

Electronic Supplementary Information

Co, Fe decorated N, S co-doping porous carbon enables high stability for oxygen reduction reaction

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Calculation of the number of transferred electrons using the K-L equation:

The dynamics of ORR on the prepared catalysts were studied in more detail by

K-L equation:

$$\frac{1}{j} = \frac{1}{j_k} + \frac{1}{j_l} = \frac{1}{j_k} + \frac{1}{B\omega^{\frac{1}{2}}} \quad (B = 0.2nFC_0D_0^{\frac{2}{3}}V^{-\frac{1}{6}})$$

where j is the measured current density, j_k and j_l are the kinetic and limiting current densities, ω is the angular velocity of the disk, n is the electron transfer number, F is the Faraday constant (96485 C mol⁻¹), C_0 is the bulk concentration of O₂ (1.6×10⁻⁶ mol L⁻¹), D_0 is the diffusion coefficient of O₂ in 0.1 M KOH, and V is the kinematic viscosity of the electrolyte (0.01 cm² s⁻¹). By adjusting the rotational speed of LSV, a good linear relationship between j^{-1} and $\omega^{-1/2}$ was observed at 0.3, 0.4, 0.5, and 0.6 V for the samples as shown in Fig. 3d. The electron transfer number n can be obtained by substituting the slope into the abovementioned equation. Here, the value of n is 3.99 for FeCo-SNC.

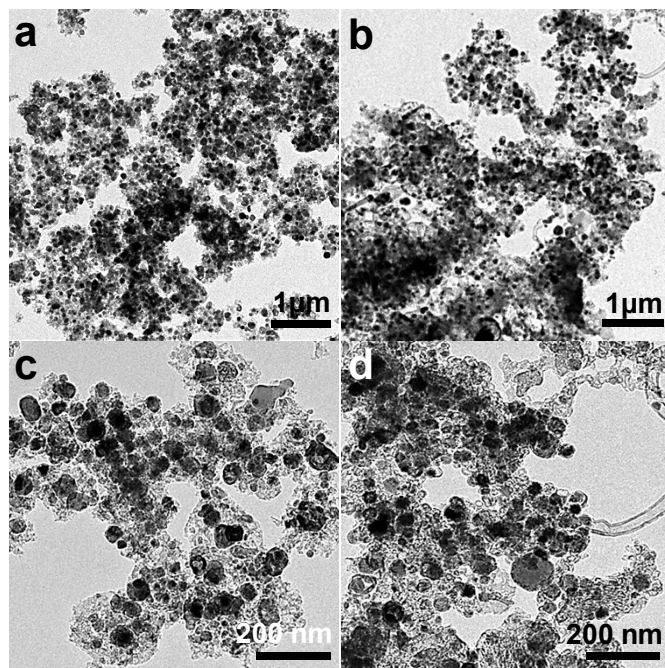


Fig. S1 TEM images of Co-NC (a, c), FeCo-NC (b, d).

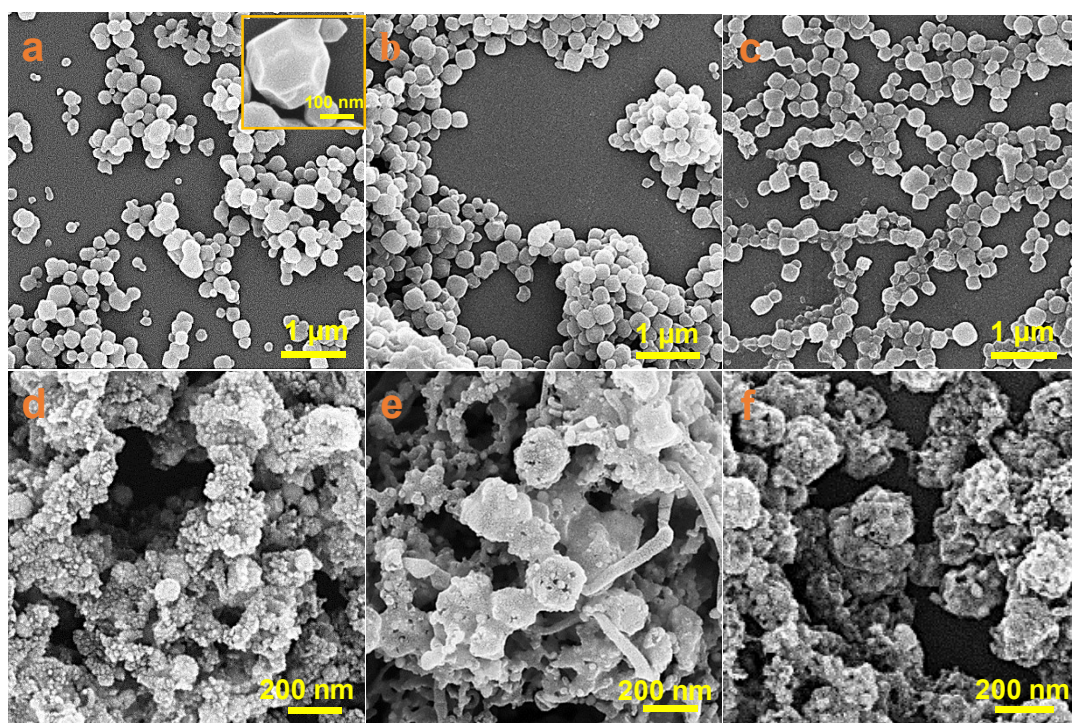


Fig. S2 SEM images of (a) ZIF-67 (inset is a magnified ZIF-67), (b) FePc/ZIF-67, (c) FeTsPc/ZIF-67, (d) Co-NC, (e) FeCo-NC, (f) FeCo-SNC.

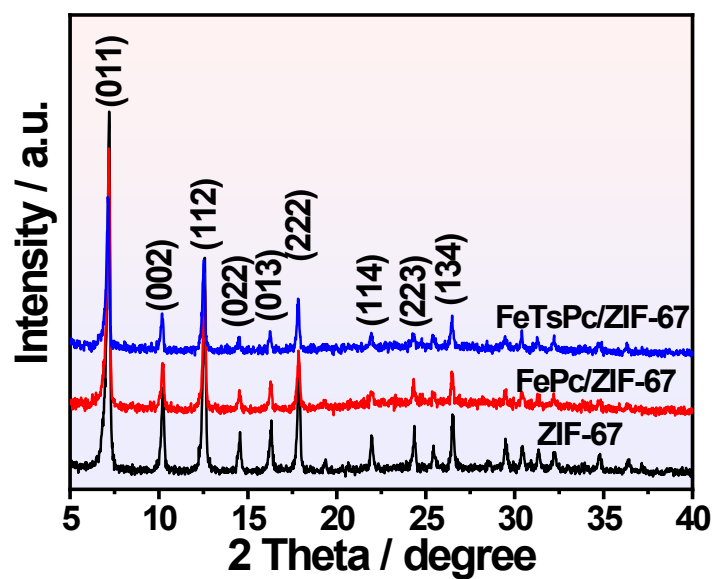


Fig. S3 XRD patterns of the prepared ZIF-67, FePc/ZIF-67 and FeTsPc/ZIF-67 catalysts, respectively.

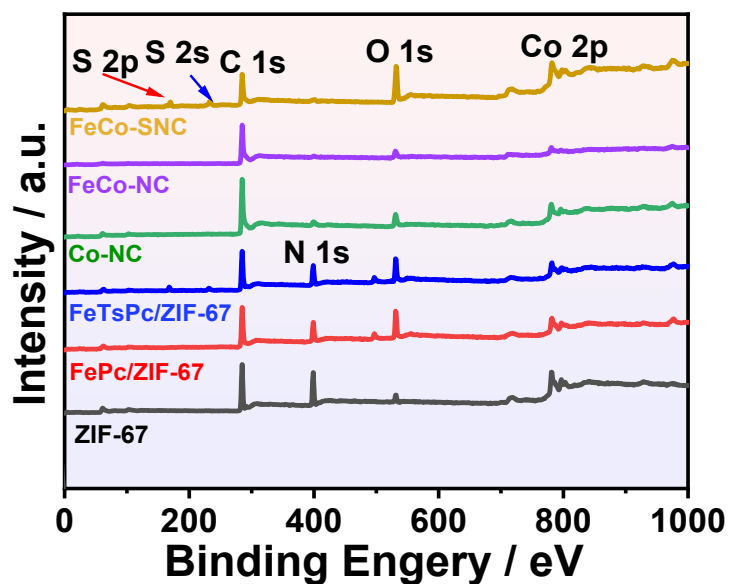


Fig. S4 Full-survey spectra of ZIF-67, FePc/ZIF-67, FeTsPc/ZIF-67, Co-NC, FeCo-NC and FeCo-SNC, respectively.

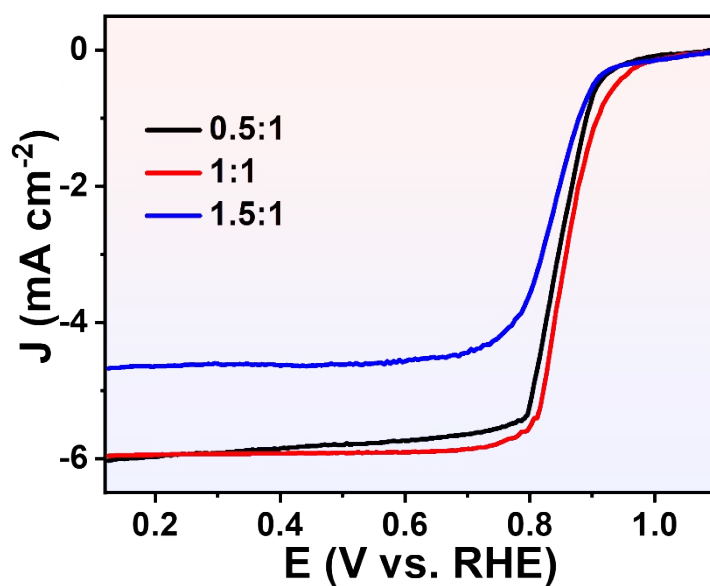


Fig. S5 LSV curves of FeCo-SNC obtained under different mass ratio of FeTsPc to ZIF-67 in an O₂-saturated 0.1 M KOH electrolyte at a rotation rate of 1600 rpm with a scan rate of 10 mV s⁻¹.

Table S1 The comparison of ORR activity on the reported catalysts.

Catalysts	E _{1/2} (V)	References
FeCo-SNC	0.856	This work
Co ₂ P/Co-N-C	0.82	1
FeCo/NSC	0.82	2
Fe porphyrin/CNT	0.84	3
O-Co-N/C	0.85	4
meso-Fe-N-C	0.85	5
MPF/M = Fe, Co	0.813	6
Fe-ND/C	0.79	7
Fe SA-NSC-900	0.86	8
Fe-N-C/PC	0.85	9
FeCo-NCNFs-800	0.85	10

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