Multiscale porous Fe-N-C network as highly efficient catalyst for oxygen reduction reaction

Ying Li,<sup>a</sup> Tong Liu,<sup>b</sup> WenXiu Yang,<sup>c</sup> Zhijun Zhu,<sup>\*b</sup> Yanling Zhai,<sup>\*a</sup> Wenling Gu,<sup>d</sup> and Chengzhou Zhu<sup>\*d</sup>

<sup>a</sup>Department of Chemistry and Chemical Engineering, Qingdao University, 308 Ningxia Road, Qingdao, 266071, China

<sup>b</sup>Department of Materials Science and Engineering, Qingdao University, 308 Ningxia Road, Qingdao, 266071, China

<sup>c</sup>Department of Materials Science & Engineering, College of Engineering, Peking University, Beijing, 100871, China

<sup>d</sup>College of Chemistry, Central China Normal University, Wuhan, 430079, PR China

\*Corresponding authors: zhuzhujun001@gmail.com (ZZ), zhaiyanling@qdu.edu.cn (YZ), czzhu@mail.ccnu.edu.cn (CZ)



Fig. S1 SEM images of NC-900 (A), FeNC-900 without Zn (B), FeNC-800 (C), and FeNC-1000 (D).



Fig. S2 The TEM images of  $SiO_2$  NPs with diameter of about 20 nm.



Fig. S3 XPS spectra of FeNC-900, NC-900 and FeNC-900 without Zn.



**Fig. S4** The Fe 2P XPS spectra of FeNC-800, FeNC-1000, FeNC-900 without Zn and FeNC-900.



Fig. S5 CV (A) and LSV (B) curves of FeNC-900 catalysts with or without Zn. CVs were recorded in  $N_2$  (black) and  $O_2$  (red) saturated 0.1 M KOH at a scan rate of 50 mV/s. LSVs were carried out in  $O_2$ -saturated 0.1 M KOH at a scan rate of 10 mV/s and a rotating speed of 1600 rpm.



Fig. S6 I-t response of FeNC-900 (black) and commercial Pt/C (red) catalysts under 0.5 V in  $O_2$ -saturated 0.1 M KOH.