

Abstract Submitted  
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**Diffusive and inertial instabilities during miscible fluid thread formation in microgeometries**<sup>1</sup> THOMAS CUBAUD, SARA NOTARO, Stony Brook University — We study the formation and stability of miscible fluid threads having large difference in viscosity using hydrodynamic focusing sections. Miscible core annular flows are useful for transporting viscous materials and can be destabilized for enhancing mass transfer. Here, we delineate phase-diagrams of the formation of miscible threads from low to large viscosity contrasts with various diffusion coefficients. Depending on fluid properties and flow rates of injection, microflows are classified into diffusive, stable, and inertial regimes. For low Péclet numbers, we examine threads dynamics when diffusive effects strongly influence flow structures. Another regime is investigated for moderate Reynolds numbers where small threads are rapidly destabilized in the inertial flow field of the sheath fluid at the junction.

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