Supplementary Information

2D π-conjugated benzo[1,2-*b*:4,5-*b*']dithiophene- and quinoxaline-based copolymers for photovoltaic applications

Margherita Bolognesi,[a] *Desta Gedefaw,*[b] *Dongfeng Dang,*[b] *Patrik Henriksson,*[b] *Wenliu Zhuang,*[b] *Marta Tessarolo,*[c] *Ergang Wang,*[b] *Michele Muccini,*[c] *Mirko Seri*[d] *and Mats R. Andersson**[b]

[a] *Laboratory MIST E-R, Via P. Gobetti, 101, 40129, Bologna, Italy. Tel: 39 051 6399173; E-mail: m.bolognesi@bo.ismn.cnr.it.*

[b] *Polymer Chemistry, Department of Chemical and Biological Engineering, Chalmers University of Technology, SE-412 96, Göteborg, Sweden. (D.G.) Tel: 46 031 7723410; E-mail: antenehe@chalmers.se; (M.A.) Tel: 46 031 7723401; E-mail: mats.andersson@chalmers.se;*

[c] *Consiglio Nazionale delle Ricerche (CNR), Istituto per lo Studio dei Materiali Nanostrutturati (ISMN), Via P. Gobetti, 101, 40129, Bologna, Italy.*

[d] *Consiglio Nazionale delle Ricerche (CNR), Istituto per la Sintesi Organica e la Fotoreattività (ISOF), Via P. Gobetti, 101, 40129, Bologna, Italy.*

Square wave voltammetry

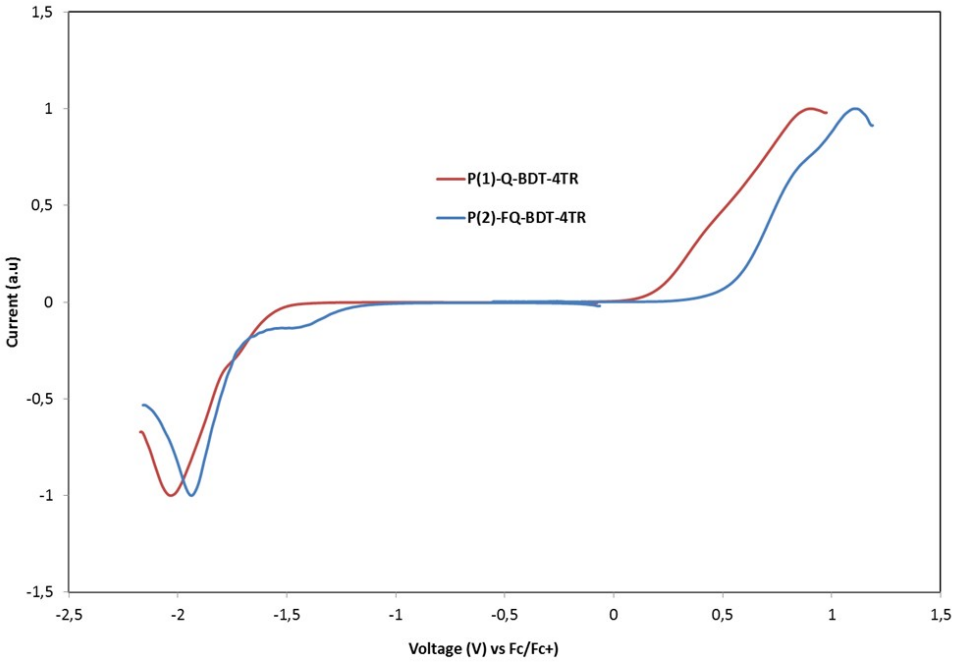

Figure S1. Square wave voltammograms of the copolymers **P(1)-Q-BDT-4TR** and **P(2)-FQ-BDT-4TR** as solid films.

NMR spectra

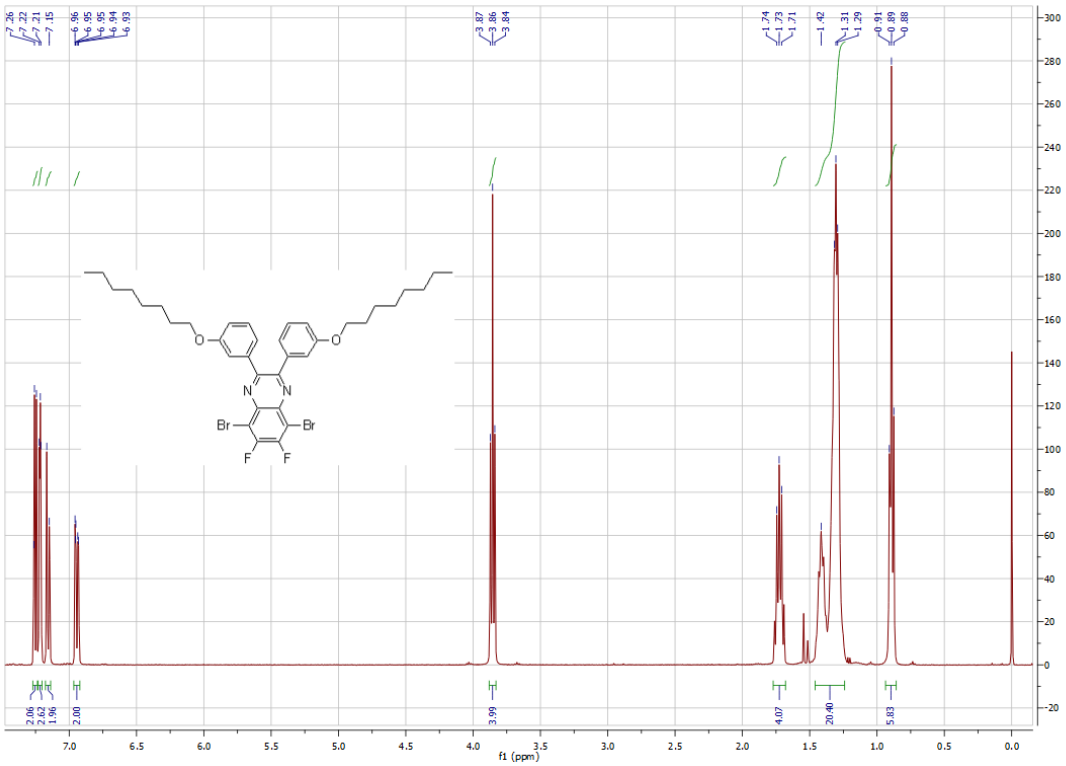

Figure S2. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **1**.

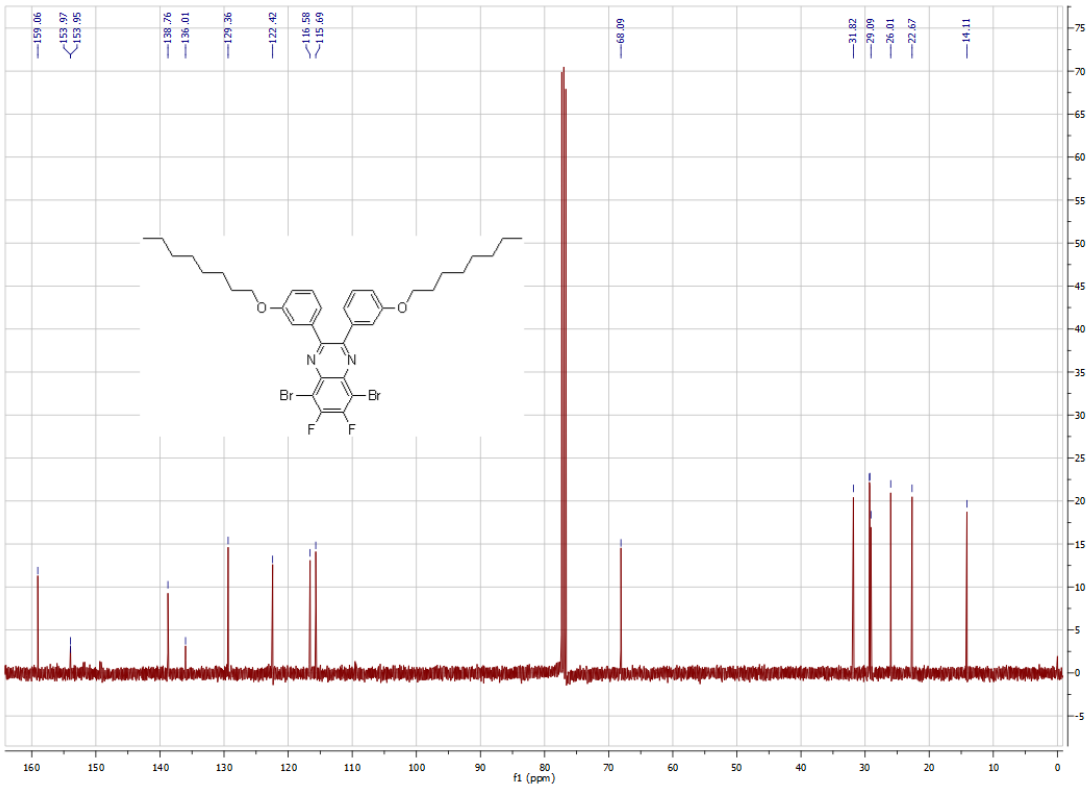

Figure S3. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **1**.

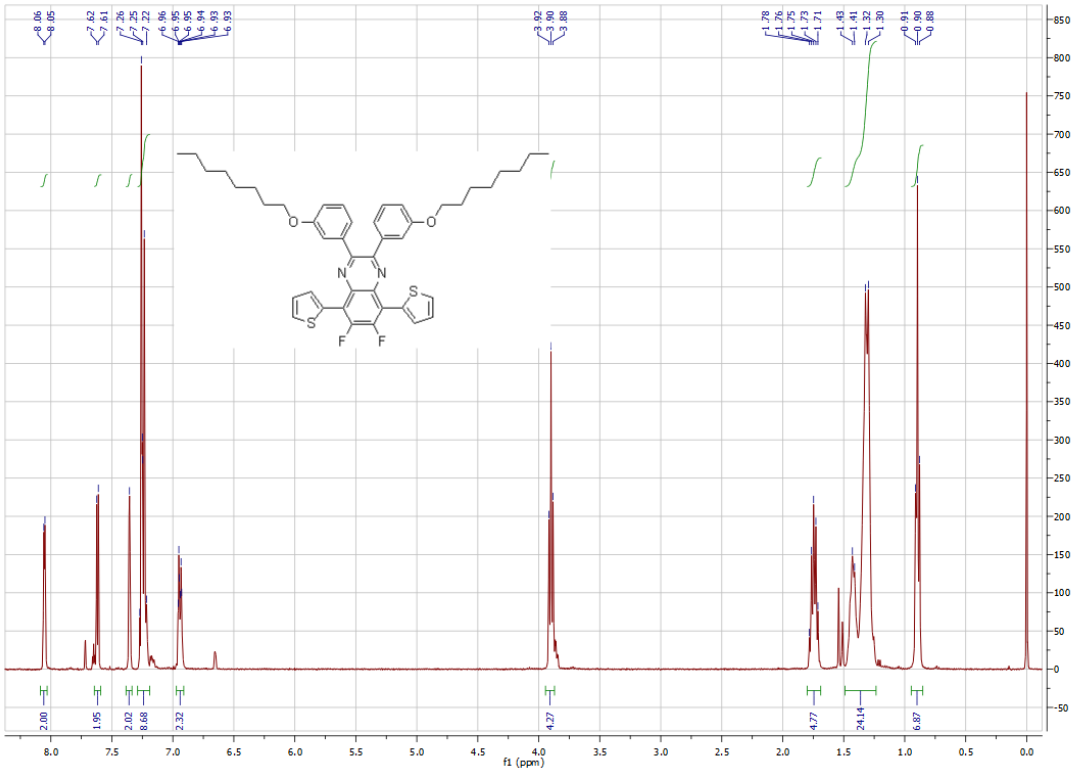

Figure S4. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **2**.

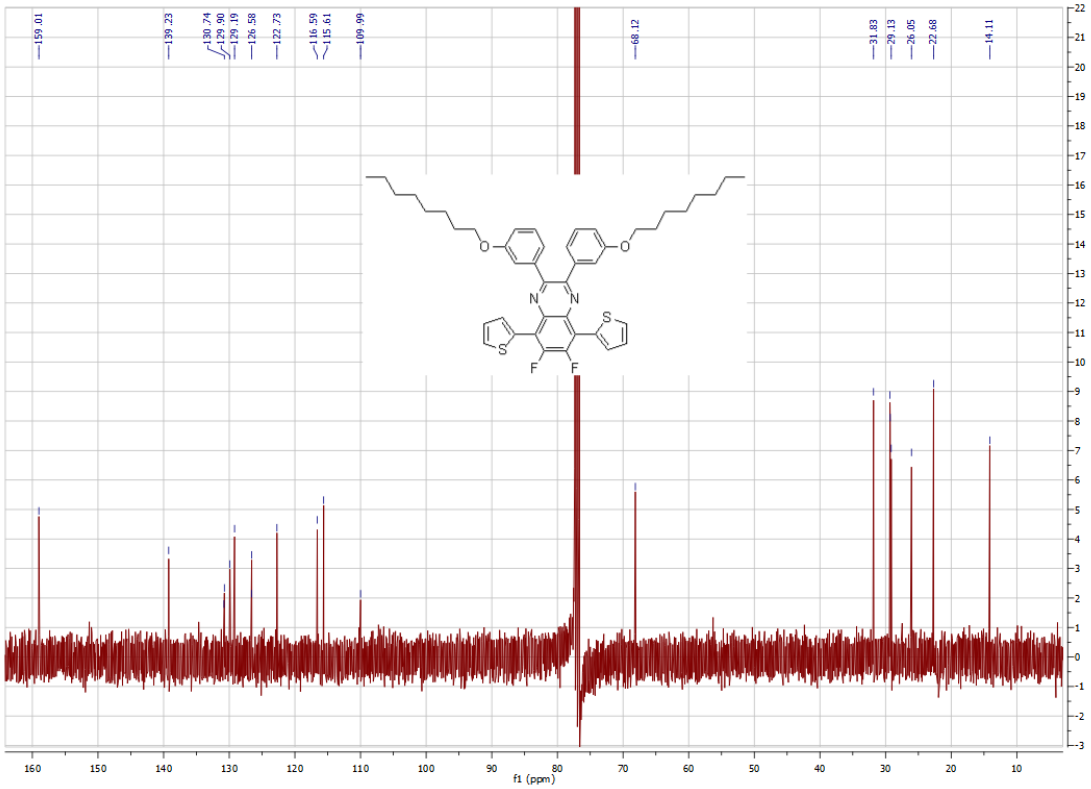

Figure S5. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **2**.

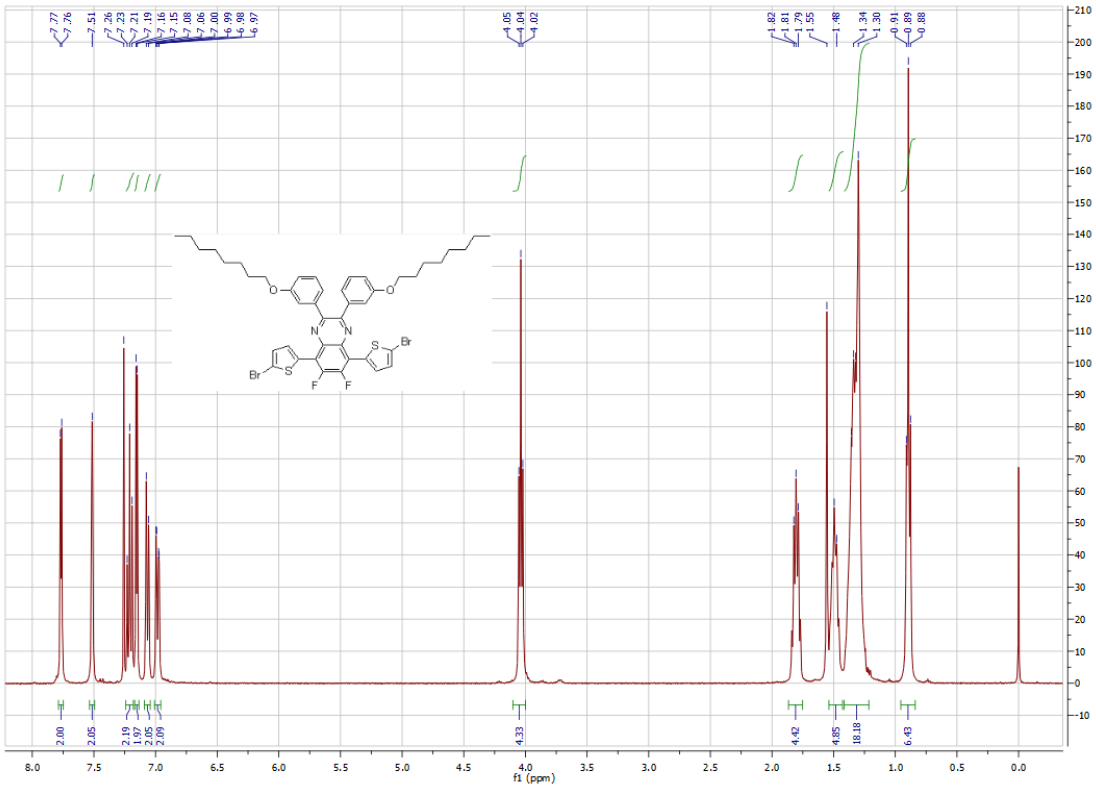

Figure S6. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **4**.

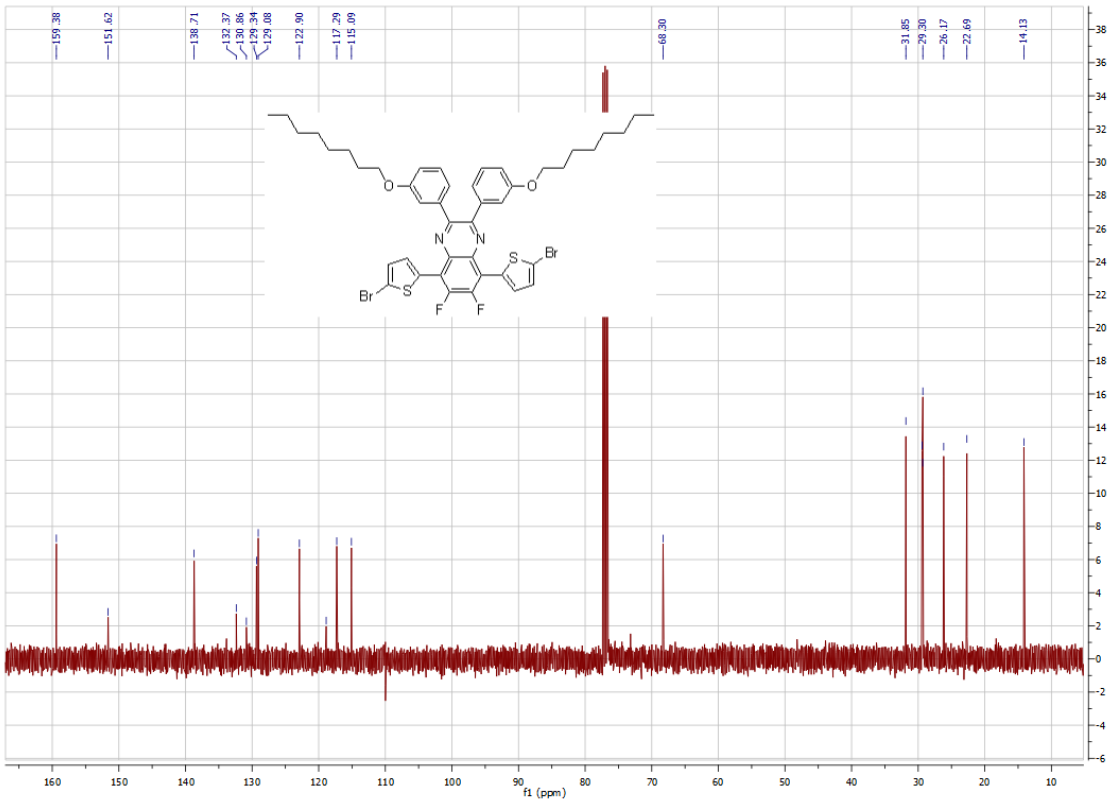

Figure S7. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **3**.

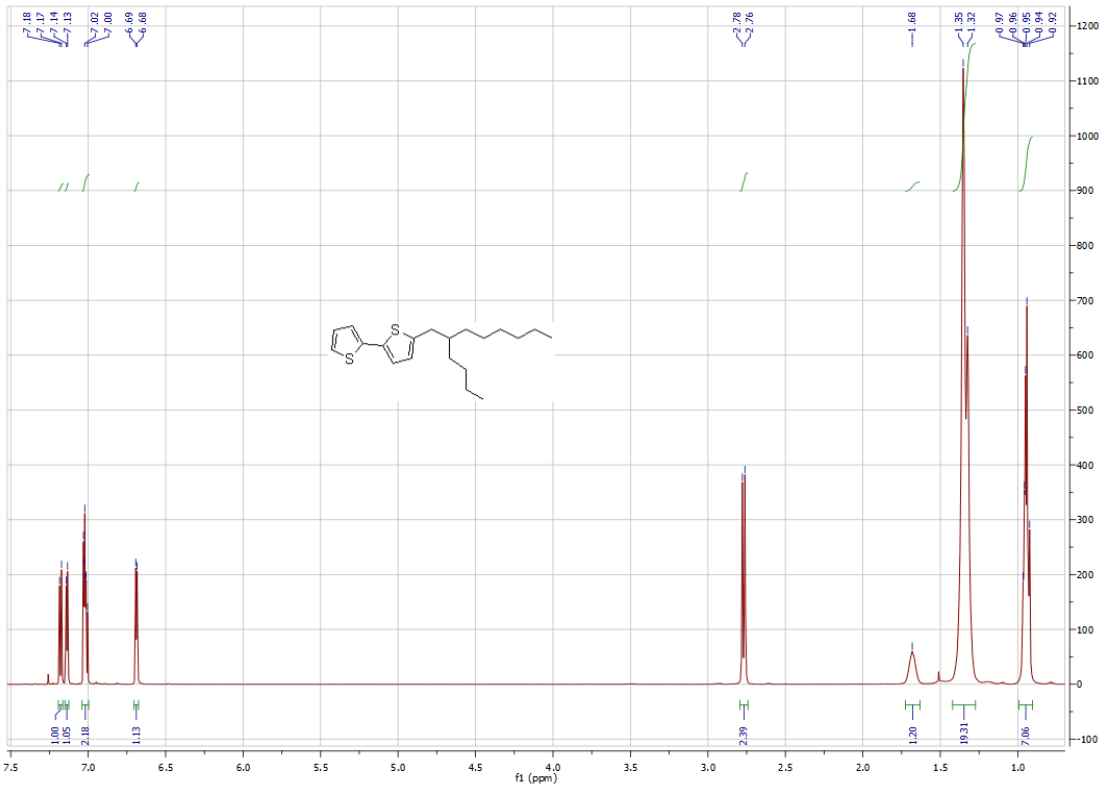

Figure S8. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **4**.

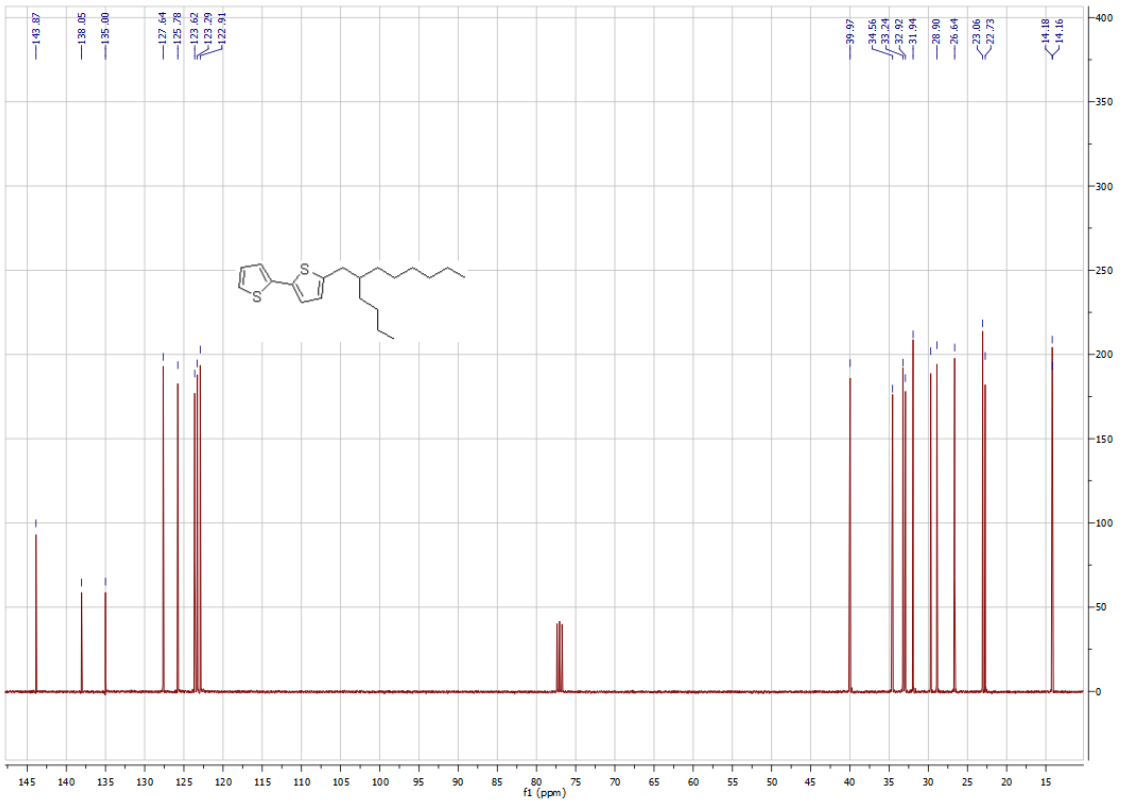

Figure S9. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **4**.

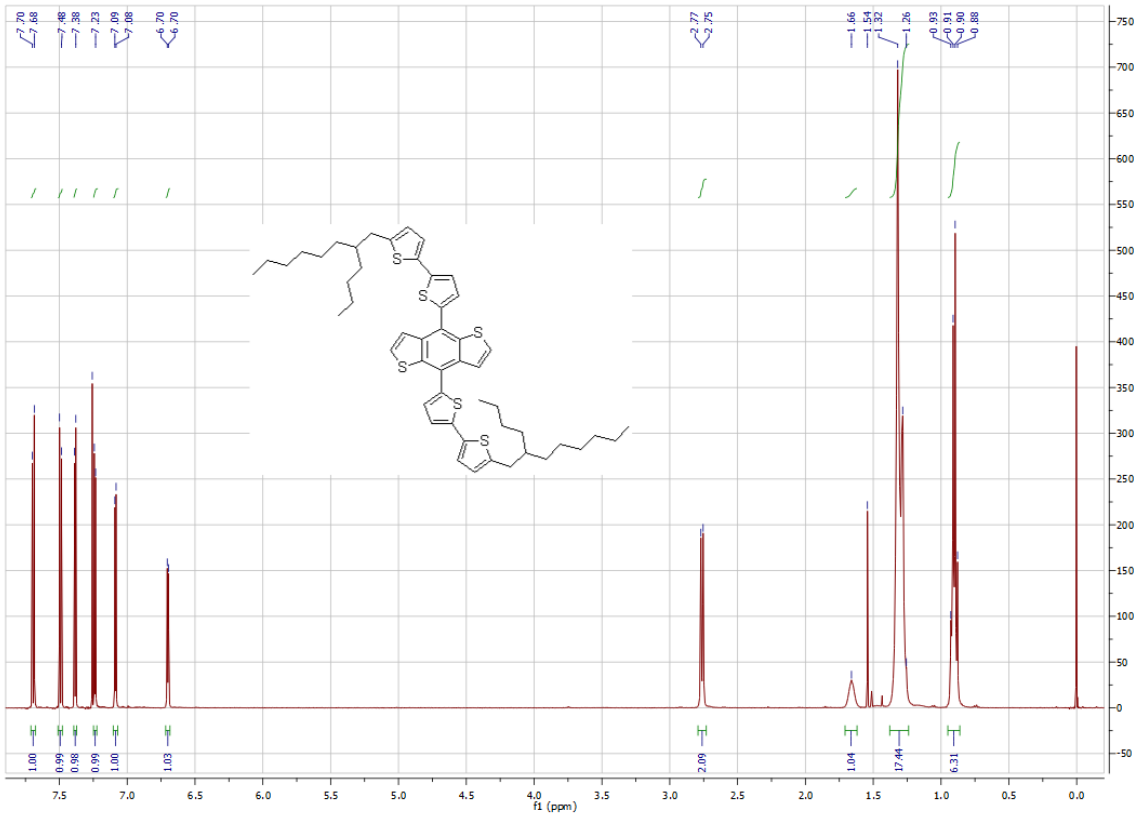

Figure S10. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **6**.

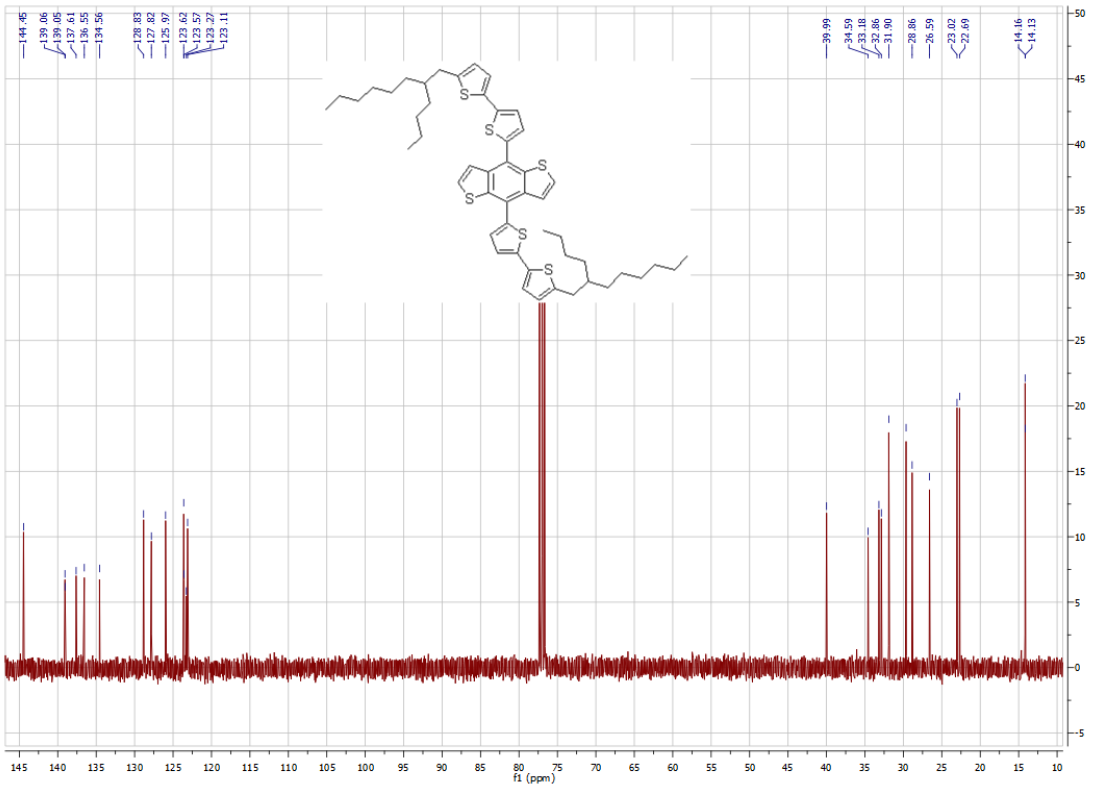

Figure S11. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **5**.

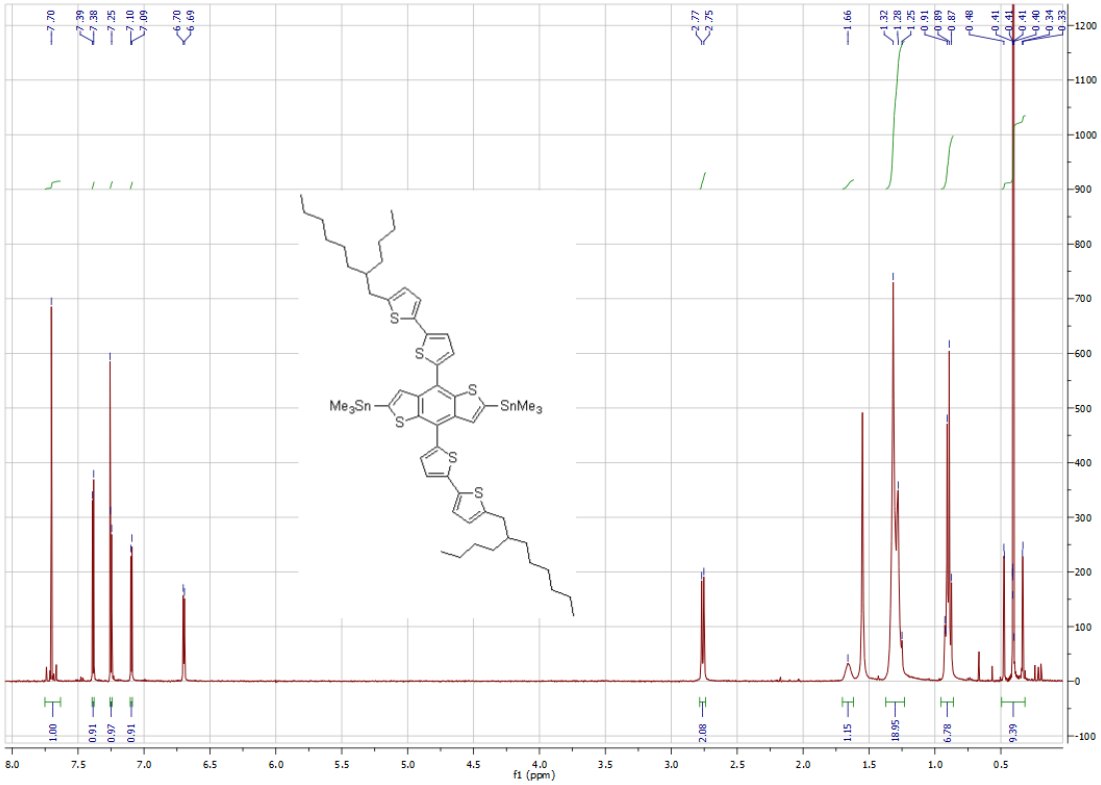

Figure S12. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **6**.

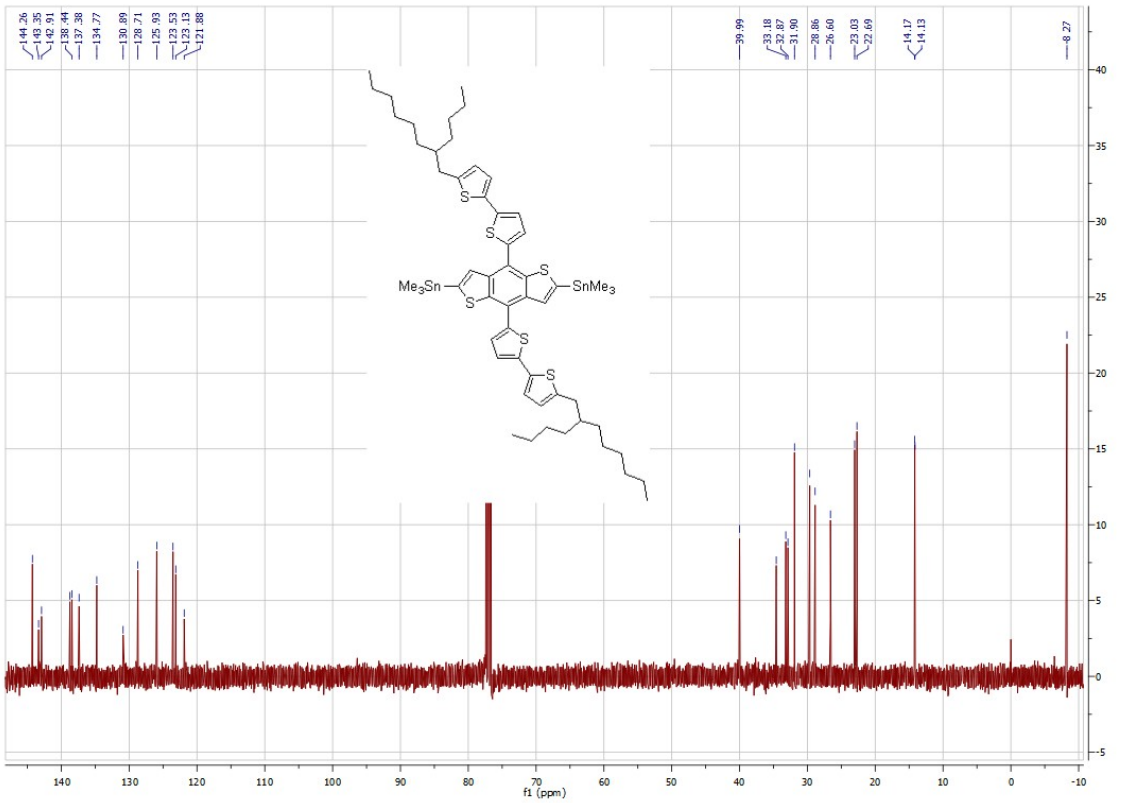

Figure S13. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **6**.

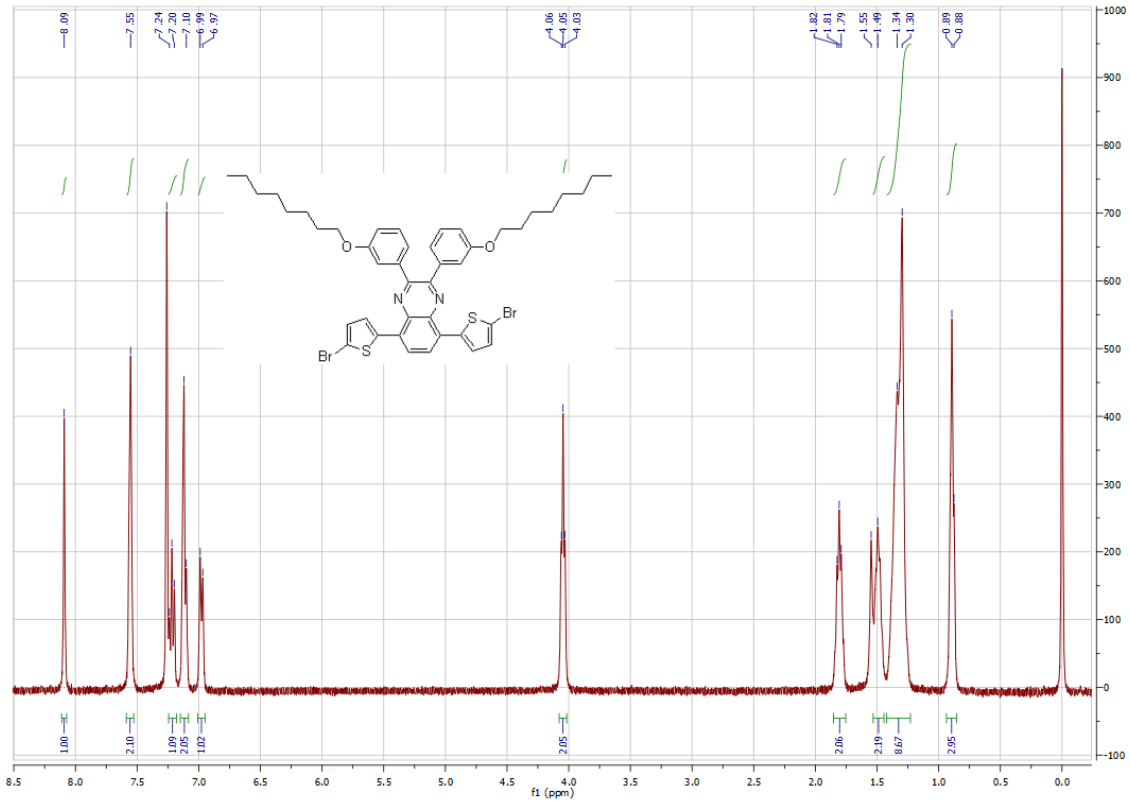

Figure S14. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of compound **8**.

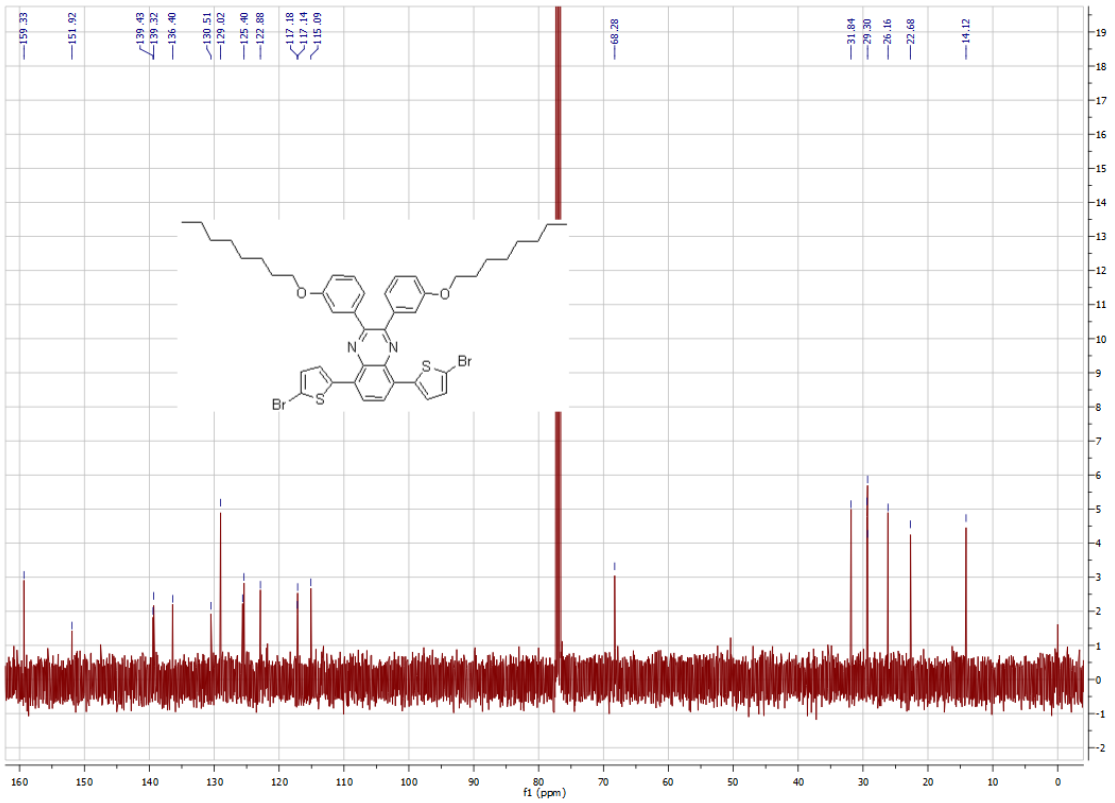

Figure S15. ^{13}C NMR spectrum (100 MHz, $CDCl_3$) of compound **7**.

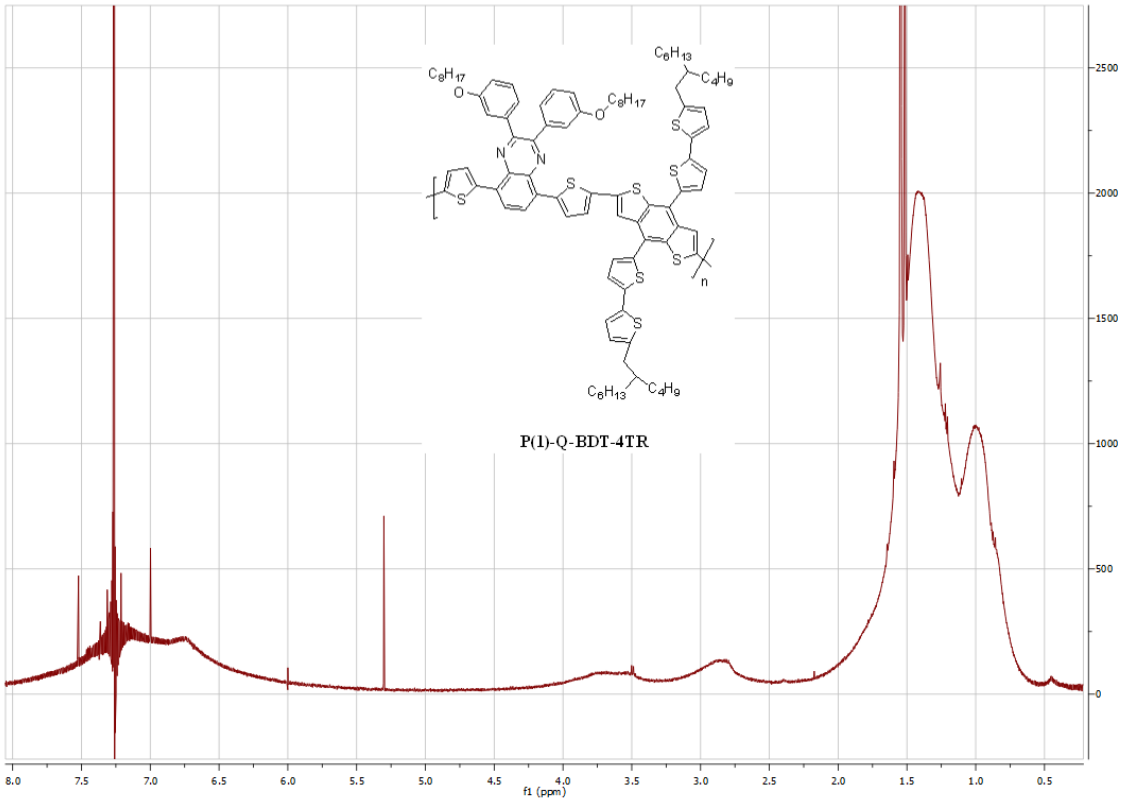

Figure S16. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of polymer **P(1)**.

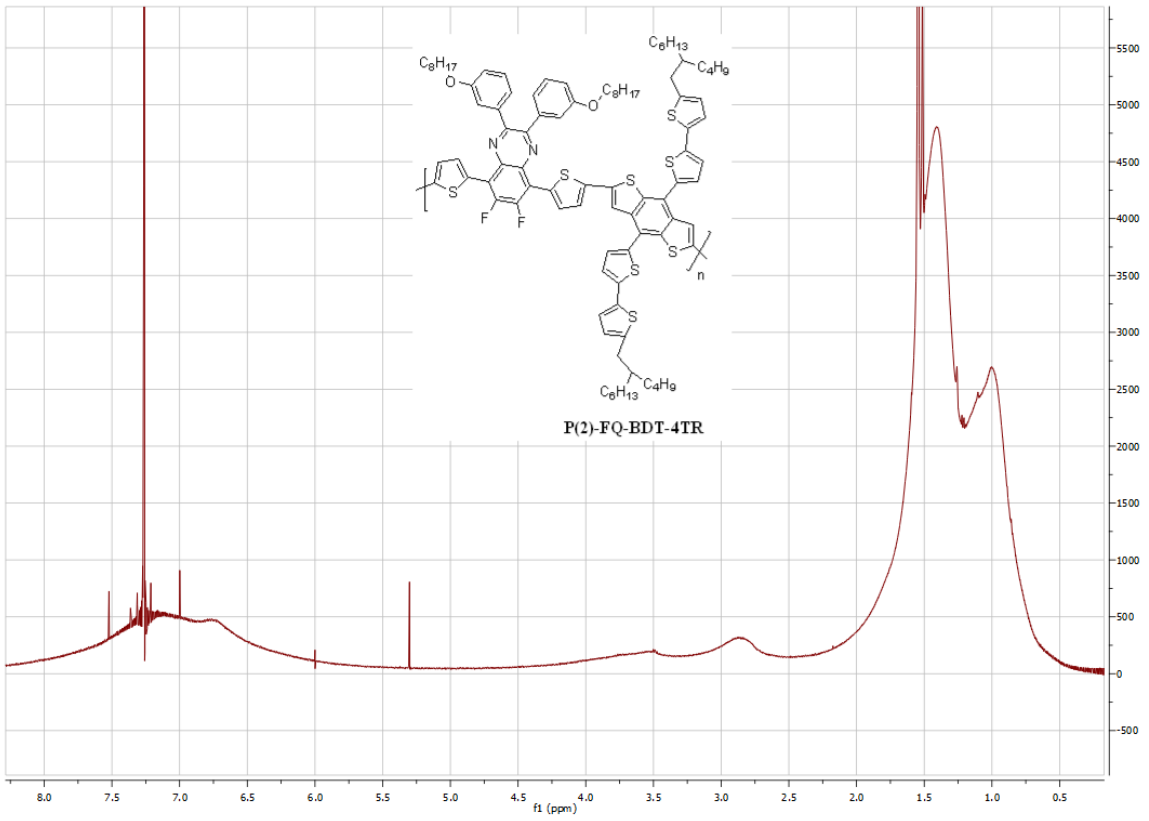

Figure S17. ^{1}H NMR spectrum (400 MHz, $CDCl_3$) of polymer **P(2)**.

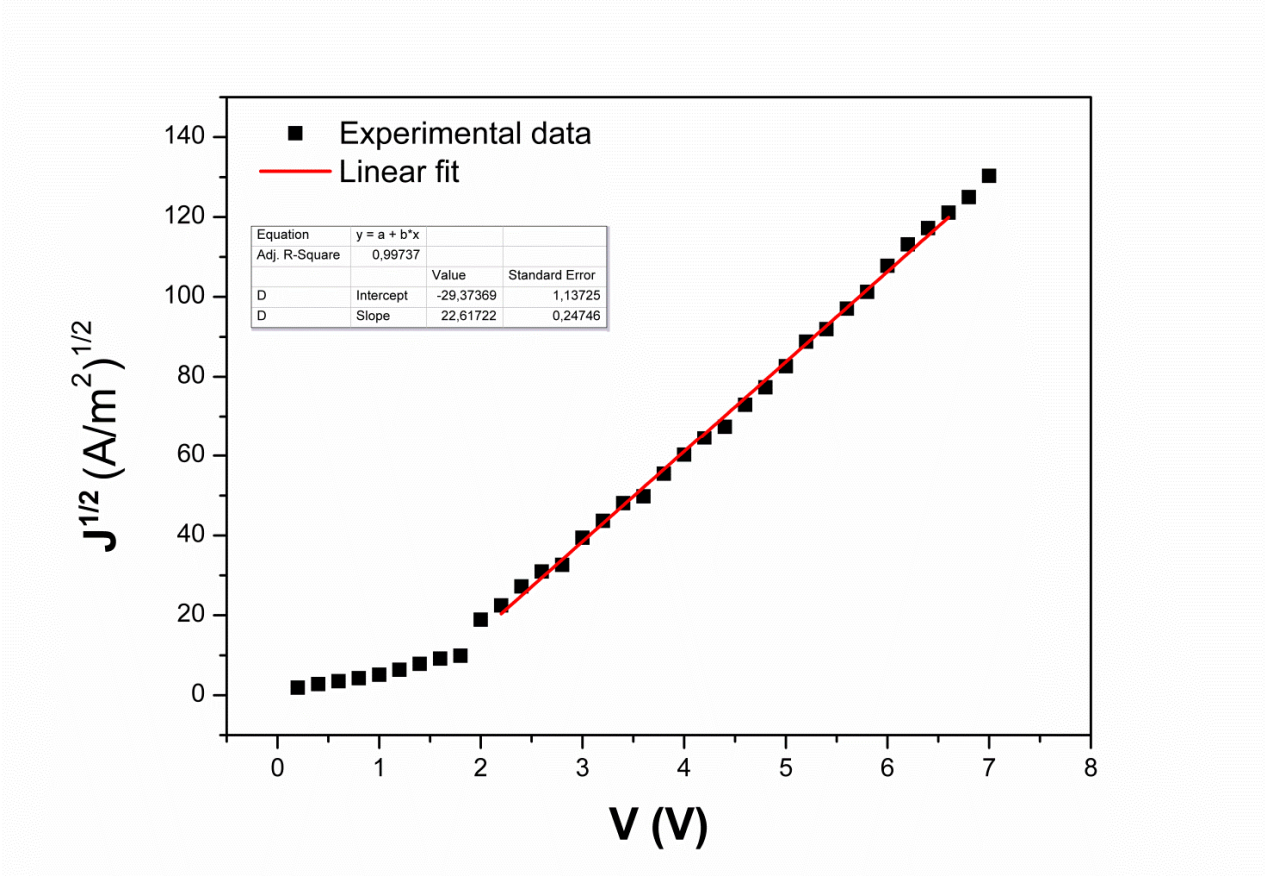

Figure S18. Dark $J^{1/2}$-V curves of the hole-only device based on the optimized **P(1)**:$PC_{61}BM$ blend.

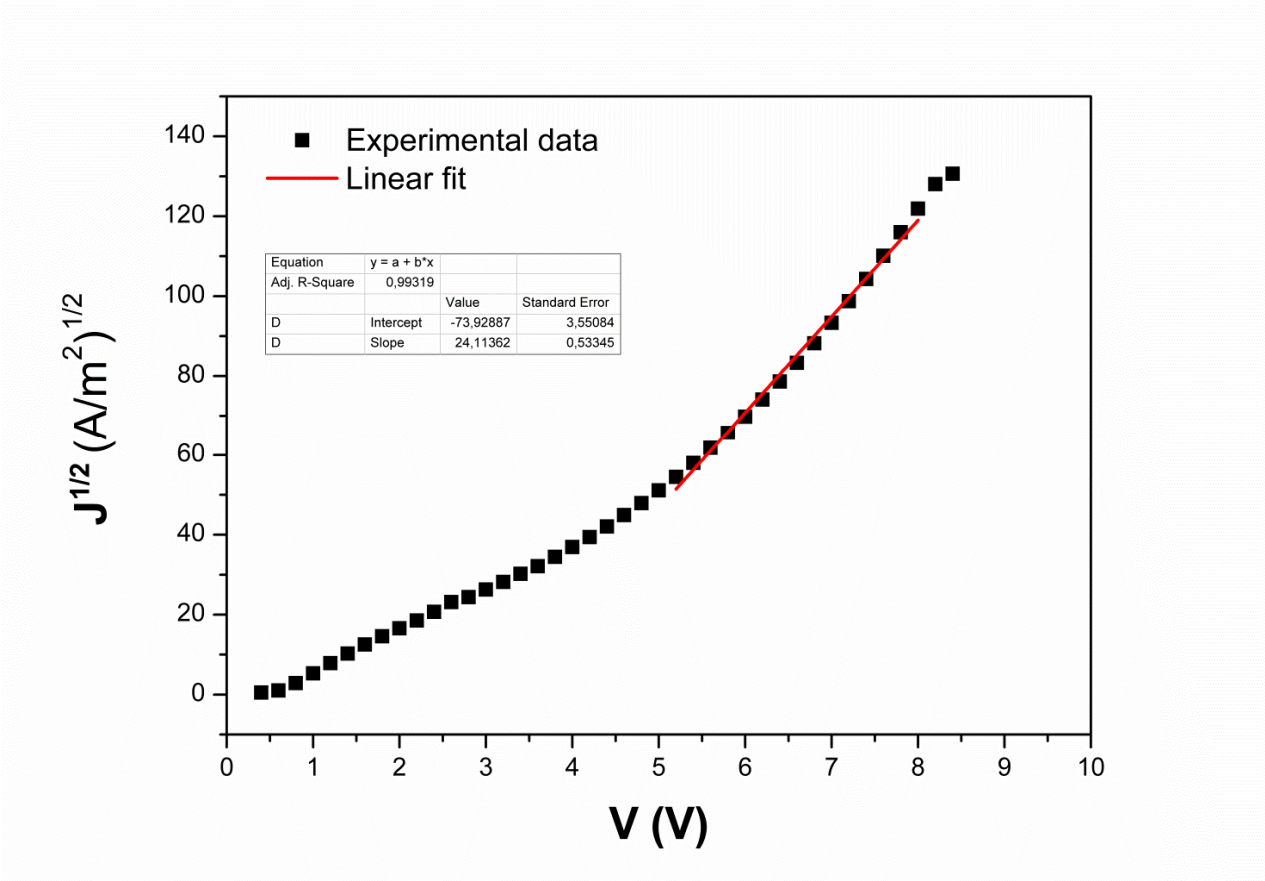

Figure S19. Dark $J^{1/2}$-V curves of the hole-only device based on the optimized **P(2)**:$PC_{61}BM$ blend.