Electronic Supplementary Information:

Mn$_{0.5}$Co$_{2.5}$O$_4$ Nanofibers Sandwiched in Graphene Sheets for Efficient Supercapacitor Electrode Materials

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Fig. S1 Thermogravimetric analysis (TGA) curves of the MnCo@rGO precursor under air flow with a temperature ramp of 5 °C min⁻¹.

Table S1 Quantitative analysis of Co, Mn, O and C contents by ICP-AES, XPS and EA.

<table>
<thead>
<tr>
<th>Samples</th>
<th>Co wt%</th>
<th>Mn wt%</th>
<th>O wt%</th>
<th>C wt%</th>
<th>Co/Mn ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICP-AES</td>
<td>31.3</td>
<td>5.8</td>
<td></td>
<td></td>
<td>5.03</td>
</tr>
<tr>
<td>XPS</td>
<td>28.8</td>
<td>5.3</td>
<td>21.6</td>
<td>44.3</td>
<td>5.06</td>
</tr>
<tr>
<td>EA</td>
<td></td>
<td></td>
<td>20.1</td>
<td>43.5</td>
<td></td>
</tr>
</tbody>
</table>
Fig. S2  (a) Full XPS spectra of the Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G composite.  (b) High-resolution Mn 2p XPS spectra of Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G. (c) High-resolution Co 2p XPS spectra of Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G. (Note for (b) and (c): the black line is the original signal, and the red curve is the result of the curve fit. Olive and magenta peaks correspond to 2p\textsubscript{1/2} and 2p\textsubscript{3/2} species, respectively, and blue peak corresponds to the associated satellite species, after de-convolution.)  (d) High-resolution O 1s XPS spectra of Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G. (Note for (d): the black line is the original signal, and the red curve is the result of the curve fit. Magenta peaks correspond to M-O-M species, and blue peak corresponds to the associated satellite species, after de-convolution.)  (e) High-
resolution C 1s XPS spectra of GO. (Note for (e): the black line is the original signal, and the red curve is the result of the curve fit. Dark yellow and magenta peaks correspond to C-OX and C-C/C=C species, respectively, and blue peak corresponds to the associated satellite species, after de-convolution.) (f) High-resolution C 1s XPS spectra of Mn_{0.5}Co_{2.5}O_{4}@G. (Note for (f): the black line is the original signal, and the red curve is the result of the curve fit. Olive and magenta peaks correspond to C=O and C-C/C=C species, respectively, and blue peak corresponds to the associated satellite species, after de-convolution.)

![Graphs](image)

**Fig. S3** Electrochemical characterization of the MnCo_{2}O_{4} for supercapacitors. (a) Galvanostatic discharge curves at various current densities ranging from 5 to 40 A g^{-1}. (b) Specific capacitances derived from the discharging curves. (c) Cycling performance at the constant current density of 10 A g^{-1}.
Fig. S4 SEM image of the Mn$_{0.5}$Co$_{2.5}$O$_4$@G composite after 5000 charge/discharge cycles.

Fig. S5 (a) Nyquist plots of the Mn$_{0.5}$Co$_{2.5}$O$_4$@G electrode after 1st, 1000th and 5000th cycle. The insets show the corresponding equivalent circuit model used for fitting impedance spectra. $R_s$ is the solution resistance, $R_{ct}$ is charge-transfer resistance caused by the Faradaic reactions, $C_{dl}$ is double-layer capacitance on the electrode surface, and $Z_w$ is the Warburg resistance related to the ion diffusion/transport in the electrolyte to the electrode surface.
Fig. S6 (a) CV curves of the Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G//AC device measured at different scan potential windows in 6.0 M KOH aqueous solution at a scan rate of 10 mV s\textsuperscript{-1}. (b) CV curves of the Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G//AC device with different Mn\textsubscript{0.5}Co\textsubscript{2.5}O\textsubscript{4}@G to AC weight ratios of 1:1.5, 1:2.5, and 1:3.5, respectively.

Electrochemical Characterization of the AC//AC and graphene//graphene symmetric supercapacitors

The AC//AC symmetric supercapacitor was fabricated with two AC-based electrodes with the same AC mass loading, and the graphene//graphene symmetric supercapacitor was fabricated with two graphene-based electrodes with the same graphene mass loading. A series of electrochemical tests including cyclic voltammetry (CV) and galvanostatic discharge measurement were performed with the CHI 760D electrochemical workstation in an aqueous KOH electrolyte (6.0 M) with a commercial coin cell (LIR 2032).
Fig. S7 CV curves of AC//AC (a) and graphene//graphene (d) symmetric supercapacitors at different scan rates. Galvanostatic discharge curves of AC//AC (b) and graphene//graphene (e) symmetric supercapacitors at different current densities. Specific capacitances of AC//AC (c) and graphene//graphene (f) symmetric supercapacitors at different current densities.