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Fabrication of unique 3D microparticles in non-rectangular microchannels with flow lithography SUNG MIN NAM, KAIST , KIBEOM KIM, WOOK PARK, Kyunghee University, WONHEE LEE, KAIST — Invention of flow lithography has offered a simple yet effective method of fabricating micro-particles. However particles produced with conventional techniques were largely limited to 2-dimensional shapes projected to form a column. We proposed inexpensive and simple soft-lithography techniques to fabricate micro-channels with various cross-sectional shapes. The non-rectangular channels are then used to fabricate micro-particles using flow lithography resulting in interesting 3D shapes such as tetrahedrals or half-pyramids. In addition, a microfluidic device capable of fabricating multi-layered micro-particles was developed. On-chip PDMS valves are used to trap and position the particle at the precise location in microchannel with varying cross-section. Multilayer particles are generated by sequential monomer exchange and polymerization along the channel. While conventional multi-layered particles made with droplet generators require their layer materials be dissolved in immiscible fluids, the new method allows diverse choice of materials, not limited to their diffusibility. The multilayer 3D particles can be applied in areas such as drug delivery and tissue engineering.

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