Supporting Information

Reversible Anion Intercalation in a Layered Aromatic Amine: A High-Voltage Host Structure for Organic Batteries

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Index to supporting information:

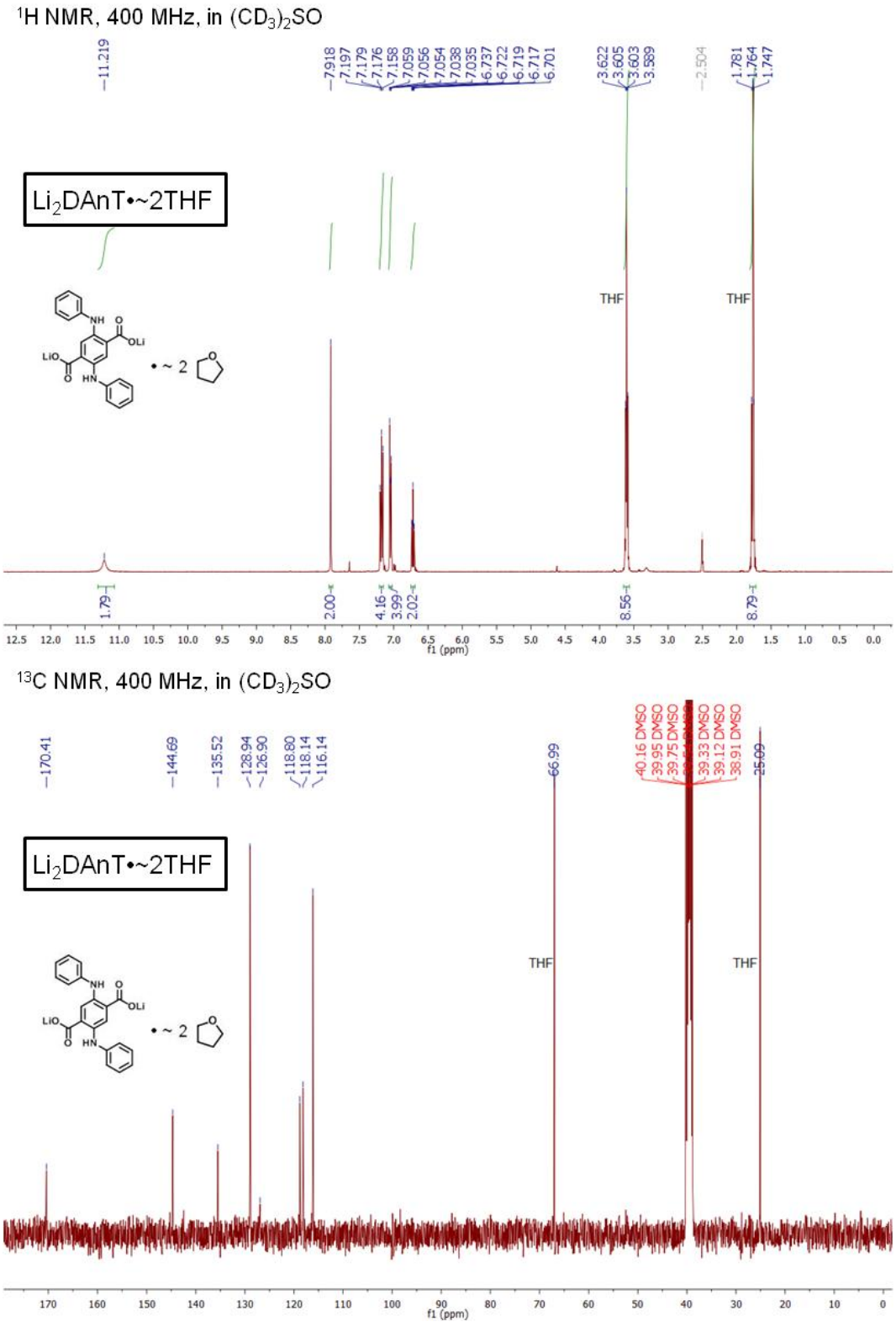

Figure S1a. ^{1}H and ^{13}C NMR spectra of $Li_2DAnT\cdot\sim2THF$ measured in $(CD_3)_2SO$ and recorded on a 400 MHz apparatus.

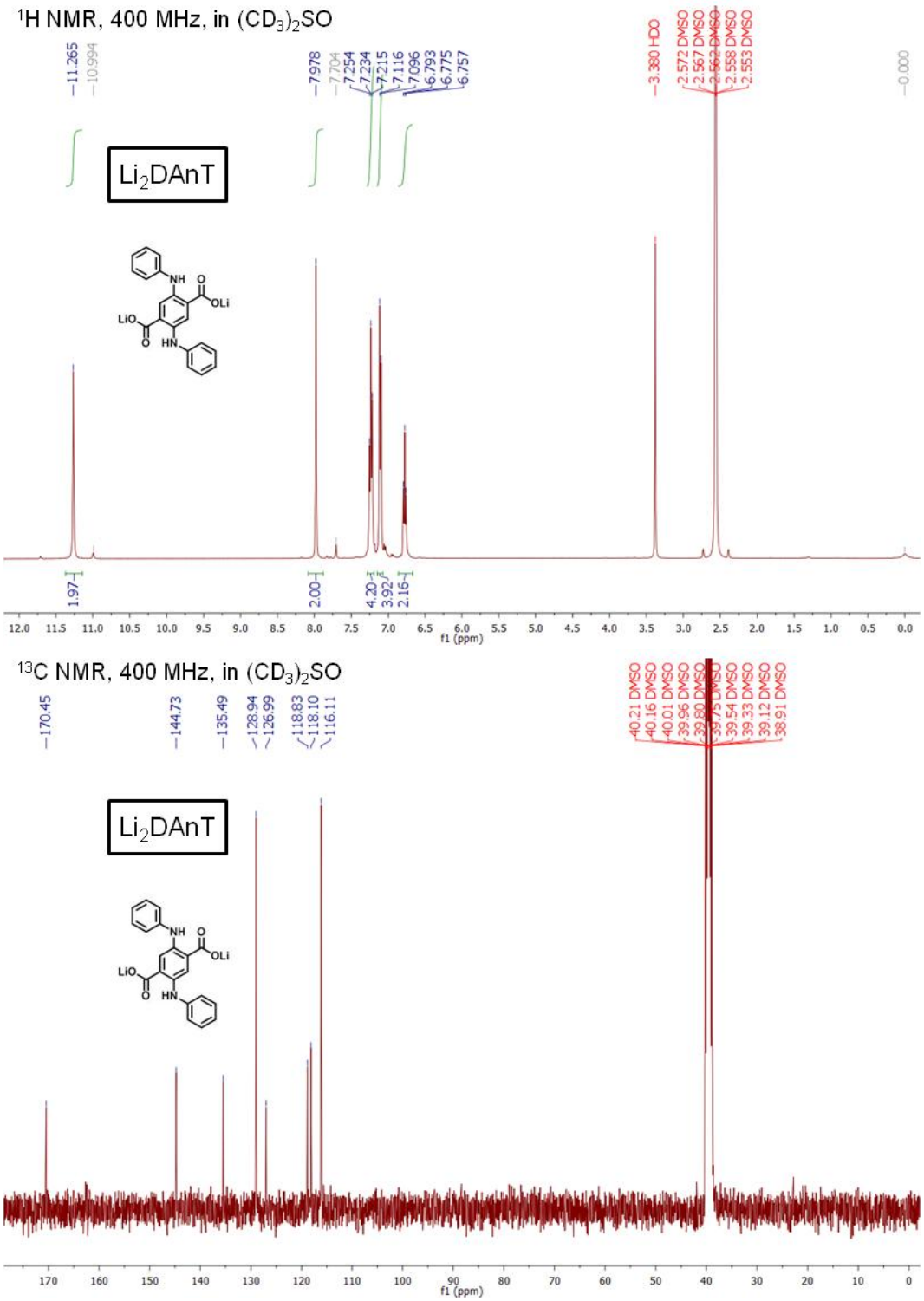

Figure S1b. ^{1}H and ^{13}C NMR spectra of Li_2DAnT measured in $(CD_3)_2SO$ and recorded on a 400 MHz apparatus.

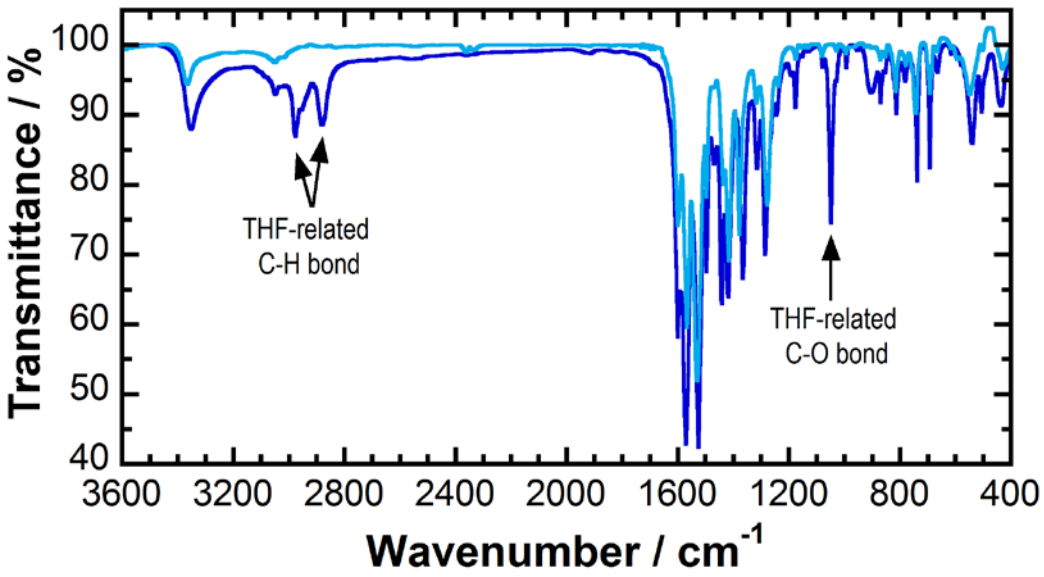

Figure S2. Overlaid FT-IR spectra of as-prepared Li_2DAnT·~2THF (deep blue) and Li_2DAnT (light blue), respectively.

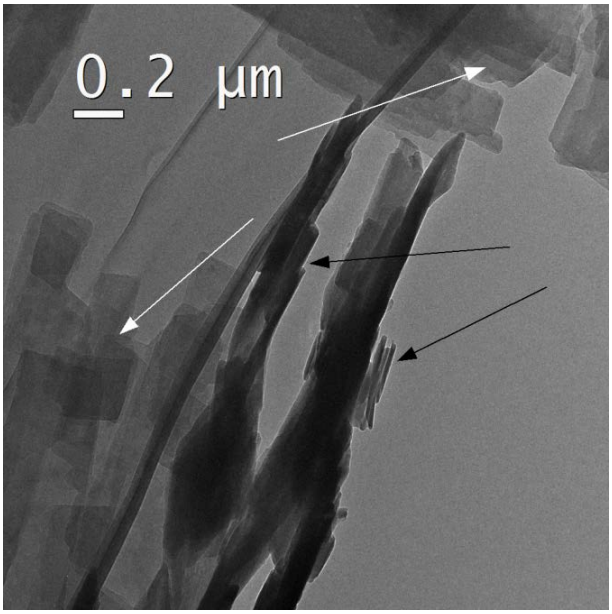

Figure S3. Typical TEM image of Li_2DAnT confirming the obtainment of a lamellar structure. White arrows correspond to crystals lying perpendicular to the electron beam while black ones correspond to those parallel.

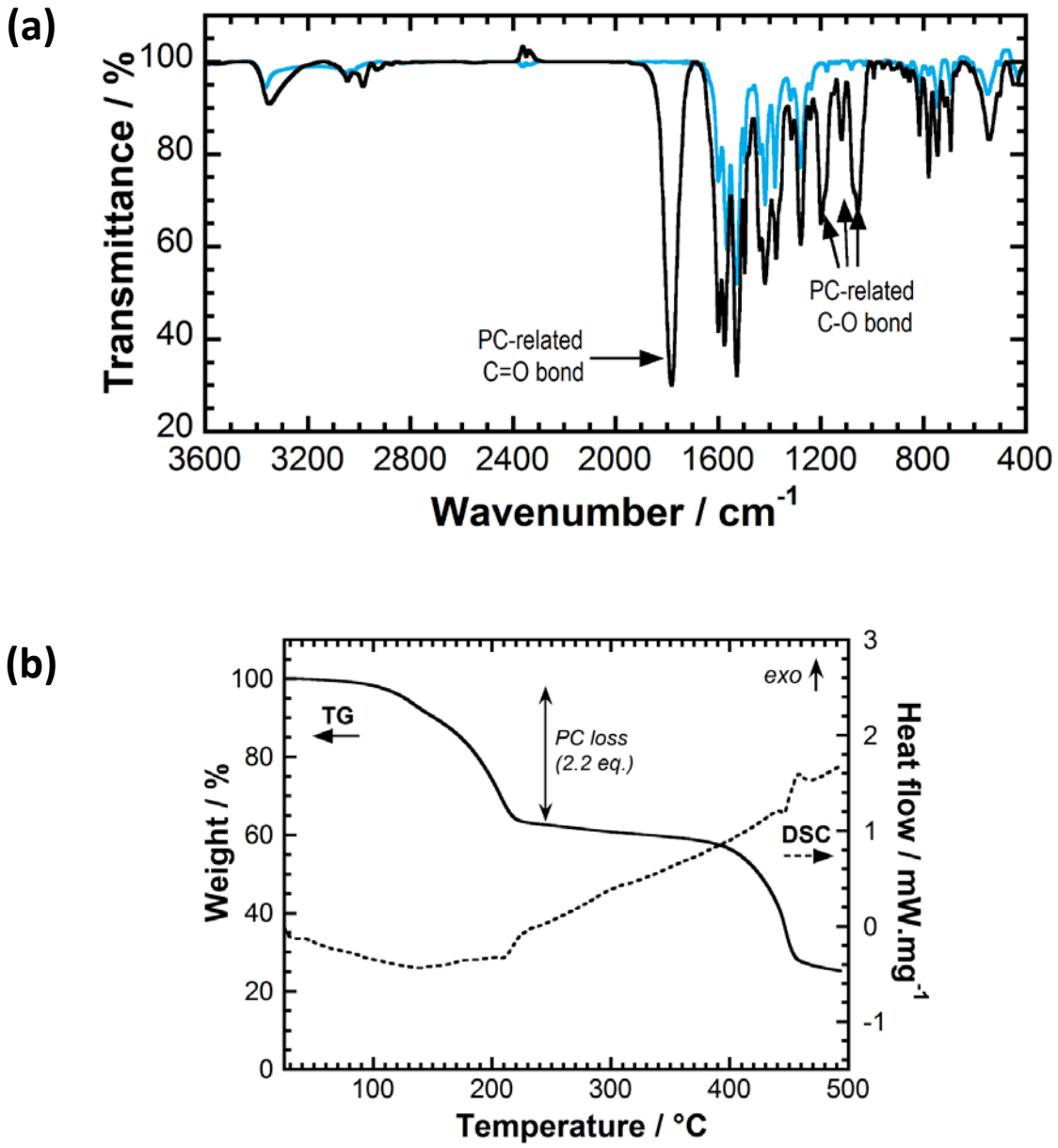

Figure S4. (a) Overlaid FT-IR spectra of Li_2DAnT (light blue) and Li_2DAnT soaked in PC then dried (black). (b) TG-DSC traces of Li_2DAnT soaked in PC then dried measured under argon at a heating rate of 5 °C.min^{-1}.

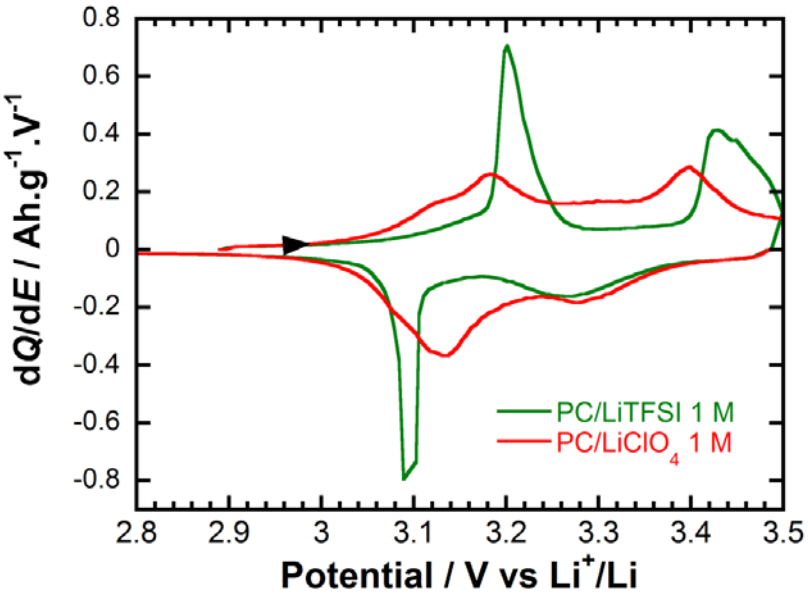

Figure S5. Overlaid of the differential capacity vs potential curves regarding the first cycle of Li_2DAnT/Li half cells cycled in PC/$LiClO_4$ 1 M (red) and PC/LiTFSI 1 M (green), respectively (extracted from potential-specific capacity curves reported in Figure 5).

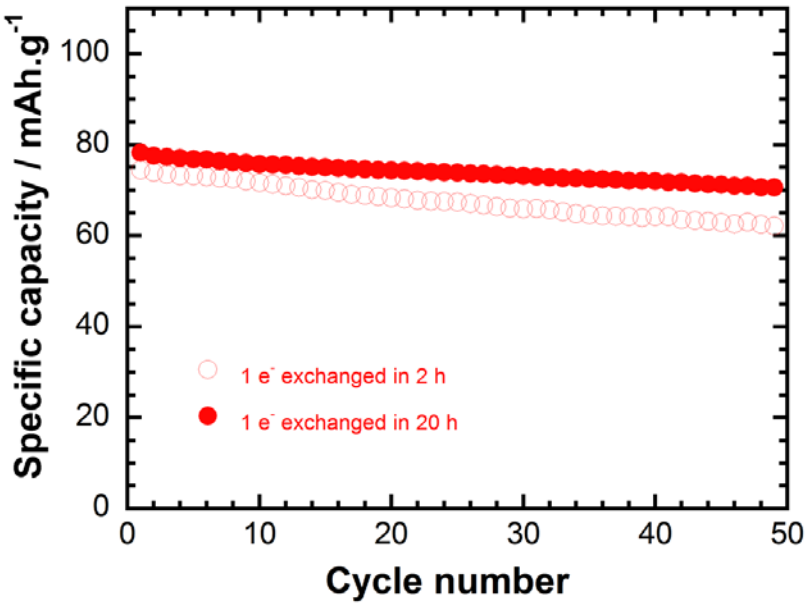

Figure S6. Discharge capacity retention curves for Li half cells using Li_2DAnT as active electrode material mixed with 33 wt% of carbon black and galvanostatically cycled at a rate of 1 electron exchanged in 2 h (I_m = 37.3 mA.g^{-1}) or 20 h (I_m = 3.73 mA.g^{-1}), respectively, using PC/$LiClO_4$ 1 M as electrolyte.

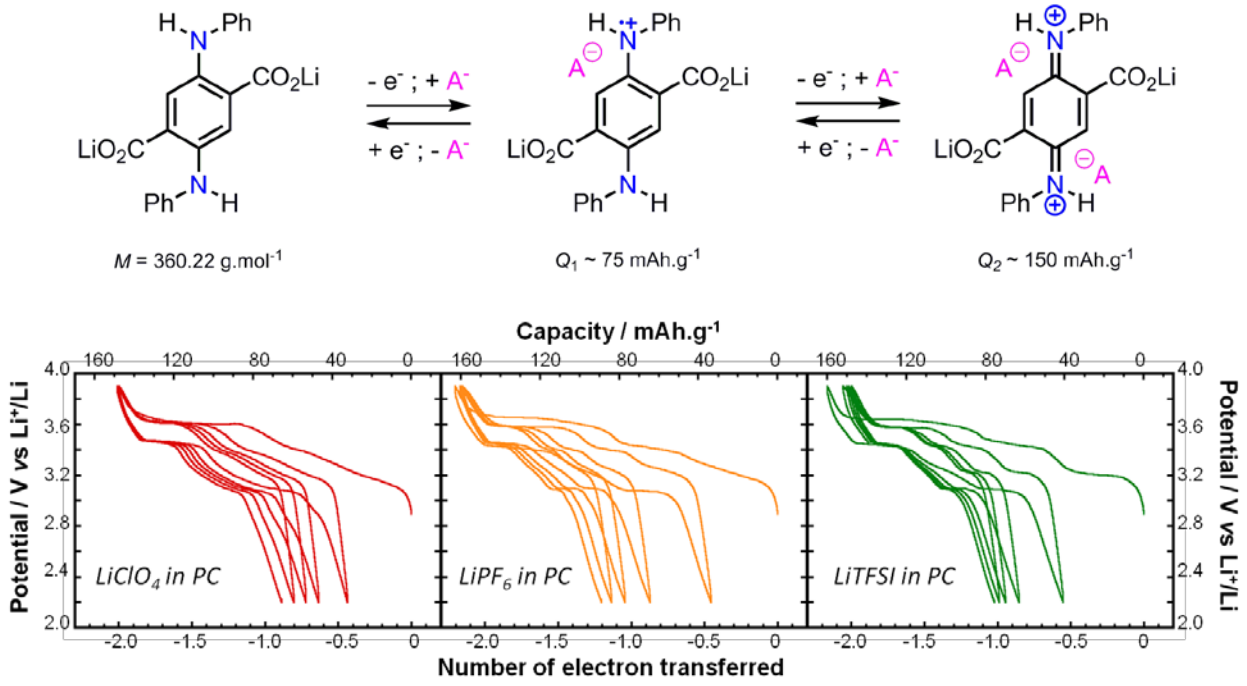

Figure S7. Electrochemical evaluation of the two-electron reaction for Li_2DAnT measured in Li half cells using 33 wt% of carbon black and galvanostatically cycled at a rate of 1 electron exchanged in 5 h (I_m = 15 mA.g^{-1}) in different electrolytes (red: PC/$LiClO_4$ 1 M; orange: PC/$LiPF_6$ 1 M; green: PC/LiTFSI 1 M). The expected electrochemical process for Li_2DAnT is also indicated at the molecular level.

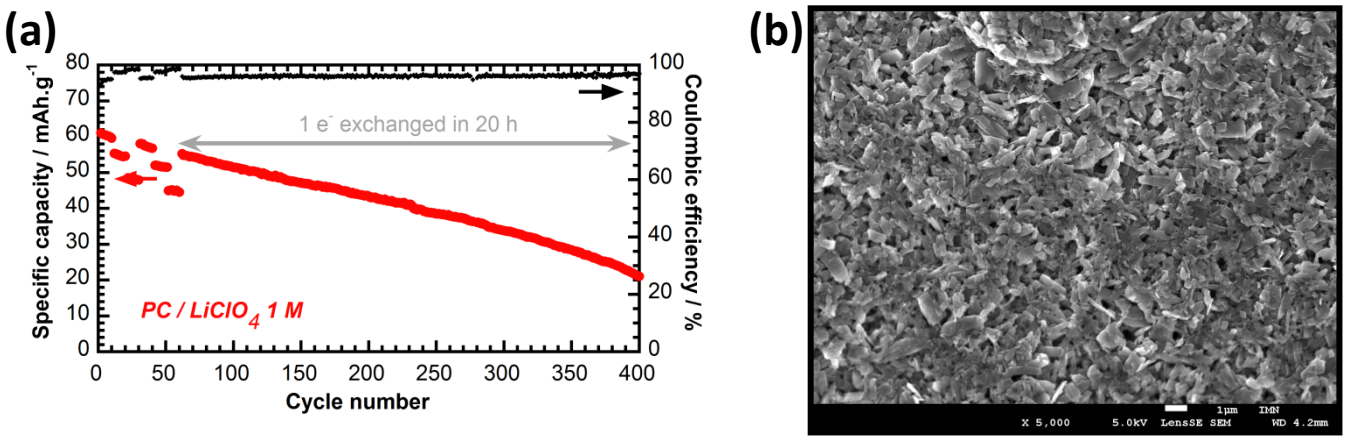

Figure S8. (a) Same discharge capacity retention curves with coulombic efficiency as reported in Figure 6b extended to 400 cycles (long-term cycling). (b) SEM imaging of the positive electrode material after 400 cycles (no binder, no carbon additive). Note that no metallization of the sample was performed for the SEM investigation.