Supporting Information

N-, Fe- and Co-Tridoped Carbon Nanotube/Nanoporous Carbon Nanocomposite with Synergistically Enhanced Activity for Oxygen Reduction in Acidic Media

Gan Wang [1,†], Wanhua Wang [1,†], Li-Kun Wang [1,†], Wei-Tang Yao [2], Peng-Fei Yao [a], Wen-Kun Zhu [2], Ping Chen [1,*], Qing-Sheng Wu [3,*]

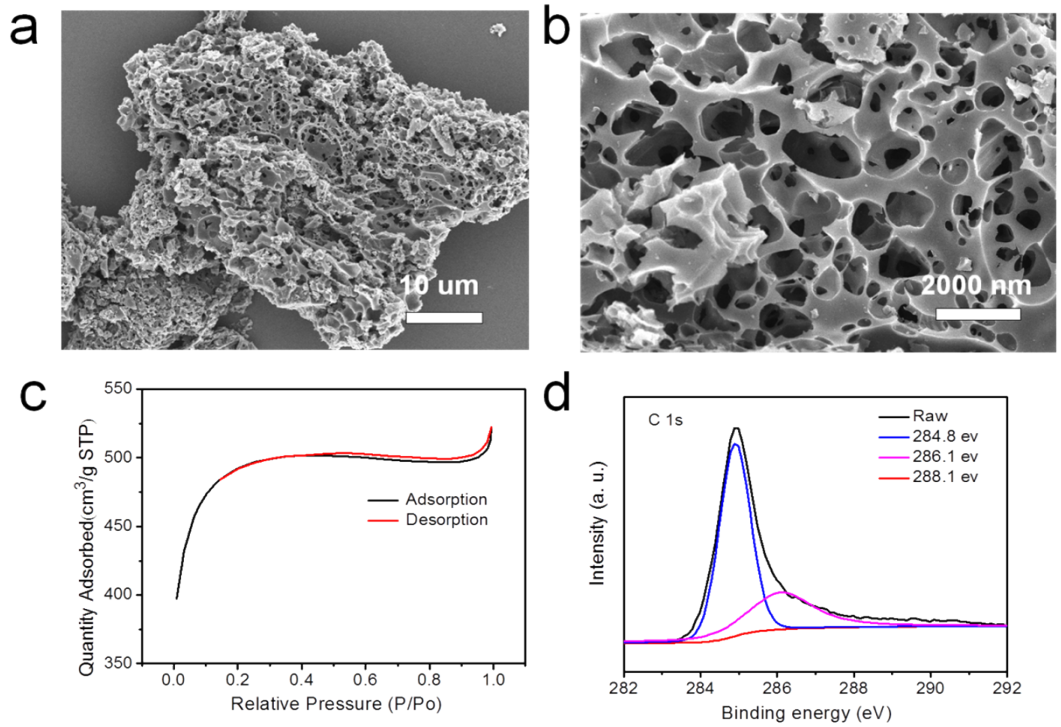
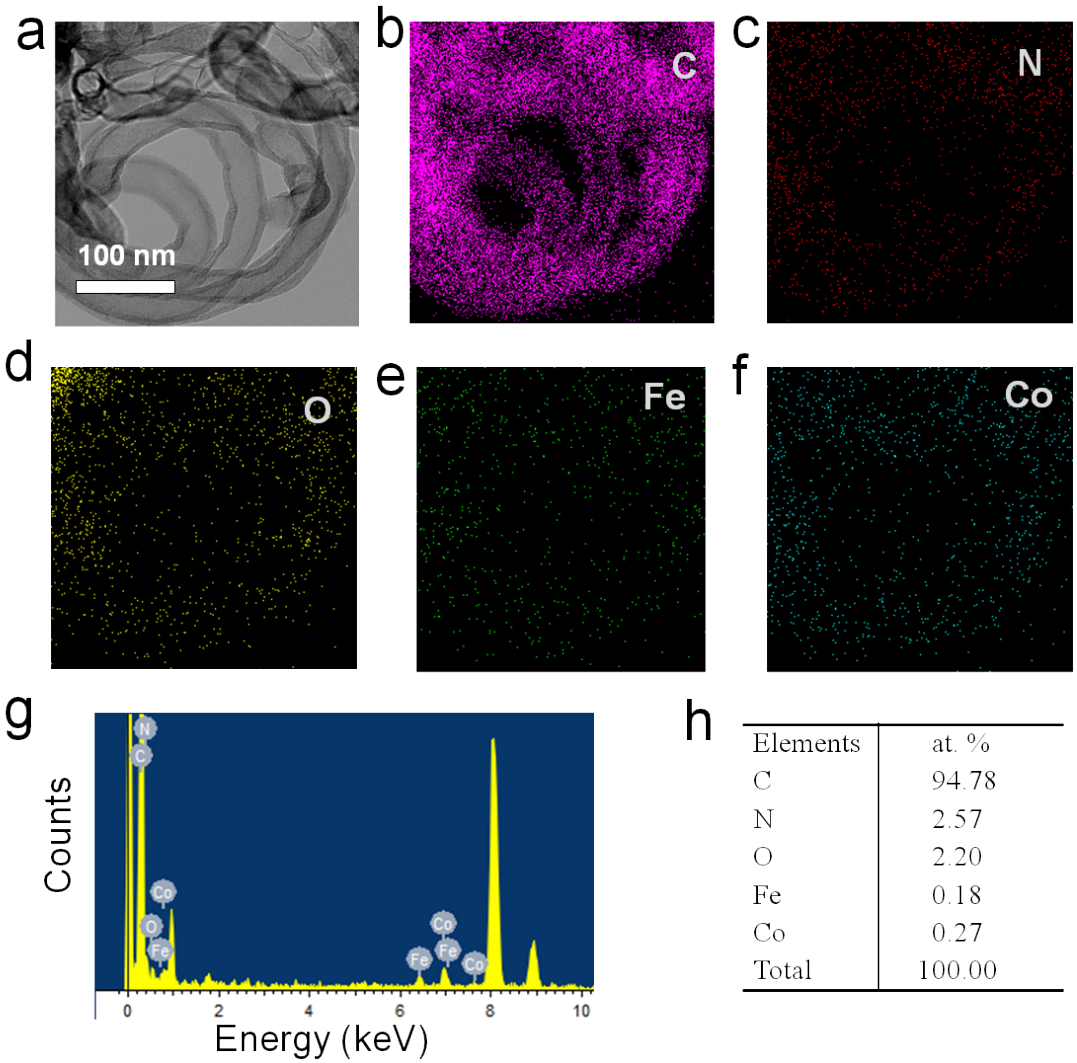


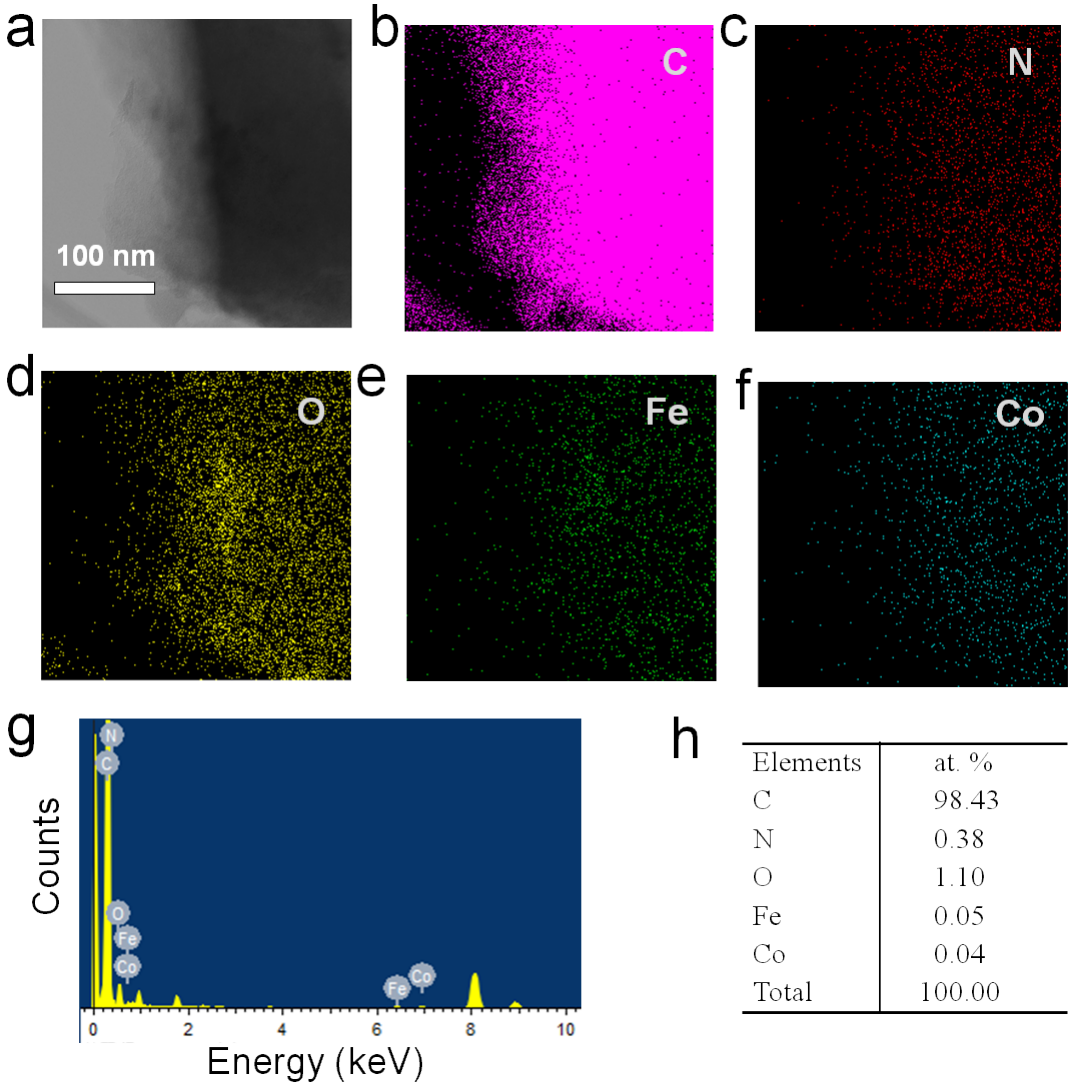
Figure S1. (a-b) SEM images of the NC; (c) Nitrogen adsorption-desorption isotherm of the NC and (d) The high-resolution C1s XPS spectra of the NC

From the Figure S1, the NC was the nanoporous carbon particles. The BET surface area, total pore volume and micropore volume of the NC was 1498.00 $m^2 g^{-1}$, 0.81 $cm^3 g^{-1}$ and 0.58 $cm^3 g^{-1}$, respectively. From the high resolution of C1s spectra, the peak at 284.8 eV corresponds to the sp^2-hybridized graphitic carbon, the peaks at 286.1 eV and 288.1 eV are attributed to C-OH and C=O configurations, respectively.



Elements	at. %
C	94.78
N	2.57
O	2.20
Fe	0.18
Co	0.27
Total	100.00

Figure S2. (a) STEM images of the typical NFeCo-CNT/NC in the square region marked with **A** in the Figure 1b; (b-f) carbon, nitrogen, oxygen, ferrum and cobalt element mappings; (g-h) elemental analysis data of the typical NFeCo-CNT/NC in the square region marked with **A** in the Figure 1b.



Elements	at. %
C	98.43
N	0.38
O	1.10
Fe	0.05
Co	0.04
Total	100.00

Figure S3. (a) STEM images of the typical NFeCo-CNT/NC in the square region marked with **B** in the Figure 1b; (b-f) carbon, nitrogen, oxygen, ferrum and cobalt element mappings; (g-h) elemental analysis data of the typical NFeCo-CNT/NC in the square region marked with **B** in the Figure 1b.

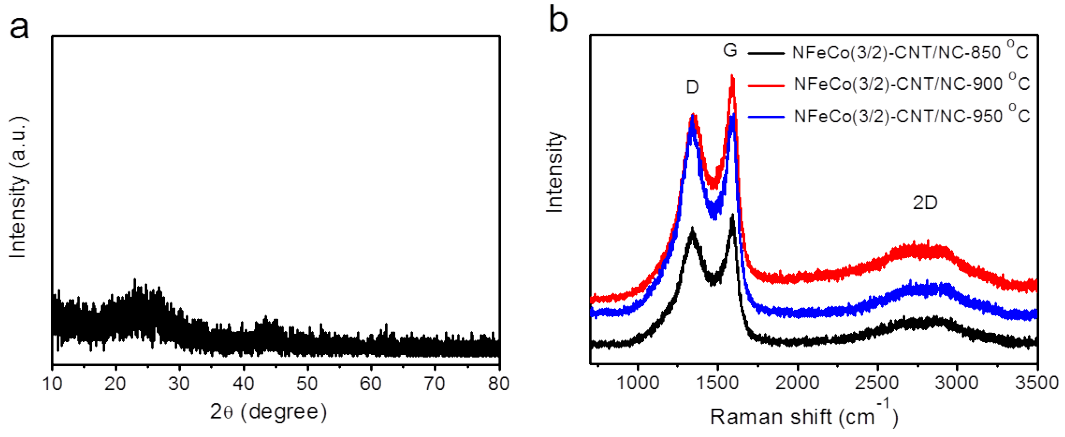


Figure S4. (a) X-ray diffraction of the typical product and Raman spectra of the products

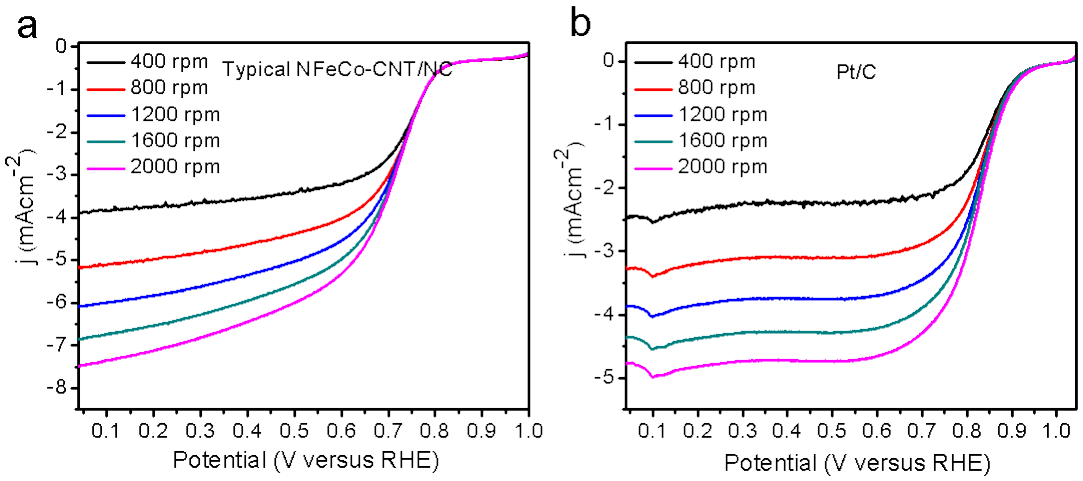


Figure S5. (a-b) RDE voltammograms for the ORR at the typical NFeCo-CNT/NC and Pt/C electrodes at the various rotation speeds (sweep rate 20 mVs^{-1})

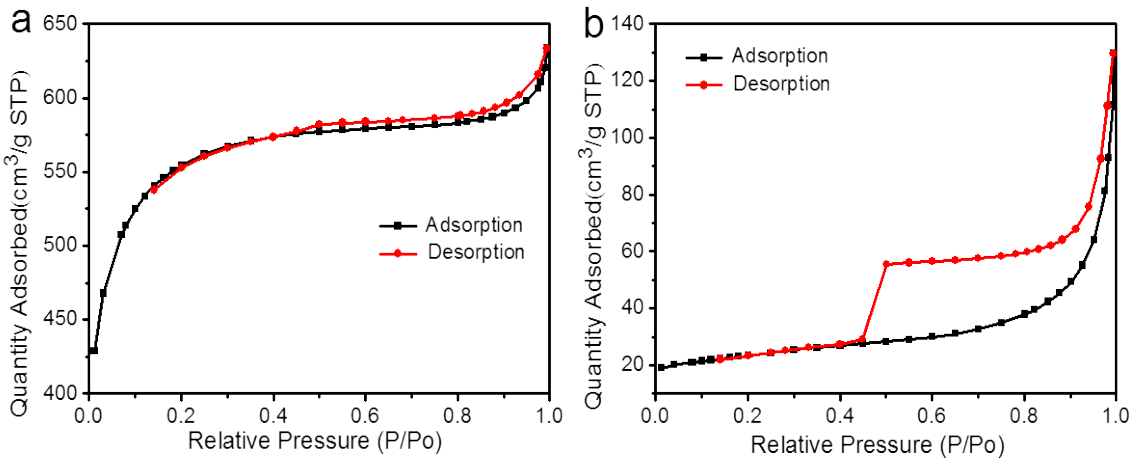


Figure S6. Nitrogen adsorption-desorption isotherm of the FeCo-NC (a) and NFeCo-CNT (b)

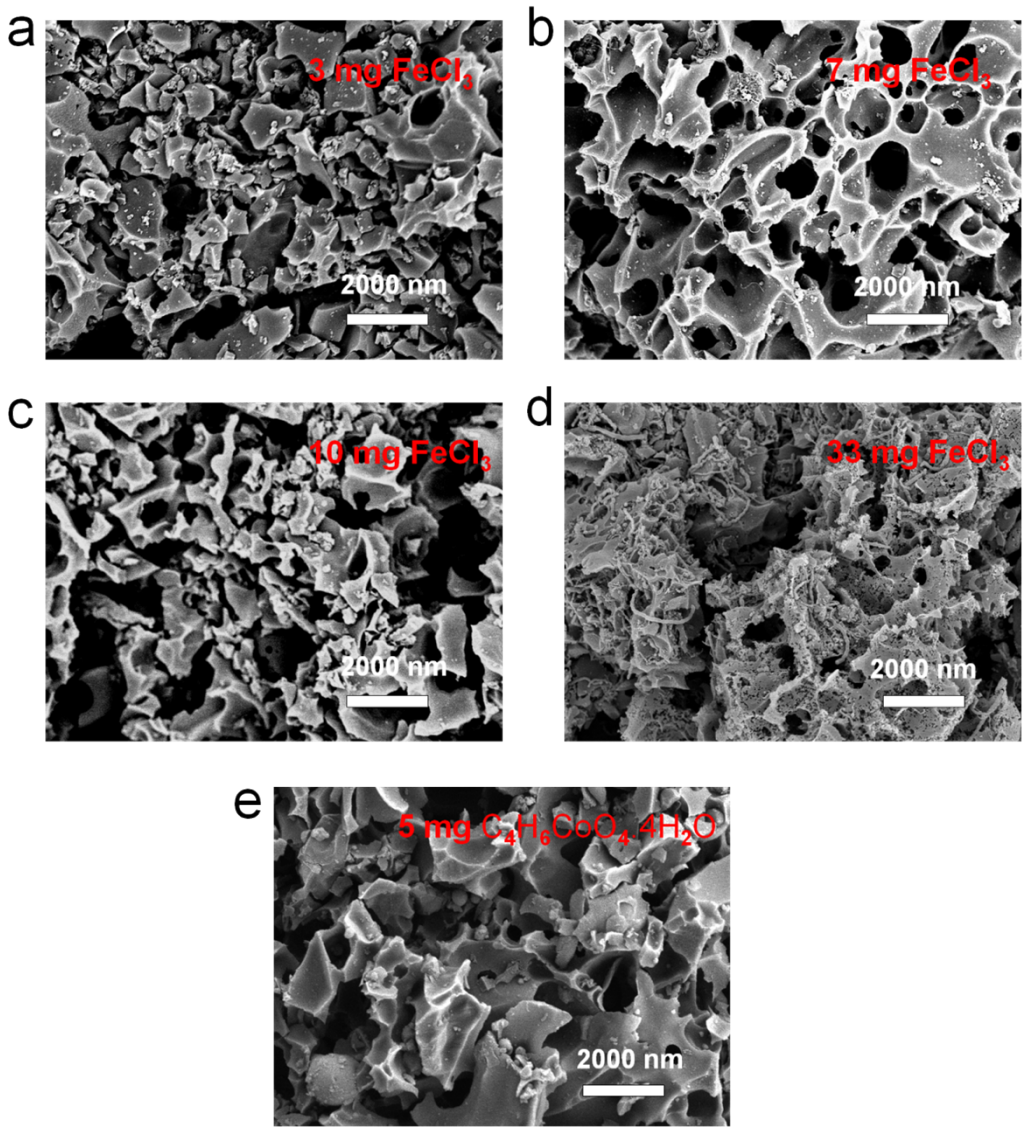


Figure S7. (a-d) SEM images of the products using different amount of $FeCl_3$ and (e) SEM image of the product using $C_4H_6CoO_44H_2O$

Table S1. Content of C, N, O, Fe and Co of the products from the XPS data

Samples	Atomic Content, %				
	C	N	O	Fe	Co
Typical NFeCo-CNT/NC	89.59	3.28	6.49	0.36	0.28
NC	92.67	without	7.33	without	without
NFeCo-CNT	88.68	5.06	4.83	0.83	0.61
FeCo-NC	92.13	1.68	5.40	0.54	0.25
NFeCo(2/3)-CNT/NC	90.15	2.69	6.68	0.25	0.24
NFeCo(4/1)-CNT/NC	87.46	3.59	8.31	0.42	0.22