

Abstract Submitted
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Selective withdrawal of non-Newtonian fluids: surface deformation induced by a sink flow DIWEN ZHOU, JAMES FENG, Department of Chemical and Biological Engineering, University of British Columbia — This talk reports experiment and numerical studies of selective withdrawal in a fluid-gas system. Using visual observation and finite element simulations based on an Arbitrary Lagrangian-Eulerian scheme, we have explored the effects of viscoelasticity on the deformation of free surface when the fluid is polymer solution (experiment) or Giesekus fluid (simulation). In the experiments, we find a thin air jet emanating from the tip of the free surface for polymer solutions when the distance between the free surface and the sink is below a critical value. This does not occur for the free surface of Newtonian liquids, and is caused by the additional elongational stress due to the polymer. In the simulations, the effects of elasticity on the surface deformation have been captured. The balance between surface and viscoelastic forces may potential be used for measuring extensional viscosity.

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