Supporting Information

Super-Dispersed Fe–N Sites Embedded into Porous Graphitic Carbon for ORR: Size, Composition, and Activity Control

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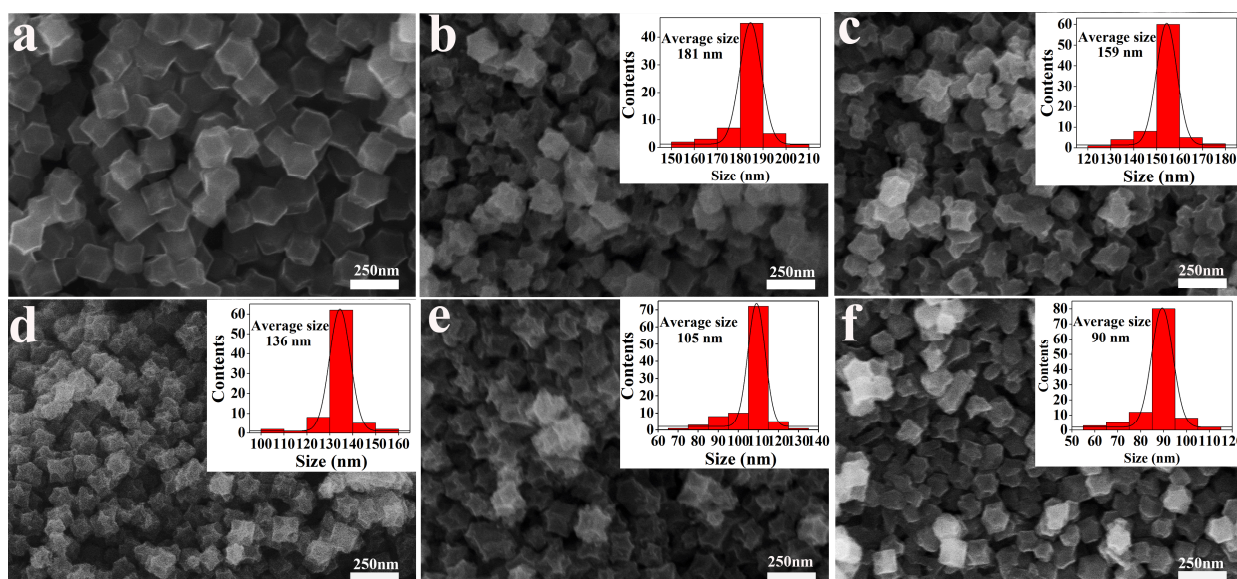* Correspondence: liujiancong@hlju.edu.cn (J.L.); wangruihong@hlju.edu.cn (R.W.); Tel.: +86-0451-86604331

Figure S1. (**a**) SEM image of Fe-ZIF-0.05 precursor and (**b–f**) SEM images of Fe-N/C-0.05-600, Fe-N/C-0.05-700, Fe-N/C-0.05-800, Fe-N/C-0.05-900 and Fe-N/C-0.05-1000. The illustration shows the particle size distribution.
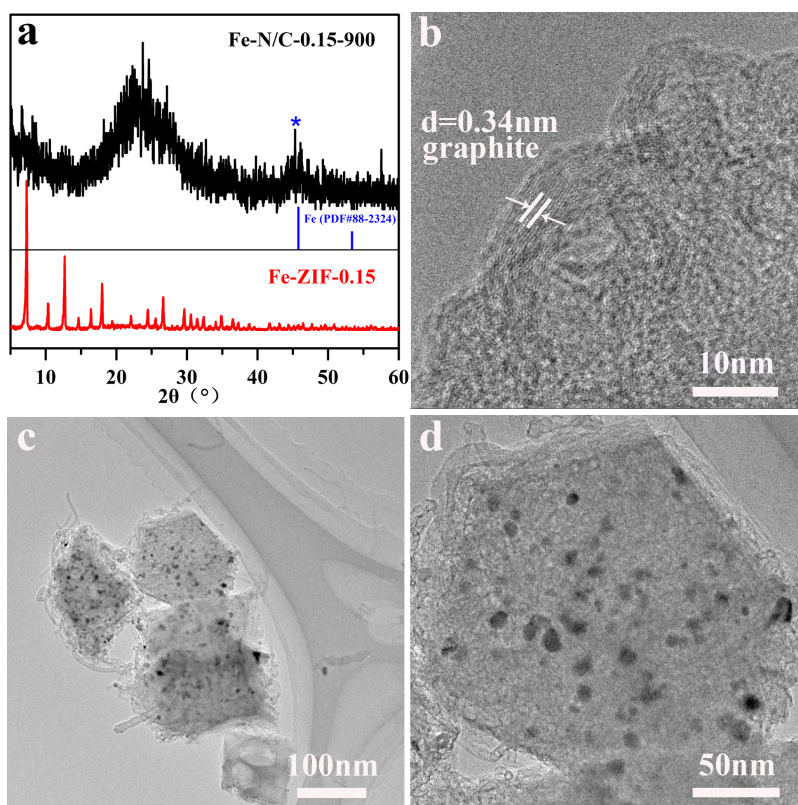
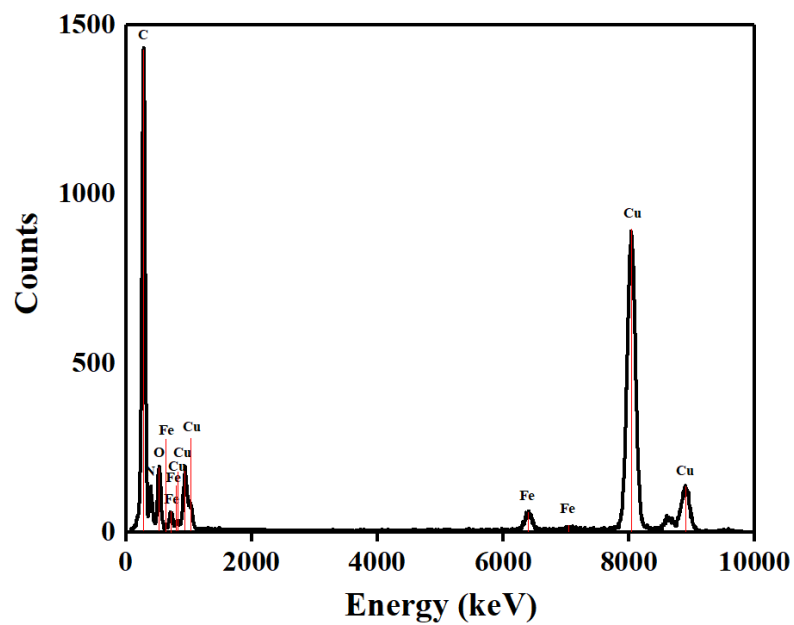**Figure S2.** (**a**) XRD and (**b–d**) TEM images of Fe-N/C-0.15-900

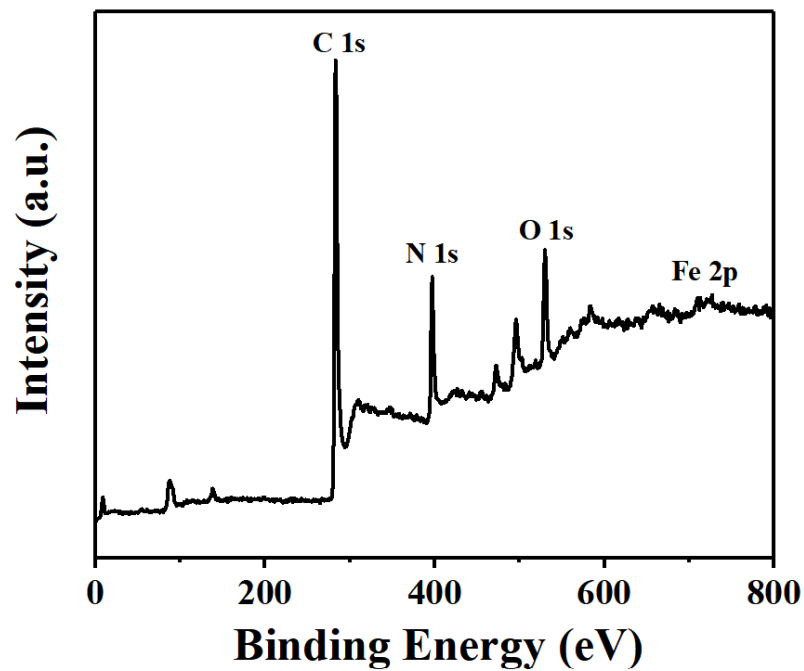**Figure S3.** The sum spectrum of the maps for Fe-N/C-0.05-900

Figure S4. The full spectrum of Fe-N/C-0.05-900

Table S1. The element atomic contents of Fe, C, N and O in Fe-N/C-0.05-900 by XPS measurement

Sample	Element atomic ration (%)			
Fe-N-C-0.05-900	Fe	C	N	O
	1.20	87.76	7.34	3.70

Table S2. The comparison of ORR activity between our work and the references

Catalyst	E_{onset} (mV)	$E_{1/2}$ (mV)	J_{lim} (mA cm^{-2})	Tafel Slope (mV/dec)	Electrolyte	Refs.
Fe-N/C-0.05-900	**99**	**88.5**	**4.8**	**52**	**0.1 M KOH**	**In this work**
Fe–N/C-155	100	85	6.0	--	0.1 M KOH	*J. Mater. Chem. A.* **2019**, *7*, 16508-16515. (Ref. 29 in paper)
FeNi0.25-NC	--	86	5.8	--	0.1M NaOH	*Appl. Surf. Sci.* **2021**, *538*, 148017. (Ref. 30 in paper)
C–Fe(OH)₃@ZIF-1000	99	88	5.9	--	0.1 M KOH	*ACS Appl. Energy Mater.* **2019**, *2*, 3194-3203. (Ref. 31 in paper)
NC@CoFe,NeCNP	97	86.5	7.99@85mV	61	1.0 M KOH	*Int. J. Hydrog. Energy.* **2021**, *46*, 9341-9350. (Ref. 32 in paper)
Fe–N₅/C@G	88	83	5.5	--	0.1 M KOH	*New J. Chem.* **2021**,*45*,13004-13014. (Ref. 1 in ESI)
HP S-doped Fe-N-C	99	91	4.47	56	1.0 M KOH	*Mater. Today Energy* **2021**, *19*, 100624 (Ref. 2 in ESI)
Fe SAs/N-C	101	91	5.8	--	0.1 M KOH	*ACS Catal.* **2019**, *9*, 2158-2163. (Ref. 3 in ESI)
FeNPs@PANI/rGO	106.1	94.2	4.5	64	0.1 M KOH	J.Power Sources. **2020**, *451*, 227733. (Ref. 4 in ESI)

Fe/N/C-48–950–1	99	86	4.8	--	0.1 M KOH	*Electrochim. Acta* **2021**, *366*, 137408. (Ref. 5 in ESI)
Fe-N/C	97.1	84.4	5.68	67	0.1 M KOH	*Int. J. Hydrog. Energy* **2019**, *44*, 27379-27389. (Ref. 6 in ESI)
Fe-N/C	82	72	5.0	55.6	0.1 M KOH	*ACS Catal.* **2017**, *7*, 1655-1663. (Ref. 7 in ESI)

References

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[3]. Yang, Z. k.; Wang, Y.; Zhu, M.Z.; Li, Z.J.; Chen, W.X.; Wei, W.C.; Yuan, T.W.; Qu, Y.T.; Xu, Q.; Zhao, C. M. Boosting oxygen reduction catalysis with Fe−N_4 Sites decorated porous carbons toward fuel cells. *ACS Catal.* **2019**, *9*, 2158-2163.

[4]. Mohammad S. A.; Halima B.;Young-Bae K.; Iron nanoparticles implanted metal-organic-frameworks based Fe–N–C catalysts for high-performance oxygen reduction reaction. *J. Power Sources.* **2020**, *451*, 227733. 5.

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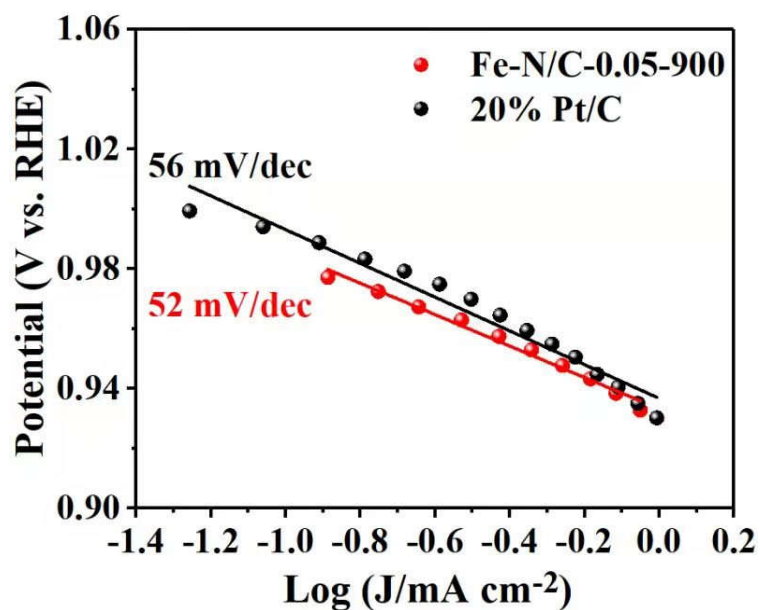Fe-Nx sites for advanced oxygen reduction in acid media. *ACS Catal*. **2017**, *7*, 1655-1663.

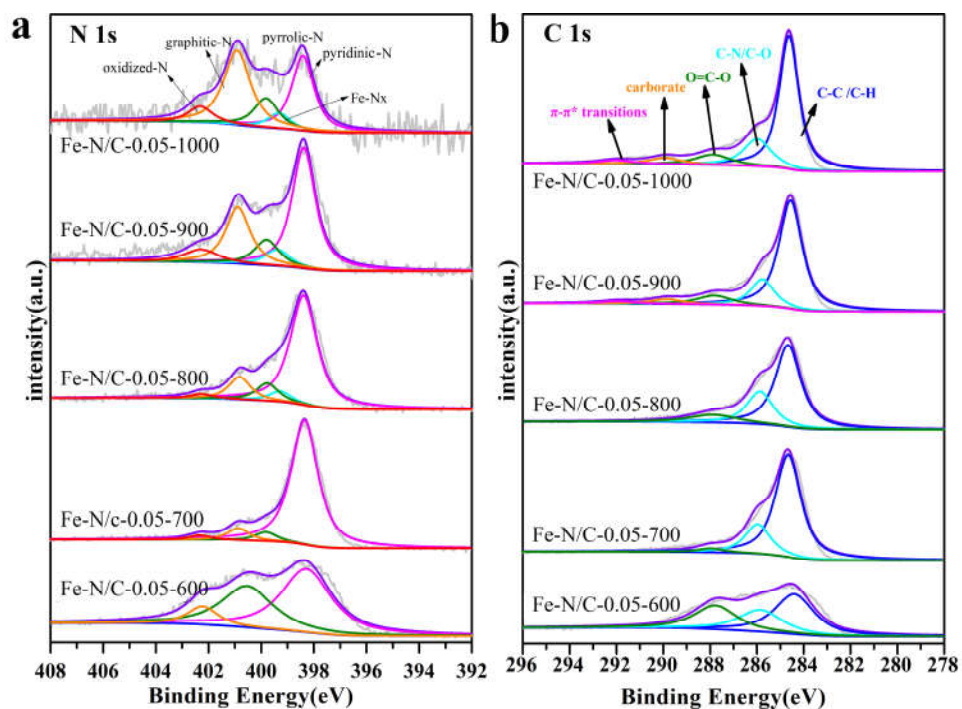**Figure S5.** Tafel curves of Fe-N/C-0.05-900 and 20% Pt/C catalysts

Figure S6. The evolution of XPS N 1s (**a**) and C 1s (**b**) spectra of the Fe-N/C catalysts with increasing heating temperature up to 1000 °C.

Table S3. The N elemental quantification determined by XPS analysis

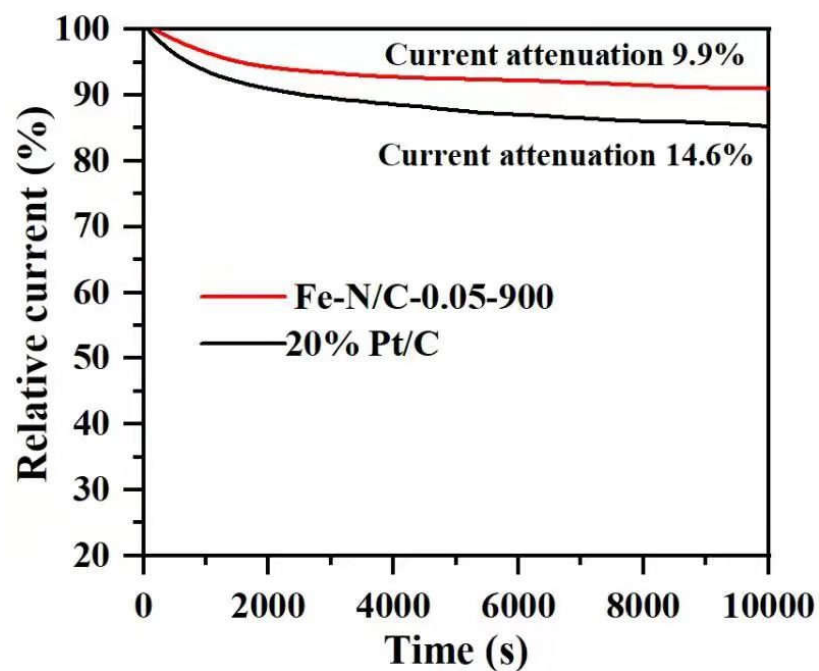|	Fe-N/C-0.05-600	Fe-N/C-0.05-700	Fe-N/C-0.05-800	Fe-N/C-0.05-900	Fe-N/C-0.05-1000
N at%	16.21	17.71	13.88	7.34	3.69

Figure S7. Chronoamperometric curves of Fe-N/C-0.05-900 and 20%Pt/C electrodes in O_2-saturated 0.1 M KOH at a rotating speed of 1600 rpm, the potential was controlled at 0.75 V for 10000 s.