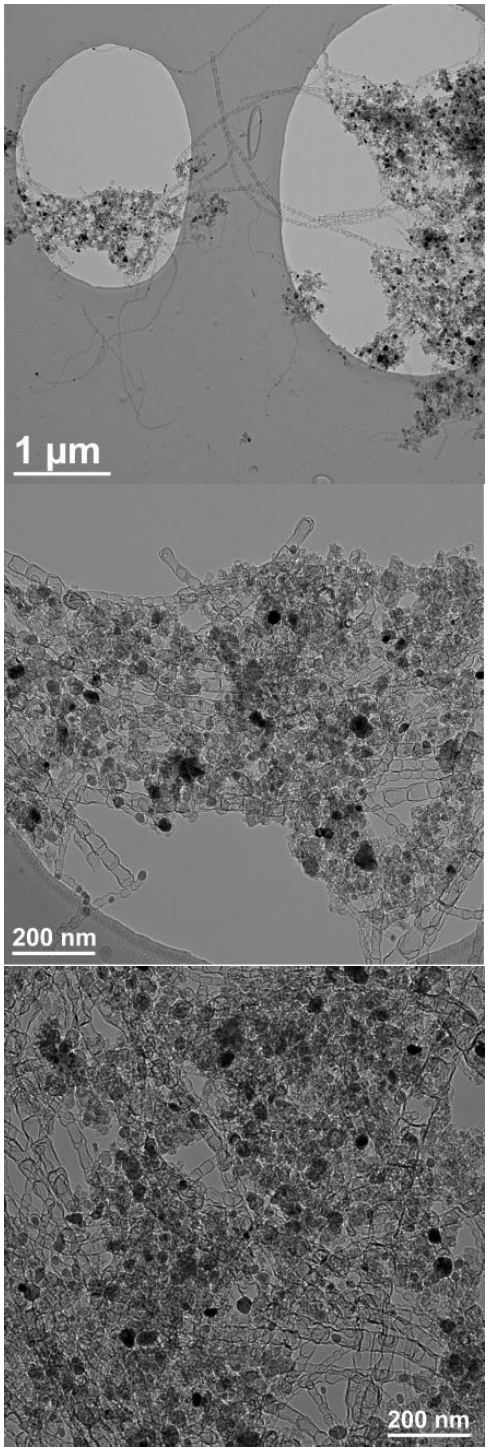
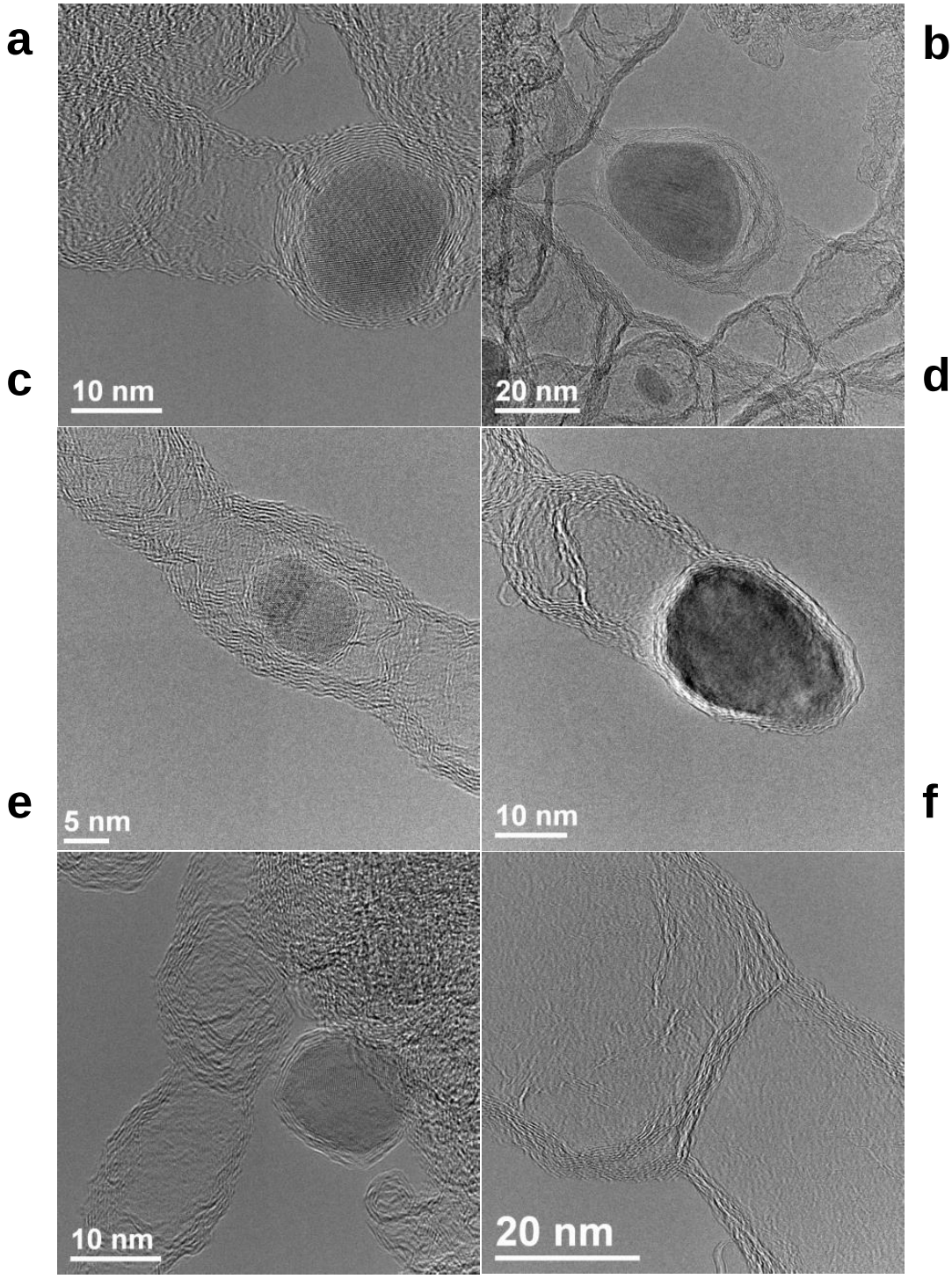
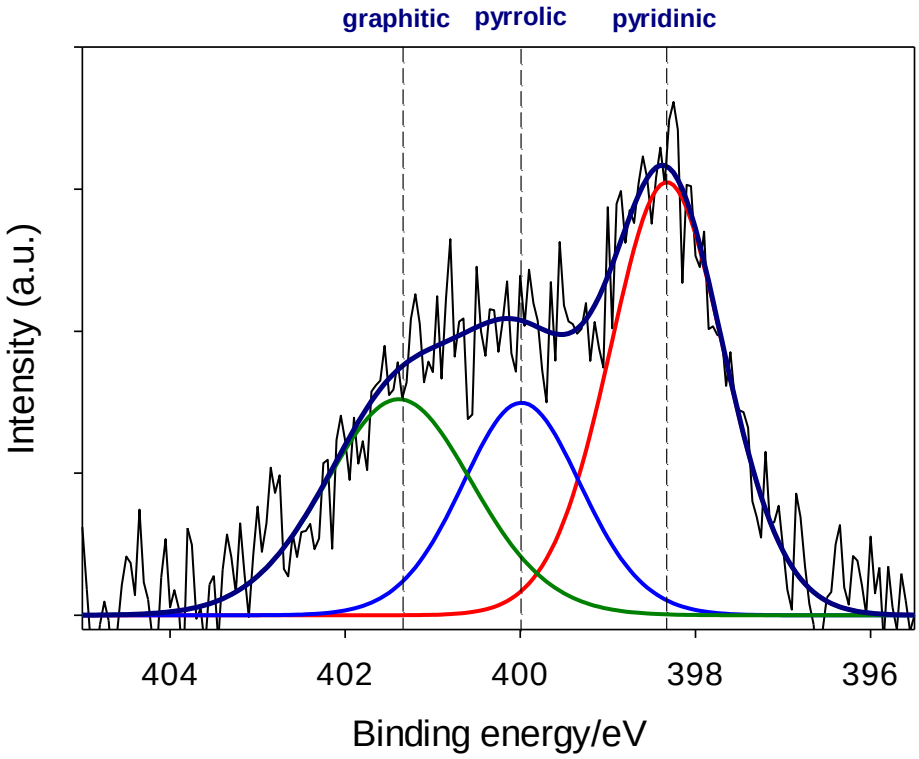


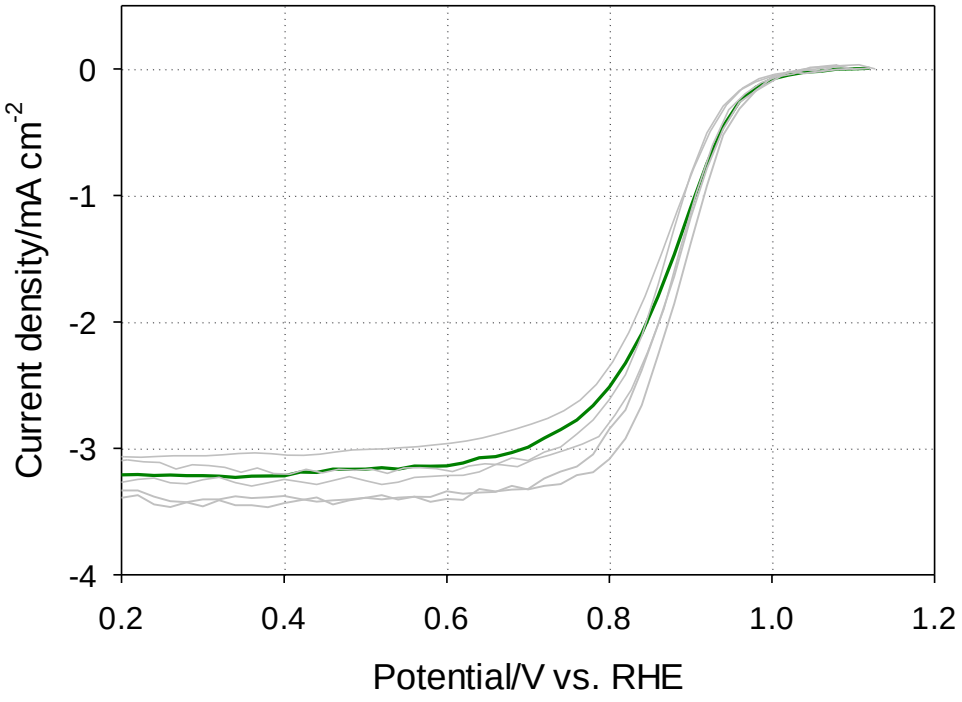
Supplementary Figure S1. CNT/CNP composite: *ca.* 10 µm CNTs distributed homogeneously in CNPs with initimate contact between CNT and CNP maintained.



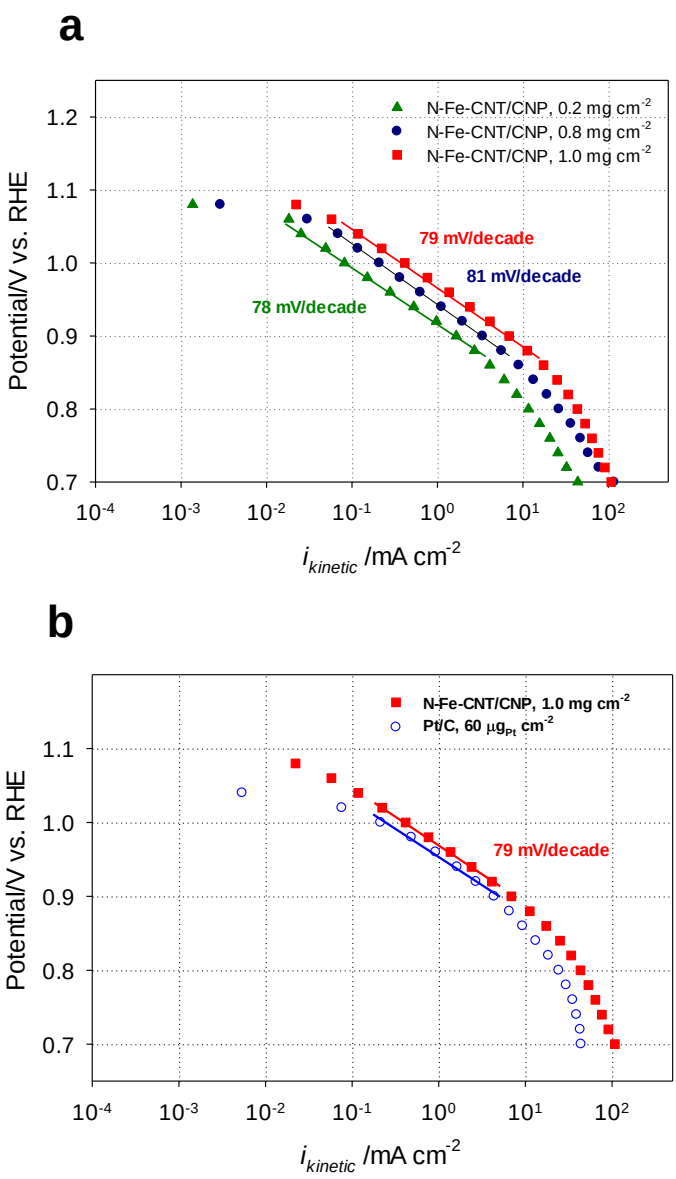
Supplementary Figure S2. TEM of CNTs in **N**-Fe-CNT/CNP catalyst showing Fe nanoparticles encapsulated in several carbon nanoshells in nanotubes or individual particles; graphene defects are also shown.



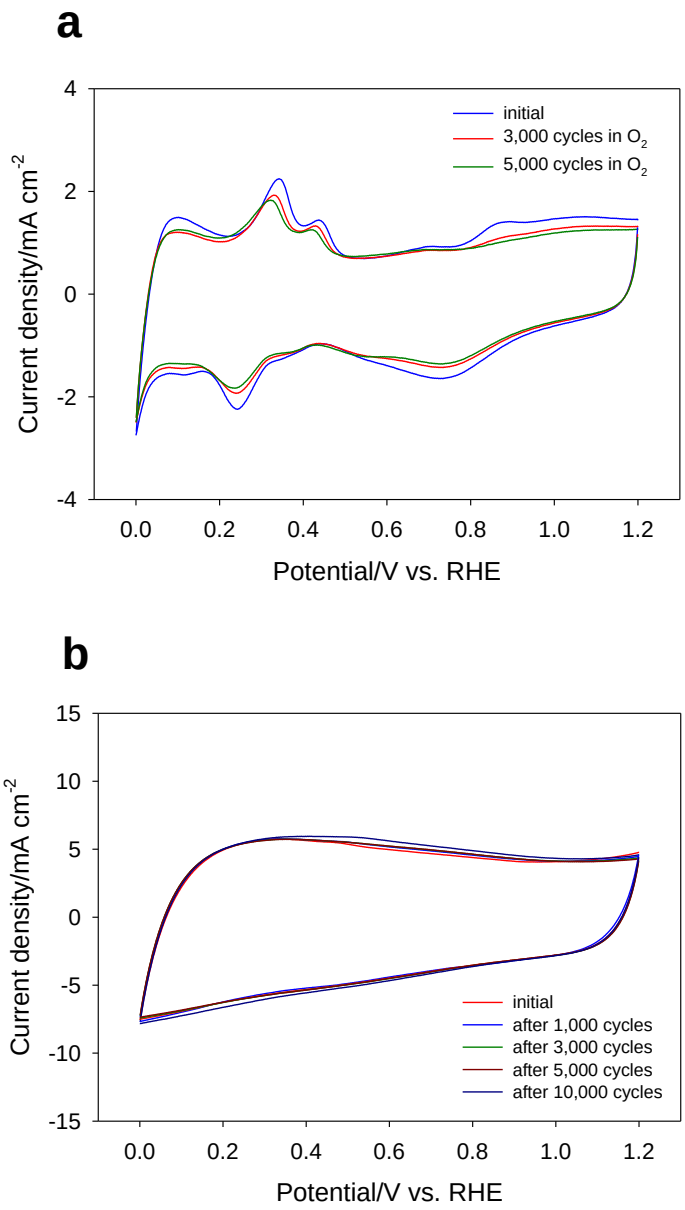
Supplementary Figure S3. N 1s XPS spectra of N-Fe-CNT/CNP catalyst. Thin black line: measured data; thick dark blue line: fitted curve. Deconvoluted nitrogen peaks: pyridinic-N (398.3 eV, red line); pyrrolic-N (400.0 eV, blue line); graphitic-N (401.1 eV, green line).



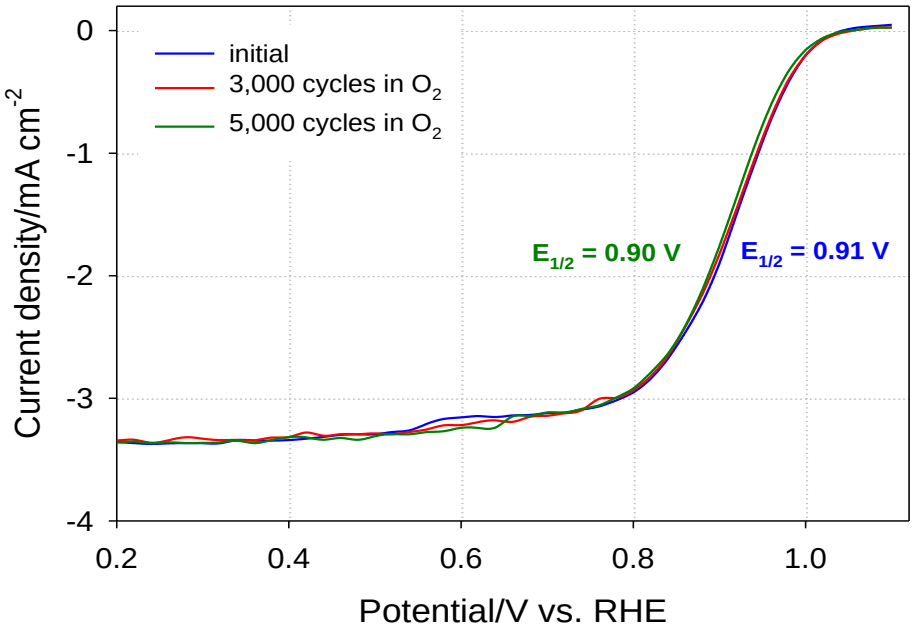
Supplementary Figure S4. Steady-state ORR polarization plots recorded with N-Fe-CNT/CNP catalysts from six different syntheses. Disk loading 0.2 mg cm^{-2}; $E_{½}$ = 0.87(3) ± 0.01(2). Plot in green has been used in Fig. 2a in the manuscript.



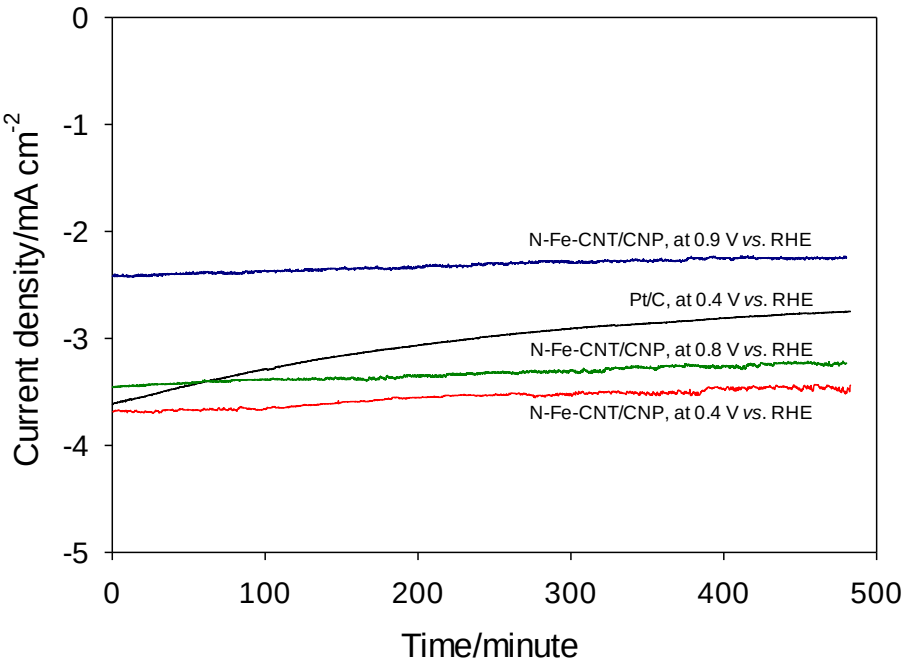
Supplementary Figure S5. ORR Tafel plots in O_2-saturated 0.1 M NaOH. (**a**) Plots for three different N-Fe-CNT/CNP catalyst loadings. (**b**) Comparison between Tafel plots recorded with N-Fe-CNT/CNP catalyst and Pt/C reference catalyst before the cycling test (Tafel slope calculated by linear regression method). The mass transport corrected ORR specific kinetic current density (i_{kinetic}) was calculated by the following equation: $i_{kinetic} = \frac{i_{measured} \times i_{limited}}{i_{limited} - i_{measured}}$



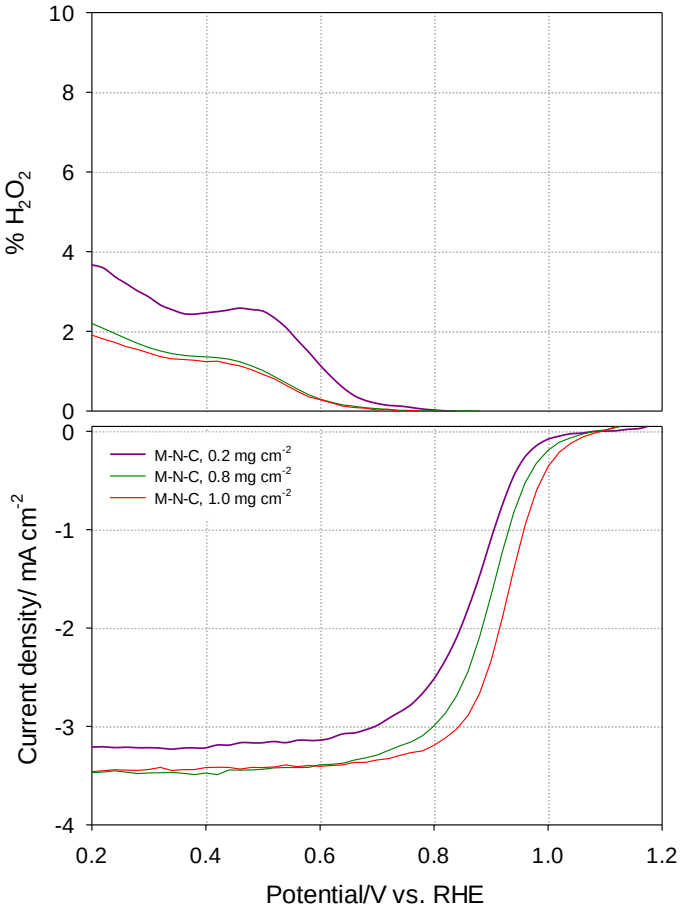
Supplementary Figure S6. Cyclic voltammograms in N_2-saturated electrolyte recorded during the cycling durability test. (**a**) Pt/C catalyst (60 μg_{Pt} cm^{-2}). (**b**) N-Fe-CNT/CNP catalyst (1.0 mg cm^{-2}).



Supplementary Figure S7. ORR polarization plots measured with Pt/C (60 μg_{Pt} cm^{-2}) during cycling durability tests in O_2-saturated 0.1 M NaOH in the potential range of 0.6-1.0 V *vs.* RHE. Scan rate 50 mV s^{-1}.



Supplementary Figure S8. RDE chronoamperometric stability tests of N-Fe-CNT/CNP and Pt/C catalysts at different potentials. O_2-saturated 0.1 M NaOH; 900 rpm; 25°C.



Supplementary Figure S9. Dependence of ORR activity and H_2O_2 yield on catalyst loading. The percent H_2O_2 yield was calculated from the disk current (I_D), the ring current (I_R), and the collection efficiency (N) using the following equation: $\boldsymbol{x_{H_2O_2}}(\%) = \frac{\boldsymbol{200I_R/N}}{\boldsymbol{I_D+I_R/N}}$

Supplementary Table S1. Elemental composition of as-received BP 2000 and N-Fe-CNT/CNP catalyst.

Samples	Atomic Content, %				
	C 1s	O 1s	N 1s	S 2p	Fe 2p
As-received BP 2000	95.07	4.72	-	0.21	-
N-Fe-CNT/CNP catalyst	92.57	4.01	3.09	0.24	0.08