

## MARK CROCKER

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### Education

University of Bristol, U.K.	Chemistry	BSc. (with Honors), 1982
University of Bristol, U.K.	Inorganic Chemistry	Ph.D., 1985
U. of Wisconsin-Madison	Organometallic Chemistry	Postdoctoral fellow, 1985-87

### Professional Appointments

2015-present	Professor, Department of Chemistry, University of Kentucky
2007-present	Associate Director, University of Kentucky Center for Applied Energy Research
2006-2015	Adjunct Associate Professor, Department of Chemistry, University of Kentucky
2006-2007	Program Manager, Biofuels and Environmental Catalysis, University of Kentucky Center for Applied Energy Research
2003-2006	Senior Scientist, University of Kentucky Center for Applied Energy Research.
2000-2002	R&D Manager (N. America), OMG Corp., Automotive Catalyst Division (formerly Degussa)
1987-1999	Shell Research & Technology Centre, Amsterdam, Netherlands: 1997-1999, Senior Research Chemist, Catalyst Research and Development Dept. 1994-1997, Project Manager, Gas Treating and Environmental Processes Dept. 1987-1994, Project Leader, Catalysis & General Processes Dept.

### Post-academic Education

1989	Introduction to Heterogeneous Catalysis, Loughborough University, U.K.
1994	Fysische Transportverschijnselen (Physical Transport Phenomena); Postacademisch Onderwijs Natuurwetenschappen, Zeist, Netherlands.
1994	Chemische Reactorkunde (Chemical Reactor Design); Postacademisch Onderwijs Natuurwetenschappen, Zeist, Netherlands.
1998	Sulphur Recovery, Sulphur Experts, Bernkastel-Kues, Germany.

### Awards

NATO Postdoctoral Research Fellowship, 1985-87  
CASE graduate student award (with British Petroleum), 1982-85

### Foreign Languages

Dutch (fluent), German (basic).

## Refereed Papers

- 121) A. Ligaba-Osena, B. Hankoua, K. DiMarco, R. Pace, M. Crocker, J. McAtee, N. Nagachar, M. Tien, T. Richard, “Reducing biomass recalcitrance by heterologous expression of a bacterial peroxidase in tobacco (*Nicotiana benthamiana*)”, *Scientific Reports – Nature*, 7 (2017) 17104.
- 120) E. Liu, L. Das, M. Crocker, B. Zhao, J. Shi, “Impact of dilute sulfuric acid, ammonium hydroxide and ionic liquid pretreatment on the fractionation and characterization of engineered switchgrass”, *BioEnergy Research*, 2017, accepted.
- 119) T. Morgan, E. Santillan-Jimenez, K. Huff, K.R. Javed, M. Crocker, “Use of Dual Detection in the Gas Chromatographic Analysis of Oleaginous Biomass Feeds and Biofuels Products to Enable Accurate Simulated Distillation and Lipid Profiling”, *Energy & Fuels*, 31 (2017) 9498.
- 118) Z. Bai, B. Chen, L. Yu, Q. Zhao, M. Crocker, C. Shi, “The function of Pt in plasma-assisted NO<sub>x</sub> storage and reduction”, *Catal. Comm.*, 102 (2017) 81.
- 117) E. Santillan-Jimenez, R. Loe, M. Garrett, T. Morgan, M. Crocker, “Effect of Cu promotion on cracking and methanation during the Ni-catalyzed deoxygenation of waste lipids and hemp seed oil to fuel-like hydrocarbons”, *Catal. Today*, 2017, <http://dx.doi.org/10.1016/j.cattod.2017.03.025>.
- 116) J.A. Jennings, S. Parkin, E. Munson, S.P. Delaney, J.L. Calahan, M. Isaacs, K. Hong, M. Crocker, “Regioselective Baeyer-Villiger Oxidation of Lignin Model Compounds with Tin Beta Zeolite Catalyst and Hydrogen Peroxide”, *RSC Advances*, 7 (2017) 25987.
- 115) Z. Bai, Z. Zhang, B. Chen, Q. Zhao, M. Crocker, C. Shi, “Non-thermal plasma enhanced NSR performance over Pt/M/Ba/Al<sub>2</sub>O<sub>3</sub> (M = Mn, Co, Cu) catalysts”, *Chem. Eng. J.*, 314 (2017) 688.
- 114) Y. Ji, D. Xu, S. Bai, U. Graham, M. Crocker, B. Chen, C. Shi, D. Harris, D. Scapens, J. Darab, “Pt- and Pd-promoted CeO<sub>2</sub>-ZrO<sub>2</sub> for passive NO<sub>x</sub> adsorber applications”, *Ind. Eng. Chem. Res.*, 56 (2017) 111.
- 113) S. Jones, Y. Ji, A. Bueno-Lopez, V. Song, M. Crocker, “CeO<sub>2</sub>-M<sub>2</sub>O<sub>3</sub> Passive NO<sub>x</sub> Adsorbers for Cold Start Applications”, *Emission Control Sci. Technol.*, 3 (2017) 59.
- 112) Z. Zhang, C. Shi, Z. Bai, M. Li, B. Chen, M. Crocker, “Low Temperature H<sub>2</sub>-plasma Assisted NO<sub>x</sub> Storage and Reduction over the Combined Pt/Ba/Al and LaMnFe Catalyst”, *Catal. Sci. Technol.*, 7 (2017) 145.
- 111) S.G. Yao, M.S. Meier, R.B. Pace III, M. Crocker, “A comparison of the oxidation of lignin model compounds in conventional and ionic liquid solvents and application to the oxidation of lignin”, *RSC Advances*, 6 (2016) 104742.
- 110) M.H. Wilson, D.T. Mohler, J.G. Groppo, T. Grubbs, S. Kesner, E.M. Frazar, A. Shea, C. Crofcheck, M. Crocker, “Capture and Recycle of Industrial CO<sub>2</sub> Emissions using Microalgae”, *Appl. Petrochem. Res.*, 6(3) (2016) 279.
- 109) E. Santillan-Jimenez, R. Pace, S. Marques, T. Morgan, C. McKelphin, J. Mobley, M. Crocker, “Extraction, characterization, purification and catalytic upgrading of algae lipids to fuel-like hydrocarbons”, *Fuel*, 180 (2016) 668.
- 108) R. Loe, E. Santillan-Jimenez, T. Morgan, L. Sewell, Y. Ji, S. Jones, M.A. Isaacs, A.F. Lee, M. Crocker, “Effect of Cu and Sn promotion on the catalytic deoxygenation of model and algal lipids to fuel-like hydrocarbons over supported Ni catalysts”, *Appl. Catal. B*, 191 (2016) 147.

- 107) S. Jones, Y. Ji, M. Crocker, "Ceria-Based Catalysts for Low Temperature NO<sub>x</sub> Storage and Release", *Catal. Lett.*, 146 (2016) 909.
- 106) X. E. C. Crofcheck, M. Crocker, "Application of recycled media and algae-based anaerobic digestate in *Scenedesmus* cultivation", *J. Renew. Sustain. Energy*, 8(1) (2016) 013116.
- 105) J. Mobley, S. Yao, M. Crocker, M. Meier, "Oxidation of Lignin and Lignin β-O-4 Model Compounds via Activated Dimethyl Sulfoxide", *RSC Advances*, 5 (2015) 105136.
- 104) Y. Wang, S. Yao, M. Crocker, X. Zhu, B. Chen, J. Xie, C. Shi, D. Ma, "An energy-efficient catalytic process for the tandem removal of formaldehyde and benzene by metal/HZSM-5 catalysts", *Catal. Sci. Technol.*, 5 (2015) 4968.
- 103) Z. Zhang, M. Crocker, B. Chen, X. Wang, Z. Bai, C. Shi, "Non-thermal plasma-assisted NO<sub>x</sub> storage and reduction over cobalt-containing LNT catalysts", *Catal. Today*, 258 (2015) 386.
- 102) E. Santillan-Jimenez, T. Morgan, M. Crocker, "Continuous catalytic deoxygenation of model and algal lipids to fuel-like hydrocarbons over Ni-Al layered double hydroxide", *Catal. Today*, 258 (2015) 284.
- 101) Z. Zhang, M. Crocker, L. Yu, X. Wang, C. Shi, "Non-thermal plasma-assisted NO<sub>x</sub> storage and reduction over cobalt-containing Pd catalyst using H<sub>2</sub> and/or CO as reductants", *Catal. Today*, 258 (2015) 175.
- 100) Z. Zhang, M. Crocker, B. Chen, Z. Bai, X. Wang, C. Shi, "Pt-free, non-thermal plasma-assisted NO<sub>x</sub> storage and reduction over M/Ba/Al<sub>2</sub>O<sub>3</sub> (M = Mn, Fe, Co, Ni, Cu) catalysts", *Catal. Today*, 256 (2015) 115.
- 99) J.K. Mobley, M. Crocker, "Catalytic oxidation of alcohols to carbonyl compounds over hydrotalcite and hydrotalcite-supported catalysts", *RSC Advances*, 5 (2015) 65780.
- 98) E. Santillan-Jimenez, M. Perdu, R. Pace, T. Morgan, M. Crocker, "Activated Carbon, Carbon Nanofiber and Carbon Nanotube Supported Molybdenum Carbide Catalysts for the Hydrodeoxygenation of Guaiacol", *Catalysts*, 5 (2015) 424.
- 97) J.-S. Choi, V. Schwartz, E. Santillan-Jimenez, M. Crocker, S.A. Lewis Sr., M.J. Lance, H.M. Meyer III, K.L. More, "Structural Evolution of Molybdenum Carbides in Hot Aqueous Environments and Impact on Low-Temperature Hydroprocessing of Acetic Acid", *Catalysts*, 5 (2015) 406.
- 96) N.D. Patil, S.G. Yao, M.S. Meier, J.K. Mobley, M. Crocker, "Selective Oxidation of the C<sub>α</sub>-C<sub>β</sub> Linkage in Lignin Model Compounds by Baeyer-Villiger Oxidation", *Organic & Biomolecular Chemistry*, 13 (2015) 3243.
- 95) Y. Ji, S. Bai, M. Crocker, "Al<sub>2</sub>O<sub>3</sub>-based Passive NO<sub>x</sub> Adsorbers for Low Temperature Applications", *Appl. Catal. B*, 170 (2015) 283.
- 94) Y. Wang, B. Chen, M. Crocker, Y. Zhang, X. Zhu, C. Shi, "Understanding on the origins of hydroxyapatite stabilized gold nanoparticles as high-efficiency catalysts for formaldehyde and benzene oxidation", *Catal. Comm.*, 59 (2015) 195.
- 93) A.E. Ware, M. Crocker, R.B. Pace, A. Placido, S. Morton III, S. Debolt, "Characterization of Endocarp Biomass and Extracted Lignin using Pyrolysis and Spectroscopic Methods", *Bioenergy Res.*, 8 (2015) 350.

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- 91) V. Rico-Pérez, A. Bueno-López, D.J. Kim, Y. Ji, M. Crocker, “Pt/Ce<sub>x</sub>Pr<sub>1-x</sub>O<sub>2</sub> (x = 1 or 0.9) NO<sub>x</sub> Storage-Reduction (NSR) Catalysts”, *Appl. Catal. B*, 163 (2015) 313.
- 90) Y. Wang, X. Zhu, M. Crocker, B. Chen, C. Shi, “A comparative study of the catalytic oxidation of HCHO and CO over Mn<sub>0.75</sub>Co<sub>2.25</sub>O<sub>4</sub> catalyst: The effect of moisture”, *Appl. Catal. B* 160-161 (2014) 542.
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- 87) B. Chen, X. Zhu, M. Crocker, Y. Wang, C. Shi, “FeO<sub>x</sub>-supported gold catalysts for catalytic removal of formaldehyde at room temperature”, *Appl. Catal. B*, 2014, 154-155 (2014) 73.
- 88) T. Morgan, E. Santillan-Jimenez, M. Crocker, Simulated Distillation Approach to the Gas Chromatographic Analysis of Feedstock and Products in the Deoxygenation of Lipids to Hydrocarbon Biofuels, *Energy & Fuels*, 28 (2014) 2654.
- 86) H.-Y. Shin, J.-H. Ryu, S.-Y. Bae, C. Crofcheck, M. Crocker, “Lipid extraction from *Scenedesmus* sp. microalgae for biodiesel production using hot compressed hexane”, *Fuel*, 130 (2014) 66.
- 85) C. Petti, R. Kushwaha, M. Tateno, A.E. Harman-Ware, M. Crocker, J. Awika, S. DeBolt, “Mutagenesis breeding for increased 3-deoxyanthocyanidin accumulation in leaves of *Sorghum bicolor* (L.): a source of natural food pigment”, *J. Agri. Food Chem.*, 62 (2014) 1227.
- 84) M.-Y. Kim, J.-S. Choi, M. Crocker, “Roles of C<sub>3</sub>H<sub>6</sub> in NH<sub>3</sub> Generation and NO<sub>x</sub> Reduction over a Cu-chabazite SCR Catalyst under Lean/Rich Cycling Conditions”, *Catal. Today*, 231 (2014) 90.
- 83) E. Santillan-Jimenez, T. Morgan, J. Shoup, A.E. Harman-Ware, M. Crocker, “Catalytic deoxygenation of triglycerides and fatty acids to hydrocarbons over Ni-Al layered double hydroxide”, *Catal. Today*, 237 (2014) 136.
- 82) D.J. Kim, J. Wang, M. Crocker, “Adsorption and desorption of propene on a commercial Cu-CHA SCR catalyst”, *Catal. Today*, 231 (2014) 83.
- 81) J. Wang, Y. Ji, G. Jacobs, S. Jones, D.J. Kim, M. Crocker, “Effect of Aging on NO<sub>x</sub> Reduction in Coupled LNT-SCR Systems”, *Appl. Catal. B*, 148-149 (2014) 51.
- 80) C. Crofcheck, X. E, A. Shea, M. Montross, M. Crocker, R. Andrews, “Influence of flue gas components on the growth rate of *Chlorella vulgaris* and *Scenedesmus acutus*”, *Transactions of the ASABE*, 56(6) (2013) 1421.
- 79) L. Xu, X. Li, M. Crocker, Z. Zhang, A. Zhu, C. Shi, “A study of the mechanism of low-temperature SCR of NO with NH<sub>3</sub> on MnO<sub>x</sub>/CeO<sub>2</sub>”, *J. Mol. Catal. A* 378 (2013) 82.
- 78) B.-B. Chen, X.-B. Zhu, M. Crocker, Y. Wang, C. Shi, “Complete oxidation of formaldehyde at ambient temperature over  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> supported Au catalyst”, *Catal. Commun.*, 42 (2013) 93.
- 77) C. Petti, A.E. Harman-Ware, M. Tateno, R. Kushwaha, A. Shearer, A.B. Downie, M. Crocker, S. DeBolt, “Sorghum mutant RG displays antithetic leaf shoot lignin accumulation resulting in improved stem saccharification properties”, *Biotechnol. Biofuels* 6 (2013) 146.

- 76) C. Crofcheck, X. E. A. Shea, M. Montross, M. Crocker, R. Andrews, “Influence of media composition on the growth rate of *Chlorella vulgaris* and *Scenedesmus acutus* utilized for CO<sub>2</sub> mitigation”, *J. Biochem. Tech.*, 4(2) (2012) 589.
- 75) A.E. Harman-Ware, T. Morgan, M. Wilson, M. Crocker, J. Zhang, K. Liu, J. Stork, S. DeBolt, “Microalgae as a renewable fuel source: fast pyrolysis of *Scenedesmus* sp.”, *Renewable Energy*, 60 (2013) 625.
- 74) C. Shi, Z. Zhang, M. Crocker, L. Xu, C. Wang, C. Au, A. Zhu, “Non-thermal plasma-assisted NO<sub>x</sub> storage and Reduction on a LaMn<sub>0.9</sub>Fe<sub>0.1</sub>O<sub>3</sub> perovskite catalyst”, *Catal. Today*, 211 (2013) 96.
- 73) Y. Ji, T.J Toops, M. Crocker, “Isocyanate formation and reactivity on a Ba-based LNT catalyst studied by DRIFTS”, *Appl. Catal. B*, 140-141 (2013) 265.
- 72) Y. Wang, A. Zhu, B. Chen, M. Crocker, C. Shi, “Three-dimensional ordered mesoporous Co–Mn oxide: A highly active catalyst for “storage–oxidation” cycling for the removal of formaldehyde”, *Catal. Commun.* 36 (2013) 52.
- 71) B.-B. Chen, C. Shi, M. Crocker, Y. Wang, A.-M. Zhu, “Catalytic removal of formaldehyde at room temperature over supported gold catalysts”, *Appl. Catal. B*, 132-133 (2013) 245.
- 70) A.E. Harman-Ware, M. Crocker, A. Preet Kaur, M.S. Meier, D. Kato, B. Lynn, “Pyrolysis-GC/MS of sinapyl and coniferyl alcohol”, *J. Anal. Appl. Pyrol.*, 99 (2013) 161.
- 69) E. Santillan-Jimenez, T. Morgan, J. Lacny, S. Mohapatra, M. Crocker, “Catalytic deoxygenation of triglycerides and fatty acids over carbon-supported nickel”, *Fuel* 103 (2013) 1010.
- 68) J. Wang, M. Crocker, “N<sub>2</sub>O Mitigation in a Coupled LNT-SCR System”, *Catal. Lett.*, 142 (2012) 1167.
- 67) C. Shi, B. Chen, X. Li, M. Crocker, Y. Wang, A. Zhu, “Catalytic formaldehyde removal by “storage-oxidation” cycling process over supported silver catalysts”, *Chem. Eng. J.*, 200-202 (2012) 729.
- 66) E. Santillan-Jimenez, M. Crocker, “Catalytic deoxygenation of fatty acids and their derivatives to hydrocarbon fuels via decarboxylation/decarbonylation”, *J. Chem. Technol. Biotechnol.*, 87 (2012) 1041.
- 65) V. Easterling, Y. Ji, M. Crocker, M. Dearth, R.W. McCabe, “Application of spaciMS to the study of ammonia formation in lean NO<sub>x</sub> trap catalysts”, *Appl. Catal. B*, 123-124 (2012) 339.
- 64) C. Shi, Y. Ji, U.M. Graham, G. Jacobs, M. Crocker, Z. Zhang, Y. Wang, T.J. Toops, NO<sub>x</sub> Storage and Reduction Properties of Model Ceria-based Lean NO<sub>x</sub> Trap Catalysts”, *Appl. Catal. B*, 119-120 (2012) 183-196.
- 63) V. Mendu, T. Shearin, J.E. Campbell Jr., J. Stork, J. Jae, M. Crocker, G. Huber, S. DeBolt, “Global bioenergy potential from high-lignin agricultural residue”, *Proc. Nat. Acad. Sci.*, 109 (2012) 4014.
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- 60) V. Mendu, A.E. Harman-Ware, M. Crocker, J. Jae, J. Stork, S. Morton III, A. Placido, G. Huber, S. DeBolt, “Identification and thermochemical analysis of high-lignin feedstocks for biofuel and biochemical production”, *Biotechnol. Biofuels*, 4 (2011) 43.

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- 56) Y. Ji, V. Easterling, U. Graham, C. Fisk, M. Crocker, J.-S. Choi, "Effect of aging on the NO<sub>x</sub> storage and reduction characteristics of fully formulated lean NO<sub>x</sub> trap catalysts", *Appl. Catal. B* 103 (2011) 413.
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- 147) V. Song and M. Crocker, "Layered Double Hydroxide Supported Gold Nanoparticles towards Lignin Depolymerization", oral presentation and SciMix poster presentation, CATL-451, 254th American Chemical Society National Meeting & Exposition, Washington, DC, August 20-24, 2017.
- 146) M. Crocker, "A Microalgae-Based Platform for the Beneficial Reuse of Carbon Dioxide Emissions from Power Plants", 2017 NETL CO<sub>2</sub> Capture Technology Project Review Meeting, August 21-25, 2017, Pittsburgh, PA.
- 145) M. Crocker, "CO<sub>2</sub> to Bioplastics: Beneficial Reuse of Carbon Emissions from Coal-fired Power Plants Using Microalgae", 2017 NETL CO<sub>2</sub> Capture Technology Project Review Meeting, August 21-25, 2017, Pittsburgh, PA.
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- 111) R. Loe, E. Santillan-Jimenez, M. Crocker, “Catalytic deoxygenation of tristearin to hydrocarbons over supported nickel alloy catalysts”, poster presentation SCE-P-24, 8<sup>th</sup> ICEC, Asheville, NC, August 24-27, 2014.
- 110) Y. Ji, M. Crocker, “Al<sub>2</sub>O<sub>3</sub>-based passive NO<sub>x</sub> adsorbers for low temperature applications”, poster presentation EC-P-98, 8<sup>th</sup> ICEC, Asheville, NC, August 24-27, 2014.
- 109) R. Pace, M. Crocker, M. Crocker, M. Meier, S.A. Morton III, A.J. Placido, “Ionic liquids as green solvents: A selective approach to biomass fractionation and deconstruction”, poster presentation GC-P-26, 8<sup>th</sup> ICEC, Asheville, NC, August 24-27, 2014.
- 108) M.-Y. Kim, J.-S. Choi, M. Crocker “Impact of Axial Catalyst Configuration on the Performance of Coupled LNT-SCR Catalysts Studied by Spatiotemporal Resolution of Reactions”, poster presentation EC-P-52, 8<sup>th</sup> ICEC, Asheville, NC, August 24-27, 2014.
- 107) M.H. Wilson, J. Groppo, S.A. Morton, J.W. Burnett, M. Crocker, “Techno-Economic Analysis of Biological Carbon Dioxide Mitigation”, oral presentation ALGA2014\_0166, Biofuels & Bioproducts, Santa Fe, NM, June 15-18, 2014.
- 106) J. Groppo, N. Rhea, H.Y. Shin, L.C. Mills, E. Santillan-Jimenez, T. Morgan, M.H. Wilson, C. Crofcheck, M. Crocker, “Microalgae Processing for the Production of Fuels”, 4<sup>th</sup> International Conference on Algal Biomass, oral presentation ALGA2014\_0165, Biofuels & Bioproducts, Santa Fe, NM, June 15-18, 2014.
- 105) S.A. Morton III, M. Crocker, L. Mills, “Pyrolysis of microalgae: Insight from process simulation”, 247<sup>th</sup> ACS National Meeting, Dallas, Texas, March 16-20, 2014, poster presentation IEC 99.
- 104) M. Crocker, M.H.W. Wilson, J. Groppo, A. Placido, S. Graham, A. Santillan-Jimenez, T. Morgan, J. Shoup, D. Kim, L. Mills, H.-Y. Shin, C. Crofcheck, “CO<sub>2</sub> Recycling Using Microalgae for the Production of Liquid Fuels”, oral presentation SCHB-20 at the 246<sup>th</sup> American Chemical Society National Meeting, Indianapolis, IN, September 11, 2013.
- 103) E. Santillan-Jimenez, T. Morgan, M. Crocker, “Conversion of Triglycerides and Fatty Acids to Fuel-Like Hydrocarbons over Supported Nickel Catalysts”, oral presentation ENFL-10 at the 246<sup>th</sup> American Chemical Society National Meeting, Indianapolis, IN, September 9, 2013.
- 102) M. Crocker, “CO<sub>2</sub> Recycling Using Microalgae for the Production of Liquid Fuels”, 3<sup>rd</sup> KACST-Oxford Petrochemical Research Forum, Wadham College, Oxford, UK, August 12, 2013.
- 101) Y. Wang, M. Crocker, C. Shi, “Three-Dimensional Ordered Mesoporous Cobalt–Manganese Oxide: Highly Active Catalyst for “Storage–Oxidation” Cycling for the Removal of Formaldehyde”, oral

presentation O-Th-BRB-10, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

100) Y. Ji, T.J Toops, M. Crocker, “Isocyanate Formation and Reactivity on a Ba-based LNT Catalyst Studied by DRIFTS and Mass Spectrometry”, oral presentation O-W-Com-13, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

99) E. Santillan-Jimenez, T. Morgan, J. Shoup, M. Crocker, “Ni-Catalyzed Conversion of Lipids to Fuel-Like Hydrocarbons: From Proof of Concept to Catalyst Recycling Studies”, oral presentation O-Tu-BRA-10, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

98) J.-S. Choi, V. Schwartz, E. Santillan-Jimenez, M. Crocker, S. Lewis, H. Meyer, K. More, “Catalytic Activity and Stability of Molybdenum Carbides in Aqueous Phase Hydrotreating of Acetic Acid”, oral presentation O-Tu-Fre-6, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

97) J. Wang, Y. Ji, M. Crocker, “Effect of Aging on NO<sub>x</sub> Reduction in Coupled LNT-SCR Systems”, poster presentation P-W-BRC-34, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

96) M.-Y. Kim, J.-S. Choi, M. Crocker, “Roles of C<sub>3</sub>H<sub>6</sub> in NH<sub>3</sub> Generation and NO<sub>x</sub> Reduction over a Cu-chabazite SCR Catalyst under Lean/Rich Cycling Conditions”, poster presentation P-Tu-BRC-112, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

95) J. Mobley, N. Patil, M. Crocker, M. Meier, “Towards Oxidative Catalytic Depolymerization of Lignin and Lignin Model Compounds”, poster presentation P-M-BRC-92, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

94) D. Kim and M. Crocker, “Adsorption and Desorption of Propene on a Cu-Chabazite Catalyst”, poster presentation P-M-BRC-70, 23<sup>rd</sup> North American Catalysis Society meeting, Louisville, KY, June 2-7, 2013.

93) J.-S. Choi, V. Schwartz, E. Santillan-Jimenez, M. Crocker, S.A. Lewis, H.M. Meyer III, K.L. More, “Catalytic Performance of Molybdenum Carbides in Aqueous-Phase Hydrotreating of Acetic Acid”, Prepr. Pap.-Am. Chem. Soc., Div. Energy Fuels Preprints 2013, 58(1) 1104.

92) A.E. Harman-Ware, M. Crocker, S. DeBolt, “Pyrolysis-GC/MS Characterization of Bioenergy Crops”, poster presentation, 2013 Workshop on Renewable Energy and Energy Efficiency, Louisville, KY, March 24-26.

91) M. Crocker, J. Mobley, A.E. Harman-Ware, R. Pace, S. Morton III, N. Patil, M. Meier, S. DeBolt, “Lignin Deconstruction for the Production of Fuels and Chemicals”, oral presentation at the 1<sup>st</sup> SEC Symposium, Impact of the Southeast on the World’s Renewable Energy Future, Atlanta, GA, February 10-12, 2013.

90) T. Graham, C. Crofcheck, A. Shea, M. Montross, M. Crocker, R. Andrews, “Investigation of Media Ingredients and Water Sources for Algae CO<sub>2</sub> Capture at Different Scales to Demonstrate the Correlations Between Lab-scale and Large-Scale Growth”, poster presentation at the 1<sup>st</sup> SEC Symposium, Impact of the Southeast on the World’s Renewable Energy Future, Atlanta, GA, February 10-12, 2013.

89) J. Mobley, N. Patil, R. Pace, M. Crocker, M.S. Meier, “Analysis of Lignin and Lignin Oxidation Products,” presented at the Southeast Regional Meeting of the ACS, Raleigh, NC, November 15, 2012.

88) L. Mills, A.E. Harman-Ware, J. Groppo, R. Pace, A. Placido, M. Wilson, S.A. Morton III, M. Crocker, “Microalgae Cultivation in Closed-Loop Photobioreactors: Biofilm Characterization,

Prevention and Removal”, Annual Meeting of the American Institute of Chemical Engineers (student conference), Pittsburg, PA, October 26-29, 2012.

87) J. Shoup, E. Santillan-Jimenez, T. Morgan, M. Crocker, “Conversion of Triglycerides and Fatty Acids to Hydrocarbons Using Supported Nickel Catalysts”, Annual Meeting of the American Institute of Chemical Engineers (student conference), Pittsburg, PA, October 26-29, 2012.

86) V. Easterling, M. Crocker, M. Dearth, R. McCabe, “Ammonia formation in Lean NOx Trap Catalysts Studied by SpaciMS”, oral presentation at the 7<sup>th</sup> International Conference on Environmental Catalysis, Lyon, France, September 2-6, 2012.

85) E. Santillan-Jimenez, T. Morgan, M. Crocker. “Conversion of triglycerides and fatty acids to hydrocarbons via decarboxylation/decarbonylation (deCO<sub>x</sub>) over supported nickel catalysts”, poster presentation at the 7<sup>th</sup> International Conference on Environmental Catalysis, Lyon, France, September 2-6, 2012.

84) A.E. Harman-Ware, M. Crocker, S. DeBolt, “Pyrolysis-GC/MS characterization of biomass”, oral presentation at the 244<sup>th</sup> ACS National Meeting, Philadelphia, August 19-23, 2012, IEC-25.

83) R. Andrews, M. Crocker, S. DeBolt, M. Meier, S.A. Morton, “Lignin deconstruction for the production of liquid fuels and chemicals”, oral presentation at the 244<sup>th</sup> ACS National Meeting, Philadelphia, August 19-23, 2012, IEC-24.

82) S.A. Morton III, R. Andrews, M. Crocker, C. Crofcheck, J. Groppo, A. Placido, “Mitigation of CO<sub>2</sub> from a coal-fired power plant using microalgae: Development and demonstration”, poster presentation at the 2<sup>nd</sup> International Conference on Algal Biomass, Biofuels and Bioproducts, San Diego, June 10-13, 2012.

81) J. Wang, Z. He, Y. Ji, M. Crocker, M.-Y. Kim, J.-S. Choi, “New Insights into the Role of the SCR Catalyst in Coupled LNT-SCR Systems”, oral presentation at the 2012 CLEERS Workshop, U. Michigan-Dearborn, MI, April 30 - 2 May, 2012.

80) J.J. Cave, M. Crocker, P. Dolloff, “Development and Use of Algae-Based System for Mitigation of CO<sub>2</sub> Generated at Power Plants”, oral presentation at the 21<sup>st</sup> Annual Business & Industry’s Sustainability and Environmental Health & Safety Symposium, Cincinnati, OH, March 27-28, 2012.

79) C. Shi, Y. Ji, U. Graham, G. Jacobs, T.J. Toops, M. Crocker, “NOx storage and reduction properties of ceria-promoted lean NOx trap catalysts”, oral presentation at the 242<sup>nd</sup> ACS National Meeting, Denver, CO, August 28-September 1, 2011, FUEL-2; Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry, 2011, 56(2), 3-4.

78) A. Harman-Ware, T. Morgan, M. Wilson, S. Mohapatra, M. Crocker, J. Zhang, K. Liu, “Fast pyrolysis of *Scenedesmus* algae”, poster presentation at the 242<sup>nd</sup> ACS National Meeting, Denver, CO, August 28-September 1, 2011, FUEL-152; Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry, 2011, 56(2), 533-534.

77) V. Easterling, M. Crocker, M. Dearth, R.W. McCabe, M.P. Harold, “A Spatio-temporal Study of Lean NOx Trap Regeneration”, oral presentation (OB09) at the 22<sup>nd</sup> North American Catalysis Society Meeting, June 5-10, 2011, Detroit, MI.

76) M. Dearth, G. Cavataio, L. Xu, H. Jen, R.W. McCabe, J. Wang, Y. Ji, L. He, M. Crocker, “A Non-NH<sub>3</sub> Pathway for NOx Conversion in Coupled LNT-SCR Systems”, oral presentation (OC19) at the 22<sup>nd</sup> North American Catalysis Society Meeting, June 5-10, 2011, Detroit, MI.

- 75) C. Shi, Y. Ji, T.J. Toops, M. Crocker, “NO<sub>x</sub> Storage and Reduction Properties of Ceria-based Lean NO<sub>x</sub> Trap Catalysts”, poster presentation (P-Mo-119) at the 22<sup>nd</sup> North American Catalysis Society Meeting, June 5-10, 2011, Detroit, MI.
- 74) S. Mohapatra, T. Morgan, E. Santillan-Jimenez, M. Crocker, “Conversion of Triglycerides and Fatty Acids to Hydrocarbons over Supported Nickel Catalysts”, poster presentation (P-Tu-53) at the 22<sup>nd</sup> North American Catalysis Society Meeting, June 5-10, 2011, Detroit, MI.
- 73) J. Mobley, L. Ware, E. Santillan-Jimenez, A. Placido, R. Andrews, M. Crocker, S. DeBolt, M. Meier, S.A. Morton III, “Dissolution and Analysis of Lignin-Rich Biomass Feedstocks”, 2011 Kentucky Renewable Energy & Energy Efficiency Workshop, Louisville, KY, March 14, 2011.
- 72) M. Crocker, “Development of an Algae-Based System for CO<sub>2</sub> Mitigation from Coal-Fired Power Plants”, invited presentation given to congressional staffers, Capitol Visitors’ Building, Washington, D.C., October 1, 2010.
- 71) M. Crocker, V. Easterling, J. Wang, M. Dearth, R. McCabe, J. Theis, “Laboratory Product Speciation Studies of the LNT + in-situ SCR NO<sub>x</sub> Emission Control Concept”, oral presentation at the 2010 Directions in Engine-Efficiency and Emissions Research (DEER) Conference, Detroit, MI, September 27-30, 2010.
- 70) M.P. Harold, M. Crocker, M. Dearth, R. McCabe, V. Balakotaiah, D. Luss, J.S. Choi, “Development of Optimal Catalyst Designs and Operating Strategies for Lean NO<sub>x</sub> Reduction in Coupled LNT-SCR Systems”, poster presented at the 2010 Directions in Engine-Efficiency and Emissions Research (DEER) Conference, Detroit, MI, September 27-30, 2010.
- 69) J. Wang, Y. Ji, M. Crocker, “The Effect of Regeneration Conditions on the Selectivity of NO<sub>x</sub> Reduction in a Fully Formulated Lean NO<sub>x</sub> Trap Catalyst”, oral presentation given at the 6<sup>th</sup> International Conference on Environmental Catalysis, Beijing, September 12-15, 2010.
- 68) Y. Ji, V. Easterling, C. Fisk, M. Crocker, J.-S. Choi, “Effect of Aging on the NO<sub>x</sub> Storage and Regeneration Characteristics of Fully Formulated Lean NO<sub>x</sub> Trap Catalysts”, poster presented at the 6<sup>th</sup> International Conference on Environmental Catalysis, Beijing, September 12-15, 2010.
- 67) T. Morgan, S.A. Morton, M. Crocker, D. Grubb, E. Santillan-Jimenez, “Application of layered double hydroxides to the production of renewable diesel”, 240<sup>th</sup> ACS National Meeting, Boston, MA, August 22-26, 2010, IEC-115.
- 66) R. Andrews, M. Crocker, S. DeBolt, M. Meier, S.A. Morton, “Lignin Deconstruction for the Production of Liquid Fuels”, 240<sup>th</sup> ACS National Meeting, Boston, MA, August 22-26, 2010, IEC-21.
- 65) E.H. Aish, M. Crocker, F.T. Ladipo, “Catalytic Epoxidation of Alkenes Using Tripodal Titanium Polyhedral Oligomeric Silsesquioxane (Ti-POSS)”, 240<sup>th</sup> ACS National Meeting, Boston, MA, August 22-26, 2010, INOR-240.
- 64) J. Wang, Y. Ji, M. Crocker, “NO<sub>x</sub> Reduction Performance on Fresh and Aged Pt/Ph/Ba/Al<sub>2</sub>O<sub>3</sub> Monolithic Lean NO<sub>x</sub> Trap Catalysts”, Tristate Catalysis Society Spring meeting, April 26, 2010, Covington, KY.
- 63) V.G. Easterling, Y. Ji, M. Crocker, J. Ura, J.R. Theis, R.W. McCabe, “Effect of Ceria on the Desulfation Characteristics of Model Lean NO<sub>x</sub> Trap Catalysts”, Tristate Catalysis Society Spring meeting, April 26, 2010, Covington, KY.

- 62) Y. Ji, V. Easterling, C. Fisk, M. Crocker, J.-S. Choi, “Effect of Ceria on the Aging Characteristics of Fully Formulated Lean NO<sub>x</sub> Trap Catalysts”, Tristate Catalysis Society Spring meeting, April 26, 2010, Covington, KY.
- 61) R. Andrews, M. Crocker, S. DeBolt, M. Meier, S. Morton, “Lignin Deconstruction for the Production of Liquid Fuels”, COST Strategic Initiative Workshop, Sustainable production of transportation fuels and chemicals: challenges and opportunities, Ostend, Belgium, April 26-28, 2010, poster P13.
- 60) Y. Ji, V. Easterling, C. Fisk, U. Graham, M. Crocker, J.-S. Choi, “Effect of Ceria on the Aging Characteristics of Fully Formulated Lean NO<sub>x</sub> Trap Catalysts”, poster presented at the 2010 CLEERS Workshop, U. Michigan-Dearborn, MI, April 20-22.
- 59) C. Crofcheck, M. Montross, K. Cassidy, A. Kroumov, A. Shea, W. Chen, R. Andrews, M. Crocker, S. Morton, C. Fisk, M. Wilson, “Medium Optimization for CO<sub>2</sub> Mitigation from Flue Gas”, Annual Institute of Biological Engineering Meeting, Cambridge, MA, March 2010.
- 58) K. Cassidy, C. Crofcheck, M. Montross, A. Shea, R. Andrews, M. Crocker, S. Morton, C. Fisk, “Algal Response to Variations in Temperature”. Annual Institute of Biological Engineering Meeting, Cambridge, MA, March 2010.
- 57) E. Santillan-Jimenez, C. Salinas-Martínez de Lecea, A. Bueno-López, M. José Illán-Gómez and M. Crocker, “Carbon Nanotube Supported Metal Catalysts for NO<sub>x</sub> Reduction Using Hydrocarbon Reductants”, Europacat IX, Salamanca, Spain, August 30 – September 4, 2009, paper P5-98.
- 56) T. Morgan, D. Grubb, E. Santillan-Jimenez, M. Crocker, “Conversion of Triglycerides to Hydrocarbons over Supported Metal Catalysts”, Europacat IX, Salamanca, Spain, August 30 – September 4, 2009, paper P6-56.
- 55) E.H. Aish, F.T. Ladipo, M. Crocker, “Catalytic epoxidation of alkenes using tripodal titanium polyhedral oligomeric silsesquioxane”, Abstract of Papers, 238<sup>th</sup> American Chemical Society National Meeting, Washington, D.C., August 16-20, 2009, INOR-753.
- 54) Yaying Ji, Courtney Fisk, Vence Easterling, Mark Crocker, Jae-Soon Choi, William Partridge, “NO<sub>x</sub> Storage-Reduction Characteristics of Ba-Based Lean NO<sub>x</sub> Trap Catalysts Subjected to Simulated Road Aging”, paper presented at the 21<sup>st</sup> North American Catalysis Society Meeting, San Francisco, CA, June 7-11, 2009, paper OB19.
- 53) Vencon Easterling, Mark Crocker, Justin Ura, Joseph Theis, Robert McCabe, “Effect of Ceria on the Desulfation Characteristics of Model Lean NO<sub>x</sub> Trap Catalysts”, paper presented at the 21<sup>st</sup> North American Catalysis Society Meeting, San Francisco, CA, June 7-11, 2009, paper P-M-18.
- 52) C. Crofcheck, M. Montross, A. Shea, W. Chen, W. Adams, A. Kroumov, R. Andrews, M. Crocker, S. Morton, C. Fisk, “Selection of Microalgal Strains and Medium Optimization for CO<sub>2</sub> Mitigation from Flue Gas”, ASABE Annual International Meeting, Reno, NV, June 2009.
- 51) M. Crocker and Y. Ji, “NO<sub>x</sub> Storage-Reduction Characteristics of Lean NO<sub>x</sub> Trap Catalysts Subjected to Simulated Road Aging”, 12<sup>th</sup> DOE Crosscut Workshop on Lean Emissions Reduction Simulation, Dearborn, MI, April 28-30, 2009.
- 50) V. Easterling, J. Ura, J. Theis, R.W. McCabe, M. Crocker, “Effect of Ceria on the Desulfation Characteristics of Model Lean NO<sub>x</sub> Trap Catalysts”, Tri-State Catalysis Society Annual Spring meeting, Lexington, April 20, 2009.
- 49) C. Crofcheck, M. Montross, A. Kroumov, A. Shea, W. Chen, W. Adams, R. Andrews, M. Crocker, S. Morton, C. Fisk, J. Groppo, “Selection of Microalgal Strains and Medium Optimization for CO<sub>2</sub>

Mitigation from Flue Gas', Annual Institute of Biological Engineering Meeting, Santa Clara, CA, March 2009.

- 48) C.A. Fisk, T. Morgan, M. Crocker, C. Crofcheck, S.A. Lewis, "Bio-oil upgrading using platinum catalysts", 5<sup>th</sup> International Conference on Environmental Catalysis, Belfast, August 31-September 3, 2008, oral presentation CE-12.
- 47) E. Santillan-Jimenez, M. Crocker, J.E. Parks II, C. Salinas Martinez de Lecea, "Carbon nanotube supported catalysts for NO reduction using hydrocarbon reductants", 5<sup>th</sup> International Conference on Environmental Catalysis, Belfast, August 31-September 3, 2008, poster 182.
- 46) Y. Ji, V. Easterling, M. Crocker, T.J. Toops, J. Theis, J. Ura, R.W. McCabe, "Effect of ceria on the sulfation and desulfation characteristics of lean NO<sub>x</sub> trap catalysts", 5<sup>th</sup> International Conference on Environmental Catalysis, Belfast, August 31-September 3, 2008, poster 181.
- 45) Y. Ji, V. Easterling, M. Crocker, T.J. Toops, J. Theis, J. Ura, R.W. McCabe, "Effect of Ceria on the Sulfation and Desulfation Characteristics of Lean NO<sub>x</sub> Trap Catalysts", 11<sup>th</sup> Cross-Cut Lean Exhaust Emissions Reduction Simulation (CLEERS) Workshop, Dearborn, MI, May 13-15, 2008.
- 44) C. Fisk, T. Morgan, M. Crocker, C. Crofcheck, S.A. Lewis, "Bio-Oil Upgrading Using Platinum Catalysts", Tri-State Catalysis Society Fall Symposium, Lexington, KY, November 19, 2007.
- 43) Y. Ji, T.J. Toops and M. Crocker, "Effect of Ceria Addition on the Regeneration of a Model LNT Catalyst", Tri-State Catalysis Society Fall Symposium, Lexington, KY, November 19, 2007.
- 42) J.L. Shumaker, C. Crofcheck, S.A. Tackett, E. Santillan-Jimenez, M. Crocker, "Biodiesel synthesis from soybean oil using calcined Li-Al layered double hydroxide catalysts," Europacat VIII, Aug 26-31, Turku, Finland, 2007, Paper O12-5.
- 41) Y. Ji, T.J. Toops, J.-S. Choi, M. Crocker, "Composition-Activity Relationships in Lean NO<sub>x</sub> Trap Catalysts", Europacat VIII, Turku, Finland, August 26-30, 2007, paper P14-9.
- 40) C. Fisk, C. Crofcheck, M. Crocker, S. Lewis, J. Storey, "A Catalytic Approach to Bio-Oil Upgrading", ASABE Annual International Meeting, Minneapolis, MN, July 2007, ASABE Paper No. 076144.
- 39) J. Shumaker, C. Crofcheck, M. Crocker, M. Montross, "Transesterification of Various Plant Oils with a Solid Heterogeneous Catalyst", ASABE Annual International Meeting, Minneapolis, MN, July 2007, ASABE Paper No. 0724237.
- 38) Y. Ji, T.J. Toops, J.-S. Choi, M. Crocker, "Effect of CeO<sub>2</sub> on the Storage and Regeneration Behavior of Lean NO<sub>x</sub> Traps", 20<sup>th</sup> North American Catalysis Society Meeting, Houston, TX, June 17-22, 2007, paper O-S4-41.
- 37) J.L. Shumaker, S.A. Tackett, E. Santillan-Jimenez, C. Crofcheck, M. Crocker, "Heterogeneous Catalysts for Biodiesel Production Derived from Layered Double Hydroxides", 19<sup>th</sup> Annual Michigan Catalysis Society Spring Symposium, Dearborn, MI, May 10, 2007.
- 36) Y. Ji, T.J. Toops, J.-S. Choi, M. Crocker, "The Effect of CeO<sub>2</sub> on the Performance of Lean NO<sub>x</sub> Trap Catalysts", 10<sup>th</sup> Cross-Cut Lean Exhaust Emissions Reduction Simulation (CLEERS) Workshop, Dearborn, MI, May 1-3, 2007.
- 35) C. Crofcheck, M. Crocker, J. Shumaker, M. Montross, "Biodiesel Production from Soybean Oil using Calcined Layered Double Hydroxide Catalysts", Institute of Biological Engineering Annual Meeting, St. Louis, MO, March 2007.

- 34) C. Fisk, C. Crofcheck, M. Crocker, J.M. Storey, S. Lewis, "A Catalytic Approach to Bio-Oil Upgrading", Institute of Biological Engineering Annual Meeting, St. Louis, MO, March 2007.
- 33) S.M. Lipka, C.R. Sartz, T.J. Harris, R. Andrews, M. Crocker, "Alternative Material Chemistries for Hybrid Aqueous Electrochemical Capacitors," 16th International Seminar on Double Layer Capacitors & Hybrid Energy Storage Devices, Dec. 4-6, Ft. Lauderdale, FL, 2006.
- 32) Y. Ji, T.J. Toops and M. Crocker, "Effect of Ceria Addition on the Regeneration of a Model LNT Catalyst", Southeastern Catalysis Society Fall Symposium, Asheville, NC, September 18, 2006.
- 31) L. Schumaker, S.A. Tackett, E. Santillan-Jimenez, C. Crofcheck and M. Crocker, "Development of Heterogeneous Catalysts for Biodiesel Production", Tri-State Catalysis Society Fall Symposium, Lexington, KY, September 13, 2006.
- 30) J.L. Shumaker, C. Crofcheck, M. Montross, S.A. Tackett and M. Crocker, "Evaluation of Heterogeneous Catalysts for Improved Biodiesel Production", 2006 ASABE Annual International Meeting, Portland, Oregon, 9 - 12 July 2006, oral presentation 066143.
- 29) C. Fisk, C. Crofcheck, M. Crocker, S. Lewis and J. Storey, "Novel Catalytic Approaches for Bio-Oil Upgrading", 2006 ASABE Annual International Meeting, Portland, Oregon, 9 - 12 July 2006, oral presentation 066035.
- 28) Y. Ji, T.J. Toops, U.M. Graham, G. Jacobs and M. Crocker, "A kinetic and DRIFTS study of supported Pt catalysts for NO oxidation", 9<sup>th</sup> Cross-Cut Lean Exhaust Emissions Reduction Simulation (CLEERS) Workshop, Dearborn, MI, May 3-4, 2006 (poster).
- 27) C. Crofcheck, M. Crocker, J. Shumaker and M. Montross, "Evaluation of Heterogeneous Catalysts for Improved Biodiesel Production", oral presentation at the 2006 Institute of Biological Engineering Meeting, Tucson, AZ, March 2006.
- 26) P.M. Patterson, G. Jacobs, D.E. Sparks, A. Tackett, M. Crocker and John A. Chaney, "Supported Bismuth Oxide Catalysts for NO<sub>x</sub> Reduction Using Hydrocarbon Reductants", 19<sup>th</sup> North American Catalysis Society Meeting, Philadelphia, PA, May 22-26, 2005, oral presentation O-104.
- 25) M. Crocker, P.M. Patterson, T.J. Toops, E. Morris, G. Jacobs and R. Keogh, "New COS adsorbents and hydrolysis catalysts for the production of low sulfur content hydrogen", 4<sup>th</sup> International Congress on Environmental Catalysis, Heidelberg, Germany, June 5-8, 2005, poster III.9.
- 24) P.M. Patterson, D.E. Sparks, G. Jacobs, N. Dogimont, A. Tackett and M. Crocker, "Development of New Catalysts for NO<sub>x</sub> Emission Control Based on Bismuth Oxide", poster presented at the 3<sup>rd</sup> Annual Kentucky Innovation and Enterprise Conference, Louisville, KY, March 30, 2005.
- 23) M. Crocker, U. Graham, R. Gonzalez, E. Morris, G. Jacobs and R. Andrews, "Preparation and Characterization of Fibrous Cerium Oxide Templated from Activated Carbon Fibers", Materials Research Society spring meeting, March 28-April 1, 2005, San Francisco, CA, paper R4.2.
- 22) M. Crocker, U. Graham, R. Gonzalez, E. Morris, G. Jacobs and R. Andrews, "Preparation and characterization of fibrous cerium oxide templated from activated carbon fibers", 2004 Nanomat, International Workshop on Nanomaterials, Lexington, KY, September 2004 (poster).
- 21) M. Crocker, D.E. Sparks, N. Dogimont, G. Jacobs and J. A. Chaney "New Catalysts for NO<sub>x</sub> Emission Control Based on Bismuth Oxide", 13<sup>th</sup> International Congress on Catalysis, Paris, July 2004, poster P6-080.

- 20) M. Crocker, P.M. Patterson, E. Morris, G. Jacobs, R. Keogh and T.J. Toops, "Nanostructured adsorbents and catalysts for the desulfurization of light hydrocarbon fuels", DOE/NSF EPSCoR Nanomaterials Workshop, Argonne National Laboratory, June 14, 2004 (poster).
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- 2) C.P. Casey and M. Crocker, "New carbon-carbon and carbon-nitrogen bond forming reactions at a diiron methyldiyne complex", 193rd ACS National Meeting, Denver, Colorado, April 1987, INOR 312.
- 1) M. Crocker, S.F. Froom, M. Green and C.E. Morton, "Synthesis and reactivity of  $\eta^4(5e)$  butadienyl-metal complexes", 191st ACS National Meeting, N.Y., N.Y., April 1986, INOR 270.

### Seminars

- 35) M. Crocker, "CO<sub>2</sub> to Fuels, Chemicals and Bioproducts: Recent Advances in (i) CO<sub>2</sub> Capture and Recycle using Microalgae and (ii) Oxidative Lignin Depolymerization", National Renewable Energy Laboratory, Golden, CO, June 8.
- 34) M. Crocker, "Heterogeneous Catalytic Depolymerization of Lignin and Lignin Model Compounds", European Bioenergy Research Institute, Aston University, U.K., May 23, 2017.
- 33) M. Crocker, "Capture and Recycle of Industrial CO<sub>2</sub> Emissions Using Microalgae", Shanxi Agricultural University, Taigu, China, September 8, 2016.
- 32) M. Crocker, "Biomass Conversion to Fuels and Chemicals", University of Kentucky Plant and Soil Science Dept., April 15, 2016.
- 31) M. Crocker, "Biomass Conversion to Fuels and Chemicals", Students of the American Chemical Society, University of Kentucky Dept. of Chemistry, April 20, 2016.
- 30) M. Crocker, "Passive NO<sub>x</sub> Adsorber Development for Diesel Applications", seminar given to the CLEERS (Cross-Cut Lean Exhaust Emissions Reduction Simulations) working group, December 10, 2015.
- 29) M. Crocker, "An Introduction to Biofuels", Suds and Science, West Sixth Brewery, Lexington, July 27, 2015.
- 28) M. Crocker, "CO<sub>2</sub> Capture and Recycle Using Microalgae", Arizona State University, April 2015.
- 27) M. Crocker, "CO<sub>2</sub> Recycling using Microalgae for the Production of Fuels", Georgetown College, KY, October 23, 2014.
- 26) M. Crocker, "Low Temperature NO<sub>x</sub> Storage and Reduction for the Abatement of Automotive Emissions", Dalian University of Technology, China, September 26, 2014.
- 25) M. Crocker, "Microalgae for CO<sub>2</sub> Recycling and Liquid Fuel Production: Process Development Studies", Beijing Forestry University, China, September 24, 2014.
- 24) M. Crocker, "Catalytic Approaches to the Depolymerization of Lignin", Southwest Forestry University, China, April 24, 2014.

- 23) M. Crocker, "Catalytic Approaches to the Depolymerization of Lignin", Beijing Forestry University, China, April 23, 2014.
- 22) M. Crocker, "CO<sub>2</sub> Recycling Using Microalgae for the Production of Liquid Fuels", Beijing Forestry University, China, April 22, 2014.
- 21) M. Crocker, "Catalysis for the Conversion of Biomass to Liquid Fuels", Beijing Forestry University, China, April 21, 2014.
- 20) M.H. Wilson and M. Crocker, "From Coal Flue Gas to Fungible Fuels: Demonstration of an Algae-Based System for CO<sub>2</sub> Mitigation from Coal-Fired Power Plants", National Energy Technology Laboratory, February 19, 2014.
- 19) M. Crocker, "Synergy of LNT and SCR Catalysts in Coupled LNT-SCR Systems", invited oral presentation at the 2013 CLEERS Workshop, U. Michigan-Dearborn, MI, April 10 - 12, 2013.
- 18) M. Crocker, "From Recalcitrant Biomass and Finicky Slime to Biofuels", Georgetown College, KY, November 27, 2012.
- 17) M. Crocker, "Synergy of LNT and Cu-chabazite SCR Catalysts in Coupled LNT-SCR Systems", seminar given to the CLEERS (Cross-Cut Lean Exhaust Emissions Reduction Simulations) lean NO<sub>x</sub> trap working group, August 16, 2012.
- 16) M. Crocker, "CO<sub>2</sub> Recycling and Biofuel Production Using Microalgae", Dept. of Inorganic Chemistry, Oxford University, U.K., August 17, 2011.
- 15) M. Crocker, "Development of an Algae-Based System for CO<sub>2</sub> Mitigation from Coal-Fired Power Plants", invited presentation given to congressional staffers, Capitol Visitors' Building, Washington, D.C., October 1, 2010.
- 14) M. Crocker, "Development of an Algae-Based System for CO<sub>2</sub> Mitigation from Coal-Fired Power Plants", 33<sup>rd</sup> Kentucky Governor's Conference on the Environment, Lexington, KY, October 1, 2009.
- 13) M. Crocker, "Thermochemical Conversion of Biomass to Biofuels", Department of Plant and Soil Science, University of Kentucky, 597 Seminar, 2009.
- 12) M. Crocker, "Application of layered double hydroxides to the production of renewable diesel", XVIII International Materials Research Congress, Cancun, Mexico, August 16-20, 2009, paper S15-01 (keynote lecture).
- 11) M. Crocker, "Thermochemical Conversion of Biomass to Biofuels", Department of Horticulture, University of Kentucky, October 15, 2008.
- 10) T. Morgan, D. Grubb, M. Crocker, "Upgrading of Algae Oil to Hydrocarbon Fuels", NETL-APS Carbon Recycling Forum, Scottsdale, AZ, September 18-19, 2008.
- 9) M. Crocker, "Biofuels and Environmental Catalysis Research at CAER", Stites & Harbison Law Firm, Lexington, KY, August 21, 2008.
- 8) M. Crocker, "Biofuels: Opportunities and Implications for Kentucky", Kentucky Business Leadership Network, Frankfort, July 11, 2008.
- 7) M. Crocker, "Catalysis for Biomass Conversion to Liquid Fuels", Department of Chemistry, George Washington University, Washington, D.C., March 17, 2007.
- 6) M. Crocker, "Soluble silsesquioxane complexes as models for titanium silicate oxidation catalysts", Department of Chemistry, University of Kentucky, 2004.

- 5) M. Crocker, "Deactivation of Automotive Emission Control Catalysts", Oak Ridge National Laboratory, Oak Ridge, TN, 2003.
- 4) M. Crocker and E.S.J. Lox, "Deactivation of Automotive Emission Control Catalysts", Southwest Research Institute, San Antonio, TX, January 2001.
- 3) M. Crocker, "Soluble Models for the Active Site in Titanosilicate Epoxidation Catalysts", Dow Chemical Co., Midland, MI, July 2000.
- 2) M. Crocker, R.J.M. Groenen, D.S. Brands and B.M. Veldmeijer, "The Shell DeVOx Process for VOC emission abatement", NPT VOC-emissions study day, The Hague, May 1998.
- 1) M. Crocker, "The Shell DeVOx Process for Destruction of Volatile Organic Compounds by Catalytic Oxidation", Cranfield University, U.K., March 1995.