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EDUCATION

Ingenieurschule Burgdorf, BE, Switzerland, B.Sc. in Chemistry, April 1980.

University of California at Santa Cruz, CA, Ph.D. in Physical Chemistry, October 1989.

PROFESSIONAL EXPERIENCE

Eawag, Swiss Federal Institute of Aquatic Science & Technology

(2000-present) Head of the group "Chemistry of Water Resources" in the department of Water Resources and Drinking water.

(1992-2000) Research Scientist and alternating head of the group "Photo- and Surface Chemistry" in the Department of Chemistry.

ETH Zurich, Lecturer (2006-present).

Stanford University, Department of Chemistry, (1990-1992) Postdoctoral Research Fellow.

University of California at Santa Cruz, Department of Physical Chemistry and Biophysics, Research- and Teaching assistant, Assistant Researcher (1984-1989).

University of Bern Switzerland, Institute of Inorganic and Physical Chemistry, (1980-1984) Technical Researcher.

RESEARCH INTERESTS

Biogeochemical cycling of metals, trace metals and pollutants

Kinetics and mechanisms of thermal and photochemically induced redox reactions

Adsorption, structure, and transformations of compounds on mineral surfaces, surface spectroscopy

Environmental technology: treatment of polluted waters with adapted technologies

SELECTED ACTIVITIES

2012-2014 Associate Editor of Environmental Science and Technology

2011-present Member of the International Advisory Committee of the Interfaces Against Pollution conference series

2004-present Member of the working group of the National Long-Term Surveillance of Swiss Rivers (NADUF) program

2009-present Drinking water projects in Bangladesh: Deep tubewells and arsenic removal in collaboration with UNICEF, Bangladesh University of Engineering and Technology and University of Dhaka. Member of the Eawag cross-cutting project Water Resource Quality

2007-2011 Lead scientist in the European training network AquaTRAIN: "Geogenic chemicals in groundwaters and soils" (Research training network with 15 European Institutions)

2004-2009 Principal investigator and coordinator of projects in Bangladesh; removal of arsenic from drinking water and geochemistry of arsenic in soils and groundwater (SNSF-funded project "Arsenic Contamination of Paddy Soils through Irrigation Water in Bangladesh" in collaboration with the soil chemistry group Prof. Ruben Kretzschmar, IPB, ETH Zürich

2000-2005 Principal investigator in the joint project "Sustainable Water Supply System in Arsenic-affected Asian Environments" of the Massachusetts Institute of Technology, USA, the University of Tokyo, Japan, and the University of Engineering and Technology, Bangladesh, (funded by the Alliance of Global Sustainability)

2000-present Structure and reactivity on surfaces probed with in-situ FTIR spectroscopy and kinetics of redox reactions (independent Eawag-funded research and collaborations)

Reviewer: *Environmental Science and Technology, Water Research, Geochimica et Cosmochimica Acta, Applied Geochemistry, Colloids and Surfaces, Journal of Hazardous Materials, Journal of Catalysis, Nature, Science of the Total Environment, Water Resources Research, Desalination, Swiss National Science Foundation and other Research Foundations*

SELECTED PUBLICATIONS

Most significant publications from last 5 years

- Senn, A.-C., Kaegi, R., Hug, S.J., Hering, J.G., Mangold, S., Voegelin, A. (2015) "Composition and structure of Fe(III)-precipitates formed by Fe(II) oxidation in water at near-neutral pH: Interdependent effects of phosphate, silicate and Ca". *Geochimica et Cosmochimica Acta*, 162,220-246.
- Katsoyiannis, I.A., Voegelin, A., Zouboulis, A.I., Hug, S.J. (2015) "Enhanced As(III) oxidation and removal by combined use of zero valent iron and hydrogen peroxide in aerated waters at neutral pH values". *Journal of Hazardous Materials*, 297, 1-7.
- Borer, P.; Hug, S.; Sonderegger, R. (2015) „Entfernung von Arsen und Uran. FOWA-Projekt: Aufbereitungsverfahren zur Arsen- und Uranentfernung aus Trinkwasser“ *Aqua & Gas* 95(4) 14-22, and Sonderegger, R.; Borer, P.; Hug, S. (2015) "Empfehlung. Umgang mit den geogenen Spurenstoffen Arsen und Uran in der Trinkwasserversorgung". *SVGW. Regelwerk. (Recommendation for Swiss Water Works for the removal of geogenic arsenic and uranium from drinking water)*.
- Johnston, R., Hug, S.J., Inauen, J., Khan, N.I., Mosler, H.-J., Yang, H. (2014). "Enhancing arsenic mitigation in Bangladesh: Findings from institutional, psychological, and technical investigations". *Science of the Total Environment*, 488-489 (1),477-483.
- Borer, P., Hug, S.J. (2014) "Photo-redox reactions of dicarboxylates and α -hydroxydicarboxylates at the surface of Fe(III)(hydr)oxides followed with in situ ATR-FTIR spectroscopy". *Journal of Colloid and Interface Science*, 416,44-53.
- Wenk, C.B., Kaegi, R., Hug, S.J. (2014) "Factors affecting arsenic and uranium removal with zero-valent iron: Laboratory tests with Kanchan-type iron nail filter columns with different groundwaters" *Environmental Chemistry*, 11, (5), 547-557.
- Voegelin, A., Senn, A.-C., Kaegi, R., Hug, S.J., Mangold, S. (2013) "Dynamic Fe-precipitate formation induced by Fe(II) oxidation in aerated phosphate-containing water". *Geochimica et Cosmochimica Acta*, 117, 216-231.
- Neumann, A., Kaegi, R., Voegelin, A., Hussam, A., Munir, A.K.M., Hug, S.J. (2013) "Arsenic removal with composite iron matrix filters in Bangladesh: A field and laboratory study". *Environmental Science and Technology*, 47 (9), 4544-4554.
- Roberts, L.C., Hug, S.J., Voegelin, A., Badruzzaman, A.B.M., Ali, M.A. (2012) "Understanding the Geological and Medical Interface of Arsenic" *As 2012 - 4th International Congress: Arsenic in the Environment 2012*, 503-504.
- Hug, S.J., Gaertner, D., Roberts, L.C., Schirmer, M., Ruettimann, T., Rosenberg, T.M., Badruzzaman, A.B.M., Ali, M.A. (2011) "Avoiding high concentrations of arsenic, manganese and salinity in deep tubewells in Munshiganj District, Bangladesh" *Appl. Geochem.*, 26: 1077-1085.
- Voegelin, A., Kaegi, R., Frommer, J., Vantelon, D., Hug, S.J., (2010) "Effect of phosphate, silicate, and Ca on Fe(III)-precipitates formed in aerated Fe(II)- and As(III)-containing water studied by X-ray absorption spectroscopy" *Geochim. Cosmochim. Acta*, 74: 164-186.
- Roberts, L.C., Hug, S.J., Dittmar, J., Voegelin, A., Kretzschmar, R., Wehrli, B., Cirpka, O.A., Saha, G.C., Ali, M.A., Badruzzaman, A.B.M. (2010) "Arsenic release from paddy soils during monsoon flooding" *Nat. Geosci.*, 3: 53-59.

Most significant publications prior to last 5 years

- Borer, P., Hug, S.J., Sulzberger, B., Kraemer, S.M., Kretzschmar, R. (2009) "ATR-FTIR spectroscopic study of the adsorption of desferrioxamine B and aerobactin to the surface of lepidocrocite (γ -FeOOH)" *Geochim. Cosmochim. Acta*, 73: 4661-4672.
- Hug, S.J., Leupin, O.X., Berg, M. (2008) "Bangladesh and Vietnam: Different groundwater compositions require different approaches to arsenic mitigation" *Environ. Sci. Technol.*, 42, 6318-6323.

- Winkel, L., Berg, M., Amini, M., Hug, S.J., Johnson, C.A. (2008) "Predicting groundwater arsenic contamination in Southeast Asia from surface parameters" *Nat. Geosci.*, 1: 536-542.
- Katsoyiannis, I.A., Ruettimann, T. and Hug, S.J. (2008) "pH dependence of fenton reagent generation and As(III) oxidation and removal by corrosion of zero valent iron in aerated water", *Environ. Sci. Technol.*, 42: 7424-7430.
- Roberts, L. C. and Hug, S. J.; Dittmar, J.; Voegelin, A., Saha, G. C.; Ali, M. A.; Badruzzanian, A. B. M., Kretzschmar, R. (2007) "Spatial distribution and temporal variability of arsenic in irrigated rice fields in Bangladesh. 1. Irrigation water", *Environ. Sci. Technol.*, 41: 5960-5966.
- Hug, S. J. and Bahnemann, D. (2006) "Infrared spectra of oxalate, malonate and succinate adsorbed on the aqueous surface of rutile, anatase and lepidocrocite measured with in situ ATR-FTIR", *J. Electron Spectrosc. Relat. Phenom.*, 150: 208-219.
- Ahmed, M.F., Ahuja, S., Alauddin, M., Hug, S.J., Lloyd, J.R, Pfaff, A., Pichler, T. , Saltikov, C., Stute, M., Van Geen, A. (2006) "Ensuring safe drinking water in Bangladesh" *Science*, 314:1687-1688.
- Leupin, O. X. and Hug, S. J. (2005) "Oxidation and removal of arsenic (III) from aerated groundwater by filtration through sand and zero-valent iron", *Water Res.*, 39: 1729-1740.
- Roberts, L. C., Hug, S. J., Ruettimann, T., Billah, M.; Khan, A. W. and Rahman, M. T. (2004) "Arsenic removal with iron(II) and iron(III) waters with high silicate and phosphate concentrations", *Environ. Sci. Technol.*, 38: 307-315.
- Hug, S. J. and Leupin, O. (2003) "Iron-catalyzed oxidation of arsenic(III) by oxygen and by hydrogen peroxide: pH-dependent formation of oxidants in the Fenton reaction", *Environ. Sci. Technol.*, 37: 2734-2742.
- Hug, S. J.; Canonica, L., Wegelin, M., Gechter, D. and Von Gunten, U. (2001) "Solar oxidation and removal of arsenic at circumneutral pH in iron containing waters", *Environ. Sci. Technol.*, 35: 2114-2121.
- Buerge, I. J. and Hug, S. J. (1999) "Influence of mineral surfaces on Chromium(VI) reduction by Iron(II)", *Environ. Sci. Technol.*, 33: 4285-4291.
- Hug, S. J. (1997) "In situ Fourier transform infrared measurements of sulfate adsorption on hematite in aqueous solutions", *J. Colloid Interface Sci.*, 197, 188, 415-422.
- Hug, S. J. and Sulzberger, B. (1994) "In-Situ Fourier-Transform Infrared Spectroscopic Evidence for the Formation of Several Different Surface Complexes of Oxalate on TiO₂ in the Aqueous-Phase", *Langmuir*, 10: 3587-3597