

Abstract Submitted
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Transport of a viscoelastic particle suspension in tortuous geometries ALEXANDER BARBATI, GARETH MCKINLEY, Massachusetts Inst of Tech-MIT — Particle transport in viscoelastic fluids is of paramount importance in a variety of physical and industrial processes. We consider the transport of rigid particles through varied and microscale tortuous sections to model larger-scale particle transport, as commonly occurs in many reservoir stimulation processes. Beginning with the development of dynamic and geometric similarity parameters, we construct a rigid microfluidic device to probe the effects of fluid elasticity, fluid inertia, particle size, and particle volume fraction on particle transport. We characterize the microchannel flows with a combination of particle image velocimetry of embedded tracer particles and direct observation of particle accumulation and occlusion within the device. These on-chip experiments are accompanied by off-chip measurements of fluid rheology, and numerical computations of the flow field.

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