

Abstract Submitted
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Dynamics of non-Newtonian fluid flow in porous media SHIMA PARSA , HARRY CHIANG, SUJIT DATTA, DAVID WEITZ, Harvard University — We study the flow of a shear thinning polymer solution within a three dimensional model porous medium made of closely packed glass beads. The polymer solution is index matched with the glass so using confocal microscopy we are able to probe the dynamics of the flow at the pore scale in the bulk of the medium. We measure the fluid velocity field in the porous medium with particle image velocimetry technique. The probability distribution of the measured velocities has an exponential tail indicating the presence of large velocities compared to the average imposed velocity. The distribution of velocities also shows correlations with the pore size. We also compare the dynamics of the flow with the case of an additional immiscible fluid trapped within the medium. The probability distribution of velocities in the presence of residual trapped oil has a wider distribution as a result of the enhanced complexity of the medium.

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