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CO_2 sequestration via pressure driven displacement experiments on fluid-gas plugs in a capillary tube SRAVYA SASETTY, THOMAS WARD, Iowa State University — This talk focuses on experiments conducted to further our understanding on the feasibility of carbon sequestration using a chemical reaction between CO_2 gas and aqueous $Ca(OH)_2$ which produces $CaCO_3$ precipitates. Experiments were performed in a capillary tube (dia $\approx$ 800 μm) by displacing liquid plugs of different volumes containing $Ca(OH)_2$ ($0 \leq c \leq 20$ mol m^{-3}) dissolved in aqueous glycerol solution using CO_2 gas at pressures 0.2 psig $\leq P \leq$ 1.0 psig. A CCD camera captured the displaced and displacing fluid interfaces and an in-house MATLAB code was used to measure both the mean U_m and tip U_t velocities. Subsequently, we measure the film thickness using the expression $m = 1 - U_m/U_t$ where m is a measure of displaced fluid still remaining inside the tube. Surface tension values obtained using an in-house pendant drop tensiometer were used to calculate the capillary number Ca. We report the m versus Ca trends observed in our experiments and compare them against immiscible fluid displacement classical results.

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