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Agglomerate Breakdown in Shear Thickening Fluids by Large Amplitude Oscillatory Shear (LAOS) RAN TAO, KIRK D. RICE, GALE A. HOLMES, NIST - Natl Inst of Stds Tech — Amorphous fumed silica and polypropylene glycol (PPG) suspensions were investigated using both steady shear and oscillatory shear rheology. As-mixed and sonicated silica/PPG suspensions show different shear thickening behavior with different critical shear rates as analyzed by the MITLAOS framework as well as the Fourier Transform approach. The as-mixed suspensions show a pronounced decrease in viscosity or modulus over the course of measurement, which is ascribed to an irreversible breakdown of silica-PPG agglomerates induced by shear. We also extend research to study colloidal silica/PPG dispersions under the same LAOS framework. In particular, we seek to understand the impact of the nanoparticle's structure, i.e., fractal vs. non-fractal, on the oscillatory STF response.

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