Supporting Imformation

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 $FeCl_3$ and 200 ml DI water were mixed and the suspension was then evaporated at 80 ^oC under magnetic stirring. The obtained powder was first treated at 550 ^oC for 4 h at a heating rate of 2 $^oC\ min^{-1}$, and then pyrolyzed at 900 ^oC at a heating rate of 10 $^oC\ min^{-1}$. After cooling down, the intermediate catalyst was collected and leached with 0.5 M H_2SO_4 for 8 h. The as-prepared intermediate was then heat-treated at 900 ^oC for another 2 h with a heating rate of 10 $^oC\ min^{-1}$.

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 ^oC in vacuum for 24h.

Characterization

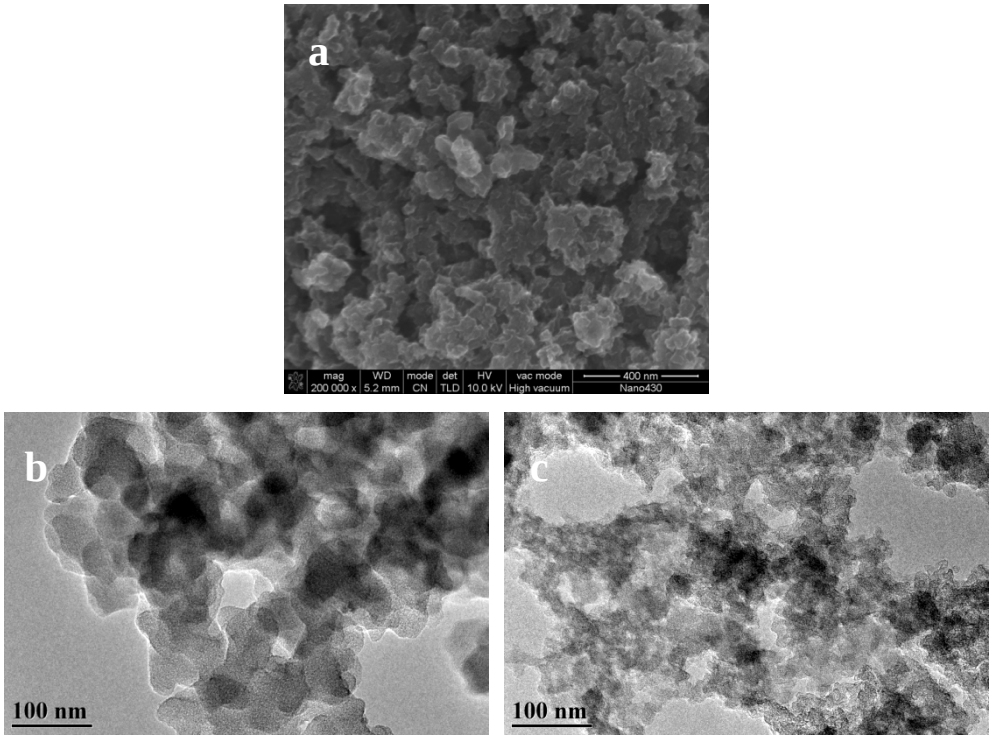

Fig. S1. (a) SEM image of Mel-CPS; (b), (c) TEM images of C-CPS and Mel-CPS

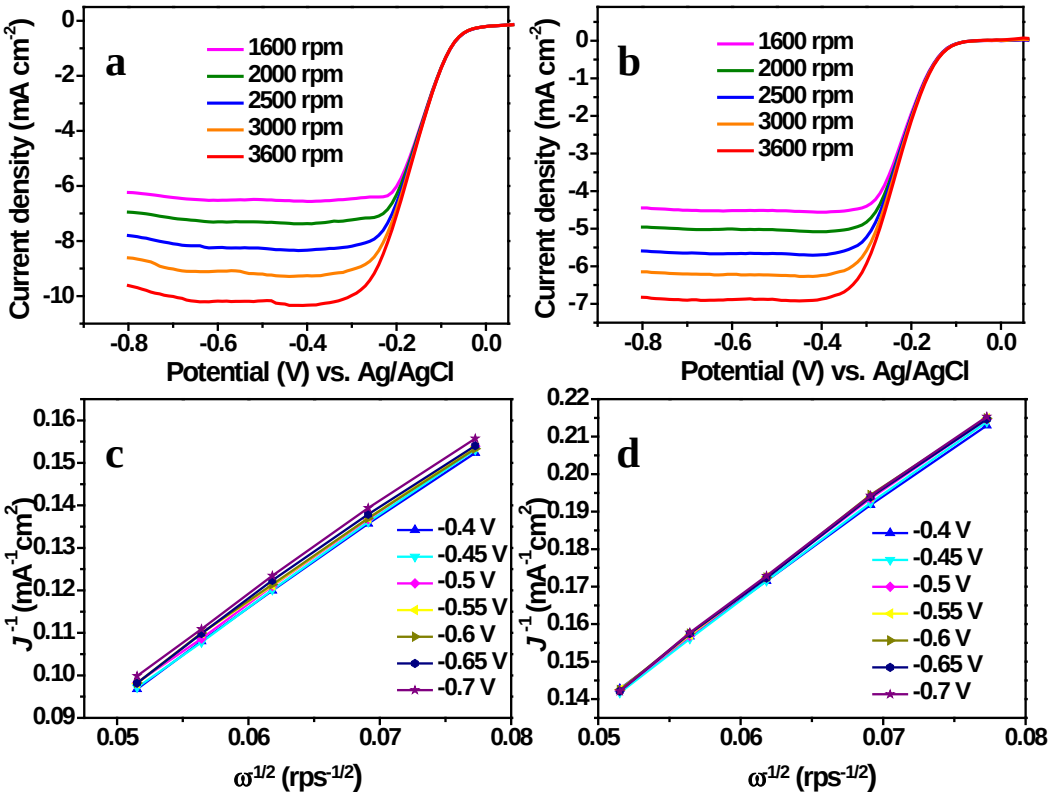

Fig.S2 (a), (b) LSV curves of Fe-Mel-CPS and Mel-CPS at varying rotating rate; (c), (d) K-L plots of Fe-Mel-CPS and Mel-CPS.

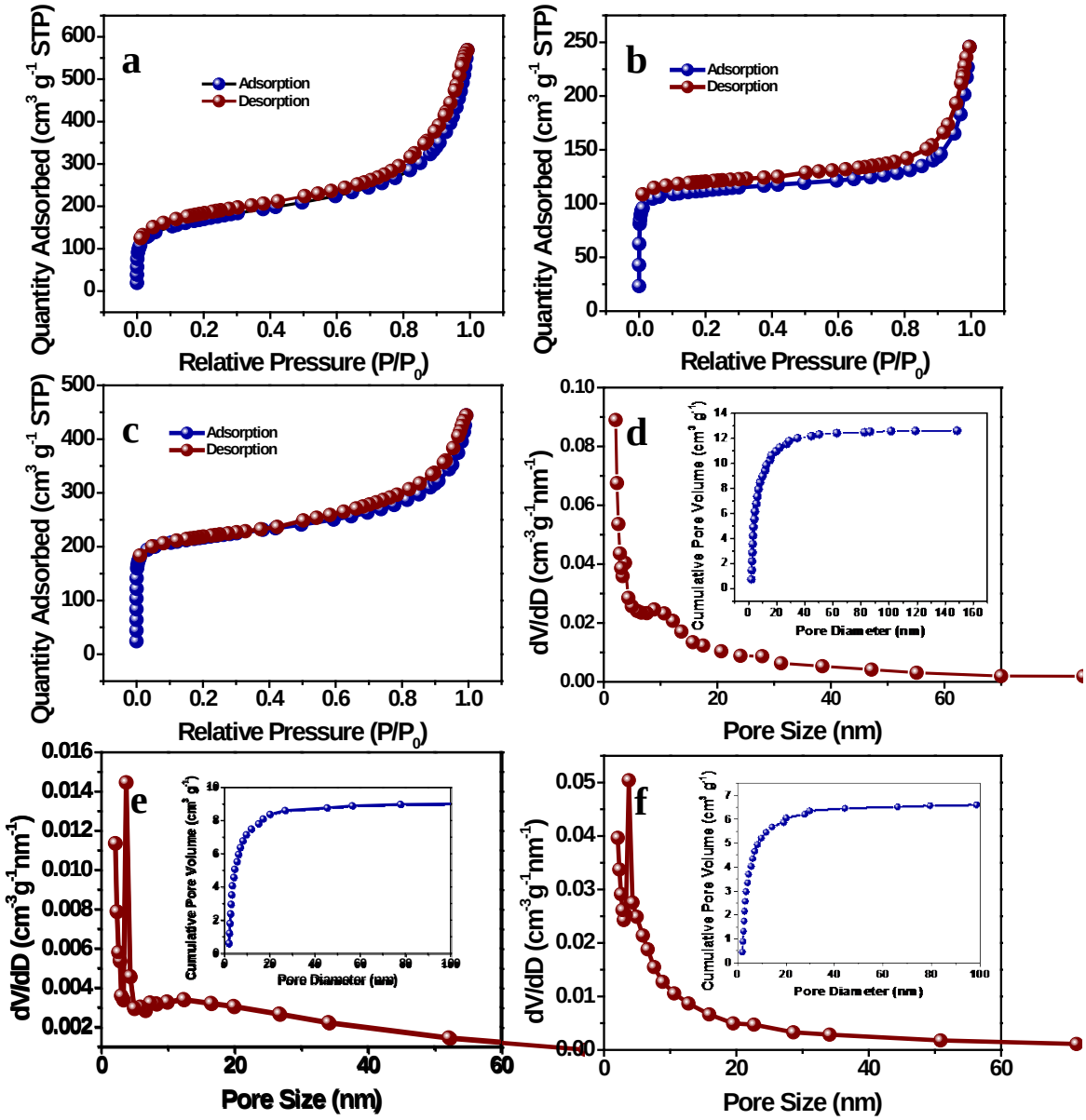

Fig. S3. (a), (b), (c): N_2 adsorption-desorption isotherms of CPS, C-CPS and Mel-CPS; (d), (e), (f): pore-size distribution and cumulative pore volume (inserted figures) of CPS, C-CPS and Mel-CPS.