Improving Injectivity Rates without Wellbore or Reservoir Damage

Scientific Achievement

Improved understanding for caprock integrity, CO_2-injection-induced damage, and localization of leakage pathways by accounting for the influence of heterogeneity on upscaling physics of fracture and flow from pore to core-scale

Significance and Impact

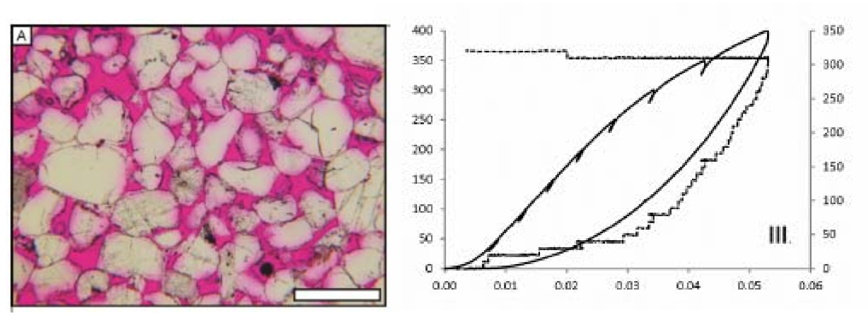
Improve injectivity, inform regulatory guidance on best practices for injection, prevent wellbore damage during injection of CO_2 or withdrawal of brine solutions, and avoid damaging effects of induced seismicity.

Publications

Dewers, T., P. Newell, S. Broome, J. Heath, and S. Bauer (In Press), Geomechanical Behavior of Cambrian Mount Simon 2 Sandstone Lithofacies, Iowa Shelf, USA, *International Journal of Greenhouse Gas Control*.

Zhang, Y. P., et al. (2013), Hydrogeologic Controls on Induced Seismicity in Crystalline Basement Rocks Due to Fluid Injection into Basal Reservoirs, *Ground Water*, *51*(4), 525-538.

Yoon, H., and T. A. Dewers (2013), Nanopore structures, statistically representative elementary volumes, and transport properties of chalk, *Geophysical Research Letters*, *40*(16), 4294-4298.



(Left) Photomicrograph of thin section from the Mount Simon sandstone. Quartz-cemented quartzarenite of fine sand with very-well to well sorting. Scale bar = 0.5 mm. (Right) Results of hydrostatic tests results showing the mean stress–volume strain responses to hydrostatic loading to 400 MPa (solid lines). Also shown are acoustic emission counts associated with the onset of post-yielding plastic strain(dashed lines).

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