Supporting Information

Cobalt and nitrogen co-doped mesoporous carbon for electrochemical hydrogen peroxide sensing: effect of graphitization

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Results

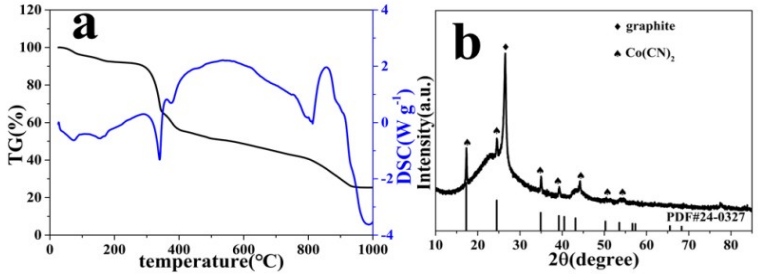

Fig.S1 (a) TGA-DSC curves of sample prepared with EDTA: Co^{2+}=1: 0.4; (b) XRD patterns of the sample prepared with EDTA: Co^{2+}=1: 0.4 after acid washing.

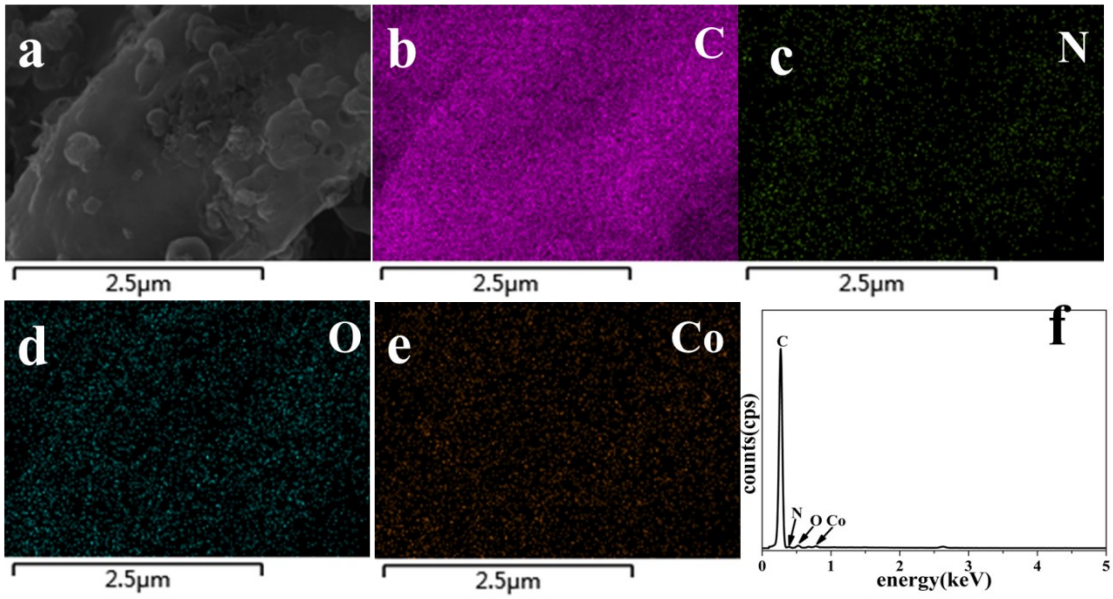

Fig.S2 FE-SEM (a) picture of Co-N/C-950; Elemental mapping images of C (b), N (c), O (d), Co (e) and EDS (f) of Co-N/C-950.

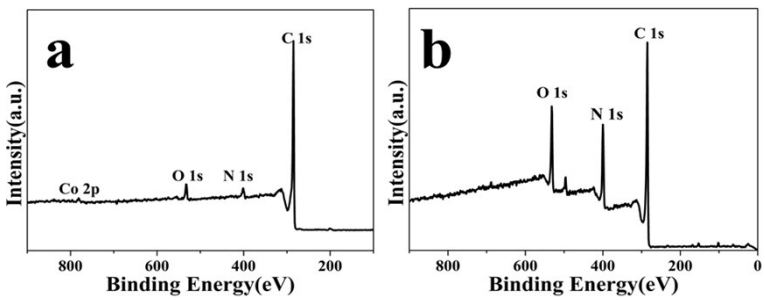

Fig.S3 (a) XPS full-scan spectra of Co-N/C-950; (b) XPS full-scan spectra of N/C; respectively.

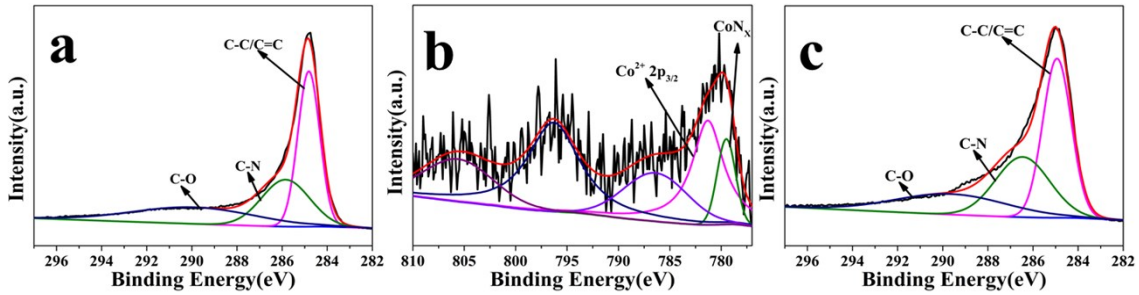

Fig.S4 (a) C 1s XPS spectra, (b) Co 2p XPS spectra of Co-N/C-950, and (c) C 1s XPS spectra of N/C; respectively.

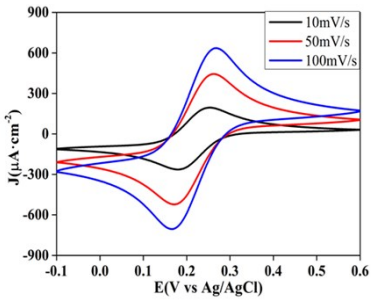

Fig.S5 Cyclic voltammograms of bare electrodes in 3mM $K_3[Fe(CN)_6]$+0.1M KCl solution at different scan rates.

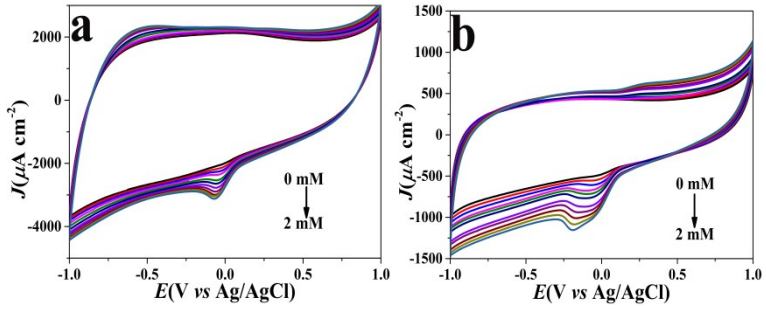

Fig.S6 Cyclic voltammograms (CV) of (a) Co-N/C-750 and (b) Co-N/C-850 on addition of different concentrations of H_2O_2 in N_2-saturated 0.1mol L^{-1} PBS (pH=7.4), potential scan rate 50mV s^{-1}.

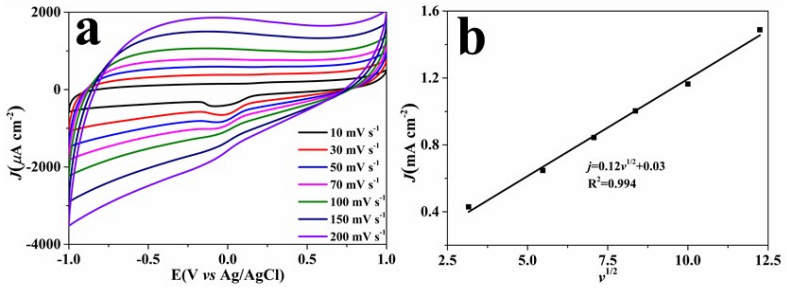

Fig.S7 CV curses (a) of Co-N/C-950 at different scan rates with 1 mM H_2O_2; the linear dependence plot of peak currents with scan rate (b).

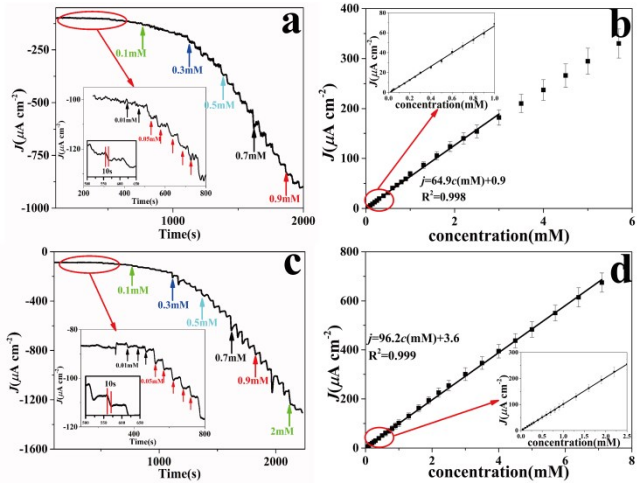

Fig.S8 Amperometric curves of (a) Co-N/C-750, (c) Co-N/C-850 with successive addition of H_2O_2 in N_2-saturated 0.1mol L^{-1} PBS (pH=7.4) at the applied potential of -0.1V and -0.15V under constant stirring. The inset pictures in (a) and (c) show the magnified cathodic current response to the low concentrations of H_2O_2. The corresponding calibration curves of (b) Co-N/C-750, (d) Co-N/C-850 toward H_2O_2 detection. The error bars represent the standard deviation of three separate measurements on the electrodes.

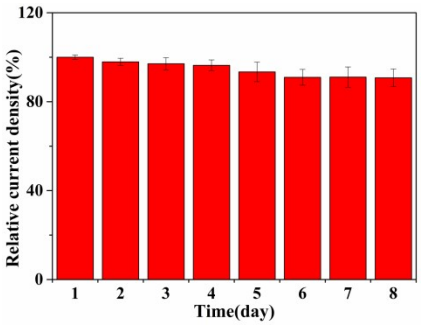

Fig.S9 Long term stability of Co-N/C-950/GCE studied in 1 mM H_2O_2 for 8 days.

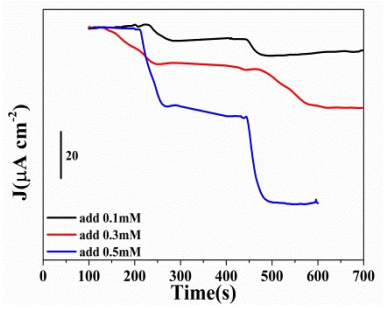

Fig.S10 Co-N/C-950 electrocatalyst for the detection of H_2O_2 in fresh water samples with different H_2O_2 concentration.

Table S1 ICP-MS data of Co-N/C-x (x=750, 850, 950)

catalysts	**Co (wt%)**
Co-N/C-750	1.93
Co-N/C-850	1.94
Co-N/C-950	1.44

Table S2 the BET data of Co-N/C-950 and N/C.

catalyst	Surface area (m^2 g^{-1})	Pore volume (cm^3 g^{-1})	Pore diameter (nm)
Co-N/C-950	211.35	0.25	4.47
N/C	463.20	0.45	3.84

Table S3 the element content of Co-N/C-950 and N/C.

catalyst	N (wt.%)	Co (wt.%)	N 1s				
			Pyridinic N	CoN_X	Pyrrolic N	Graphitic N	Oxidized N
Co-N/C-950	6.2	0.4	13.4	5.6	28.3	17.1	35.6
N/C	10.4	-	32.5	-	44.8	9.3	13.4