

## Support information

### Study of Multi-Electron Redox Mechanism via Electrochromic Behavior in Hexaazatriphthylene-Based Polymer as Cathode of Lithium Organic Batteries

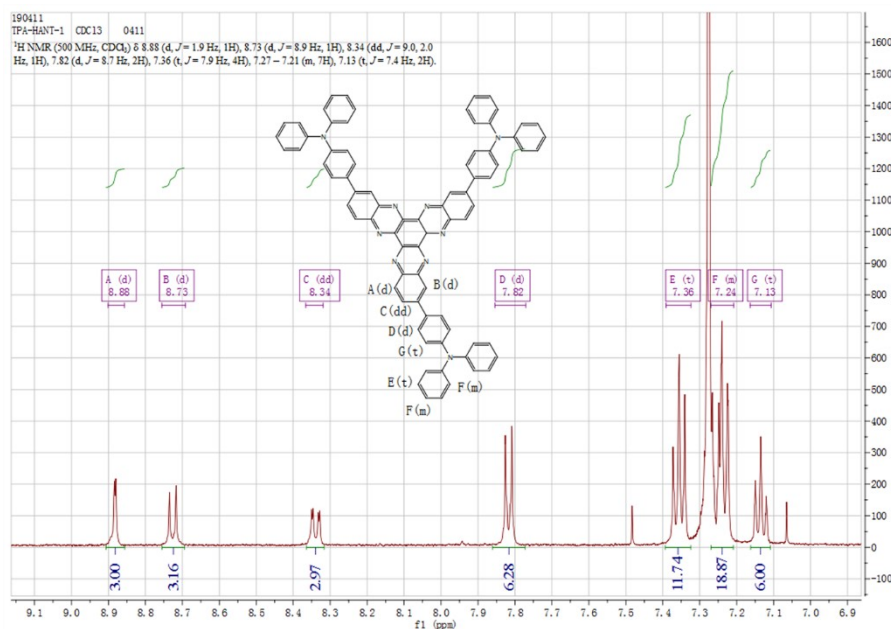
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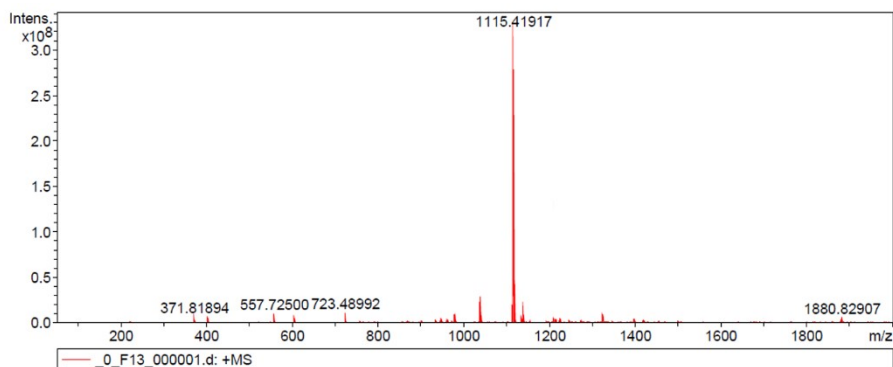
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Figure S1

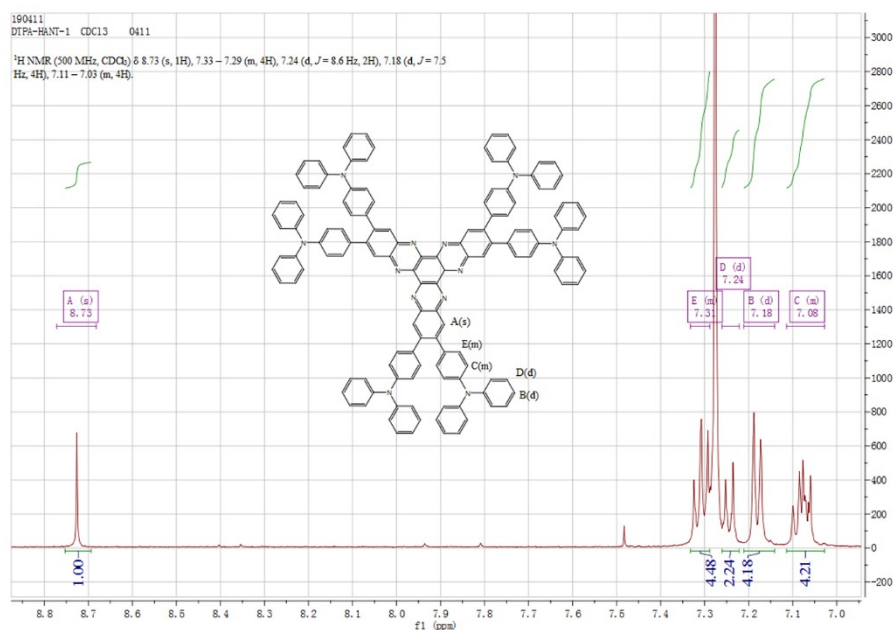


The <sup>1</sup>H NMR of TPA-HATN

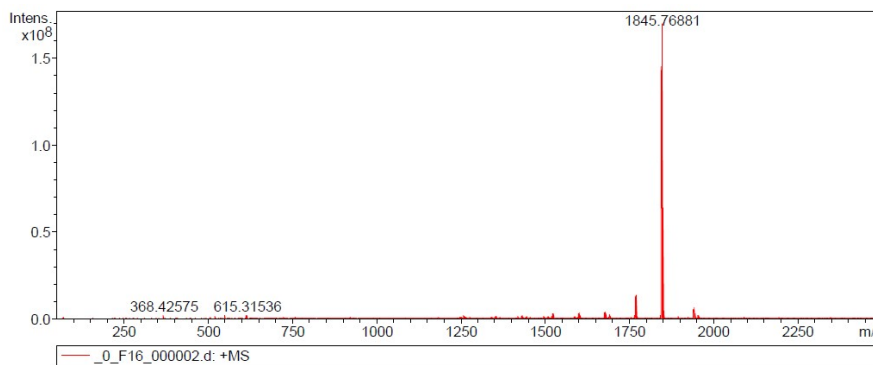


## The MADLI-TOF-MS of TPA-HATN

Figure S2



## The <sup>1</sup>H NMR of DTPA-HATN



## The MADLI-TOF MS of DTPA-HATN

Figure S3



Figure S3. The schematic diagram of microelectrochemical cell open lithium battery test

Figure S4

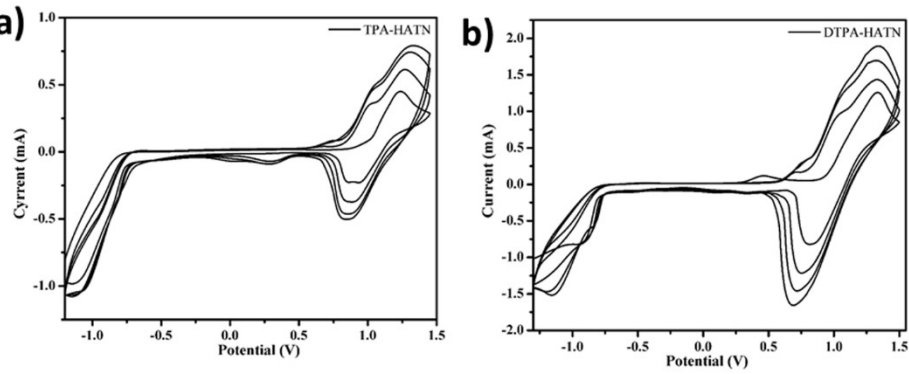
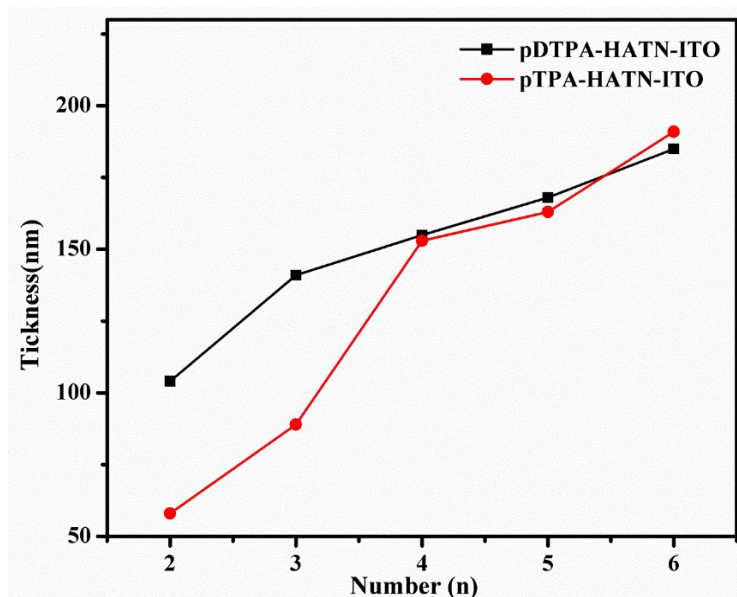


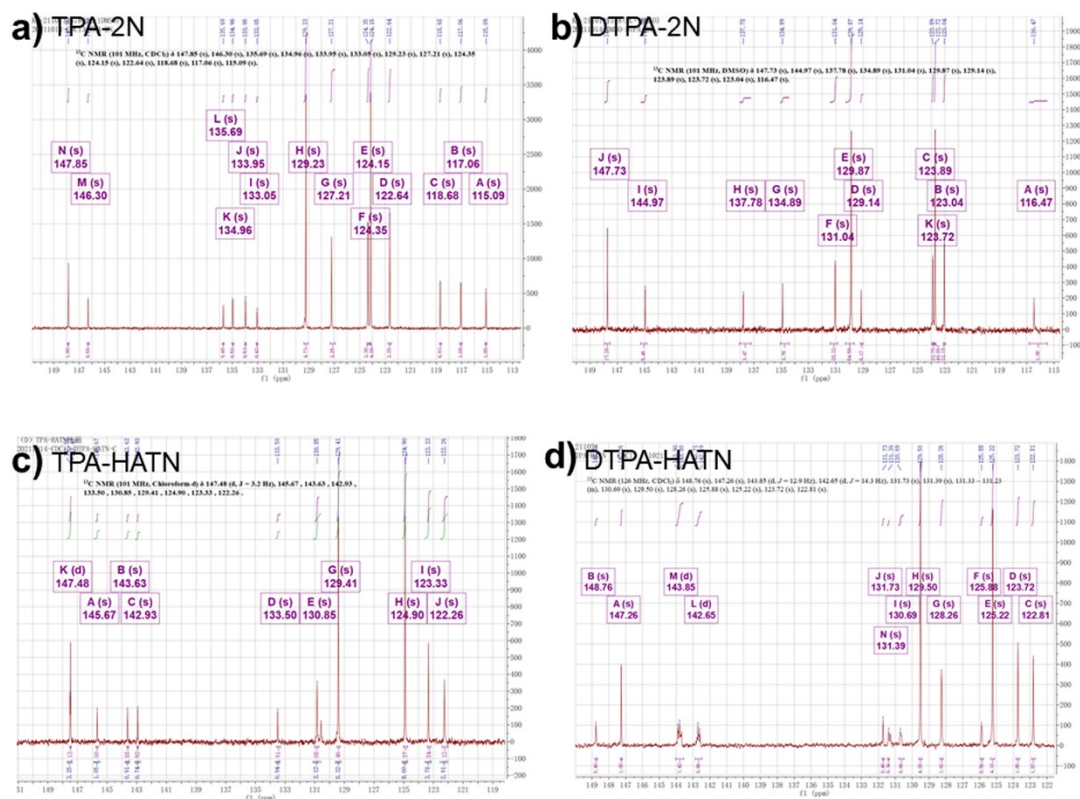
Figure S4. The CV polymerization curve of the TPA-HATN and DTPA-HATN

Figure S5



**Figure S5.** The film thickness of PDTPA-HATN and PTPA-HATN under different cyclic voltammogram polymerization cycles

**Figure S6**



**Figure S6** the <sup>13</sup>C NMR of the TPA-2N, DTPA-2N, TPA-HATN, DTPA-HATN.

**Figure S7**

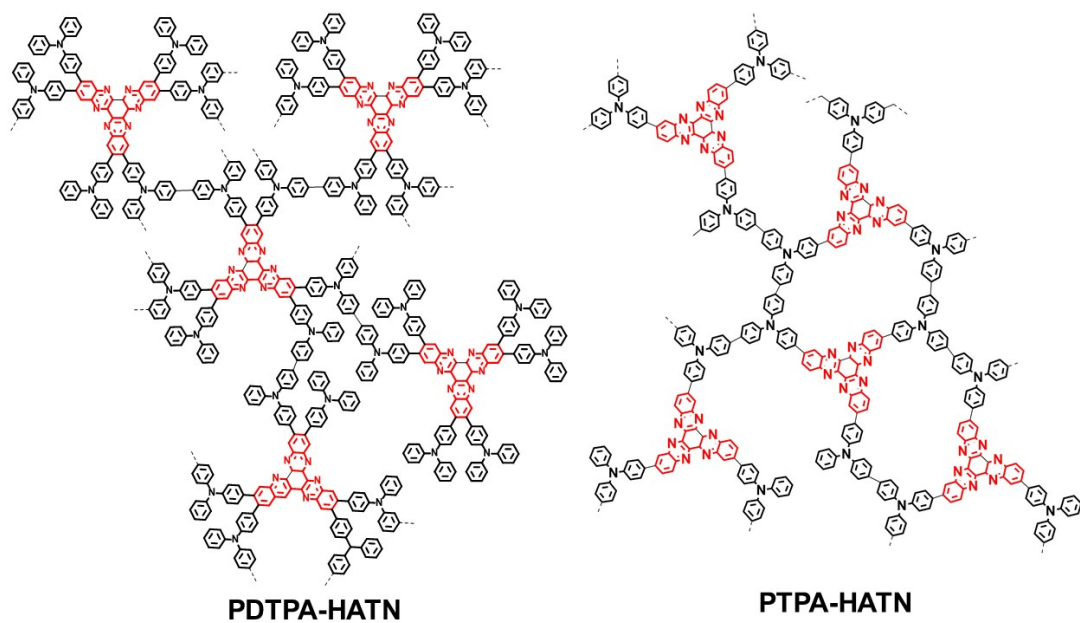


Figure S7 The possible polymers structure of PTPA-HATN and PDTPA-HATN.

Figure S8

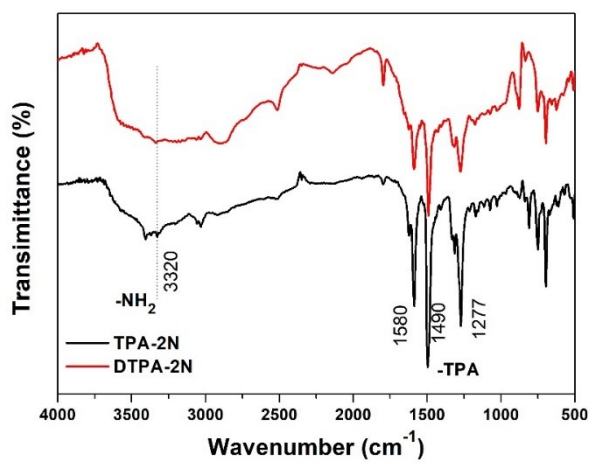


Figure S8. The FT-IR of the TPA-2N and DTPA-2N.

Figure S9

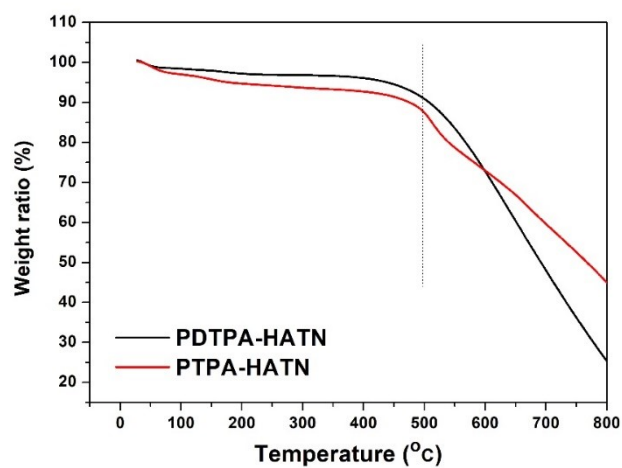


Figure S9 The TGA of the polymers PDTPA-HATN and PTPA-HATN.

Figure S10

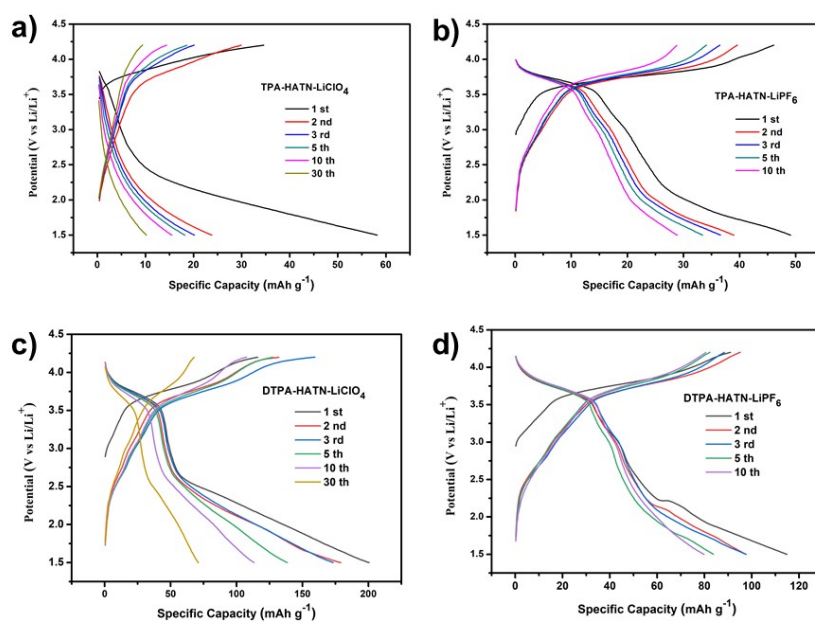
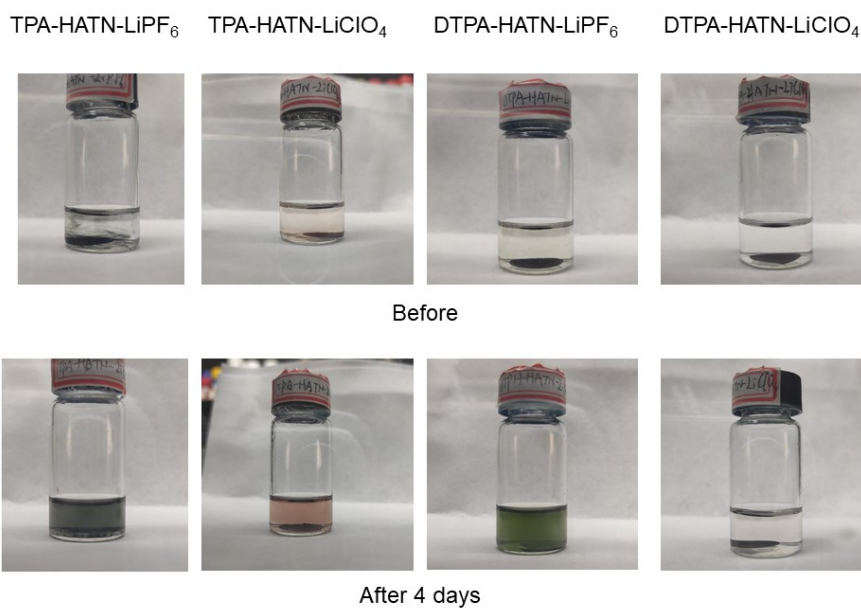


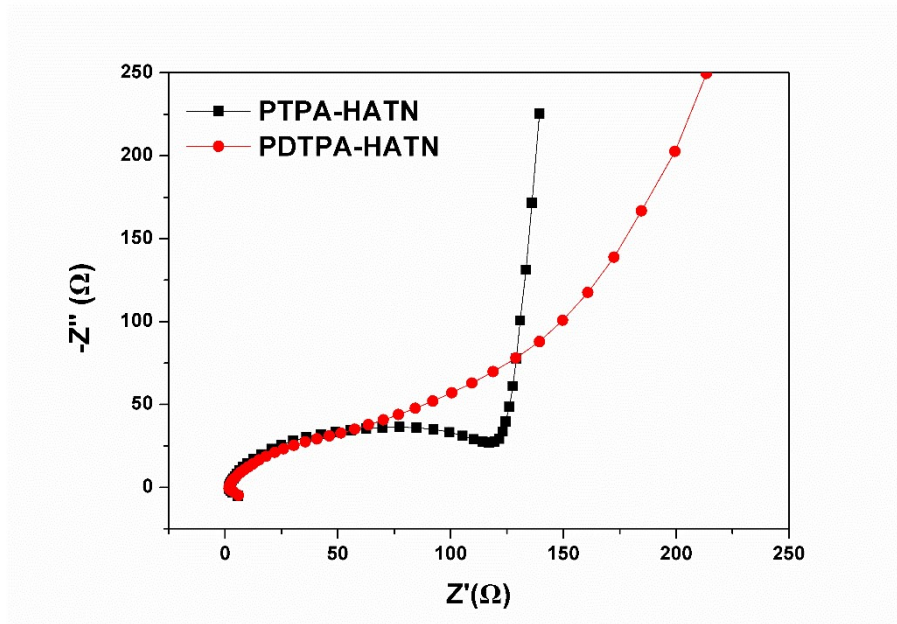
Figure S10 The charge/discharge curves of two monomers TPA-HATN and DTPA-HATN in  $\text{LiClO}_4$  and  $\text{LiPF}_6$  electrolyte

Figure S11



**Figure S11** The solubility tests of two monomer electrodes in electrolyte before and after 4 days.

**Figure S12**



**Figure S12** The EIS measurements of PTPA-HATN and PDTPA for three groups of batteries data

**Figure S13**

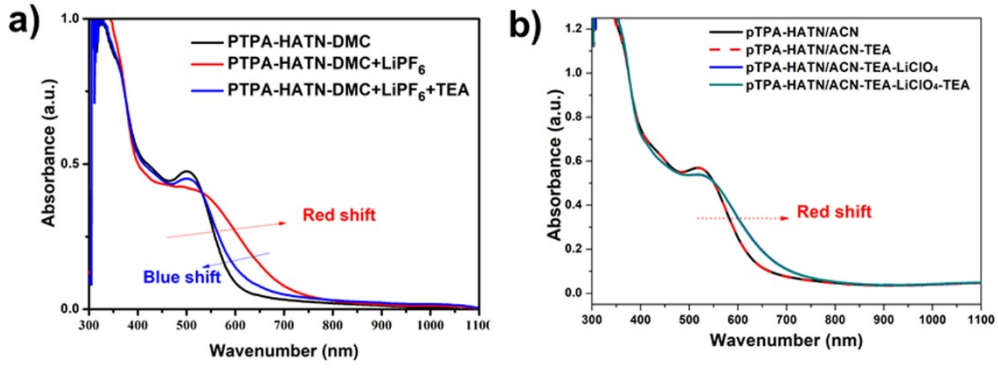


Figure S13 The UV tests of PTPA-HATN film in electrolytes and then added TEA solution.

Figure S14

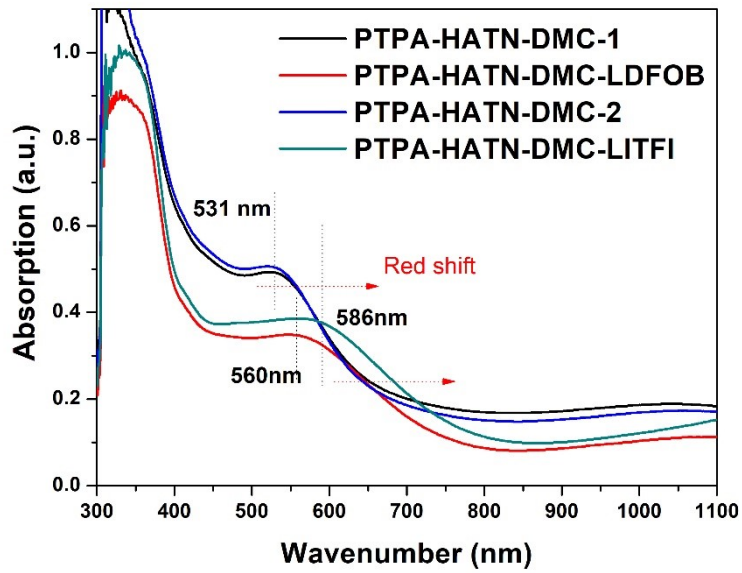


Figure S14 The UV tests of PTPA-HATN film LDFOB and LITFI electrolytes.

Figure S15



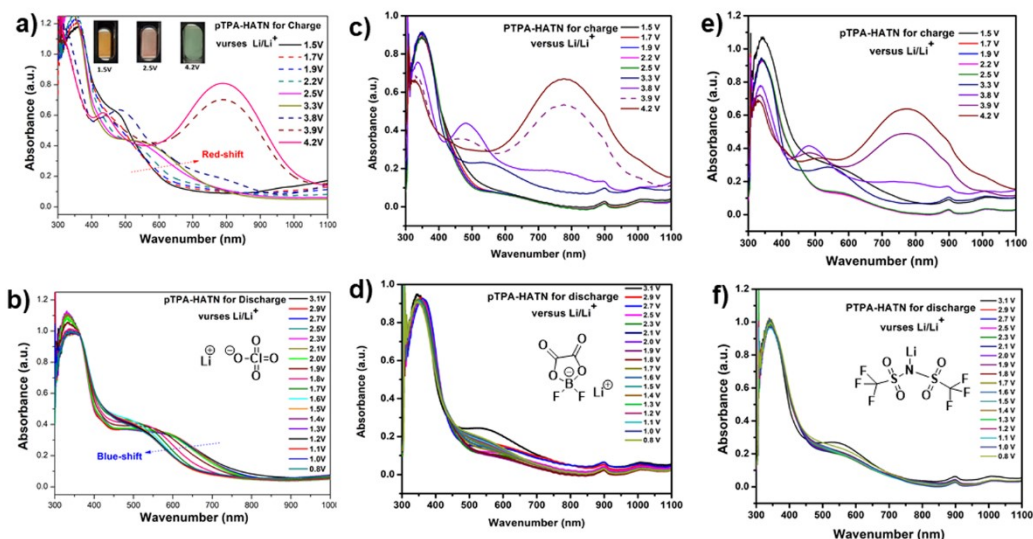


Figure S15 The UV tests of PTPA-HATN film during the charge/discharge process in  $\text{LiClO}_4$ , LDFOB and LITFI electrolytes.

Figure S16

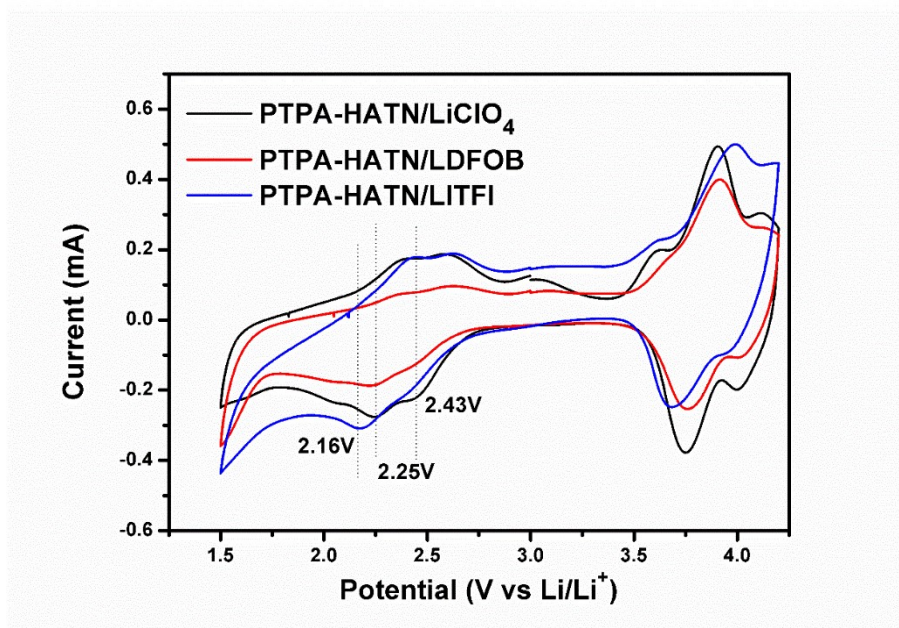


Figure S16 The CV curves of PTPA-HATN electrode in  $\text{LiClO}_4$ , LDFOB, LITFI electrolytes at 5 mV/s