

Supplementary Information for:

CoMn₂O₄ hierarchical microspheres with high catalytic activity towards p-nitrophenol reduction

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Figure S1. Mn2p XPS spectra of (a) C400, (b) C600 and (c) C700.

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Figure S2. The GC-MS results of (a) the reactant p-nitrophenol and (b) the p-aminophenol product after extracting the reaction mixture with ethyl acetate.

Figure S3. XRD patterns of C500 and the C500 after reaction(C500-A).

Figure S4. (a) SEM image of CoMn_2O_4 with non-hierarchical shape. (b) XRD pattern of CoMn_2O_4 with non-hierarchical shape. (c) UV-vis absorption spectra of p-nitrophenol reduction with NaBH_4 catalyzed by CoMn_2O_4 with non-hierarchical shape.

Preparation of CoMn_2O_4 with non-hierarchical shape: CoMn_2O_4 with non-hierarchical shape has been prepared by chemically co-deposition method: 80 mg $\text{Mn}(\text{CH}_3\text{COO})_2 \cdot 4\text{H}_2\text{O}$ and 40 mg $\text{Mn}(\text{CH}_3\text{COO})_2 \cdot 4\text{H}_2\text{O}$ added simultaneously to deionized water (50 ml), K_2CO_3 (1 mmol/L) solution was used as precipitant, adjusted the PH to 9 at room temperature, after stewing 4 hours, The resulting precipitate was then centrifuged, washed with distilled water and ethanol and then dried under oven at 60 °C. The thermal decomposition of the pink precursor to CoMn_2O_4 was performed at 400 °C, for 2 h in air in the oven with a heating rate of 10 °C min^{-1} .

Catalytic performance measurements CoMn_2O_4 with non-hierarchical shape:

The catalytic test was same as the catalytic process of CoMn_2O_4 hierarchical microspheres, except that the catalyst was changed to CoMn_2O_4 with non-hierarchical shape.