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Stabilization of a finite slice in miscible displacement in homogeneous porous media SATYAJIT PRAMANIK, NORDITA, MANORANJAN MISHRA, Indian Institute of Technology Ropar, India — We numerically studied the miscible displacement of a finite slice of variable viscosity and density. The stability of the finite slice depends on different flow parameters, such as displacement velocity U, mobility ratio R, and the density contrast. Series of numerical simulations corresponding to different ordered pair (R, U) in the parameter space, and a given density contrast reveal six different instability regions. We have shown that independent of the width of the slice, there always exists a region of stable displacement, and below a critical value of the slice width, this stable region increases with decreasing slice width. Further we observe that the viscous fingering (buoyancy-induced instability) at the upper interface induces buoyancy-induced instability (viscous fingering) at the lower interface. Besides the fundamental fluid dynamics understanding, our results can be helpful to model CO2 sequestration and chromatographic separation.

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