Supporting information

Red to orange thermally activated delayed fluorescence polymers based on 2-(4-(diphenylamino)-phenyl)-9*H*-thioxanthen-9-one-10,10-dioxide for efficient solution-processed OLEDs

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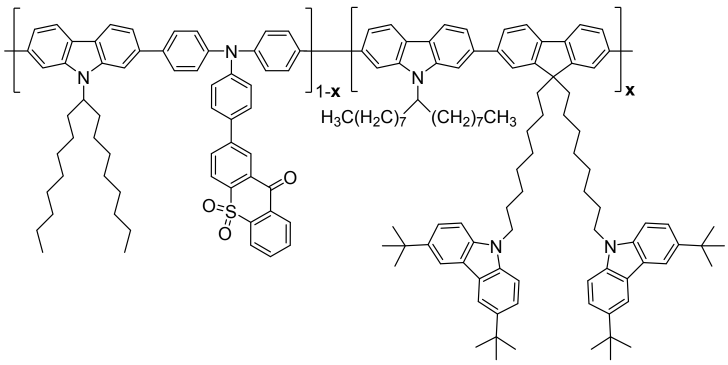
Additional characterization data



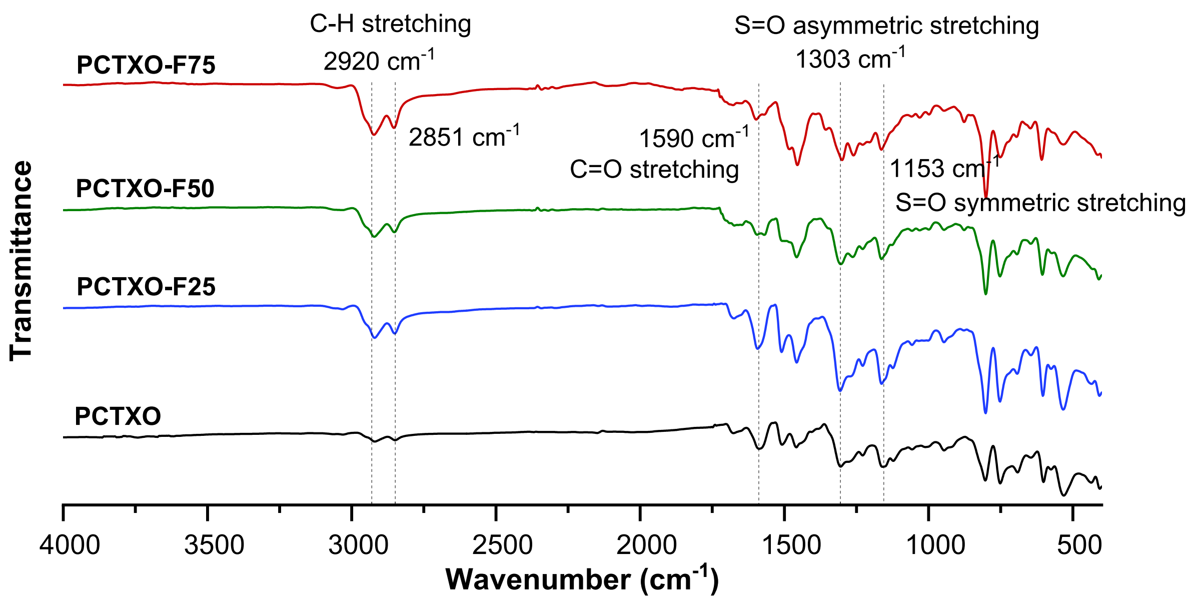
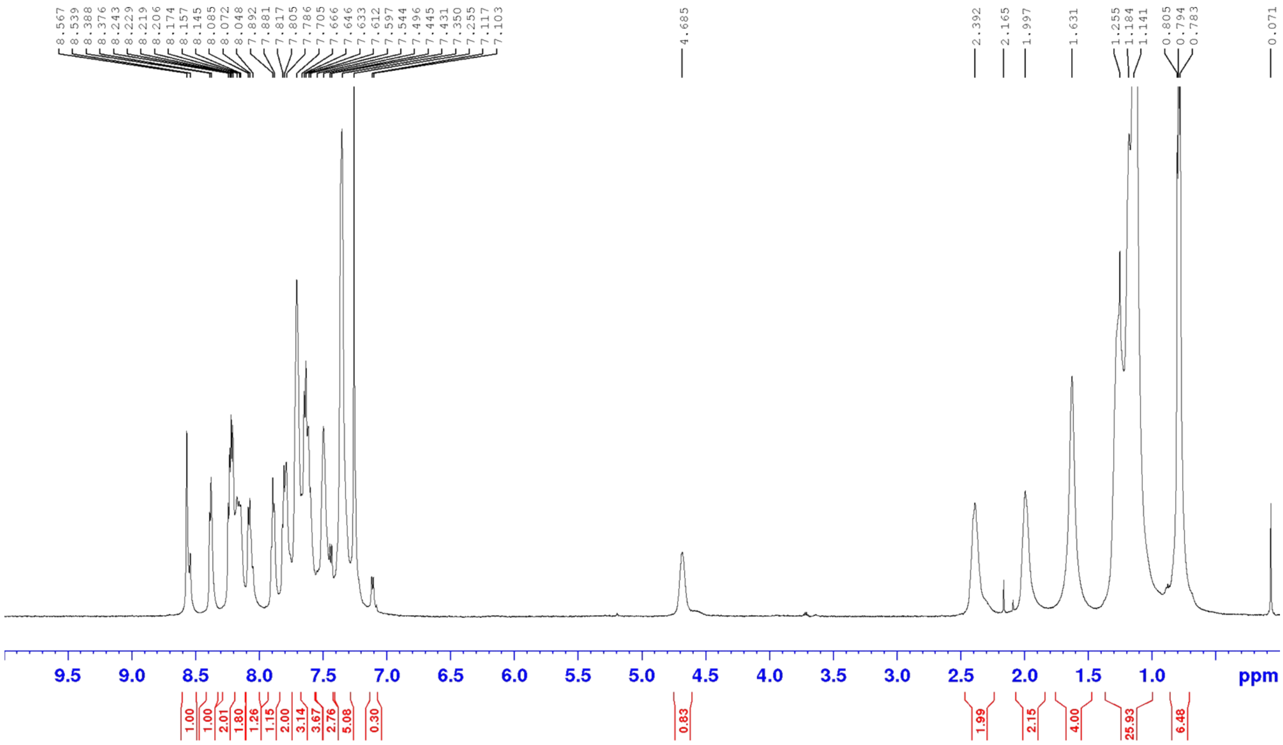
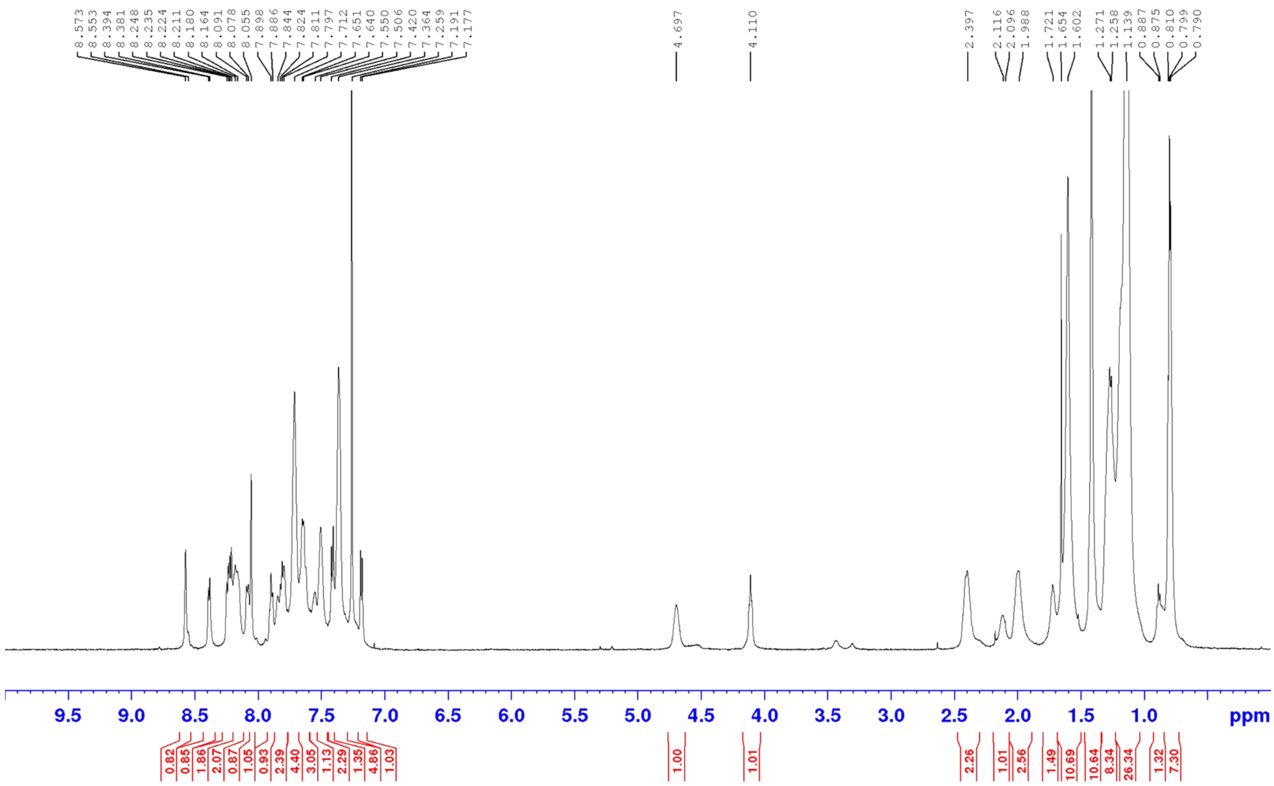


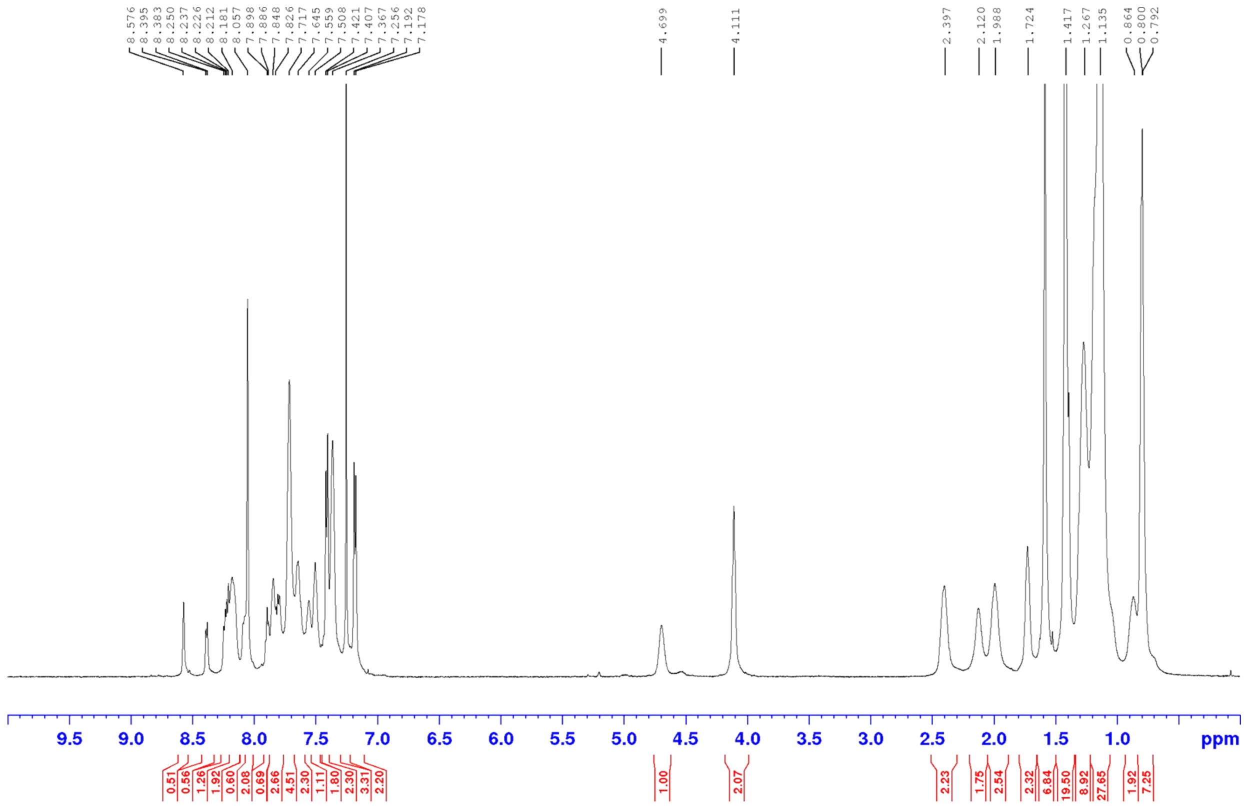
Fig. S1 ATR FTIR spectra of the polymers



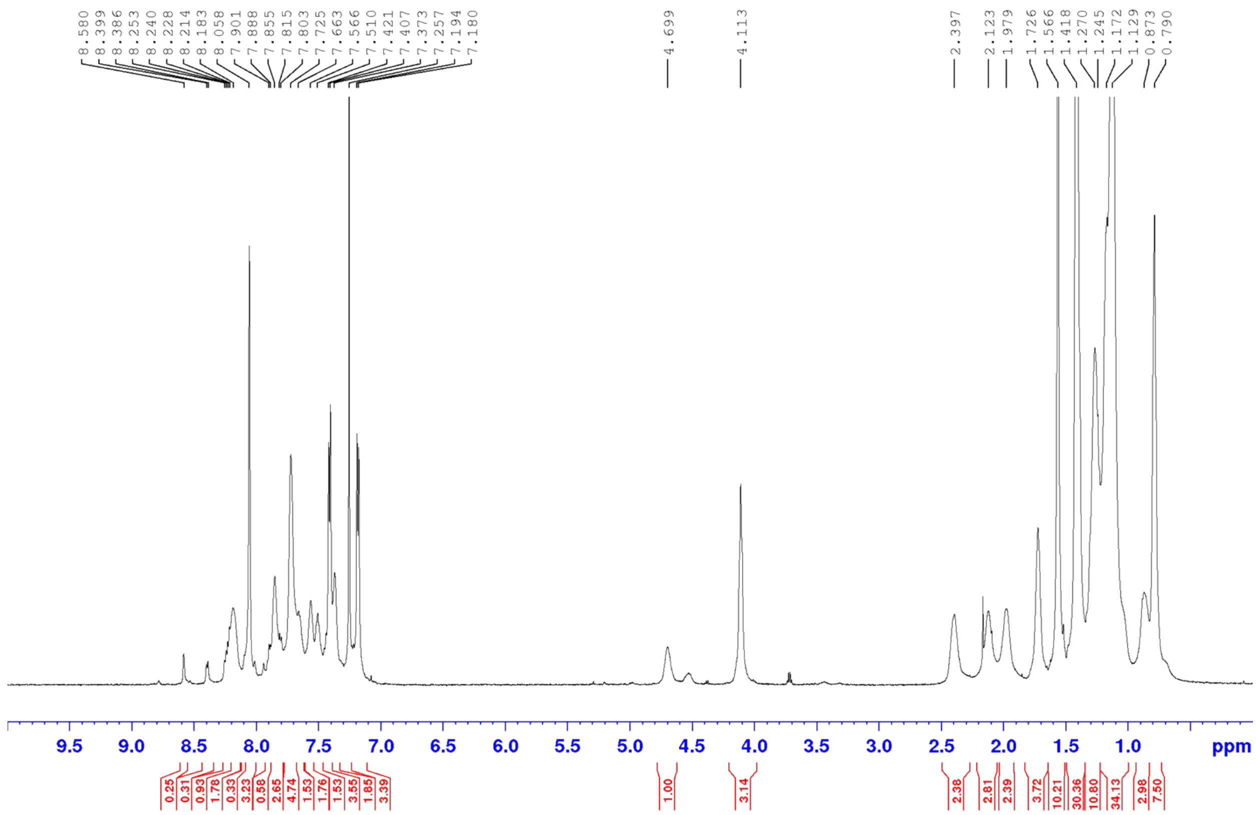
PCTXO



PCTXO-F25

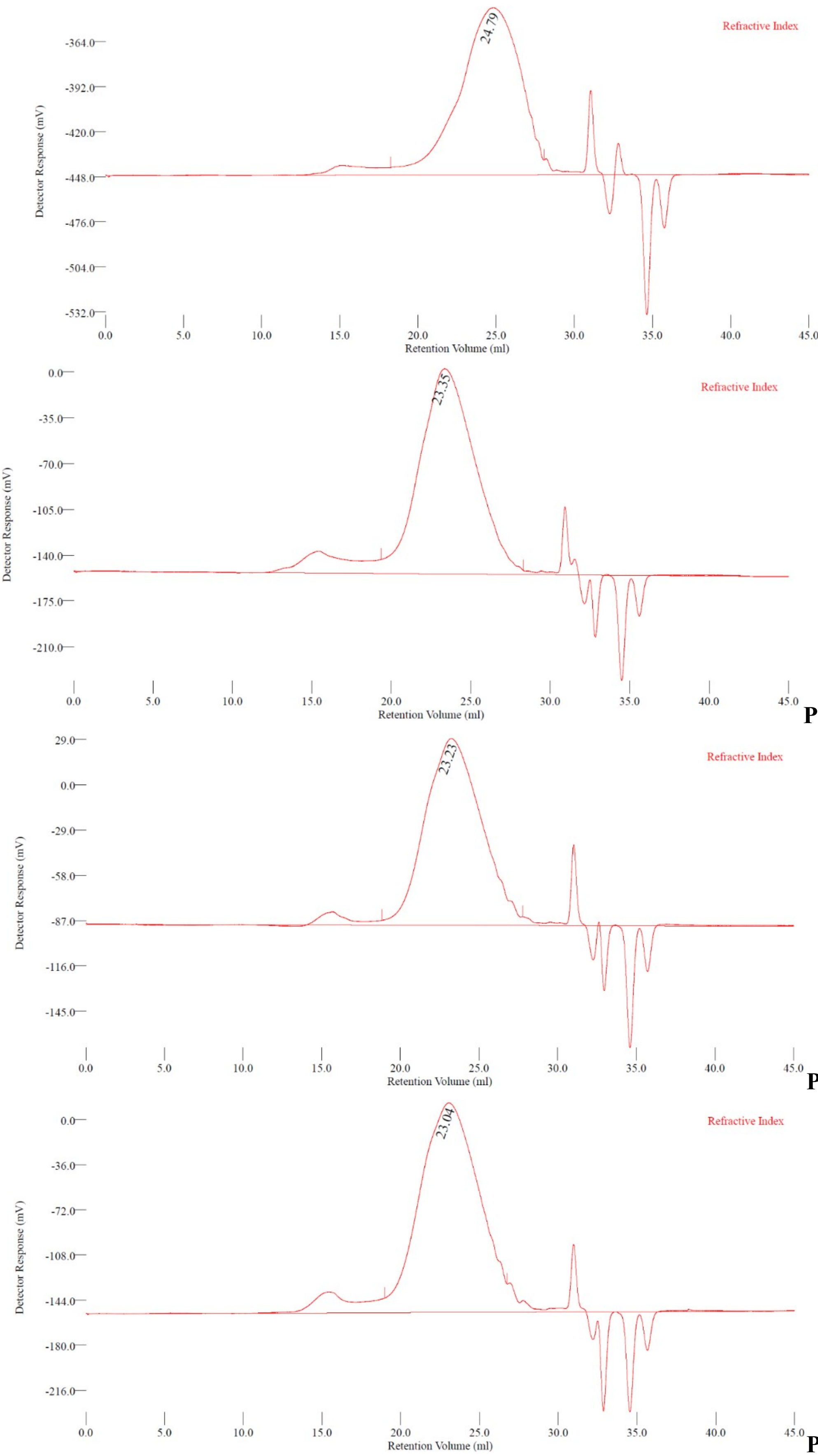


PCTXO-F50



PCTXO-F75

Fig. S2 600 MHz 1H-NMR spectra ($CDCl_3$) of the polymers



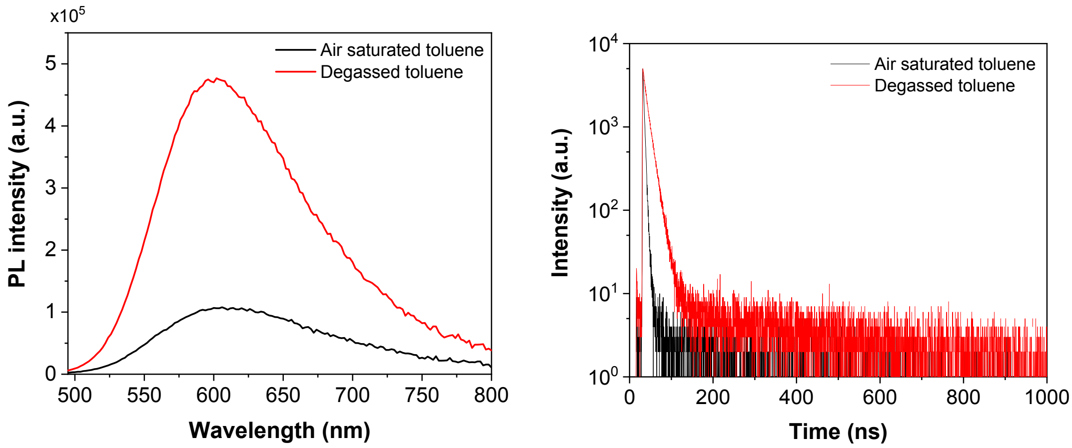
PCTXO

PCTXO-F25

PCTXO-50

PCTXO-75

Fig. S3 GPC traces of the polymers in THF at 35 °C with RI detector using polystyrene linear standards for calibration.



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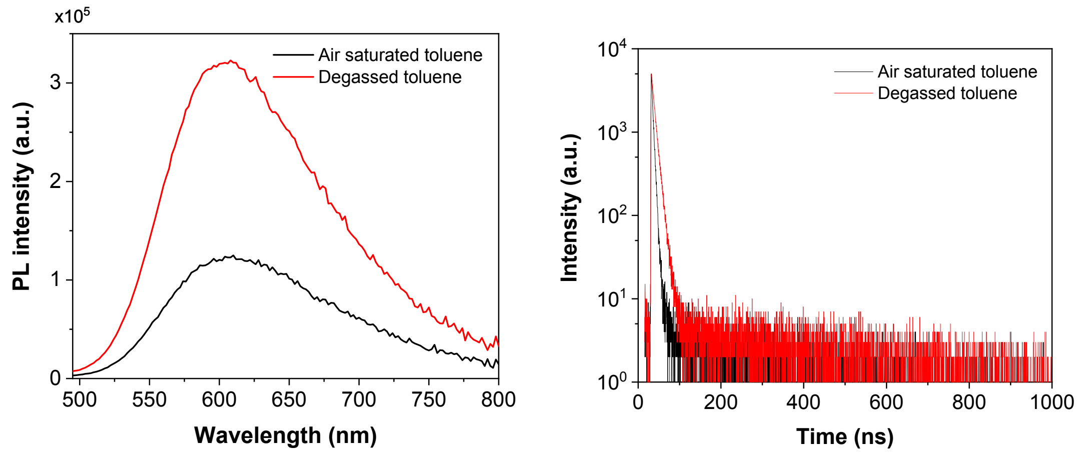
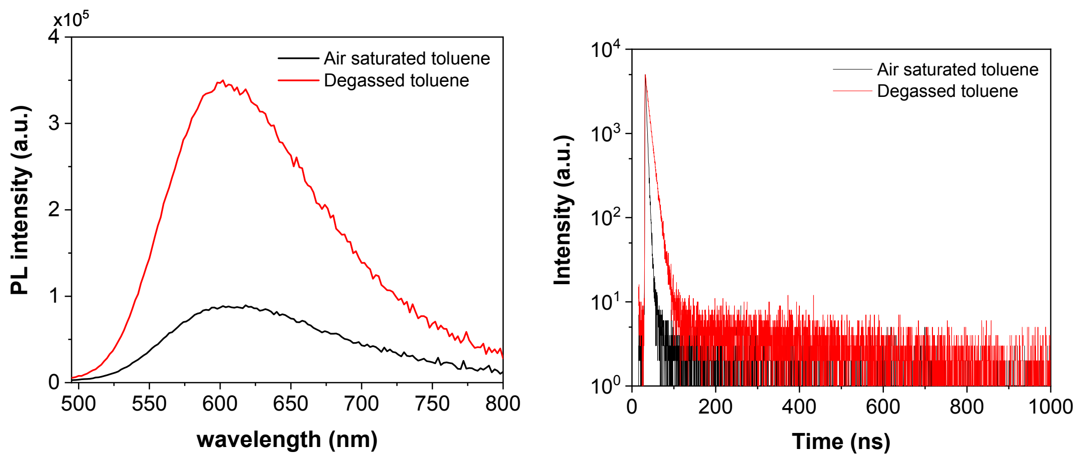


PCTXO-F25



PCTXO-F50

Fig. S4 PL spectra and transient PL decay spectra of air-saturated and degassed polymer toluene solutions

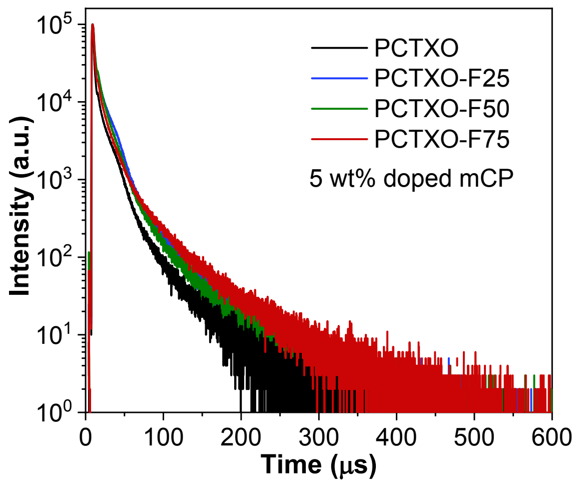
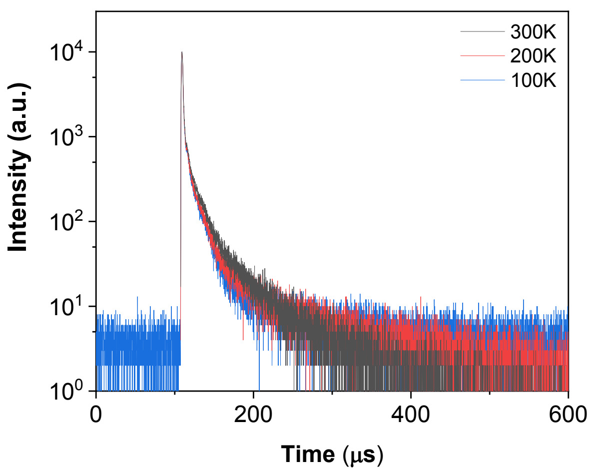
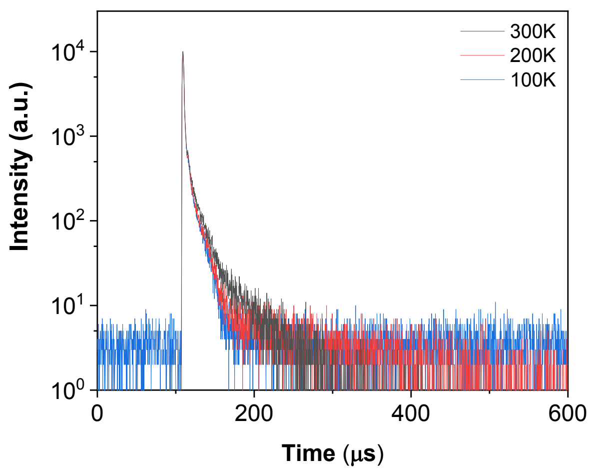


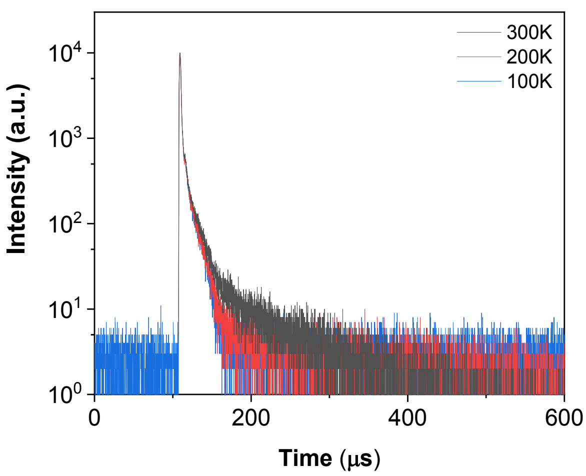
Fig. S5 Transient PL decay spectra of the polymers 5 wt% doped mCP films at room temperature.



PCTXO-F25



PCTXO-F50



PCTXO-F75

Fig. S6 Transient PL decay spectra of the polymers **PCTXO-Fx** 1 wt% doped in mCP:Zeonex film recorded at various temperatures in N_2.

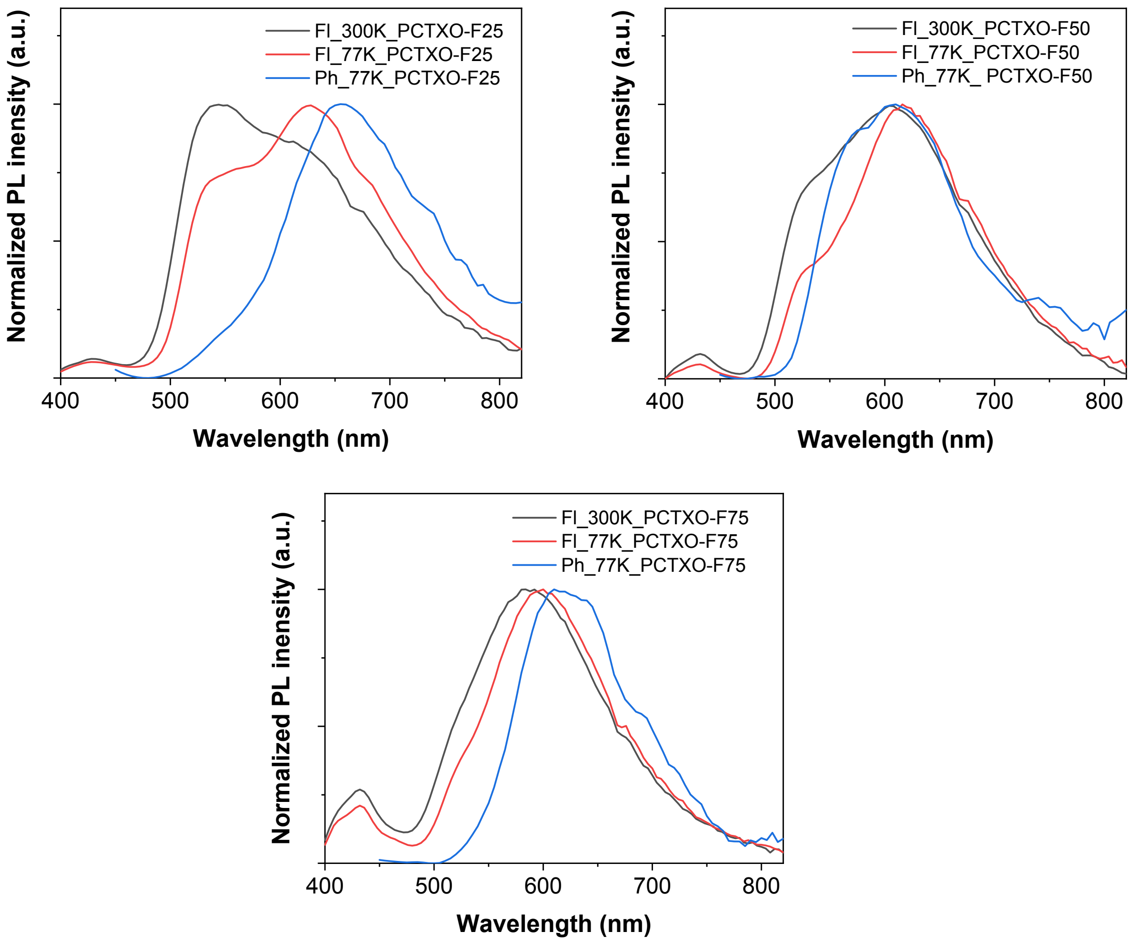


Fig. S7 Fluorescence (Fl) and phosphorescence (Ph) spectra of the polymers **PCTXO-Fx** 1 wt% doped in Zeonex film recorded at 300 K and 77 K.

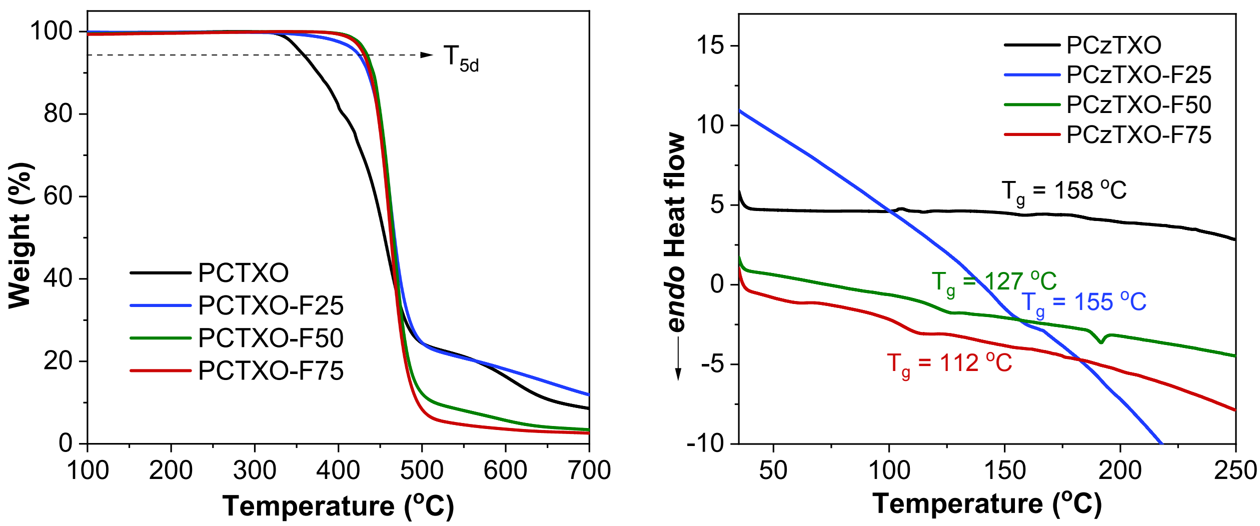


Fig. S8 TGA and DSC thermograms of **PCTXO/PCTXO-Fx** measured N_2 flow at heating rate of 10 °C min^{-1}.

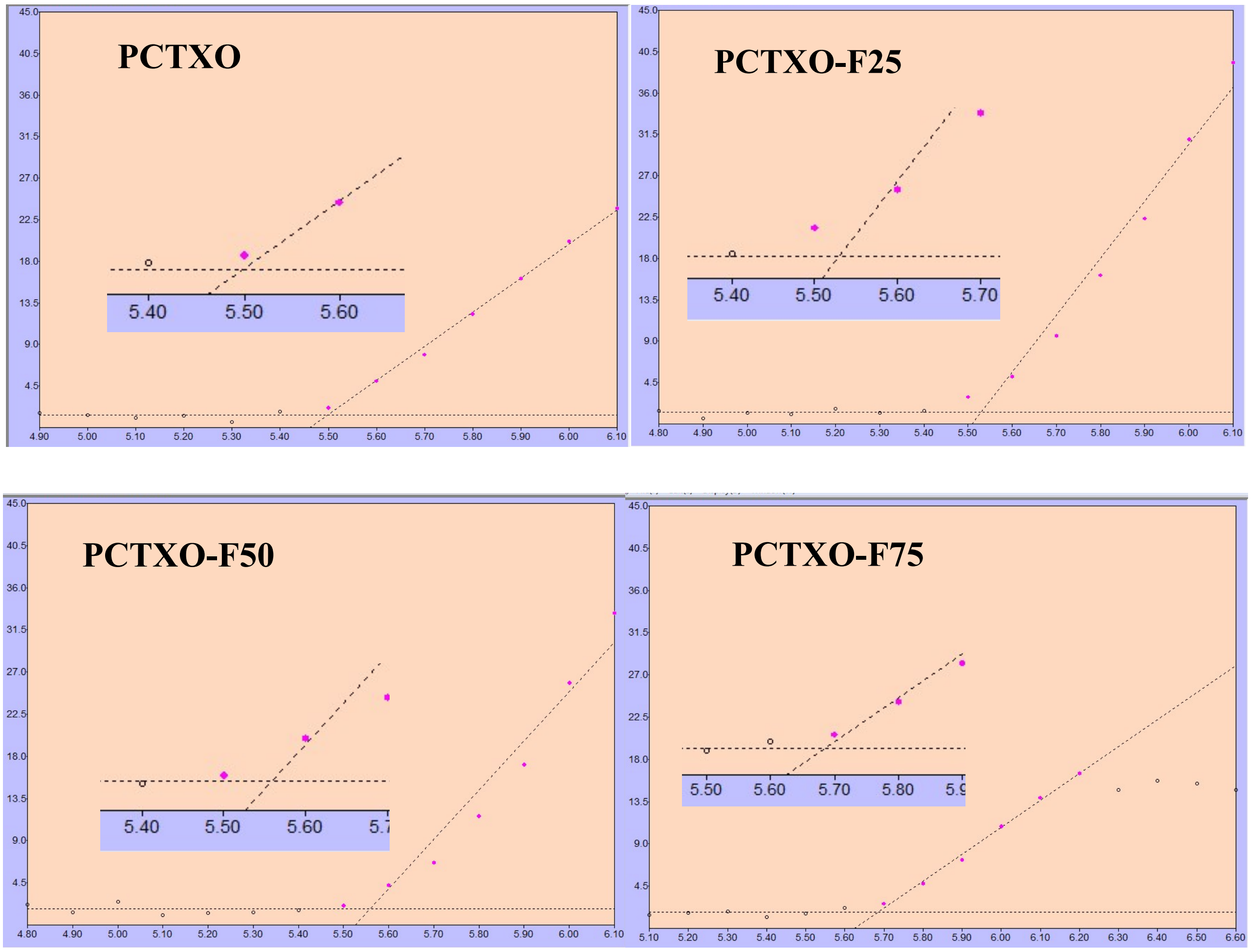


Fig. S9 Photoelectron spectroscopy in air (PESA) spectra of the polymers.

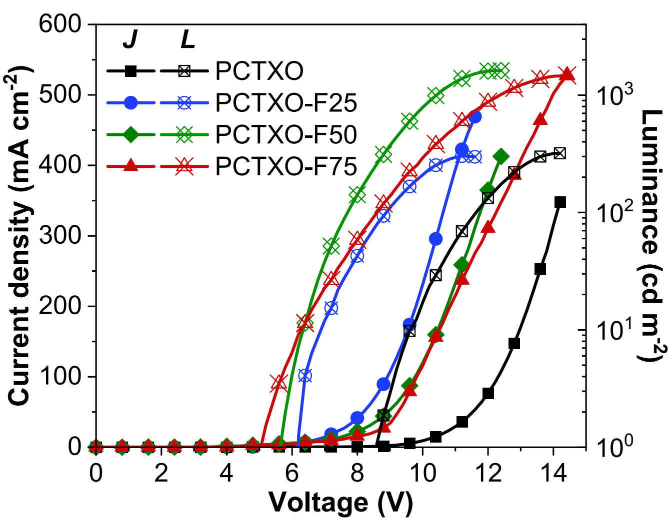
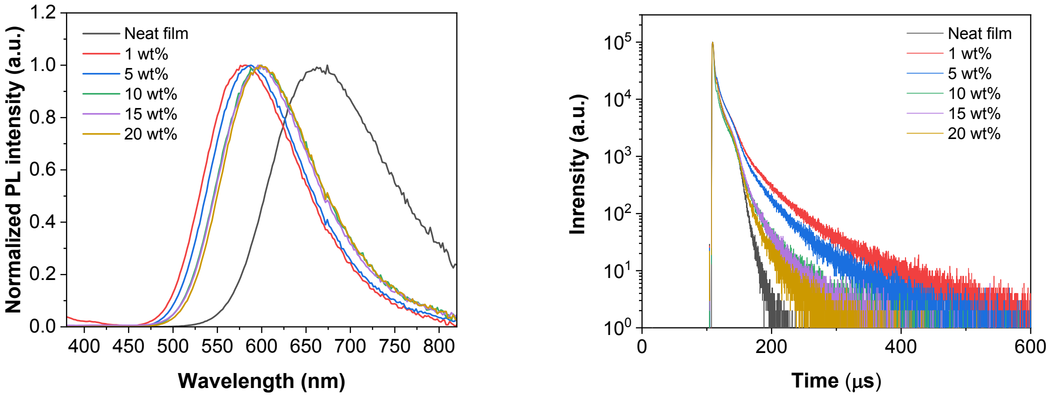
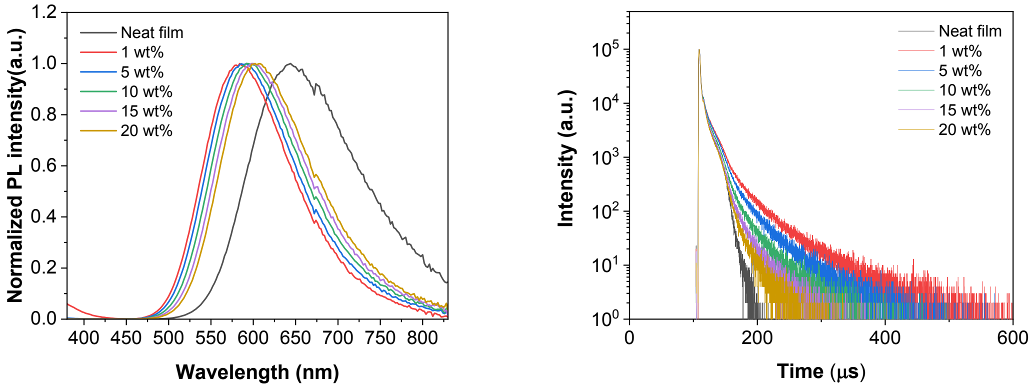


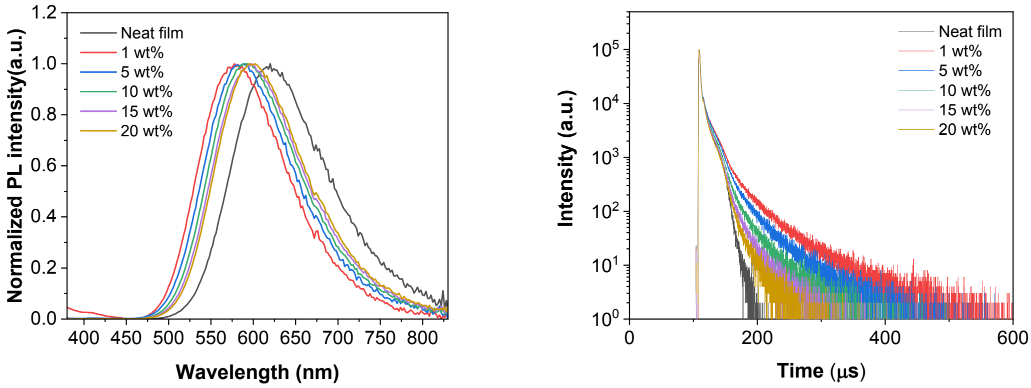
Fig. S10 Current density−voltage-luminance (*J-V-L*) characteristics of the non-doped OLEDs (devices I-IV).



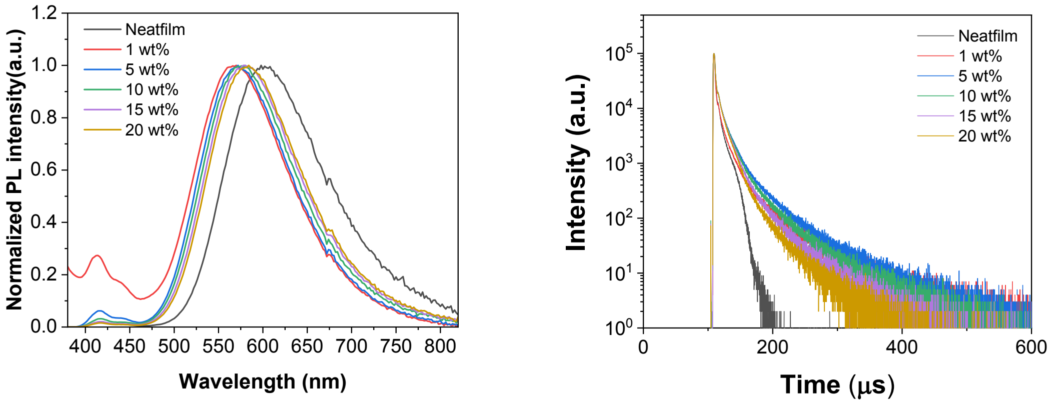
PCTXO



PCTXO-F25



PCTXO-F50



PCTXO-F75

Fig. S11 PL and transient PL decay spectra of **PCTXO** and **PCTXO-Fx** doped in mCP films.

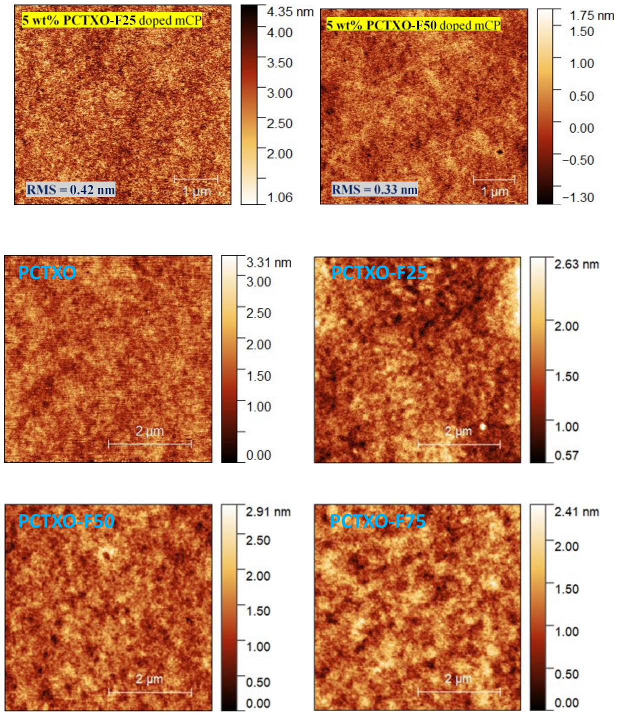


Fig. S12 AFM images of the neat and **PCTXO-F75**, **PCTXO-F50**, **PCTXO-F25**, **PCTXO** films and **PCTXO-F25** and **PCTXO-F50** 5 wt% doped in mCP films.

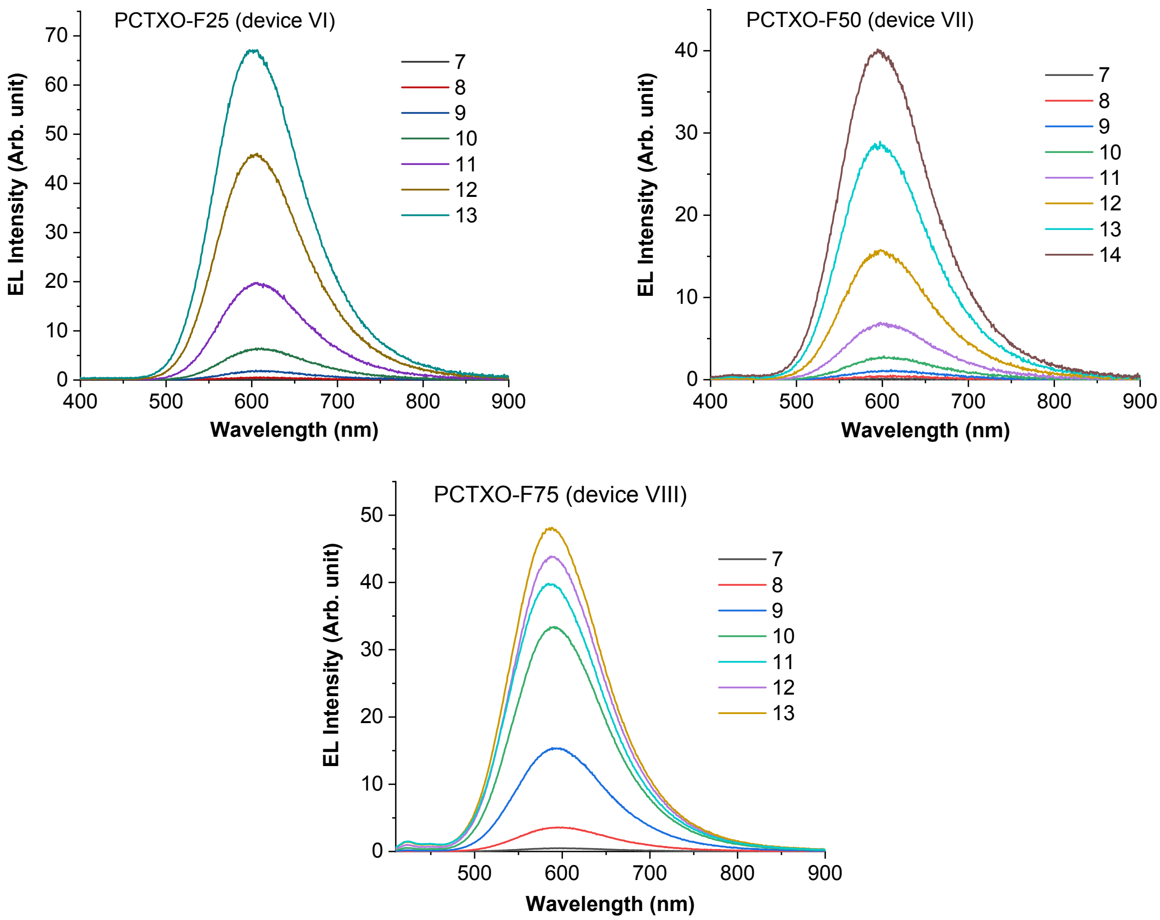
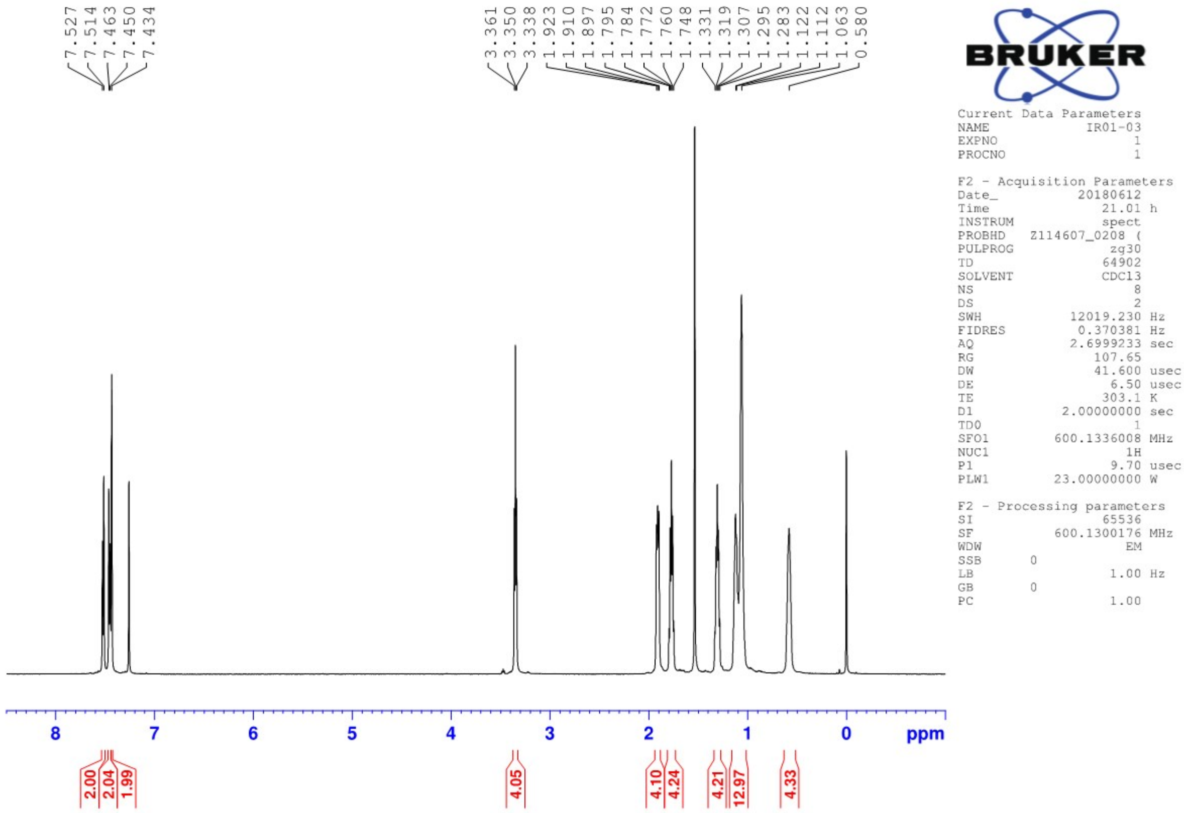
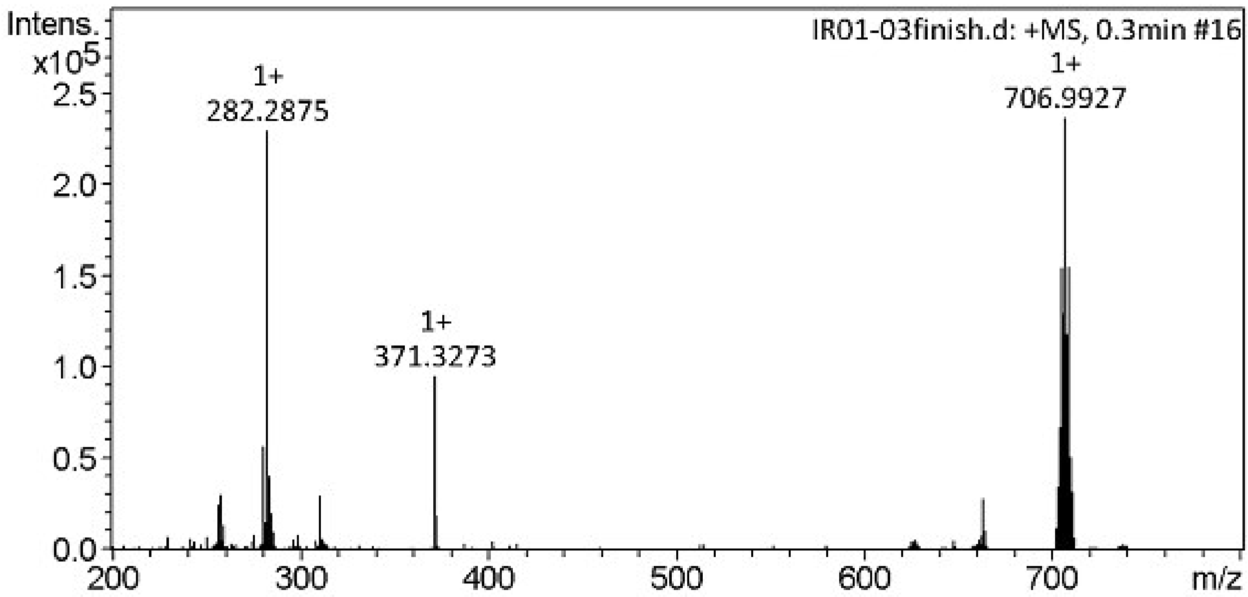


Fig. S13 EL spectra of **PCTXO-Fx**-based OLEDs (devices VI-VIII) at different applied voltages

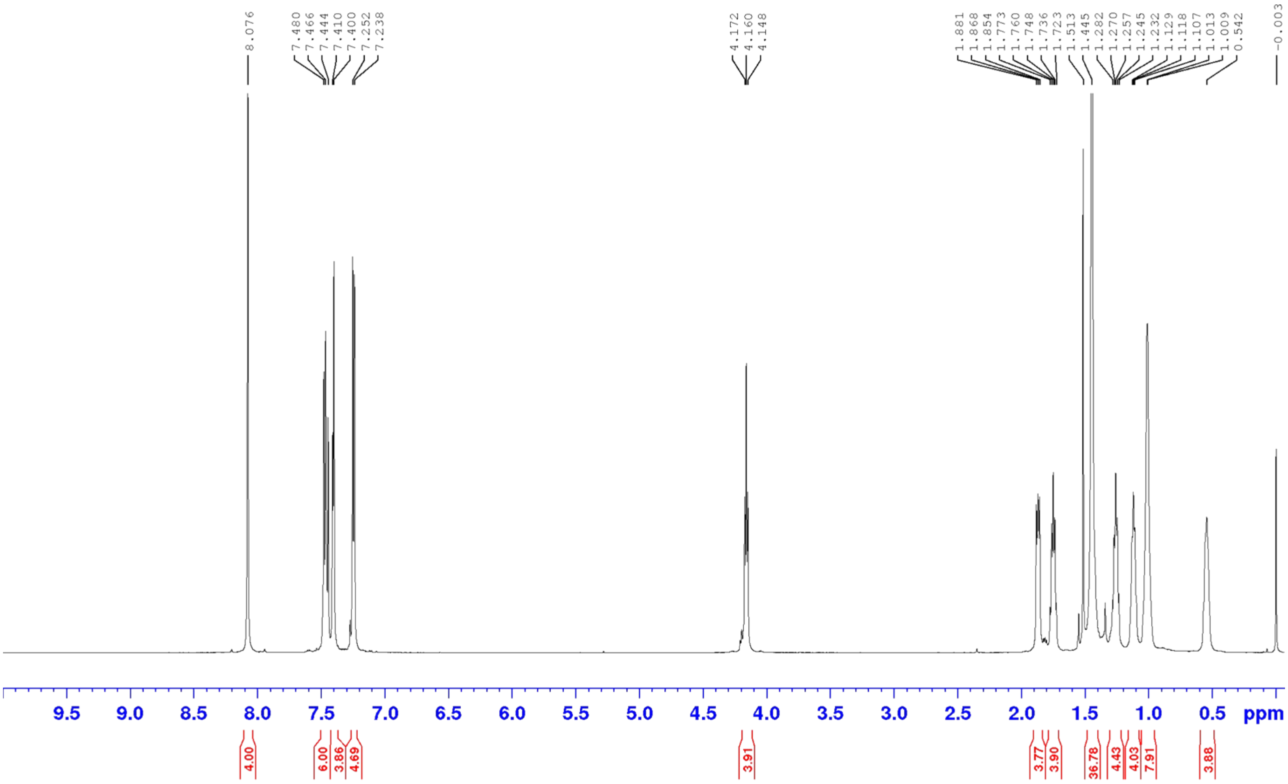
Fig. S14 Copies of NMR spectra and HRSM spectra of the intermediates.

Compound 2

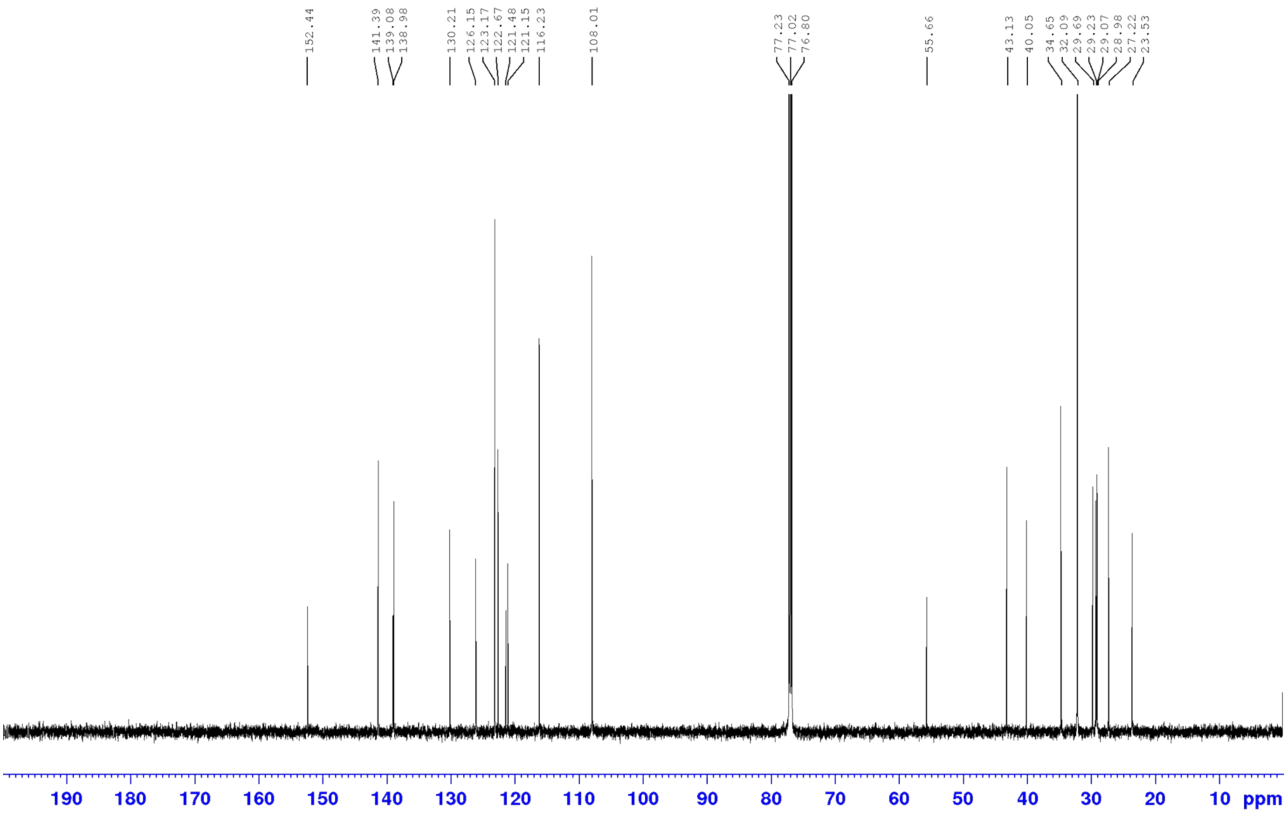




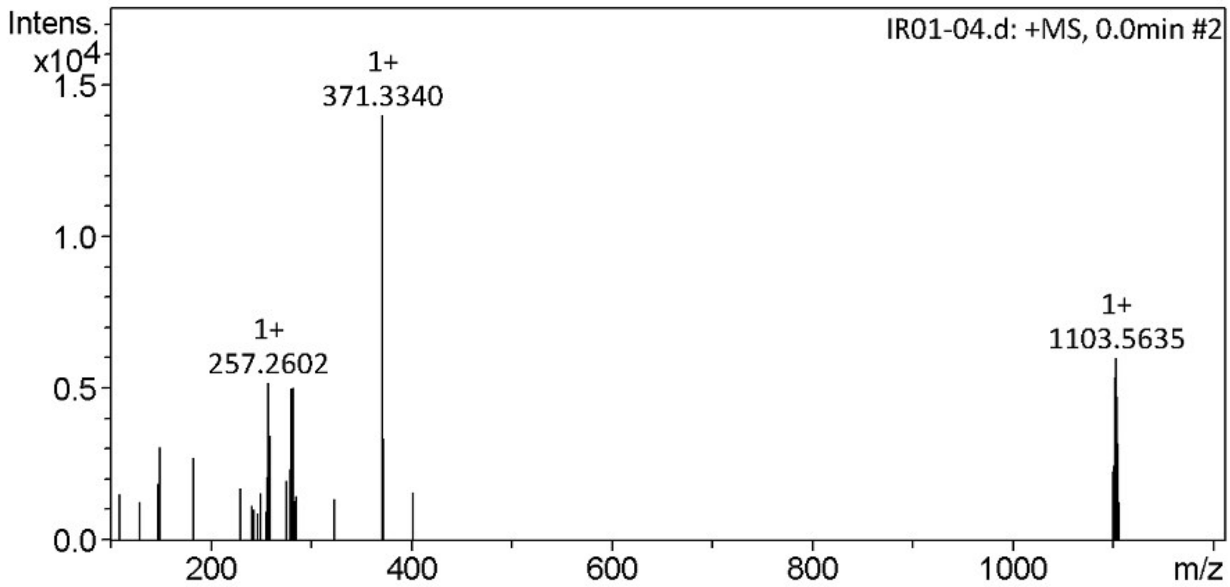
Compounds 3



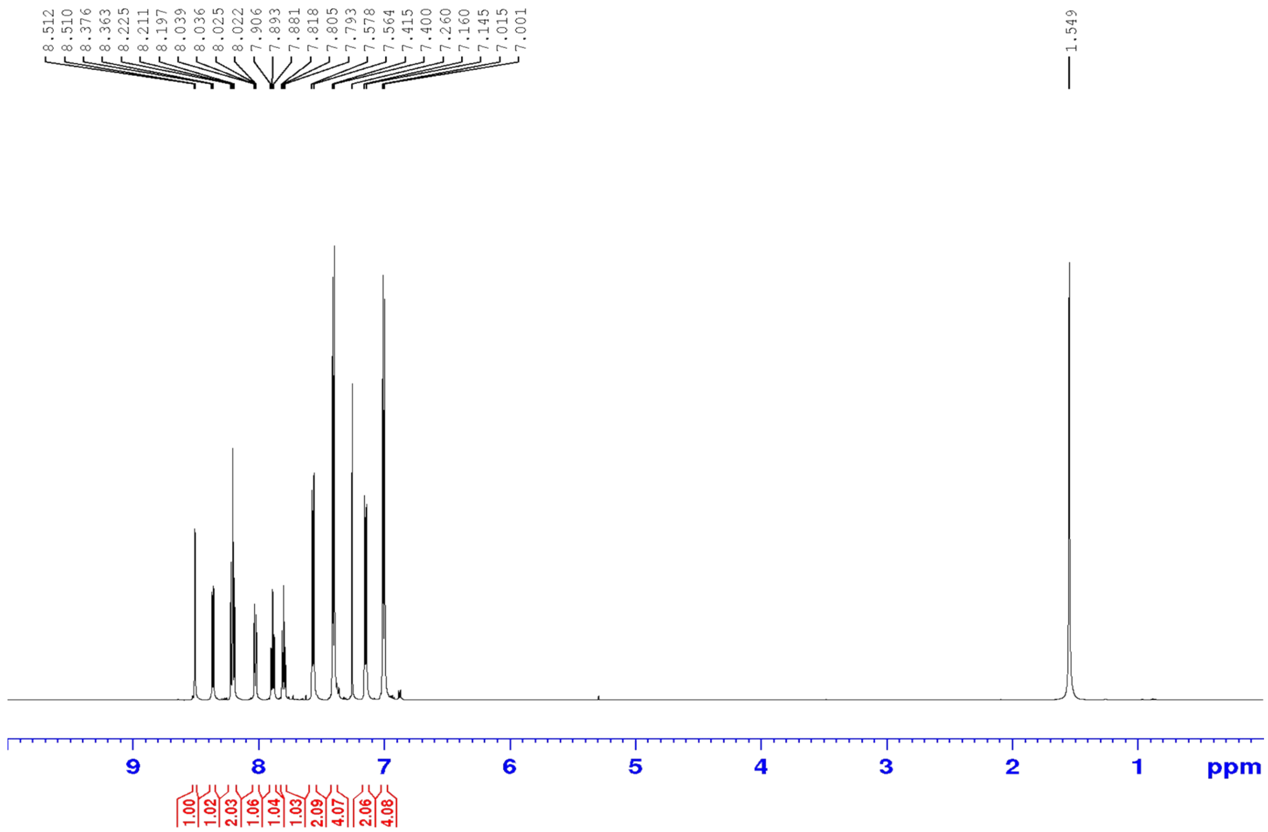
8.076
7.480
7.466
7.444
7.410
7.400
7.252
7.238
4.172
4.160
4.148
1.881
1.868
1.854
1.773
1.760
1.748
1.736
1.723
1.513
1.445
1.282
1.270
1.257
1.245
1.232
1.129
1.118
1.107
1.013
1.009
0.542
-0.003
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
4.00
6.00
3.86
4.69
3.91
3.77
3.90
36.78
4.43
4.03
7.91
3.88

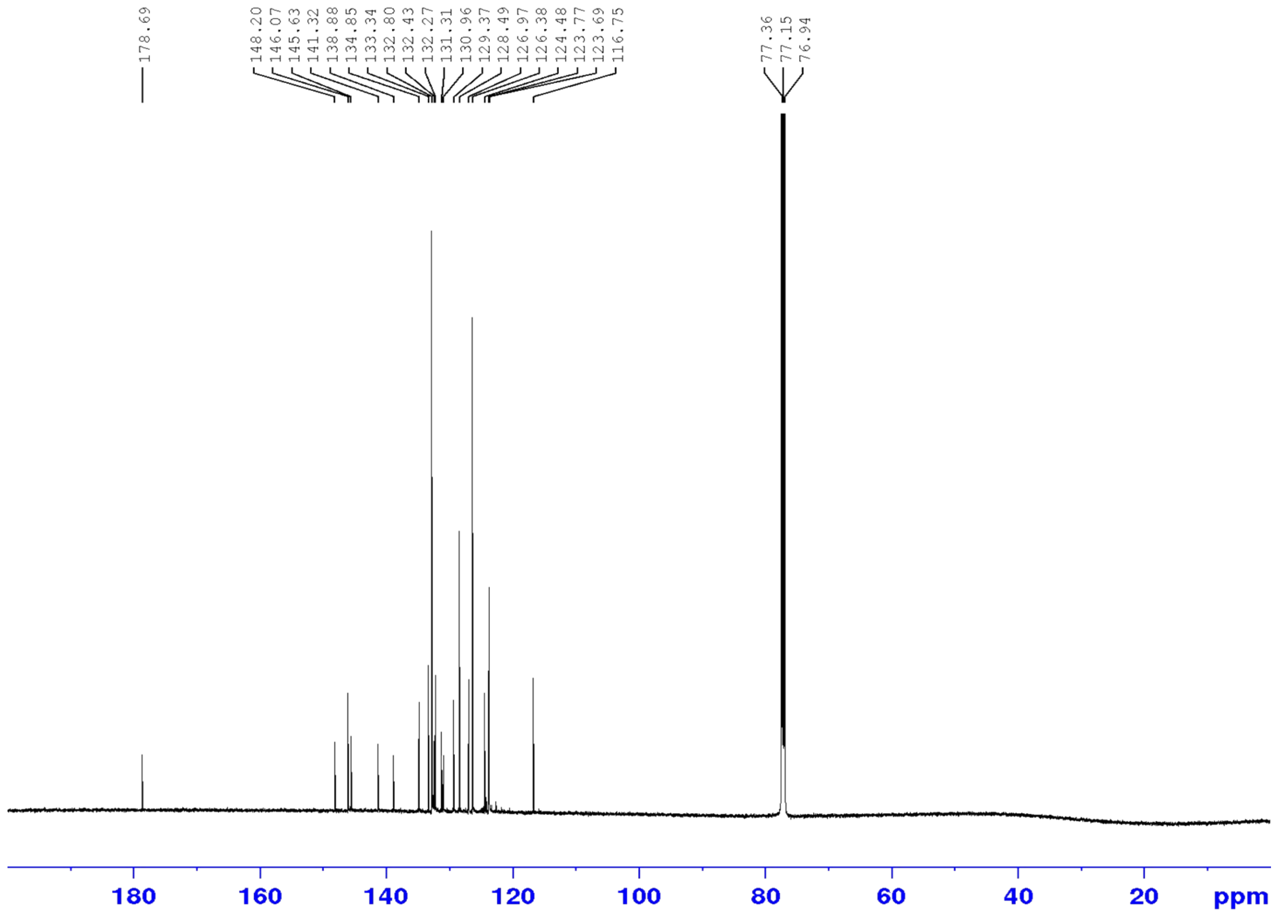


152.44
141.39
139.08
138.98
130.21
126.15
123.17
122.67
121.48
121.15
116.23
108.01
77.23
77.02
76.80
55.66
43.13
40.05
34.65
32.09
29.69
29.23
29.07
28.98
27.22
23.53
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 ppm


Intens.
x10^4
IR01-04.d: +MS, 0.0min #2
1+
371.3340
1+
257.2602
1+
1103.5635
m/z

Compound 5


8.512
8.510
8.376
8.363
8.225
8.211
8.197
8.039
8.036
8.025
8.022
7.906
7.893
7.881
7.818
7.805
7.793
7.578
7.564
7.415
7.400
7.260
7.160
7.145
7.015
7.001
1.549
ppm
1.00
1.02
2.03
1.06
1.04
1.03
2.09
4.07
2.06
4.08


178.69
148.20
146.07
145.63
141.32
138.88
134.85
133.34
132.80
132.43
132.27
131.31
130.96
129.37
128.49
126.97
126.38
124.48
123.77
123.69
116.75
77.36
77.15
76.94
180
160
140
120
100
80
60
40
20
ppm