Brandy M. Toner

CONTACT

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Environmental Chemistry Laboratory
Department of Soil, Water, and Climate
University of Minnesota – Twin Cities
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RESEARCH

Environmental surface chemistry
X-ray absorption spectroscopy
Cycling of metals in natural and contaminated environments
Microbe-mineral interactions
Bacterial biofilm processes

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY

Ph. D., Department of Environmental Science, Policy, and Management
Dissertation: Environmental Geochemistry of a Biogenic Manganese Oxide
Committee: Garrison Sposito, Mary Firestone, and David Sedlak
May 2004

M.S., Department of Civil and Environmental Engineering
May 1999

BEMIDIJI STATE UNIVERSITY, MINNESOTA

B.S., with honors, Department of Environmental Studies
Hydrogeology emphasis, Mathematics minor
May 1997

AWARDS

National Research Council Associate (2005)
National Academy of Science
NASA Astrobiology Institute, Marine Biological Laboratory

Competitively Awarded Access to Synchrotron Instruments (2004 – 2008)
Lawrence Berkeley National Laboratory
The Advanced Light Source

Outstanding Graduate Student Instructor (2002)
Department of Environmental Science, Policy and Management
University of California at Berkeley

Walter and Ruth Schubert Prize (2002)
Prize annually recognizes the most outstanding graduate student in the Division of Ecosystem Sciences, University of California at Berkeley

Departmental Fellowship (1997 - 1998)
Department of Civil and Environmental Engineering
University of California at Berkeley

Outstanding Graduating Senior in Environmental Studies (1997)
Bemidji State University

National Science Foundation - Undergraduate Research Grant (1996 - 1997)
Department of Environmental Studies
Bemidji State University

RESEARCH SUMMARY

SEAFLOOR IRON SPECIATION AND ROCK WEATHERING	Chemical and microbiological weathering of hydrothermal chimney sulfide minerals, basaltic glasses, and hydrothermal vent particles
BIOMINERALIZATION	Bacterial Mn oxidation, biogenic Mn oxide structure and reactivity
METAL SPECIATION	Metal speciation in bacterial biofilms and on mineral surfaces
PESTICIDE DEGRADATION	Atrazine degradation by Mn oxides
HYDROCARBON CONTAMINATION	Polycyclic aromatic hydrocarbons (PAHs) in bay sediments at the Alameda Naval Air Station
	Installation of sampling, observation, and injection wells at hydrocarbon spill site Science Volunteer with US Geological Survey
STREAM HYDROLOGY	Characterization of groundwater seepage into a river at US Geological Survey Interdisciplinary Research Initiative site

PROFESSIONAL ACTIVITIES

PROFESSOR	Soil Chemistry and Mineralogy Graduate level course SOIL5311 Co-taught with Paul Bloom, Spring 2008
GRADUATE STUDENT INSTRUCTOR	Introduction to Environmental Studies Professors: Garrison Sposito and Robert Hass Content: Environmental science and literature
	Terrestrial Ecosystem Analysis: Below ground processes Professors: Mary Firestone, Harvey Doner, and Masoud Ghodrati Content: Soil microbiology, chemistry and physics: laboratory demonstrations and student research projects
GUEST LECTURER	Mineralogy for Biologists MIT/WHOI Joint Program Woods Hole Oceanographic Institution
	Aqueous Environmental Geochemistry Dept. of Civil and Environmental Engineering University of California at Berkeley
MENTOR	Mentored undergraduate and graduate researchers in synchrotron-radiation X-ray absorption spectroscopy, laboratory chemistry, microbiology, and molecular biology University of California at Berkeley, Woods Hole Oceanographic Institution
TUTOR	Tutored undergraduate students in mathematics through second quarter calculus Bemidji State University
REVIEWER	Environmental Science and Technology, Geochimica et Cosmochimica Acta, Geomicrobiology Journal, Aquatic Geochemistry, Geochemical Transactions, American Mineralogist, Chemosphere, Geology, Chemistry of Materials, Stanford Synchrotron Radiation Laboratory proposals

WORKSHOPS and TRAINING

COSEE Instructor Training – Communicating Ocean Sciences,
Woods Hole, MA, 10/19/07
InterRidge Theoretical Institute, Biogeochemical Interaction at Deep-sea Vents, 9/10-14/07
Pale Blue Dot III, Adler Planetarium, Chicago, IL, 9/17-20/06.
Short Course Molecular Geomicrobiology, Mineralogical Society of America,
Berkeley, CA, 12/2-4/05

PUBLICATIONS

Toner, B., Manceau, A., Webb, S. M., and Sposito, G. (2006). Zinc sorption to biogenic hexagonal-birnessite particles within a hydrated bacterial biofilm. *Geochim. Cosmochim. Acta.* **70:** 27-43.

Villalobos, M., Lanson, B., Manceau, A., **Toner, B.**, and Sposito, G. (2006). Structural model for the biogenic Mn oxide produced by *Pseudomonas putida*. *Am. Mineral.* **91**:489-502.

Toner, B., Fakra, S., Villalobos, M., Warwick, T., and Sposito, G. (2005). Spatially resolved characterization of biogenic manganese oxide production within a bacterial biofilm. *Appl. Environ. Microbiol* **71**: 1300-1310.

Toner, B., Manceau, A., Marcus, M. A., Millet, D. B., and Sposito, G. (2005). Zinc sorption by a bacterial biofilm. *Environ. Sci. Technol.* **39**: 8288-8294.

Toner, B. and Sposito, G. (2005). Reductive dissolution of biogenic manganese oxides in the presence of a hydrated biofilm. *Geomicrobiol. J.* **22**: 171-180.

Villalobos, M., **Toner, B.**, Bargar, J., and Sposito, G. (2003). Characterization of the manganese oxide produced by *Pseudomonas putida* strain MnB1. *Geochim. Cosmochim. Acta* **67**: 2649-2662.

Duff, J.H., **Toner, B**., Jackman, A.P., and Triska, F.J. (2000) Determination of groundwater discharge into a sand and gravel bottom river: a preliminary comparison of chloride dilution and seepage meter techniques. *Internationale Verieinigung fur Theoretische und Angewandte Limnologie, Vernhandlungen* 27: 1-6.

SELECTED PRESENTATIONS

Toner, B., Fakra, S.C, Manganini, S.J., Moffett, J.W., German, C.R., and Edwards, K.J. Particulate Organic Carbon and Iron Speciation within Deep-Sea Hydrothermal Plumes. Geomicrobiology and Environmental Biogeochemistry of Iron and Manganese. *Eos Trans. AGU, 88*(52), Fall Meet. Suppl., Abstract B23G-08. *Talk.*

Toner, B. Metals in the Environment: A Molecular-Level View. Department of Soil, Water, and Climate. University of Minnesota – Twin Cities. May 21, 2007. *Invited talk.*

Toner, B. Metals in the Environment: A Molecular-Level View. Department of Geosciences. State University of New York, Stony Brook. May 19, 2007. *Invited talk.*

Toner, B. Deciphering Deep-Sea Iron Speciation with Spatially-Resolved X-ray Absorption Spectroscopy. Environmental Chemistry and Technology Program. University of Wisconsin, Madison. Jan. 19, 2007. *Invited talk.*

Toner, B. Metals in the Environment: A Molecular-Level View of Speciation. Department of Civil and Environmental Engineering. University of Wisconsin, Madison. Jan. 18, 2007. *Invited talk.*

Toner, B., Santelli, C.M., Marlow, J.J., Rouxel, O., and Edwards, K.J. Microbe-Mineral Interactions in Extinct Hydrothermal Chimneys at East Pacific Rise: Spatially-Resolved Chemical and Mineralogical Approaches. Biofilms in the Environment: Adaptive Roles,

Microbe-Mineral Interactions, and Contributions to Global Biogeochemical Cycles. *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract B14B-02, 2006. *Invited talk*.

Toner, B., Santelli, C.M., Rouxel, O., and Edwards, K.J. Seafloor Weathering of Hydrothermal Chimney Sulfide Minerals from East Pacific Rise 9 ^{o} N: an X-ray Absorption Spectroscopic Study. Environmental Bioinorganic Chemistry, Gordon Research Conference, Andover, NH, June 18-23, 2006. *Poster*.

Toner., B. A Spectroscopic View of Microbe-Mineral Interactions. Department of Marine Chemistry and Geochemistry. Woods Hole Oceanographic Institution. May 23, 2006. *Talk*.

Toner, B., Santelli, C.M., Bach, W., Rogers, D.M. and Edwards, K.J. Low-Temperature Weathering of Hydrothermal Chimney Sulfide Minerals at Juan de Fuca Ridge. NASA's Astrobiology Science Conference (AbSciCon), Washington, D.C., March 26 - 30, 2006. *Talk*.

Toner, B., Santelli, C.M., Rogers, D.M., and Edwards, K.J. Low-Temperature Weathering of Hydrothermal Sulfide Minerals at Juan de Fuca Ridge. Crustal Construction, Tectonic, Alteration, Microbiological, and Transport Processes on the Flanks of Mid-Ocean Ridges. *Eos Trans.AGU*, 86(52), Fall Meet. Suppl. Abstract T33A-0518, 2005. *Poster*.

Toner, B., Fakra, S., Villalobos, M., Warwick, T. and Sposito, G. Spatially Resolved Characterization of Biogenic Manganese Oxide Production within a Bacterial Biofilm. Gordon Research Conference, Environmental Bioinorganic Chemistry. Lewiston, ME, June 20-25, 2004. *Poster*.

Toner B., Manceau, A., Villalobos, M., Fakra, S., Webb, S. M., Marcus, M. A., Bargar, J. R., Tebo, B. M. and Sposito, G. Reactivity of a Bacterial Manganese Oxide Produced within a Biofilm. Microbially Mediated Manganese and Iron Oxidation in the Biosphere. 227th American Chemical Society National Meeting, Anaheim, CA, March 28-April 1, 2004. *Talk*.

Toner B., Manceau, A., Marcus, M. A. and Sposito, G. Trace Metal Sequestration by the Manganese Oxidizing Bacterium *Pseudomonas putida*. Applications of Synchrotron Radiation in Low-Temperature Geochemistry and Environmental Science. American Geophysical Union. (*Eos Trans.* AGU, 83(47) Fall Meet. Suppl., Abstract V61C-08, 2002.) *Talk*.

Toner, B. and Sposito, G. Reductive Dissolution of Biogenic Manganese Oxides. Gordon Research Conference, Environmental Bioinorganic Chemistry, Andover, NH, June 16-21, 2002. *Poster*.

Toner, B. Reactivity of Biogenic Mn Oxides. USGS Menlo Park, CA, Dec 2001. *Invited talk*.

Toner, B. and Sposito, G. Contaminant Transformation by a Biogenic Manganese Oxide. Nanoparticles in the Environment, American Geophysical Union. (*Eos Trans.* AGU, 82(47) Fall Meet. Suppl., Abstract V32A-0960, 2001.) *Poster*.