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

Supporting information

Unique Torsional Cruciform π-Architectures Composed of Donor and Acceptor Axes Exhibiting Mechanochromic and Electrochromic Properties

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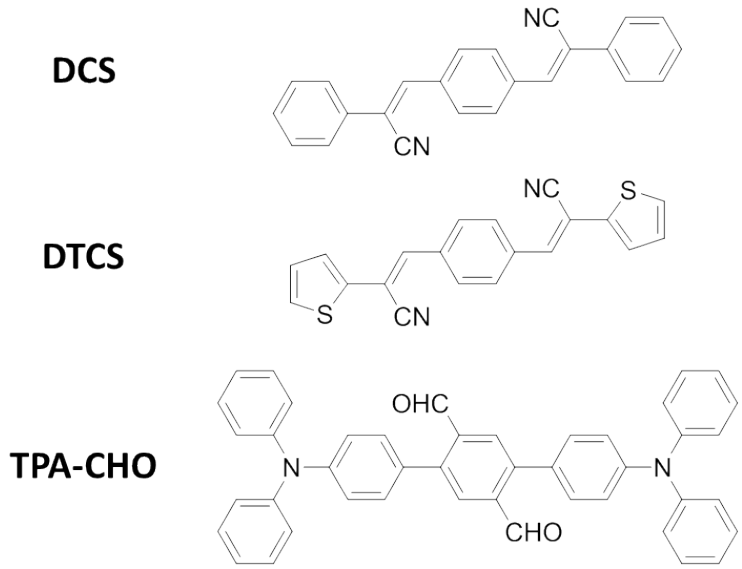

Scheme S1 Molecular structures of DCS, DTCS and TPA-CHO.

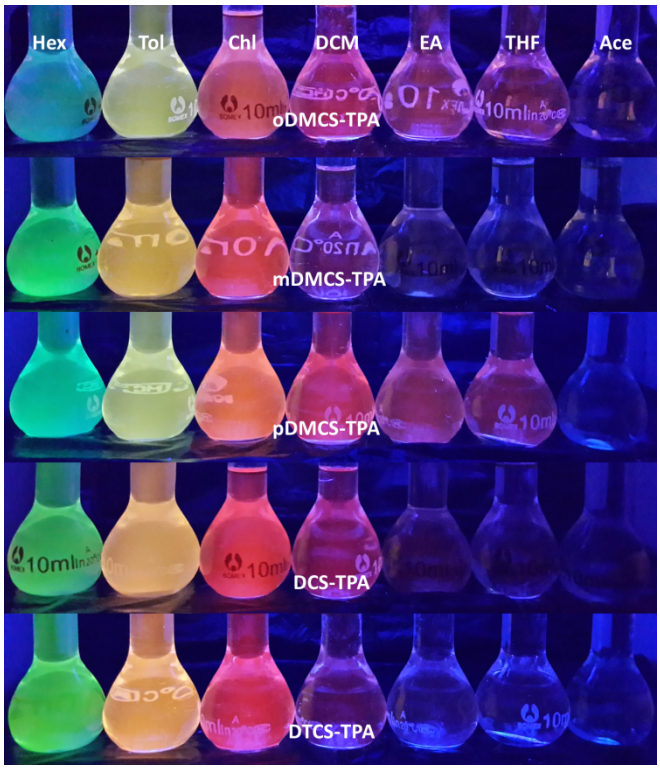

Fig. S1 Photographs of compounds in different solvents under 365 nm UV light. Hex, hexane; Tol, toluene; Chl, chloroform; DCM, dichloromethane; EA, ethyl acetate; THF, tetrahydrofuran; Ace, acetone.

Table S1 The solvent polarity parameters (Δ f) and fluorescence maximum frequencies (ν) of compounds in different solvents.

Solvents		Hex	Tol	Chl	EA	THF	DCM
$f(\varepsilon,n)$		-0.001	0.014	0.149	0.200	0.210	0.217
υ_f (10^4 cm^{-1})	oDMCS-TPA	2.012	1.869	1.724	1.701	1.689	1.661
	mDMCS-TPA	1.927	1.767	1.650	1.626	1.600	1.613
	pDMCS-TPA	1.980	1.832	1.715	1.672	1.650	1.656
	DCS-TPA	1.942	1.786	1.669	1.629	1.621	1.618
	DTCS-TPA	1.894	1.742	1.634	1.595	1.580	1.585
	DCS	2.358	2.370	2.283	2.315	2.294	2.299
	DTCS	2.193	2.119	2.119	2.132	2.101	2.114
	TPA-CHO	2.058	-	2.037	2.110	2.062	2.037

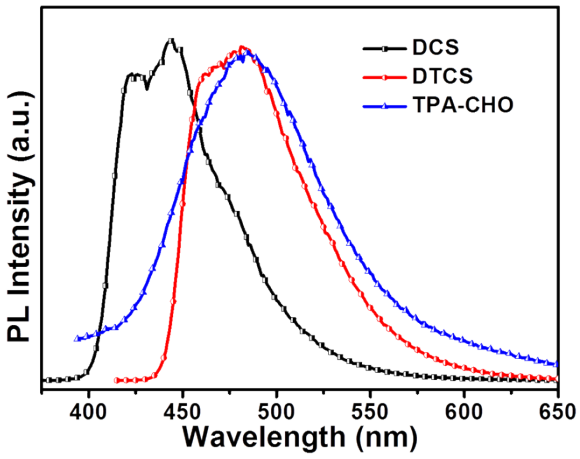

Fig. S2 Normalized PL spectra of DCS, DTCS and TPA-CHO in THF solution (10 μM).

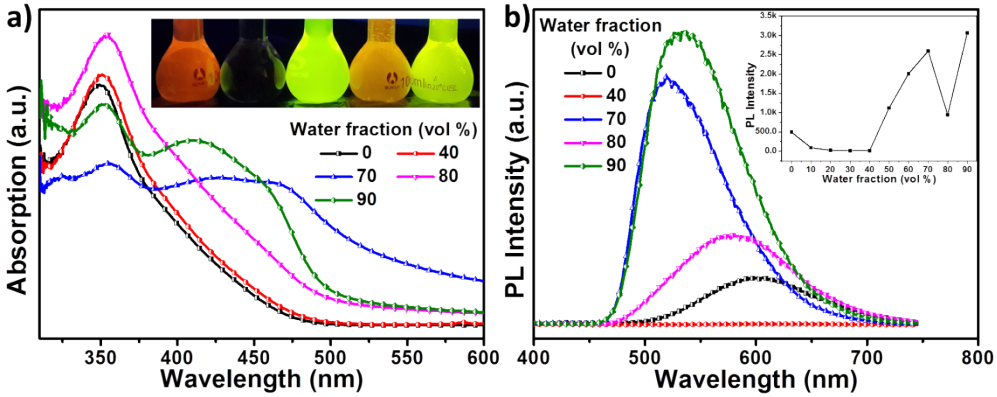

Fig. S3 Absorption and PL spectra of pDMCS-TPA (10 μM) in THF-Water mixtures with different volume fractions of water. The inset in (a) shows the photograph of mixtures with increasing volume fractions of water (from left to right) under 365 nm UV light. The inset in (b) shows a plot of relative PL intensity against water content.

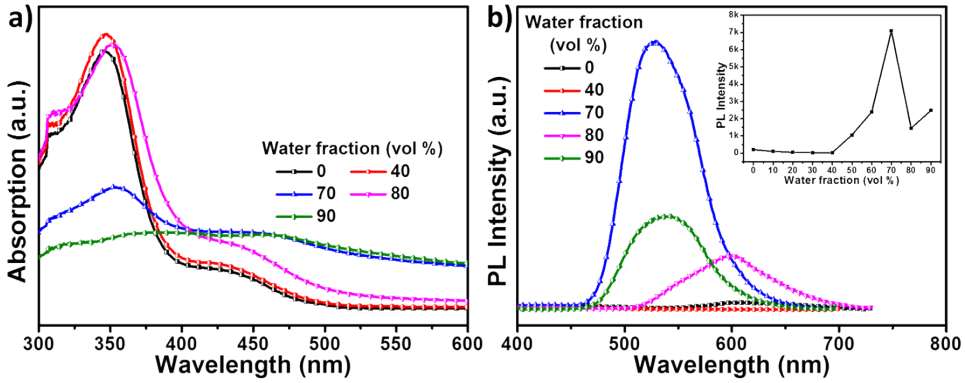

Fig. S4 Absorption (a) and PL (b) spectra of DCS-TPA (10 μM) in THF-Water mixtures with different volume fractions of water. The inset shows a plot of relative PL intensity against water content.

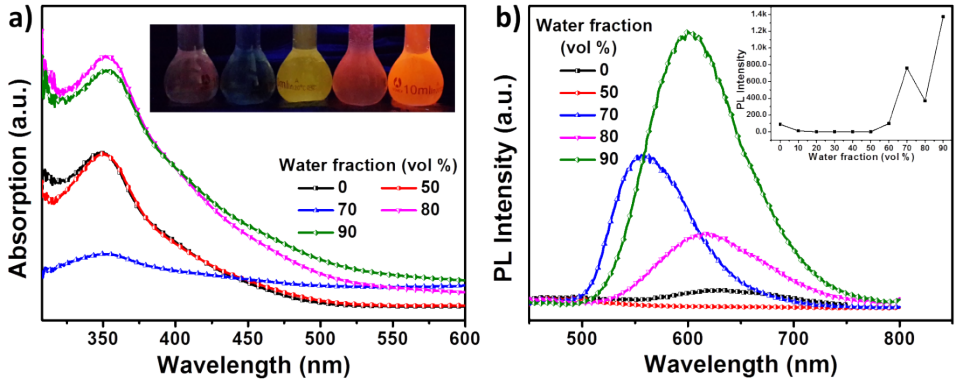

Fig. S5 Absorption (a) and PL (b) spectra of DTCS-TPA (10 μM) in THF-Water mixtures with different volume fractions of water. The inset in (a) shows the photograph of mixtures with increasing volume fractions of water (from left to right) under 365 nm UV light. The inset in (b) shows a plot of relative PL intensity against water content.

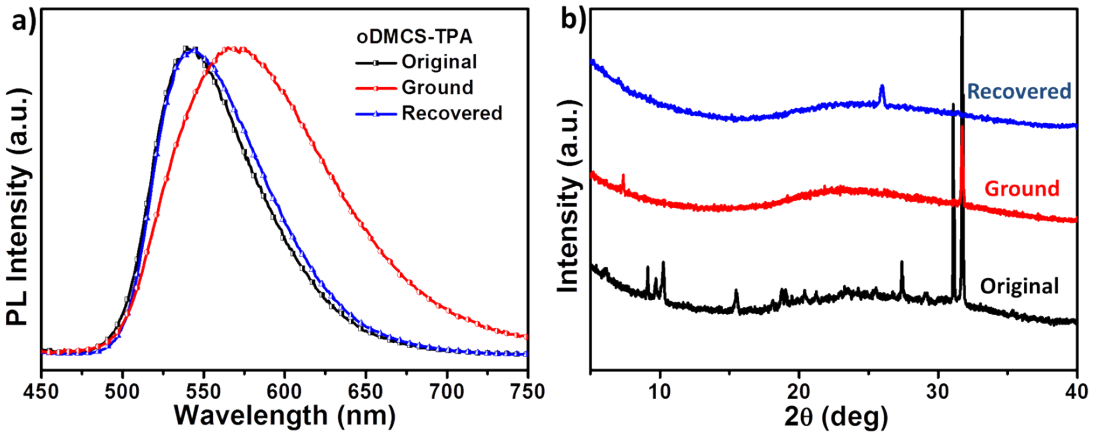

Fig. S6 Luminescence spectra (a) and XRD (b) of oDMCS-TPA solid upon different treatment.

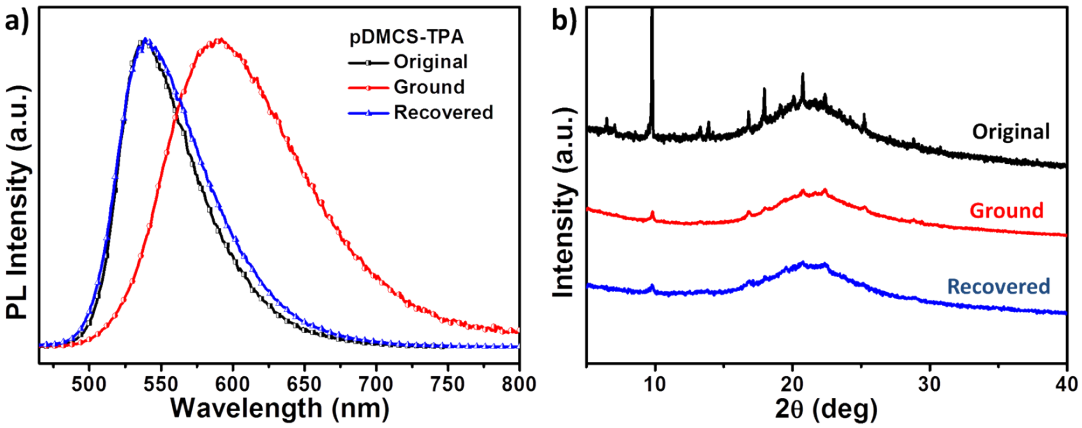

Fig. S7 Luminescence spectra (a) and XRD (b) of pDMCS-TPA solid upon different treatment.

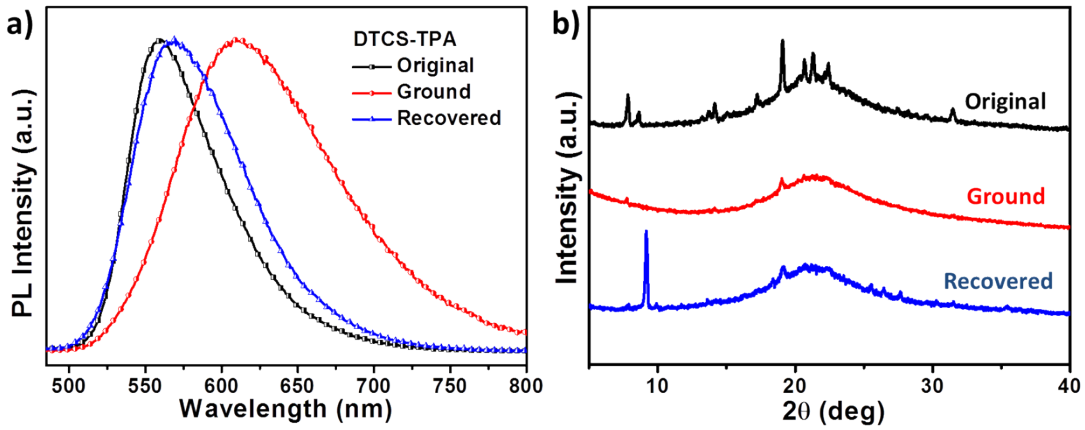

Fig. S8 Luminescence spectra (a) and XRD (b) of DTCS-TPA solid upon different treatment.

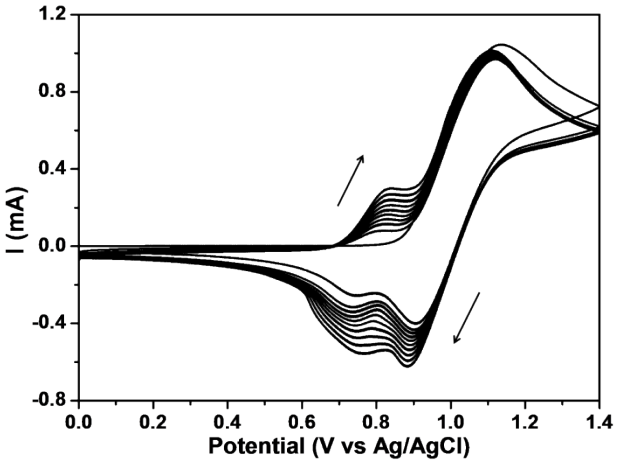

Fig. S9 Cyclic voltammogram curves of 1.5 mM DCS-TPA in 0.1 M TBAP/CH_2Cl_2 solution at a scan rate of 100 mV/s.

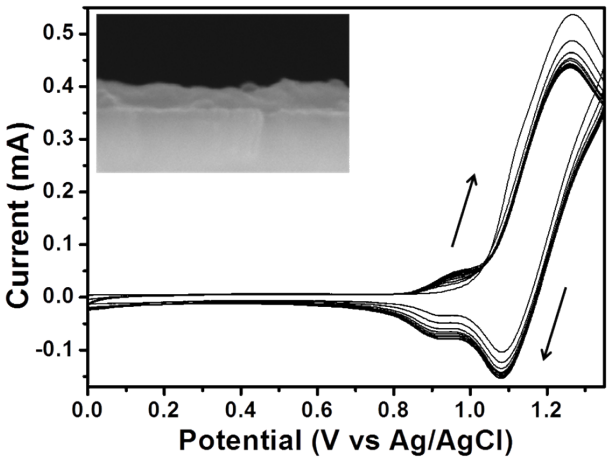

Fig. S10 Cyclic voltammogram curves of 1.5 mM DTCS-TPA in 0.1 M TBAP/CH_2Cl_2 solution at a scan rate of 100 mV/s. Inset shows the SEM image of the polymerized film on the surface of ITO.

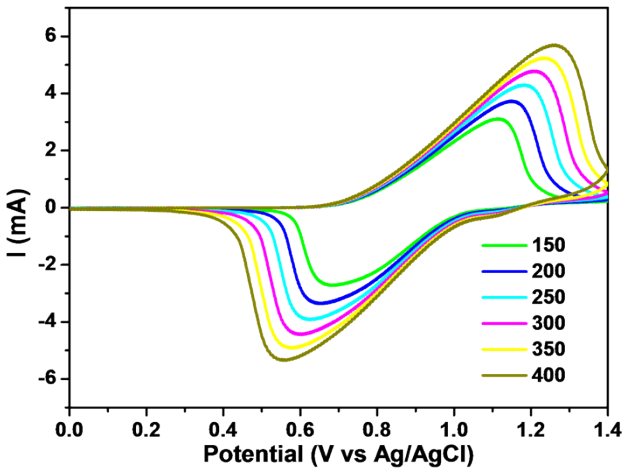

Fig. S11 Cyclic voltammogram of P(DCS-TPA) film in 0.1 M TBAP/ACN at various scan rates.

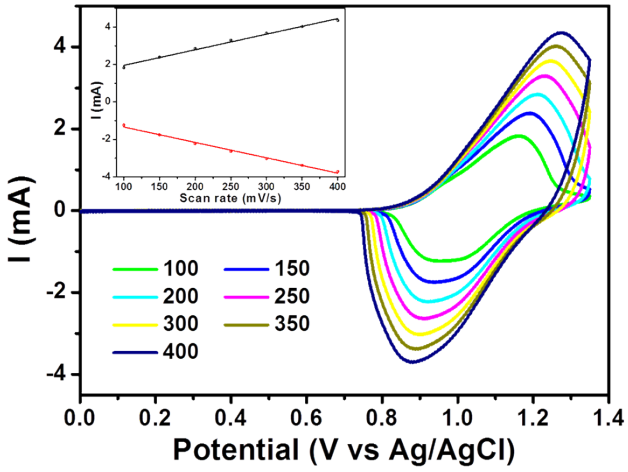

Fig. S12 Cyclic voltammogram of P(DTCS-TPA) film in 0.1 M TBAP/ACN at various scan rates. Inset shows the plot of anodic and cathodic peak current density vs. scan rate.

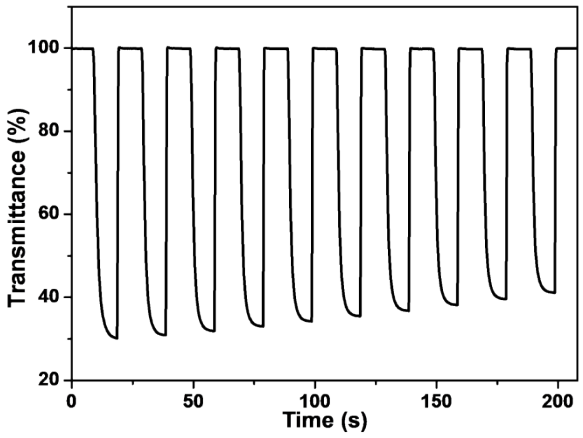

Fig. S13 Electrochromic switching response for P(DCS-TPA) film monitored at 765 nm in 0.1 M TBAP/ACN solution with a residence time of 10 s.

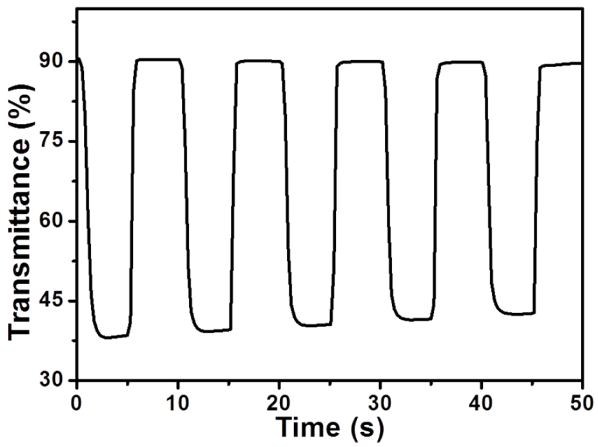

Fig. S14 Electrochromic switching response for P(DTCS-TPA) film monitored at 760 nm in 0.1 M TBAP/ACN solution with a residence time of 5 s.

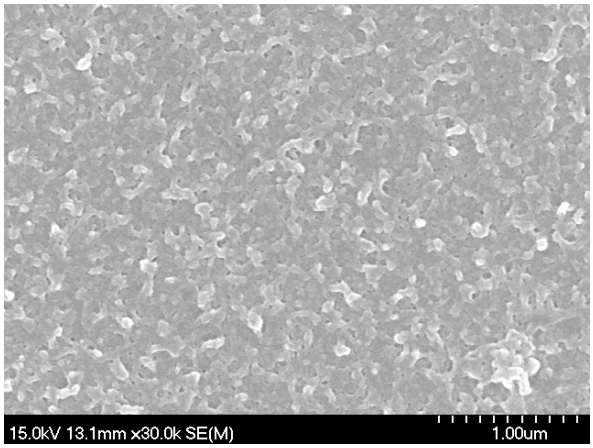

Fig. S15 SEM image of P(DCS-TPA) film.

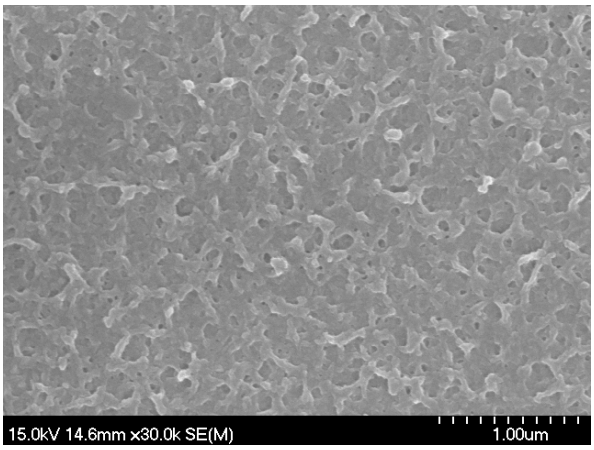

Fig. S16 SEM image of P(DTCS-TPA) film.