Supplementary Material (ESI) for Journal of Materials Chemistry

Electronic Supplementary Information

Solution-processable, high-T_g, ambipolar polyimide electrochromics bearing pyrenylamine units

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Table S1 Inherent viscosity and solubility behavior of polyimides

Code	η_{inh}[a] (dL/g)	Solubility in various solvents[b]					
	PAA	NMP	DMAc	DMF	DMSO	*m*-Cresol	THF
3a	2.02	+	+ -	+ -	+ -	+ -	-
3b	-	+ -	+ -	+ -	+ -	+ -	-

[a] Inherent viscosity measured at a concentration of 0.5 dL/g in DMAc at 30 °C. PAA = Poly(amic acid) [b] Qualitative solubility was tested with 10 mg of a sample in 1 mL of a stirred solvent. +: soluble on heating; + - : partially soluble; - : insoluble even on heating at 80 °C. NMP: *N*-methyl-2- pyrrolidone; DMAc: *N*,*N*-dimethylacetamide; DMF: *N*,*N*-dimethylformamide; DMSO: dimethyl sulfoxide; THF: tetrahydrofuran.

Table S2 Elemental analysis of the polyimides[a]

Polymer code	Formula of the repeat unit (formula weight)	Elemental analysis (%)			
			C	H	N
3a	$(C_{38}H_{19}N_3O_4)_n$ $(581.60)_n$	Calcd.	78.48	3.29	7.23
		Found	77.67	3.33	7.32
3b	$(C_{42}H_{21}N_3O_4)_n$ $(631.66)_n$	Calcd.	79.86	3.35	6.65
		Found	78.98	3.39	6.74

[a] All samples were heated at 100 °C in vacuum for 6 h prior to analysis.

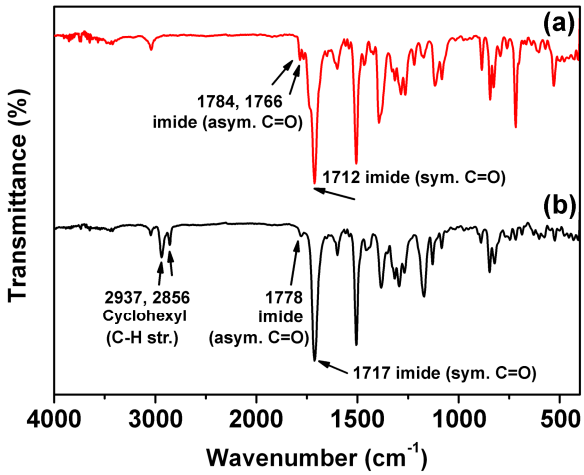

Fig. S1 IR spectra of the model compounds (a) **M1** and (b) **M2**.

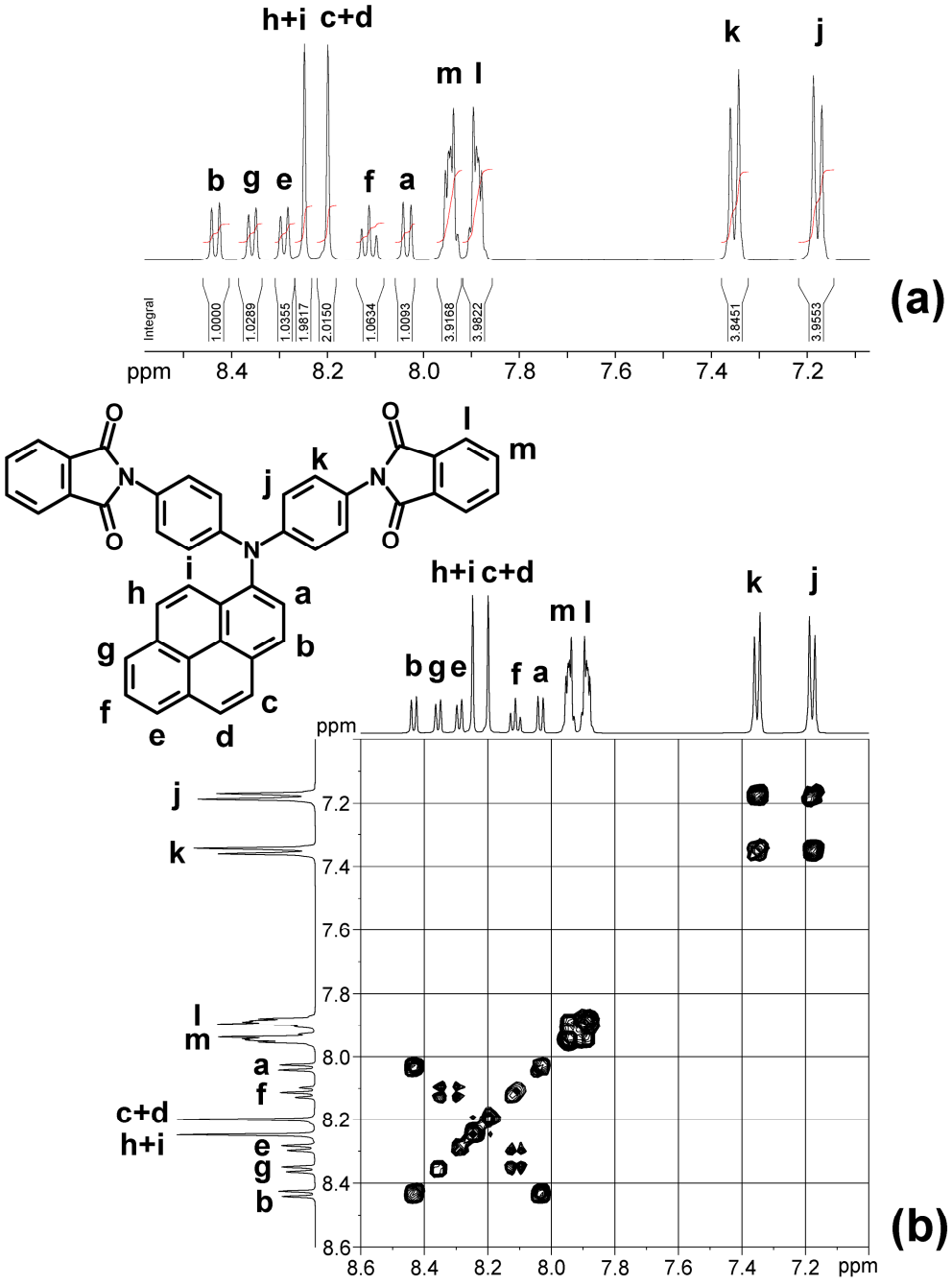

Fig. S2 (a) ^{1}H and (b) H-H COSY NMR spectra of the model compound **M1** in DMSO-d_6.

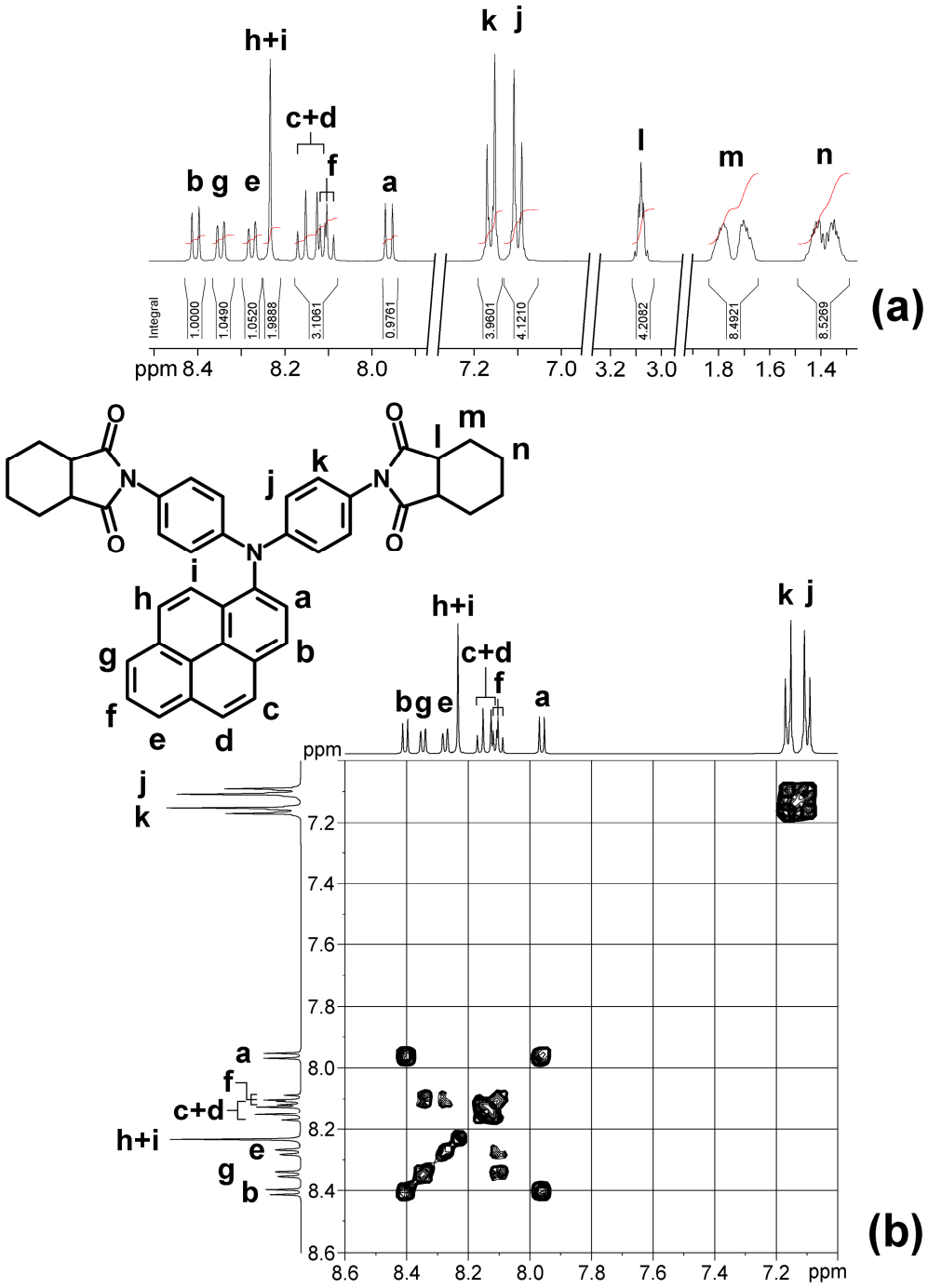

Fig. S3 (a) ^{1}H and (b) H-H COSY NMR spectra of the model compound **M2** in DMSO-d_6.

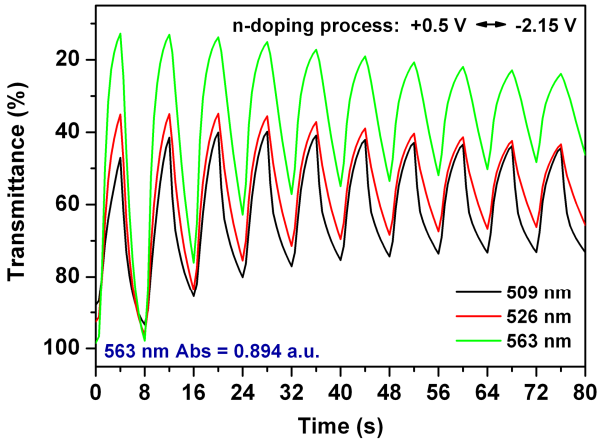

Fig. S4 Optical transmittance change for polyimide **3a** film (with an optical density of 0.894 a.u.) monitored at 509, 526 and 563 nm while switching between its pale yellow (neutral) and pink (reduced) states in 0.1 M Bu_4NClO_4/DMF by applying a potential step +0.5/ - 2.15 V (vs. Ag/AgCl) and cycle time 8 s.