Supporting Information

Synthesis of ir-$Co(OH)_2$ nanosheets: Cobalt(II) nitrate hexahydrate（1.876mmol,0.546g）was dissolved in 30 ml methanol to form a clear solution，which was subsequently injected into 30ml of methanol containing 0.154 g 2-methylimidazole under ultrasound for 10min at room temperature. The mixed solution was then transferred into 50ml beaker and stirred overnight at 25 °C. The as-obtained precipitates were centrifuged and washed with ethanol several time and dried in vacuum at 50 °C for overnight.

Synthesis of ZIF-67 dodecahedrons

0.546g $Co(NO_3)_2$ and 0.616g 2-methylimidazole was dissolved in 15 ml of MeOH respectively, and then the former solution was added to the latter and ultrasonicated for 10 min .Then, this mixed solution was injected into 30mL of MeOH with 1 g of CTAB and stirred at room temperature for overnight. The as-obtained precipitates were centrifuged and washed with ethanol several time and dried in vacuum at 50 °C for overnight.

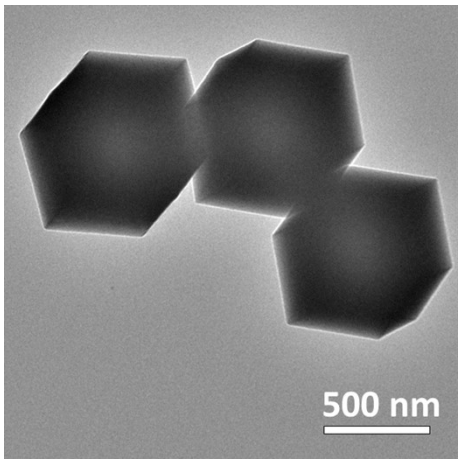

Fig. S1. The ZIF-67 material obtained when the mole ratio of 2-methylimidazole and cobalt nitrate is 4:1.

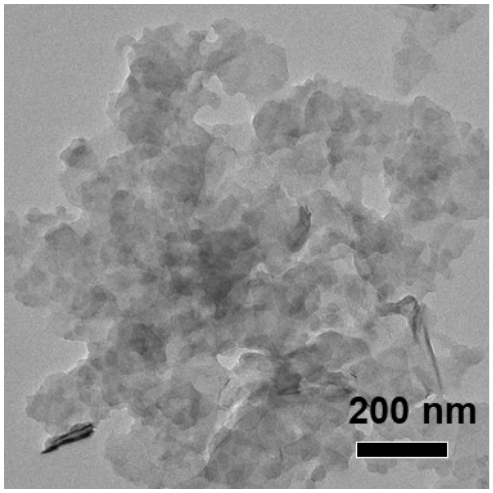

Fig. S2. The $Co(OH)_2$ material obtained when the mole ratio of 2-methylimidazole and cobalt nitrate is 1:1.

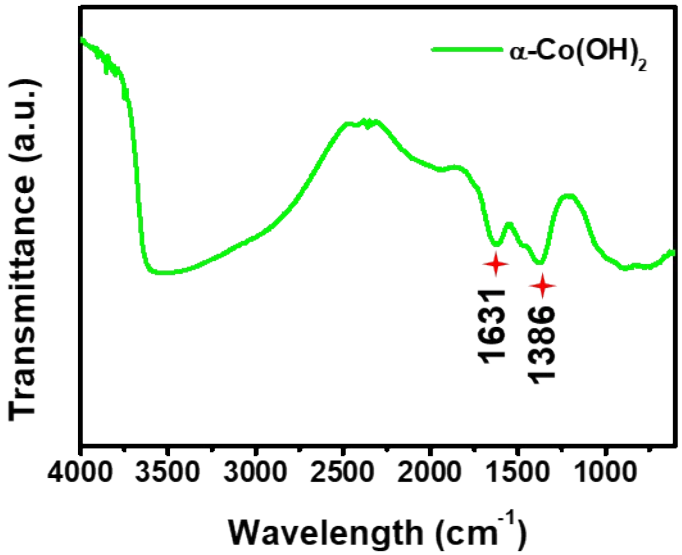

Fig. S3. FT-IR spectra of α-$Co(OH)_2$.

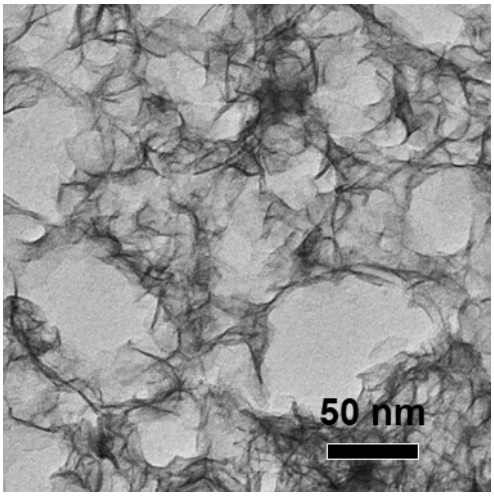

Fig. S4. TEM image of $Co(OH)_2$ nanosheets obtained when using EtOH as solvent.

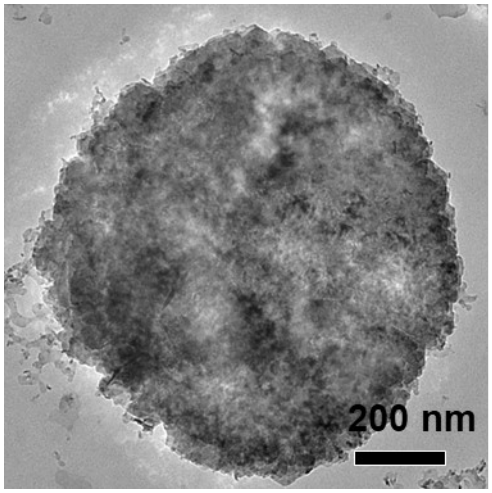

Fig. S5. TEM image of β-$Co(OH)_2$ obtained when NaOH is used instead of 2-methylimidazole.

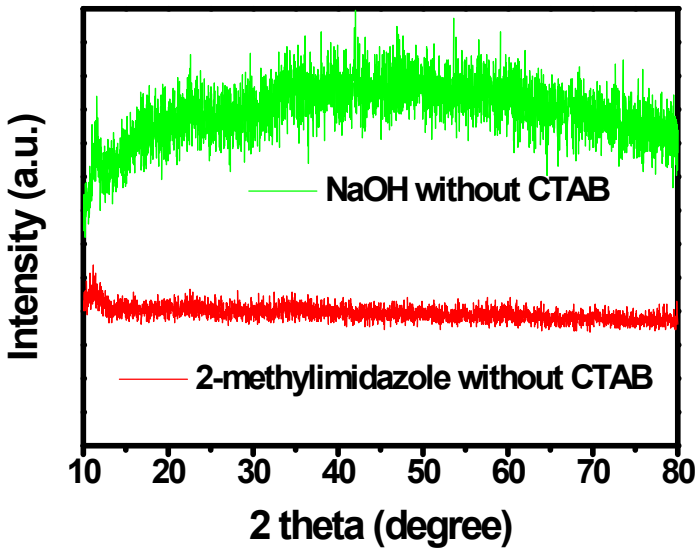

Fig. S6. XRD pattern of α-$Co(OH)_2$ obtained through 2-methylimidazole solution and NaOH solution without CTAB as surfactant.

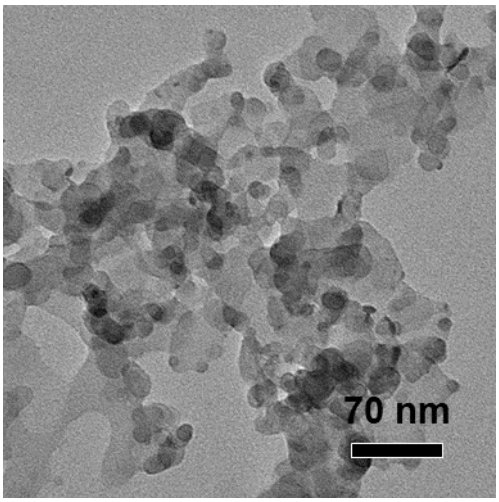

Fig. S7. TEM image of β-$Co(OH)_2$ nanosheet obtained when CTAB is not added.

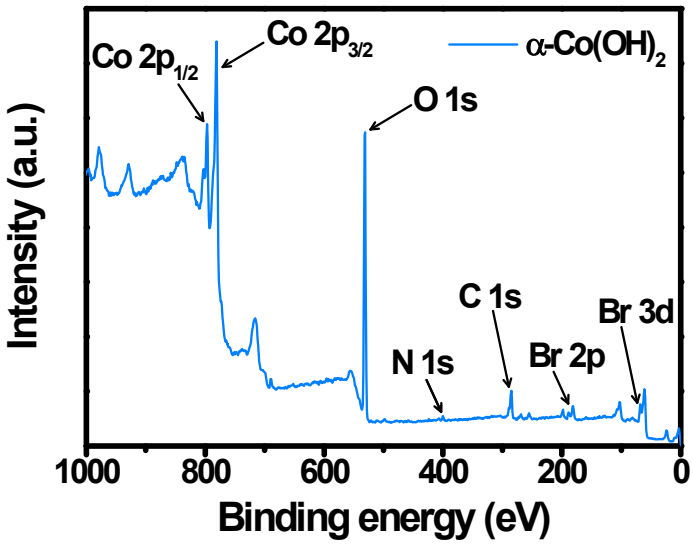

Fig. S8. XPS survey scan spectra of α-$Co(OH)_2$ NSs

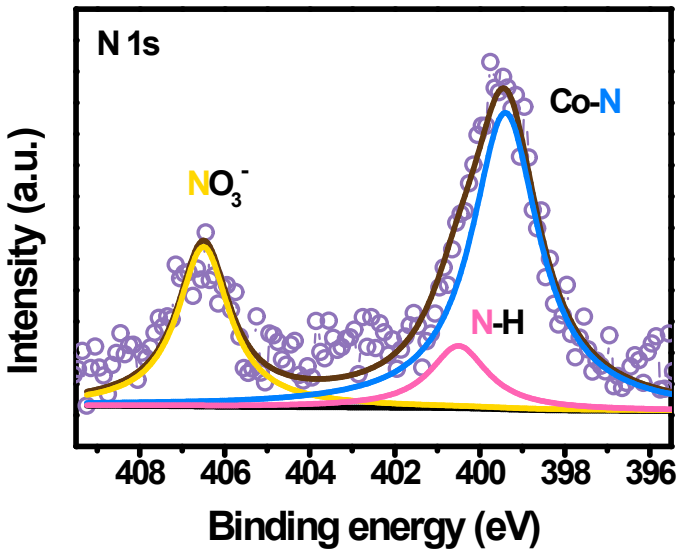

Fig. S9. High resolution XPS N 1s spectra of α-$Co(OH)_2$ NSs.

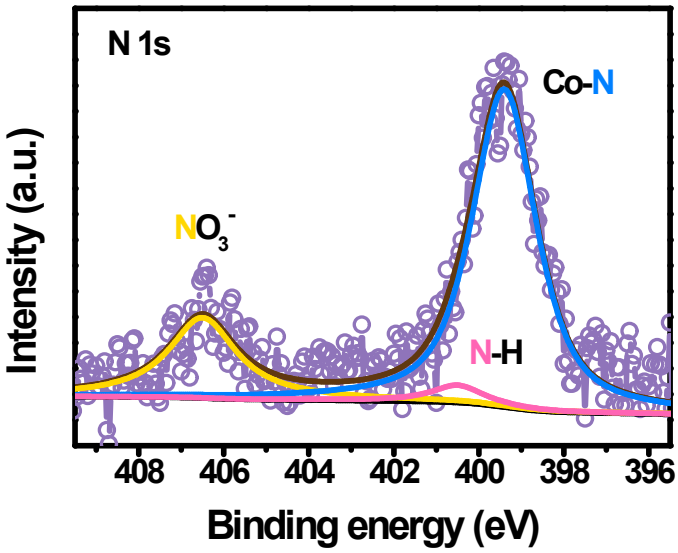

Fig. S10. High resolution XPS N 1s spectra of β-$Co(OH)_2$.

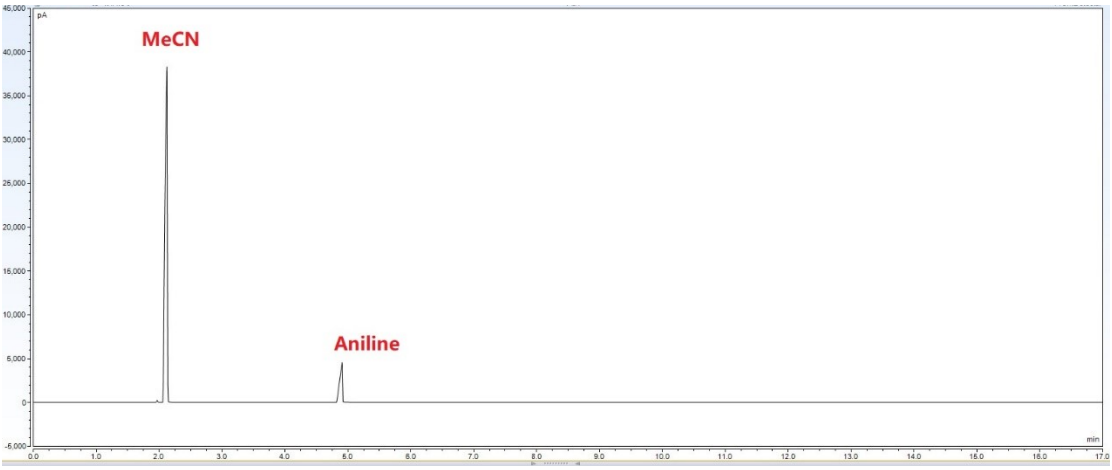

Fig. S11 GC spectrum of nitrobenzene transfer hydrogenation.

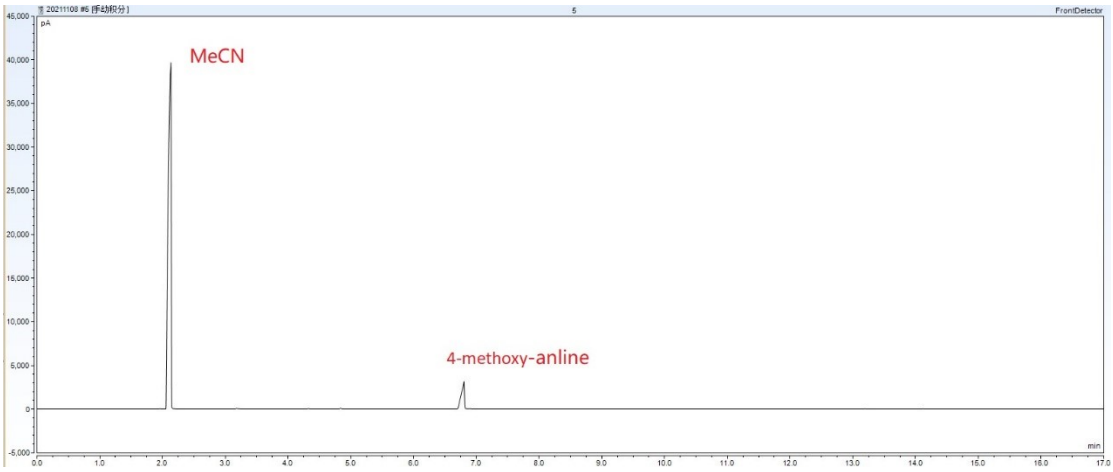

Fig. S12 GC spectrum of 4-methoxy-nitrobenzene transfer hydrogenation.

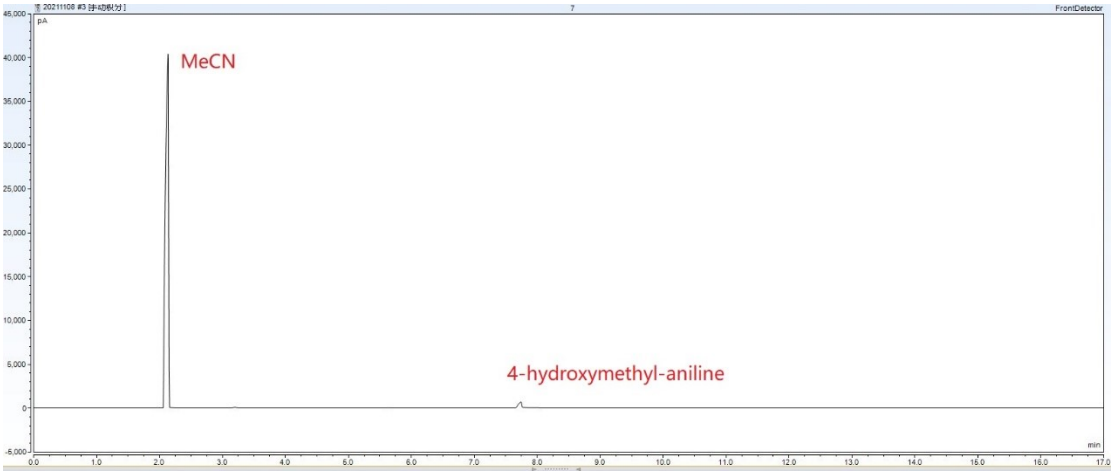

Fig. S13 GC spectrum of 4-hydroxymethyl-nitrobenzene transfer hydrogenation.

Fig. S14 GC spectrum of 1-nitroanthraquinone transfer hydrogenation.