A Colorimetric Hydrocarbon Sensor Based on Polydiacetylene(PDA)/Polydimethylsiloxane(PDMS) Composite

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Exceptional challenges have confronted the rational design of colorimetric sensors for saturated aliphatic hydrocarbons (SAHCs). The main reasons for this difficulty are the extremely nonpolar nature of targets and lack of functional groups that can interact with probes. By taking advantage of a mechanochromic conjugated polydiacetylene (PDA)[1-3] and the hydrocarbon induced swelling properties of polydimethylsiloxane (PDMS)[4], we have fabricated a sensor film. The unprecedented PDA-PDMS composite sensor undergoes a blue-to-red colorimetric transition in time regimes that are dependent on the chain length of the hydrocarbon. In addition, the development of the red color is directly proportional to the swelling ratio of the film. This straightforward approach enables naked eye differentiation between n-pentane and n-heptane. The versatility of the sensor system was demonstrated by using it for the colorimetric determination of kerosene in adulterated diesel oil.