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Experimental study of pattern formation during carbon dioxide mineralization GABOR SCHUSZTER, FABIAN BRAU, ANNE DE WIT, Université Libre de Brussels — Injection of supercritical carbon dioxide in deep porous aquifers, where mineral carbonation takes place via chemical reactions, is one of the possible long-term storage of this greenhouse gas. This mineralization process is investigated experimentally under controlled conditions in a confined horizontal Hele-Shaw geometry where an aqueous solution of sodium carbonate is injected radially into a solution of calcium chloride. Precipitation of calcium carbonate in various finger, flower or tube-like patterns is observed in the mixing zone between the two solutions. These precipitation structures and their growth dynamics are studied quantitatively as a function of the parameters of the problem, which are the injection rate and the reactant concentrations. In particular, we show the existence of critical concentrations of reactants above which the amount of the calcium carbonate precipitate produced drops significantly.

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