VITA

MARK S. MEIER

Professor of Organic Chemistry, Department of Chemistry, University of Kentucky, Lexington, KY 40506-0055, Telephone (859) 257-3837, fax (859) 323-1069, email meier@uky.edu

EDUCATION

B. A., Dartmouth College, 1982
Senior Thesis: "A Novel Approach to the Sarpagine-Vobasine Alkaloids" (G. W. Gribble)
Ph.D., University of Oregon, 1988
Dissertation: "The Development of Cobaloxime-Mediated Radical Alkyl-Alkenyl Cross Coupling Reactions and an Application to a Synthesis of Ammonium 3-Deoxy-D-*manno*-2-Octulosonate (KDO)" (B. P. Branchaud)

Professional Experience

Undergraduate Teaching Assistant, Department of Chemistry, Dartmouth College, 1982.
Graduate Teaching/Research Assistant, Department of Chemistry, University of Oregon, 1982-1988.
Curator, QE-300 and XL-100 NMR systems, Department of Chemistry, University of Oregon, 1984-1988.
Postdoctoral Research Fellow, Department of Chemistry, University of Texas at Austin, 1988-1990.
Assistant Professor, Department of Chemistry, University of Kentucky, 1990-1996.
Associate Professor, Department of Chemistry, University of Kentucky, 1996-2001.
Professor, Department of Chemistry, University of Kentucky, 2001-present.
Director, Nuclear Magnetic Resonance Services, 1997-2003.
Associate Director, Advanced Carbon Materials Center (NSF-MRSEC), 2000-2003.
Director of Graduate Studies, Department of Chemistry, 2003-2006
Associate Chairman, Department of Chemistry, 2003 - 2006

Research Interests

Synthetic Organic Chemistry
Chemical Effects of Strong Molecular Dipoles
Organic and Organometallic Synthetic Methodology
Application of Synthetic Chemistry to Physical and Biological Problems
Chemistry of Fullerenes and Carbon Nanotubes

Professional Activities

Member, American Chemical Society
Member, Organic Division, American Chemical Society

Honors

Marcus Heiman Award, 1982 (Creative Arts, Dartmouth College)
Voted a member of the "Top 10 Professors" in the College of Arts and Sciences by the 1998 - 2003 graduating classes at the University of Kentucky

Research Publications

1. "New Synthetic Methods via Free Radicals. Free Radical Generation via Photolytic Homolysis of Alkyl-Cobaloxime C-Co Bonds. Efficient Radical Trapping with Useful Functional Groups" Branchaud, B. P.; Meier, M. S.; Malekzadeh, N. M. *J. Org. Chem.* **1987**, *52*, 212-217.

2. "Alkyl-Alkenyl Cross Coupling Via Cobaloxime Radical Chemistry. An Alkyl Equivalent To The Heck Reaction Compatible With Common Organic Functional Groups" Branchaud, B. P.; Meier, M. S.; Choi, Y. *Tetrahedron Lett.* **1988**, *29*, 167-70.

3. "A Synthesis of Ammonium 3-Deoxy-D-*Manno*-2-Octulosonate (Ammonium KDO) From D-Mannose via Cobaloxime-Mediated Radical Alkyl-Alkenyl Cross Coupling" Branchaud, B. P.; Meier, M. S. *Tetrahedron Lett.* **1988**, *29*, 3191-3194.

4. "A Novel Strategy For The Synthesis Of Ammonium 3-Deoxy-D-*Manno*-2-Octulosonate (Ammonium KDO) From Lower Carbohydrates. C-C Bond Construction At C_6 of D-Mannose Via Cobaloxime-Mediated Radical Alkyl-Alkenyl Cross Coupling" Branchaud, B. P.; Meier, M. S. *J. Org. Chem.* **1989**, *54*, 1320-1326.

5. "Cobaloxime-Mediated Radical Cross Coupling Reactions" Branchaud, B. P.; Meier, M. S.; Choi, Y. L.; Yu, G. -X., in *Organic Free Radicals. Proceedings of the 5th International Symposium, Zurich, 18.-23. September 1988*, Fischer, H.; Heimgartner, H., Eds.; Springer-Verlag: New York; 1988, pp 13-14.

6. "Peptide Conformational Distributions as Studied by Electron-Transfer Kinetics" Meier, M. S.; Fox, M. A.; Miller, J. R. *J. Org. Chem.* **1991**, *56*, 5380-5384.

7. "Efficient Preparative Separation of C_{60} and C_{70}. Gel Permeation Chromatography of Fullerenes using 100% Toluene as Mobile Phase" Meier, M. S.; Selegue, J. P. *J. Org. Chem.* **1992**, *57*, 1924-1926.

8. "Photo-Assisted Structural Transition and Oxygen Diffusion in Solid C_{60} Films" Zhou, P.; Rao, A. M.; Wang, K.-A.; Robertson, J. D.; Eloi, C.; Meier, M. S.; Ren, L.; Bi, X. X.; Eklund, P. C. *Appl. Phys. Lett.* **1992** *60*, 2871-2873.

9. "Dielectric Function of C_{70} Films," Ren, S.; Wang, Y.; Rao, A. M.; Meier, M. S.; Selegue, J. P.; Eklund, P. C. *Appl. Phys. Lett.* **1992**, *61*, 124-126.

10. "Elevated Temperature Gel Permeation Chromatography and Electrochemical Behavior of the C_{84} Fullerene," Meier, M. S.; Guarr, T. F.; Selegue, J. P.; Vance, V. K. *J. Chem. Soc. Chem. Commun.***1993**, 63-65.

11. "Thermal Properties of Fullerenes," Chung, M.; Wang, K.; Eklund, P. C.; Brill, J. W.; Xiang, X.-D.; Mostovov, R.; Hou, J.-G.; Zettle, A.; Davis, J. F.; Golden, A.; Meier, M. S.; Selegue, J. P. *Synth. Metals* **1993**, *55-57*, 2985-2990..

12. "Addition of Nitrile Oxides to C_{60}: Formation of Isoxazoline Derivatives of Fullerenes," Meier, M. S.; Poplawska, M. *J. Org. Chem.* **1993**, *58*, 4524-4525.

13. "Electrochemistry of the $C_{60}H_2$ Fullerene,"Guarr, T. F.; Meier, M. S.; Vance, V. K.; Clayton, M. *J. Am. Chem. Soc.* **1993**, 115, 9862-9863.

14. "Synthesis of Hydrogenated Fullerenes by Zinc/Acid Reduction," Meier, M. S.; Vance, V. K.; Corbin, P. L.; Clayton, M.; Mollman, M.; Poplawska, M. *Tetrahedron Lett.*, **1994**, *35*, 5789-5792.

15. "Preparation and Isolation of Three Isomeric C_{70} Isoxazolines: Strong Deshielding in the Polar Region of C_{70}," Meier, M. S.; Poplawska, M.; Compton, A.; Shaw, J.; Selegue, J. P.; Guarr, T. F. *J. Am. Chem. Soc.* **1994**, *116*, 7044-7048.

16. "Muon Investigations of Fullerenyl Radicals," Addison-Jones, B.; Percival, P. W.; Brodovitch, J.-C.; Ji, F.; Wlodek, S.; Selegue, J. P; Meier, M. S.; Wakefield, J. B. *Hyperfine Interactions* **1994**, *86*, 817-824.

17. J. P. Selegue, J. P. Shaw, T. F. Guarr and M. S. Meier, "Purification and Characterization of the Larger Fullerenes: New Aspects of C_{76}, C_{78} and C_{84}," in *Recent Advances in the Physics and Chemistry of Fullerenes*, The Electrochemical Society, **1994**, 1274-1291.

18. "Fullerenes as Nanoscale Connectors," Meier, M. S.; Rice, D. J.; Thomas, C. J.; Majidi, V.; Pogue, R.; Poplawska, M., in *Science and Technology of Fullerene Materials* , Proceedings of The Materials Research Society, **1995**, vol. 359, pp. 369-372.

19. "Linking Fullerene Units: Steps Toward Fullerene-Based Nanostructures" Meier, M. S.; Rice, D. J. in *Recent Advances in the Physics and Chemistry of Fullerenes*, The Electrochemical Society, **1995**, 1128-1137.

20. "The Addition of Nitrile Oxides to C_{60}," Meier, M. S.; Poplawska, M. *Tetrahedron* , **1996**, *52*, 5043-5052.

21. "Intramolecular Excited State Electronic Coupling Along an α-Helical Peptide," Batchelder, T. L.; Fox, R. J. III, Meier, M. S.; Fox, M. A. *J. Org. Chem.*, **1996**, *61*, 4206-4209.

22. "The Effect of a Peptide Helix Macrodipole on the pKa of an Asp Side-Chain Carboxylate," Joshi, H. V.; Meier, M. S. *J. Am. Chem. Soc.* **1996**, *118*, 12038-12044.

23. "Synthesis and Isolation of One Isomer of $C_{60}H_6$," Meier, M. S.; Weedon, B. R.; Spielmann, H. P. *J. Am. Chem. Soc.*, **1996**, *118*, 11682-11683.

24. "Hydrogenation of C_{60} Using Exhaustive Metal Reduction," Meier, M. S.; Laske Cooke, J. A.; Weedon, B. R.; and Spielmann, H. P. in *Recent Advances in the Physics and Chemistry of Fullerenes*, The Electrochemical Society, **1996**, *3*, 1193-1199.

25. "The Lower Hydrides of C_{60} and C_{70}," Bergosh, R. G.; Meier, M. S.; Spielmann, H. P.; Wang, G.-W.; Weedon, B. R. In *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials* **1997**, *4,* 240-245.

26. "Dissolving Metal Reductions of Fullerenes,"Bergosh, R. G.; Meier, M. S.; Laske Cooke, J. A.; Spielmann, H. P.; Weedon, B. R. *J. Org. Chem.* **1997**, *62*, 7667-7672.

27. "Effect of α-Phenyl-*tert*-Butylnitrone on Endotoxin Toxemia in Horses," Harkins, J. D.; Carney, J. M.; Meier, M. S.; Leak, S. C.; Tobin, T. *Vet. Human Toxicol.* **1997**, *39*, 268-271.

28. "Benzyne Adds Across a Closed 5-6 Ring Fusion in C_{70}: Evidence for Bond Delocalization in Fullerenes," Meier, M. S.; Wang, G.-W.; Haddon, R. C.; Brock, C. P.; Lloyd, M. A.; Selegue, J. P. *J. Am. Chem. Soc.* **1998**, *120*, 2337-2342.

29. "Addition of Benzyne to a Closed 5,6-Ring Fusion," Wang, G.-W.; Meier, M. S.; Haddon, R. C. Selegue, J. P.; Brock, C. P.; Lloyd, M. A. *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials* **1998**, *5,* 289-295.

30. "Hydrogenation of the Parent Fulleroid of C_{60} by Zinc/Copper Reduction," Weedon, B. R.; Meier, M. S.; Spielmann, H. P. *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials* **1998**, *6,* 1094-1102.

31. "Alkylation of C_{60}^{2-} Generated From $C_{60}H_2$," Meier, M. S.; Bergosh, R. G. *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials* **1998**, *6,* 1103-1109.

32. "Preparation of $C_{70}H_2$, $C_{70}H_4$ and $C_{70}H_8$: Three Independent Reduction Manifolds in the Zn(Cu) Reduction of C_{70}," Spielmann, H. P.; Wang, G.-W., Meier, M. S.; Weedon, B. R. *J. Org. Chem.* **1998**, *63,* 9865-9871.

33. "Fulleroid Addition Regiochemistry Is Driven By π-Orbital Misalignment," Weedon, B. R.; Haddon, R. C.; Spielmann, H. P.; Meier, M. S. *J. Am. Chem. Soc.***1999** *121*, 335-340.

34. "The First Structurally Characterized Homofullerene (Fulleroid): 7,8-Dichloromethanohomo[70]fullerene," Kiely, A.; Haddon, R. C.; Meier. M. S.; Selegue. J. P.; Brock, C. P.; Patrick, B. O.; Wang, G.-W.; Chen. Y. *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials* **1999**, 99-12, 180-187.

35. "The First Structurally Characterized Homofullerene (Fulleroid): 7,8-Dichloromethanohomo[70]fullerene," Kiely, A.; Haddon, R. C.; Meier. M. S.;

Selegue. J. P.; Brock, C. P.; Partrick, B. O.; Wang, G.-W.; Chen. Y. *J. Am. Chem. Soc.* **1999**, *121*, 7971-7972.

36. "Reactivity, Spectroscopy, and Structure of Reduced Fullerenes;" Meier, M. S.; Spielmann, H. P.; Haddon, R. C.; Bergosh, R. C.; Gallagher, M. E.; Hamon, M. A.; Weedon, B. E. *Carbon*, **2000**, *38*, 1535-1538.

37. "Preparation and NMR Characterization of $C_{70}H_{10}$: Cutting a Fullerene π-System in Half," Spielmann, H. P.; Weedon, B. R.; Meier, M. S.*; J. Org. Chem.*, **2000**, *65*, 2755-2758.

38. "A ^{3}He NMR Study of $^{3}He@C_{60}H_6$ and $^{3}He@C_{70}H_{2\text{-}10}$," Wang, G.-W., Weedon, B. R., Meier, M. S., Saunders, M., Cross, R. J. *Org. Lett*, **2000**, *2*, 2241-2243.

39. "Photophysical Studies of C_{70}-Benzyne Monoadducts: Strong Isomer Effects," Bachilo, S. M.; Benedetto, A. F.; Weisman, R. B.; Meier, M. S.; Wang, G.-W.; Weedon, B. R.; Selegue, J. P. *Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials* **2000,** 281-288.

40. "Chromatographic Purification of Soluble Single Walled Carbon Nanotubes (s-SWNTs)," Niyogi, S.; Hamon, M. A.; Bhowmik, P.; Rozenzhak, S. M.; Itkis, M. E.; Meier, M. S.; Haddon, R. C. *J. Am. Chem. Soc.*, **2001**, 123, 733-734.

41. "Preparation and Characterization of the Fullerene Diols 1,2-$C_{60}(OH)_2$, 1,2-$C_{70}(OH)_2$, and 5,6-$C_{70}(OH)_2$," Meier, M. S.; Kiegiel, J. *Org. Lett.***2001***, 3*, 1717-1719.

42. "Chromatographic Purification and Properties of Soluble Single-Walled Carbon Nanotubes," Zhao, Z.; Hu, H.; Niyogi, S.; Itkis, M. E.; Hamon, M. A.; Bhowmik, P.; Meier, M. S.; Haddon, R. C. *J. Am. Chem. Soc.* **2001**, *123,* 11673-11677.

43. "A Novel Synthesis of Branched High Molecular Weight (C_{40+}) Long-Chain Alkanes," Lehmler, H-J., Bergosh, R. G., Meier, M. S., Carlson, R. M. K., *Bioscience, Biotechnology, and Biochemistry,* **2002**, *66*, 523-531.

44. "Thermogravimetric Analysis of the Oxidation of Multi-Walled Carbon Nanotubes: Evidence for the Role of Defect Sites in Carbon Nanotube Chemistry," Bom, D.; Andrews, R.; Jacques, D.; Anthony, J.; Chen, B.; Meier, M. S.; Selegue, J. P.*Nanoletters,* **2002**, *2*, 615-619.

45. "Alkylation of Dihydrofullerenes," Meier, M. S.; Bergosh, R. G.; Gallagher, M. E.; Spielmann, H. P.; Wang, Z. *J. Org. Chem.* **2002**, *67*, 5946-5952.

46. "A ^{13}C INADEQUATE and HF-GIAO Study of $C_{60}H_2$ and $C_{60}H_6$. Identification of Ring Currents in a 1,2-Dihydrofullerene," Meier, M. S.; Spielmann, H.P.; Haddon, R. C.; Bergosh, R. G.; *J. Am. Chem. Soc.* **2002**, *124*, 8090-8094.

47. "Monoalkylation of C_{60} and C_{70} with Zn and Active Alkyl Halides," Wang, Z.; Meier, M. S.; *J. Org. Chem.* **2003**, *68*, 3043-3048.

48. "7,8-Dichloromethanohomo[70]fullerene, an Unusual but Unexceptional Methanoannulene," Kiely, A. F.; Meier, M. S.; Patrick, B. O.; Selegue, J. P.; Brock, C. P. *Helv. Chim. Acta* **2003**, *86*, 1140-1151.

49. "Trends in Chemical Shift Dispersion in Fullerene Derivatives. Tuning Distant Magnetic Properties with Local Strain," Meier, M. S.; Spielmann, H. P; Bergosh, R. G.; Tetreau, M., *J. Org. Chem.* **2003**, *68*, 7867-7870.

50. Methodology for the Preparation of C1-Monoalkylated 1,2-Dihydro[C_{70}] Derivatives: Formation of "the other" Regioisomer;" Wang, Z.; Meier, M. S., *J. Org. Chem.* **2004**, *69*, 2178-2180.

51. Hybrid Nanoparticles Based on Organized Protein Coupling on Fullerenes," Nednoor, P.; Capaccio, M.; Gavalas, V. G.; Meier, M. S.; Anthony, J. E.; Bachas, L. G. *Bioconjugate Chemistry* **2004**, 15(1), 12-15.

52. "Coupling Biomolecules to Fullerenes Through a Molecular Adapter," Cappachio, M.; Gavalas, V. G.; Anthony, J.; Meier, M.; Bachas, L. G., *Bioconj. Chem.* **2005**, 241- 244.

Review Articles

1. "Bis(Bromomethyl)-1,3-Butadiene," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol. 1, pp 439-440.

2. "2-Methylamino Benzenethiol," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol 5, pp 3422-3423.

3. "3-Methyl-2-Phenyl-1,3,2-oxazaphospholidine," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol. 5, pp 3566-3567.

4. "Phosphoric Acid," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol 6, pp 4112-4114.

5. "Phosphorous(V) Oxide," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol 6, pp 4127-4129.

6. "Phosphorous Oxychloride," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol 6, pp 4133-4137.

7. "Triphenylphosphine Hydrobromide," Invited contribution for The Encyclopedia of Reagents for Organic Synthesis, Leo A. Paquette, Editor-in-Chief, Wiley, **1995**, Vol 8, pp 5392-5393.

8. "Cycloadditions to C_{60}," Invited chapter for "The Chemistry of Fullerenes;" Roger Taylor, editor; World Scientific Books, **1995**, pp. 174-194.

9. "Solution-State Syntheses of Fullerene-Based Pendant, Pearl Chain, and Dendritic Polymers;" Meier, M. S.; invited chapter in *Fullerene Polymers and Fullerene Polymer Composites*; Eklund, P C. and Rao, A. M., Eds.; Springer Series in Material Science, vol 38, pp 369-389; **2000**.

10. “Organic Chemistry of Fullerenes,” Wilson, Stephen R.; Schuster, David I.; Nuber, Berthold; Meier, Mark S.; Maggini, Michele; Prato, Maurizio; Taylor, Roger. Fullerenes: Chem., Phys. Technol. **2000**, 91-176.

11. "The Synthesis and Characterization of Fullerene Hydrides,” Nossal, J.; Saini, R. K.; Billups, W. E.; Meier, M.; *Euro. J. Chem.* **2001***,* 4167-4180.

12. "Fullerene Chemistry," Meier, M. S. Dekker Encyclopedia of Nanotechnology, **2004**, In Press.

Other Publications

1. “Efficient Separation of Fullerenes on Preparative Gel Permeation Chromatography Columns,” Meier, M. S.; Selegue, J. P. *Energia* **1993**, *4*, 1-3.

2. “Chemically-Functionalized Carbon Nanotubes – Reactivity Drives Research” *Energia,* **2001**, *12,* 1-4**.**