CURRICULUM VITAE

Mahdi M. Abu-Omar

Department of Chemistry, Purdue University
mabuomar@purdue.edu

EDUCATION

B.S. *summa cum laude*, Chemistry	Hampden-Sydney College, Virginia	1992
Ph.D., Chemistry	Iowa State University (Research advisor: James H. Espenson)	1996
Postdoc, Dept. of Chemistry	California Institute of Technology (Research advisor: Harry B. Gray)	1996-97

PROFESSIONAL APPOINTMENTS

Division Head, Inorganic Chemistry, Purdue University	2011-present
Associate Director, Center for Catalytic Conversion of Biomass to Biofuels (C3Bio), Discovery Park, Purdue University	2009-present
Professor, Department of Chemistry, Purdue University	2008-present
Visiting Scholar, Department of Chemistry, Stanford University	2011
Visiting Professor, Faculté de Chimie, L'université Louis Pasteur, Strasbourg, France	2009
Visiting Professor, Department of Organic Chemistry, Weizmann Institute of Science, Rehovot, Israel	2008
Associate Professor, Department of Chemistry, Purdue University	2003-08
Assistant Professor, Department of Chemistry and Biochemistry, UCLA,	1997-03

AWARDS AND HONORS

Crano Memorial Lecturer, University of Akron	2013
Fellow, American Association for Advancement of Science (AAAS)	2012
JPP Young Investigator Award, Society of Porphyrins and Phthalocyanines	2010
College of Science Interdisciplinary Award, Purdue University	2010
University Faculty Scholar, Purdue University	2008-13
Entrepreneur Leadership Academy, Purdue University	2009
Senior Fulbright Fellow, US-Israel Education Foundation	2008
Team Excellence Award, College of Engineering, Purdue University	2007
Seeds for Success, Purdue University	2006 & 2009
Faculty Career Development Award, UCLA	2001 & 1999
Faculty Early Career Development Award (CAREER), NSF	1999-03
Beckman Young Investigator Award, Beckman Foundation	1999-02
Basil O'Connor Starter Scholar Research Award, March of Dimes	1999-01
NIH Postdoctoral Fellowship	1996-97
ΑΧΣ Award for Excellence in Graduate Research, Iowa State University	1996

PROFESSIONAL AND SCHOLARLY ASSOCIATIONS

Society of Porphyrins and Phthalocyanines, member	2009-present
American Association for the Advancement of Science, fellow	2012-present
American Association for the Advancement of Science, member	1997-2012
American Chemical Society, member	1992-present

MAJOR RESEARCH ACCOMPLISHMENTS

- Discovered rhenium catalyzed hydrodeoxygenation (HDO) of diols/polyols to alkenes and applied its utility to the conversion of biomass-derived molecules to high-value organics (HVO).
- Illustrated the use of cheap and abundant catalysts based on aluminum and organic acids for the fractionation of biomass into sugars and the subsequent dehydration of sugars to furfurals.
- Developed synergistic and tandem catalysis for the conversion of lignin to aromatic compounds.
- Demonstrated the use of manganese and ruthenium porphyrins as catalysts for "green" synthesis of chlorine dioxide gas from chlorite under ambient and neutral pH conditions.
- Established the chemical mechanism for the biological detoxification of chlorite to innocuous chloride and dioxygen with the heme enzyme chlorite dismutase.
- Synthesized, isolated, and characterized the first examples of terminal manganese(V) imido complexes.
- Established the utility of molecular weight distribution (MWD) in studying the kinetics of single-site olefin polymerization catalysts.
- Demonstrated the use of oxorhenium coordination catalysts in reductions of organic carbonyl compounds and production of hydrogen.
- Clarified the mechanism by which metal oxo, imido, and nitrido compounds catalyze hydrosilylation reactions.
- Developed and prepared oxorhenium(V) oxazoline catalysts for the efficient reduction of perchlorate, an environmental contaminant, under mild conditions.
- Established "green" catalytic epoxidations with urea hydrogen peroxide in nonvolatile ionic liquids, and demonstrated the utility of ^{2}H NMR in studying chemical kinetics in ionic liquids.
- Clarified the kinetic mechanism (order of substrate binding) and its molecular basis for the non-heme enzyme phenylalanine hydroxylase.
- Discovered an *in vivo* posttranslational oxidative-repair of a mutation in the second coordination sphere of human phenylalanine hydroxylase.
- Defined the role of the metal cofactor in unfolding dynamics of the enzyme phenylalanine hydroxylase and its effect on protein aggregation in disease (PKU).

CURRENT FUNDING

Agency/Title of Project: NSF/ *High-Valent Imido and Oxo Complexes in Electron Transfer, Atom Transfer, and Chlorite Catalysis*. 9/1/11 – 8/31/14. Total cost: $405K. Single PI grant.

Agency/Title of Project: DOE/ *Oxo Rhenium and Molybdenum Catalysts for C-O Cleavage and Deoxygenation*. 8/1/12-7/31/15. Total cost: $495K. Single PI grant.

Agency/Title of Project: DOE/ *Catalyst Design by Discovery Informatics*. Duration of Funding: 9/1/12-8/31/15. Total cost: $2.0 million. Multiple PI's (with 3 colleagues from Chemical Engineering). 30% of the grant is for effort in the Abu-Omar group.

Agency/Title of Project: DOE/ *Energy Frontiers Research Center for direct Catalytic Conversion of Biomass to Biofuels (C3Bio).* Duration of Funding: 8/1/09-7/31/14. Total cost: $18.5 million. Multiple PI's from five institutions, Purdue University (lead institution), National Renewable Energy Laboratory (NREL), University of Tennessee, Knoxville, Argonne National Laboratory (ANL), and Northeastern University. C3Bio supports 1 postdoc and 3 graduate students in the Abu-Omar group, an approximate of $300K per year.

Agency/Title of Project: NSF/ EFRI *Maximizing Conversion of Biomass to Carbon Liquid Fuel*. Duration of Funding: 9/1/09-8/31/13. Total cost: $2 million. Multiple PI's (with 3 colleagues from Chemical Engineering and two from Botany). $350K allocated to the Abu-Omar group.

PUBLICATIONS AND LECTURES

Ninety plus original research articles in peer reviewed journals. (A complete list is attached below. More than 100 invited lectures and symposia presentations.

OTHER PROFESSIONAL ACTIVITIES

Member, Nominations and Symposia Planning Committee, Inorganic Division, American Chemical Society, 2002

Organizer, Award Symposium in honor of Professor James H. Espenson, recipient of the 2004 ACS Award for Distinguished Service in Inorganic Chemistry, 227th *ACS National Meeting* (2004), Anaheim, California

Co-organizer and Chair, Symposium on Homogeneous and Heterogeneous Oxidation Catalysis, 228th *ACS National Meeting* (2004), Philadelphia, Pennsylvania

Co-organizer, Symposium on Novel Ligands of Early Transition Metals, 231th *ACS National Meeting* (2006), Atlanta, Georgia

Chair, Third Energy Center Hydrogen Initiative (ECHI-3) Symposium, April, 2008, Purdue University, West Lafayette, Indiana

Discussion Leader, Gordon Research Conference, Inorganic Reaction Mechanisms, Galveston, Texas, March, 2009

Vice-chair, Gordon Research Conference, Inorganic Reaction Mechanisms, Galveston, Texas, 2011

Chair, Gordon Research Conference, Inorganic Reaction Mechanisms, Galveston, Texas, 2013

Editorial Board Member, BioInorganic Reaction Mechanisms, De Gruyter, 2011-Present

Scientific Advisory Board, Center for Environmentally Beneficial Catalysis (CEBC), University of Kansas, 2011-Present

GRADUATE RESEARCH PROGRAM (mentored 10 postdocs and 38 Ph.D. students)

Visiting scientists: (1) Professor Tae-Jin Won, 2008, Associate Professor, Changwon National University, Korea. (2) Professor Basudeb Saha, 2011, Associate Professor, Department of Chemistry, University of Delhi, India.

Former postdocs : (1) Dr. Virginie M. Béreau, 12/99-8/01, current affiliation: Assistant Professor, IUT Paul Sabatier- Département de Chimie, Avenue Georges Pompidou- BP 258, France. (2) Dr. Aram M. Nersissian, 3/99-12/00, current affiliation: Professor, Occidental College, California. (3) Dr. Nikos Hontzeas, 9/04-4/05, current affiliation: Global Product Manager, bioMerieux, St. Louis. (4) Dr. Elon A. Ison, 6/04-7/06, current affiliation: Assistant Professor, Department of Chemistry, North Carolina State University. (5) Dr. Corneliu Stanciu, 6/05-5/08, current affiliation: Scientist, Applied Research Unit, Intrexon Corporation, Germantown, Maryland. (6) Dr. Guodong Du, 8/05-6/08, current affiliation: Assistant Professor, Department of Chemistry, University of North Dakota. (7) Dr. Michael J. Zdilla, 6/05-6/09, current affiliation: Assistant Professor, Department of Chemistry, Temple University, Philadelphia, Pennsylvania. (8) Dr. Aysegol Senocak, 6/1/2011-6/30/2012, current affiliation: Assistant Professor, Gaziosmanpasa University, Tokat, Turkey.

Current postdocs: (1) Dr. Trenton Parsell, and (2) Dr. Kothanda Rama Pichaandi.

Former graduate students: (1) Rhonda K. Larson, Ph.D. 2001, current affiliation: Senior Director, Global Advertising Operations, Yahoo, Mountain View, California. (2) Denny M. Schoch, M.S. 2000, current affiliation: Physician in Nashville, Tennessee. (3) Joachin J. Arias, Ph.D. 2001, current affiliation: Science teacher with Los Angeles Unified School District. (4) Gregory S. Owens, Ph.D. 2001, current affiliation: Associate Professor (Lecturer), Department of Chemistry, University of Utah, Salt Lake City, Utah. (5) Kimberly J. Miller, Ph.D. 2002, current affiliation: Partner, Knobbe Martens Intellectual Property Law,

San Diego, California. (6) Rebecca A. Eikey, Ph.D. 2002, current affiliation: Professor and department chair, College of the Canyons, California. (7) Alon Volner, Ph.D. 2003, current affiliation: Chief Chemist, Department of Public Health, Los Angeles, California. (8) Lee D. McPherson, Ph.D. 2004, current affiliation: Research Analyst, Center for Naval Analyses, Alexandria, Virginia. (9) Jung H. Hwang, Ph.D. 2004, current affiliation: Process Development Chemist, Heraeus Metal Processing, Inc., Santa Fe Springs, California. (10) Andrew A. Han, Ph.D. 2005, current affiliation: Postdoc, UC Davis. (11) Mui Sam, Ph.D. 2005, current affiliation: Research Chemist, Department of Toxic Substance Control, Berkeley, California. (12) Richard Himes, Ph.D. 2005, current affiliation: Assistant Professor, Department of Chemistry, College of Charleston, South Carolina. (13) Shalini Sharma, Ph.D. 2005, current affiliation: Scientist, JSR Micro, Berkeley, California. (14) Aristobulo Loaiza, Ph.D. 2008, current affiliation: Market Intelligence Analyst, BASF Chemical Company, Morristown, New Jersey. (15) Amanda Q. Lee, Ph.D. 2009, current affiliation: Research Fellow, City of Hope, Duarte, California. (16) Rex A. Corbin, Ph.D. 2009, current affiliation: Staff chemist, Crane Naval Base, Indiana. (17) Jeanette E. Ziegler, Ph.D. 2010, current affiliation: Marketing, Sensient, St. Louis, Missouri. (18) Nicholas E. Travia, Ph.D. 2010, current affiliation: Postdoctoral Scholar, Los Alamos National Laboratory, New Mexico. (19) Jennifer Petersen, Ph.D. 2010, current affiliation: Research Analyst, Center for Naval Analyses, Alexandria, Virginia. (20) Andrew Evans, M.S. 2011, current affiliation: Ph.D. student, Purdue University, Indiana. (21) Erin Smith, Ph.D. 2012, current affiliation: High School Teacher, Maryland. (22) Eurick Kim, Ph.D. 2012, current affiliation: Postdoc, Purdue University.

Current graduate students: (1) Christine Bohn, (2) Curt Bougher, (3) Isaac Corn, (4) Thilina Gunasekara (TG), (5) Scott Hicks, (6) Yuan Jiang, (7) Ian Klein, (8) Shuo Liu, (9) Michael Mazzotta, (10) Paul Pletcher, (11) Andrew Preston, (12) Manasa Ramachandra, (13) Judith Ronau, (14) Keith Steelman, (15) Benjamin Wegenhart, (16) and Jing Yi.

TEACHING

Undergraduate: General Chemistry (several terms at Purdue and UCLA), Inorganic Chemistry (3 terms at UCLA), Metal-Organic Laboratory (2 terms at UCLA).

Graduate: Advanced Inorganic Chemistry (several terms at Purdue and UCLA), Transition Metal and Organometallic Chemistry (1 term at Purdue), Bioinorganic Chemistry (2 terms at UCLA), Chemical Kinetics and Reaction Mechanisms (3 terms at UCLA and 2 terms at Purdue).

Instructor's rating: Between 4.3 and 4.9 out of 5.0 for all courses at the undergraduate and graduate levels.

PROFESSIONAL SERVICES AND CONSULTING

Reviewer for the following journals: *Inorganic Chemistry, Journal of the American Chemical Society, Chemical Communications, Angewandte Chemie International Edition, Journal of Organic Chemistry, Organometallics, Organic Letters, Chemical Reviews, European Journal of Inorganic Chemistry, Dalton Transactions, Environmental Science and Technology, Biochemistry, Journal of Biological Inorganic Chemistry, Inorganica Chimica Acta, Journal of Inorganic Biochemistry, Journal of Organometallic Chemistry, Tetrahedron Letters, Inorganic Communications, Coordination Chemistry Reviews, Catalysis Today, Green Chemistry, and Journal of Molecular Catalysis A: Chemical.*

Reviewer for the following agencies: National Science Foundation, Environmental Protection Agency, Department of Energy/Basic Energy Sciences, American Chemical Society/Petroleum Research Fund, National Institute of Health/NIGMS, Council for Chemical Sciences of the Netherlands Organization for Scientific Research (CW-NWO), Israel Science Foundation, the Beckman Foundation.

CRIF review panel, National Science Foundation	11/00
Ad hoc member of Metallobiochemistry (BMT) study section, NIH	06/04
Collaborative research in chemistry review panel, NSF	12/04

Panel member, Texas' Advanced Research Program (ARP)	02/06
Broco, Inc. Underwater cutting & welding systems, consultant	1998-00
Pollard, Harrell, and Googooian, Attorney at Law, consultant	2001-04
Extractica, LLC, consultant	2003-05
Nossaman, Guthner, Knox & Elliot, LLP, consultant	2007-09
External reviewer, Biorenewables Program, Los Alamos National Laboratory	2011
Member, Review Panel, Catalysis Program, NSF	2012

University

Member, Curriculum Committee, UCLA	1997-03
Member, Committee on Safety, UCLA	1999-03
Member, Graduate Studies Committee, UCLA	2000-03
Inorganic Graduate Advisor, UCLA	2000-03
Member, Safety Committee, Purdue University	2004-present
Member, Colloquium Committee, Purdue University	2004-present
Chair, National Standings Committee, Purdue University	2005-07
Chair, Awards Committee, Purdue University	2005-07
Chair, Inorganic Faculty Search Committee, Purdue University	2007-08
Chair, Inorganic Faculty Search Committee, Purdue University	2012
Member, Diversity Committee, Purdue University	2008-present
Member, Faculty Honors Committee, College of Science, Purdue	2006-08
Member, Committee on Diversity, Academic Senate, UCLA	1998-00
Faculty Advisor, Beta Gamma Chapter of AXΣ Fraternity, UCLA	1999-03
Chair, NMR Facility Faculty Advisory Committee, Purdue University	2012-present
Member, Search committee for Energy Center Director	2005-06
Member, Executive Advisory Board, Energy Center, Purdue University	2005-09
Member, Center for Catalyst Design, Purdue University	2004-present
Co-chair, Second Energy Center Hydrogen Initiative (ECHI-2) Symposium	2007
Chair, Third Energy Center Hydrogen Initiative (ECHI-3) Symposium	2008

PUBLICATION LIST (* Refer to publications where Mahdi Abu-Omar is the senior corresponding author)

1. Peter E. Peterson, Mahdi Abu-Omar, Thomas W. Johnson, Ricky Parham, Dennis Goldin, Charles Henry, III, Andrew Cook, and Kevin M. Dunn, "*Ab Initio* Predictions of Vibrational Frequencies for Cationic Species" *J. Phys. Chem.* **1995**, *99*, 5927-5933.
2. Mahdi M. Abu-Omar and James H. Espenson, "Oxidations of ER_3 (E = P, As, or Sb) by Hydrogen Peroxide: Methylrhenium Trioxide as Catalyst" *J. Am. Chem. Soc.* **1995**, *117*, 272-280.
3. Mahdi M. Abu-Omar and James H. Espenson, "Facile Abstractions of Successive Oxygen Atoms from Perchlorate Ions by Methylrhenium Dioxide" *Inorg. Chem.* **1995**, *34*, 6239-6240.
4. Mahdi M. Abu-Omar and James H. Espenson, "Oxidations of Cyclic β-Diketones Catalyzed by Methylrhenium Trioxide" *Organometallics* **1996**, *15*, 3543-3549.
5. Mahdi M. Abu-Omar, Peter J. Hansen, and James H. Espenson, "Deactivation of Methylrhenium Trioxide-Peroxide Catalysts by Diverse and Competing Pathways" *J. Am. Chem. Soc.* **1996**,*118*, 4966-4974.

6. Mahdi M. Abu-Omar, Evan H. Appleman, and James H. Espenson, "Oxygen Transfer Reactions of Methylrhenium Oxides" *Inorg. Chem.* **1996**, *35*, 7751-7757.

7. James H. Espenson and Mahdi M. Abu-Omar, "Reactions Catalyzed by Methylrhenium Trioxide" In *Electron Transfer Reactions: Inorganic, Organometallic, and Biological Applications*; S. S. Iseid, Ed., Advances in Chemistry Series, American Chemical Society: Washington, DC **1997**, *253*, pp 99-134. [BOOK CHAPTER]

8. (*) Mahdi M. Abu-Omar and Saeed I. Khan, "Molecular Rhenium(V) Oxotransferases: Oxidation of Thiols with Sulfoxides. The Case of Substrate-Inhibited Catalysis" *Inorg. Chem.* **1998**, *37*, 4979-4985.

9. (*) Kimberly J. Miller, Jun Ho Baag, and Mahdi M. Abu-Omar, "Synthesis, Characterization, and Reactivity of Palladium(II) Salen and Oxazoline Complexes" *Inorg. Chem.* **1999**, *38*, 4510-4514.

10. (*) Jung H. Hwang and Mahdi M. Abu-Omar, "New vanadium oxazoline catalysts for epoxidation of allylic alcohols" *Tetrahedron Lett.* **1999**, *40*, 8313-8316.

11. (*) Gregory S. Owens, Joachin Arias, and Mahdi M. Abu-Omar, "Rhenium oxo complexes in catalytic oxidations" *Catalysis Today* **2000**, *55*, 317-363. [REVIEW ARTICLE]

12. (*) Gregory S. Owens and Mahdi M. Abu-Omar, "Methyltrioxorhenium-catalyzed epoxidations in ionic liquids" *Chem. Commun.* **2000**, 1165-1166.

13. (*) Mahdi M. Abu-Omar, Lee D. McPherson, Joachin Arias, and Virginie M. Béreau, "Clean and Efficient Catalytic Reduction of Perchlorate" *Angew. Chem. Int. Ed.* **2000**, *39*, 4310-4313.

14. (*) Joachin Arias, Craig R. Newlands, and Mahdi M. Abu-Omar, "Kinetics and Mechanisms of Catalytic Oxygen Atom Transfer with Oxorhenium(V) Oxazoline Complexes" *Inorg. Chem.* **2001**, *40*, 2185-2192.

15. Junjun Wu, Mahdi M. Abu-Omar, and Sarah H. Tolbert, "Fluorescent Probes of the Molecular Environment within Mesostructured Silica/Surfactant Composites under High Pressure" *Nano Letters* **2001**, *1*, 27-31.

16. Angel J. Di Bilio, Brian R. Crane, William A. Wehbi, Cynthia N. Kiser, Mahdi M. Abu-Omar, Rose M. Carlos, John H. Richards, Jay R. Winkler, and Harry B. Gray, "Properties of Photogenerated Tryptophan and Tyrosyl Radicals in Structurally Characterized Proteins Containing Rhenium(I) Tricarbonyl Diimines" *J. Am. Chem. Soc.* **2001**, *123*, 3181-3182.

17. Mahdi M. Abu-Omar, "Green Chemistry" *2002 McGraw-Hill Yearbook of Science & Technology*, McGraw-Hill: New York, 2001, pp 148-151. [BOOK CHAPTER]

18. (*) Kimberly J. Miller, Terutaka T. Kitagawa, and Mahdi M. Abu-Omar, "Kinetics and Mechanisms of Methyl Vinyl Ketone Hydroalkoxylation Catalyzed by Palladium(II) Complexes" *Organometallics* **2001**, *20*, 4403-4412.

19. (*) Virginie M. Béreau, Saeed I. Khan, and Mahdi M. Abu-Omar, "Synthesis of Enantiopure Oxorhenium (V) and Arylimidorhenium (V) '3+2' Schiff Base Complexes. X-Ray Diffraction, Cyclic Voltammetry, UV-visible, and Circular Dichroism Characterizations" *Inorg. Chem.* **2001**, *40*, 6767-6773.

20. (*) Armando Durazo and Mahdi M. Abu-Omar, "Deuterium NMR Spectroscopy is a Versatile and Economical Tool for Monitoring Reaction Kinetics in Ionic Liquids" *Chem. Commun.* **2002**, 66-67.

21. (*) Susan E. Bailey, Rebecca A. Eikey, Mahdi M. Abu-Omar, and Jeffrey I. Zink, "Excited State Distortions Determined from Structured Luminescence of Nitridorhenium (V) Complexes" *Inorg. Chem.* **2002**, *41*, 1755-1760.

22. (*) Gregory S. Owens, Armando Durazo, and Mahdi M. Abu-Omar, "Kinetics of MTO-Catalyzed Olefin Epoxidation in Ambient Temperature Ionic Liquids: UV-vis and ^{2}H NMR Study" *Chem. Eur. J.* **2002**, *8*, 3053-3059.

23. (*) Gregory S. Owens and Mahdi M. Abu-Omar, "Catalytic Oxidations in Ionic Liquids" In *Ionic Liquids: Industrial Applications to Green Chemsitry*; R. D. Rogers and K. R. Seddon, Eds, Advances in Chemistry Series, American Chemical Society: Washington, DC **2002**, Vol. 818, pp 325-333. [BOOK CHAPTER]

24. Heidi Erlandsen, Joo Y. Kim, Marianne G. Patch, Andrew Han, Alon Volner, Mahdi M. Abu-Omar, and Raymond C. Stevens, "Structural Comparison of Bacterial and Human Iron-Dependent Phenylalanine Hydroxylases- Similar Fold, Different Stability and Reaction Rates" *J. Mol. Biol.* **2002**, *320*, 645-661.

25. (*) Mahdi M. Abu-Omar, Gregory S. Owens, Armando Durazo, "Catalytic oxidation and comparative kinetics in room-temperature ionic liquids." *Proceedings - Electrochemical Society* **2002**, Vol. 19 (Molten Salts XIII), pp 224-233. [BOOK CHAPTER]

26. (*) Gregory S. Owens and Mahdi M. Abu-Omar, "Comparative kinetic investigations in ionic liquids using the MTO/Peroxide system" *J. Mol. Catal. A: Chemical* **2002**, *187*, 215-225.

27. (*) Rebecca A. Eikey, Saeed I. Khan, and Mahdi M. Abu-Omar, "The Elusive Terminal Imido of Manganese(V)" *Angew. Chem. Int. Ed.* **2002**, *41*, 3592-3595.

28. (*) Alon Volner, Jerome Zoidakis, and Mahdi M. Abu-Omar, "The order of substrate binding in bacterial phenylalanine hydroxylase and its mechanistic implication for pterin-dependent oxygenases" *J. Biol. Inorg. Chem.* **2003**, *8*, 121-128.

29. Charles C. Van Kirk, Virginie Béreau, Mahdi M. Abu-Omar, and Dennis H. Evans, "Voltammetric Studies of Rhenium(V) Compounds Containing the 2-(2'-Hydroxyphenyl)-2-oxazoline Ligand" *J. Electroanal. Chem.* **2003**, *541*, 31-38.

30. (*) Kimberly J. Miller and Mahdi M. Abu-Omar, "Palladium-Catalyzed S_N1 Reactions of Secondary Benzylic Alcohols: Etherification, Amination, and Thioetherification" *Eur. J. Org. Chem.* **2003**, 1294-1299.

31. (*) Sylvia Daoud-Kinzie, Mario Thevis, Khan Ngo, Julian P. Whitelegge, Joseph A. Loo, and Mahdi M. Abu-Omar, "Post-Translational Hydroxylation of Human Phenylalanine Hydroxylase is a Novel Example of Enzyme Self-Repair within the Second Coordination Sphere of Catalytic Iron" *J. Am. Chem. Soc.* **2003**, *125*, 4710-4711.

32. Mahdi M. Abu-Omar, "Swift oxo transfer reactions of perchlorate ions and other substrates catalyzed by rhenium oxazoline and thiazoline complexes" *Chem. Commun.* **2003**, 2102-2111. [FEATURE ARTICLE]

33. (*) Rebecca A. Eikey and Mahdi M. Abu-Omar, "Nitrido and imido transition metal complexes of Groups 6-8" *Coord. Chem. Rev.* **2003**, *243*, 83-124. [REVIEW ARTICLE]

34. (*) Mahdi M. Abu-Omar, Gregory S. Owens, and Armando Durazo, "Catalytic Olefin Epoxidation and Dihydroxylation with Hydrogen Peroxide in Common Ionic Liquids: Comparative Kinetics and Mechanistic Study" In *Ionic Liquids as Green Solvents: Progress and Prospects*; R. D. Rogers and K. R. Seddon, Eds, Advances in Chemistry Series, American Chemical Society: Washington, DC **2003**, Vol. 856, pp 277-288. [BOOK CHAPTER]

35. Mahdi M. Abu-Omar, "Effective and Catalytic Reduction of Perchlorate by Atom Transfer-Reaction Kinetics and Mechanisms" *Comments on Inorg. Chem.* **2003**, *24*, 15-37.

36. (*) Jung H. Hwang, Rhonda K. Larson, Mahdi M. Abu-Omar, "Kinetics and Mechanistic Studies of Anticarcinogenic Bisperoxovanadium(V) Compounds: Ligand Substitution Reactions at Physiological pH and Relevance to DNA Interactions" *Inorg. Chem.* **2003**, *42*, 7967-7977.

37. (*) Lee D. McPherson, Virginie M. Béreau, Mahdi M. Abu-Omar, Vesela Ugrinova, Lihung Pu, Scheroi D. Taylor, Seth N. Brown, "Organometallic and Coordination Complexes. Oxorhenium(V) Oxazoline Complexes for Oxygen Atom Transfer" *Inorg. Synth.* **2004**, *34*, 54-59.

38. (*) Jerome Zoidakis, Mui Sam, Alon Volner, Andrew Han, Kim Vu, and Mahdi M. Abu-Omar, "Role of the second coordination sphere residue tyrosine 179 in substrate affinity and catalytic activity of phenylalanine hydroxylase" *J. Biol. Inorg. Chem.* **2004**, *9*, 289-296.

39. (*) Lee D. McPherson, Markus Drees, Saeed I. Khan, Thomas Strassner, and Mahdi M. Abu-Omar, "Multielectron Atom Transfer Reactions of Perchlorate and Other Substrates Catalyzed by Rhenium Oxazoline and Thiazoline Complexes: Reaction Kinetics, Mechanisms, and Density Functional Theory Calculations" *Inorg. Chem.* **2004**, *43*, 4036-4050.

40. Nikos Hontzeas, Jérôme Zoidakis, Bernard R. Glick, and Mahdi M. Abu-Omar, "Expression and characterization of 1-aminocyclopropane-1-carboxylate deaminase from the rhizobacterium *Pseudomonas putida* UW4: A key enzyme in plant growth promotion" *Biochim. Biophys. Acta* **2004**, *1703*, 11-19.

41. (*) Mui Sam, Jung H. Hwang, Guillaume Chanfreau, and Mahdi M. Abu-Omar, "Hydroxyl Radical is the Active Species in Photochemical DNA Strand Scission by Bisperoxovanadium(V) Phenanthroline" *Inorg. Chem.* **2004**, *43*, 8447-8455.

42. (*) Jérôme Zoidakis, Aristobulo Loaiza, Kim Vu, and Mahdi M. Abu-Omar, "Effect of temperature, pH, and metals on the stability an dactivity of phenylalanine hydroxylase from *Chromobacterium violaceum*" *J. Inorg. Biochem.* **2005**, *99*, 771-775.

43. (*) Nicola Edwards, Rebecca A. Eikey, Saeed I. Khan, and Mahdi M. Abu-Omar, "High Valent Imido Complexes of Manganese and Chromium Corrole" *Inorg. Chem.* **2005**, *44*, 3700-3708.

44. (*) Mahdi M. Abu-Omar, Aristobulo Loaiza, and Nikos Hontzeas, "Reaction Mechanisms of Mononuclear Non-heme Iron Oxygenases" *Chem. Rev.* **2005**, *105*, 2227-2252. [REVIEW ARTICLE]

45. (*) Mahdi M. Abu-Omar, Catherine E. Shields, Nicola Y. Edwards, and Rebecca A. Eikey, "On the Mechanism of Organic Azides Reaction with Transition Metals: Evidence for Triplet Nitrene Capture" *Angew. Chem. Int. Ed.* **2005**, *44*, 6203-6207.

46. (*) Elon A. Ison, Rex A. Corbin, and Mahdi M. Abu-Omar, "Hydrogen Production from Hydrolytic Oxidation of Organosilanes Using a Cationic Oxorhenium Catalyst" *J. Am. Chem. Soc.* **2005**, *127*, 11938-11939.

47. (*) Elon A. Ison, Evan R. Trivedi, Rex A. Corbin, and Mahdi M. Abu-Omar, "New Mechanism for Reduction Catalysis by Metal Oxo: Hydrosilation of Organic Carbonyl Groups Catalyzed by a Rhenium(V) Oxo Complex" *J. Am. Chem. Soc.* **2005**, *127*, 15374-15375.

48. N. Hontzeas, A. O. Richardson, A. Belimov, V. Safronova, M. M. Abu-Omar, B. R. Glick, "Evidence for Horizontal Transfer of 1-Aminocyclopropane-1-Carboxylate Deaminase Genes" *Appl. Environ. Microbiol.* **2005**, *71*, 7556-7558.

49. (*) Khamphee Phomphrai, Andrew E. Fenwick, Shalini Sharma, Phillip E. Fanwick, James M. Caruthers, W. Nicholas Delgass, Mahdi M. Abu-Omar, and Ian P. Rothwell, "Diverse Pathways of Activation and Deactivation of Half-Sandwich Aryloxide Titanium Polymerization Catalysts" *Organometallics* **2006**, *25*, 214-220.

50. (*) Elon A. Ison, Jeanette E. Cessarich, Guodong Du, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "Synthesis of Cationic Oxorhenium Salen Complexes via μ-Oxo Abstraction and Their Activity in Catalytic Reductions" *Inorg. Chem.* **2006**, *45*, 2385-2387.

51. (*) Andrew H. Han, Amanda Q. Lee, and Mahdi M. Abu-Omar, "EPR and UV-vis Studies of the Nitric Oxide Adducts of Bacterial Phenylalanine Hydroxylase: Effects of Cofactor and Substrate on the Iron Environment" *Inorg. Chem.* **2006**, *45*, 4277-4283.

52. (*) Guodong Du and Mahdi M. Abu-Omar, "Catalytic Hydrosilylation of Carbonyl Compounds with Cationic Oxorhenium(V) Salen" *Organometallics* **2006**, 25, 4920-4923.

53. (*) Michael J. Zdilla and Mahdi M. Abu-Omar, "Mechanism of Catalytic Aziridination with Manganese Corrole: The Often Postulated High-Valent Mn(V) Imido Is Not the Group Transfer Reagent" *J. Am. Chem. Soc.* **2006**, *128*, 16971-16979.

54. (*) Elon A. Ison, Jeanette E. Cessarich, Nicholas E. Travia, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "Synthesis of Cationic Rhenium(VII) Oxo Imido Complexes and Their Tunability Towards Oxygen Atom Transfer" *J. Am. Chem. Soc.* **2007**, *129*, 1167-1178.

55. (*) Thomas A. Manz, Khamphee Phomphrai, Grigori Medvedev, Balachandra B. Krishnamurthy, Shalini Sharma, Jesmin Haq, Krista A. Novstrup, Kendall T. Thomson, W. Nicholas Delgass, James M. Caruthers, and Mahdi M. Abu-Omar, "Structure-Activity Correlation in Titanium Single-Site Olefin Polymerization Catalysts Containing Mixed Cyclopentadienyl/Aryloxide Ligation" *J. Am. Chem. Soc.* **2007**, *129*, 3776-3777.

56. (*) Guodong Du, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "Mechanistic Insight into Hydrosilylation Reactions Catalyzed by High Valent Re≡X (X = O, NAr, or N) Complexes: The Silane (Si-H) Does Not Add Across The Metal-Ligand Multiple Bond" *J. Am. Chem. Soc.* **2007**, *129*, 5180-5187.

57. (*) Michael J. Zdilla, Jennifer L. Dexheimer, and Mahdi M. Abu-Omar, "Hydrogen Atom Transfer Reactions of Imido Manganese(V) Corrole: One Reaction with Two Mechanistic Pathways" *J. Am. Chem. Soc.* **2007**, *129*, 11505-11511.

58. (*) Corneliu Stanciu, Mary E. Jones, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "Multi-electron Activation of Dioxygen on Zirconium(IV) to Give an Unprecedented Bisperoxo Complex" *J. Am. Chem. Soc.* **2007**, *129*, 12400-12401.

59. (*) Aristobulo Loaiza, Kathryn M. Armstrong, Brian M. Baker, and Mahdi M. Abu-Omar, "Kinetics of Thermal Unfolding of Phenylalanine Hydroxylase Containing Different Metal Cofactors (Fe^{II}, Co^{II}, and Zn^{II}) and Their Isokinetic Relationship" *Inorg. Chem.* **2008**, *47*, 4877-4883.

60. (*) Guodong Du, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "Cationic oxorhenium chiral salen complexes for asymmetric hydrosilylation and kinetic resolution of alcohols" *Inorg. Chim. Acta* **2008**, *361*, 3184-3192. (Special issue in honor of Prof. Angelici)

61. (*) Guodong Du and Mahdi M. Abu-Omar, "Oxo and Imido Complexes of Rhenium and Molybdenum in Catalytic Reductions" *Curr. Org. Chem.* **2008**, *12*, 1185-1198. [Invited Review Article]

62. (*) Michael J. Zdilla, Amanda Q. Lee, and Mahdi M. Abu-Omar, "Bioinspired Dismutation of Chlorite to Dioxygen and Chloride Catalyzed by a Water-Soluble Iron Porphyrin" *Angew. Chem. Int. Ed.* **2008**, *47*, 7697-7700.

63. Thomas A. Manz, Shalini Sharma, Khamphee Phomphrai, Krista A. Novstrup, Andrew E. Fenwick, Phillip E. Fanwick, Grogori A. Medvedev, Mahdi M. Abu-Omar, W. Nicholas Delgass,

Kendall T. Thomson, and James M. Caruthers, "Quantitative Effects of Ion Pairing and Sterics on Chain Propagation Kinetics for 1-Hexene Polymerization Catalyzed by Mixed Cp'/ArO Complexes" *Organometallics* **2008**, *27,* 5504-5520.

64. (*) Michael J. Zdilla and Mahdi M. Abu-Omar, "A Manganese(III) Corrole-Oxidant Adduct as the Active Intermediate in Catalytic Hydrogen Atom Transfer" *Inorg. Chem.* **2008**, *47*, 10718-10722.

65. (*) Amanda Q. Lee, Bennett R. Streit, Michael J. Zdilla, Mahdi M. Abu-Omar, and Jennifer L. DuBois, "Mechanism of and exquisite selectivity for O-O bond formation in heme-dependent chlorite dismutase" *Proc. Natl. Acad. Sci. USA* **2008**, 15654-15659.

66. (*) Michael J. Zdilla, Amanda Q. Lee, and Mahdi M. Abu-Omar, "Concerted Dismutation of Chlorite Ion: Water-Soluble Iron-Porphyrins As First Generation Model Complexes for Chlorite Dismutase" *Inorg. Chem.* **2009**, *48*, 2260-2268.

67. (*) Rex A. Corbin, Elon A. Ison, and Mahdi M. Abu-Omar, "Catalysis by cationic oxorhenium(V): hydrolysis and alcoholysis of organic silanes" *Dalton Trans.* **2009**, 2850-2855.

68. (*) Jeanette E. Ziegler, Michael J. Zdilla, Andrew J. Evans, and Mahdi M. Abu-Omar, "H_2-Driven Deoxygenation of Epoxides and Diols to Alkenes Catalyzed by Methyltrioxorhenium" *Inorg. Chem.* **2009**, *48*, 9998-10000.

69. (*) Jeanette E. Ziegler, Guodong Du, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "An Efficient Method for the Preparation of Oxo Molybdenum Salalen Complexes and Their Unusual Use as Hydrosilylation Catalysts" *Inorg. Chem.* **2009**, *48*, 11290-11296.

70. (*) Krista A. Novstrup, Nicholas E. Travia, Grigori A. Medvedev, Corneliu Stanciu, Jeffrey M. Switzer, Kendall T. Thomson, W. Nicholas Delgass, Mahdi M. Abu-Omar, and James M. Caruthers, "Mechanistic Detail Revealed via Comprehensive Kinetic Modeling of [*rac*-(C_2H_4(1-Indenyl)$_2$)Zr(Me)$_2$]-Catalyzed 1-Hexene Polymerization" *J. Am. Chem. Soc.* **2010**, *132*, 558-566.

71. (*) Benjamin L. Wegenhart and Mahdi M. Abu-Omar, "A Solvent-Free Method for Making Dioxolane and Dioxane from the Biorenewables Glycerol and Furfural Catalyzed by Oxorhenium(V) Oxazoline " *Inorg. Chem.* **2010**, *49*, 4741-4743.

72. Mahdi M. Abu-Omar, "Oxygen Atom Transfer" in *Physical Inorganic Chemistry: Reactions, Processes, and Applications* (Ed. Andreja Bakac), John Wiley & Sons, Inc., New Jersey, **2010**, pp. 75-108.

73. (*) Erin E. Smith, Guodong Du, Phillip E. Fanwick, and Mahdi M. Abu-Omar "Dehydrocoupling of Organosilanes with a Dinuclear Nickel Hydride Catalyst and Isolation of a Nickel Silyl Complex" *Organometallics* **2010**, *29*, 6527-6533.

74. (*) Scott D. Hicks, Jennifer L. Petersen, Curt J. Bougher, and Mahdi M. Abu-Omar, "Chlorite Dismutation to Chlorine Dioxide Catalyzed by Water-Soluble Manganese Porphyrin" *Angew. Chem. Int. Ed.* **2011**, *50*, 699-702.

75. Mahdi M. Abu-Omar, "High-valent complexes of iron and manganese complexes of corrole and porphyrin in atom transfer and dioxygen evolving catalysis "*Dalton Trans* . **2011**, *40*, 3435-3444. (Invited perspective article)

76. (*) Aristobulo Loaiza, Judith Ronau, Alexander Ribbe, Lia Stanciu, John W. Burgner II, Lake N. Paul, and Mahdi M. Abu-Omar, "Folding dynamics of phenylalanine hydroxylase depends on the enzyme metallation state: the native metal, iron, protects against aggregate intermediates" *Eur. Biophys. J.* **2011**, *40*, 959-968.

77. Jason M. Keith, Mahdi M. Abu-Omar, and Michael B. Hall, "Mechanistic Investigation of Concerted Dismutation of Chlorite Ion by Water Soluble Iron Porphyrins" *Inorg. Chem.* **2011**, *50*, 7928-7930.

78. (*) Nicholas E. Travia, Zhenggang Xu, Jason M. Keith, Elon A. Ison, Phillip E. Fanwick, Michael B. Hall, and Mahdi M. Abu-Omar, "Observation of Inductive Effects That Cause Change in the Rate -Determining Step for the Conversion of Rhenium Azides to Imido Complexes " *Inorg. Chem.* **2011**, *50*, 10505-10514.

79. (*) Basudeb Saha, Saikat Dutta, and Mahdi M. Abu-Omar, "Aerobic oxidation of 5-hydroxymethylfurfural with homogeneous and nanoparticulate catalysts " *Catal. Sci. Technol.* **2012**, *2*, 79-81.

80. (*) Yu Yang , Chang-wei Hu, and Mahdi M. Abu-Omar, "Conversion of carbohydrates and lignocellulosic biomass into 5-hydroxymethylfurfural using $AlCl_3 \bullet 6H_2O$ catalyst in a biphasic solvent system " *Green Chem.* **2012**, *14*, 509-513.

81. (*) Eurick S. Kim, Shuo Liu, Mahdi M. Abu-Omar, and Nathan S. Mosier, "Selective Conversion of Biomass Hemicellulose to Furfural Using Maleic Acid with Microwave Heating" *Energy Fuels* **2012**, *26*, 1298-1304.

82. Laura J. Haupert, Benjamin C. Owen, Christopher L. Marcum, Tiffany M. Jarrell, Christopher J. Pulliam,Lucas M. Amundson, Padmaja Narra, Mohammad Sabir Aquell, Trenton Parsell, Mahdi M. Abu-Omar, and Hilkka I. Kenttamaa, "Characterization of model compounds of processed lignin and the lignome by using atmospheric pressure ionization tandem mass spectrometry" *Fuel* **2012**, *95*, 634-641.

83. (*) Saikat Dutta, Sudipta De, Md. Imteyaz Alam, Mahdi M. Abu-Omar, Basudeb Saha, "Direct conversion of cellulose and lignocellulosic biomass into chemicals and biofuel with metal chloride catalysts" *J. Cat.* **2012**, *288*, 8-15.

84. (*) Yu Yang , Chang-wei Hu, and Mahdi M. Abu-Omar, "Synthesis of furfural from xylose, xylan, and biomass using $AlCl_3 \bullet 6H_2O$ in biphasic medium via xylose isomerization to xylulose" *ChemSusChem* **2012**, *5*, 405-410.

85. (*) Kothanda Rama Pichaandi, Phillip E. Fanwick, and Mahdi M. Abu-Omar, "Trioxorhena(VII)carborane Anion and Its Methyl-Substituted Analogue: Synthesis, Structure, DFT, and Catalytic Studies" *Organometallics* **2012**, *31*, 1888-1896.

86. (*) Yu Yang, Xi Xiang, Dongmei Tong, Chang-wei Hu, and Mahdi M. Abu-Omar, "One-pot synthesis of 5-hydroxymethylfurfural directly from starch over SO_4^{2-}/ZrO_2-Al_2O_3 solid catalyst" *Bioresource Technology* **2012**, *116*, 302-306.

87. (*) Yu Yang, Chang-wei Hu, and Mahdi M. Abu-Omar, "Conversion of glucose into furans in the presence of $AlCl_3$ in an ethanol-water solvent system" *Bioresource Technology* **2012**, *116*, 190-194.

88. (*) Yu Yang, Mahdi M. Abu-Omar, and Chang-wei Hu, "Heteropolyacid catalyzed conversion of fructose, sucrose, and inulin to 5-ethoxymethylfurfural, a liquid biofuel candidate" *Applied Energy* **2012**, *99*, 80-84.

89. (*) Jeffrey M. Switzer, Nicholas E. Travia, D. Keith Steelman, Grigori A. Medvedev, Kendall T. Thomson, W. Nicholas Delgass, Mahdi M. Abu-Omar, and James M. Caruthers, "Kinetic Modeling of 1-Hexene Polymerization Catalyzed by $Zr(^tBu\text{-}ON^{NMe2}O)Bn_2/B(C_6F_5)_3$" *Macromolecules* **2012**, *45*, 4978-4988.

90. (*) Jing Yi, Shuo Liu, and Mahdi M. Abu-Omar, "Rhenium-Catalyzed Transfer Hydrogenation and Deoxygenation of Biomass-Derived Polyols to Small and Useful Organics" *ChemSusChem* **2012**, *5*, 1401-1404.

91. Benjamin C. Owen, Laura J. Haupert, Tiffany M. Jarrell, Christopher L. Marcum, Trenton H. Parsell, Mahdi M. Abu-Omar, Joseph J. Bozell, Stuart K. Black, and Hilkka I. Kenttämaa, "High Performance Liquid Chromatography/High-Resolution Multiple Stage Tandem Mass Spectrometry Using Negative-Ion Mode Hydroxide-Doped Electrospray Ionization for the Characterization of Lignin Degradation Products" *Anal. Chem.* **2012**, *84*, 6000-6007.

92. (*) Benjamin L. Wegenhart, Shuo Liu, Melanie Thom, David Stanley, and Mahdi M. Abu-Omar, "Solvent-Free Methods for Making Acetals Derived from Glycerol and Furfural and Their Use as a Biodiesel Fuel Component" *ACS Catal.* **2012**, *2*, 2524-2530.

93. (*) Trenton Parsell, Benjamin Owen, Ian Klein, Tiffany Jarrell, Christopher Marcum, Laura Haupert, Lucas Amundson, Hilkka Kenttamaa, Fabio Ribeiro, Jeffrey T. Miller, and Mahdi M. Abu-Omar, "Cleavage and Hydrodeoxygenation (HDO) of C-O Bonds Relevant to Lignin Conversion Using Pd/Zn Synergistic Catalysis" *Chem. Sci.* **2013**, *4*, 806-813.

94. Judith A. Ronau, Lake N. Paul, Isaac R. Corn, Kyle T. Wagner, Mahdi M. Abu-Omar, and Chittaranjan Das, "Discovery of a phenylalanine distal binding site in bacterial phenylalanine hydroxylase and its functional implication" " *Eur. J. Biophys.*, Submitted.

95. (*) Basudeb Saha, Dinesh Gupta, Mahdi M. Abu-Omar, Arindam Modak, and Asim Bhaumik, "Porphyrin based porous organic polymer supported iron(III) catalyst for efficient aerobic oxidation of 5-hydroxymethylfurfural into 2,5-furandicarboxylic acid" *J. Cat.* In press.

96. (*) Yu Yang, Changwei Hu, and Mahdi M. Abu-Omar, "The effect of hydrochloric acid on the conversion of glucose to 5-hydroxymethylfurfural in $AlCl_3$-H_2O/THF biphasic medium" *J. Mol. Catal. A: Chemical*, Submitted.