

Juliane Weber, Ph.D.

R&D Staff Member

Chemical Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN, 37830
weberj@ornl.gov

Education and Training

2013 – 2017	Ph.D., Geochemistry, RWTH Aachen University, Germany Advisor: Prof. Dirk Bosbach, <i>summa cum laude</i>
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 = 13)

- (29) P. Yang, J.N. Bracco, G. Camacho Meneses, K. Yuan, J.E. Stubbs, M.D. Boamah, M. Brahlek, M. Sassi, P.J. Eng, M.G. Boebinger, A. Y. Borisevich, A.K. Wanhala, Z. Wang, K.M. Rosso, Andrew G. Stack, J. Weber, accepted at ACS ES&T.
- (28) G. Camacho Meneses, J. Weber, R.P. Hermann, A. Wanhala, J.E. Stubbs, P.J. Eng, K. Yuan, A.Y. Borisevich, M.G. Boebinger, T. Liu, A.G. Stack, J.N. Bracco, in press at JPCC. Inhibition of Reaction Layer Formation on MgO(100) by Doping with Trace Amounts of Iron.
- (27) J. Weber, B. Moseley[‡], K. Yuan, B.R. Evans, V. Starchenko, E. Tajuelo Rodriguez, D.Y. Chung[‡], M. G. Boebinger, M.A. McGuire, G. Yumnam, R.P. Hermann, L.M. Anovitz, A.G. Stack, 2025. Influence of Dissolved Iron in Solution on MgO Hydroxylation and Carbonation. *J. Phys. Chem. C*, 129, 194-204.
[\[DOI: 10.1021/acs.jpcc.4c04953\]](https://doi.org/10.1021/acs.jpcc.4c04953)
- (26) S. Parvin, E. Aransiola, M. Ammar, S. Lee[‡], L. Zhang, J. Weber, J. Baltrusaitis, **2024**, Tailored Ni(OH)₂/CuCo/Ni(OH)₂ Composite Interfaces for Efficient and Durable Urea Oxidation Reaction. *ACS Applied Materials & Interfaces*, 16, 67715-67729.
[\[DOI: 10.1021/acsami.4c14041\]](https://doi.org/10.1021/acsami.4c14041)
- (25) K. Yuan, N. Rampal, S. Adapa[‡], B.R. Evans, J.N. Bracco, M.G. Boebinger, A.G. Stack, J. Weber, **2024**. Iron Impurity Impairs the CO₂ Capture Performane of MgO: Insights from Microscopy and Machine Learning Molecular Dynamics. *ACS Applied Materials & Interfaces*, 16, 64233-64243.
[\[DOI: 10.1021/acsami.4c13597\]](https://doi.org/10.1021/acsami.4c13597)

- (24) R. Zhang, P.A. Bosomworth, J. Weber, J. Ilavsky, S.A. Chen[‡], A. Flores-Betancourt, E. P. Gilbert, J. Mata, M. L. Rivers, P. J. Eng, L. M. Anovitz, **2024**. The Role of Annealing and Grain Boundary Controls on the Mechanical Properties of Limestones and Marbles. *International Journal of Rock Mechanics and Mining Sciences*. 183, 105926.
[DOI: 10.1016/j.ijrmms.2024.105926]
- (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 CaCO₃ 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/Al₂O₃ 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 CO₂. *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 (FeCO₃) replacement of limestone (CaCO₃). *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 (BaSO₄). *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_x, Sr_{1-x}) SO₄ 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)SO₄ + H₂O: 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)SO₄+ H₂O: 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)SO₄ + H₂O: 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 ²²⁶Ra 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 CaCO₃-CaMg(CO₃)₂ and CaF₂. 258th 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)SO₄, (Ca,Mg)CO₃ and Ca(CO₃,F). 256th 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. 252nd American Chemical Society National Meeting & Exposition, Philadelphia, USA, 2016.

GRANTS

External Funding:

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| \$4,500,000 | PI, Department of Energy, Basic Energy Sciences, Material Sciences and Engineering Division. “ <i>Fundamental Mechanisms Driving Efficiency of CO₂ Capture Using Mineral Looping</i> ” 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. “ <i>Redox Chemistry of UO₂ under Repository Relevant Conditions in the Presence of Zircaloy and Waste Canister Material</i> ”, Total Grant \$800,000. 2021-2025 |

Internal Funding:

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| \$190,000 | PI, SEED Money Proposal, Oak Ridge National Laboratory. <i>Electrochemical CO₂ Conversion via Layered Double Hydroxides</i> . 2021-2022 |
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\$10,000	Co-I, Internal Proposal for Core Facility Use, University of Arizona <i>Impact Modification of Indigenous Lunar Materials. 2020-2021</i>
\$70,152	Co-PI, Equipment Enhancement Fund, University of Arizona: <i>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</i>