Supporting information for

Sacrificial Template Induced Interconnected Bubble-like N-doped Carbon Nanofoam as a PH-universal Electrocatalysts for Oxygen Reduction Reaction

Table S1 precursor species and their corresponding components

<table>
<thead>
<tr>
<th>Precursor</th>
<th>Zinc nitrate hexahydrate (g/600mL water)</th>
<th>Glucose (g/600mL water)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>18</td>
<td>22.8</td>
</tr>
<tr>
<td>b</td>
<td>8.925</td>
<td>11.4</td>
</tr>
<tr>
<td>c</td>
<td>1</td>
<td>1.28</td>
</tr>
</tbody>
</table>

Fig. S1 SEM images of sphere-like carbon materials derived from precursor a (a), b (b) and c (c).
Fig. S2 High resolution C 1s spectra of C-950 (a), N-C-900 (b), N-C-950 (c) and N-C-1000 (d).

Fig. S3 High resolution Zn 2p XPS spectrum of N-C-950.
Fig. S4 CV curves of N-C-950 (a) and Pt/C (b) measured in three different solutions.

Fig. S5 Chronoamperometric curves of a glassy carbon electrode modified with N-C-950 and Pt/C at -0.30 V vs. Ag/AgCl in an O$_2$-saturated 0.1 M KOH solution at a rotation rate of 1600 rpm.
Fig. S6 LSV curves of N-C-950 and Pt/C measured in O$_2$-saturated PBS solution at a rotation speed of 1600 rpm with a scan rate of 5 mV s$^{-1}$.

Fig. S7 a. RRDE voltammograms in O$_2$-saturated PBS solution at room temperature at a rotation speed of 1600 rpm with a scan rate of 5 mV s$^{-1}$ for N-C-950; b. the electron transfer number and hydrogen peroxide yield obtained from the RRDE curves for N-C-950.
Fig. S8 Chronoamperometric curves of a glassy carbon electrode modified with N-C-950 and Pt/C, respectively, at -0.25 V vs Ag/AgCl in O$_2$-saturated 0.1 M PBS solution at a rotation rate of 1600 rpm.

Fig. S9 LSV curves of N-C-950 and Pt/C measured in O$_2$-saturated 0.5 M H$_2$SO$_4$ solution at a rotation speed of 1600 rpm with a scan rate of 5 mV s$^{-1}$. 
Fig. S10 a. RRDE voltammograms in O$_2$-saturated 0.5 M H$_2$SO$_4$ solution at room temperature at a rotation speed of 1600 rpm with a scan rate of 5mV s$^{-1}$ for N-C-950; b. the electron transfer number and hydrogen peroxide yield obtained from the RRDE curves for N-C-950.

Fig. S11 Chronoamperometric curves of a glassy carbon electrode modified with N-C-950 and Pt/C, respectively, at -0.25 V vs Ag/AgCl in O$_2$-saturated 0.5 M H$_2$SO$_4$ solution at a rotation rate of 1600 rpm.

Fig. S12 (a) Voltage and power density tendencies with increasing current densities; (b) Discharge curves of the as-prepared N-C-950 and Pt/C at a current density of 50 mA cm$^{-2}$. 
Scheme S1. Schematic of Zn-air battery configuration.