Electronic Supplementary Material (ESI) for Polymer Chemistry

Supporting Information

Thermally cross-linkable hole transporting polymer synthesized by living anionic polymerization for effective electron blocking and reduction of exciton quenching in multilayer polymer light emitting diodes

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TGA of d-P**BAB**

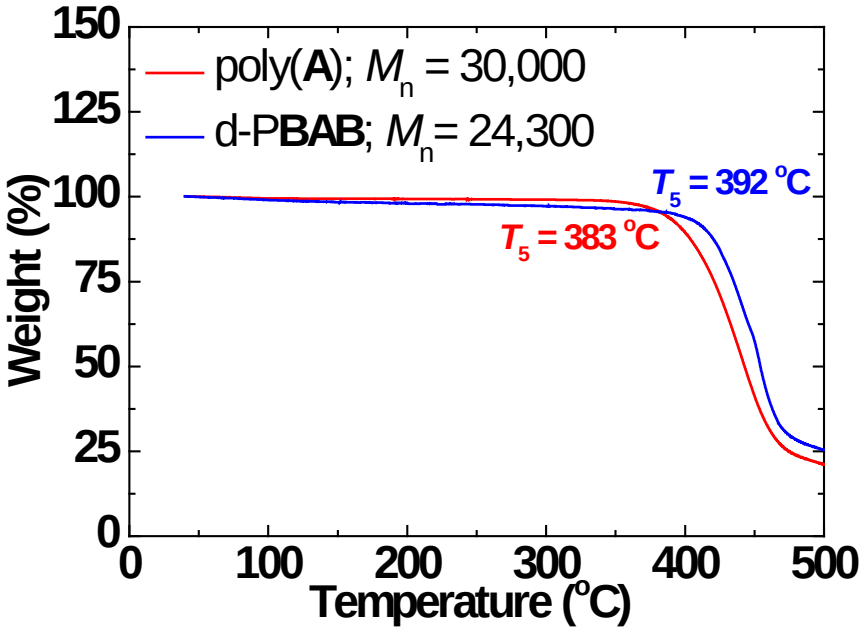

Fig. S1 Thermogravimetric analysis (TGA) thermograms of poly(**A**) (M_n = 30,000) and d-P**BAB** (M_n = 24,300) under nitrogen with a heating rate of 10 °C/min. The thermal stability of d-P**BAB** was compared with that of poly(**A**) without a cross-linker using TGA. Although the molecular weight of d-P**BAB** was lower than that of poly(**A**), d-P**BAB** (5 wt% loss at 392 °C) exhibited a higher thermal stability than poly(**A**) (5 wt% loss at 383 °C) due to cross-linking.[1,2]

TCSPC of d-P**BAB** and cross-linked d-P**BAB**

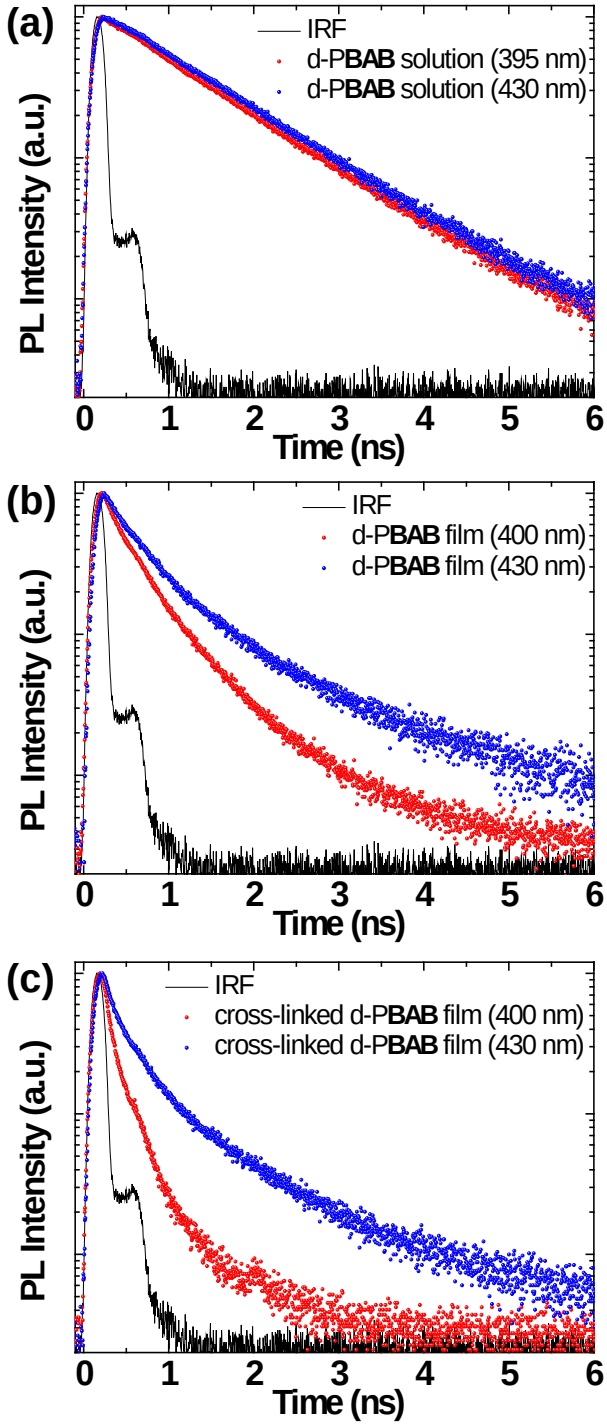

Fig. S2 PL decay profiles of (a) d-P**BAB** solution, d-P**BAB** film (b) before and (c) after thermal cross-linking at 240 °C for 50 min.

Table S1 Exciton lifetimes (τ_{avr}) of d-P**BAB** solution, d-P**BAB** film before and after thermal cross-linking at 240 °C for 50 min.[a]

samples	monitored wavelength, nm	τ_1 (f_1), ns	τ_2 (f_2), ns	χ^2	τ_{avr}, ns
d-P**BAB** solution	395	1.13 (0.84)	0.39 (0.16)	1.03	1.01
d-P**BAB** solution	430	1.16 (0.89)	0.61 (0.11)	1.05	1.10
d-P**BAB** film	400	0.72 (0.23)	0.23 (0.77)	1.24	0.34
d-P**BAB** film	430	1.46 (0.18)	0.35 (0.82)	1.22	0.55
cross-linked d-P**BAB** film	400	0.58 (0.05)	0.11 (0.95)	1.37	0.13
cross-linked d-P**BAB** film	430	1.16 (0.15)	0.21 (0.85)	1.54	0.35

[a] The PL decay curves were fitted with a biexponential function to calculate the lifetime of d-P**BAB**. The amplitude weighted average exciton lifetime (τ_{avr}) was $f_1\tau_1 + f_2\tau_2$, where f_1 and f_2 are fractional intensities and τ_1 and τ_2 are lifetimes.

CV of cross-linked d-P**BAB**

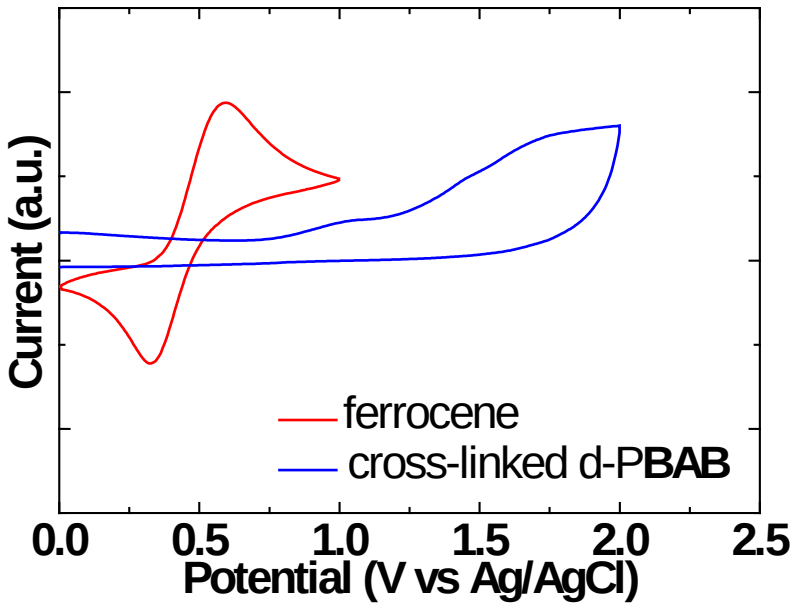

Fig. S3 Cyclic voltammograms of ferrocene and d-P**BAB** film cross-linked at 240 °C for 50 min.

HOMO energy level of cross-linked d-P**BAB** was calculated from the onset oxidation potential (E_{ox}(onset)) based on the reference energy level of ferrocene (4.80 eV) below vacuum level (Figure S4): E_{HOMO} (eV) = –(E_{ox}(onset) – $E_{1/2}$(ferrocene) + 4.80 eV). LUMO energy level was determined by the difference between the HOMO energy level and the optical band gap (E_g): E_{LUMO} (eV) = E_{HOMO} + E_g.[3-5] The $E_{1/2}$ was measured to be 0.456 V vs. Ag/AgCl electrode in acetonitrile.

References

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