Electronic Supplementary Material (ESI) for RSC Advances.

Synthesis and anisotropic self-assembly of Ag nanoparticles immobilized by Pluronic F127 triblock copolymer for colorimetric detection of H_2O_2†

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1. Experimental

F127 micelles, Ag@DA system and Ag@$NaBH_4$@F127 system are prepared as the contrast.

Preparation of F127 micelles

In a typical synthesis, 10mg of F127 was added to 10mL ultrapure water and dissolved with continuous magnetic stirring at 60° C for 12 h, the resultant F127 solution was incubated at 60° C for 24 h without agitation. The obtained colourless transparent solution was cooled at room temperature just after the reaction.

Preparation of Ag@DA system

200μL dopamine hydrochloride (4.42 mmol L^{-1}) and 100μL sodium hydroxide (0.1 mol L^{-1}) were sequentially added to 10mL ultrapure water in order to form a reducing environment. After 20 min, $AgNO_3$ (8 mmol L^{-1}) was added dropwise to the above solution with stirring slowly. Immediately, the solution color turned from colorless to yellow, suggesting the formation of Ag@DA system.

Preparation of Ag@$NaBH_4$@F127 system

200μL $NaBH_4$ (10 mmol L^{-1}) was added to 10mL prepared F127 micelles in order to form a reducing environment. $AgNO_3$ (8 mmol L^{-1}) was added dropwise to the above solution with vigorous stirring. Immediately, the solution color turned from colorless to yellow, suggesting the formation of Ag@$NaBH_4$@F127 system.

2. Results

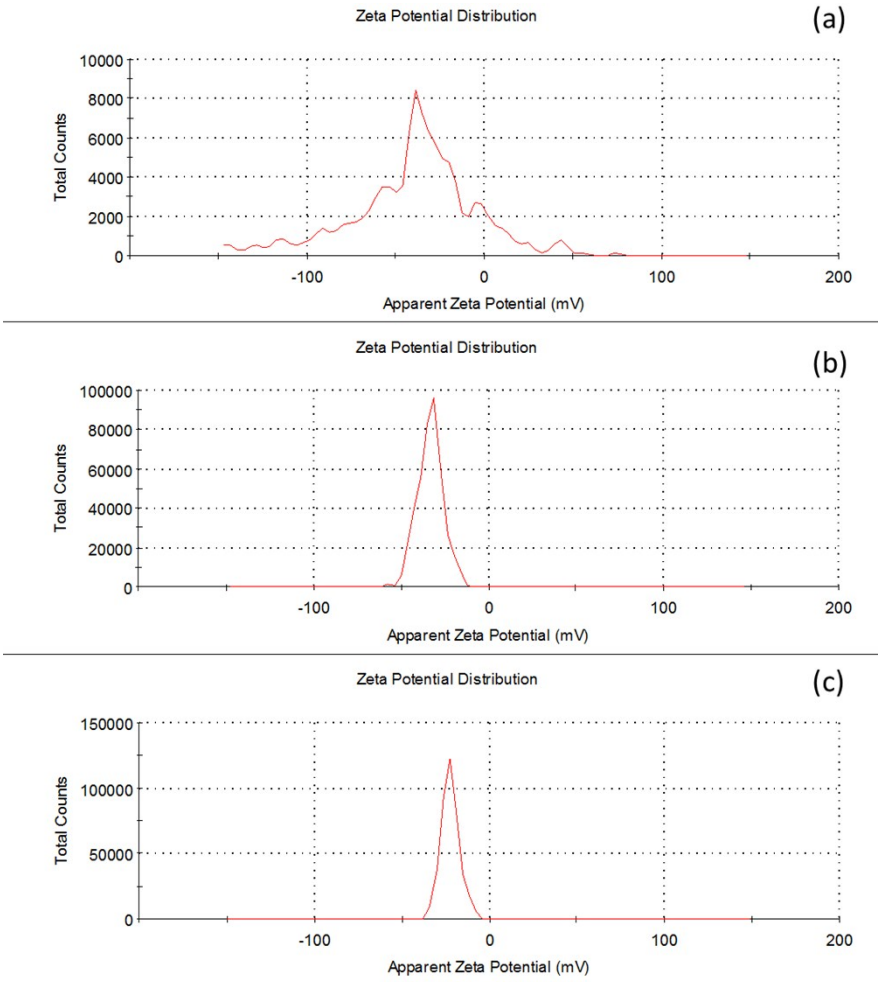

Fig. S1 Zeta potential of (a) Ag@DA system; (b) F127 micelles and (c) Ag@DA@F127 system.

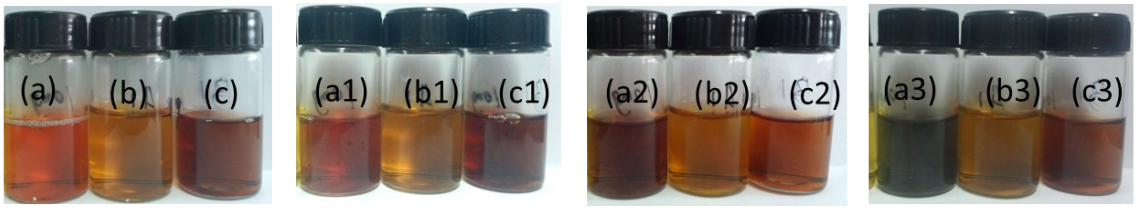

Fig. S2 Photographs of fresh (a) Ag@$NaBH_4$@F127; (b) Ag@DA and (c) Ag@DA@F127 aqueous solutions. (a1); (b1) and (c1) are the corresponding solutions stand for 1 h. (a2); (b2) and (c2) are the corresponding solutions stand for 12 h. (a3); (b3) and (c3) are the corresponding solutions stand for 24 h.

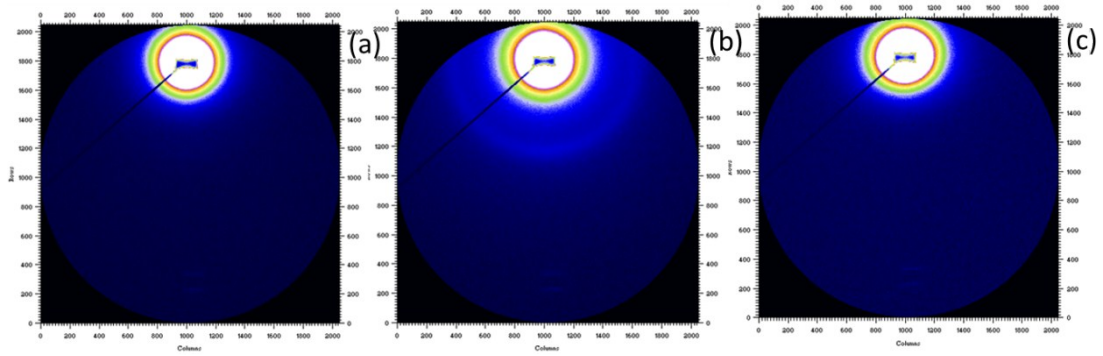

Fig. S3 2D SAXS patterns of (a) Ag@DA system; (b) and (c) Ag@DA@F127 system.

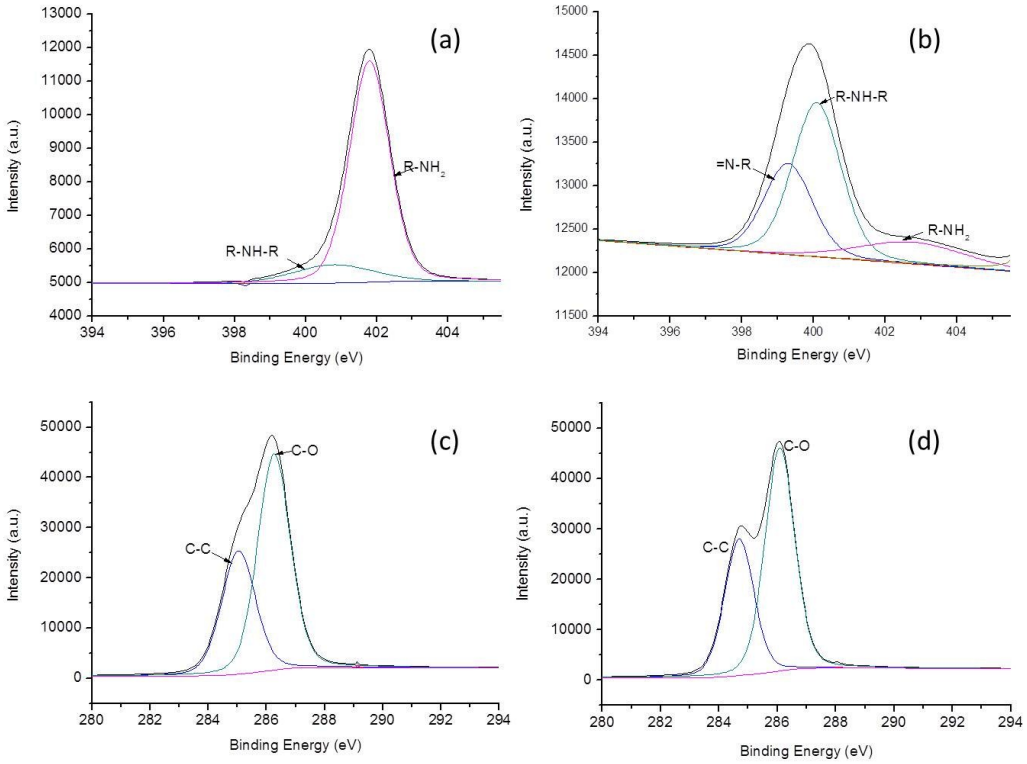

Fig. S4 N1s XPS spectra of (a) pure DA (b) Ag@DA system (65/35 wt. %); C1s XPS spectra of (c) F127 micelles and (d) Ag@DA@F127 system (2.6/1.4/96 wt. %).

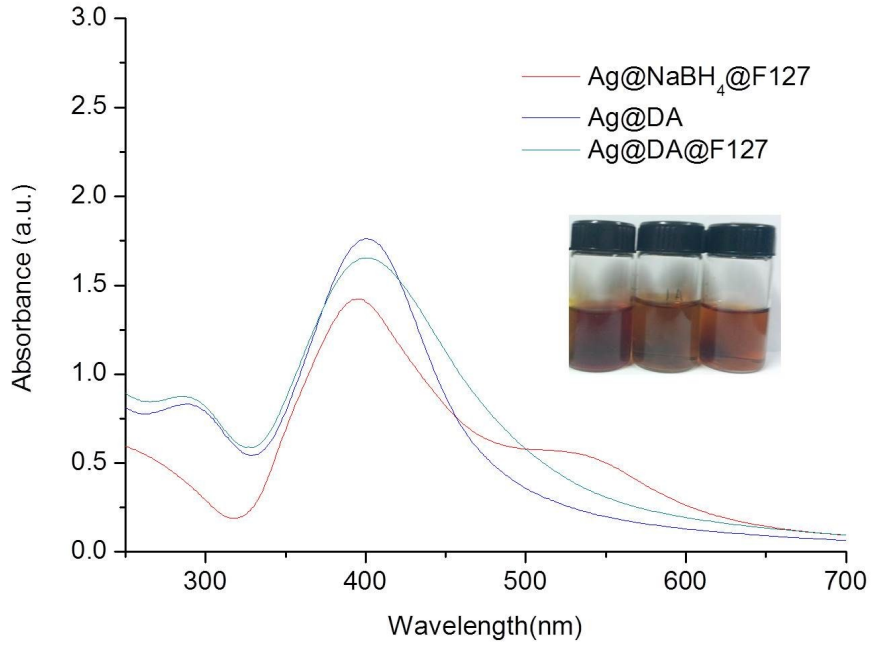

Fig. S5 UV-vis absorption spectra of fresh Ag@$NaHB_4$, Ag@$NaHB_4$@F127, Ag@DA and Ag@DA@F127 aqueous solutions; Inset: photographs of Ag@$NaHB_4$@F127, Ag@DA and Ag@DA@F127 aqueous solutions (from left to right).

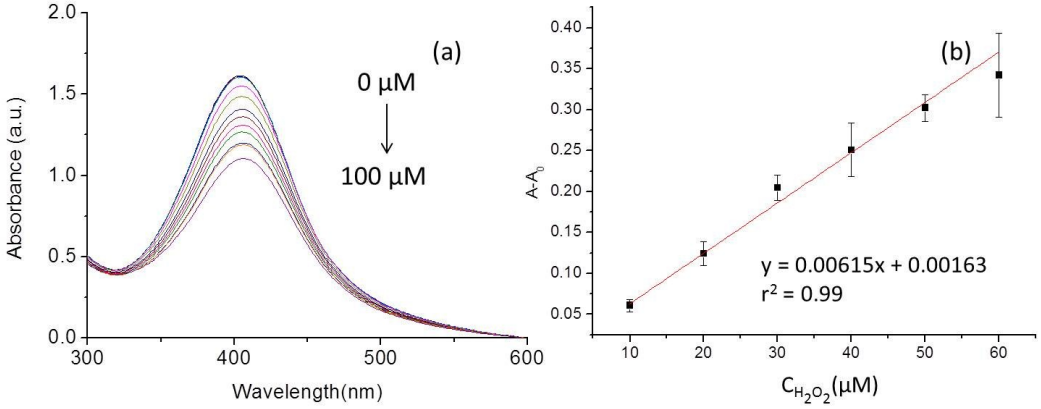

Fig. S6 (a) UV−vis absorption spectra of Ag@DA system in the presence of 0, 0.1, 1.0, 5, 10, 20, 30, 40, 50, 60, 70, 80, and 100 μM H_2O_2; (b) plot of absorbance decrease versus H_2O_2 concentration (10~60 μM).