Curriculum Vitae

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RICHARD L. VALENTINE

Dr. Valentine's major research interests lie in the area of environmental process chemistry and design especially as applied to drinking water treatment, processes occurring in distribution systems, and decontamination of contaminated soils and waste streams. He has directed projects covering a number of areas which include among others: Membrane treatment of drinking water, photo degradation of humic substances as related to the formation of trace gases, reaction mechanisms and kinetics of disinfectant by-product formation, role of the pipe-water interface in disinfectant demand and DBP formation, processes affecting water quality in distribution systems, sources and sinks for radium and radon in drinking water distribution systems, radium removal from drinking water, mineral dissolution processes, use of metal oxides as adsorbents in drinking water treatment, advanced oxidation processes and reactions of hydrogen peroxide in the subsurface environment, and treatment and detoxification of contaminated soils and wastewater streams.

EDUCATION:

Ph.D. l982 Civil Engineering, (Sanitary/Environmental Engin.), University of California, Berkeley.
M.S.E. 1977 Civil Engineering, (Sanitary/Environmental), University of California, Berkeley.
M.S.E. 1974 Chemical Engineering, University of Michigan, Ann Arbor Michigan.
B.S.E. 1973 Chemical Engineering (Cum Laude), University of Michigan, Ann Arbor Michigan.
B.S. 1973 Chemistry (with distinction), University of Michigan, Ann Arbor, Michigan

REGISTRATION:

P.E. State of Iowa

EXPERIENCE:

PROFESSOR

Dept. of Civil and Environmental Engineering
The University of Iowa
Iowa City, Iowa 52242
August 1996 to present

ASSOCIATE PROFESSOR

Dept. of Civil and Environmental Engineering
The University of Iowa
Iowa City, Iowa 52242
August 1987 - August 1996

ASSISTANT PROFESSOR

Dept. of Civil and Environmental Engineering
The University of Iowa; Iowa City, Iowa 52242
August 1982 - July 1987

GRADUATE STUDENT RESEARCH ASSISTANT

Lawrence Berkeley Laboratory, Berkeley, California. Marine Sciences Group
September 1979 - August 1982.

RESEARCH AND TEACHING ASSISTANT

Department of Civil Engineering, Sanitary/Environmental Division, University of California
December 1978-September 1979.

RESEARCH ASSOCIATE

Department of Chemical Engineering, University of Michigan, Ann Arbor, Michigan
December 1974 through September 1976.

PROJECT ENGINEER

Environmental Dynamics, Inc., Ann Arbor, Michigan - April 1974 - May 1975.

CONSULTING:

Clients: Metropolitan Water District, Los Angeles, CA; Chevron Oil Environmental Research Center, Richmond, Ca; University of Nevada, Las Vegas; Wallace, Holland, Schmitt, and Kassel; RJN Associates, Mongomery-Watson; Stanley Consultants; Howard R. Green; CH2M Hill; HDR associates; King Abdul Aziz City for Science and Technology, Saudi Arabia, Black and Veatch; City of San Fransciso, Black and Veatch Inc., Metropolitan Water Resources Authority (Boston, MA), Strand Inc. Los Angles Department of Power and Water, Metropolitan Water Resources Authority (Boston area), City of Cincinnati, Ohio, State of Minnesota, Tonka Equipment Co., City of Joliet, Illinois, Lee Odell Consulting Inc.; Camp Dresser and McGee (CDM); Long Beach California; Aerojet Inc.

General areas of work: Application and control of chloramines for disinfection of distribution systems, modeling disinfectant fate and losses, Formation and control of disinfection by-products; corrosion control strategies, chemical degradation of water in distribution systems; design and implementation of technologies for radium and radon control and removal, advanced oxidation processes; general education and technology transfer.

SOCIETIES AND ORGANIZATIONS:

Phi Lambda Upsilon (Honor Chemical Society)
Chi Epsilon (CE Honor society)
American Chemical Society
American Water Works Association
Water Environment Federation

AFFILIATIONS:

Member:
American Water Works Association
Water Environment Federation
American Chemical Society
Association of Environmental Engineering Professors
Society for Environmental Toxicology and Chemistry
American Geophysical Union
International Chemical Oxidation Society

PATENTS:

*Catalytic Fixed Bed Reactor Systems for the Destruction of Contaminants Using Hydrogen Peroxide U.S. pat. no. 5,817,240; October 6, 19*98.

ACADEMIC HONORS:

National Research Council Senior Research Associate, 1990. Research Associate working in the EPA Environmental Research Laboratory, Athens, Georgia, 1990-1991.

Recipient of an Office of Research and Development 1993 Scientific and Technological Achievement Award for paper "Formation of Carbon Monoxide from the Photodegradation of Dissolved Organic Carbon", Environmental Science and Technology, Vol. 27, No 2, 1993, pp. 409-412.

1999 Association of Environmental Engineering and Science Professors Outstanding Dissertation Award (Major Advisor) "Monochloramine Loss inn the Presence of Ferrous Iron: Kinetics, Mechanisms, and Products", Peter Vikesland, doctoral student.

2000 American Water Works Association Academic Achievement Award (Major Advisor) to Peter Vikesland for Best Ph.D. Dissertation, "Monochloramine Loss inn the Presence of Ferrous Iron: Kinetics, Mechanisms, and Products"

JOURNAL AND OTHER PEER REVIEWED PUBLICATIONS:

Schultz, J. S., Valentine, R. L., and Choi, C. Y., "Reflection Coefficients of Homopore Membranes: Effect of Molecular Size and Configuration," Journal of General Physiology, Vol. 73, 1979, pp. 49-60.

Hartwig, E., and Valentine, R.L., "Bromoform Production in Tropical Open-Ocean Waters," Water Chlorination: Environmental Impact and Health Effects, Vol. 4, Book 1, 1982; R.L. Jolley et al, eds., Ann Arbor Science, pp. 311-330.

Valentine, R.L. and Selleck, R.E., "Effect of Bromide and Nitrite on the Degradation of Monochloramine," Water Chlorination: Environmental Impact and Health Effects, Vol. 4, Book 1, 1982; R.L. Jolley et al, eds., Ann Arbor Science, pp. 125-137.

Venkataramiah, A., Lakshmi, G., Best, C., Hartwig, E. and Valentine, R.L., "Effect of Chlorinated Discharges on Marine Animals," Water Chlorination: Environmental Impact and Health Effects, Vol 4, Book 2, 1982; R.L. Jolley, et al, eds., Ann Arbor Science, pp. 947-958.

Valentine, R.L. and Jafvert, C., "Commentary on the Kinetics of Monobromamine Disproportionation - Dibromamine Formation in Aqueous Ammonia Solutions", Environmental Science and Technology, Vol. 19, No. 3, 1985, pp. 286-287.

Valentine, R.L., "The Disappearance of Monochloramine in the Presence of Nitrite", Water Chlorination: Environmental Impact and Health Effects; 1985, R.L. Jolley, ed., Ann Arbor Science, pp. 975-984.

Valentine, R.L., "Bromochloramine Oxidation of N,N-diethyl-p-phenylenediamine in the Presence of Monochloramine", Environ. Sci. and Technology, Vol. 20, No. 2, 1986, 166-170.

Valentine, R.L., Brandt, K.I., Jafvert, C.T., "A Spectrophotometric Study of the Formation of an Unidentified Monochloramine Decomposition Product", Water Research, Vol. 20, No. 8, 1986, pp. 1067-1074.

Jafvert, C.T., Valentine, R.L., "Dichloramine Decomposition in the Presence of Excess Ammonia", Water Research, Vol. 21, No. 8, August 1987, pp. 967-973.

Valentine, R.L., Mulholland, T.S., Splinter, R.C., "Radium Removal Using Sorption to Filter Sand", Journal of the American Water Works Association, April 1987, pp. 170-176.

Valentine, R.L., Jafvert, C.T., "General Acid Catalysis of Monochloramine Disproportionation", Environmental Science and Technology, Vol. 22:6, June 1988, pp. 691-696.

Valentine, R.L., Jafvert, C.T., "Evaluation of a Chloramine Decomposition Model Incorporating General Acid Catalysis", Water Research, September 1988, pp. 1147-1153.

Valentine, R.L. and Wilber, G., "Some Physical-Chemical Characteristics of an Unidentified Chloramine Decomposition Product", In Water Chlorination: Chemistry, Environmental Impact and Health Effects, Vol. 6, 1989.

Valentine, R.L., Meyer, J., Spangler, K., "Removing Radium by Adding Preformed Hydrous Manganese Oxides", Journal of the American Water Works Association, February 1990.

Asolekar, S.R., Valentine, R.L., and Schnoor, J.L., "Kinetics of Chemical Weathering in B Horizon Spodosol Fraction", Water Resources Research, Vol. 27, No. 4, April 1991, pp. 527-532.

Jafvert, C. and Valentine, R.L., "A Reaction Scheme for Chlorination of Ammoniacal Water", Environmental Science and Technology, Vol. 26, No. 3, 1992, pp. 577-586.

Valentine, R.L. and Zepp, R.G., "Formation of Carbon Monoxide from the Photodegradation of Dissolved Organic Carbon", Environemental Science and Technology, Vol. 27, No 2, 1993, pp. 409-412.

Ghosh, M.; Benjamin, M.; Harms, L., Knocke, W., Lowry, J. and Valentine, R. L. "Committee Report: Research Needs for Inorganic Contaminants", Journal of the American Water Works Association, June 1993, pp. 106--113.

Leung, S.W. and Valentine, R. L."An Unidentified Chloramine Decomposition Product, I: A Proposed Formation Mechanism", Water Research, Vol. 28, No. 6,1994, pp.1475-1483 .

Leung, S.W. and Valentine, R. L. "An Unidentified Chloramine Decomposition Product, II: Chemistry and Characteristics", Water Research, Vol. 28, No. 6, 1994, pp. 1485-1495.

Valentine, R. L. and Stearns, S.W. "Formation of Radon from Water Distribution System Deposits", Environmental Science and Technology, Vol. 28, No 3, 1994, pp. 534-537.

Chung M., Hao, Oliver J., and Valentine, Richard L. "Kinetics of Monochloramine Reactions with Nitrite", Journal of Environmental Engineering (ASCE), Vol. 120, No. 4, 1994, (July/Aug.), pp. 859-874.

Field, W. R., Fisher, E. L., Valentine, R. L. and Kross, B. C. "Radium-Bearing pipe scale deposits: Implications for National Waterborne Radon Sampling Methodologies", Journal of the American Public Health Association, Vol. 85, No. 4, 1995 (April), pp.567-570.

Miller, C. M. and Valentine, Richard L. "Oxidation behavior of aqueous contaminants in the presence of hydrogen peroxide and filter media", Journal of Hazardous Materials, Vol 41, No. 1 (April), 1995, pp. 105-116.

Miller, C. M. and Valentine, Richard L. "Hydrogen Peroxide Decomposition and Quinoline Degradation in the Presence Of Aquifer Material", Water Research,, Vol. 29, No. 10, 1995, pp. 2353-2359.

Miller, C.M., Valentine, Richard L., Stacy, J., Roehl, Marc, E. and Alvarez, Pedro, J.J. "Chemical Oxidation and Toxicity Reduction of Pesticide-Contaminated Soils", In Bioremediation of Recalcitrant Organics, 3(7), R. L. Hinchee, R. E. Hueppel, D.B. Anderson (Eds)., Battelle Press, 1995, pp. 175-181.

Miller, C.M., Valentine, Richard L.,Roehl, Marc, E. and Alvarez, Pedro, J.J. "Chemical and Microbiological Assessment of Pendimethalin Contaminated Soil After Treatment With Fenton's Reagent", Water Research, 1996, Vol. 30, No. 11, pp. 2579-2586.

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Kovacs, Phillip, E., Alvarez, Pedro J.J., and Valentine Richard L. "The Effect of Static Magnetic Fields on Biological Systems: Implications for Enhanced Biodegradation", accepted for publication, Critical Reviews in Environmental Science and Engineering, 27(4):319-382, 1997.

Valentine, Richard L. and Wang, H.C. "Iron Oxide Surface Catalyzed Oxidation of Quinoline by Hydrogen peroxide" Journal of Environmental Engineering (ASCE), 1998, Vol.124 (1); 31-38.

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Miller, Christopher, and Valentine, Richard L. "Mechanistic Studies of Surface Catalyzed H2O2 Decomposition and Contaminant Degradation in the Presence of Sand", Water Research,, Vol 33, No. 12 (August), 1999, pp. 2805-2816.

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Vikesland, Peter, Ozekin Kenan, and Valentine, R.L. "Monochloramine Decay in Model and Distribution System Water". Water Research , Vol. 35, no. 7, pp. 1766-1776, 2001.

Vikesland, Peter J. and Valentine, Richard L. " Iron-Oxide Surface Catalyzed Oxidation of Ferrous Iron: Implications of Oxide Type and Carbonate on Reactivity", of, Environmental Science and Technology, Vol. 36 (Feb), pp. 512-519, 2002.\

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Duirk, Steve and Valentine, R. L.," Reaction of Monochloramine with Humic Acid", Journal of Environmental Monitoring Vol. 4, pp. 85-89, 2002.

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Choi, Junghoon, Duirk, Stephen, E. and Valentine, Richard L. "Mechanistic Studies of N-nitrosodimethylamine formation in Drinking Water", Journal of Environmental Monitoring, 4(2), pp.249-252, 2002.

Choi, Junghoon, and Valentine, Richard L. "A kinetic model of N-nitrosodimethylamine (NDMA) formation during water chlorination/chloramination", Journal Water Science and Technology, Vol. 46, No. 3, pp. 65-71, 2002

Mitch, William A., Sharp, Jonathan O., Trussell, R. Rhodes, Valentine, Richard L., Alvarez-Cohen, Lisa, and Sedlak, David L. "N-Nitrosodimethylamine (NDMA) as a Drinking Water Contaminant: A Review", Environmental Engineering Science, Vol. 20, No. 5, pp. 389-403, 2003.

Choi, Junghoon, and Valentine, Richard L "N-Nitrosodimethylamine (NDMA) Formation By Free Chlorine Enhanced Nitrosation of Dimethylamine (DMA)", Environmental Science and Technology, Vol. 37, No.21, pp. 4871-4876, 2003.

Duirk, Steve E., Gombert, Bertrand, Croue, Jean-Phillipe, and Valentine, Richard L. "Modeling Monochloramine Loss in the Presence of Natural Organic Matter, Water Research, 39 (14): 3418-3431 Sept. 2005.

Duirk, Steve, E. and Valentine, Richard L. "Modeling dichloroacetic acid formation from the reaction of monochloramine with natural organic matter", Water Research, 40 (14):2667-2674, 2006.

Chen, Z., and R. L. Valentine," Modeling the formation of N-nitrosodimethylamine (NDMA) from the reaction of natural organic matter (NOM) with monochloramine", Environmental Science & Technology, 40, 7290-7297, December 2006.

BOOKS AND MONOGRAPHS:

Valentine, R.L., "Nonbiological Transformation", in Vadose Zone Modeling of Organic Pollutants, Stephen C. Hern and Susan M. Melancon, eds., Ch. 10, pp. 223-245, 1986, Lewis Publishers, Inc.

Valentine, R.L., Schnoor, J.S., "Biotransformation", in Vadose Zone Modeling of Organic Pollutants, Stephen C. Hern and Susan M. Melancon, eds., Ch. 9, pp. 192-223, 1986, Lewis Publishers, Inc.

Jury, W.A., Valentine, R.L., "Transport Mechanisms and Loss Pathways for Chemicals in Soils", in Vadose Zone Modeling of Organic Pollutants, Stephen C. Hern and Susan M. Melancon, eds., Ch. 2, pp. 37-61, 1986, Lewis Publishers, Inc.

Valentine, R. L., Kurt, A., Meyer, J., Walsh, D., and Mielke, W. "Radium Removal Using Preformed Hydrous Manganese Oxides", Report for the American Water Works Association Research Foundation, 1992, 87 pp. ISBN 0-89867-625-8

Valentine, R. L., Ozekin, K. and Vikesland, P.J. "Chloramine Decomposition in Distribution System and Model Waters", Prepared for AWWA Research Foundation, 1998. pp.144, ISBN 0-89867-945-1.

Valentine, R. L., Vikesland, P.J., Slatenow, S., and Patocha, Anita, "Role of the Pipe-Water Interface in Disinfectant By-product Formation and Disinfectant Loss, Report for AWWA Research Foundation, 2000, pp. 257, ISBN 1-58321-044-7.

Valentine, R.L., Barrett, S., Andrews, S. "Factors Affecting the Formation of NDMA in Water and Occurrence", Report for AWWA Research Foundation, 2005, AWWA Research Foundation, pp.252 ISBN 1-58321-378-3.

Drinking Water Distribution Systems: Assessing and Reducing Risks, Committee on Public Water Supply Distribution Systems: Assessing and Reducting Risks, National Research Council, the National Academies Press, Washington, D.C., ISBN 10-309-10306-1, 2006

CONFERENCE PROCEEDINGS:

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Venkataramiah, A., Lakshmi, G., Best, C., Gunter, G., Hartwig, E., and Valentine, R.L., "Effects of Chemical Pollutants from OTEC Plants on Marine Animals", Proceedings of the 8th Ocean Energy Conference, 1982, The Marine Technology Society, Washington, D.C.

Horne, A.J., Bennett, M., Valentine, R.L., Selleck, R.E., Russell, P.P., Wild, P.W., "The Effects of Chlorination of Wastewater on Juvenile Dungeness Crabs in San Francisco Bay Waters", In: Life History, Environment and Mariculture Studies of the Dungeness Crab, Cancer Magister with Emphasis on the Central California Fishery Resource, P.W. Wild and R.N. Tasto (eds.), Fish Bulletin 172, Dept. of Fish and Game, State of California (1983).

Valentine, R.L., Splinter, R.C., Horng, J.J., Nogaj, T. "Factors Affecting Radium Removal in an Iron Removal Process", Proceedings of National Annual AWWA Meeting, Washington, D.C., June 23-27, 1985, pp. 1377-1395.

Jafvert, C.T., Valentine, R.L., "A Unified Chlorine-Ammonia Speciation and Fate Model", Proceedings of the 1986 National Annual AWWA Meeting, Denver, CO, June 23-26, 1986, pp. 315-318.

Valentine, R.L., Splinter, R.C., Mulholland, T.S., Baker, J.M., "Removal of Radium from Groundwater Using a Novel Sand Filtration Process", Proceedings of the 1986 National Annual American Water Works Association (AWWA) Meeting, Denver, CO, June 23-26, 1986, pp. 415-420.

Valentine, R.L., Splinter, R.C., Mulholland, T., Lauch, R.P., "Radium Removal From Groundwater Using Sorption to Filter Sand", Proceedings of the 1986 National American Society of Civil Engineers (ASCE) Environmental Engineering Conference, Cincinnati, OH, July 8-10, 1986, pp. 62-67.

Valentine, R.L., Jafvert, C.T., "Experimental Verification of a Unified Chlorine-Ammonia Reaction Model", Proceedings of the 1986 National American Society of Civil Engineers (ASCE) Environmental Engineering Conference, Cincinnati, OH, July 8-10, 1986, pp. 240-246.

Jafvert, C.T., Valentine, R.L., "A Unified Chlorine-Ammonia Speciation and Fate Model", Proceedings of the 1986 National Annual AWWA Meeting, Denver, CO, June 23-26, 1986, pp. 315-318.

Valentine, R. L. and Jafvert, C.T."The Effect of Inorganic Composition on the Kinetics of Chloramine Decomposition in the Presence of Excess Ammonia", Proceedings of the American Chemical Society 194th National Meeting, Division of Environmental Chemistry, New Orleans, August 30-September 4, 1987.

Valentine, R.L., Spangler, K., Meyer, J., "Radium Removal from Groundwater Using Sorption to Freshly Precipitated Hydrous Manganese Oxides", Proceedings of the 1988 National American Water Works Association Meeting, June 19-23, Orlando, FL, pp. 194-195.

Valentine, R.L., Zepp, R.G., "Factors Affecting the Photochemical formation of Carbon Monoxide in the Southeastern United States", preprints of papers presented at the 201st National ACS Meeting, Atlanta, GA, April 14-19, 1991, Vol. 31, No. 1, pp. 524-527.

Valentine, R.L., Kurt, A., Walsh, D., Mielke, W., "Radium Removal Using Addition of Hydrous Manganese Oxides: Full-Scale Application", AWWA Seminar Proceedings, Emerging Technologies in Practice, June 17, 1990, Cincinnati, OH.

Valentine, R.L., and Zepp, R.G., "Photochemical Formation of Carbon Monoxide in Wetland Water", EOS Transactions, American Geophysical Union, Vol. 71, No. 43, October 23, 1990, p. 1236-1239.

Valentine, R.L., Stearns, S., and Kurt, A., "Radon and Radium From Distribution System and Filter Media Deposits" Proceedings of the American Water Works Association Water Quality Technology Conference, Toronto, Canada, Nov. 15-19, 1992 pp. 501-506.

Miller, Christopher M. and Valentine, R. L. "Granular Media Surface Catalyzed Hydrogen Peroxide Decomposition and Oxidation of Selected Organics", Proceedings of the Third International Symposium on Chemical Oxidation: Technology for the Nineties, Vanderbilt University, Nashville, Tennessee, February 17-19, 1993; Eds. John Roth and Alan R. Bowers, Technomic Publishing Co., Lancaster, pp.80-90.

Wang, A.H. and Valentine, R. L."Hydrogen Peroxide Decomposition Kinetics in the Presence Iron Oxides", Proceedings of the Third International Symposium on Chemical Oxidation: Technology for the Nineties, Vanderbilt University, Nashville, Tennessee, February 17-19, 1993; Eds. John Roth and Alan R. Bowers, Technomic Publishing Co., Lancaster, pp.74-79.

Thompson, P. and Valentine R. L. "Chloramine Decomposition Studies: Simultaneous Nitrogen and Chlorine Mass Balances " Proceedings of National ACS meeting, Division of Environmental Chemistry , ACS publication, Chicago, Ill. August 22-27, 1993, pp. 168-120.

Leung, S. W. and Valentine, R. L. "Chloramine Loss and the Formation of an Unidentified Product in Chloraminated Water ", Proceedings of National ACS meeting, Division of Environmental Chemistry,, Chicago, Ill, ACS publication, August 22-27, 1993, pp. 164-167.

Miller, C. M. and Valentine, R. L, "Kinetics of Quinoline Degradation by Hydrogen Peroxide in the Presence of Aquifer Material" Proceedings of the National Meeting of the Division of Environmental Chemistry, American Chemical Society, Denver, CO, March 28 - April 2, 1993, pp. 32-34.

Miller, Christopher. M, Valentine, Richard L., and Yoon, Tai-il. "Degradation of Phenol and Quinoline by Hydrogen Peroxide in the Presence of Magnetite and Hematite", Proceedings of the National Meeting of the Division of Environmental Chemistry, American Chemical Society,Anaheim, CA, April 2-7, 1995, pp.59-60.

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Ozekin, Kenan; Valentine, Richard L., and Vikeslan, Peter J. "Modeling Chloramine Decomposition in Natural and Model Waters", Proceedings of the National Meeting of the Division of Environmental Chemistry, American Chemical Society, Chicago, IL, August 21-26, 1995, pp.706-707.

Jackson, James R. and Valentine, Richard L."The Effect of Corrosion Control Strategies on Radium Accumulation and Radon Release from Model Distribution System Deposits", Proceedings of the 1995 Meeting of the National American Water Works Association, June 18-23, Anaheim, CA, 1995.

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Miller, Christopher M. and Valentine, Richard L. "Role of 'Super Oxide Anion in Contaminant Degradation by Hydrogen Peroxide in the Presence of Sandy Aquifer Material", Proceeding of the National Meeting of the Division of Environmental Chemistry, American Chemical Society, Orlando, FL, August 25-29, 1996, pp. 27-28

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Vikesland P. J. and Valentine R. L., "Reactions of Iron with Monochloramine with Iron" Proceeding of the American Chemical Society Meeting, August 1999, Chicago, Ill., 214-216.

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Choi, J. and Valentine, R. L.. " Formation of N-nitrosodimethylamine (NDMA) in chloraminated Water: New disinfection by-product", Proceedings the 221 st National Meeting (Environmental Division), San Diego, CA, April 1-5, 2001, Vol 41, No. 1, pg 8-11.

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