

Polydiacetylene/Zinc oxide nanocomposites for colorimetric sensing applications

Nisanart Traiphol*

*^aLaboratory of Advanced Chromic Materials, Department of Materials Science,
Faculty of Science, Chulalongkorn University, Bangkok 10330, Thailand*

*Nisanart.t@Chula.ac.th

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Polydiacetylene (PDA) assemblies are known to exhibit color transition upon exposure to various external stimuli, rendering them to be utilized in many sensing technologies. Our research group introduces a new method for controlling color-transition behaviors of PDA assemblies, which is much simpler and lower cost compared to structural modification routes. By self-assembling of PDA onto zinc oxide (ZnO) nanoparticles, PDA/ZnO nanocomposite can be simply prepared. Strong interfacial interactions in the nanocomposite result in reversible thermochromism, dual colorimetric response to acids or bases and high color stability in organic solvents. Color-transition temperatures of the PDA/ZnO nanocomposites can be systematically controlled by varying alkyl chain length of the constituent PDAs, photopolymerization time, types of solvent and addition of surfactants. In addition to suspensions, the PDA/ZnO nanocomposites can also be fabricated into paper-based and polymeric films. This can be conveniently utilized for sensing temperature, acids/bases and other chemicals in various kinds of media including aqueous, organic solvents, food and cosmetics.