Supporting Information

Polystyrene foam to high-performance doped carbon catalyst with ultrahigh surface area and hierarchical porous structures for oxygen reduction

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Preparation of materials

Fe-Mel-CPS

1.0 g CPS, 2.0 g melamine, 1.0 g FeCl₃ and 200 ml DI water were mixed and the suspension was then evaporated at 80 °C under magnetic stirring. The obtained powder was first treated at 550 °C for 4 h at a heating rate of 2 °C min⁻¹, and then pyrolyzed at 900 °C at a heating rate of 10 °C min⁻¹. After cooling down, the intermediate catalyst was collected and leached with 0.5 M H₂SO₄ for 8 h. The as-prepared intermediate was then heat-treated at 900 °C for another 2 h with a heating rate of 10 °C min⁻¹.

The second acid treatment of Fe-Mel-CPS

The as-prepared Fe-Mel-CPS was leached by using 1 M HCl solution and filtrated under diminished pressure immediately when the heating equipment was removed. The residue was then rinsed with DI water and dried at 80 °C in vacuum for 24h.
Characterization

Fig. S1. (a) SEM image of Mel-CPS; (b), (c) TEM images of C-CPS and Mel-CPS

![SEM image of Mel-CPS](image1)

![TEM images of C-CPS and Mel-CPS](image2)

Fig.S2 (a), (b) LSV curves of Fe-Mel-CPS and Mel-CPS at varying rotating rate; (c), (d) K-L plots of Fe-Mel-CPS and Mel-CPS.

![LSV curves](image3)

![K-L plots](image4)
Fig. S3. (a), (b), (c): N<sub>2</sub> adsorption-desorption isotherms of CPS, C-CPS and Mel-CPS; (d), (e), (f): pore-size distribution and cumulative pore volume (inserted figures) of CPS, C-CPS and Mel-CPS.