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Recyclable ferromagnetic chitosan nanozyme for decomposing phenol*

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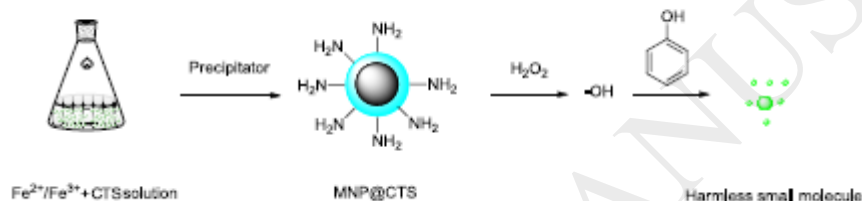
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Graphical Abstract



To improve the catalyst activity and stability of MNP for wastewater treatment, ferromagnetic chitosan nanozyme (MNP@CTS) is synthesized via an improved hydrothermal method and molecular self-assembly technology. Its particle size was 11.76 nm, polydispersity index (PDI) was 0.073, surface zeta potential was 40.34 mV, saturation magnetization value was 35.28 $\text{emu}\cdot\text{g}^{-1}$ and coercivity value was 17.56 Oe. The catalytic condition was extensively optimized among a range of pH and temperature, as well as initial concentrations of the substrate and H_2O_2 , and MNP@CTS removed over 95% phenol from aqueous solution within 5 h under the optimum conditions. Moreover, MNP@CTS was stable and could be regenerated for reuse for at least ten rounds. Thus, our findings open up a wide spectrum and lay a foundation of environmentally friendly applications of MNP@CTS by showing several attractive features, such as easy preparation, low cost, excellent catalytic activity, good stability and reusability.

Highlights

- MNP@CTS was synthesized via a hydrothermal method and self-assembly technology.
- MCCCBC increased catalyst activity and stability.

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