

Multiscale Simulation of CO₂ Reactive Transport

Scientific Achievement

Developed novel modeling technique for bridging spatial scales (10^{-6} to 10^2 m) so that reactive transport of CO₂ in subsurface can be accurately modeled

Significance and Impact

Enables understanding and predictions of emergent patterns that develop during reactive transport of CO₂ in subsurface as well as other subsurface phenomena

Research Details

- Hundreds of pore-scale models used for modeling emergent pathways formed in reactive transport
- Heterogeneous pressure field possible because of pore-scale simulation
- Super Permeability Tensor (SPT) is a new upscaling approach
- Coupling advanced numerical approaches and high performance computing make this novel multiscale approach possible

R.T. Peterson, M.T. Balhoff and S. Bryant, J. of Multiscale Modeling 3 (3), 2011, 109-131.

Sun, T., Mehmani, Y., Bhagmane, J., Balhoff, M. T. *International Journal of Oil, Gas, and Coal Technology*, v5 (2/3), 249-266 (2012)

