Curriculum Vitae for
CARL I. STEEFEL

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EDUCATION:

1972	Princeton University
1974	Washington University - B.A. English Literature
1982	University of Colorado, Boulder - M.S. Geology.
1987	Yale University - M.Phil. Geology
1992	Yale University - Ph.D Geochemistry

EXPERIENCE:

2012-Present	Senior Scientist, Energy Geosciences Division, Lawrence Berkeley National Lab
2004-2012	Staff Scientist, Earth Sciences Division, Lawrence Berkeley National Lab
1998-2004	Staff Scientist, Environmental Science Division, Lawrence Livermore National Laboratory
1995-1998	Assistant Professor of Geology, University of South Florida
1995	Senior Research Scientist, Interfacial Geochemistry Group, Battelle Pacific Northwest Laboratories
1993-1995	Research Scientist, Interfacial Geochemistry Group, Battelle Pacific Northwest Laboratories
1991-1992	Post-Doctoral Associate, Mineralogisch-Petrographisches Institut, Universitat Bern, Switzerland
1985-1991	Teaching and research fellowships, Yale University Department of Geology
1985	Project Geologist, Anaconda Minerals
1983-1985	Staff Geologist, Anaconda Minerals
1981-1983	Geologist, Anaconda Minerals
1979-1980	Temporary Geologist, Anaconda Minerals
1978	Geological Assistant, U.S.G.S. Branch of Exploration Research
1976	Manuscripts librarian, Huntington Library, San Marino, California

RESEARCH INTERESTS:

Reactive contaminant transport: Contaminant migration in groundwater and the vadose zone
Chemical weathering: Developing quantitative reactive transport models for rock weathering
Reactive transport modeling: Approaches to numerical modeling of reactive contaminant transport and water-rock interaction
Mineral-water kinetics: Mineral dissolution and precipitation kinetics
Biogeochemistry: Biogeochemical reactions in groundwater and estuaries
Hydrothermal systems: Mineral-water reactions and transport in mid-ocean ridge and off-axis hydrothermal systems

AWARDS & RECOGNITION:

2017 R&D 100 Award Winner for reactive transport software CrunchFlow (https://www.rd100conference.com/awards/winners-finalists/year/2017/)

2016 George A. Miller Visiting Scholar at the Center for Advanced Study at the University of Illinois Champaign, May-June 2016.
2007 Award for outstanding contributions to basic research in the geosciences, Geosciences Research Program, Division of Chemical Sciences, Geosciences, and Biosciences, U.S. Department of Energy, May 2007.
1990 Philip M. Orville Prize for outstanding research and scholarship, Dept. of Geology and Geophysics, Yale University
1990 Best Student Contribution, 2nd International Symposium on the Geochemistry of the Earth's Surface and of Mineral Formation, Aix-en-Provence, France (with P. Van Cappellen, K.L. Nagy, and A.C. Lasaga)
1989 Outstanding Mention, GSA Research Proposal
1974 Phi Beta Kappa, Washington University

KEYNOTE AND INVITED PRESENTATIONS:

2017 Keynote Address "A Mean Electrostatic Model for Ion Transport through Heterogeneous Clay", 2017 Clay Conference, Davos, Switzerland, September 27, 2017.
2017 Keynote Address "Reactive Transport at the Crossroads", Workshop on *Reactive Transport for the Earth and Environmental Sciences in the 21st Century*, Clos Lucé, Amboise, France, October 2, 2017.
2017 "The Lab-Field Rate Discrepancy Revisited", Invited talk at Susan Brantley 2017 Geochemistry Medal session, American Chemical Society, April 4, 2017.
2016 "Multi-Scale Reactive Transport Modeling," Workshop at Bureau de Recherches Géologiques et Minières, Orleans, France, October 25, 2016
2016 "Multi-scale reactive transport modeling of terrestrial systems," Plenary Invited Talk, EPSRC Workshop on *Reactive Transport in Porous Media*, Imperial College London.
2016 "New Approaches to Modeling Water-Rock-Gas Interaction," Invited Talk at Cambridge University, UK, March 24, 2016
2016 "Reactive transport modeling for evaluation and optimization of architected materials," with C. Tournassat, Keynote Talk at 2016 Goldschmidt
2016 "A New Approach to Modeling Nucleation, Crystal Growth, and the Ostwald Step Rule," Invited Talk at Spring 2016 American Chemical Society Meeting, San Diego, CA
2015 "Multiple Scale (and Multi-Scale) Reactive Transport Modeling of Terrestrial Systems," Keynote Address at 2015 Goldschmidt in Prague, Czech Republic, Aug. 20, 2015.
2015 "Contaminant Fate and Transport in Geological Environments," Keynote address at Basic Research Needs workshop for Environmental Management, Bethesda, MD, 8 July, 2015.
2015 "Modeling Reactive Transport in Fractured Shales," Invited Talk at the *Shale at all Scales* Workshop, Santa Fe, NM, 10 June, 2015.
2014 "The GEWaSC Framework: Multiscale Modeling of Coupled Biogeochemical, Microbiological, and Hydrological Processes," Invited Talk at 2014 Goldschmidt Conference, Sacramento, CA, June 13, 2014
2014 "What is the State of the Art in Reactive Transport Modeling," presented at an NSF workshop on Expanding the role of Reactive Transport Modeling (RTM) within the Biogeochemical Sciences, Arlington, VA, April 14, 2014
2014 "Genome-Enabled Watershed Simulation Capability (GEWaSC)," Plenary Talk at Terrestrial Ecosystem and Subsurface Biogeochemical Research meeting, Potomac, MD, May 6, 2014
2014 "Reactive Transport Models (RTM): Pores to Plots to Watersheds" presented at DOE Workshop on Computational Challenges for Mechanistic Modeling of Terrestrial Environments, Gaithersburg, MD, March 26, 2014.
2013 "What are the Time Scales for Carbonate Mineral Sequestration in the Subsurface?" presented at the 2013 Fall American Geophysical Union meeting, San Francisco, CA, Dec. 11, 2013.
2013 "Intercomparison of Reactive Transport Models" at 2013 SIAM meeting, Padova, Italy, June 19, 2013.

2013 "Approaches for Assessing Time Scales for Carbonate Mineral Sequestration" at Helmholtz-Zentrum fur Umweltforschung (UFZ), Potsdam, Germany, May 13, 2013.

2013 "Reaction Fronts: Microscopic and Macroscopic" at Kongsberg Seminar, Kongsberg, Norway, May 9, 2013.

2013 "Time Scales for Carbonate Mineral Sequestration" at Washington University, May 1, 2013.

2013 "What are the time Scales for Carbonate Mineral Sequestration of CO_2 in the Subsurface," Yale University Department of Geology, February 14, 2013.

2013 "Experimental and Modeling Studies to Determine Time Scales for Carbonate Mineral Sequestration" at Le Studium Conference, Orleans, France, February 25, 2013.

2012 "Pore to Flood Plain Scale Modeling of Reactive Transport" at 2012 Fall AGU Meeting, San Francisco, Ca, December 4, 2012.

2012 "Characterization and Modeling of Reactivity in a Sandstone containing Internal Diffusion-Controlled Zones" at BES Geosciences Worshop on Reaction and Transport within Internal Domains of Porous Medium, December 2, 2012.

2012 "What are the time Scales for Carbonate Mineral Sequestration of CO_2 in the Subsurface," Colorado School of Mines, November 15, 2012.

2012 "What are the time Scales for Carbonate Mineral Sequestration of CO_2 in the Subsurface," University of Missouri, Kansas City, November 7, 2012.

2012 "New Directions in Reactive Transport Modeling" at Subsurface Simulation Benchmark Workshop, National Central University, Taiwan, November 29, 2012.

2012 "What are the time Scales for Carbonate Mineral Sequestration of CO_2 in the Subsurface," UCLA Department of Earth and Planetary Sciences, October 4, 2012.

2012 "Diffusion versus Surface Reaction Control of Mineral Precipitation and Dissolution Kinetics at the Pore Scale" at Goldschmidt 2012, Montreal, Canada, June 27, 2012.

2011 Invited speaker, Upscaling Carbonate Precipitation Associated with CO_2 Sequestration, American Geophysical Union Fall Meeting

2011 Invited speaker, Pore Scale Modeling of Mixing-Induced Carbonate Precipitation, American Geophysical Union Fall Meeting

2011 Keynote speaker, American Chemical Society symposium *Multiscale Spatiotemporal Complexity in Geologic Carbon Sequestration: Linking Experimentation and Modeling*, August 2011.

2011 Invited speaker, Stanford University Geochemistry Colloquium.

2011 Invited speaker at Geochemical Transport in Compacted Clays, Bern, Switzerland.

2011 Invited speaker at workshop on Glass Corrosion, Manchester, England.

2010 Invited speaker, American Geophysical Union symposium *CO_2 Sequestration Inside Pores: From Molecules to Microbes*, December, 2010.

2010 Invited speaker at Department of Geological Sciences, University of Oregon.

2009 Invited speaker, Modeling Waste Form Performance in the Near-Field Environment, *Waste Form Performance and Technology*, U.S. National Academy of Sciences, November 4, 2009.

2008 Keynote speaker, 2008 Goldschmidt Conference, *Modeling of Thermodynamic and Kinetic Controls on Complex Biogeochemical Reaction Networks*.

2007 Keynote speaker, 2007 Goldschmidt Conference, *Interpreting Reaction Rates at the Field Scale*.

2006 Keynote speaker, American Chemical Society symposium *Understanding Radionuclide Transport in the Environment: Remediation, Nuclear Waste Disposal, and Long-Term Stewardship*, March 2007.

2005 Keynote speaker, Geochemical and Transport Modeling, *10th International Conference on Migration of Behaviour of Actinides and Fission Products in the Geosphere*, Migration 2005 Avignon, France, September, 2005.

2005 Invited speaker, Conceptualizing Subsurface Biogeochemical Processes, *2005 International Symposium for Subsurface Microbiology, Jackson, Wyoming, August, 2005.*

2004 Invited speaker, Quantifying Rates in Biogeochemical Reaction Networks, *2004 Goldschmidt Conference*, June 2004.

2004 Keynote speaker, Reactive transport modeling of multicomponent cation exchange at the laboratory and field scale, *Workshop on Conceptual Model Development for Subsurface Reactive Transport Modeling of Inorganic Contaminants, Radionuclides, and Nutrients*, April 20-22, 2004, Albuquerque, New Mexico.

2003 Keynote speaker, *International Conference on Gas-Water-Rock Interaction with Application to CO_2 Sequestration and Petroleum Migration*, Institut Francaise du Petrole, Rueuil-Malmaison, France, Nov. 20-22, 2003.

2001 Invited speaker, DOE NABIR Workshop on Biogeochemical Modeling, October 21-22, 2001 at Pennsylvania State University.

2001 Invited speaker, 2001 Goldschmidt Meeting, Session on *Metals in the Weathering Environment*

2000 Plenary session speaker, *Computational Methods in Water Resources XIII*, June 25-29, 2000, Calgary, Canada.

2001 Invited speaker, AGU special session *Coupled Biogeochemical Processes Affecting the Transport of Contaminants in the Subsurface,* spring 2000

1999 University of Waterloo, Waterloo, Canada, a seminar entitled *Comparing Laboratory and Field Reaction/Weathering Rates: Is There a Discrepancy?,* April 27, 1999.

1999 Woods Hole Oceanographic Institute, a seminar on *Reactive Transport in Discrete Fractures: The role of Chemical Kinetics and Permeability Change*, April 15, 1999.

1999 University of Oregon Department of Geology, a seminar on *Reactive Transport in Discrete Fractures: A Case Study from Maqarin, Jordan*, March 12, Eugene, Oregon.

1999 Oregon State University Department of Geology, a seminar on *Reactive Transport in Discrete Fractures: A Case Study from Maqarin, Jordan*, March 11, Corvallis, Oregon.

1998 *Geochemical Kinetics: From the Laboratory to the Field*, presented at the European Research Conference on *Geochemistry of Crustal Fluids: Characterization of Reactive Transport in Natural Systems*. May 22-27, Heraklion, Crete.

1997 *Overview of Modeling of Coupled Reactive Transport Processes* presented at the Alternative Models and Interpretations for the Near-Field Altered Zone Coupled Effects Expert Elicitation Workshop, Dec. 3-4, 1997, Las Vegas, Nevada.

1997 *Incorporating Intra-Aqueous Kinetics into Reactive Transport Models* presented at a Workshop on Modeling Reactive Transport held at Battelle PNNL, Nov. 28-Dec.2, 1997.

1996 Geological Society of America Symposium on *Application of Reactive Transport Modeling to Natural Systems*, October 28.

1996 Approaches to Modeling Reactive Transport, presented at the Mineralogical Society of America Short Course on *Reactive Transport in Porous Media*, October 25-27, Golden, Colorado.

1995 Keynote Speaker, European Research Conference on *Natural Waters and Water Technologies*, November 3-8, Lenggries, Germany.

1995 Departmental colloquium, University of Idaho, March 10, Moscow, Idaho.

1994 Keynote Speaker, Chapman Conference on "Hydrogeologic Processes: Building and Testing Atomistic to Basin-Scale Models," June 6-9, 1994, Lincoln, New Hampshire

1992 Departmental colloquium, Johns Hopkins University.

1990 V.M. Goldschmidt Conference, May, 1990

PROFESSIONAL ACTIVITIES:

Associate Editor, *Geochimica et Cosmochimica Acta*, June 2011-present

Lead Editor, *Reviews in Mineralogy and Geochemistry* **80** "Pore-Scale Geochemical Processes" 2015.

Co-Editor, *Reviews in Mineralogy* **34**, "Reactive Transport in Porous Media", 1996.

Lead Editor of a Special Issue of *Computational Geoscience* on Subsurface Environmental Benchmark Modeling

Journal of Contaminant Hydrology, Associate Editor 2005-present

Journal of Hydrology, Associate Editor (2002-2007)

American Journal of Science, Associate Editor (2002-2004)
Principal developer of CrunchFlow Reactive Transport software package
Lead Instructor, CrunchTope Short Course at "Reactive Transport for the Earth and Environmental Sciences in the 21st Century" workshop in Amboise, France, October 5, 2017
Lead Instructor, CrunchTope Short Course, Pohang University of Technology, Pohang, South Korea, December 6-8, 2016.
Lead Instructor, CrunchTope Short Course, 2016 Goldschmidt Conference, June 25-26, 2016.
Lead Instructor, CrunchTope Short Course, University of Illinois, June 8-9, 2016.
Lead Instructor, CrunchFlow Short Course, March 22-23, 2016, Imperial College, London.
Lead Instructor, CrunchFlow Short Course, August 24-25, 2013 Goldschmidt Conference, Florence, Italy.
Participant for 2011 Goldschmidt theme *Frontiers in Computational Geochemistry*.
Co-chair for 2009 Goldschmidt Theme *Frontiers in Computational Geochemistry.*
Berkeley Lab representative on panel to assess the state of flow and transport modeling at the Hanford Site, November 2005.
Lead instructor for short course in Reactive Transport Modeling, University of Bern (4 times), Bureau de Recherches Géologiques et Minières, LBNL, Penn State, Shell Oil, Heriot-Watt University, University of Minnesota
Yucca Mountain Unsaturated Zone/Radionuclide Transport Model Peer Review Panel, member, January-July, 1999.
Member: American Geophysical Union, Geochemical Society

PUBLICATIONS:
Google Scholar for Carl Steefel:
https://scholar.google.com/citations?user=Yv-KZG0AAAAJ&hl=en
ResearcherID for Carl Steefel:
http://www.researcherid.com/rid/B-7758-2010

Articles

Siirila-Woodburn, E.R., C.I. Steefel, K.H. Williams, J.T. Birkholzer (2018) Predicting the impact of land management decisions on overland flow generation: Implications for cesium migration in forested Fukushima watersheds. *Advances in Water Resources* **113**: 42-54.

Deng, H., C.I. Steefel, S. Molins, D. DePaolo (2018) Fracture evolution in multi-mineral systems: The role of mineral composition, flow rate and fracture aperture heterogeneity. *ACS Earth Space Chem*. doi: 10.1021/acsearthspacechem.7b00130

Dwivedi, D., B. Arora, C.I. Steefel, B. Dafflon, R. Versteeg (2017) Hot spots and hot moments of nitrogen in a riparian corridor. doi: 10.1002/2017WR022346

Perdrial, N., A. Vazquez-Ortega, G. Wang, M. Kanematsu, K.T. Mueller, W. Um, C.I. Steefel, P. O'Day, J. Chorover (2018) Uranium speciation in acid waste-weathered sediments: The role of aging and phosphate amendments. *Applied Geochemistry* **89**: 109-120.

Cao, B., A.G. Stack, C.I. Steefel, D.J. DePaolo, L.N. Lammers, Y. Hu (2017) Investigating calcite growth rates using a quartz crystal microbalance with dissipation (QCM-D). *Geochimica et Cosmochimica Acta* **222**: 269-283.

Deng, H., M. Voltolini, S. Molins, C. Steefel, D. DePaolo, J. Ajo-Franklin, and L. Yang, (2017) Alteration and erosion of rock matrix bordering a carbonate-rich shale fracture. *Environmental Science and Technology* **51**: 8861, doi: 10.1021/acs.est.7b02063

Li, Q., C.I. Steefel, Y-S Jun (2017) Deciphering calcium carbonate precipitation associated with CO_2 attack on cement using reactive transport modeling. *Environmental Science and Technology* **51**: 10861-10871, doi: 10.1021/acs.est.7b00594.

Arora, B., D. Dwivedi, N. Spycher, C. Steefel (2017) On modeling CO_2 dynamics in a flood Plain aquifer. *Procedia Earth and Planetary Science* **17**: 408-411

Dwivedi, D, C Steefel, B Arora, G Bisht (2017) Impact of intra-meander hyporheic flow on nitrogen cycling. *Procedia Earth and Planetary Science* **17**: 404-407.

Guo, J. B. Cao, C.I. Steefel, J. Chen, Y. Hu. (2017) Effects of sulfate and magnesium on cement degradation under geologic CO_2 sequestration conditions. *International Journal of Greenhouse Gas Control* **63**: 118-125.

Molins, S., Trebotich, D., Miller, G. H. and Steefel, C. I. (2017) Mineralogical and transport controls on the evolution of porous media texture using direct numerical simulation. *Water Resources Research*. doi:10.1002/2016WR020323

Reinoso-Maset, E., C.I. Steefel, W. Um, J. Chorover, P. O'Day (2017) Rates and mechanisms of uranyl oxyhydroxide mineral dissolution. *Geochimica et Cosmochimica Acta* **207**: 298-321.

Beckingham, LE, CI Steefel, AM Swift, M Voltolini, L Yang, LM Anovitz (2017) Evaluation of accessible mineral surface areas for improved prediction of mineral reaction rates in porous media. *Geochimica et Cosmochimica Acta* **205**: 31-49.

Varadharajan, C., HR Beller, M Bill, EL Brodie, ME Conrad, R Han, C Irwin, JT Larsen, HC Lim, S Molins, CI Steefel, AVan Hise, L Yang, PS Nico (2017) Reoxidation of chromium (III) products formed under different biogeochemical regimes. *Environmental Science and Technology* **51**: 4918-4927

Yabusaki, S.B., M.J. Wilkins, Y. Fang, K.H. Williams, B. Arora, J. Bargar, H. Beller, N.J. Bouskill, E.L. Brodie, J.N. Christensen, M.S. Conrad, R.E. Danczak, E. King, N.F. Spycher, C.I. Steefel, T. Tokunaga, R. Versteeg, S.R. Waichler, H.M. Wainwright (2017) Water table dynamics and biogeochemical cycling in a shallow, variably-saturated floodplain. *Environmental Science & Technology* **51***:* 3307-3317

Li, L, K. Maher, A. Navarre-Sitchler, J. Druhan, C. Meile, C. Lawrence, J. Moore, J. Perdrial, P. Sullivan, A. Thompson, L. Jin, E.W. Bolton, S.L. Brantley, W.E. Dietrich, K.U. Mayer, C.I. Steefel, A. Valocchi, J. Zachara, B. Kocar, J. Mcintosh, C. Bao, B.M. Tutolo, J. Beisman, M. Kumar, E. Sonnenthal (2017) Expanding the role of reactive transport models in critical zone processes, *Earth-Science Reviews* **165**: 280-301.

Beckingham, L.E., C.I. Steefel, Alexander M. Swift, Marco Voltolini, Li Yang, Lawrence Anovitz, Julie M. Sheets, David R. Cole, Timothy J. Kneafsey, Elizabeth H. Mitnick, Shuo Zhang, Gautier Landrot, Jonathan Ajo-Franklin, Donald DePaolo, Saeko Mito, Ziqiu Xue (2017) Evaluation of accessible mineral surface areas for improved prediction of mineral reaction rates in porous media. *Geochimica et Cosmochimica Acta* **205**: 31-49.

Arora, B., D. Dwivedi, S.S. Hubbard, .C.I. Steefel, K.H. Williams (2016) Identifying geochemical hot moments and their controls on a contaminated river floodplain system using wavelet and entropy approaches. *Environmental Modeling and Software* **85**: 27-41.

Dwivedi, D., B Arora, S Molins, CI Steefel (2016) Benchmarking reactive transport codes for subsurface environmental problems. Groundwater assessment, modeling, and management: 299-316, CRC Press.

Tournassat, C., I.C. Bourg, M. Holmboe, G. Sposito, C.I. Steefel (2016) Molecular dynamics simulations of anion exclusion in clay interlayer nanopores. *Clays and Clay Minerals* **64**: 374-388, doi:10.1346/CCMN.2016.0640403.

Beckingham, L., E. Mitnick, C.I. Steefel, S. Zhang, Marco Voltolini, Alexander M. Swift, Li Yang, David R. Cole, Julia M. Sheets, Jonathan B. Ajo-Franklin, Donald J. DePaolo, Saeko Mito, Ziqiu Xue (2016) Evaluation of mineral reactive surface area estimates for prediction of reactivity of a multi-mineral sediment, *Geochimica et Cosmochimica Acta* **188***:* 310-329.

Deng, H., S. Molins, C.I. Steefel, D. DePaolo, M. Voltolini, L. Yang, J. Ajo-Franklin, (2016) A 2.5D reactive transport model for fracture alteration, *Environmental Science & Technology* **50**: 7564-7571.

Tournassat, C., S. Gaboreau, J-C Robinet, I.C. Bourg, C.I. Steefel (2016), Impact of microstructure on anion exclusion in compacted clay. *Clay Minerals Society Workshop Lecture Series* **21**: 137-149.

Noiriel, C., C.I Steefel, L. Yang, D. Bernard (2015) Effects of pore-scale precipitation on permeability and flow. *Advances in Water Resources* **95**: 125-137.

Lai, K.H., J.S. Chen, C.W. Liu, S.Y. Hsu, C.I. Steefel (2016) Effect of medium permeability anisotropy on the morphological evolution of two non-uniformities in a geochemical dissolution system, *J. Hydrology* **533**: 224-233.

Arora, B., N. F. Spycher, C. I. Steefel, S. Molins, M. Bill, M.E., Conrad, W. Dong, B. Faybishenko, T.K. Tokunaga, J. Wan, K.H. Williams and S.B. Yabusaki (2016) Influence of hydrological, biogeochemical and temperature transients on subsurface carbon fluxes in a flood plain environment, *Biogeochemistry* **127**: 367-396.

Steefel, C.I., S. Emmanuel, L. Anovitz (2015) Pore-Scale Geochemical Processes—Preface. *Reviews in Mineralogy and Geochemistry* **80**: iii-iv.

Tournassat, C.,C.I. Steefel, I.C. Bourg, C.I. Steefel, F. Bergaya (2015) Introduction. In *Natural and Clay Barriers Vol. 6* (eds. C. Tournassat, C.I. Steefel, I.C. Bourg, and F. Bergaya): 1-3, Elsevier.

Tournassat, C., I.C. Bourg, C.I. Steefel, F. Bergaya (2015) Surface properties of clay minerals. In *Natural and Clay Barriers Vol. 6* (eds. C. Tournassat, C.I. Steefel, I.C. Bourg, and F. Bergaya): 5-31, Elsevier.

Steefel, C.I., L. Beckingham, G. Landrot (2015) Micro-continuum approaches for modeling pore-scale geochemical processes. *Reviews in Mineralogy and Geochemistry* **80**: 217-246.

Tournassat, C., C.I Steefel (2015) Ionic transport in nano-porous clays with consideration of electrostatic effects. *Reviews in Mineralogy and Geochemistry* **80**: 287-329.

Steefel, C.I., S.B. Yabusaki, K.U. Mayer (2015) Reactive transport benchmarks for subsurface environmental simulation. *Computational Geosciences* **19**: 439-443. DOI: 10.1007/s10596-015-9499-2.

Chagneau, A., C. Tournassat, C.I. Steefel, I.C. Bourg, S. Gaboreau, I. Esteve, T. Kupcik, F. Claret, T. Schäfer (2015) Complete restriction of $^{36}Cl^-$ diffusion by celestite precipitation in densely compacted illite. *Environmental Science and Technology Letters* **2 (5)**, 139-143. DOI: 10.1021/acs.estlett.5b00080

Icenhower, J., C.I. Steefel (2015) Dissolution rate of borosilicate glass SON68: A method of quantification based upon interferometry and implications for experimental and natural weathering rates of glass. *Geochimica et Cosmochimia Acta* **157**: 147-163.

Beisman, J., Maxwell, R., Navarre-Sitchler, A., Steefel, C.I. (2015) ParCrunchFlow: An efficient, parallel reactive transport simulation tool for chemically and physically heterogeneous subsurface environments. *Computational Geosciences* **19**: 403-422. DOI: 10.1007/s10596-015-9475-x.

Bazilevskaya, E., G. Rother, D.F.R. Mildner, M. Pavich, D. Cole, M.P. Bhatt, L. Jin, C.I. Steefel, S.L. Brantley (2015) How oxidation and dissolution in diabase and granite control porosity during weathering. *Soil Science Society of America Journal* **79**, no. 1: 55-73.

Rasouli, P., C.I. Steefel, K.U. Mayer, M. Rolle (2015) Benchmarks for multicomponent diffusion and electrochemical migration. *Computational Geosciences* **19**: 523-533. DOI: 10.1007/s10596-015-9481-z.

Mayer, K.U., P. Alt-Epping, D. Jacques, B. Arora and C.I. Steefel (2015) Benchmark problems for reactive transport modeling of the generation and attenuation of acid rock drainage. *Computational Geosciences* **19**: 599-611. DOI: 10.1007/s10596-015-9476-9.

Marty, N.C.M., Blanc, P., Bildstein, O., Claret, F., Cochepin, B., Danyang, S., Gaucher, E., Jacques, D., Lartigue, J-E., Mayer, K.U., Meeussen, J.C.L., Munier, I., Pointeau, I., Sanheng, L., Steefel, C.I. (2015) Benchmarks for multicomponent reactive transport across a cement/clay interface. *Computational Geosciences* **19**: 635-653. DOI 10.1007/s10596-014-9463-6

Xie, M., Mayer, K.U., Claret, F., Alt-Epping, P., Diederik, J., Steefel, C.I., Chiaberge, C., Simunek, J. (2015) Implementation and evaluation of permeability-porosity and tortuosity-porosity relationships linked to mineral dissolution-precipitation. *Computational Geosciences* **19**: 655-671. DOI 10.1007/s10596-014-9458-3

Zhang, S., Yang, L., DePaolo, D.J., Steefel, C.I. (2015) Chemical affinity and pH effects on chlorite on chlorite dissolution kinetics under geological CO_2 sequestration conditions. *Chemical Geology* **396**: 208-217.

Perdrial, N., Thompson, A., Steefel, C.I., O'Day, P.A., Chorover, J. (2014) Mineral transformation controls speciation and pore-fluid transmission of contaminants in waste-weathered Hanford sediments. *Geochimica et Cosmochimica Acta* **141**: 4870507.

Alt-Epping, P., Tournassat, C., Rasouli, P., Steefel, C.I., Mayer, K.U., Jenni, A., Mäder, U., Sengor, S., Fernandez, R. (2015) Benchmark reactive transport simulations of a column experiment in compacted bentonite with multi-species diffusion and explicit treatment of electrostatic effects. *Computational Geosciences* **19**: 535-550. DOI 10.1007/s10596-014-9451-x

Arora, B., Sengor, S.S., Spycher, N., Steefel, C.I. (2015) A reactive transport benchmark on heavy metal cycling in lake sediments. *Computational Geosciences* **19**: 613-633. DOI: 10.1007/s10596-014-9445-8

Steefel, C.I., Appelo, C.A.J., Arora, B., Jacques, D., Kalbacher, T., Kolditz, O., Lagneau, V., Lichtner, P.C., Mayer, K.U., Meeussen, J.C.L., Molins, S., Moulton, D., Shao, H., Šimůnek, J., Spycher, N., Yabusaki, S.B., Yeh, G.T. (2015) Reactive transport codes for subsurface environmental simulation, *Computational Geosciences* **19**: 445-478. DOI: 10.1007/s10596-014-9443-x

Beller, H.R., Yang, L., Varadharajan, C., Han, R., Lim, H.C., Karaoz, U., Molins, S., Marcus, M.A., Brodie, E.L., Steefel, C.I., Nico, P. (2014) Divergent aquifer biogeochemical systems converge on similar and unexpected Cr(VI) reduction products. *Environmental Science and Technology*, DOI**:** 10.1021/es5016982

Wanner, C., Druhan, J.L., Amos, R.T., Alt-Epping, P., Steefel, C.I. (2015) Benchmarking the simulation of Cr isotope fractionation. *Computational Geosciences* **19**: 497-521. DOI 10.1007/s10596-014-9436-9.

Lawrence, C., Steefel, C., Maher, K. (2014), Abiotic/biotic coupling in the rhizosphere. *Procedia Earth and Planetary Science* **10**: 104-108.

Steefel, C.I., Druhan, J.L., Maher, K. (2014), Modeling coupled chemical and isotopic equilibration rates. *Procedia Earth and Planetary Science* **10**: 208-217.

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