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

Supporting Information

Long-Term-Stable, Solution-Processable, Electrochromic Carbon Nanotubes/Polymer Composite for Smart Supercapacitor with Wide Working Potential Window

Tongtong Ye[a], Ying Sun[a]*, Xuan Zhao[a], Baoping Lin [a]*, Hong Yang[a], Xueqin Zhang[a] and Linxiang Guo[a].

School of Chemistry and Chemical Engineering, Southeast University, Nanjing, 211189, P. R. China

*Author to whom correspondence should be addressed
Email: sunyseu@seu.edu.cn (S.Y.), lbp@seu.edu.cn (L.B.)

Contents

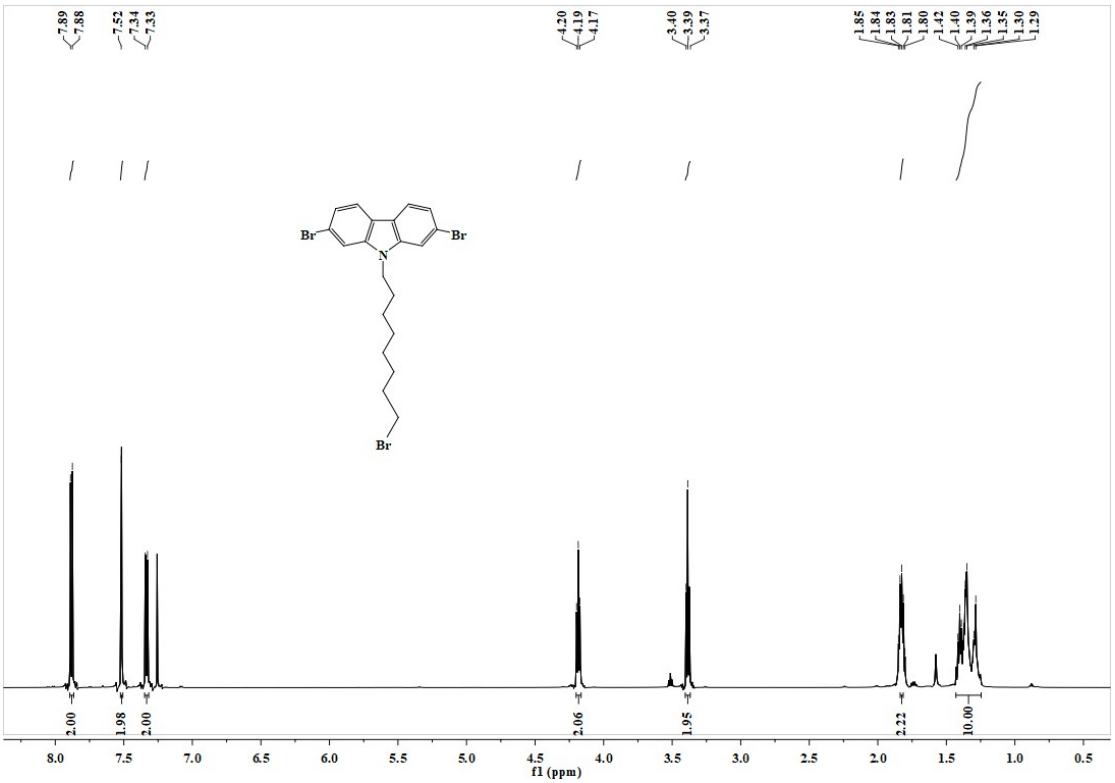

Fig. S1a. [1]HNMR spectra of 2,7-Dibromo-9-(8-bromooctyl)-9H-carbazol in chloroform-d.

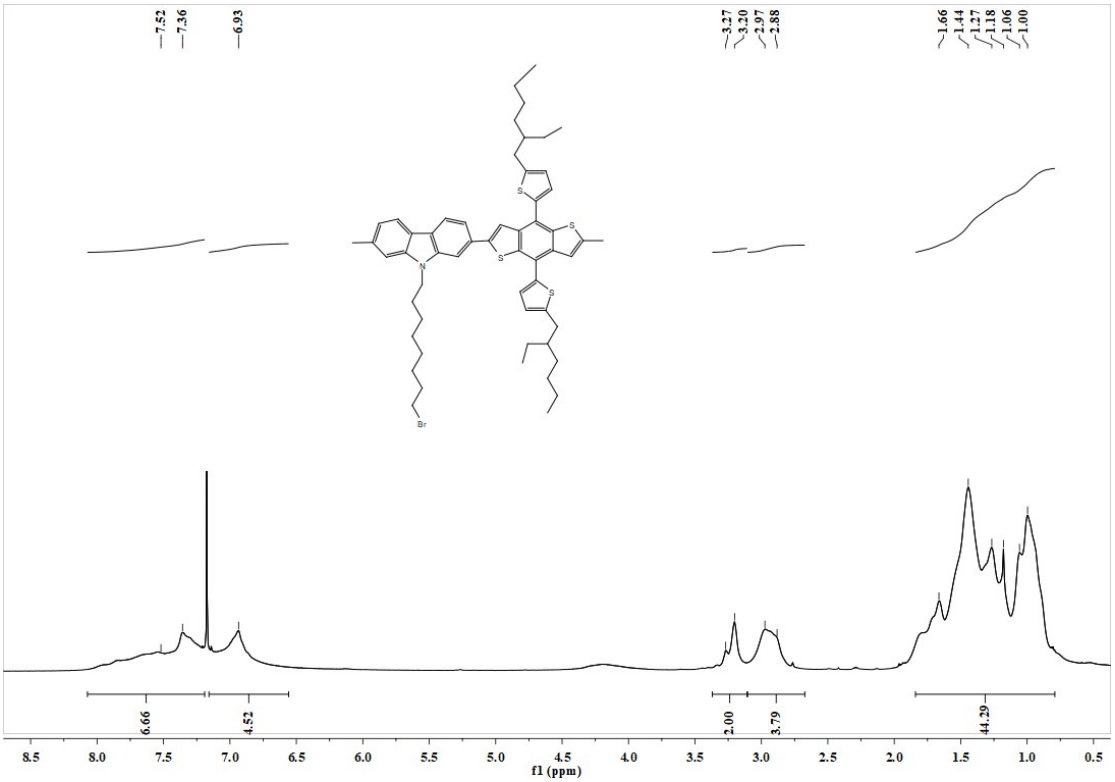

Fig. S1b. [1]HNMR spectra of PBDTC in chloroform-d.

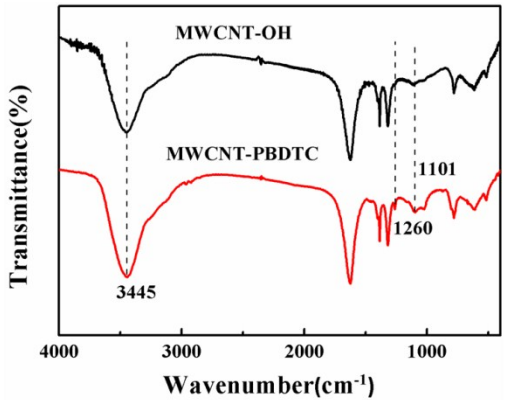

Fig. S2. FT-IR spectra of MWCNT-PBDTC and MWCNT-OH.

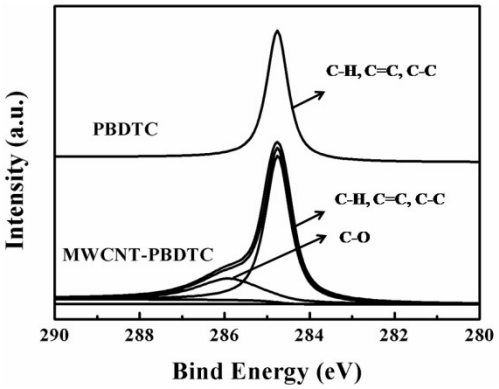

Fig. S3. The C1s XPS spectra of PBDTC and MWCNT-PBDTC.

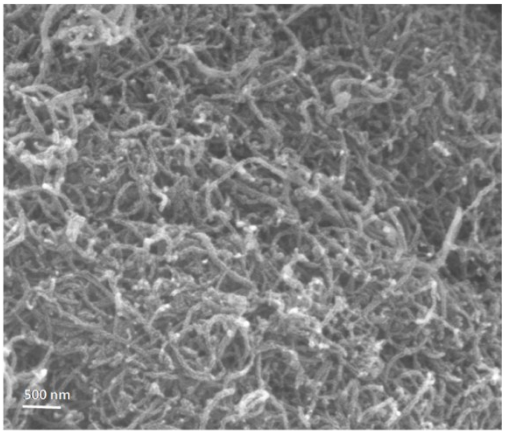

Fig. S4. FE-SEM image of MWCNT-OH.

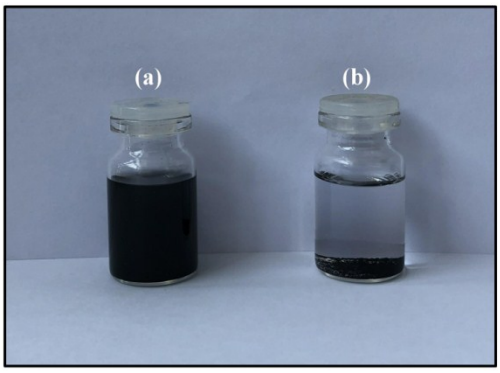

Fig. S5. Comparison of solubility of the samples in chloroform: (a) MWCNT-PBDTC, (b) MWCNT-OH. The black dispersion shown in (a) is stable for at least 30 days. The concentration for each sample is 5 mg mL^{-1}.

Table 1. Performance of symmetric supercapacitor device.

E (W h kg^{-1})	P (W kg^{-1})	E ($\times 10^{-3}$ mW h cm^{-2})	P (mW cm^{-2})
174.7	4800	17.47	0.48
148.2	7200	14.82	0.72
135.4	16800	13.54	1.68
129.9	36000	12.30	3.60
120.0	48000	12.00	4.80

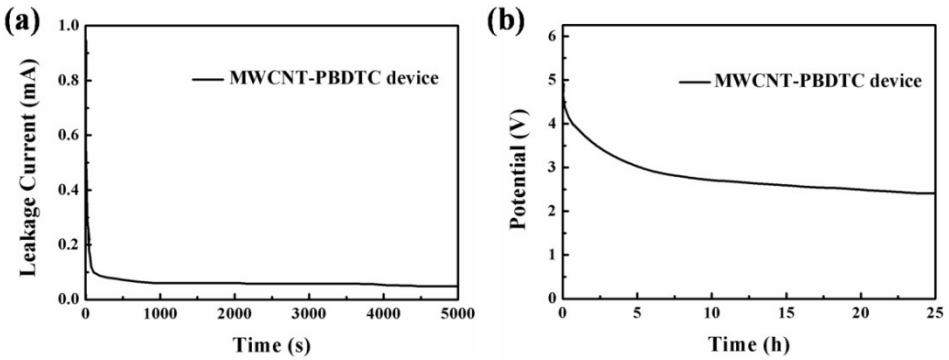

Fig. S6. (a) Leakage current curve of MWCNT-PBDTC device charged at 2 mA to 4.8 V and kept at 4.8 V for 5000 s. (b) Self-discharge curve of MWCNT-PBDTC device after charging at 4.8 V for 15 min.

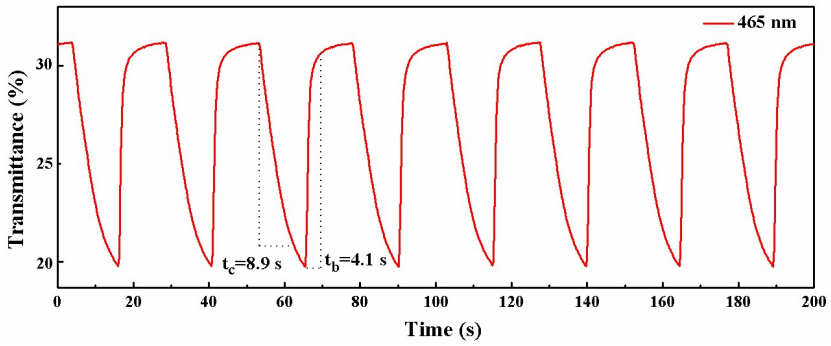

Fig. S7. In situ optical responses of device for 30 s per step measured at 465 nm and the calculation of response times.