

Electronic Supplementary Information (ESI) for
**Reduction of 4-nitrophenol catalyzed by silver nanoparticles
supported on polymer micelles and vesicles**

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Experimental Section

Materials

Sodium borohydride (NaBH_4 , 96%) were purchased from Sinopharm Chemical Reagent, CO., Ltd. Silver nitrate (AgNO_3 , AR), 4-nitrophenol (4-NP, AR) and other reagents were purchased from Aladdin Chemistry, Co.

Characterization

TEM images were obtained using a JEM-2100 electron microscope operating at an acceleration voltage of 200 kV. To prepare TEM samples, 10 μL of diluted aqueous vesicle solution at 1.0 mg mL^{-1} was placed on a carbon-coated copper grid. 1.0% of phosphotungstic acid (PTA) was used as stain. The water droplet was removed by evaporation under ambient conditions.

The UV–vis absorption spectra of aqueous polymer solution and silver nanoparticles were acquired using a UV-759S spectra (UV-759S, Q/YXL270, Shanghai Precision & Scientific Instrument Co., Ltd) to monitor the UV absorption changing of the solution.

Preparation of Ag@vesicle-2

The aqueous $\text{PEO}_{43}\text{-}b\text{-P}(t\text{AA}_{56}\text{-stat-AA}_9)$ vesicle solution (1.0 mg mL^{-1} ; 9.0 mL) was mixed with AgNO_3 solution (1.0 mg mL^{-1} ; 1.0 mL). After gently stirring for 30 min in the dark at room temperature, the solid NaBH_4 (2.0 mg) was then quickly added to the vesicle solution. The solution immediately became yellow after adding NaBH_4 . After

4 h of reduction, the solution was then purified by dialysis against water for 20 h and the yellow aqueous solution was collected for further measurement (Fig. S1).

Fig. S1 Digital image of vesicles before and after Ag loaded. After reduction of AgNO_3 , the solution turned yellow.

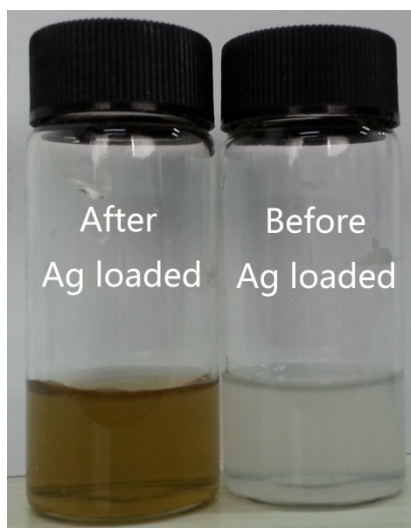


Fig. S2 TEM image of $\text{Ag}@$ vesicle-2. The scale bar is 200 nm. Most silver nanoparticles in the membrane can be seen in the membrane of the vesicle.

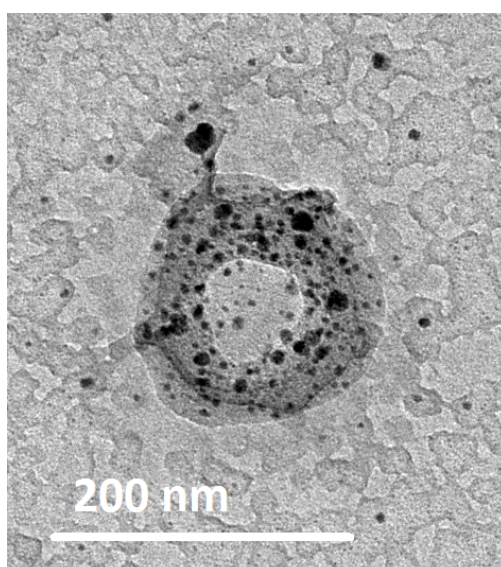


Fig. S3 Absorbance spectrum of 4-nitrophenol by sodium borohydride with Ag@micelle-1 at silver concentration of $1.0 \mu\text{g mL}^{-1}$. The full conversion takes place in 144 min. The main peak at 400 nm (nitrophenolate ions) decreases with the reaction time (black arrow), whereas a second peak at 300 nm (4-AP) slowly increases. Conditions: $[4\text{-NP}] = 5.0 \times 10^{-5} \text{ M}$, $[\text{NaBH}_4] = 6.6 \times 10^{-3} \text{ M}$, $T = 25 \text{ }^\circ\text{C}$.

