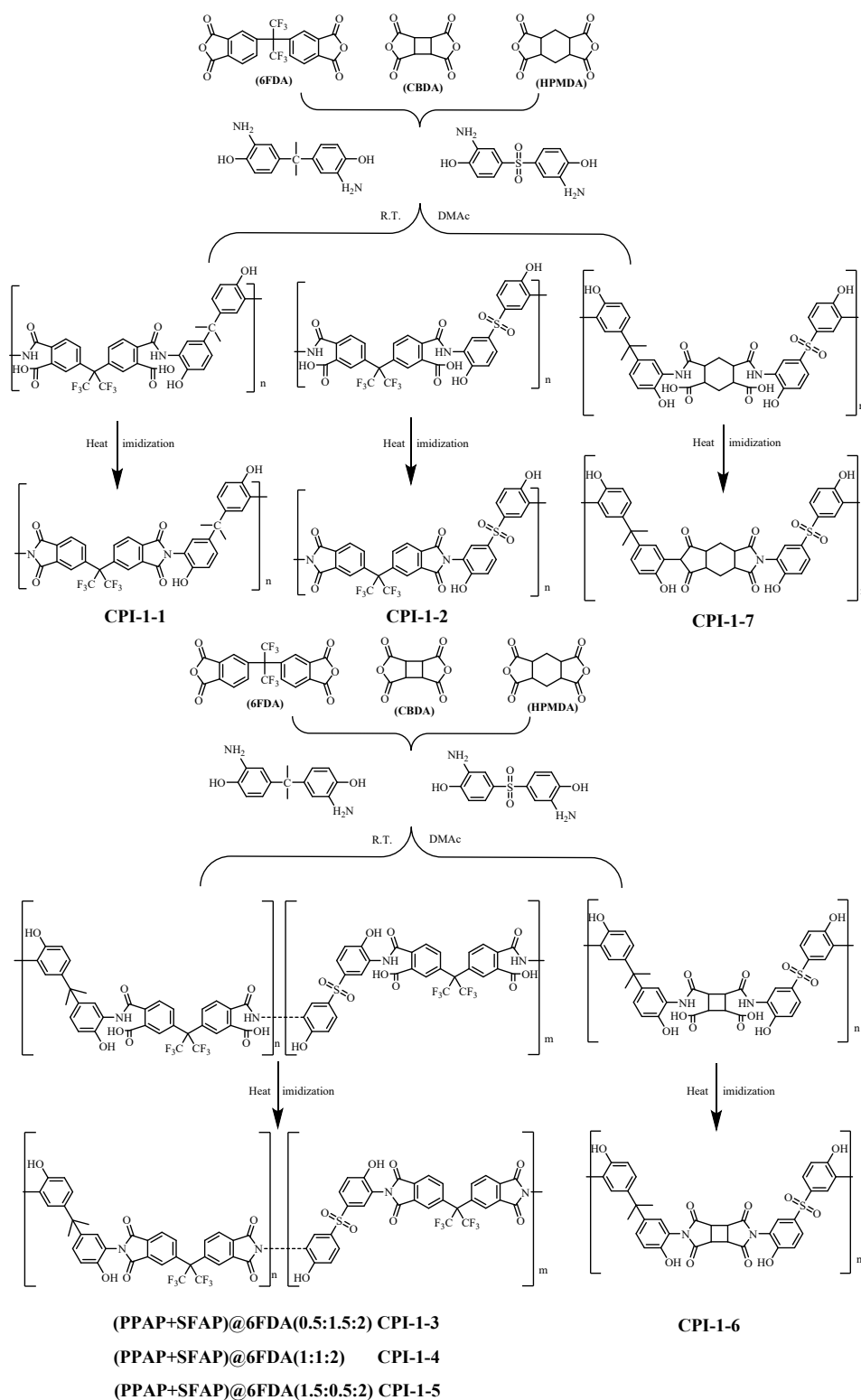


Supplementary information

1. Synthesis route of transparent polyimide.



Scheme S1. Synthetic routes of CPI-1-1, CPI-1-2, CPI-1-3, CPI-1-4, CPI-1-5, CPI-1-6, CPI-1-7

2. Molecular structure confirmation

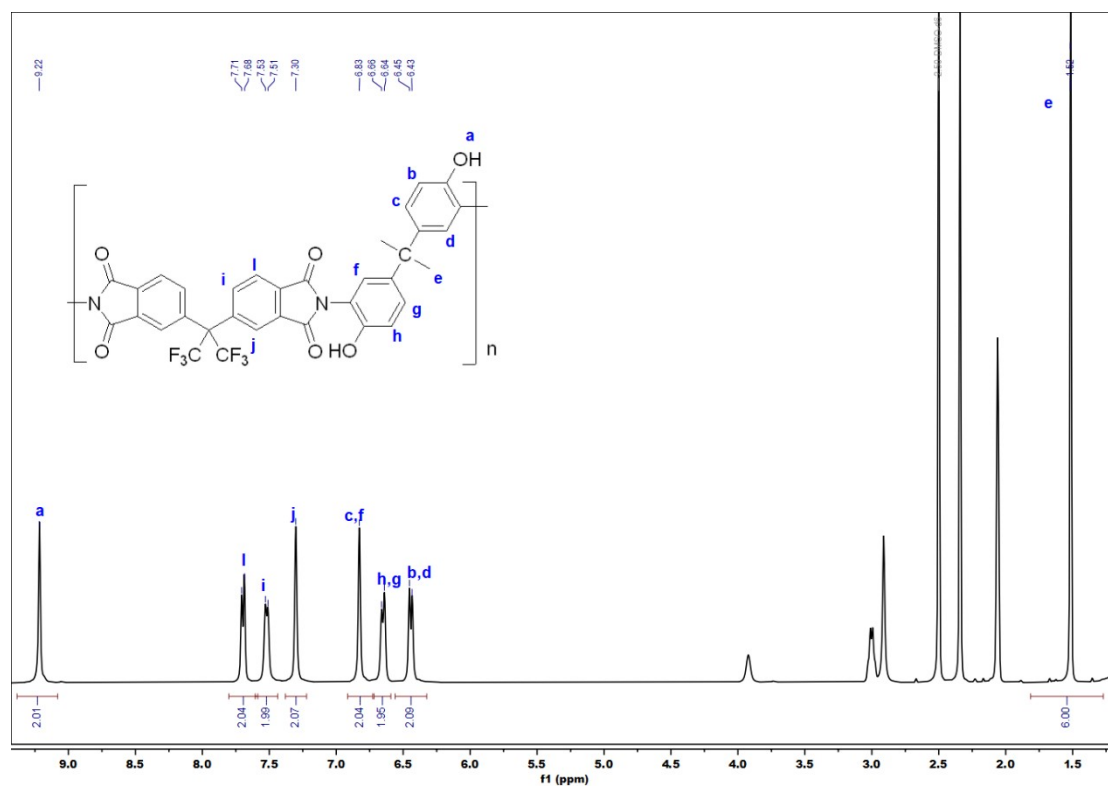


Figure S1. ¹H NMR of CPI-1-1

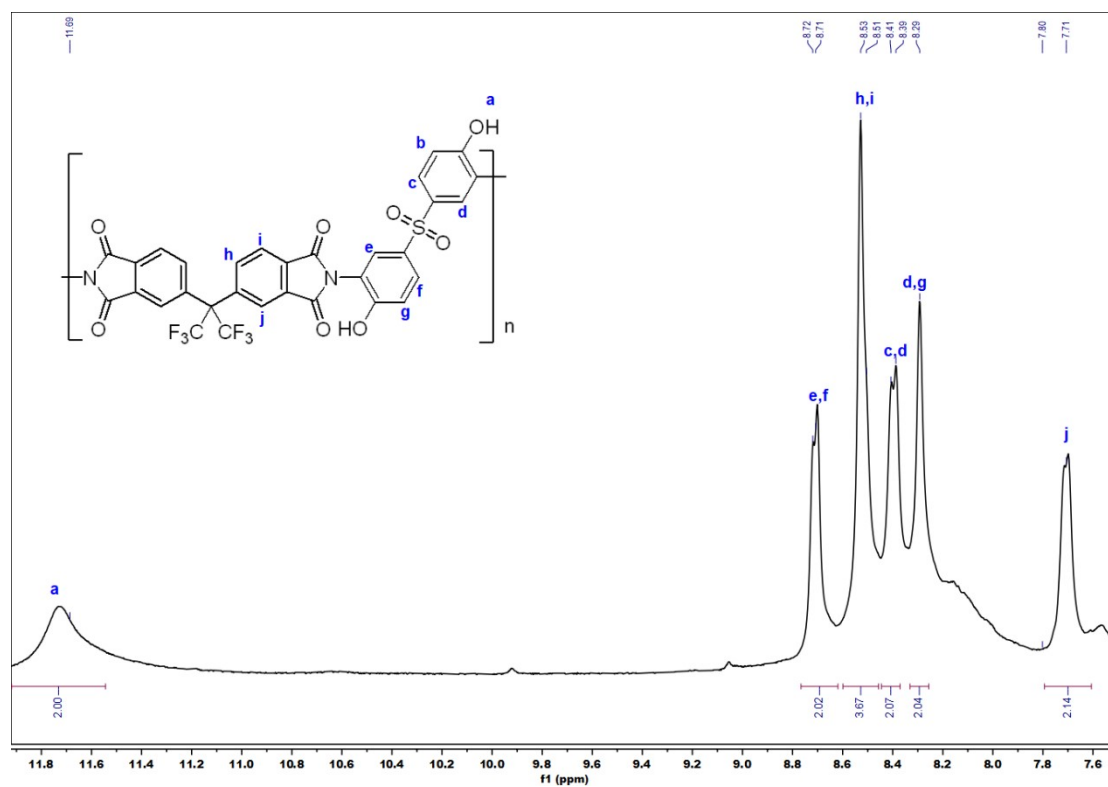


Figure S2. ^1H NMR of **CPI-1-2**

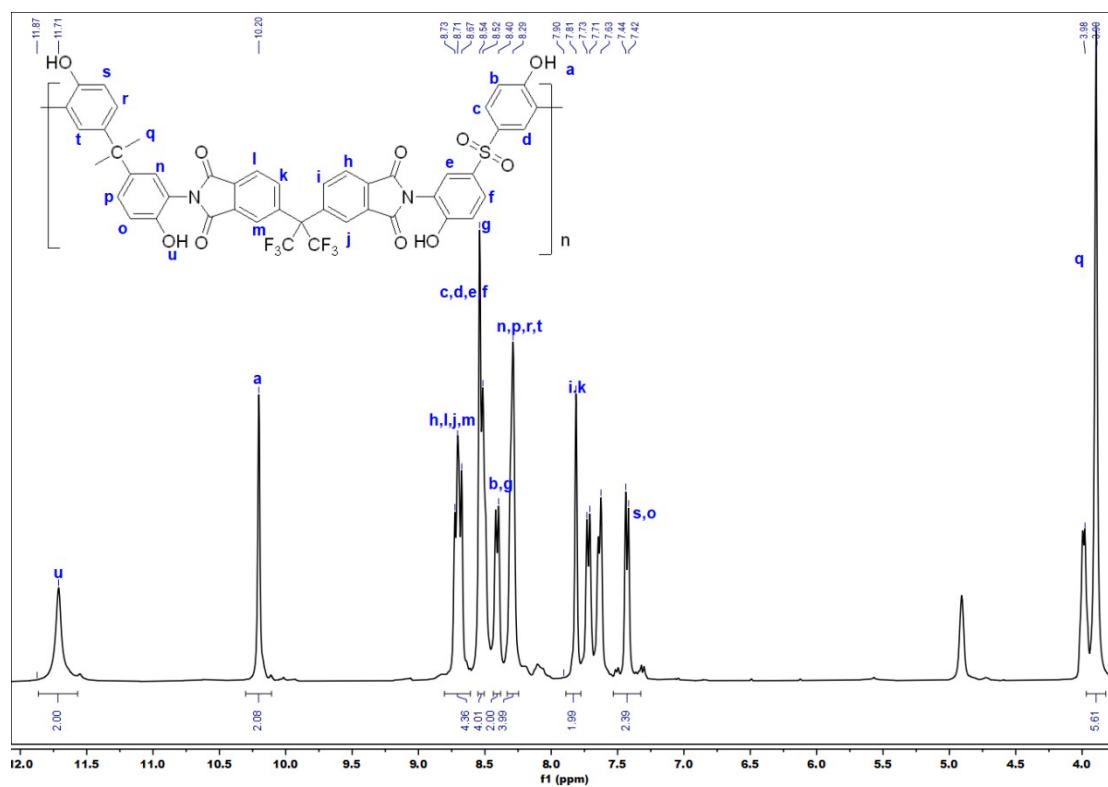


Figure S3. ^1H NMR of **CPI-1-4**

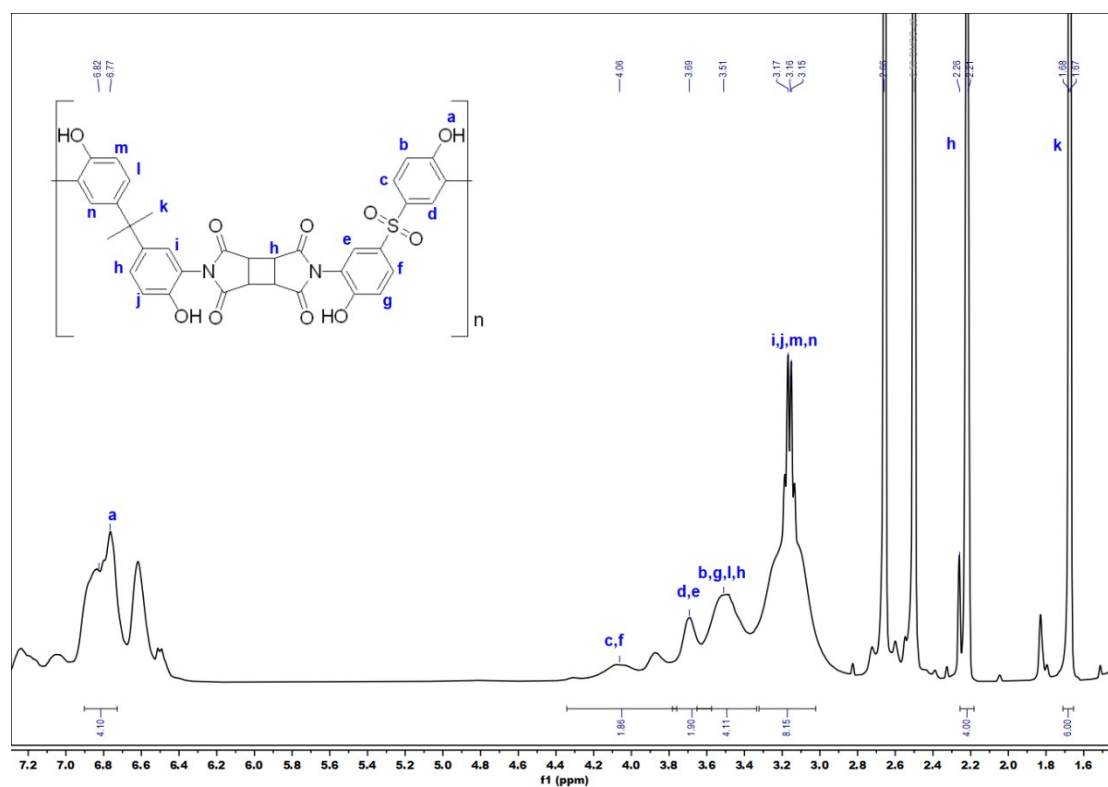


Figure S4. ^1H NMR of **CPI-1-6**

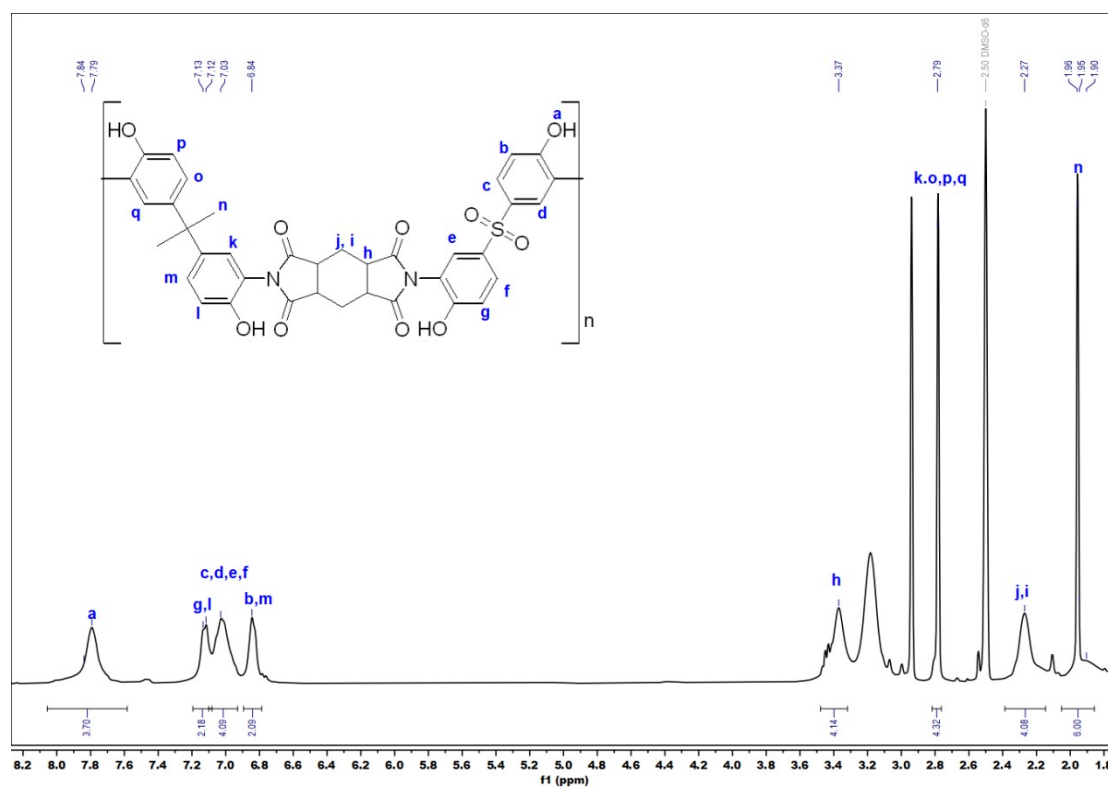


Figure S5. ¹H NMR of CPI-1-7

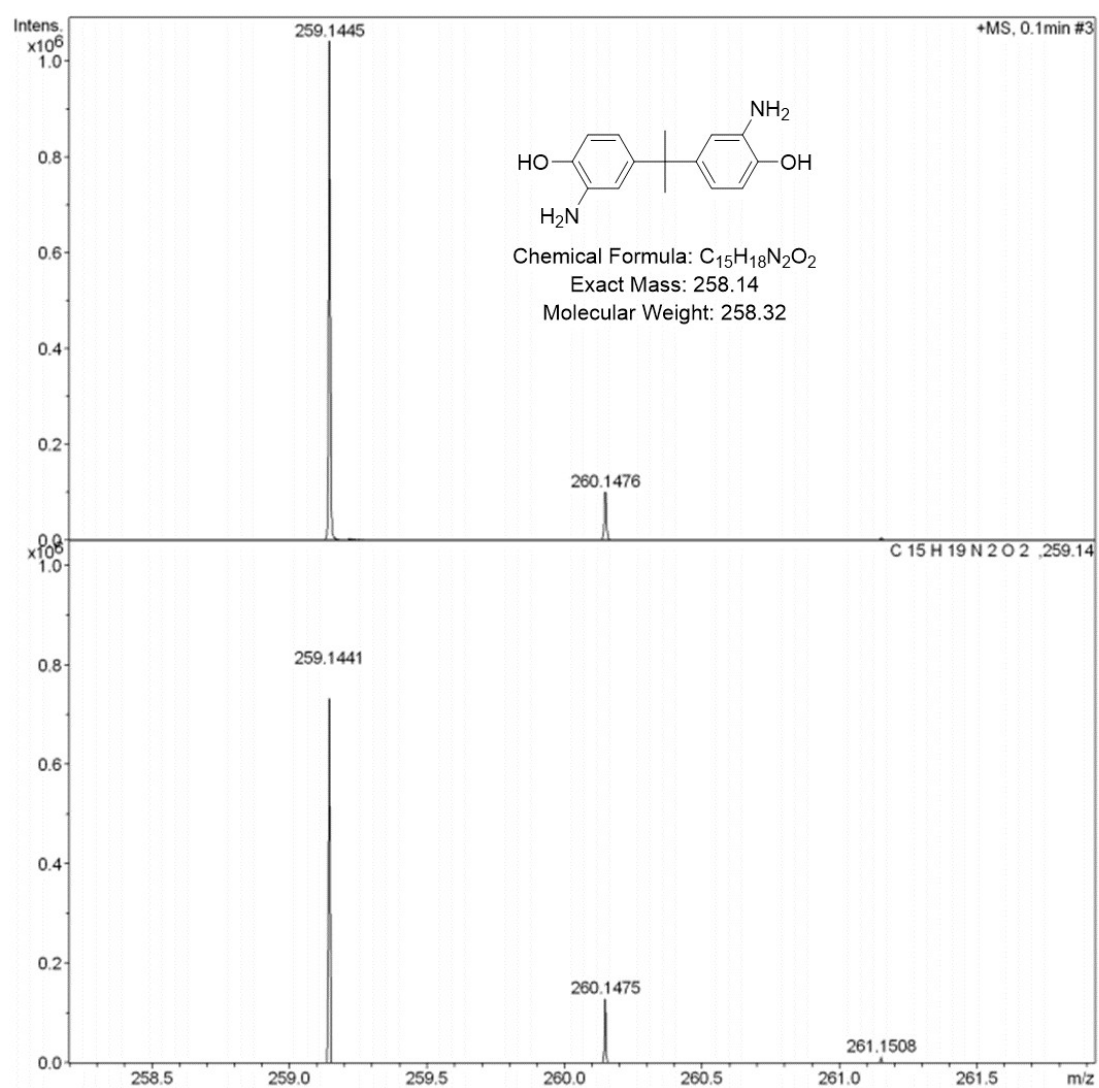


Figure S6. GC-MS of PPAP.

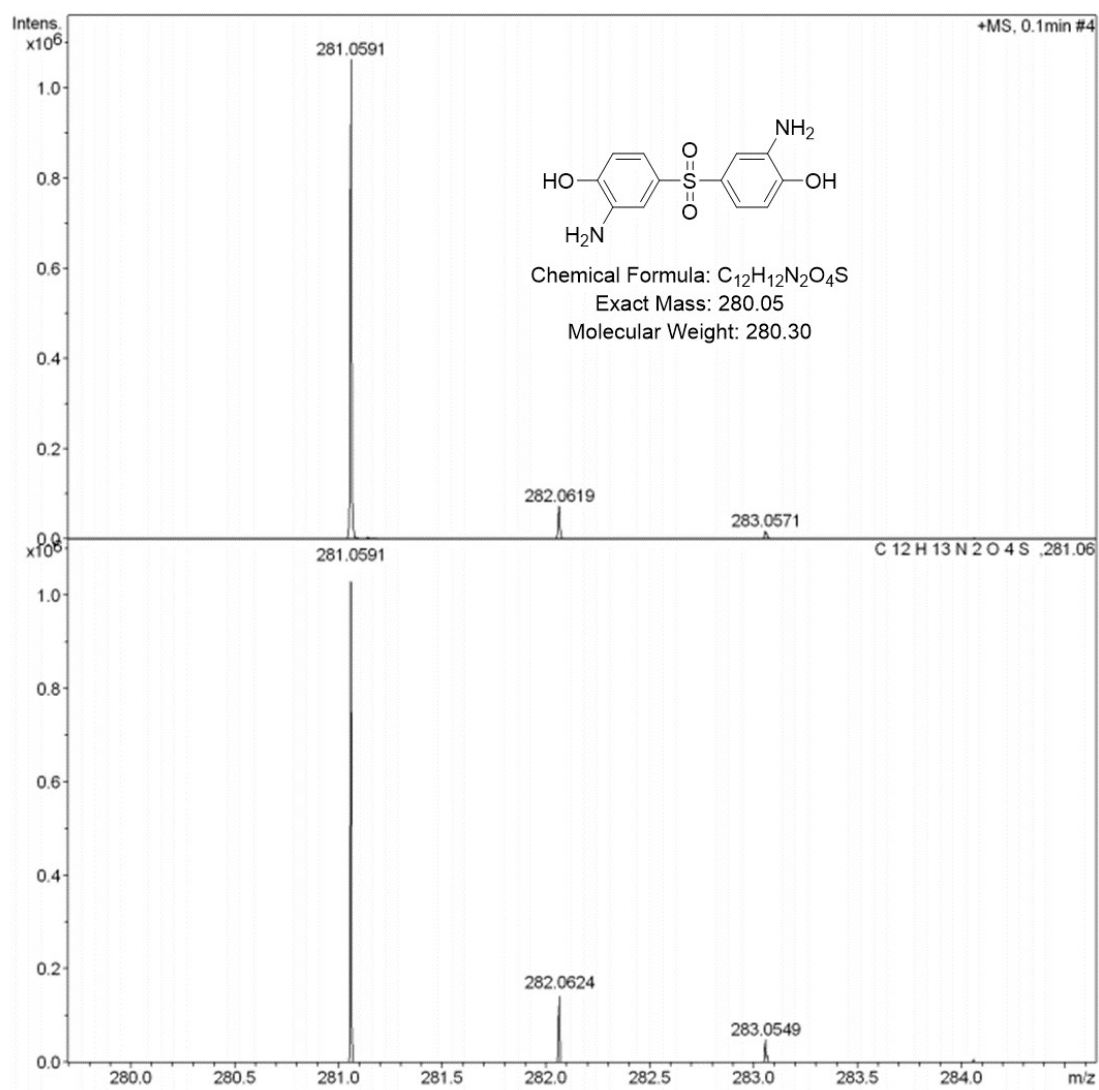
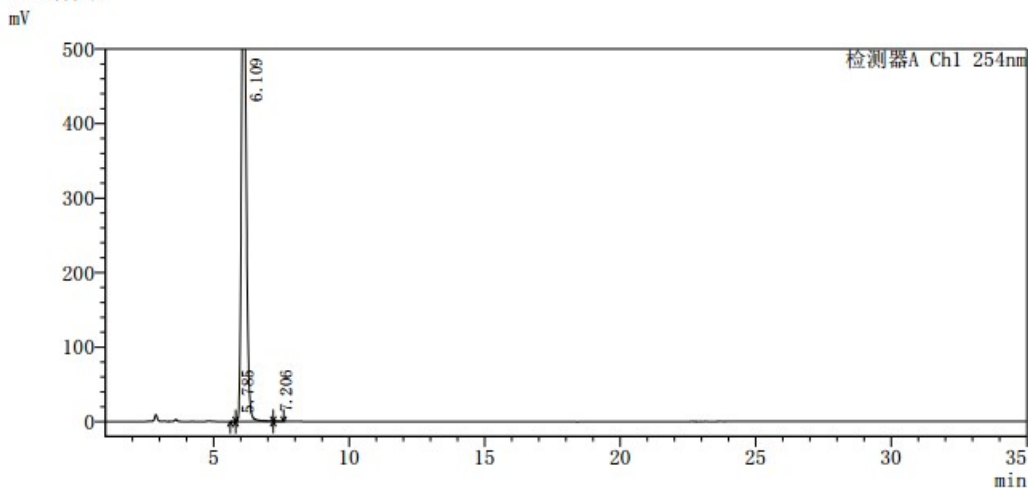


Figure S7. GC-MS of SFAP.

＜样品信息＞

样品名 : 20AT-240717-L12#-A8-PPAP-2020709-1
 数据文件名 : 20AT-240717-L12#-A8-PPAP-2020709-1.lcd
 样品瓶号 : 1-5 样品类型 :
 进样体积 : 2 uL
 分析日期 : 2024/7/17 10:52:13 分析者 :
 处理日期 : 2024/8/9 14:34:21 处理者 :

＜色谱图＞



＜峰表＞

检测器A Ch1 254nm

峰号	保留时间	面积	高度	浓度	化合物名
1	5.785	466	66	0.0056	
2	6.109	8280265	731941	99.9533	PPAP
3	7.206	3406	324	0.0411	
总计		8284137	732331		

Figure S8. HPLC of PPAP

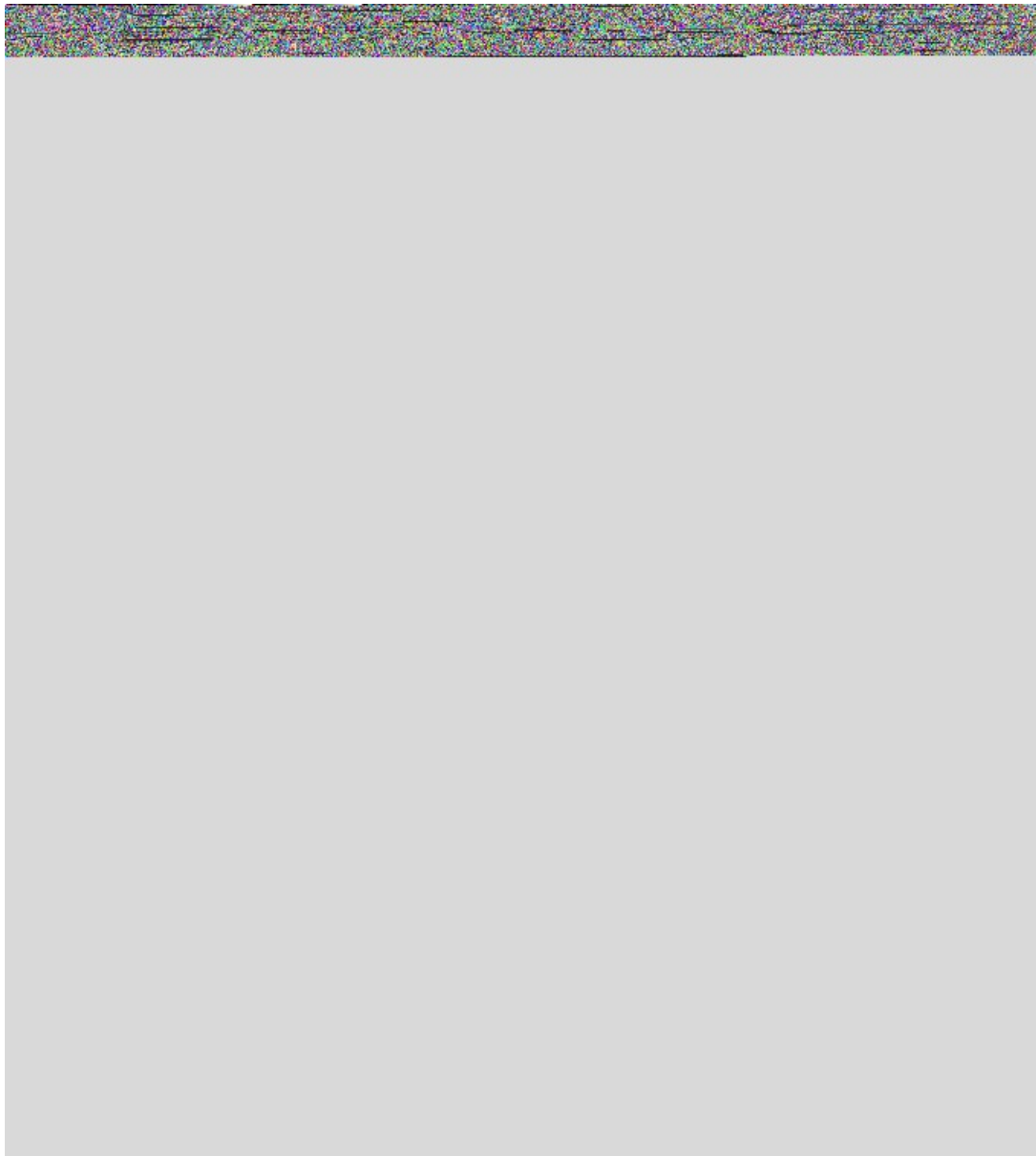


Figure S9. HPLC of SFAP

MW Averages

Mp: 257689

Mn: 176389

Mv: 245252

Mw: 258446

Mz: 356356

Mz+1: 463466

PD: 1.4652

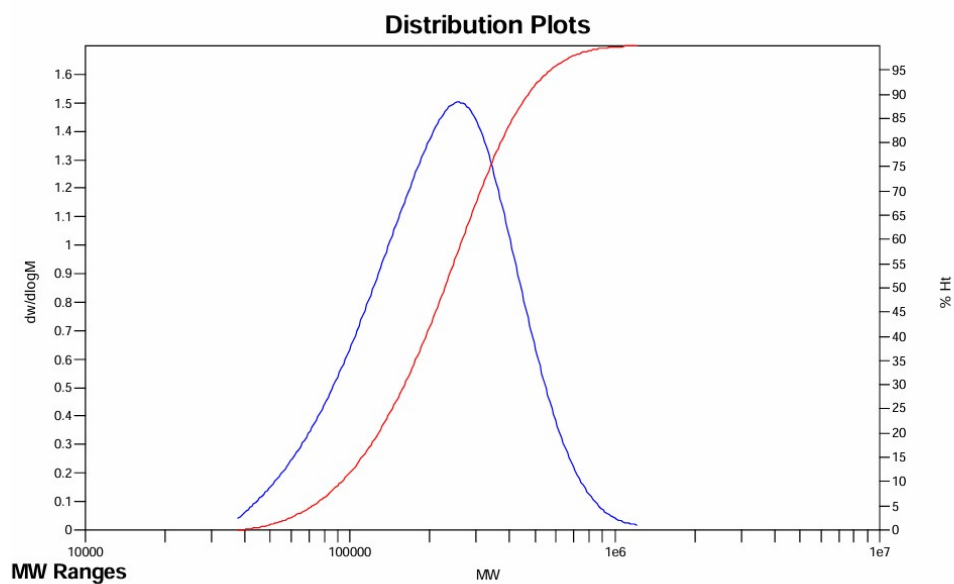


Figure S10. GPC of CPI-1-1

FRCF: 1.0000

MW Averages

Mp: 40430

Mn: 34264

Mv: 41892

Mw: 43404

Mz: 54479

Mz+1: 66275

PD: 1.2668

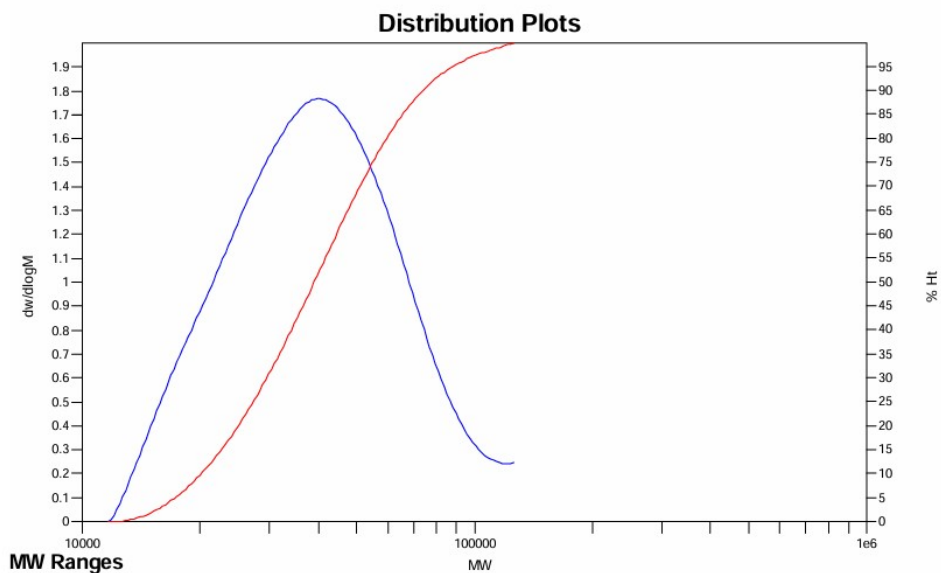


Figure S11. GPC of CPI-1-2

MW Averages

Mp: 88102 Mn: 60018 Mv: 86645 Mw: 91690
Mz: 127734 Mz+1: 161858 PD: 1.5277

Distribution Plots

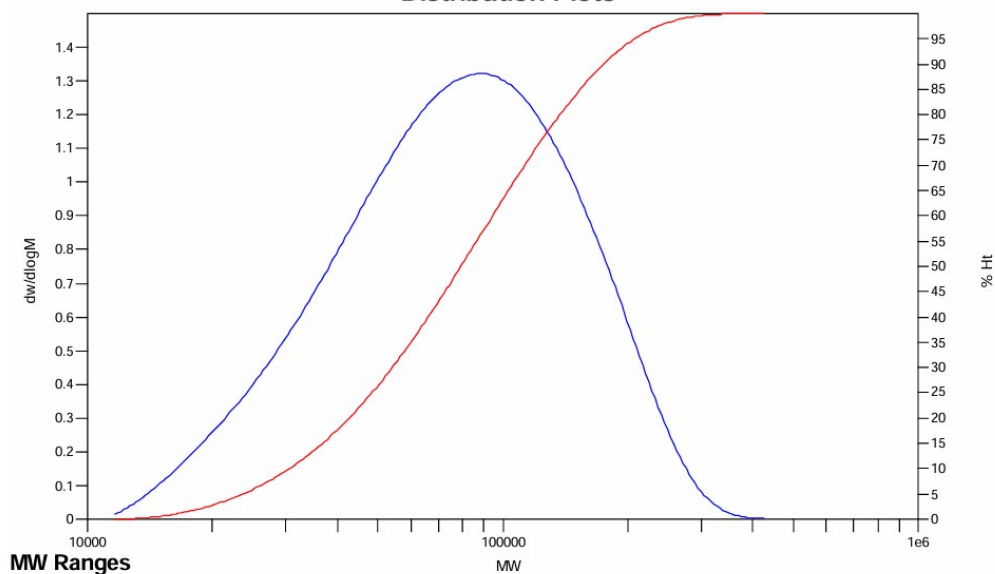


Figure S12. GPC of CPI-1-4

MW Averages

Mp: 36534 Mn: 31021 Mv: 39639 Mw: 41439
Mz: 55409 Mz+1: 72089 PD: 1.3358

Distribution Plots

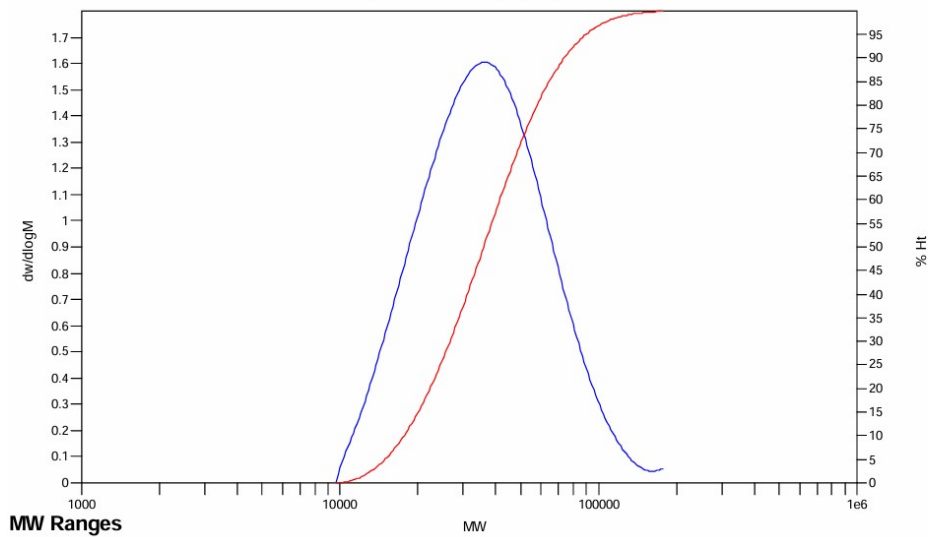


Figure S13. GPC of CPI-1-6

MW Averages

Mp: 37789

Mn: 29762

Mv: 37179

Mw: 38618

Mz: 49095

Mz+1: 60415

PD: 1.2976

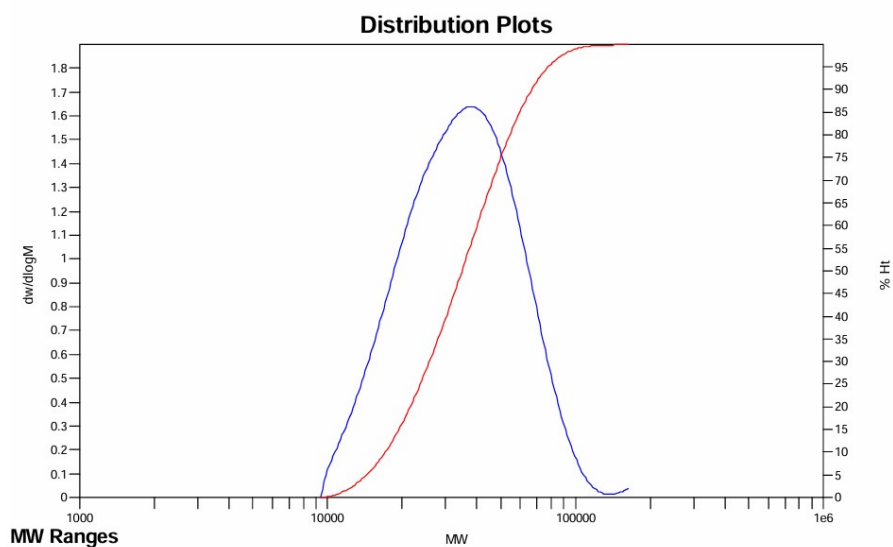


Figure S14. GPC of **CPI-1-7**

3. Application evaluation

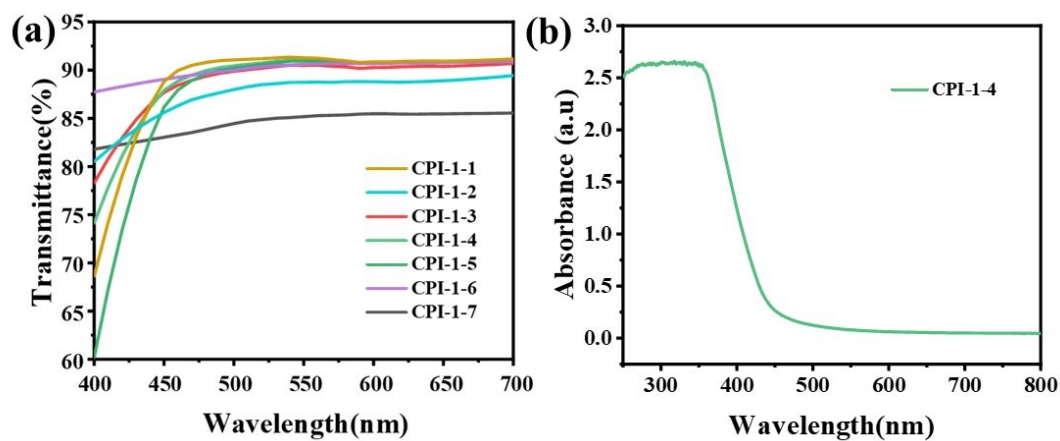


Figure S15. (a) UV-vis spectra of CPI films. (b) UV-vis absorption spectrum of **CPI-1-4** film



Figure S16. Digital images of CPI-1-X

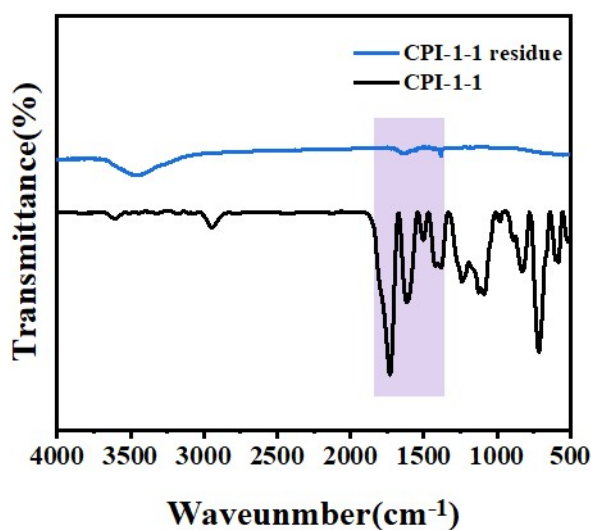


Figure S18. Comparative analysis of the FTIR spectra for **CPI-1-1** before and after TGA analysis.

CPI	Solvents ^a					
	DMAc	DMF	DMSO	DCE	THF	Toulene
CPI-1-1	+	+	+	-	-	-
CPI-1-2	+	+	-	-	-	-
CPI-1-3	+	+	+	-	-	-
CIP-1-4	+	+	+	-	-	-
CPI-1-5	+	+	+	-	-	-
CPI-1-6	+	+	+	-	-	-
CPI-1-7	+	+	+	-	-	-

a: The qualitative solubility was tested with 10 mg sample in 1 mL of solvent.

++: soluble at room temperature; +: soluble on heating; +/-: partial soluble on heating; -: insoluble.

Table S1. Soluble of the seven CPI films.

CPI	T _g ^a (%)
CPI-1-1	169.36±2.39
CPI-1-2	236.28±6.75
CPI-1-3	224.45±9.76
CPI-1-4	219.70±9.27
CPI-1-5	212.59±4.24
CPI-1-6	267.01±3.00
CPI-1-7	268.46±3.94

Tg^a: The values were determined by DSC and are reported as the mean ± standard deviation (n=3).

Table S2. Thermal properties of the CPI films.

CPI	Tensile Strength (MPa)	Tensile modulus (MPa)	Breaking Elongation (%)
CPI-1-1	22.07	0.10352	73.20
CPI-1-2	7.16	0.16691	41.78
CPI-1-3	6.23	0.46193	20.36
CPI-1-4	5.48	0.22291	24.27
CPI-1-5	13.22	0.22667	54.38

Table S3. Mechanical properties of the CPI films.