

M. FREDERICK HAWTHORNE

Bibliography

BIBLIOGRAPHY

M. FREDERICK HAWTHORNE

1. Corwin Hansch and Fred Hawthorne, "Catalytic Synthesis of Thianaphene from Ethylbenzene," *J. Am. Chem. Soc.*, 70, 2495 (1948).
2. Fred Hawthorne and Donald J. Cram, "Studies in Stereochemistry. XV. Effect of Configuration on Steric Inhibition of Resonance in Diastereomerically Related Compounds," *J. Am. Chem. Soc.*, 74, 5859 (1952).
3. M. F. Hawthorne and Donald J. Cram, "The Relative Sensitivity of Triphenylmethyl Chloride to Electrophiles and Nucleophiles in Benzene Solution," *J. Am. Chem. Soc.*, 76, 3451 (1954).
4. M. F. Hawthorne, "The Question of Hydrogen Bonded Transition States in Nucleophilic Aromatic Substitution Reactions," *J. Am. Chem. Soc.*, 76, 6358 (1954).
5. M. Frederick Hawthorne, George S. Hammond and Bruce M. Graybill, "The Nucleophilicity of the Cyanide Ion," *J. Am. Chem. Soc.*, 77, 486 (1955).
6. M. F. Hawthorne and George S. Hammond, "The Oxygenation of the Tri(*p*-nitrophenyl)methide Ion. A Novel Oxidation-Reduction Reaction," *J. Am. Chem. Soc.*, 77, 2549 (1955).
7. Lawrence R. Parks, George S. Hammond and M. Frederick Hawthorne, "Substituent Effects on the Reactions of Benzoate Ions with 2,4-Dinitrochlorobenzene and Methyl Iodide," *J. Am. Chem. Soc.*, 77, 2903 (1955).
8. M. Frederick Hawthorne, "The Thermal Decomposition of Tri-(*p*-nitrophenyl)methyl Nitrate. A New Example of the Wieland Rearrangement," *J. Am. Chem. Soc.*, 77, 5523 (1955).
9. M. Frederick Hawthorne, "The Displacement of Positive Halogen from Tri-(*p*-nitrophenyl)-methyl Halides," *J. Am. Chem. Soc.*, 77, 5739 (1955).
10. Jeremiah P. Freeman and M. Frederick Hawthorne, "The Action of Lithium Aluminum Hydride and Organometallic Reagents on 4-Hydroxycoumarin," *J. Am. Chem. Soc.*, 78, 3366 (1956).
11. M. F. Hawthorne, "*aci*-Nitroalkanes. I. The Mechanism of the ter Meer Reaction," *J. Am. Chem. Soc.*, 78, 4980 (1956).
12. William D. Emmons and M. Frederick Hawthorne, "Primary and Secondary Isotope Effects in the Enolization of Ketones," *J. Am. Chem. Soc.*, 78, 5593 (1956).
13. M. Frederick Hawthorne, "Peroxytrifluoroacetic Acid as a Reagent for Determination of the Carbonyl Function in Aldehydes and Ketones," *J. Anal. Chem.*, 28, 540 (1956).

14. F. William Sunderman, M. Frederick Hawthorne and G.L. Baker, "Delayed Sensitivity of the Skin to Phenylmercuric Acetate," *A.M.A. Arch. of Ind. Hlth.*, 13, 574 (1956).
15. M. Frederick Hawthorne, "The Ferrocene Reduction of the Triphenylmethyl Carbonium Ion," *J. Org. Chem.*, 21, 363 (1956).
16. M. Frederick Hawthorne, "Additional Spectroscopic Evidence for Cyclopropyl Ring Conjugation," *J. Org. Chem.*, 21, 1523 (1956).
17. M. Frederick Hawthorne, "*aci*-Nitroalkanes. II. The Mechanism of the Nef Reaction," *J. Am. Chem. Soc.*, 79, 2510 (1957).
18. M. Frederick Hawthorne and R. Donald Strahm, "*aci*-Nitroalkanes. III. The Solvolysis of *alpha*-Chloronitrosocycloalkanes in the Presence of Electrophilic Silver Ion," *J. Am. Chem. Soc.*, 79, 2515 (1957).
19. M. Frederick Hawthorne and R. Donald Strahm, "*aci*-Nitroalkanes. IV. The Mechanism of the Hydrolysis of 1-Chloronitroethane," *J. Am. Chem. Soc.*, 79, 3471 (1957).
20. M. Frederick Hawthorne, "Simple Procedure for the Conversion of Aryl Halides to the Corresponding Phenols," *J. Org. Chem.*, 22, 1001 (1957).
21. M. Frederick Hawthorne and R. Donald Strahm, "Kinetics of the Thermal Isomerization of 2-*tert*-Butyl-3-phenyloxazirane," *J. Org. Chem.*, 22, 1263 (1957).
22. M. Frederick Hawthorne, "Amine Aryl- and Diarylboranes: Derivatives of a New Class of Substituted Boranes," *Chem. and Ind.*, 1242 (1957).
23. M. Frederick Hawthorne and John J. Miller, "Deuterium Exchange of Decaborane with Deuterium Oxide and Deuterium Chloride," *J. Am. Chem. Soc.*, 80, 754 (1958).
24. M. Frederick Hawthorne, "The Reaction of Phosphine Methylenes with Boron Hydrides," *J. Am. Chem. Soc.*, 80, 3480 (1958).
25. M. Frederick Hawthorne, "Amine Boranes. I. The Preparation of Pyridine Arylboranes," *J. Am. Chem. Soc.*, 80, 4291 (1958).
26. M. Frederick Hawthorne, "Amine Boranes. II. The Preparation of Pyridine Diarylboranes," *J. Am. Chem. Soc.*, 80, 4293 (1958).
27. M. Frederick Hawthorne and Edward S. Lewis, "Amine Boranes. III. Hydrolysis of Pyridine Diphenylborane and the Mechanism of Hydride Transfer Reactions," *J. Am. Chem. Soc.*, 80, 4296 (1958).
28. M. Frederick Hawthorne and John A. Dupont, "The Preparation and Reactions of beta-Chloroethyl- and gamma-Chloropropylborane Derivatives," *J. Am. Chem. Soc.*, 80, 5830 (1958).
29. M. Frederick Hawthorne, William D. Emmons and K. S. McCallum, "A Re-examination of the Peroxyacid Cleavage of Ketones. I. Relative Migratory Aptitudes," *J. Am. Chem. Soc.*, 80, 6393 (1958).

30. M. Frederick Hawthorne and William D. Emmons, "A Re-examination of the Peroxyacid Cleavage of Ketones. II. Kinetics of the Baeyer-Villiger Reaction," *J. Am. Chem. Soc.*, **80**, 6398 (1958).
31. M. Frederick Hawthorne and Anthony R. Pitochelli, "Displacement Reactions on the B₁₀H₁₂ Unit," *J. Am. Chem. Soc.*, **80**, 6685 (1958).
32. M. Frederick Hawthorne, "Preparation and Reactions of Mesityleneboronic Acid," *J. Org. Chem.*, **23**, 1579 (1958).
33. M. Frederick Hawthorne, "Preparation of Trialkylboranes or Primary Alcohols from Pyridine-Borane and Terminal Olefins," *J. Org. Chem.*, **23**, 1788 (1958).
34. John J. Miller and M. Frederick Hawthorne, "The Course of the Base-catalyzed Hydrogen Exchange in Decaborane," *J. Amer. Chem. Soc.*, **81**, 4501 (1959).
35. John A. Dupont and M. Frederick Hawthorne, "Deuterium Exchange of Decaborane with Deuterium Chloride Under Electrophilic Conditions," *J. Amer. Chem. Soc.*, **81**, 4998 (1959).
36. M. Frederick Hawthorne and Anthony R. Pitochelli, "The Reaction of Bis-Acetonitrile Decaborane with Amines," *J. Am. Chem. Soc.*, **81**, 5519 (1959).
37. William N. Lipscomb, Anthony R. Pitochelli and M. Frederick Hawthorne, "Probable Structure of the B₁₀H₁₀²⁻ Ion," *J. Am. Chem. Soc.*, **81**, 5833 (1959).
38. M. Frederick Hawthorne, "Trialkylamine Alkylboranes and a New Synthesis of Borazoles," *J. Am. Chem. Soc.*, **81**, 5836 (1959).
39. M. Frederick Hawthorne and John J. Miller, "The Alkoxylation of Decaborane," *J. Am. Chem. Soc.*, **82**, 500 (1960).
40. George S. Hammond, M. Frederick Hawthorne, James H. Waters and Bruce M. Graybill, "Ion-Pair Formation in the Reactions of Alkyl Iodides with Silver Salts," *J. Am. Chem. Soc.*, **82**, 704 (1960).
41. M. Frederick Hawthorne, "A Simple Preparation of Dialkyl Alkylthioboronates and Trialkylthioborates," *J. Am. Chem. Soc.*, **82**, 748 (1960).
42. M. Frederick Hawthorne, "The Preparation of *t*-Butyldialkylboranes and 1-*t*-Butylborocyclopentane from Olefins and Trimethylamine *t*-Butylborane," *J. Am. Chem. Soc.*, **82**, 748 (1960).
43. M. Frederick Hawthorne, Anthony R. Pitochelli, R. Donald Strahm and John J. Miller, "The Preparation and Characterization of Salts which Contain the B₁₀H₁₃ Anion," *J. Am. Chem. Soc.*, **82**, 1825 (1960).
44. M. Frederick Hawthorne, "Cyclopropanes from Allylic Chlorides *via* Hydroboration," *J. Am. Chem. Soc.*, **82**, 1886 (1960).
45. John K. Ruff and M. Frederick Hawthorne, "The Amine Complexes of Aluminum Hydride. I," *J. Am. Chem. Soc.*, **82**, 2141 (1960).
46. Anthony R. Pitochelli and M. Frederick Hawthorne, "The Isolation of the Icosahedral B₁₂H₁₂²⁻ Ion," *J. Am. Chem. Soc.*, **82**, 3228 (1960).

47. R. Donald Strahm and M. Frederick Hawthorne, "Determination of Boron in Boronhydrides and Organoboron Compounds by Oxidation with Trifluoroperoxyacetic Acid," *J. Anal. Chem.*, 32 530 (1960).
48. M. Frederick Hawthorne, "The Reaction of Alkylidene Triphenylphosphoranes with Diborane and Trialkylamine Alkylboranes," *J. Am. Chem. Soc.*, 83, 367 (1961).
49. John K. Ruff and M. Frederick Hawthorne, "The Amine Complexes of Aluminum Hydride. II.," *J. Am. Chem. Soc.*, 83, 535 (1961).
50. M. Frederick Hawthorne, "Amine Boranes. V. The Preparation of Trimethylamine Alkylboranes and 2-Alkylborobenzimidazolines," *J. Am. Chem. Soc.*, 83, 831 (1961).
51. M. Frederick Hawthorne, "Amine Boranes. VI. The Preparation of B,B,B-Trialkylborazines from Trimethylamine Alkylboranes and Ammonia," *J. Am. Chem. Soc.*, 83, 833 (1961).
52. M. Frederick Hawthorne, "Amine Boranes. VII. The Preparation of Dialkyl Alkylthioboronate and Trialkylthioborate Esters," *J. Am. Chem. Soc.*, 83, 1345 (1961).
53. M. Frederick Hawthorne, "Amine Boranes. VIII. The Hydroboration of Terminal Olefins, Dienes and Terminal Acetylenes with Trimethylamine *t*-Butylborane," *J. Am. Chem. Soc.*, 83, 2541 (1961).
54. Bruce M. Graybill, John K. Ruff and M. Frederick Hawthorne, "A Novel Synthesis of the Triborohydride Anion, $B_3H_8^-$," *J. Am. Chem. Soc.*, 83, 2669 (1961).
55. M. Frederick Hawthorne, "Amine Boranes. IX. Dialkylamino Alkylboranes and Bis-(diethylamino) *n*-Butylborane," *J. Am. Chem. Soc.*, 83, 2671 (1961).
56. Bruce M. Graybill and M. Frederick Hawthorne, "The Nature of the Colored 6,9-Bis-pyridine Decaborane Molecule, $B_{10}H_{12}Py_2$," *J. Am. Chem. Soc.*, 83, 2673 (1961).
57. Robert A. Wiesboeck, Anthony R. Pitochelli and M. Frederick Hawthorne, "Oxazahydroborate Ions," *J. Am. Chem. Soc.*, 83, 4108 (1961).
58. Anthony R. Pitochelli, Raymond Ettinger, John A. Dupont and M. Frederick Hawthorne, "Observations on the Mechanism of $B_{10}H_{10}^{2-}$ Formation," *J. Am. Chem. Soc.*, 84, 1057 (1962).
59. John A. Dupont and M. Frederick Hawthorne, "The Nature of the Electrophilic Deuterium Exchange Reaction of Decaborane with Deuterium Chloride," *J. Am. Chem. Soc.*, 84, 1804 (1962).
60. Anthony R. Pitochelli, William N. Lipscomb and M. Frederick Hawthorne, "Isomers of $B_{20}H_{18}^{2-}$," *J. Am. Chem. Soc.*, 84, 3026 (1962).
61. Anthony R. Pitochelli and M. Frederick Hawthorne, "The Preparation of a New Boron Hydride, $B_{18}H_{22}$," *J. Am. Chem. Soc.*, 84, 3218 (1962).
62. Bruce M. Graybill, Anthony R. Pitochelli and M. Frederick Hawthorne, "The Preparation and Reactions of $B_{10}H_{13}$ (Ligand) Anions," *Inorg. Chem.*, 1, 622 (1962).
63. Bruce M. Graybill, Anthony R. Pitochelli and M. Frederick Hawthorne, "The Preparation and Reactions of B_9H_{13} (Ligand) Compounds," *Inorg. Chem.*, 1, 626 (1962).

64. M. Frederick Hawthorne, "Amine Boranes-X. Alkylideneamino *t*-Butylboranes. The Hydroboration of Nitriles with Trimethylamine *t*-Butylborane," *Tetrahedron*, 17, 117 (1962).
65. J. A. Dupont and M. F. Hawthorne, "The B₁₀H₁₅ Anion," *Chem. and Ind.*, 405 (1962).
66. M. Frederick Hawthorne, Richard L. Pilling, Peter F. Stokely and Philip M. Garrett, "The Isolation and Characterization of B₂₀H₁₉³⁻ and B₂₀H₁₈⁴⁻ Ions," *J. Am. Chem. Soc.*, 85, 3704 (1963).
67. M. Frederick Hawthorne, Richard L. Pilling, Peter F. Stokely and Philip M. Garrett, "The Reaction of the B₂₀H₁₈²⁻ Ion With Hydroxide Ion," *J. Am. Chem. Soc.*, 85, 3704 (1963).
68. G. S. Hammond, W. D. Emmons, C. O. Parker, B. M. Graybill, J. H. Waters and M. F. Hawthorne, "Silver Salt Alkylation Reactions and the Preparation of Polynitroalkanes," *Tetrahedron*, 19, Suppl. 1, 177-195. Pergamon Press Ltd. (1963).
69. M. Frederick Hawthorne and Marten Reintjes, "The Reductive Alkylation of Quinones with Trialkylboranes," *J. Am. Chem. Soc.*, 86, 951 (1964).
70. Robert A. Wiesboeck and M. Frederick Hawthorne, "Dicarbaundecaborane(13) and Derivatives," *J. Am. Chem. Soc.*, 86, 1642 (1964).
71. John A. Dupont and M. Frederick Hawthorne, "The Preparation of 1-[1,2-Dicarbaclvododecaboranyl(12)]-1,2-dicarbaclvododecaborane(12)," *J. Am. Chem. Soc.*, 86, 1643 (1964).
72. Richard L. Pilling, M. Frederick Hawthorne and Eugene A. Pier, "The Boron-11 Nuclear Magnetic Resonance Spectrum of B₂₀H₁₈²⁻ at 60 Mc./sec.," *J. Am. Chem. Soc.*, 86, 3568 (1964).
73. M. Frederick Hawthorne and Frederick P. Olsen, "Azo Coupling of Aryldiazonium and B₁₀H₁₀²⁻ Ions," *J. Am. Chem. Soc.*, 86, 4219 (1964).
74. Fred Tebbe, Philip M. Garrett and M. Frederick Hawthorne, "A New Carborane, B₉C₂H₁₁, and Its Derivatives," *J. Am. Chem. Soc.*, 86, 4222 (1964).
75. Philip M. Garrett, Fred N. Tebbe and M. Frederick Hawthorne, "The Thermal Isomerization of C-Phenyldicarbaundecaborate(12)," *J. Am. Chem. Soc.*, 86, 5016 (1964).
76. M. Frederick Hawthorne and Marten Reintjes, "Cyclic Dialkylboronium Acetylacetonates," *J. Am. Chem. Soc.*, 86, 5016 (1964).
77. M. Frederick Hawthorne and William L. Budde, "Mechanism of Displacement Reactions at Tetrahedral Boron. Triethyl- and Trimethylamine-Borane Substrates," *J. Am. Chem. Soc.*, 86, 5337 (1964).
78. M. Frederick Hawthorne, William L. Budde and Donald Walmsley, "Displacement Reactions at Tetrahedral Boron. Trimethylamine-Alkyl- and Arylboranes," *J. Am. Chem. Soc.*, 86, 5337 (1964).
79. M. Frederick Hawthorne, Richard L. Pilling and Russell N. Grimes, "A Mechanism Study of B₁₀H₁₀²⁻ Formation," *J. Am. Chem. Soc.*, 86, 5338 (1964).
80. M. Frederick Hawthorne and Patrick A. Wegner, "The Dependence of the Visible Absorption Spectrum of B₁₀H₁₃Py⁻ upon Solvent Polarity and Temperature," *Inorg. Chem.*, 3, 774 (1964).

81. Richard L. Pilling, Fred N. Tebbe, M. Frederick Hawthorne, and Eugene A. Pier, "Boron-11 Nuclear Magnetic Resonance Spectra of Two Boron Hydride Derivatives at 60 Mc./sec.," *Proceedings of the Chemical Society* (London), 402 (December **1964**).
82. M. Frederick Hawthorne, Book Review: "Organoboron Chemistry, Vol. I," by H. Steinberg, reviewed for *Chemical and Engineering News* (**1964**).
83. M. Frederick Hawthorne, Donald C. Young and Patrick A. Wegner, "Carbametallic Boron Hydride Derivatives. I. Apparent Analogs of Ferrocene and Ferricinium Ion," *J. Am. Chem. Soc.*, 87, 1818 (**1965**).
84. M. Frederick Hawthorne, Richard L. Pilling and Peter F. Stokely, "The Preparation and Rearrangement of the Three Isomeric $B_{20}H_{18}^{4-}$ Ions," *J. Am. Chem. Soc.*, 87, 1893 (**1965**).
85. M. Frederick Hawthorne and Frederic P. Olsen, "Reaction of $B_{10}H_{10}^{2-}$ with Aryldiazonium Salts," *J. Am. Chem. Soc.*, 87, 2366 (**1965**).
86. M. Frederick Hawthorne and Timothy D. Andrews, "Carbametallic Boron Hydride Derivatives. II. Apparent Analogs of $\pi-C_5H_5Mn(CO)_3$ and $\pi-C_5H_5Re(CO)_3$," *J. Am. Chem. Soc.*, 87, 2496 (**1965**).
87. M. Frederick Hawthorne and Richard L. Pilling, "Carbametallic Boron Hydride Derivatives. III. The $\pi-C_5H_5Fe(\pi-B_9C_2H_{11})$ System," *J. Am. Chem. Soc.*, 87, 3987 (**1965**).
88. M. Frederick Hawthorne and Patrick A. Wegner, "B-Phenyl-1,2-dicarbo-dodecaborane(12) from $B_9C_2H_{11}^{2-}$ through an Insertion Reaction," *J. Am. Chem. Soc.*, 87, 4392 (**1965**).
89. M. Frederick Hawthorne and Marten Reintjes, "The Preparation of Alkylhydroquinones by the Reductive Alkylation of Quinones with Trialkylboranes," *J. Am. Chem. Soc.*, 87, 4585 (**1965**).
90. M. Frederick Hawthorne, Richard L. Pilling, and Phillip M. Garrett, "A Study of the Reaction of Hydroxide Ion with $B_{20}H_{18}^{2-}$," *J. Am. Chem. Soc.*, 87, 4740 (**1965**).
91. M. Frederick Hawthorne, Thomas E. Berry and Patrick A. Wegner, "The Electronic Properties of the 1,2- and 1,7-Dicarba-dodecaborane(12) Groups Bonded at Carbon," *J. Am. Chem. Soc.*, 87, 4746 (**1965**).
92. M. Frederick Hawthorne, Patrick Wegner, and Robert C. Stafford, "Comments on the Reaction of Amines with 1,2-Dicarba-dodecaborane(12)," *Inorg. Chem.*, 4, 1675 (**1965**).
93. Frederic P. Olsen and M. Frederick Hawthorne, "Halodicarbaundecaborate(11) Ions," *Inorg. Chem.*, 4, 1839 (**1965**).
94. Thomas E. Berry, Fred N. Tebbe and M. Frederick Hawthorne, "Comments Regarding the Structure of $B_9C_2H_{11}$," *Tetrahedron Letters*, 12, 715 (**1965**).
95. M. Frederick Hawthorne and Timothy D. Andrews, "Carborane Analogues of Cobalticinium Ion," *J.C.S., Chem. Comm.*, 443 (**1965**).
96. M. Frederick Hawthorne and Marten Reintjes, "Dialkylboronium Acetylacetonates," *J. Org. Chem.*, 30, 3851 (**1965**).
97. Fred N. Tebbe, Philip M. Garrett and M. Frederick Hawthorne, "A Dicarbano-dodecaborane(13)," *J. Am. Chem. Soc.*, 88, 607 (**1966**).

98. Fred N. Tebbe, Philip M. Garrett, Donald C. Young and M. Frederick Hawthorne, "The $B_6C_2H_8$, $B_7C_2H_9$, and $B_8C_2H_{10}$ Carborane Systems," *J. Am. Chem. Soc.*, 88, 609 (1966).
99. M. Frederick Hawthorne and Richard L. Pilling, "Photoisomerization of the $B_{20}H_{18}^{2-}$ Ion," *J. Am. Chem. Soc.*, 88, 3873 (1966).
100. M. F. Hawthorne, "Polyhedral Boranes, Carboranes and Carbametallic Boron Hydride Derivatives," *Endeavor*, 25, 145 (1966).
101. Patrick A. Wegner and M. Frederick Hawthorne, "Preparation and Properties of $[\pi-(C_6H_5)_4C_4]Pd[\pi-B_9C_2H_{11}]$," *J.C.S., Chem. Comm.*, 861 (1966).
102. Leslie F. Warren, Jr. and M. Frederick Hawthorne, " (3)-1,2-Dicarbollyl Complexes of Nickel(III) and Nickel(IV)," *J. Am. Chem. Soc.*, 89, 470 (1967).
103. M. Frederick Hawthorne, Richard L. Pilling and Russell N. Grimes, "The Mechanism of $B_{10}H_{10}^{2-}$ Formation from $B_{10}H_{12}(ligand)_2$ Species," *J. Am. Chem. Soc.*, 89, 1067 (1967).
104. M. Frederick Hawthorne, Richard L. Pilling and Ravindra C. Vasavada, "The Mechanism of Ligand Exchange with $B_{10}H_{12}(ligand)_2$ Species," *J. Am. Chem. Soc.*, 89, 1075 (1967).
105. F. Lalor, M. F. Hawthorne, A. H. Maki, K. Darlington, A. Davison, H. B. Gray, Z. Dori and E. I. Stiefel, "Identification of Two Reduction Products of Glyoxal Bis(2-mercaptoanil) nickel. Characterization of the One-Electron Reduction Product and the Partially Hydrogenated Anion," *J. Am. Chem. Soc.*, 89, 2278 (1967).
106. M. Frederick Hawthorne and T. Adrian George, "New Polyhedral Transition Metal Complexes Containing the $B_7C_2H_9^{2-}$ Ligand," *J. Am. Chem. Soc.*, 89, 7114 (1967).
107. M. Frederick Hawthorne and A. Denise Pitts, "The $B_6C_2H_8^{2-}$ Ligand in a New Polyhedral Transition Metal Complex Containing Manganese," *J. Am. Chem. Soc.*, 89, 7115 (1967).
108. M. Frederick Hawthorne, Donald C. Young, Philip M. Garrett, David A. Owen, Sarah G. Schwerin, Fred N. Tebbe and Patrick A. Wegner, "The Preparation and Characterization of the (3)-1,2- and (3)-1,7-Dicarbadoodecahydroundecaborate(-1) Ions," *J. Am. Chem. Soc.*, 90, 862 (1968).
109. Fred N. Tebbe, Philip M. Garrett and M. Frederick Hawthorne, "The Polyhedral $B_9C_2H_{11}$, $B_8C_2H_{10}$, $B_7C_2H_9$, and $B_6C_2H_8$ Carboranes and the $B_7C_2H_{13}$ System," *J. Am. Chem. Soc.*, 90, 869 (1968).
110. M. Frederick Hawthorne, Donald C. Young, Timothy D. Andrews, David V. Howe, Richard L. Pilling, A. Denise Pitts, Marten Reintjes, Leslie F. Warren, Jr. and Patrick A. Wegner, " π -Dicarbollyl Derivatives of the Transition Metals. Metallocene Analogs," *J. Am. Chem. Soc.*, 90, 879 (1968).
111. M. Frederick Hawthorne and Patrick A. Wegner, "The Reconstruction of the 1,2-Dicarboclovododecaborane(12) Structure by Boron Atom Insertion with (3)-1,2-Dicarbollide Ions," *J. Am. Chem. Soc.*, 90, 896 (1968).
112. T. Adrian George and M. Frederick Hawthorne, "Thermal Rearrangement of $B_7C_2H_9^{2-}$ Ligand-Cobalt Complexes," *J. Am. Chem. Soc.*, 90, 1661 (1968).

113. James N. Francis and M. Frederick Hawthorne, "A Novel Bidentate *pi*-Bonding Ligand Derived from 1,2-Dicarba-*closo*-dodecaborane(12)," *J. Am. Chem. Soc.*, 90, 1663 (1968).
114. M. Frederick Hawthorne, Book Review: "Production of Boranes and Related Research," 1967, Edited by Richard T. Holzmman, reviewed for *J. Am. Chem. Soc.*, 90, 3000 (1968).
115. Frederick P. Olsen, Ravindra C. Vasavada and M. Frederick Hawthorne, "The Chemistry of *n*-B₁₈H₂₂ and *i*-B₁₈H₂₂," *J. Am. Chem. Soc.*, 90, 3946 (1968).
116. Leslie F. Warren, Jr. and M. Frederick Hawthorne, "Metallocene Analogs of Copper, Gold and Palladium Derived from the (3)-1,2-Dicarbollide Ions," *J. Am. Chem. Soc.*, 90, 4823 (1968).
117. M. Frederick Hawthorne and David A. Owen, "Synthesis of Novel Substituted (3)-1,7-Dicarbaundecaborate(12) Ions from 1,8-Dicarba-*closo*-undecaborane(11) and Carbanions," *J. Am. Chem. Soc.*, 90, 5912 (1968).
118. Gerhard Popp and M. Frederick Hawthorne, "1-Trimethylamino-1-beryl-2,3-dicarba-*closo*-dodecaborane(12). An analog of the B₁₁CH₁₂⁻ Ion," *J. Am. Chem. Soc.*, 90, 6553 (1968).
119. Gary B. Dunks and M. Frederick Hawthorne, "The Formation of CB₅H₉ and Its 1-Methyl Derivative from 1,7-C₂B₆H₈," *J. Am. Chem. Soc.*, 90, 7355 (1968).
120. Gary B. Dunks and M. Frederick Hawthorne, "An Improved Synthesis of 1,7-C₂B₆H₈," *Inorg. Chem.*, 7, 1038 (1968).
121. Helmut E. Ruhle and M. Frederick Hawthorne, "*Pi*-Dicarbollyl Derivatives of Chromium. Metallocene Analogs," *Inorg. Chem.*, 7, 2279 (1968).
122. M. Frederick Hawthorne, "The Chemistry of the Polyhedral Species Derived from Transition Metals and Carboranes," *Accts. of Chem. Res.*, 1, 281 (1968).
123. M.F. Hawthorne, "Recent Developments in the Chemistry of Polyhedral Complexes Derived from Transition Metals and Carboranes," Proceedings of the 2nd Organometallic Symposium, *Pure Appl. Chem.*, 17, 195 (1968).
124. Robert J. Wilson, Leslie F. Warren, Jr. and M. Frederick Hawthorne, "The Existence of the Nickel(IV) Dication Derived from Nickelocene and a Cationic Boron Hydride Analog," *J. Am. Chem. Soc.*, 91, 758 (1969).
125. Donald C. Young, David V. Howe and M. Frederick Hawthorne, "Ligand Derivatives of (3)-1,2-Dicarbododecahydroundecaborate(-1)," *J. Am. Chem. Soc.*, 91, 859 (1969).
126. James C. Smart, Philip M. Garrett and M. Frederick Hawthorne, "Novel Sigma-bonded Transition Metal Carborane Complexes," *J. Am. Chem. Soc.*, 91, 1031 (1969).
127. Melvyn R. Churchill, Karen Gold, James N. Francis and M. Frederick Hawthorne, "The Preparation and Crystallographic Characterization of a Bridged Metallocarborane Complex Containing a Carbonium Ion Center: (B₉C₂H₁₀)₂CoS₂CH," *J. Am. Chem. Soc.*, 91, 1222 (1969).
128. Philip M. Garrett, James C. Smart and M.F. Hawthorne, "Representative Derivative Chemistry of the 1,6- and 1,10-B₈C₂H₁₀ Carborane System," *J. Am. Chem. Soc.*, 91, 4707 (1969).

129. T. Adrian George and M. Frederick Hawthorne, "Cobalt Complexes Containing the $B_7C_2H_9^{2-}$ Ligand. A Metallocene Analog," *J. Am. Chem. Soc.*, 91, 5475 (1969).
130. David A. Owen and M. Frederick Hawthorne, "Preparation of 4-Substituted (3)-1,7-Dicarba-*nido*-dodecahydroundecaborate(-1) Ions and 3-Substituted 1,8-Dicarba-*closo*-undecaborane(11)," *J. Am. Chem. Soc.*, 91, 6002 (1969).
131. M. Frederick Hawthorne and Helmut W. Ruhle, "Transition Metal Carbonyl Complexes of the (3)-1,2-Dicarbollide Ion," *Inorg. Chem.*, 8, 176 (1969).
132. Bruce M. Graybill and M. Frederick Hawthorne, "Observations on Reactions of $(\pi-C_5H_5)-Co(\pi-B_7C_2H_9)$ Isomers with Electrophiles," *Inorg. Chem.*, 8, 1799 (1969).
133. A. Denise George and M. Frederick Hawthorne, "Polyhedral Manganese Carbonyl Derivatives of the $B_6C_2H_8^{2-}$ Ligand," *Inorg. Chem.*, 8, 1801 (1969).
134. Philip M. Garrett, James C. Smart, Gary S. Ditta and M. Frederick Hawthorne, "The Polyhedral $B_6C_2H_8$, $B_7C_2H_9$, and $B_8C_2H_{10}$ Carboranes and Their C-Monomethyl and C-Monophenyl Derivatives," *Inorg. Chem.*, 8, 1907 (1969).
135. Philip M. Garrett, T. Adrian George and M. Frederick Hawthorne, "Oxidation of the (3)-1,7 -Dicarba-*nido*-dodecahydroundecaborate(-1) Ion. A New Preparation of 1,3-Dicarba-*nido* -nonaborane(13)," *Inorg. Chem.*, 8, 2008 (1969).
136. Gary B. Dunks and M. Frederick Hawthorne, "The Formation of 2-Carba-*nido*-hexaborane(9) and Several of Its Alkyl Derivatives," *Inorg. Chem.*, 8, 2667 (1969).
137. Leslie F. Warren, Jr. and M. Frederick Hawthorne, "The Chemistry of the Bis- $[\pi-(3)-1,2 -dicarbollyl]$ Metalates of Nickel and Palladium," *J. Am. Chem. Soc.*, 92, 1157 (1970).
138. David A. Owen and M. Frederick Hawthorne, "Novel Chelated Biscarborane Transition Metal Complexes Formed through Carbon-Metal σ Bonds," *J. Am. Chem. Soc.*, 92, 3194 (1970).
139. Melvyn R. Churchill, Arthur H. Reis, Jr., James N. Francis and M. Frederick Hawthorne, "Preparation and Crystallographic Characterization of the $[B_9C_2H_{11} \cdot Co \cdot B_8C_2H_{10} \cdot Co \cdot B_9C_2H_{11}]^{3-}$ Anion. A System with Four Fused Icosahedra," *J. Am. Chem. Soc.*, 92, 4993 (1970).
140. Robert G. Adler and M. Frederick Hawthorne, "Determination of the Electronic Properties of Carboranes, Carborane Anions, and Metallocarboranes from Fluorine-19 Nuclear Magnetic Resonance Studies," *J. Am. Chem. Soc.*, 92, 6174 (1970).
141. David A.T. Young, Gerald R. Willey, M. Frederick Hawthorne, Melvin R. Churchill and Arthur H. Reis, Jr., "Reaction of (3)-1,2- $B_9C_2H_{13}$ with Aluminum Trialkyls. Synthesis of 1,2- $B_9C_2H_{12}AlR_2$ and 1,2- $B_9C_2H_{11}AlR$ Complexes, with Crystallographic Characterization of 1,2- $B_9C_2H_{11}Al(C_2H_5)$," *J. Am. Chem. Soc.*, 92, 6663 (1970).
142. Gary B. Dunks and M. Frederick Hawthorne, "Formation of a Novel Cobalt-Carborane Complex Involving the $C_2B_6H_8^{4-}$ Ligand Produced by Reduction of 1,7- $C_2B_6H_8$," *J. Am. Chem. Soc.*, 92, 7213 (1970).

143. Gary B. Dunks and M. Frederick Hawthorne, "Electrophilic Substitution Reactions of 1,6 - Dicarba-*closo*-nonaborane(9)," *Inorg. Chem.*, 9, 893 (1970).
144. Philip M. Garrett, Gary S. Ditta and M.F. Hawthorne, "An Improved Synthesis of 1,6-Dicarba-*closo*-decaborane(10)," *Inorg. Chem.*, 9, 1947 (1970).
145. David A. Owen and M. Frederick Hawthorne, "Chelated Biscarborane Transition Metal Derivatives Formed through Carbon-Metal σ Bonds," *J. Am. Chem. Soc.*, 93, 873 (1971).
146. Philip M. Garrett, Gary S. Ditta and M. Frederick Hawthorne, "Preparation and Reactions of a Dicarba-*nido*-decaborane(12)," *J. Am. Chem. Soc.*, 93, 1265 (1971).
147. David A. Owen, James C. Smart, Philip M. Garrett and M. Frederick Hawthorne, "Iron(II)- and Manganese(I)-Carborane Complexes Formed through Metal-Carbon σ Bonds," *J. Am. Chem. Soc.*, 93, 1362 (1971).
148. M. Frederick Hawthorne, Leslie F. Warren, Jr., Kenneth P. Callahan and Neill F. Travers, "Chemistry of Bis[π -(3)-1,2-dicarbollyl]metalates. Protonation and Boron Substitution," *J. Am. Chem. Soc.*, 93, 2407 (1971).
149. D. V. Howe, C. J. Jones, R. J. Wiersema and M. F. Hawthorne, "Deuteration and Spectroscopic Studies of (3)-1,2- and (3)-1,7-Dicarba-*nido*-dodecahydroundecaborate(1-) and (3)-1,2-Dicarba-*nido*-undecaborane(13)," *Inorg. Chem.*, 10, 2516 (1971).
150. Gary B. Dunks, Mary M. McKown and M. Frederick Hawthorne, "Probable Formation of 13-Atom Polyhedral Complexes Containing $B_{10}C_2H_{12}^{2-}$ and Cobalt," *J. Am. Chem. Soc.*, 93, 2541 (1971).
151. William J. Evans and M. Frederick Hawthorne, "An 11-Atom Polyhedral Metallocarborane Formed from 1,6-*closo*- $B_8C_2H_{10}$ by Polyhedral Expansion," *J. Am. Chem. Soc.*, 93, 3063 (1971).
152. William L. Budde and M. Frederick Hawthorne, "Nucleophilic Substitution at Tetrahedral Boron. Trimethyl- and Triethylamine-Borane Substrates," *J. Am. Chem. Soc.*, 93, 3147 (1971).
153. Donald E. Walmsley, William L. Budde and M. Frederick Hawthorne, "Nucleophilic Substitution at Tetrahedral Boron. Trimethylamine-Alkyl- and -Arylborane Substrates," *J. Am. Chem. Soc.*, 93, 3150 (1971).
154. Fergus J. Lalor, Timm Paxson and M. Frederick Hawthorne, "Nucleophilic Substitution at Tetrahedral Boron. Methylamine-Diarylborane Substrates," *J. Am. Chem. Soc.*, 93, 3156 (1971).
155. Moses K. Kaloustian, Richard J. Wiersema and M. Frederick Hawthorne, "Novel Isomers of π -Cyclopentadienyl- π -(3)-1,2-dicarbollylcobalt(III)," *J. Am. Chem. Soc.*, 93, 4912 (1971).
156. David A. T. Young, Richard J. Wiersema and M. Frederick Hawthorne, "Alkylaluminum and Alkylgallium Derivatives of (3)-1, 2- $B_9C_2H_{13}$," *J. Am. Chem. Soc.*, 93, 5687 (1971).
157. G. Popp and M. Frederick Hawthorne, "3-Trimethylamino-3-beryl-1,2-dicarba-*closo*-dodecaborane(12) and Related Species," *Inorg. Chem.*, 10, 391 (1971).

158. James N. Francis and M. Frederick Hawthorne, "Synthesis and Reactions of Novel Bridged Dicarbolide Complexes Having Electron-Deficient Carbon Atoms," *Inorg. Chem.*, **10**, 594 (1971).
159. James N. Francis and M. Frederick Hawthorne, "Synthesis and Properties of Cobalt Complexes Containing the Bidentate π -Bonding $B_8C_2H_1^{4-}$ Ligand," *Inorg. Chem.*, **10**, 863 (1971).
160. David A. T. Young, Timm E. Paxson and M. Frederick Hawthorne, "The Preparation of Two Alkenyl-Substituted Carboranes. Their Properties and Some Derivative Chemistry," *Inorg. Chem.*, **10**, 786 (1971).
161. M. F. Hawthorne, D. A. Owen and J. W. Wiggins, "The Degradation of Biscarborane," *Inorg. Chem.*, **10**, 1304 (1971).
162. Melvyn R. Churchill, Arthur H. Reis, Jr., David A. T. Young, Gerald R. Willey and M. Frederick Hawthorne, "X-Ray Crystallographic Determination of the Molecular Structure of $B_9C_2H_{12}AlMe_2$, A Nonrigid Alumino-carborane Derivative," *J.C.S., Chem. Comm.*, 298 (1971).
163. M. Frederick Hawthorne, Richard J. Wiersema and Mitsuo Takasugi, "Preparation of Tumor-Specific Boron Compounds. 1. In Vitro Studies Using Boron-Labeled Antibodies and Elemental Boron as Neutron Targets," *J. Med. Chem.*, **15**, 449 (1972).
164. J. N. Francis, C. J. Jones and M. F. Hawthorne, "Chemistry of Bis(π -7,8-dicarbollyl)metalates. Reaction Between $[(\pi-7,8-B_9C_2H_{11})_2Co]^-$ and Aryl Diazonium Salts," *J. Am. Chem. Soc.*, **94**, 4878 (1972).
165. Timm E. Paxson, Moses K. Kaloustian, Glenn M. Tom, Richard J. Wiersema and M. Frederick Hawthorne, "Metallocene Compounds Derived from μ -1,2-Trimethylene-1,2-dicarbido-closo-dodecaborane(10)," *J. Am. Chem. Soc.*, **94**, 4882 (1972).
166. Moses K. Kaloustian, Richard J. Wiersema and M. Frederick Hawthorne, "Thermal Rearrangement of π -Cyclopentadienyl- π -dicarbollyl Derivatives of Cobalt," *J. Am. Chem. Soc.*, **94**, 6679 (1972).
167. Christopher J. Jones, James N. Francis and M. Frederick Hawthorne, "New 10- and 11-Atom Polyhedral Metallocarboranes Prepared by Polyhedral Contraction," *J. Am. Chem. Soc.*, **94**, 8391 (1972).
168. William N. Lipscomb, Richard J. Wiersema and M. Frederick Hawthorne, "Structural Ambiguity of the $B_{10}H_{14}^{2-}$ Ion," *Inorg. Chem.*, **11**, 651 (1972).
169. William J. Evans and M. Frederick Hawthorne, "The Direct Synthesis of a Bimetallic Carborane Complex by Polyhedral Expansion of a Monometallic carborane," *J.C.S., Chem. Comm.*, 611 (1972).
170. Gary B. Dunks, Richard J. Wiersema and M. Frederick Hawthorne, "Isomeric $B_{10}C_2H_{13}^-$ Ions Derived from the Direct Reduction of $B_{10}C_2H_{12}$," *J.C.S., Chem. Comm.*, 899 (1972).
171. C. J. Jones, J. N. Francis and M. F. Hawthorne, "The Chemistry of an 11-Atom Polyhedral Metallocarborane Prepared by Polyhedral Contraction," *J.C.S., Chem. Comm.*, 900 (1972).

172. Donald F. Dustin and M. Frederick Hawthorne, "A Novel 9-Vertex Metallocarborane Containing A Monocarbon Carborane Ligand," *J.C.S., Chem. Comm.*, 1329 (1972).
173. M. F. Hawthorne, "Recent Developments in the Chemistry of Polyhedral Complexes Derived from Metals and Carboranes, Proceedings of the First International Meeting of Boron Compounds," *Pure Appl. Chem.*, 29, 547 (1972).
174. M. Frederick Hawthorne and Gary B. Dunks, "Metallocarboranes that Exhibit Novel Chemical Features," *Science*, 178, 462 (1972).
175. Donald F. Dustin, Gary B. Dunks and M. Frederick Hawthorne, "Novel 13-Vertex Metallocarborane Complexes Formed by Polyhedral Expansion of 1,2-Dicarba-*closo*-dodecaborane(12) (1,2-B₁₀C₂H₁₂)," *J. Am. Chem. Soc.*, 95, 110 (1973).
176. Richard N. Leyden and M. F. Hawthorne, "A Novel Transfer of the Diazonium Function from Carbon to Boron," *J. Am. Chem. Soc.*, 95, 2032 (1973).
177. Elvin L. Hoel and M. Frederick Hawthorne, "Intramolecular Oxidative Addition of Iridium to a Boron-Hydrogen Bond of a Complexed Carboranylphosphine," *J. Am. Chem. Soc.*, 95, 2712 (1973).
178. Gary B. Dunks, Richard J. Wiersema and M. Frederick Hawthorne, "Chemical and Structural Studies of the B₁₀C₂H₁₂²⁻ Ions Produced from Icosahedral B₁₀C₂H₁₂ Carboranes," *J. Am. Chem. Soc.*, 95, 3174 (1973).
179. M. F. Hawthorne, "Book Review: Boranes in Organic Chemistry by H.C. Brown," *J. Am. Chem. Soc.*, 95, 3443 (1973).
180. William J. Evans, Gary B. Dunks and M. Frederick Hawthorne, "Synthesis of Metallocarboranes by Polyhedral Expansion," *J. Am. Chem. Soc.*, 95, 4565 (1973).
181. Kenneth P. Callahan and M. Frederick Hawthorne, "Organometallic Reactions of 1-Ethynyl-1,2-carborane," *J. Am. Chem. Soc.*, 95, 4574 (1973).
182. E. L. Muetterties, R. J. Wiersema and M. F. Hawthorne, "Detection of Polytopal Isomers in the Solution State. I. The Eight-Atom Family," *J. Am. Chem. Soc.*, 95, 7520 (1973).
183. Christopher J. Jones, James N. Francis and M. Frederick Hawthorne, "Derivative Chemistry of Metallocarboranes. *Nido* 11-Atom Metallocarboranes and Their Lewis Base Adducts," *J. Am. Chem. Soc.*, 95, 7633 (1973).
184. Christopher J. Jones and M. Frederick Hawthorne, "Synthesis of Icosahedral Metallocarboranes," *Inorg. Chem.*, 12, 608 (1973).
185. Timm E. Paxson, Kenneth P. Callahan and M. F. Hawthorne, "An Improved Synthesis of Biscarborane and Its Precursor Ethynylcarborane," *Inorg. Chem.*, 12, 708 (1973).
186. Richard J. Wiersema and M. Frederick Hawthorne, "Electrochemistry and Boron-11 Nuclear Magnetic Resonance Spectra of Monocarbon Carboranes," *Inorg. Chem.*, 12, 785 (1973).
187. Donald F. Dustin and M. Frederick Hawthorne, "Synthesis of Nine-Vertex Monocarbon Metallocarboranes by Polyhedral Contraction," *Inorg. Chem.*, 12, 1380 (1973).

188. Kenneth P. Callahan, Charles E. Strouse, Steven W. Layten and M. Frederick Hawthorne, "Preparation and Crystallographic Characterization of a 2:1 Adduct of Ethynyldicarbadoodecaborane(12) and *trans*-IrCl(CO)(PPh₃)₂," *J.C.S., Chem. Comm.*, 465 (1973).
189. Christopher J. Jones, William J. Evans and M. Frederick Hawthorne, "Electronic Considerations in Metalloboranes," *J.C.S., Chem. Comm.*, 543 (1973).
190. Chris G. Salentine and M. Frederick Hawthorne, "Synthesis of a Mixed-metal Bimetallic Monocarbon Metallocarborane by Polyhedral Expansion," *J.C.S., Chem. Comm.*, 560 (1973).
191. William J. Evans and M. Frederick Hawthorne, "Synthesis of a Trimetallic Metallocarborane by Polyhedral Expansion," *J.C.S., Chem. Comm.*, 706 (1973).
192. Donald F. Dustin, William J. Evans and M. Frederick Hawthorne, "Synthesis of Cobaltacarboranes: Two Methods," *J.C.S., Chem. Comm.*, 805 (1973).
193. Gary B. Dunks and M. F. Hawthorne, "The Non-Icosahedral Carboranes: Synthesis and Reactions," *Accts. Chem. Res.*, 6, 124 (1973).
194. M. F. Hawthorne, "New Routes to, and Reactions of Polyhedral Transition Metal Carborane Species," Proceedings of the 13th International Conference on Chemistry, *Pure Appl. Chem.*, 33, 475 (1973).
195. William J. Evans, Christopher J. Jones, Bohumil Stibr and M. Frederick Hawthorne, "Rearrangements of Bimetallic Cobaltacarboranes," *J. Organometal. Chem.*, 60, C27 (1973).
196. William J. Evans and M. Frederick Hawthorne, "Synthesis of Bimetallocarboranes by Thermal Metal Transfer," *J. Am. Chem. Soc.*, 96, 301 (1974).
197. Richard J. Wiersema and M. Frederick Hawthorne, "Electron Delocalization in Paramagnetic Metallocarboranes," *J. Am. Chem. Soc.*, 96, 761 (1974).
198. Donald F. Dustin, William J. Evans, Christopher J. Jones, Richard J. Wiersema, Henry Gong, Steven Chan and M. Frederick Hawthorne, "Thermal Rearrangements of Nonicosahedral Cobaltacarboranes," *J. Am. Chem. Soc.*, 96, 3085 (1974).
199. Donald F. Dustin and M. Frederick Hawthorne, "New 13-Atom Bimetallocarboranes Prepared by Polyhedral Subrogation," *J. Am. Chem. Soc.*, 96, 3462 (1974).
200. Timm E. Paxson and M. Frederick Hawthorne, "Preparation of Hydridometalloboranes and Their Use as Homogeneous Catalysts," *J. Am. Chem. Soc.*, 96, 4674 (1974).
201. Elvin L. Hoel and M. Frederick Hawthorne, "Transition Metal Catalyzed Exchange of Deuterium Gas with Terminal Boron-Hydrogen Bonds in Carboranes, Metalloboranes and Other Boron Compounds," *J. Am. Chem. Soc.*, 96, 4676 (1974).
202. Elvin L. Hoel and M. F. Hawthorne, "Preparation of B-σ-Metalloboranes by Oxidative Addition. Model Intermediates for Transition Metal Catalyzed Hydrogen-Deuterium Exchange in Boron-Hydrogen Containing Species," *J. Am. Chem. Soc.*, 96, 6770 (1974).

203. William J. Evans, Christopher J. Jones, Bohumil Stibr, Roger A. Grey and M. Frederick Hawthorne, "Polyhedral Metallocarborane Chemistry. Thermal Rearrangements of Bimetallic Cobaltacarboranes," *J. Am. Chem. Soc.*, 96, 7405 (1974).
204. Richard R. Rietz and M. Frederick Hawthorne, "Synthesis of *closo*-1,7-B₁₀C₂H₁₂ from *nido*-2-B₅CH₉," *Inorg. Chem.*, 13, 755 (1974).
205. William J. Evans and M. Frederick Hawthorne, "Polyhedral Expansion of Metallocarboranes," *Inorg. Chem.*, 13, 869 (1974).
206. Elvin L. Hoel, Charles E. Strouse and M. Frederick Hawthorne, "Structures of Metallocarboranes. I. Crystal and Molecular Structure of 2,6-Di- π -cyclopentadienyloctahydro-1,10 -dicarba-2,6-dicobalta-*closo*-decaborane at -150°; a Bimetallocarborane with a Metal-Metal Bond," *Inorg. Chem.*, 13, 1388 (1974).
207. Kenneth P. Callahan, Charles E. Strouse, Anna Lee Sims and M. Frederick Hawthorne, "Structures of Metallocarboranes. II. Crystal and Molecular Structure of the Metallocarborane Complex Cesium 3- η -Cyclopentadienyloctahydro-4-carba-3-cobalta-*closo*-nonaborate(1-), Cs⁺[(C₅H₅)Co(CB₇H₈)]⁻," *Inorg. Chem.*, 13, 1393 (1974).
208. Kenneth P. Callahan, Charles E. Strouse, Anna Lee Sims and M. Frederick Hawthorne, "Structures of Metallocarboranes. III. Crystal and Molecular Structure of the Bimetallocarborane Complex 2,3-Di- η -cyclopentadienyl-1,7-dicarba-2,3-dicobaltadodecaborane(10), (η -C₅H₅)₂Co₂C₂B₈H₁₀," *Inorg. Chem.*, 13, 1397 (1974).
209. Richard R. Rietz, Donald F. Dustin and M. Frederick Hawthorne, "Preparation of η -Cyclopentadienylcobalt(III) and η -Cyclopentadienylnickel(IV) Complexes of the η -7-B₁₀CH₁₁³⁻ Carbolide Ligand," *Inorg. Chem.*, 13, 1580 (1974).
210. Hampton D. Smith, Jr. and M. Frederick Hawthorne, "Synthesis of *nido*- and *closo*-Arsacarboranes," *Inorg. Chem.*, 13, 2312 (1974).
211. Timm E. Paxson, M. Frederick Hawthorne, Leo D. Brown, and William N. Lipscomb, "Observations Regarding Cu-H-B Interactions in CuI₂B₁₀H₁₀," *Inorg. Chem.*, 13, 2772 (1974).
212. Kenneth P. Callahan, Frederick Y. Lo, Charles E. Strouse, Anna Lee Sims and M. Frederick Hawthorne, "Structures of Metallocarboranes. IV. Crystal and Molecular Structure of the *Nido* Metallocarborane Complex 8- η -Cyclopentadienyl-6,7-dicarba-8-cobalta-*nido*-nonaborane(11), 8- η -C₅H₅-8-Co-6,7-C₂B₇H₁₁ at -160°," *Inorg. Chem.*, 13, 2842 (1974).
213. Chris G. Salentine, Richard R. Rietz and M. Frederick Hawthorne, "A Nickel(IV) Complex of the B₈CH₉³⁻ Ligand," *Inorg. Chem.*, 13, 3025 (1974).
214. William J. Evans and M. Frederick Hawthorne, "Synthesis of Fourteen-Vertex Metallocarboranes by Polyhedral Expansion," *J.C.S., Chem. Comm.*, 38 (1974).
215. Guy Evrard, John A. Ricci, Jr., Ivan Bernal, William J. Evans, Donald F. Dustin, and M. Frederick Hawthorne, "Crystal and Molecular Structure of a Novel Bimetallocarborane Anion," *J.C.S., Chem. Comm.*, 234 (1974).

216. P. Calvin Maybury, Robert W. Mitchell and M. Frederick Hawthorne, "Hydrogen Adducts of Cobalt and Nickel Boride," *J.C.S., Chem. Comm.*, 534 (1974).
217. William J. Evans and M. Frederick Hawthorne, "High-pressure Liquid Chromatography of Metallocarboranes," *J. Chrom.*, 88, 187 (1974).
218. M. Frederick Hawthorne, Kenneth P. Callahan, and Richard J. Wiersema, "Polyhedral Rearrangements Involving Five- and Six-Coordinate Carbon," *Tetrahedron*, 30, 1795 (1974).
219. Timm E. Paxson, Kenneth P. Callahan, Elvin L. Hoel and M. F. Hawthorne, "Metallocarboranes: Past, Present, and Future," *Organotransition Metal Chemistry*, Plenum, p. 1 (1974).
220. Kenneth P. Callahan and M. Frederick Hawthorne, "New Chemistry of Metallocarboranes and Metalloboranes," *Pure Appl. Chem.*, 39, 475 (1974).
221. Kenneth P. Callahan, William J. Evans and M. F. Hawthorne, "Carboranes and Metallocarboranes," *Annals of the New York Academy of Sciences*, 239, 88 (1974).
222. Kenneth P. Callahan, William J. Evans, Frederick Y. Lo, Charles E. Strouse and M. Frederick Hawthorne, "Structures of Metallocarboranes. V. Synthesis and Crystal and Molecular Structure of the *Closo* 20-Electron Bimetallocarborane 1,6-Bis(η -cyclopentadienyl)-1,6-diferra-2,3-dicarba-*closo*-decaborane(8), 1,6-(η -C₅H₅)₂-1,6,2,3-Fe₂C₂B₆H₈," *J. Am. Chem. Soc.*, 97, 296 (1975).
223. Chris G. Salentine and M. Frederick Hawthorne, "Metallocarborane Complexes of Titanium, Zirconium and Vanadium," *J. Am. Chem. Soc.*, 97, 426 (1975).
224. Frederick Y. Lo, Charles E. Strouse, Kenneth P. Callahan, Carolyn B. Knobler and M. Frederick Hawthorne, "Structures of Metallocarboranes. VI. A Titanium Sandwich Complex. Crystal and Molecular Structure of [(CH₃)₄N]₂{[1,6-C₂B₁₀H₁₀(CH₃)₂]₂Ti}, Bis(Tetramethylammonium)-4,4'-*commo*-Bis(decahydro-1,6-dimethyl-1,6-dicarba-4-titana-*closo*-tri-decaborate)(2-) at -160°," *J. Am. Chem. Soc.*, 97, 428 (1975).
225. B. Patrick Sullivan, Richard N. Leyden and M. Frederick Hawthorne, "The Synthesis of Icosahedral Nickelaboranes," *J. Am. Chem. Soc.*, 97, 455 (1975).
226. Chris G. Salentine and M. Frederick Hawthorne, "Chemistry of Monocarbon Metallocarboranes Including Polyhedral Rearrangements in Mixed-Metal Bimetallocarboranes," *J. Am. Chem. Soc.*, 97, 6382 (1975).
227. Elvin L. Hoel and M. F. Hawthorne, "Preparation of B- σ -Carboranyl Iridium Complexes by Oxidative Addition of Terminal Boron-Hydrogen Bonds to Iridium(I) Species," *J. Am. Chem. Soc.*, 97, 6388 (1975).
228. Earl L. Muetterties, Elvin L. Hoel, Chris G. Salentine and M. Frederick Hawthorne, "Intramolecular Rearrangements in Boron Clusters," *Inorg. Chem.*, 14, 950 (1975).
229. Timm E. Paxson and M. Frederick Hawthorne, "*nido*-Metalloboranes Derived from B₁₀H₁₀²⁻," *Inorg. Chem.*, 14, 1604 (1975).

230. Richard N. Leyden and M. Frederick Hawthorne, "Reaction of Phenylboron Dichloride with Cyclopentadienyldicarbollylcobalt," *Inorg. Chem.*, **14**, 2018 (1975).
231. Richard N. Leyden and M. Frederick Hawthorne, "Synthesis of Diazonium Derivatives of $B_{10}H_{10}^{2-}$ from Arylazo Intermediates," *Inorg. Chem.*, **14**, 2444 (1975).
232. Richard N. Leyden and M. Frederick Hawthorne, "Isomeric $(\eta^5-C_5H_5)NiB_9H_9^-$ Metalloborane Anions from $B_9H_{12}^-$ and Nickelocene," *J.C.S., Chem. Comm.*, 310 (1975).
233. Chris G. Salentine and M. Frederick Hawthorne, "Synthesis of η^5 -Cyclopentadienyl- and η^8 -Cyclo-octatetraenyl-titanacarboranes of Titanium-(II), -(III), and -(IV)," *J.C.S., Chem. Comm.*, 848 (1975).
234. M. Frederick Hawthorne, "Perspectives in Metallocarborane Chemistry," *J. Orgmet. Chem.*, **100**, 97 (1975).
235. Chris G. Salentine, Charles E. Strouse and M. Frederick Hawthorne, "Synthesis and Crystal Structure of a Novel Electron-Rich *Nido* Trimetallocarborane," *J. Am. Chem. Soc.*, **98**, 841 (1976).
236. Chris G. Salentine, Charles E. Strouse and M. Frederick Hawthorne, "Structures of Metallocarboranes: Preparation of Monocarbon Polymetallocarboranes and the Crystal and Molecular Structure of a Novel Electron-Rich *nido*-Trimetallocarborane," *Inorg. Chem.*, **15**, 1832 (1976).
237. Chris G. Salentine and M. Frederick Hawthorne, "Studies of Metallocarboranes Incorporating the Early Transition Metals," *Inorg. Chem.*, **15**, 2872 (1976).
238. Edward H. S. Wong and M. Frederick Hawthorne, "Synthesis and Characterization of Seven-Coordinate Hydrido-Complexes of Ruthenium with Carbaborane: X-Ray Diffraction Study of $2,1,7-(PPh_3)_2RuH_2C_2B_9H_{11}$," *J.C.S., Chem. Comm.*, 257 (1976).
239. Chu W. Jung and M. Frederick Hawthorne, "Synthesis of Ten- and Eleven-Vertex Hydridometalloboranes by Oxidative Addition," *J.C.S., Chem. Comm.*, 499 (1976).
240. Stephen B. Miller and M. Frederick Hawthorne, "Novel Ligand Rearrangement of *closo*-Nickelacarbaboranes," *J.C.S., Chem. Comm.*, 786 (1976).
241. Kenneth P. Callahan and M. Frederick Hawthorne, "Ten Years of Metallocarboranes," *Adv. Orgmet. Chem.*, **14**, 145 (1976). Edited by F. G. A. Stone and Robert West, Academic Press, New York, N.Y.
242. Gordon E. Hardy, Kenneth P. Callahan, Charles E. Strouse and M. Frederick Hawthorne, "A Homogeneous Metallocarborane Catalyst: $3,3-[PPh_3]_2-3-H-3,1,2-RhC_2B_9H_{11}$," *Acta Cryst.*, **B32**, 264 (1976).
243. Elvin L. Hoel, Mehdi Talebinasab-Savari and M. F. Hawthorne, "Deuterium Exchange at Terminal Boron-Hydrogen Bonds Catalyzed by Certain Transition Metal Complexes. A Qualitative Study of Selectivity and Mechanism," *J. Am. Chem. Soc.*, **99**, 4356 (1977).

244. B. A. Sosinsky, W. C. Kalb, R. A. Grey, V. A. Uski and M. F. Hawthorne, "Preparation of [3,3-(Ph₃P)₂-3-H-4-(polystyrylmethyl)-3,1,2-RhC₂B₉H₁₀]. A Polymer-bound Metallocarborane Catalyst," *J. Am. Chem. Soc.*, **99**, 6768 (1977).
245. Kenneth P. Callahan and M. Frederick Hawthorne, "New Aspects of Boron Chemistry," *La Recherche*, **76**, 225 (1977).
246. R. N. Leyden, B. P. Sullivan, R. T. Baker and M. F. Hawthorne, "Synthesis of *closo*- and *nido*-Metalloboranes from Metallocenes," *J. Am. Chem. Soc.*, **100**, 3758 (1978).
247. R. T. Baker, R. E. King, C. Knobler, C. A. O'Con and M. F. Hawthorne, "Characterization and Molecular Structure of [(PPh₃)RhC₂B₉H₁₁]₂, a Phosphinorhodacarborane Dimer Containing Rh-H-B Bridges," *J. Am. Chem. Soc.*, **100**, 8266 (1978).
248. C. B. Salentine and M. F. Hawthorne, "Synthesis of Electron-Deficient Biferracarboranes," *Inorg. Chem.*, **17**, 1498 (1978).
249. K. P. Callahan, A. L. Sims, C. B. Knobler, F. Y. Lo and M. F. Hawthorne, "Structures of Metallocarboranes. 8. Crystal and Molecular Structure of the 11-Vertex Heterobimetallocarborane 1,8-Di- η -cyclopentadienyl-1-ferro-8-cobalto-2,3-dicarbaundecaborane(9), 1,8-(η -C₅H₅)₂-1-Fe-8-Co-2,3-C₂B₇H₉," *Inorg. Chem.*, **17**, 1658 (1978).
250. G. E. Hardy, K. P. Callahan and M. F. Hawthorne, "Structures of Metallocarboranes. IV. Crystal and Molecular Structure of the 10-Vertex Heterobimetallocarborane 2,3-Di- η -cyclopentadienyl-10-carba-(2,3)-(nickelacobalta)decaborane(8), 2,3-(η -C₅H₅)₂-(2,3)-NiCo-10-CB₇H₈," *Inorg. Chem.*, **17**, 1662 (1978).
251. Edward H. S. Wong and M. Frederick Hawthorne, "Hydrido-Complexes of Ruthenium with Carborane Ligands," *Inorg. Chem.*, **17**, 2683 (1978).
252. W. C. Kalb, R. G. Teller and M. F. Hawthorne, "Reactions at the Rhodium Vertex of a Rhodacarborane Cluster. Preparation, Crystal and Solution Structure, and Reactions of 3,3-(Ph₃P)₂-3-(HSO₄)-3,1,2-RhC₂B₉H₁₁·O(C₂H₅)₂," *J. Am. Chem. Soc.*, **101**, 5417 (1979).
253. William E. Hatfield, Chris G. Salentine, Kenneth P. Callahan and M. Frederick Hawthorne, "Magnetic Studies of Chromium(II) and Chromium(III) Metallocarboranes," *Inorg. Chem.*, **18**, 1600 (1979).
254. Raymond G. Teller, Joseph J. Wilczynski and M. Frederick Hawthorne, "Metallocarboranes in Catalysis. X-Ray Crystal and Molecular Structure of 3-PPh₃-3-CO-4-C₅H₅N-3,1,2-RhC₂B₉H₁₀," *J.C.S., Chem. Comm.*, 472 (1979).
255. Zenon Demidowicz, Raymond G. Teller and M. Frederick Hawthorne, "Synthesis and Molecular Structure of [3-(PPh₃)-3,3-(NO₃)-3,1,2-RhC₂B₉H₁₁], a Versatile Metallocarborane Reagent," *J.C.S., Chem. Comm.*, 831 (1979).
256. C. W. Jung and M. F. Hawthorne, "Eleven-Vertex Rhodium, Iridium, and Ruthenium Phosphinometallocarborane Complexes Formed from Sodium Undecahydro-5,6-dicarba-*nido*-decaborate(1-)," *J. Am. Chem. Soc.*, **102**, 3024 (1980).

257. C. W. Jung, R. T. Baker, C. B. Knobler and M. F. Hawthorne, "Closo and Hyper-Closo Ten-Vertex Ruthenacarboranes Containing Chelating Alkenylphosphine Ligands," *J. Am. Chem. Soc.*, **102**, 5782 (1980).
258. W. C. Kalb, C. W. Kreimendahl, D. C. Busby and M. F. Hawthorne, "A ^{11}B NMR Study of the closo-Hydridorhodacarborane 3,3-[(C₂H₅)₃P]₂-3-H-3,1,2-RhC₂B₉H₁₁ Prepared *in situ* from 3,3-(Ph₃P)₂-3-H-3,1,2-RhC₂B₉H₁₁," *Inorg. Chem.*, **19**, 1590 (1980).
259. James A. Doi, Raymond G. Teller and M. Frederick Hawthorne, "Reaction of [Ir(cyclo-octa-1,5-diene){P(*p*-tolyl)₃}₂][nido-7,8-C₂B₉H₁₂] with Hydrogen; Synthesis and X-Ray Structure of 3,9-[(H)₂{P(*p*-tolyl)₃}₂Ir]-3,9-μ-(H)₂-7,8-C₂B₉H₁₀," *J.C.S., Chem. Comm.*, **80** (1980).
260. Todd B. Marder, Judith A. Long and M. Frederick Hawthorne, "Ready Cage Exchange Reactions of Icosahedral Hydridophosphinorhodacarboranes," *J.C.S., Chem. Comm.*, 677 (1980).
261. Mark S. Delaney, Carolyn B. Knobler and M. Frederick Hawthorne, "Precursor of an Extraordinarily Reactive Homogeneous Hydrogenation Catalyst. Synthesis, X-Ray Crystal Structure, and Reactions of [closo-1,3-μ-(η²-3,4-CH₂=CHCH₂CH₂)-3-H-3-PPh₃-3,1,2-RhC₂B₉H₁₀]," *J.C.S., Chem. Comm.*, 849 (1980).
262. C. W. Jung, R. T. Baker and M. F. Hawthorne, "Ten-Vertex closo- and hyper-closo-Phosphinometalloborane Complexes Derived from Sodium Dodecahydro-1,3-dicarba-arachno-nonaborate(1-)," *J. Am. Chem. Soc.*, **103**, 810 (1981).
263. Todd B. Marder, R. Thomas Baker, Judith A. Long, James A. Doi and M. Frederick Hawthorne, "Dynamic FTNMR Studies of Hindered Metal-Cage Rotation in Twelve-Vertex closo-Phosphinometalloborane Complexes," *J. Am. Chem. Soc.*, **103**, 2988 (1981).
264. M. S. Delaney, C. B. Knobler and M. F. Hawthorne, "A Designed Metallacarborane Catalyst. Synthesis, Structure, and Reactions of [closo-1,3-μ-(η²-3-CH₂=CHCH₂CH₂)]-3-H-3-PPh₃-3,1,2-RhC₂B₉H₁₀]," *Inorg. Chem.*, **20**, 1341 (1981).
265. John D. Hewes, Carolyn B. Knobler and M. F. Hawthorne, "Synthesis, Characterization and X-Ray Crystal Structure of 1,1-(PPh₃)₂-1-H-1,2,4-RhC₂B₁₀H₁₂, A Supraicosahedral Metalloborane Catalyst Precursor," *J.C.S., Chem. Comm.*, 206 (1981).
266. Mark S. Delaney, Raymond G. Teller and M. Frederick Hawthorne, "Synthesis, X-ray Crystal Structure, and Reactions of [closo-1,3-μ-2,3-μ-{1,2-μ-(η²-3,4-CH₂CH₂C(Me)=CHCH₂CH₂CH₂)}-3-H-3-PPh₃-3,1,2-RhC₂B₉H₉], A Metallacarborane Catalyst," *J.C.S., Chem. Comm.*, 235 (1981).
267. William C. Kalb, Zenon Demidowicz, Donna Speckman, Carolyn Knobler, Raymond G. Teller and M. Frederick Hawthorne, "Reactions at the Metal Vertex of a Monometal Metallacarborane Cluster. Chemistry of [closo-3,3-(PPh₃)₂-3-HSO₄-3,1,2-RhC₂B₉H₁₁] and [closo-3-PPh₃-3,3-(NO)₃-3,1,2-RhC₂B₉H₁₁]," *Inorg. Chem.*, **21**, 4027 (1982).
268. David C. Busby and M. Frederick Hawthorne, "The Crown Ether Promoted Base Degradation of *p*-Carborane," *Inorg. Chem.*, **21**, 4101 (1982).

269. E. Mizusawa, Howard L. Dahlman, Sidney J. Bennett, David M. Goldenberg and M. Frederick Hawthorne, "Neutron-capture therapy of human cancer: *In vitro* results on the preparation of boron-labeled antibodies to carcinoembryonic antigen," *Proc. Natl. Acad. Sci. USA*, 79, 3011 (1982).
270. John A. Walker, Carolyn B. Knobler and M. Frederick Hawthorne, "Syntheses and Structures of Anionic *closo*-Rhodacarborane Clusters That Contain a Formal Rh(I) Vertex," *J. Am. Chem. Soc.*, 105, 3368 (1983).
271. John A. Walker, Carolyn B. Knobler and M. Frederick Hawthorne, "1,3-Dipolar Cycloaddition Reactions of Low-Valent Metal-Carbonyl Complexes with Arylnitrile N-Oxides," *J. Am. Chem. Soc.*, 105, 3370 (1983).
272. Limin Zheng, R. Thomas Baker, Carolyn B. Knobler, John A. Walker and M. Frederick Hawthorne, "Synthesis and Characterization of Anionic Halogen-containing Rhodacarboranes. Crystal and Molecular Structure of the Hydrogen Bonded Ion Pair, $[\text{HPPH}_3][\text{closo-3-Ph}_3\text{P-3,3-Br}_2\text{-3,1,2-RhC}_2\text{B}_9\text{H}_{11}]$," *Inorg. Chem.*, 22, 3350 (1983).
273. R. E. King III, S. B. Miller, C. B. Knobler and M. F. Hawthorne, "Simultaneous Conversion of Ni-PR₃ and B-H to Ni-H and B-PR₃ Linkages by Thermal Rearrangement of d⁸ *closo*-Bis-(triarylphosphine)nickelacarboranes. Crystal and Molecular Structure of [*closo*-3-(μ-CO)-8-PPh₃-3,1,2-NiC₂B₉H₁₀]₂: A Dimeric Nickelacarborane Complex Containing a Metal-Metal Bond," *Inorg. Chem.*, 22, 3548 (1983).
274. John A. Walker, Conrad A. O'Con, Limin Zheng, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Characterization of a Dimeric Hydridorhodacarborane Anion Derived from the *nido*-Monocarbaborane, B₁₀H₁₂CNH₃," *J.C.S., Chem. Comm.*, 803 (1983).
275. Paul E. Behnken, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structure Determination of [(PET₃)RhC₂B₉H₁₀]₂: A Binuclear Rhodacarborane Containing Four Bonds Between Two Icosahedra," *Angew. Chem. Int. Ed.*, 22, 722 (1983).
276. R. Thomas Baker, Mark S. Delaney, Roswell E. King III, Carolyn B. Knobler, Judith A. Long, Todd B. Marder, Timm E. Paxson, Raymond G. Teller and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 2. Synthesis and Reactivity of *Closo* Icosahedral Bis(Phosphine)hydridorhodacarboranes and the Crystal and Molecular Structures of Two Unusual *closo*-Phosphinerhodacarborane Complexes," *J. Am. Chem. Soc.*, 106, 2965 (1984).
277. Judith A. Long, Todd B. Marder, Paul E. Behnken and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 3. Synthesis and Reactivity of *exo-nido*-Phosphinerhodacarboranes," *J. Am. Chem. Soc.*, 106, 2979 (1984).
278. Carolyn B. Knobler, Todd B. Marder, Eugene A. Mizusawa, Raymond G. Teller, Judith A. Long, Paul E. Behnken and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 4. Structures of *closo*- and *exo-nido*-Phosphinerhodacarboranes and a $[(\text{PPh}_3)_3\text{Rh}]^+ [\text{nido-7-R-7,8-C}_2\text{B}_9\text{H}_{11}]^-$ Salt," *J. Am. Chem. Soc.*, 106, 2990 (1984).

279. Judith A. Long, Todd B. Marder and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 5. Interconversion of *closo*-Bis(Phosphine)hydridorhodacarboranes by Rhodium Transfer between η^5 -*nido*-Carborane Anions," *J. Am. Chem. Soc.*, **106**, 3004 (1984).
280. Paul E. Behnken, James A. Belmont, David C. Busby, Mark S. Delaney, Roswell E. King, III, Charles W. Kreimendahl, Todd B. Marder, Joseph J. Wilczynski and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 6. Kinetics and Mechanism of Alkene Hydrogenation and Isomerization Catalyzed by Rhodacarborane Clusters. A Search for Cluster Catalysis," *J. Am. Chem. Soc.*, **106**, 3011 (1984).
281. John D. Hewes, Charles W. Kreimendahl, Todd B. Marder and M. Frederick Hawthorne, "Metal-Promoted Insertion of an Activated Alkene into a B-H Bond of an Exopolyhedral *nido* - Rhodacarborane: Rhodium-Catalyzed Hydroboration," *J. Am. Chem. Soc.*, **106**, 5757 (1984).
282. Paul E. Behnken, David C. Busby, Mark S. Delaney, Roswell E. King III, Charles W. Kreimendahl, Todd B. Marder, Joseph J. Wilczynski and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 7. Kinetics and Mechanism of Acrylate Ester Hydrogenation Catalyzed by *closo*-Rhodacarboranes," *J. Am. Chem. Soc.*, **106**, 7444 (1984).
283. James A. Doi, Eugene A. Mizusawa, Carolyn B. Knobler and M. Frederick Hawthorne, "Rearrangement of *closo*-3,3-(PPh₃)₂-3-H-1-(R)-3,1,2-IrC₂B₉H₁₀ to *closo*-2,2-(PPh₃)₂-2-H-8-(R)-2,1,8-IrC₂B₉H₁₀. Synthesis and X-ray Structure of *closo*-2,2-(PPh₃)₂-2-H-8-(C₆H₅)-2,1,8-IrC₂B₉H₁₀," *Inorg. Chem.*, **23**, 1482 (1984).
284. Paul E. Behnken and M. Frederick Hawthorne, "Reactions at the Metal Vertex of a Ruthenacarborane Cluster. Activation of Carbon Monoxide by *closo*-3,3,3-(CO)₃-3,1,2-RuC₂B₉H₁₁," *Inorg. Chem.*, **23**, 3420 (1984).
285. Paul Lu, Carolyn B. Knobler and M. Frederick Hawthorne, "9,9-Bis-7,8-dicarba-9-rhoda-*nido*-undecaborane(11), C₃₈H₄₁B₈P₂Rh, (triphenylphosphine)-7,8-RhC₂B₈H₁₁, an *endo-nido* Carbarhodaborane Complex Containing an Acidic Bridging Hydrogen," *Acta Cryst.*, **C40**, 1704 (1984).
286. George Ferguson, M. Frederick Hawthorne, Branko Kaitner and Fergus J. Lalor, "The Synthesis and Structure of an Icosahedral Thiadirhodadodecaborane Complex, 7-Chloro-2,3-bis(η -pentamethylcyclopentadienyl)-1-thia-2,3-dirhoda-*closo*-dodecaborane(9), C₂₀H₃₈B₉ClRh₂S," *Acta Cryst.*, **C40**, 1707 (1984).
287. Anthony J. Serino and M. Frederick Hawthorne, "Chromatography of Carborane Monoanions on Silica," *J. Chromatography*, **291**, 384 (1984).
288. David M. Goldenberg, Robert M. Sharkey, Francis J. Primus, Eugene A. Mizusawa and M. Frederick Hawthorne, "Neutron-capture Therapy of Human Cancer: *In vivo* Results on Tumor Localization of Boron-10-Labeled Antibodies to Carcinoembryonic Antigen in the GW-39 Tumor Model System," *Proc. Natl. Acad. Sci. USA*, **81**, 560 (1984).
289. M. Frederick Hawthorne, "Catalysis with Metallacarboranes," *IUPAC, Chemistry for the Future* Edited by H. Grunewald, Pergamon Press: New York, 135 (1984).

290. Paul E. Behnken, Todd B. Marder, R. T. Baker, Carolyn B. Knobler, Michael R. Thompson and M. Frederick Hawthorne, "Synthesis, Structural Characterization and Stereospecificity in the Formation of Bimetallic Rhodacarborane Clusters Containing Rh-H-B Bridge Interactions," *J. Am. Chem. Soc.*, **107**, 932 (1985).
291. R. E. King III, D. C. Busby and M. Frederick Hawthorne, "Reactions at the Rhodium Vertex of Isomeric *closo*-Bis(triphenylphosphine)hydridorhodacarboranes, Alkenyl Acetate Cleavage and Subsequent Reactions," *J. Organomet. Chem.*, **279**, 103 (1985).
292. John D. Hewes, Michael R. Thompson and M. Frederick Hawthorne, "Model Intermediates for Rhodacarborane Catalysis: Isolation of a Disubstituted *closo*-Bis(triphenylphosphine)-hydridorhodacarborane," *Organometallics*, **4**, 13 (1985).
293. Donna M. Speckman, Carolyn B. Knobler and M. Frederick Hawthorne, "A Stable 16-Electron Rh(III) Rhodacarborane Derived From an Intermediate Containing an Agostic Hydrogen Atom. Molecular Structure of *closo*-3-(η^3 -C₈H₁₃)-1,2-(CH₃)₂-3,1,2-RhC₂B₉H₉," *Organometallics*, **4**, 426 (1985).
294. Eugene A. Mizusawa, Michael R. Thompson and M. Frederick Hawthorne, "Synthesis and Antibody Labeling Studies with the *p*-Isothiocyanatobenzene Derivatives of 1,2-Dicarba-*closo*-dodecaborane(12) and the *nido*-7,8-Dicarbadoecahydroundecaborate(-1) Ion for Neutron-Capture Therapy of Human Cancer. Crystal and Molecular Structure of Cs⁺[*nido*-7-(*p*-C₆H₄NCS)-9-I-7,8-C₂B₉H₁₁]⁻," *Inorg. Chem.*, **24**, 1911 (1985).
295. John A. Walker, Carolyn B. Knobler and M. Frederick Hawthorne, "The Synthesis, Structural Characterization and Reactions of *closo*-Rhodacarborane Anions Containing a Formal d⁸ Metal Vertex," *Inorg. Chem.*, **24**, 2688 (1985).
296. Donna M. Speckman, Carolyn B. Knobler and M. Frederick Hawthorne, "Aromatization of the Norbornadiene Ligand in a Rhodacarborane to an η^5 -Ethylcyclopentadienyl Ligand Via an Intermediate Which Contains an Agostic H-Atom," *Organometallics*, **4**, 1692 (1985).
297. Carolyn B. Knobler, Roswell E. King III and M. Frederick Hawthorne, "An *-Ortho*-metallated Phosphinorhodacarborane Complex, *closo*-3-(P(C₆H₅)₃)-3,3-(P(C₆H₅)₂-*o*-C₆H₄)-3,1,2 - RhC₂B₉H₁₁ C₆H₆," *Acta Cryst.*, **C42**, 159 (1986).
298. William S. Rees, Jr., David M. Schubert, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and X-ray Crystal Structure of a Novel Bimetallic bis- η^5 -Dicarbollide Aluminum Sandwich Complex," *J. Am. Chem. Soc.*, **108**, 5367 (1986).
299. William S. Rees, Jr., David M. Schubert, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Molecular Structure of a Novel bis- η^5 -Dicarbollide Silicon Sandwich Compound: *commo*-3,3'-Si-(3,1,2-SiC₂B₉H₁₁)₂," *J. Am. Chem. Soc.*, **108**, 5369 (1986).
300. Peter A. Chetcuti, Carolyn B. Knobler and M. Frederick Hawthorne, "Intramolecular Conversion of a 5-Membered Iridacycle to a 3-Membered Counterpart by CO₂ Extrusion," *Organometallics*, **5**, 1913 (1986).

301. Peter A. Chetcuti and M. Frederick Hawthorne, "The Activation of C-H Bonds with Intermediates Produced by Mild Thermal Decomposition of the Metallacycles $(C_5Me_5)Ir[C(p-ClC_6H_4) = NOC(=O)](CO)$ and $(C_5Me_5)Rh[C(p-FC_6H_4) = NOC(=O)](PMe_3)$ in Hydrocarbon Solvents," *J. Am. Chem. Soc.*, **109**, 942 (1987).
302. David M. Schubert, Carolyn B. Knobler, William S. Rees, Jr. and M. Frederick Hawthorne, "Synthesis and Molecular Structure of a Novel Aluminacarborane: *nido*- $[\mu-6,9-AlEt(OEt_2) - 6,9-C_2B_8H_{10}]$," *Organometallics*, **6**, 201 (1987).
303. David M. Schubert, Carolyn B. Knobler, William S. Rees, Jr. and M. Frederick Hawthorne, "Synthesis and X-Ray Structure of a Novel Bis(*nido*-carboranyl)aluminate Complex: $[Al(\eta^2-6,9-C_2B_8H_{10})_2]^-$," *Organometallics*, **6**, 203 (1987).
304. Youngkyu Do, Carolyn B. Knobler, and M. Frederick Hawthorne, "Syntheses of Heterotetranuclear Metallacarboranes Containing a Planar M_2Cu_2 ($M = Mo; W$) Rhomb and B-H-Cu Bridges: Structure of $[Mo_2Cu_2(\mu-CO)_4(CO)_2(\mu-H)_2-(C_2B_9H_{10})_2]^{2-}$," *J. Am. Chem. Soc.*, **109**, 1853 (1987).
305. John A. Walker, Limin Zheng, Carolyn B. Knobler, Jorge Soto and M. Frederick Hawthorne, "The Synthesis and Reactions of Icosahedral Rhodacarboranes Bearing η^3 -Allyl, Alkyl and Acyl Moieties at the Metal Vertex," *Inorg. Chem.*, **26**, 1608 (1987).
306. David M. Schubert, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and X-Ray Structure of a Bis(carboranyl)aluminate Derived from *nido*- $[2,7-C_2B_6H_8]^{2-}$," *Organometallics*, **6**, 1353 (1987).
307. Youngkyu Do, Han Chyul Kang, Carolyn B. Knobler and M. Frederick Hawthorne, "Cupracarboranes Containing a *closo*- $Cu(I)C_2B_9$ Geometry. Synthesis and Structure of $[(PPh_3)CuC_2B_9H_{11}]^-$ and $[(PPh_3)_2Cu_2(\mu-H)_2C_2B_9H_9]$," *Inorg. Chem.*, **26**, 2348 (1987).
308. Han Chyul Kang, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Molecular Structure of *closo*-3- $(\eta^6-CH_3C_6H_5)$ -3,1,2- $FeC_2B_9H_{11}$ and *closo*-3- $(\eta^6-1,4-(CH_3)_2C_6H_4)$ -3,1,2- $FeC_2B_9H_{11}$," *Inorg. Chem.*, **26**, 3409 (1987).
309. Han Chyul Kang, Youngkyu Do, Carolyn B. Knobler and M. Frederick Hawthorne, "A 'Clustered Cluster' with a 'Pinwheel' Ligand Array. Synthesis and Structure of a Trinuclear Cupracarborane," *J. Am. Chem. Soc.*, **109**, 6530 (1987).
310. David M. Schubert, William S. Rees, Jr., Carolyn B. Knobler and M. Frederick Hawthorne, "Studies of Metallacarborane Derivatives Containing Aluminum and Silicon," *Pure Appl. Chem.*, **59**, 869 (1987).
311. Peter A. Chetcuti, John A. Walker, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis of Metallacycles by 1,3-Dipolar Cycloaddition Reactions Between Low-Valent Metal Carbonyls and Aryl Nitrile *N*-Oxides," *Organometallics*, **7**, 641 (1988).
312. Peter A. Chetcuti, Carolyn B. Knobler and M. Frederick Hawthorne, "The Formation of η^2 -Side-Bonded Aryl Nitrile Complexes from 4-Metallaisoxazoline-5-one Species and Their

- Application in the Thermal and Photochemical Activation of C-H Bonds,” *Organometallics*, 7, 650 (1988).
313. Han Chyul Kang, Youngkyu Do, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Copper(I) Cupracarboranes. A Novel 'Pinwheel' Cluster,” *Inorg. Chem.*, 27, 1716 (1988).
 314. Mark J. Manning, Carolyn B. Knobler and M. Frederick Hawthorne, "Dicarbollide Complexes of Samarium and Ytterbium. Synthesis and Structural Characterization of the First *closo*-Lanthanacarboranes,” *J. Am. Chem. Soc.*, 110, 4458 (1988).
 315. Marc A. Bandman, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and X-Ray Structure of a Symmetrical Bis(η^5 -dicarbollide) Aluminum Sandwich,” *Inorg. Chem.*, 27, 2399 (1988).
 316. Kenneth Shelly, Carolyn B. Knobler and M. Frederick Hawthorne, "Bridged Metalla-*bis*-Dicarbollides: Structure of [10,10'- μ -(1,2-C₆H₄)-*bis*-(7,8-C₂B₉H₁₀)₂]Co (1-) and Synthesis of Its Iron Analog,” *New J. Chem.*, 12, 317 (1988).
 317. David M. Schubert, Carolyn B. Knobler, Patrick A. Wegner and M. Frederick Hawthorne, "Synthesis and Characterization of 12-Vertex Dinuclear Cobaltaborane Complexes Containing the Co₂(CO)₅ Moiety and SEt₂ Cage Substituents,” *J. Am. Chem. Soc.*, 110, 5219 (1988).
 318. Julie L. Maurer, Anthony J. Serino and M. Frederick Hawthorne, "Hydrophilically Augmented Glycosyl Carborane Derivatives for Incorporation in Antibody Conjugation Reagents,” *Organometallics*, 7, 2519 (1988).
 319. David M. Schubert, Mark J. Manning and M. Frederick Hawthorne, "The Synthesis and Structural Characterization of Carborane Derivatives Containing Main Group and f-Block Elements,” *Phosphorus, Sulfur and Silicon and the Related Elements*, 41, 253 (1989).
 320. Gary L. Wood, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis of Cp₂Ti[C≡CSi(CH₃)₃]₂ and the Synthesis and Molecular Structure of {Cp₂TiC≡CSi(CH₃)₃}₂,” *Inorg. Chem.*, 27, 382 (1989).
 321. Marc A. Bandman, Carolyn B. Knobler and M. Frederick Hawthorne, "The Synthesis and Structural Characterization of the First Gallacarborane Sandwich,” *Inorg. Chem.*, 28, 1204 (1989).
 322. James A. Belmont, Jorge Soto, Roswell E. King, III, Andrew J. Donaldson, John D. Hewes and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 8. Part I. Catalytic Hydrogenolysis of Alkenyl Acetates. Part II. Catalytic Alkene Isomerization and Hydrogenation Revisited,” *J. Am. Chem. Soc.*, 111, 7475 (1989).
 323. Kwan Mook Kim, Youngkyu Do, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of a Zwitterionic Triphenylphosphine Derivative of the Dicarbollide Anion: [*nido*-9-P(C₆H₅)₃-7,8-C₂B₉H₁₁],” *Bulletin of the Korean Chemical Society*, 10, 321 (1989).

324. Julie L. Maurer, Fabienne Berchier, Anthony J. Serino, Carolyn B. Knobler and M. Frederick Hawthorne, "Glycosyl Carborane Derivatives and the Determination of the Absolute Configuration of a Diastereomeric Triol from X-Ray Diffraction," *J. Org. Chem.*, 55, 838 (1990).
325. Thomas D. Getman, Carolyn B. Knobler and M. Frederick Hawthorne, "The Molecular Structure of $[nido-7,9-(CH_3)_2-7,9-C_2B_{10}H_{11}]^-$. The Kinetic Product Formed by Protonation of $[nido-(CH_3)_2C_2B_{10}H_{10}]^{2-}$," *Inorg. Chem.*, 29, 158 (1990).
326. David M. Schubert, Carolyn B. Knobler, Swiatoslaw Trofimenko and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Metallacarborane Poly(pyrazoyl)borate Complexes," *Inorg. Chem.*, 29, 2364 (1990).
327. David M. Schubert, Marc A. Bandman, William S. Rees, Jr., Carolyn B. Knobler, Paul Lu, Wanwoo Nam and M. Frederick Hawthorne, "Synthesis of Group 13 Element Metallacarboranes and Related Structure Reactivity Correlations," *Organometallics*, 9, 2046 (1990).
328. Han Chyul Kang and M. Frederick Hawthorne, "Metallacarboranes in Catalysis. 9. Catalytic Hydrosilanolysis of Alkenyl Acetates by Triethylsilane," *Organometallics*, 9, 2327 (1990).
329. Rajesh Khattar, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Characterization of the First Example of a Metallacarborane that Incorporates an Alkaline Earth Metal: The Molecular Structure of $closo-1,1,1,1-(MeCN)_4-1,2,4-CaC_2B_{10}H_{12}$," *J. Am. Chem. Soc.*, 112, 4962 (1990).
330. Thomas D. Getman, Carolyn B. Knobler and M. Frederick Hawthorne, "Multiple Bond Character Between Two Carborane Polyhedra: The Two-Electron Reduction of Bis-carborane," *J. Am. Chem. Soc.* 112, 4593 (1990).
331. Rajesh Khattar, Carolyn B. Knobler and M. Frederick Hawthorne, "Preparation and Characterization of $[closo-1,1,1-MeCN)_3-1,2,4-SrC_2B_{10}H_{12}]_n$: The First Structural Characterization of a Polymeric Self-Assembling Metallacarborane," *Inorg. Chem.*, 29, 2191 (1990).
332. M. Frederick Hawthorne, Aravamuthan Varadarajan, Carolyn B. Knobler, Sarmistha Chakrabarti, Raymond J. Paxton, Barbara G. Beatty and Frederick L. Curtis, "Radiometallacarboranes as Tumor Imaging Reagents," *J. Am. Chem. Soc.*, 112, 5365 (1990).
333. David M. Schubert, William S. Rees, Jr., Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis, Structural Characterization, and Reactivity of the Bis(η^5 -dicarbollide) Silicon Sandwich Compound $commo-3,3'-Si(3,1,2-SiC_2B_9H_{11})_2$," *Organometallics*, 9, 2938 (1990).
334. Sharon S. Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Molecular Structure of $closo-3-(\eta^6-C_6H_6)-3,1,2-FeC_2B_9H_{11}$," *J. Organomet. Chem.*, 394, 29 (1990).
335. Sharon S. Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Mononuclear Iron(II) Ferracarboranes," *Organometallics*, 10, 670 (1991).

336. M. Frederick Hawthorne, "Biochemical Applications of Boron Cluster Chemistry," *Pure Appl. Chem.*, **63**, 327 (1991).
337. Mark J. Manning, Carolyn B. Knobler, Rajesh Khattar and M. Frederick Hawthorne, "Metallacarborane Complexes That Incorporate the Lanthanides. Synthesis, Molecular Structure and Spectroscopic Characterization of Dicarbollide Complexes of Samarium and Ytterium," *Inorg. Chem.*, **30**, 2009 (1991).
338. Sharon S. Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "A Ferracarborane Analog to [Fp]-. Synthesis and Reactions of [*closo*-3,3-(CO)₂-3,1,2-FeC₂B₉H₁₁]²⁻," *Organometallics*, **10**, 1054 (1991).
339. Han Chyul Kang, Sharon S. Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Syntheses of Charge-Compensated Dicarbollide Ligand Precursors and Their Use in the Preparation of Novel Metallacarboranes," *Inorg. Chem.*, **30**, 2024 (1991).
340. Aravamuthan Varadarajan, Robert M. Sharkey, David M. Goldenberg and M. Frederick Hawthorne, "Conjugation of Phenyl Isothiocyanate Derivatives of Carborane to Antitumor Antibody and the *in vivo* Localization of the Conjugates in Nude Mice," *Bioconj. Chem.*, **102**, (1991).
341. Aravamuthan Varadarajan and M. Frederick Hawthorne, "Novel Carboranyl Amino Acids and Peptides: Reagents for Antibody Modification and Subsequent Neutron Capture Studies," *Bioconj. Chem.*, **2**, 242 (1991).
342. Rajesh Khattar, Carolyn B. Knobler, Stephen E. Johnson and M. Frederick Hawthorne, "The Synthesis and Structural Characterization of the Europium Sandwich, [1,1-(THF)₂-*commo*-1,1'-Eu(1,2,4-EuC₂B₁₀H₁₂)₂]²⁻," *Inorg. Chem.*, **30**, 1970 (1991).
343. Raymond J. Paxton, Barbara G. Beatty, M. Frederick Hawthorne, Aravamuthan Varadarajan, Lawrence E. Williams, Frederick L. Curtis, Carolyn B. Knobler, J. David Beatty and John E. Shively, "A Transition Metal Complex (Venus Flytrap Cluster) for Radioimmuno-detection and Radioimmunotherapy," *Proc. Natl. Acad. Sci.*, **88**, 3387 (1991).
344. Kenneth Shelly, M. Frederick Hawthorne and Paul G. Schmidt, "Liposomal Delivery of Boron for BNCT," Proceedings of the Fourth International Symposium for Neutron Capture Therapy for Cancer, *Progress in Neutron Capture Therapy for Cancer*, Edited by B. J. Allen, et al., Plenum Publishing Corp.: New York, 259 (1992).
345. M. Frederick Hawthorne, Aravamuthan Varadarajan, Raymond J. Paxton, Barbara G. Beatty, and Frederick L. Curtis, "Studies Related to Antibody-Mediated Boron Delivery for BNCT," Proceedings of the Fourth International Symposium for Neutron Capture Therapy for Cancer, *Progress in Neutron Capture Therapy for Cancer*, Edited by B. J. Allen, et al., Plenum Publishing Corp.: New York, 277 (1992).
346. Frank A. Gomez, Stephen E. Johnson and M. Frederick Hawthorne, "A Versatile Protecting Group for 1,2-Dicarba-*closo*-dodecaborane(12) and the Structure of a Silylcarborane Derivative," *J. Am. Chem. Soc.*, **113**, 5915 (1991).

347. Mark J. Manning, Carolyn B. Knobler, M. Frederick Hawthorne and Youngkyu Do, "Dicarbollide Complexes of Thallium: Structural and ^{11}B NMR Studies," *Inorg. Chem.*, **30**, 3589 (1991).
348. Jinkwon Kim, Youngkyu Do, Young Soo Sohn, Carolyn B. Knobler and M. Frederick Hawthorne, "Heterodinuclear Group 6 Metallocarboranes: synthesis and characterization of $[\text{closo-3,3,3-(CO)}_3\text{-3-SnPh}_3\text{-3,1,2-MC}_2\text{B}_9\text{H}_{11}]^-$ (M = Cr, Mo, W)," *J. Organomet. Chem.*, **418**, C-1 (1991).
349. Thomas D. Getman, Carolyn B. Knobler and M. Frederick Hawthorne, "Reduction of Biscarborane: Molecular Structures of $[(15\text{-crown-5})_3\text{Na}_2](\text{C}_2\text{B}_{10}\text{H}_{11})_2$ and $[\text{P}(\text{C}_6\text{H}_5)_3\text{CH}_3]_2[\mu\text{-9,10-CH-}\mu\text{-9',10'-CH-nido-7'-CB}_{10}\text{H}_{11})\text{-nido-7-CB}_{10}\text{H}_{11}]$," *Inorg. Chem.*, **31**, 101 (1992).
350. Kevin Thorne, Su-Jen Ting, Cheng-Jye Chu, John D. Mackenzie, Thomas Getman and M. Frederick Hawthorne, "Synthesis of TiC via Polymeric Titanates: the Preparation of Fibers and Thin Films," *J. Mat. Sci.*, **27**, 4406 (1992).
351. Lai-Ling Ng, Bradford K. Ng, Kenneth Shelly, Carolyn B. Knobler, and M. Frederick Hawthorne, "Structural Analysis of $[\text{Et}_3\text{NH}][\text{Cu}(1\text{-B}_{10}\text{H}_9\text{N}_2)_2]$ and $[\text{Et}_3\text{NH}][1\text{-B}_{10}\text{H}_9\text{N}_2]$," *Inorg. Chem.*, **30**, 4278 (1991).
352. Xiaoguang Yang, Carolyn B. Knobler, and M. Frederick Hawthorne, "[12]Mercuracarborand-4," the First Representative of a New Class of Rigid Macrocyclic Electrophiles: The Chloride Ion Complex of a Charge-Reversed Analogue of [12]Crown-4," *Angew. Chem. Int. Ed.*, **30**, 1507 (1991).
353. Rajesh Khattar, Mark J. Manning, Carolyn B. Knobler, Stephen E. Johnson and M. Frederick Hawthorne, "Synthesis, Structure and Characterization of Lanthanacarboranes. Molecular Structures of $[\text{closo-1,1,1-(MeCN)}_3\text{-1,2,4-EuC}_2\text{B}_{10}\text{H}_{12}]$ and $[1,1\text{-(THF)}_2\text{-commo-1,1'-Eu}(1,2,4\text{-EuC}_2\text{B}_{10}\text{H}_{12})_2]^{2-}$," *Inorg. Chem.*, **31**, 268 (1992).
354. Xiaoguang Yang, Carolyn B. Knobler and M. Frederick Hawthorne, "Macrocyclic Lewis Acid Host-Halide Ion Guest Species. Complexes of Iodide Ion," *J. Am. Chem. Soc.*, **114**, 380 (1992).
355. Frank A. Gomez and M. Frederick Hawthorne, "A Simple Route to C-Monosubstituted Carborane Derivatives," *J. Org. Chem.*, **57**, 1384 (1992).
356. Thomas D. Getman, Philip M. Garrett, Carolyn B. Knobler, M. Frederick Hawthorne, and Kevin Thorne, John D. MacKenzie, "A Silyl Carborane Containing the *closo*-1,10- $\text{C}_2\text{B}_8\text{H}_8$ Fragment," *Organometallics*, **11**, 2723 (1992).
357. Timothy J. Henly, Carolyn B. Knobler, and M. Frederick Hawthorne, "Reactions of Anionic Carborane Nucleophiles with Chromium-Coordinated Haloarenes," *Organometallics*, **11**, 2313 (1992).

358. Kenneth Shelly, Carolyn B. Knobler, and M. Frederick Hawthorne, "Synthesis of Monosubstituted Derivatives of *closo*-Decahydrodecaborate(2-). X-Ray Crystal Structures of [*closo*-2-B₁₀H₉CO]⁻ and [*closo*-2-B₁₀H₉NCO]²⁻," *Inorg. Chem.*, **31**, 2889 (1992).
359. Stephen E. Johnson, Frank Gomez and M. Frederick Hawthorne, "Organofunctionalized Derivatives of *o*-Carborane as Molecular Precursors to Non-Oxide Ceramics of Boron," *European Journal of Solid State and Inorganic Chemistry*, **29**, 113 (1992).
360. Raymond J. Paxton, Barbara G. Beatty, Aravamuthan Varadarajan and M. Frederick Hawthorne, "Carboranyl Peptide-Antibody Conjugates for Neutron-Capture Therapy: Preparation, Characterization, and in Vivo Evaluation," *Bioconj. Chem.*, **3**, 241 (1992).
361. John Arnold, Stephen E. Johnson, Carolyn B. Knobler and M. Frederick Hawthorne, "A Metalloporphyrin-Carborane Sandwich Compound: Synthesis and X-Ray Crystal Structure of (OEP)Zr(η^5 -1,2-C₂B₉H₁₁), *J. Am. Chem. Soc.*, **114**, 3996 (1992).
362. Xiaoguang Yang, Stephen E. Johnson, Saeed I. Khan and M. Frederick Hawthorne, "Multidentate Macrocyclic Lewis Acids: Release of "[12] Mercuracarborand-4" from Its Iodide Complex and the Structure of Its Tetra(tetrahydrofuran) Dihydrate Complex," *Angew. Chem. Int. Ed.*, **31**, 893 (1992).
363. Frank A. Gomez, Stephen E. Johnson, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Metallacarboranes Containing Bridged Dicarbollide Ligands," *Inorg. Chem.*, **31**, 3558 (1992).
364. Lai-Ling Ng, Bradford K. Ng, Carolyn B. Knobler and M. Frederick Hawthorne, "Structural Analysis of the e² and a² Isomers of B₂₀H₁₈⁴⁻," *Inorg. Chem.*, **31**, 3669 (1992).
365. M. Frederick Hawthorne, Ipe J. Mavunkal, and Carolyn B. Knobler, "Electrophilic Reactions of Protonated *closo*-B₁₀H₁₀²⁻ with Arenes, Alkane C-H Bonds, and Triflate Ion Forming Aryl, Alkyl, and Triflate *nido*-6X-B₁₀H₁₃ Derivatives," *J. Am. Chem. Soc.*, **114**, 4427 (1992).
366. M. Frederick Hawthorne, "The Role of Chemistry in the Development of Boron Neutron Capture Therapy for Cancer," *Angew. Chem. Int. Ed.*, **32**, 950 (1993).
367. Kenneth Shelley, Debra A. Feakes, M. Frederick Hawthorne, Paul G. Schmidt, Teresa A. Krisch, and William F. Bauer, "Model Studies Directed Toward the Boron Neutron Capture Therapy of Cancer: Boron Delivery to Murine Tumors with Liposomes," *Proc. Natl. Acad. Sci.*, **89**, 9039 (1992).
368. Aravamuthan Varadarajan, Stephen Johnson, Frank Gomez, Sarmistha Chakrabarti, Carolyn Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Pyrazole-Bridged Metalla-Bis(dicarbollide) Derivatives of Cobalt, Nickel, Copper, and Iron: Models for Venus Flytrap Cluster Reagents," *J. Am. Chem. Soc.*, **114**, 9003 (1992).
369. Xiaoguang Yang, Stephen Johnson, M. Frederick Hawthorne, Haixing Zheng, Kevin Thorne and J. D. Mackenzie, "Design and Synthesis of Chemical Precursors To Boron Carbide," *Proc. Mater. Res. Soc. Symp. Better Ceramics Through Chemistry VI.*, San Francisco, CA (1992).

370. Stephen E. Johnson and M. Frederick Hawthorne, "Ring Compounds of Boron and Phosphorus," *Phosphorus, Sulfur, and Silicon*, 64, 7 (1992).
371. Xiaoguang Yang, Zhiping Zheng, Carolyn B. Knobler and M. Frederick Hawthorne, "Anti-Crown" Chemistry: Synthesis of [9]Mercuracarborand-3 and the Crystal Structure of Its Acetonitrile Complexes," *J. Am. Chem. Soc.*, 115, 193 (1993).
372. Xiaoguang Yang and M. Frederick Hawthorne, "A Convenient Synthesis of Carboranyl Aldehydes from (Hydroxymethyl) Carboranes," *Inorg. Chem.*, 32, 242 (1993).
373. Xiaoguang Yang, Wei Jiang, Carolyn B. Knobler and M. Frederick Hawthorne, "Rigid-Rod Molecules: Carbororods. Synthesis of Tetrameric *p*-Carboranes and the Crystal Structure of Bis(tri-*n*-Butylsilyl)-Tetra-*p*-Carboranes," *J. Am. Chem. Soc.*, 114, 9719 (1992).
374. M. Frederick Hawthorne, "Boron Delivery To Tumors Mediated By Macromolecules and Vesicles," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al., Plenum Publishing Corp.: New York, 345 (1993).
375. D. A. Feakes, K. J. Shelly, M. Frederick Hawthorne, P. G. Schmidt, C. A. Elstad, G. G. Meadows, W. F. Bauer, "Liposomal Delivery of Boron To Murine Tumors for Boron Neutron Capture Therapy," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al., Plenum Publishing Corp.: New York, 395 (1993).
376. K. J. Shelly, M. Frederick Hawthorne, Carolyn B. Knobler, "Carbonyl Nonahydrodecaborate(1): A Versatile Synthron for Functionalized Borane Anions," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al., Plenum Publishing Corp.: New York, 325 (1993).
377. Robert R. Kane, Roger H. Pak, Lai-Lin Ng, M. Frederick Hawthorne, "Novel Carboranyl Amino Acids and Peptides," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al., Plenum Publishing Corp.: New York, 273 (1993).
378. Robert R. Kane, Christine S. Lee, C. L. Coe, M. A. St. Rose, Karin Drechsel, M. Frederick Hawthorne, "Novel Carboranyl Diols and Their Derived Phosphate Esters," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al., Plenum Publishing Corp.: New York, 293 (1993).
379. Robert R. Kane, Roger Pak, M. Frederick Hawthorne, "Solution-Phase Segment Synthesis of Boron-Rich Peptides," *J. Org. Chem.*, 58, 991 (1993).
380. Xiaoguang Yang, Carolyn Knobler, M. Frederick Hawthorne, "Supramolecular Chemistry: Molecular Aggregates of *Closo*-B₁₀H₁₀²⁻ with [12]Mercuracarborand-4," *J. Am. Chem. Soc.*, 115, 4904 (1993).

381. Robert R. Kane, Christine S. Lee, Karin Drechsel, and M. Frederick Hawthorne, "Solution-Phase Synthesis of Boron-Rich Phosphates," *J. Org. Chem.*, **58**, 3227 (1993).
382. Igor T. Chizhevsky, Stephen E. Johnson, Carolyn B. Knobler, Frank A. Gomez and M. Frederick Hawthorne, "Carboracycles: A Family of Novel Macrocyclic Carborane Derivatives," *J. Am. Chem. Soc.*, **115**, 6981 (1993).
383. Igor T. Chizhevsky, Irina V. Pisareva, Pavel V. Petrovskii, Vladimir I. Bregadze, Alexandr I. Yanovsky, Yuri T. Struchkov, Carolyn B. Knobler and M. Frederick Hawthorne, "Facile Conversion of the Dimeric $\{[\text{Ph}_3\text{PRhB}_{10}\text{H}_{10}\text{CNH}_2]_2\text{H}\}^+ [\text{PPN}]^-$ Cluster to 16-Electron Mononuclear *Closo*-Rhodacarboranes by N-Quaternization," *Inorg. Chem.*, **32**, 3393 (1993).
384. Zhiping Zheng, Xiaoguang Yang, Carolyn B. Knobler and M. Frederick Hawthorne, "An Iodide Ion Complex of a Hydrophobic Tetraphenyl [12]Mercuracarborand-4 Having a Sterically Encumbered Cavity," *J. Am. Chem. Soc.*, **115**, 5320 (1993).
385. Robert R. Kane, Karin Drechsel and M. Frederick Hawthorne, "Automated Syntheses of Carborane-Derived Homogeneous Oligophosphates: Reagents for Use in the Immunoprotein-Mediated Boron Neutron Capture Therapy (BNCT) of Cancer," *J. Am. Chem. Soc.*, **115**, 8853 (1993).
386. Kevin J. Thorne, Stephen E. Johnson, Haixing Zheng, John D. Mackenzie and M. Frederick Hawthorne, "A Chemically Designed, UV Curable Polycarbosilane Polymer for the Production of Silicon Carbide," *Chem. Mater.*, **6**, 110 (1994).
387. Barbara G. Beatty, Raymond J. Paxton, M. Frederick Hawthorne, Lawrence E. Williams, Karen J. Rickard-Dickson, Tulan Do, John E. Shively and J. David Beatty, "Pharmacokinetics of an Anti-Carcinoembryonic Antigen Monoclonal Antibody Conjugated to a Bifunctional Transition Metal Carborane Complex (Venus Flytrap Cluster) in Tumor-Bearing Mice," *The Journal of Nuclear Medicine*, **34**, 1294 (1993).
388. Debra A. Feakes, Kenneth Shelly, Carolyn B. Knobler, and M. Frederick Hawthorne, " $\text{Na}_3[\text{B}_{20}\text{H}_{17}\text{NH}_3]$: Synthesis and Liposomal Delivery to Murine Tumors," *Proc. Natl. Acad. Sci.*, **91**, 3029 (1994).
389. M. Frederick Hawthorne, Xiaoguang Yang, and Zhiping Zheng, "Host-guest Chemistry of Anion-complexation by Macrocyclic Multidentate Lewis Acids," *Pure and Appl. Chem.*, **66**, 245 (1994).
390. M. Frederick Hawthorne, "Host-Guest Chemistry of Anion-Complexation by Macrocyclic Multidentate Lewis Acids," Proceedings of the Eighth International Meeting on Boron Chemistry (IMEBORON VIII), *Current Topics in the Chemistry of Boron*, Edited by George W. Kabalka, The Royal Society of Chemistry, Cambridge, 207 (1994).
391. I. T. Chizhevsky, I. A. Lobanova, I. V. Pisareva, T. V. Zinevich, V. I. Bregadze, A. I. Yanovsky, Yu. T. Struchkov, C. B. Knobler, and M. Frederick Hawthorne, "Novel *Exo-Nido*-Ruthena- and *Closo*-Rhodacarboranes. Chemistry, Structure and Catalytic Activity in Organic Reactions," Proceedings of the Eighth International Meeting on Boron Chemistry

- (IMEBORON VIII), *Current Topics in the Chemistry of Boron*, Edited by George W. Kabalka, The Royal Society of Chemistry, Cambridge, 301 (1994).
392. Xiaoguang Yang, Carolyn B. Knobler, Zhiping Zheng and M. Frederick Hawthorne, "Host-Guest Chemistry of a New Class of Macrocyclic Multidentate Lewis Acids Comprised of Carborane-Supported Electrophilic Mercury Centers," *J. Am. Chem. Soc.*, *116*, 7142 (1994).
 393. C. A. Elstad, K. R. Meinkoth, B. A. Mathison, G. G. Meadows, D. H. Kinder, M. Frederick Hawthorne, Kenneth J. Shelly, and Debra A. Feakes, "In Vivo and In Vitro Uptake of Boronated Compounds By B16-BL6 Murine Melanoma," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al. Plenum Publishing Corp.: New York, 619 (1993).
 394. S. Sjöberg, M. Frederick Hawthorne, P. Lindström, J. Malmquist, J. Carlsson, A. Anderson, and O. Pettersson, "Asymmetric Synthesis of Carboranyl Amino Acids With Potential Use in BNCT," Proceedings of the Fifth International Symposium for Neutron Capture Therapy for Cancer, *Advances in Neutron Capture Therapy*, Edited by A. H. Soloway, et al. Plenum Publishing Corp.: New York, 269 (1993).
 395. Kenneth Shelly, Debra A. Feakes and M. Frederick Hawthorne, "Boron Delivery by Liposomes for BNCT: Development of Lipoidal Boron Compounds," Proceedings of the Eighth International Meeting on Boron Chemistry (IMEBORON VIII), *Current Topics in the Chemistry of Boron*, Edited by George W. Kabalka, The Royal Society of Chemistry: Cambridge, 165 (1994).
 396. Danan Dow, Ipe J. Mavunkal, Jeanette A. Krause Bauer, Carolyn B. Knobler, M. Frederick Hawthorne and Sheldon G. Shore, "Synthesis and Structure of Triethylammonium 2-Acetonitrilenonahydro-*closo*-decaborate (-1)," *Inorg. Chem.*, *33*, 6432 (1994).
 397. Charng-Jui Chen, Robert R. Kane, F. James Primus, György Szalai, M. Frederick Hawthorne and John E. Shively, "Synthesis and Characterization of Oligomeric *Nido*-carboranyl Phosphate Diester Conjugates to Antibody and Antibody Fragments for Potential Use in Boron Neutron Capture Therapy of Solid Tumors," *Bioconj. Chem.*, *5*, 557 (1994).
 398. Karin Drechsel, Christine S. Lee, Eamon W. Leung, Robert R. Kane and M. Frederick Hawthorne, "Synthesis of New Building Blocks for Boron-Rich Oligomers in Boron Neutron Capture Therapy (BNCT). I.," *Tetrahedron Lett.*, *35*, 6217 (1994).
 399. Roger H. Pak, Robert R. Kane, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of [(CH₃)₃NH][*nido*-9,11-I₂-7,8-C₂B₉H₁₀] and [(CH₃)₃NH][*nido*-9-I-7,8-C₂B₉H₁₁]," *Inorg. Chem.*, *33*, 5355 (1994).
 400. Robert R. Kane, Karin Dreschel, Young Soo Kim, Cynthia L. Beno, Christine S. Lee, Gabriel Mendez, Solomon Romano, and M. Frederick Hawthorne, "Boron-Rich Oligophosphates - Novel Molecules for Use in BNCT," *Cancer Neutron Capture Therapy. Proceedings of the*

- 6th International Symposium on Neutron Capture Therapy for Cancer*, Kobe, Japan, Plenum Publishing Corp.: New York, 57 (November, **1994**).
401. M. Frederick Hawthorne, Debra A. Feakes, and Kenneth Shelly, "Recent Results with Liposomes as Boron Delivery Vehicles for Boron Neutron Capture Therapy," *Cancer Neutron Capture Therapy. Proceedings of the Sixth International Symposium on Neutron Capture Therapy for Cancer*, Kobe, Japan, Plenum Publishing Corp.: New York, 27 (November, **1994**).
 402. Jian Kun Shen, Songsheng Zhang, Fred Basolo, Stephen E. Johnson and M. Frederick Hawthorne, "Carbon Monoxide Substitution of Anionic and Neutral (η^5 -Dicarbollyl)Rh(CO)₂ with Phosphines and Phosphites: A Kinetic and Mechanistic Study of Ring Slippage as Compared to (η^5 -C₅H₅)Rh(CO)₂," *Inorg. Chim. Acta.*, 235, 89 (**1995**).
 403. Zhiping Zheng, Carolyn B. Knobler, Carol E. Curtis, and M. Frederick Hawthorne, "Structure and Bonding of a Novel Mercuracycle Complex Containing B-Hg Bonds at Carborane Vertices," *Inorg. Chem.*, 34, 432 (**1995**).
 404. David E. Harwell, Juliet Nabakka, Carolyn B. Knobler, M. Frederick Hawthorne, "Synthesis and Structural Characterization of an Ether-Bridged Cobalta-Bis(dicarbollide): A Model for Venus Flytrap Cluster Reagents," *Can. J. Chem.*, 73, 1044 (**1995**).
 405. Zhiping Zheng, Wei Jiang, Alfred A. Zinn, Carolyn B. Knobler, and M. Frederick Hawthorne, "Facile Electrophilic Iodination of Icosahedral Carboranes, Synthesis of Carborane Derivatives with Boron-Carbon Bonds via the Palladium-Catalyzed Reaction of Diiodocarboranes with Grignard Reagents," *Inorg. Chem.*, 34, 2095 (**1995**).
 406. Stefan Sjöberg, M. Frederick Hawthorne, Serge Wilmouth, and Peter Lindström, "Asymmetric Synthesis of Carboranyl Amino Acids with Potential Use in BNCT," *Chemistry - A European Journal*, 1, 430 (**1995**).
 407. Young-Soo Kim, Robert R. Kane, Cynthia L. Beno, Solomon Romano, Gabriel Mendez, and M. Frederick Hawthorne, "Synthesis of New Building Blocks for Boron-Rich Oligomers in Boron Neutron Capture Therapy (BNCT). II. Monomers Derived From 2,2-Disubstituted-1,3-Diols," *Tetrahedron Letters*, 36, 5147 (**1995**).
 408. Debra A. Feakes, Kenneth Shelly, and M. Frederick Hawthorne, "Selective Boron Delivery to Murine Tumors by Lipophilic Species Incorporated in the Membranes of Unilamellar Liposomes," *Proc. Natl. Acad. Sci. USA*, 92, 1367 (**1995**).
 409. Roger H. Pak, F. James Primus, Karen J. Rickhard-Dickson, Lai Ling Ng, Robert R. Kane, and M. Frederick Hawthorne, "Preparation and Properties of *nido*-Carborane-Specific Monoclonal Antibodies for Potential use in Boron Neutron Capture Therapy for Cancer," *Proc. Natl. Acad. Sci. USA*, 92, 6986 (**1995**).
 410. Wei Jiang, Carolyn B. Knobler, Carol E. Curtis, Mark Mortimer and M. Frederick Hawthorne, "Iodination Reactions of Icosahedral *para*-Carborane and the Synthesis of Carborane Derivatives with Boron-Carbon Bonds," *Inorg. Chem.*, 34, 3491 (**1995**).

411. Wei Jiang, Carolyn B. Knobler, Mark D. Mortimer, and M. Frederick Hawthorne, "A Camouflaged Icosahedral Carborane: Dodecamethyl-1,12-dicarba-closo-dodecarborane(12) and Related Compounds," *Angew. Chem. Int. Ed.*, **34**, 1332 (1995).
412. Zhiping Zheng, Carolyn C. Knobler, and M. Frederick Hawthorne, "Stereoselective Anion Template Effects: Syntheses and Molecular Structures of Tetraphenyl[12]Mercuracarborand-4 Complexes of Halide Ions," *J. Am. Chem. Soc.*, **117**, 5105 (1995).
413. Xiaoguang Yang, Wei Jiang, Carolyn B. Knobler, Mark D. Mortimer, and M. Frederick Hawthorne, "The Synthesis and Structural Characterization of Carborane Oligomers Connected by Carbon-Carbon and Carbon-Boron Bonds Between Icosahedra," *Inorg. Chim. Acta*, **240**, 371 (1995).
414. Zhiping Zheng, Martin Diaz, Carolyn B. Knobler, and M. Frederick Hawthorne, "A Mercuracarborand Characterized by B-Hg-B Bonds: Synthesis and Structure of *Cyclo*-[(*t*-BuMe₂Si)₂C₂B₁₀H₈Hg]₃," *J. Am. Chem. Soc.*, **117**, 12338 (1995).
415. Zhiping Zheng, Carolyn C. Knobler, Mark D. Mortimer, Gapgoung Kong, and M. Frederick Hawthorne, "Hydrocarbon-Soluble Mercuracarborands: Syntheses, Halide Complexes, and Supramolecular Chemistry," *Inorg. Chem.*, **35**, 1235 (1996).
416. M. Frederick Hawthorne and Mark D. Mortimer, "Building to Order," *Chemistry in Britain*, **32**, No. 4, 32 (1996).
417. Igor T. Chizhevsky, Irina V. Pisareva, Pavel V. Petrovskii, Vladimir I. Bregadze, Fedor M. Dolgushin, Alexandr I. Yanovsky, Yuri T. Struchkov, and M. Frederick Hawthorne, "Synthesis and Molecular Structure of a Novel Monocarbon Hydridorhodacarborane: *closo*-2,7-(PPh₃)₂-2-H-2-Cl-1-(NMe₃)-2,1-RhCB₁₀H₉," *Inorg. Chem.*, **35**, 1386 (1996).
418. Alfred A. Zinn, Zhiping Zheng, Carolyn B. Knobler, and M. Frederick Hawthorne, "A Hexamethyl Derivative of [9]Mercuracarborand-3: Synthesis, Characterization, and Host-Guest Chemistry," *J. Am. Chem. Soc.*, **118**, 70 (1996).
419. Wei Jiang, Carolyn B. Knobler, and M. Frederick Hawthorne, "Decakis(dichloromethyl)-*para*-Carborane: Camouflage of an Icosahedral Carborane Using Bulky Functional Substituents," *Angew. Chem. Int. Ed.*, **35**, 2536 (1996).
420. David E. Harwell, Mark D. Mortimer, Carolyn B. Knobler, Frank A. L. Anet, and M. F. Hawthorne, "Auracarboranes With and Without Au-Au Interactions: An Unusually Strong Auophilic Interaction," *J. Am. Chem. Soc.*, **118**, 2679 (1996).
421. Rachel Watson-Clark, Carolyn B. Knobler and M. F. Hawthorne, "Synthesis and Structure of the Elusive [*a*²-B₂₀H₁₉]³⁻ Anion," *Inorg. Chem.*, **35**, 2963 (1996).
422. Wei Jiang, David E. Harwell, Mark D. Mortimer, Carolyn B. Knobler and M. Frederick Hawthorne, "Palladium-Catalyzed Coupling of Ethynylated *p*-Carborane Derivatives: Synthesis and Structural Characterization of Modular Ethynylated *p*-Carborane Molecules," *Inorg. Chem.*, **35**, 4355 (1996).

423. Wei Jiang, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Bis- and Tris(*closo*-1,2-C₂B₁₀H₁₁-1-yl)- Substituted Biphenyl and Benzene," *Inorg. Chem.*, **35**, 3056 (1996).
424. Emil M. Georgiev, Kenneth Shelly, Debra A. Feakes, Jeremy Kuniyoshi, Solomon Romano, and M. Frederick Hawthorne, "Synthesis of Amine Derivatives of the Polyhedral Borane Anion [B₂₀H₁₈]⁴⁻," *Inorg. Chem.*, **35**, 5412 (1996).
425. Mark D. Mortimer, Carolyn B. Knobler, and M. Frederick Hawthorne, "Methylation of Boron Vertices of the Cobalt Dicarbollide Anion," *Inorg. Chem.*, **35**, 5750 (1996).
426. Wei Jiang, Igor T. Chizhevsky, Mark D. Mortimer, Weilin Chen, Carolyn B. Knobler, S. E. Johnson, F. A. Gomez, and M. Frederick Hawthorne, "Carboracycles: Macrocyclic Compounds Composed of Carborane Icosahedra Linked by Organic Bridging Groups," *Inorg. Chem.*, **35**, 5417 (1996).
427. Fangbiao Li, Kenneth Shelly, Robert R. Kane, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis and Structure of the Polyhedral [μ -B₂₀H₁₇OH]²⁻ Borane Anion Containing Both Oxygen- and Hydrogen-Bridge Bonds," *J. Am. Chem. Soc.*, **118**, 6506 (1996).
428. Roger H. Pak, F. James Primus, Karen J. Rickard-Dickson, Gyorgy Szalai, James L. Bolen, Jr., Robert R. Kane, and M. Frederick Hawthorne, "Bispecific Antibody Mediated Targeting of *nido*-Carboranes to Human Colon Carcinoma Cells," *Bioconj. Chem.*, **7**, 532 (1996).
429. Fangbiao Li, Kenneth Shelly, Robert R. Kane, Carolyn B. Knobler and M. Frederick Hawthorne, "The Novel [*n*-B₂₀H₁₈]²⁻ Induced Nucleophilic Ring-Opening of Tetrahydrofuran by Alkoxide Anions," *Angew. Chem. Int. Ed.*, **35**, 2646 (1996).
430. M. Frederick Hawthorne, "Carborane Chemistry at Work and at Play," Proceedings of the Ninth International Meeting on Boron Chemistry, *Advances in Boron Chemistry*, Special Publication No. 201, Edited by W. Siebert, the Royal Society of Chemistry: Cambridge, 261 (1996).
431. M. F. Hawthorne and Kenneth Shelly, "Liposomes as Drug Delivery Vehicles for Boron Agents," *J. Neuro-Oncol.*, **33**, 53 (1997).
432. Mark D. Mortimer, Wei Jiang, Zhiping Zheng, Robert R. Kane, Igor T. Chizhevsky, Carolyn B. Knobler, and M. Frederick Hawthorne, "Rods, Rings, Balls and Strings!," *NATO ARW Proceedings Book, Modular Chemistry*, Edited by J. Michl, Kluwer Acad. Publ., 551 (1997).
433. M. Frederick Hawthorne and Zhiping Zheng, "Recognition of Electron-Donating Guests by Carborane-Supported Multidentate Macrocyclic Lewis Acid Hosts," *Accts. Chem. Res.*, **30**, 267 (1997).
434. Igor T. Chizhevsky, Irina V. Pisareva, E. V. Vorentzov, Vladimir I. Bregadze, F. M. Dolgushin, Alexandr I. Yanovsky, Yuri T. Struchkov, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis, Structure and Reactivity of a Novel Monocarbon Hydridorhodacarborane, *closo*-2,2-(Ph₃P)₂-2H-1-(Me₃N)-2,1-RhCB₁₀H₁₀. Molecular

- Structure of 16-Electron *closo*-2-(Ph₃P)-2-Cl-1-(Me₃N)-2,1-RhCB₁₀H₁₀,” *J. Organometal. Chem.*, 536, 223 (1997).
435. Robert R. Kane, Lufeng Guan, Kenneth Shelly and M. Frederick Hawthorne, “Approaches to the Selective Concentration of Boron-Rich Oligophosphates in Tumors,” *Advances in Neutron Capture Therapy, Vol. II, Chemistry and Biology*, Edited by B. Larsson, et al., Elsevier: Amsterdam, 362 (1997).
 436. Robert R. Kane, Young Soo Kim and M. Frederick Hawthorne, “The Synthesis, Purification, Characterization and Derivatization of Boron-Rich Oligophosphates,” *Advances in Neutron Capture Therapy, Vol. II, Chemistry and Biology*, Edited by B. Larsson, et al., Elsevier: Amsterdam, 113 (1997).
 437. Kenneth Shelly, Fangbiao Li, Rachel Watson-Clark and M. Frederick Hawthorne, “Derivative Chemistry of the [n-B₂₀H₁₈]²⁻ Anion,” *Advances in Neutron Capture Therapy, Vol. II, Chemistry and Biology*, Edited by B. Larsson, et al., Elsevier: Amsterdam, 30 (1997).
 438. Kenneth Shelly, Emil M. Georgiev, Rachel Watson-Clark and M. Frederick Hawthorne, “Boron Delivery to Tumors for BNCT: Recent Murine Results with Liposomes,” *Advances in Neutron Capture Therapy, Vol. II, Chemistry and Biology*, Edited by B. Larsson, et al., Elsevier: Amsterdam, 357 (1997).
 439. David E. Harwell, Jeffrey McMillan, Carolyn B. Knobler and M. Frederick Hawthorne, “Structural Characterization of Representative d⁷, d⁸ and d⁹ Transition Metal Complexes of Bis(*o*-carborane),” *Inorg. Chem.*, 36, 5951 (1997).
 440. Rachel Watson-Clark and M. Frederick Hawthorne, “An Exploratory Evaluation of the Reactions of Organic Oxidants with Polyhedral Borane Anions,” *Inorg. Chem.*, 36, 5419 (1997).
 441. Rachel A. Watson-Clark, Mona Lisa Banquerigo, Kenneth Shelly, M. Frederick Hawthorne and Ernest L. Brahn, “Model Studies Directed Toward the Application of Boron Neutron Capture Therapy to Rheumatoid Arthritis: Boron Delivery by Liposomes to Rat Collagen-Induced Arthritis,” *Proc. Natl. Acad. Sci. USA*, 95, 2531 (1998).
 442. Rachel Watson-Clark, Carolyn B. Knobler and M. Frederick Hawthorne, “The Synthesis and Structure of the [2-*closo*-B₁₀H₉NHCOHCH₂CH₃]⁻ Anion,” *C.J. Wilkins: An 80th Birthday Tribute*, Edited by D.J. Hogan and B.E. Williamson, New Zealand Institute of Chemistry, Christchurch, 93 (1998).
 443. Juliet M. Nabakka, David E. Harwell, Carolyn B. Knobler and M. Frederick Hawthorne, “Synthesis and Structural Characterization of a Thioether-Bridged *commo*-Metallabis(dicarbollide) Species: A Model System for Venus Flytrap Cluster Reagents,” *J. Organomet. Chem.*, 550, 423 (1998).
 444. M. Frederick Hawthorne, “New Horizons for Therapy Based on the Boron Neutron Capture Reaction,” *Mol. Med. Today*, 4, No. 4, 174 (1998).

445. Toralf Peymann, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis of Alkyl and Aryl Derivatives of *closo*-B₁₂H₁₂²⁻ by the Palladium-Catalyzed Coupling of *closo*-B₁₂H₁₁I₂⁻ with Grignard Reagents," *Inorg. Chem.*, 37, 1544 (1998).
446. Axel Herzog, Carolyn B. Knobler and M. Frederick Hawthorne, "Adaptation of the Barton Reaction to Carborane Chemistry: The Synthesis and Reactivity of 2-Hydroxyimino-1-hydroxymethylnona-*B*-methyl-1,12-dicarba-*closo*-dodecaborane(12)," *Angew. Chem. Int. Ed.*, 37, 1552 (1998).
447. Laura J. Yeager, Fusayo Saeki, Kenneth Shelly, M. Frederick Hawthorne and Robin L. Garrell, "A New Class of Self Assembled Monolayers: *closo*-B₁₂H₁₁S³⁻ on Gold," *J. Am. Chem. Soc.*, 120, 9961 (1998).
448. Fangbiao Li, Kenneth Shelly, Carolyn B. Knobler and M. Frederick Hawthorne, "Formation of a Novel Amidinium-bridged Polyhedral Borane Ion by Incorporation of Acetonitrile Solvent Molecule," *Angew. Chem. Int. Ed.*, 37, 1865 (1998).
449. Fangbiao Li, Kenneth Shelly, Carolyn B. Knobler and M. Frederick Hawthorne, "A New Isomer of the [B₂₀H₁₈]²⁻ Ion: Synthesis, Structure and Reactivity of [*cis*-B₂₀H₁₈]²⁻ and [*cis*-B₂₀H₁₇NH₃]," *Angew. Chem. Int. Ed.*, 37, 1868 (1998).
450. George Harakas, Tuan Vu, Carolyn B. Knobler, and M. Frederick Hawthorne, "Synthesis and Crystal Structure of 9,12-Bis(4-acetylphenyl)-1,2-Dicarbadoecaborane(12): Self-Assembly Involving Intermolecular Carboranyl C-H Hydrogen Bonding", *J. Am. Chem. Soc.*, 120, 6405 (1998).
451. Lufeng Guan, Letitia A. Wims, Robert R. Kane, Mark Smuckler, Sherie L. Morrison and M. Frederick Hawthorne, "Homogeneous Immunoconjugates for Boron Neutron Capture Therapy: Design, Synthesis and Preliminary Characterization," *Proc. Natl. Acad. Sci. USA*, 95, 13206 (1998).
452. Igor T. Chizhevsky, Irina A. Lobanova, Pavel V. Petrovskii, Vladimir I. Bregadze, Fyodor M. Dolgushin, Alexandr I. Yanovsky, Yuri T. Struchkov, Anatolii L. Chistyakov, Ivan V. Stankevich, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis of Mixed-Metal (Ru-Rh) Bimetallacarboranes via *exo-nido*- and *closo*-Ruthenacarboranes. Molecular Structures of (η⁵-C₈H₁₂)Rh(μ-H)Ru(PPh₃)₂(η⁵-C₂B₉H₁₁) and Anionic *closo*-Ruthenacarborane Precursors," *Organometallics*, 18, 726 (1999).
453. Toralf Peymann, Axel Herzog, Carolyn B. Knobler, and M. Frederick Hawthorne, "Aromatic Polyhedral Hydroxyborates: Bridging Boron Oxides and Boron Hydrides," *Angew. Chem. Int. Ed.*, 38, 1061 (1999).
454. Axel Herzog, Carolyn Knobler, M. Frederick Hawthorne, Andreas Maderna and Walter Siebert, "Camouflaged Carboranes as Surrogates for C₆₀: Syntheses of Functionalized Derivatives by Selective Hydroxyalkylation," *J. Org. Chem.*, 64, 1045 (1999).
455. Weilin Chen, Juston J. Rockwell, Carolyn B. Knobler, David E. Harwell and M. Frederick Hawthorne, "Synthesis and Characterization of *ortho*-3- and *meta*-2-substituted Carboranes

- Through a Boron-Insertion Reaction, Including the Structure of the Product of a Double-Insertion Reaction,” *Polyhedron*, 18, 1725 (1999).
456. Alfred A. Zinn, Carolyn B. Knobler, David E. Harwell, and M. Frederick Hawthorne, “Molecular Aggregates of Nitrate Ion with the Tetravalent Lewis Acid Host 12-Mercuracarborand-4: Novel Trihaptο Coordination of NO₃⁻,” *Inorg. Chem.*, 38, 2227 (1999).
 457. Ibrahim H. A. Badr, Martin Diaz, M. Frederick Hawthorne and Leonidas G. Bachas, “Mercuracarborand “Anti-Crown Ether” Based Chloride Sensitive Liquid/Polymeric Membrane Electrodes,” *Anal. Chem.*, 71, 1371 (1999).
 458. Axel Herzog, Andreas Maderna, George N. Harakas, Carolyn B. Knobler and M. Frederick Hawthorne, “A Camouflaged *Nido*-Carborane Anion: Facile Synthesis of Octa-*B*-methyl-1,2-dicarba-*closo*-dodecaborane(12) and Its Deboration Reaction,” *Chem. Eur. J.*, 5, 1212 (1999).
 459. David M. Schubert, David E. Harwell, Carolyn B. Knobler and M. Frederick Hawthorne, “Structural Characterization of Charge Transfer Complexes of the Nickel(IV) Bis-(3,1,2-Dicarbollyl) Sandwich Compound,” *Acta Chemica Scandinavia, Festschrift* , 53, 721 (1999).
 460. Hans Lee, Martin Diaz and M. Frederick Hawthorne, “Mercuracarborand-Catalyzed Diels-Alder Reaction of a Thionoester with Cyclopentadiene,” *Tetrahedron Lett.*, 40, 7651 (1999).
 461. Toralf Peymann, Carolyn B. Knobler, and M. Frederick Hawthorne, “An Icosahedral Array of Methyl Groups Supported by an Aromatic Borane Scaffold: The [*closo*-B₁₂(CH₃)₁₂]²⁻ Ion,” *J. Am. Chem. Soc.*, 121, 5601 (1999).
 462. Fangbiao Li, Kenneth Shelly, Carolyn B. Knobler, and M. Frederick Hawthorne, “The Synthesis of [Me₄N]₂[*a*²-B₂₀H₁₆(NH₃)₂] and *trans*-B₂₀H₁₆(NH₃)₂ from [Me₃NH][*cis*-B₂₀H₁₇NH₃] and Their Structural Characterization,” *Inorg. Chem.*, 38 , 4926 (1999).
 463. Toralf Peymann, Carolyn B. Knobler, and M. Frederick Hawthorne, “An Unpaired Electron Incarcerated Within an Icosahedral Borane Cage: Synthesis and Crystal Structure of the Blue, Air-Stable {[*closo*-B₁₂(CH₃)₁₂]}[•] Radical,” *Chem. Comm.*, 2039 (1999).
 464. M. Frederick Hawthorne and Andreas Maderna, “Applications of Radiolabeled Boron Clusters to the Diagnosis and Treatment of Cancer,” *Chem. Rev.*, 99, 3421 (1999).
 465. Akira Nakanishi, Lufeng Guan, Robert R. Kane, Harumi Kasamatsu and M. Frederick Hawthorne, “Toward a Cancer Therapy with Boron-rich Oligomeric Phosphate Diesters that Target the Cell Nucleus,” *Proc. Natl. Acad. Sci. USA*, 96, 238 (1999).
 466. Weilin Chen, Martin Diaz, Juston Rockwell, Carolyn B. Knobler and M. Frederick Hawthorne, “Synthesis and Characterization of Water-Soluble Boron-Substituted *Ortho*-Carborane Derivatives,” *Comptes Rendus de l’Académie des Sciences – Série IIc – Chimie*, 3, 223 (2000).
 467. M. Frederick Hawthorne, “Broadening the Conflux of Boron and Carbon Chemistries,” Proceedings of the Tenth International Conference on Boron Chemistry, *Contemporary Boron Chemistry*, Edited by M. Davidson, A.K. Hughes, T.B. Marder and K. Wade, Royal Society of Chemistry: Cambridge, 197 (2000).

468. Toralf Peymann, Carolyn B. Knobler and M. Frederick Hawthorne, "A Study of the Sequential Acid-Catalyzed Hydroxylation of Dodecahydro-*closo*-Dodecaborate(2-)," *Inorg. Chem.*, **39**, 1163 (2000).
469. Hans Lee, Martin Diaz, Carolyn Knobler and M. Frederick Hawthorne, "Octahedral Coordination of Iodide in an Electrophilic Sandwich," *Angew. Chem. Int. Ed.*, **39**, 776 (2000).
470. Juston J. Rockwell, Axel Herzog, Toralf Peymann, Carolyn B. Knobler and M. Frederick Hawthorne, "Recent Advances in the Field of Camouflaged Carboranes and Polyhedral Boranes," *Current Sci.*, **78**, 405 (2000).
471. Ibrahim H.A. Badr, R. Daniel Johnson, Martin Diaz, M. Frederick Hawthorne and Leonidas G. Bachas, "A Selective Optical Sensor Based on [9]Mercuracarborand-3, A New Type of Ionopore with a Chloride Complexing Cavity," *Anal. Chem.*, **72**, 4249 (2000).
472. Hans Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Supramolecular Self-Assembly Directed by Carborane C-H...F Interactions," *Chem. Comm.*, **24**, 2485 (2000).
473. Toralf Peymann, Carolyn B. Knobler, Saeed I. Khan and M. Frederick Hawthorne, "Dodecamethyl-*closo*-dodecaborate(2-)," *Inorg. Chem.*, **40**, 1291 (2001).
474. Andreas Maderna, Carolyn Knobler and M. Frederick Hawthorne, "Twelvefold Functionalization of an Icosahedral Surface by Total Esterification of $[B_{12}(OH)_{12}]^{2-}$: 12(12)-Closomers," *Angew. Chem. Int. Ed.*, **40**, 1662 (2001).
475. Toralf Peymann, Carolyn Knobler, Saeed I. Khan and M. Frederick Hawthorne, "Dodeca(benzyloxy)dodecaborane, $B_{12}(OCH_2Ph)_{12}$: A Stable Derivative of *hypercloso*- $B_{12}H_{12}$," *Angew. Chem. Int. Ed.*, **40**, 1664 (2001).
476. Axel Herzog, Ryan P. Callahan, Charles L.B. Macdonald, Vincent M. Lynch, M. Frederick Hawthorne and Richard J. Lagow, "A Perfluorinated Nanosphere: Synthesis and Structure of Perfluoro-deca-B-methyl-*para*-carborane," *Angew. Chem. Int. Ed.*, **40**, 2121 (2001).
477. Hans Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Modular Self-Assembly of A Microporous Solid Based upon Mercuracarborand-4 and A New Bonding Motif," *Angew. Chem. Int. Ed.*, **40**, 2124 (2001).
478. Hans Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Octahedral Coordination of Halide Ions (I-, Br-, Cl-) Sandwich Bonded with Tridentate Mercuracarborand-3 Receptors," *J. Am. Chem. Soc.*, **123**, 8543 (2001).
479. Hans Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "A Hydrogen Bonded [(Mercuracarborand-Water)₂-Benzene] π -Sandwich Complex," *Angew. Chem. Int. Ed.*, **40**, 3058 (2001).
480. Theodore W. Bitner, Timothy J. Wedge, M. Frederick Hawthorne and Jeffrey I. Zink, "Synthesis and Luminescence Spectroscopy of a Series of $[\eta^5\text{-CpFe(CO)}_2]$ Complexes Containing 1,12-Dicarba-*closo*-dodecaboranyl and -ylene Ligands," *Inorg. Chem.*, **40**, 5428 (2001).

481. Jason Thomas and M. Frederick Hawthorne, "Dodeca(carboranyl)-substituted Closures: Toward Unimolecular Nanoparticles as Delivery Vehicles for BNCT," *Chem. Comm.*, 1884 (2001).
482. George E. Laramore, K.J. Stelzer, R. Risler, J.L. Schwartz, J.J. Douglas, J.P. Einck, D.W. Nigg, C.A. Wemple, J.K. Hartwell, Y.D. Harker, Patrick R. Gavin and M. Frederick Hawthorne, "Neutron Capture Therapy (NCT) Enhancement of Fast Neutron Radiotherapy: Application to Non-Small Cell Lung Cancer," Proceedings of the Sixteenth International Conference on Application of Accelerators in Research and Industry, J.L. Duggan and I.L. Morgan, Editors. American Institute of Physics (2001).
483. M. Frederick Hawthorne, "Obituary: Donald J. Cram (1919-2001)," *Nature* 412, 696 (2001).
484. Andreas Maderna, Axel Herzog Carolyn B. Knobler and M. Frederick Hawthorne, "The Syntheses of Amphiphilic Camouflaged Carboranes as Modules for Supramolecular Construction," *J. Am. Chem. Soc.*, 123, 10423 (2001).
485. Axel Herzog, Carolyn B. Knobler and M. Frederick Hawthorne, "Synthesis, Structure, and Reactivity of *closo*-2,3,4,5,6,7,8,9,10,11-decahydroxy-1,12-*bis*-(sulfonic acid)-1,12-dicarbado-dodecaborane (12)," *J. Am. Chem. Soc.*, 123, 12791 (2001).
486. K.J. Stelzer, P. R. Gavin, R. Risler, H. Kippenes, M. F. Hawthorne, D.W. Nigg and G. E. Laramore, "Boron Neutron Capture-Enhanced Fast Neutron Therapy (BNC/FNT) for Non-Small Cell Lung Cancer in Canine Patients," *Frontiers in Neutron Capture Therapy, Vol.1*, M. Frederick Hawthorne, Kenneth Shelly and Richard J. Wiersema, Editors. Kluwer Academic/Plenum Publishers: New York, New York, 735 (2001).
487. Toralf Peymann, Carolyn B. Knobler, Saeed I. Khan, and M. Frederick Hawthorne, "Dodecahydroxy-*closo*-dodecaborate (2-)," *J. Am. Chem. Soc.*, 123, 2182 (2001).
488. Toralf Peymann, Kenneth Shelly and M. Frederick Hawthorne, "Recent Developments in the Chemistry of $[B_{12}H_{12}]^{2-}$," *Frontiers in Neutron Capture Therapy, Vol.2*, M. Frederick Hawthorne, Kenneth Shelly and Richard J. Wiersema, Editors. Kluwer Academic/Plenum Publishers: New York, New York, 775 (2001).
489. Fangbiao Li, Kenneth Shelly, Carolyn B. Knobler and M. Frederick Hawthorne, "Benzoquinone Oxidation of the $[ae-B_{20}H_{17}NH_3]^{3-}$ and $[ae-B_{20}H_{17}OH]^{4-}$ Ions," *Frontiers in Neutron Capture Therapy, Vol.2*, M. Frederick Hawthorne, Kenneth Shelly, and Richard J. Wiersema, Editors. Kluwer Academic/Plenum Publishers: New York, New York, 807 (2001).
490. Mark B. Smuckler, Satish S. Jalisatgi, Lufeng Guan, Akira Nakanishi, Harumi Kasamatsu, and M. Frederick Hawthorne, "Boron-Rich Oligomeric Phosphate Diesters that Target the Cell Nucleus *In Vitro*," *Frontiers in Neutron Capture Therapy, Vol.2*, M. Frederick Hawthorne, Kenneth Shelly and Richard J. Wiersema, Editors. Kluwer Academic/Plenum Publishers: New York, New York, 1103 (2001).
491. M. Frederick Hawthorne, Kenneth Shelly, and Fangbiao Li, "The Versatile Chemistry of the $[B_{20}H_{18}]^{2-}$ Ions: Novel Reactions and Structural Motifs," *Chem. Comm.*, 547 (2002).

492. Andreas Maderna, Ramon Huertas, M. Frederick Hawthorne, Raymond Luguya, and M. Graca H. Vicente, "Synthesis of a Porphyrin-labeled Carboranyl Phosphate Diester: A Potential New Drug for Boron Neutron Capture Therapy," *Chem. Comm.*, 16, 1784 (2002).
493. M. Frederick Hawthorne, "Further Advances at the Interface of Boron and Carbon Chemistries," Proceedings of the Eleventh International Conference on Boron Chemistry, Published by the A. Nesmeyanov Institute of Organoelement Compounds, Russian Academy of Sciences, Y. N. Bubnov, Editor., Moscow, Russia (2002).
494. Timothy J. Wedge and M. Frederick Hawthorne, "Multidentate Carborane-Containing Lewis Acids and Their Chemistry: Mercuracarborands," *Coord. Chem.*, 240, 111 (2003).
495. Michael J. Bayer, Axel Herzog, Martin Diaz, George A. Harakas, Hans Lee, Carolyn B. Knobler, and M. Frederick Hawthorne, "The Synthesis of Carboracycles Derived from B,B'-Bis(aryl) Derivatives of Icosahedral *ortho*-Carborane," *European J. Chem.*, 12, 2732-2744 (2003).
496. Zhu Yinghuai, Keith Carpenter, Ching Chi Bun, Stefan Bahnmuehler, Chan Pek Ke, Venugopal Shanmugham Srid, Leong Weng Kee, and M. Frederick Hawthorne, "(R)-Binap-Mediated Asymmetric Hydrogenation with a Rhodacarborane Catalyst in Ionic-Liquid Media," *Angew. Chem. Int. Ed.*, 42, 3792 (2003).
497. M. Frederick Hawthorne and Mark W. Lee, "A Critical Assessment of Boron Target Compounds for Boron Neutron Capture Therapy," *J. Neuro-Oncol.*, 62, 33-45 (2003).
498. M. Frederick Hawthorne, Cynthia L. Beno, David E. Harwell, Satish S. Jalisatgi, and Carolyn B. Knobler, "Intra and Intermolecular Hydrogen Bonding in Some Cobaltacarboranes", *J. Mol. Struct.*, 656, 239-247 (2003).
499. M. Frederick Hawthorne, "Some Biomedical Applications of Aromatic Polyhedral Boranes and Their Progeny," Special Publication of the King Faisal Foundation Honoring the King Faisal International Prize in Science 2003 (2003).
500. M. Frederick Hawthorne, "New Discoveries at the Interface of Boron and Carbon Chemistries," *Pure and Appl. Chem.*, 75, 1157 (2003).
501. Sean L. Johnston, Mark W. Lee, and M. Frederick Hawthorne, "Development of Cell-surface Protein Targeted CT and MR Contrast Agents", *Applied Radiology (Supplement)*, 70-77 (2003).
502. Tiejun Li, Jason Thomas, and M. Frederick Hawthorne, "Liposomes from Novel Carborane-containing Lipids for Boron Neutron Capture Therapy", Abstract of papers, 225th Annual ACS meeting, March 25, 2003. (2003).
503. Michael J. Bayer and M. Frederick Hawthorne, "An Improved Method for the Synthesis of [Closo-B₁₂(OH)₁₂]²⁻," *Inorg. Chem.*, 43, 2018-2020 (2004).
504. Timothy J. Wedge, Axel Herzog, Ramón Huertas, Mark W. Lee, Carolyn B. Knobler and M. Frederick Hawthorne, "Metal-Metal Communication Through Carborane Cages Supporting Electroactive [η⁵-CpFe(CO)₂ Substituents", *Organometallics*, 23, 482 (2004).

505. M. Frederick Hawthorne, Jeffrey I. Zink, Johnny M. Skelton, Michael J. Bayer, Chris Liu, Ester Livshits, Roi Baer, and Daniel Neuhauser, "Electrical or Photocontrol of the Rotary Motion of a Metallocarborane", *Science*, **303**, 1849-1851 (2004).
506. D. Scott Wilbur, Ming-Kuan Chyan, Donald K. Hamlin, Brian B. Kegley, Ruedi Risler, Pradip M. Pathare, Janna Quinn, Robert L. Vessella, Catherine Foulon, Michael Zalutsky, Timothy J. Wedge, and M. Frederick Hawthorne, "Reagents for Astatination of Biomolecules. Comparison of the *In Vivo* Distribution and Stability of Some Radioiodinated and Astatinated Benzamidyl- and *nido*-Carboranyl Compounds", *Bioconj. Chem.*, **15**, 203-223 (2004).
507. Michael J. Bayer, Satish S. Jalisatgi, Brian Smart, Axel Herzog, Carolyn B. Knobler, and M. Frederick Hawthorne, "B-Octamethyl-[12]Mercuracarborand-4 as Host for "Naked" Fluoride Ions", *Angew. Chem. Int. Ed.*, **116**, 1890-1893 (2004).
508. Axel Herzog, Satish S. Jalisatgi, Carolyn B. Knobler, Timothy J. Wedge, and M. Frederick Hawthorne, "Camouflaged Carborarods Derived from B-permethyl-1,12-diethynyl-para- and B-octamethyl-1,7-diethynyl-meta-carborane Modules", *Chem. Eur. J.*, **11**, 7155-7174 (2005).
509. Hershel Jude, Hendrik Disteldorf, Sonja Fischer, Timothy J. Wedge, Adam M. Hawkridge, Atta M. Arif, M. Frederick Hawthorne, David C. Muddiman, and Peter J. Stang, "Coordination Driven Self-assemblies with a Carborane Backbone", *J. Am. Chem. Soc.*, **127**, 12131-12139 (2005).
510. Ling Ma, Julie Hamdi, Jiaying Huang, and M. Frederick Hawthorne, "Camouflaged Carborane Amphiphiles: Synthesis and Self-assembly", *Inorg. Chem.*, **44**, 7249-7258 (2005).
511. Bhaskar M. Ramachandran, Carolyn B. Knobler, and M. Frederick Hawthorne, "Example of an Intramolecular, Non-classical C-H-- π Hydrogen Bonding Interaction in an Arylcarborane Derivative", *J. Mol. Struct.* (2005).
512. Omar K. Farha, Richard L. Julius, Mark W. Lee, Ramon E. Huertas, Carolyn B. Knobler, and M. Frederick Hawthorne, "Synthesis of Stable Dodeca-(alkoxy) Derivatives of Hypercloso-B₁₂H₁₂", *J. Am. Chem. Soc.*, **127**(51), 18243-18251 (2005).
513. Ling Ma, Julie Hamdi, Frances Wong, and M. Frederick Hawthorne, "Closomers of High Boron Content: Synthesis, Characterization, and Potential Application as Unimolecular Nanoparticle Delivery Vehicles for BNCT", *Inorg. Chem.*, **45**, 278-285 (2005).
514. Tiejun Li, Satish S. Jalisatgi, Michael J. Bayer, Andreas Maderna, Saeed I. Khan, and M. Frederick Hawthorne, "Organic Syntheses on an Icosahedral Borane Surface: Closomer Structures with Twelfelfold Functionality", *J. Am. Chem. Soc.*, **127**, 17832-17841 (2005).
515. Bhaskar M. Ramachandran and M. Frederick Hawthorne, "Synthesis and Structural Characterization of Symmetrical *Closo*-4,7-I₂-1,2-C₂B₁₀H₁₀ and [(CH₃)₃NH][*nido*-2,4-I₂-7,8-C₂B₉H₁₀]" *Inorg. Chem.*, **45**, 336-340 (2005).
516. Tiejun Li, Julie Hamdi, and M. Frederick Hawthorne, "Unilamellar Liposomes with Enhanced Boron Content", *Bioconj. Chem.* (2005) (In press).

517. Omar K. Farha, Richard L. Julius, M. Frederick Hawthorne, "Synthesis of a Homotrifunctional Conjugation Reagent Based on Maleimide Chemistry", *Tetrahedron Letters* (**2005**) (Submitted).
518. Mark W. Lee, Omar Farha, Corwin Hansch, and M. Frederick Hawthorne, "Substituent Effects on the Electronic Properties of Ether Derivatives of *Closo*-B₁₂(OH)₁₂; Pseudo-metal Boron Cages with Tunable Redox Potentials", *J. Am. Chem. Soc.*, (**2005**) (Submitted).
519. Bradley W. Schuller. Peter J. Binns. Kent J. Riley, Ling Ma, Frederick Hawthorne, and Jeffrey A. Coderre, "Selective Irradiation of the Vascular Endothelium Has No Effect on the Survival of Murine Intestinal Crypt Stem Cells", *Proc. Nat. Acad. Sci.* (**2005**) (In press).
520. M. Frederick Hawthorne, Bhaskar M. Ramachandran, Robert D. Kennedy, Carolyn B. Knobler, "Approaches to Rotary Molecular Motors", Proceedings of the Twelfth International Meeting on Boron Chemistry (IMEBORON XII), *Pure Appl. Chem.* (**2006**) (Submitted).

Book Chapters

1. G.S. Hammond and M.F. Hawthorne, Chapter 3, "Steric Effects in Aromatic Substitution" in *Steric Effects in Organic Chemistry*, Edited by M.S. Newman, John Wiley and Sons, Inc., New York, New York (**1956**).
2. M.F. Hawthorne, "The Chemistry of Decaborane-14" Chapter in *Advances in Inorganic Chemistry and Radiochemistry*, Academic Press, Vol. V, Academic Press, Inc., New York (**1963**).
3. M.F. Hawthorne, "Boron Hydrides" Chapter in *The Preparation of Boron and Its Compounds*, Edited by E.L. Muetterties, John Wiley and Sons, Inc., New York, New York (**1967**).
4. M.F. Hawthorne and R.L. Pilling, "The Preparation of the B₁₀H₁₀²⁻ Ion," Vol. IX, *Inorganic Syntheses*, Edited by S. Young Tyree, Jr., McGraw-Hill Publishing Co., Inc., New York, New York (**1967**).
5. M.F. Hawthorne, T.D. Andrews, P.M. Garrett, F.P. Olsen, M. Reintjes, F.N. Tebbe, L.F. Warren, P.A. Wegner and D.C. Young, "Icosahedral Carboranes and Intermediates Leading to the Preparation of Carbametallic Boron Hydride Derivatives," Vol. 10, *Inorganic Syntheses*, Edited by E.L. Muetterties, McGraw-Hill Publishing Co., Inc., New York, New York (**1967**).
6. G.B. Dunks and M.F. Hawthorne, "*Closo*-Heteroboranes Exclusive of Carboranes," Chapter 11, *Boron Hydride Chemistry*, Edited by E.L. Muetterties, Academic Press, Inc., New York, New York (**1975**).

7. M.F. Hawthorne, "Search for Cluster Catalysis with Metallacarboranes" in *Molecular Structure and Energetics*, Coedited by Joel Liebman and Arthur Greenberg, VCH Publishers, Inc., Deerfield Beach, Florida (1987).
8. David M. Schubert, William S. Rees, Jr., Carolyn B. Knobler and M. Frederick Hawthorne, "Novel Aluminum- and Silicon-Containing Carboranes," *Proceedings of The 3rd Annual Conference on Ultrastructure Processing of Ceramics, Glasses and Composites*, Edited by J.D. Mackenzie, John Wiley and Sons, Inc.: New York, New York (1988).
9. Rajesh Khattar and M. Frederick Hawthorne, "Metallacarboranes of the Lanthanide and Alkaline-Earth Metals: Potential High Energy Fuel Additives" in *Chemistry of Energetic Materials*, Edited by G. A. Olah and D. Squire, Academic Press, San Diego, California (1991).
10. M. Frederick Hawthorne, Omar Farha, Richard Julius, Ling Ma, Satish S. Jalisatgi, Tiejun Li, and Michael Bayer, "Polyhedral Boranes in the Nanoworld" in *Modern Aspects of Main Group Chemistry*, ACS Symposium Series (In press, 2004).

Books

1. M. Frederick Hawthorne, Kenneth Shelly and Richard J. Wiersema, Editors, *Frontiers in Neutron Capture Therapy, Vol. 1*, Kluwer Academic/Plenum Publishers: New York, New York (2001).
2. M. Frederick Hawthorne, Kenneth Shelly and Richard J. Wiersema, Editors, *Frontiers in Neutron Capture Therapy, Vol. 2*, Kluwer Academic/Plenum Publishers: New York, New York (2001).

Patents

- U.S. 2,954,411 - Process for the Preparation of Cyclopropanes.
Marion F. Hawthorne, May 10, 1959.
- U.S. 3,151,169 - Boron-Containing Carbinols Useful in Propellants.
Marion F. Hawthorne and Samuel F. Reed, Jr., September 29, 1964.
- U.S. 3,154,520 - Boron-Substituted Silanes and Polymers Therefrom.
John A. Dupont and Marion F. Hawthorne, October 27, 1964.
- U.S. 3,228,986 - Boron-Containing Compounds.
John A. Dupont and Marion F. Hawthorne, January 11, 1966.
- U.S. 3,228,987 - Boron-Containing Compounds.
John A. Dupont and Marion F. Hawthorne, January 11, 1966.

- U.S. 3,254,096 - Derivatives of Biscarborane.
John A. Dupont and Marion F. Hawthorne, May 31, 1966.
- U.S. 3,254,117 - Carbonanylacetylenes and Acid, Alcohol and Halide Derivatives Thereof.
John A. Dupont and Marion F. Hawthorne, May 31, 1966.
- U.S. 3,453,092- Diammoniododecaborane(12) and Diammoniododecaborane(12) Hydrazinate.
Marion F. Hawthorne and A.R. Pitochelli, August 1, 1969.
- U.S. 3,917,719 - 4-Nitro-*m*-cresol.
R.A. Baldwin, M.F. Hawthorne and M.T. Cheng, November 4, 1975.
- U.S. 3,967,989 - High Energy Propellant Compositions Including Vinyl
Decaborane-Polyester Copolymer Binder.
Marion F. Hawthorne, July 6, 1976.
- U.S. 3,976,596 - Hydridometallic Carborane Catalytic Compounds.
Marion F. Hawthorne and Timm E. Paxson, August 24, 1976.
- U.S. 4,001,058 - Process for the Preparation of Dekenyl Acrylates and
Methacrylates and Products Thereof.
Marion F. Hawthorne, January 4, 1977.
- U.S. 4,062,883 - Polymer-Bound Metallocarborane Catalyst Product and Process.
Marion F. Hawthorne and William Kalb, December 13, 1977.
- U.S. 4,363,747 - Metallocarborane Precursor and Catalyst.
Marion F. Hawthorne and Mark S. Delaney, December 14, 1982.
- U.S. 4,824,659 - Antibody Conjugates with Boron or Functional Group-Containing
Polymers .
Marion F. Hawthorne, April 25, 1989.
- U.S. 5,066,479 Metallocarborane Chelates Conjugated to Antibodies for
Radioimmunoassay and Radiomtherapy.
Marion F. Hawthorne, November 19, 1991.
- U.S. 5,648,532 - Compositions for Boron Neutron Capture Therapy and Methods
Thereof.
Marion F. Hawthorne, Kenneth J. Shelly and Debra A. Feakes, June 3, 1993.
- U.S. 6,074,625 - Boron-Containing Hormone Analogs and Methods of Their Use in
Imaging or Killing Cells Having Hormone Receptors.
Marion F. Hawthorne and M. T. Groudine, June 27, 1994.
- U.S. 5,666,642 - Extraction of Cesium and Strontium Ions from Nuclear Waste.
Marion F. Hawthorne and G. B. Dunks, April 21, 1995.
- U.S. 5,698,169 - Methods and Agents for the Extraction of Cesium and Strontium
from Nuclear Waste.
Marion F. Hawthorne and G. B. Dunks, December 16, 1997.
- U.S. 5,856,551 Macromolecular Structure for Boron Neutron Capture Therapy.

		Marion F. Hawthorne and Robert R. Kane, January 5, 1999
U.S.	5,888,473 -	Liposome Compositions for Boron Neutron Capture Therapy and Methods Thereof. Marion F. Hawthorne, Kenneth J. Shelly and Debra A. Feakes, March 30, 1999.
U.S.	5,985,117 -	Ion-Selective Membrane Sensors with Mercuracarborand Ionophore. Leonidas G. Bachas and M. F. Hawthorne, November 16, 1999.
U.S.	6,248,916 -	Macromolecular Structures for Boron Neutron Capture Therapy. Marion F. Hawthorne and Robert R. Kane, June 19, 2001.
U.S.	6,274,116	Compositions for Boron Delivery to Mammalian Tissue. Marion F. Hawthorne, Kenneth J. Shelly and Debra A. Feakes, August 14, 2001.
U.S.	6,323,372	Synthesis of Perhydroxydodecaborate Salts and Related Species. Marion F. Hawthorne and Toralf Peymann, November 27, 2001.
U.S.	6,355,840	Synthesis of Permethyl dodecaborate and Paramagnetic Dodecaborate Salt. Marion F. Hawthorne and Toralf Peymann, April 12, 2002.
U.S.	6,517,808	Methods for Boron Delivery to Mammalian Tissue. Marion F. Hawthorne, Debra A. Feakes and Kenneth J. Shelly, February 11, 2003.
U.S.	6,664,426	Ether and Ester Derivatives of the Perborate Icosahedron. Marion F. Hawthorne, Toralf Peymann, and Andreas Maderna, December 2003.
Pending		Rapid Activation of Fluoride-18 for use in Positron Emission Tomography. Marion F. Hawthorne, Martin Diaz and Brian Smart.
Pending		Organofunctionalized Per-B Hydroxy Polyhedral Boranes. Marion F. Hawthorne, Andreas Maderna and Toralf Peymann.
Pending		Fuel Blends for Hydrogen Generators. Michael T. Kelly, Ying Wu, Marion F. Hawthorne.
Pending		Redox Active Molecules with Tunable Oxidation Potentials. Marion F. Hawthorne, Mark Lee, Omar K. Farha.
Pending		Siloxy Derivatives with Tunable Properties. Marion F. Hawthorne, Mark Lee, Omar K. Farha.
Pending		A Homotrifunctional Conjugation Reagent Based on Maleimide Chemistry Marion F. Hawthorne, Richard L. Julius, Omar K. Farha