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Effects of polymer retention on dynamics of single phase flow SHIMA PARSA, DAVID WEITZ, Harvard University — We study the effect of adsorption of polymer solution on dynamics of a single phase flow in a model porous medium. We use confocal microscopy to fully visualize the flow of fluid in 3D micromodel of porous media. Polymer flooding is known to be an effective method for enhanced oil recovery. However, the physical mechanism is not clearly understood. We study the effect of polymer retention on the dynamics of single phase flow using particle image velocimetery. The distribution of velocities in the medium changes greatly after flow of high concentrations of polymer through the medium. Comparing the magnitude of velocities before and after the polymer flow, we observe reduction of accessible pores to the fluid at similar injection rates. Independent measurement of the permeability of the medium confirms the decrease in the porosity. Measurements of the retention of polymer in porous media shows a weak dependence on the hydrodynamic radius of the polymer. In these experiments, the viscoelastic behavior of the polymer is isolated from velocity measurements.

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