

Here we present a novel low-cost micro-fabrication method we term Splash-stop lithography. This unconventional approach to manufacturing solid objects exploits UV curable polymers to fabricate three-dimensional shapes that naturally occur in fluid dynamics. Fluids often create a broad variety of dynamic shapes (stable for short time scales), such as perfectly smooth spheres, parabolas, or even singularities. Here we present fabrication techniques that allow us to freeze these shapes permanently using fast UV curable polymers. We further present one application for these ultra-fast polymerization methods in high-throughput low-cost manufacturing of micro-optical components; specially focusing on manufacturing of ultra-low cost print-and-fold origami microscopes (Foldscope). We further describe the printing hardware developed for precision control of ultra-fast polymerization of complex, high-aspect ratio, three-dimensional shapes in a high-throughput roll-to-roll fashion.