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PERSONAL

Born: March 4, 1942, Silver Spring, Maryland

Married 1970 to Rosalind Tuthill, one child, Cathy

EDUCATION

Ph.D., 1971, The Pennsylvania State University (Geochemistry)

A.B., 1964, Princeton University (Geology and Chemistry)

POSITIONS HELD

Assistant Professor, University of Maryland, 1970-76

Associate Professor, University of Maryland, 1976-1984

Professor, University of Maryland, 1984-2004

Director, Maryland Water Resources Research Center, 1990 -2001

Professor Emeritus, University of Maryland, 2005-

HONORS

Magna cum laude graduate, Princeton University, 1964

Fellow, Mineralogical Society of America, 1985

Environmental Science Fellowship, American Association for the Advancement of Science: 1988

Senior Visiting Fellow, Manchester University, U.K., 1989-1990

Allan Cox Visiting Professorship, Stanford University, 1998-1999

Distinguished Scholar-Teacher, University of Maryland, 2001-2002

University of Maryland Rainmaker (V.P.'s list of top 100 in research support) 2003-2004

Fulbright Scholar, Rudjer Boškovic Institute, Zagreb Croatia, 2005-2006

EXPERTISE

Aqueous and environmental geochemistry, including: geochemistry at redox extrema (e.g. sulfidic environments, chlorinated and ozonated water systems), geochemistry of trace metals, metalloids and xenobiotics; stable and radioactive isotopes in aquifers and estuaries, applied thermodynamics and kinetics.

PRINCIPAL PROFESSION SERVICE

American Chemical Society: Division of Geochemistry Chair-Elect/Chair, 1984-85; Co-Convener, *Symposium on Marine Chemistry in the Coastal Environment*, 1975; Co-convener, *Symposium on Aquatic and Surface Photochemistry*, 1992; Convener, *Symposium on Synchrotron X-rays in the Earth and Environmental Sciences*, 1997; Member, Editorial Board, *Environmental Science and Technology*, 1987-92; Co-convener, *Symposium on Halogen and Halamine Chemistry in Biology, Health and the Environment*, 2005.

Geochemical Society: Treasurer, 1975-78; Technical Program Chairman, 1st Goldschmidt Conference, 1988; Associate Editor, *Geochimica et Cosmochimica Acta* 2002-present.

U.S. Environmental Protection Agency: Convener, *Workshop on Fate and Effects of Chlorine*, Solomons, MD, 1976; Site visitor and reviewer of Disinfection By-Products Program, Cincinnati, 1983

NAS -NRC: Member of panel on Chemistry of Water Disinfectants, 1978-79; Contributed to *Drinking Water and Health*, Vol. 2 National Academy of Sciences, Washington DC (1980).

National Science Foundation: Steering committee for workshop to design an environmental biogeochemistry program, 1994; Panel Member, Water and Watersheds, June 1995; Panel Member and Site Visitor, EMSI and CRAEMS Programs, July 2000, July 2002.

U.S. Geological Survey: Member, Scientific Liaison Committee for Potomac River NAWQA Program, 1991-2001 ; Member, Scientific Liaison Committee for Susquehanna River NAWQA Program, 1991-2001

U.S. Department of Agriculture: Chair, external review committee for Environmental Chemistry Laboratory, 1994

Department of Energy: Member, *Workshop on Molecular Environmental Science*, 1995; Panel member, Hydrology Program, 1996

International Geological Congress: Co-Chair, Geohost Committee 1989.

Chesapeake Research Consortium (a Mid-Atlantic consortium of research institutions), Member, Board of Trustees, 1991-2000.

Geological Society of Washington: President Elect/President, 1995-6, Councilor, 1972-74; Vice President, 1984; Chair, Awards Comm. 1991; Chair, Audit Comm. 1992.

Ohio State University, 2001-2005, Member, Scientific Advisory Board, Environmental Molecular Science Institute.

Stanford University, 2004-2008, Chair, Scientific Advisory Board, Environmental Molecular Science Institute.

Geochimica et Cosmochimica Acta, Associate Editor, 2002-present.

BOOKS

1. Hall, L.W., Jr., Helz, G.R., and Burton, D.T., 1981. *Power Plant Chlorination: A Biological and Chemical Assessment*, Ann Arbor Science, 236 p.
2. Helz, G.R., Zepp, R.G. and Crosby, D.(Eds.) 1994, *Aquatic and Surface Photochemistry*, CRC/Lewis Publishers, Boca Raton, FL, 552 pp.

RESEARCH PAPERS

1. Helz, G.R., and Holland, H.D., 1965, The Solubility and Geologic Occurrence of Strontianite, *Geochimica et Cosmochimica Acta*, **29**, 1305-15.
2. Helz, G.R. 1971, Hydrothermal Solubility of Magnetite, Ph.D. Dissertation, Pennsylvania State University, University Park PA 110pp. (University Microfilms, 72-9475)
3. Hill, J.M., and Helz, G.R., 1972, Copper and Zinc in Estuarine Waters Near a Coal-Fired Electric Power Plant -- Correlation with Oyster Greening, *Environmental Letters*, **5**, 165-74.
4. Helz, G.R., and Sinex, S.A., 1974, Chemical Equilibria in the Thermal Springs of Virginia, *Geochimica et Cosmochimica Acta*, **38**, 1807-20.
5. Harris, R.L., Helz, G.R., and Cory, R.L., 1975, Processes Affecting the Vertical Distribution of Trace Components in the Chesapeake Bay, In Marine Chemistry in the Coastal Environment (T.M. Church, Ed.), Amer. Chem. Soc. Symposium Series, **18**, 175-85.
6. Helz, G.R., Huggett, R.J., and Hill, J.M., 1975, Behavior of Mn, Fe, Cu, Zn, Cd and Pb Discharged from a Wastewater Treatment Plant into an Estuarine Environment, *Water Research*, **9**, 631-6.
7. Bailey, S.M., Helz, G.R., and Harris, R.L., 1975, Investigation of the Transport of Metals and Orthophosphate Away from a Sewage Treatment Plant Outfall, *Environmental Letters*, **10**, 159-69.
8. Helz, G.R., 1976, Trace Element Inventory for the Northern Chesapeake Bay with Emphasis on the Influence of Man, *Geochimica et Cosmochimica Acta*, **40**, 573-80.
9. Sugam, R. and Helz, G.R., 1976, Apparent Ionization Constant of Hypochlorous Acid in Seawater, *Environmental Science and Technology*, **10**, 384-86.
10. Herr, F.L., and Helz, G.R., 1976, Measurement of the Activity Coefficient of Aqueous NaHS to 80°C and 0.2 m in the System NaHS-H₂S-H₂O, *Journal of Solution Chemistry*, **5**, 833-52.
11. Sugam R. and Helz G.R. 1977. Speciation of Chlorine Produced Oxidants in Marine Waters: Theoretical Aspects. *Chesapeake Science*. **18**, 113-115.
12. Helz, G.R., Hsu, R.Y., and Block, R.M., 1978, Bromoform Production by Oxidative Biocides in Marine Waters: In Ozone/Chlorine Dioxide Oxidation Products of Organic Materials (R.G. Rice, J.A. Cotruvo, Eds.), Ozone Press International. p. 68-76.
13. Helz, G.R., Sugam, R., and Hsu, R.Y., 1978, Chlorine Degradation and Volatile Halocarbon Generation in Estuarine Waters, in Water Chlorination: Environmental Impact and Health Effects, Vol. 2, R.L. Jolley, D.H. Hamilton, and H. Gorchev, Ann Arbor Science Pub., p. 209-222.
14. Herr, F.L. and Helz, G.R., 1978, On the Possibility of Bisulfide Ion Pairs in Natural Brines and Hydrothermal Solutions, *Economic Geology*, **73**, 73-8.
15. Helz, G.R., and Hsu, R.Y., 1978, Volatile Chloro- and Bromo-Carbons in Coastal Waters, *Limnology and Oceanography*, **23**, 858-869.
16. Helz, G.R., and Wyllie, P.J., 1979, Liquidus Relationships in the System CaCO₃-Ca(OH)₂-CaS and the Solubility of Sulfur in Carbonatite Magmas; *Geochimica et Cosmochimica Acta*, **43**, 259-65.

17. Kosak-Channing, L., and Helz, G.R., 1979, Ozone Reactivity with Seawater Components, *Ozone: Science and Engineering*, **1**, 39-46.
18. Horzempa, L.M., and Helz, G.R., 1979, Controls on the Stability of Sulfide Sols; Colloidal Covellite as an Example, *Geochimica et Cosmochimica Acta*, **43**, 1645-50.
19. Stewart, M.E., Blogoslawski, W.J., Hsu, R.Y., and Helz, G.R., 1979, By-Products of Oxidative Biocides in Marine Waters: Toxicity to Oyster Larvae, *Marine Pollution Bulletin*, **10**, 166-69.
20. Sinex, S.A., Cantillo, A.Y., and Helz, G.R., 1980, Accuracy of Acid Extraction Methods for Trace Metals in Sediments, *Analytical Chemistry*, **52**, 2342-46.
21. Helz, G.R., 1980, Anthropogenic C1 and C2 Halocarbons: Potential as Coastal Water-Mass Tracers, In Hydrocarbons and Halogenated Hydrocarbons in the Aquatic Environment, (B.K. Afghan and D. Mackay, Eds.), Plenum Press, p. 435-44.
22. Helz, G.R., Sigleo, A.C., and Hill, C., 1980, The Mechanism of Chlorine Degradation in Estuarine Waters, In Water Chlorination: Environmental Impact and Health Effects (R.L. Jolley, Ed.), Ann Arbor Science, **3**, 381-88.
23. Sugam, R., and Helz, G.R., 1980, Seawater Chlorination: A Description of Chemical Speciation, In Water Chlorination: Environmental Impact and Health Effects (R.L. Jolley, Ed.), Ann Arbor Science, **3**, 421-27.
24. Sigleo, A.C., Helz, G.R., and Zoller, W.H., 1980, Organic-Rich Colloidal Material in Estuaries and Its Alteration by Chlorine, *Environmental Science and Technology*, **14**, 673-79.
25. Richardson, L.B., Burton, D.T., Helz, G.R., and Roderick, J.C., 1981, Residual Oxidant Decay and Bromate Formation in Chlorinated and Ozonated Seawater, *Water Research*, **15**, 1067-74.
26. Sigleo, A.C., and Helz, G.R., 1981, Composition of Estuarine Colloidal Material: Major and Trace Elements, *Geochimica et Cosmochimica Acta*, **45**, 2501-09.
27. Sinex, S.A., Helz, G.R., 1981, Regional Geochemistry of Trace Elements in Chesapeake Bay Sediments, *Environmental Geology*, **3**, 315-23.
28. Sugam, R., and Helz, G.R., 1981, Chlorine Speciation in Seawater: A Metastable Equilibrium Model for Cl and Br Species, *Chemosphere*, **10**, 41-57.
29. Sigleo, A.C., Hoering, T.C., and Helz, G.R., 1982, Composition of Estuarine Colloidal Material: Organic Components, *Geochimica et Cosmochimica Acta*, **46**, 1619-26.
30. Sinex, S.A., and Helz, G.R., 1982, Entrapment of Zinc and Other Trace Elements in a Rapidly Flushed, Industrialized Harbor, *Environmental Science and Technology*, **16**, 820-25.
31. Helz, G.R., and Horzempa, L.M., 1983, EDTA as a Kinetic Inhibitor of Copper (II) Sulfide Precipitation, *Water Research*, **17**, 167-72.
32. Kosak-Channing, L., and Helz, G.R., 1983, The Solubility of Ozone in Water and 0-0.6M Sulfate Solutions, 5-30 °C, *Environmental Science and Technology*, **17**, 145-49.
33. Helz, G.R., Jaworske, D.A. and Kosak-Channing, L. 1983, Experience with Amperometric Titrations for Total Chlorine in the Micrograms-Per-Liter Range: Limitations to Accuracy. In: Water Chlorination, Environmental Impact and Health Effects, (R.G. Jolley, W.A. Brungs, J.A. Cotruvo, R. B. Cumming, J.S. Mattice and V. Jacobs, Eds.), **4**, 667-680, Lewis Publishers, Chelsea, MI.

34. Helz, G.R., Dotson, D.A. and Sigleo, A.C. 1983, Chlorine Demand: Studies Concerning its Chemical Basis. In: Water Chlorination, Environmental Impact and Health Effects, (R.G. Jolley, W.A. Brungs, J.A. Cotruvo, R. B. Cumming, J.S. Mattice and V. Jacobs, Eds.), **4**, 181-190, Lewis Publishers, Chelsea, MI.
35. Sigleo, A.C., Hare, P.E., and Helz, G.R., 1983, The Amino Acid Composition of Estuarine Colloidal Material, *Estuarine, Coastal and Shelf Science*, **17**, 87-96.
36. Cantillo, A.Y., Sinex, S.A., and Helz, G.R., 1984, Evaluation of a Lithium Metaborate Fusion - DC Plasma Emission Method for Elemental Analysis of Estuarine Sediments, *Analytical Chemistry*, **56**, 33-37.
37. Uhler, A.D., and Helz, G.R., 1984, Precipitation of PbS from Solutions Containing EDTA, *Journal of Crystal Growth*, **66**, 401-11.
38. Helz, G.R., Sugam, R. and Sigleo, A.C., 1984, Chemical Modifications of Estuarine Water by a Power Plant Using Continuous Chlorination, *Environmental Science and Technology*, **18**, 192-99.
39. Helz, G.R., and Kosak-Channing, L., 1984, Dechlorination of Wastewater and Cooling Water, *Environmental Science and Technology*, **18**, 48A-55A.
40. Uhler, A.D., and Helz, G.R., 1984, Solubility Product of Galena at 298 K: A Possible Explanation for Apparent Supersaturation in Nature, *Geochimica et Cosmochimica Acta*, **48**, 1155-60.
41. Officer, C.B., Lynch, D.R., Setlock, G.H., and Helz, G.R., 1984, Recent Sedimentation in Chesapeake Bay, In The Estuary as a Filter, V.S. Kennedy (Ed.), p. 131-57, Academic Press, Orlando.
42. Dotson, D.A., and Helz, G.R., 1985, Chlorine Decay Chemistry in Natural Waters, In Water Chlorination, Environmental Impact and Health Effects, (R.G. Jolley, R.J. Bull, W.P. Davis, S. Katz, M.H. Roberts, and V. Jacobs, Eds.), **5**, 713-22, Lewis Publishers, Chelsea, MI.
43. Jaworske, D.A., and Helz, G.R., 1985, Rapid Oxidant Demand: Methods for Study, In Water Chlorination Chemical Environmental Impact and Health Effects, (R.L. Jolley, R.J. Bull, W.P. Davis, S. Katz, M.H. Roberts, and V. Jacobs, Eds.), **5**, 1081-1090, Lewis Publishers, Chelsea, MI.
44. Helz, G.R., and Kieber, R.J., 1985, Hydrogen Peroxide: A Minor But Significant Contribution to Chlorine Demand, In Water Chlorination: Environmental Impact and Health Effects, (R.L. Jolley, R.J. Bull, W.P. Davis, S. Katz, M.H. Roberts, and V. Jacobs, Eds.), **5**, 1033-40, Lewis Publishers, Chelsea, MI.
45. Helz, G.R., Uhler, A.D., and Sugam, R., 1985, Dechlorination and Trihalomethane Yields, *Bulletin of Environmental Contamination and Toxicology*, **34**, 497-503.
46. Jaworske, D.A., and Helz, G.R., 1985, Use of a Rotating Ring Disc Electrode to Study Fast Bromine Demand Reactions, *International Journal of Environmental Analytical Chemistry*, **19**, 189-202.
47. Helz, G.R., Sinex, S.A., Ferri, K.L. and Nichols, M., 1985, Processes Controlling Fe, Mn, and Zn in Sediments of Northern Chesapeake Bay, *Estuarine, Coastal and Shelf Science*, **21**, 1-16.
48. Jaworske, D.A. and Helz, G.R., 1985, Rapid Consumption of Bromine Oxidants in River and Estuarine Waters, *Environmental Science and Technology*, **19**, 1188-91.
49. Helz, G.R., Setlock, G.H., Cantillo, A.Y., and Moore, W.S., 1985, Processes Controlling the Regional Distribution of ²¹⁰Pb, ²²⁶Ra and Anthropogenic Zinc in Estuarine Sediments, *Earth and Planetary Science Letters*, **76**, 23-34.
50. Dotson, D.A., Helz, G.R., and Sugam, R., 1986, Mineralization of Organic Matter and Other Chemical Effects of Chlorination, *Water Research*, **20**, 1031-39.

51. Helz, G.R., and Sinex, S.A., 1986, Influence of Infrequent Floods on the Trace Metal Composition of Estuarine Sediments, *Marine Chemistry*, **20**, 1-11.
52. Kieber, R.J., and Helz, G.R., 1986, Two-Method Verification of Hydrogen Peroxide Determinations in Natural Waters, *Analytical Chemistry*, **58**, 2312-15.
53. Shea, D., and Helz, G.R., 1987, Kinetics of Inhibited Crystal Growth: Precipitation of CuS from Solutions Containing Chelated Copper (II), *Journal of Colloid and Interface Science*, **116**, 373-83.
54. Helz, G.R., Dai, J.H., Kijak, P.J., Fendinger, N.J., and Radway, J.C., 1987, Processes Controlling the Composition of Acid Sulfate Solutions Evolved from Coal, *Applied Geochemistry*, **2**, 427-436.
55. Purdy, C.G., Mignerey, A.C., Helz, G.R., Drummond, D.D., Kubik, P.W., Elmore, D. and Hemmick, T., 1987, C1-36: A Tracer in Groundwater in the Aquia Formation of Southern, Maryland, *Nuclear Instruments and Methods in Physics Research*, **B92**, 372-375.
56. Helz, G.R., and Huggett, R.J., 1987, Contaminants in Chesapeake Bay: The Regional Perspective, Ch. 13. p. 270-297, In S.K. Majumdar, L.W. Hall, Jr. and H.M. Austin. Contaminant Problems and Management of Living Chesapeake Bay Resources. Pennsylvania Academy of Science, Philadelphia.
57. Dai, Jihong and Helz, G.R., 1988, High Performance Liquid Chromatographic Determination of Nitrotriacetic Acid, Ethylenediaminetetraacetic Acid and Related Aminopolycarboxylic Acids Using an Amperometric Detector, *Analytical Chemistry*, **60**, 301-305.
58. Kijak, P.J., and Helz, G.R., 1988, Fate of Sulfur (IV) Dechlorinating Agents in Natural Waters: Effect of Suspended Sediments, *Environmental Science and Technology*, **22**, 1171-1177.
59. Shea, D., and Helz, G.R., 1988, The Solubility of Copper in Sulfidic Waters: Sulfide and Polysulfide Complexes in Equilibrium with Covellite, *Geochimica et Cosmochimica Acta*, **52**, 1815-1825.
60. Shea, D., and Helz, G.R., 1989, Solubility Product Constants of Covellite and a Poorly Crystalline Copper Sulfide Precipitate at 298 K. *Geochimica et Cosmochimica Acta*, **53**, 229-236.
61. Nweke, A.C. and Helz, G.R., 1990, A Method for Determining the Completeness of Dechlorination with Sulfite. In Water Chlorination: Chemistry, Environmental Impact and Health Effects. (R.L. Jolley, L.W. Condie, J.D. Johnson, S. Katz, R.A. Minear, J.S. Mattice and V.A. Jacobs, Eds.) Lewis Publishers, **6**, 741-750.
62. Kieber, R. J. and Helz, G. R. 1992. Photoreduction of Aqueous Chromium (VI). *Environmental Science and Technology*. **26**, 307-312.
63. Helz, G.R. and Valette-Silver, J.N. 1992. Beryllium-10 as an Indicator of Sediment Provenance: An Example from Chesapeake Bay. *Estuarine Coastal and Shelf Science*, **34**,459-69.
64. Purdy, C.B., Burr, G., Rubin, M., Helz, G.R. and Mignerey, A.C. 1992. Dissolved Organic and Inorganic ¹⁴C Concentrations and Ages for Coastal Plain Aquifers in Southern Maryland. *Radiocarbon*, **34**, 654-663.
65. Daskalakis, K. and Helz, G.R. 1992. The Solubility of CdS (Greenockite) in Sulfidic Waters at 25°C. *Environmental Science and Technology*, **26**, 2462-2468.
66. Helz, G.R., Charnock, J.M., Vaughan, D.J. and Garner, C.D. 1993. Multinuclearity of Aqueous Copper and Zinc Bisulfide Complexes: An EXAFS Investigation. *Geochimica et Cosmochimica Acta*, **57**, 15-25.
67. Daskalakis, K. and Helz, G.R. 1993. The Solubility of Sphalerite (ZnS) in Sulfidic Solutions at 25°C and 1 atm Pressure. *Geochimica et Cosmochimica Acta*. **57**,4923-4931.

68. Hainsworth, L.J., Mignerey, A.C., Helz, G.R., Sharma, P. and Kubik, P.W. 1994, Modern Chlorine-36 Deposition in Southern Maryland, U.S.A. *Nuclear Instruments and Methods in Physics Reviews*. **B92**, 345-349.
69. Thompson, R. A. and Helz, G.R. 1994. Copper Speciation in Sulfidic Solutions at Low Sulfur Activity. Further Evidence of Cluster Complexes? *Geochimica et Cosmochimica Acta*. **58**, 2971-2983.
70. Helz, G.R. and Nweke, A.C. 1995. Incompleteness of Wastewater Dechlorination. *Environmental Science Technology* **29**, 1018-1022.
71. Kieber, R.J. and Helz, G.R. 1995. Temporal and Seasonal Variation of Hydrogen Peroxide Levels in Estuarine Waters. *Estuarine, Coastal and Shelf Science*, **40**, 495-503.
72. Paquette, K. and Helz, G.R. 1995. Solubility of Cinnabar (Red HgS) and Implications for Mercury Speciation in Sulfidic Waters. *Water, Air and Soil Pollution*, **80**, 1053-1056.
73. Helz, G.R., Tossell, J. Charnock, J.M., Patrick, R.A.D., Vaughan, D.J. and Garner, C.D. 1995. Oligomerization in Arsenic (III) Sulfide Solutions: Theoretical Constraints and Spectroscopic Evidence. *Geochimica et Cosmochimica Acta*, **59**, 4591-4604.
74. Purdy, C.B., Helz, G.R., Mignerey, A.C., Kubik, P.W., Elmore, D., Sharma, P., and Hemmick, T. 1995, Aquia Aquifer Dissolved Cl⁻ and ³⁶Cl/Cl: Implications for Flow Velocities. *Water Resources Research*, **32**, 1163-1171.
75. Helz, G.R., Miller, C.V., Charnock, J.M., Mosselmans, J.F.W., Parttrick, R.A.D., Garner, C.D. and Vaughan, D.J. 1996. Mechanism of Molybdenum Removal from the Sea and Its Concentration in Black Shales; EXAFS Evidence. *Geochimica et Cosmochimica Acta*, **60**, 3631-3642.
76. Patrick, R.A.D., Mosselmans, J.F.W., Charnock, J.M., England, K.E.R., Helz, G.R., Garner, C.D. and Vaughan, D.J. 1997. The Structure of Amorphous Copper Sulfide Precipitates: An X-ray Absorption Study. *Geochimica et Cosmochimica Acta*, **61**, 2023-2036.
77. Paquette, K. and Helz, G.R. 1997, Inorganic Speciation of Mercury in Sulfidic Waters; The Importance of Zero-Valent Sulfur. *Environmental Science and Technology*. **31**, 2148-2153
78. Rock, M.L., Kearney, P.C. and Helz, G.R. 1998, Innovative Remediation Technology. Chap. 12, p. 285-306 In: P.C. Kearney and T. Roberts (eds.) Pesticide Remediation in Soils and Water. John Wiley Sons.
79. Jensen, J.S. and Helz, G.R. 1998, Dechlorination Kinetics at Alkaline pH of N-Chloropiperidine, a Genotoxin in Chlorinated Municipal Wastewater. *Water Research*, **32**, 2615-2620.
80. Jensen, J.S. and Helz, G.R. 1998, Rates of Reduction of N-Chlorinated Peptides by Sulfite; Relevance to Incomplete Dechlorination of Wastewaters. *Environmental Science and Technology*. **32**, 516-522.
81. MacCrehan, W.A., Jensen, J.S. and Helz, G.R. 1998. Detection of Sewage Organic Chlorination Products the are Resistant to Dechlorination with Sulfite. *Environmental Science and Technology*, **32**, 3640-3645.
82. Jameel, R.H. and Helz, G.R. 1999, Organic Chloramines in Disinfected Wastewaters: Rates of Reduction and Toxicity. *Environmental Toxicology and Chemistry*, **18**, 1899-1904.
83. Jensen, J.S., Lam, Y.-F. and Helz, G.R. 1999, Role of Amide Nitrogen in Water Chlorination; Proton NMR Evidence. *Environmental Science and Technology*, **33**, 3568-3573.
84. Mosselmans, J.F.W., Helz, G.R., Patrick, R.A.D., Charnock, J.M., and Vaughan, D.J. 2000, A Study of Speciation of Antimony in Bisulfide Solutions by X-Ray Absorption Spectroscopy. *Applied Geochemistry* **15**, 879-889.

85. Clarke, M.B. and Helz, G.R. 2000, Metal-Thiometalate Transport of Biologically Active Trace Elements in Sulfidic Environments. 1. Experimental Evidence for Copper Thioarsenite. *Environmental Science and Technology*, **34**, 1477-1482.
86. Erickson B.E. and Helz G.R. 2000, Molybdenum(VI) Speciation in Sulfidic Waters; Stability and Lability of Thiomolybdates, *Geochimica et Cosmochimica Acta*, **64**, 1149-1158.
87. Helz, G.R., Adelson, J.M., Miller, C.V., Cornwell, J.C., Hill, J.M., Horan, M. and Walker, R.J. 2000, Osmium Isotopes Demonstrate Distal Transport of Contaminated Sediments in Chesapeake Bay. *Environmental Science and Technology*, **34**, 2528-2534.
88. Adelson, J. M., Helz, G. R. and Miller, C.V. 2001, Reconstructing the Rise of Recent Coastal Anoxia; Molybdenum in Chesapeake Bay Sediments. *Geochimica et Cosmochimica Acta*, **65**, 237-252.
89. Rock, M.L., Helz, G.R. and James, B.R. 2001, Hydrogen peroxide effects on chromium oxidation state and solubility in four diverse, chromium-enriched soils. *Environmental Science and Technology*, **35**, 4954-4059.
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91. Vorlicek, T.P. and Helz, G.R. 2002, Catalysis by Mineral Surfaces: Implications for Mo Geochemistry in Anoxic Environments. *Geochimica et Cosmochimica Acta*, **66**, 3679-3692.
92. Helz, G.R., Valerio, M.S. and Capps, N.E. 2002, Antimony Speciation in Alkaline Sulfide Solutions: Role of Zero-Valent Sulfur. *Environmental Science and Technology*, **36**, 943-948.
93. Bostick B.C., Fendorf S. and Helz G.R. 2003, Differential Adsorption of Molybdate and Tetrathiomolybdate on Pyrite (FeS₂). *Environmental Science and Technology*, **37**, 285-291.
94. Ciglonecki, I. and Helz, G.R. 2003, Voltammetric Study of MoS₄²⁻ and SbS₄³⁻, Possible Components of "Dissolved Sulfide" in Oxidic Natural Waters. *Electroanalysis*, **15**, 145-150.
95. Vorlicek T.P., Kahn M.D., Kasuya Y. and Helz G.R. 2004, Capture of Molybdenum in Pyrite-Forming Sediments; Role of Ligand-Induced Reduction by Polysulfides. *Geochimica et Cosmochimica Acta*, **68**, 547-556.
96. Bedner M., MacCrehan W.A. and Helz G.R. 2004, Production of Macromolecular Chloramines by Chlorine Transfer Reactions. *Environmental Science and Technology*, **38**, 1753-1758.
97. Bedner M., MacCrehan W.A. and Helz G.R. 2004, Making Chlorine Greener: Survey of Alternatives to Sulfite for Dechlorination. *Water Research*, **38**, 2505-2514.
98. Helz, G.R., Vorlicek, T.P. and Kahn, M.D. 2004. Molybdenum Scavenging by Iron Monosulfide. *Environmental Science and Technology*, **38**, 4263-4268.
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101. Ciglonecki, I., Krznaric, D. and Helz, G.R. 2005. Voltammetry of Copper Sulfide Particles and Nanoparticles; Investigation of the Cluster Hypothesis. *Environmental and Science Technology*, **39**, 7492-7498.
102. Krznaric, D, Helz, G.R. and Ciglonecki, I. 2006. Prospect of determining copper sulfide particles by voltammetry; A potential artifact in supersaturated solutions. *Journal of Electroanalytical Chemistry* **590**, 207-214.

103. Bura-Nakic' E., Krznicaric' D., Jurašin D., Helz, G.R., and Ciglencecki I. 2007 Voltammetric characterization of metal sulfide particles and nanoparticles in model solutions and natural waters. *Analytica Chimica Acta*, 594, 44-51.
104. Bell, A.M.T, Charnock, J.M., Helz, G.R., Lennie, A.R., Livens, F.R., Mosselmans, J.F.W., Patrick, R.A.D. and Vaughan, D.J. 2007. Evidence for dissolved polymeric mercury(II)-sulfur complexes. *Chemical Geology*, 243, 122-127.
105. Krznicaric, D, Helz, G.R., Bura-Nakic and Jurašin, D. 2008, Accumulation mechanism for metal chalcogenide nanoparticles at Hg⁰ electrodes; Cu sulfide example. *Analytical Chemistry*, 80, 742-749.
106. Helz, G.R. and Tossell, J. A. 2008. Thermodynamic model for arsenic speciation in sulfidic waters; a novel use of *ab initio* computations. *Geochimica et Cosmochimica Acta*, 72, 4457-4468.
107. Bura-Nakic, E., Helz, G.R., Ciglencecki, I. and Cosovic, B. (2009) Reduced sulfur species in a stratified seawater lake (Rogoznica Lake, Croatia); seasonal variations and argument for organic carriers of reactive sulfur. *Geochimica et Cosmochimica Acta*, 73, 3738-3751.
108. Dolor, M.K., Helz, G.R., and McDonough, W.F. (2009) Sediment profiles of less commonly determined elements measured by laser ablation ICP-MS. *Marine Pollution Bulletin*, 59, 182-192.
109. Dolor, M.K., Gilmour, C.C. and Helz, G.R. (2009) Distinct microbial behavior of Re compared to Tc: evidence against microbial Re fixation in aquatic sediments. *J. Geomicrobiology*, 26, 1-13.
110. Scheiderich, K., Helz, G.R. and Walker, R.J. (2010) Century-long record of Mo isotopic composition in sediments of a seasonally anoxic estuary (Chesapeake Bay). *Earth and Planetary Science Letters* 289, 189-197.
111. Scheiderich, K., Zerkle, A.L., Helz, G.R., Farquhar, J., Walker, R.J. (2010) Molybdenum isotope, multiple sulfur isotope, and redox-sensitive element behavior in early Pleistocene Mediterranean sapropels. *Chemical Geology* 193, 134-144.
112. Helz, G.R. and Erickson, B.E. (2011) Quantification of the copper(I) tetrathiomolybdate affinity with implications for aquatic ecosystems. *Environmental Toxicology and Chemistry*, 30, 97-102.
113. Bura-Nakic, E., Krznicaric, D., Ciglencecki, I. and Helz, G.R., (2011) Assessment of the voltammetric evidence for FeS_(aq) in sulfidic waters. *Electroanalysis*, 22, in press.
114. Helz, G. R., Bura-Nakic, E., Mikac, N. and Ciglencecki, I. (2011) New model for molybdenum removal from euxinic waters. *Chemical Geology*, 284, 323-332.
115. Dolor, M.K., Helz, G.R. and McDonough, W.F. (2011) Cause of the chalcophile trace element enrichments marking the Holocene to Anthropocene transition in northern Chesapeake Bay sediments. *Geochimica et Cosmochimica Acta*, in press.
116. Helz, G. R., Ciglencecki, I., Krznicaric, D. and Bura-Nakic, E. (2011) Voltammetry of sulfide nanoparticles and the FeS_(aq) problem. ACS book, in review.

OTHER PUBLICATIONS (NOT PEER REVIEWED)

1. Helz, G.R. 1972, Chemistry of Acid Mine Drainage. Proceedings Regional Educators Annual Chemistry Teaching Symposium (REACTS 1972), University of Maryland, College Park p. 38-49.
2. Helz, G.R., 1976, Review of Environmental Biogeochemistry, *Geochimica et Cosmochimica Acta*, **40**, 1583.

3. Huggett, R., Block, R.M., Bricker, O., Felvey, T., and Helz, G.R., 1977, Toxic Substances in the Chesapeake Bay, Proceedings of the Bi-State Conference on the Chesapeake Bay, p. 121-38.
4. Block, R.M., Helz, G.R., and Davis, W.P., 1977, The Fate and Effects of Chlorine in Coastal Waters, *Chesapeake Science*, **18**, 97-101.
5. Helz, G.R., 1978, Review of: Water Chlorination: Environmental Impact and Health Effects, *Chesapeake Science*, **19**.
6. Helz, G.R., 1980, Residual Chlorine Analysis, in Condenser Biofouling Control, (J.F. Garey, R.M. Jordan, A.H. Aitken, D.T. Burton, and R.H. Gray, Eds.), Ann Arbor Science, p. 363-72.
7. Helz, G.R., 1982, Review of: Aquatic Chemistry, *Geochimica et Cosmochimica Acta*, **46**, 1473.
8. Helz, G.R., 1982, Chlorine Chemistry, In Chlorine-Bane or Benefit: Proceedings of a Conference on the Uses of Chlorine in Estuaries, Chesapeake Research Consortium, Annapolis, MD, p. 19-27.
9. Helz, G.R., and Uhler, A.D., 1982, Organic Inhibition Kinetics of Sulfide Precipitation, *Estudios Geologicos*, **38**, 273-77.
10. Kijak, P.J. and Helz, G.R. 1986, The Role of Grain Coatings on Lithic Particles in the Oxidation of Aqueous Sulfur(IV). Preprints of Extended Abstracts, Division of Petroleum Chemistry, American Chemical Society **31**, 581-582.
11. Helz, G.R., 1988, Review of: Samples and Standards, *Journal of the American Chemical Society*, **110**, 990.
12. Helz, G.R., 1989, Responses of Estuarine and Coastal Marine Waters to Changing Climate, Reports, 1988 Environmental Science and Engineering Fellows Program, Amer. Assoc. Advancement of Science, Washington DC. P. 11-14.
13. Henderson, C.M.B., Charnock, J.M., Helz, G.R., Kohn, S.C., Patrick, R.A.D. and Vaughan, D.J., 1991, EXAFS in earth sciences research. p. 573-578 In: X-Ray Absorption Fine Structure, S.S. Hasnain (Ed.) Ellis Horwood Ltd. Chichester, England.
14. Helz, G.R. and Jensen, J.S. (1998) Incomplete dechlorination caused by slow reduction kinetics of peptides. p 83-90 in Disinfection '98, The Latest Trends in Wastewater Disinfection: Chlorination vs. UV Disinfection. Water Environment Federation, Alexandria VA.
15. MacCrehan, W.A., Helz, G.R. and Jensen, J.S. (1998) Sewage wastewater chlorination products that are slowly dechlorinated by sulfite. p 91-97 in Disinfection '98, The Latest Trends in Wastewater Disinfection: Chlorination vs. UV Disinfection. Water Environment Federation, Alexandria VA.
16. Helz, G.R. 2000, Introduction to the Collection of Papers Honoring Hu Barnes, *Geochemical Transactions*, **1**.
17. Vorkicek, T. and Helz, G.R. 2000. Mineral Oxide Catalysis of Thiomolybdate Interconversions. Preprints of Extended Abstracts, Division of Environmental Chemistry, American Chemical Society **40**, 573-576.
18. Capps, N.E., Helz, G.R. 2000, Counterintuitive Oxidation of Antimony in Sulfidic Waters. Preprints of Extended Abstracts, Division of Environmental Chemistry, American Chemical Society **40**, 571-573.
19. Adelson, J.M., Helz, G.R. and Miller C.V. 2002. Erratum to J.M. Adelson, G.R. Helz and C.V. Miller (2001) Reconstructing the rise of recent coastal anoxia; molybdenum in Chesapeake Bay Sediments. *Geochimica et Cosmochimica Acta*, **66**, 4367.

20. Bedner, M., MacCrehan, W.A. and Helz, G.R. (2004) Making Chlorine Greener: An Investigation of Alternate Dechlorination Agents for Chloramine Removal in Wastewater. Preprints of Extended Abstracts, Division of Environmental Chemistry, American Chemical Society.
21. Neuberger, C.S.; Helz, G.R. (2004) Thioarsenites as ligands: Promoting the Mobility of d¹⁰ metals in contaminated waters. Preprints of Extended Abstracts, Division of Environmental Chemistry, American Chemical Society, 44.
22. Krznaric, D., Helz, G.R. and Ciglencecki, I. (2006) Voltammetry of copper sulfide at the mercury electrode. Proceedings of the 4th Croatian Symposium on Electrochemistry, Primošten Croatia, Croatian Society of Chemical Engineers.
23. Helz, G.R. (2008) Citation for the presentation of the 2007 C.C. Patterson Award to Gordon E. Brown, Jr., *Geochim. Cosmochim. Acta*, 72, S9.

RESEARCH REPORTS

1. Helz, G.R., 1975, A Preliminary Evaluation of Possible Environmental Hazards Associated with the Present Widespread Use of Chlorine, Report Prepared for Environmental Health Division, Md. Dept. of Health and Mental Hygiene.
2. Helz, G.R., Hsu, R.Y., Horzempa, L.M., and Ferri, K.L., 1975, Reconnaissance Survey of the Bata Shoe Co. Latex Wastre Disposal Problem Report Prepared for Md. Dept. Natural Resources.
3. Davis, W.P., Middaugh, D.P., Carpenter, J.H., Helz, G.R., Roberts, M.H., 1977, Program Review Proceedings of: Environmental Effects of Energy Related Activities on Marine/Estuarine Ecosystems, NTIS PB 284 296.
4. Sugam, R., and Helz, G.R., 1977, The Chemistry of Chlorine in Estuarine Waters, Md. Power Plant Siting Program PPRP-26.
5. Helz, G.R., Gretz, J.W., Higgins, P., Peterson, J.C., Sigleo, A.C., and Sugam, R., 1978, A Survey of Chlorine Analytical Methods Suitable for the Power Industry. *Elec. Power Res. Inst.*, 99 pp., EA 929.
6. Helz, G.R., Sigleo, A.C., and Zoller, W.H., 1980, Effect of Power Plants on Colloidal Organic Matter in Estuaries, Maryland Power Plant Siting Report, PPRP-43, 64 pp.
7. Helz, G.R., and Kosak-Channing, L., 1980, Chlorine Alternatives: Reactions of O₃, H₂O₂, and BrCl with Inorganic Components of Seawater, Maryland Power Plant Siting Report, PPRP-44, 59 pp.
8. Helz, G.R., Hsu, R.Y., and Sugam, R., 1981. Halocarbon Production from Oxidative Biocides in Estuarine Waters, EPA 600/3-81-010, PB81-157927, 44 pp.
9. Helz, G.R., Sinex, S.A., Setlock, G.H., and Cantillo, A.Y., 1983, Chesapeake Bay Sediment Trace Elements, U.S. Environ. Protection Agency, EPA-600/S3-83-012 (NTIS No. PB 83-207621).
10. Helz, G.R., Jaworske, D.A., Dotson, D. and Kieber, R., 1984, The Mechanisms of Chlorine Decay in Estuarine Water. Maryland Power Plant Siting Program, PPSP/PPRP-93 (NTIS PB85-153500), 146 pp.
11. Sugam, R., Sandvik, W.A., Singh, N.K., Helz, G.R., Dotson, D.A., Uhler, A.D. and Kieber, R., 1984, Condenser Biofouling Control: A Consideration of Chlorine Minimization Dechlorination and Ozonation, Electric Power Research Institute, Palo Alto, CA, 145 pp.
12. M.S. Kearney, L.G. Ward, C.M. Cofta, and G.R. Helz, 1985, Sedimentology, Geochronology and Trace Metals in the Nanticoke and Choptank Rivers, Chesapeake Bay, Maryland Water Resource Program, NTIS Report No. PB86235645/AS, 94 pp.

13. Helz, G.R., 1986, Effect of Toxins on Aquatic Organisms, How Serious is the Problem?, In Disinfection of Wastewater Effluents and Sludges, University of Miami, College of Engineering Report.
14. Helz, G.R., Kijak, P.J. and Nweke, A.C., 1988, Dechlorination of Sulfur Dioxide: An Assessment of Environmental Effects. U.S. Environmental Protection Agency, 67 pp.
15. Tuttle, J.H., Helz, G.R., Radway, J.C., and Fendinger, N.J., Means, J.C., 1989, Chemical and Microbiological Factors Influencing the Leaching of Trace Metals and Trace Organics from Coal, Maryland Power Plant Research Program, 417 pp.
16. G.R. Helz, 1989, Responses of Estuarine and Coastal Marine Waters to Changing Climate, In Reports, 1988 Environmental Science and Engineering Fellows Program, American Association for the Advancement of Science, AAAS No 89-09S, 57 pp.
17. N.J. Valette-Silver and G.R. Helz, 1990. Behavior of Dissolved Al, Cu, Be and Cr During Simulated Dilution of Acidic, Iron-Bearing Coal Leachates with Alkaline Surface Waters. Md. Power Plant Research Program. Research Reports Series. CBRM-TR-90-1, 41pp.
18. A. C. Mignerey, G.R. Helz, C.B. Purdy and C.A. Bond 1994. New Ground Water Tracers: Development and Application to Maryland's Major Coastal Plain Aquifers. Chesapeake Research and Monitoring Division, CNRM-TR-94-3. 54 pp.
19. R.A.D. Patrick, J.F.W. Mosselmans, D.J. Vaughan, B.Gale, C.D. Garner, J.M. Charnock, A. Smith and G. Helz. 1994. A Cryostat for Station 3.4 and the Development of Amorphous CuS Precipitates. Synchrotron Radiation, An Appendix to the Daresbury Annual Report, Daresbury Laboratory, U.K.
20. G.R. Helz and J.M. Adelson, 1998. Geochemical Methods for Investigating Past Changes in Chesapeake Bay. Special Report, Research and Monitoring Division, Maryland Department of Natural Resources, 45 pp.

SPECIAL RECOGNITIONS (See also Honors, p. 1)

NSF Summer Fellowship, Bermuda Biological Station, 1966
 NSF Traineeship, Pennsylvania State University, 1965-70
 Alexander von Humbolt Fellowship, Georg-August-Universität, Göttingen (declined) 1981.
 Outstanding Division Award of the American Chemical Society (won by Geochemistry Division while Helz was Division Chairman, 1984-85).
 Semester Research Awards, University of Maryland, 1985; 1993, 2001.
 Certificate of Merit, Outstanding Oral Paper, Environmental Division, ACS, 1986.
 Certificate of Appreciation, Environmental Division, ACS (for organizing a symposium on aquatic photochemistry) 1992.
 Invited to teach a two-day short course on environmental chemistry, Central Research Laboratories, Rohm and Haas, Spring House PA, January 1998.
 Invited to serve as international representative, search committee to appoint a chaired professor in environmental sciences, Manchester University, UK, 1998.
 Gemstone Fellow, University of Maryland Honors Program, 1999-
 Cambridge University Press: U.S. Editor of book series on environmental chemistry, 1982-86.
 American Chemical Society: Member, Editorial Board, 1987-92, *Environmental Science and Technology*
 Geochemical Society: Associate Editor, *Geochimica et Cosmochimica Acta* 2002-present.
 Session Chair, Gordon Conference on Environmental Sciences, Water, 2002
 Member, American Water Works Association Research Foundation Project Advisory Committee for a project at Arizona State University.
 Certificate of Appreciation for 30 Year's Service, American Chemical Society Division of Environmental Chemistry.

INVITED LECTURES

1. Chesapeake Biological Laboratory, Solomons, MD., 1976. "Chlorine Chemistry in Marine Waters".
2. U.S. Geological Survey, Menlo Park, CA., 1977. "Chlorine Chemistry in Marine Waters".
3. Oak Ridge National Laboratory, Oak Ridge, TN., 1977. "Chlorine Chemistry in Marine Waters".
4. Duke University Marine Center, Beaufort, NC., 1977, "Chlorine Chemistry in Marine Waters".
5. University of Wisconsin, Milwaukee, Jan., 1979. "Chlorine Chemistry in Marine Waters".
6. Condenser Biofouling Control Symposium, Atlanta, GA., April 1979. (Organized by the Electric Power Research Institute). "Chlorine Analysis".
7. Symposium on Analysis of Polar and High Molecular Weight Compounds, Honolulu, April 1979. (Organized by the American Chemical Society). "Chlorinated vs. Unchlorinated Natural Macromolecules, Halogen and Trace Metal Comparison by Neutron Activation Analysis".
8. Horn Point Environmental Laboratory, Cambridge, MD., May 1979. "The Fate of Chlorine in Estuarine Water".
9. Colorado School of Mines, Golden, CO., October 30, 1979. "Apparent Supersaturation in Sulfidic Natural Waters".
10. Versar, Inc., Springfield, VA., March 14, 1980. "Chlorine Loss Mechanisms in Estuarine Water".
11. Yale University, New Haven, Connecticut, June 15, 1980. "Environmental Geochemistry of Strong Oxidants in Seawater".
12. Conference on the Uses of Chlorine in Estuaries, Fredericksburg, VA., May 27-28, 1981. "Chlorine Chemistry".
13. Fourth Conference on Water Chlorination, Pacific Grove, CA., October, 1981. "Experience with Amperometric Titrations for Total Chlorine in the Micrograms per Liter Range, Limitations to Accuracy".
14. Department of Civil Engineering, Stanford University, November 13, 1981. "Chlorination Chemistry in Seawater".
15. J.M. Montgomery, Inc., Pasadena, CA., January 13, 1982. "Chlorination Chemistry in Seawater".
16. Department of Geology, Stanford University, January 27, 1982. "Trace Element Dynamics in Estuaries".
17. SRI International, Menlo Park, CA., February 22, 1982. "Chlorination Chemistry in Seawater".
18. Department of Geology, Leeds University, England, April 2, 1982. "The Fate of Strong Oxidants in Seawater".
19. American Geophysical Union Annual Meeting, Philadelphia, June 8, 1982. "Trace Element Deposition History in Chesapeake Bay",
20. Horn Point Environmental Laboratory, Cambridge, MD., October 20, 1982. "Estuarine Trace Element Budgets".
21. Marine Sciences Center, University of Connecticut, October 22, 1982. "Estuarine Trace Element Budgets".

22. Sigma Xi, University of Maryland, College Park, March 31, 1983. "Prospects for Regional Contamination of Chesapeake Bay".
23. College of Marine Sciences, University of Delaware, April 12, 1983. "Chlorination Chemistry in Estuaries".
24. Carnegie Institution of Washington, Department of Terrestrial Magnetism, June 8, 1983. "Radionuclide Geochemistry in Chesapeake Bay".
25. Chesapeake Bay Foundation, Annapolis, MD., February 14, 1984. "Toxic Substances in Chesapeake Bay".
26. Johns Hopkins University, Department of Geography and Environmental Engineering, April 5, 1984. "Chlorine Decay Mechanisms".
27. University of Miami, Department of Civil Engineering, May 7, 1984. "Fate of Disinfecting Agents".
28. University of Maryland, Department of Geology, September 14, 1984. "Trace Element Geochemistry and Geochronology in Modern Sediments of Chesapeake Bay".
29. Virginia Institute of Marine Sciences, College of William and Mary, March 21, 1985. "Trace Metals, Chlorine and Other Inorganic Trace Substances in Chesapeake Bay".
30. Chemical Society of Washington, Young Chemists Committee, April 18, 1985. "Recent Research on Toxic Substances in Chesapeake Bay".
31. University of Delaware, Department of Civil Engineering, October 18, 1985. "Kinetics of Sulfide Precipitation Reactions".
32. University of North Carolina at Chapel Hill, Department of Environmental Sciences, October 24, 1985. "Copper Geochemistry in Sulfidic Waters".
33. University of South Carolina, Department of Geology, October 25, 1985. "Trace Element Geochemistry in Modern Sediments of Chesapeake Bay".
34. Florida Institute of Technology, Department of Chemistry, October 29, 1985. "Copper Geochemistry in Sulfidic Waters".
35. Environmental Research Laboratory, U.S.E.P.H., Athens, GA., October 31, 1985. "Environmental Fate of Copper in Sulfidic Waters".
36. George Mason University, Fairfax, VA., May 12-14, 1986. "Radon's Daughters in Geochemistry and Health". Conference on Indoor Radon in the Mid-Atlantic States.
37. Maryland Geological Survey, Baltimore, MD., November 6, 1986. "Beryllium-10 Geochemistry in Chesapeake Bay".
38. Howard University, Department of Chemistry, October 30, 1987. "Copper Geochemistry in Sulfidic Waters".
39. Old Dominion University, Department of Chemistry, November 20, 1987. "Disinfection Chemistry".
40. McGill University, Montreal, February 11, 1988. "The Aqueous Geochemistry of Copper at Low Temperatures".
41. Woods Hole Oceanographic Institution, Woods Hole, MA., Oct. 23-26, 1989. "Photoreduction of Chromium in Natural Waters."

42. Liverpool University, Department of Oceanography, Oct. 12, 1989. "Accelerator Mass Spectrometry; Applications of ^{10}Be and ^{36}Cl ."
43. Marine Chemistry Discussion Group (U.K.) Southampton University, Nov. 30, 1989. "Photoreduction of Chromium in Estuarine Waters."
44. Manchester University, Department of Geology, Dec. 12, 1989. "Accelerator Mass Spectrometry: Some New Opportunities."
45. Mineralogical Society of Great Britain and Ireland. Annual Meeting, London, Dec. 18-20. "Copper Concentration Controls in Sulfidic Natural Waters."
46. University of East Anglia, Department of Environmental Sciences, Jan. 15, 1990. "Solution Chemistry of Copper in Anoxic Waters."
47. Bristol University, Department of Geology, May 30, 1990. "Marine Geochemistry of Copper in Anoxic Waters."
48. Philadelphia Academy of Sciences, Benedict Estuarine Laboratory, April 18, 1991 "Accelerator Mass Spectrometry; New Applications to Estuaries and Aquifers."
49. National Oceanic and Atmospheric Administration, Rockville Md. July 11, 1991, "Regional Contamination of Chesapeake Bay."
50. Department of Natural Sciences, University of Maryland Eastern Shore, September 11, 1991, "Toxic Substances in Chesapeake Bay."
51. Department of Chemistry, University of North Carolina, Wilmington, Oct 18, 1991, "Metal Complexing in Sulfidic Natural Waters: The Multinuclearity Problem."
52. Department of Geography, University of Maryland, College Park. Feb 22, 1993. "History of Chesapeake Bay's Contamination Observed in Sediments."
53. Department of Geology, University of Maryland, College Park. Sept. 24, 1993. "History of Chesapeake Bay's Contamination."
54. Brookhaven National Laboratory, April 28, 1994, "Speciation of Copper in Anoxic Waters."
55. Institute of Mineralogy and Petrology, ETH, Zurich, May 13, 1994, "Speciation of Copper in Anoxic Waters."
56. Gettysburg College, Gettysburg, PA Sept. 15, 1994, "Metal Sulfide Chemistry and Climate Change in Chesapeake Bay."
57. Department of Natural Sciences, University of Maryland Eastern Shore, September 20, 1995, "Deep Coastal Plain Aquifers--An Accelerator Mass Spectrometry Study."
58. Chemistry and Physics Department, Salisbury State College, November 17, 1995, "History of Anoxia in Chesapeake Bay; A New Geochemical Approach."
59. Department of Geology, University of Toronto, Jan. 11, 1996, "Molybdenum, Black Shales and the Modern Coastal Anoxia Problem."
60. G.R. Helz 1995. Frontiers in Our Understanding of Trace Metal Behavior in Sulfidic Solutions. Plenary Lecture, 3rd International Conference on Silver in the Environment. Washington DC.

61. Department of Chemistry, Old Dominion University, Feb. 22, 1996. "Molybdenum, Black Shales and the Modern Coastal Anoxia Problem."
62. Chesapeake Biological Laboratory, University of Maryland, Solomons MD Mar. 15, 1996, "Molybdenum, Black Shales and Modern Coastal Anoxia."
63. Department of Environmental Sciences, Lancaster University, U.K. Mar. 21, 1996, "Speciation of Copper in Anoxic Waters"
64. Institut des Sciences del la Terre, Toulouse, Mar. 29, 1996, "Speciation of Copper in Sulfidic Waters."
65. Ten Hour Short Course: "Environmental Chemistry; Challenge for the 21st Century" Rohm and Haas Corp., Springhouse PA Jan. 1998
66. Ten Hour Short Course: "Environmental Chemistry; Challenge for the 21st Century" Institute of Fundamental Studies, Kandy, Sri Lanka, June 1998.
67. Department of Civil Engineering, University of California at Berkeley, Sept. 25, 1998, "The Chemistry of Dechlorination of Wastewaters."
68. Department of Geology and Environmental Science, Stanford University, Oct. 22, 1998, "Frontiers in Our Understanding of Trace Metals in Sulfidic Waters."
69. Department of Oceanography, University of Washington, Nov. 19, 1998, "Frontiers in Our Understanding of Trace Metals in Sulfidic Waters."
70. Department of Oceanography, University of Washington, Nov. 20, 1998, "Molybdenum, Black Shales and Modern Coastal Anoxia."
71. U.S. Geological Survey, Menlo Park CA, Dec. 14, 1998, "Molybdenum, Black Shales and Modern Coastal Anoxia."
72. Department of Civil and Environmental Engineering, Stanford University, Jan 15, 1999, "Will Wastewater Dechlorination Work?"
73. Department of Geosciences, Pennsylvania State University, Feb. 16, 1999, "Molybdenum, Black Shales and Modern Coastal Anoxia"
74. Department of Geosciences, Pennsylvania State University, Feb 17, 1999, "Frontiers in our Understanding of Trace Metals in Sulfidic Waters"
75. Department of Environmental Engineering, University of Nevada at Reno, Mar 1, 1999, "Will Wastewater Dechlorination Work?"
76. Swiss Federal Institute of Water Pollution Control (EAWAG) April 9, 1999 "Deficient Dechlorination; The Peptide Problem."
77. Department of Civil and Environmental Engineering, Stanford University, April 22, 1999, "Mobility of Hazardous Trace Metals in Sulfidic Environments; Limitations to Knowledge"
78. Department of Environmental Engineering, California Institute of Technology, April 28, 1999, "Deficient Dechlorination; the Peptide Problem."
79. Department of Geology and Environmental Sciences, Stanford University, May 5, 1999, "Molybdenum, Black Shales and Modern Coastal Anoxia"

80. Department of Geology, Leeds University, Jan 19, 2000, "Molybdenum, Black Shales and Modern Coastal Anoxia"
81. Department of Oceanography, Liverpool University, Jan 20, 2000, "Molybdenum, Black Shales and Modern Coastal Anoxia"
82. Department of Chemistry, Ohio State University, Feb 15, 2000, "Reconstructing the Rise of Recent Coastal Anoxia"
83. Department of Earth and Planetary Sciences, Harvard University, Symposium Honoring H.D. Holland, May 28, 2000, "Reconstructing the Rise in Recent Coastal Anoxia"
84. Western Maryland College, Westminster MD Oct. 13, 2000, "Reconstructing the Rise in Recent Coastal Anoxia"
85. Chemistry Department, Old Dominion University, Norfolk Va "Reconstructing the Rise of Recent Coastal Anoxia" Feb. 1, 2002.
86. Institut für Wasserforschung und Wassertechnologie, Wiesbaden, Germany, "Analytical Determination of Organic Chloramines and Their Removal from Wastewaters" March 11, 2002.
87. Max Planck Institut für Chemie, Mainz, Germany, "Reconstructing the Rise of Recent Coastal Anoxia." March 12, 2002
88. University of New South Wales, Sydney AUST, "Making Chlorine Greener; Better Dechlorination Technology." July 24, 2002.
89. Monash University, Melbourne AUST, "Reconstructing the Rise of Recent Coastal Anoxia." Aug 5, 2002
90. Monash University, Melbourne AUST, "Making Chlorine Greener; Better Dechlorination Technology." Aug 5, 2002.
91. Australian National University, Canberra, AUST, "Reconstructing the Rise of Recent Coastal Anoxia." Aug. 8, 2002.
92. CSIRO, Lucas Heights Science and Technology Center, Bangor, AUST, "Reconstructing the Rise of Recent Coastal Anoxia." Aug 9, 2002.
93. Princeton University, Princeton NJ, "Reconstructing the Rise of Recent Coastal Anoxia." Sept 19, 2002
94. University of Maryland REACTS DAY, "Pollution of Chesapeake Bay." Oct 4, 2002
95. South Dakota State University, Brookings SD, "Reconstructing the Rise of Recent Coastal Anoxia." April 9, 2003.
96. Minnesota State University, Mankato MN, "Reconstructing the Rise of Recent Coastal Anoxia." April 10, 2003
97. University of Wisconsin, Madison, WI "Fascinating Frontier: Trace Element Geochemistry in Sulfidic Environments." April 11, 2003.
98. University of Wisconsin, Madison, WI. Lewis G. Weeks Lecture, "Reconstructing the Rise of Recent Coastal Anoxia" April 11, 2003.
99. Queens College, Flushing NY. "Making Chlorine Greener." September 15, 2003.

100. New York Academy of Science, New York, NY, "Molybdenum, Black Shales and Modern Coastal Anoxia" September 15, 2003.
101. Lebanon Valley College, Annville PA, "Reconstructing the Rise of Recent Coastal Anoxia" October 20, 2003.
102. Rudjer Boskovic Institute, Zagreb, Croatia, Workshop on Anoxic Coastal Waters, "Fate of Molybdate in the Sea; Insights Gained from the Laboratory," Jan 17-21, 2004.
103. Johns Hopkins University, Department of Geography and Environmental Engineering, Baltimore Md, "Making Chlorine Greener; a New Look at Dechlorination Technology." Oct. 8, 2004.
104. Water Resources Research Center, University of Maryland, Conference on Wastewater Treatment Plants and the Chesapeake Bay; "A New Look at Dechlorination" Oct. 22, 2004.
105. Department of Toxicology, North Carolina State University, Raleigh NC. "Making Chlorine Greener; A New Look at Dechlorination Technology." March 1, 2005.
106. Department of Chemistry, University of North Carolina at Wilmington, Wilmington NC "Making Chlorine Greener; A New Look at Dechlorination Technology." March 2, 2005.
107. National Science Foundation Workshop on Environmental Molecular Science Institutes, Washington DC, "Finding a Place for Environmental Science in the Academy: A Thirty Years' Perspective." Aug 26-27, 2005.
108. Emory and Henry College, Emory VA. *Platt Lecture*, "Reconstructing the Rise of Recent Coastal Anoxia." Sept. 22, 2005.
109. School of Earth Sciences, University of Manchester, "Reconstructing the Rise of Recent Coastal Anoxia." March 8, 2006.
110. School of Geography, Earth and Environmental Science, University of Birmingham, "Copper in Anaerobic Environments; Complexes, Clusters or Nanoparticles." March 10, 2006.
111. Croatian Academy of Sciences, Zagreb, Croatia, "Molybdenum geochemistry; tool for reconstructing the history of coastal anoxia," May 11, 2006
112. Ruđer Bošković Institute, Zagreb, Croatia, "Novel arsenic geochemistry in anoxic waters; Advantages of an experimental/computational partnership," June 7, 2006.
113. University of Split, Institute of Fisheries, Split, Croatia, "Molybdenum geochemistry; tool for reconstructing the history of coastal anoxia," June 2, 2006.
114. DVGW-Technologiezentrum Wasser, University of Karlsruhe, "Making Chlorine Greener; A New Look at Dechlorination Technology." June 21, 2006.
115. Earth and Planetary Science, Johns Hopkins University, Baltimore Md, "Novel Arsenic Geochemistry in Suboxic and Anoxic Waters." Nov. 13, 2006.
116. Department of Chemistry, Old Dominion University, Norfolk VA "Novel Arsenic Geochemistry in Suboxic and Anoxic Waters." Jan 12, 2007.
117. Department of Geology, University of Maryland, College Park MD "Deposition mechanisms for the sedimentary redox indicators, U, Mo and Re." Feb. 1, 2007
118. Department of Geosciences, Arizona State University, Tempe AZ, "Deposition mechanisms for the sedimentary redox indicators, U, Mo and Re." Feb. 15, 2007

119. Departments of Chemistry and Geology, Franklin and Marshall College, Lancaster PA “Novel Arsenic Geochemistry: Relevance to Arsenic-Related Public Health Disasters.” March 2, 2007.
120. Geophysical Laboratory, Carnegie Institution of Washington, “How redox sensitive elements can be fixed.” April 16, 2007.
121. College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis OR, “How redox sensitive elements can be fixed.” Dec 4, 2007.
122. Department of Chemistry, University of Maryland, REACTS DAY, “Geochemistry of the Anthropocene” Jan 11, 2008
123. Scientists Cliffs Association (community association, Calvert Co. MD) “Effect of Climate Change on Chesapeake Bay. I. Water Quality.” Jan. 26, 2008
124. Department of Geology, University of Maryland, College Park MD, “Enigmatic Arsenic Chemistry in Sulfidic Waters, A New Perspective.” Feb. 5, 2008.
125. Department of Environmental Geosciences, University of Vienna, “Copper in sulfidic environments; complexes, clusters or crystals?” March 13, 2008.
126. Chesapeake Biological Laboratory, University of Maryland Center for Environmental Studies, Solomons, MD “Do Sulfide Nanoparticles Control Copper Availability in Natural Waters?” September 3, 2008
127. , Ruđer Bošković Institute, Zagreb Croatia, “Arsenic’s Astonishing Redox Chemistry in Sulfidic Natural Waters.” June 30, 2009.
128. U.S. Geological Survey, Catonsville MD, “Cause of Chalcophile Trace Element Enrichments in Chesapeake Bay.” May, 2010.
129. U.S. Geological Survey, “Whence Chesapeake Bay’s Anthropocene Chalcophile Element Enrichments?” May 2010.
130. Trent University, Peterborough ONT, “Making Chlorine Greener” March 2, 2011
131. Trent University, Peterborough ONT, “Molybdenum the Dead Zone Indicator; How Does It Work?” March 4, 2011
132. University of California, Riverside, “New Model for Mo Removal from Euxinic Waters.” March 28, 2011.
133. Potomac Geophysical Society, Washington DC, “The Holocene-Anthropocene Transition in Chesapeake Bay. May 19, 2011.
134. Goldschmidt 2011, Prague, Czech Republic, Keynote: “Geochemical roles of thioanions of the heavier metals and metalloids.” August 18, 2011.
135. Ford Scientific Lecture, Minnesota State University, Mankato MN, “Making Chlorine Greener.” September 19, 2011.
136. Ford Public Lecture, Minnesota State University, Mankato MN, “Environmental Chemistry in the Half Century since *Silent Spring*.” September 19, 2011.

OTHER PROFESSIONAL SERVICE

A. Symposium Organizer

Organizing Committee for Am. Chem. Soc. Symposium on Marine Chemistry in the Coastal Environment, 1975.

Organizer, UM-EPA Workshop on Fate and Effects of Chlorine in the Marine Environment, Solomons, MD., 1976.

Organizer, Symposium on Estuarine Chemistry, American Chemical Society - MARM Meeting, Philadelphia, 1980.

Chairman Technical Program Committee, Goldschmidt Conference, May 11-13, 1988 (An international conference to commemorate the 100th anniversary of the birth of V.M. Goldschmidt).

Co-convener, Symposium on Environmental Aquatic and Surface Photochemistry, American Chemical Society National Meeting, San Francisco, April 1991.

Convener, Symposium, Applications of Synchrotron X-Rays in the Earth and Environmental Sciences, American Chem. Soc. Meeting, Las Vegas, Sept 1997.

Convener, Symposium on Hydrothermal and Aquatic Geochemistry in Honor of H.L. Barnes, Goldschmidt Conference, Boston MA August, 1999.

Convener, Symposium on Halogen and Halamine Chemistry in Biology, Health and the Environment. American Chem. Soc. Meeting, Washington DC, August 28-September 1, 2005.

Convener, Symposium on Trace Element Interactions With Reduced Sulfur Species, Goldschmidt 2007 Meeting, Cologne Germany August 19-23, 2007.

B. Service on Panels and Working Groups

Member, Working Group on Toxic Substances, Governors' Bi-State Conference on the Chesapeake Bay, 1977.

Delegate, National Sea Grant Association Research Council, 1977.

Member, Chemistry of Disinfectants Subcommittee, Safe Drinking Water Committee, National Academy of Science - National Research Council, 1978-79.

Panel Member, MIT-NOAA Workshop on Marine Pollution Problems in the North and Middle Atlantic Regions, Durham, NH, June 11-13, 1980.

Site Visitor and Reviewer, Major University of Wisconsin Research Program Sponsored by EPRI, Milwaukee, WI., August 21-22, 1980

Site Visitor and Reviewer, Disinfection By-Products Program at EPA Laboratory in Cincinnati, September 21-23, 1983.

Member Review Panel, New York University Superfund Center, September 20-21, 1990.

Member Review Panel, Michigan Universities Superfund Center, 1990.

Member Review Panel, Superfund Research Centers Program, NIEHS, 1991

Member Review Panel, U.S.-Israel Cooperative Development Program (State Department), 1991, 2003

Member, Liason Committees, Susquehanna and Potomac River NAWQA Projects, U.S. Geological Survey.

Chair, External Review Panel, Environmental Chemistry Laboratory, USDA, March 1994

Member, NSF/EPA Panel on Water and Watersheds, June 1995

Member, DOE Workshop on Molecular Environmental Science, Airlie House, July 5-8, 1995

Member Discussion Panel, National Grants Management Association, August, 1996

Member, DOE Review Panel on Environmental Management and Science Program, June 20-21, 1996

Member, NSF Chemistry Division EMSI and CRAEMS Program Panel, July 2000

Site Visitor, SUNY Stony Brook NSF Environmental Science Program, July 2000.

Site Vistor, Ohio State NSF Environmental Science Program, July 2000.

Member, NSF Chemistry Division EMSI Program Panel, July 2002.

Site Visitor, Notre Dame NSF Environmental Science Program, July 2002

Site Visitor, SUNY Stony Brook NSF Environmental Science Program, July 2002.

Selection Panel, 2007-2008 Croatian Fulbright Scholars and Exchange Students, June 8-9, 2006.

Moderator, Orientation Program for 2006-2007 Fulbright Grantees going to Former Jugoslavia, July 12-14, 2006.

Site Vistor, Arizona State University, for Amer. Water Works Assoc. Research Foundation, February 16, 2007

Advisory Committee, Ph.D. candidate Charles Elliot, Department of Geography and Environmental Engineering, Johns Hopkins University, June 2009-.