Supporting Information

Alkoxyphenylthiophene Linked Benzodithiophene Based Medium Band Gap Polymers for Organic Photovoltaics: Efficiency Improvement upon Methanol Treatment Depends on the Planarity of Backbone

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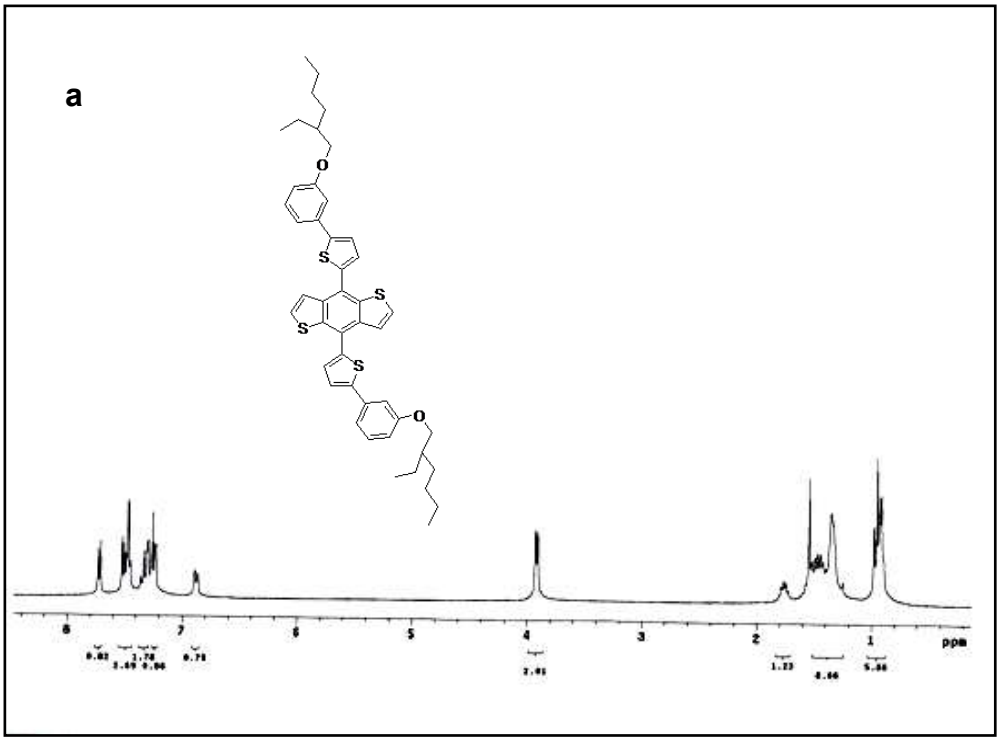

a
O
S
S
S
S
S
O
8
7
6
5
4
3
2
1
ppm

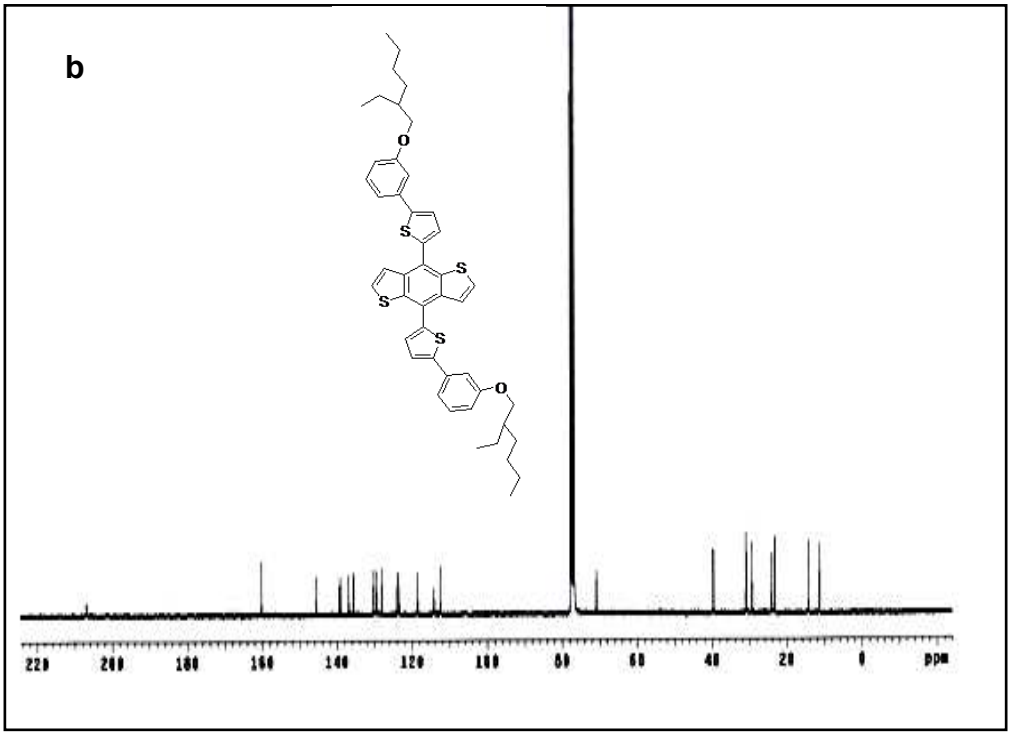
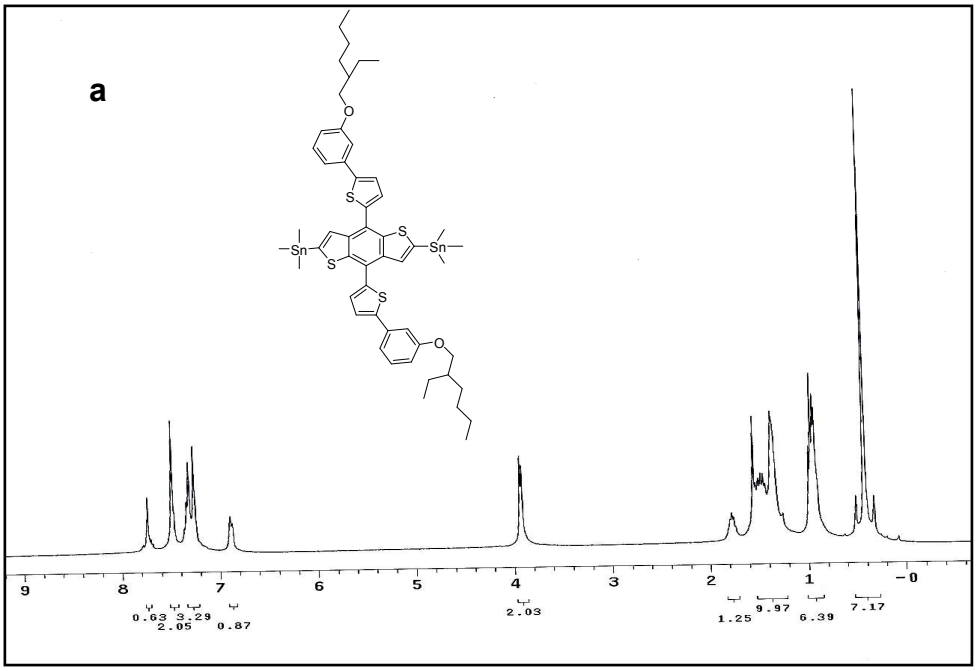

b
O
S
S
S
S
O
220
200
180
160
140
120
100
80
60
40
20
0
ppm

Figure S1


a
9
8
7
6
5
4
3
2
1
0
0.63
3.29
2.05
0.87
2.03
1.25
9.97
6.39
7.17

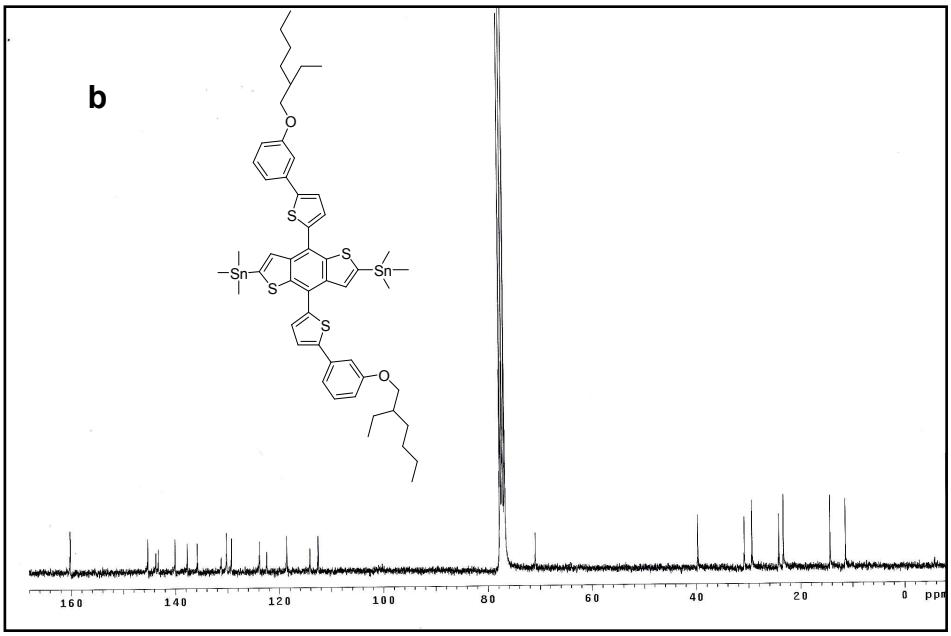

b
160
140
120
100
80
60
40
20
0
ppm

Figure S2

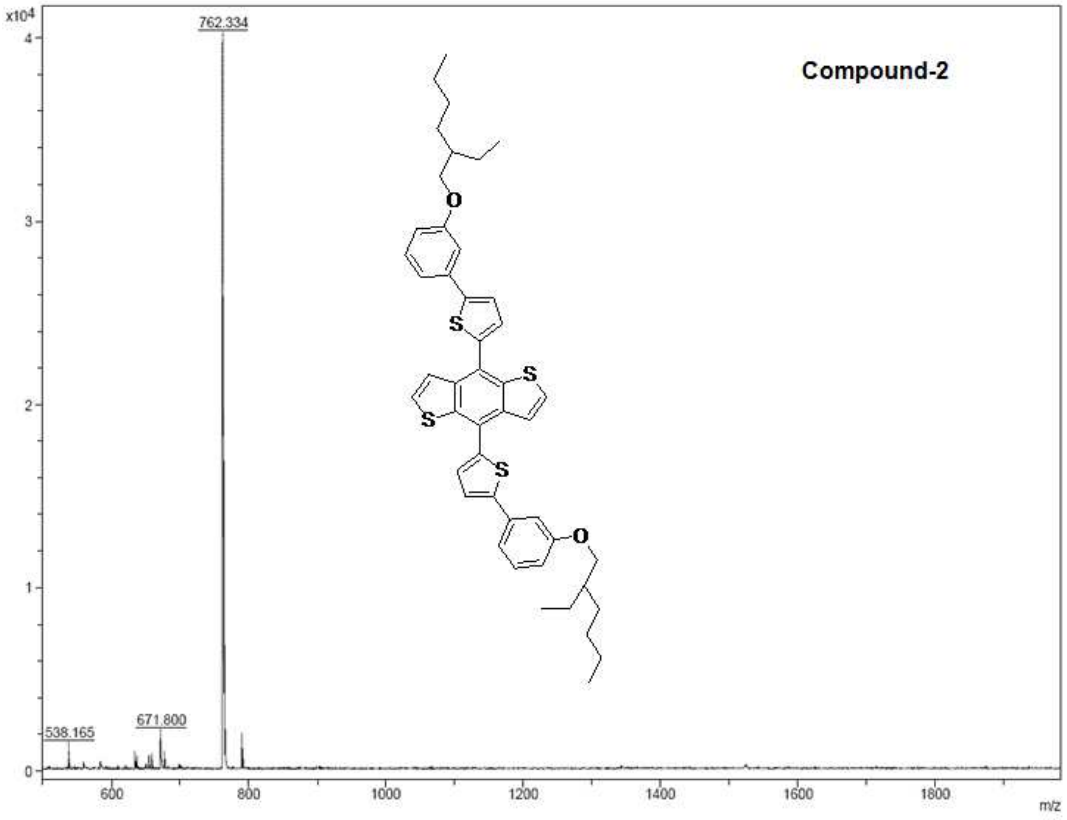


Figure S3

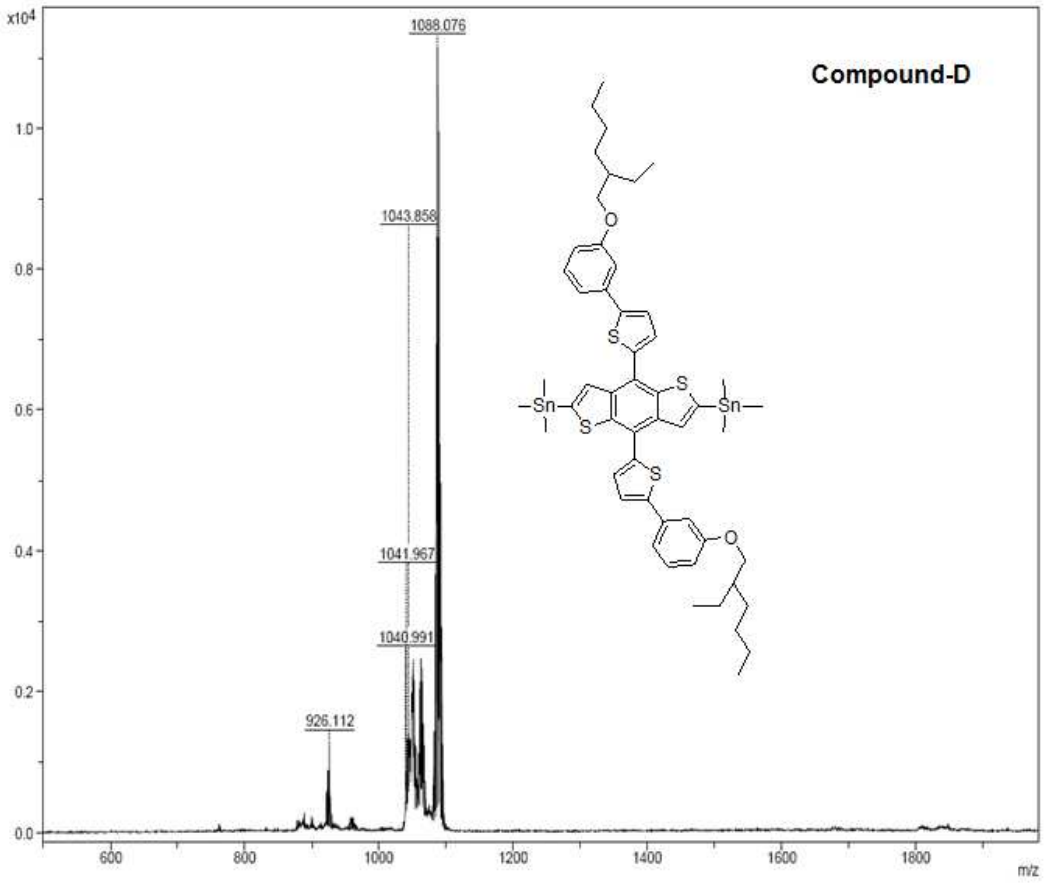
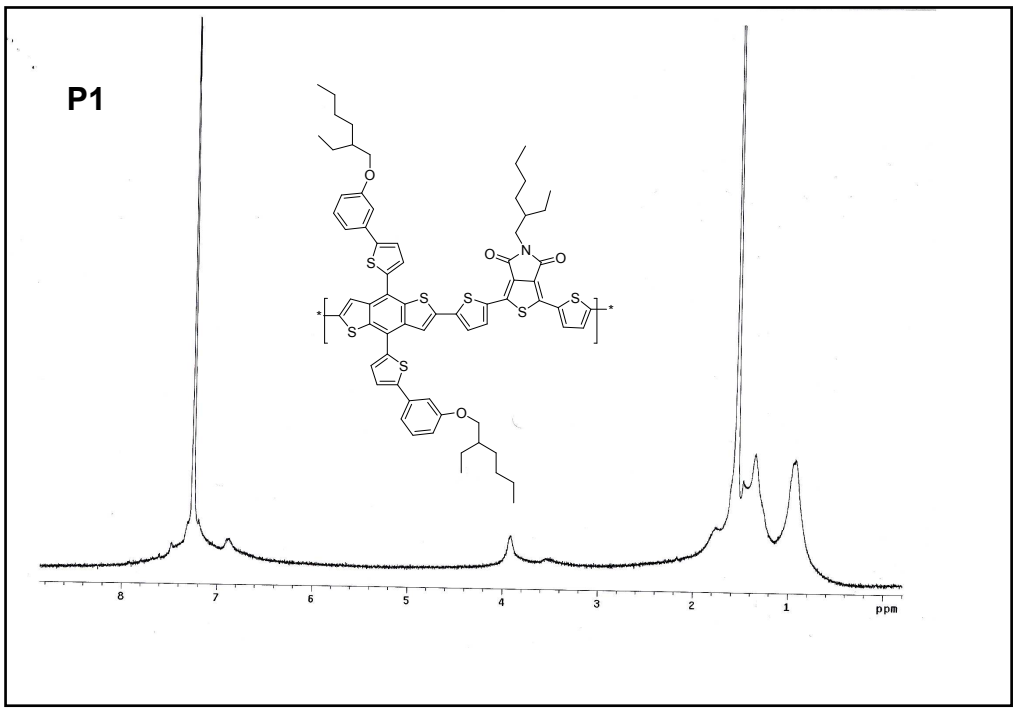

x10^4
1088.076
1043.858
1041.967
1040.991
926.112
Compound-D
1.0
0.8
0.6
0.4
0.2
0.0
600
800
1000
1200
1400
1600
1800
m/z

Figure S4



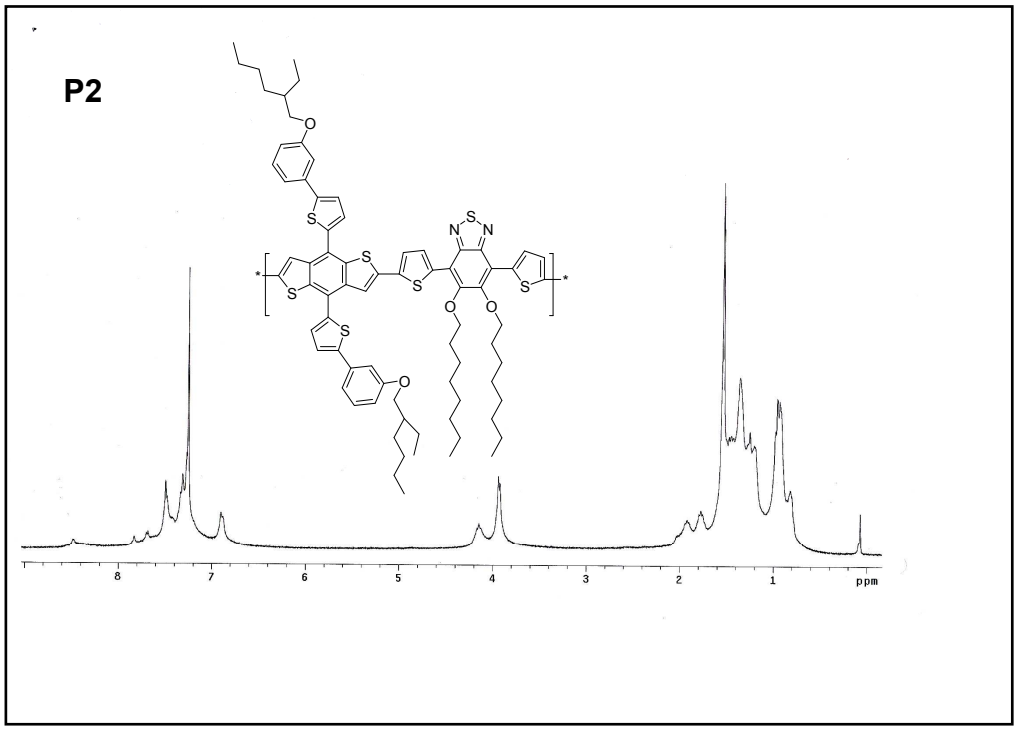


Figure S5.

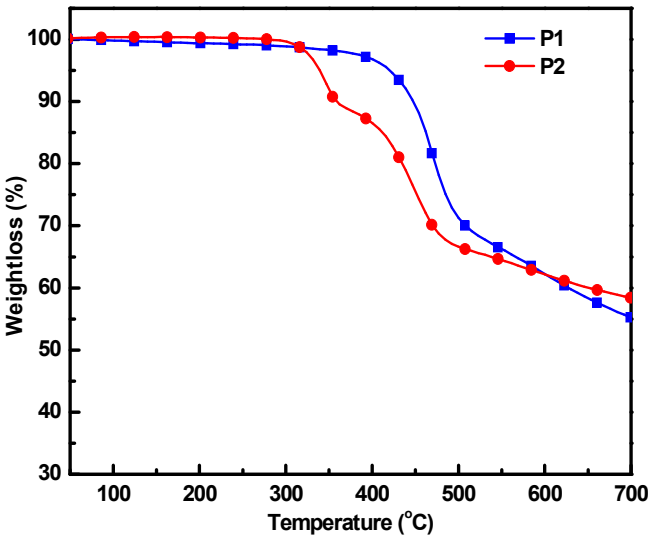

P1
P2
Weightloss (%)
Temperature (°C)
100
90
80
70
60
50
40
30
100
200
300
400
500
600
700

Figure S6

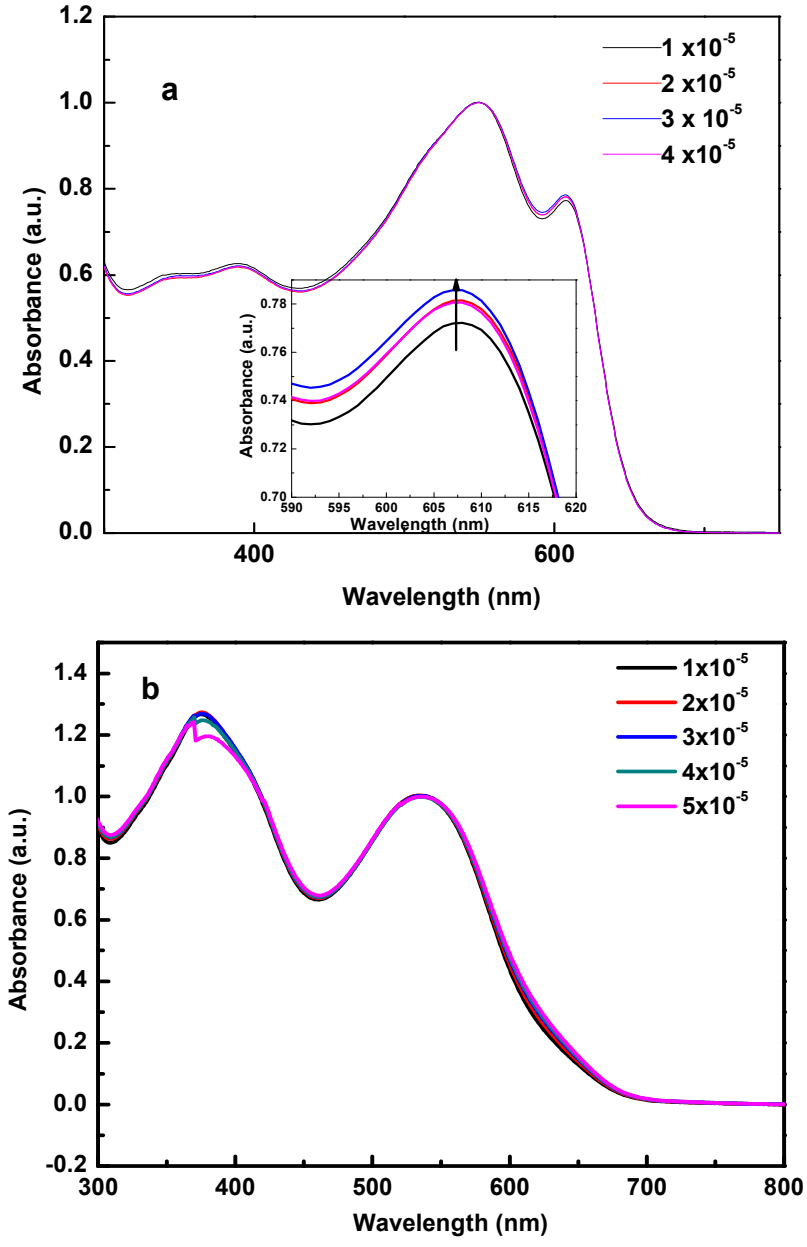

a
1 x10-5
2 x10-5
3 x 10-5
4 x10-5
Absorbance (a.u.)
Wavelength (nm)
b
1x10-5
2x10-5
3x10-5
4x10-5
5x10-5
Absorbance (a.u.)
Wavelength (nm)

Figure S7

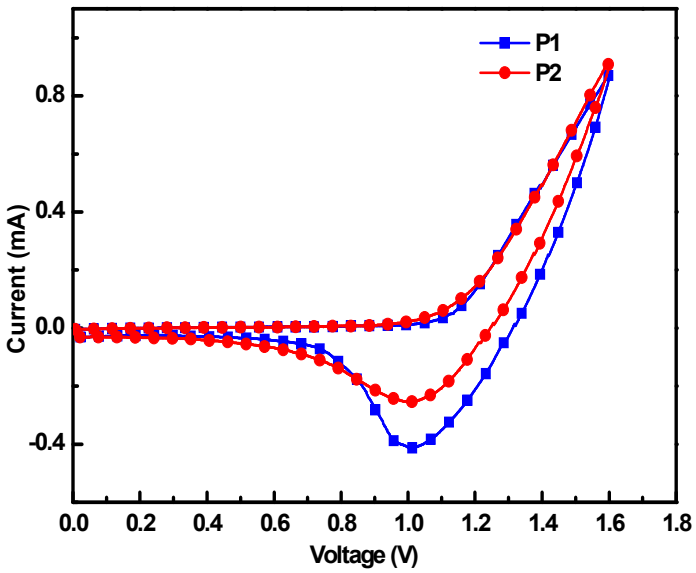


Figure S8

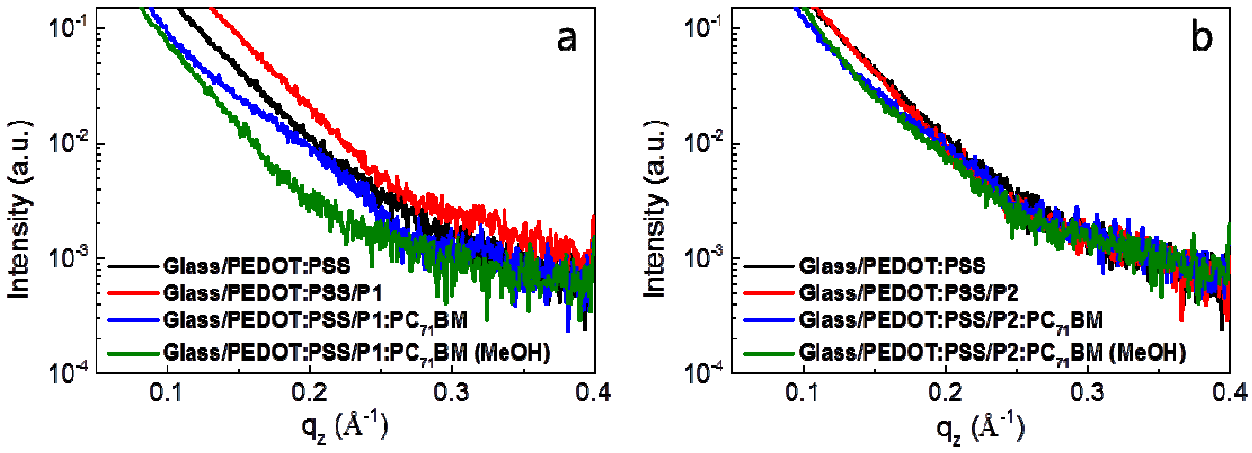

a
b
Intensity (a.u.)
q_z (Å^{-1})
Glass/PEDOT:PSS
Glass/PEDOT:PSS/P1
Glass/PEDOT:PSS/P1:PC$_{71}$BM
Glass/PEDOT:PSS/P1:PC$_{71}$BM (MeOH)
Glass/PEDOT:PSS/P2
Glass/PEDOT:PSS/P2:PC$_{71}$BM
Glass/PEDOT:PSS/P2:PC$_{71}$BM (MeOH)

Figure S9

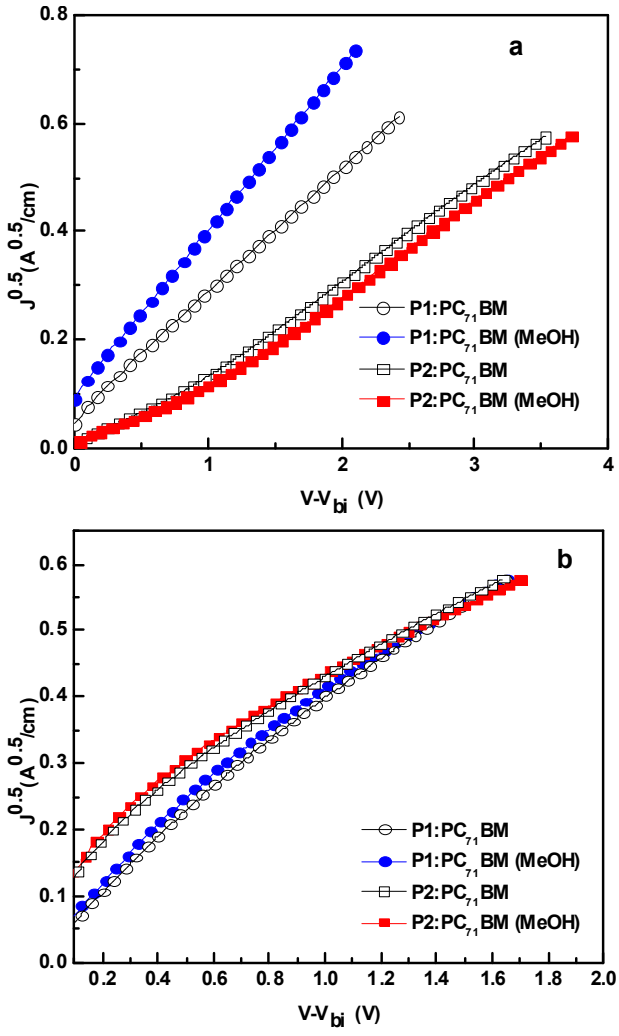

a
b
P1:PC71BM
P1:PC71BM (MeOH)
P2:PC71BM
P2:PC71BM (MeOH)
J0.5(A0.5/cm)
V-Vbi (V)

Figure S10

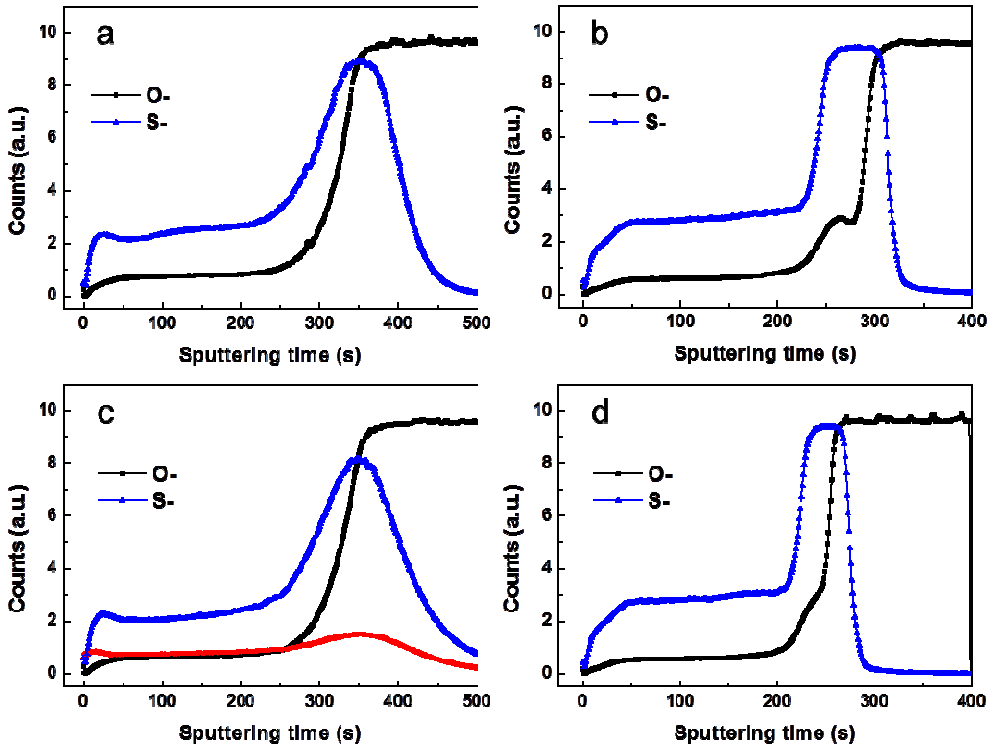


Figure S11

Table S1. Molecular Weights and Thermal Decomposition Temperatures of Polymers

polymer	M_w (g/mol)[a]	M_n (g/mol)[a]	PDI	T_d (^oC) [b]
P1	36000	30000	1.2	417
P2	32000	24000	1.3	337

[a] M_w, M_n and polydispersity index were determined by gel permeation chromatography (GPC) in THF. [b] Decomposition temperature at 5% weight loss.

Table S2. Hole Mobilities and Electron Mobilities of Polymers: $PC_{71}BM$ With and Without Methanol Treatment

polymer	treatment	hole mobility ($cm^2V^{-1}s^{-1}$)	electron mobility ($cm^2V^{-1}s^{-1}$)
P1	none	1.62×10^{-4}	3.65×10^{-4}
P1	methanol	3.01×10^{-4}	3.80×10^{-4}
P2	none	9.45×10^{-5}	2.82×10^{-4}
P2	methanol	8.62×10^{-5}	2.62×10^{-4}