Supporting Information

for

Rice Husk-Derived Mn₃O₄/Manganese Silicate/C Nanostructured Composites for High-Performance Hybrid Supercapacitors

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Figure S1. FE-SEM images of (a-b) RHs after pre-carbonization; (c) a-C/SiO$_2$ and (d) b-C/SiO$_2$. 

**Figure S1**
Figure S2. (a-c) FE-SEM images of c-C/SiO$_2$; (d-f) TEM images of c-C/SiO$_2$. 
Figure S3

Figure S3. EDS spectrum and elemental mapping images of c-C/SiO$_2$. 
Figure S4. (a-b) FE-SEM images of c-MnSi-0.8; (d-f) FE-SEM images of c-MnSi-3.
Figure S5. Corresponding EDS mapping of C basement in c-MnSi-2.
Figure S6. XPS spectra of c-C/SiO$_2$: (a) Survey XPS spectrum; (b-d) High-resolution spectra of C$_{1s}$, Si$_{2p}$, O$_{1s}$, respectively.
Figure S7

![Figure S7](image1.png)

**Figure S7.** CV curves of c-MnSi-2 at various voltage windows.

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Figure S8

![Figure S8](image2.png)

**Figure S8.** (a) CV curves of c-MnSi-2 and (b) log(i) vs log(v) plots based on peak 1.
Figure S9. CV curves of the as-prepared samples with various ratios of Mn/Si at different scan rates from 5 mV s\(^{-1}\) to 100 mV s\(^{-1}\).
Figure S10

Figure S10. GCD curves of the as-prepared samples with various ratios of Mn/Si at different current densities from 0.5 A g⁻¹ to 10 A g⁻¹.
Figure S11

(a) CV curves and (b) GCD curves of as-prepared samples in different active ratios.

Figure S12

CV curves of c-MnSi-2//Ni(OH)$_2$ HSC on various potential limits.
Figure S13. Digital images of c-MnSi-2//Ni(OH)$_2$ ASC bent at various angles and their corresponding CV curves.
Table S1

Table S1. Comparison of the specific capacitance of Mn$_3$O$_4$ doped MnSi/C composites and some of other previously reported Mn- and Si- based electrode materials.

<table>
<thead>
<tr>
<th>Si- or Mn-based materials</th>
<th>Electrolyte</th>
<th>Potential /V</th>
<th>Capacitance</th>
<th>Cycling capability</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesoporous-Li$_2$MnSiO$_4$</td>
<td>2 M KOH</td>
<td>0–0.55</td>
<td>120 F g$^{-1}$, 20 mV·s$^{-1}$</td>
<td>85.7% after 500</td>
<td>1</td>
</tr>
<tr>
<td>Ni$_3$Si$_2$O$_6$(OH)$_4$/RGO</td>
<td>2 M KOH</td>
<td>0.2–0.6</td>
<td>178.9 F g$^{-1}$, 1 A g$^{-1}$</td>
<td>97.6% after 5000</td>
<td>2</td>
</tr>
<tr>
<td>NS-C-CoSiO</td>
<td>3 M KOH</td>
<td>−0.05–0.4</td>
<td>1600 F g$^{-1}$, 1 A g$^{-1}$</td>
<td>99.1% after 6000</td>
<td>3</td>
</tr>
<tr>
<td>Mn$_3$O$_4$ round shaped nanocrystals</td>
<td>1 M Na$_2$SO$_4$</td>
<td>0–0.5</td>
<td>57 F g$^{-1}$, 2 mV·s$^{-1}$</td>
<td>81.1% after 1000</td>
<td>4</td>
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<tr>
<td>(Ni, Co)$_3$Si$_2$O$_5$(OH)$_4$</td>
<td>1 M KOH</td>
<td>0–0.5</td>
<td>144 F g$^{-1}$, 1 A g$^{-1}$</td>
<td>99.3% after 10000</td>
<td>5</td>
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<tr>
<td>Manganese silicate drapes</td>
<td>1 M KOH</td>
<td>−0.5–0.4</td>
<td>283 F g$^{-1}$, 0.5 A g$^{-1}$</td>
<td>74.7% after 1000</td>
<td>6</td>
</tr>
<tr>
<td>Co$_3$Si$_2$O$_5$(OH)$_4$</td>
<td>6 M KOH</td>
<td>0–0.5</td>
<td>570 F g$^{-1}$, 0.7 A g$^{-1}$</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Co$_3$(Si$_2$O$_5$)$_2$(OH)$_2$</td>
<td>6 M KOH</td>
<td>0.1–0.55</td>
<td>237 F g$^{-1}$, 5.7 mA cm$^{-2}$</td>
<td>95% after 150</td>
<td>8</td>
</tr>
<tr>
<td>Mn$_3$O$_4$ thin film</td>
<td>1 M Na$_2$SO$_4$</td>
<td>−0.1–0.9</td>
<td>314 F g$^{-1}$, 5 mV·s$^{-1}$</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>MnO$_2$/ZnO</td>
<td>1 M Na$_2$SO$_4$</td>
<td>0–0.8</td>
<td>230 mF cm$^{-2}$, 10 mV·s$^{-1}$</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>Cu-doped Mn$_3$O$_4$</td>
<td>1 M Na$_2$SO$_4$</td>
<td>0–1</td>
<td>134 F g$^{-1}$, 0.5 A g$^{-1}$</td>
<td>-</td>
<td>11</td>
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<tr>
<td>AMSi/MWCNTs</td>
<td>1 M Na$_2$SO$_4$</td>
<td>−0.2–0.8</td>
<td>203 F g$^{-1}$, 1 A g$^{-1}$</td>
<td>41% after 1000</td>
<td>12</td>
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<tr>
<td>MnO$_2$/carbon cloth</td>
<td>0.1 M Na$_2$SO$_4$</td>
<td>0–0.8</td>
<td>230, 10 mV s$^{-1}$</td>
<td>98.5% after 3000</td>
<td>13</td>
</tr>
<tr>
<td>c-MnSi-2</td>
<td>3 M KOH</td>
<td>−0.9–0.4</td>
<td>108 F g$^{-1}$, 1 A g$^{-1}$</td>
<td>82% after 8400</td>
<td>This work</td>
</tr>
</tbody>
</table>

M = mol L$^{-1}$;

* The capacitance based on the total mass of the active materials on the two electrodes.
References