Geological Carbon Sequestration

CO_2 and Co-injectant Solubility (impurities in CO2 streams)

- Ji X and **Zhu** C (2013) Predicting possible effects of H_2S impurity on CO_2 transportation and geological storage. ***Environmental Science & Technology*** 47: 55-62, dx.doi.org/10.1021/es301292n.
- Ji X and **Zhu** C (2012) A SAFT Equation of State for the Quaternary H_2S-CO_2-H_2O-NaCl system. ***Geochimica et Cosmochimica Acta*** 91: 40–59, doi.org/10.1016/j.gca.2012.05.023.
- Ji X and **Zhu** C (2013) A SAFT Equation of State for the H_2S-CO_2-H_2O-NaCl system and applications for CO_2 - H_2S transportation and geological storage." ***Energy Procedia*** 37: 3780-3791. doi: 10.1016/j.egypro.2013.06.274.
- Ji, X. and **Zhu**, C. (2010) Modelling of phase equilibria in the H_2S-H_2O system with statistical associating fluid theory. Energy & Fuels v. 24, 6208-6213. DOI:10.1021/ef100847j.
- Hu, J, Duan, Z, **Zhu, C.**, and Chou, I., (2007) PVTx properties of the CO_2-H_2O and CO_2-H_2O-NaCl systems below 647K: Assessment of experimental data and thermodynamic models. *Chemical Geology*, v. 238, p.249-267.
- Duan, Z., Sun, R, Liu, R, and **Zhu**, C. (2007) Accurate thermodynamic model for H_2S solubility in pure water and brines. *Energy & Fuels*, v. 21, 2056-2065.
- Duan, Z., Sun, R., **Zhu, C.** and Chou, I., (2006) An improved model for the calculation of CO_2 solubility in aqueous solutions containing Na^+, K^+, Ca^{2+}, Mg^{2+}, Cl^-, and SO_4^{2-}. *Marine Chemistry*. v.98, 131-139.

Numerical Modeling of CO_2 Migration, Partitioning, and Reactions with Reservoir Rocks

- **Zhu C**, ‡Zhang GR, ‡Lu P, ‡Meng LF, Ji X (2015) Benchmark modeling of the Sleipner CO_2 plume: Calibration to seismic data for the uppermost layer and model sensitivity analysis. *The International Journal of Greenhouse Gas Control* 43: 233-246, doi: 10.1016/j.ijggc.2014.12.016
- Zhang GR, ‡Peng L, ‡Zhang YL, Wei XM, *__Zhu C__ (2015) Effects of rate law formulation on predicting CO_2 sequestration in sandstone formations. *International Journal of Energy Research* 39(14): 1890-1908, doi: 10.1002/er.3374.
- ‡Zhang GR, ‡Lu P, ‡Zhang YL, Wei XM, *__Zhu C__ (2016) Impacts of mineral reaction kinetics and regional groundwater flow on long-term CO_2 fate at Sleipner. *Energy & Fuel* 30(5): 4159-4180, doi: 10.1021/acs.energyfuels.5b02556
- Liu, Faye (Yifei), P. Lu, C. **Zhu**, Y. Xiao (2011) Coupled reactive transport modeling of CO_2 Sequestration in the Mt. Simon Sandstone Formation, Midwest U.S.A. *The International Journal of Greenhouse Gas Control*, DOI: 10.1016/j.ijggc.2010.08.008.
- Strazisar, B. R., **Zhu, C.**, and Hedges, S. W., (2006) Preliminary modeling of the long-term fate of CO_2 following injection into deep geological formations. ***Environmental Geosciences*** v.13, no.1, 1-15, 2006.

Mineralogical or Above Ground Carbon Sequestration (U.S. Patent 7922792 "Method for Sequestration of CO_2 and SO_2 Utilizing a Plurality of Waste Streams")

- Dilmore, R., Lu, P., Soong, Y. , Allen, Hedges, H., Fu, J. K., Dobbs, C., Degalbo, A., **Zhu, C.** , (2008) Sequestration of CO_2 in mixtures of bauxite residue and saline waste water. ***Energy & Fuels***, v 22, No.1, p.343-353.
- Soong, Y., Allen, D.E., McCarthy-Jone, J.R., Harrison D.K., Hedges, S.H., Baltrus, J.P., and **Zhu, C.**, (2004) Preliminary experimental results of CO_2 sequestration with brine. *Proceedings of the 11th International Symposium on Water/Rock Interaction WRI-11*, June 27-2 July 2004, Saratoga Springs, New York, 597-600.

CO_2-feldspar-water Reaction Kinetics (field, experiments, and modeling)

- **Zhu**, C., Lu, P., Zheng, Z., Ganor, J. (2010) Coupled Alkali Feldspar Dissolution and Secondary Mineral Precipitation in Batch Systems: 4. Numerical modeling of reaction path. ***Geochimica et Cosmochimica Acta. .*** v.74, pp. 3963-3983, Doi:10.1016/j.gca.2010.04.012.
- **Zhu**, C., and Lu, P. (2009) Alkali Feldspar Dissolution and Secondary Mineral Precipitation in Batch Systems: 3. Saturation states of product minerals and reaction paths. ***Geochimica et Cosmochimica Acta.*** v. 73 (9),3171-3120. doi: 10.1016/j.gca.2009.03.015.
- Lu P, Fu Q, Seyfried Jr. WE, Jones K., and †Zhu C (2013) Coupled alkali feldspar dissolution and secondary mineral precipitation in batch systems: 2 Effects of CO_2 and implications for carbon sequestration. ***Applied Geochemistry*** 30: 75-90, Doi10.1016/j.apgeochem.2012.04.005
- Fu, Q., P Lu, H. Konishi, R. Dilmore, H. Xu, W. E. Seyfried, Jr., and C. **Zhu**. (2009) Coupled alkali-feldspar Dissolution and Secondary Mineral Precipitation in Batch Systems: 1. New Experimental Data at 200°C and 300 bars. ***Chemical Geology***, 91(3), 955-964.
- Georg, R. B., **Zhu**, C. Reynolds, R.C., and Halliday, A.N. (2009) Stable silicon isotopes of groundwater, feldspars, and clay coatings in the Navajo Sandstone aquifer, Black Mesa, Arizona, USA. ***Geochimica et Cosmochimica Acta,*** **v.** 73, p. 2229-2241.
- Hereford, A. G., Keating, E., Guthrie, G., **Zhu, C.**, (2007) Reactions and reaction rates in the regional aquifer beneath Pajarito Plateau, north-central New Mexico. ***Environmental Geology***, v. 52, No. 5, p. 965-977. DOI: 10.1007/s00254-006-0539-z.
- Ganor, J., Lu, P., Zheng, Z., and **Zhu, C.**, (2007) Bridging the gap between laboratory measurements and field estimations of weathering using simple calculations. ***Environmental Geology***. v.53, No.3, p.599-610. DOI 10.1007/s00254-007-0675-0.
- **Zhu, C.**, Veblen, D.R., Blum, A.E, Chipera, S. (2006) Naturally weathered feldspar surfaces in the Navajo Sandstone aquifer, Black Mesa, Arizona: Electron microscopic characterization. ***Geochimica et Cosmochimica Acta*** v. 70, no.18, 4600-4616, doi:10.1016/j.gca.2006.07.013.
- **Zhu, C.** (2005) Feldspar dissolution in saturated aquifers: In situ rates. ***Geochimica et Cosmochimica Acta*** v. 69, No.6, 1435-1453.
- **Zhu, C.**, A.E. Blum, D.R. Veblen (2004) Feldspar dissolution rates and clay precipitation in the Navajo aquifer at Black Mesa, Arizona, USA. *Proceedings of the 11th Water/Rock Interaction Conference*, Saratoga Springs, New York, pp. 895-899.

Laboratory Experiments on Host Rock Reactivity and Caprock Integrity

- Liu, Faye (Yifei), P. Lu, C. Griffth, S.a W. Hedges, C. **Zhu** (2012) CO_2-caprock-brine interaction: Reactivity Experiments on Eau Claire Shale and a review of literature. ***The International Journal of Greenhouse Gas Control*** 7: 153–167, doi.org/10.1016/j.ijggc.2012.01.012.
- Lu, P, Fu, Q., Seyfried, W.E. Jr, Hereford, A.G., **Zhu**, C. (2010) Navajo Sandstone-Brine-CO_2 interaction: Implications for Geological Carbon Sequestration. ***Environmental Earth Sciences***, 62 (1): 101-118doi:10.1007/s12665-010-0501-y