

Fabrication of Microparticles Using Structured Elastomeric Membranes inside a Microfluidic Channel

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Microparticles have a great potential in various applications such as drug delivery, tissue engineering, etc. Compared to the other fabrication techniques to synthesize microparticles, the methods adopting microfluidic devices have unique advantages for the continuous fabrication of microparticles. In this work, structured elastomeric membranes were exploited for the fabrication of microparticles inside microfluidic channels. The masters for structured elastomeric membranes were fabricated by photolithography with photomask containing various shapes. The thin structured elastomeric membranes were prepared by spin coating the polydimethylsiloxane (PDMS) on the masters. Then, the membranes were incorporated between two-layered microfluidic devices composed of fluid channel and control channel. The thin structured membranes acted like traps for the confinement of photocurable resin. The trapping of the elastomeric membranes could be controlled by the pneumatic actuation of control channel. The confined photocurable resin inside negative relief structures was exposed to UV light to fabricate the microparticles.