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Impact of wetting films on stability diagrams of two-phase flow in porous media

Tuesday, 14 May 2024 14:30 (15 minutes)

The stability of two-phase flow in porous media is known to depend on the viscosity ratio and on the capillary number. The transition from a stable regime, to viscous or capillary fingering is not always clear. In this work, we investigate the role of wetting films on the stability of two-phase flow during a drainage. Such films are ubiquitous in porous media and appear when the solid is strongly wetted by one of the fluid. We develop a new dynamic pore-doublet approach combined with microfluidic experiments to highlight the role of the wetting films on the stability diagrams. We demonstrate that the layers of wetting fluid along the solid walls significantly alter the stability of the invasion.

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