Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Effects of Fluorination on the Electrochromic Performance of Benzothiadiazole-Based Donor-Acceptor Copolymers

*Wei Teng Neo, Kok Haw Ong, Ting Ting Lin, Soo-Jin Chua, and Jianwei Xu**
Email: jw-xu@imre.a-star.edu.sg

1 NMR of Monomers and Polymers

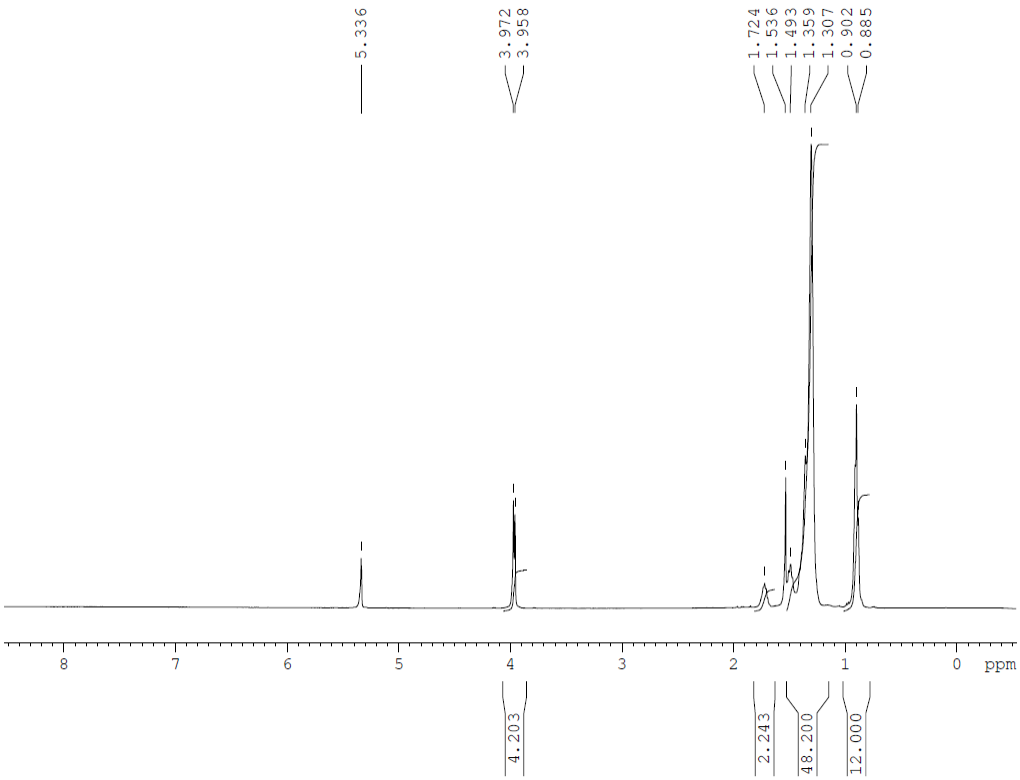


Figure S1 ^{1}H NMR spectrum of compound **2** (CD_2Cl_2, room temperature).

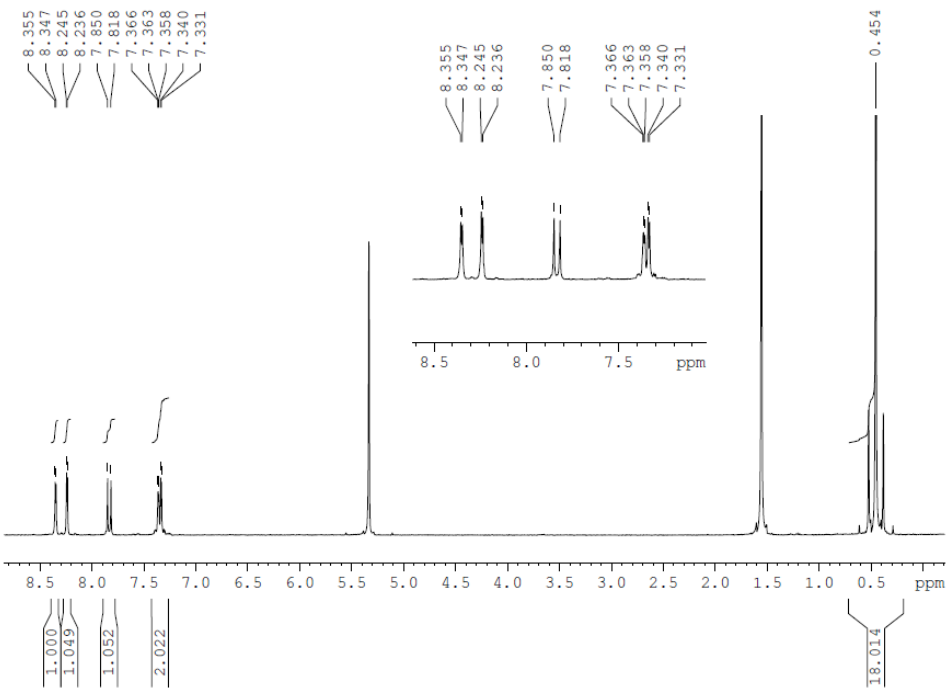


Figure S2 ^{1}H NMR spectrum of compound **4b** (CD_2Cl_2, room temperature).

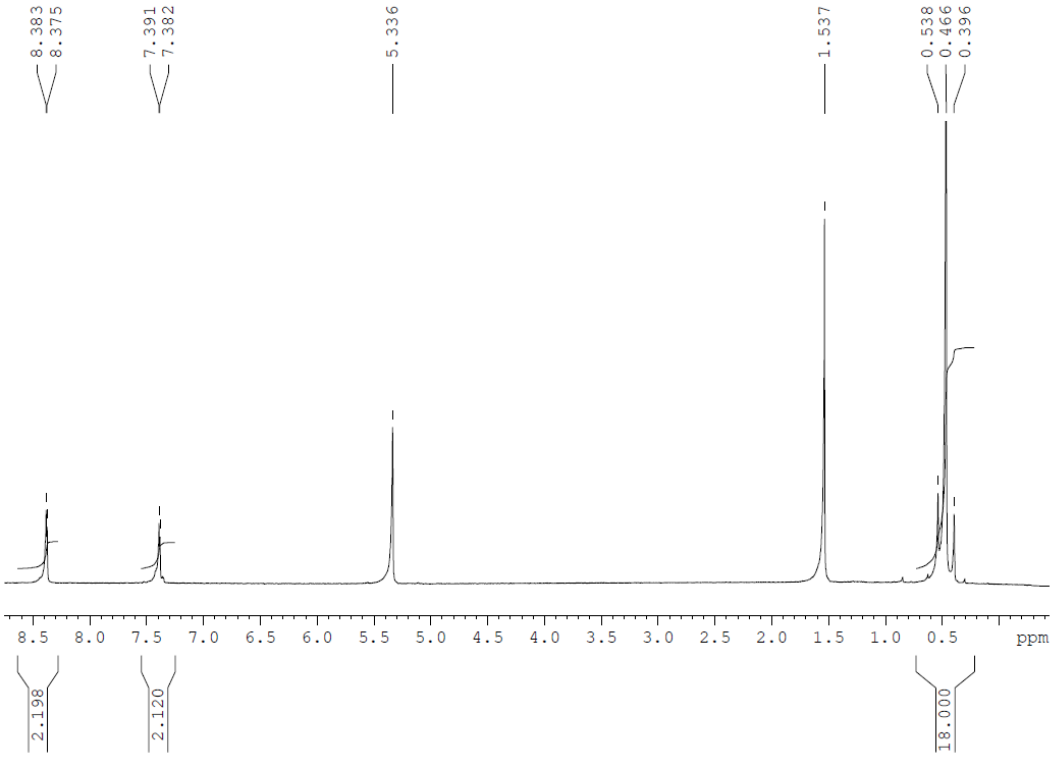


Figure S3 ^{1}H NMR spectrum of compound **4c** (CD_2Cl_2, room temperature).

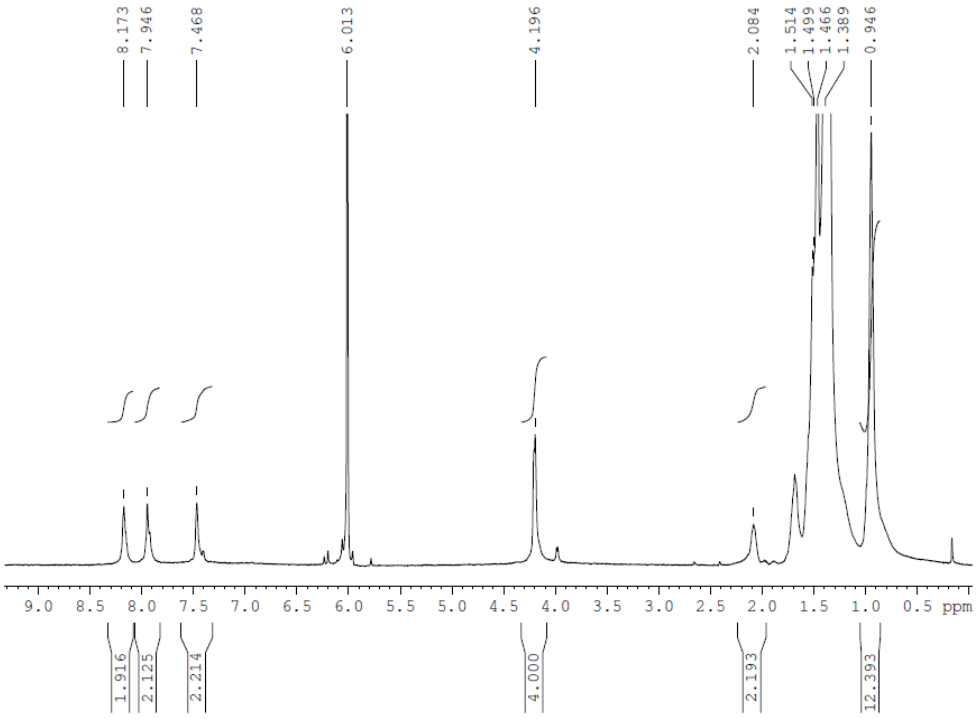


Figure S4 ^{1}H NMR spectrum of **PDAT-DTBT** ($C_2D_2Cl_4$, 120 °C).

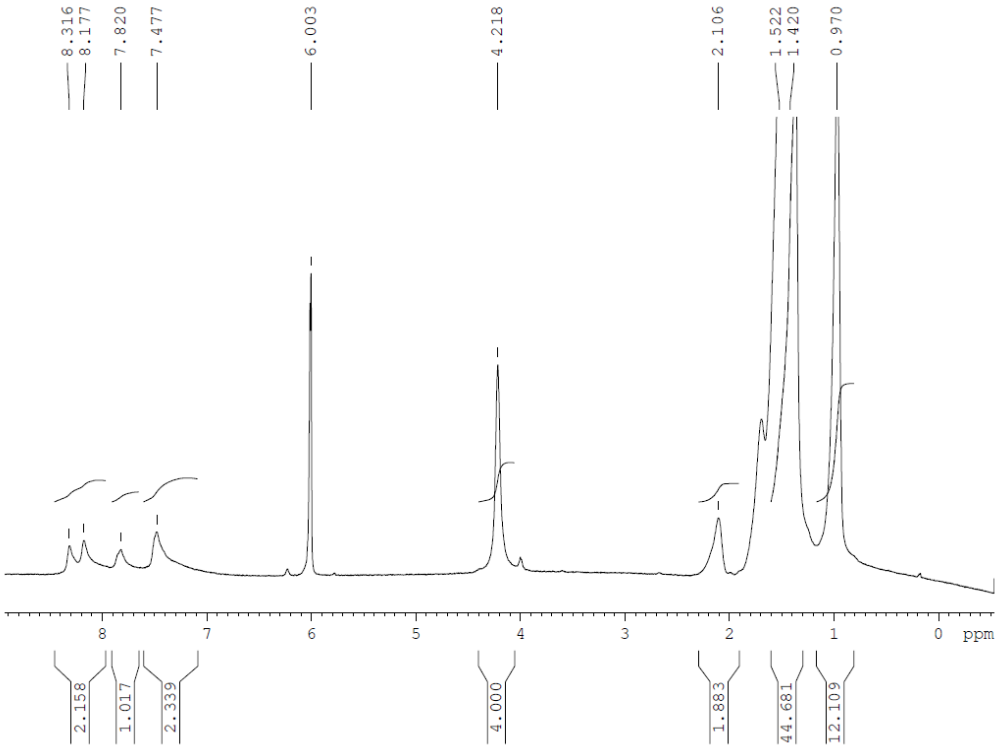


Figure S5 ^{1}H NMR spectrum of **PDAT-DTBT-F** ($C_2D_2Cl_4$, 120 °C).

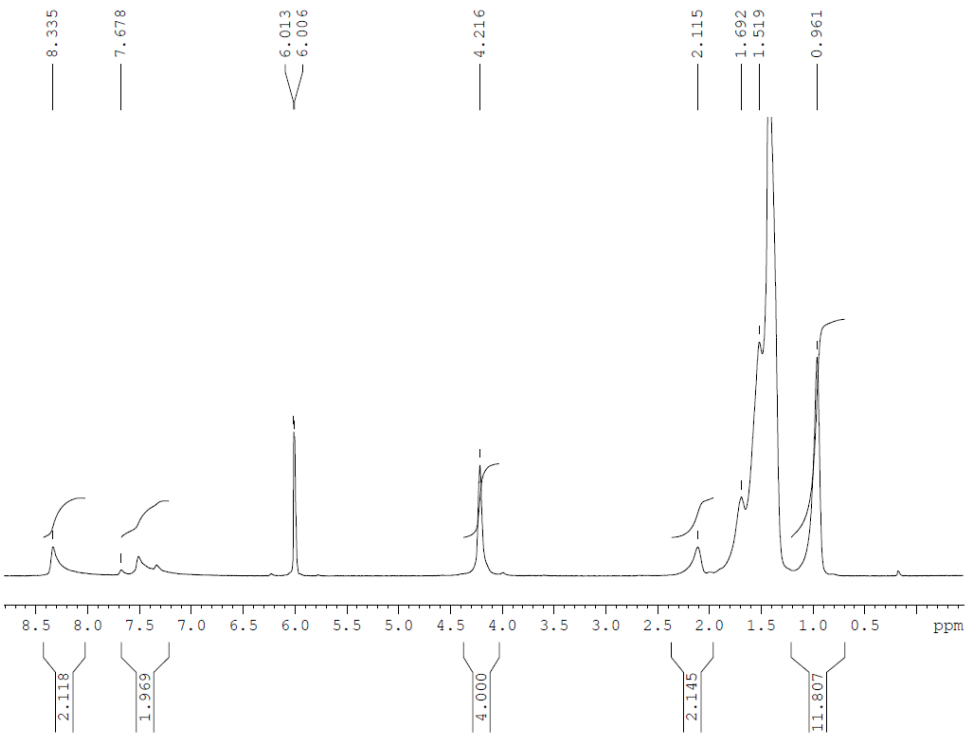
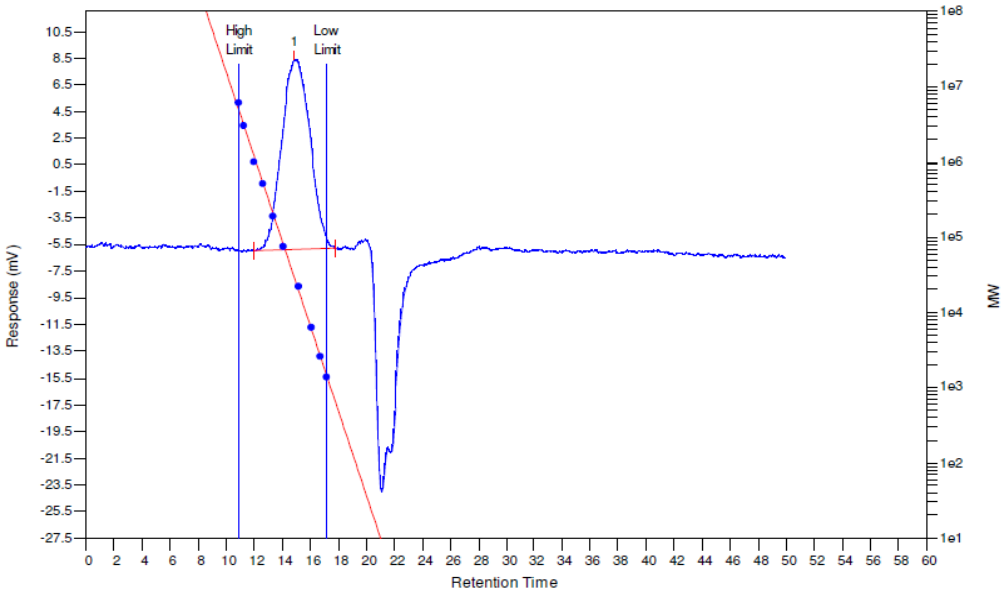


Figure S6 ^{1}H NMR spectrum of **PDAT-DTBT-2F** ($C_2D_2Cl_4$, 120 °C).

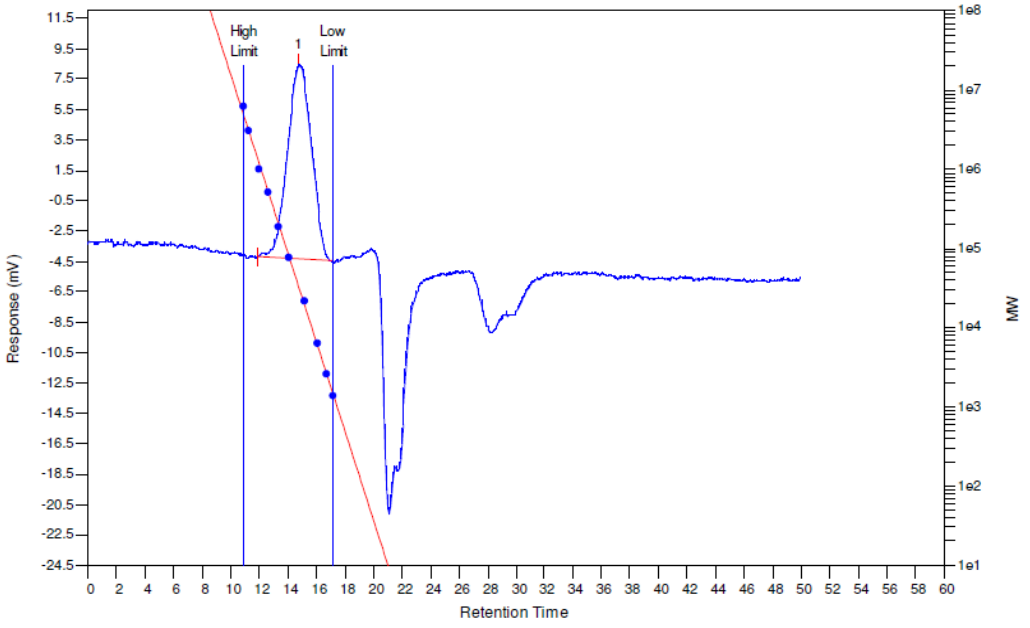
2 GPC, TGA and DSC Plots of Polymers



MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	31181	12934	48352	143431	306204	40171	3.73836

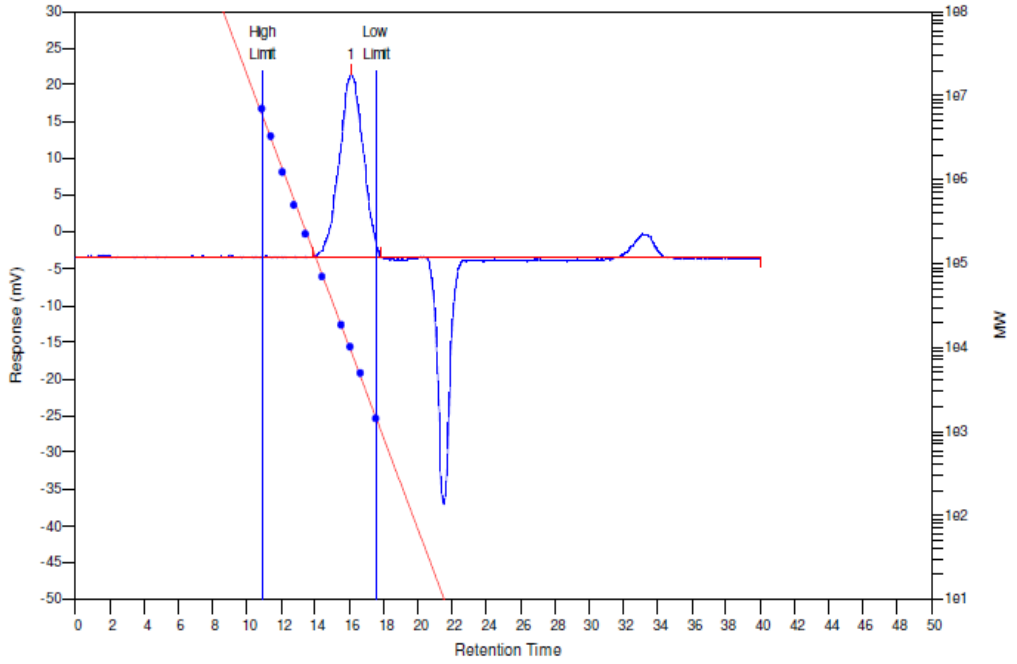
Figure S7 GPC chromatogram of **PDAT-DTBT**.



MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	33992	19989	55596	182608	488040	46870	2.78133

Figure S8 GPC chromatogram of **PDAT-DTBT-F**.



MW Averages

Peak No	Mp	Mn	Mw	Mz	Mz+1	Mv	PD
1	9097	6695	12572	23757	40610	11398	1.87782

Figure S9 GPC chromatogram of **PDAT-DTBT-2F**.

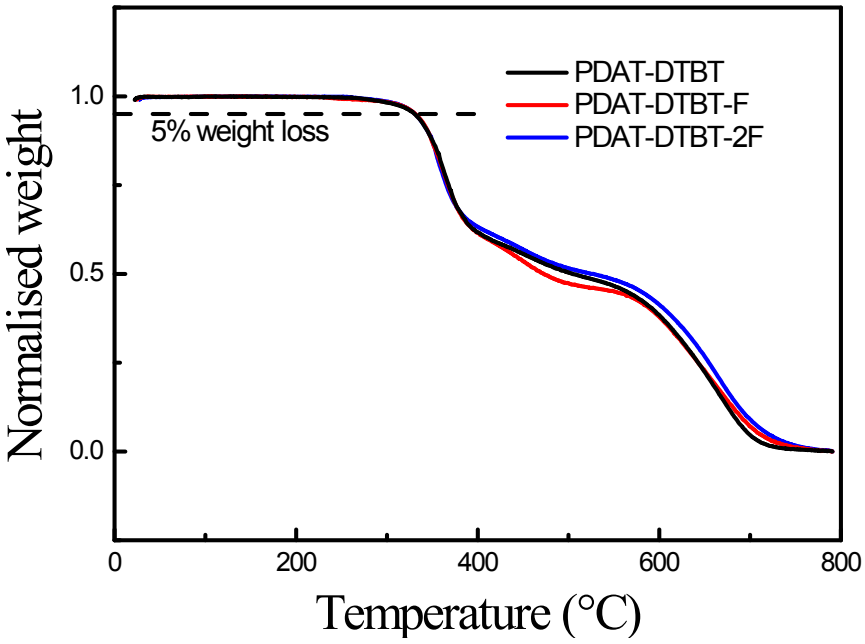


Figure S10 Thermograms of **PDAT-DTBT**, **PDAT-DTBT-F** and **PDAT-DTBT-2F**.

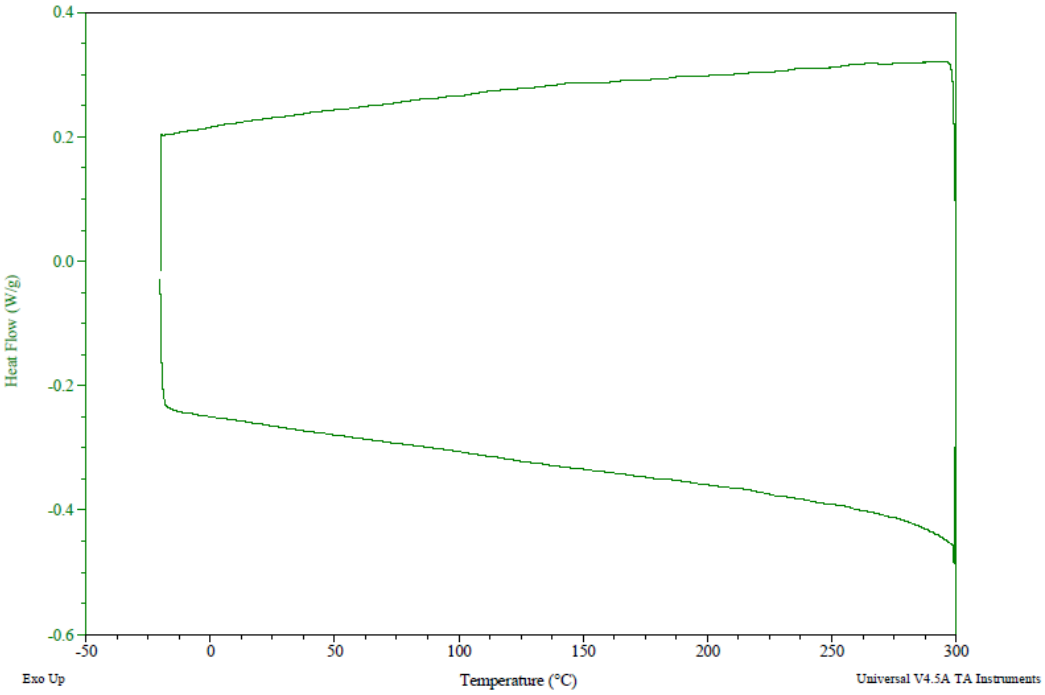


Figure S11 DSC plot of **PDAT-DTBT**.

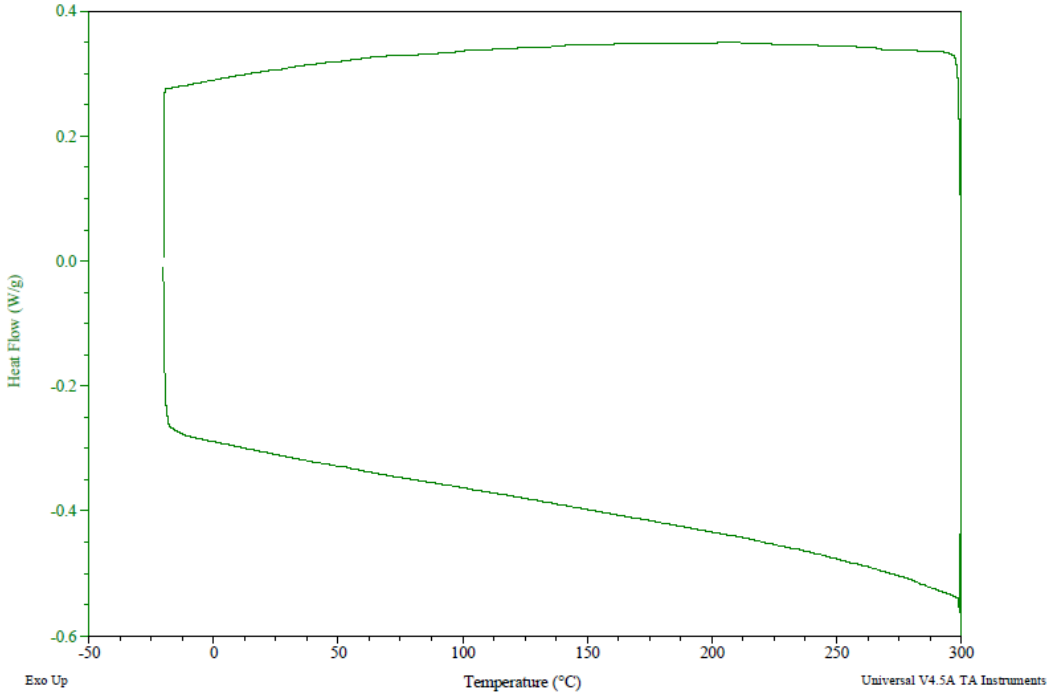


Figure S12 DSC plot of **PDAT-DTBT-F**.

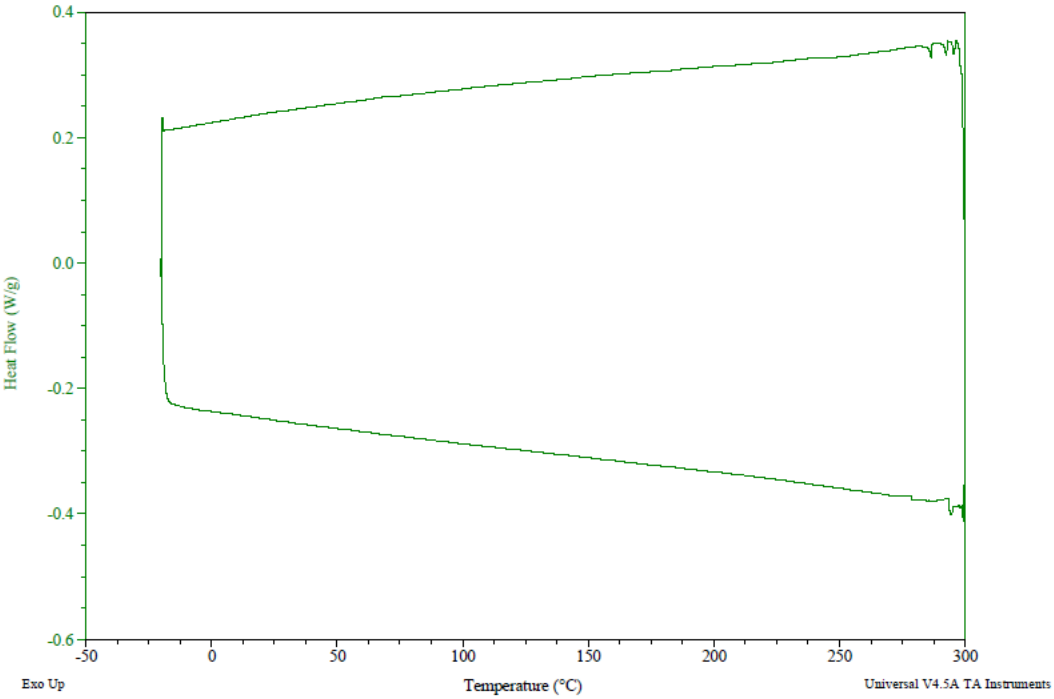


Figure S13 DSC plot of **PDAT-DTBT-2F**.

3 Degradation Profile of Electrochromic Devices

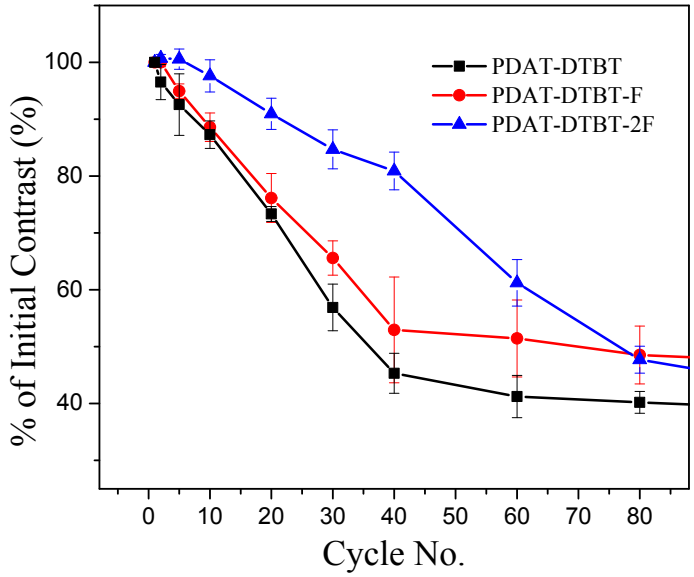


Figure S14 Degradation profiles of **PDAT-DTBT**, **PDAT-DTBT-F** and **PDAT-DTBT-2F** devices during the 'burn-in' period. The devices were switched at 15 s cycles between +1.6 and -1.6 V at 1500 nm. Data was obtained based on 3 repeated trials.

4 TD-DFT Calculations

Table S1. DFT calculations of **PDAT-DTBT**, **PDAT-DTBT-F** and **PDAT-DTBT-2F** dimer.

Model	HOMO (eV)	LUMO (eV)	LH gap (eV)
PDAT-DTBT	-4.668	-2.705	1.963
PDAT-DTBT-F	-4.694	-2.780	1.914
PDAT-DTBT-2F	-4.754	-2.782	1.972