

Abstract Submitted
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From fingering to fracture in a complex fluid BAUDOUIN SAINTYVES, CEA-Saclay — We present a novel experiment – a specific Hele-Shaw cell with mobile sides which can be pulled at a prescribed velocity - with which both liquids and solids can be loaded with the same boundary conditions, beyond the small deformation regime. With such a system, one can examine quantitatively the response of a viscoelastic material when the loading rate is varied. In the case of viscous Newtonian liquids, an air bubble is shown to destabilize in a Saffman-Taylor manner, forming a finger which elongates in the direction in which the mobile sides are pulled. In contrast, in a Maxwell liquid, we observe a different kind of instability, which gives rise to more complex patterns. This instability leading to local stress concentrations, it is immediately followed by fracture. The displacement field is evaluated in each case by using tracers and image correlations.

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