

MARK GREGORY BRADLEY

Widener University
One University Place
Chester, PA 19013
610-499-4267
bradley@pop1.science.widener.edu
mgbradle@sas.upenn.edu

EDUCATION:

Postdoctoral Fellow, 1978-79	Department of Chemistry Massachusetts Institute of Technology Cambridge, MA 02139 Supervisor: Mark S. Wrighton
Doctor of Philosophy, 1978	Department of Chemistry Pennsylvania State University University Park, PA 16802 Major Field: Inorganic Chemistry Thesis: "Photochemical Properties of Selected Transition Metal Complexes" Advisor: Gregory L. Geoffroy
Bachelor of Science, 1974	Providence College Providence, RI 02918 Major: Chemistry (graduated with the highest distinction in chemistry)

HONORS:

Cabot Solar Energy Fellow, Massachusetts Institute of Technology 1978-79
Hickey Science Award, Providence College 1974

EXPERIENCE:

September 2005 – present Associate Professor of Chemistry, Department of Chemistry, Widener University, Chester, PA 19013

September 2000 – August 2005 Assistant Professor of Chemistry, Department of Chemistry, Widener University, Chester, PA 19013 Course responsibilities include inorganic chemistry, general chemistry lecture and laboratory courses, and nursing chemistry lecture and laboratory courses. Undergraduate research projects in solid state inorganic chemistry.

July 2001 - present Visiting Faculty, Department of Chemistry, University of Pennsylvania, Philadelphia, PA 19104 A variety of collaborative research projects involving the synthesis of new solid state materials with interesting chemical, magnetic and superconducting properties.

September 1991 - August 2000 Visiting Assistant Professor, Department of Chemistry, Widener University, Chester, PA 19013 Instructor for lecture and laboratory courses including general chemistry, nursing chemistry and food science.

July 1992 - July 1998 Visiting Lecturer, Department of Chemistry, Bryn Mawr College, Bryn Mawr, PA 19010 Instructor for lecture courses in general chemistry for undergraduate and post-graduate students.

June 1988 - August 1991 Adjunct Faculty, Department of Chemistry, Widener University, Chester PA, 19103 (part time) Instructor for general chemistry.

August 1988 - August 1991 Instructor and Subject Coordinator, Pre-Freshman Program, University of Pennsylvania, Philadelphia, PA 19104 Instructor in chemistry courses for incoming freshman in a program designed to increase retention of undergraduate students and improve their academic performance.

July 1987 - August 1989 Adjunct Faculty, School of Nursing, University of Pennsylvania, Philadelphia, PA 19104 (part time) Instructor for Inorganic Chemistry for Nurses (Nursing 40), an introductory lecture and laboratory covering the basic principles of general chemistry.

Jan. 1981 - August 1989 Adjunct Faculty, College of General Studies, University of Pennsylvania, Philadelphia, PA 19104 (part time), Taught courses in general chemistry, nursing chemistry and chemistry for non-science students.

July 1979 - June 1986 Assistant Professor, Department of Chemistry, University of Pennsylvania, Philadelphia, PA 19104 Investigated the utility of semiconductor-based electrochemical cells for solar energy conversion. Examined the uphill conversion of CO₂ into useful organic fuel molecules. Succeeded in converting CO₂ into CO with moderate energy conversion efficiency. Studied the mediated reduction of carbon dioxide using transition metal complexes as electron-transfer catalysts. Studied the kinetics of mass-transfer and electron-transfer at semiconductor electrodes. Evaluated the excited state and electrochemical properties of various organometallic complexes. Examined the small molecule chemistry of a variety of transition metal complexes.

Feb. 1978 - June 1979 Postdoctoral Fellow, Massachusetts Institute of Technology, Conducted studies involving photoelectrochemical cells for optical energy conversion. Prepared and characterized reagents for the chemical modification of semiconductor electrode surfaces. Demonstrated that surface attached ferrocenes stabilize n-Si to photoanodic corrosion. Showed that chemically modified n-Si can mediate electron transfer to solution redox couples. Examined a series of dinuclear ferrocenes for the ability to catalyze the reduction of water to hydrogen. Investigated semiconductor-based solar cells for the ability to convert light into electricity.

Sept. 1974 - Jan. 1978 Graduate Fellow, Pennsylvania State University, Conducted a variety of studies in organometallic photochemistry. Investigated the photochemical properties of a series of transition metal hydride complexes. Established that elimination of H₂ from polyhydride complexes is a general phenomenon, and yields highly reactive unsaturated complexes. Synthesized novel complexes of N₂, C₂H₂, C₂H₄, CO and CO₂ from photogenerated intermediates. Discovered a photochemical route to [RuClH(PPh₃)₃], an extremely active homogeneous hydrogenation catalyst. Studied the solution excited state properties of iridium isocyanide complexes. Established that irradiation of solution oligomers or iridium leads to highly reactive unsaturated monomeric species.

Oct. 1973 - July 1974 Research Technician, Bercen Chemical Company, Providence, RI (part time), Performed quality control for plant production. Evaluated new textile and paper chemicals. Tested performance of product line in new applications.

Publications

1. G.L. Geoffroy and M.G. Bradley, "Photochemical Generation of Chlorohydridotriphenyl-phosphineruthenium, $[\text{RuHC1}(\text{PPh}_3)_3]$ ", *Chem. Commun.*, 20 (1976).
2. M.G. Bradley and G.L. Geoffroy, "Photochemistry of Transition Metal Hydride Complexes II. $[\text{RuHC1}(\text{CO})(\text{PPh}_3)_3]$, and $[\text{RuHC1}(\text{CO})_2(\text{PPh}_3)_2]$ ", *Inorg. Chem.*, 16, 744 (1977).
3. G.L. Geoffroy and M.G. Bradley, "Photoinduced Loss of H_2 from $[\text{Mo}(\eta^5\text{-C}_5\text{H}_5)_2\text{H}_2]$, Generation of Molybdenocene", *J. Organomet. Chem.*, 134, C27 (1977).
4. M.G. Bradley and G. L. Geoffroy, "Photochemistry of Transition Metal Hydride Complexes III. Photoinduced Elimination of Hydrogen from $[\text{Mo}(\eta^5\text{-C}_5\text{H}_5)_2\text{H}_2]$ ", *Inorg. Chem.*, 17, 2410 (1978).
5. M.G. Bradley, R. Pierantozzi and G.L. Geoffroy, "Photochemistry of Transition Metal Hydride Complexes", *Advances in Chemistry Series*, 167, 181 (1978).
6. M.G. Bradley, M.E. Keeney and G.L. Geoffroy, "Photochemistry of Oligomeric Iridium Isocyanide Complexes", *Inorg. Chem.*, 17, 777 (1978).
7. M.G. Bradley, M.E. Keeney and G.L. Geoffroy, "Solution Photochemical Properties of Oligomeric Iridium Isocyanide Complexes", *Ann. N.Y. Acad. Sci.*, 313, 588 (1978).
8. M.S. Wrighton, A.B. Bocarsly, J.M. Bolts, M.G. Bradley, A.B. Fischer, N.A. Lewis, M.C. Palazotto, E.G. Walton, "Chemically Derivatized Semiconductor Photoelectrodes. A Technique for the Stabilization of n-Type Semiconductors", *Advances in Chemistry Series*, 184, 269 (1980).
9. D.C. Bookbinder, N.S. Lewis, M.G. Bradley, A.B. Bocarsly and M.S. Wrighton, "Photoelectrochemical Reduction of N, N'-Dimethyl-4,4'-Bipyridium in Aqueous Media at p-Type Silicon: Sustained Photogeneration of a Species Capable of Evolving Hydrogen", *J. Am. Chem. Soc.*, 101, 7721 (1979).
10. A. B. Bocarsly, E.G. Walton, M.S. Wrighton and M.G. Bradley, "Two-Electron Oxidations at Illuminated n-Type Semiconductor Electrodes: Use of Chemically Derivatized Electrodes", *J. Electroanal. Chem.*, 100, 283 (1979).
11. D.A. Roberts, G.L. Geoffroy and M.G. Bradley, "Reversible Insertion of CO_2 into the Re-H Bond of Photogenerated $[\text{ReH}(\text{Ph}_2\text{PCH}_2\text{CH}_2\text{PPh}_2)]$ ", *J. Organomet. Chem.*, 198, C75 (1980).
12. M.G. Bradley, D. A. Roberts and G.L. Geoffroy, "Photogeneration of Reactive $[\text{ReH}(\text{diphos})_2]$, Its Reversible Coordination of CO_2 , and Activation of Aromatic C-H Bonds", *J. Am. Chem. Soc.*, 103, 379 (1981).
13. M.G. Bradley and T. Tysak, "p-Type Silicon Based Photoelectrochemical Cells for Solar Energy Conversion: Electrochemistry of Tetraazamacrocyclic Metal Complexes at Illuminated p-Type Silicon Semiconducting Electrodes", *J. Electroanal. Chem.*, 135, 153 (1982).
14. M.G. Bradley and B.R. Hofmann, Jr., "Decarbonylation of Methanol by Highly Reactive Rhenium Complexes", *Chem. Commun.*, 1180 (1982).
15. M.G. Bradley, T. Tysak, N. Vlachopoulos and D.J. Graves, "Electrocatalytic Reduction of Carbon Dioxide at Illuminated p-Silicon Semiconducting Electrodes", *Chem. Commun.*, 349(1983).
16. M.G. Bradley, T. Tysak and N. Vlachopoulos, "Stabilization of n-Si to Photoanodic Decomposition by $[\text{Ni}(\text{S}_2\text{C}_2\text{Ph}_2)_2]$ and $[\text{Fe}(\eta^5\text{-C}_5\text{H}_5)(\text{CO})_4]$ ", *J. Electroanal. Chem.*, 160, 345(1984).
17. T. G. Barclift and M.G. Bradley, "Synthesis of Superconducting Intermetallic Borocarbides", *Proceedings National Conference on Undergraduate Research*, (2002)

18. A. R. Puerta, E.E. Remsen, M.G. Bradley, W. Sherwood, L.G. Sneddon, "Synthesis and Ceramic Conversion of 9-BBN Modified Allylhydridopolycarbosilane: A New Single Source Precursor to Boron Modified Silicon Carbide", *Chemistry of Materials*, 15, 478 (2003).
19. Upal Kusari, Yuqi Li, Mark G. Bradley and Larry G. Sneddon, "Polyborane Reactions in Ionic Liquids. New Efficient Routes to Functionalized Decaborane and *ortho*-Carborane Clusters", *J. Am. Chem. Soc.*, 126, 8662 (2004).
20. Yuqi Li, Upal Kusari, Patrick J. Carroll, Mark G. Bradley and Larry G. Sneddon, "Polyborane Reactions in Ionic Liquids", *Pure and Applied Chemistry*, 78, 1349 (2006).
21. Martin E. Bluhm, Mark G. Bradley, Robert Butterick, III, Upal Kusari and Larry G. Sneddon, "Amineborane-Based Chemical Hydrogen Storage: Enhanced Ammonia Borane Dehydrogenation in Ionic Liquids", *J. Am. Chem. Soc.*, 128, 7748 (2006).
22. Martin E. Bluhm, Mark G. Bradley and Larry G. Sneddon, "Promoted Hydrogen Release from Ammonia Borane", *Prep. Pap.-Am. Chem. Soc., Div. Fuel Chem.*, 51, 571 (2006).
23. Kim, M. J., Chatterjee, S., Kim, S.M., Stach, E.A., Bradley, M.G., Pender, M.J., Sneddon, L.G. and Maruyama, B., "Double-Walled Boron Nitride Nanotubes Grown by Floating Catalyst Chemical Vapor Deposition", *Nano Lett.*, 8(10), 3298 (2008)