Biosketch

Univ.-Prof. Dr. Stephan Krämer

Position in CoE: Key Researcher

Personal Details

Place of birth	Rüsselsheim, Germany
Nationality	German
Children	3 (2000, 2002, 2008)
Affiliation:	University of Vienna
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Profile	ReseacherID: AAB-1487-2020
List of publications	ORCID: 0000-0002-3378-8530
Academic age	24 years since PhD

Academic Career and Positions Held

After studying at the **Technical University of Darmstadt** and the **University of Oklahoma** (with a **Fulbright Scholarship**), I earned a **Diploma** degree in Earth Sciences at the Ruhr **Universität Bochum** in **1992**. Then, I moved to **UCLA** and the **California Institute of Technology** to work under the guidance of Prof. Janet Hering and received a **doctoral degree** based on this work at the **Technical University of Darmstadt** in **1997** (summa com laude). Thereafter, I held a **postdoctoral position** at the **University of California, Berkeley** with Prof. Garrison Sposito and between 2000 and 2006 I worked as Oberassistent at the **ETH Zürich** in the lab of Prof. Ruben Kretzschmar, where I obtained a **habilitation** in **2005**. I joined the **University of Vienna** as **full professor** for Environmental Biogeochemistry, where I served as head of the Department for Environmental Geosciences (EDGE) since **2012**.

Scientific Achievements and Scientific Contribution to the CoE

Scientific achievements. The scientific interests of my research group are focused on molecular mechanisms involved in **bio-mineral interactions**. We are using spectroscopic methods including synchrotron X-ray, IR-, UV-VIS and fluorescence spectroscopy, mass spectrometry including non-traditional isotope geochemistry and a range of other methods in order to understand how organisms use a plethora of **biogenic compounds** including metallophores, redox active compounds (including redox-shuttles), surfactants, proteins, extracellular enzymes and DNA to modify their **geochemical environment** and to interact with **mineral surfaces**. We have published extensively in that area and successfully acquired funding from national and international sources.

Scientific contributions to the CoE. We will investigate how **biomes react** to their **extracellular environment** and how they address and **control** detailed molecular scale **geochemical mechanisms** and their rates. In order to do that, we provide know-how about the reactivity of biogenic compounds in solutions and at mineral surfaces, along with a range of methods to interrogate it. This know-how can be applied to processes such as plant and microbial nutrient uptake (including competitive and synergistic effects), attachment and electron shuttling in biofilms and responses to toxic substances.

10 Most Important Publications (*relevant for the CoE)

1. *Reyes, C.; Hodgskiss, L. H.; Baars, O.; Kerou, M.; Bayer, B.; Schleper, C.; **Kraemer, S. M.** Copper Limiting Threshold in the Terrestrial Ammonia Oxidizing Archaeon Nitrososphaera Viennensis. *Research in Microbiology* **2020**, *171* (3–4), 134–142. *https://doi.org/10.1016/j.resmic.2020.01.003*.
2. Kessler, N.; **Kraemer, S. M.**; Shaked, Y.; Schenkeveld, W. D. C. Investigation of Siderophore-Promoted and Reductive Dissolution of Dust in Marine Microenvironments Such as Trichodesmium Colonies. *Front. Mar. Sci.* **2020**, *7*, 45. *https://doi.org/10.3389/fmars.2020.00045*.
3. *Kang, K.; Schenkeveld, W. D. C.; Biswakarma, J.; Borowski, S. C.; Hug, S. J.; Hering, J. G.; **Kraemer, S. M.** Low Fe(II) Concentrations Catalyze the Dissolution of Various Fe(III) (Hydr)Oxide Minerals in the Presence of Diverse Ligands and over a Broad PH Range. *Environ. Sci. Technol.* **2019**, *53* (1), 98–107. *https://doi.org/10.1021/acs.est.8b03909*.
4. *Kubicki, J. D.; Tunega, D.; **Kraemer, S. M.** A Density Functional Theory Investigation of Oxalate and Fe(II) Adsorption onto the (010) Goethite Surface with Implications for Ligand- and Reduction-Promoted Dissolution. *Chemical Geology* **2017**, *464*, 14–22. *https://doi.org/10.1016/j.chemgeo.2016.08.010*.
5. Schenkeveld, W. D. C.; Wang, Z.; Giammar, D. E.; **Kraemer, S. M.** Synergistic Effects between Biogenic Ligands and a Reductant in Fe Acquisition from Calcareous Soil. *Environ. Sci. Technol.* **2016**, *50* (12), 6381–6388. *https://doi.org/10.1021/acs.est.6b01623*.
6. ***Kraemer, S. M.**; Duckworth, O. W.; Harrington, J. M.; Schenkeveld, W. D. C. Metallophores and Trace Metal Biogeochemistry. *Aquat Geochem* **2015**, *21* (2–4), 159–195. https://doi.org/10.1007/s10498-014-9246-7.
7. **Kraemer, S. M.**; Crowley, D. E.; Kretzschmar, R. Geochemical Aspects of Phytosiderophore-Promoted Iron Acquisition by Plants. In *Advances in Agronomy*; Elsevier, **2006**; Vol. 91, pp 1–46. *https://doi.org/10.1016/S0065-2113(06)91001-3*.
8. Carrasco, N.; Kretzschmar, R.; Pesch, M.-L.; **Kraemer, S. M.** Low Concentrations of Surfactants Enhance Siderophore-Promoted Dissolution of Goethite. *Environ. Sci. Technol.* **2007**, *41* (10), 3633–3638. *https://doi.org/10.1021/es062897r*.
9. Wiederhold, J. G.; **Kraemer, S. M.**; Teutsch, N.; Borer, P. M.; Halliday, A. N.; Kretzschmar, R. Iron Isotope Fractionation during Proton-Promoted, Ligand-Controlled, and Reductive Dissolution of Goethite. *Environ. Sci. Technol.* **2006**, *40* (12), 3787–3793. *https://doi.org/10.1021/es052228y*.
10. Borer, P. M.; Sulzberger, B.; Reichard, P.; **Kraemer, S. M.** Effect of Siderophores on the Light-Induced Dissolution of Colloidal Iron(III) (Hydr)Oxides. *Marine Chemistry* **2005**, *93* (2–4), 179–193. *https://doi.org/10.1016/j.marchem.2004.08.006*.