Electronic Supplementary Information

Nanowire-templated formation of SnO$_2$/carbon nanotubes with enhanced lithium storage properties

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Fig. S1 (a) FESEM image and (b) XRD pattern of MnO$_x$ nanowires.

Fig. S2 (a) FESEM image and (b) XRD pattern of MnO$_x$/SnO$_2$ nanocables.
Fig. S3 FESEM image of MnO$_x$/SnO$_2$/PDA nanocables.

Fig. S4 (a) FESEM image and (b) corresponding EDX spectrum of the MnO$_x$/SnO$_2$/C nanocables.
**Fig. S5** (a) FESEM image and (b) corresponding EDX spectrum of the SnO$_2$/C-NTs nanocomposite.

**Fig. S6** XRD pattern of the SnO$_2$/C-NTs nanocomposite.
**Fig. S7** TGA curve of the SnO$_2$/C-NTs nanocomposite.

**Fig. S8** (a) N$_2$ adsorption–desorption isotherms of the SnO$_2$/C-NTs nanocomposite and (b) the pore-size distribution calculated from the adsorption branch.
Fig. S9 (a) FESEM and (b) TEM images of SnO$_2$-NTs obtained after calcining SnO$_2$/C-NTs in air at 550 °C.

Fig. S10 XRD pattern of SnO$_2$-NTs.
Fig. S11 (a) Charge–discharge voltage profiles, (b) cycling performance, and (c) rate capability of the MnO$_x$/SnO$_2$/C nanocables in the voltage range of 0.01–2 V vs. Li/Li$^+$ at a current density of 500 mA g$^{-1}$. 
Fig. S12 FESEM image of the SnO$_2$/C-NTs electrode before cycling. It should be noted that the small nanoparticles in the electrode are carbon black (Super-P-Li).

Fig. S13 (a) FESEM image and (b) TEM image of the SnO$_2$/C-NTs electrode after 100 charge–discharge cycles at a current density of 500 mA g$^{-1}$ between 0.01 and 2 V. It is worth mentioning that the nanoparticles in the electrode are carbon black (Super-P-Li).
Fig. S14 Nyquist plots of the SnO$_2$-NTs and SnO$_2$/C-NTs electrodes.
Table S1. Electrochemical performance of various SnO$_2$-based anode materials for lithium-ion batteries.

<table>
<thead>
<tr>
<th>SnO$_2$-based anode materials</th>
<th>Voltage range (V)</th>
<th>Current density (mA g$^{-1}$)</th>
<th>Discharge capacity (mA h g$^{-1}$)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>SnO$_2$-tube-in-CNT nanostructures</td>
<td>0.05–3</td>
<td>~300</td>
<td>542 (after 200 cycles)</td>
<td>1</td>
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<tr>
<td>Mesoporous SnO$_2$ overlaying MWCNTs hybrid composites</td>
<td>0.25–2</td>
<td>33.3</td>
<td>344.5 (after 50 cycles)</td>
<td>2</td>
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<tr>
<td>Tin nanoparticles encapsulated in elastic hollow carbon spheres</td>
<td>0.05–3</td>
<td>500</td>
<td>550 (after 100 cycles)</td>
<td>3</td>
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<tr>
<td>Coaxial SnO$_2$@carbon hollow nanospheres</td>
<td>0.05–2</td>
<td>500</td>
<td>460 (after 100 cycles)</td>
<td>4</td>
</tr>
<tr>
<td>SnO$_2$ nanotubes</td>
<td>0.05–1.5</td>
<td>100</td>
<td>468 (after 30 cycles)</td>
<td>5</td>
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<tr>
<td>SnO$_2$ nanosheets</td>
<td>0.05–3</td>
<td>78.2</td>
<td>559 (after 20 cycles)</td>
<td>6</td>
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<tr>
<td>SnO$_2$ hierarchical structures</td>
<td>0.01–1.2</td>
<td>400</td>
<td>516 (after 50 cycles)</td>
<td>7</td>
</tr>
<tr>
<td>Graphene-supported SnO$_2$ nanosheets</td>
<td>0.01–1.2</td>
<td>400</td>
<td>518 (after 50 cycles)</td>
<td>8</td>
</tr>
<tr>
<td>SnO$_2$ nanoboxes</td>
<td>0.01–2</td>
<td>~150</td>
<td>570 (after 40 cycles)</td>
<td>9</td>
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<tr>
<td>CNTs@SnO$_2$@carbon coaxial nanocables</td>
<td>0.01–2</td>
<td>400</td>
<td>505 (after 60 cycles)</td>
<td>10</td>
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<td>SnO$_2$@carbon hierarchical tubular structures</td>
<td>0.05–1.5</td>
<td>200</td>
<td>700 (after 50 cycles)</td>
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<tr>
<td>Porous SnO$_2$ microboxes</td>
<td>0.05–1.5</td>
<td>200</td>
<td>550 (after 150 cycles)</td>
<td>12</td>
</tr>
<tr>
<td>SnO$_2$/C-NTs</td>
<td>0.01–2</td>
<td>500</td>
<td>596 (after 200 cycles)</td>
<td>This work</td>
</tr>
</tbody>
</table>
Supplementary References