

Supplementary Information:

Multifunctional hollow polydopamine-based composites

(Fe₃O₄/PDA@Ag) for efficient degradation of organic dyes

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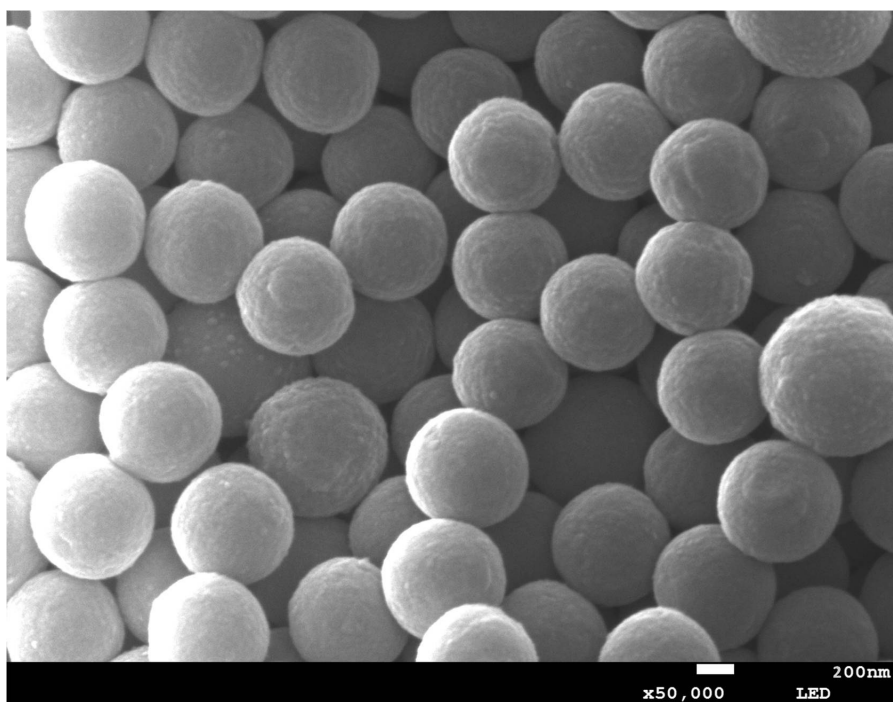


Fig S1. SEM image of PS-COOH microspheres.

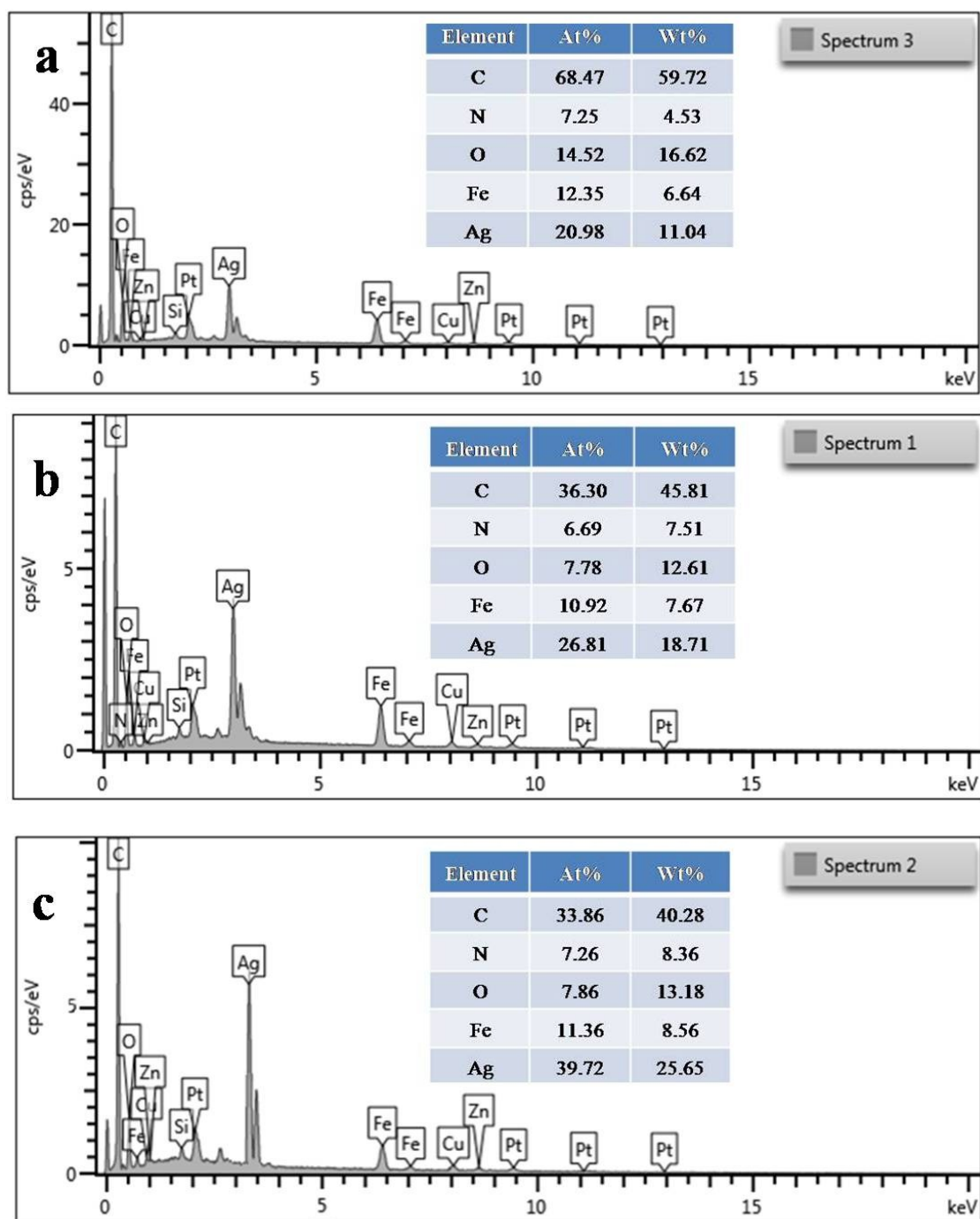


Fig S2. EDS analysis of (a) $\text{Fe}_3\text{O}_4/\text{PDA}@\text{Ag}$ I hollow spheres; (b) $\text{Fe}_3\text{O}_4/\text{PDA}@\text{Ag}$ II hollow spheres; (c) $\text{Fe}_3\text{O}_4/\text{PDA}@\text{Ag}$ III hollow spheres.

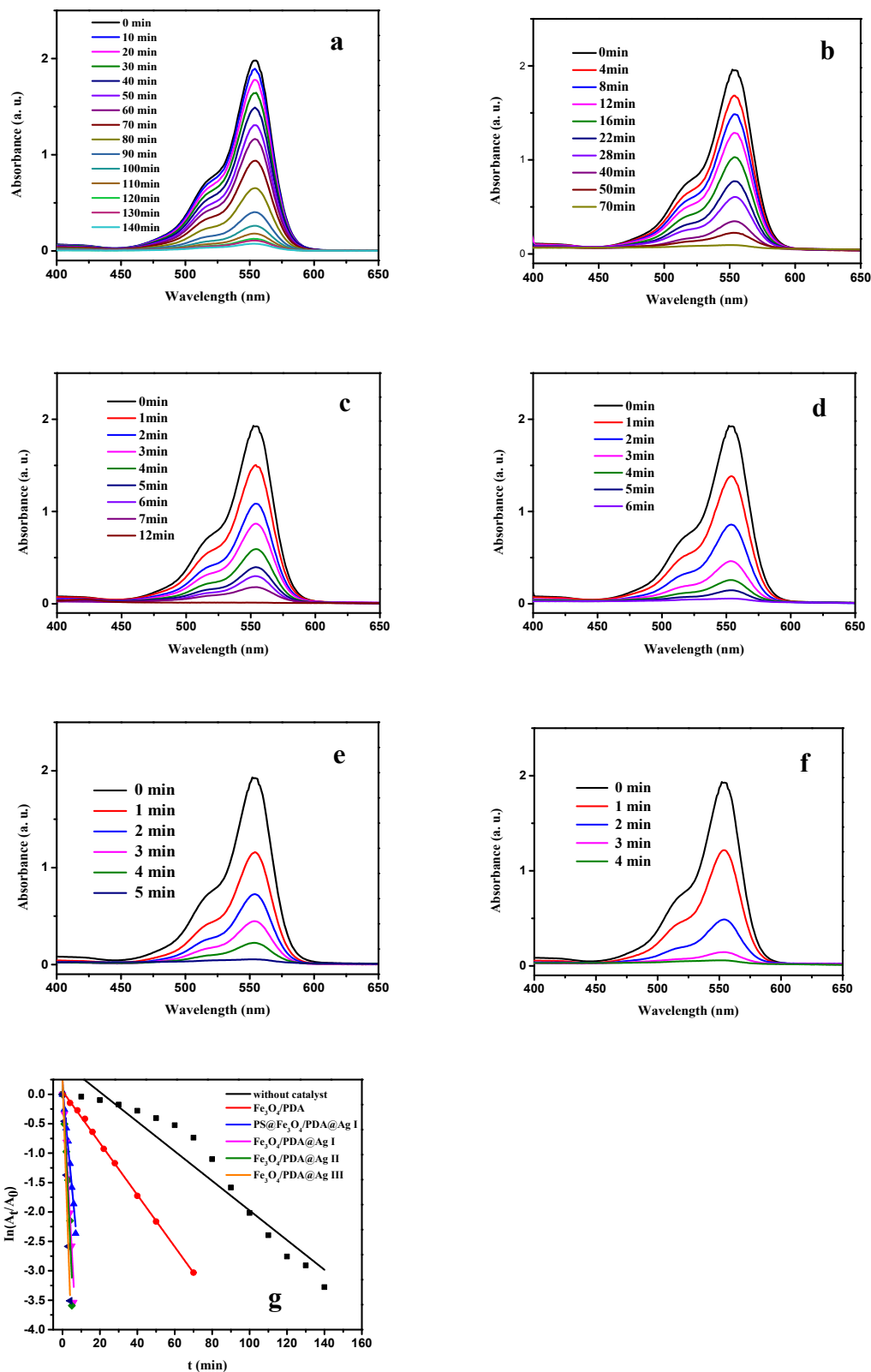


Fig S3. Time-dependent UV-Vis absorption spectra in the presence of (a) without catalyst; (b) $\text{Fe}_3\text{O}_4/\text{PDA}$ hollow spheres; (c) $\text{PS}@/\text{Fe}_3\text{O}_4/\text{PDA}@/\text{Ag}$ composites; (d)

Fe₃O₄/PDA@Ag I hollow spheres; (e) Fe₃O₄/PDA@Ag II hollow spheres; (f) Fe₃O₄/PDA@Ag III hollow spheres; (g) The relationship between $\ln(A_t/A_0)$ and the reaction time at different conditions.

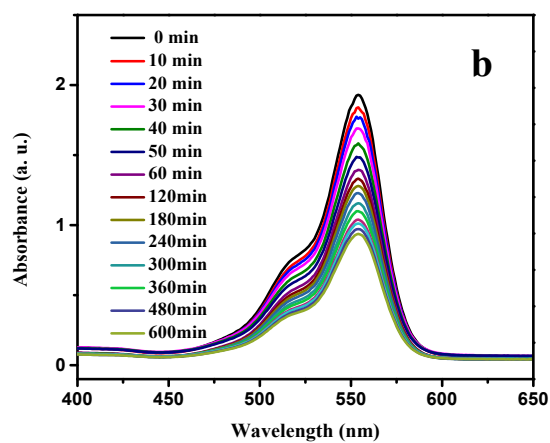
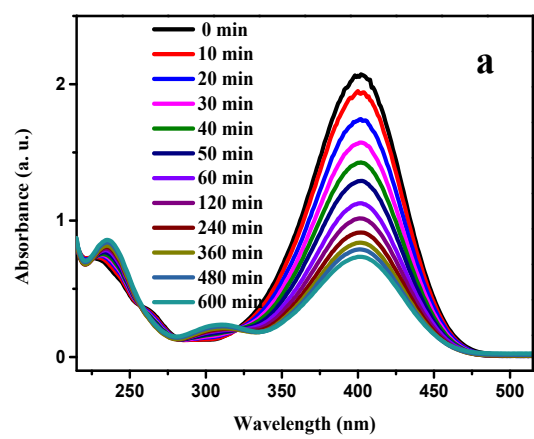


Fig. S4. Time-dependent UV-Vis absorption spectra in the presence of hollow $\text{Fe}_3\text{O}_4/\text{PDA}@\text{Ag}$ I catalyst without nitrogen atmosphere in (a) 4-NP and (b) RhB reaction system.

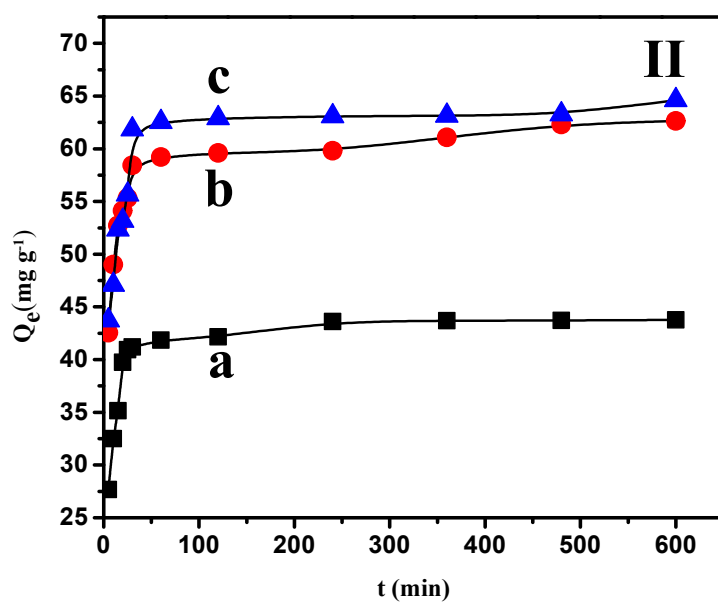
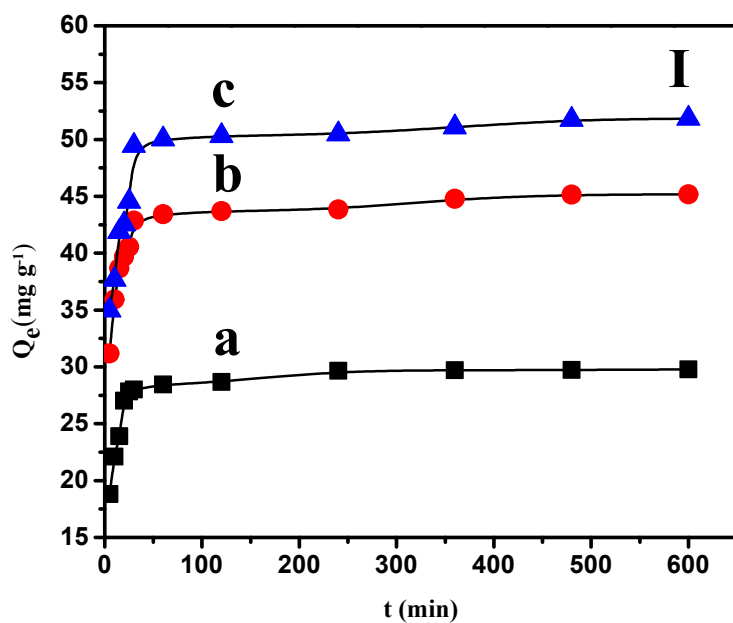


Fig. S5. Effect of contact time on the adsorption of (I) 4-NP and (II) RhB by (a) PS@Fe₃O₄/PDA@Ag, (b) Fe₃O₄/PDA@Ag I, and (c) Fe₃O₄/PDA (adsorbent dose, 0.01 g; initial 4-NP and RhB concentration, 500 mg L⁻¹; volume, 20 mL; pH, 7.0 and temperature, 293± 2K).

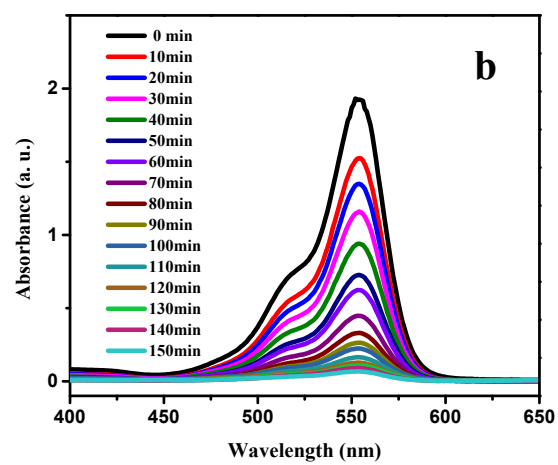
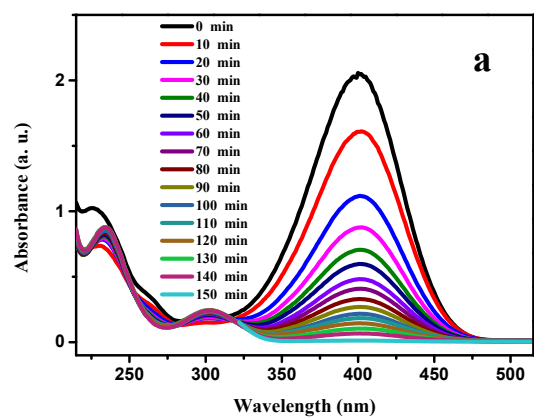


Fig. S6. Time-dependent UV-Vis absorption spectra in the presence of pure Fe₃O₄NPs in (a) 4-NP and (b) RhB reaction system.

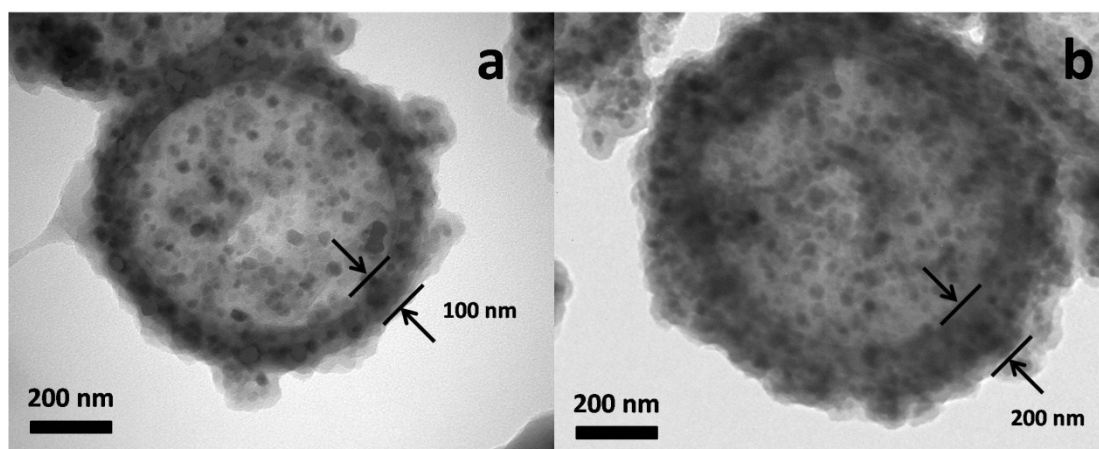


Fig S7. Magnified TEM image of (a) $\text{Fe}_3\text{O}_4/\text{PDA}$ hollow spheres and (b) $\text{Fe}_3\text{O}_4/\text{PDA}(200)$ hollow spheres.

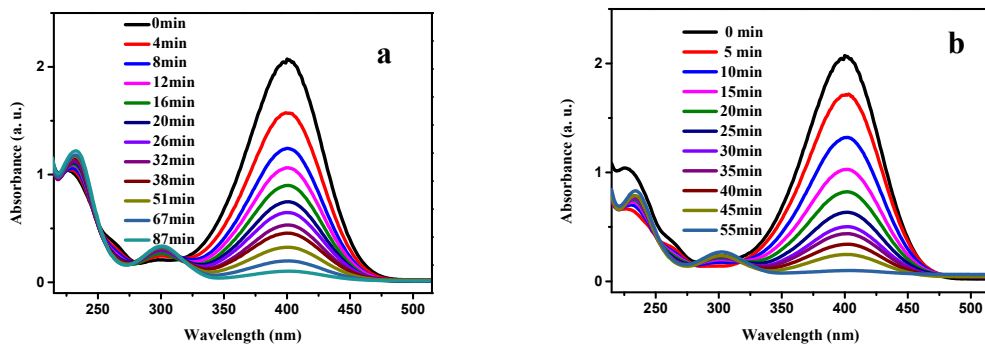


Fig. S8. Time-dependent UV-Vis absorption spectra in the presence of (a) Fe₃O₄/PDA hollow spheres and (b) Fe₃O₄/PDA(200) hollow spheres in 4-NP reaction system.

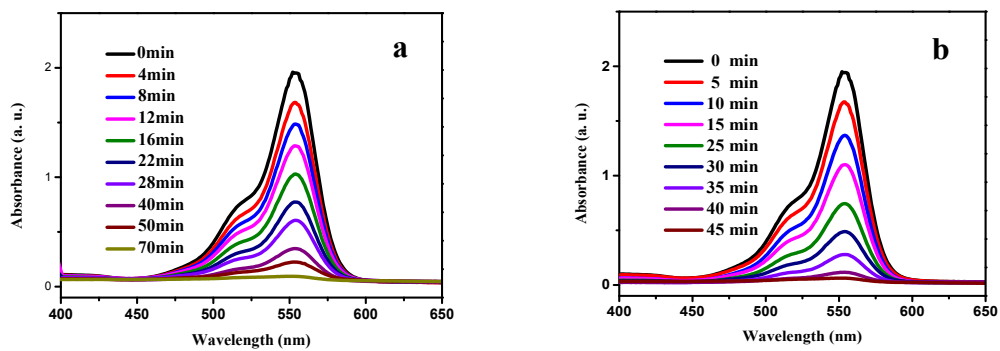


Fig. S9. Time-dependent UV-Vis absorption spectra in the presence of (a) Fe₃O₄/PDA hollow spheres and (b) Fe₃O₄/PDA(200) hollow spheres in RhB reaction system.

Table S1 Comparison of catalytic property of different catalysts in recent studies ^a.

Catalyst	Catalyst dosage	Ag NPs loading ^b	NaBH ₄ dosage	4-NP		RhB	
	mg	Wt%		k(min ⁻¹)	R ²	k(min ⁻¹)	R ²
Without catalyst	0	0	1.3ml × 0.2M	0.017	0.967	0.025	0.923
Fe ₃ O ₄ NPs	1.0	0	1.3ml × 0.2M	0.021	0.957	0.021	0.908
Fe ₃ O ₄ /PDA	1.0	0	1.3ml × 0.2M	0.032	0.985	0.044	0.998
Fe ₃ O ₄ /PDA(200)	1.0	0	1.3ml × 0.2M	0.048	0.976	0.072	0.912
PS@Fe ₃ O ₄ /PDA@Ag	1.0	8.97	1.3ml × 0.2M	0.410	0.991	0.333	0.989
Fe ₃ O ₄ /PDA@Ag I	1.0	11.04	1.3ml × 0.2M	0.600	0.995	0.582	0.979
Fe ₃ O ₄ /PDA@Ag II	1.0	18.71	1.3ml × 0.2M	0.754	0.845	0.668	0.926
Fe ₃ O ₄ /PDA@Ag III	1.0	25.65	1.3ml × 0.2M	0.888	0.587	0.915	0.974

^a Reaction conditions: 25°C, pH = 7;

^b Obtained from EDS.