Supporting Informations

Functionalization of graphene oxide with naphthalenediimide diamine for high performance cathode materials of lithium-ion batteries

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\textbf{Table S1} Elemental composition of GO and NDIDA-GO tested by XPS

<table>
<thead>
<tr>
<th>Sample</th>
<th>C1s (at.%)</th>
<th>N1s (at.%)</th>
<th>O1s (at.%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GO</td>
<td>67.78</td>
<td>0.74</td>
<td>31.48</td>
</tr>
<tr>
<td>GO-N-Ph</td>
<td>72.95</td>
<td>4.27</td>
<td>22.77</td>
</tr>
</tbody>
</table>

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**Fig. S1.** High-resolution XPS spectra of N 1s for NDIDA-GO and GO

**Fig. S2.** TGA curves of NDIDA, GO and NDIDA-GO.
Fig. S3. Higher magnification FESEM (a) and high magnification FESEM (b) images of the NDIDA-GO sample; higher magnification FESEM (c) and high magnification FESEM (d) images of the GO sample.

Fig. S4. Nitrogen adsorption-desorption isotherm for the synthesized GO. Inset: pore size distribution.
**Fig S5** Photographs of the NDIDA electrode and the NDIDA-GO electrode in the electrolyte in different time interval.

**Fig. S6.** Proposed electrochemical Li storage mechanism in the NDIDA-GO electrode.
Fig. S7. CV curves of the NDIDA electrode.

Fig. S8. CV curves of the NDIDA-GO electrode.

Fig. S9. The Nyquist plot of the NDIDA electrode after 1 cycle. Inset is equivalent circuit model. $R_1$, and $R_{s\text{ct}}$ values obtained by Zview software simulation are 18.6, and 4366 Ω, respectively.
Fig. S10. The Nyquist plot of the GO electrode after 1 cycle. Inset is equivalent circuit model. $R_1$, $R_s$ and $R_{ct}$ values obtained by Zview software simulation are 8, 5, 280 and 192 $\Omega$, respectively.