

## Hydrogel Micro-Droplet Formation with Very Low Size Variation in a Microfluidic Device

김영호\*, Dang Trung Dung<sup>1</sup>, 김규만<sup>1</sup>  
경북대학교 차세대에너지기술연구소;  
<sup>1</sup>경북대학교 기계공학과  
(hi05kim@hanmail.net\*)

Micoscale droplets have useful applications including biochip, chemical sensor, HPLC column filler, drug delivery system, and nano-reactor etc. A general fabrication method of micoscale droplets produces high size variation that reduces application efficiency. In this study, hydrogel micro-droplet formation with very low size variation in a polydimethylsiloxane (PDMS) microfluidic device has been presented. A series of micro-fluidic devices with various channel shapes and diameters was designed and fabricated. Then micro-droplets of poly(ethylene glycol) (PEG) hydrogel in mineral oil were prepared in a microfluidic channel of the microfluidic device. Effect of microfluidic channel shape and diameters, flow rate, surfactant concentration, PEG hydrogel concentration on micro-droplet formation in the microfluidic device had been investigated and optimized to obtain mono-size hydrogel micro-droplets. The fabricated droplet sizes are from 40 to 200  $\mu\text{m}$ . The prepared hydrogel micro-droplets might applicable to drug delivery system and sensor applications.