Supporting Information

Effect of carbon hybridization in 9H-fluorene unit on the photovoltaic properties of different fluorene based conjugated polymers

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NMR spectra of intermediates

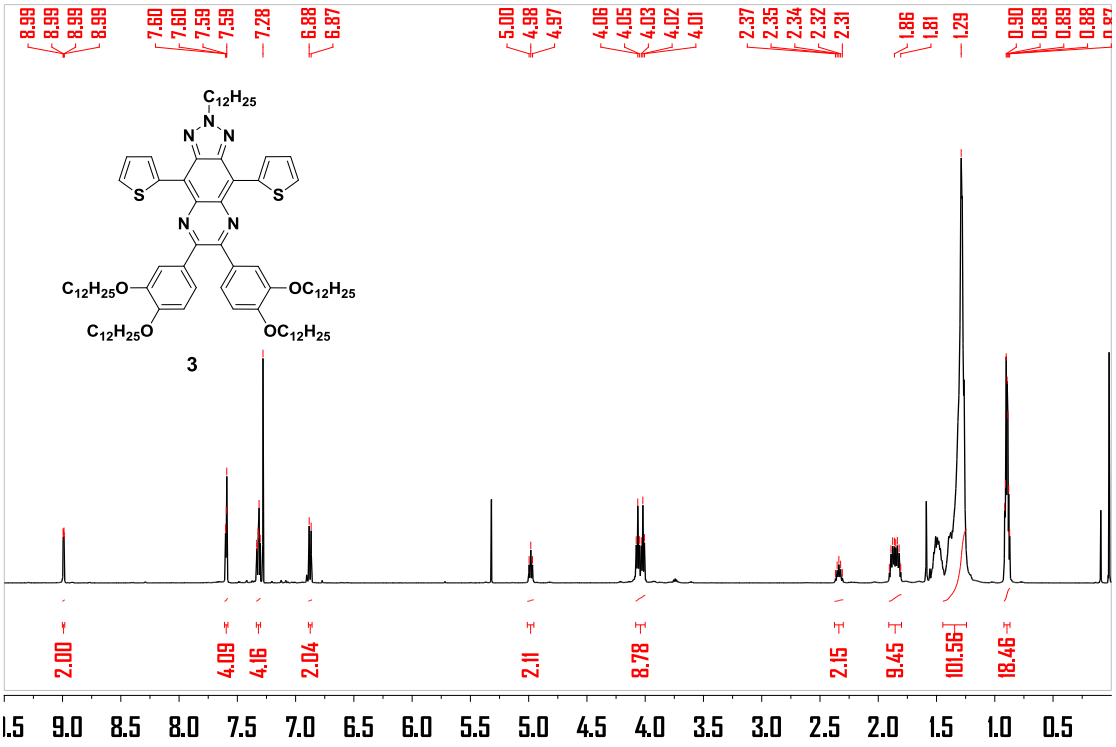

Fig. S1. ^{1}H NMR spectrum of compound **3** (500 MHz, in $CDCl_3$)

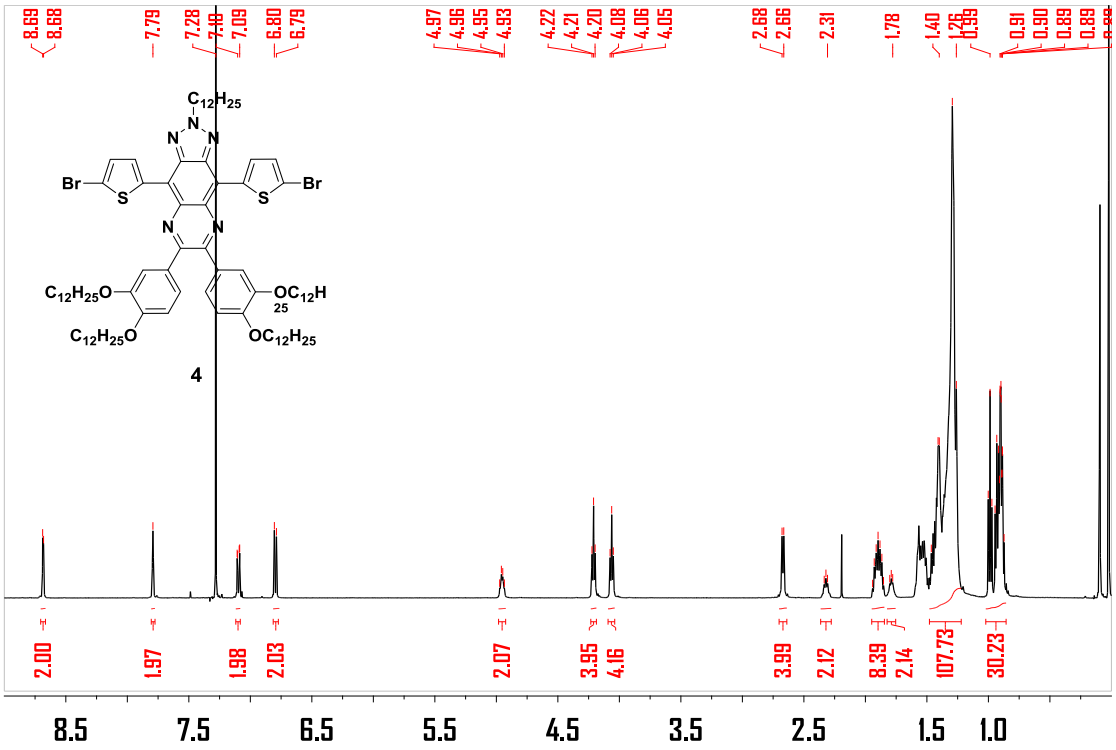

Fig. S2. [1] H NMR spectrum of compound **4** (500 MHz, in $CDCl_3$)

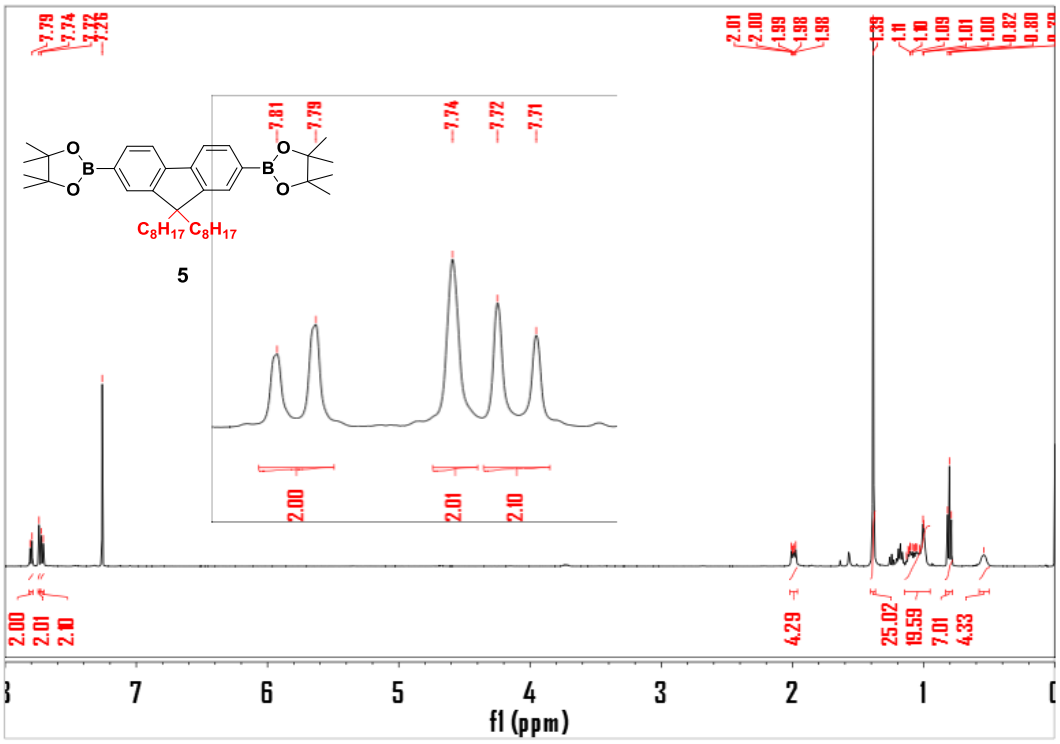

Fig. S3. [1] H NMR spectrum of compound **5** (500 MHz, in $CDCl_3$)

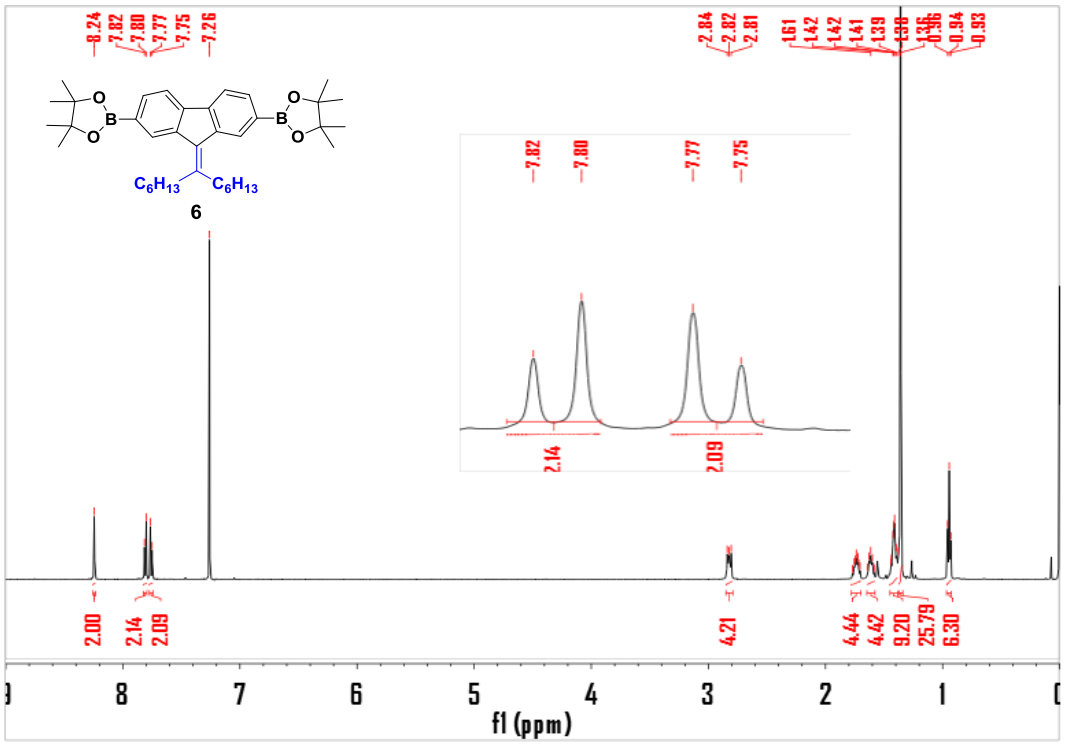

Fig. S4. [1] H NMR spectrum of compound **6** (500 MHz, in $CDCl_3$)

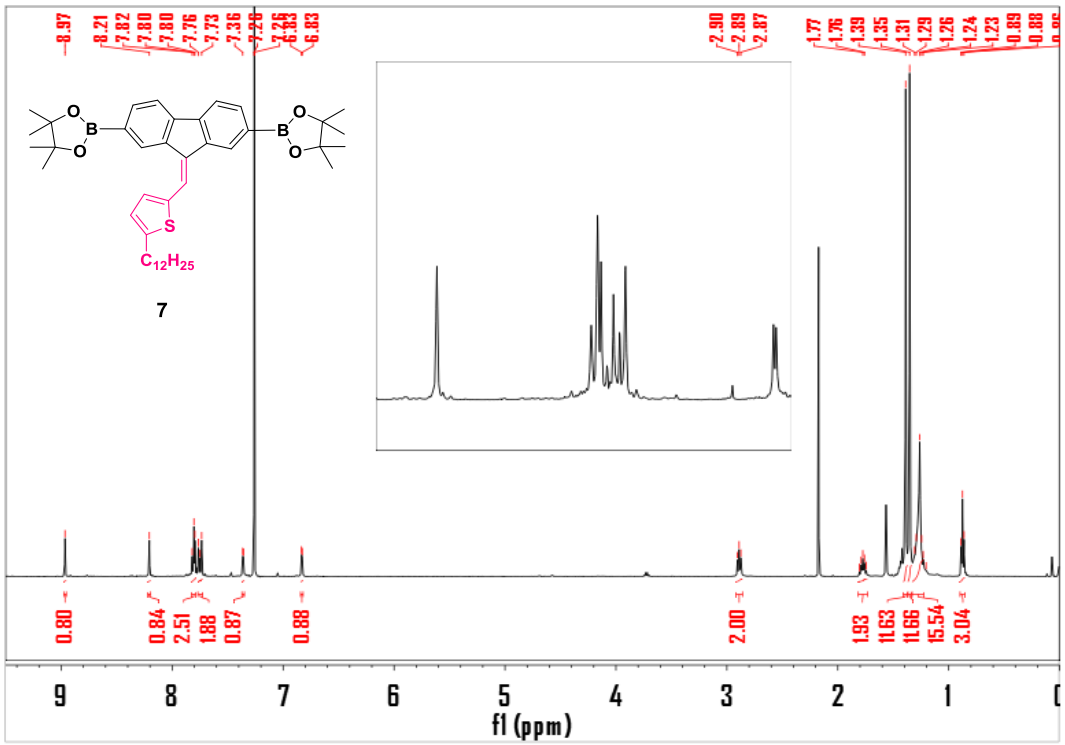

Fig. S5. [1] H NMR spectrum of compound **7** (500 MHz, in $CDCl_3$)

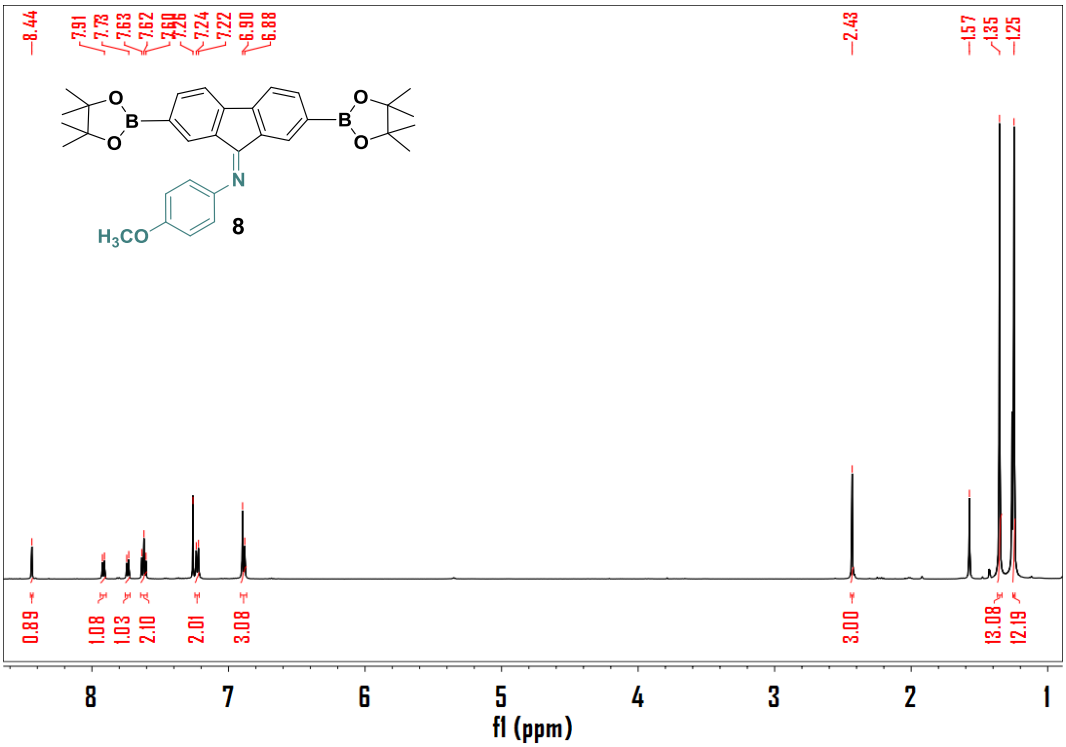

Fig. S6. [1] H NMR spectrum of compound **8** (500 MHz, in $CDCl_3$)

Standard Suzuki cross-coupling reaction:

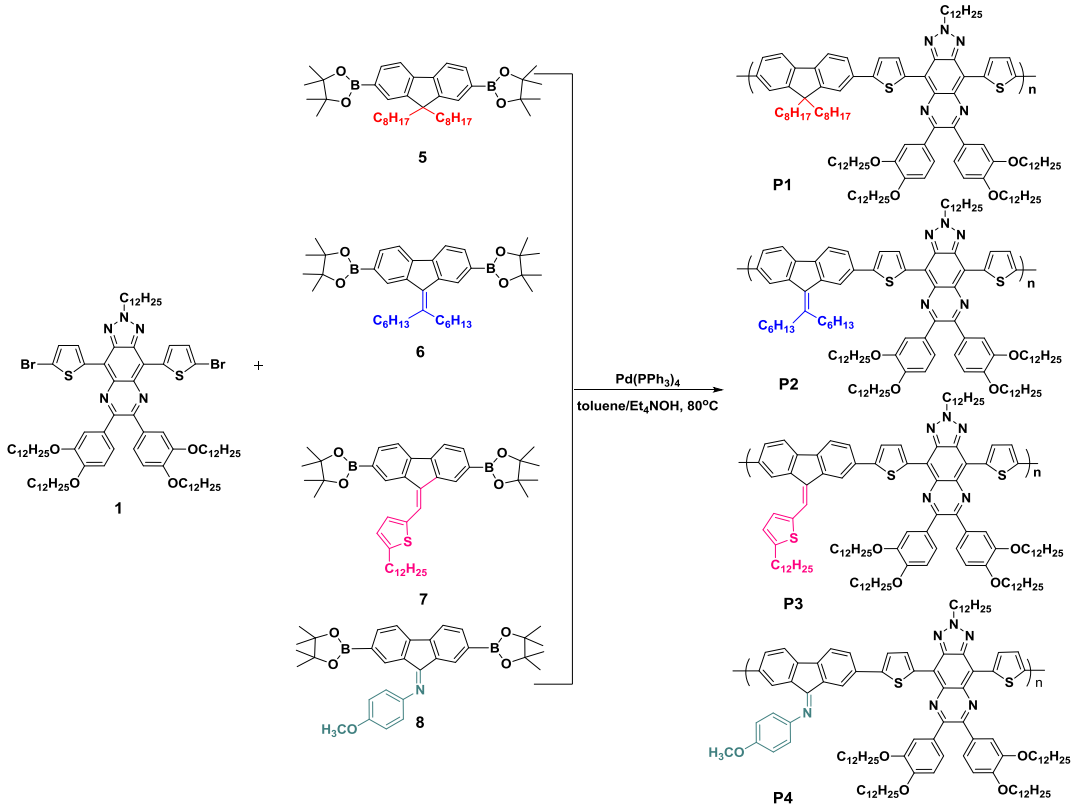

Fig. S7. Synthetic route for polymers.

Typically, in a 10 ml Schlenk tube, compound **4** (1 eq), compound **5** or **6** or **7** or **8** (1 eq) and $Pd(PPh_3)_4$ (0.05 eq) were dissolved in degassed toluene (4 ml)/Et_4NOH (2 ml). The

mixture was refluxed with vigorous stirring for 48 hours under nitrogen atmosphere. After cooling to room temperature, the mixture was poured into methanol. The precipitated material was collected and was Soxhlet-extracted in order with methanol, acetone and then with chloroform. The chloroform solution was concentrated to a small volume to precipitate the polymer out of methanol. Finally, the polymer was collected by filtration and dried under vacuum at 40°C overnight with yield ranging from 70% to 88%.

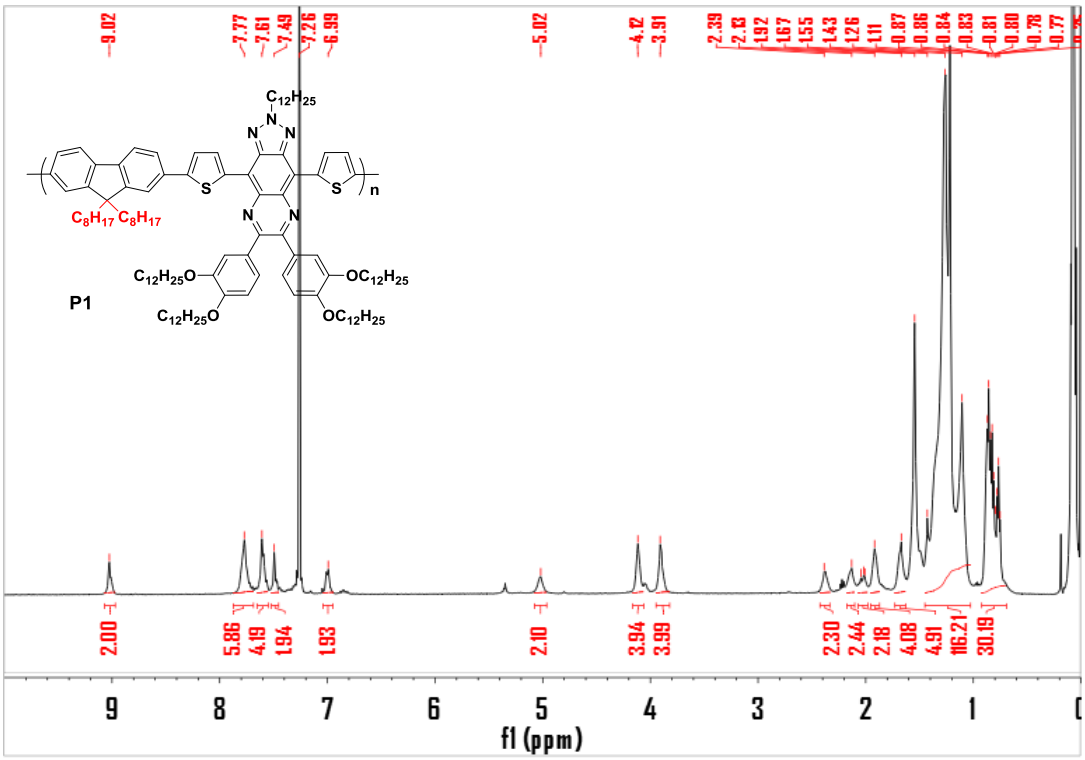

Fig. S8. ^{1}H NMR spectrum of **P1** (500 MHz, in $CDCl_3$)

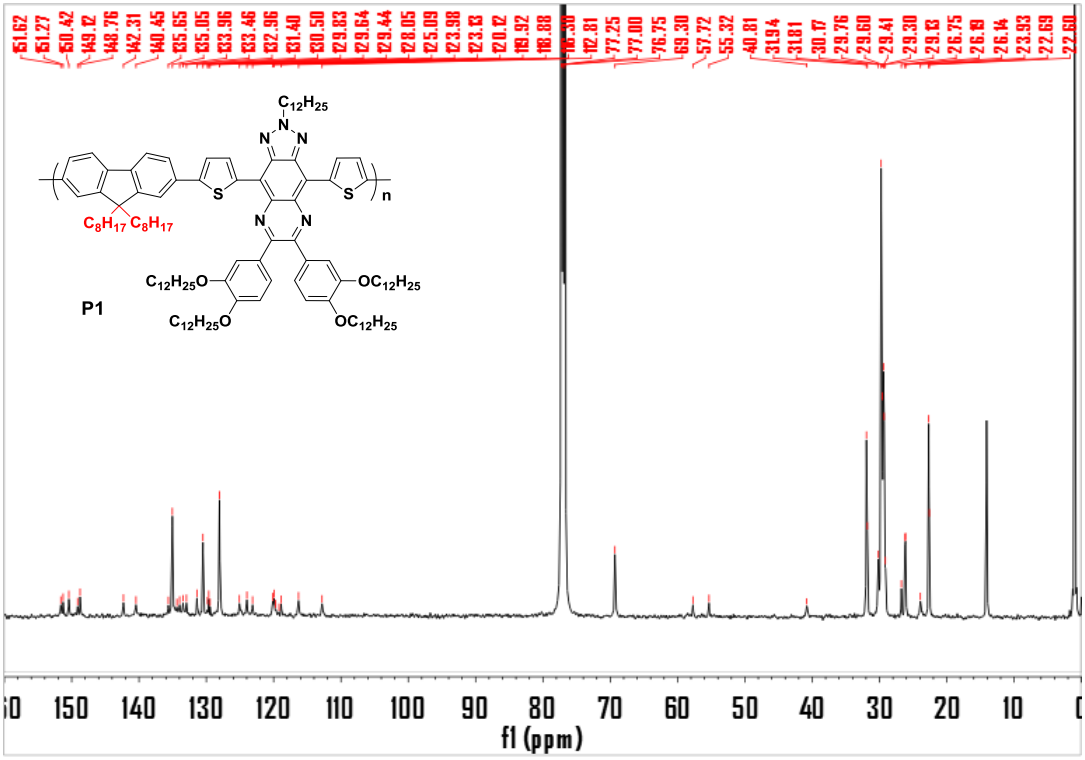

Fig. S9. ^{13}C NMR spectrum of **P1** (125 MHz, in $CDCl_3$)

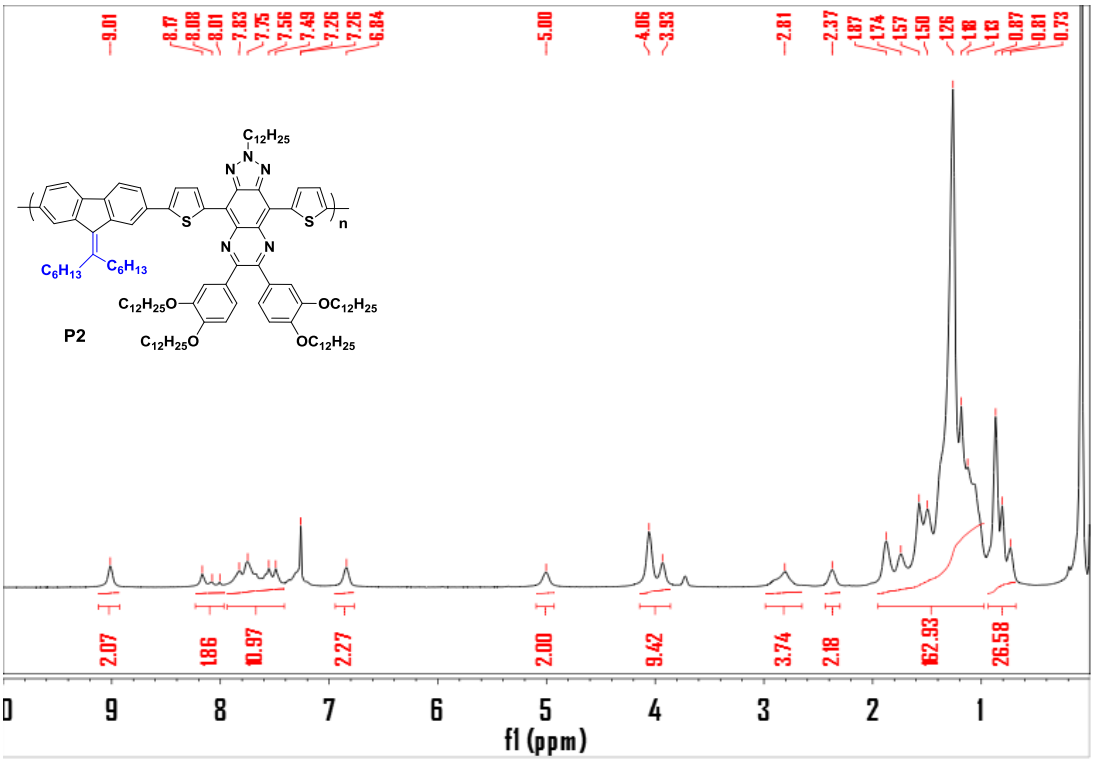

Fig. S10. ^{1}H NMR spectrum of **P2** (500 MHz, in $CDCl_3$)

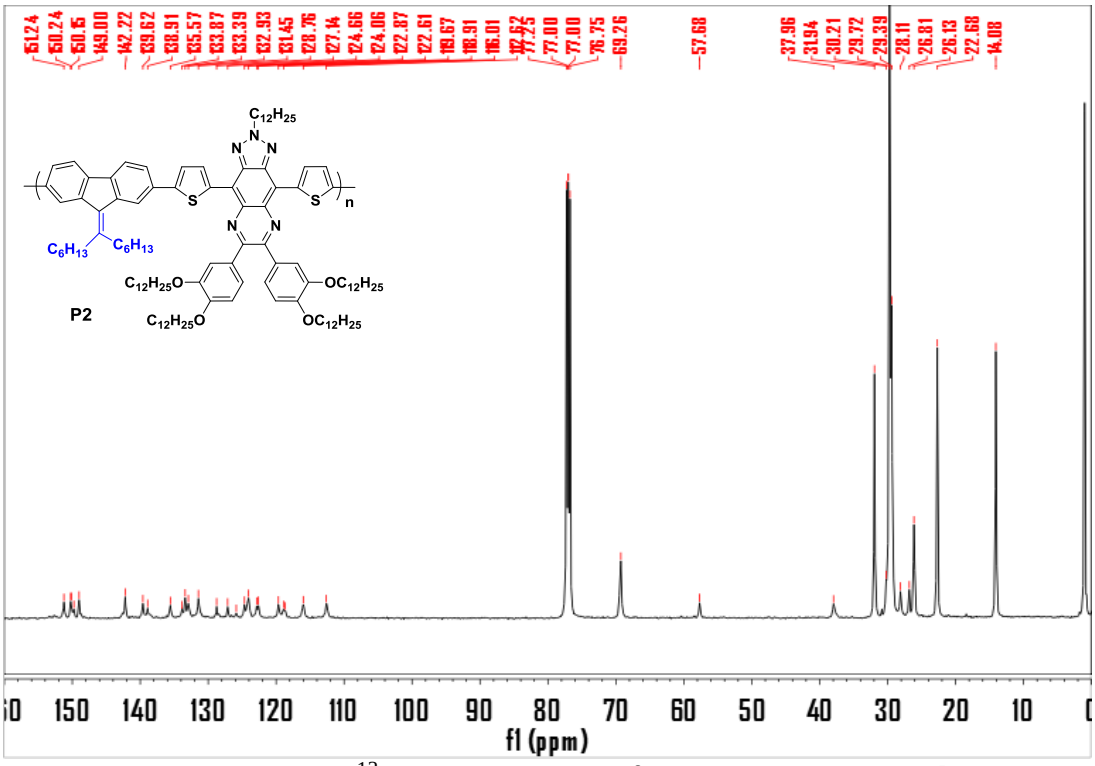

Fig. 11. ^{13}C NMR spectrum of **P2** (125 MHz, in $CDCl_3$)

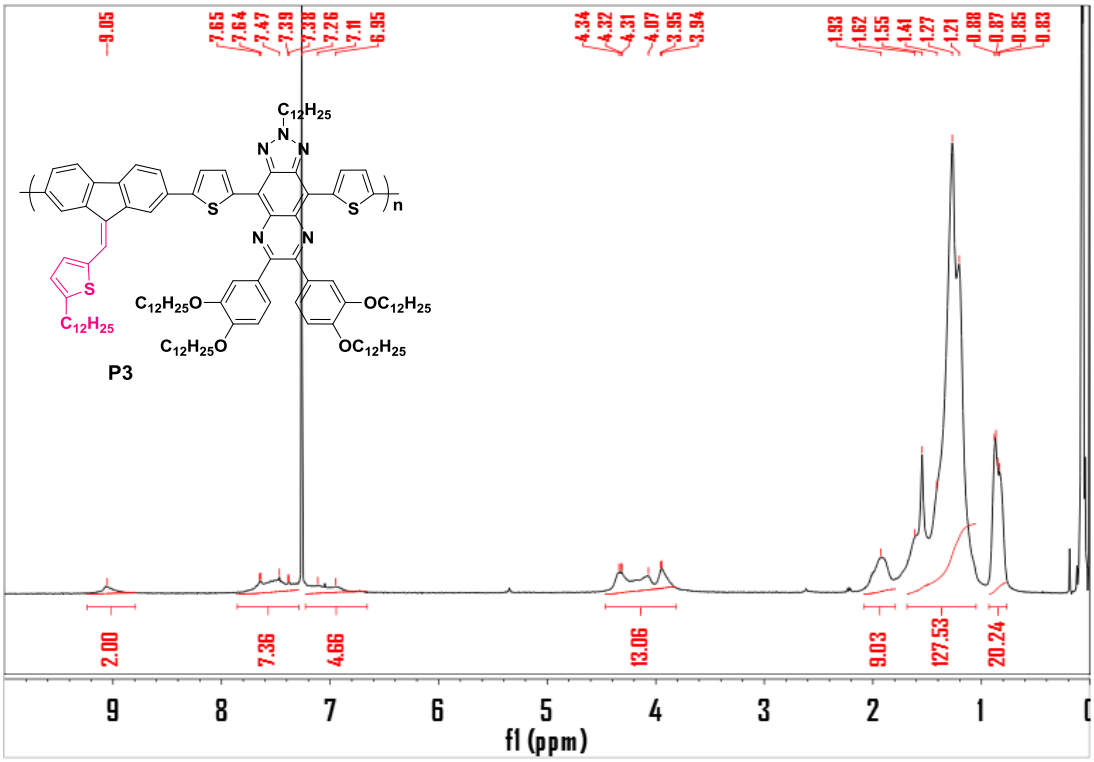

Fig. S12. ^{1}H NMR spectrum of **P3** (500 MHz, in $CDCl_3$)

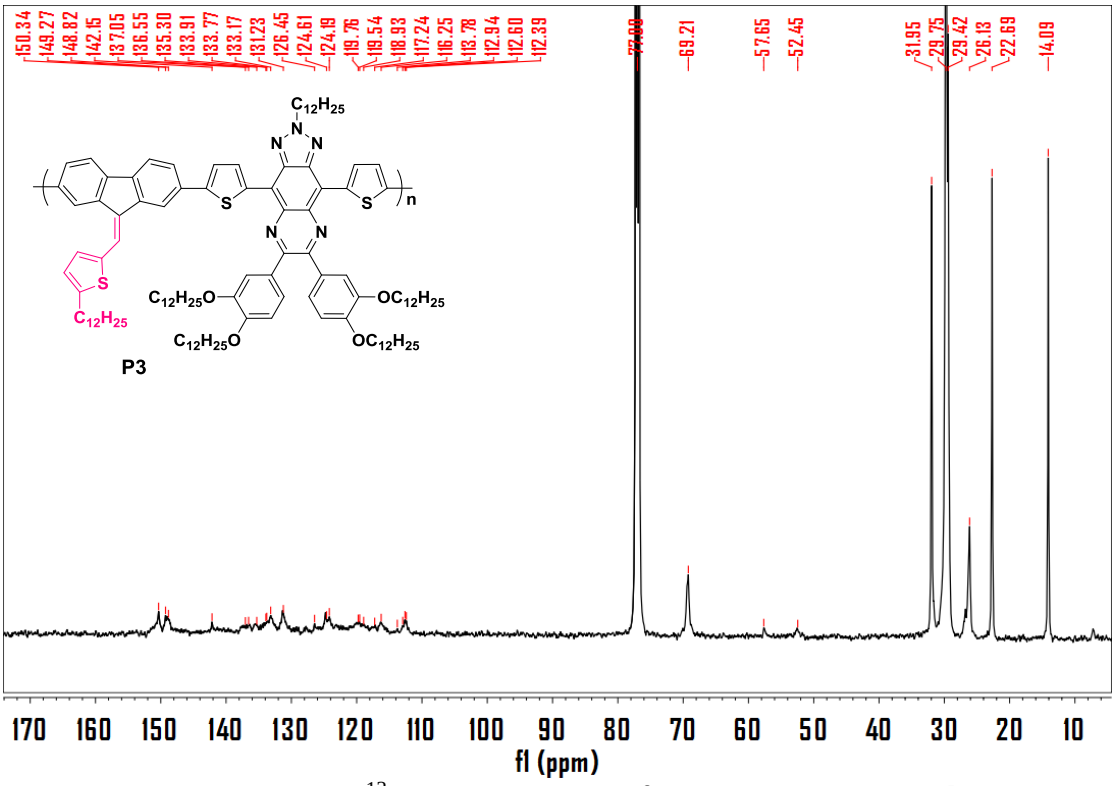

Fig. S13. ^{13}C NMR spectrum of **P3** (125 MHz, in $CDCl_3$)

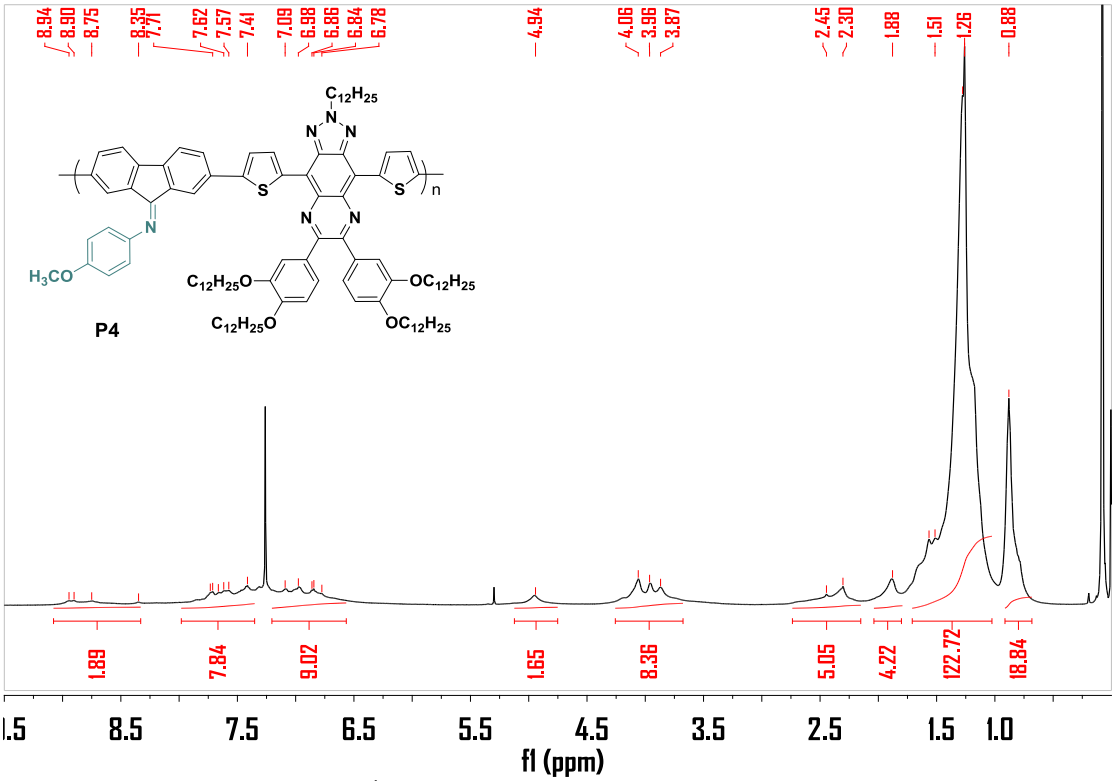

Fig. S14. ^{1}H NMR spectrum of **P4** (500 MHz, in $CDCl_3$)

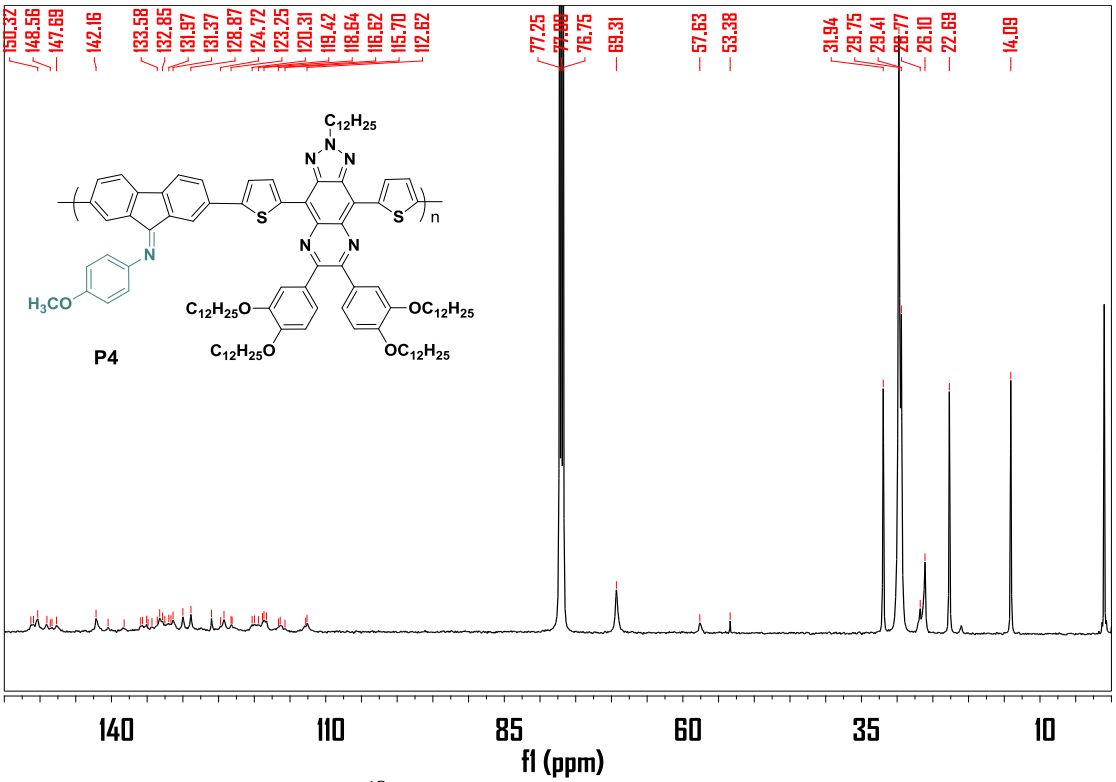

Fig. S15. ^{13}C NMR spectrum of **P4** (125 MHz, in $CDCl_3$)