

### Interfacial Design of Rapid-Sensing Conjugated Polymers

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Conjugated polymer nanoarchitectures based on polydiacetylene materials are interesting biomimetic materials in view of application to chemical and biological sensors. These conjugated materials are unique in changing color from blue to red and/or in altering fluorescence emission, caused by perturbation of materials' electronic state and energy transfer upon specific binding events. Based on these optical characteristics, we can utilize the conjugated polymers as label-free detection agents for chemical and biological targets. In this presentation, we demonstrate strategy of interfacial design of soft nanoarchitectures achieving the label-free and/or rapid detection capability. Their sensitivity and specificity were analyzed in the range of nM to sub-fM depending on the kind of target species. The printed array patterns, characters, and images were found to detect the target substances successfully out of mixture samples. In addition, a strikingly rapid detection of biological targets within ca. 10 min. was also enabled by designing 3-dimensional architectures involving columnar and/or porous interfaces showing higher surface area that enhanced the accessibility and the mass transfer rate of the target molecules.