

Supporting information

Fabrication of Shish-kebab Structure of $\text{MnO}_2@\text{Co}_3\text{O}_4$ with Remarkable Enhanced Oxidase-mimicking Activity for Detection of L-cysteine

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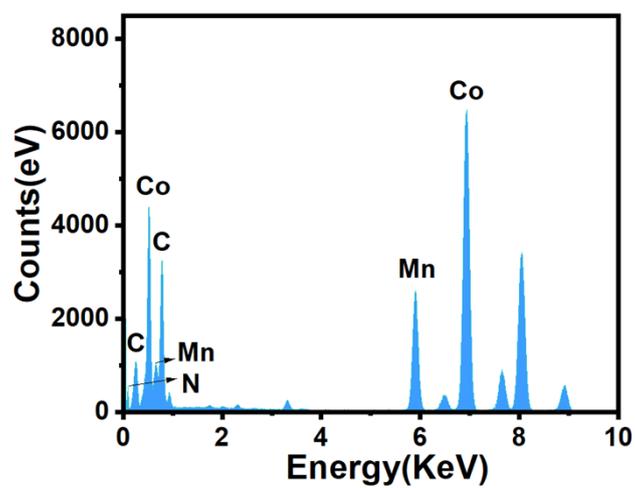


Figure. S1.EDX spectrum of $\text{MnO}_2@\text{Co}_3\text{O}_4$

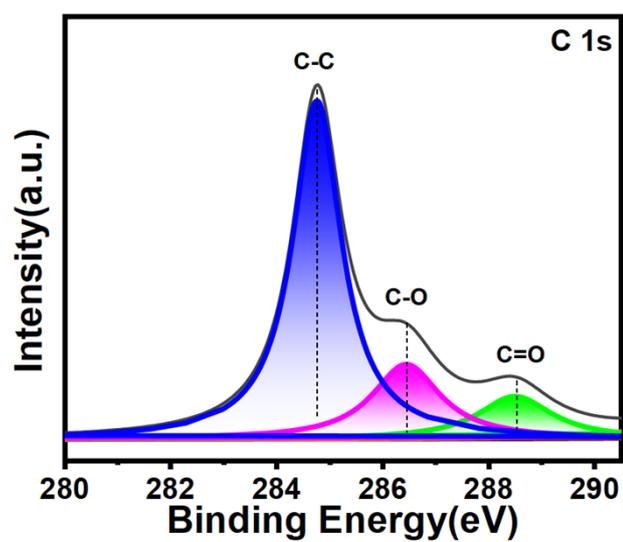


Figure. S2. C 1s spectra of the $\text{MnO}_2@\text{Co}_3\text{O}_4$.

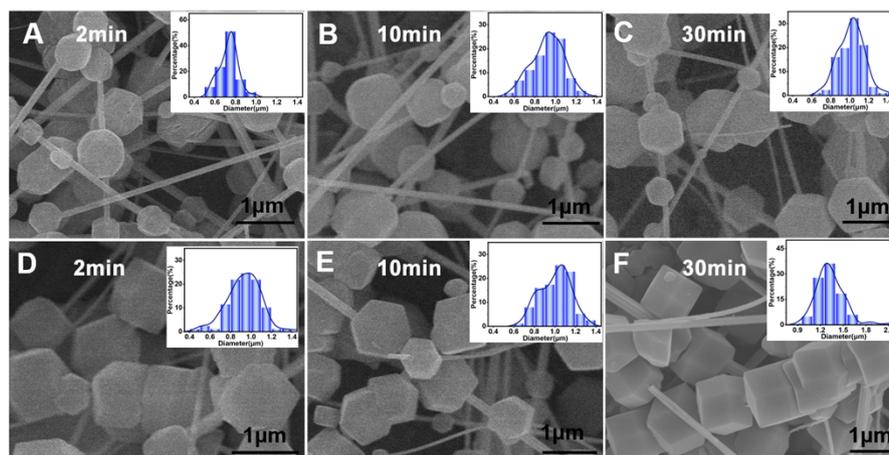


Figure. S3. SEM and Particle size distributions images of $\text{MnO}_2@ZIF-67$, the mixture was stirred for 2 minutes(A), 10 minutes(B), and 30 minutes(C) respectively, without overnight standing. SEM and Particle size distributions images of $\text{MnO}_2@ZIF-67$, the mixture was stirred for 2 minutes(D), 10 minutes(E), and 30 minutes(F) respectively, with overnight standing.

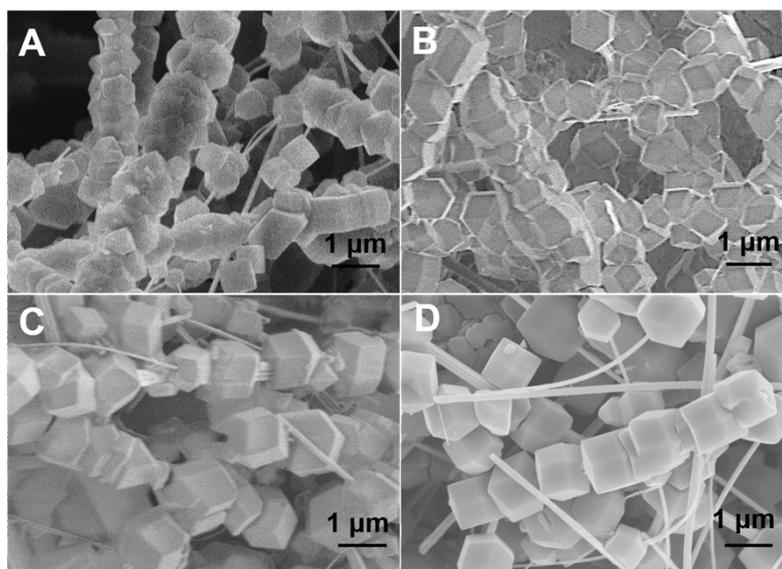


Figure. S4. The SEM images of $\text{MnO}_2@ZIF-67$ without PVP(A), with the addition of 100mg PVP(B), 200mg PVP(C) and 300mg PVP(D).

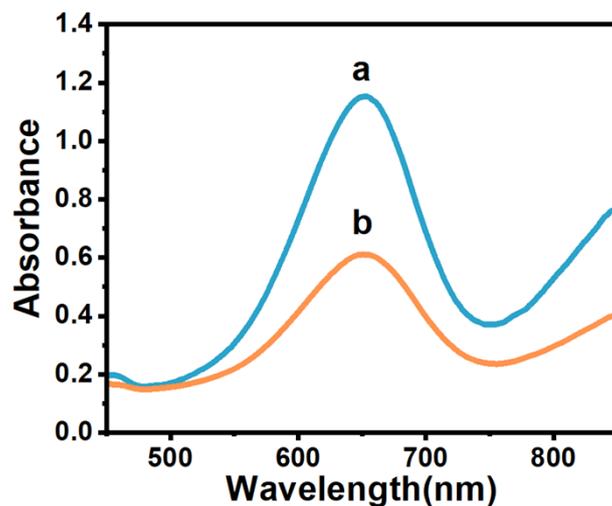


Figure. S5. The absorption spectra of the reaction in the air (a) and N₂(b).

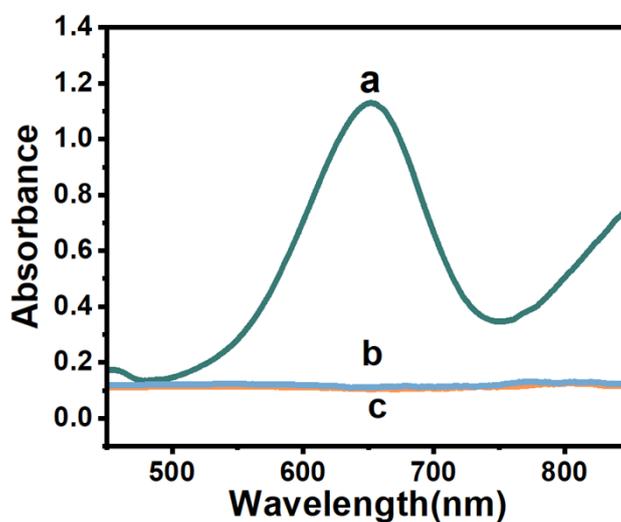


Figure. S6. (A) Typical UV-Vis spectra of different reaction systems: (a) MnO₂@Co₃O₄+TMB+buffer, (b) MnO₂@Co₃O₄+TMB+buffer+NaHSO₃ and (c) MnO₂@Co₃O₄+TMB+buffer+Vitamin C. Experiments were performed by adding 2mg.mL⁻¹ of MnO₂@Co₃O₄ into pH 3.0 HAc-NaAc buffer solution containing 0.25mM TMB applied in the experiments as substrates at 50°C for 8 min.

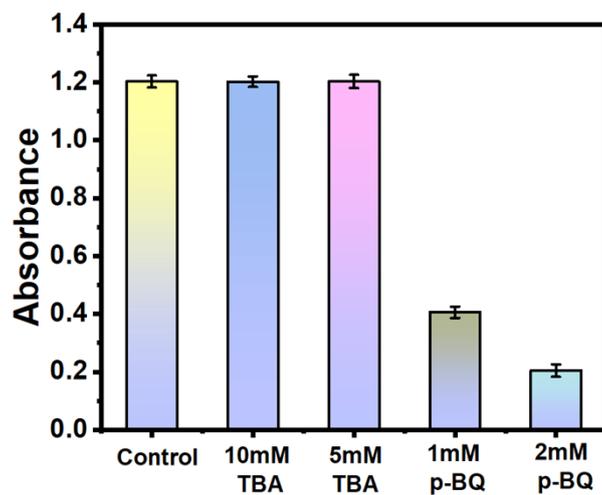


Figure. S7. The effect of free radical scavenger on the TMB-MnO₂@Co₃O₄ system. Experiments were performed by adding 2mg.mL⁻¹ of MnO₂@Co₃O₄ into pH 3.0 HAc-NaAc buffer solution containing 0.25mM TMB applied in the experiments as substrates at 25°C for 10min.

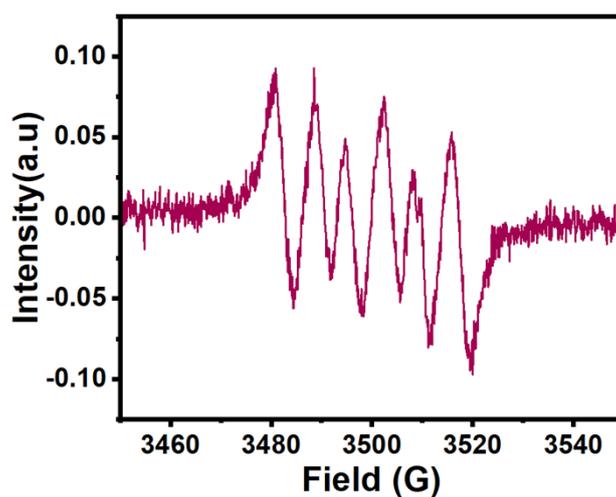


Figure. S8. EPR spectrum for detection of O₂⁻ radicals. EPR determination was performed with 30 μl 5,5-dimethyl-1-pyrroline N-oxide (DMPO) and 30 μl of 1mg/ml MnO₂@Co₃O₄ in 100 ml deionized water/methanol as solvent. After the mixture is evenly mixed, a certain amount of the mixture is placed on a quartz tube and put into the EPR sample chamber for superoxide radical test.