

## Polydiacetylene Chemical Sensors Using Fluorescence Resonance Energy Transfer

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Polydiacetylene (PDA) has been widely investigated as a sensor due to unique colorimetric and fluorescent changes by external stimuli, that is, from blue to red and from non-fluorescent to red-fluorescent. However, the quantum yield of PDA alone is very low. In order to overcome this disadvantage, we employed fluorescence resonance energy transfer (FRET). In this study, we prepared a mixed vesicle by inserting BODIPY fluorescent dye (BO558) into 10,12-Pentacosadiynoic acid (PCDA) vesicles. We report that mixed vesicle sensors can selectively detect  $\alpha$ -cyclodextrin ( $\alpha$ -CD) over  $\gamma$ -cyclodextrin ( $\gamma$ -CD). The fluorescence intensity of polymerized PCDA/BO558 vesicles was significantly decreased. The intensity was increased upon reaction with  $\alpha$ -CD, while it was not almost changed upon reaction with  $\gamma$ -CD. Such fluorescent increases are believed to result from reduced energy transfer due to a conformational change of the conjugated backbone of PCDA by the inclusion complexation of  $\alpha$ -CD. When compared to colorimetric response of the PCDA vesicles, the fluorescence changes of the PCDA/BO558 vesicles using FRET were more valuable in view of detection performance.