Electronic Supplementary Information

MOF-derived CuCoNi trimetallic hybrids as efficient oxygen evolution reaction electrocatalysts

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Fig. S1 TEM image of CoNi-Cu(BDC).

Fig. S2 (a-e) EDX elemental mapping images of CoNi-Cu(BDC).

Fig. S3 (a) SEM images of Co-Cu(BDC) and Ni-Cu(BDC).
Fig. S4 SEM images of Cu(BDC) through hot reflux synthesis method before (a) and after impregnation (b).

Fig. S5 (a) XRD patterns of Co-Cu(BDC) and Ni-Cu(BDC).

In order to seek the optimum conditions of CoNi-Cu(BDC) synthesis, numerous experiments need to be investigated. First, for the research of metal precursors, the ratio of Co and Ni is 1:1 and impregnation time is 60 min, changing the different metal precursors. Second, for the research of metal ions ratios, the metal precursors (cobalt acetate and nickel acetate) and impregnation time (60 min) are kept constant and the metal ions ratios are changed. Third, for the research of impregnation time, the metal precursors (cobalt acetate and nickel acetate) and ratios of Co/Ni (2:1) are
kept constant and the impregnation times are changed to 10 min, 30 min, 120 min and 240 min.

**Fig. S6** LSV curves of CoNi-Cu(BDC) with different Co and Ni precursors.

**Fig. S7** LSV curves of CoNi-Cu(BDC) with different Co and Ni ratios.
Fig. S8 LSV curves of CoNi-Cu(BDC) with different impregnation times.

Fig. S9 LSV curves of CoNi-Cu(BDC) with different loading amounts.
Fig. S10 LSV curve of CoNi-Cu(BDC) (Cu(BDC) through hot reflux synthesis method).

Fig. S11 (a) LSV curves and (b) Tafel plots of CoNi-Cu(BDC) and CuCoNi(BDC).
Table S1 The OER catalytic performances comparison of the recently reported MOF-based electrocatalysts.

<table>
<thead>
<tr>
<th>Catalyst</th>
<th>Overpotential (mV)</th>
<th>Tafel slope (mV dec⁻¹)</th>
<th>Electrolyte</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoNi-Cu(BDC)</td>
<td>327 mV @ 10 mA·cm⁻²</td>
<td>75.7</td>
<td>1 M KOH</td>
<td>This work</td>
</tr>
<tr>
<td>CoNi-NDC/PANI-NF</td>
<td>323 mV @ 10 mA·cm⁻²</td>
<td>73.3</td>
<td>1 M KOH</td>
<td>1</td>
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<td>Co₃O₄/Fe₂O₃ nanocubes</td>
<td>310 mV @ 10 mA·cm⁻²</td>
<td>67</td>
<td>1 M KOH</td>
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<tr>
<td>NiCo-C-3</td>
<td>420 mV @ 10 mA·cm⁻²</td>
<td>107</td>
<td>1 M KOH</td>
<td>3</td>
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<tr>
<td>NiCoS-3</td>
<td>320 mV @ 10 mA·cm⁻²</td>
<td>58.8</td>
<td>1 M KOH</td>
<td>4</td>
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<tr>
<td>CoNC-CNF-1000</td>
<td>450 mV @ 10 mA·cm⁻²</td>
<td>94</td>
<td>0.1 M KOH</td>
<td>5</td>
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<td>Co₈S₈/NSCNFs-850</td>
<td>302mV @ 30 mA·cm⁻²</td>
<td>54</td>
<td>1 M KOH</td>
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<tr>
<td>Ni@NiO/N-C nanowires</td>
<td>390 mV @ 10 mA·cm⁻²</td>
<td>100</td>
<td>1 M KOH</td>
<td>7</td>
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<tr>
<td>Co-Ni₃C/Ni@C</td>
<td>325 mV @ 10 mA·cm⁻²</td>
<td>67.76</td>
<td>1 M KOH</td>
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<td>FeNi@CNF</td>
<td>356 mV @ 10 mA·cm⁻²</td>
<td>62.6</td>
<td>1 M KOH</td>
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<td>Cu@CuO–C</td>
<td>340 mV @ 10 mA·cm⁻²</td>
<td>156</td>
<td>0.1 M KOH</td>
<td>10</td>
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</tbody>
</table>

References:

4. Z. Yu, Y. Bai, S. M. Zhang, Y. X. Liu, N. Q. Zhang and K. N. Sun, Int. J. Hydrogen Energy, 2018,
43, 8815-8823.