

### Pumpless Fluid Handling in Microfluidic System Using Magneto-responsive Microspheres

심재영, 최재훈, 양승만\*  
KAIST  
(smyang@kaist.ac.kr\*)

Fluid control is a key element in the performance of microfluidic “lab-on-a-chip” system. Although many microfluidic devices have been developed for various applications, most of such devices require complicated and large mechanical instruments for handling solutions. In this work, we integrated magneto-responsive microspheres into the microchannels for pumpless fluid handling. Magneto-responsive microspheres could be fabricated by photopolymerization of emulsion droplets including iron oxide nanoparticles. Due to the net magnetic moments, microspheres could be rotated under the external magnetic field. It is possible to control the velocity or direction of fluid by changing the rotational motion of microspheres. Moreover, immediate shift of flow direction could induce the mixing of fluids in microscale channels.