Electronic Supporting Information

Fe/N co-doped Carbon Microspheres as a High Performance Electrocatalyst for Oxygen Reduction Reaction

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Formula

the *K-L* equations:

$$1/j_{lim} = 1/j_{lev}+1/j=1/(B_{\omega}^{1/2})+1/j_k \quad (1)$$

$$B = 0.62nFC_O(D_O)^{2/3}v^{-1/6} \quad (2)$$

$$j_k = nFkC_O \quad (3)$$

where j_{lim} (mA cm^{-2}) is the measured current density, which is related to Levich current (j_{lev}) and kinetic current (j_k). ω is the electrode rotation rate, F is the Faraday constant (96485 C mol^{-1}), Co is the bulk concentration of O_2 (Co= 1.21×10^{-6} mol cm^{-3}), Do is the diffusion coefficient of O_2 (Do= 1.9×10^{-5} cm^2 s^{-1}), *v* is the kinematic viscosity of the electrolyte (0.01 cm^2 s^{-1}), and k is the electron-transfer rate constant.

Table S1. Comparison of the electrocatalytic activity of NCMS-Fe and the reported catalysts for ORR in alkaline solution.

Catalyst	Reference electrode	electrolyte	Onset potential (V)	Reference
NCNC700/900	Ag/AgCl	0.1M KOH	-0.13	[1]
NCS-H	Ag/AgCl	0.1M KOH	-0.10	[2]
NCNTs/G	SCE	0.1M KOH	-0.136	[3]
N-HCNPs	Ag/AgCl	0.1M KOH	-0.08	[4]
N-GC	Ag/AgCl	0.1M KOH	-0.05	[5]
NCMS-Fe	Ag/AgCl	0.1M KOH	0.025	This work

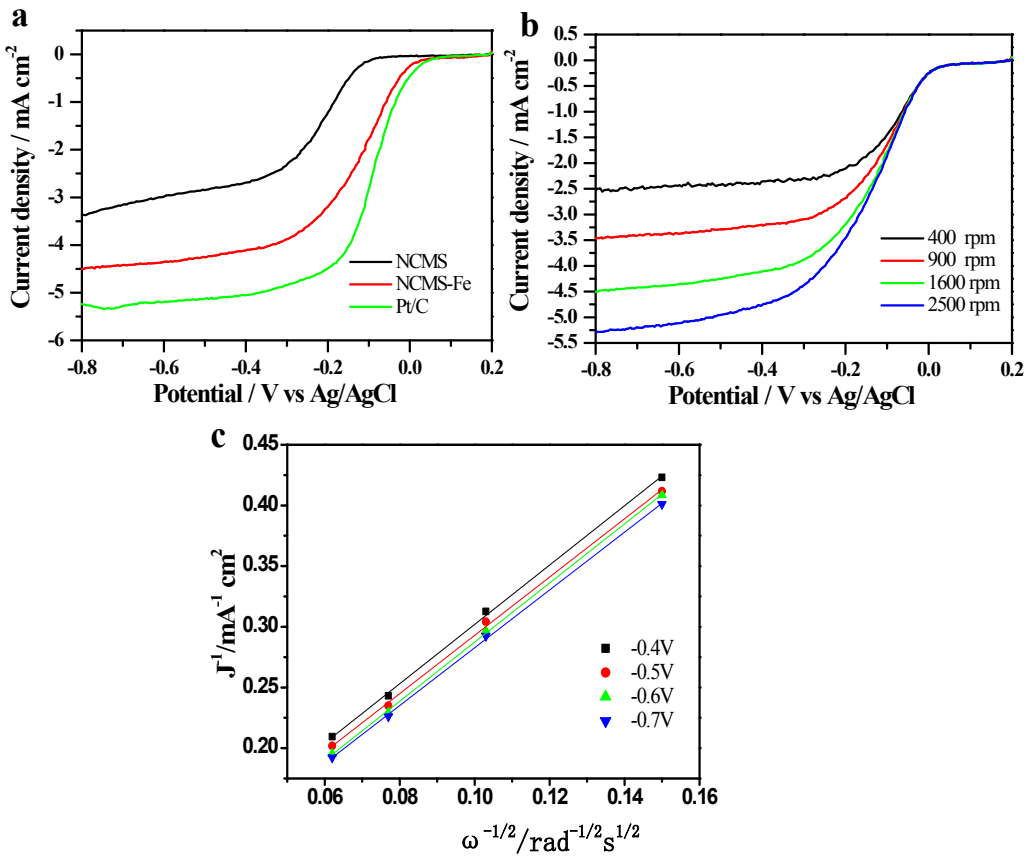

Fig. S1. (a) Polarization curves (RDE) of NCMS, NCMS-Fe and the commercial 20 wt% Pt/C at 1600 rpm in O_2-saturated 0.1 mol L^{-1} KOH; (b) RDE voltammograms at different rotating rates in 0.1 mol L^{-1}KOH solution saturated with O_2 with a scan rate rate of 10 mV s^{-1}; (c) Koutecky–Levich plot (j^{-1} vs. $\omega^{-1/2}$) obtained from the RDE data at -0.4, -0.5, -0.6 and -0.7 V of NCMS-Fe.

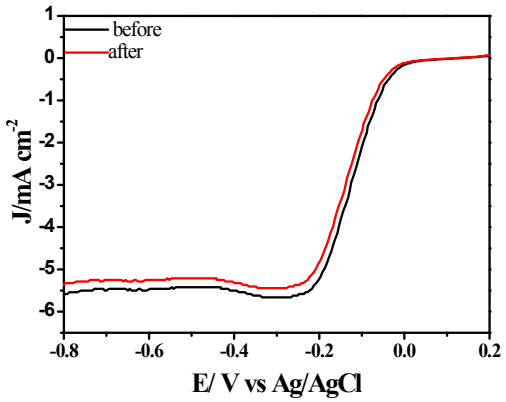

Fig. S2 ORR polarization (RRDE) plots of NCMS-Fe before and after 2000 potential cycles in O_2-saturated 0.1 M KOH.

Reference

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