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Impact of Ostwald ripening on the stability of capillary-trapped CO2: a retrospective

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Capillary trapping is a key mechanism that increases CO_2 storage security by immobilizing a substantial fraction of the injected CO_2 in the pores of the reservoir formation. The long-term stability of capillary-trapped CO_2 is desirable, as remobilization of the trapped phase impacts the extent and rate of CO_2 plume migration and CO_2 dissolution and mineralization. Redistribution of the trapped CO_2 phase may happen due to mass transfer driven by differences in capillary pressure between trapped CO_2 ganglia, a process called Ostwald ripening.

This presentation details the early research dedicated to Ostwald ripening in porous media with application to geologic carbon storage, led by Sally Benson's group. This includes experimental investigations using time-lapse x-ray microtomography imaging and the first pore-scale and continuum-scale modeling work.The talk also briefly reviews studies that this body of work has inspired in recent years and summarizes the main findings regarding the role of Ostwald ripening on the stability of capillary trapping.

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References

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