Supplementary Information

New insights into the sulfite activation by amorphous Fe1-xNixS for RhB removal: The synergistic effect of free radical and non-free radical pathway

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Text S1 Electrochemical measurement

The three-electrode system underwent electrochemical testing utilizing the CHI 660D workstation. The working electrode consisted of conductive glass coated with the catalyst, the counter electrode was constructed of platinum wire, and the reference electrode was Ag/AgCl. A 0.1 M Na_2SO_4 solution served as the electrolyte. Cyclic voltammetry (CV) measurements were conducted at a scanning speed of 50 mV s-1 within the potential range of -0.6 V to 0.6 V. Additionally, electrochemical impedance spectroscopy (EIS) was performed at 0 V bias (DC = 0 V) across the frequency range of 100 kHz to 0.01 Hz, followed by equivalent circuit simulation. The Tafel extrapolation method was employed for linearly fitting the polarization region in the stable open circuit potential, from which the corrosion potential was determined. The open-circuit potential was detected in 0.1MNa_2SO_4 electrolyte. After the catalyst voltage stabilized, sulfite was added to observe the potential change. After the catalyst voltage stabilized again, RhB was added to observe the potential change.

Text S2 Cyclic experiments

The reusability of $Fe_{1-x}Ni_xS$-0.06 was notably limited due to various factors. Primarily, the catalyst's amorphous nature made it susceptible to aggregation post-reaction, reducing the availability of active sites. Furthermore, the degradation intermediates adsorbed on the catalyst surface proved difficult to eliminate using water and ethanol. Addressing these obstacles to improve the catalyst's reproducibility emerges as a pivotal focus for forthcoming research endeavors.

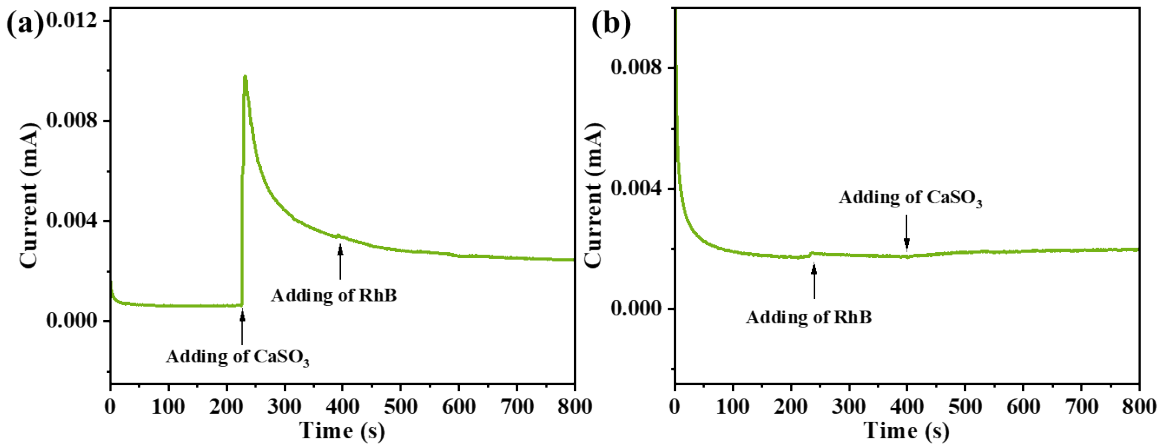

Fig. S1. i-t curve: different adding sequence of $CaSO_3$ and RhB.

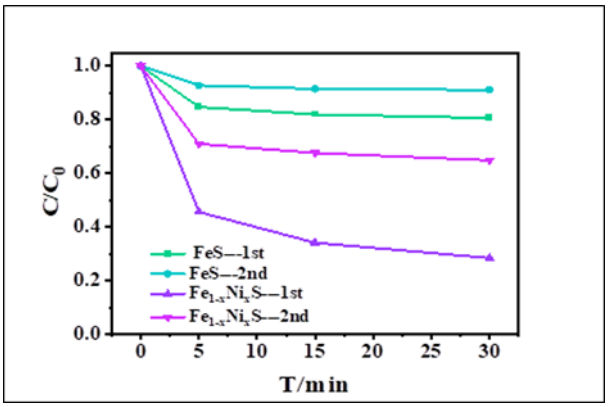

Fig. S2. Cyclic experimental diagram of RhB degradation by FeS and $Fe_{1-x}Ni_xS$-0.06 activated sulfite.