Supporting Information

Biomass soybean straw derived Fe-N co-doped porous carbon as an efficient electrocatalyst for oxygen reduction in both alkaline and acidic media

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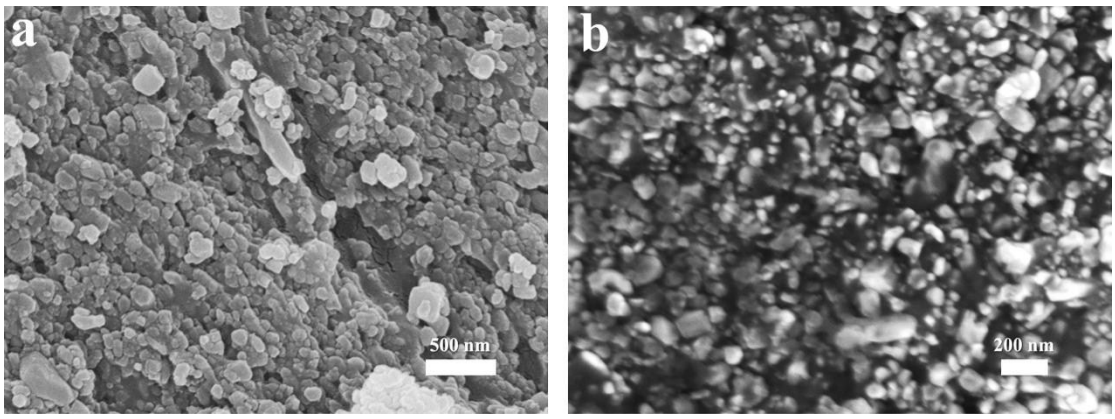

Fig. S1. SEM images of soybean straw mixed with magnesia before (a) and after calcination (b)

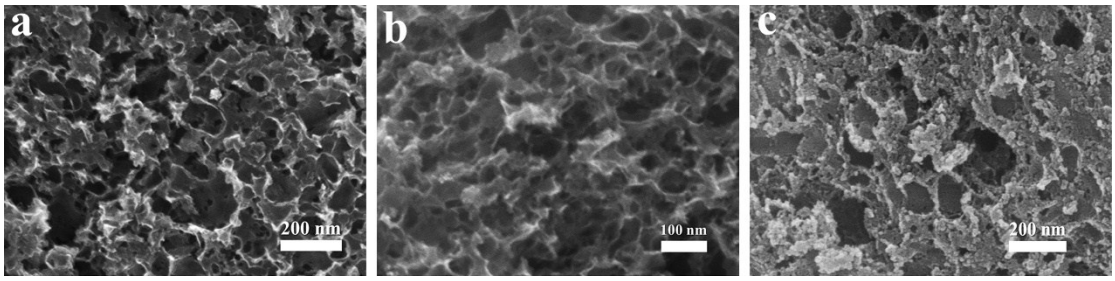

Fig. S2. SEM images of PC (a), N-PC (b) and Fe-PC (c)

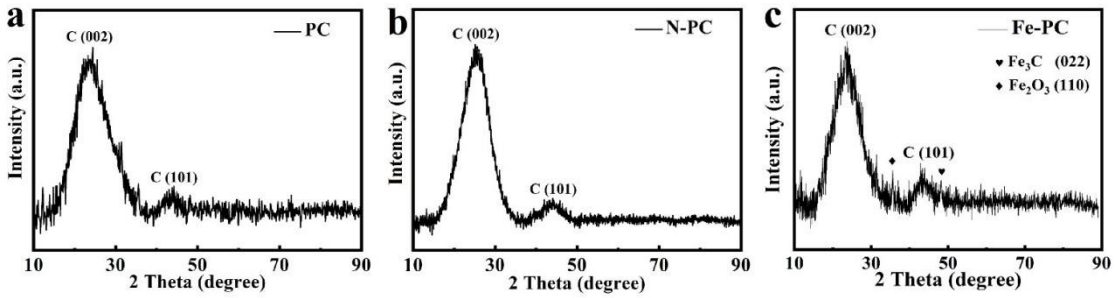

Fig. S3. XRD patterns of PC (a), N-PC (b) and Fe-PC (c)

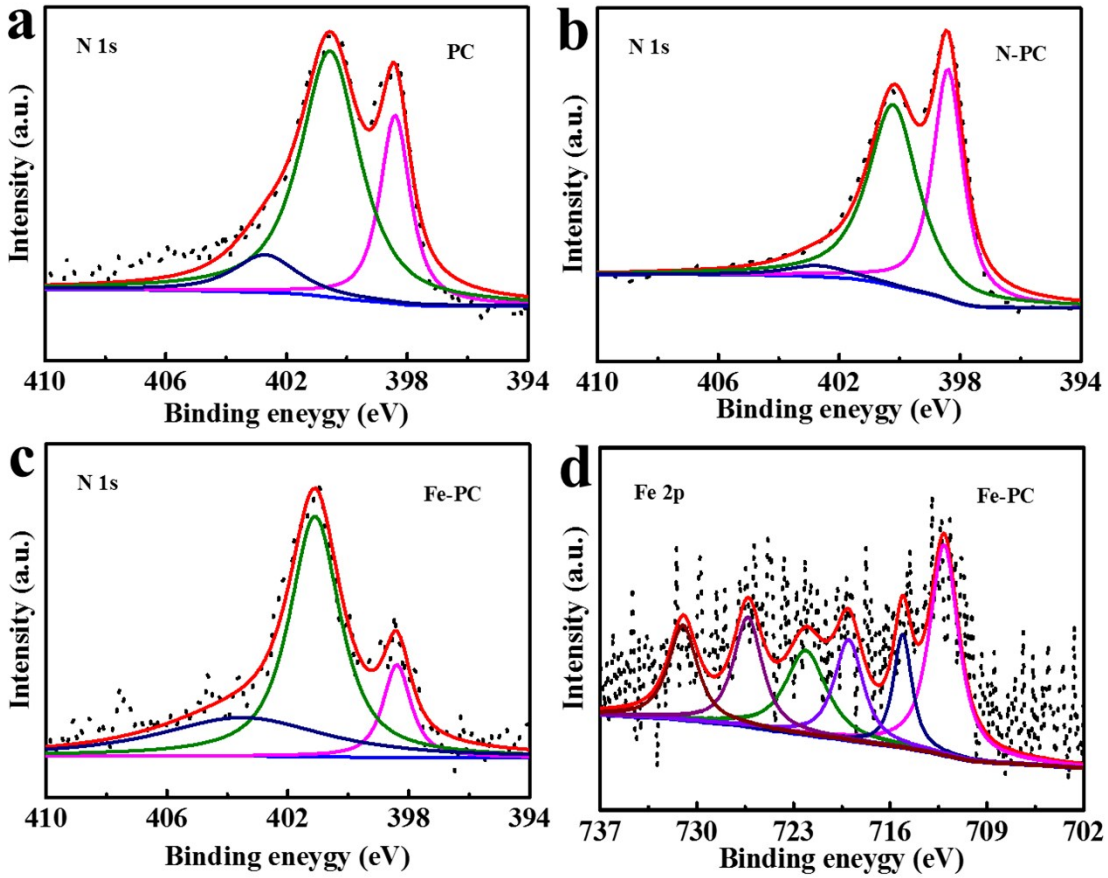

Fig. S4. N 1s spectra of PC (a), N-PC (b), Fe-PC (c), and Fe 2p spectra of Fe-PC (d).

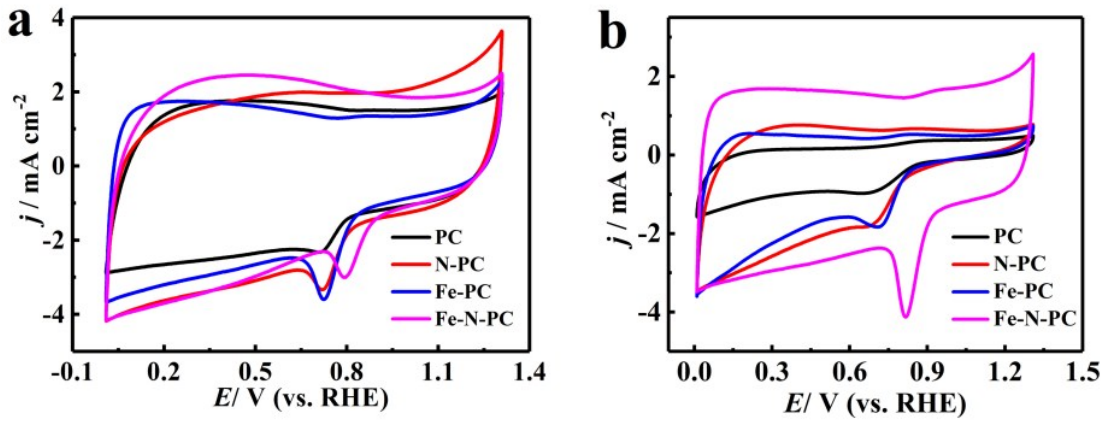

Fig. S5. The CV curves of a series of soybean straw catalysts were studied in a saturated O_2 solution of 0.1 M KOH (a) and 0.1 M $HClO_4$ (b).

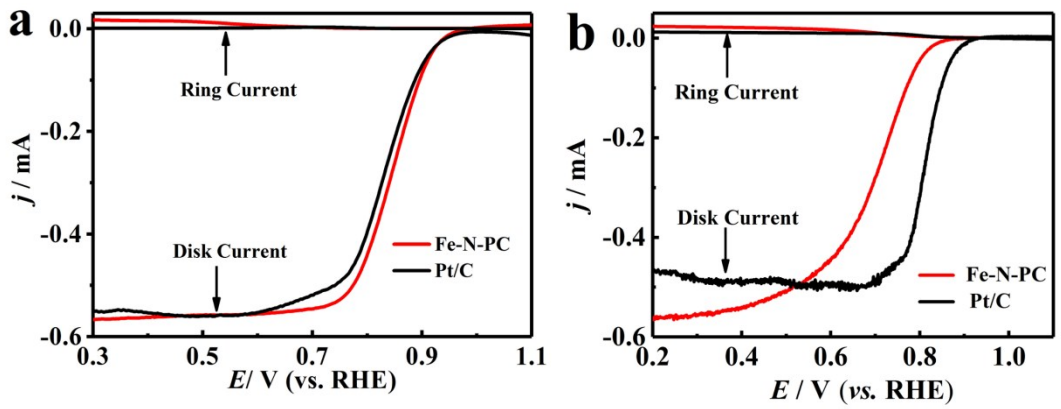

Fig. S6. RRDE ring current and disk current of Fe-N-PC and Pt/C measured at 0.1 M KOH (a) and 0.1 M $HClO_4$ (b).

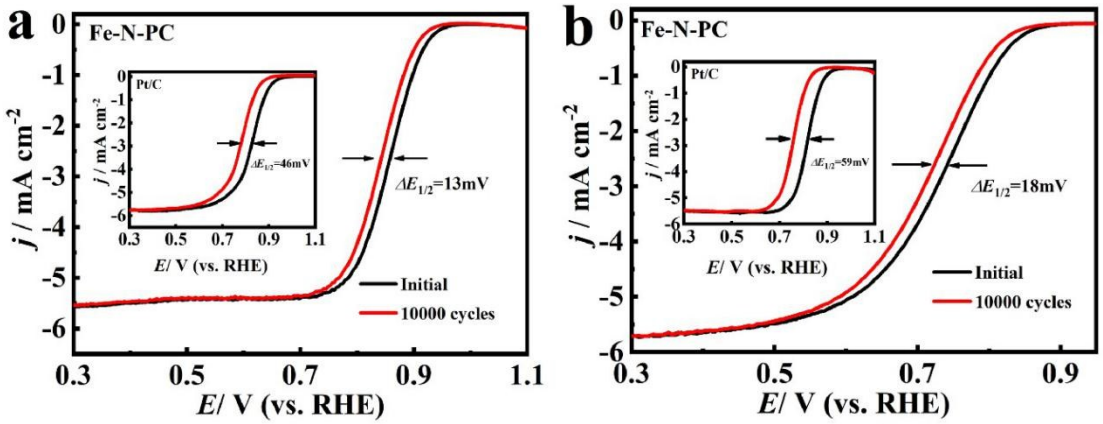

Fig. S7. Cycling stabilities of Fe-N-PC and Pt/C catalysts in O2-saturated 0.1 M KOH solution (a) and 0.1 M $HClO_4$ solution (b).

Table S1. The ORR performance parameters of different catalysts under alkaline conditions were compared.

Samples	E_{onset} (V *vs.*RHE)	$E_{1/2}$ (V *vs.*RHE)	Electrolyte
PC	0.882	0.755	0.1 M KOH
N-PC	0.896	0.759	0.1 M KOH
Fe-PC	0.899	0.765	0.1 M KOH
Fe-N-PC	0.989	0.854	0.1 M KOH
Pt/C	0.984	0.827	0.1 M KOH
Fe14NDC-9[1]	0.968	0.888	0.1 M KOH
FeN/C-800[2]	0.923	0.809	0.1 M KOH
Fe-N-C-AH[3]	0.942	0.848	0.1 M KOH
Fe-CZIF-800-10[4]	0.982	0.830	0.1 M KOH

Table S2. The ORR performance parameters of different catalysts under acidic conditions were compared.

Samples	E_{onset} (V *vs.*RHE)	$E_{1/2}$ (V *vs.*RHE)	Electrolyte
PC	0.709	0.481	0.1 M $HClO_4$
N-PC	0.721	0.503	0.1 M $HClO_4$
Fe-PC	0.784	0.552	0.1 M $HClO_4$
Fe-N-PC	0.886	0.754	0.1 M $HClO_4$
Pt/C	0.934	0.802	0.1 M $HClO_4$
5% Fe-N/C[5]	0.861	0.735	0.5 M H_2SO_4
Co-N-GA[6]	0.88	0.73	0.5 M H_2SO_4
$(Fe, Fe)_2$ +N_2 /H_2[7]	0.88	0.75	0.5 M H_2SO_4
Fe-N-CC[8]	0.80	0.52	0.5 M H_2SO_4

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