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# Controlling viscous fingering in hierarchal porous media

Tuesday, 1 June 2021 19:00 (1 hour)

Viscous fingering commonly takes place when a low viscosity fluid displaces a higher viscosity fluid. Although the fundamental principles governing the interfacial pattern in Hele-Shaw cell are well understood, their manifestation in porous media remains elusive. Here, we study viscous fingering in hierarchal porous media (HPM) consisting of a spatially-organized bimodal pore size distribution, namely patches of small and large pores. We use direct numerical simulations and microfluidic experiments to show that viscous fingering, typically highly random, develops into structured interfacial patterns in HPM, in contrast to its random nature in random media. We show that this invasion selectivity highly depends on the flow rate and the pore size contrast. Our results demonstrate that HPM provides a mean to control the morphology of displacement patterns, paving the way towards improved designs of chromatographic columns, membranes, microfluidic devices, and other applications where controlling interface morphology of the displacement pattern in porous materials is desirable.

## Time Block Preference

Time Block A (09:00-12:00 CET)

### References

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# Session Classification: Poster +

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