

# Juliane Weber, Ph.D.

R&D Staff Member

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## Education and Training

- 2013 – 2017 Ph.D., Geochemistry, RWTH Aachen University, Germany  
Advisor: Prof. Dirk Bosbach, *summa cum laude*
- 2011 – 2013 M. Sc., Geoscience, University of Bonn, Germany
- 2008 – 2011 B. Sc., Geoscience, University of Bonn, Germany

## Appointments

- Since 6/2024 R&D Staff Member, Geochemistry and Interfacial Science Group, Oak Ridge National Laboratory
- 11/2020 – 6/2024 Associate R&D Staff Member, Geochemistry and Interfacial Science Group, Oak Ridge National Laboratory
- 03/2019 – 11/2020 Associate Staff Scientist, Kuiper Imaging & Microscopy Facility, University of Arizona
- 04/2017 – 3/2019 Postdoctoral Research Associate, Geochemistry, Oak Ridge National Laboratory, Advisor: Dr. Andrew G. Stack
- 2013 – 2017 Graduate Student at Forschungszentrum Jülich Helmholtz Research Laboratory, Germany

## Publications (h-index = 12)

- (23) A. Chen, J. Weber, V. Starchenko, P.J. Eng, J.E. Stubbs, H. Wang, T. Liu, T.L. Spano, B.C. Chakoumakos, A.G. Stack, **2024**. Real-Time Atomic-Scale Structural Analysis Resolves the Amorphous to Crystalline CaCO<sub>3</sub> Mechanism Controversy. *Crystal Growth & Design*, in press.  
[DOI: 10.1021/acs.cgd.4c00245]
- (22) Y. Wu, Y. Li, X. Yu, X. Ma, M. Boebinger, J. Weber, Z. Wu, **2024**. Insights into size effects of Pt/Al<sub>2</sub>O<sub>3</sub> catalyst on hydrogen production from methylcyclohexane dehydrogenation. *Catalysis Science & Technology*, in press.  
[DOI: 10.1039/D3CY01568H]
- (21) J. N. Bracco, G. Camacho Meneses, O. Colon, K. Yuan, J. E. Stubbs, P.J. Eng, A. K. Wanhala, J. D. Einkauf, M. G. Boebinger, A. G. Stack, J. Weber, **2024**. Reaction Layer Formation on MgO in the Presence of Humidity. *ACS Applied Materials & Interfaces*, 16, 1, 712-722.  
[DOI: 10.1021/acsami.3c14823]
- (20) J. Weber, V. Starchenko, K. Yuan, L. M. Anovitz, A. V. Ievlev, R. R. Unocic, A. Y. Borisevich, M. G. Boebinger, A. G. Stack, **2023**. Armoring of MgO by a Passivation Layer Impedes Direct Air Capture of CO<sub>2</sub>. *Environmental Science & Technology*, 57, 40, 14929-14937.  
[DOI: 10.1021/acs.est.3c04690]
- (19) P.M. Zanetta, V. Rao Manga, Y.-J. Chang, T. Ramprasad, J. Weber, J. R. Beckett, T. J. Zega, **2023**. Atomic-scale characterization of the oxidation state of Ti in meteoric

- hibonite: Implications for early solar system thermodynamics. *American Mineralogist*, 108, 5, 881-902.  
[DOI: 10.2138/am-2022-8311]
- (18) J. Weber, V. Starchenko, J. Ilavsky, L.F. Allard, J. Mata, K. Debeer-Schmitt, C.G. Cooke, K. Littrell, L. He, R. Zhang, A.G. Stack, L.M. Anovitz, **2023**. Grain Boundary Widening controls siderite (FeCO<sub>3</sub>) replacement of limestone (CaCO<sub>3</sub>). *Scientific Reports*, 13, 4581  
[DOI: 10.1038/s41598-023-30757-y]
- (17) A.B. Brady, J. Weber, K. Yuan, L.F. Allard, O. Avina, R. Ogaz, Y.J. Chang, N. Rampal, V. Starchenko, G. Rother, L.M. Anovitz, H.W. Wang, A.G. Stack, **2022**. In Situ Observations of Barium Sulfate Nucleation in Nanopores. *Crystal Growth & Design*, 22(12), pp.6941-6951.
- (16) P. Yang, N. Rampal, J. Weber, J.N. Bracco, P. Fenter, A.G. Stack, S.S. Lee, **2022**. Synergistic Enhancement of Lead and Selenate Uptake at the Barite (001)–Water Interface. *Environmental Science & Technology*, 56(23), pp.16801-16810.
- (15) N. Deng, X. Zuo, A.G. Stack, S.S. Lee, Z. Zhou, J. Weber, Y. Hu, **2022**. Selenite and Selenate Sequestration during Coprecipitation with Barite: Insights from Mineralization Processes of Adsorption, Nucleation, and Growth. *Environmental Science & Technology*, 56(22), pp.15518-15527.
- (14) P. Mane, S. Wallace, M., Bose, P. Wallace, M. Wadhwa, J. Weber, T. J. Zega, **2022**. Earliest Evidence of Nebular Shock Waves Recorded in a Calcium-Aluminium-rich Inclusion. *Geochimica et Cosmochimica Acta*, 332, p. 369 – 388.
- (13) P.M. Zanetta, V. R. Manga, Y.-J. Chang, T. Ramprasad, J. Weber, J.R. Beckett, T.J. Zega, **2022**. Atomic-scale Characterization of the Oxidation State of Ti in Meteoritic Hibonite: Implications for Early Solar System Thermodynamics. *American Mineralogist*. *In press*.
- (12) J. Weber, J.N. Bracco, K. Yuan, V. Starchenko, A.G. Stack, **2022**. Studies of Mineral Nucleation and Growth Across Multiple Scales: Review of the Current State of Research using the Example of Barite (BaSO<sub>4</sub>). *ACS Earth and Space Chemistry*, 5(12), pp.3338-3361.  
[DOI: 10.1021/acsearthspacechem.1c00055]
- (11) J. Weber, et al., **2021**. Influence of Microstructure on Replacement and Porosity Generation during Experimental Dolomitization of Limestones. *Geochimica et Cosmochimica Acta*, 303, 137-158.  
[DOI: 10.1016/j.gca.2021.03.029]
- (10) J. Weber, et al., **2019**. Controls of Microstructure and Chemical Reactivity of the Replacement of Limestone by Fluorite Studied Using Spatially Resolved Small Angle X-Ray and Neutron Scattering. *ACS Earth and Space Chemistry*, 3, 9, 1998 – 2016.  
[DOI: 10.1021/acsearthspacechem.9b00085]
- (9) N. Deng, A. G. Stack, J. Weber, et al., **2019**. Organic–mineral interfacial chemistry drives heterogeneous nucleation of Sr-rich (Ba<sub>x</sub>, Sr<sub>1-x</sub>) SO<sub>4</sub> from undersaturated solution. *Proceedings of the National Academy of Sciences*, 116 (27) 13221-13226.  
[DOI: 10.1073/pnas.1821065116]

- (8) I. Povstugar, J. Weber, et al. **2019**. Correlative Atom Probe Tomography and Transmission Electron Microscopy Analysis of Grain Boundaries in Thermally Grown Alumina Scale. *Microscopy and Microanalyses*, 1-10.  
[DOI: /10.1017/S143192761801557X]
- (7) F. Brandt, M. Klinkenberg, J. Poonosamy, J. Weber, D. Bosbach, **2018**. The Effect of Ionic Strength and  $Sr_{aq}$  upon the Uptake of Ra during the Recrystallization of Barite. *Minerals*, 8(11), 502.  
[DOI: 10.3390/min8110502]
- (6) J. Weber, et al. **2018**. Unraveling the Effects of Strontium Incorporation on Barite Growth – In Situ and Ex Situ Observations Using Multiscale Chemical Imaging. *Crystal Growth & Design*, 18 (9), 5521-5533.  
[DOI: 10.1021/acs.cgd.8b00839]
- (5) M. Klinkenberg, J. Weber, et al., **2018**. The Solid Solution – Aqueous Solution System (Ba,Sr,Ra)SO<sub>4</sub> + H<sub>2</sub>O: A Combined Experimental and Theoretical Study of phase equilibria at Sr-rich compositions. *Chemical Geology*, 497, 1-17.  
[DOI: 10.1016/j.chemgeo.2018.08.009]
- (4) V. L. Vinograd, D. A. Kulik, F. Brandt, M. Klinkenberg, J. Weber, B. Winkler, D. Bosbach, **2018**. Thermodynamics of the Solid Solution-Aqueous Solution System (Ba,Sr,Ra)SO<sub>4</sub>+ H<sub>2</sub>O: I. The Effect of Strontium Content on Radium Uptake by Barite. *Applied Geochemistry*, 89, 59-74.  
[DOI: 10.1016/j.apgeochem.2017.11.009]
- (3) V. L. Vinograd, D. A. Kulik, F. Brandt, M. Klinkenberg, J. Weber, B. Winkler, D. Bosbach, **2018**. Thermodynamics of the Solid Solution – Aqueous Solution System (Ba,Sr,Ra)SO<sub>4</sub> + H<sub>2</sub>O: II Radium Retention in Barite-type Minerals at Elevated Temperatures. *Applied Geochemistry*, 93, 190-208.  
[DOI: 10.1016/j.apgeochem.2017.10.019]
- (2) J. Weber, et al., **2017**. Retention of <sup>226</sup>Ra by Barite: The Role of internal Porosity. *Chemical Geology*, 466, 722-732.  
[DOI: 10.1016/j.chemgeo.2017.07.021]
- (1) J. Weber, et al., **2016**. Nano-structural Features of Barite Crystals observed by Electron Microscopy and Atom Probe Tomography. *Chemical Geology*, 424, 51-59.  
[DOI: 10.1016/j.chemgeo.2016.01.018]

## **CONFERENCE CONTRIBUTIONS**

### Invited Talks

- (4) J. Weber, M. Cheshire, V. Distefano, K.C. Littrell, M. Bleuel, J. Bozell, A. Ievlev, A.G. Stack, L.M. Anovitz. The Effect of Microstructure on Replacement Reactions – The Example of Limestone Replacement by Fluorite and Dolomite. Goldschmidt conference, virtual, Fall 2020.
- (3) J. Weber, M. Cheshire, V. H. Distefano, K. C. Littrell, M. Bleuel, J. Ilavsky, J. K. Bozell, A. Ievlev, A. G. Stack, L. A. Anovitz. Microstructural Changes in Dissolution/Reprecipitation of CaCO<sub>3</sub>-CaMg(CO<sub>3</sub>)<sub>2</sub> and CaF<sub>2</sub>. 258<sup>th</sup> American Chemical Society National Meeting & Exposition, San Diego, Fall 2019.
- (2) J. Weber, L. Anovitz, K. Litrell, J. N. Bracco, S. R. Higgins, A. L. Bertagni, S. A. Jindra, A. Ievlev, M. Lorenz, J. Poplawsky, K. More, V. Starchenko, A. G. Stack. Using High-

resolution Chemical Imaging Techniques to Understand the Fate of Impurities at the Mineral-water Interface over Multiple Scales – The Example of (Ba,Sr)SO<sub>4</sub>, (Ca,Mg)CO<sub>3</sub> and Ca(CO<sub>3</sub>,F). 256<sup>th</sup> American Chemical Society National Meeting & Exposition, Boston, USA, Fall 2018.

- (1) J. Weber, F. Brandt, M. Klinkenberg, J. Barthel, U. Breuer, D. Bosbach. The Uptake of Ra into Barite. 252<sup>nd</sup> American Chemical Society National Meeting & Exposition, Philadelphia, USA, 2016.

## **GRANTS**

### *External Funding:*

- \$4,500,000 PI, Department of Energy, Basic Energy Sciences, Material Sciences and Engineering Division. “*Fundamental Mechanisms Driving Efficiency of CO<sub>2</sub> Capture Using Mineral Looping*” **2022-2025**
- ~\$300,000 Co-I, Department of Energy, Basic Energy Sciences, UNCAGE-ME III EFRC **2022-2026**
- \$80,000 Co-I, Department of Energy Nuclear Energy University Program. “*Redox Chemistry of UO<sub>2</sub> under Repository Relevant Conditions in the Presence of Zircaloy and Waste Canister Material*”, Total Grant \$800,000. **2021-2024**

### *Internal Funding:*

- \$190,000 PI, SEED Money Proposal, Oak Ridge National Laboratory. *Electrochemical CO<sub>2</sub> Conversion via Layered Double Hydroxides*. **2021-2022**
- \$10,000 Co-I, Internal Proposal for Core Facility Use, University of Arizona *Impact Modification of Indigenous Lunar Materials*. **2020-2021**
- \$70,152 Co-PI, Equipment Enhancement Fund, University of Arizona: *Acquisition of a backscatter electron detector and automated stage software for the Helios Focused-Ion-Beam Scanning-Electron Microscope in the Kuiper Materials Imaging and Characterization Facility*. **2020-2021**