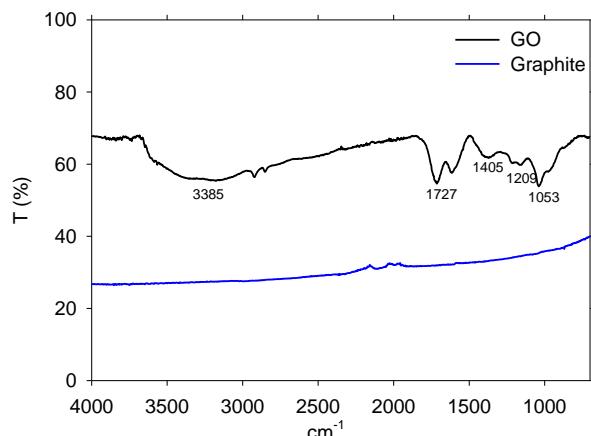


*Supplementary Materials*

# Enhanced Storage Performance of PANI and PANI/Graphene Composites Synthesized in Protic Ionic Liquids

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**Figure S1.** ATR-FTIR spectra of GO and graphite.

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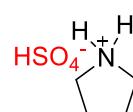
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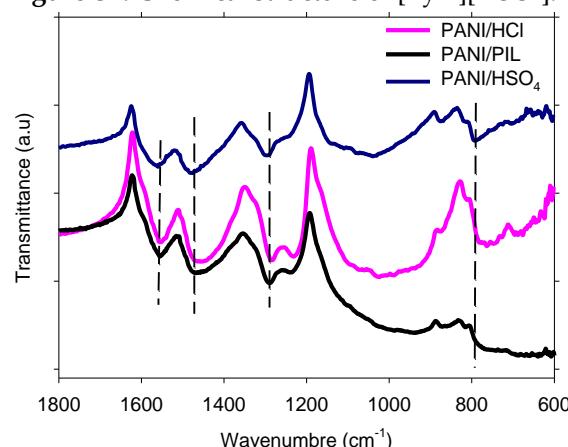
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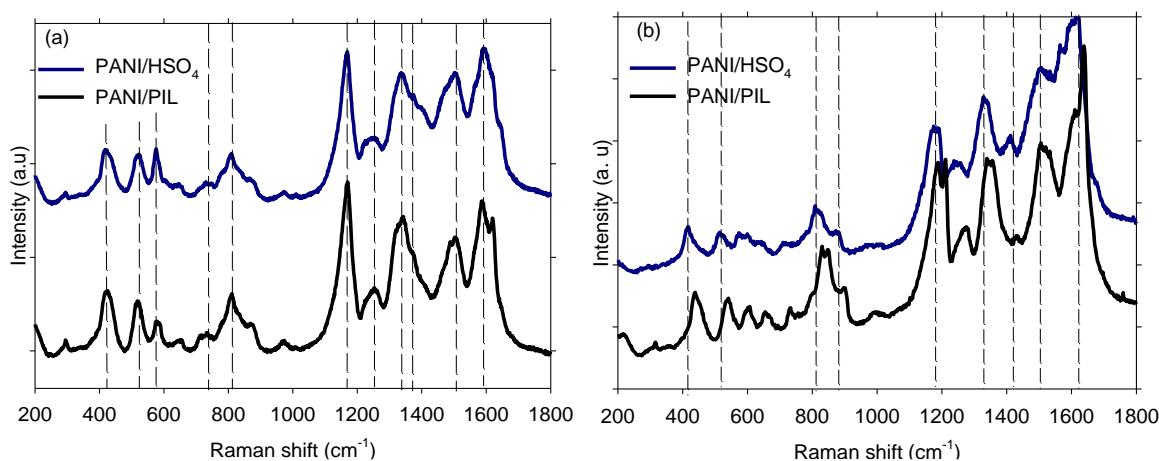
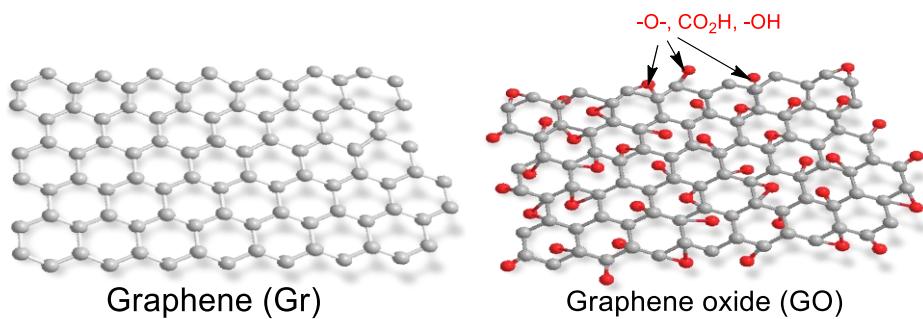
**Figure S2.** Chemical structure of [Pyrr][HSO<sub>4</sub>].

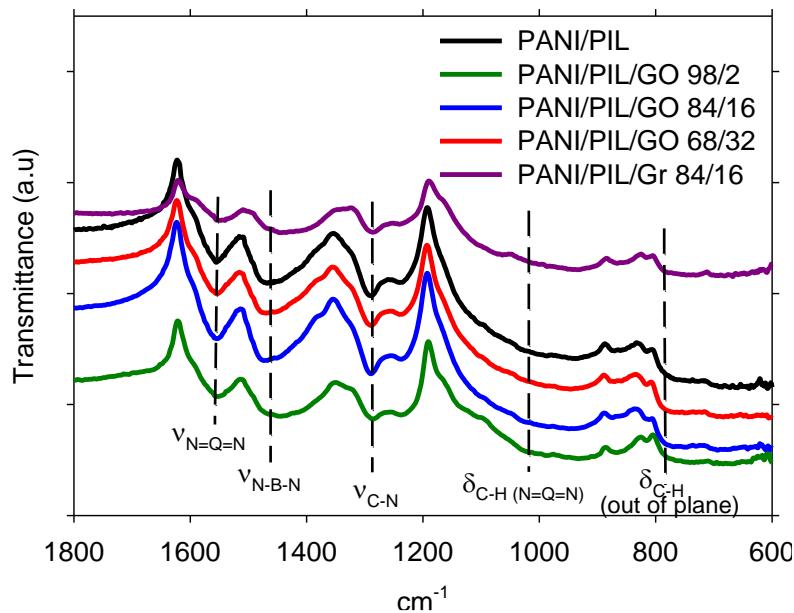


**Figure S3.** ATR-FTIR spectra of PANI/HCl, PANI/PIL and PANI/HSO<sub>4</sub>.

**Table S1.** Main ATR-FTIR bands of synthesized PANI.

Wavenumber ( $\text{cm}^{-1}$ )	Band Characteristics
776	Para-disubstituted aromatic ring [1,2]
1028	C-H in plane bending vibration [3]
1238	C-N <sup>+</sup> . stretching [4]
1295	Aromatic C-N stretching indicating secondary aromatic amine group [3]
1466	C-N strecting of benzenoid rings [3]
1558	C-N stretching of quinoid rings [3]

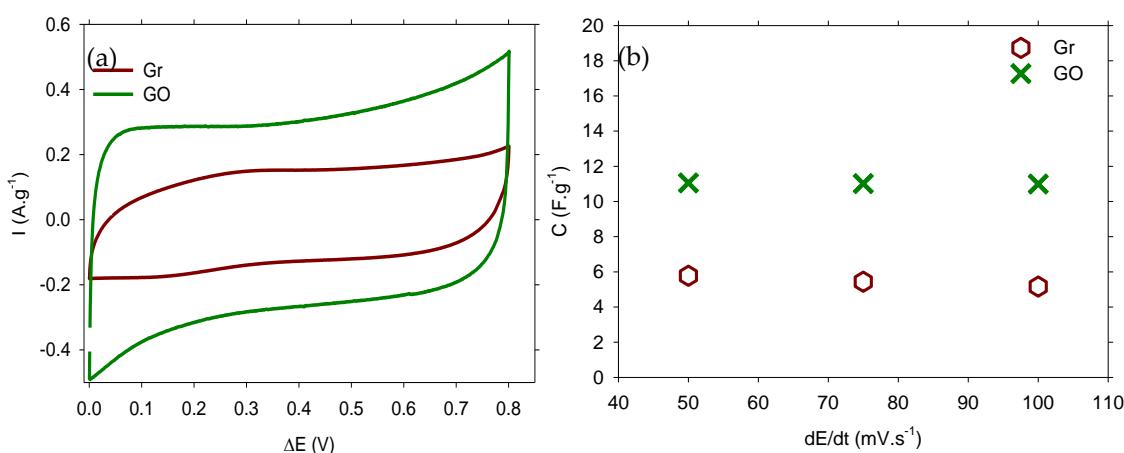
**Figure S4.** Raman spectra of Pani/PIL and Pani/HSO<sub>4</sub> using **(a)** 633 and **(b)** 514 nm excitations.**Figure S5.** Graphene (Gr) vs. graphene oxide (GO).



**Figure S6.** AT-IR spectra of the PANI/HCl, PANI/PIL and PANI/PIL/GO nanocomposites (B : benzoïd units, Q : quinonid units, ☺: stretching vibration and ☺☺: bending vibration).

**Table S2.** Specific capacitance, energy and power densities at 10 A.g<sup>-1</sup> of PANI/HCl, PANI/PIL and PANI/PIL/GO 84/16.

Electrode Material	ATR-FIR (F.g <sup>-1</sup> ) @ 10 A.g <sup>-1</sup>	Energy Density Wh.Kg <sup>-1</sup> @ 10 A.g <sup>-1</sup>	Power Density W.Kg <sup>-1</sup> @ 10 A.g <sup>-1</sup>
PANI/HCl	65.8	1.46	2930
PANI/PIL	173.4	3.85	2942
PANI/PIL/GO 84/16	223.0	4.95	3687



**Figure S7.** (a) CV curves at 100 mV.s<sup>-1</sup> and (b) specific capacitance as function of scan rate of Gr and GO in H<sub>2</sub>SO<sub>4</sub> 1 mol.L<sup>-1</sup>. CVs have been recorded using two electrodes configurations (symmetric capacitors). Specific capacitances are relative to the total weight of the electrodes in the symmetric capacitors.

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