

Thin Film Coated Colloidal Microparticles with Designed Shape and Characteristic Spectrum

심재영, 최재훈, 임종민, 황혜림, 조수정, 양승만*

KAIST

(smyang@kaist.ac.kr*)

Microparticles have a great potential in many applications like drug delivery, tissue engineering, etc. Compared to the other fabrication techniques to synthesize microparticles, the methods adopting microfluidic devices have advantages for the continuous fabrication of microparticles. In this work, microfluidic tool called structured elastomeric membranes (SEM) were exploited for the fabrication of colloidal microparticles inside the microfluidic channel. In this system, shapes and colors of particles could be controlled via the feature of structures and colloidal crystal structures. The masters for SEM were fabricated by photolithography with photomask containing various shapes. The membranes incorporated between flow and control channels acted as pneumatic valves and led to confinement of fluids inside structures on the membrane. Colloidal microparticles with 3D structures could be synthesized by trapping of photocurable silica suspensions inside structures and subsequent exposure of UV light. In addition, porous internal structures were created by treating microparticles with 5% HF solution to remove silica particles. These periodic structures displayed iridescent colors by reflecting light according to the Bragg's law.