

Iron and Nitrogen Co-doped Hierarchical Porous Graphite Carbon for High-Efficiency Oxygen Reduction Reaction In a Wide Range of pH

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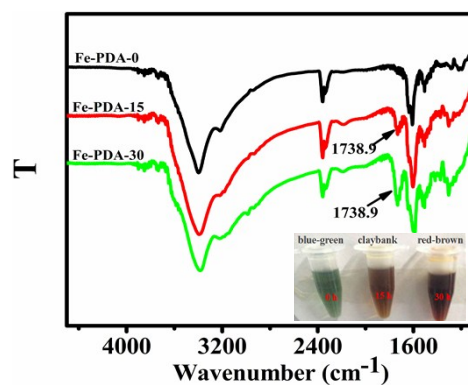


Figure S1 Infrared spectra of the gel polymer precursors with different polymerization time of 0 h, 15 h and 30 h. The inset is the corresponding color variation pictures at different polymerization time.

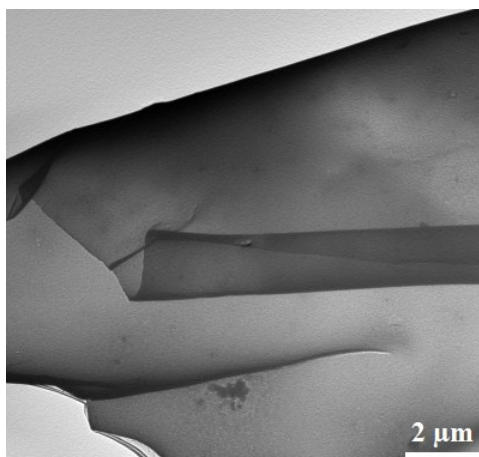


Figure S2 TEM image of the obtained precursor of Fe-PDA-30.

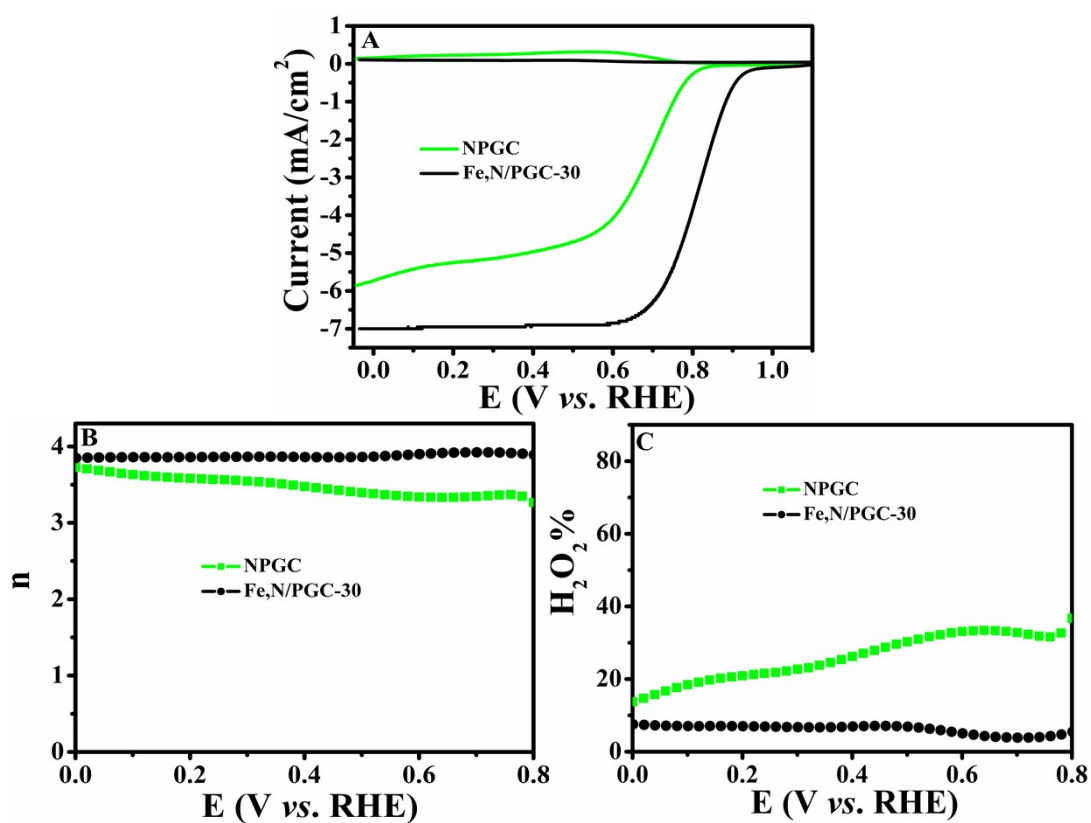


Figure S3 LSV curves (A) electron transfer number (B) and H₂O₂ yield (C) of NPGC and Fe,N/PGC-30 catalysts were measured in 0.1 M KOH electrolyte. The scan rate and rotation rate were 5 mV/s and 1600 rpm, respectively.

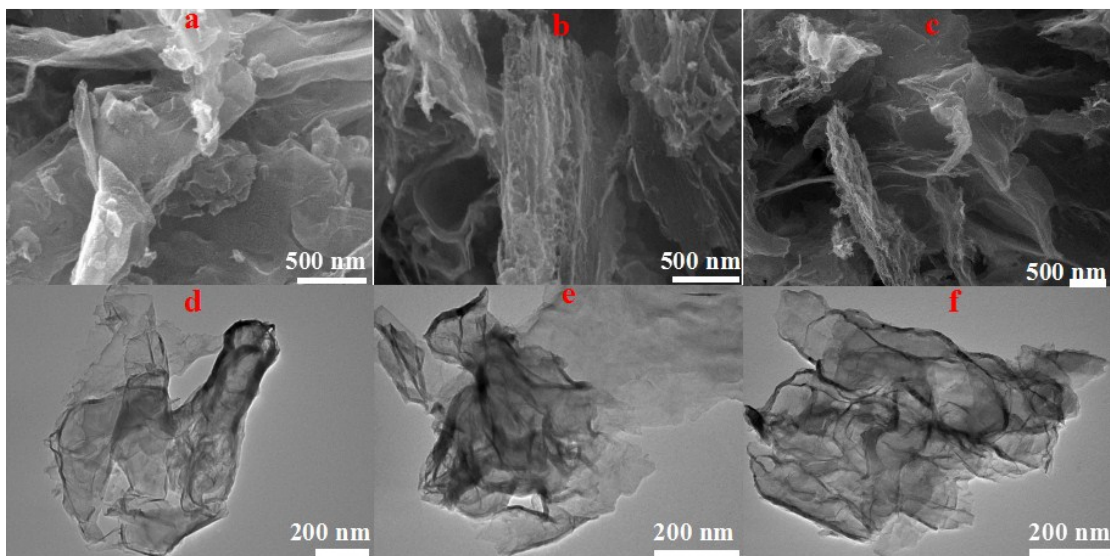


Figure S4 SEM images of Fe,N/PGC-0 (a), Fe,N/PGC-15 (b) and Fe,N/PGC-30 (c); TEM images of Fe,N/PGC-0 (d), Fe,N/PGC-15 (e) and Fe,N/PGC-30 (f).

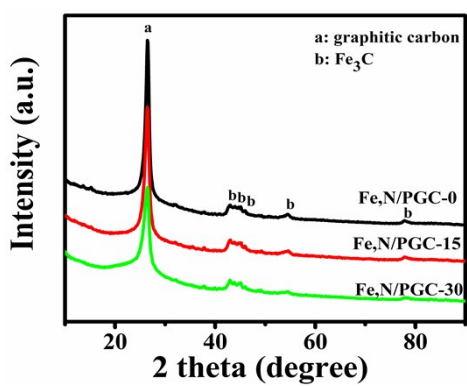


Figure S5 XRD patterns of different catalysts.

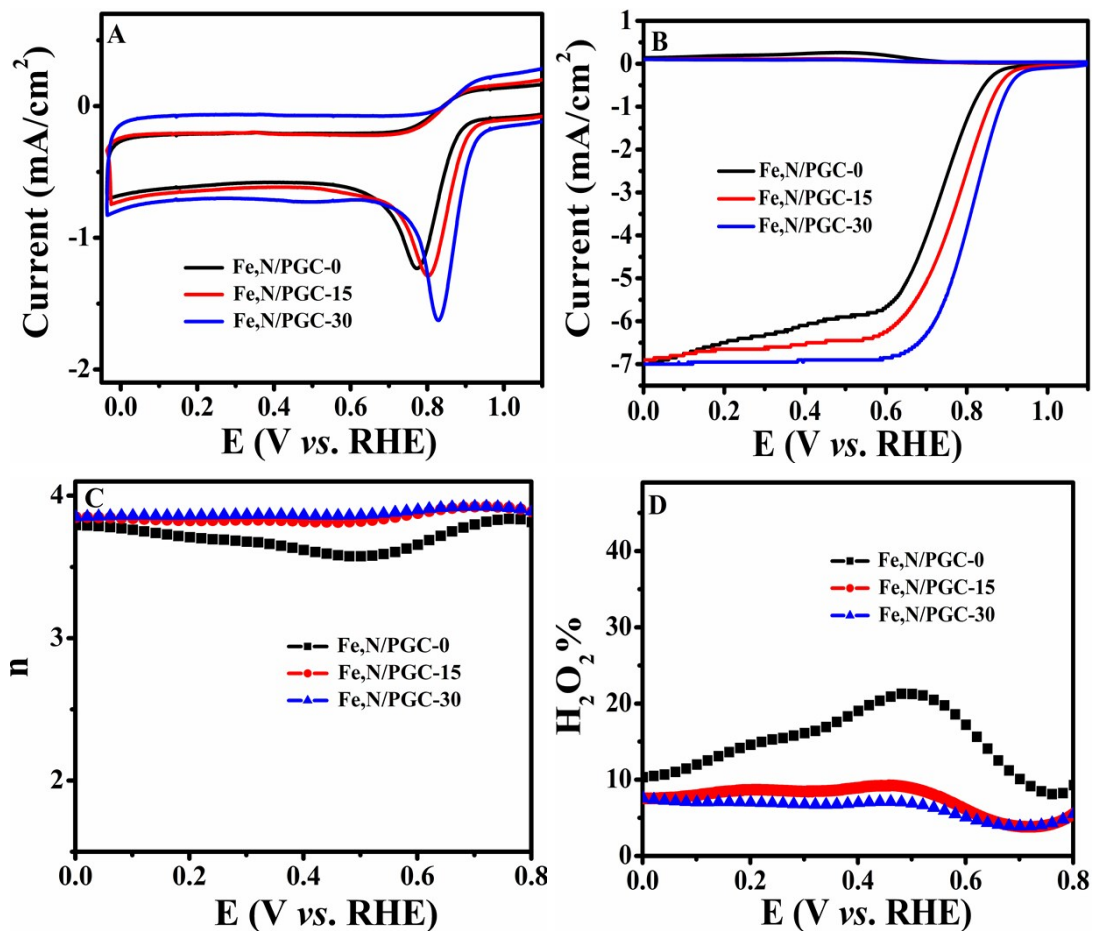


Figure S6 CV curves (A) of the different catalysts in an O₂-saturated 0.1 M KOH solution. LSV curves (B) electron transfer number (C) and H₂O₂ yield (D) of different catalysts were measured in 0.1 M KOH electrolyte. The scan rate and rotation rate were 5 mV/s and 1600 rpm, respectively.

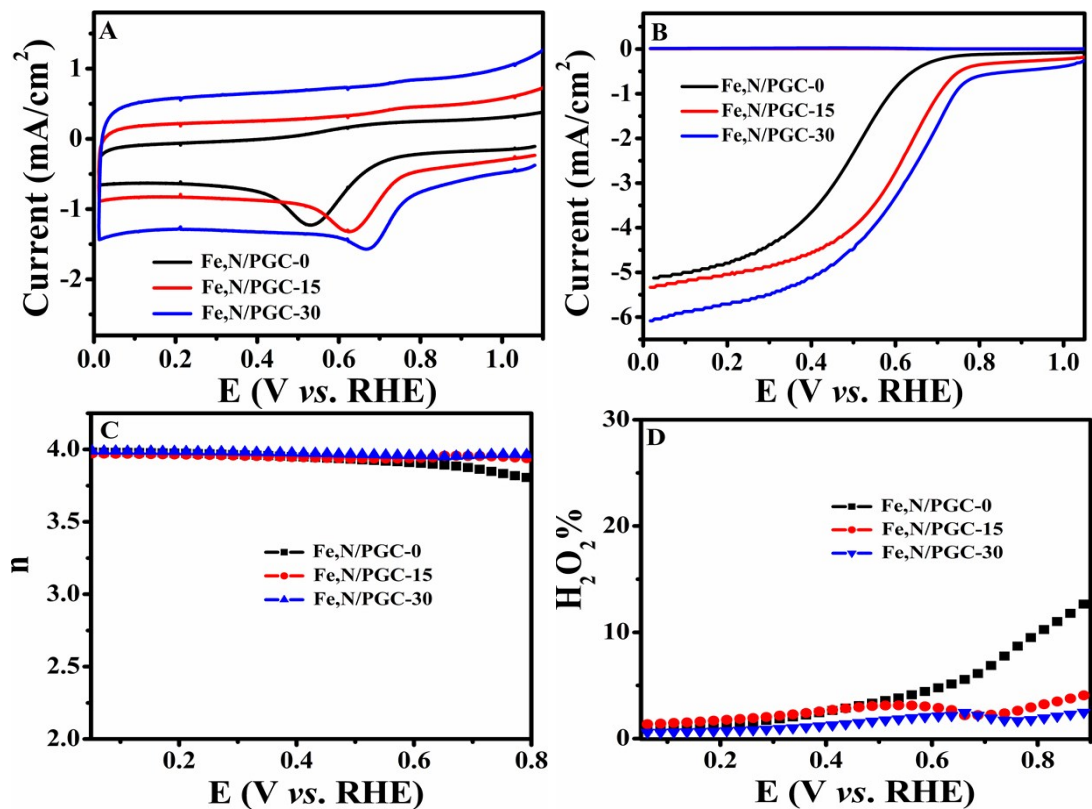


Figure S7 CV curves (A) of the different catalysts in an O_2 -saturated 0.5 M H_2SO_4 solution. LSV curves (B) electron transfer number (C) and H_2O_2 yield (D) of different catalysts were measured in 0.5 M H_2SO_4 electrolyte. The scan rate and rotation rate were 5 mV/s and 1600 rpm, respectively.

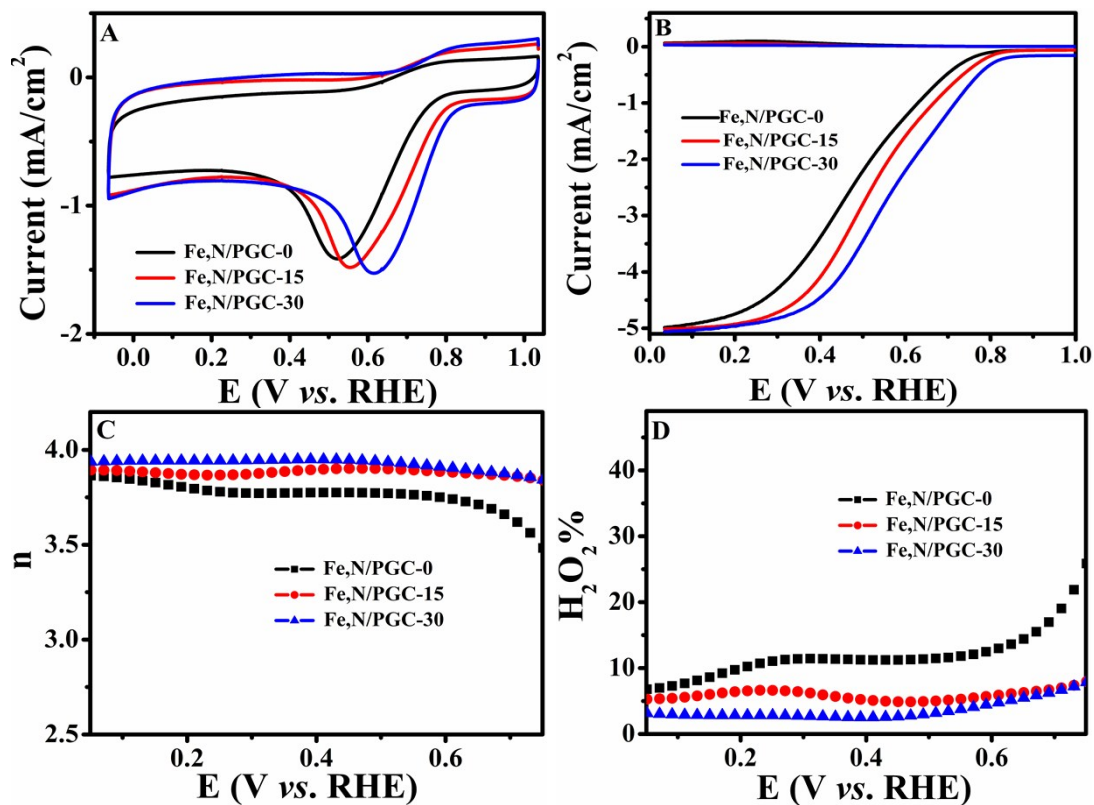


Figure S8 CV curves (A) of the different catalysts in an O₂-saturated 0.1 M PBS (pH = 7.4) solution. LSV curves (B) electron transfer number (C) and H₂O₂ yield (D) of different catalysts were measured in 0.1 M PBS (pH = 7.4) electrolyte. The scan rate and rotation rate were 5 mV/s and 1600 rpm, respectively.

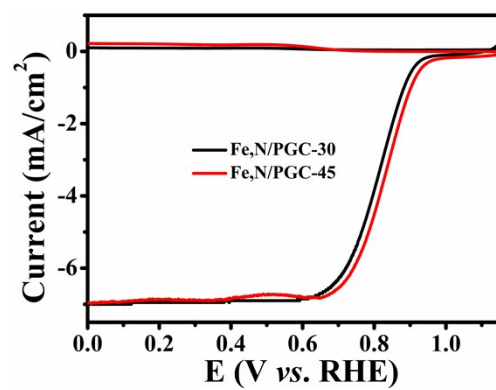


Figure S9 LSV of the Fe,N/PGC-30 and Fe,N/PGC-45 catalysts in O₂ saturated 0.1 M KOH electrolyte with the scan rate of 5 mVs⁻¹. Rotation rate is 1600 rpm.

Table S1 Comparison of the ORR ability of various catalysts.

Catalysts	Electrolyte	E_{onset} (V) vs. RHE	$E_{1/2}$ (V) vs. RHE	Electron transfer number (n)	Reference
	0.1 M KOH	0.96	0.82	3.9	This work
Fe,N/PGC-30	0.5 M H ₂ SO ₄	0.86	0.64	3.97	
	0.1 M PBS	0.85	0.61	3.96	
Cu-CTF/CP	0.1 M PBS	0.81	0.59	3.75-3.95	1
Fe-N/C-800	0.1 M KOH	0.923	0.8	3.9	2
	0.1 M HClO ₄	0.72	0.55	3.97	
Fe-P-C	0.1 M KOH	0.95	—	3.62	3
	0.1 M HClO ₄	0.84	0.52	3.8	
CoS ₂ /N,S-GO	0.1 M KOH	0.79	—	3.81	4
Co-C@Co ₉ S ₈ DSNCs	0.1 M KOH	0.96 V	0.8	3.8	5
g-C ₃ N ₄ /C	0.1 M KOH	0.6	—	3.17	6
Co-O ₄ -N	0.1 M KOH	0.88	0.81	3.75	7
—: no data presented.					

Table S2 The Brunauer-Emmet-Teller (BET) surface area of different catalysts.

	Fe,N/PGC-0	Fe,N/PGC-15	Fe,N/PGC-30
BET surface area			
(m ² g ⁻¹)	172.85	433.649	509.331
Pore volume			
(cm ³ g ⁻¹)	0.20	0.293	0.315

Table S3 The Elemental compositions of different catalyst samples determined by EDX (ICP-AES).

elements compositions (%) determined by EDX At %					
Samples	(ICP-AES wt%)				
	C atom %	O atom %	N atom %	Fe atom %	(Fe) wt %
Fe,N/PGC-0	91.47	3.57	4.77	0.18	(0.82)
Fe,N/PGC-15	90.22	4.15	5.35	0.28	(1.26)
Fe,N/PGC-30	87.65	5.08	6.86	0.41	(1.84)

References

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