Supporting Information

for

Redox-stable and visible/near-infrared electrochromic aramids with main-chain triphenylamine and pendent 3,6-di-tert-butylcarbazole units

by

Sheng-Huei Hsiao,* Hui-Min Wang,a Shih-Ho Liaoab

a Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei 10608, Taiwan. E-mail: shhsiao@ntut.edu.tw b Department of Chemical Engineering, Tatung University, Taipei 10451, Taiwan

List of Contents for Supplementary Material:

Fig. S1 IR spectra of dinitro compound 1 and target diamine monomer 2.
Fig. S2 (a) 1H NMR spectrum of dinitro compound 1 in DMSO-d6.
Fig. S3. Typical IR spectrum of polyamide 4b.
Fig. S4 (a) 1H NMR spectrum and (b) aromatic portion of the 1H-1H COSY spectrum of polyamide 5b in DMSO-d6.
Fig. S5 WAXD patterns of the polyamide films.
Fig. S6 TGA curves of polyamide 4d with a heating rate of 20 °C/min.
Fig. S7 TMA of polyamide 4b with a heating rate of 10 °C/min.
Fig. S8 UV-Vis absorption and PL spectra of the dilute solutions of compounds 1 and 2 and polyamide 4a in NMP (10⁻⁵ M). Photographs show the PL images of their solutions on exposure to a standard laboratory UV lamp (Excited at 365 nm).
Fig. S9 CV diagrams of the cast films of polyamides 4b and 4′b on the ITO-coated glass slide in 0.1 M TBAP/CH3CN at a scan rate of 50 mV/s.
Fig. S10 UV-Vis-NIR absorption spectra of the cast films of polyamides 4b and 4′b on the ITO-coated glass substrate in 0.1 M TBAP/CH3CN at their neutral, cation, and dication forms.
Fig. S1. IR spectra of dinitro compound 1 and target diamine monomer 2.

Fig. S2 (a) $^1$H NMR spectrum of dinitro compound 1 in DMSO-$d_6$. 
**Fig. S3.** Typical IR spectrum of polyamide 4b.

**Fig. S4** (a) $^1$H NMR spectrum and (b) aromatic portion of the $^1$H-$^1$H COSY spectrum of polyamide 5b in DMSO-$d_6$. 

~ 3 ~
Fig. S5 WAXD patterns of the polyamide films.

Fig. S6 TGA curves of polyamide 4d with a heating rate of 20 °C/min.
Fig. S7 TMA of polyamide 4b with a heating rate of 10 °C/min.

Fig. S8 UV-Vis absorption and PL spectra of the dilute solutions of compounds 1 and 2 and polyamide 4a in NMP (10⁻³ M). Photographs show the PL images of their solutions on exposure to a standard laboratory UV lamp (Excited at 365 nm).
Fig. S9 CV diagrams of the cast films of polyamides 4b and 4’b on the ITO-coated glass slide in 0.1 M TBAP/CH₃CN at a scan rate of 50 mV/s.

Fig. S10 UV-Vis-NIR absorption spectra of the cast films of polyamides 4b and 4’b on the ITO-coated glass substrate in 0.1 M TBAP/CH₃CN at their neutral, cation, and dication forms.