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Wettability and its impact on hydro-capillary fracturing in granular media MATHIAS TROJER, PIETRO DEANNA, RUBEN JUANES, Massachusetts Inst of Tech-MIT — Two-phase flow in geologic porous media is important in many natural and industrial processes. While it is well known that wetting properties of porous media can vary drastically depending on the type of media and the pore fluids, the effect of wettability on capillary-driven fracturing continues to challenge our microscopic and macroscopic descriptions. Here we study this problem experimentally, starting with the classic experiment of two-phase flow in a horizontal Hele-Shaw cell filled with a granular medium. We inject a low-viscosity fluid into a thin bed of glass beads initially saturated with a fluid 350 times more viscous. The control parameters are the injection rate, the confining stress and the contact angle of the liquid-liquid-solid interface; carefully chosen fluid pairs allow us to cover the entire range from drainage to imbibition. We demonstrate that wettability exerts a powerful influence on the invasion/fracturing morphology of unfavorable mobility displacements. High time resolution imaging techniques allow us to quantify matrix displacement and fracture opening dynamics. Our results provide insights on fracture propagation and fracture length distribution, parameters which are critically important to better understand long-term hydrocarbon production from shale

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