Conjugated Nanosome Sensors and Chips

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Polydiacetylene-based conjugated supramolecules are interesting biomimetic materials in view of application to chemical and biological sensors. These supramolecules are unique in changing color from blue to red upon specific binding events, caused by shortening of effective conjugation 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 conventional solution-phase nanosomes and solid-supported films of polydiacetylenes. Recently, we were successful in immobilization of the conjugated nanosomes on solid substrates without losing their unique sensing property. In this presentation, we report on printing technology of the nanosomes to fabricate dot array patterns that show fluorescence self-emission upon recognition. This technique allows us, for the first time, to fabricate chemical and/or biochips based on polydiacetylene nanosomes and to screen binding events simultaneously. Exemplary applications will be discussed for label-free detection of chemicals and biomolecules.