Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.
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Supplementary Information

Protein-stabilized Ir nanoparticles with usual charge selective peroxidase property

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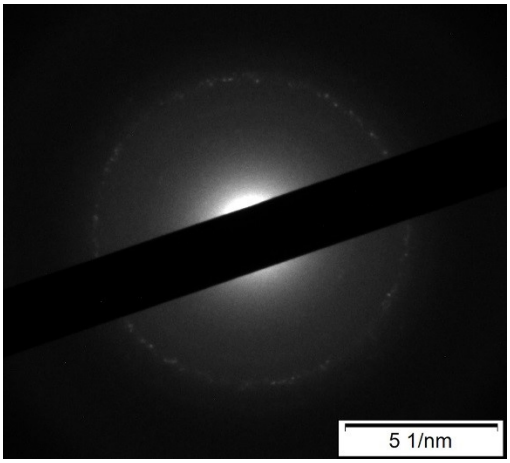


Fig.S1 Selected area electron diffraction pattern of BSA-IrNPs.

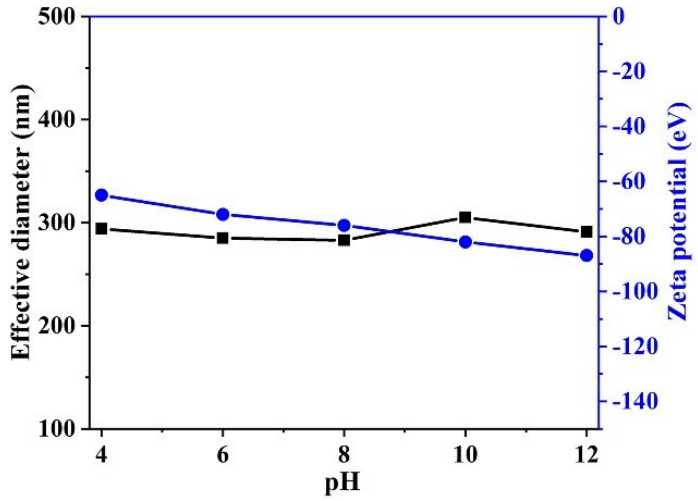


Fig.S2 Effects of pH on the stability of BSA-IrNPs in 0.2 M BR buffer solution.

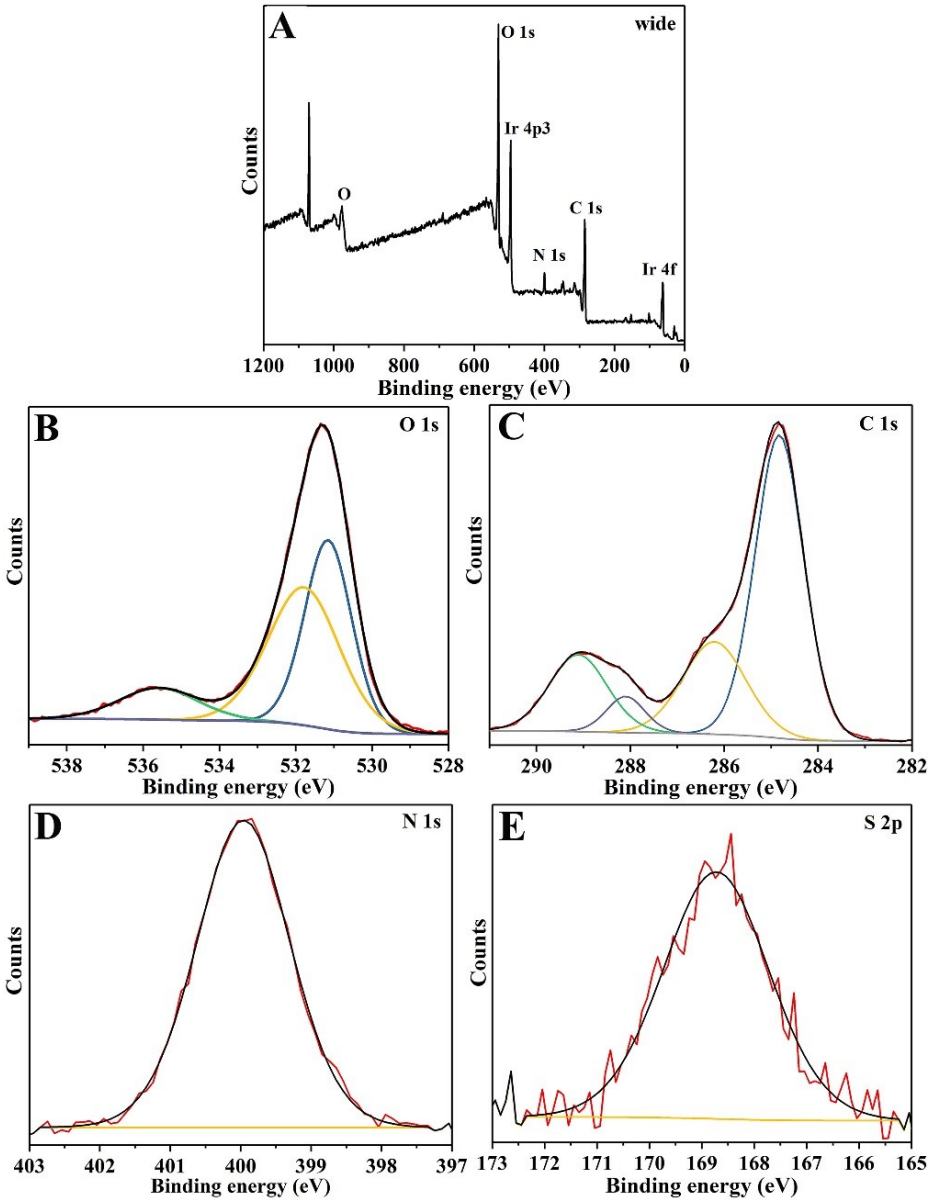


Fig. S3 XPS analysis of the BSA-IrNPs: (A) survey scan, (B) O species, (C) C species, (D) N species and (E) S species.

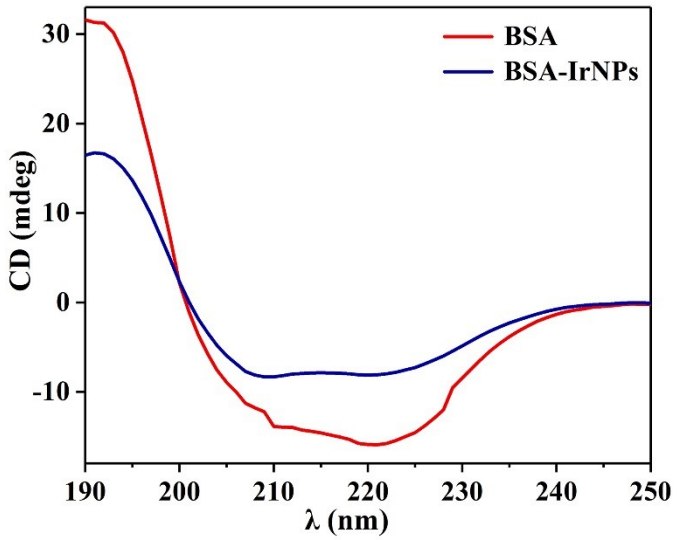


Fig.S4 Circular dichroism spectra of BSA and BSA-IrNPs.

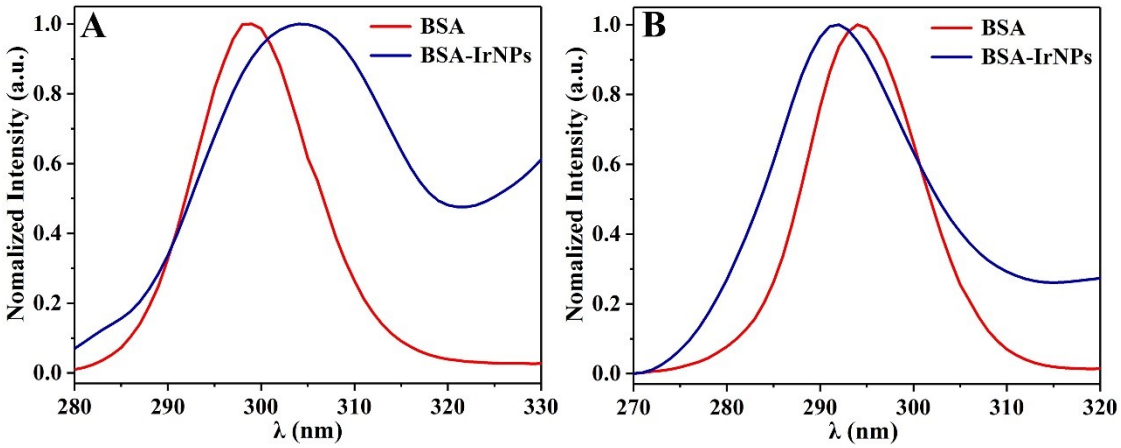


Fig.S5 Synchronous fluorescence spectra of BSA in the presence BSA-IrNPs and BSA at △λ=15 nm (A) and △λ=60 nm (B).

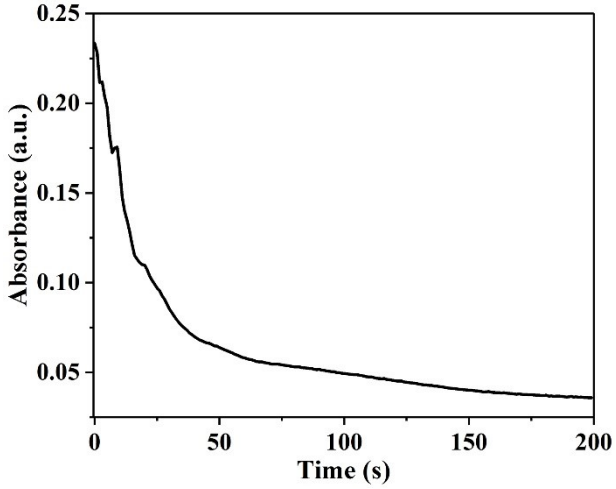


Fig.S6 Time-dependent absorbance changes at 652 nm of TMB over BSA-IrNPs and H_2O_2 at room temperature and pH 3.65.

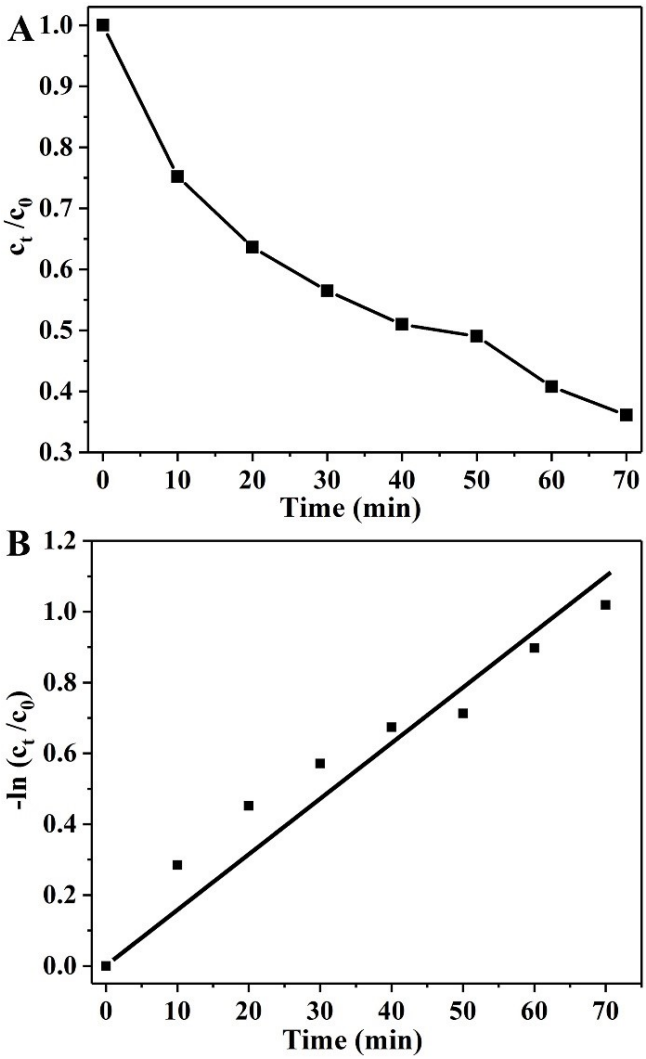


Fig.S7 Time profiles c_t/c_0 (A) and $\ln(c_t/c_0)$ (B) for BSA-IrNPs in RhB degradation at room temperature.

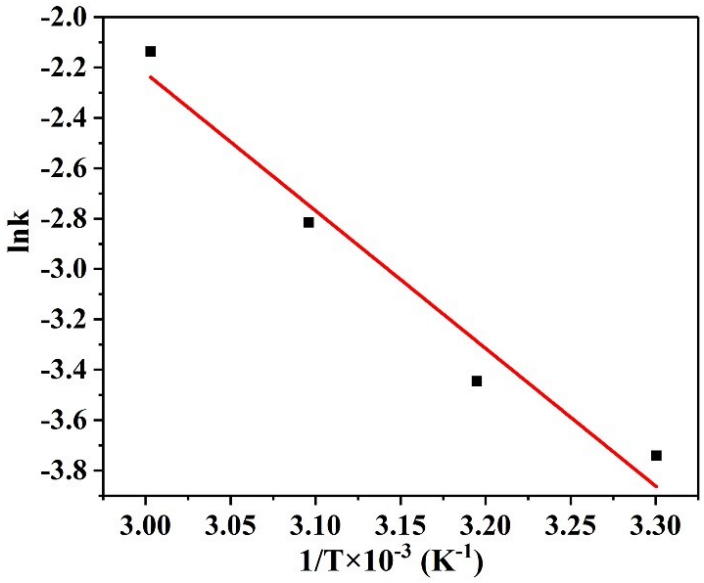


Fig.S8 Effect of reaction temperature on the RhB degradation rate in BSA-IrNPs/H_2O_2 system.

Table S1 The activation energy (E_a) of different nanozymes

nanozymes	E_a (kJ·mol^{-1})
nano-Co_3O_4	61.96
Co_3O_4-$CoFe_2O_4$ NPs	40.73
Co_3O_4-SBA15	56.45
Co_3O_4-KIT6	51.93
BSA-IrNPs	35.71

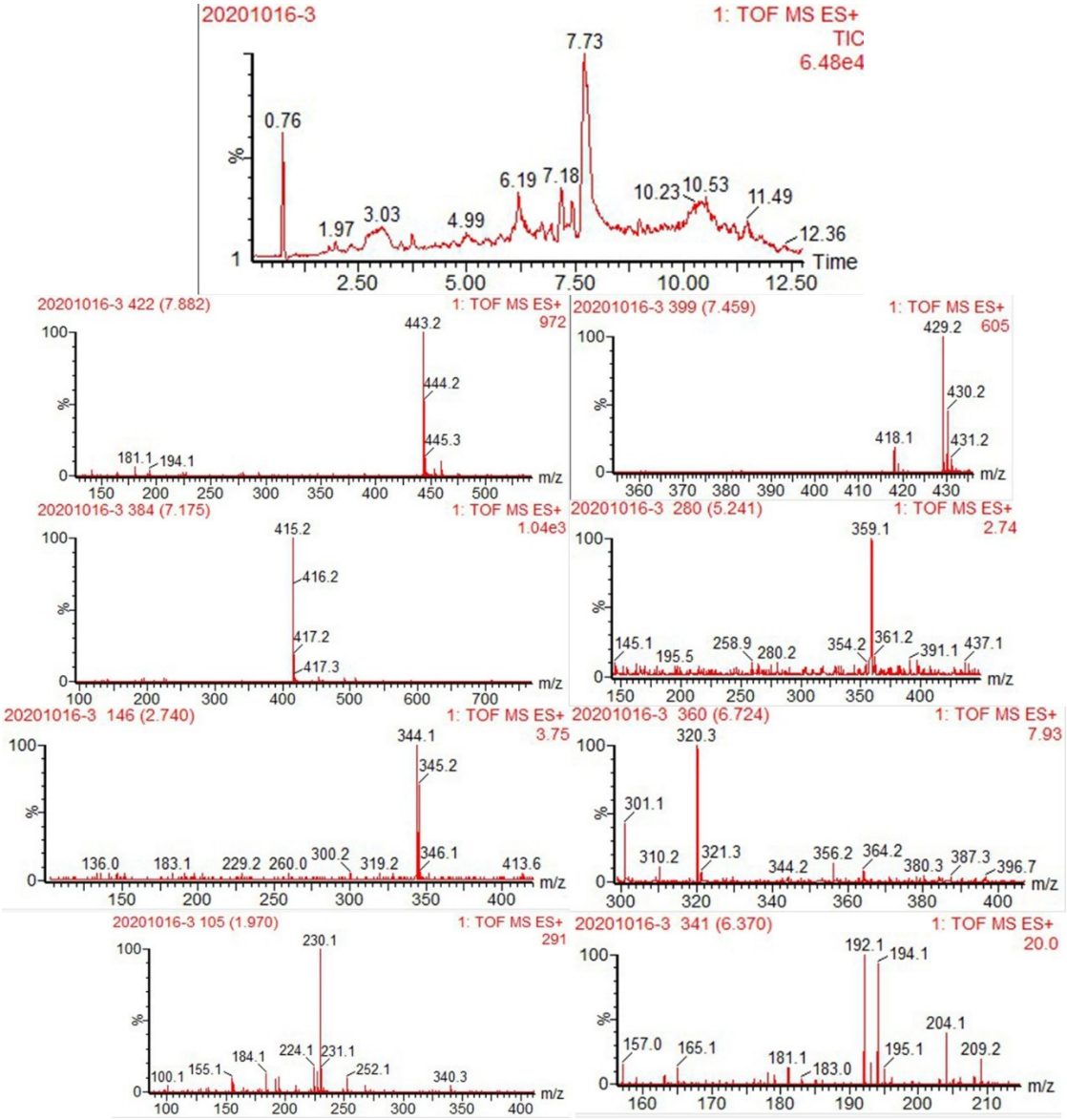


Fig.S9 LC-MS analysis of the intermediates for RhB degradation and the mass spectra of the detected intermediates.

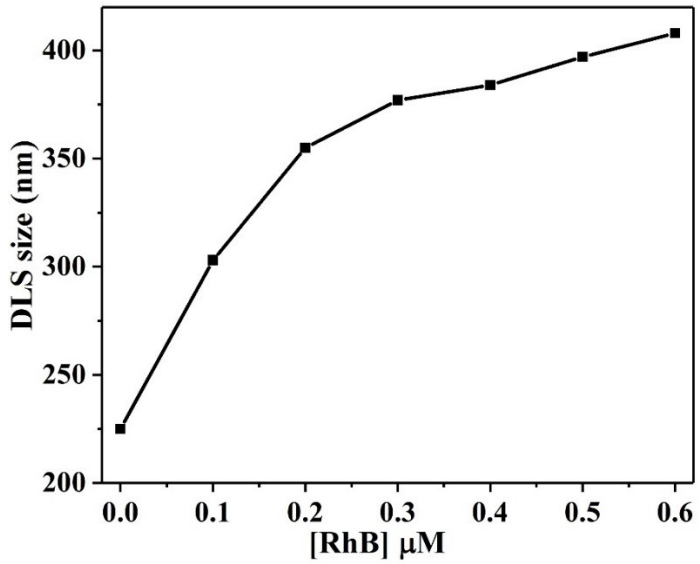


Fig.S10 The DLS sizes of BSA-IrNPs with the increase of RhB. The concentration of BSA-IrNPs was fixed at 0.03 mg/mL.

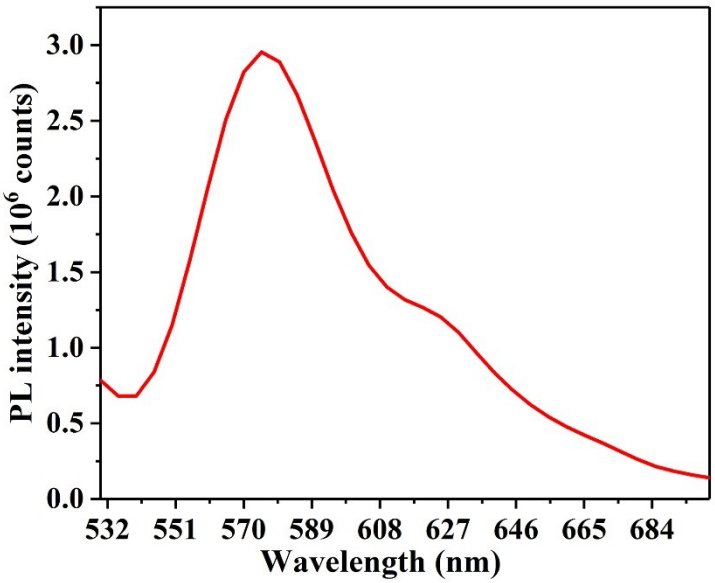
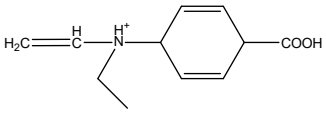
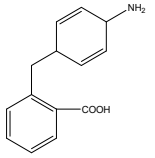
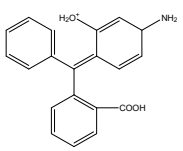
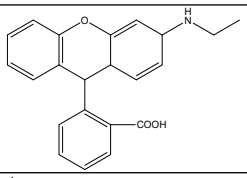
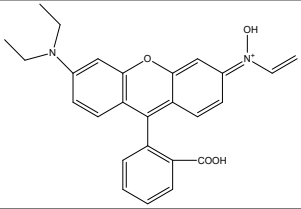
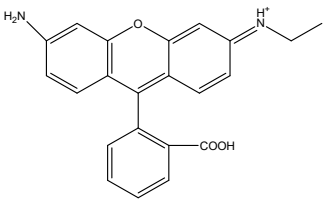
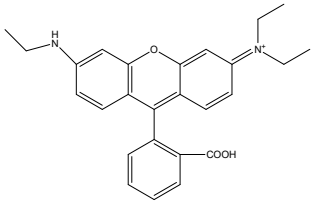
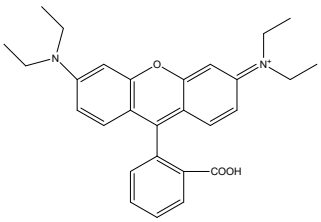
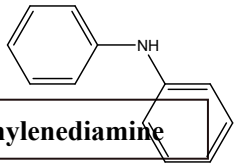


Fig.S11 PL emission spectrum of the BSA-IrNPs powder. Before the detection, the BSA-IrNPs were incubated in RhB solution (0.1 mg/mL) for 6 hours. After that, the product was collected by removing the supernatant liquid and washing with ethanol for three times. Then, the powders were obtained after drying in vacuum at 45°C for 12 h

Table S2 LC-MS information about main fragment ions of identified degradation intermediates of RhB.

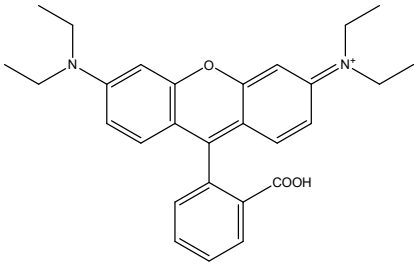
product	compounds	RT/min	m/z
P1		6.37	192
P2		1.97	230
P3		7.93	320
P4		2.74	344
P5		7.459	429
P6		5.241	359
P7		7.175	415
RhB		7.882	443

p-aminophenol

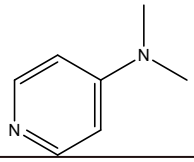


p-phenylenediamine

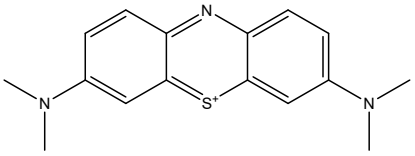
diphenylamine



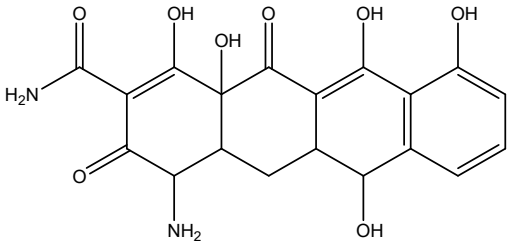
Rhodamine B



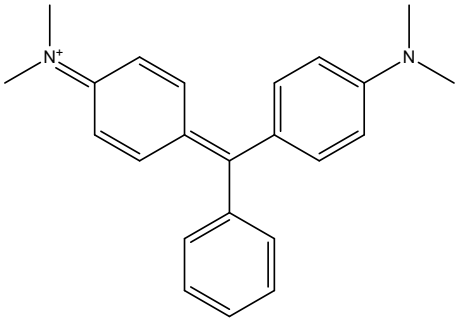
4-dimethylaminopyridine



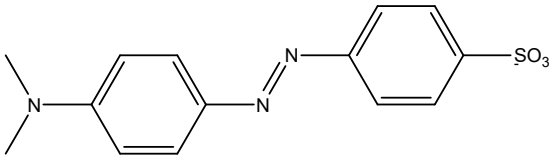
methylene blue



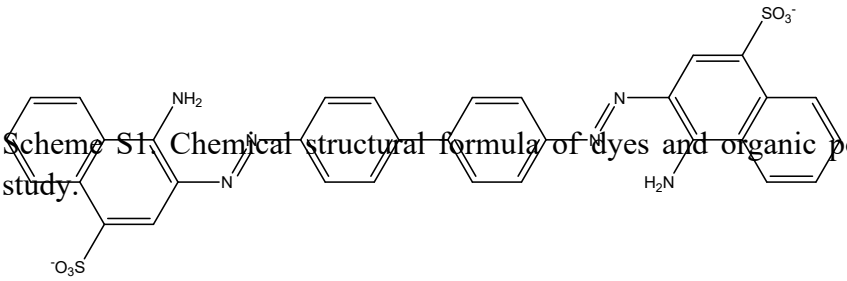
tetracycline hydrochloride



malachite green



methyl orange



Congo red

Scheme S1. Chemical structural formula of dyes and organic pollutant used in this study.