

Polydiacetylene-based chemosensor using Inkjet Printing

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Amphiphilic diacetylene has been widely investigated as a supramolecular sensor matrix due to their unique properties. Polydiacetylene (PDA) undergoes a visible color transition from blue to red due to various environmental stimuli including temperature, chemical solvent and ligand-receptor interaction. “Blue-phase” PDAs are nonfluorescent while their “red-phase” counterparts fluorescent. This property of PDAs makes these materials quite potential as label-free biosensors and chemical sensors. In order to enhance their technological applications, we used inkjet printing method that is versatile due to high speed, relatively simple process, compatibility with a wide range of substrates, and ability to deposit very small droplets. In this study, we detected α -cyclodextrin (α -CD) using PDA nanoparticles which were immobilized on various porous substrates by physical adsorption using a piezoelectric inkjet printer. Immobilized nanoparticles were reacted with CDs (α -, β -, γ -CD). We observed that PDA on substrate was selectively respond to α -CD by fluorescence emission. The results show that PDA-based chemosensor can be fabricated any shapes of pattern on various substrates easily by using inkjet printing technique.