Supporting Information

Ni-P@NiCo LDH Core-Shell Nanowires Decorated Nickel Foam with Enhanced Areal Specific Capacitance for High-Performance Supercapacitors

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Figure S1 photograph of (a) Ni foam, (b) Ni-P and (c) Ni-P@NiCo LDH samples

Figure S2 FESEM images of Ni-P@ NiCo LDH samples electrodeposited at 10 mv s\(^{-1}\) (A) and 30 mv s\(^{-1}\)(B) for 20 cycles.
Figure S3 HRTEM image of Ni-P nanorod, Inset: FFT pattern

Figure S4 CV (A) and GCD (C) curves of Ni-P@NiCo LDH obtained at a scan rate of 20 mV s\(^{-1}\) for different CV cycles; CV (B) and GCD (D) curves of Ni-P@NiCo LDH obtained at different scan rate for 20 cycles. The corresponding samples were denoted as Ni-P@NiCo LDH-1 (at 20 mV s\(^{-1}\) for 10 cycles), Ni-P@NiCo LDH-2 (at 20 mV s\(^{-1}\) for 20 cycles), Ni-P@NiCo LDH-3 (at 20 mV s\(^{-1}\) for 30 cycles), Ni-P@NiCo LDH-4 (at 10 mV s\(^{-1}\) for 20 cycles), Ni-P@NiCo LDH-5 (at 30 mV s\(^{-1}\) for 20 cycles), respectively.
**Figure S5** CV (A) and GCD (B) curves of Ni-P@NiCo LDH core-shell hybrids at various scan rates and different current densities.

**Figure S6** (A), (C) Values of $b$, which are derived from the slope of the plots of $\log i$ vs. $\log v$ at different potentials and (B), (D) the plots of $\log i$ vs. $\log v$ at different potentials.
**Figure S7** (A) GCD curves at different current densities of Ni-P and NiCo LDH samples

**Figure S8** Mass specific capacitance of Ni-P, NiCo LDH and Ni-P@NiCo LDH samples at different current densities

**Figure S9** CVs curves of NiCo LDH (A), Ni-P (B) and Ni-P@NiCo LDH (C) and (D) Plots of the current density vs. scan rate of these samples
Figure S10 Original and fitted EIS plots of Ni-P@NiCo LDH

Figure S11 Original and fitted EIS plots of Ni-P

Figure S12 Original and fitted EIS plots of NiCo LDH
Figure S13 Electrochemical performance of ASCs in the aqueous electrolyte (6 M KOH). (A) Schematic illustration of the assembled ASCs; (B) CV curves of Ni-P@NiCo LDH and AC electrodes at a scan rate of 30 mV s$^{-1}$; (C) CV curves of Ni-P@NiCo LDH //AC ASCs collected in different voltage windows at a scan rate of 50 mV s$^{-1}$ and (D) GCD curves of Ni-P@NiCo LDH //AC ASCs collected in different voltage windows at a current density of 20 mA cm$^{-2}$.

Figure S14 Mass specific capacitances of Ni-P@NiCo LDH //AC ASCs at different current densities


Table S1 Comparison of electrochemical performance of Ni-P@NiCo LDH electrode with some representative hierarchical nanostructures

<table>
<thead>
<tr>
<th>Hierarchical nanostructures</th>
<th>Mass loading (mg cm(^{-2}))</th>
<th>Specific capacitance</th>
<th>Stability</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiP@CoAl-LDH NTAs</td>
<td>0.9</td>
<td>0.26 F cm(^{-2}) at 1 mA cm(^{-2})</td>
<td>95.50%</td>
<td>1</td>
</tr>
<tr>
<td>CoS@NiCo(_2)S(_4)</td>
<td>2.35</td>
<td>7.62 F cm(^{-2}) at 5 mA cm(^{-2})</td>
<td>71.7%</td>
<td>2</td>
</tr>
<tr>
<td>Co(_3)O(_4)@Au</td>
<td>-</td>
<td>6.39 F cm(^{-2}) at 5 mA cm(^{-2})</td>
<td>78%</td>
<td>3</td>
</tr>
<tr>
<td>Co(_3)O(_4)@NiMo</td>
<td>5.2</td>
<td>5.69 F cm(^{-2}) at 30 mA cm(^{-2})</td>
<td>84%</td>
<td>4</td>
</tr>
<tr>
<td>Co(_3)O(_4)@NiCo(_2)O(_4)</td>
<td>1.5</td>
<td>2.04 F cm(^{-2}) at 5 mV s(^{-1})</td>
<td>83.7%</td>
<td>5</td>
</tr>
<tr>
<td>NiCo(_2)S(_4)@PPy</td>
<td>6.87</td>
<td>9.781 F cm(^{-2}) at 5 mA cm(^{-2})</td>
<td>80.64%</td>
<td>6</td>
</tr>
<tr>
<td>ZnO@C@NiC(_2)O(_4)</td>
<td>3.0</td>
<td>3.18 F cm(^{-2}) at 6 mA cm(^{-2})</td>
<td>76%</td>
<td>7</td>
</tr>
<tr>
<td>ZnO@MnO(_2)</td>
<td>5.7</td>
<td>5.2 F cm(^{-2}) at 0.36 mA cm(^{-2})</td>
<td>95%</td>
<td>8</td>
</tr>
<tr>
<td>This work</td>
<td>2.74</td>
<td>12.9 F cm(^{-2}) at 5 mA cm(^{-2})</td>
<td>96%</td>
<td>10000 cycles</td>
</tr>
</tbody>
</table>

References