

WENMING DONG

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Education

- Ph.D., Nuclear Physics, Lanzhou University, PRC, 2000 (Sorption/transport of radionuclides).
- M.S., Radiochemistry, Lanzhou University, PRC, 1993 (Interactions of radionuclides with humics).
- B.S., Chemistry, Northwest Normal University, PRC, 1987.

Research Interests

Main research interests focus on the environmental biogeochemistry: (1) Transport and transformation mechanisms of natural organic matter (NOM) affected by biogeochemical and climate change in terrestrial and subsurface environments, (2) Biogeochemical processes controlling transport and transformation of contaminants (e.g., radionuclides and heavy metals) in relevant aquifers, and (3) aqueous and surface complexation reactions, and the mechanisms and models of contaminant interactions with minerals and NOM (e.g., humic/fulvic acids).

Research Experience

2009-Present: Senior Scientific Engineering Associate, Earth Science Division, Lawrence Berkeley National Laboratory (LBNL).

- Investigating subsurface transport and transformation of natural organic matter, and the spatial and seasonal variations of dissolved organic matter affected by biogeochemical and climate conditions.
- Characterization of natural organic matter, and various soils, sediments and minerals.
- Developing natural biogenic surfactants (NBS) for enhanced oil recovery (EOR).
- Developed additive surface complexation models for predicting U(VI) adsorption.
- Immobilization of U(VI) in acidic waste plumes.
- Investigated the persistent source influences on the trailing edge of a groundwater plume, and natural attenuation timeframes associated with the F-Area Savannah River Site

2004-2009: Post-doctoral researcher and research associate, Environmental Science Division, Oak Ridge National Laboratory (ORNL).

- Determined the important ternary complexes of U(VI)-CO₃-(Mg, Ca, Sr, and Ba) and their binding constants.
- Determined the complexation and speciation of Tc(IV), U(IV) and Hg(II,0) with natural/anthropogenic organic ligands.
- Determined the dissolution and oxidation rates of Tc (IV)- and U(IV)-oxides under both reducing and oxidizing conditions.
- Studied the bioreduction rates of U(VI) affected by Ca, Mg, Na and EDTA.

2002-2004: Post-doctoral research fellow, Department of Geography and Environmental Engineering, Johns Hopkins University (JHU).

- Studied sorption/desorption, speciation, transport and bioreduction of depleted uranium associated with Aberdeen Proving Ground site, Maryland.
- Conducted sorption and diffusion of U(VI) species associated with Hanford site sediment, Washington.
- Analysis and characterization of soils and sediments.

2000-2001: Research associate, Institute of Nuclear Physics, Paris University-XI, France.

- U(VI) sorption onto oxides, surface complexation modeling and EXAFS analysis.

1993-2000: Assistant/associate professor, Radiochemistry Laboratory, Lanzhou University, China.

- Sorption-desorption and transport of many radionuclides with soils and minerals.

- Complexation of radionuclides with humic and fulvic acids.
- Separation, measurement and identification of radionuclides.

Instrumentation and Modeling Skills

- Molecular spectroscopy: LIFS, Fluorescence EEM, (ATR)-FT-IR, EXAFS, ¹³C-NMR.
- Radioanalyses: alpha/beta-liquid scintillation counting spectrometers, gamma-ray detection systems, kinetic phosphorescence analyzer (KPA) for uranium(VI) analysis etc.
- Other laboratory instrumentation: XRD, SEM, ICP-MS, IC, HPLC, AAS, DLS (particle size and zeta-potential), N₂- or Kr-BET (surface area), total organic/inorganic carbon/nitrogen (TOC/TIC/TON) analyzer, DSC-TGA, ball mills, microscopes, UV-vis, anaerobic glovebox, ultra-/micro-filtration, autoclave and other routine instrumentation.
- Modeling: biogeochemical processes modeling using PHREEQC, FITEQL, SCIENTIST and MATLAB, and skills with graphical and data analysis softwares (e.g., OriginLab, and Sigmaplot) as well as strong working knowledge on spreadsheets and other routine office applications.

Professional Affiliations and Activities: Members of AGU, ACS (2006-2009), AAAS (206-2008) and Sigma XI (2006-2007); Manuscript and proposal reviewer for many scientific journals (EST, GCA etc.) and agencies.

Patents: Wan J, **W. Dong** and T.K. Tokunaga, Method to attenuate U(VI) mobility in acidic waste plumes using humic acids, US DOE Invention #S-126,248 (2011).

Selected Publications in Peer-Reviewed Journals (up to 60)

1. **Dong W.** and J. Wan, Additive surface complexation modeling of uranium(VI) adsorption onto quartz-sand dominated sediments, *Environ. Sci. Technol.*, 48, 6569-6577, **2014**.
2. Tokunaga T.K., J. Wan, J.W. Jung, T.W. Kim, Y. Kim and **W. Dong**, Capillary pressure and saturation relations for supercritical CO₂ and brine in sand: high-pressure Pc(Sw) controller/meter measurements, and capillary scaling predictions, *Water Resour. Res.*, 49, 4566-4579, **2013**.
3. Boggs M.A., M. Islam, **W. Dong** and N.A. Wall, Complexation of Tc(IV) with EDTA at varying ionic strength of NaCl, *Radiochim. Acta*, 101, 13-18, **2013**.
4. Wall N.A., N. Karunathilake and **W. Dong**, Interactions of Tc(IV) with citrate in NaCl media, *Radiochim. Acta*, 101, 111-116, **2013**.
5. **Dong W.**, T. K. Tokunaga, J. A. Davis, and J. Wan, Uranium(VI) adsorption and surface complexation modeling onto background sediments from the F-Area Savannah River Site, *Environ. Sci. Technol.*, 46, 1565-1571, **2012**.
6. Wan J., T. K. Tokunaga, **W. Dong**, M. E. Denham, and S. S. Hubbard, Persistent Source Influences on the Trailing Edge of a Groundwater Plume, and Natural Attenuation Timeframes: The F-Area Savannah River Site, *Environ. Sci. Technol.*, 46, 4490-4497, **2012**.
7. **Dong W.**, Y. Bian, L. Liang, and B. Gu, Binding constants of mercury and dissolved organic matter determined by a modified ion exchange technique, *Environ. Sci. Technol.*, 45, 3576-3583, **2011**.
8. Wan J., **W. Dong** and T. K. Tokunaga, Method to attenuate U(VI) mobility in acidic waste plumes using humic acids, *Environ. Sci. Technol.*, 45, 2331-2337, **2011**.
9. Gu B., **W. Dong**, L. Liang and N.A. Wall, Dissolution of technetium(IV) oxide by natural and synthetic organic ligands under both reducing and oxidizing conditions, *Environ. Sci. Technol.*, 45, 4771-4777, **2011**.
10. **Dong W.**, L. Liang, S C. Brooks, G. Southworth and B. Gu, 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, **2010**.
11. Gu B., Y. Bian, C. L. Millera, **W. Dong**, X. Jiang and L. Liang, Mercury reduction and complexation by natural organic matter in anoxic environments, *PNAS*, Early Edition, 1-5, **2010**.
12. Boggs M.A., **W. Dong**, B. Gu and N. A. Wall, Complexation of Tc(IV) with acetate at varying ionic strengths, *Radiochim. Acta*, 98, 583-587, **2010**.

13. **Dong W.** and S. C. Brooks, Formation of aqueous $\text{MgUO}_2(\text{CO}_3)_3^{2-}$ complex and uranium anion exchange mechanism onto an exchange resin, *Environ. Sci. Technol.*, 42, 1979-1983, **2008**.
14. **Dong W.** and Brooks S.C., Determination of the formation constants of ternary complexes of uranyl and carbonate with alkaline earth metals (Mg^{2+} , Ca^{2+} , Sr^{2+} , and Ba^{2+}) using anion exchange method, *Environ. Sci. Technol.*, 40, 4689-4695, **2006**.
15. **Dong W.**, G. Xie, T.R. Miller, M.P. Franklin, T. Palmateer Oxenberg, E.J. Bouwer, W.P. Ball, and R.U. Halden. Sorption and bioreduction of hexavalent uranium at a military facility by the Chesapeake Bay, *Environ. Poll.*, 142, 132-142, **2006**.
16. **Dong W.**, W. P. Ball, C. Liu, Z. Wang, A.T. Stone, J. Bai, and J. M. Zachara. Influence of calcite solids and dissolved calcium on U(VI) sorption to a Hanford subsurface sediment, *Environ. Sci. Technol.*, 39, 7949-7955, **2005**.
17. Wang X., **W. Dong** and Z. Tao, A multitracer study on the adsorption of 32 elements on a natural hematite ($\alpha\text{-Fe}_2\text{O}_3$): effects of pH and fulvic acid, *Colloids & Surfaces A: Physicochim. Eng. Aspects*, 223, 135-143, **2003**.
18. Tao Z. and **W. Dong**, Additivity rule and its application to the sorption of radionuclides on soils, *Radiochim. Acta*, 91, 299-304, **2003**.
19. **Dong W.**, H. Zhang, M. Huang and Z. Tao, Use of the ion exchange method for the determination of stability constants of trivalent metals complexes with humic and fulvic acids I. Eu^{3+} and Am^{3+} complexes in weakly acidic conditions, *App. Radiat. Isotopes*, 56, 959-965, **2002**.
20. **Dong W.**, W. Li and Z. Tao, Use of the ion exchange method for the determination of stability constants of trivalent metals complexes with humic and fulvic acids II. Tb^{3+} , Yb^{3+} and Gd^{3+} complexes in weakly alkaline conditions, *App. Radiat. Isotopes*, 56, 967-974, **2002**.
21. **Dong W.**, Z. Guo, J. Du, L. Zheng and Z. Tao, Sorption characteristics of zinc(II) by calcareous soil - radiotracer study, *App. Radiat. Isotopes*, 54, 371-375, **2001**.
22. **Dong W.**, X. Wang, Z. Qin, C. Zhou and Z. Tao, Preparation of multitracer from $\text{Th}(\text{NO}_3)_3$ irradiated by ^{40}Ar ion beam, *J. Radioanal. Nucl. Chem.*, 250(2), 263-266, **2001**.
23. **Dong W.**, X. Wang, A. Wang, X. Bian, Y. Gong, J. Du and Z. Tao, Comparative study on sorption / desorption of radioeuropium on alumina, bentonite and red earth: effects of pH, ionic strength, humic substance, iron oxides in red earth, *App. Radiat. Isotopes*, 54, 603-601, **2001**.
24. **Dong W.**, X. Wang, Y. Shen, X. Zhao and Z. Tao, Sorption characteristics of radiocobalt on bentonite and kaolinite, *J. Radioanal. Nucl. Chem.*, 245(2), 431-434, **2000**.
25. **Dong W.**, X. Wang, J. Du, D. Wang and Z. Tao, Sorption and desorption of radioselenium on red earth and its solid components, *J. Radioanal. Nucl. Chem.*, 240(3), 715-719, **1999**.
26. **Dong W.**, X. Wang, J. Du, X. Bian, F. Ma and Z. Tao, Sorption and desorption characteristics of Eu (III) on a red earth: Results from batch and column investigations, *J. Radioanal. Nucl. Chem.*, 242(3), 793-797, **1999**.
27. **Dong W.**, W. Li et al., Effects of ionic strength and pH on the stability constants of the complexes of Co(II) with soil fulvic acid, *J. Radioanal. Nucl. Chem.*, 241(2), 351-353, **1999**.
28. Tao Z. and **W. Dong**, Comparison between the one pK and two pK models of the metal oxide-water interface, *J. Colloid Interface Sci.*, 208, 248-251, **1998**.
29. Du J., **W. Dong**, X. Wang, H. Liu and Z. Tao, Sorption and desorption of radiocesium on Calcareous soil and its solid components, *J. Radioanal. Nucl. Chem.*, 231(1-2) 183-185, **1998**.
30. Tao Z. and **W. Dong**, Use of anion exchange method for determination of stability constants of metal-humic substance complexes, *Radiochim. Acta*, 73, 1-3, **1996**.
31. Du J., **W. Dong**, Wang X. and Z. Tao, Sorption and desorption of radiostrontium on calcareous soil and its solid components, *J. Radioanal. Nucl. Chem.*, 203(1), 31-36, **1996**.
32. Tao Z., **W. Dong**, J. Du and Z. Guo, Sorption and desorption of radioiodine on a calcareous soil and its solid Components, *J. Radioanal. Nucl. Chem.*, 214(2), 147-157, **1996**.

Conference Presentations: 30+ oral and poster presentations for the ACS, AGU, Goldschmidt and US DOE-SBR-PI meetings.