Electronic Supplementary Material (ESI) for Polymer Chemistry.
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Supporting Information

Side-Chain Engineering in Naphthalenediimide-Based n-Type Polymers for High-Performance All-Polymer Photodetectors

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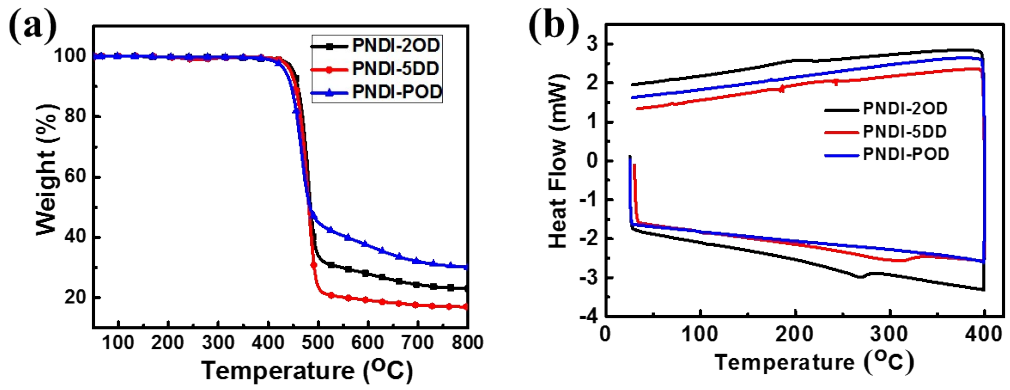


Figure S1. (a) TGA thermograms of polymers under nitrogen flow; (b) The second heating and cooling DSC scans of polymers under nitrogen flow.

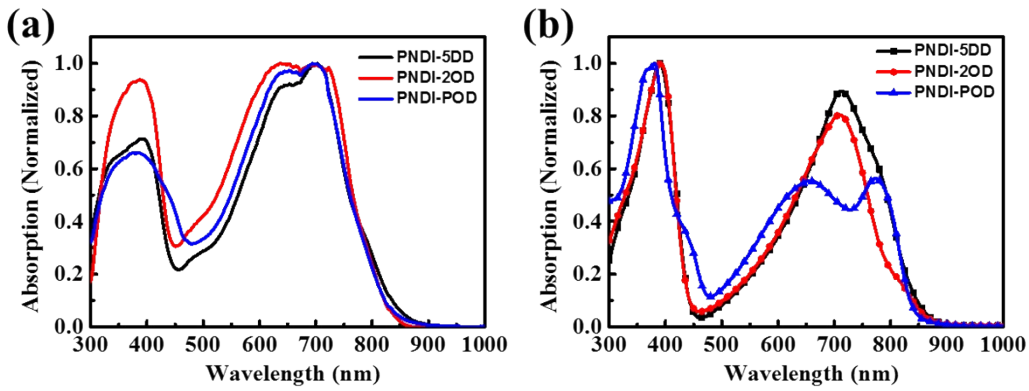


Figure S2. (a) The absorption of the blend films of polymers:PTB7-Th; (b) The absorption of the polymers in dilute chloroform solution (0.03 g/L).

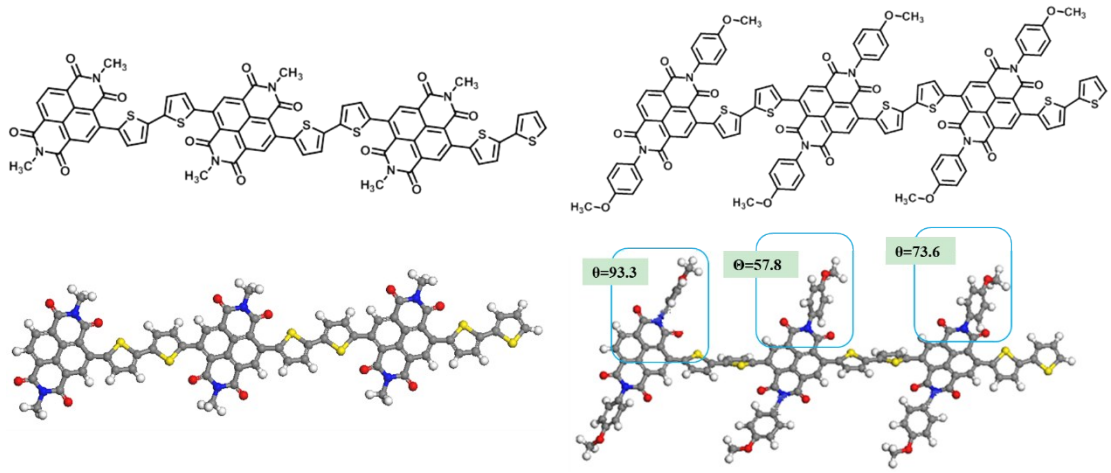


Figure S3. The optimized molecular configuration by DFT methods.

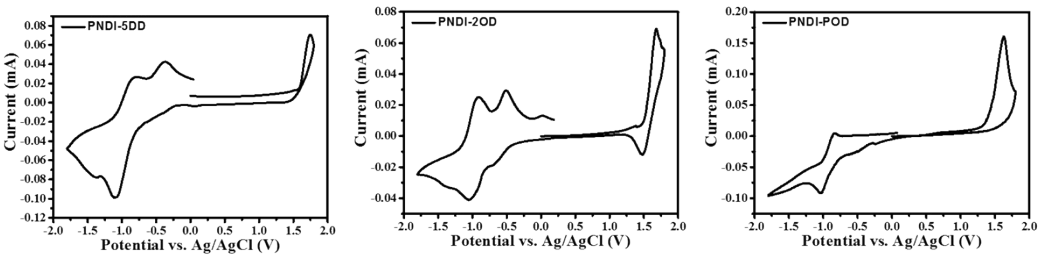


Figure S4. Cyclic voltammograms of polymer films on Pt electrode in 0.1 M *n*-Bu_4NPF_6 solution in dry acetonitrile with a scan rate of 50 mV/s.

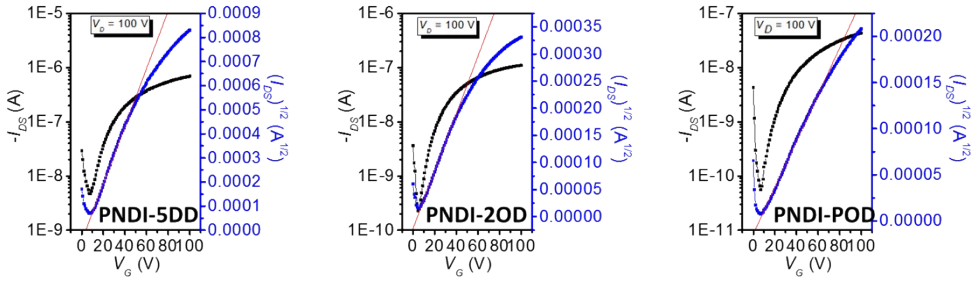


Figure S5. Transfer curves of the polymers in BGTC OFETs.

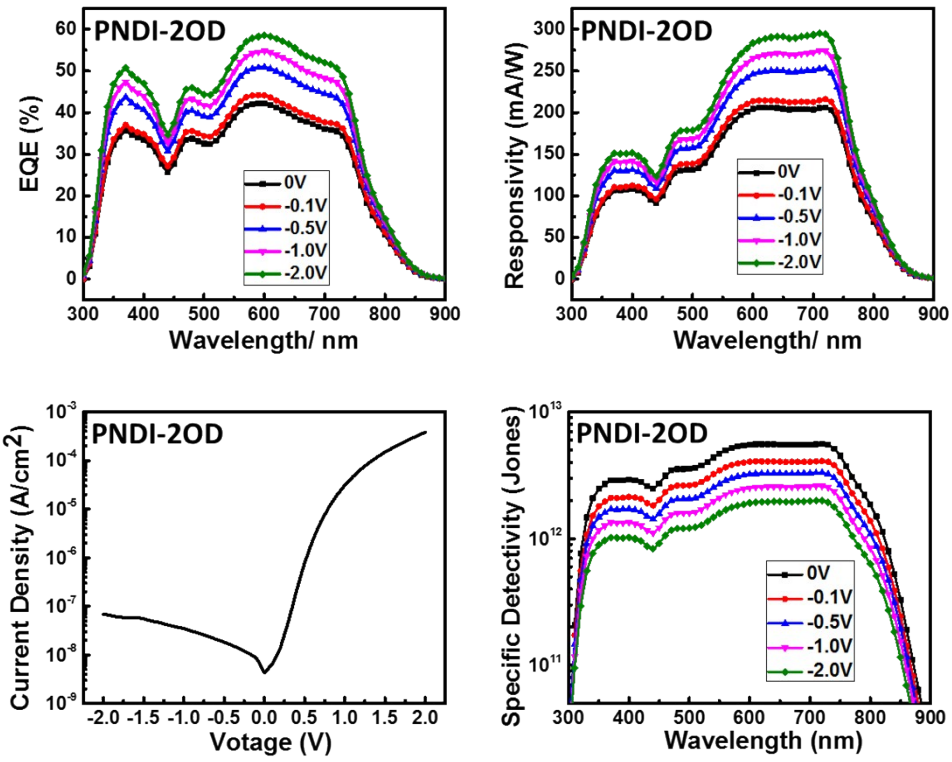


Figure S6. The device parameters of PNDI-2OD based photodetectors.

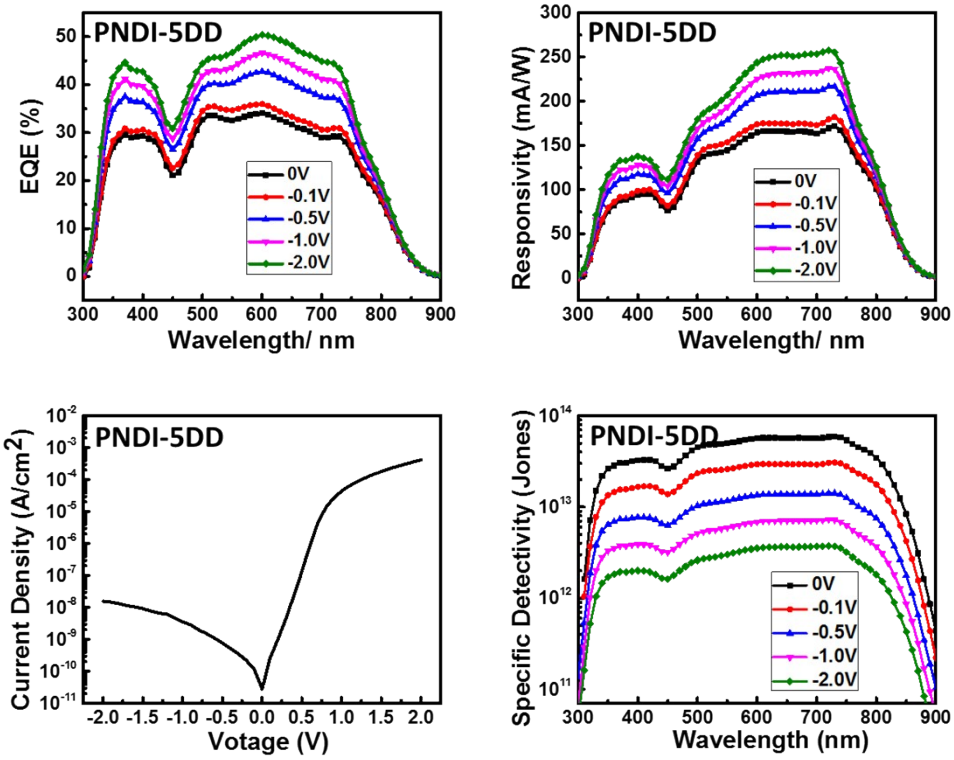


Figure S7. The device parameters of PNDI-5DD based photodetectors.

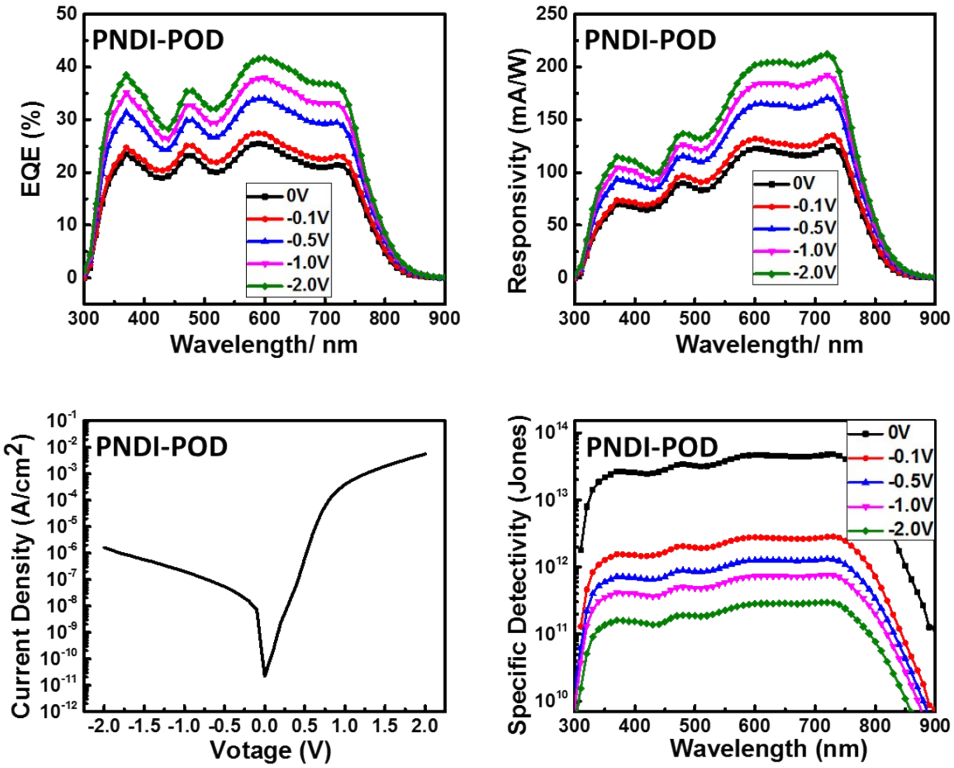


Figure S8. The device parameters of PNDI-POD based photodetectors.

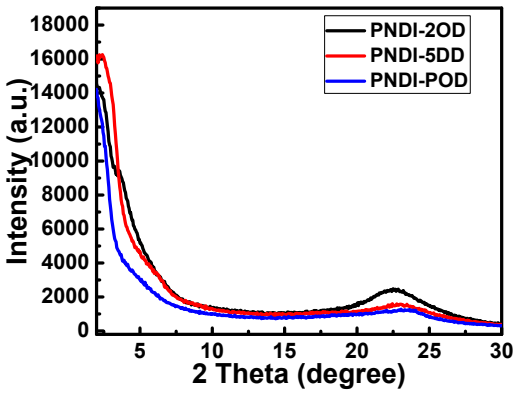
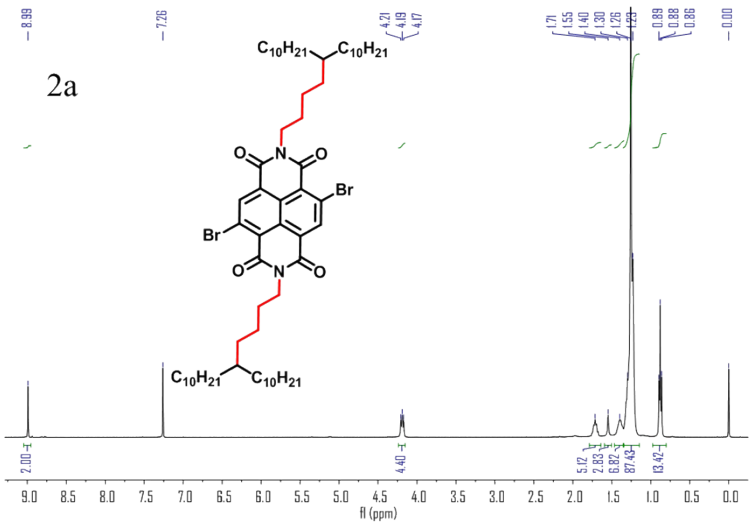


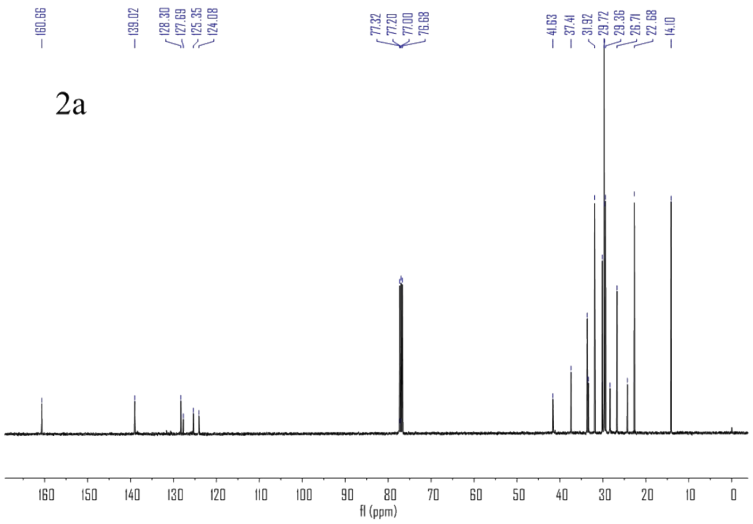
Figure S9. The out-of-plane GIXRD of the polymers by spin-coated blend films.

Table S1. The electrical parameters of the polymers.

Polymer	μ_e ($cm^2V^{-1}s^{-1}$)	V_{th} (V)	I_{on}/I_{off}
PNDI-5DD	9.6×10^{-4}	5	10^2
PNDI-2OD	1.9×10^{-4}	0.5	10^2
PNDI-POD	4.2×10^{-5}	2	10^3

^{1}H NMR, ^{13}CNMR spectrum and MS of compound **2a**.

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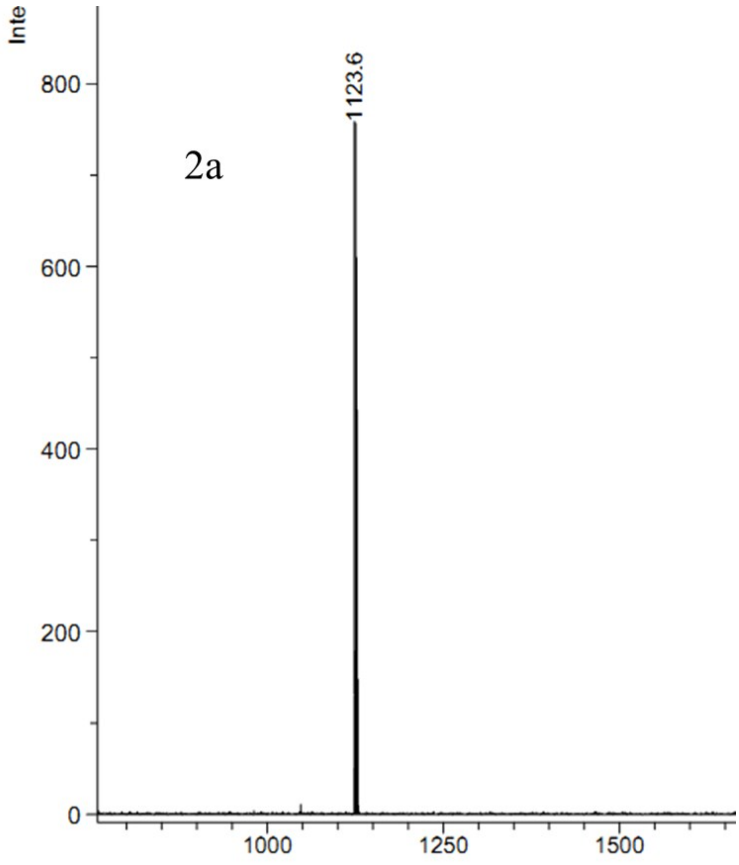
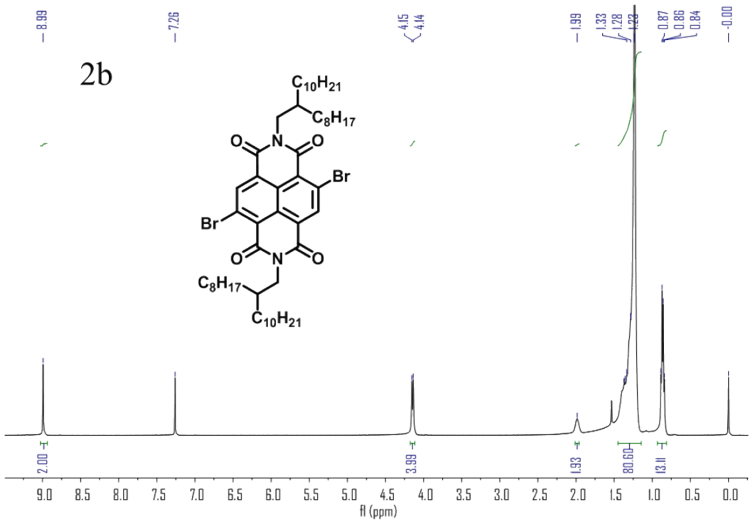
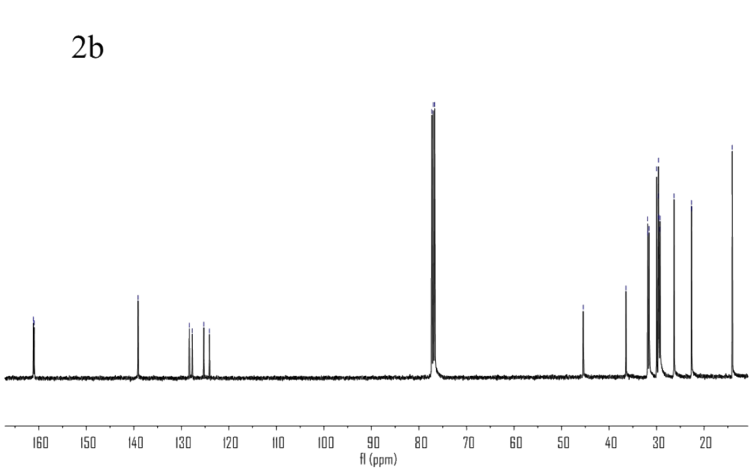
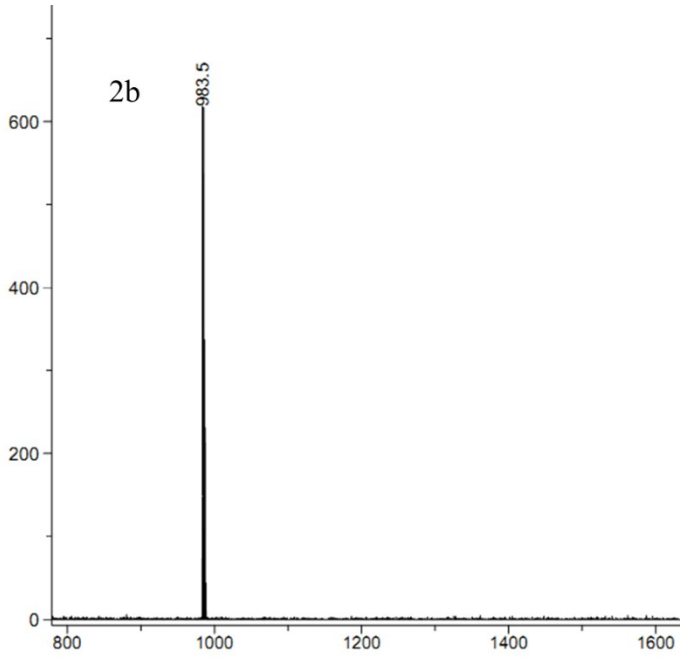
139.012
128.30
127.69
125.35
124.08
77.32
77.20
77.00
76.68
41.63
37.41
31.92
29.72
29.36
26.71
22.68
14.10
2a
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


Inte
800
600
400
200
0
1123.6
2a
1000
1250
1500

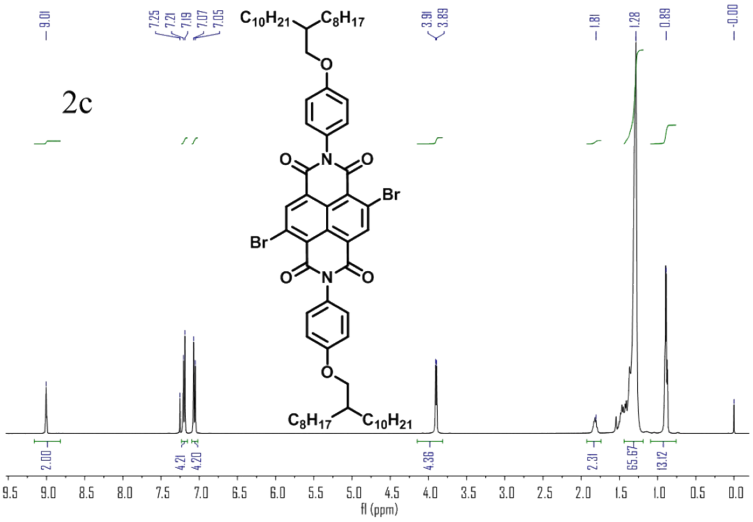
^{1}H NMR, ^{13}CNMR spectrum and MS of compound **2b**.

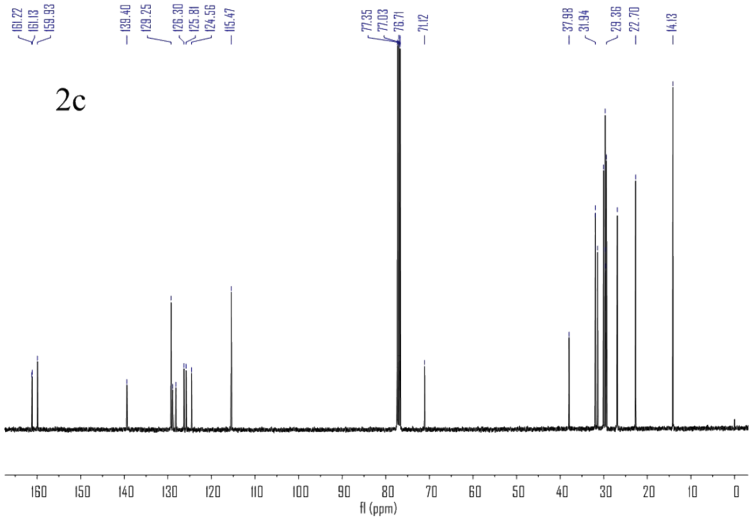


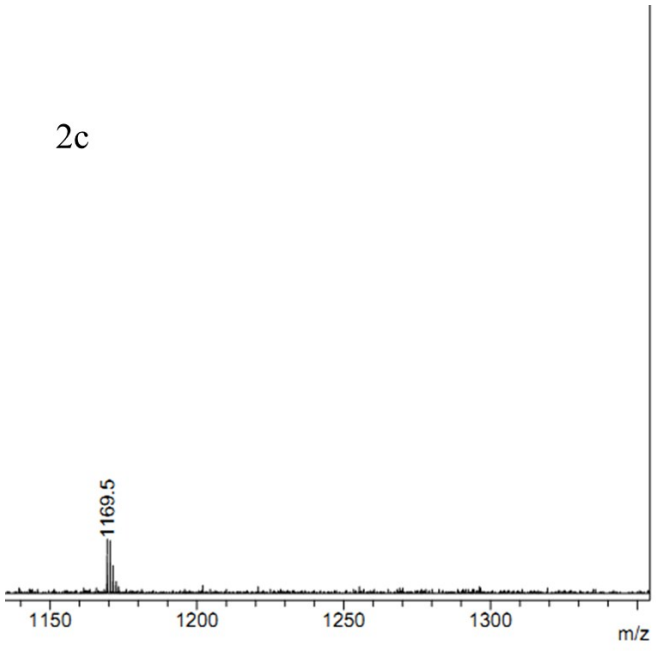




^{1}H NMR, ^{13}CNMR spectrum and MS of compound **2c**.







^{1}H NMR spectrum of compound Polymers.