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Experimental Investigation of Dissolution-Driven Convection in Heterogeneous Porous Medium RUI NI, ASHWANTH K. R. SALIBINDLA, ASHIK ULLAH MOHAMMAD MASUK, JIKANG SHEN, Department of Mechanical and Nuclear Engineering, Pennsylvania State University — Subsurface carbon sequestration in saline aquifers has emerged as one promising method to mitigate anthropogenic emission of CO2 because of the potential storage capacity of the accessible formations. Being injected into the porous formation underground, the buoyant CO2 will start to migrate upward and may eventually leak back to the surface through faults in the overlying caprock. This leaking process may be hindered or even completely stopped due to the dissolution of CO2 into the brine. For those locations, where the supercritical CO2 is above the brine, the dissolution between the two fluids leads to a mixture with higher density than both CO2 and brine; and thus the resultant solution on the interface is unstable, drawing the CO2-rich mixture downward and rendering the sequestration significantly more stable. Previous laboratory experiments on dissolution-driven convection were mostly limited to a simplified case where the porous medium was assumed to be homogenous. To account for the heterogeneity existing in the actual formations, we designed a series of experiments in controlled ways to introduce spatial variations of permeability. By measuring the mass transfer efficiency under different conditions, our experiments provide a new way to assess the

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