Supplementary Material (ESI) for Chemical Communications

Electronic Supplementary Information

Experimental Section

Materials and Reagents: 4,4'-Bis(2-benzoxazolyl)stilbene, platinum octaethylporphyrin, styrene and methacrylic acid were purchased from Sigma-Aldrich (www.sigmaaldrich.com); polyvinylpyrrolidone K-30 was obtained from Sinopharm Chemical Reagent Co. Ltd, Shanghai, China; α,α′-Azoisobutyronitrile (Sinopharm Chemical Reagent Co. Ltd, Shanghai, China) was recrystallized from ethanol and stored in the dark; and polyurethane hydrogel (type D4) was bought from Cardiotech Intl. Inc., Wilmington, USA (www.advbiomaterials.com).

Preparation of oxygen sensitive polystyrene microparticles: Oxygen sensitive polystyrene microparticles were prepared following the disperse polymerization method[1]. Typically, PtOEP (6.0 mg), 4,4′-Bis(2-benzoxazolyl)stilbene (8.0 mg) and *α,α′*-Azoisobutyronitrile (62.5 mg) were dissolved in styrene (7.0 mL) and methacrylic acid (60 μL); the solution was quickly mixed with ethanol (25 mL) containing dissolved polyvinylpyrrolidone K-30 (0.188g). The mixture was then kept in the dark after purging with nitrogen for 30min to remove any oxygen. Polymerization was conducted for 24 h at 70 ^{o}C. After cooling to room temperature, the resulting particles were centrifuged and then washed with ethanol three times to remove any by-products. The final oxygen sensitive polystyrene microparticles were dispersed in ethanol (30 mL).

Chameleon cloth preparation: Polystyrene microparticles in ethanol (0.5 mL) were mixed with 5 % (w/w) polyurethane hydrogel (0.5 mL) in ethanol/water (90/10, v/v),

coated on a cotton thread which was then embroidered into a piece of cotton cloth without any fluorescent brightener. The cloth was dried at room temperature to obtain the chameleon cloth.

Characterization of the prepared oxygen sensitive chameleon cloth: Fluorescence profiles were obtained from a Hitachi F-4500 fluorometer (Hitachi Co. Ltd., Japan). An ultra bright 365 nm UV-LED (Nichia Corporation, Japan) was used to excite the chameleon cloth. A Nikon D300 CMOS digital camera (Nikon Co. Ltd., Japan) was used for recording color images. Microscopic images were obtained from Hitachi S-4800 Scanning electron microscopy (Hitachi Co. Ltd., Japan).

References:

1 Zhang, Z.L., Long, Y., Pan, J.B., Yan, X.M., 2010. *J Mater Chem* 20(6), 1179-1185.

Supporting Figures:

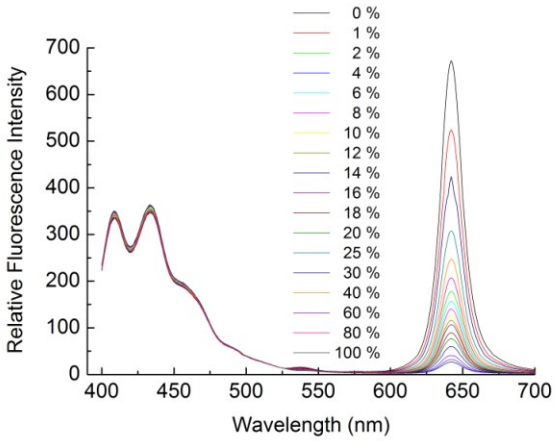


Figure S1. Fluorescence spectra of the oxygen sensitive chameleon cloth at different oxygen concentrations (λ_{exc}=365 nm)

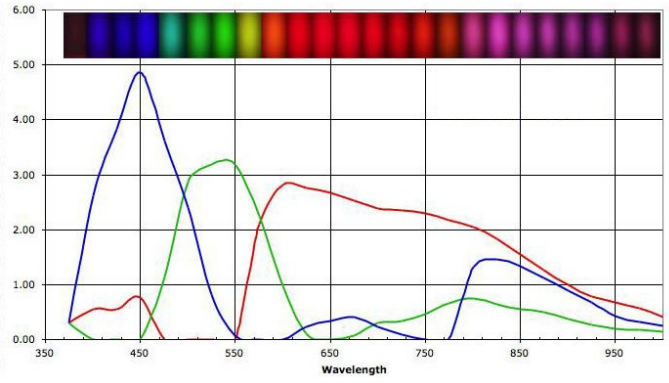


Figure S2. Spectral response of the CMOS chip showing the sensitivities of the red, green and blue (RGB) channels.

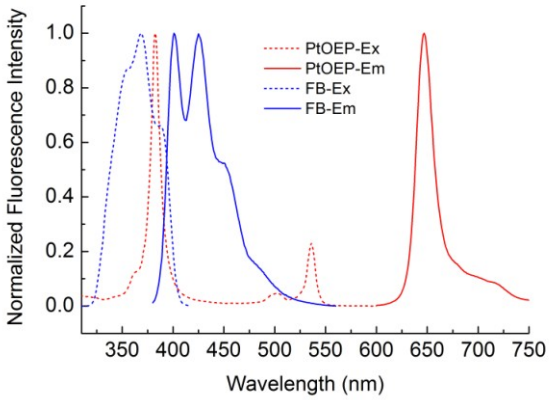


Figure S3. Fluorescence Spectra of the stilbene dye (FB) and PtOEP (λ_{exc}=365 nm for emission spectra)

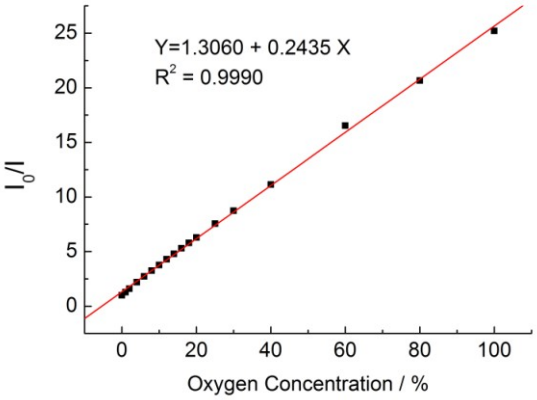


Figure S4. Linear relationship between I_0/I and oxygen concentration (measured at λ_{em}=642 nm)

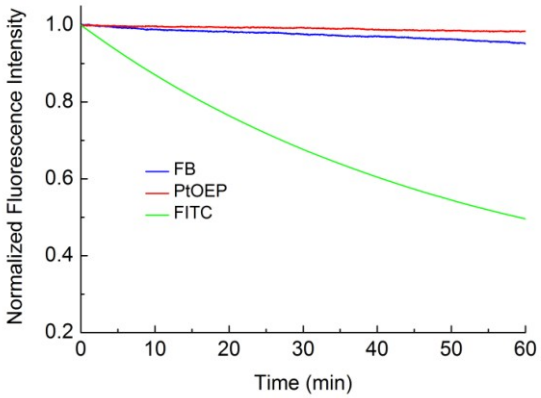


Figure S5. Photostabilities of the stilbene dye (FB) and PtOEP dye compared with fluorescein isothiocyanate (FITC) in diluted solutions.

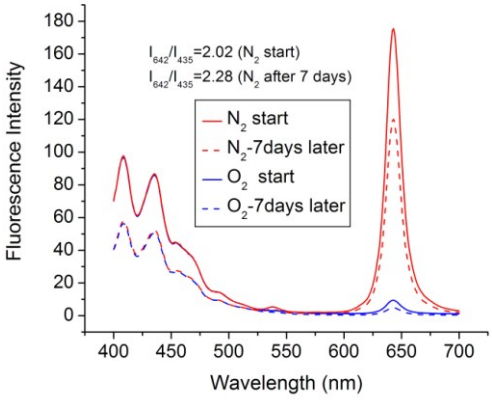


Figure S6. Photostability of the chameleon cloth before and after continuous exposed under sunshine for 7 days.

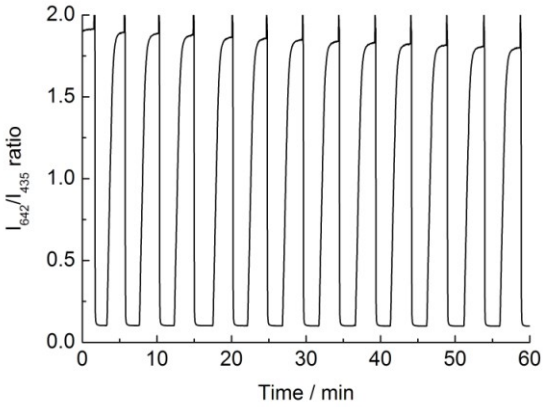


Figure S7. Reversibility and response time of the chameleon cloth

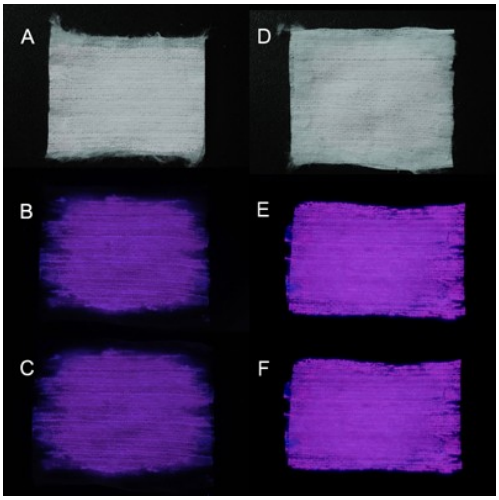
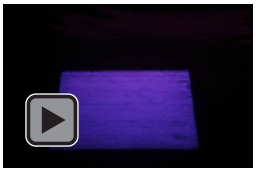


Figure S8. Physical stability of the label. A) real picture of the labeled cloth before immersing in water; B) real picture under UV lamp of the label before immersing in water; C) real picture under UV lamp of the label after immersing in water for 24h; D) real picture of the labeled cloth before washing using detergent; E) real picture under UV lamp of the label before washing using detergent; F) real picture under UV lamp of the label after washing using detergent.

Supporting Video



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