Supporting Information

Hierarchically Tubular Nitrogen-doped Carbon Structures for Oxygen Reduction Reaction

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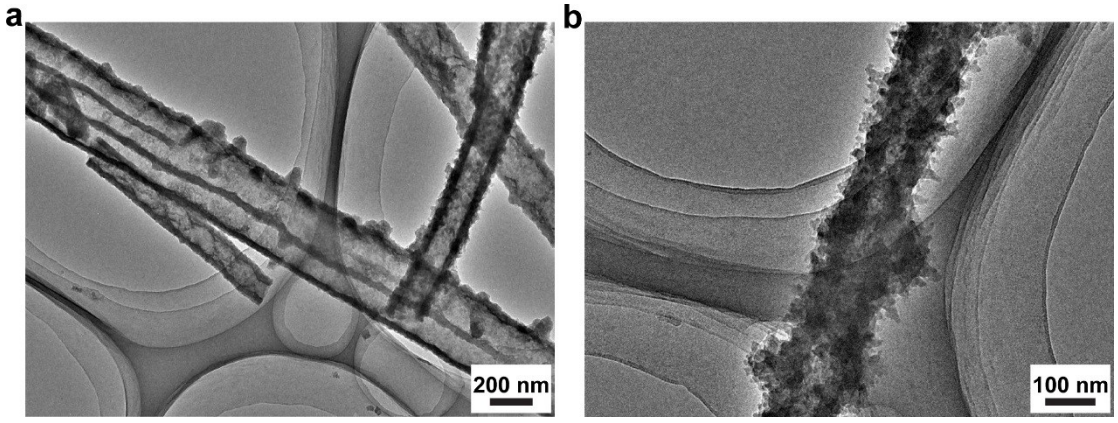

Figure S1. (a, b) TEM images of Cu_2O-HT-NCTs.

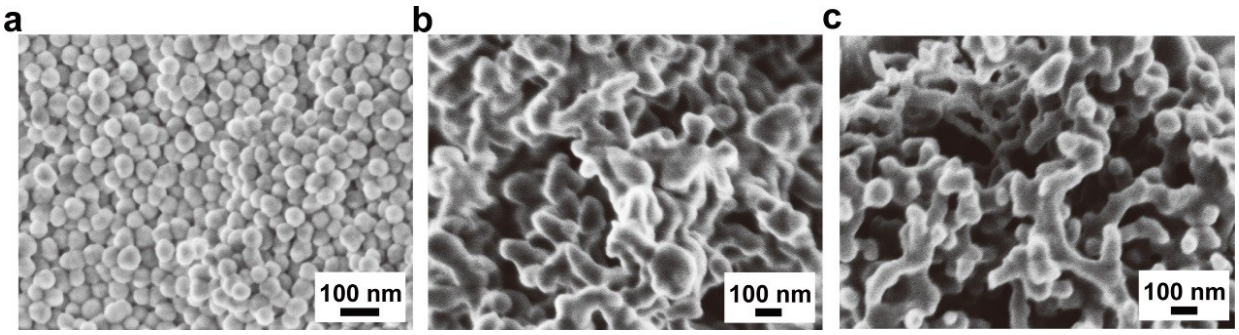

Figure S2. SEM images of (a) SiO_2 nanospheres, (b) SiO_2-CNs and (c) Si-CNs.

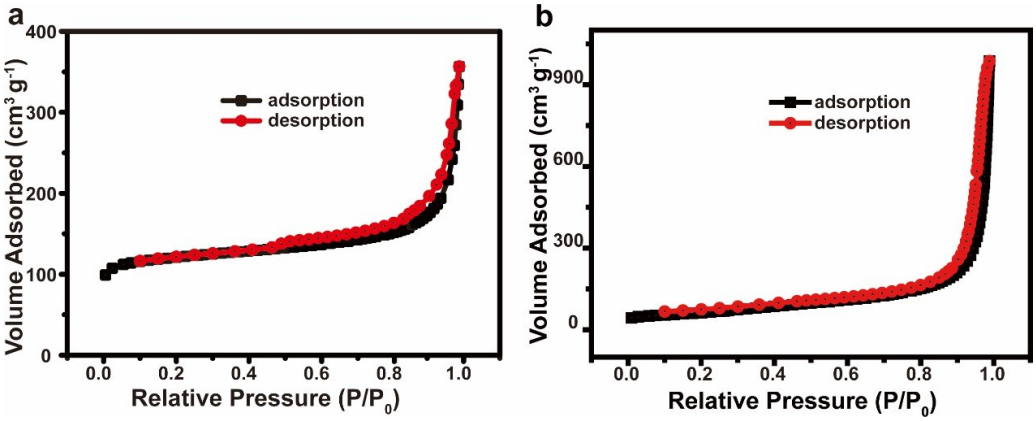

Figure S3. N_2 adsorption-desorption curves of (a) the HT-NCTs and (b) Si-CNs.

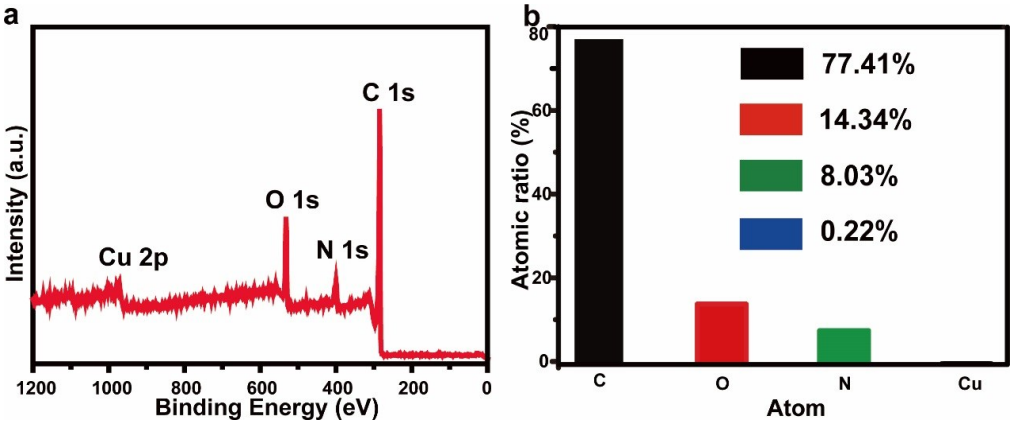

Figure S4. (a) XPS spectrum of HT-NCTs. (b) Different atomic proportion of HT-NCTs.

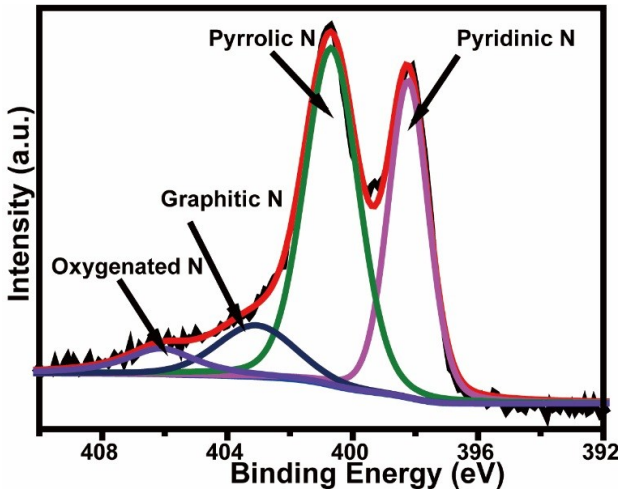

Figure S5. High-resolution XPS spectra of N 1s in Si-CNs.

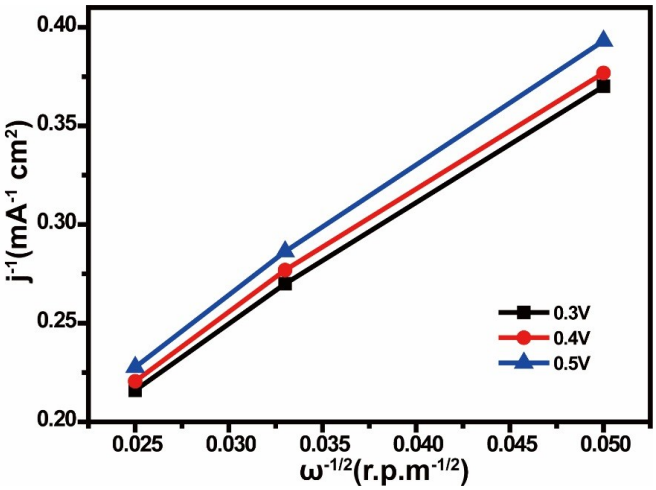

Figure S6. K–L plots of HT-NCTs at the potential of 0.3, 0.4 and 0.5 V.

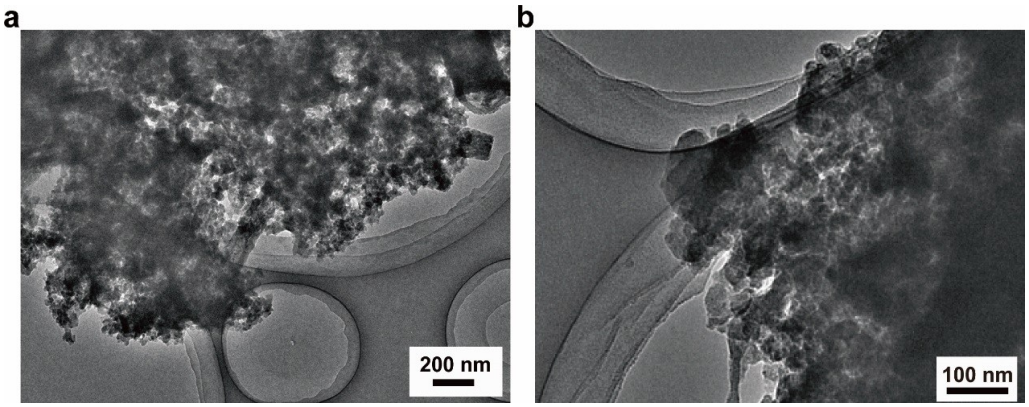

Figure S7. (a, b) TEM images of HT-NCTs after stability tests.

Table S1. Proportions of Different Kinds of Nitrogen in HT-NCTs

	Pyridinic N	Pyrrolic N	Graphitic N	Oxygenated N	Total
Relative content	26.72%	15.23%	42.64%	15.41%	100%
Total content	2.34 at%	1.33 at%	3.73 at%	1.35 at%	8.03 at%

Table S2. Proportions of Different Kinds of Nitrogen in Si-CNs

	Pyridinic N	Pyrrolic N	Graphitic N	Oxygenated N	Total
Relative content	34.27%	48.77%	10.79%	6.17%	100%
Total content	1.81 at%	2.57 at%	0.57 at%	0.33 at%	5.28 at%

Table S3. Comparison of Different ORR Catalysts

Reference	Onset potential (V vs. RHE)	Half-wave potential (V vs. RHE)	Limiting current ($mA\ cm^{-2}$)	Loading ($mg\ cm^{-2}$)
S1	**0.9**	**0.76**	**5.79**	**0.204**
S2	**0.9**	**0.79**	**4.1**	**0.102**
S3	**0.86**	**0.77**	**4.8**	**0.498**
S4	**0.83**	**0.72**	**4.5**	**0.396**
S5	**0.88**	**0.76**	**3.3**	**0.251**
This work	**0.89**	**0.76**	**4.9**	**0.137**

References:

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S2. X. Fu, X. Hu, Z. Yan, K. Lei, F. Li, F. Cheng and J. Chen, *Chem. Commun.*, 2016, **52,** 1725-1728.

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S4. G. Panomsuwan, N. Saito, T. Ishizaki, *ACS Appl. Mater. Interfaces*, 2016, **8,** 6962-6971.

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