

Microfluidic device incorporating hydrogel microreactor for simultaneous detection of phenol & hydrogen peroxide

장은지, 박선아¹, 김범상¹, 고원건*

연세대학교 화공생명공학과; ¹홍익대학교 화학공학과

(wongun@yonsei.ac.kr*)

In this study, a simple and sensitive detection method for phenol compounds were investigated using poly(ethylene glycol) (PEG) hydrogel entrapping enzyme and quantum dot (QD) within microfluidic device. This system is composed of channel connected with two inlet and outlet, which have width and height approximately 300um and 30um, respectively. One of the channels was filled with PEG-DA hydrogel precursor solution with tyrosinase and QD which has emission peak 585nm. The other one was filled with peroxidase and QD which has emission peak 525nm. To fabricate hydrogel micro-particles, precursor solution filled microchannels were exposed to UV light through photo-mask. When the analyte solution composed of either hydrogen peroxide or phenol is flown into the microfluidic channel, each fluorescent quenching can be measured. Accuracy of the system was proved by measurement of photoluminescent (PL) quenching PEG hydrogel state with different concentrations of analyte. The PL quenching of QDs were dependent molecular weight of PEG, and concentration of QDs and/or enzymes.