Supporting Information

High performance functionalized anthracene organic supercapacitors

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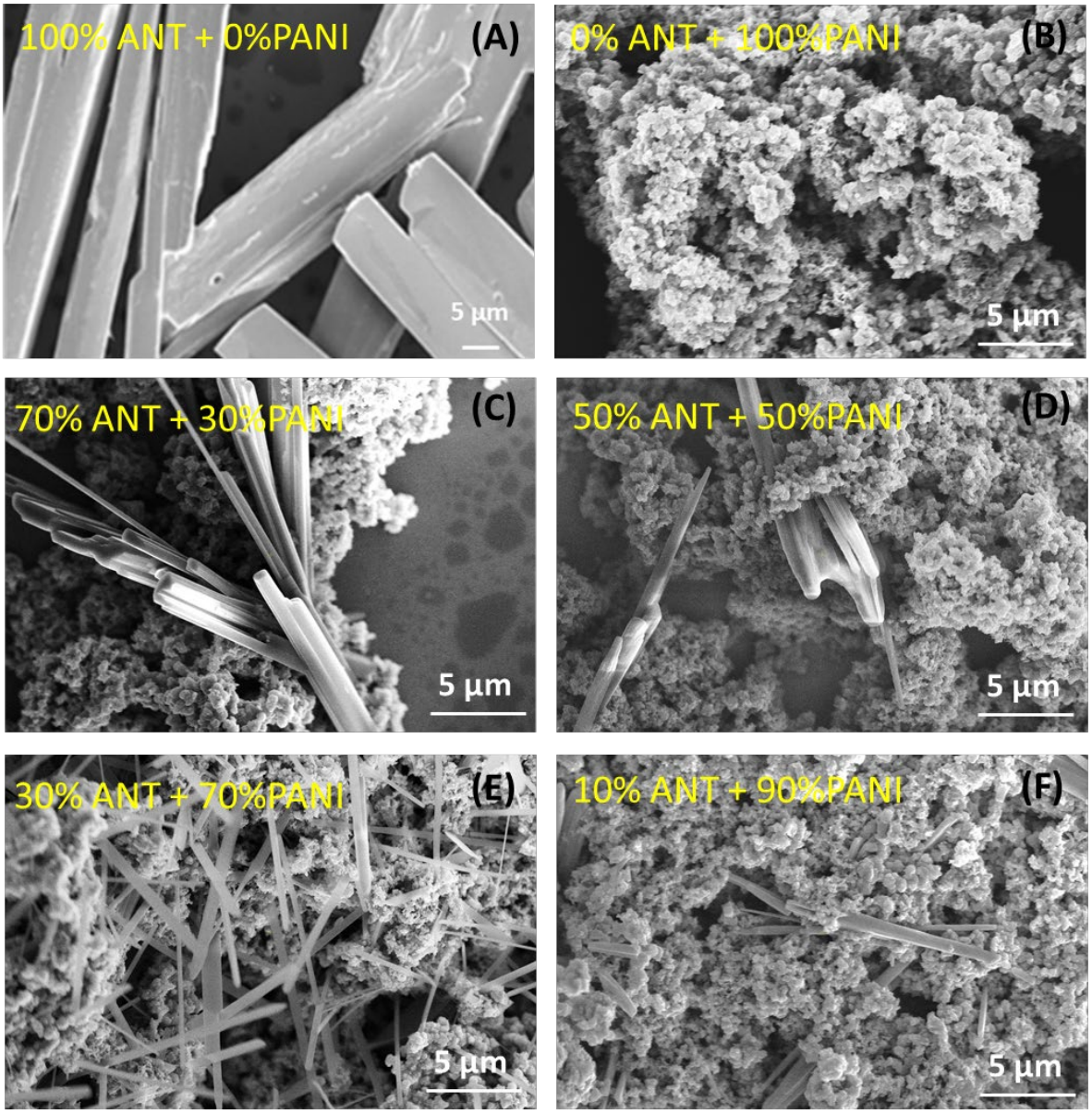


Figure **S1 SEM micrographs for** A. **Pristine *tert*-butyl-ethylene-ketone-ANT,** B. **PANI, and** C-F. **Pristine *tert*-butyl-ethylene-ketone-ANT/PANI composite with varying weight ratios.**

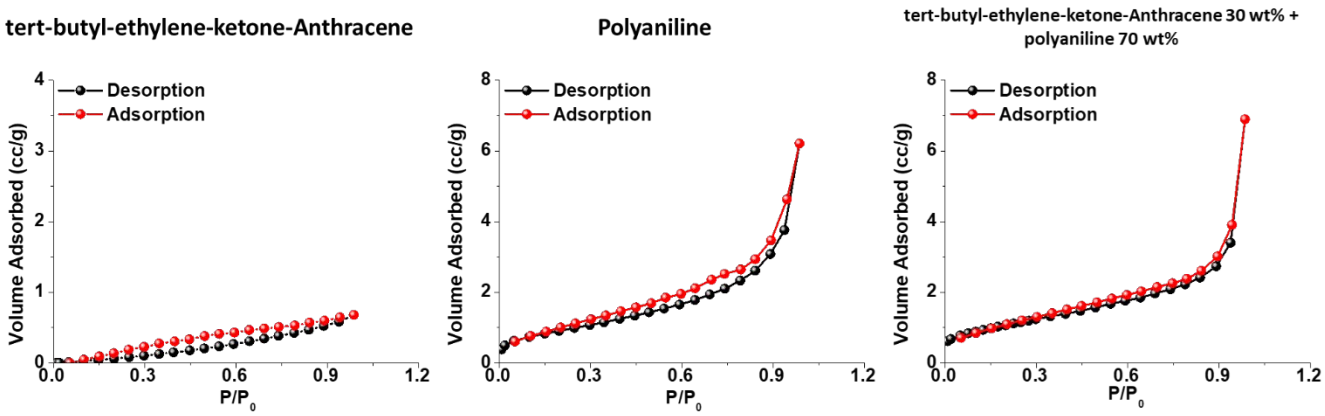


Figure **S2 N_2 adsorption desorption curve for tert-butyl-ethylene-ketone-Anthracene (Surface area: 16.9 m^2/g), polyaniline (Surface area: 36.5 m^2/g) and tert-butyl-ethylene-ketone-Anthracene/polyaniline composite (3:7) (Surface area: 43.6 m^2/g).**

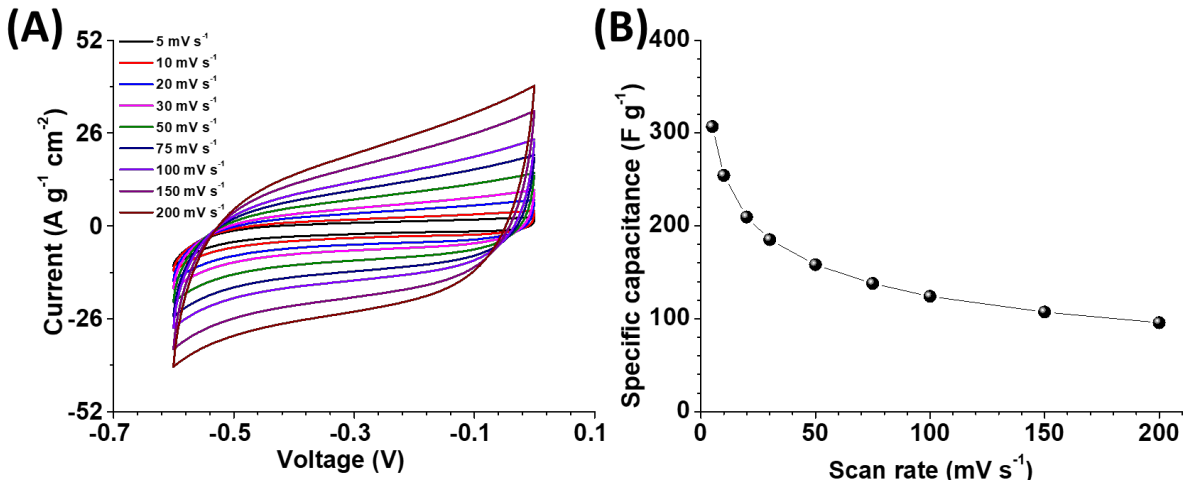


Figure **S3** A. **CV curves for electrode prepared using RGO/AC composite (1:1 weight ratio).** B. **Corresponding specific capacitance calculated form each of the CV at various scan rate.**

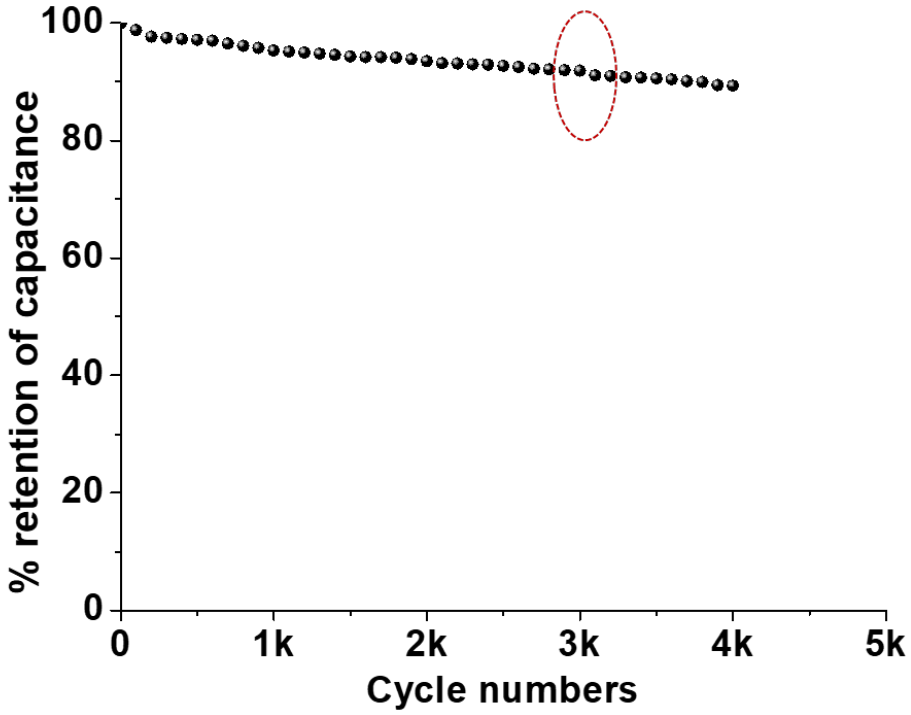


Figure **S4. Cycling a fresh device to 3000 cycles followed by a 72 hrs resting and then a final 1000 cycles. After resting only, a 0.6% drop in capacitance is observed.**

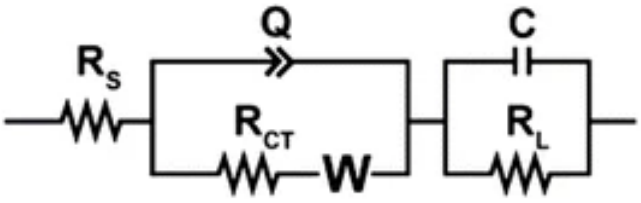


Figure **S5 Equivalent series circuit to fit the EIS measured for aqueous device.**

NMR spectra were recorded on Bruker DPX 400 instruments. The Chemical shifts, given in ppm, are relative to the residual solvent peaks.

Spectral data for the anthracene derivatives.

ketone-ANT: Following the general procedure **1**, the product **methyl-ethylene-ketone-ANT** was obtained as a pale yellow solid and the structure of the compound was confirmed by ^{1}H and ^{13}CNMR data with those reported in previous literature.[1]

^{1}H NMR (400 MHz, $CDCl_3$): δ 8.49 (d, *J* = 15.6 Hz, 1H), 8.47 (s, 1H), 8.21 (dd, *J* = 7.6, 3.8 Hz, 2H), 8.03 (dd, *J* = 7.6, 3.8 Hz, 2H), 7.54 – 7.47 (m, 4H), 6.72 (d, *J* = 15.6 Hz, 1H), 2.57 (s, 3H).

^{13}C NMR (100 MHz, $CDCl_3$): δ 197. 8, 140.6, 136.0, 131.4, 129.5, 129.1, 128.6, 126.6, 125.6, 125.2, 28.2.

HRMS (ESI): calc. for $[(C_{18}H_{14}O)H]$ (M+H) 247.1123, measured 247.1113.

***tert*-butyl-ethylene-ketone-ANT**: Following the general procedure **1**, the product ***tert*-butyl-ethylene-ketone-ANT** was obtained as a pale yellow solid and the structure of the compound was confirmed by ^{1}H and ^{13}CNMR data with those reported in previous literature.[1]

^{1}H NMR (400 MHz, $CDCl_3$): δ 8.63 (d, *J* = 15.6 Hz, 1H), 8.46 (s, 1H), 8.22 (dd, *J* = 7.6, 3.8 Hz, 2H), 8.06 (dd, *J* = 7.6, 3.8 Hz, 2H), 7.52 – 7.49 (m, 4H), 7.10 (d, *J* = 15.6 Hz, 1H), 1.30 (s, 9H).

HRMS (ESI): calc. for $[(C_{21}H_{20}O)H]$ (M+H) 288.1514, measured 288.1509.

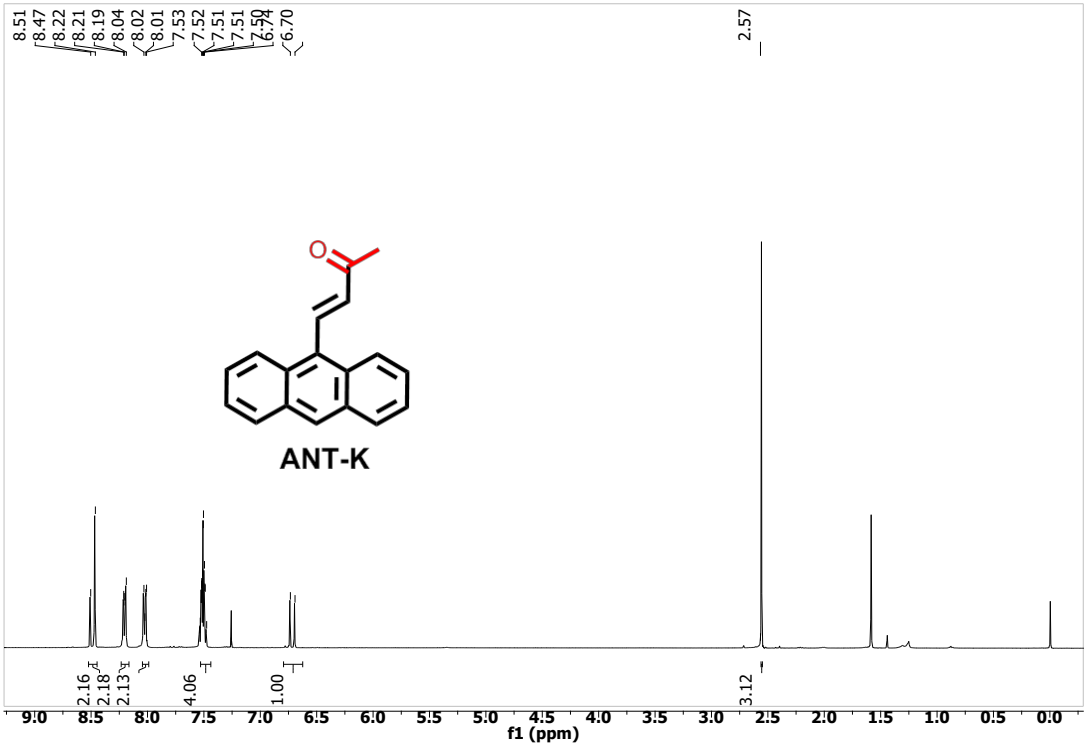
cyano-ethylene-ANT: Following the general procedure **2**, the product **cyano-ethylene-ANT** was obtained as an orange solid and the structure of the compound was confirmed by ^{1}H and ^{13}CNMR data with those reported in previous literature.[1]

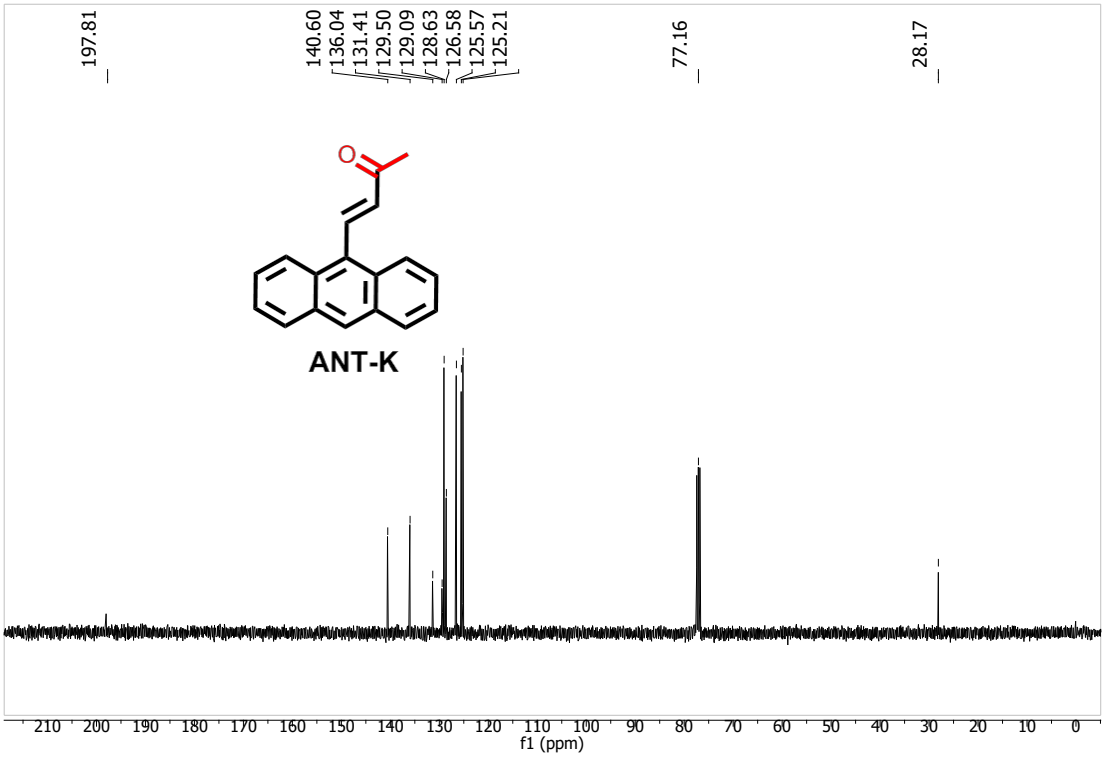
^{1}H NMR (400 MHz, $CDCl_3$): δ 8.96 (s, 1H), 8.66 (s, 1H), 8.10 (d, *J* = 15.6 Hz, 2H), 7.94 (d, *J* = 15.6 Hz, 2H) (dd, *J* = 7.6, 3.8 Hz, 2H), 7.70 – 7.66 (m, 2H), 7.61 – 7.57 (m, 2H).

^{13}C NMR (100 MHz, $CDCl_3$): δ 160.7, 132.6, 131.0, 129.7, 129.2, 128.5, 126.2, 124.0, 113.0, 111.3.

HRMS (ESI): calc. for [($C_{18}H_{11}N_2$)H] (M+2H) 256.1000, measured 256.2632.

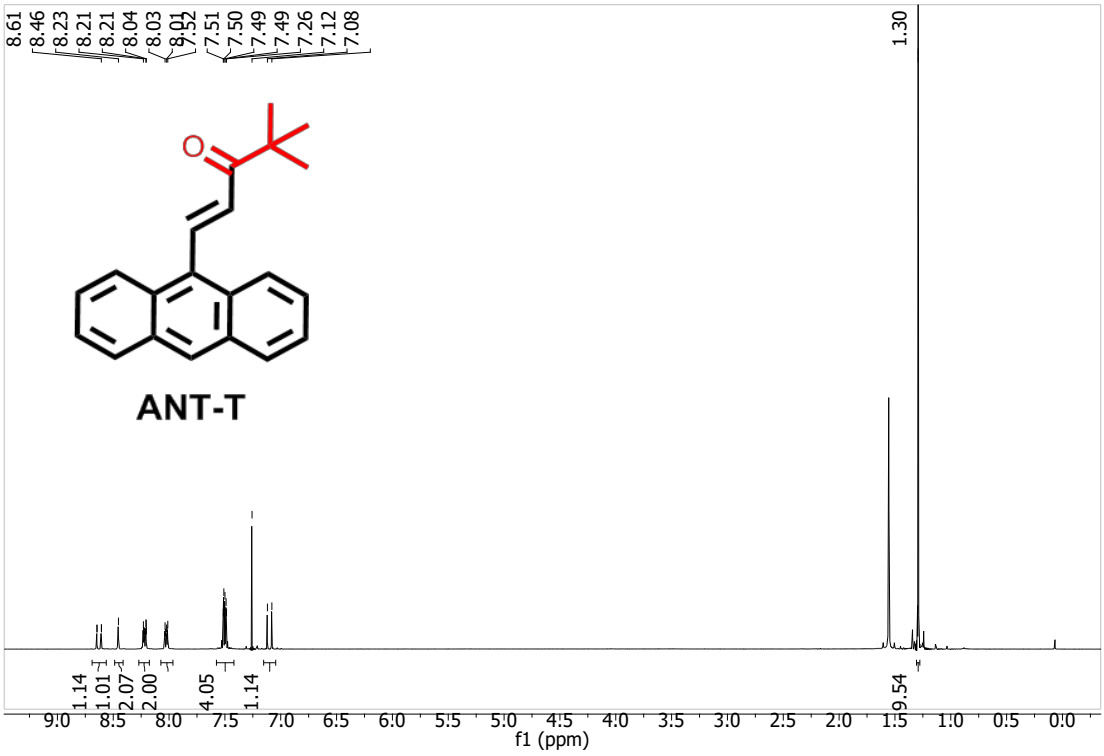
Figure **S6: ^{1}H and ^{13}CNMR Spectra of methyl-ethylene-ketone-ANT**





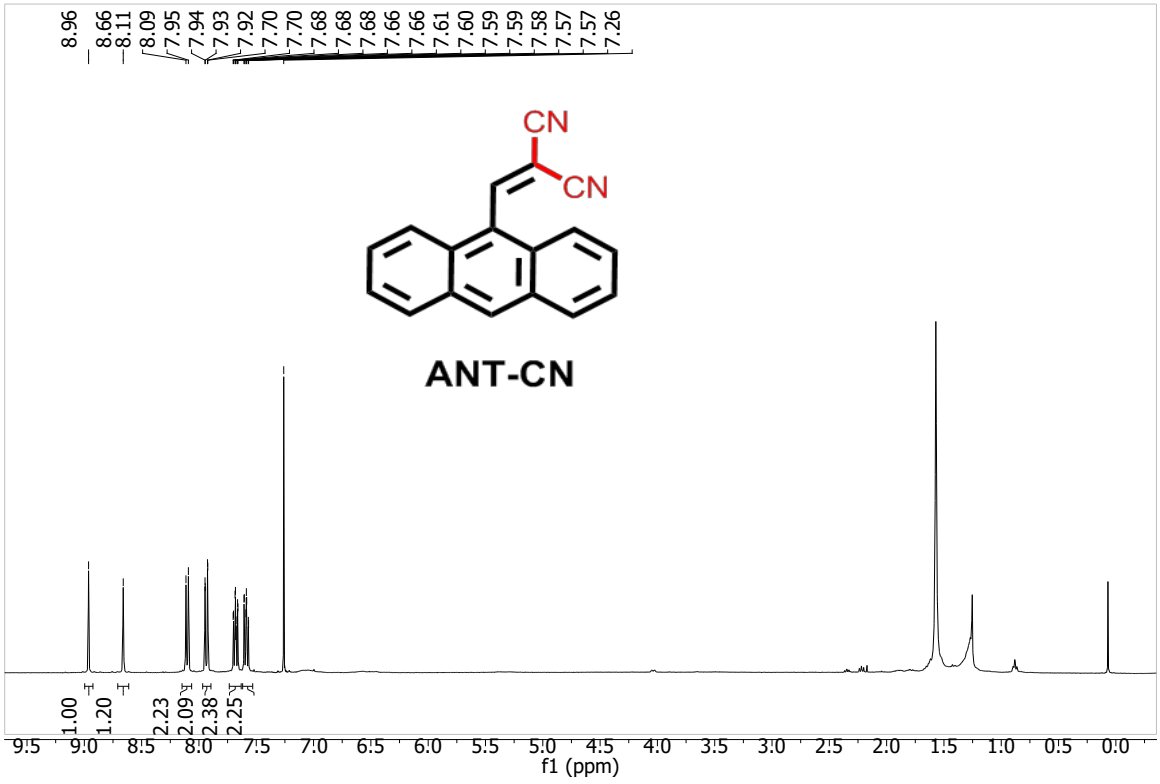
Chemical shift (ppm)

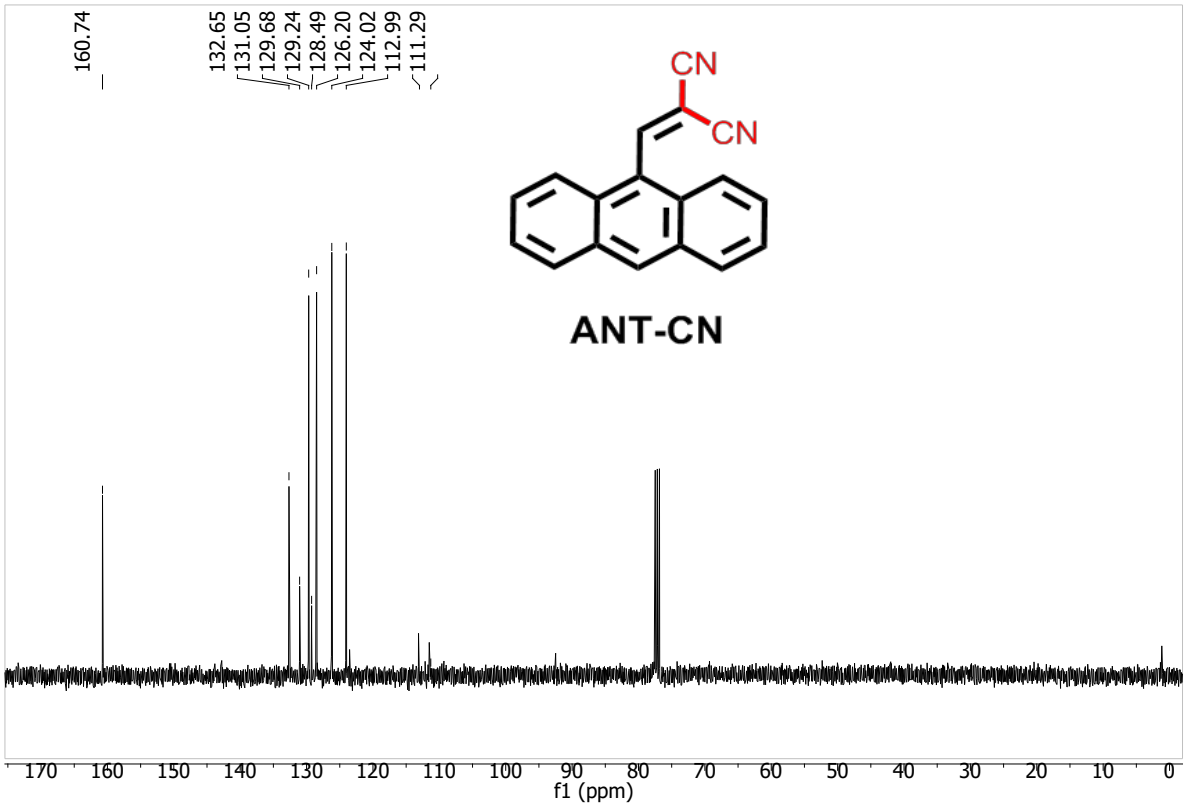
Figure **S7: ^{1}H and^{13}CNMRSpectra of *tert*-butyl-ethylene-ketone-ANT**



Chemical shift (ppm)

Figure **S8: ^{1}H and ^{13}C NMR spectra of cyano-ANT**





Chemical shift (ppm)

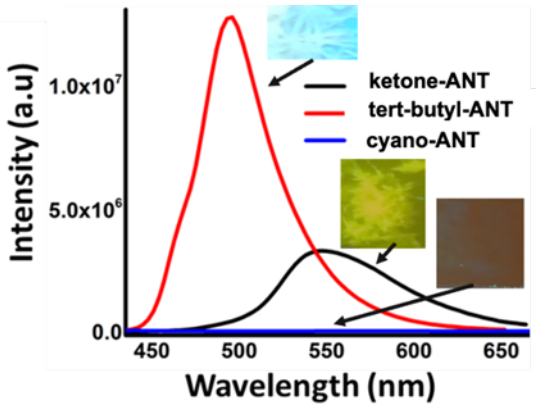


Figure **S9. PL spectra of deposited anthracene derivatives on glass slides using ethanol (insets showing glass coated with material under UV).** Fluorescence spectroscopy measurements were carried out using a Fluorolog spectrophotometer (HORIBA Scientific, Irvine, CA) (Shown in Figure S7).

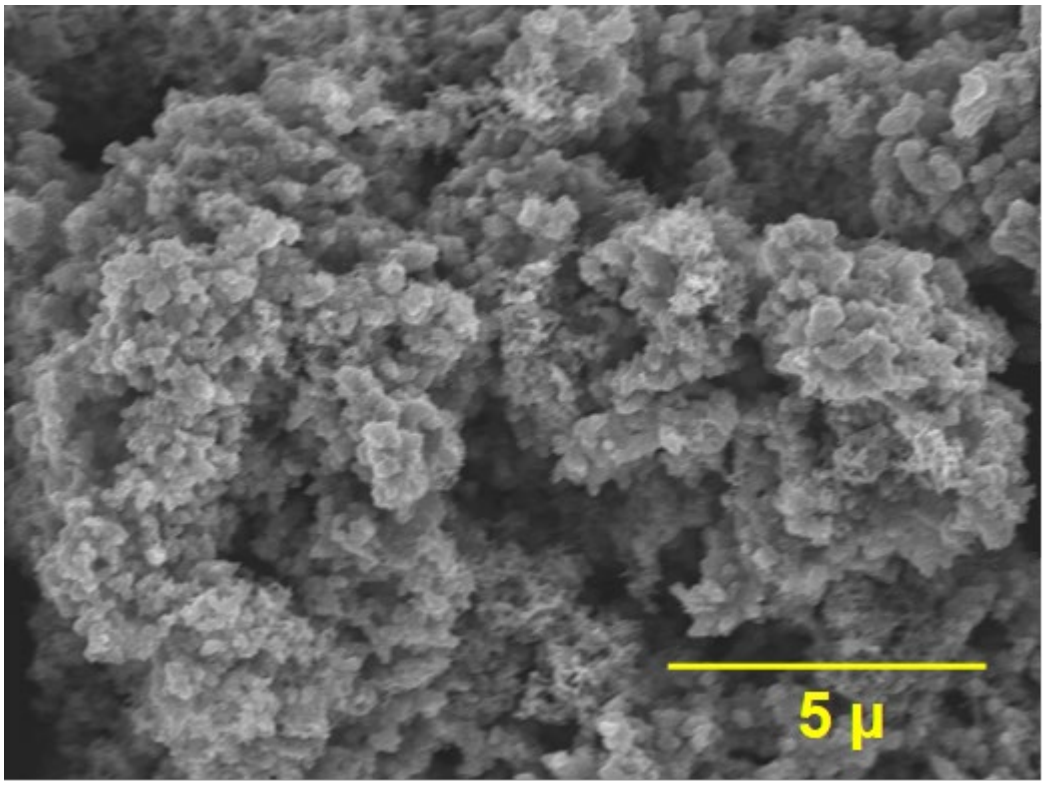


Figure **S10. SEM micrograph of Polyaniline.**

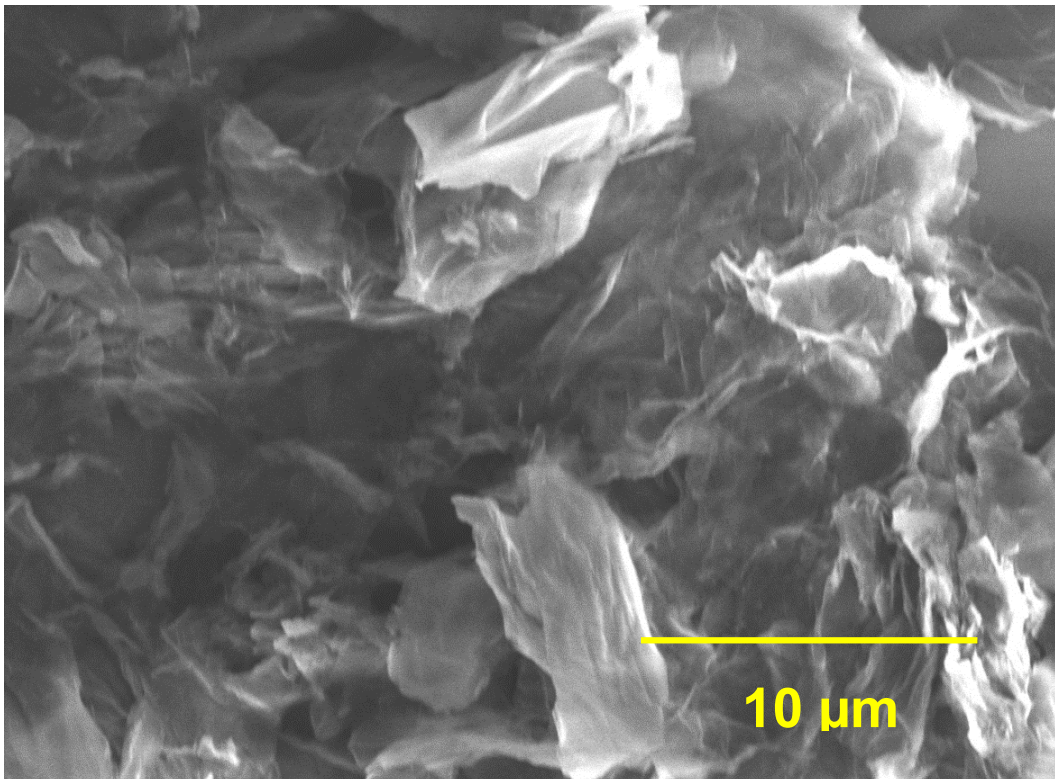


Figure **S11. SEM micrograph of reduced graphene oxide.**

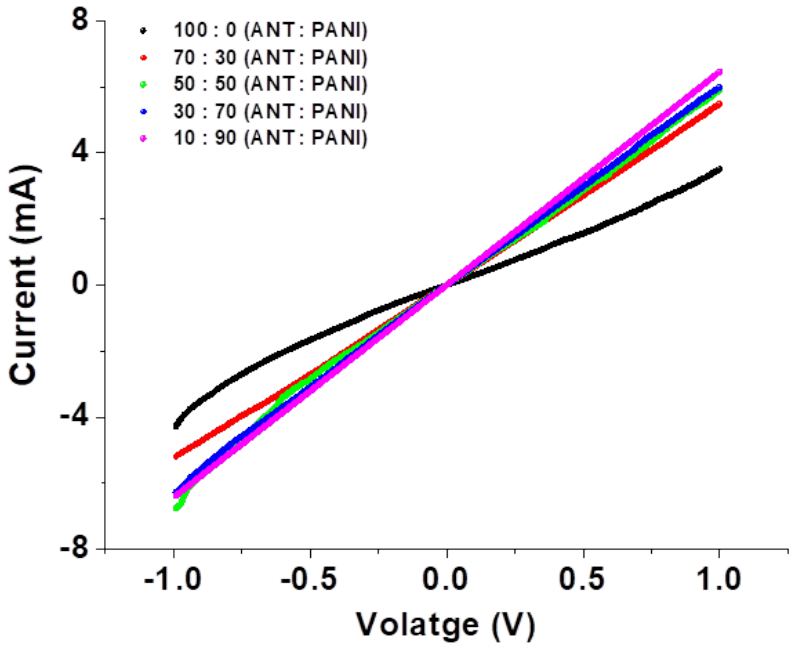


Figure **S12. IV characteristic of composites with varying concentration of PANI and slop indicate with PANI, conductivity increases.**

Conductivity of the *tert*-butyl-ethylene-ketone-ANT/PANI thin films (2 cm length).

ANT with PANI	Pure ANT	30% PANI	50% PANI	70% PANI	90% PANI
Material conductivity (Ω^{-1} cm) x 10^{-3}	3.56	5.50	5.58	6.00	6.46

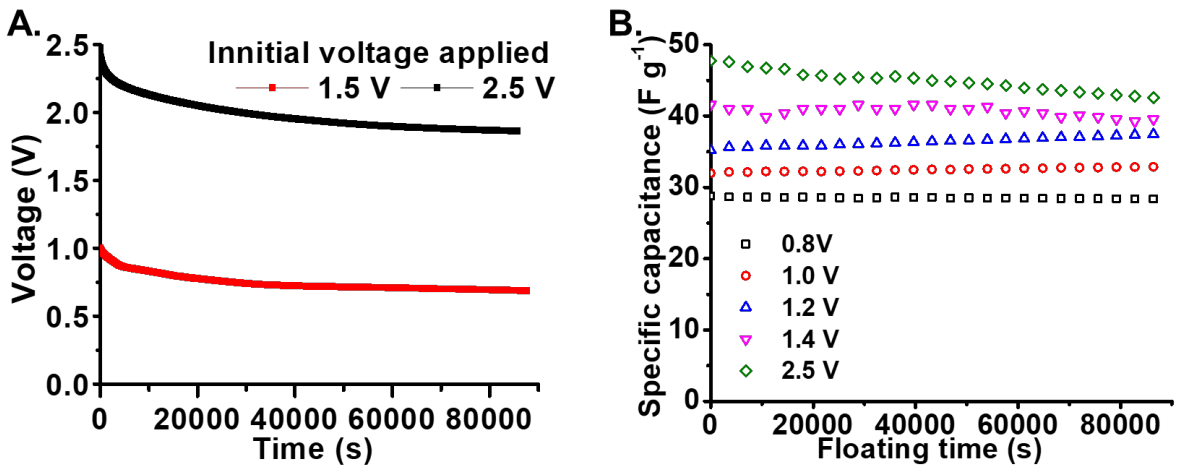


Figure S13. Long term stability analysis. A. Self-discharge behavior of asymmetric non-aqueous device at two different charging voltage after 100 cycles. **B**. Effect of floating at different voltage values.