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Particle enrichment and instability on a fluid interface¹ BENJAMIN DRUECKE, ALIREZA HOOSHANGINEJAD, University of Minnesota, JENNA BROWN, Fort Lewis College, SUNGYON LEE, University of Minnesota — We investigate the displacement of a suspension of non-colloidal particles by an immiscible fluid inside a vertical Hele-Shaw cell with a gap less than twice the nominal particle size. We find that the particles move slower than the invading fluid and accumulate on the interface. The particle enrichment can cause an interfacial instability reminiscent of the classic Saffman-Taylor instability. However, unlike the classic viscous fingering patterns, the invading fluid penetrates into regions surrounding clusters of high particle concentration. In this way, the high-concentration clusters deform the otherwise flat interface. Although this effect is enhanced by the presence of many particles in a cluster, we show that the instability can also occur in the case of a single particle for a narrower range of parameters. In this poster, we present experimental results and discuss the competition between viscous drag and interfacial energy giving rise to this instability.

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