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Anionic surfactant detection using polydiacetylene-based nanocomposites

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Polydiacetylenes (PDAs) are color-responsive polymers to various stimuli. The development of PDAs as anionic surfactant sensors by structural modification involved complicated and costly processes. In this study, we introduce a facile approach for preparing polydiacetylene/zinc (II) ion/zinc oxide (PDA/Zn2+/ZnO) nanocomposites utilized for anionic surfactant detection. Cationic surfactant, cetyltrimethylammonium bromide (CTAB) is incorporated into the nanocomposites via a simple mixing process to adjust their color transition behaviors. Addition of CTAB at 1 mM induces the blue-to-yellow color transition of the nanocomposites. Interestingly, the nanocomposites exhibit yellow-to-red color transition in response to sodium dodecyl sulfate (SDS). This demonstrates the ability of the nanocomposites as anionic surfactant sensors. A key mechanism of the color transition is the interaction between CTAB and SDS, which induces perturbation in the outer layers of the nanocomposites.

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