Supplementary information

Phosphatized NiCo LDHs 1D Dendritic Electrode for High Energy Asymmetric Supercapacitor

Fig. S1. The full XPS spectra of the 4M-NiCo LDHs and 4M-P@NiCo LDHs.
Fig. S2. Electrochemical properties of activated carbon (AC) under three electrode system: (a) CV curves at different scan rates; (b) GCD curves at different current densities; (c) Calculated specific capacitances of AC as a function of current density; (d) Nyquist plots.

Fig. S3. FESEM images of 4M-P@NiCo LDHs after 5000 charge−discharge cycles.
Fig. S4. calculated mass specific capacitance of different obtained electrodes at various current densities.
Table S1. Structural parameters obtained from N2 adsorption isotherms analysis.

<table>
<thead>
<tr>
<th>samples</th>
<th>SBET (m² g⁻¹)ᵃ</th>
<th>Pore volume (cm³ g⁻¹)ᵇ</th>
<th>Average pore size (nm)ᵇ</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiCo LDHs</td>
<td>3.93</td>
<td>0.00464</td>
<td>4.96</td>
</tr>
<tr>
<td>4M-P@NiCo LDHs</td>
<td>10.27</td>
<td>0.00861</td>
<td>3.53</td>
</tr>
</tbody>
</table>

ᵃ) Obtained from BET method;
ᵇ) Total pore volume taken from the N₂ adsorption volume at a relative pressure (P/P₀) of 0.99.

Table S2. Element components of electrode material before and after phosphatized treatment obtained by XPS detection (At %).

<table>
<thead>
<tr>
<th>element</th>
<th>4M-NiCo LDHs</th>
<th>4M-P@NiCo LDHs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni</td>
<td>15.7</td>
<td>3.77</td>
</tr>
<tr>
<td>Co</td>
<td>24.9</td>
<td>7.23</td>
</tr>
<tr>
<td>O</td>
<td>59.34</td>
<td>41.27</td>
</tr>
<tr>
<td>P</td>
<td>-</td>
<td>47.73</td>
</tr>
</tbody>
</table>

Phosphatized rate: About 18% (measured by the decrease of oxygen content)
Table S3. Comparison of areal capacitances of LDHs based electrodes in references.

<table>
<thead>
<tr>
<th>Electrode materials</th>
<th>Electrolyte</th>
<th>Areal capacitance (F cm(^{-2}))</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ni(OH)(_2)/NiCo(_2)O(_4)/carbon fiber paper</td>
<td>1 M KOH</td>
<td>5.2 (2 mA cm(^{-2}))</td>
<td>1</td>
</tr>
<tr>
<td>NiCo-CO(_3) LDH grown on Ni foam</td>
<td>2 M KOH</td>
<td>6.2 (2 mA cm(^{-2}))</td>
<td>2</td>
</tr>
<tr>
<td>Ni-P@NiCo LDH Decorated Ni Foam</td>
<td>6 M KOH</td>
<td>6.4 (100 mA cm(^{-2}))</td>
<td>3</td>
</tr>
<tr>
<td>NiCo(_2)S(_4) nanotube NiMn-LDH arrays 3D graphene sponge</td>
<td>6 M KOH</td>
<td>1.26 (10 mA cm(^{-2}))</td>
<td>4</td>
</tr>
<tr>
<td>Ni-Co-LDH/graphene composites</td>
<td>6 M KOH</td>
<td>0.16 (16 mA cm(^{-2}))</td>
<td>5</td>
</tr>
<tr>
<td>NiP@CoAl-LDH nanotube arrays</td>
<td>2 M KOH</td>
<td>1 (20 mA cm(^{-2}))</td>
<td>6</td>
</tr>
<tr>
<td>Ni – Co LDH/3D Graphene Nickel Foam</td>
<td>6 M KOH</td>
<td>1.25 (50 mA cm(^{-2}))</td>
<td>7</td>
</tr>
<tr>
<td>CoAl-LDH/NiCo(_2)S(_4) sheets</td>
<td>2 M KOH</td>
<td>2.4 (10 mA cm(^{-2}))</td>
<td>8</td>
</tr>
<tr>
<td>Ni(OH)(_2) and Cu grown on Ni foam</td>
<td>2 M KOH</td>
<td>5.2 (50 mA cm(^{-2}))</td>
<td>9</td>
</tr>
</tbody>
</table>


