Supporting Information

Hierarchical interconnected macro-/mesoporous Co-containing N-doped carbon for efficient oxygen reduction reactions

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Figure S1. SEM images of (a) PS colloidal spheres and (b) composites of PVA and PS. Inset: an optical photo of the composites of PVA and PS.

Figure S2. SEM images of (a) HP-Co-CN-550, (b) HP-Co-CN-800, and (c) HP-Co-1000.
Figure S3. The thermogravimetric analysis (TGA) of PS, PVA, and PS/PVA.

Table 1. Atomic concentrations (at%) of C, Co, and heterocyclic N components of all as-prepared samples from XPS analysis.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Co</th>
<th>C</th>
<th>N</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP-Co-CN-800</td>
<td>0.22</td>
<td>77.14</td>
<td>10.13</td>
<td>4.39</td>
<td>2.14</td>
<td>2.36</td>
<td>1.24</td>
</tr>
<tr>
<td>HP-Co-CN-900</td>
<td>0.35</td>
<td>81.85</td>
<td>9.08</td>
<td>3.07</td>
<td>1.91</td>
<td>3.57</td>
<td>0.53</td>
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<tr>
<td>HP-Co-CN-1000</td>
<td>0.18</td>
<td>83.72</td>
<td>6.80</td>
<td>0.92</td>
<td>2.01</td>
<td>2.70</td>
<td>1.17</td>
</tr>
<tr>
<td>HP-CN</td>
<td>0</td>
<td>82.15</td>
<td>9.12</td>
<td>3.15</td>
<td>1.87</td>
<td>3.51</td>
<td>0.59</td>
</tr>
<tr>
<td>Co-CN</td>
<td>0.3</td>
<td>83.12</td>
<td>9.65</td>
<td>3.40</td>
<td>1.95</td>
<td>3.47</td>
<td>0.83</td>
</tr>
</tbody>
</table>
**Figure S4** EDS elemental mapping indicating the distribution of N, O, and Co in HP-Co-CN-900.

**Figure S5.** RDE linear sweep voltammograms recorded for HP-Co-CN-800 and HP-Co-CN-1000 supported on a GC electrode in an O$_2$-saturated 0.1M KOH solution at a scan rate of 10 mV s$^{-1}$ and different rotation rates.
Figure S6. (a) Low-magnification and (b) high-magnification SEM images of as-synthesized HP-CNPs. (c) SEM images of the Co-CNPs. (d) N$_2$ adsorption–desorption isotherms and the corresponding pore size distribution (inset) of the Co-CNPs.

Figure S7. Linear sweep voltammograms recorded for HP-CNPs and Co-CNPs supported on a GC electrode (c) K-L plots and (d) electrochemical activity given as the kinetic current density ($J_k$) at -0.5 V from HP-CNPs, Co-CNPs, and HP-Co-CNPs, respectively.
Figure S8. (a) Cyclic voltammograms of Pt/C and (b) linear sweep voltammograms of HP-Co-CN-900 in O₂- or N₂-saturated 0.1 M KOH solutions as well as O₂-saturated 0.1 M KOH solution with 3 M CH₃OH.

Figure S9. CV of HP-Co-CN-900 before and after stability test (2000 cycles in oxygen-saturated 0.1 M KOH at a scan rate of 100 mV s⁻¹).