

BAOHUA GU

Environmental Sciences Division
Oak Ridge National Laboratory
P.O. Box 2008 MS6036
Oak Ridge, TN 37831-6036

Senior Scientist
Phone: (865) 574-7286
FAX: (865) 576-8543
E-mail: gub1@ornl.gov

EDUCATION

1991 University of California, Berkeley Ph.D. Environmental Chemistry
1986 University of British Columbia, Canada M.Sc. Soil Chemistry

PROFESSIONAL POSITIONS

2005 – Present Adjunct Faculty, Dept. of Biosystems Engineering and Soil Science, University of Tennessee, Knoxville, TN.
2002 – Present Senior Scientist and Team Leader, Environmental Chemistry and Technology, Environmental Sciences Division (ESD), Oak Ridge National Laboratory.
1993 – 2001 Research Staff member, ESD.

EXPERTISE AND PROFESSIONAL EXPERIENCE

- Biogeochemical and interfacial mechanisms and kinetics controlling the reactions, transformation, transport, and fate of nanomaterials and contaminants in the environment.
- Nanomaterials synthesis, nano-scale complexity at the mineral-water interface, spectroscopy and novel applications in chemical, biological and environmental analysis.
- Research and development of environmental remediation technologies such as bioremediation, permeable reactive barriers, separation and treatment of uranium, perchlorate, pertechnetate, and other pollutants in contaminated water and sediments.

AWARDS AND PATENTS

R&D 100 Award, R&D Magazine, 2004; Distinguished Scientific Achievement Award, ORNL, 2001; Technical Achievement Award, ORNL, 1999 and 2000.
Holder of 3 US patents, one pending: Gu., B., et al. 2004 (US Patent 6,800,203; European Patent 1507587); Gu, B. and G.M. Brown. 2002 (US Patent 6,358,396); Brown, G.M., et al. 2002 (US Patent 6,448,299); Gu, B., et al. 2006, US Patent pending (11/528,016).

SELECTED RECENT PUBLICATIONS (from >100)

Dong, W., L. Liang, S. Brooks, G. Southworth and B. Gu. 2010. Roles of dissolved organic matter in the speciation of mercury and methylmercury in a contaminated ecosystem in Oak Ridge, Tennessee. *Environ. Chem.* 7:94-102.
Miller, C., G. Southworth, S.C. Brooks, L. Liang and B. Gu. 2009. Kinetic controls on the complexation between mercury and dissolved organic matter in a contaminated environment. *Environ. Sci. Technol.* 43:8548-8553.
Ruan, C.M., W. Wang, and B. Gu. 2007. Determining uranium in environmental samples by surface-enhanced Raman spectroscopy. *Anal. Chim. Acta.* 605:80-86.
Luo, W., J. Zhou, W. Wu, T. Yan, C. Criddle, P.M. Jardine, and B. Gu. 2007. Electron donor effects on bioreduction rates of uranium and microbial community under varying bicarbonate and sulfate conditions. *Appl. Microbiol. Biotech.* 77:713-721.
Gu, B.H., G.M. Brown, and C.C. Chiang. 2007. Treatment of perchlorate-contaminated groundwater using highly selective, regenerable ion-exchange technologies. *Environ. Sci. Technol.* 41:6277-6282.
Wang, W., B. Gu, and L. Liang. 2007. Effect of anionic surfactants on synthesis and self-assembling of silica colloidal nanoparticles. *J. Coll. Inter. Sci.* 313:169-173.

- Gu, B. and C. Ruan. 2007. Determination of technetium and its speciation by surface enhanced Raman spectroscopy. *Anal. Chem.* 79:2341-2345.
- He, Z. et al. 2007. Geochip: a comprehensive microarray for investigating biogeochemical, ecological, and environmental processes. *ISME* 1:67-77.
- Ruan C.M., W. Wang, and B. Gu. 2007. Single-molecule detection of thionine on aggregated gold nanoparticles by surface enhanced Raman scattering. *J. Raman Spectr.* 38:568-573.
- Ruan C.M., B. Gu, G. Eres, W. Wang, and Z. Zhang. 2007. Controlled fabrication of nanopillar array substrates for surface-enhanced Raman spectroscopy. *Langmuir* 23:5757-5760.
- Gu, B. and J.D. Coates. 2006. *Perchlorate Environmental Occurrence, Interactions and Treatment*, Springer, NY.
- Gu, B., W. Wu, M.A. Ginder-Vogel, M.W. Fields, J. Zhou, S. Fendorf, P.M. Jardine, and C. Criddle. 2005. Bioreduction of uranium in a contaminated soil column. *Environ. Sci. Technol.* 39:4841-4847.
- Gu, B., H. Yan, P. Zhou, D. Watson, M. Park, and J.D. Istok. 2005. Humics impact uranium bioreduction and oxidation. *Environ. Sci. Technol.* 39:5268-5275.
- Zhou, P. and B. Gu. 2005. Extraction of oxidized and reduced forms of uranium from contaminated soils: the effects of carbonate concentration and pH. *Environ. Sci. Technol.* 39:4435-4440.
- Wu, W., B. Gu, M.W. Fields, M. Genetile, Y. Ku, H. Yan, S. Tiquias, J. Nyman, J. Zhou, P.M. Jardine, and C. Criddle. 2005. Uranium(VI) reduction by denitrifying biomass. *Bioremed. J.* 9:49-61.
- Wang, W. and B. Gu. 2005. Self-assembly of two- and three-dimensional particle arrays by manipulating hydrophobicity of silica nanoparticles, *J. Phys. Chem. B* 109, 22175-22180.
- Wang, W. and B. Gu. 2005. Surface-enhanced Raman spectroscopy substrates via self-assembly of silver nanoparticles on surface functionalized glass for perchlorate detection. *Appl. Spectr.* 59:1509-1515.
- Gu, B., J. Tio, W. Wang, Y. Ku, and S. Dai. 2004. Raman spectroscopic detection for perchlorate at low concentrations. *Appl. Spectr.* 58:741-744.
- Wang, W., B. Gu, L. Liang, and W. Hamilton. 2003. Fabrication of two- and three-dimensional silica nanocolloidal particle arrays. *J. Phys. Chem. B* 107:3400-3404.
- Chen, J., B. Gu, R.A. Royer, and W.D. Burgos. 2003. The roles of natural organic matter fractions in chemical and microbial reduction of ferric iron. *Sci. Total Environ.* 307:167-178.
- Gu, B., S.C. Brooks, Y. Roh, and P.M. Jardine. 2003. Geochemical reactions and dynamics during titration of a contaminated groundwater. *Geochim. Cosmochim. Acta* 67:2749-2761.
- Chen, J., B. Gu, E.J. LeBoeuf, H. Pan, and S. Dai. 2002. Spectroscopic characterization of the structural and functional properties of natural organic matter fractions. *Chemosphere* 48:59-68.
- Gu, B., T.J. Phelps, L. Liang, M.J. Dickey, Y. Roh, B.L. Kinsall, A.V. Palumbo, and G.K. Jacobs. 1999. Biogeochemical dynamics in zero-valent iron columns. *Environ. Sci. Technol.* 33:2170-2177.
- Gu, B., T. Mehlhorn, L. Liang and J.F. McCarthy. 1996. Competitive adsorption, displacement, and transport of organic matter on iron oxide. *Geochim. Cosmochim. Acta* 60:2977-2992.
- Gu, B., J. Schmitt, Z. Chen, L. Liang and J.F. McCarthy. 1995. Adsorption and desorption of different organic matter fractions on iron oxide. *Geochim. Cosmochim. Acta* 59:219-229.
- Gu, B., J. Schmitt, Z. Chen, L. Liang and J.F. McCarthy. 1994. Adsorption-desorption of natural organic matter on iron-oxide: mechanisms and models. *Environ. Sci. Technol.* 28:38-46.
- Gu, B. and H.E. Doner. 1992. The microstructure of dilute clay and humic acid suspensions revealed by freeze-fracture electron microscopy. *Clays Clay Miner.* 40:246-250.
- Gu, B. and L.E. Lowe. 1990. Studies on the adsorption of boron on humic acids. *Can. J. Soil Sci.* 70:305-311.

MAJOR COLLABORATORS AND CO-EDITORS

J.D. Coates (UC, Berkeley), J.D. Istok (OSU), W. Burgos (PSU), C.S. Criddle (SU), S. Dai (ORNL), G. Eres (ORNL), W. Wu (SU), J. Luo (GIT), P. Hatzinger (Shaw), J.F. Bohlke (USGS); N.C. Sturchio (UIC), P.M. Jardine (ORNL), D. Watson (ORNL), P. Bonnesen (ORNL), B. Moyer (ORNL), S. Brooks

(ORNL), G.M. Brown (ORNL), W. Hamilton (ORNL), L. Liang (ORNL), Z. Zhang (ORNL), J. Zhou (UO), A. Jackson (TTU), W. Wang (ORNL), D.J. Wesolowski (ORNL).

FORMER ADVISORS AND ADVISEES (POSTGRADUATE STUDENTS)

Advisors: J.F. McCarthy (Postdoc), H.E. Doner (Ph.D.), L. Lowe (M.Sc.).

Advisees: W. Wang, C. Ruan, D.H. Phillips, W. Luo, Y.K. Ku, P. Zhou, M.J. Dickey, J. Chen, K. Dowlen.