

Electronic Supplementary Information

Effect of nanoparticle composition on oxygen reduction reaction activity of Fe/N-C catalysts: a comparative study

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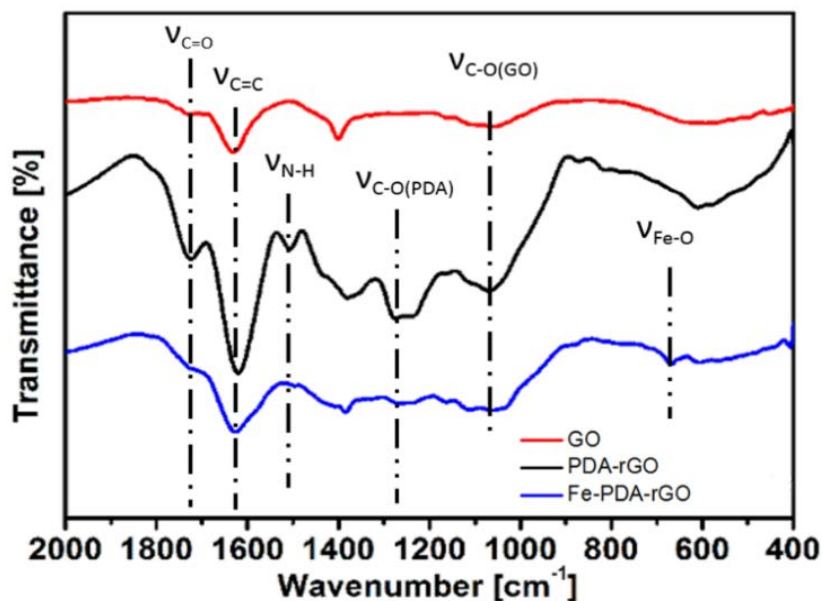


Fig. S1 FTIR spectra of GO, PDA-rGO and Fe-PDA-rGO. The characteristic adsorption bands of GO (1634 , 1057 and 1729 cm^{-1}) and PDA (1509 cm^{-1}) could be observed in the Fe-PDA-rGO precursor. The peak at 670 cm^{-1} corresponds to the Fe-O bond, indicating the coordination between Fe ion and catechol group in Fe-PDA-rGO precursor.

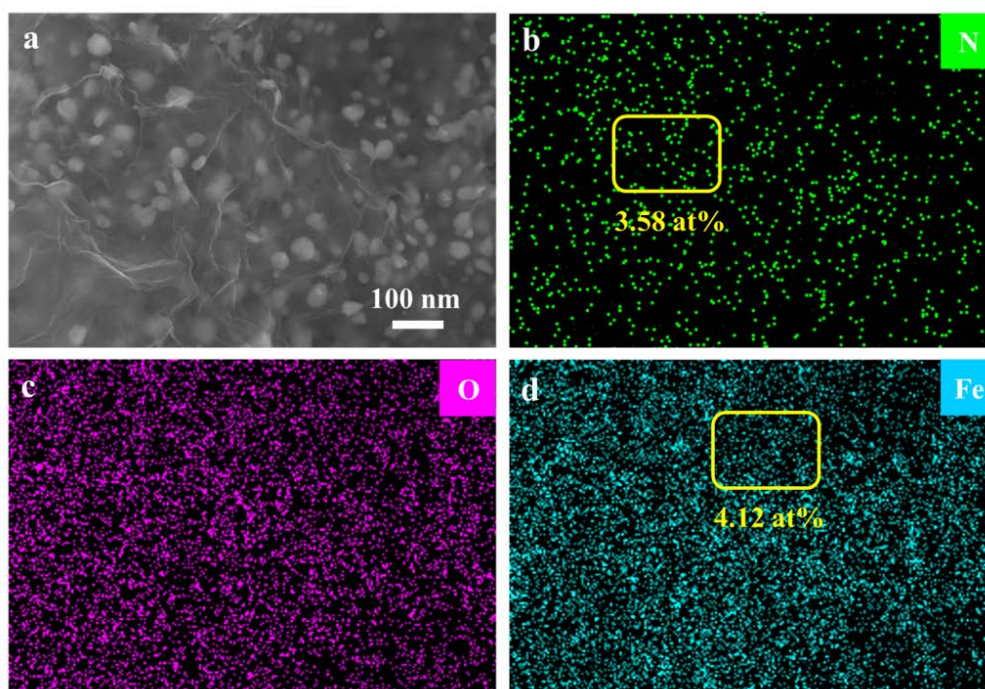


Fig. S2 SEM image (a) and corresponding N (b), O (c) and Fe (d) EDS mapping images of Fe/Fe₃O₄@N-G.

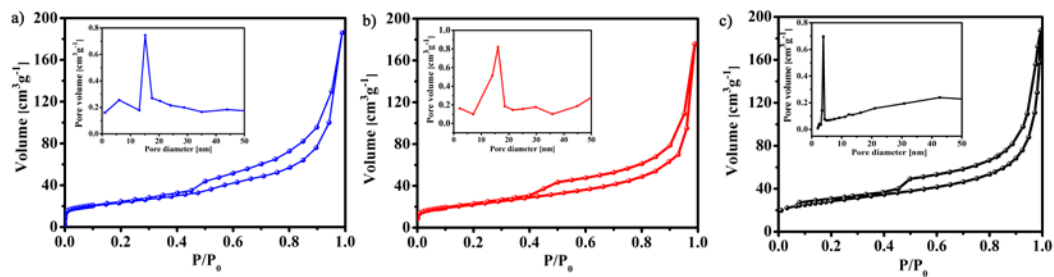


Fig. S3 Nitrogen sorption isotherm plot (inset: BJH pore size distribution) of $\text{Fe}_x\text{N@N-G}$ (a), $\text{Fe/Fe}_3\text{O}_4\text{@N-G}$ (b), and $\text{Fe}_3\text{C@N-G}$ (c).

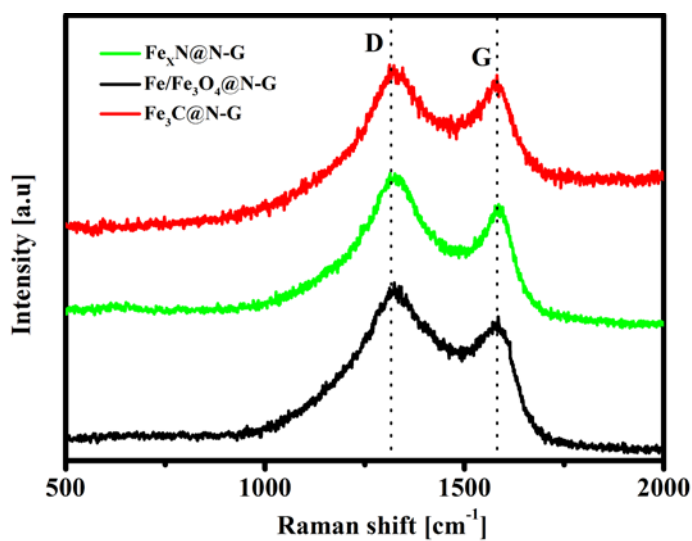


Fig. S4 Raman spectra of three catalysts.

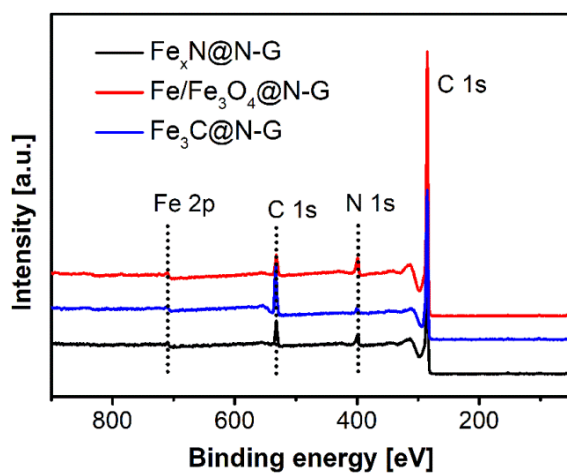


Fig. S5 XPS survey spectrum (a) and Fe 2p (b) spectra of three catalysts.

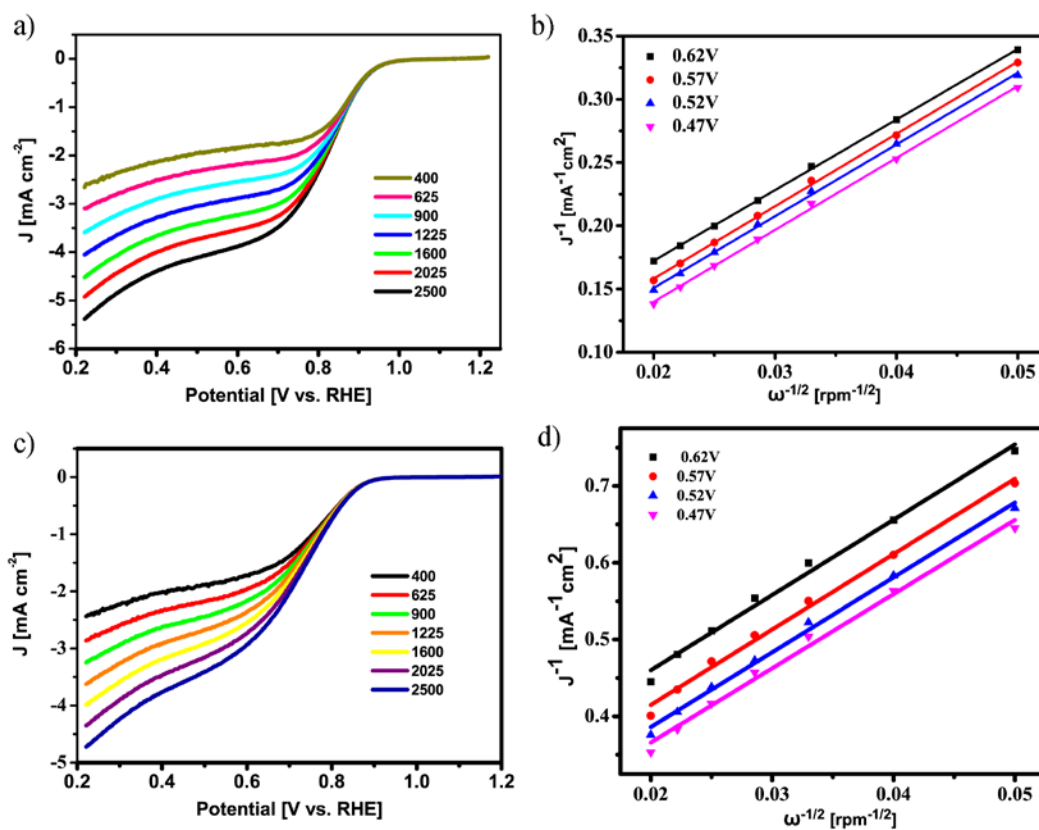


Fig. S6 LSV curves at different rotating rates and corresponding K - L plots of $\text{Fe}_x\text{N@N-G}$ (a, b) and $\text{Fe}_3\text{C@N-G}$ (c, d).

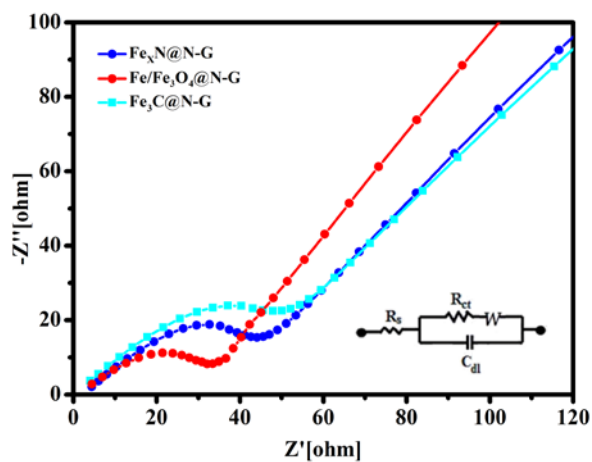


Fig. S7 EIS of three catalysts at a potential of 0.90 V (vs. RHE). Inset shows the electrical equivalent circuit used to simulate the Nyquist plots, where R_s is the electrolyte resistance, R_{ct} is the charge-transfer resistance, and C_{dl} represents the double-layer capacitance.

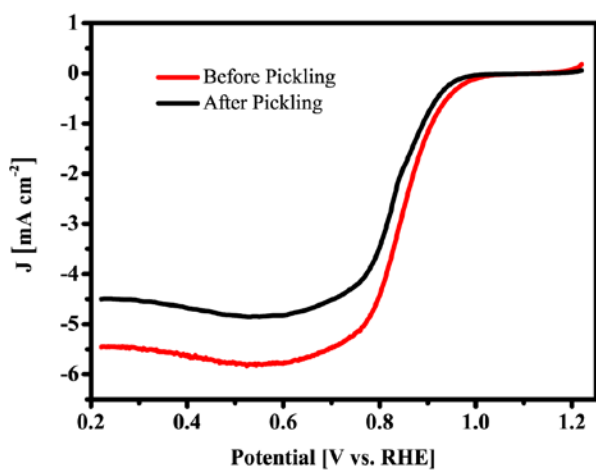


Fig. S8 LSV curves of Fe/Fe₃O₄@N-G before and after pickling at a rotation rate of 1600 rpm and sweep rate of 5 mV s⁻¹.

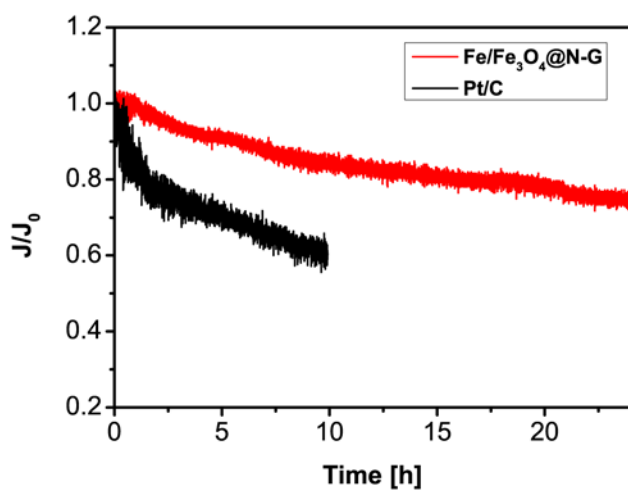


Fig. S9 Amperometric curves of Fe/Fe₃O₄@N-G and commercial Pt/C at 0.69 V (vs. RHE) in O₂-saturated 0.1 M KOH solution. J₀ is defines as the initial current density.

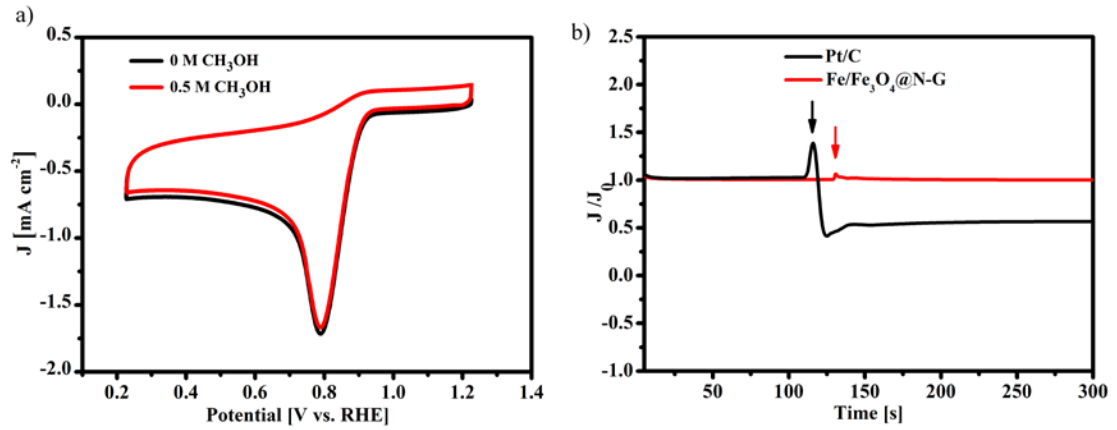


Fig. S10 (a) CV curves of Fe/Fe₃O₄@N-G in O₂-saturated 0.1 M KOH solution with and without methanol; (b) amperometric curves of Fe/Fe₃O₄@N-G and commercial Pt/C at 0.69 V (vs. RHE) in O₂-saturated 0.1 M KOH solution. The arrows indicate the addition of 0.5 M methanol into the electrolyte.