Supporting Information

The role of Central Fe atom in N₄-macrocycle Structure for the Enhancement of Oxygen Reduction Reaction in Heteroatom Nitrogen-Carbon Nanosphere

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Fig. S1. (a) N_2 sorption isotherms with a (b) pore diameter distribution of FP-MCSs.

	Surface area (m ² g ⁻¹)	Pore volume (cm ³ g ⁻¹)	Mean pore diameter (nm)
P-MCS	232	0.95	14.15
FP-MCS1	238	1.10	18.88
FP-MCS2	230	1.02	17.92
FP-MCS3	225	0.90	13.60

Table S1. Structural parameter of FP-MCSs

	Nitrogen	Hydrogen	Carbon
P-MCS	2.89	0.53	82.85
FP-MCS1	1.32	0.51	84.26
FP-MCS2	2.44	0.53	83.44
FP-MCS3	3.02	0.58	82.23

Table. S2. Elemental compositions of the prepared catalysts obtained from the EA (wt. %)



Fig. S2. C1s and Fe2p XPS spectra of FP-MCS-3; The peaks are fitted into three energy components centered ar ound 707.2, 709.4 and 711.8 eV, corresponding to ionic state of iron (Fe2p_{1/2}, red line and blue line) and metalli c iron (Fe2p_{3/2}, gray line), respectively.



Fig. S3. RDE linear sweep voltammetry for (a) P-MCS, (b) FP-MCS-3 on a GC electrode in an O₂-saturated 0.1 M KOH solution at a scan rate of 10 mV/s with different rotation RPM.



Fig. S4. UV-Vis absorbance spectra of P-MCS and FP-MCS-3.