Electronic Supplementary Material (ESI) for Nanoscale.

Supplementary Information

A simple way to prepare Au@polypyrrole/Fe_3O_4 hollow capsules with high stability and their application in catalytic reduction of methylene blue dye

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Fig. S1 Energy-dispersive X-ray absorption (EDX) spectroscopy of the Au@PPy/Fe_3O_4 hollow capsules. The signal of Si raise from detector of TEM, while Cu is attributed to the sample grid film. It is necessary to mention that the signal of C partly raise from PPy shell and partly raise from grid film.

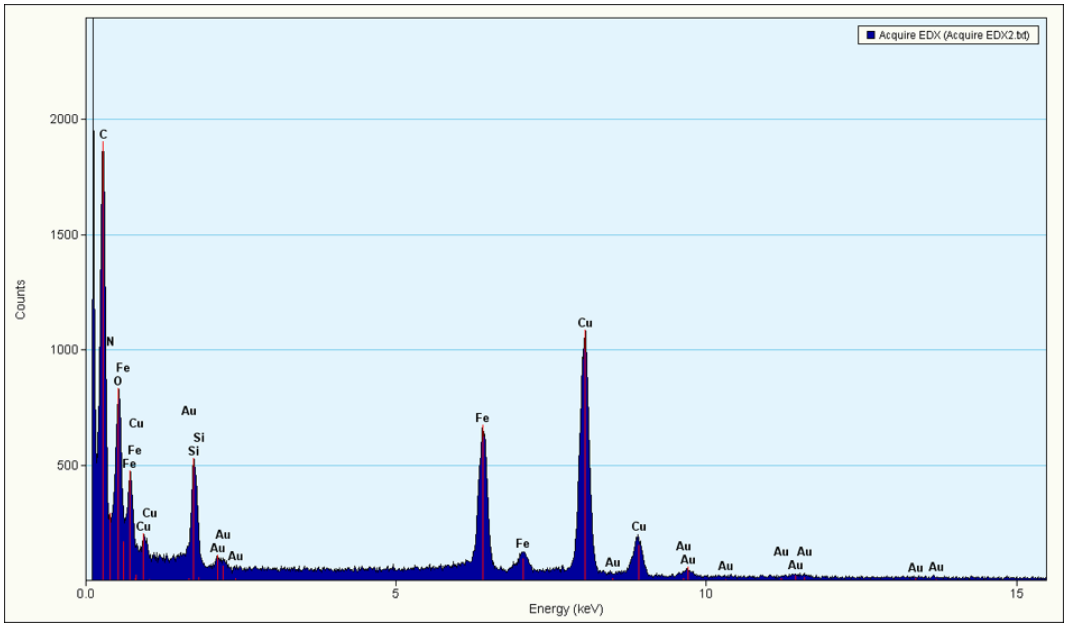

Fig. S2 High-resolution Fe 2p XPS spectrum of Au@PPy/Fe_3O_4 hollow capsules.

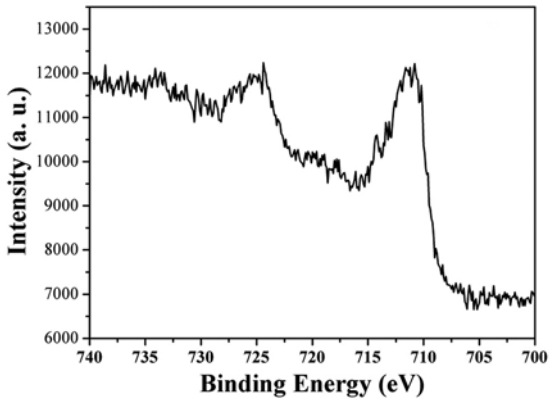

Fig. S3 Magnetization curves at 5 K of Au@PPy/Fe_3O_4 hollow capsules. The magnetization at 5 K is 31.6, 39.3 and 40.4 emu/g for samples prepared with 10, 30 and 50 mg $FeCl_2 \cdot 4H_2O$, respectively.

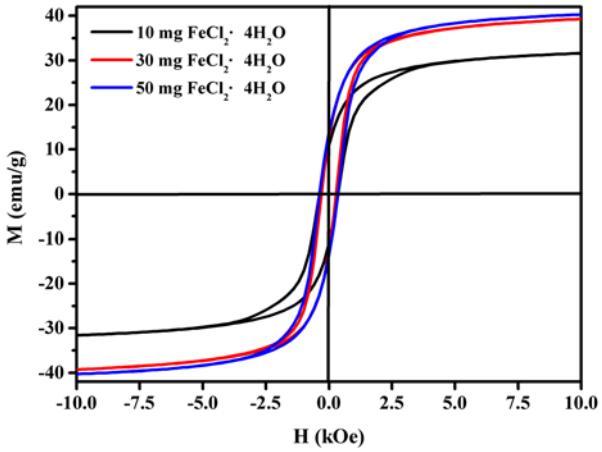

Fig. S4 The rate constant *k* of precursor PS/Au composites estimated by the slopes of straight lines of $\ln(A_t/A_0)$ *vs.* reaction time.

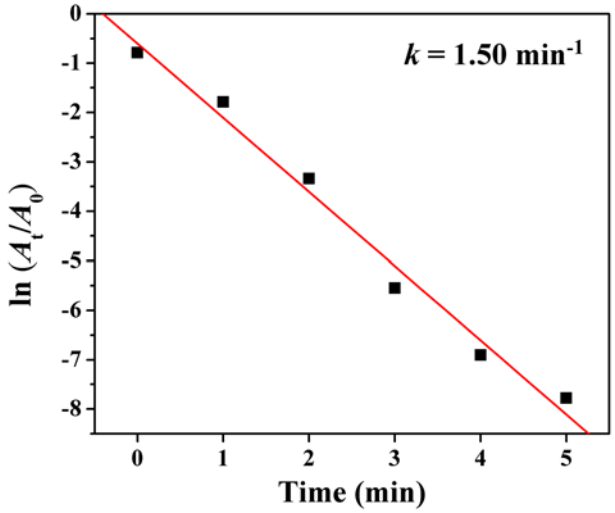

Fig. S5 UV-Vis spectra of the MB dye and $NaBH_4$ mixture in absence of catalysts at different times. Inset shows the rate constant *k* estimated by the slopes of straight lines of $\ln(A_t/A_0)$ *vs.* reaction time.

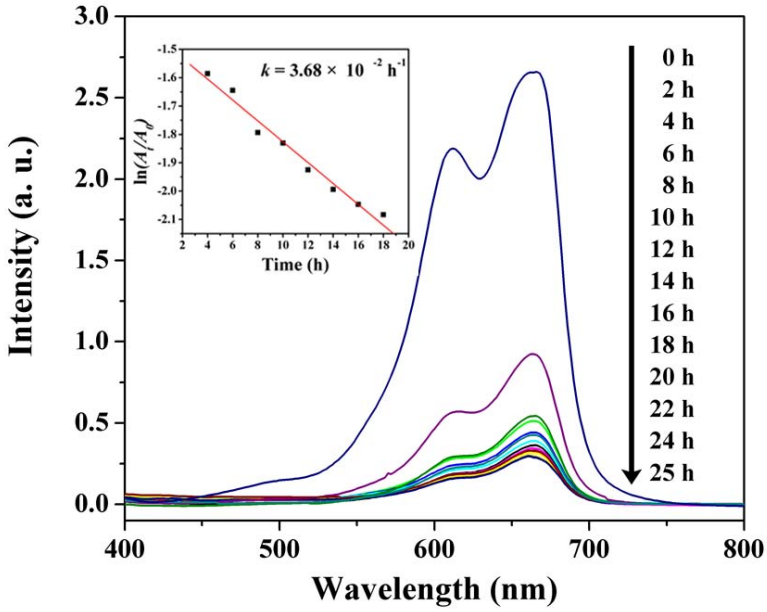

Fig. S6 The rate constant *k* estimated by the slopes of straight lines of $\ln(A_t/A_0)$ *vs.* reduction time using 0.1 mg catalysts at different reused circles: (a) 2nd; (b) 3rd; (c) 4th; and (d) 5th. Here, the time that catalytic reaction started is set as the beginning time (t = 0).