

Robert J. McMahon

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Personal Information

Born September 27, 1958 in Mendota, Illinois
Married to Angela McMahon
United States Citizen

Education

1985-1988	postdoc / Chemistry	Massachusetts Institute of Technology With Mark S. Wrighton
1985	Ph.D. Chemistry	University of California, Los Angeles With Orville L. Chapman
1980	B.S. Chemistry	University of Illinois at Urbana-Champaign <i>Magna Cum Laude</i> ; Highest Distinction in the Major

Professional Experience

2007-present	Helfaer Professor of Chemistry, University of Wisconsin-Madison
1997-2007	Professor of Chemistry
1994-1997	Associate Professor of Chemistry
1988-1994	Assistant Professor of Chemistry

Research Interests

astrochemistry; mechanistic organic chemistry of interstellar space; generation and characterization of reactive intermediates; thermal and photochemical rearrangement mechanisms of organic and organometallic compounds; organic materials chemistry

Honors and Awards

2010	JILA Visiting Fellow - Univ. Colorado	1984	UCLA Distinguished Scholar
2003	Fellow - American Assn. Adv. Science	1984	Winstein Dissertation Award
2000	Vilas Faculty Associate Award	1983	IBM Corporation Graduate Fellow
1996	NSF Award for Special Creativity	1980	NSF Graduate Fellow
1994	Fellow - Alfred P. Sloan Foundation	1979	Phi Kappa Phi Honor Society
1992	Departmental Teaching Award	1979	Phi Lambda Upsilon Honorary Society
1989	NSF Presidential Young Investigator	1976	Edmund James Undergraduate Scholar
1989	Sigma Xi Scientific Research Society	1976	Valedictorian, Mendota High School

Professional Activities

Associate Editor, *The Journal of Organic Chemistry* (2000-present); ACS Joint Board-Council Committee on Chemical Abstracts Service (2010-present); Governing Board, International Symposia on Reactive Intermediates and Unusual Molecules (ISRIUM) (2004-present); Steering Committee, Midwest Astrochemistry Consortium (2008-present); Executive Committee, ACS Division of Organic Chemistry (2007-2009); Scientific Organizing Committee, XVth International Workshop on Quantum Atomic and Molecular Tunneling in Solids and other Condensed Phases (2008-2010); International Advisory Board, 18th Conference on Physical-Organic Chemistry, International Union of Pure and Applied Chemistry (IUPAC) (2005-2006); Governing Board, Reaction Mechanisms Conference (2000-2006); NSF Panel:

Galactic Astronomy (2006); NSF Workshop: Reactive Intermediates, co-organizer (2003-2006); NSF Panel: Graduate Research Fellowships (2004); Visiting Lecturer, National Science Council, Taiwan (2003); Visiting Scholar, Harvard-Smithsonian Center for Astrophysics (2003); NSF Panel: CAREER Awards and Margin Review (2001); Co-Organizer, 28th Reaction Mechanisms Conference (2000); Organizer, Workshop on “Designing and Building Chemistry Laboratories” 36th National Organic Chemistry Symposium (1999); Review Panel, Canada Foundation for Innovation (1999); Organizer, “Bartlett Session” on Chemistry of the Interstellar Medium, 27th Reaction Mechanisms Conference 1998); NSF Panel: Life in Extreme Environments (1998); Consultant, Ohmeda Corporation (1998). Co-Organizer: 15 local, national, international meetings and symposia.

Local Activities

Departmental: Organic Chemistry Division, Chair (2007-2008; 2009-present); Building Committee, Chair (1995-1998, 2004-2010), Consultant (1999-2003, 2010-present); Fundraising Committee (2003-2005); Materials Chemistry Steering Committee (1999-present); Instrumentation Subcommittee (IR, EPR, PES) (1988-present); Long-Range Planning Committee (2001-2002), Chair (2004-2005); Chair Search Committee (2004); Faculty Recruiting Committee, Functional Organic Materials Cluster Hire (2001-2002); Post-tenure Review Committee (1998-2001); Faculty Recruiting Committee (1999); Safety Committee, Chair (1998).

University: Campus Planning Committee (2004-present); University Architect, Search and Screen Committee (2004); Campus Master Plan Steering Committee (2004-2005); Principal Investigators Committee (2003-2007); Facilities Committee, College of Letters and Science (1995-2002; 2009-present); Materials Science Advisory Committee (1988-1995).

Degrees awarded to 24 Ph.D. students, 7 M.S. students, 25 undergraduate research students.

Current research group includes 7 graduate students, 2 undergraduate students.

Publications

1. Stereoselectivity of Lithium Aluminum Hydride and Lithium Alkoxyaluminumhydride Reductions of 3,3,5-Trimethylcyclohexanone in Diethyl Ether, Robert J. McMahon, Karl E. Wieggers, and Stanley G. Smith, *J. Org. Chem.* **1981**, 46, 99-101.
2. Organometallic π -Complexes of Silacycles, Robert J. McMahon, *Coord. Chem. Rev.* **1982**, 47, 1-14.
3. Photochemical Wolff Rearrangement of a Triplet Ground-state Carbene, Richard A. Hayes, Thomas C. Hess, Robert J. McMahon, and Orville L. Chapman, *J. Am. Chem. Soc.* **1983**, 105, 7786-7787.
4. Rearrangements of Tolylmethylenes via Cycloheptatetraenes: Formation of Benzocyclo-butene and Styrene, Orville L. Chapman, Robert J. McMahon, and Paul R. West, *J. Am. Chem. Soc.* **1984**, 106, 7973-7974.
5. Mechanistic Studies on the Wolff Rearrangement: The Chemistry and Spectroscopy of Some α -Ketocarbenes, Robert J. McMahon, Orville L. Chapman, Richard A. Hayes, Thomas C. Hess, and Hans-Peter Krimmer, *J. Am. Chem. Soc.* **1985**, 107, 7597-7606.
6. Benzobicyclo[4.1.0]hepta-2,4,6-trienes, Paul R. West, Anne M. Mooring, Robert J. McMahon, and Orville L. Chapman, *J. Org. Chem.* **1986**, 51, 1316-1320.
7. Triplet Ground-state Cycloheptatrienylidene, Robert J. McMahon and Orville L. Chapman, *J. Am. Chem. Soc.* **1986**, 108, 1713-1714.
8. Direct Spectroscopic Observation of Intramolecular Hydrogen Shifts in Carbenes, Robert J. McMahon and Orville L. Chapman, *J. Am. Chem. Soc.* **1987**, 109, 683-692.
9. 1,2,4,6-Cycloheptatetraene: The Key Intermediate in Arylcarbene Interconversions and Related C_7H_6 Rearrangements, Robert J. McMahon, Christopher J. Abelt, Orville L. Chapman, Jeffery W. Johnson, Curtis L. Kreil, Jean-Pierre LeRoux, Anne M. Mooring, and Paul R. West, *J. Am. Chem. Soc.* **1987**, 109, 2456-2469.
10. Rearrangements of the Isomeric Tolylmethylenes, Orville L. Chapman, Jeffery W. Johnson, Robert J. McMahon, and Paul R. West, *J. Am. Chem. Soc.* **1988**, 110, 501-509.
11. Intramolecular Excited-state Electron Transfer in a Covalently Linked Porphyrin-Viologen Molecule: Direct Observation of the Charge-separated Intermediate by Resonance Raman Spectroscopy, Robert J. McMahon, R. Ken Forcé, Howard H. Patterson, and Mark S. Wrighton, *J. Am. Chem. Soc.* **1988**, 110, 2670-2672.
12. Spectroscopic Detection of Excited-state Electron Transfer in Porphyrin-Viologen Systems, R. Ken Forcé, Robert J. McMahon, Jie Yu, and Mark S. Wrighton, *Spectrochimica Acta*, **1989**, 45A, 23-30.
13. Regiochemistry of Acylation of Ferrocenylarylethylenes, Kevin L. Kott and Robert J. McMahon, *J. Org. Chem.* **1992**, 57, 3097-3101.
14. Isomerism in Coordinatively Unsaturated $Fe(CO)_3(\eta^2\text{-Alkene})$ Complexes, Terence M. Barnhart, Richard F. Fenske, and Robert J. McMahon, *Inorg. Chem.* **1992**, 31, 2679-2681.
15. Direct Spectroscopic Observation of a Thermal C-H Bond Insertion Reaction at 10 K: Intramolecular Rearrangement of $Fe(CO)_3(\eta^2\text{-}C_3H_6)$ to Produce $HFe(CO)_3(\eta^3\text{-}C_3H_5)$, Terence M. Barnhart and Robert J. McMahon, *J. Am. Chem. Soc.* **1992**, 114, 5434-5435.
16. Photochemistry of Matrix-Isolated Diazoethane and Methyl diazirine: Ethylidene Trapping?, Randal A. Seburg and Robert J. McMahon, *J. Am. Chem. Soc.* **1992**, 114, 7183-7189.
17. Kinetic Generation of $cis\text{-}C_5H_5(CO)_2ReH_2$ from Reaction of $C_5H_5Re(\mu\text{-}H)Pt(H)(PPh_3)_2$ with

Publications

- Diphenylacetylene, Charles P. Casey, Robin S. Tanke, Paulette N. Hazin, Carl R. Kemnitz, and Robert J. McMahon, *Inorg. Chem.* **1992**, *31*, 5474-5479.
18. Ground-State Multiplicity of Halo(trifluoromethyl)carbenes, Randal A. Seburg and Robert J. McMahon, *J. Org. Chem.* **1993**, *58*, 979-980.
 19. Photoequilibration of 2-Naphthylcarbene and 2,3-Benzobicyclo[4.1.0]hepta-2,4,6-triene, Steven W. Albrecht and Robert J. McMahon, *J. Am. Chem. Soc.* **1993**, *115*, 855-859.
 20. Observation of Photoinduced Electron Transfer at a Liquid-Liquid Interface by Optical Second Harmonic Generation, Kevin L. Kott, Daniel A. Higgins, Robert J. McMahon, and Robert M. Corn, *J. Am. Chem. Soc.* **1993**, *115*, 5342-5343.
 21. Structure and Reactivity of $\text{HFe}(\text{CO})_3(\eta^3\text{-C}_3\text{H}_5)$, Terence M. Barnhart, James De Felippis, and Robert J. McMahon, *Angew. Chem.* **1993**, *105*, 1134-1136; *Angew. Chem. Int. Ed. Engl.* **1993**, *32*, 1073-1074.
 22. UV Photodissociation and Energy-Selective Ionization of Organometallic Compounds in a Molecular Beam, Jeffrey A. Bartz, Terence M. Barnhart, Douglas B. Galloway, L. Gregory Huey, Thomas Glenewinkel-Meyer, Robert J. McMahon, and F. Fleming Crim, In *Laser Chemistry of Organometallics*, J. Chaiken, Ed.; ACS Symposium Series No. 530, American Chemical Society: Washington, DC, 1993; Chapter 9.
 23. Gas Phase Photodissociation of $(\eta^5\text{-Cyclopentadienyl})\text{Fe}(\text{CO})_2\text{R}$ and $(\eta^5\text{-Indenyl})\text{Fe}(\text{CO})_2\text{R}$ in a Molecular Beam: Competitive Loss of Alkyl Radical and Alkene Detected by Vacuum-Ultraviolet Ionization and Time-of-Flight Mass Spectrometry, Jeffrey A. Bartz, Terence M. Barnhart, Douglas B. Galloway, L. Gregory Huey, Thomas Glenewinkel-Meyer, Robert J. McMahon, and F. Fleming Crim, *J. Am. Chem. Soc.* **1993**, *115*, 8389-8395.
 24. Structure and Rearrangements of 1,3-Diphenylpropynylidene, Jeffrey T. DePinto and Robert J. McMahon, *J. Am. Chem. Soc.* **1993**, *115*, 12573-12574.
 25. Structure of Triplet Propynylidene, Randal A. Seburg, Jeffrey T. DePinto, Eric V. Patterson, and Robert J. McMahon, *J. Am. Chem. Soc.* **1995**, *117*, 835-836.
 26. Second-Order Nonlinear Optical Properties of Substituted Arylphosphine Oxides, Kevin L. Kott, Craig M. Whitaker, and Robert J. McMahon, *Chem. Mater.* **1995**, *7*, 426-439.
 27. Synthesis and Solid-State Structure of Substituted Arylphosphine Oxides, Craig M. Whitaker, Kevin L. Kott, and Robert J. McMahon, *J. Org. Chem.* **1995**, *60*, 3499-3508.
 28. Automerization in Propynylidene (HCCCH), Propadienylidene (H_2CCC), and Cyclopropenylidene ($\text{c-C}_3\text{H}_2$), Randal A. Seburg and Robert J. McMahon, *Angew. Chem.* **1995**, *107*, 2198-2201; *Angew. Chem. Int. Ed. Engl.* **1995**, *34*, 2009-2012.
 29. Synthesis and Characterization of Organic Materials with Conveniently Accessible Supercooled Liquid and Glassy Phases: Isomeric 1,3,5-Tris(naphthyl)benzenes, Craig M. Whitaker and Robert J. McMahon, *J. Phys. Chem.* **1996**, *100*, 1081-1090.
 30. The C_7H_6 Potential Energy Surface Revisited: Relative Energies and IR Assignment, Stephan Matzinger, Thomas Bally, Eric V. Patterson, and Robert J. McMahon, *J. Am. Chem. Soc.* **1996**, *118*, 1535-1542.
 31. Nitrogen and Oxygen Donors in Nonlinear Optical Materials: Effects of Alkyl vs. Phenyl Substitution on the Molecular Hyperpolarizability, Craig M. Whitaker, Eric V. Patterson, Kevin L. Kott, and Robert J. McMahon, *J. Am. Chem. Soc.* **1996**, *118*, 9966-9973.
 32. The Electronic Spectrum of Propadienylidene ($\text{H}_2\text{C}=\text{C}=\text{C}:$), John F. Stanton, Jeffrey T. DePinto,

Publications

- Randal A. Seburg, Jonathan A. Hodges, and Robert J. McMahon, *J. Am. Chem. Soc.* **1997**, *119*, 429-430.
33. Rearrangements of C₇H₆ Isomers: Computational Studies of the Interconversions of Bicyclo[3.2.0]hepta-1,3,6-triene, Bicyclo[3.2.0]hept-3,6-diene-2-ylidene, Bicyclo[3.2.0]-hepta-2,3,6-triene, and Cyclohepta-1,2,4,6-tetraene, Eric V. Patterson and Robert J. McMahon, *J. Org. Chem.* **1997**, *62*, 4398-4405.
34. Structures, Automerizations, and Isomerizations of C₃H₂ Isomers, Randal A. Seburg, Eric V. Patterson, John F. Stanton, and Robert J. McMahon, *J. Am. Chem. Soc.* **1997**, *119*, 5847-5856.
35. Structures and Stabilities of C₅H₂ Isomers: Quantum Chemical Studies, Randal A. Seburg, Robert J. McMahon, John F. Stanton, and Jürgen Gauss, *J. Am. Chem. Soc.* **1997**, *119*, 10838-10845.
36. Facile Synthesis and Nonlinear Optical Properties of Push-Pull 5,15-Diphenylporphyrins, Ming Yeung, Anthony C. H. Ng, Michael G. B. Drew, Erich Vorpapel, Eric M. Breitung, Robert J. McMahon, and Dennis K. P. Ng, *J. Org. Chem.* **1998**, *63*, 7143-7150.
37. Reversible Interconversion between Singlet and Triplet Naphthyl Carbomethoxy Carbene, Zhendong Zhu, Thomas Bally, Louise L. Stracener, and Robert J. McMahon, *J. Am. Chem. Soc.* **1999**, *121*, 2863-2874.
38. Structure-Property Relationships in Organic Nonlinear Optical Materials, Eric M. Breitung and Robert J. McMahon; In *Organic Nonlinear Optical Materials and Devices*, B. Kippelen, H. Lackritz, and R. Claus, Eds.; Materials Research Society Symposium Proceedings; Materials Research Society: Pittsburgh, 1999; Vol. 561; F2.7.
39. Synthesis and Characterization of Thiazole-Containing Chromophores for Second-Order Nonlinear Optics, Yuh-Kai Wang, Ching-Fong Shu, Eric M. Breitung, and Robert J. McMahon, *J. Mater. Chem.* **1999**, *9*, 1449-1452.
40. Synthesis and Characterization of Nonlinear Optical Chromophores with Conformationally-Locked Polyenes Possessing Enhanced Thermal Stability, Yuan-Cheng Shu, Zhi-Hao Gong, Ching-Fong Shu, Eric M. Breitung, Robert J. McMahon, Gene-Hsiang Lee, and Alex K.-Y. Jen, *Chem. Mater.* **1999**, *11*, 1628-1632.
41. Photoequilibration of 1-Naphthylcarbene and 4,5-Benzobicyclo[4.1.0]hepta-2,4,6-triene, Paul A. Bonvallet and Robert J. McMahon, *J. Am. Chem. Soc.* **1999**, *121*, 10496-10503.
42. Ortho-Conjugatively Linked Reactive Intermediates. The Cases of Ortho-Phenylene-(Bis)-Nitrene, -Carbenonitrene, and -(Bis)Carbene, Athanassios Nicolaidis, Takehito Nakayama, Katsuhisa Yamazaki, Hideo Tomioka, Shiro Koseki, Louise L. Stracener, and Robert J. McMahon, *J. Am. Chem. Soc.* **1999**, *121*, 10526-10572.
43. Measurement of Solute Dipole Moments in Dilute Solution: A Simple Three-Terminal Cell, Eric M. Breitung, Worth E. Vaughan, and Robert J. McMahon, *Rev. Sci. Instrum.* **2000**, *71*, 224-227.
44. Singlet-Triplet Energy Separation of Cyclobutylidene, Louise L. Stracener, Robert J. Halter, Robert J. McMahon, Claire Castro, and William L. Karney, *J. Org. Chem.* **2000**, *65*, 199-204.
45. Equilibrium Structure of *cis*-Hex-3-ene-1,5-diyne and Relevance to the Bergman Cyclization, Robert J. McMahon, Robert J. Halter, Ryan L. Fimmen, Robb J. Wilson, Sean A. Peebles, Robert L. Kuczkowski, and John F. Stanton, *J. Am. Chem. Soc.* **2000**, *122*, 939-949.
46. Thiazole and Thiophene Analogs of Donor-Acceptor Stilbenes: Molecular Hyperpolarizability and Structure-Property Relationships, Eric M. Breitung, Ching-Fong Shu, and Robert J. McMahon, *J. Am. Chem. Soc.* **2000**, *122*, 1154-1160.

Publications

47. Generation, Characterization, and Rearrangements of 4,5-Benzocyclohepta-1,2,4,6-tetraene, Paul A. Bonvallet and Robert J. McMahon, *J. Am. Chem. Soc.* **2000**, *122*, 9332-9333.
48. Electronic Spectrum of Propadienylidene ($\text{H}_2\text{C}=\text{C}=\text{C}:$) and its Relevance to the Diffuse Interstellar Bands, Jonathan A. Hodges, Robert J. McMahon, Kurt W. Sattelmeyer, and John F. Stanton, *Astrophys. J.* **2000**, *544*, 838-842.
49. The Elusive Benzocyclobutenylidene: A Combined Computational and Experimental Attempt, Athanassios Nicolaides, Takeshi Matsushita, Kohichi Yonezawa, Shinji Sawai, Hideo Tomioka, Louise L. Stracener, Jonathan A. Hodges, and Robert J. McMahon, *J. Am. Chem. Soc.* **2001**, *123*, 2870-2876.
50. Microwave Spectra and Molecular Structures of (Z)-Pent-2-ene-4-ynenitrile and Maleonitrile, Robert J. Halter, Ryan L. Fimmen, Robert J. McMahon, Sean A. Peebles, Robert L. Kuczkowski, and John F. Stanton, *J. Am. Chem. Soc.* **2001**, *123*, 12353-12363.
51. Access to the Naphthylcarbene Rearrangement Manifold via Isomeric Benzodiazocycloheptatrienes, Paul A. Bonvallet, Eric M. Todd, Yong Seol Kim, and Robert J. McMahon, *J. Org. Chem.* **2002**, *67*, 9031-9042.
52. Formation of an Atomically Abrupt Interface between a Polycyclic Aromatic Molecule and the Silicon (001) Surface via Direct Si-C Linkage, Michael P. Schwartz, Robert J. Halter, Robert J. McMahon, Robert J. Hamers, *J. Phys. Chem. B* **2003**, *107*, 224-228.
53. Self Diffusion of *tris*-Naphthylbenzene Near the Glass Transition Temperature, Stephen F. Swallen, Paul A. Bonvallet, Robert J. McMahon, and M. D. Ediger, *Phys. Rev. Lett.* **2003**, *90*, 015901.
54. Chemical Reactions Involving Quantum Tunneling, Robert J. McMahon, *Science* **2003**, *299*, 833-834.
55. The Radio Spectrum of the Phenyl Radical, R. J. McMahon, M. C. McCarthy, C. A. Gottlieb, J. B. Dudek, J. F. Stanton, P. Thaddeus, *Astrophys. J.* **2003**, *590*, L61-L64.
56. Obituary for Orville L. Chapman, Robert J. McMahon, *Angew. Chem. Int. Ed.* **2004**, *43*, 4122.
57. Interstellar Chemistry: A Strategy for Detecting Polycyclic Aromatic Hydrocarbons in Space, F. J. Lovas, Robert J. McMahon, Jens-Uwe Grabow, Melanie Schnell, James Mack, Lawrence T. Scott, Robert L. Kuczkowski, *J. Am. Chem. Soc.* **2005**, *127*, 4345-4349.
58. Ring Opening of 2,5-Didehydrothiophene: Structures and Rearrangements of $\text{C}_4\text{H}_2\text{S}$ Isomers, Yong Seol Kim and Robert J. McMahon, *J. Org. Chem.* **2005**, *70*, 8171-8179.
59. Reactive Carbon-Chain Molecules: Synthesis of 1-Diazo-2,4-pentadiyne and Spectroscopic Characterization of Triplet Pentadiynylidene ($\text{H}-\text{C}\equiv\text{C}-\text{C}-\text{C}\equiv\text{C}-\text{H}$), Nathan P. Bowling, Robert J. Halter, Jonathan A. Hodges, Randal A. Seburg, Phillip S. Thomas, Christopher S. Simmons, John F. Stanton, and Robert J. McMahon, *J. Am. Chem. Soc.* **2006**, *128*, 3291-3302.
60. Eneidyne Isomers of Tetraethynylethene, Nathan P. Bowling and Robert J. McMahon, *J. Org. Chem.* **2006**, *71*, 5841-5847. [selected as feature article for journal cover]
61. Neutron Reflectivity Measurements of the Translational Motion of *tris*-Naphthylbenzene at the Glass Transition Temperature, Stephen F. Swallen, Marie K. Mapes, Yong Seol Kim, Robert J. McMahon, M. D. Ediger, Sushil Satija, *J. Chem. Phys.* **2006**, *124*, 184501.
62. Ring Opening of 2,5-Didehydrothiophene: Matrix Photochemistry of $\text{C}_4\text{H}_2\text{S}$ Isomers, Yong Seol Kim, Hiroshi Inui, and Robert J. McMahon, *J. Org. Chem.* **2006**, *71*, 9602-9608.
63. Organic Glasses with Exceptional Thermodynamic and Kinetic Stability, Stephen F. Swallen,

Publications

- Kenneth L. Kearns, Marie K. Mapes, Yong Seol Kim, Robert J. McMahon, M. D. Ediger, Tian Wu, Lian Yu, Sushil Satija, *Science* **2007**, 315, 353-356.
64. Triplet 1,3-Diphenylpropynylidene (Ph-C-C-C-Ph), Jeffrey T. DePinto, Wendy A. deProphetis, Jessica L. Menke, and Robert J. McMahon, *J. Am. Chem. Soc.* **2007**, 129, 2308-2315.
65. Organic Glass-Forming Materials: 1,3,5-Tris(naphthyl)benzene Derivatives, Paul A. Bonvallet, Caroline J. Breitzkreuz, Yong Seol Kim, Eric M. Todd, Katherine Traynor, Charles G. Fry, M. D. Ediger, and Robert J. McMahon, *J. Org. Chem.* **2007**, 72, 10051-10057.
66. A Search for *ortho*-Benzyne (*o*-C₆H₄) in CRL 618, Susanna L. Widicus-Weaver, Anthony J. Remijan, Robert J. McMahon, and Benjamin J. McCall, *Astrophys. J.* **2007**, 671, L153-L156.
67. Molecular View of the Isothermal Transformation of a Stable Glass to a Liquid, Stephen F. Swallen, Kenneth L. Kearns, Sushil Satija, Katherine Traynor, Robert J. McMahon, M. D. Ediger, *J. Chem. Phys.* **2008**, 128, 214514.
68. Organic Chemistry: Synthesis and Study of Reactive Intermediates Found in Interstellar Space, Caroline R. Pharr and Robert J. McMahon, *J. Chem. Educ.* **2008**, 85, 1454.
69. Stable Glass Transformation to Supercooled Liquid via Surface-Initiated Growth Front, Stephen F. Swallen, Katherine Traynor, Robert J. McMahon, M. D. Ediger, Thomas E. Mates, *Phys. Rev. Lett.* **2009**, 102, 065503.
70. Self-Diffusion of Supercooled *tris*-Naphthylbenzene, Stephen F. Swallen, Katherine Traynor, Robert J. McMahon, M. D. Ediger, Thomas E. Mates, *J. Phys. Chem. B* **2009**, 113, 4600-4608.
71. Propynal Equivalents and Diazopropyne: Synthesis of all mono-¹³C Isotopomers, Randal A. Seburg, Jonathan A. Hodges, Robert J. McMahon, *Helv. Chim. Acta* **2009**, 92, 1626-1643.
72. Spectroscopy and Photochemistry of Triplet Methylpentadiynylidene (Me-C≡C-C-C≡C-H), Phillip S. Thomas, Nathan P. Bowling, Robert J. McMahon, *J. Am. Chem. Soc.* **2009**, 131, 8649-8659.
73. Structure of Triplet Propynylidene (HCCCH) as Probed by IR, UV/vis, and EPR Spectroscopy of Isotopomers, Randal A. Seburg, Eric V. Patterson, Robert J. McMahon, *J. Am. Chem. Soc.* **2009**, 131, 9442-9455.
74. The Transformation of Stable Glasses into Supercooled Liquids: Growth Fronts and Anomalously Fast Liquid Diffusion, Stephen F. Swallen, Katherine Windsor, Robert J. McMahon, M. D. Ediger, Thomas E. Mates, *J. Phys. Chem. B* **2010**, 114, 2635-2643.
75. Attempted Isolation and Characterization of Diazirinone (N₂CO), Christopher J. Shaffer, Brian J. Esselman, Robert J. McMahon, John F. Stanton, R. Claude Woods, *J. Org. Chem.* **2010**, 75, 1815-1821.
76. Effects of Cyano-Substituents on Cyclobutadiene and its Isomers, Jessica L. Menke, Eric V. Patterson, Robert J. McMahon, *J. Phys. Chem. A* **2010**, 114, 6431-6437.
77. Dialkynyl Carbene Derivatives: Generation and Characterization of Triplet *t*-Butylpentadiynylidene (t-Bu-C≡C-C-C≡C-H) and Dimethylpentadiynylidene (Me-C≡C-C-C≡C-Me), Phillip S. Thomas, Nathan P. Bowling, Nicola J. Burrmann, Robert J. McMahon, *J. Org. Chem.* **2010**, 75, 6372-6381.
78. Synthesis of Some Simple Diynals, Diynones, Their Hydrazones, and Diazo Compounds: Precursors to a Family of Dialkynyl Carbenes (R¹-C≡C-C-C≡C-R²), Nathan P. Bowling, Nicola J. Burrmann, Robert J. Halter, Jonathan A. Hodges, Robert J. McMahon, *J. Org. Chem.* **2010**, 75, 6382-6390.

Publications

79. On the Trimerization of Cyanoacetylene: Mechanism of Formation of Tricyanobenzene Isomers and Laboratory Detection of their Radio Spectra, Henning Hopf, Cornelia Mlynek, Robert J. McMahon, Jessica L. Menke, Alberto Lesarri, Michael Rosemeyer and Jens-Uwe Grabow, *Chem. Eur. J.* **2010**, *16*, 14115-14123.
80. Photochemistry of Matrix-Isolated 5-Cyano-2*H*-pyran-2-one (δ -Cyano- α -pyrone) and Cyano-cyclobuta-1,3-diene, Jessica L. Menke, Robert J. McMahon, *Can. J. Chem.* **2011**, *89*, 186-194.
- 81.

Plenary Lectures

1. Spectroscopic Observation of a Thermal C–H Bond Insertion Reaction at 10 K, Robert J. McMahon, 15th NSF National Organometallic Chemistry Workshop, Annandale, NJ; May 1991.
2. Intramolecular Hydrogen Shifts in Organic and Organometallic Reactive Intermediates, Robert J. McMahon, Gordon Research Conference on Physical-Organic Chemistry, Plymouth, NH; June, 1991.
3. Intramolecular Hydrogen Shifts in Organic and Organometallic Reactive Intermediates, Robert J. McMahon, Gordon Research Conference on Organic Photochemistry, Andover, NH; July, 1991.
4. Bond-Shift Isomerism in Acetylenic Carbenes, Robert J. McMahon, 11th NSF Workshop on Reactive Intermediates, Shelter Island, New York; September, 1992.
5. New Paradigms for the Design of Second-Order Nonlinear Optical Materials, Robert J. McMahon, Florida Advanced Materials Chemistry Conference, Palm Coast, Florida; March, 1994.
6. Hydrogen Shifts in Isomeric Methyl-Substituted Naphthyl Carbenes: Striking Differences in Thermal Reactivity at Low Temperatures, Robert J. McMahon, 25th Reaction Mechanisms Conference, South Bend, Indiana; June, 1994.
7. Structure and Rearrangements of Acetylenic Carbenes, Robert J. McMahon, 2nd Heron Island Conference on Unusual Molecules and Reactive Intermediates, Heron Island, Queensland, Australia; July, 1994.
8. Oxidative-Addition Reactions of Reactive Organic and Organometallic Intermediates, Robert J. McMahon, 7th Winter Conference of the Inter-American Photochemical Society, Clearwater Beach, Florida; January, 1995.
9. Automerization in Propynylidene (HCCCH), Propadienylidene (H_2CCC), and Cyclopropenylidene ($\text{c-C}_3\text{H}_2$), Robert J. McMahon and Randal A. Seburg, Polish-American Workshop on Reactive Intermediates, Zakopane, Poland; August, 1995.
10. Structure and Rearrangements of C_3H_2 Isomers, Robert J. McMahon, Telluride Summer Workshop “Radicals in the Rockies II”, Telluride, Colorado; July, 1996.
11. *o*-Halophenylcarbenes: Halogen Perturbation of the Electronic Structure of the Carbene, Robert J. McMahon, Mie International Workshop on Reactive Intermediates, Mie University, Tsu, Japan; September 1996.
12. Structure-Property Relationships in Organic Nonlinear Optical Materials, Robert J. McMahon, Gordon Research Conference on Organic Structures and Properties, Kyushu University, Fukuoka, Japan; September 1996.
13. Chemistry and Light, Robert J. McMahon, Public Lecture to the Citizens of Fukuoka, Japan; September 1996.
14. Studies Involving Nonlinear Optical Materials: Chemical Probes of NLO Phenomena and NLO Probes of Chemical Phenomena, Robert J. McMahon, U.S. / Japan Workshop on Photoresponsive Materials, Catalina Island, California; November 1996.
15. Spectroscopy and Rearrangements of C_3H_2 Isomers: Propadienylidene and Cyclopropyne, Robert J. McMahon, International Conference on Structural and Mechanistic Organic Chemistry: A Tribute to Professor N. L. Allinger, University of Georgia, Athens, Georgia; June 1997.
16. Spectroscopic Characterization of Propadienylidene ($\text{H}_2\text{C}=\text{C}=\text{C}:$), Robert J. McMahon, Jeffrey T. DePinto, Randal A. Seburg, Jonathan A. Hodges, and John F. Stanton, 52nd Ohio State University International Symposium on Molecular Spectroscopy, Columbus, Ohio; June 1997.

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17. The Organic Chemistry of the Interstellar Medium, Robert J. McMahon, UCLA Chemistry Symposium in Honor of Orville L. Chapman, University of California, Los Angeles, California; July 1997.
18. Chemistry and Spectroscopy of C_3H_2 and C_5H_2 Isomers: Relevance to the Organic Chemistry of the Interstellar Medium, Robert J. McMahon, International Conference on Reactive Intermediates and Unusual Molecules, Lake Tahoe, Nevada; July 1997.
19. Structure-Property Relationships in Organic Nonlinear Optical Materials, Robert J. McMahon, 32nd Midwest Regional Meeting of the American Chemical Society, Osage Beach, Missouri; October, 1997.
20. Structure and Spectroscopy of Organic Intermediates Relevant to the Chemistry of the Interstellar Medium, Robert J. McMahon, 81st National Meeting of the Canadian Society for Chemistry, Vancouver, British Columbia, Canada; June 1998.
21. Mechanistic Organic Chemistry of Relevance to the Interstellar Medium, Robert J. McMahon, 27th Reaction Mechanisms Conference, Asilomar, CA; June, 1998.
22. Structure and Spectroscopy of Organic Intermediates Relevant to the Chemistry of the Interstellar Medium, Robert J. McMahon, International Conference on Reactive Intermediates and Reaction Mechanisms, Ascona, Switzerland; July 1998.
23. Mechanistic Organic Chemistry of Relevance to the Interstellar Medium, Robert J. McMahon, Telluride Summer Workshop "Radicals in the Rockies III", Telluride, Colorado; July, 1999.
24. Reactive Organic Species of Relevance to the Chemistry of Interstellar Clouds, Robert J. McMahon, Gordon Research Conference on the Chemistry and Physics of Matrix Isolated Species, Plymouth, NH; July, 1999.
25. Reactive Organic Species of Relevance to the Chemistry of Interstellar Space, Robert J. McMahon, Inaugural Symposium for the Goering Visiting Professorship, Department of Chemistry, University of Wisconsin, Madison, WI; October 1999.
26. Reactive Organic Species of Relevance to the Chemistry of Interstellar Space, Robert J. McMahon, Symposium on Reactive Intermediates and Unusual Molecules, International Chemical Congress of Pacific Basin Societies (Pacifichem 2000), Honolulu, HI; December, 2000.
27. Photochemistry and Spectroscopy of Interstellar Molecules, Robert J. McMahon, 12th Conference of the Inter-American Photochemical Society, Córdoba, Argentina; May, 2001.
28. Structure and Rearrangements of Naphthylcarbenes and Related $C_{11}H_8$ Isomers, Robert J. McMahon, Inter-American Workshop on Photochemistry, Photophysics, and Spectroscopy in Organized Media, Córdoba, Argentina; May, 2001.
29. The Organic Chemistry of Interstellar Space, Robert J. McMahon, Gordon Research Conference on Physical-Organic Chemistry, Plymouth, NH; July, 2001.
30. Thermal and Photochemical Rearrangements of Naphthylcarbenes, Robert J. McMahon, International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM), Nara, Japan; September, 2001.
31. Photochemistry and Spectroscopy of Interstellar Organic Molecules, Robert J. McMahon, 85th National Meeting of the Canadian Society for Chemistry, Vancouver, British Columbia, Canada; June 2002.
32. The Organic Chemistry of Interstellar Space, Robert J. McMahon, 22nd NSF Workshop on Reactive Intermediates, Newport, Rhode Island; August, 2003.

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33. Microwave Spectroscopy of Reactive Organic Intermediates in Combustion and Interstellar Chemistry, Robert J. McMahon, Michael C. McCarthy, Carl A. Gottlieb, John B. Dudek, John F. Stanton, and Patrick Thaddeus, International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM), Reykjavik Iceland; August, 2003.
34. Reactive Intermediates and the Organic Chemistry of Interstellar Space, Robert J. McMahon, Kyushu International Symposium on Physical-Organic Chemistry, Fukuoka, Japan; September 2003.
35. The Organic Chemistry of Interstellar Space, Robert J. McMahon, 23rd NSF Workshop on Reactive Intermediates, Green Lake, Wisconsin; June, 2004.
36. Structure, Spectroscopy, and Rearrangements of C₂NH Isomers, Wendy A. deProphetis, Robert J. McMahon, Christopher S. Simmons, and John F. Stanton, 3rd Heron Island Conference on Unusual Molecules and Reactive Intermediates, Heron Island, Queensland, Australia; July, 2004.
37. The Organic Chemistry of Interstellar Space, Robert J. McMahon, 24th NSF Workshop on Reactive Intermediates, Bodega Bay, California; July, 2005.
38. Ring-Opened Isomers of 2,5-Didehydrothiophene: Theory and Experiment, Robert J. McMahon and Yong Seol Kim, International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM), Edinburgh, Scotland; August, 2005.
39. Structure, Spectroscopy, and Rearrangements of Dialkynyl Carbenes, Robert J. McMahon, Nathan P. Bowling, Robert J. Halter, Phillip S. Thomas, John F. Stanton, and Christopher S. Simmons, Symposium on Reactive Intermediates and Unusual Molecules, International Chemical Congress of Pacific Basin Societies (Pacifichem 2005), Honolulu, HI; December, 2005.
40. Photochemistry and Spectroscopy of Interstellar Organic Molecules, Robert J. McMahon and Wendy A. deProphetis, Symposium on Organic Photochemistry, International Chemical Congress of Pacific Basin Societies (Pacifichem 2005), Honolulu, HI; December, 2005.
41. The Intersection of Organic Chemistry and Astrochemistry, Robert J. McMahon, 31st Reaction Mechanisms Conference, College Park, MD; June, 2006.
42. Photochemistry and Spectroscopy of Unsaturated Hydrocarbons, Robert J. McMahon, First Workshop on: "Titan – Observations, Experiments, Computations, and Modeling", Honolulu, HI; February 2007.
43. A Quest to Reveal the Signatures of Aromatic Compounds in Space, Robert J. McMahon, Enrico Fermi Institute Mini-Symposium on Interstellar Molecules, Chicago, IL; April 2007.
44. A Quest to Reveal the Signatures of Aromatic Compounds in Space, Robert J. McMahon, 4th Heron Island Conference on Unusual Molecules and Reactive Intermediates, Heron Island, Queensland, Australia; July, 2007.
45. Thermal Rearrangements of Triplet Arylcarbenes, Robert J. McMahon, XIVth International Workshop on Quantum Atomic and Molecular Tunneling in Solids and other Condensed Systems (QAMTS2007), Houston, TX; October, 2007.
46. Photochemistry and Spectroscopy of Unsaturated Hydrocarbons, Robert J. McMahon, Second Workshop on: "Titan – Observations, Experiments, Computations, and Modeling", Miami, FL; March 2008.
47. The Organic Chemistry of Space, Robert J. McMahon, *Journal of Organic Chemistry* Editor's Symposium on Organic Chemistry, Park City, UT; July 2008.

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48. Organic Reactive Intermediates and the Chemistry of Interstellar Space, Robert J. McMahon, 10th International Symposium on Organic Free Radicals (ISOFR 10) and 3rd Pacific Symposium on Radical Chemistry (PSRC 3), Heron Island, Queensland, Australia; August, 2008.
49. Photochemistry and Spectroscopy of Unsaturated Hydrocarbons, Robert J. McMahon, 43rd Midwest Regional Meeting of the American Chemical Society, Kearney, Nebraska; October, 2008.
50. Chemistry and Spectroscopy of Carbon-Chain Molecules, Robert J. McMahon, International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM), Prague, Czech Republic; July, 2009.
51. Thermal Rearrangements of Triplet Carbenes, Robert J. McMahon, Organic Free Radicals Conference – Ottawa (OFRO), Ottawa, Canada; July, 2009.
52. Photochemistry and Spectroscopy of Organic Reactive Intermediates, Robert J. McMahon, Austin Symposium on Molecular Structure and Dynamics, Austin, TX; March, 2010.
53. Tunneling in Hydrogen-Atom Transfer Reactions of Triplet Arylcarbenes, Robert J. McMahon, XVth International Workshop on Quantum Atomic and Molecular Tunneling in Solids and other Condensed Systems (QAMTS2010), Darmstadt, Germany; September, 2010.
54. Generation and Characterization of Triplet Thienylcarbenes, Robert J. McMahon, Symposium on Reactive Intermediates and Unusual Molecules, International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, HI; December, 2010.
55. Photochemistry and Spectroscopy of Carbon-Chain Compounds, Robert J. McMahon, Symposium on Organic Photochemistry, International Chemical Congress of Pacific Basin Societies (Pacifichem 2010), Honolulu, HI; December, 2010.
56. Organic Reactive Intermediates and the Chemistry of Interstellar Space, Robert J. McMahon, ALMA: Extending the Limits of Astrophysical Spectroscopy, Victoria, BC, Canada; January 2011.
57. Chemistry and Spectroscopy of Unsaturated Carbon Chains, Robert J. McMahon, International Conference on Physics and Chemistry of Matrix Isolated Species (MATRIX2011), Vancouver, BC, Canada; July 2011.