

Synthesis of poly(N-isopropylacrylamide) hydrogel using a microfluidic channel and study on concentration sensor

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In this study, PDMS microchannels were fabricated by using a soft lithography process. Poly (N-isopropylacrylamide) (PNIPAm) micro-hydrogel spheres were synthesized by using the microfluidic channel. The volume of synthesized hydrogel was reduced as increasing temperature, exhibiting lower critical solution temperature (LCST) behavior at around 32 °C. The volume changes of the hydrogels were monitored as they were immersed into poly(vinyl alcohol) (PVA) or sodium chloride (NaCl) solution. The effects of temperature and solution concentration on the volume of the hydrogels were investigated. The osmotic pressures of the hydrogels were calculated from the solid contents in the hydrogel by using the Flory-Huggins theory. It was suggested that the hydrogel can be used as a sensor detecting concentration of solution and temperature.