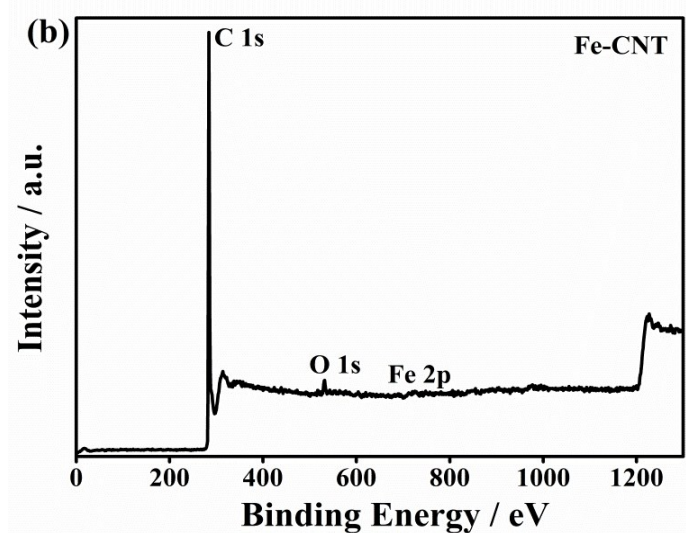
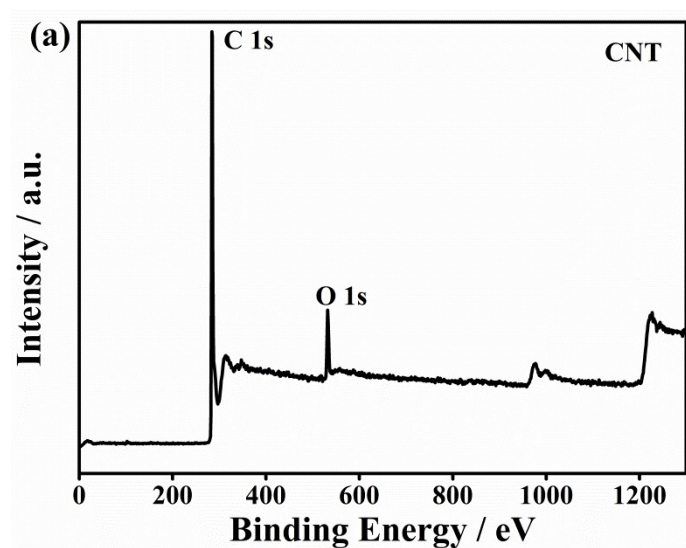


Electronic Supplementary Information

Enhancing oxygen reduction reaction durability via coating graphene layers on the iron-nitrogen supported carbon nanotubes

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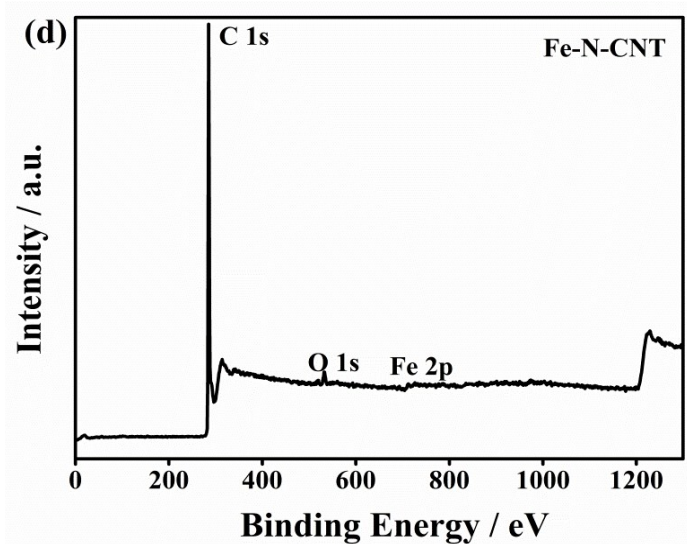
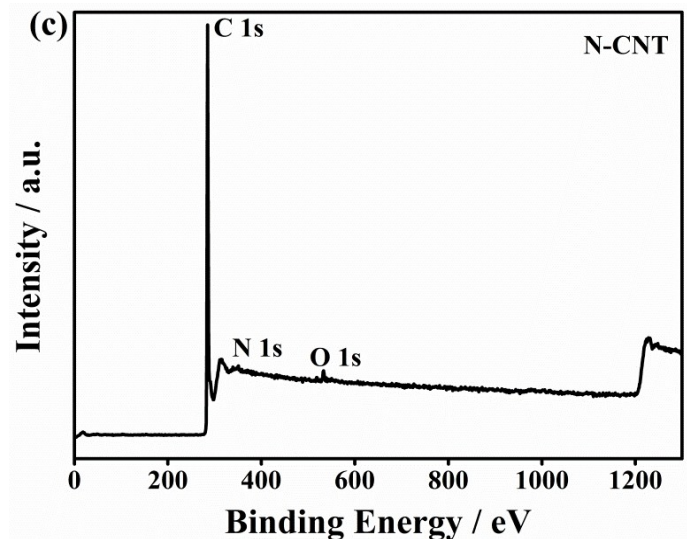


Fig. S1 XPS survey spectrum, (a) CNT, (b) Fe-CNT, (c) N-CNT, (d) Fe-N-CNT.

Table S1 Percentage content of C 1s, O 1s, N 1s, and Fe 2p for Fe-N-CNT@GN calculated from the Fig. S1.

Samples	C (at. %)	O (at. %)	N (at. %)	Fe (at. %)
CNT	93.1	6.9	--	--
Fe-CNT	97.2	2.4	--	0.4
N-CNT	97.7	1.6	0.7	--
Fe-N-CNT	96.7	2.3	0.6	0.4
Fe-N-CNT@GN	97.5	1.5	0.9	0.2

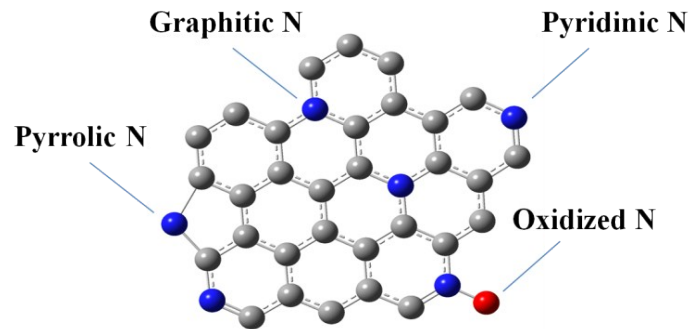


Fig. S2 Types of nitrogen species that can be incorporated into graphitic carbon.

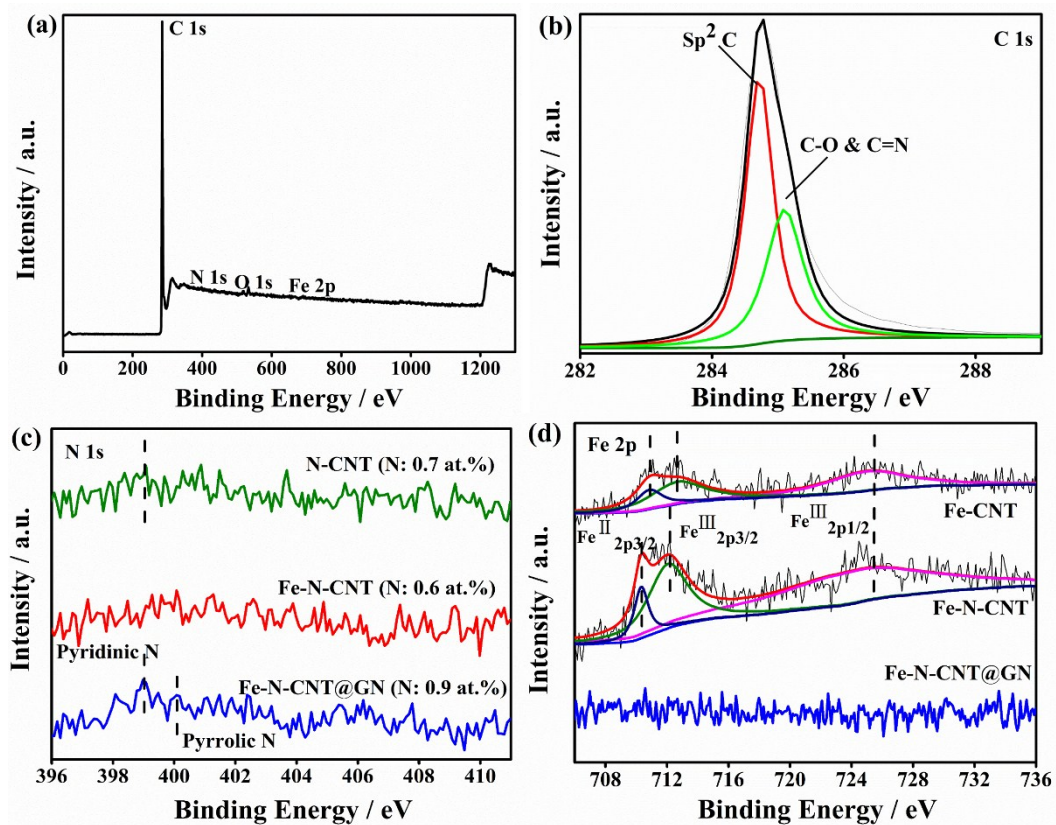


Fig. S3 (a) XPS survey spectrum of Fe-N-CNT@GN, (b) the corresponding high-resolution C 1s spectrum, (c) high-resolution N 1s spectra of N-CNT, Fe-N-CNT and Fe-N-CNT@GN and (d) high-resolution Fe 2p spectra of Fe-CNT, Fe-N-CNT and Fe-N-CNT@GN.

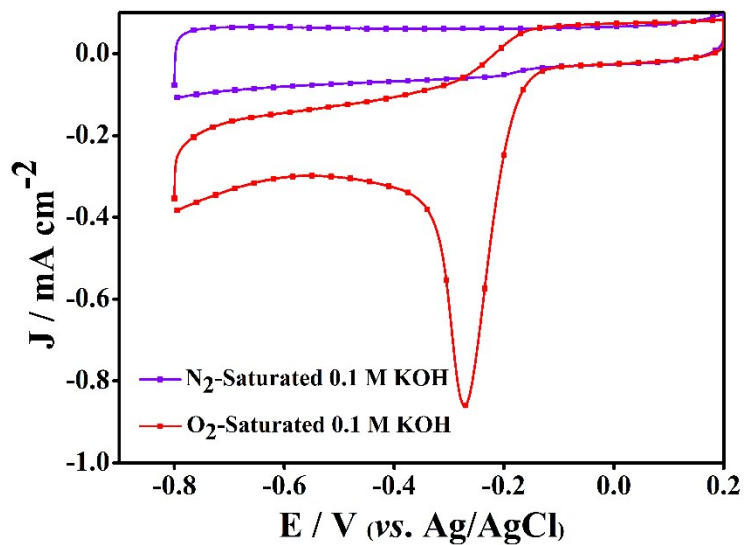


Fig. S4 CV curves of the Fe-N-CNT@GN in N_2 - and O_2 -saturated 0.1 M KOH solutions, scan rate: 10 mV s^{-1} .

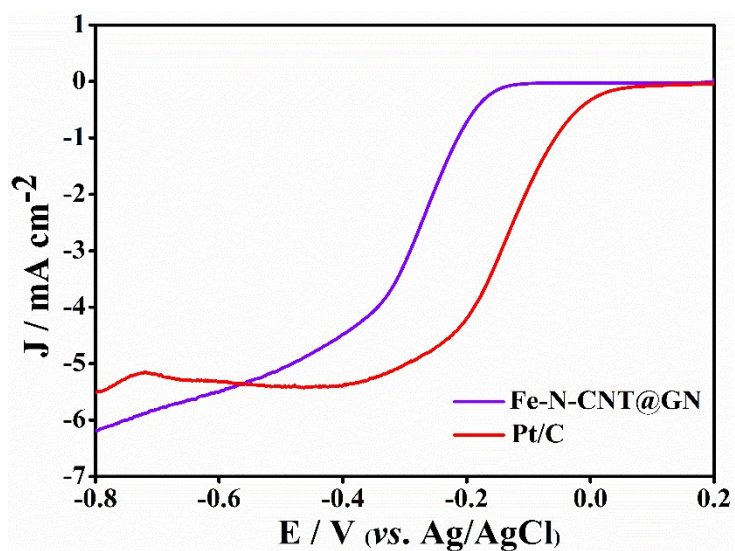
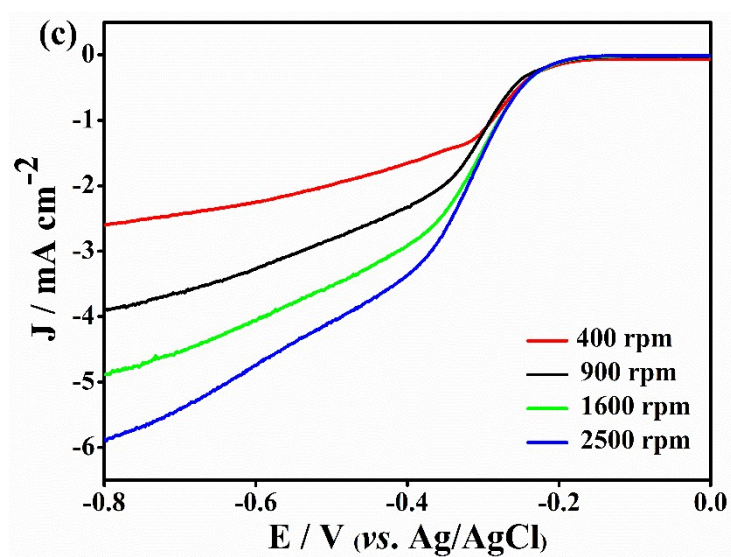
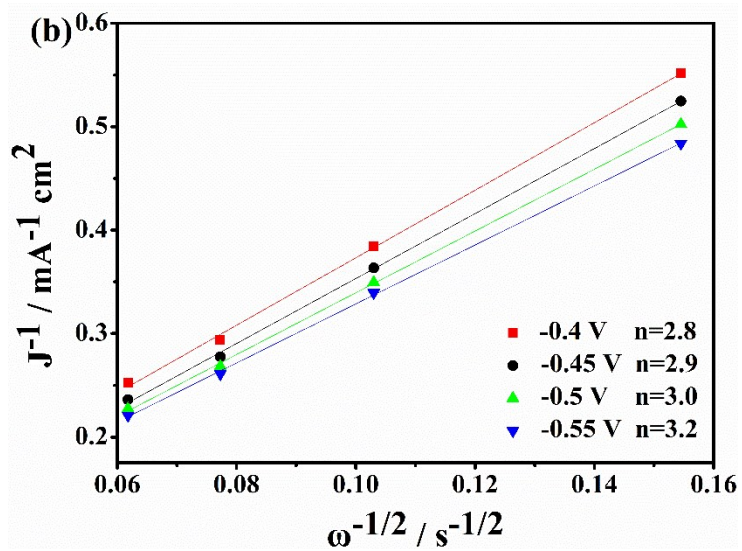
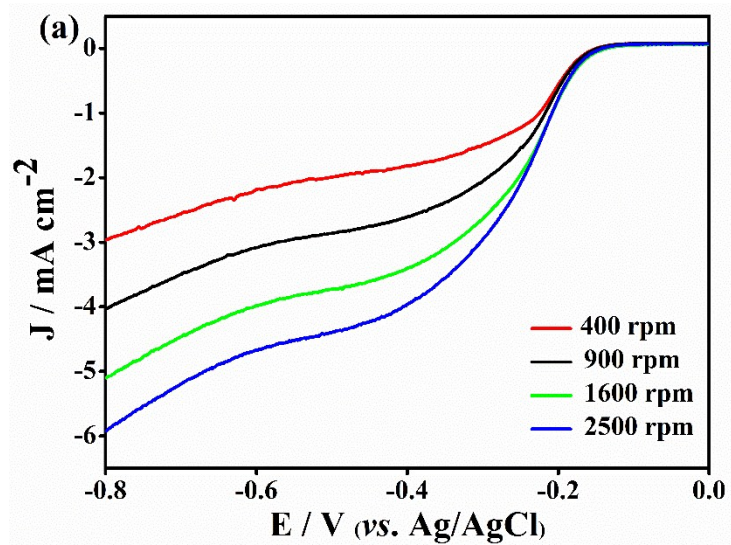
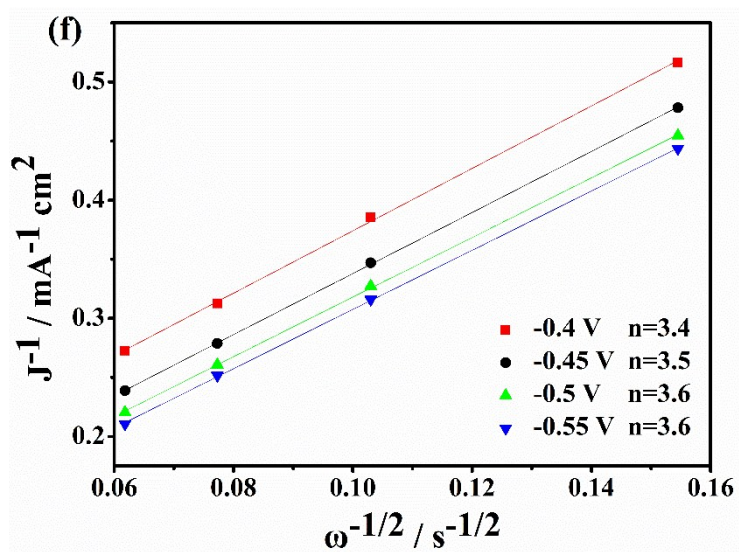
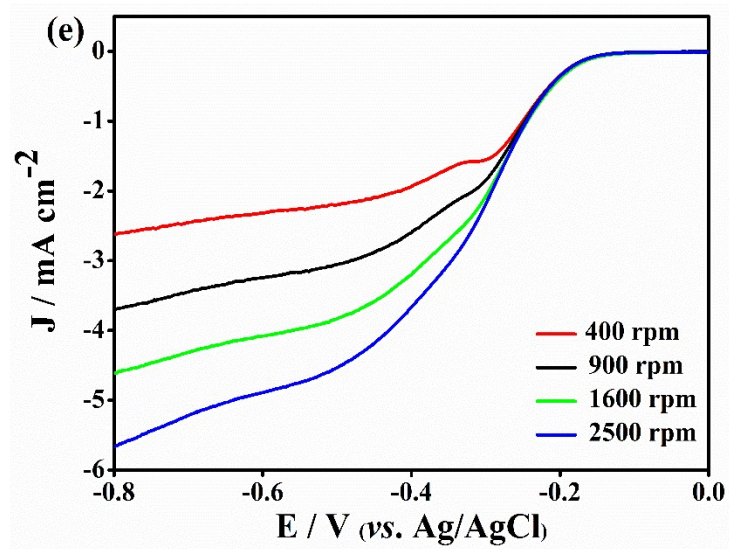
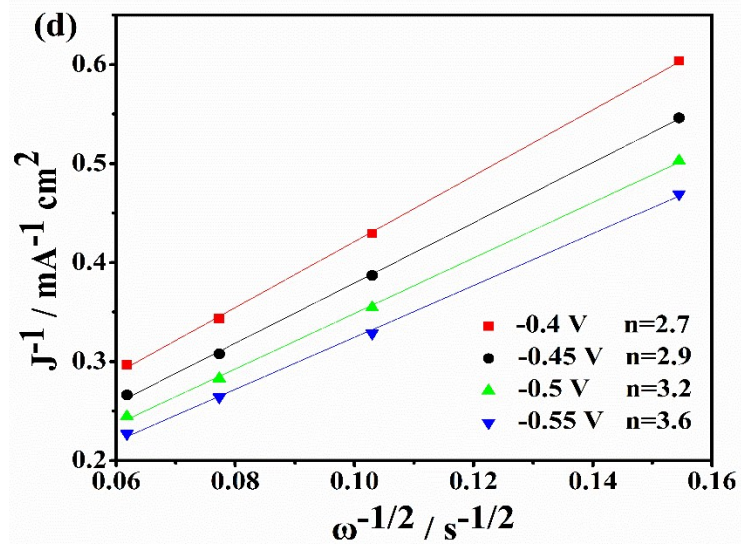


Fig. S5 CV curves of Fe-N-CNT@GN and commercial Pt/C in O_2 -saturated 0.1 M KOH solution, scan rate: 10 mV s^{-1} , rotation rate: 1600 rpm.





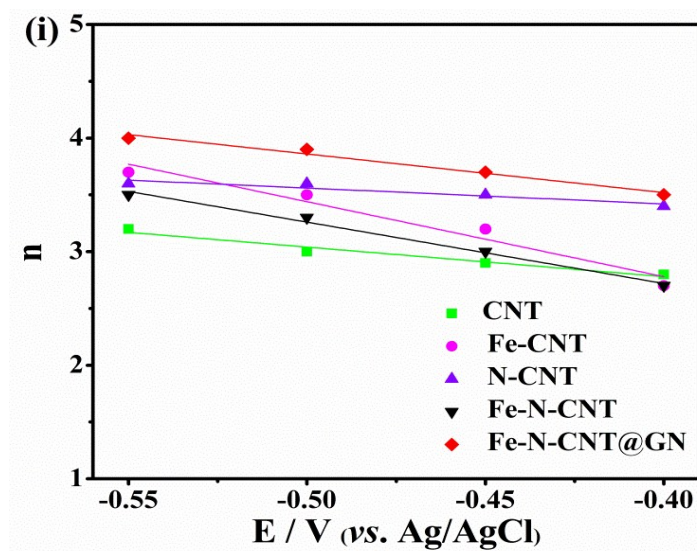
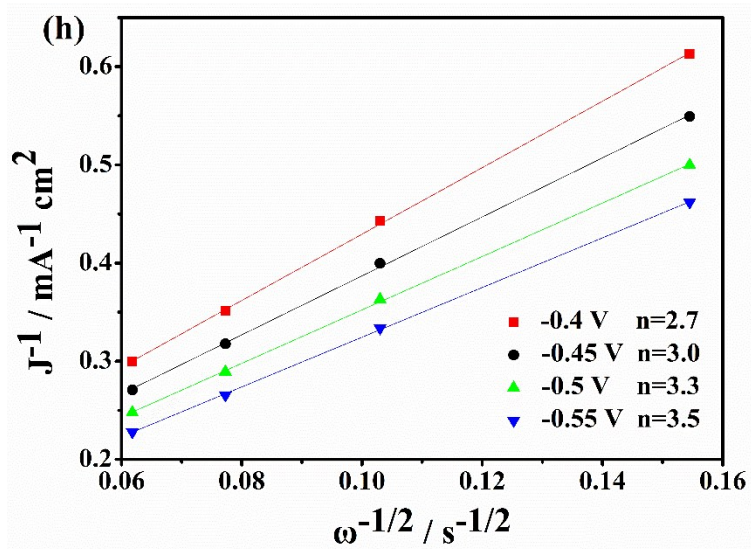
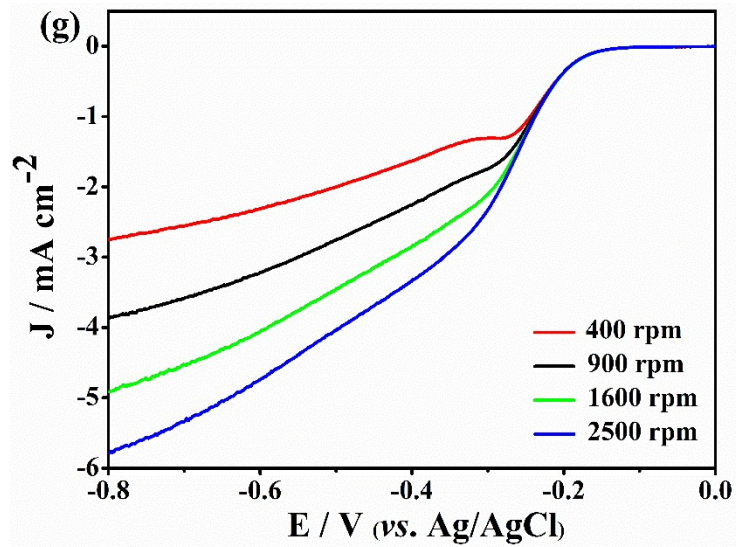


Fig. S6 (a) CV curves of CNT in O_2 -saturated 0.1 M KOH solution at different rotation rates. (b)

Koutecky-Levich plots of CNT derived from CV curves in (a) at different electrode potentials. (c, d) Fe-CNT, (e, f) N-CNT, (g, h) Fe-N-CNT, (i) the dependence of electron transfer numbers n on the potential for the CNT, Fe-CNT, N-CNT, Fe-N-CNT, Fe-N-CNT@GN samples.

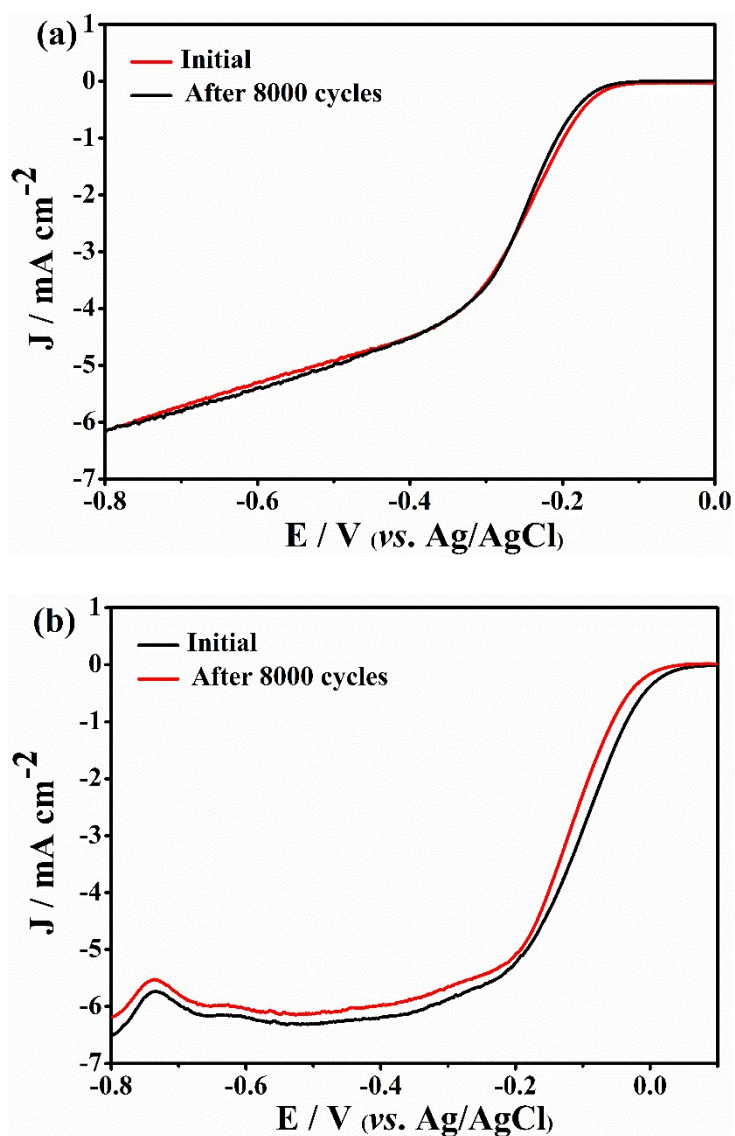


Fig. S7 The stability of Fe-N-CNT@GN (a) and the commercial Pt/C (b) was symbolized by the half-wave potential decay before and after the accelerated aging tests (AATs). The potential cycles were from -0.3 to 0.1 V in a O₂-saturated 0.1 M KOH solution at 1600 rpm with a scan rate of 100 mV s⁻¹.