Supporting Information for

Preparation of Monodispersed Ferrous Nanoparticles Embedded Carbon Aerogels via *in-situ* Solid Phase Polymerization for Electrocatalytic Oxygen Reduction

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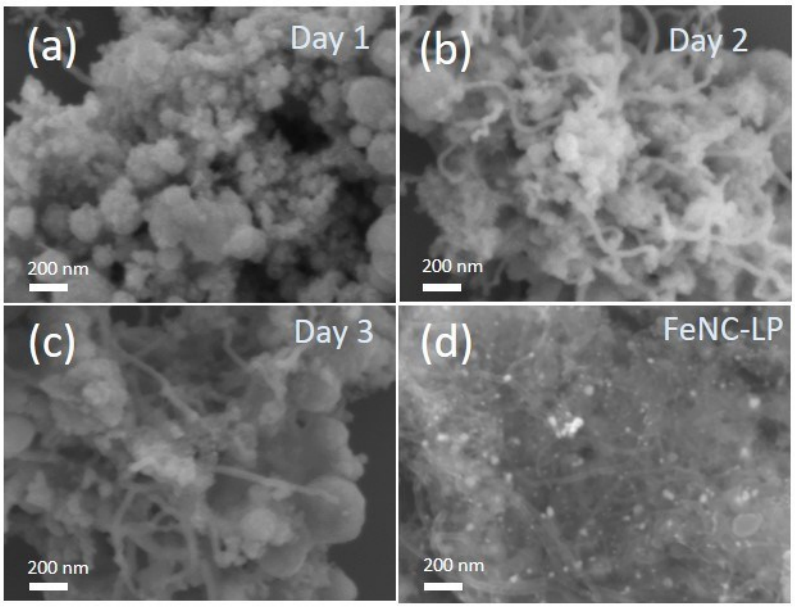

Figure S1. SEM images of the intermediate products obtained after liquid phase polymerization conducted under 25 °C for 1, 2 and 3 days (a-c) and the final FeNC-LP (d).

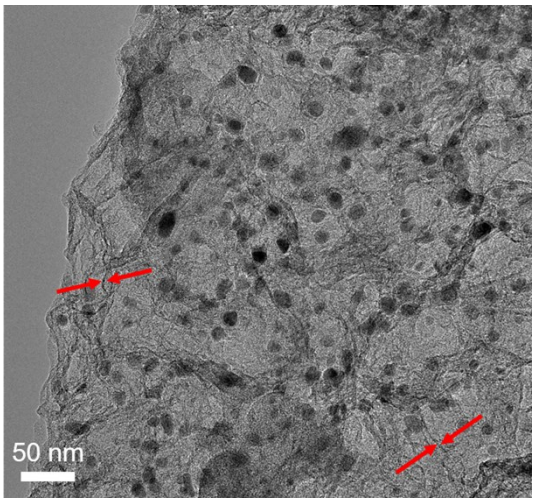

Figure S2. TEM images of FeNC-3.

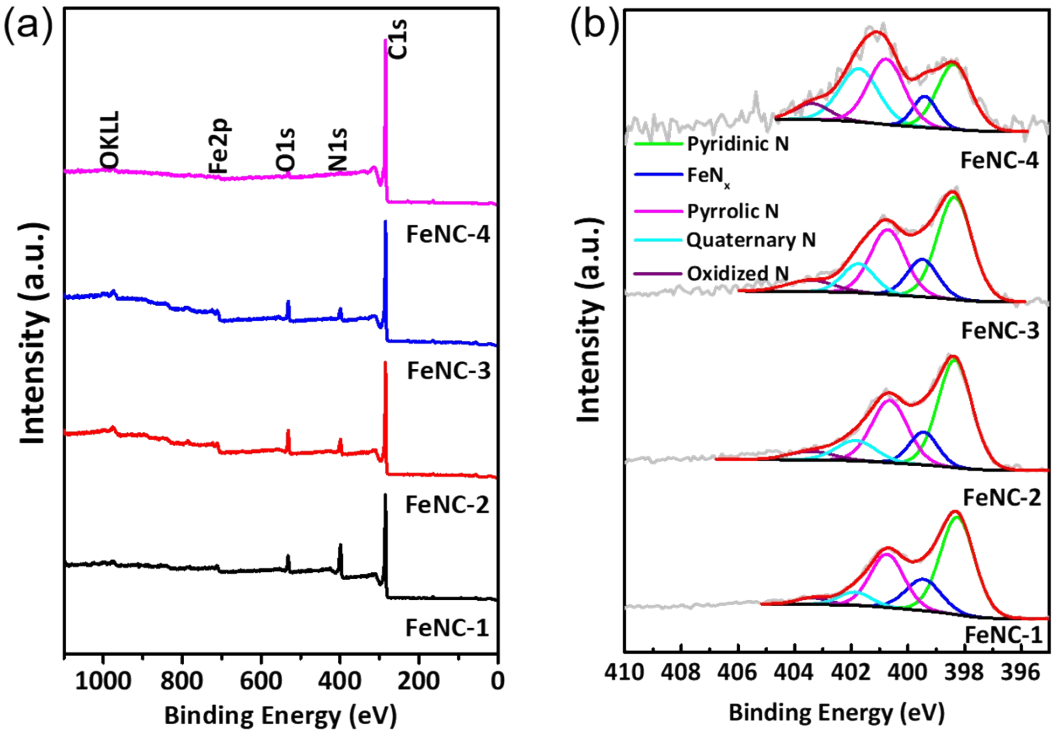

Figure S3. XPS survey of the FeNC catalysts (a) and the high resolution N 1s spectra (b).

Table S1. Atomic content of the N species measured by XPS method.

Catalysts	Pyridinic N (%)	FeN_x (%)	Pyrrolic N (%)	Quaternary N (%)	Oxidized N (%)
FeNC-1	48.5	16.0	26.2	6.3	3.0
FeNC-2	45.7	11.5	27.8	10.0	5.0
FeNC-3	42.4	13.6	26.7	11.0	6.3
FeNC-4	28.6	9.3	30.1	24.5	7.5

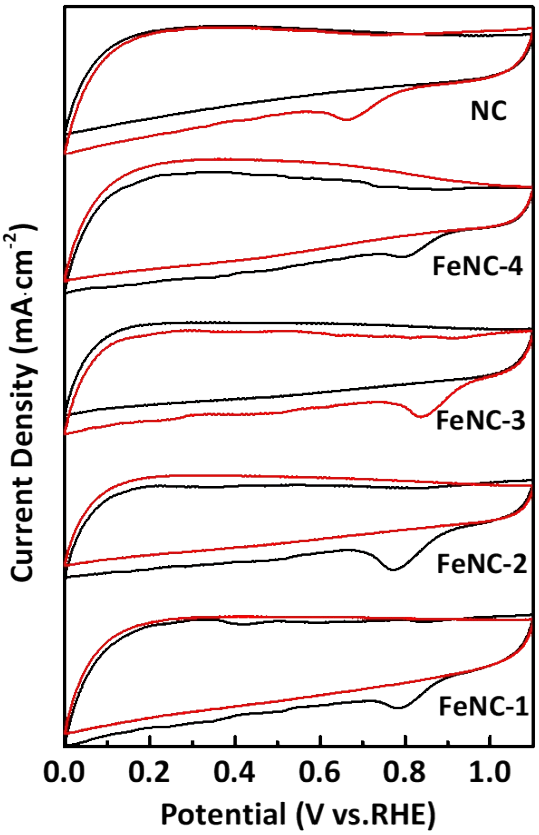

Figure S4. CV curves of the catalysts in O_2-saturated 0.1 M KOH solution at a scan rate of 50 mV s^{-1}.

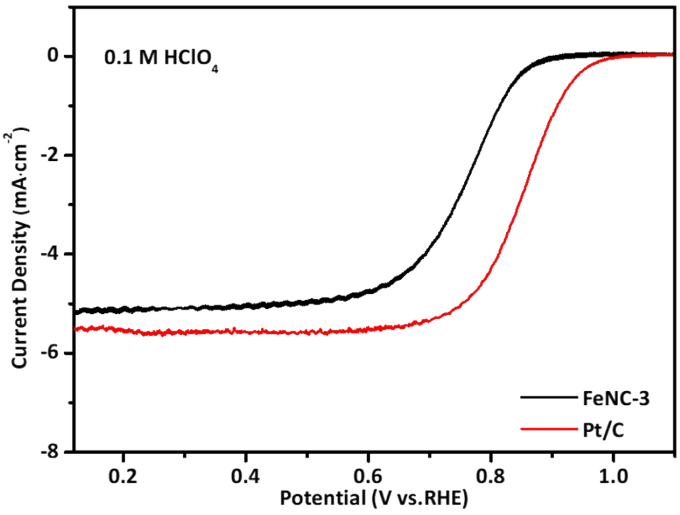

Figure S5. LSV curves of FeNC-3 and commercial Pt/C collected in O_2-saturated 0.1 M $HClO_4$ at a scan rate of 10 mV s^{-1} and a rotation rate of 1600 rpm.

Table S2. Comparison of ORR performance between FeNC-3 and the state-of-art catalysts reported in the literatures in O_2-saturated 0.1 M KOH.

Electrocatalysts	$E_{1/2}$	E_{onset}	Kinetic Current Density (J_k) mA·cm^{-2}		Ref.
	V vs. RHE	V vs. RHE	@0.8 V	@ 0.9 V	
FeNC-3	**0.919**	**1.080**	**127.7**	**7.83**	**This work**
FePc/$Ti_3C_2T_x$	0.89	0.97	-	3.0	1
Fe2-Z8-C	0.87	0.98	-	2.6	2
pCNT@Fe@GL	0.87	0.97	-	6.1	3
Fe-ISAs/CN	0.900	0.986	87.45	6.06	4
Fe@C-FeNCs-2	0.899	~1.0	41.6	-	5
Fe-N/C-800	0.81	0.98	-	0.4	6
FePhen@MoF-ArNH3	0.860	1.03	-	2.1	7
(Fe, Mn)-N-C	0.900	0.98	36.8	-	8

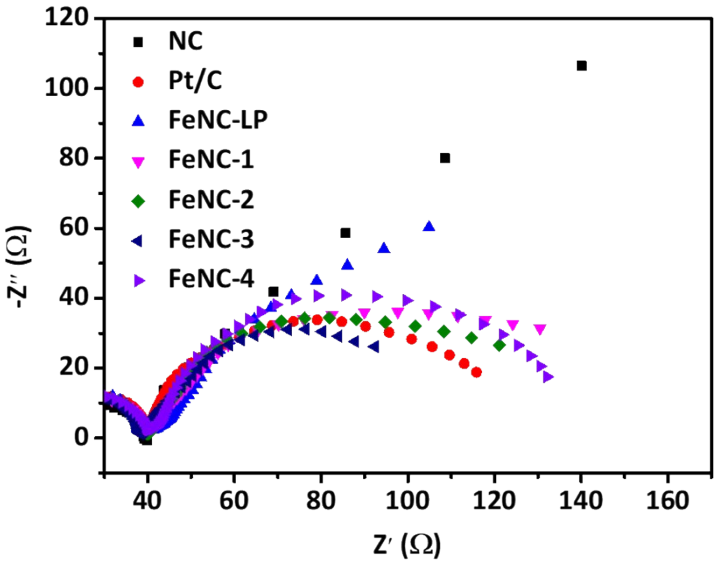

Figure S6. Nyquist plots of different samples obtained in O_2-saturated 0.1 M KOH at 0.85 V vs. RHE from 100 kHz to 0.01 Hz.

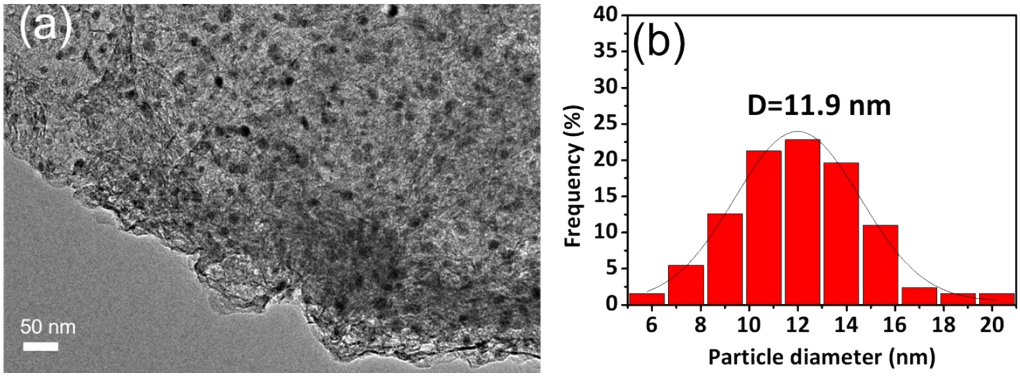

Figure S7. TEM images (a) and particle-size distribution (b) of FeNC-3 after 5000 potential cycles.

References

[1] Z. L. Li, Z. C. Zhuang, F. Lv, H. Zhu, L. Zhou, M. C. Luo, J. X. Zhu, Z. Q. Lang, S. H. Feng, W. Chen, L. Q. Mai and S. J. Guo, Adv. Mater., 2018, 30, 1803220.

[2] Q. T. Liu, X. F. Liu, L. R. Zheng, J. L. Shui, Angew. Chem. Int. Edit., 2018, 57, 1204-1208.

[3] S. H. Ahn, X. W. Yu, A. Manthiram, Adv. Mater., 2017, 29, 1606534.

[4] Y. J. Chen, S. F. Ji, Y. G. Wang, J. C. Dong, W. X. Chen, Z. Li, R. G. Shen, L. R. Zheng, Z. B. Zhuang, D. S. Wang and Y. D. Li, Angew. Chem. Int. Ed., 2017, 56, 6937-6941.

[5] W. J. Jiang, L. Gu, L. Li, Y. Zhang, X. Zhang, L. J. Zhang, J. Q. Wang, J. S. Hu, Z. D. Wei and L. J. Wan, J. Am. Chem. Soc., 2016, 138, 3570-3578.

[6] W. H. Niu, L. G. Li, X. J. Liu, N. Wang, J. Liu, W. J. Zhou, Z. H. Tang and S. W. Chen, J. Am. Chem. Soc., 2015, 137, 5555-5562.

[7] K. Strickland, E. Miner, Q. Y. Jia, U. Tylus, N. Ramaswamy, W. T. Liang, M. T. Sougrati, F. Jaouen and S. Mukerjee, Nat. Commum., 2015, 6, 7343.

[8] N. R. Sahraie, U. I. Kramm, J. L. Steingerg, Y. J. Zhang, A. Thomas, T. Reier, J. P. Paraknowitsch and P. Strasser, Nat. Commum., 2015, 6, 8618.