Supporting Information

Impact of Size Control of Graphene Oxide Nanosheet for Enhancing Electrical and Mechanical Properties of Carbon Nanotube-Polymer Composites

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Keywords: size-controlled graphene oxides, multi-walled carbon nanotubes (CNTs), dispersants, CNT-polymer nanocomposites
Fig. S1. SEM images and size histograms of GO nanosheets sonicated for (a) 0 min, (b) 10 min, (c) 30 min, (d) 60 min, and (e) 120 min, respectively.
Fig. S2. AFM images and thickness profiles of (a) GO0, (b) GO1, (c) GO2, (d) GO3, and (e) GO4.
Table S1. Calculated C/O ratio of graphite and GOs with different lateral size

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<th></th>
<th>Graphite</th>
<th>GO0</th>
<th>GO1</th>
<th>GO2</th>
<th>GO3</th>
<th>GO4</th>
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<tr>
<td><strong>C/O Ratio</strong></td>
<td>16.5</td>
<td>1.74</td>
<td>1.55</td>
<td>1.59</td>
<td>1.62</td>
<td>1.56</td>
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Fig. S3. XPS C1s spectra of GOs sonicated for 0, 10, 30, 60, and 120 min.
Fig. S4. Photographic and TEM images of MWCNT dispersed in DI water: (a–b) pristine MWCNTs, and (c–d) GO4-assisted MWCNT dispersion. (The red arrow indicates GO sheet.)

Fig. S5. (a) UV-vis absorption spectra of GO4-MWCNTs. (b) UV absorbance of MWCNTs at different wavelengths as a function of concentration of MWCNTs dispersed in water (from the Beer-Lambert Law)
**Fig. S6.** MWCNT films deposited on polymer membranes. Digital pictures and SEM images (inset shows higher magnification) of (a–b) GO0-MWCNT film, and (c–d) GO4-MWCNT film
Fig. S7. Stress-strain behavior of GO-MWCNT composites containing different MWCNT volume fraction: (a) pristine MWCNT, (b) GO0-MWCNT, (c) GO2-MWCNT, and (d) GO4-MWCNT filled in the PVA composites, respectively. In all GO-MWCNT samples, $W_{GO}/W_{MWCNT}$ were kept constant at 0.5.

Fig. S8. Young’s moduli of GO-MWCNT composites containing different GOs as a function of the MWCNT volume fraction: (a) GO0, (b) GO2, and (c) GO4.