Article:
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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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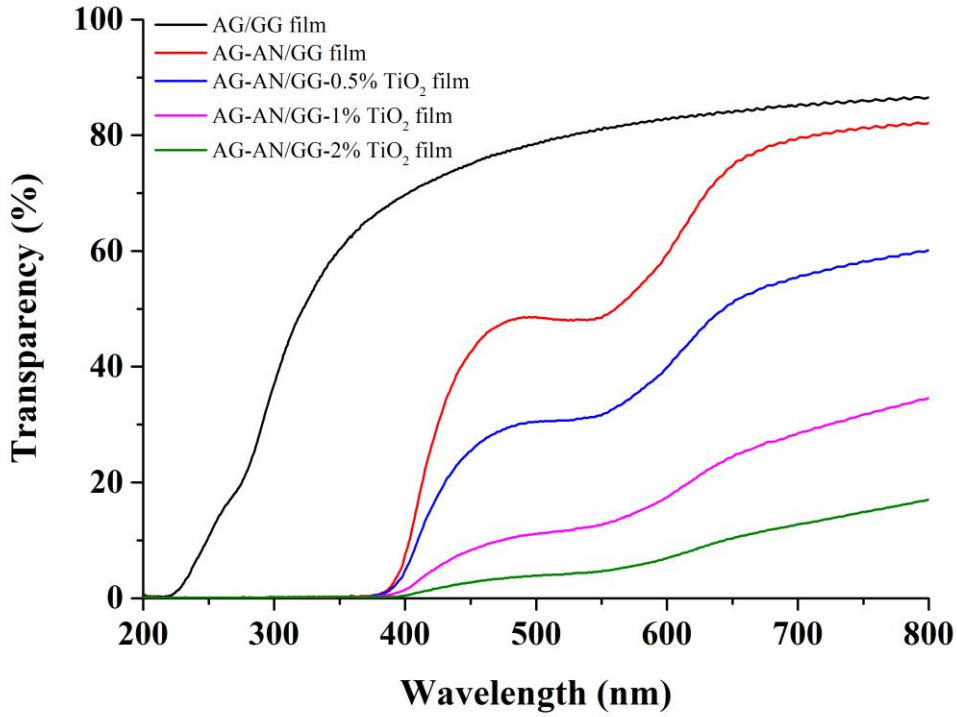

Fig. S1. Transparencies of the films in the UV-Vis spectrum range. The transparency of the colorimetric films decreased with the increase of TiO_2 content in the visible ranges (~ 400-800 nm), indicating the barrier ability of TiO_2 nanoparticles towards visible light through physical reflection.

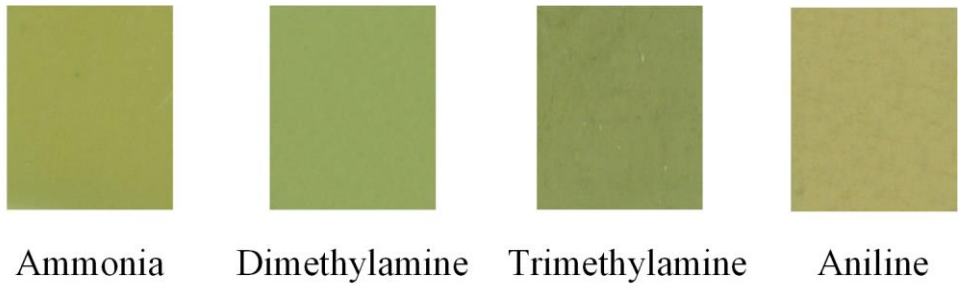

Fig. S2. The images of the AG-AN/GG-2%TiO_2 film after being exposed to ammonia, dimethylamine, trimethylamine and aniline. The test condition was 25 ℃and 75% relative humidity.

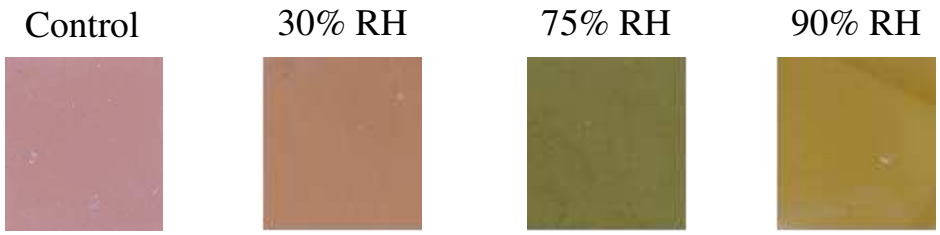

Fig. S3. The images of the AG-AN/GG-2%TiO_2 film (Control), and after being exposed to 0.255 mM trimethylamine under different relative humidity (RH). The test temperature was 25 ℃.

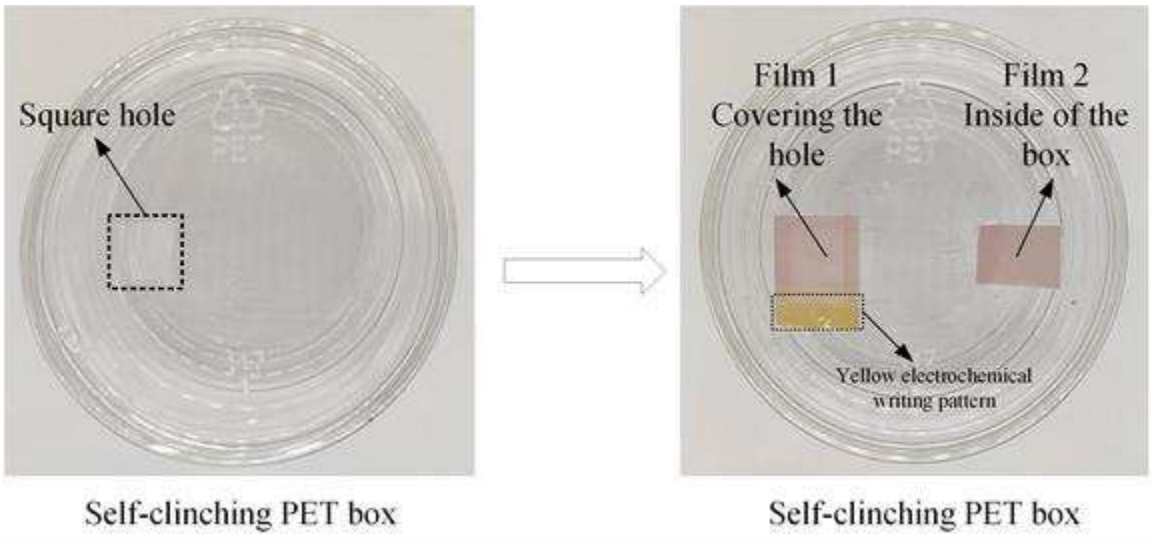

Fig. S4. The packaging box with colorimetric films for meat spoilage indicating. Film 1: the AG-AN/GG-2%TiO_2 film with an electrochemical writing pattern (yellow color); Film 2: the AG-AN/GG-2%TiO_2 film without electrochemical writing pattern.

Table S1. Cost of materials needed to fabricate the AG-AN/GG-2%TiO_2 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
$CaCl_2 \cdot 2H_2O$	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.