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Supporting Information

Amine-responsive bilayer films with improved illumination stability and electrochemical writing ability for visual monitoring of meat spoilage

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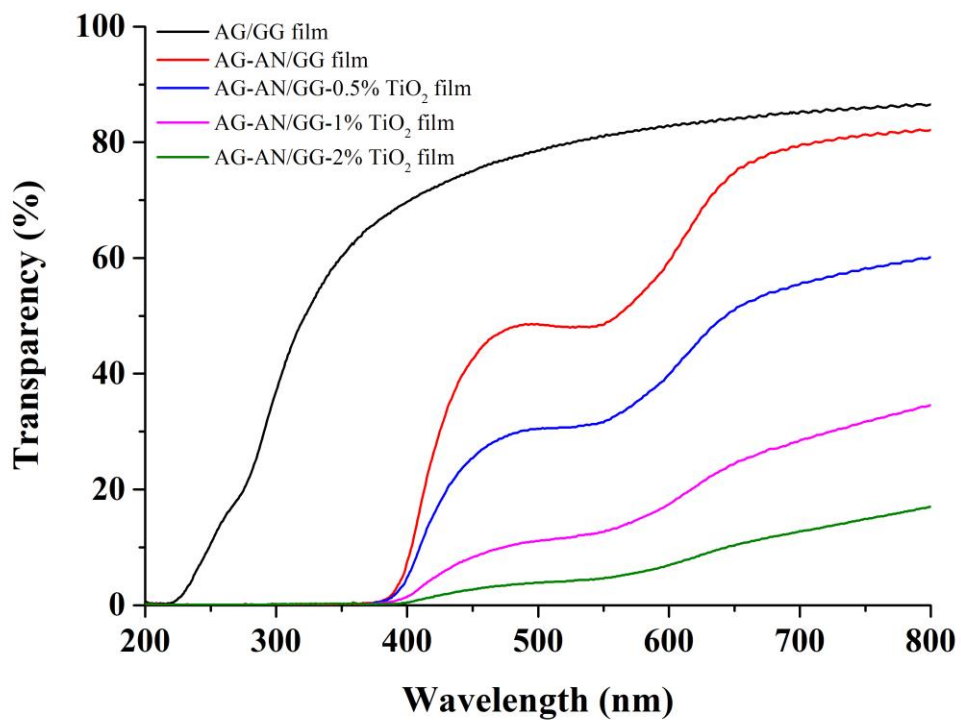


Fig. S1. Transparencies of the films in the UV-Vis spectrum range. The transparency of the colorimetric films decreased with the increase of TiO₂ content in the visible ranges (~ 400-800 nm), indicating the barrier ability of TiO₂ nanoparticles towards visible light through physical reflection.

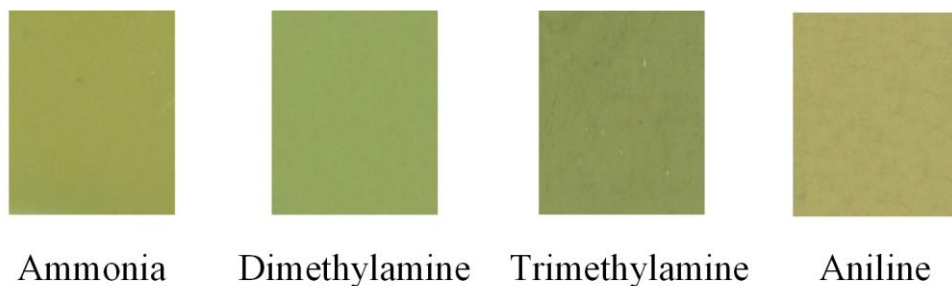


Fig. S2. The images of the AG-AN/GG-2%TiO₂ film after being exposed to ammonia, dimethylamine, trimethylamine and aniline. The test condition was 25 °C and 75% relative humidity.

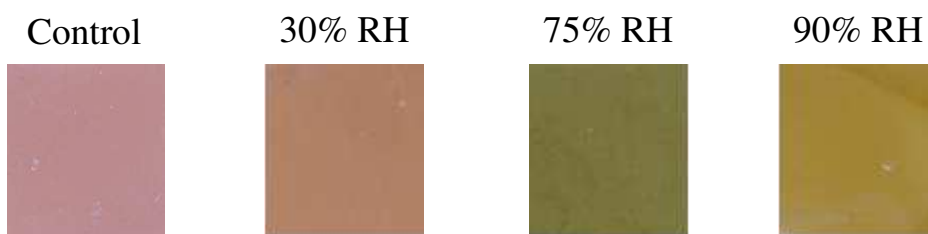


Fig. S3. The images of the AG-AN/GG-2%TiO₂ film (Control), and after being exposed to 0.255 mM trimethylamine under different relative humidity (RH). The test temperature was 25 °C.

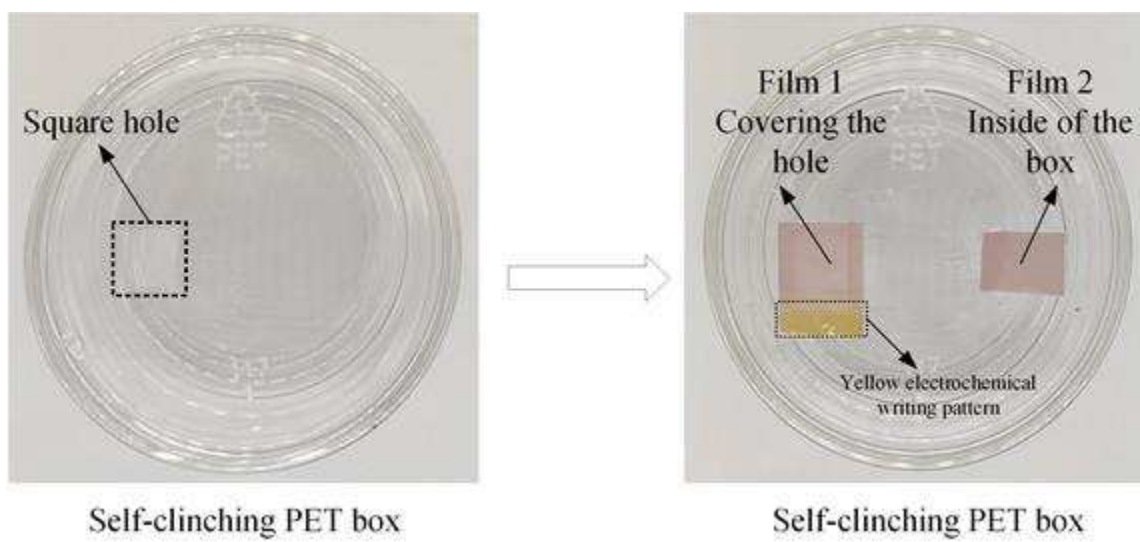


Fig. S4. The packaging box with colorimetric films for meat spoilage indicating. Film 1: the AG-AN/GG-2%TiO₂ film with an electrochemical writing pattern (yellow color); Film 2: the AG-AN/GG-2%TiO₂ film without electrochemical writing pattern.

Table S1. Cost of materials needed to fabricate the AG-AN/GG-2%TiO₂ film (diameter 53 mm)

Chemicals	Concentration	Volume	Price*	Price per 1000 units
Agar	20 g/L	6 mL	\$ 0.068/g	\$ 8.16
Gellan gum	20 g/L	6 mL	\$ 0.033/g	\$ 3.96
TiO ₂	0.4 g/L	6 mL	\$ 0.097/g	\$ 0.24
CaCl ₂ ·2H ₂ O	0.4 g/L	6 mL	\$ 0.008/g	\$ 0.02
Anthocyanins	80 mg/L	6 mL	\$ 9.942/g**	\$ 4.77
Total	-	-	-	\$ 17.15

*Prices of standard chemicals in the list are from Sinopharm Chemical Reagent Co., Ltd (Shanghai, China)

** Price of anthocyanins was calculated according to the mass of anthocyanins extracted from dried rose.