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Capillary breakup of discontinuously shear thickening suspensions PAWEL ZIMOCZ, GARETH MCKINLEY, ANETTE HOSOI, Massachusetts Institute of Technology — Extensional rheology of discontinuously shear thickening suspensions is not well understood, in part due to unresolved experimental challenges. Such suspensions tend to sag, drain or fracture when tested using traditional tools such as filament-stretching or capillary breakup extensional rheometers. We present an alternative method of conducting capillary breakup experiments with thickening suspensions by placing them between two layers of immiscible oil. In experiments conducted with silica and cornstarch particles we observe the formation of bead-on-a-string morphologies with multiple satellite and sub-satellite bead generations, similar to the morphologies observed in breakup of viscoelastic fluids. Using a one dimensional numerical model, we show that formation of beads is a consequence of the discontinuous nature of thickening in the suspensions. Finally, we delineate the parameter regimes where formation of beads occurs, and where it is suppressed.

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