Diagnostic Application of Bio-Hybrid Polymer Nanoparticles

안동준*, 오민규, 김종만[1]
고려대학교 화공생명공학과; [1]한양대학교 화학공학과
(ahn@korea.ac.kr*)

Nanometer-scale polydiacetylene supramolecules are interesting biomimetic materials in view of application to chemical and biological sensors. These conjugated supramolecules are unique in changing color from blue to red upon specific binding events, caused by shortening of delocalization length of π-electrons along diacetylenic backbones. Various binding events including viruses, toxins, glucose, and ionic interactions have been reported detectible. However, simultaneous screening of various binding events has not been possible with solution-phase nanosomes and solid-supported films of polydiacetylenes. In this presentation, we report on printing of the bio-hybrid nanosomes on glass by using a conventional ink-jet spotter to fabricate dot array patterns. Each dot is found to possess the color changing property as well as the fluorescence self-emission. This technique allows us, for the first time, to fabricate chemical and/or biochips based on bio-hybrid polydiacetylene nanosomes and to screen binding events simultaneously. Exemplary applications will be discussed for label-free detection of small molecules, DNAs, proteins, and cells. [Reference: J. Am. Chem. Soc. 127, 17580 (2005)]