

supporting information

**Fluorescence enhancement of Fisetin by silver nanoparticles with cetyltrimethyl ammonium bromide micelles**

Xiaodan Liu, Xia Wu\*

*Key Laboratory of Colloid and Interface Chemistry (Shandong University), Ministry of Education, School of Chemistry and Chemical Engineering, Shandong University, Jinan 250100, P. R. China*

\*Corresponding author, Tel.: +86 53188365459; Fax: +86 53188564464; e-mail address: [wux@sdu.edu.cn](mailto:wux@sdu.edu.cn) (X. Wu)

### Effect of pH and choice of buffer solution

The pH effect on the fluorescence intensity of the system was tested (Fig. S1). The fluorescence intensity of Fisetin-CTAB decreases with an increase of pH from 4.4 to 5.6, in contrast, that of AgNPs-CTAB-Fisetin is increased. The maximum enhanced fluorescence is obtained at pH 5.2. The effect of different buffers on the fluorescence intensity of the system is also monitored at pH (5.2 ± 0.05). The change of fluorescence intensity (%) of the system with and without AgNPs for formic acid-NaOH, Britton-Robinson, Tris-HCl, HMTA-HCl and NaAc-HAc is 100, 84.3, 75.5, 72.7 and 57.2, respectively. So, formic-NaOH is chosen for the following experiments.

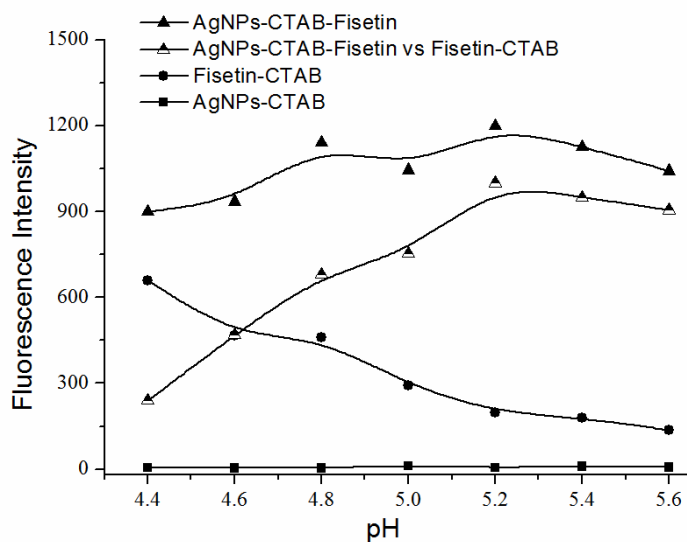


Fig. S1 Effect of pH

Conditions:  $C_{\text{Fisetin}} : 5.0 \times 10^{-6} \text{ mol L}^{-1}$ ,  $C_{\text{CTAB}} : 5.0 \times 10^{-4} \text{ mol L}^{-1}$ ,  $C_{\text{AgNPs}} : 4.0 \times 10^{-6} \text{ mol L}^{-1}$ , Formic-NaOH:  $2.0 \times 10^{-2} \text{ mol L}^{-1}$  (pH=5.2)

### Effect of the concentration of AgNPs

AgNPs concentrations have an positive effect on fluorescence response (Fig. S2). The fluorescence intensity of the system first rapidly increases with the increase of AgNPs concentrations and reaches maximum at  $4.0 \times 10^{-6} \text{ mol L}^{-1}$ , and then slightly decreases. Therefore, AgNPs concentration of  $4.0 \times 10^{-6} \text{ mol L}^{-1}$  is chosen for further research.

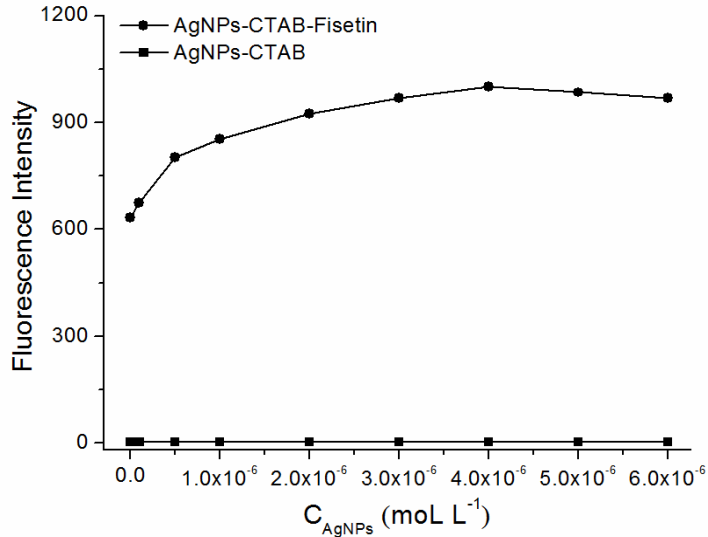


Fig. S2 Effect of the concentration of AgNPs

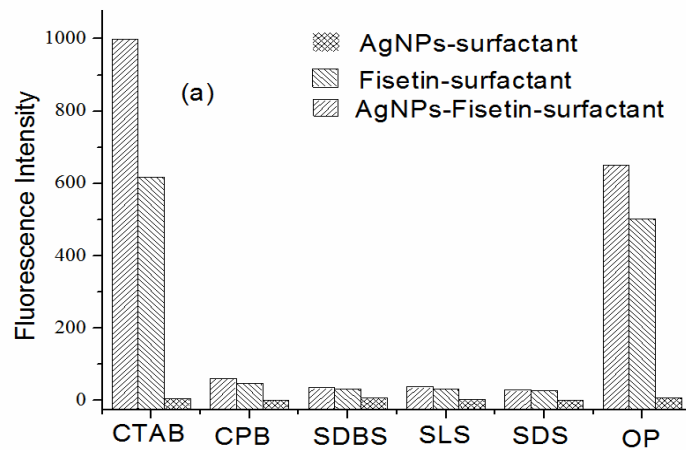
Conditions:  $C_{\text{Fisetin}} : 5.0 \times 10^{-6} \text{ mol L}^{-1}$ ,  $C_{\text{CTAB}} : 5.0 \times 10^{-4} \text{ mol L}^{-1}$ , Formic-NaOH:  $2.0 \times 10^{-2} \text{ mol L}^{-1}$  (pH=5.2)

#### Effect of surfactants

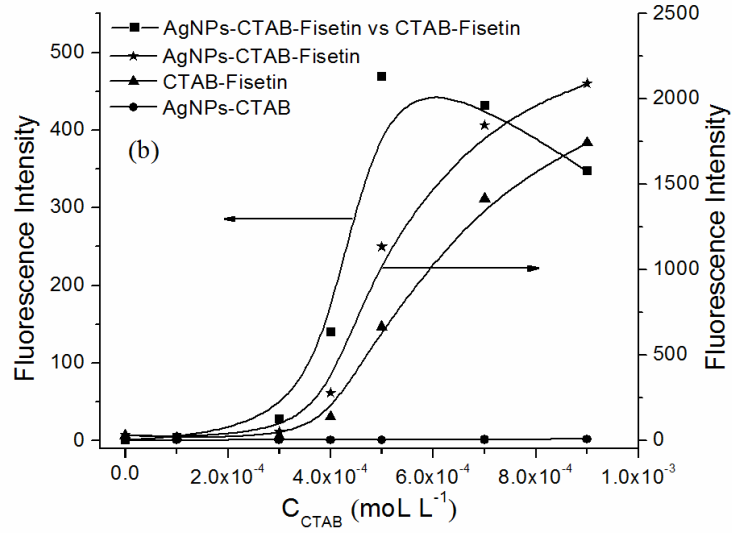
Fixing surfactants concentration at  $5.0 \times 10^{-4} \text{ mol L}^{-1}$ , a comparison of the effect of various surfactants on fluorescence intensity is tested (Fig. S3a). The change of fluorescence intensity (%) of the system with and without AgNPs for CTAB, octyl phenoxy poly ethoxy (OP), cetylpyridinium bromide (CPB), sodium dodecyl benzene sulfonate (SDBS), sodium lauryl sulfonate (SLS), and sodium dodecyl sulfonate (SDS) is 100, 82, 14, 3, 10 and 5, respectively. Compared to the other surfactants at the same concentration ( $5.0 \times 10^{-4} \text{ mol L}^{-1}$ ), CTAB gives the strongest synergistic fluorescence enhancement effect with AgNPs for Fisetin. So CTAB is chosen as a sensitizer.

Fig. S3b shows a plot of fluorescence intensity versus CTAB concentrations. With the increase of the concentration of CTAB, the fluorescence intensities of Fisetin-CTAB and Fisetin-CTAB-AgNPs both increase, while the fluorescence intensity of AgNPs-CTAB was almost unchanged. And the amplification of fluorescence signal of Fisetin-CTAB-AgNPs is more obvious. When the concentration of CTAB is  $5.0 \times 10^{-4} \text{ mol L}^{-1}$ , the synergistic fluorescence enhancement effect of CTAB and AgNPs is the strongest.

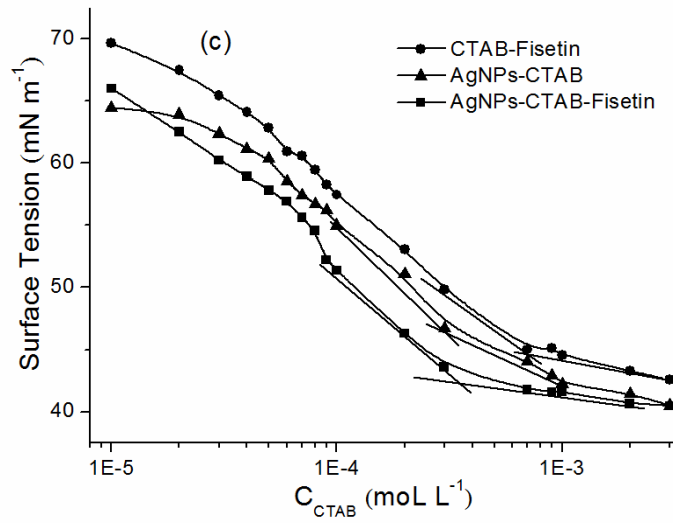
A surface tension concentration curve of CTAB is shown in Fig. S3c. The critical micelle concentration (CMC) value was estimated from the intersection of the extrapolated linear portions of the plot of surface tension versus logarithm of CTAB concentration, the critical micelle concentrations (CMC) of CTAB in the systems of Fisetin-CTAB, AgNPs-CTAB and AgNPs-CTAB-Fisetin are  $7.0 \times 10^{-4} \text{ mol L}^{-1}$ ,  $3.1 \times 10^{-4} \text{ mol L}^{-1}$  and  $3.3 \times 10^{-4} \text{ mol L}^{-1}$ , respectively.



(a) Effect of various surfactants



(b) Effect of the concentration of CTAB



(b) Surface tension curve of the system

Fig. S3 Effect of surfactants

Conditions:  $C_{\text{Fisetin}}: 5.0 \times 10^{-6} \text{ mol L}^{-1}$ ,  $C_{\text{AgNPs}}: 4.0 \times 10^{-6} \text{ mol L}^{-1}$ ,  $C_{\text{surfactants}}: 5.0 \times 10^{-4} \text{ mol L}^{-1}$ , Formic-NaOH:  $2.0 \times 10^{-2} \text{ mol L}^{-1}$  (pH=5.2)

## Dynamic light scattering

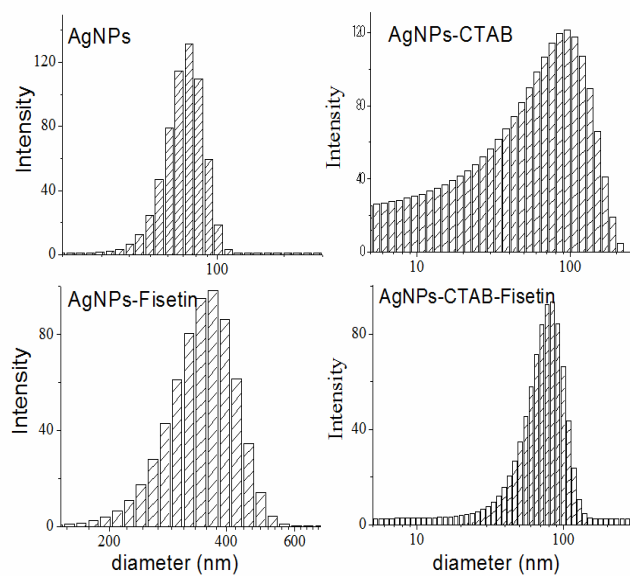


Fig.S4 Dynamic light scattering of the system

Conditions:  $C_{\text{Fisetin}}: 5.0 \times 10^{-5} \text{ mol L}^{-1}$ ,  $C_{\text{AgNPs}}: 4.0 \times 10^{-5} \text{ mol L}^{-1}$ ,  $C_{\text{CTAB}}: 5.0 \times 10^{-4} \text{ mol L}^{-1}$ , Formic-NaOH:  $2.0 \times 10^{-2} \text{ mol L}^{-1}$  (pH=5.2)