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Heaps of Shapes: Flow-Stabilized Solids with Non-Spherical Colloids SCOTT LINDAUER, North Carolina State University, C. WYATT SHIELDS IV, GABRIEL P. LOPEZ, Duke University, KAREN E. DANIELS, ROBERT RIEHN, North Carolina State University — Flow-stabilized solids are a class of fragile matter that are formed when a dense suspension of hard colloids is accumulated against a semipermeable barrier. We build a microfluidic device to confine Brownian particles in a quasi-2D channel; a controlled flow rate above a critical value forms flow-stabilized solids against the barrier. We extend prior work on submicron spherical particles, to particles of size 2-5 microns, and of various shapes: circular, rectangular, hexagonal, and triangular prisms. We perform experiments on these flow-stabilized solids to observe the angle of repose, packing fraction, and orientational order as a function of flow rate. We vary the flow rate quasi-statically in order to conduct the experiment at steady state. We find a critical flow rate below which no pile forms. In general, particles with less-circular shape form more stable heaps.

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