

## Curriculum Vitae – Wolfgang Bach

Date of birth: September 24, 1964  
Place of birth: Dillenburg, Germany  
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### Academic education and career

1991: Diploma in Mineralogy (University of Giessen)  
1996: PhD (Dr. rer.nat.) in Geochemistry (University of Giessen)

### Employments

1995 – 1996 Scientific Associate, University of Potsdam  
1996 – 1999 Postdoctoral Scholar, Woods Hole Oceanographic Institution  
1999 – 2003 Assistant Scientist, Woods Hole Oceanographic Institution  
2003 – 2005 Associate Scientist, Woods Hole Oceanographic Institution  
2014 – 2016 Adjunct Professor. University of Bergen  
2005 – present Professor (W3) and head of the “petrology of the ocean crust research group”, Geoscience Department, University of Bremen

### Major Research Interests

- Seafloor hydrothermal systems
- Ocean-lithosphere exchange budgets
- Thermodynamics and kinetics of fluid-rock reactions
- Bioenergetics of chemosynthesis-based ecosystems
- Geochemical and isotopic evolution of the Earth's crust and mantle

### Selected Expert Activities

- Reviewer for Nature, Science, PNAS, Geology, Earth and Planetary Science Letters, Journal of Petrology, Geochimica et Cosmochimica Acta, Chemical Geology, Lithos, Astrobiology, Geobiology, etc.
- Referee for DFG, NSF, NERC, SNSB, IODP
- Member of the IODP Joides Resolution Facility Board (2016 – present)
- Member of the German Research Council Proposal Evaluation Board (2016 – present)
- Associate Editor for *Geochimica et Cosmochimica Acta* (since 2012)
- Organization of the ECORD Summer School on Mid-Ocean Ridge Processes in 2009 and 2015
- Organization of the DEBI-RCN short course in “Crustal Processes and Life” in 2012
- Participation as lecturer in five Ridge/InterRidge Summer Schools
- Member of Scientific Committee for Oceanic Research (SCOR) Working Group on Hydrothermal Energy Transfer and its Impact on the Ocean Carbon Cycles
- Senior Personnel of the Seamount Biogeoscience Network
- Participant of the Deep Sea & Subsea Frontier (DS<sup>3</sup>F); Working Package 1: Lithosphere – biosphere interaction and resources
- Co-chair of Steering Committee IODP New Ventures in Exploring Scientific Targets
- Chair of Academic Programs, Geoscience Department (2008-2010)
- Member of the InterRidge Workgroup Deep Earth Sampling
- Session and Theme convener of numerous Goldschmidt and AGU conferences
- Representative of the IODP Science Steering and Evaluation Panel (2003-2005)
- Participant in five ODP cruises and co-chief scientist of one IODP cruise; participant in nine other seagoing cruises and chief scientist of three.
- Supervisor of five completed Ph.D. Theses and three pending ones

### Student supervision

- Master: Peter Canovas (WHOI/MIT), Stephanie Vogel, Johan Faust, Janis Thal, Lotta Ternieten, Bastian Bieseler, Andreas Türke, Alexander Diehl, Maike Schlegel, Sara Niedenzu, Dario Fußmann, Simon Prause (U Bremen)
- PhD: Cara Santelli, Paul Craddock (WHOI/MIT), Frieder Klein, Michael Hentscher, Heike Anders, Svenja Rausch, Janis Thal, Christian Hansen, Nikki Blaauwbroek, Andreas Türke (U Bremen)

### Postdoctoral supervision

- Martin Rosner (now IsoAnalysis, Berlin), Eoghan Reeves (now University of Bergen), Niels Jöns (now University of Bochum), Jörn Hövelmann (now GFZ Potsdam), Wolf-Achim Kahl, Janis Thal (both University of Bremen)

### Peer-reviewed publications

- Meier D, Pjevac P, Bach W, Hourdez S, Gurguis PR, Vidoudez C, Amann R, Meyerdierks A (2017) Niche partitioning of diverse sulfur-oxidizing bacteria at hydrothermal vents. *ISME Journal*
- Jöns NJ, Kahl W-A, Bach W (2017) Reaction-induced porosity and onset of low-temperature carbonation in abyssal peridotites: insights from 3D high-resolution microtomography. *Lithos* 268–271, 274–284
- Toffolo L, Nimis P, Martin S, Tumiatì S, Bach W (2016) The Cogne magnetite deposit (NW Italy): a Mesozoic subseafloor ultramafic-hosted hydrothermal system? <http://dx.doi.org/10.1016/j.oregeorev.2016.11.030>
- Beermann O, Garbe-Schönberg D, Bach W, Holzheid A (2016) Time-resolved interaction of seawater with gabbro: An experimental study of rare-earth element behavior up to 475 °C, 100 MPa. *Geochimica et Cosmochimica Acta*, doi 10.1016/j.gca.2016.10.016
- Price RE, Breuer C, Reeves E, Bach W, Pichler T (2016) Arsenic bioaccumulation and biotransformation in deep-sea hydrothermal vent organisms from the PACMANUS hydrothermal field, Manus Basin, PNG. *Deep-Sea research I*, doi: 10.1016/j.dsr.2016.08.012
- Smrzka D, Zwicker J, Klügel A, Monien P, Bach W, Bohrmann G, Peckmann J (2016) Establishing criteria to distinguish oil- from methane seep carbonates. *Geology* 44, 667-670, DOI:10.1130/G38029.1
- Zhang X, Zhou Y, Fang J, Bach W, Edwards KJ, Orcutt BN, Wang F (2016) Nitrogen Stimulates the Growth of Subsurface Basalt-associated Microorganisms at the Western Flank of the Mid-Atlantic Ridge. *Frontiers in Microbiology* <http://dx.doi.org/10.3389/fmicb.2016.00633>
- Thal J, Tivey MA, Yoerger D, Jöns N, Bach W (2016) Subaqueous cryptodome eruption, hydrothermal activity and related seafloor morphologies on the andesitic North Su volcano. *Journal of Volcanological and Geothermal Research* 323, 80–96
- Toner BM, Rouxel O, Santelli CM, Bach W, Edwards KJ (2016) Iron oxidation pathways and redox micro-environments in seafloor sulfide-mineral deposits: spatially resolved Fe XAS and  $\delta^{57/54}\text{Fe}$  observations. *Frontiers in Microbiology* <http://dx.doi.org/10.3389/fmicb.2016.00648>
- Meier D, Bach W, Gurguis PR, Gruber-Vodicka H, Reeves EP, Richter M, Vidoudez C, Amann R, Meyerdierks A (2016) Heterotrophic Proteobacteria in the vicinity of active hydrothermal venting. *Environmental Microbiology* DOI: 10.1111/1462-2920.13304
- McCollom TM, Klein F, Robbins M, Moskowitz B, Berquo TS, Jöns J, Bach W, Templeton A (2016) Temperature Trends for Reaction Rates, Hydrogen Generation, and Partitioning of Iron During Experimental Serpentinization of Olivine. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2016.03.002
- Kahl WA, Hansen C, Bach W (2016) A new X-ray transparent flow-through reaction cell for a  $\mu\text{-CT}$ -based concomitant surveillance of the reaction progress of hydrothermal mineral-fluid interactions, *Solid Earth Discuss.*, doi:10.5194/se-2016-25
- Bach W (2016) Some compositional and kinetic controls on the bioenergetic landscapes in oceanic basement. *Frontiers in Microbiology* 7:107. doi: 10.3389/fmicb.2016.00107
- Jackson MD, Gudmundsson MT, Schiffman P, Bach W, Cappelletti P, Coleman NJ, Ivarsson M, Jonasson K, Jørgensen SL, Marteinson V, McPhio J, Moore JG, Nielson D, Rhodes JM, Rispoli C, Stefansson A, Türke A, Vanorio T, Weisenberger TB, White JDL, Zierenberg R, Zimanowski B (2015) Time-lapse characterization of hydrothermal seawater and microbial interactions with basaltic tephra at Surtsey volcano, *Scientific Drilling* 3, 1-8

- Hawkes J, Hansen C.T., Goldhammer T, Bach W, Dittmar T (2016) Molecular alteration of marine dissolved organic matter under experimental hydrothermal conditions. *Geochimica et Cosmochimica Acta* 175, 68-85. <http://dx.doi.org/j.gca.2015.11.025>
- Schroeder T, Bach W, Jöns N, Jöns S, Monien P, Klügel A (2015) Fluid circulation and carbonate vein precipitation in the footwall of an oceanic core complex, Ocean Drilling Program Site 1275, Mid-Atlantic Ridge. *Geochemistry, Geophysics, Geosystems* 16, DOI: 10.1002/2015GC006041
- Hawkes JA, Rossel PE, Stubbins A Butterfield D, Connelly DP, Achterberg EP, Koschinsky A, Chavagnac V, Hansen C., Bach W, Dittmar T (2015) Efficient removal of recalcitrant deep-ocean dissolved organic matter during hydrothermal circulation. *Nature geoscience* DOI: 10.1089/ast.2014.1255
- Türke A, Nakamura K, Bach W (2015) Palagonitization of basalt glass in the flanks of mid-ocean ridges: implications for the bioenergetics of oceanic intracrustal ecosystems. *Astrobiology* 15, 10, DOI: 10.1089/ast.2014.1255
- Ivarsson M, Peckmann J, Tehler A, Broman C, Bach W, Behrens K, Reitner J, Böttcher ME, Norbäck-Ivarsson L (2015) Zygomycetes in vesicular basanites from Vesteris Seamount, Greenland Basin – A new type of cryptoendolithic fungi. *PLOS One* 10(7): e0133368. doi:10.1371/journal.pone.0133368
- Rioux M, Jöns N, Bowering S, Lissenberg J, Bach W, Kylander-Clark A, Hacker B, Dudas F. (2015) U-Pb dating of interspersed gabbroic magmatism and hydrothermal metamorphism during lower crustal accretion, Vema lithospheric section, Mid-Atlantic Ridge. *Journal of Geophysical Research – Solid Earth* DOI: 10.1002/2014JB011668
- Anenburg M, Katzir Y, Rhede D, Jöns N, Bach W (2015) Rare earth element evolution and migration in plagiogranites: a record preserved in epidote and allanite of the Troodos ophiolite. *Contributions to Mineralogy and Petrology* 169:25, DOI 10.1007/s00410-015-1114-y
- Beier C, Bach W, Turner S, Niedermeier D, Woodhead J, Erzinger J, Krumm S (2015) Origin of silicic magmas at spreading centers – an example from the South East Rift, Manus Basin. *Journal of Petrology* 56, 255-272 doi: 10.1093/petrology/egu077
- Jamieson JW, Petersen S, Bach W (2015) Hydrothermalism. *Encyclopedia of Marine Geosciences*. Springer, Dordrecht. DOI 10.1007/978-94-007-6644-0\_119-1
- Kahl WA, Jöns N, Bach W, Klein F (2015) Ultramafic clasts from the South Chamorro serpentine mud volcano reveal a polyphase serpentinization history of the Mariana forearc mantle. *Lithos* 227: 1-20
- Fisher AT, Alt JC, Bach W (2015) Hydrogeologic properties, processes, and alteration in the igneous ocean crust. In: Stein R, Blackman D, Inagaki F, Larsen H-C Earth and Life Processes Discovered From Subseafloor Environments. *Developments in Marine Sciences* Vol. 7, Elsevier, Amsterdam
- Seewald JS, Reeves E, Bach W, Saccocia PJ, Craddock PR, Shanks III WC, Sylva SP, Pichler P, Rosner M, Walsh E (2015) Submarine venting of magmatic volatiles in the Eastern Manus Basin, Papua New Guinea. *Geochimica et Cosmochimica Acta* 163: 178-199.
- Keith M, Haase KM, Schwarz-Schampera U, Klemd R, Petersen S, Bach W (2014) Effects of temperature, sulphur and oxygen fugacity on the composition of sphalerite from submarine hydrothermal vents. *Geology* doi:10.1130/G35655.1
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- Türke A, Bach W, Mehmood MS (2014) Data report: X-ray fluorescence scanning of sediment cores from Holes U1382B, U1383D, U1384A, and 1074A from the North Pond area. In Edwards KJ, Bach W, Klaus A, and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.), doi:10.2204/iodp.proc.336.109.20x
- Edwards KJ, Bach W, Klaus A (2014) IODP Expedition 336: Initiation of long-term coupled microbiological, geochemical, and hydrological experimentation within the seafloor at North Pond, western flank of the Mid-Atlantic Ridge. *Scientific Drilling* 17, 13-18. doi:10.5194/sd-17-13-2014
- Thal J, Tivey MA, Yoerger D, Jöns N, Bach W (2014) Geologic setting of PACManus hydrothermal vents – High-resolution mapping and in situ observations. *Marine Geology* 355: 98-114

- Plümper O, Beinlich A, Bach W, Janots E, Austrheim H (2014) Garnets within geode-like serpentinite veins: Implications for element transport, hydrogen production and life-supporting environment formation. *Geochimica Cosmochimica Acta* 151, 454-471
- Klein F, Bach W, Humphris SE, Kahl WA, Jöns N, Moskowitz B, Berquo TS (2014) Magnetite in seafloor serpentinite – Some like it hot. *Geology* doi: 10.1130/G35068.1
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- Klein F, Bach W, McCollom TM (2013) Compositional controls on hydrogen generation during serpentinization of ultramafic rocks. *Lithos* 178, 55-69. <http://dx.doi.org/10.1016/j.lithos.2013.03.008>
- Rausch S, Böhm F, Bach W, Klügel A, Eisenhauer A (2013) Calcium carbonate veins in ocean crust record increases in seawater Mg/Ca and Sr/Ca within the past 30 million years *Earth Planetary Science Letters* 362, 215-224
- Peckmann J, Sandy MR, Taylor DG, Gier S, Bach W (2013) An Early Jurassic brachiopod-dominated seep deposit enclosed by serpentinite, eastern Oregon. *Palaeogeography, Palaeoclimatology, Palaeoecology* 390, 4-16, doi 10.1016/j.palaeo.2013.01.003
- Bach W, Jöns N, Klein F (2013) Metasomatism of the Ocean Crust. In: Metasomatism and Metamorphism (Harlov D, Austrheim H, editors) *Lecture Notes in Earth Sciences*, Springer, 253-288, doi: 10.1007/978-3-642-28394-9\_8
- Toner BM, Lesniewski RA, Marlow JJ, Santelli CM, Bach W, Orcutt BN, Edwards KJ (2013) Mineralogy drives bacterial biogeography of hydrothermally inactive seafloor sulfide deposits, *Geomicrobiology Journal*, doi 10.1080/01490451.2012.688925
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- Edwards KJ, Wheat CG, Orcutt BN, Hulme S, Becker K, Jannasch H, Haddad A, Pettigrew T, Rhinehart W, Grigar K, Bach W, Kirkwood W and Klaus A (2012) Design and deployment of borehole observatories and experiments during IODP Exp. 336, Mid-Atlantic Ridge flank at North Pond, In Edwards KJ, Bach W, Klaus A, and the Expedition 336 Scientists, *Proc. IODP*, 336: Tokyo (Integrated Ocean Drilling Program Management International, Inc.), doi:10.2204/iodp.proc.336.109.201
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- Berndmeyer C, Birgel D, Brunner B, Wehrmann L, Jöns N, Bach W, Arning E, Föllmi K, Peckmann J (2012): The influence of bacterial activity on phosphorite formation in the Miocene Monterey Formation, California. *Palaeogeography, Palaeoclimatology, Palaeoecology* 317-318, 171-181
- Hentscher M, Bach W (2012) Geochemically induced shifts in catabolic energy yields explain past ecological changes of diffuse vents in the East Pacific Rise 9°50'N area. *Geochemical Transactions* 13:2. doi:10.1186/1467-4866-13-2
- Perner M, Hentscher M, Rychlik N, Seifert R, Strauss H, Bach W (2012) Driving forces behind the biotope structures of low-temperature venting areas at 5°S and 9°S MAR, *Environmental Microbiology Reports* 3: 727-737
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- Edwards KJ, Glazer BT, Rouxel OJ, Bach W, Emerson D, Davis RE, Toner BM, Chan CS, Tebo BM, Staudigel H, Moyer CL (2011) Ultra-diffuse Hydrothermal Venting Supports Fe-oxidizing Bacteria and Massive UMBER Deposition at 5000m off Hawai'i *The ISME Journal: Multidisciplinary Journal of Microbial Ecology* doi:10.1038/ismej.2011.48
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