Supplemental information

for

Cholesterol modified OPE functionalized film: fabrication, fluorescence behaviors and sensing performances

Hongyue Wang, Gang He, Xiangli Chen, Taihong Liu, Liping Ding, Yu Fang*

Key Laboratory of Applied Surface and Colloid Chemistry (Ministry of Education), School of Chemistry and Chemical Engineering, Shaanxi Normal University, Xi'an 710062, P. R. China

Figure S1. Plots of the ratios of I_{451}/I_{514} of Film 3 against the compositions of the mixture solvents (ethanol / THF, ethanol is a poor solvent for Film 3) at which the fluorescence measurements were conducted.

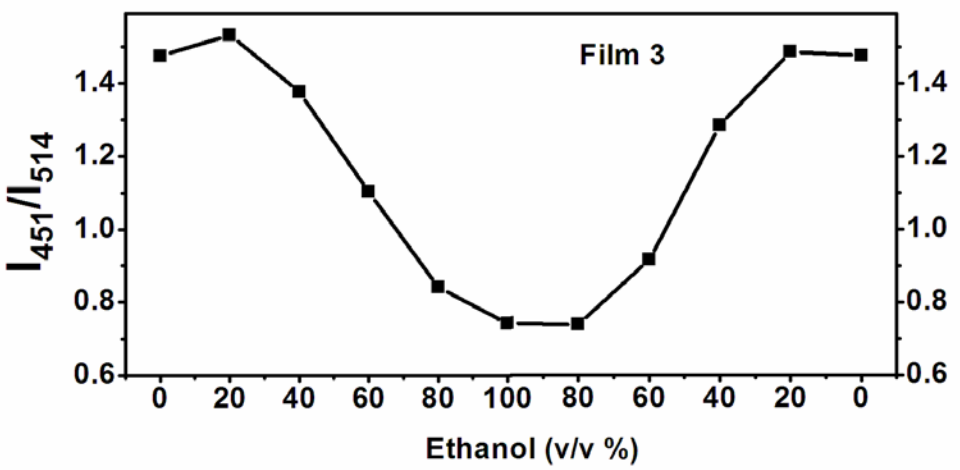
Figure S2. Fluorescence emission spectra of Film 1 in the presence of different concentrations of TNT in an aqueous medium (from top to bottom, 0, 2, 4, 6, 8, 10, 20, 30, 40 and 50 μM; λ_{ex}=370 nm).

Figure S3. ATR-IR spectra of Film 1(a) and Film 2 (b), for each film, one of the spectra is from a virgin film and the other is from the one treated with PA.

Figure S4. Result from fluorescence quenching studies of PA to the emission of Film 1 in aqueous medium, and the results from same experiment but with presence of NaCl (2.5 mM) or NaOH (2.5 mM).

Details for the calculation of the standard deviation of the percent of amino groups reacted.

* Corresponding author. E-mail: yfang@snnu.edu.cn. Tel: 0086-29-85300081. Fax: 0086-29-85310097



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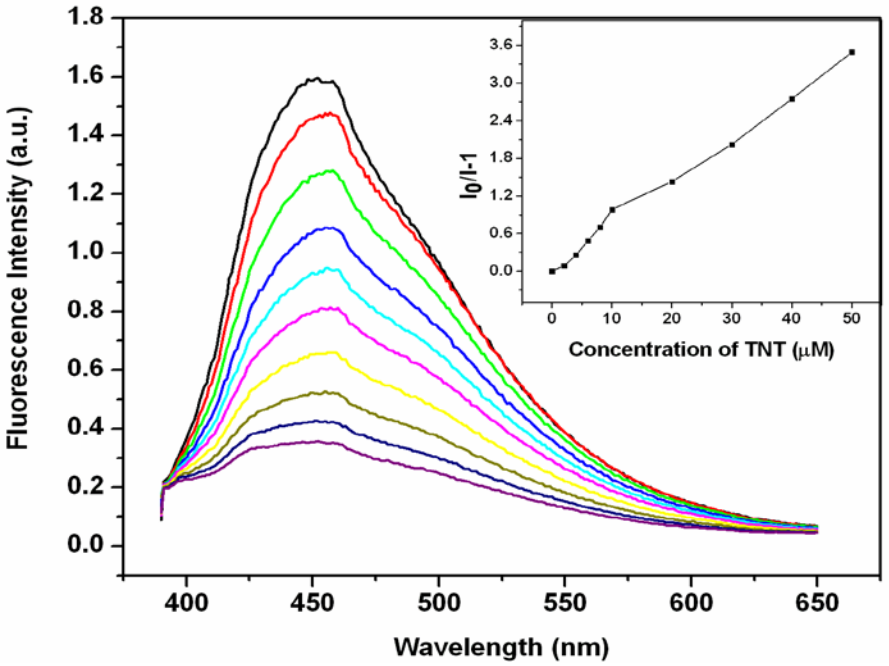

Figure S2. Fluorescence emission spectra of Film 1 in the presence of different concentrations of TNT in an aqueous medium (from top to bottom, 0, 2, 4, 6, 8, 10, 20, 30, 40 and 50 μM; λ_{ex} = 370 nm).

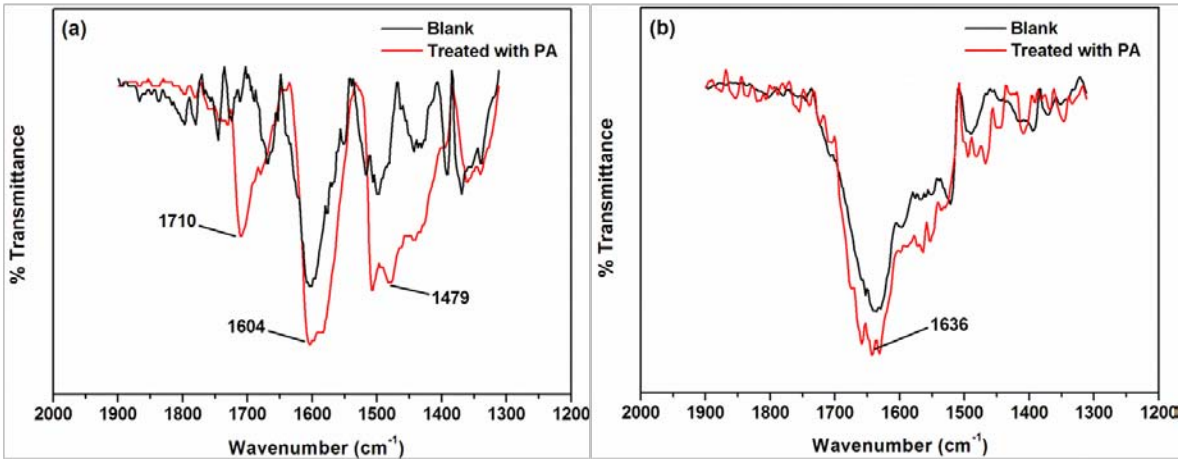

Figure S3. ATR-IR spectra of Film 1(a) and Film 2 (b), for each film, one of the spectra is from a virgin film and the other is from the one treated with PA.

The ATR-IR spectra of Film 1 and Film 2 in virgin state were collected from 4000 cm^{-1} to 600 cm^{-1}. Then, the films were immersed in aqueous solution of PA (20 µM) for 6 hours, and then washed with water for several times. Finally, the films were dried under a gentle stream of nitrogen. The ATR-IR spectra of the PA treated films were collected in the same way as described for the virgin films. The results are shown in Figure S3. With reference to the traces shown in the figures, it is clearly seen that compared to the trace of the virgin film, Film 1, new signals appeared in the trace of the corresponding PA treated film, in particular, 1710 cm^{-1} and 1479 cm^{-1} (c.f. Figure 3a). But for the control film, Film 2, there is no significant difference between the trace of the virgin film and the one of its corresponding PA treated film (c.f. Figure 3b). This result can be taken as direct evidence to support the model proposed to explain why the cholesterol modified OPE functionalized film has a specific affinity to the analyte, PA.

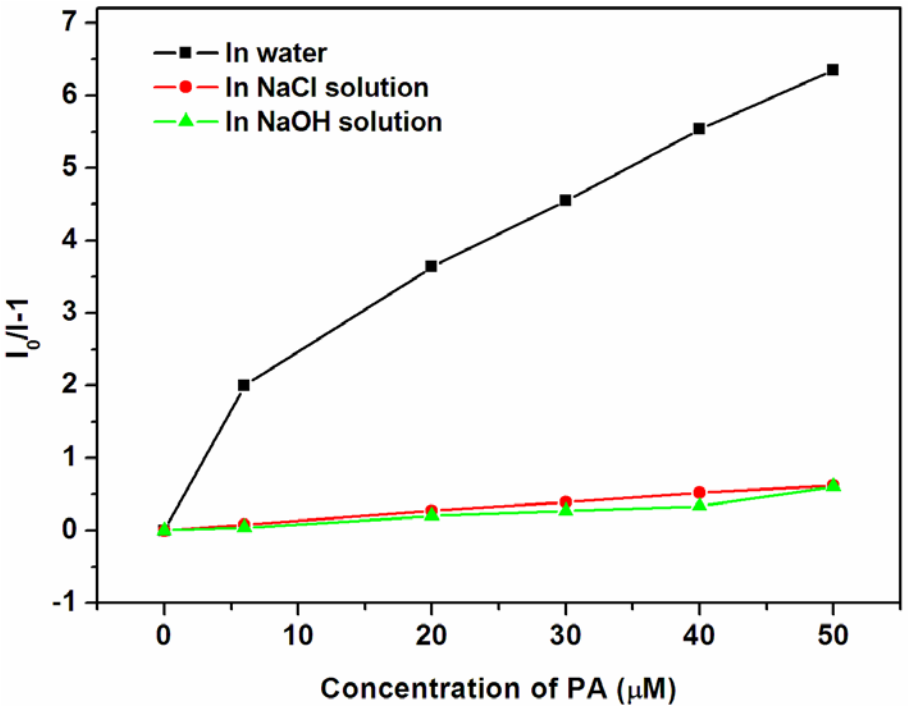

Figure S4. Result from fluorescence quenching studies of PA to the emission of Film 1 in aqueous medium, and the results from same experiment but with presence of NaCl (2.5 mM) or NaOH (2.5 mM).

The calculation of the standard deviation of the percent of amino groups reacted according to the following functions:

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}\left(x_i - \bar{x}\right)^2} \qquad (1)$$

The standard deviation (*S*) was calculated by measuring the percent of amino groups reacted by XPS for more than 3 times and then got the average percent ($\bar{x}$). By fitting the data into Function 1, the value of standard deviation (*S*) was obtained.