Electronic Supplementary Material (ESI) for RSC Advances.

Highly Efficient Electrocatalysts with $CoO/CoFe_2O_4$ Composites embedded within N-doped Porous Carbon Materials Prepared by Hard-template Method for Oxygen Reduction Reaction

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Table S1. The surface area and mean pore size distribution of FeCo/NPC pyrolyzed at various temperature of 600 to 1000 °C.

Electrocatalysts	S_{BET}	D_{ave} (nm)
FeCo/NPC (600)	861	4.0
FeCo/NPC (700)	894	4.2
FeCo/NPC (800)	761	4.3
FeCo/NPC (900)	958	3.2
FeCo/NPC (1000)	990	5.8

Table S2. The $E_{1/2}$ comparison of NNMEs with different transition metal salts (Fe or/and Co), metal-free NNME and commercial Pt/C measured in 0.1 M KOH solution.

Electrocatalysts	Co	$FeCo_3$	FeCo	Fe_3Co	Fe	metal free	Pt/C
$E_{1//2}$ (V vs. RHE)	0.728	0.831	0.865	0.833	0.791	0.745	0.844

Table S3. The surface area and mean pore size distribution of NNMEs: NNME-No MgO (900), NNME-No Adipic acid (900) and FeCo/NPC (900).

Electrocatalysts	S_{BET} ($m^2\ g^{-1}$)	S_{mic} ($m^2\ g^{-1}$)	V_t ($cm^3\ g^{-1}$)	D_{ave} (nm)
NNME-No MgO (900)	417	166	0.4	4.2
NNME-No Adipic acid (900)	833	598	0.5	2.8
FeCo/NPC (900)	958	720	0.7	3.2

Table S4. The $E_{1/2}$ comparison of NNMEs compared with reported data in 0.1 M KOH solution.

Electrocatalyst	Cat. loading (mg cm^{-2})	E_{onset} (V vs. RHE)	$E_{1/2}$ (V vs. RHE)	Reference
CNT/HPC-1000	0.6	0.92	0.82	*Angew. Chem. Int. Ed.* **2014**, 53, 4102-4106 [1]
Carbon-L	0.1	0.86	0.70	*Energy Environ. Sci.* **2014**, 7, 442-450 [2]
Fe-N/C-800	0.1	0.92	0.81	*J. Am. Chem. Soc.* **2014**, 136, 11027-11033 [3]
PANI-4.5Fe-HT2 (SBA-15)	0.61	0.95	0.84	*J. Mater. Chem. A* **2014**, 2, 8617-8622 [4]
Fe-N-GC-900 (2:1)	0.2	1.01	0.86	*ACS Catal.* **2014**, 4, 1793-1800 [5]
Fe_3C/NG-800	0.4	1.03	0.86	*Adv. Mater.* **2015**, 27, 2521-2527 [6]
Co@Co_3O_4@C-CM	0.1	0.93	0.81	*Energy Environ. Sci.* **2015**, 8, 568-576 [7]
N/Co-doped PCP//NRGO	0.714	0.97	0.86	*Adv. Funct. Mater.* **2015**, 25, 872-882 [8]
N-Carbon nanotube frameworks	0.2	0.97	0.87	*Nat. Energy* **2016**, 1, 15006 [9]
Core/shell NPME	0.6	0.936	0.87	*Adv. Funct. Mater.* **2017**, 1604356 [10]
FeCo/NPC (900)	0.6	0.934	0.865	This work

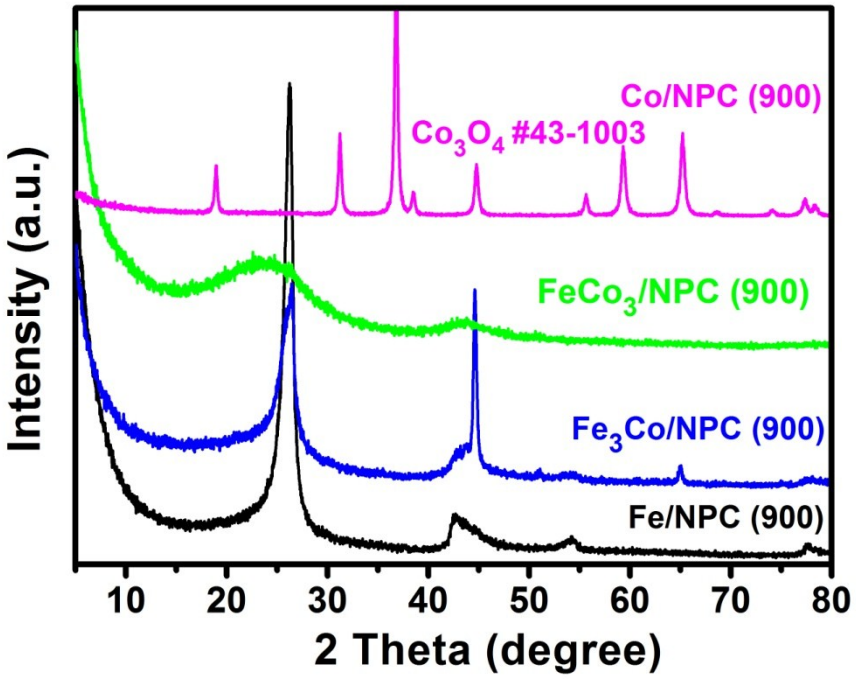
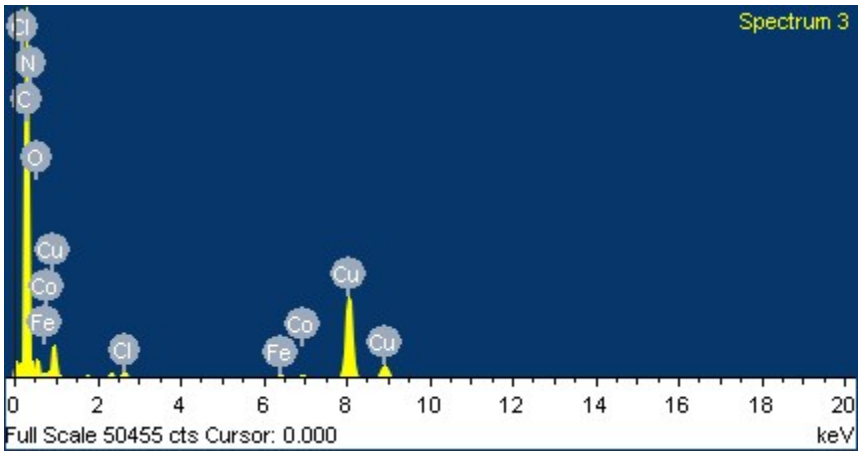


Fig. S1. The XRD patterns of NNMEs prepared with different ratio of Fe and Co, including only Fe, Fe_3Co, $FeCo_3$ and only Co.



(a)

Element	Weight%	Atomic%
C K	70.84	88.33
N K	3.47	3.71
O K	2.55	2.38
Cl K	0.58	0.25
Fe K	0.30	0.08
Co K	0.53	0.14
Cu K	21.73	5.12
Totals	100.00	

(b)

Fig. S2. The EDX (a) and the according element content (b) of FeCo/NPC (900).

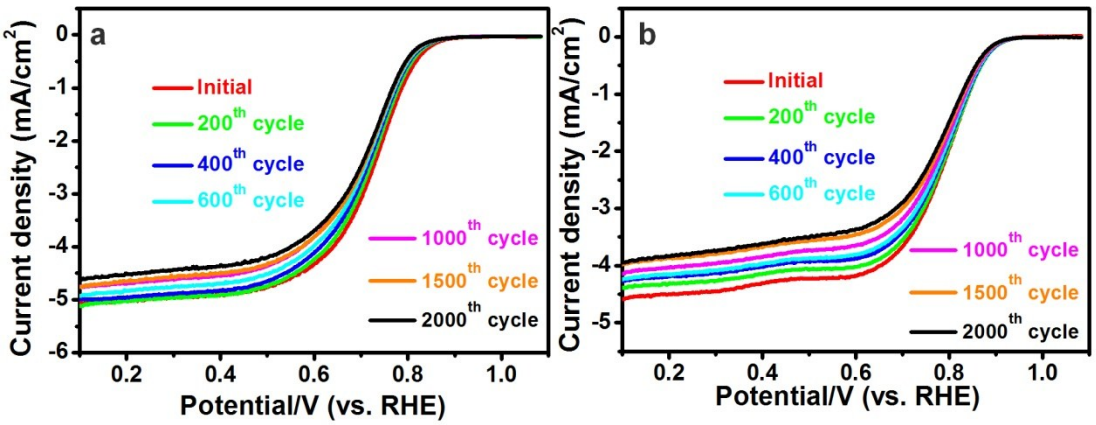


Fig. S3. ORR polarization curves of (a) Co/NPC (900) and (b) Fe/NPC (900) at 1600 rpm with a scan rate of 5 mV s^{-1} in O_2-saturated 0.1 M KOH solution.

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