



SELECTED AFR RESEARCH PAPERS AND PUBLICATIONS

- "Very Rapid Coal Pyrolysis," **Fuel**, **65**, 182 (1986).
- "Vapor Phase Cracking of Newly-Formed Coal Tars," **IEC Process Des. Dev.**, **26**, 1831 (1987).
- "A General Model of Coal Devolatilization," **Energy and Fuel**, **2**, 405 (1988).
- "A Study of Thermal Stability of JP-5 Using FT-IR and FIMS," **ACS Div. of Petroleum Chemistry**, **34**, 4, 816 (1989).
- "FT-IR Spectroscopy in Process Monitoring Part II: Applications," **Sensors**, **8**, 13, (1991).
- "Pyrolysis of Phenol-Formaldehyde Resin: Experiments and Modeling," **ACS Div. of Fuel Chemistry Preprints**, **36**, 2, 664 (1991).
- "Studies of Retrogressive Reactions in Direct Liquefaction," **1991 Int. Conf. on Coal Science**, New Castle, England, (1991).
- "Modeling of Mild Gasification Processes," **8th Annual Int. Pittsburgh Coal Conference**, Pittsburgh, PA, 183-188 (1991).
- "The Application of FT-IR Methods to the Characterization of Coal Liquefaction Process Streams," **ACS Div. of Fuel Chem. Preprints**, **37**, 4, 1903 (1992).
- "Review of Coal Pyrolysis: Experiments, Kinetic Rates, and Mechanisms," **Progress in Energy and Combustion Science**, **18**, 133 (1992).
- "The Prediction of Coal Char Reactivity Under Combustion Conditions," **Proceedings of the Twenty-Fourth Symposium International on Combustion/The Combustion Institute**, pp. 1189-1197 (1992).
- "A Novel Test Instrument for Fuel Thermal Stability," **Proc. SPIE-Int. Soc. Opt. Eng.**, 2069, 20-31 (1993).
- "A Characterization Method and Model for Predicting Coal Conversion Behavior," **Fuel**, **72**, 4, 469-488 (1993).
- "On-Line FT-IR Analysis of Fossil-Fuel Fired Power Plants," **Proc. of the Air and Waste Management Int. Symp. on Optical Sensing for Environmental Monitoring**, Atlanta, GA (1993).
- "Measurement and Modeling of Lignin Pyrolysis," **Journal of Biomass & Bioenergy** **7**, 107 (1994).
- "An Instrument for Characterization of the Thermal and Optical Properties of Charring Polymeric Materials," **25th Int. Symposium on Combustion**, (1994).
- "Pyrolysis," in **Encyclopedia of Energy Technology and the Environment** (A. Bisio and S.G. Boots, Eds.), John Wiley & Sons, New York, pp. 2281-2308 (1995).

- "Reprocessing of Used Tires into Activated Carbon and Other Products," **Industrial & Engineering Chemistry Research**, 34, 3102-3111 (1995).
- "A Coal Fired Heat Exchanger for an Externally Fired Gas Turbine," **ASME Transactions of the Journal of Eng. for Gas Turbine & Power**, 118, (1996).
- "Mercury SO₂ and NO Removal from Flue Gas by Adsorption on Activated Carbons," **Proc. Twenty-Third Biennial Conference on Carbon**, The Pennsylvania State University, II, 130-131 (1997, July 13-18).
- "Modeling of Biomass Pyrolysis Kinetics," **Twenty-Seventh Symposium (International) on Combustion /The Combustion Institute**, pp. 1327-1334 (1998).
- "Pyrolysis Kinetics of the Waste-Tire Constituents: Extender Oil, Natural Rubber, and Styrene-Butadiene Rubber," **ACS Div. of Fuel Chem. Preprints**, 43(1), 185-191 (1998).
- "Sensor for Performance Monitoring of Advanced Gas Turbines," **SPIE Conference on Advanced Sensors**, Process Industries and the Environment, Boston, MA, (November 1998).
- "Microporous Carbon Adsorbents for Hydrogen Storage," **International Journal of the Society of Material Eng. for Resources**, 7, 253-266 (1999)
- "Pyrolysis processing of mixed solid waste streams," **ACS Div. of Fuel Chem. Prepr.**, 45 (3), 466-474, 2000.
- "A Prototype Pyrolyzer for Solid Waste Resource Recovery in Space," **SAE 2001-01-2349**, presented at the 31st International Conference on Environmental Systems, July 9-12, 2001, Orlando, Florida).
- "Pyrolysis-Based Processing of Diesel Fuel," **ACS Division of Fuel Chemistry Preprints**, 46(2), 481 (2001).
- "Simultaneous Short and Long Wavelength Infrared Pyrometer Measurements in a Heavy-Duty Gas Turbine," **Transactions of the ASME**, 528, Vol 124 (July 2002).
- "Biomass Pyrolysis for Distributed Energy Generation," **ACS Division of Fuel Chemistry Preprints**, 48(2), 584 (2003).
- "Pyrolysis of Miscanthus Giganteus and wood pellets: TG-FTIR analysis and reaction kinetics," **Fuel**, 82, 1139-1147 (2003).
- "Carbon Black Derived from Waste Tire Pyrolysis Oil," **Proc. Carbon 2004 Conf.**, Brown University, Providence, RI (July 11-15, 2004).
- Wójtowicz, M. A. and Serio, M. A., "Pyrolysis modeling with enhanced predictive capabilities;" **Proc. 44th Coal Science Conference**, The Japan Institute of Energy, ix-x, Akita, Japan, 11-12 October, 2007.
- De Jong, W., Di Nola, G., Venneker, B. C. H., Spliethoff, H., and Wójtowicz, M.

- A., "TG-FTIR pyrolysis of coal and secondary biomass fuels: determination of pyrolysis kinetic parameters for main species and NO_x precursors," **Fuel** **86** (15), 2367–2376, 2007.
- Tsamba, A. J., Yang, W., Blasiak, W., and Wójtowicz, M. A., "Cashew nut shells pyrolysis: individual gas evolution rates and yields," **Energy & Fuels** **21** (4), 2357–2362, 2007.
 - Wójtowicz, M. A., Florczak, E., and Serio, M. A., "Kinetics of carbon-dioxide activation of chars derived from waste tires," **Proc. Carbon 2007 Conf.**, Seattle, Washington, July 15–20, 2007.
 - Rubenstein, E. P., Wójtowicz, M. A., Florczak, E., Kroo, E., Gordon, J., Townsend, L. W., Wilkins, R., Gersey, B., and Atwell, W., "Structural and radiation shielding properties of non-parasitic, multi-functional microporous carbon for aerospace applications," **Proc. 37th Int. Conf. on Environmental Systems (ICES)**, Chicago, Illinois, July 9-12, 2007, SAE technical paper No. ICES-2007-01-3111, SAE International, 2007.
 - Wójtowicz, M. A., Florczak, E., Kroo, E., Kroo, T., Serio, M. A., and Dombrowski, K., "Mercury removal from coal-combustion flue gas using activated carbon derived from waste tires," **ACS Div. of Fuel Chem. Prepr.** **52** (1), 157–159, 2007.
 - Serio, M., Kroo, E., Florczak, E., Wójtowicz, M., Wignarajah, K., Hogan, J., and Fisher, J., "Pyrolysis of mixed solid food, paper, and packaging wastes" **Proc. 38th Int. Conf. on Environmental Systems (ICES)**, San Francisco, California, June 29–July 2, 2008, SAE technical paper No. 2008-01-2050, SAE International, 2008.
 - Serio, M. A. and Wójtowicz, M. A., "Methodology for identification and classification of biomass pyrolysis behavior," **Proc. 39th Int. Conf. on Environmental Systems (ICES)**, Savannah, Georgia, July 12–16, 2009, SAE technical paper No. 2009-01-2384, SAE International, 2009.
 - Saddawi, A., Jones, J. M., Williams, A., and Wójtowicz, M. A., "Kinetics of the thermal decomposition of biomass," **Energy & Fuels**, **24** (2), 1274–1282, 2010.
 - Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Wignarajah, K., and Fisher, J., "A compact, efficient pyrolysis/oxidation system for solid waste," **Proc. 40th Int. Conf. on Environmental Systems (ICES)**, Barcelona, Spain, July 11–15, 2010, technical paper No. AIAA-2010-6009, AIAA, 2010.
 - Drukier, G. A., Rubenstein, E. R., Solomon, P. R., Wójtowicz, M. A., and Serio, M. A., "Low Cost, Pervasive Detection of Radiation Threats," **Proc. 2011 Int. Conf. on Technologies for Homeland Security (HST '11)**, pp. 365-371, IEEE, 15-17 November, 2011, Waltham, Massachusetts.
 - Zeppieri, S., Wójtowicz, M., Serio, M., Zaffaris, G., and Colket, M., "Iso-dodecane pyrolysis model development," **Proc. 50th AIAA Aerospace Sciences Meeting**, Nashville, Tennessee, 9-12 January, 2012; technical paper No. AIAA 2012-1277, AIAA, 2012.
 - Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Wignarajah, K. and Fisher, J.,

"Pyrolysis yields from microwave-assisted heating of solid wastes," **Proc. 42nd Int. Conf. on Environmental Systems (ICES)**, San Diego, California, July 15-19, technical paper No. AIAA-2012-3566, AIAA, 2012

- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Wignarajah, K. and Fisher, J., "Methane production from pyrolysis of mixed solid wastes," *Proc. 42nd Int. Conf. on Environmental Systems (ICES)*, San Diego, California, July 15-19, technical paper No. AIAA-2012-3567, AIAA, 2012.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., and Jennings, M. A., "Reversible ammonia sorption on carbon for the Primary Life Support System (PLSS)," *Proc. 42nd Int. Conf. on Environmental Systems (ICES)*, San Diego, California, July 15-19, technical paper No. AIAA-2012-3437, AIAA, 2012.
- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Wignarajah, K. and Fisher, J., "A prototype microwave pyrolyzer for solid wastes," **Proc. 43rd Int. Conf. on Environmental Systems (ICES)**, Vail, Colorado, July 14-18, technical paper No. AIAA-2013-3371, AIAA, 2013.
- Markham, J.A., Cosgrove, J., Scire, Jr. J., Haldeman, C., and Agoos, I., "Aircraft engine-mounted camera system for long wavelength infrared imaging of in-service thermal barrier coated turbine blade," **Review of Scientific Instruments**, 85, 124902, 2014.
- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Lee, J., Wignarajah, K., and Fisher, J., "Torrefaction processing of spacecraft solid wastes," *Proc. 44th International Conference on Environmental Systems (ICES)*, Tucson, Arizona, 13-17 July 2014, technical paper No. ICES-2014-211, AIAA, 2014.
- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Lee, J., and Fisher, J., "Use of pyrolysis processing for trash to supply gas (TtSG)," *Proc. 44th International Conference on Environmental Systems (ICES)*, Tucson, Arizona, 13-17 July 2014, technical paper No. ICES-2014-226, AIAA, 2014.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., Manthina, V. Singh, P., and Chullen, C., "Carbon-based regenerable sorbents for the combined carbon dioxide and ammonia removal for the Primary Life Support System (PLSS)," *Proc. 44th International Conference on Environmental Systems (ICES)*, Tucson, Arizona, 13-17 July 2014, technical paper No. ICES-2014-241, AIAA, 2014.
- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Lee, J., Wignarajah, K., and Fisher, J., "Space applications of torrefaction processing," **Proc. 45th International Conference on Environmental Systems (ICES)**, Bellevue, Washington, 12-16 July, 2015, technical paper No. ICES-2015-291, 2015.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., and Wilburn, M. S., "Adsorption of ammonia on regenerable carbon sorbents," **Proc. 45th International Conference on Environmental Systems (ICES)**, Bellevue, Washington, 12-16 July, 2015, technical paper No. ICES-2015-179, 2015.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., and Wilburn, M. S., "Co-adsorption of ammonia and formaldehyde on regenerable carbon sorbents for the Primary Life Support System (PLSS)," **Proc. 46th International Conference on**

Environmental Systems (ICES), Vienna, Austria, 10-14 July, 2016, technical paper No. ICES-2016-345, 2016.

- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Stapleton, T. J., Nalette, T. A., Ewert, M. K., Lee, J., and Fisher, J., "Torrefaction processing for human solid waste management," *Proc. 46th International Conference on Environmental Systems (ICES)*, Vienna, Austria, 10-14 July, 2016, technical paper No. ICES-2016-341, 2016.
- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., Stapleton, T. J., Nalette, T. A., Ewert, M. K., Lee, J., and Fisher, J., "Measurement and modeling of torrefaction processing for human solid waste management in space," **Proc. 47th International Conference on Environmental Systems (ICES)**, Charleston, South Carolina, 16-20 July, 2017, technical paper No. ICES-2017-335, 2017.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., Nalette, T., Guerrero, S. V., Papale, W., and Wilburn, M. S., "Development of trace contaminant control prototypes for the Primary Life Support System (PLSS)," **Proc. 47th International Conference on Environmental Systems (ICES)**, Charleston, South Carolina, 16-20 July, 2017, technical paper No. ICES-2017-270, 2017.
- Mason, P. E., Jones, J. M., Darvell, L. I., Williams, A., and Wójtowicz, M. A., "Studies on the effects of feedstock particle size in biomass torrefaction processes," International Bioenergy Conference 2017, Manchester, UK, March 22-23, 2017.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., Nalette, T., Guerrero, S. V., Papale, W., and Wilburn, M. S., "Development of trace contaminant control prototypes for the Portable Life Support System (PLSS)," *Proc. 47th International Conference on Environmental Systems (ICES)*, Charleston, South Carolina, 16-20 July, 2017, technical paper No. ICES-2017-270, 2017.
- Serio, M. A., Wójtowicz, M. A., Cosgrove, J. E., Stapleton, T. J., Torres, M. A., Ewert, M. K., and Lee, J. M., "A prototype torrefaction processing unit for human solid waste in space," *Proc. 48th International Conference on Environmental Systems (ICES)*, Albuquerque, New Mexico, 8-12 July, 2018, technical paper No. ICES-2018-250, 2018.
- Serio, M. A., Wójtowicz, M. A., Cosgrove, J. E., Stapleton, T. J., Ewert, M. K., and Lee, J. M., "Operational data for a full-scale prototype Torrefaction Processing Unit (TPU) for spacecraft," *Proc. 49th International Conference on Environmental Systems (ICES)*, Boston, Massachusetts, 7-11 July, 2019, technical paper No. ICES-2019-291, 2019.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., Carlson, A., and Chullen, C., "Monolithic trace-contaminant sorbents fabricated from 3D-printed polymer precursors," *Proc. 49th International Conference on Environmental Systems (ICES)*, Boston, Massachusetts, 7-11 July, 2019, technical paper No. ICES-2019-286, 2019.
- Serio, M. A., Cosgrove, J. E., Wójtowicz, M. A., and Lee, J. M., "Optimization of a spacecraft Torrefaction Processing Unit (TPU) for human metabolic waste," *Proc. International Conference on Environmental Systems (ICES)*, 12-16 July,

2020, technical paper No. ICES-2020-507, 2020.

- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., and Lee, J. M., "An Equivalent System Mass (ESM) Analysis for the Universal Waste Management System (UWMS) with and without the Torrefaction Processing Unit (TPU)," *Proc. International Conference on Environmental Systems (ICES)*, 12-16 July, 2020, technical paper No. ICES-2020-560, 2020.
- Cosgrove, J. E., Wójtowicz, M. A., Serio, M. A., and Lee, J. M., "Gas evolution from torrefaction processing of human solid wastes," *Proc. 50th International Conference on Environmental Systems (ICES)*, 12-15 July, 2021, technical paper No. ICES-2021-346, 2021.
- Wójtowicz, M. A., Cosgrove, J. E., Serio, M. A., Carlson, A. E., Hostetler, J. M., Espinosa, N. J., and Chullen, C., "Pressure-swing adsorption of trace contaminants using carbon sorbent monoliths," *Proc. 50th International Conference on Environmental Systems (ICES)*, 12-15 July, 2021, technical paper No. ICES-2021-358, 2021.