

Kevin G. Knauss

PRESENT POSITION:

Staff Scientist
Earth Sciences Division
Lawrence Berkeley National Laboratory
1 Cyclotron Road, Mail Stop 90R-1116
Berkeley, CA 94720
510-486-5344

EDUCATION:

9/71-8/76, University of Southern California, Los Angeles, CA, Ph.D. (Geological Sciences)
9/69-6/71, Iowa State University of Science and Technology, Ames, IA, B.Sc. (Chemistry)
7/67-6/69, United States Military Academy, West Point, NY

PREVIOUS RESEARCH EXPERIENCE:

Geochemist, Earth Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA, 9/07-present
Geochemist, Earth Sciences Department, Lawrence Livermore National Laboratory, Livermore, CA, 9/76-9/07
Geochemistry Group Leader, Earth Sciences Department, Lawrence Livermore National Laboratory, Livermore, CA, 6/82-12/93

GENERAL RESEARCH INTERESTS:

Solution thermodynamics, chemical kinetics, hydrothermal geochemistry, nano/micro-scale fluid-solid interface interactions, and uranium-series disequilibria

PUBLICATIONS AND OTHER PAPERS (partial, limited to last 15 years):

- Kharaka, Y. K., Thordsen, T. T., Hovorka, S. D., Nance, S., Cole, D. R., Phelps, T. J., Knauss, K. G., (2009) Potential environmental issues of CO₂ storage in deep saline aquifers: Geochemical results from the Frio-I Brine Pilot test, Texas, USA. *Applied Geochemistry*, v. 24, p. 1106-1112.
- Kharaka Y.K., Thordsen J.J., Hovorka S.D., Nance H.S., Cole D.R., Phelps T.J. and Knauss K.G. (2007) Subsurface monitoring of anthropogenic CO₂ injected in sedimentary basins: Results from the Frio-I brine test, Texas, USA. *Proceedings of the 12th International Water-Rock Interaction Symposium*, 597-601.
- Rau, G.H., Knauss, K.G., Langer, W.H. and Caldeira, K. (2006) Reducing energy-related CO₂ emissions using accelerated weathering of limestone. *Energy*, v.32, 1471-1477.
- Hovorka S.D., Benson S.M., Doughty C., Freifeld B.M., Sakarai S., Daley T.M., Kharaka Y.K., Holtz M.H., Trautz R.C., Nance H.S., Myer L.R. and Knauss K.G. (2006) Measuring permanence of CO₂ storage in saline formations: the Frio experiment. *Env. Geosci.*, v. 13, 105-121.
- Kharaka Y.K., Cole D.R., Hovorka S.D., Gunter W.D., Knauss K.G. and Freifeld B.M. (2006) Gas-water-rock interactions in Frio Formation following CO₂ injection: Implications to the storage of greenhouse gases in sedimentary basins. *Geology*, v. 34, 577-580.
- Carroll S.A. and Knauss K.G. (2005) Dependence of labradorite dissolution kinetics on CO_{2(aq)}, Al_(aq), and temperature. *Chem. Geol.*, v. 217, 213-225.
- Knauss K.G., Johnson J.W. and Steefel C.I. (2005) Evaluation of the impact of CO₂, co-contaminant gas, aqueous fluid and reservoir rock interactions on the geological sequestration of CO₂. *Chem. Geol.*, v. 217, 339-350.
- Johnson J.W., Nitao J.J., and Knauss K.G. (2004) *Reactive transport modeling of CO₂ storage in saline aquifers to elucidate fundamental processes, trapping mechanisms, and sequestration partitioning*: in **Geologic Storage of Carbon Dioxide**, Geol. Soc. London Spec. Pub. 233, Baines, S.J., and Worden, R.H., eds., p. 107-128.
- Higgins S. R., Hu X., Knauss K. G. (2004) Kinetics of Elementary Steps on Cleaved Dolomite Surfaces in Undersaturated Alkaline Aqueous Solutions. *Proceedings of the 11th International Water-Rock Interaction Symposium*, 757-761.
- Knauss K. G., Eggleston C. M., Greer B, Higgins S. R. (2004) Coupled carbonate mineral dissolution and

growth: reactive transport experiments and modeling of calcite dissolution and strontianite growth. *Proceedings of the 11th International Water-Rock Interaction Symposium*, 555-559.

- Higgins S. R., Stack A. G., Knauss K. G., Eggleston C. M., and Jordan G. (2002) Probing molecular scale adsorption and dissolution-growth processes using nonlinear optical and scanning probe methods suitable for hydrothermal applications. In *Water-Rock Interactions, Ore Deposits, and Environmental Geochemistry: A Tribute to David A. Crerar*, Special Publication No. 7 (ed. R. Hellmann and S. A. Wood), pp. 111-128. The Geochemical Society.
- Higgins S. R., Boram L. H., Eggleston C. M., Coles B. A., Compton R. G. and Knauss K. G. (2002) Dissolution kinetics, step and surface morphology of magnesite (104) surfaces in acidic aqueous solution at 60C by atomic force microscopy under defined hydrodynamic conditions, *Journal of Physical Chemistry B*, v. 106, 6696-6705.
- Jordan G., Higgins S. R., Eggleston C. M., Knauss K. G. and Schmahl W. W. (2001) Dissolution kinetics of magnesite in acidic aqueous solution, a hydrothermal atomic force microscopy (HAFM) study: Step orientation and kink dynamics. *Geochim. Cosmochim. Acta*, 65, 4257-4266.
- Knauss, K.G., Dibley, M.J., Bourcier, W.L. and Shaw, H.F. (2001) Ti(IV) Hydrolysis constants derived from rutile solubility measurements made from 100° to 300°C. *Appl. Geochem.*, v. 16, 1115-1128.
- Knauss, K.G., Dibley, M.J., Leif, R.N., Mew, D.A. and Aines, R.D. (2000) The solubility of trichloroethene (TCE) and tetrachloroethene (PCE) as a function of temperature. *Appl. Geochem.*, v. 15, 501-512.
- Higgins S. R., Bosbach D., Eggleston C. M. and Knauss K. G. (2000) Kink dynamics and step growth on barium sulfate (001): A hydrothermal atomic force microscopy study, *Journal of Physical Chemistry B*, 104, 6978-6982.
- Knauss, K.G., Dibley, M.J., Leif, R.N., Mew, D.A. and Aines, R.D. (1999) Aqueous oxidation of trichloroethene (TCE): a kinetic study. *Appl. Geochem.*, v. 14, 531-541.
- Jordan G., Higgins S. R., Eggleston C. M., Swapp S. M., Janney D. E., and Knauss K. G. (1999) Acidic dissolution of plagioclase. In-situ observations by hydrothermal atomic force microscopy. *Geochim. Cosmochim. Acta*, v. 83, 3183-3191.
- Higgins, S.R., Eggleston, C.M., Knauss, K.G. and Boro, C.O. (1998) A hydrothermal atomic force microscope for imaging in aqueous solution up to 150°C. *Rev. Sci. Instrum.*, v.69, 2994-2998.
- Higgins S. R., Jordan G., Eggleston C. M. and Knauss K. G. (1998) Dissolution kinetics of the barium sulfate (001) surface by hydrothermal atomic force microscopy. *Langmuir*, 14, 4967-4971.
- Knauss, K.G., Copenhaver, S.A., Braun, R.L. and Burnham, A.K. (1997) Hydrous pyrolysis of New Albany and Phosphoria shales: Production kinetics of carboxylic acids and light hydrocarbons and interactions between the inorganic and organic chemical systems. *Org. Geochem.*, v. 27, 477-496.
- Burnham, A.K., Gregg, H.R., Ward, R.L., Knauss, K.G., Copenhaver, S.A, Reynolds, J.G. and Sanborn, R. (1997) Decomposition kinetics and mechanism of n-hexadecane-1,2-¹³C₂ and dodec-1-ene-1,2-¹³C₂ doped in petroleum and n-hexadecane. *Geochim. Cosmochim. Acta*, v. 61, 3725-3737.
- Jackson, K.J., Burnham, A.K., Braun, R.L. and Knauss, K.G. (1995) Temperature and pressure dependence of n-hexadecane cracking. *Org. Geochem.* v. 23, p. 941-953.
- Knauss, K.G., and Copenhaver, S.A. (1995) The solubility of p-xylene in water as a function of temperature and pressure and calculated thermodynamic quantities. *Geochim. Cosmochim. Acta*, v. 59, p. 2443-2448.