring of the Trans-esterification Process of Jatropha Oil,” *Fuel Process. Technol*. **97**, 60-64, 2012.
2. N. Alonso-Morales, M. A. Gilarranz, F. Heras, J. J. Rodriguez, S. Eser (3), “Effects of Heat

 Treatment on the Structure of LDPE-Derived Solid Carbons,” *Chem. Eng. J*. **172**, 1126-1136, 2011.

1. A. Ram Mohan, S. Eser, “Effectiveness of Low-Pressure Metal-Organic Chemical

 Vapor Deposition Coatings on Metal Surfaces for the Mitigation of Fouling from Heated Jet Fuel,” *Ind. Eng. Chem. Res*. **50**, 7290-7304, 2011.

1. A. Ram Mohan and S. Eser, “Analysis of Carbonaceous Solid Deposits from Thermal Oxidative Stressing of Jet-A Fuel on Iron- and Nickel-Based Alloy Surfaces,” *Ind. Eng. Chem. Res.* **49**, 2722–2730, 2010.
2. N. Alonso-Morales, M. A. Gilarranz, F. Heras F, S. Eser S, J. J. Rodriguez, “Effects of Reactor Configuration on the Yield of Solid Carbon from Pyrolysis of Low-Density Polyethylene Source,” *Energy Fuels* **23**, 6095-6101, 2009.
3. N. Alonso-Morales, M. A. Gilarranz, F. Heras F, S. Eser S, J. J. Rodriguez, “Influence of Operating Variables on Solid Carbons Obtained by Low-Density Polyethylene Pyrolysis in a Semi-continuous Fast Heating Quartz Reactor,” *Energy Fuels* **23**, 6102-6110, 2009.
4. R. Venkataraman and S. Eser, “Characterization of Deposits Formed on Diesel Injectors in Field Test and from Thermal Oxidative Degradation of n-hexadecane in a Laboratory Reactor, *Chemistry Central Journal* **2**, 25, 2008.
5. R. Venkataraman and S. Eser, “Characterization of Solid Deposits Formed from Jet Fuel Degradation under Pyrolytic Conditions: Metal Sulfides,” *Ind. Eng. Chem. Res*. **47**, 9351–9360, 2008.
6. R. Venkataraman and S. Eser, “Characterization of Solid Deposits Formed from Short Durations of Jet Fuel Degradation: Carbonaceous Solids,” *Ind. Eng. Chem. Res*. **47**, 9337–9350, 2008.
7. R. Venkataraman and S. Eser, “Characterization of Solid Deposits from the Thermal-oxidative Degradation of Jet Fuel,” *Int. J. Oil, Gas and Coal Technology* **1**(1/2), 2008.
8. J. P. Mathews, S. Eser, P. G. Hatcher, A. W. Scaroni, “The shape of Pulverized Bituminous Vitrinite Coal Particles,” *KONA Powder and Particle* **25**,145-152, 2007.
9. G. Wang and S. Eser, “Molecular Composition of the High-Boiling Components of Needle Coke Feedstocks and Mesophase Development,” *Energy Fuels* **21**, 3563- 3572, 2007.
10. S. Eser and G. Wang, “A Laboratory Study of a Pretreatment Approach To Accommodate High-Sulfur FCC Decant Oils as Feedstocks for Commercial Needle Coke,” *Energy Fuels* **21**, 3573-3582, 2007.
11. D. González, O. Altin, S. Eser, and A. B. Garcia, “Temperature-programmed Oxidation Studies of Carbon Materials Prepared from Anthracites by High-Temperature Treatment,” *Mater. Chem. Phys*. **101**, 137-141, 2007.
12. S. Eser, R. Venkataraman, and O. Altin, “Utility of Temperature-Programmed Oxidation for Characterization of Carbonaceous Deposits from Heated Jet Fuel,” *Ind. Eng. Chem. Res.* **45**, 8956-8962, 2006.
13. S. Eser, R. Venkataraman, and O. Altin, “Deposition of Carbonaceous Solids on Different Substrates from Thermal Stressing of JP-8 and Jet A Fuels,” *Ind. Eng. Chem. Res*. **45**, 8946-8955, 2006.
14. O. Altin and S. Eser, “Pre-oxidation of Inconel Alloys for Inhibition of Carbon Deposition from Heated Jet Fuel,” *Oxid. Met.* **65**, 75-99, 2006.
15. H. Groenzin, O. C. Mullins, S. Eser, J. Mathews, M. G. Yang, D, Jones, “Molecular Size of Asphaltene Solubility Fractions,” *Energy Fuels* **17**, 498-503, 2003.
16. J. Xie, P. K. Sharma, V.V. Varadan , V.K. Varadan, B. K. Pradhan , S. Eser, “Thermal, Raman and Surface Area Studies of Microcoiled Carbon Fiber Synthesized by CVD Microwave System,” *Mater. Chem. Phys.* **76**, 217-223, 2002.
17. R. N. Basu, O. Altin, M. J. Mayo, C. A. Randall and S. Eser, “Fugitive Carbon Deposition by CVD for Solid Oxide Fuel Cell Zirconia Electrolyte Fabrication,” *J. Electrochem. Soc.* **148**, A506-A512, 2001.
18. O. Altin and S. Eser, “Analysis of Solid Deposits from Thermal Stressing of a JP-8 Fuel on Different Tube Surfaces in a Flow Reactor," *Ind. Eng. Chem. Res.* **40**, 596- 603, 2001.
19. O. Altin and S. Eser, “Analysis of Solid Deposits from Thermal Stressing of a JP-8 Fuel on Different Superalloy Surfaces in a Flow Reactor,” *Ind. Eng. Chem. Res.* **40**, 589-595, 2001.
20. S. Eser, O. Altin, and B. K. Pradhan, “Formation of Carbon Nanotubes from Jet Fuel on Superalloys at Moderate Temperature and High Pressure,” *Carbon* **38**, 1512-1515, 2000.
21. O. Altin and S. Eser, “Characterization of Carbon Deposits from Jet Fuel on Inconel 600 and Inconel X Surfaces,” *Ind. Eng. Chem. Res.* **39**, 642-645, 2000.
22. J. Yu and S. Eser, “Supercritical-Phase Thermal Decomposition of Binary Mixtures of Jet Fuel Model Compounds,” *Fuel* **79**, 759-768, 2000.
23. S. A. Carabineiro, I.F. Silva, M. Klimkiewicz, and S. Eser, “In-Situ Techniques for Studying Deterioration of C/C Composite Aircraft Brakes by Catalytic Oxidation,” *Mater. Corros.* **50**, 1-7, 1999.
24. J. Yu, and S. Eser, “Thermal Decomposition of Jet Fuel Model Compounds under Near-Critical and Supercritical Conditions: 2. Decalin and Tetralin,” *Ind. Eng. Chem. Res.* **37**, 4601–4608, 1998.
25. J. Yu and S. Eser, “Thermal Decomposition of Jet Fuel Model Compounds under Near-Critical and Supercritical Conditions: 1. N-Butylbenzene and n- Butylcyclohexane,” *Ind. Eng. Chem. Res.* **37**, 4591–4600, 1998.
26. I. F. Silva, C. Palma, M. Klimkiewicz, and S. Eser, “Kinetics, in-situ x-ray Diffraction, and Environmental Scanning Electron Microscopy of Activated Charcoal Gasification Catalyzed by Vanadium Oxide, Molybdenum Oxide and their Eutectic Alloy,” *Carbon* **36**, 861-868, 1998.
27. I. F. Silva, M. Klimkiewicz, and S. Eser “An Environmental Scanning Electron Microscopy Study of Activated Charcoal Gasification Catalyzed by MoO3 in Air and in Oxygen and by Eutectic Alloy of MoO3 and V2O5 in Air,” *Energy Fuels* **12**, 554 –562, 1998.
28. J. Yu and S. Eser, “Kinetics of Supercritical-Phase Thermal Decomposition of C-10 to C-14 Normal Alkanes and Their Mixtures,” *Ind. Eng. Chem. Res.* **36**, 585-591, 1997.
29. J. Yu and S. Eser, “Thermal Decomposition of C-10 to C-14 Normal Alkanes in Near-Critical and Supercritical Regions: Product Distributions and Reaction Mechanisms,” *Ind. Eng. Chem. Res.* **36**, 574-584, 1997.
30. T. R. Filley, R. M. Filley, S. Eser, and K. H. Freeman, “Compound-Specific Isotope Analyses of Products from Carbonization of a FCC Decant Oil Doped with 13C- Enriched 4-Methyldibenzothiophene,” *Energy Fuels* **11**, 637-646, 1997.
31. R. M. Filley and S. Eser, “Reactions of 13C Labeled 4-Methyldibenzothiophene Carbonized with FCC Decant Oils,” *Energy Fuels* **11**, 631-636, 1997.
32. R. M. Filley and S. Eser, “Analysis of Hydrocarbons and Sulfur Compounds in FCC Decant Oils and their Carbonization Products,” *Energy Fuels* **11**, 623-630, 1997.
33. K. Gergova and S. Eser, “Effects of Activation Method on the Pore Structure of Activated Carbons from Apricot Stones,” *Carbon* **34**, 879-888, 1996.
34. S. Eser and L. Hou, “3-D 1H NMR Imaging of Porosity in Calcined Needle Cokes,” *Carbon* **34**, 805-807, 1996.
35. E. M. Yoon, L. Selvaraj, S. Eser, and M. M. Coleman, “High-Temperature Stabilizers for Jet Fuels and Similar Hydrocarbon Mixtures,” *Energy Fuels* **10**, 812- 815, 1996.
36. S. Eser, “Mesophase and Pyrolytic Carbon Formation in Aircraft Fuel Lines,” *Carbon* **34**, 539-547, 1996.
37. K. Gergova, S. Eser, H. H. Schobert, M. Klimkiewicz, and P. Brown, “Environmental Scanning Electron Microscopy of Producing Activated Carbons from Anthracite,” *Fuel* **74**, 1042-1048, 1995.
38. J. Yu and S. Eser, “Determination of Critical Properties of Some Jet Fuels,” *Ind. Eng. Chem. Res.* **34**, 404-409, 1995.
39. N. Petrov, K. Gergova, and S. Eser, “Effect of Water Vapor on the Porous Structure of Activated Carbon from Lignite,” *Fuel* **73**, 1197-1201, 1994.
40. K. Gergova, N. Petrov, and S. Eser, “Adsorption Properties and Microstructures of Activated Carbons Produced from Agricultural By-products by Steam Pyrolysis,” *Carbon* **32**, 693-702, 1994.
41. T. Sasaki, R. G. Jenkins, S. Eser, and H. H. Schobert, “Carbonization of Anthracene and Phenanthrene II. Spectroscopy and Mechanisms,” *Energy Fuels* **7**, 1047-1053, 1993.
42. T. Sasaki, R. G. Jenkins, S. Eser, and H. H. Schobert, “Carbonization of Anthracene and Phenanthrene I. Kinetics and Mesophase Development,” *Energy Fuels* **7**, 1039- 1046, 1993.
43. K. Gergova, S. Eser, and H. H. Schobert, “Preparation and Characterization of Activated Carbons from Anthracite,” *Energy Fuels* **7**, 661-668, 1993.
44. C. Song, S. Eser, H. H. Schobert, and P.G. Hatcher, “Pyrolytic Degradation Studies of a Coal-Derived and a Petroleum-Derived Aviation Jet Fuel,” *Energy Fuels* 7, 234-243, 1993.
45. G. D. Cody, S. Eser, P. G. Hatcher, A. Davis, M. Sobkowiak, S. Shenoy, and P. C. Painter, “Temperature Dependence of the Swelling of Coals in Pyridine,” *Energy Fuels* **6**, 716-719, 1992.
46. S. Eser, R. G. Jenkins, G. Wei, H. H. Schobert, and J. T. Joseph “High-Temperature Swelling of Coal/Tetralin Mixtures in A High-Pressure Microdilatometer,” *Fuel* **70**, 1445-1455, 1991.
47. S. Eser and R. G. Jenkins, “Carbonization of Petroleum Feedstocks II: Chemical Constitution of the Feedstock Asphaltenes and Mesophase Development,” *Carbon* **27**, 889-897, 1989.
48. S. Eser and R. G. Jenkins, “Carbonization of Petroleum Feedstocks I: Relationships Between Chemical Constitution of the Feedstocks and Mesophase Development,” *Carbon* **27**, 877-887, 1989.
49. S. Eser, F. J. Derbyshire, and G. G. Karsner, “Improvement of Coke Texture by Thermal Pretreatment of Petroleum Residua,” *Fuel* **68**, 1146-1151, 1989.
50. S. Eser, R. G. Jenkins, M. Malladi, and F. J. Derbyshire, “Carbonization of Coker Feedstocks and Their Fractions,” *Carbon* **24**, 77-82, 1986.
51. A. Çulfaz and S. Eser, “Yield and Composition of the Products from Pyrolysis of Solid Fuels,” *Doğa Bilim Dergisi* **9**, 1-11, 1985 (in Turkish).

*Selected Refereed Book Chapters*

1. M. R. Riazi and S. Eser, “Feedstocks and Products of Crude Oil and Natural Gas Refineries,” In *Petroleum and Natural Gas Refining and Processing*, Editors: M. R. Riazi, S. Eser, J. L. Peña, ASTM International, West Conshohocken, PA, 2013, pp. 21-32.
2. M. R. Riazi and S. Eser, “Properties, Specifications, and Quality of Crude Oil and Petroleum Products,” In *Petroleum and Natural Gas Refining and Processing*, Editors: M. R. Riazi, S. Eser, J. L. Peña, ASTM International, West Conshohocken, PA, 2013, pp. 79-100.
3. S. Eser and M. R. Riazi, “Crude Oil Refining Processes,” In *Petroleum and Natural Gas Refining and Processing*, Editors: M. R. Riazi, S. Eser, J. L. Peña, ASTM International, West Conshohocken, PA, 2013, pp. 101-126.
4. S. Eser and Jose Guitian, “Heavy Oil Processing,” In *Petroleum and Natural Gas Refining and Processing*, Editors: M. R. Riazi, S. Eser, J. L. Peña, ASTM International, West Conshohocken, PA, 2013, pp. 177-196.
5. S. Eser, G. Wang, J. Clemons, “Molecular Constitution, Carbonization Reactivity and Mesophase Development from FCC Decant Oil and its Derivatives” in *Heavy Hydrocarbon Resources: Characterization, Upgrading, and Utilization* Editors: Masakatsu Nomura, Parviz M. Rahimi and Omer Refa Koseoglu, ACS Symposium Series, No. 895; Oxford University Press, 2004, pp. 95-111.
6. S. Eser and J. Andresen, “Properties of Fuels, Petroleum Pitch, Petroleum Coke, and Carbon Materials,” In *Fuels and Lubricants Handbook: Technology, Properties, Performance, and Testing*, Editors: George E. Totten; Rajesh J. Shah; Steven R. Westbrook, ASTM, West Conshohocken, PA, 2003, pp. 757-786.
7. S. Eser, “Carbonaceous Mesophase Formation and Molecular Composition of Petroleum Feedstocks,” in Supercarbon: Synthesis, Properties, and Applications, S. Yoshimura and R. P. H. Chang Eds, Springer-Verlag, Berlin, 1998, pp.147-155.
8. A.W. Scaroni, M.R. Khan, S. Eser, L. R. Radovic, "Coal Pyrolysis," In Handbook of Extractive Metallurgy, Edited by F. Habashi, Wiley-VCH, Weinheim, 224-268, 1997.
9. W. Scaroni, M.R. Khan, S. Eser, L. R. Radovic, "Coal Pyrolysis," In Ullmann's Encyclopedia of Industrial Chemistry, Vol. A7, 245-280, 1986.

#### f. *Instructional Activities*

*Major Courses Developed and Taught at PSU and Izmir Institute of Technology (IIT)*

#### EGEE 101H-Energy and the Environment

#### EM SC 420/STS 420/SOC 420-Energy and Modern Society

#### EGEE 210/211-Technological and Social Legacy of Pennsylvania Coal

#### EGEE 437-Fundamentals of Renewable Energy

#### EGEE 438-Sustainable Energy Options

EGEE 494-Research Project

ENE 556-Energy Engineering Workshop - Energy and Society - A Science Technology Society Approach (Developed and taught at IIT in Izmir)

ENE 580 Special Topics in Energy Engineering - Sustainable Energy (Developed and taught at IIT in Izmir)

####  F SC 432 / CH E 432 - Petroleum Processing

F SC 501 –Problems in Fuel Science

F SC 502 – Problems in Fuels Engineering

STS 201 – Energy, Global Climate Change, and Biodiversity

#### *Courses Taught at PSU*

EGEE 464W – Energy Capstone Design Project

EM SC 470W – Undergraduate Collaborative Research in Earth and Mineral Sciences on Energy and the Environment (three separate offerings with student travel to [Iceland, UK], New Zealand, [Iceland, Holland, Sweeden, Denmark, Germany, Norway])

EM SC 100S – Earth and Mineral Sciences First-Year Seminar

#### *g. Synergistic Activities*

#### *American Chemical Society*

 Fellow, 2014

 Division of Energy and Fuels Chemistry: Councilor, 2016-2020, 2013-2015, Division of Fuel Chemistry: Councilor, 2010-2012, Chair of Executive Committee, 2005; Program Chair, 2004.

*American Carbon Society*

 Advisory Committee for 2010-2016 term, Awards Secretary 2010-2016

 International Advisory Board for the Annual World Conference on Carbon, Shanghai, China, 2011.

*Penn State University*

 Graduate Council, Elected Member, 2001-2002, 2002-2004

 Advisory Committee for International Partnerships and Academic Linkages, 2003

 Teaching and Learning Consortium, Chair, Faculty Team, 2001- 2003

 Schreyer Honors College, Faculty Advisory Committee, 2006-2011

 Department of Energy and Mineral Engineering, PSU

 Energy and Fuels Option in Chemical Engineering, Officer

 Strategic Planning Committee, Chair, 2001-2002

 Phi Kappa Phi Honor Society/Penn State Chapter, Treasurer, 2006-2008

*Editorship/Editorial Boards*

Co-editor and co-author (5 chapters) for ASTM’s Handbook of Petroleum and Natural Gas Refining and Processing, Editors: M. R. Riazi, S. Eser, J. L. Peña

- 33 chapters, published in 2013 by ASTM International

 Journal New Carbon Materials (2010- present)

 International Journal of Oil, Gas and Coal Technology (2007-present)

 Chemistry Central Journal (2006-present)

 Journal of ASTM International (2006-present)

### *h. Collaborators & Other Affiliations*

#### *(i) Collaborators*

Juan José Rodríguez, Miguel Angel Gilarranz, José Antonio Casas, *Universidad Autónoma de Madrid*, Spain; Isabel Fonseca, *Universidade* *Nova de Lisboa,* Portugal; A.B. Garcia, *Instituto Nacional del Carbón (INCAR),* Spain;Jason Qiu, *Dalian University of Technology*, China; Qing-Fang Zha, *University of Petroleum, Qingdao*, China

#### *(ii) Graduate and Postdoctoral Advisors*

Ph.D. Dissertation, Robert G. Jenkins, University of Vermont

Postdoctoral: R.T. K. Baker, Private Sector

 *(iii) Thesis Advisees, Post-Doctoral, and Visiting Scholars*

 1. Jian Yu, Ph.D. 2. Jun Li, Ph.D.

3. Rose M. Filley, M.S. 4. Gaolin Qiao, Ph.D.

 5. Fan Zhang, M. S. 6. Mine Gunes Ucak, M.S.

 7. Guohua Wang, Ph.D., Postdoc 8. Ramya Venkataraman, M.S., Ph.D.

 9. Abraham J. Brandt, M.S. 10. Sylvain Didier Kouma, M.S.

 11. Arun Ram Mohan, Ph. D., Postdoc 12. Ronald T. Wincek, M.S.

 13. Joseph P. Abrahamson, M.S. 14. Shuming Zheng, Postdoc

 15. Orhan Altin, Postdoc 16. Bhabendra Pradhan, Postdoc \

 17. Yan Lai Liu, Postdoc 18. Qing-Fang Zha, Visiting Professor, China

 19. Isabel Fonseca (S Silva), Scholar Portugal 20. Eloisa González Serrano, Scholar, Spain

 21. Yusuke Nakayama, Professor, Japan 22. Lale Ersoy, Professor, Turkey

 23. E. Raymundo-Piñero, Scholar, France 24. Yun-Soo Lim, Professor, S. Korea

 25. Noelia A. Morales, Scholar, Spain 26. Limin Chen, Postdoc

 27. José Antonio Casas, Professor, Spain 28. Ariadna Alvarez, Scholar, Spain

 29. Ramiro Ruiz Rosas, Scholar, Spain 30. Elena Diaz Nieto, Visiting Scholar, Spain

 31. Angel F. Mohedano, Scholar, Spain 32.Sara Andreoli,Visiting Schol. Postdoc,Italy

 33. Carlos F. Ruiz, Visiting Scholar, Spain