

Electronic supplementary information

Diels-Alder cycloaddition polymerization of highly aromatic polyimides and their multiblock copolymers

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Compound 3

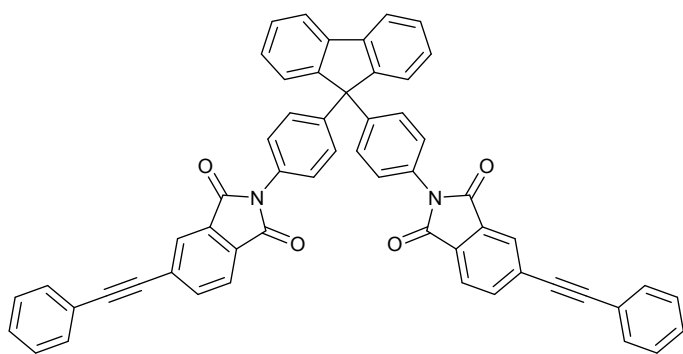


Figure ESI 1: Structure of compound 3

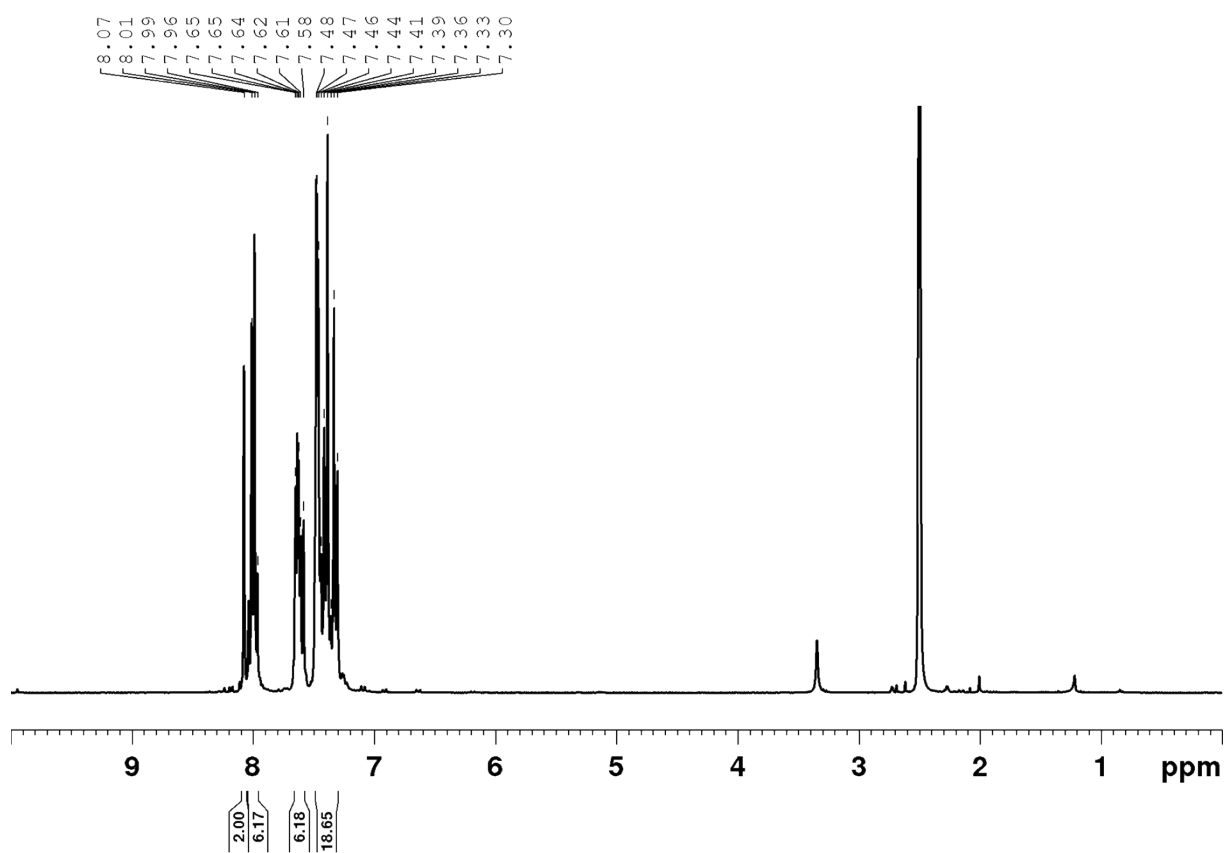


Figure ESI 2: ¹H-NMR of compound 3 in DMSO-d₆

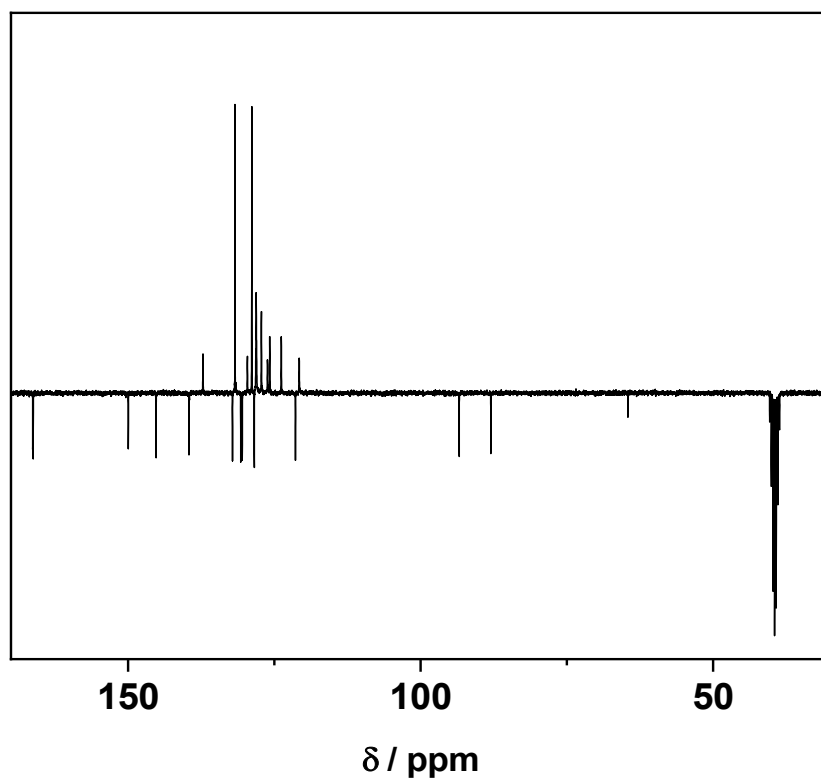


Figure ESI 3: ^{13}C -NMR of compound **3** in DMSO- d_6

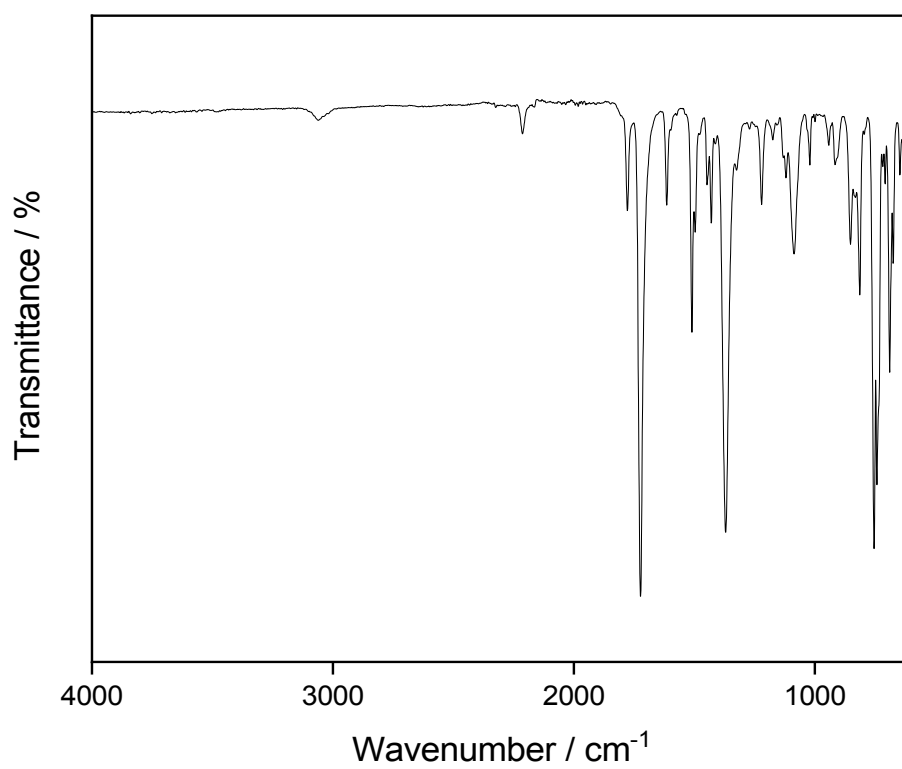


Figure ESI 4: FTIR-ATR of compound **3**

Compound 5

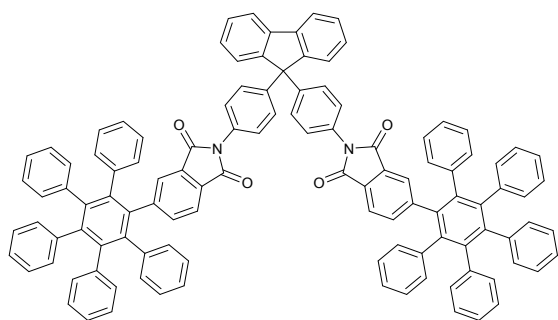


Figure ESI 5: Structure of compound 5

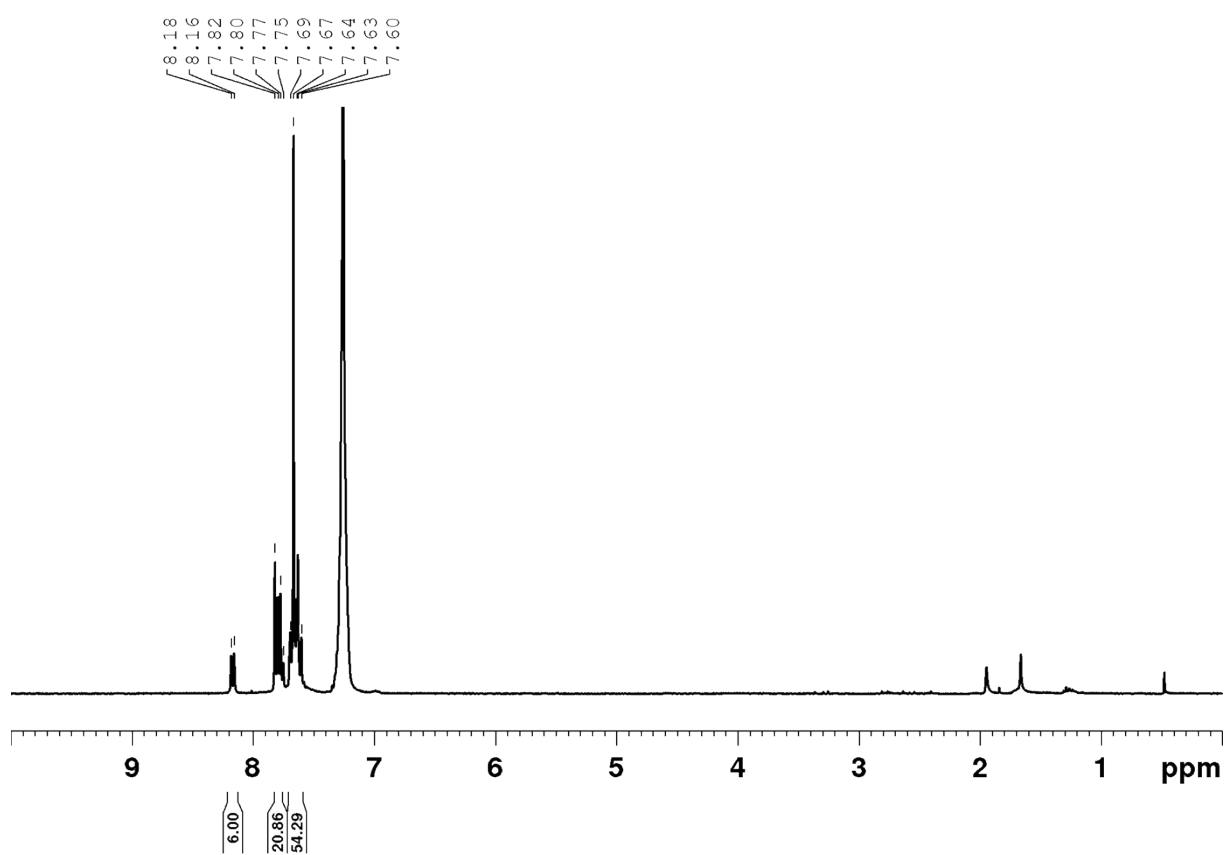


Figure ESI 6: ¹H-NMR of compound 5 in CDCl₃

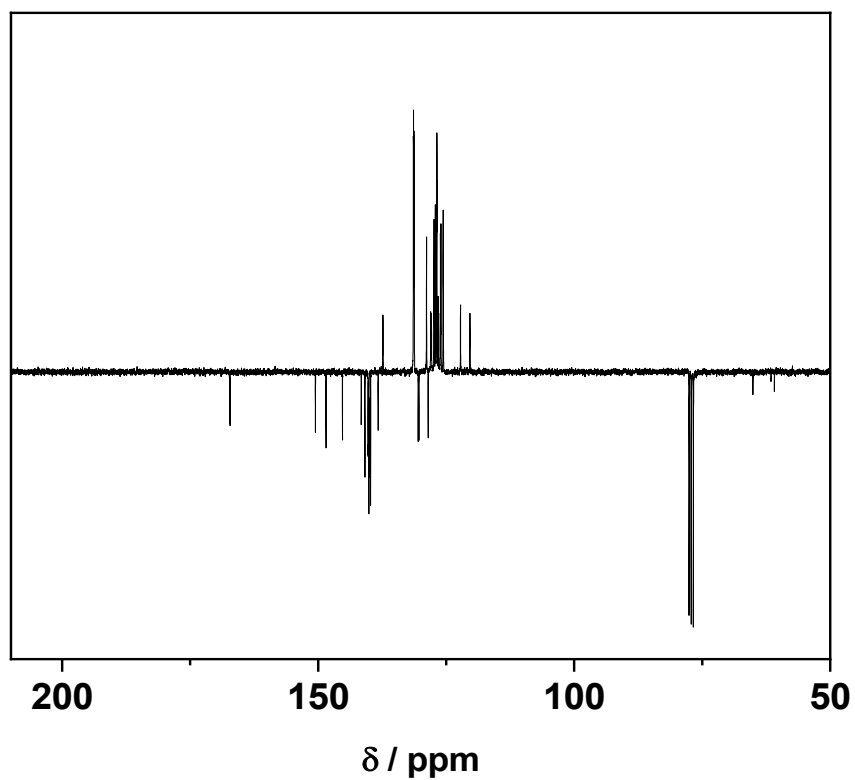


Figure ESI 7: ^{13}C -NMR of compound 5 in CDCl_3

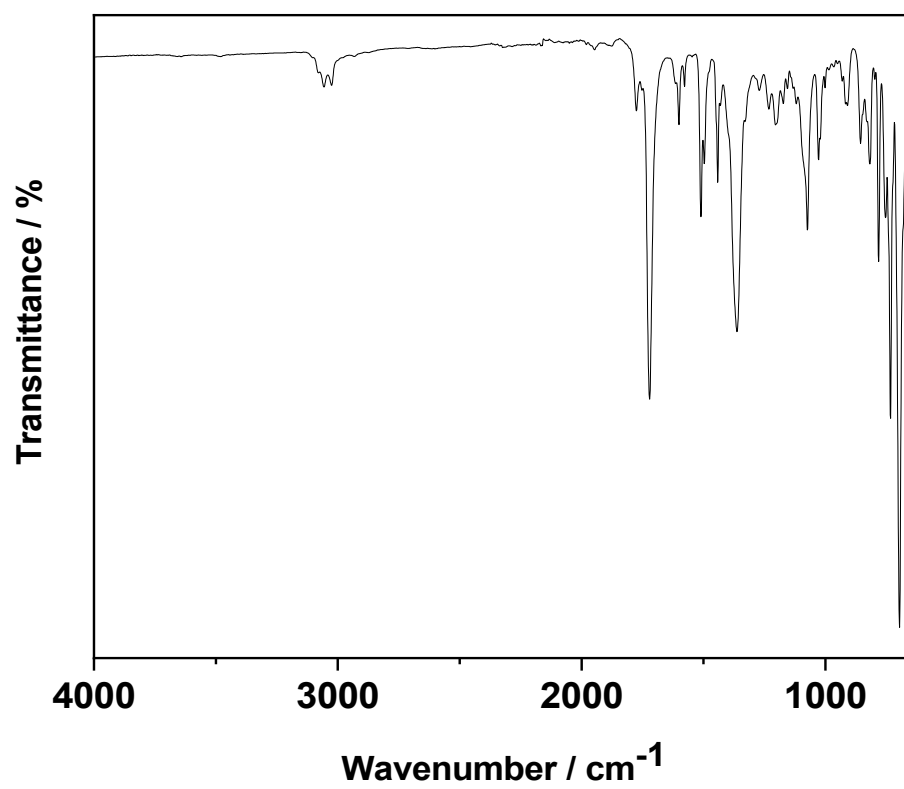


Figure ESI 8: FTIR-ATR of compound 5

Compound 6

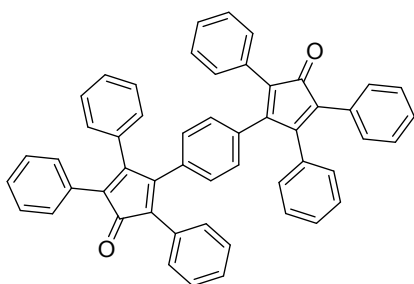


Figure ESI 9: Structure of compound 6

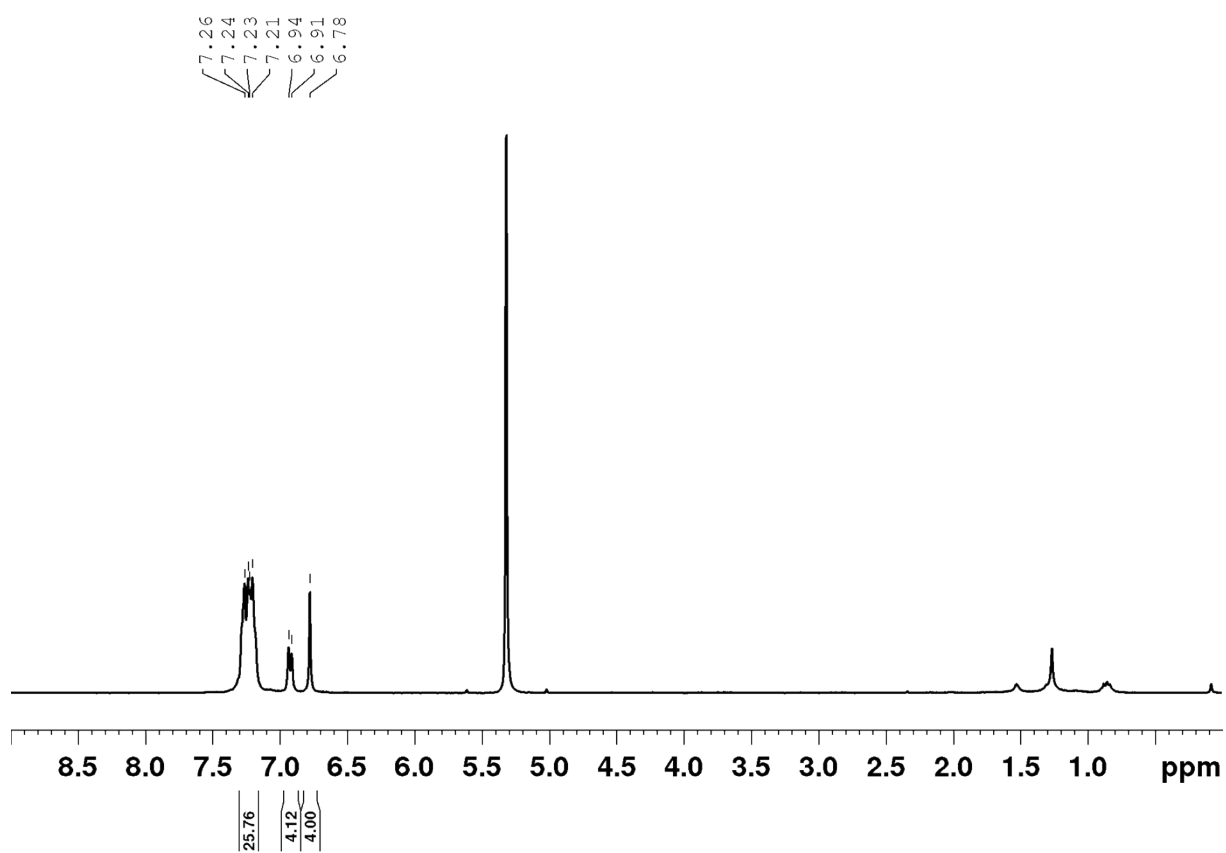


Figure ESI 10: $^1\text{H-NMR}$ of compound 6 in CD_2Cl_2

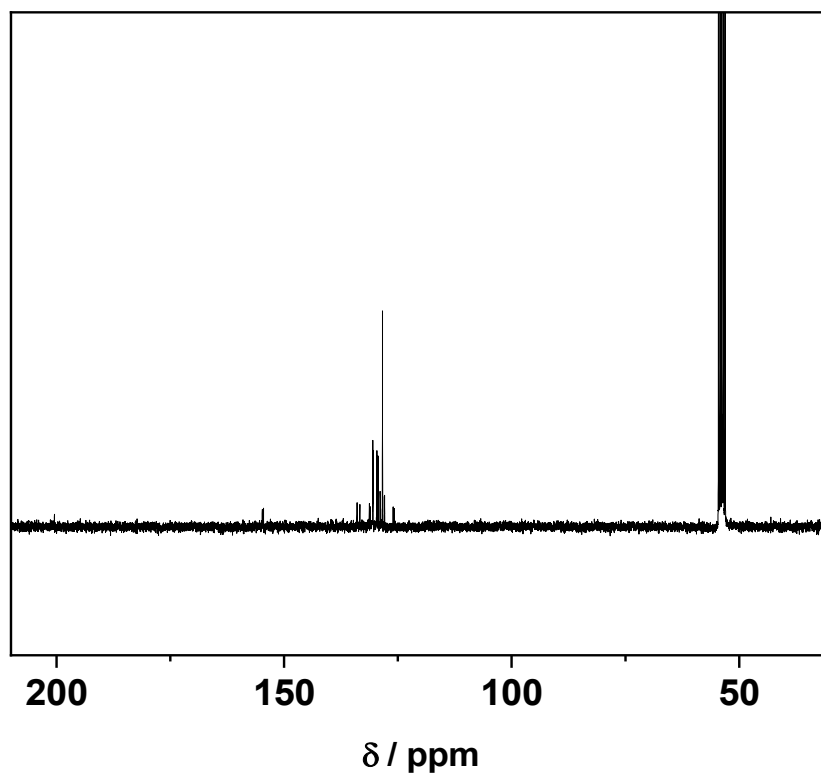


Figure ESI 11: ^{13}C -NMR of compound **6** in CD_2Cl_2

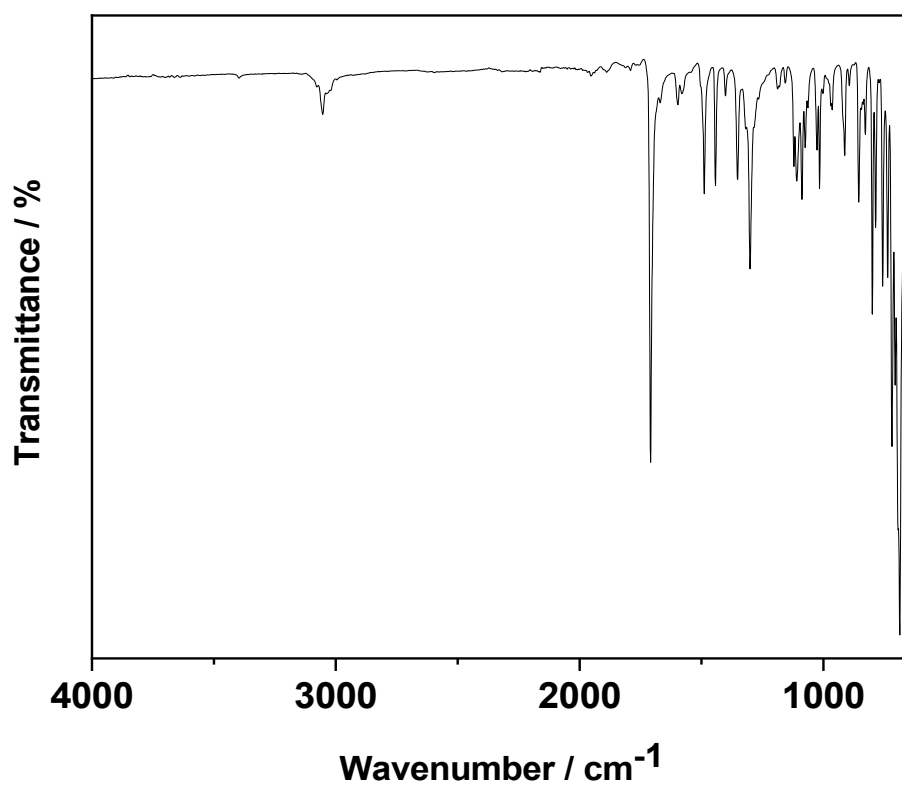


Figure ESI 12: FTIR-ATR of compound **6**

PI-1

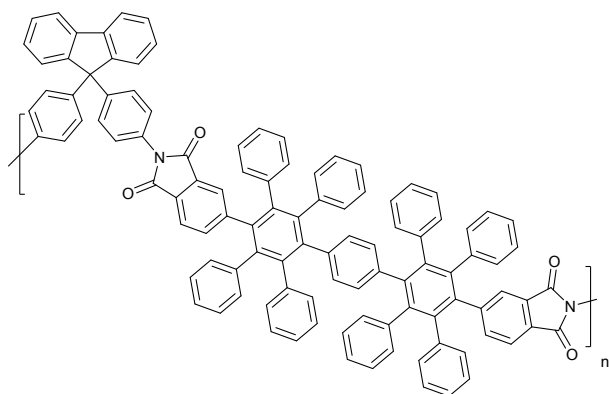


Figure ESI 13: Structure of PI-1

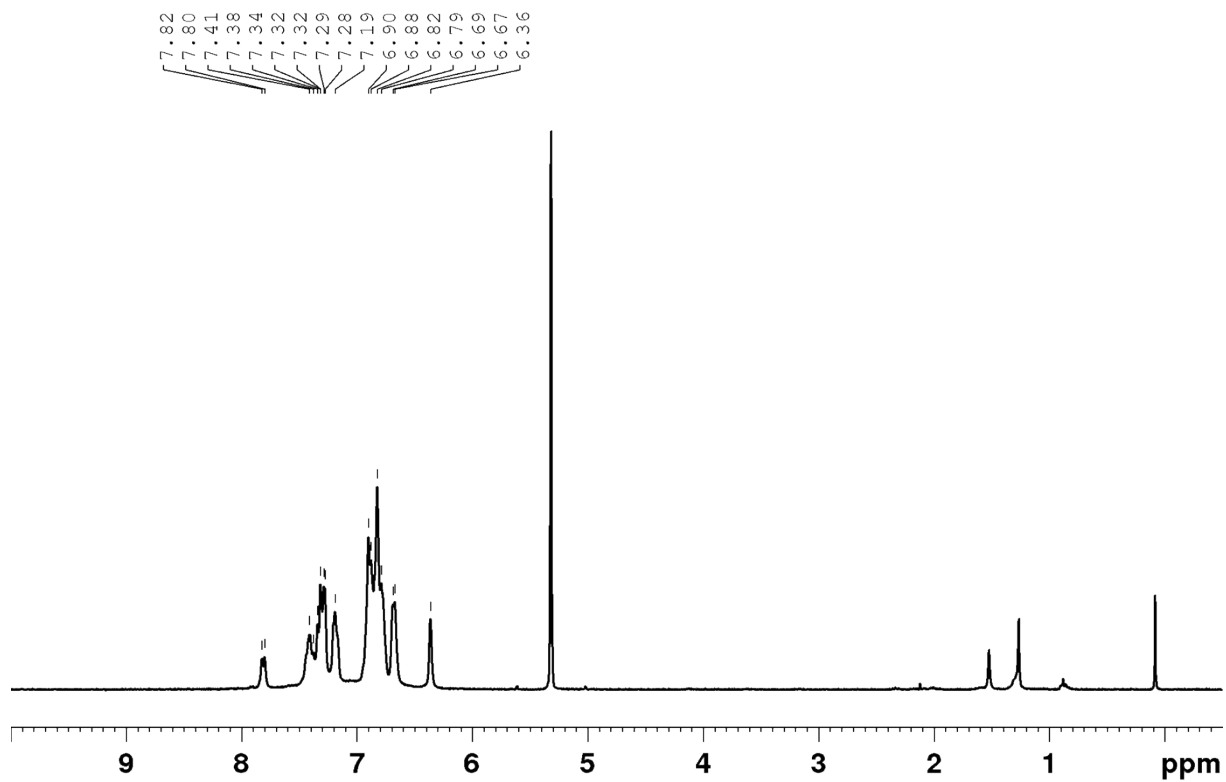


Figure ESI 14: ¹H-NMR of PI-1 in CD₂Cl₂

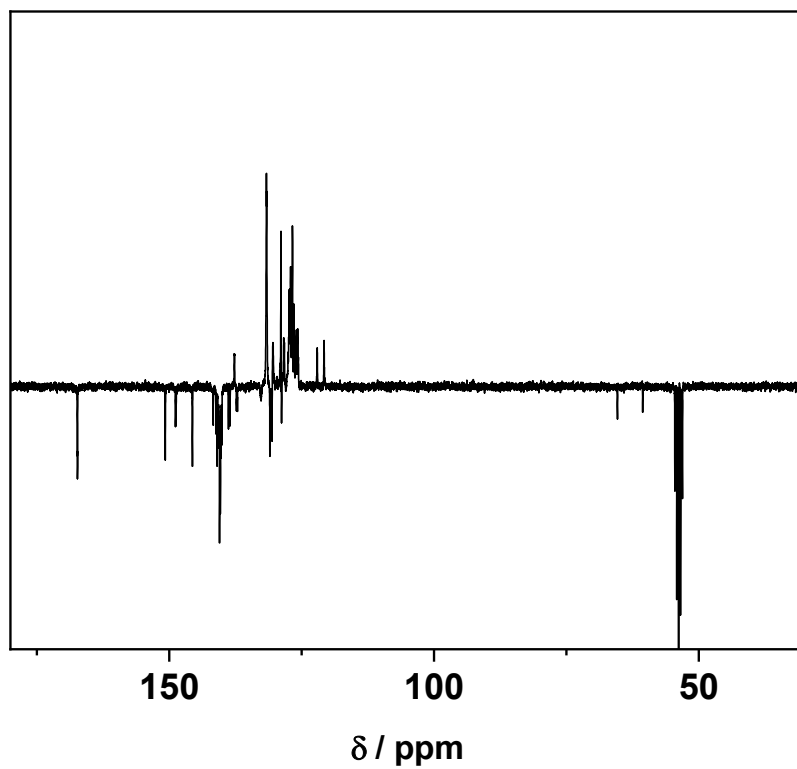


Figure ESI 15: ^{13}C -NMR of PI-1 in CD_2Cl_2

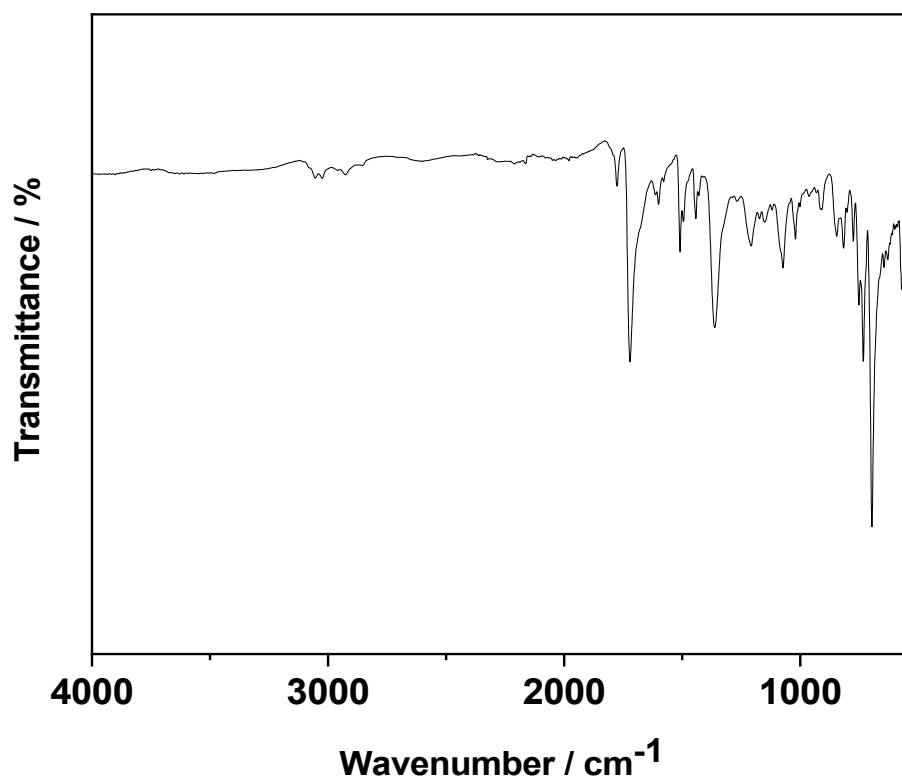


Figure ESI 16: FTIR-ATR of PI-1

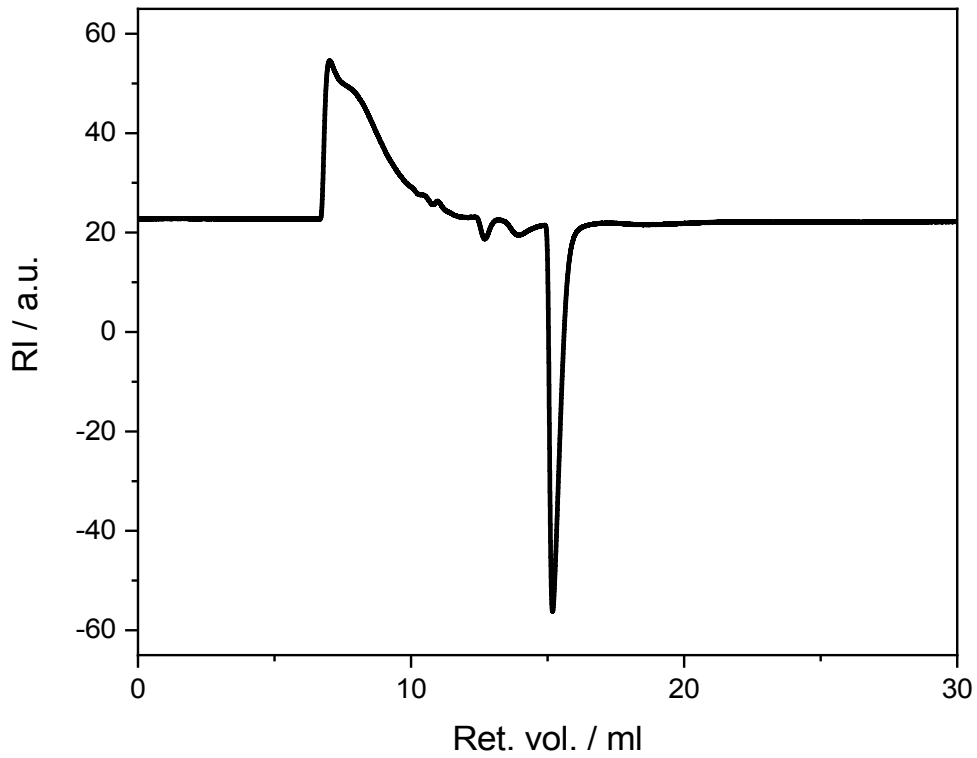


Figure ESI 17: Refractive index detector response of SEC of PI-1

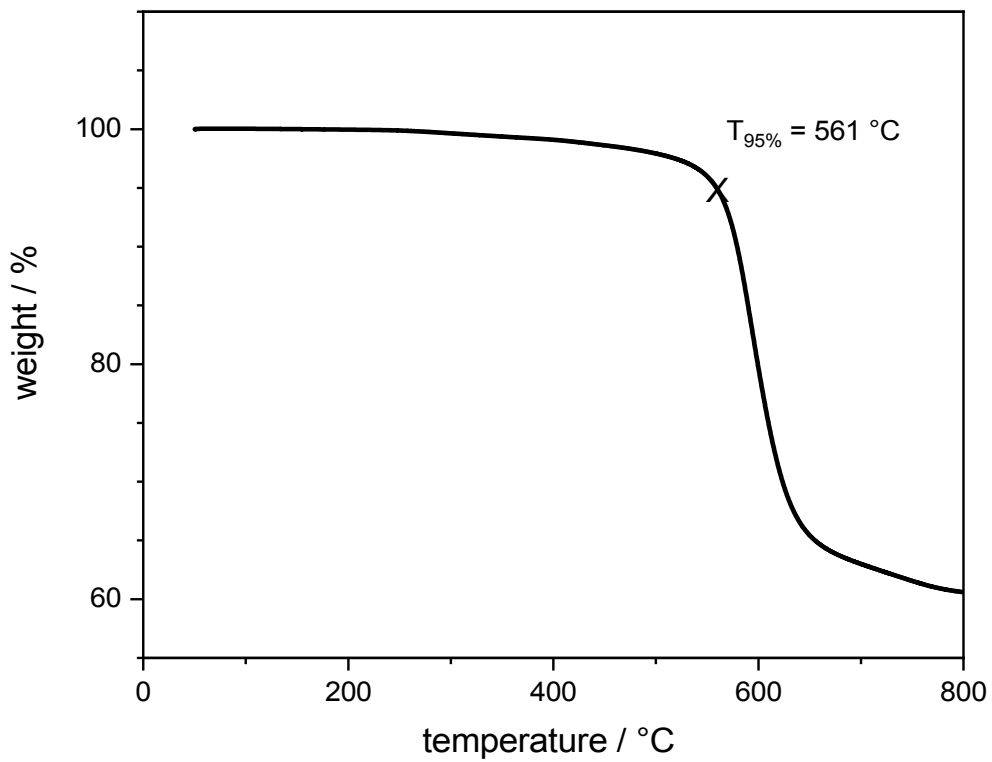


Figure ESI 18: TGA curve of PI-1 (heating rate 10 °C/min)

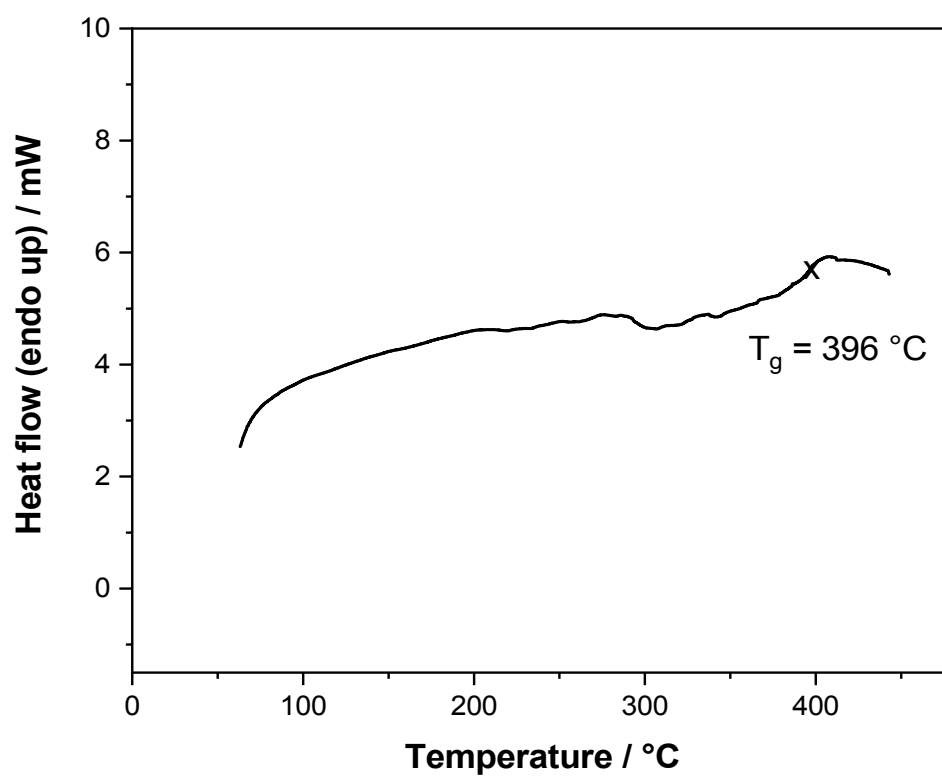


Figure ESI 19: DSC measurement of **PI-1** (second heating cycle, endo up)

PI-2

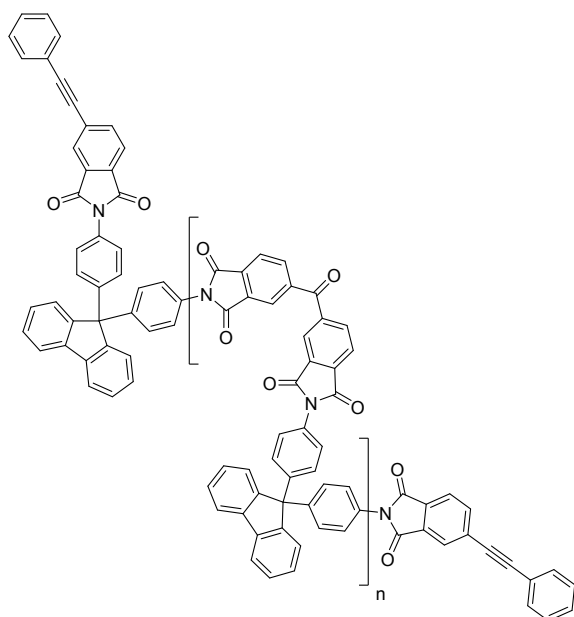


Figure ESI 20: Structure of PI-2

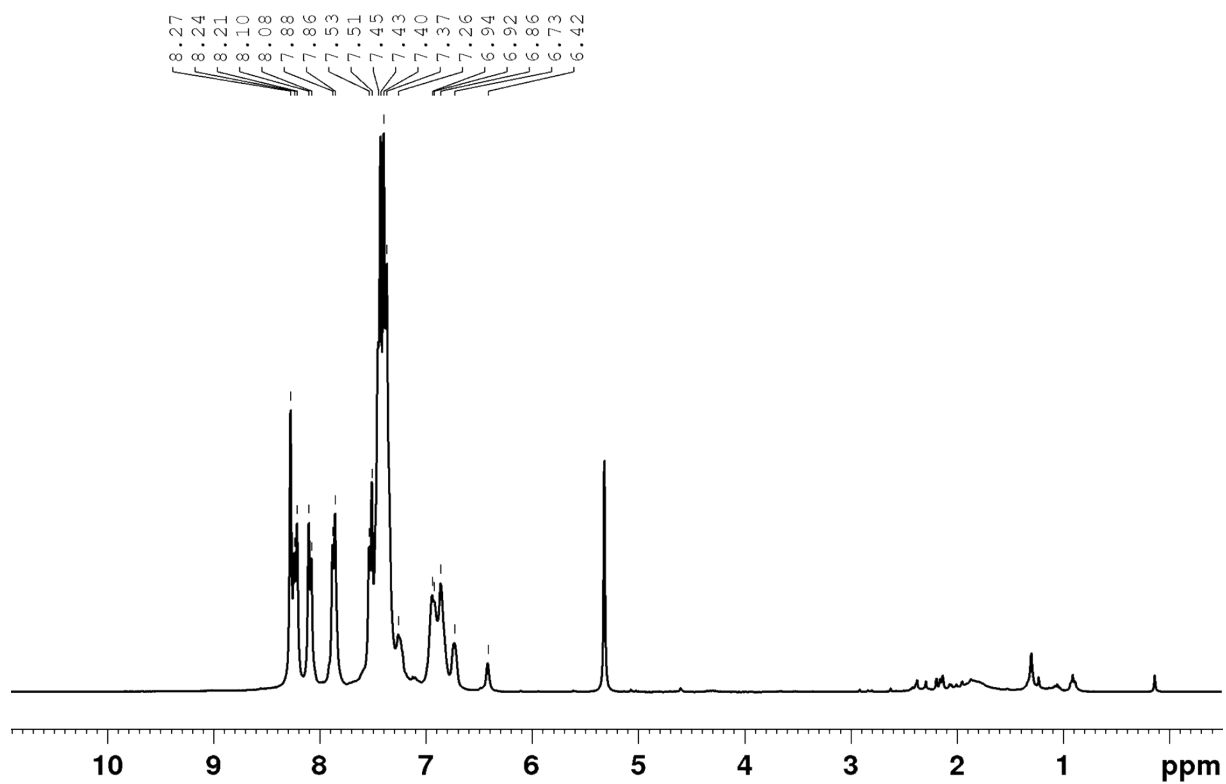


Figure ESI 21: ¹H-NMR of PI-2 in CDCl₃

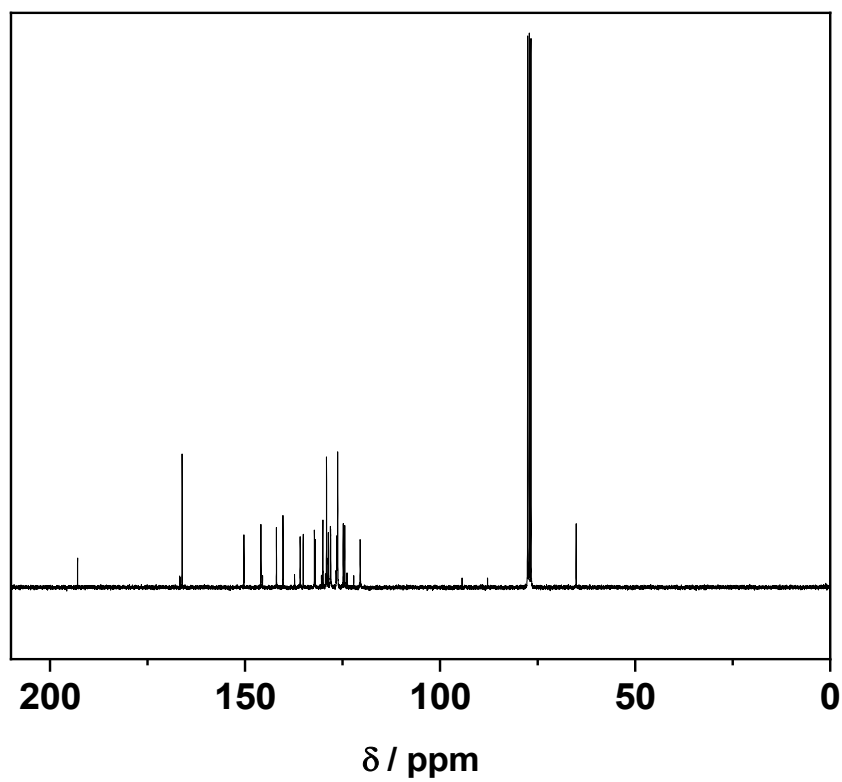


Figure ESI 22: ^{13}C -NMR of PI-2 in CDCl_3

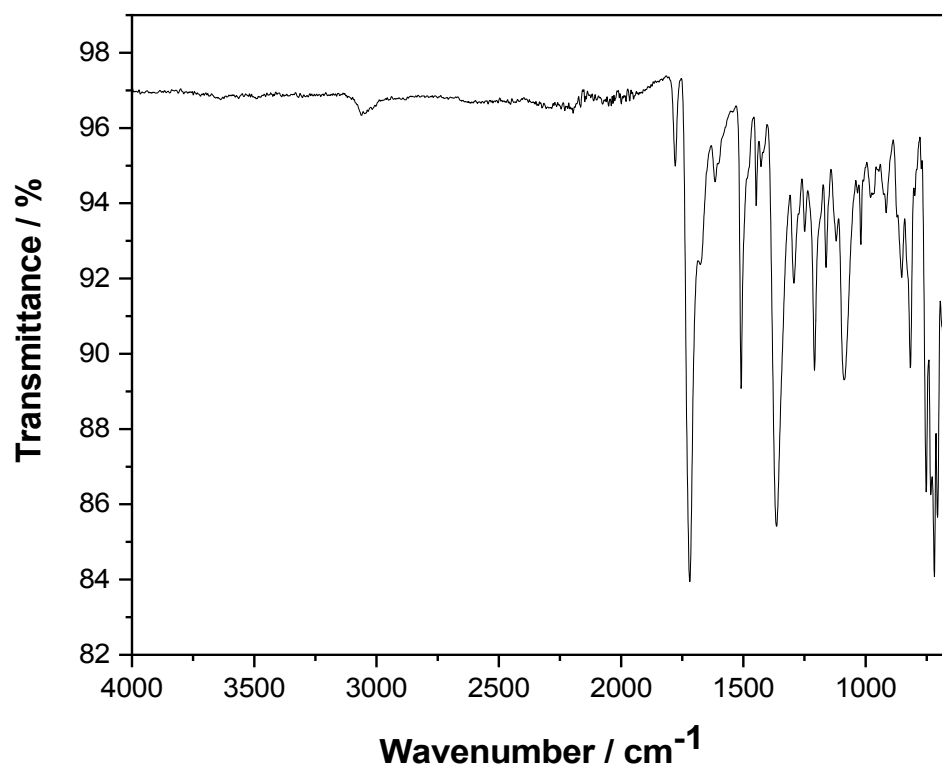


Figure ESI 23: FTIR-ATR of PI-2

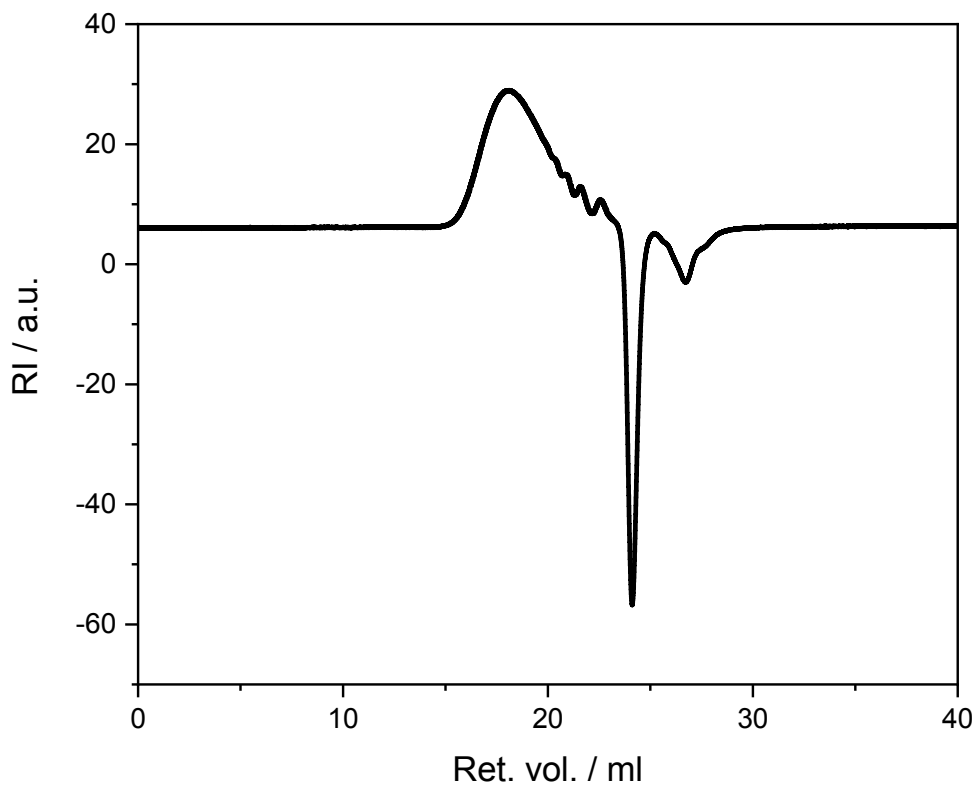


Figure ESI 24: Refractive index detector response of SEC of PI-2

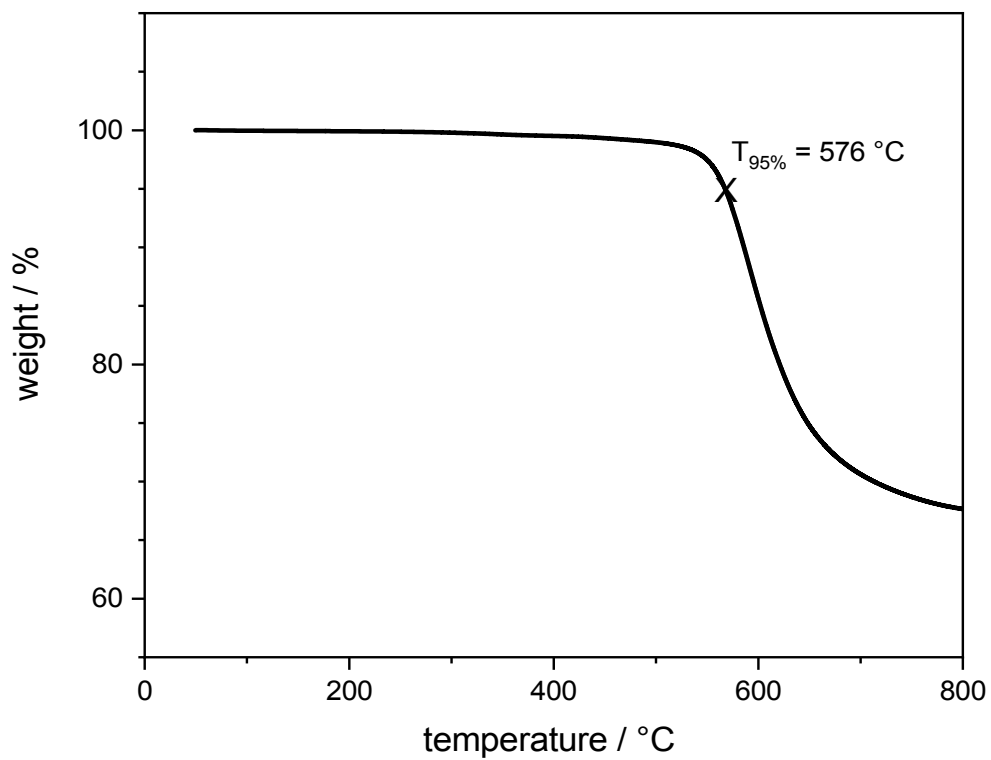


Figure ESI 25: TGA curve of PI-2 (heating rate 10 °C/min)

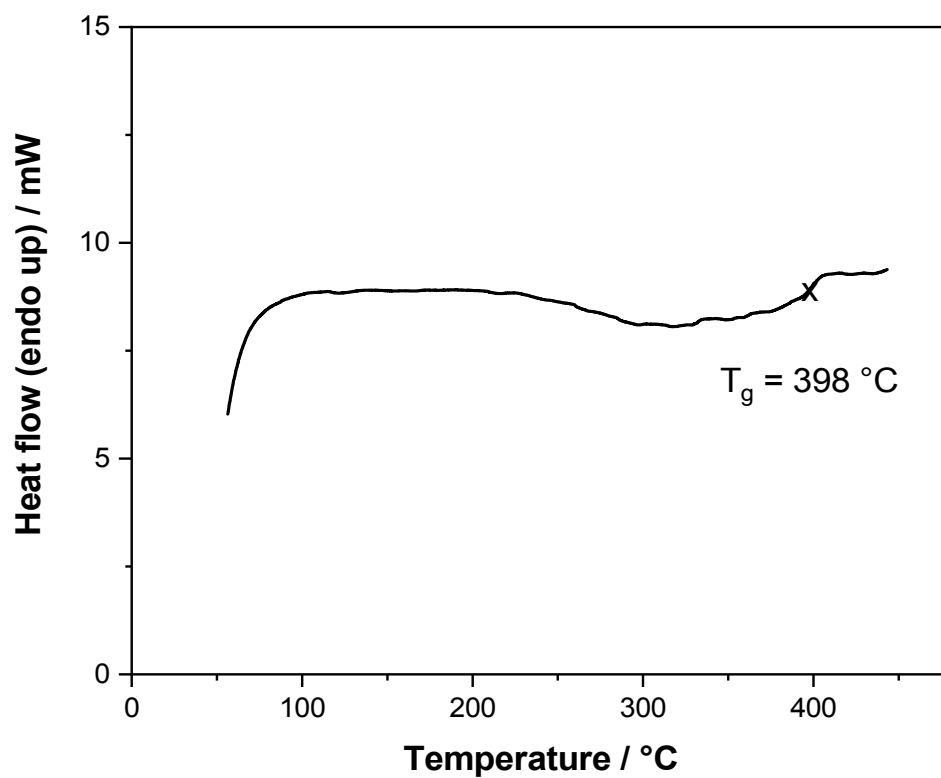


Figure ESI 26: DSC measurement of PI-2 (second heating cycle, endo up)

PI-3

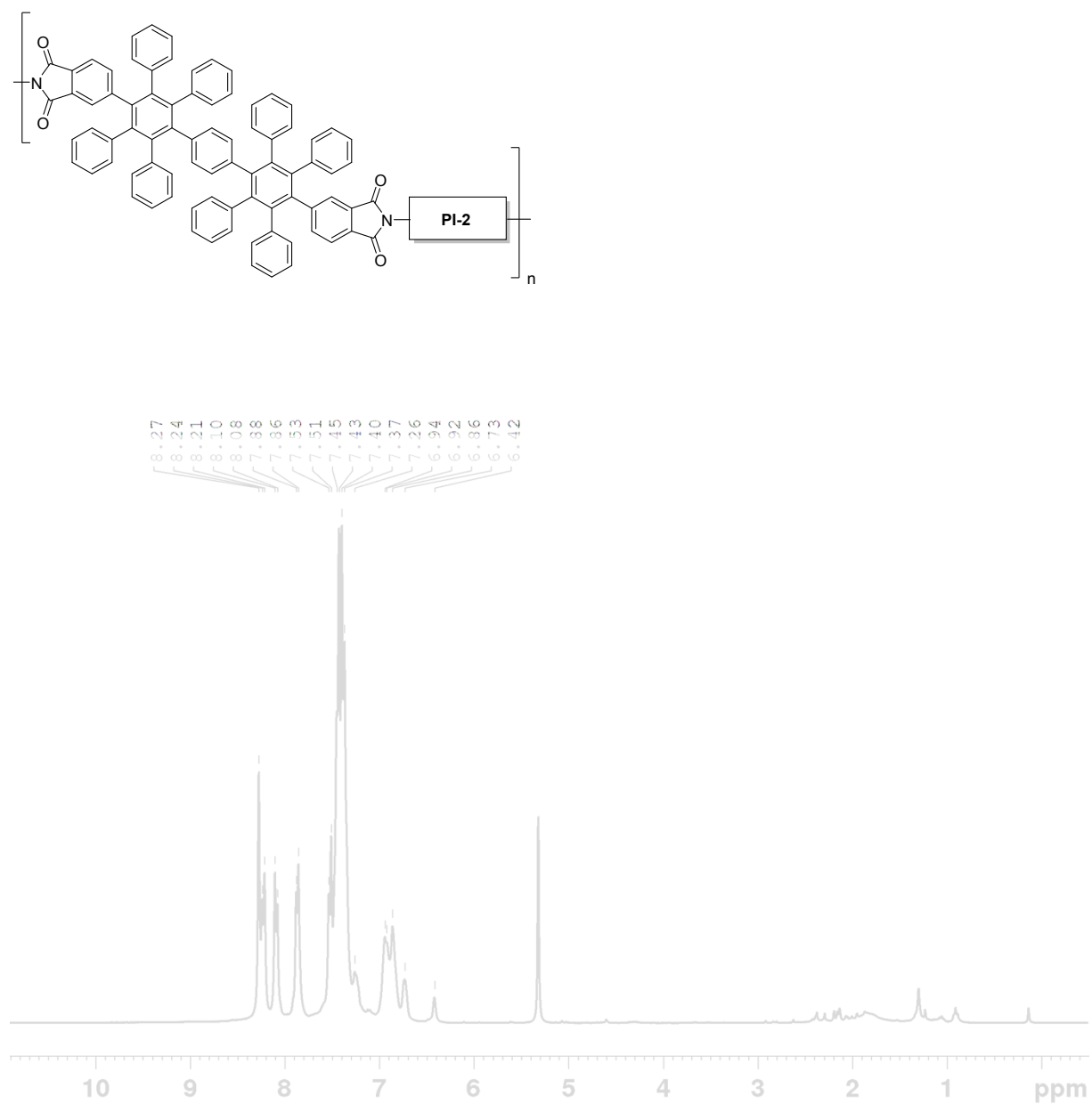


Figure ESI 27: $^1\text{H-NMR}$ of PI-3 in CD_2Cl_2

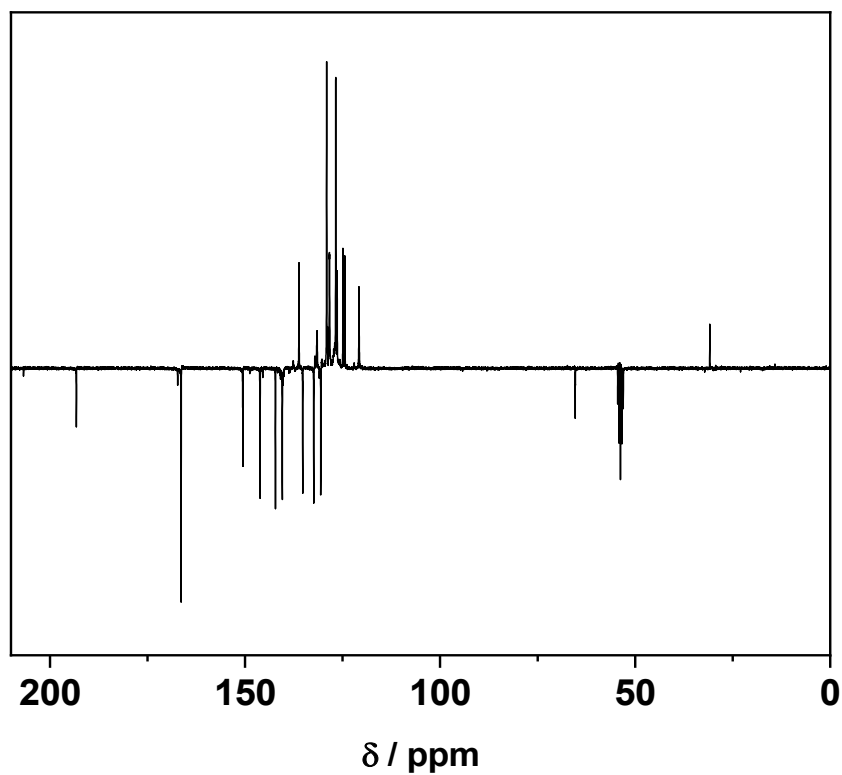


Figure ESI 28: ^{13}C -NMR of PI-3 in CD_2Cl_2

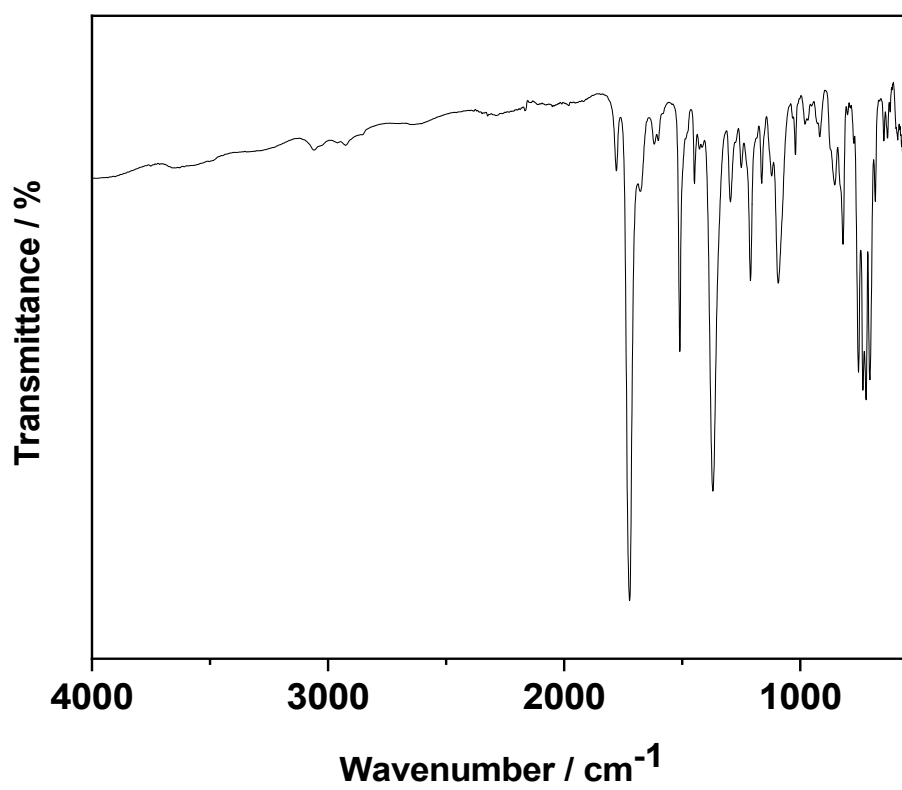


Figure ESI 29: FTIR-ATR of PI-3

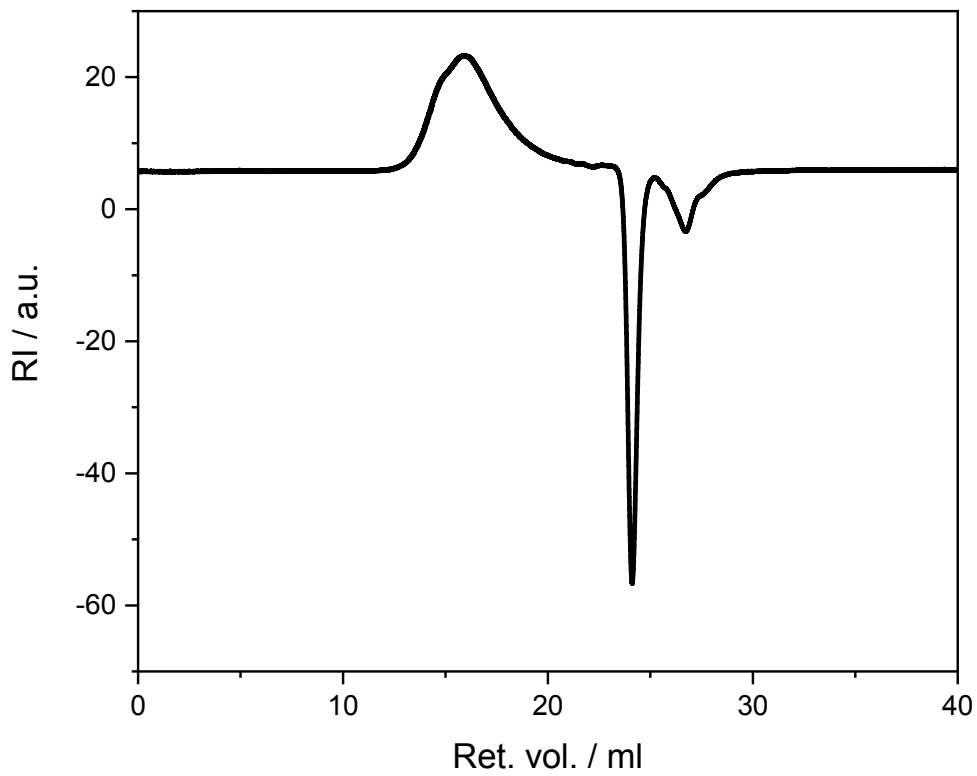


Figure ESI 30: Refractive index detector response of SEC of PI-3

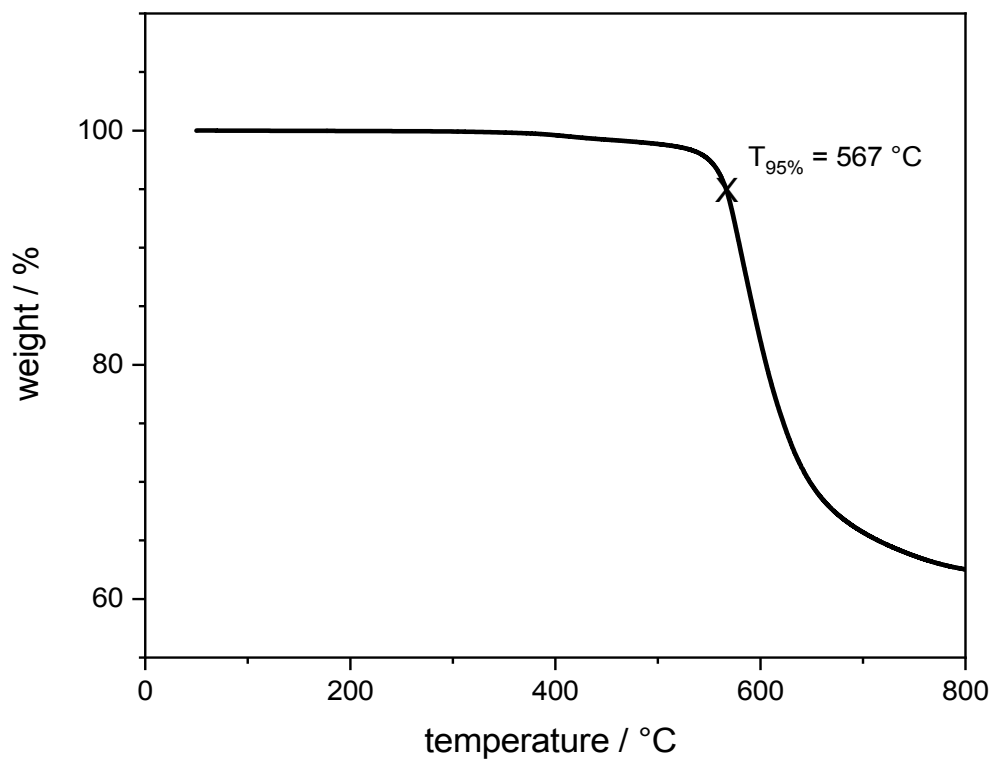


Figure ESI 31: TGA curve of PI-3(heating rate 10 °C/min)

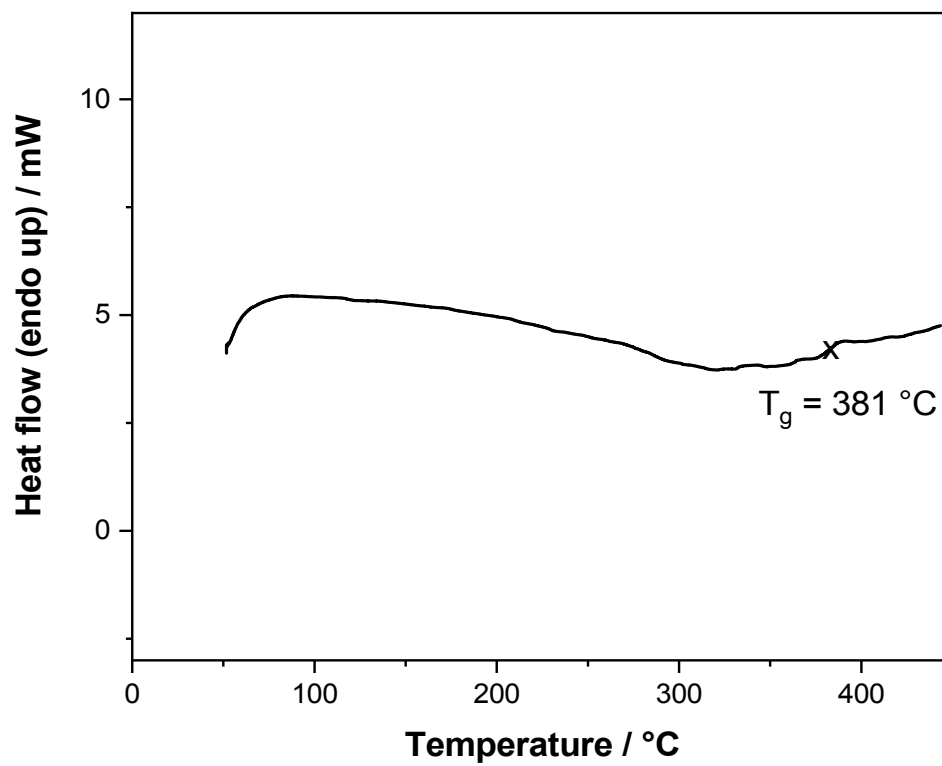


Figure ESI 32: DSC measurement of PI-3 (second heating cycle, endo up)

PI-4

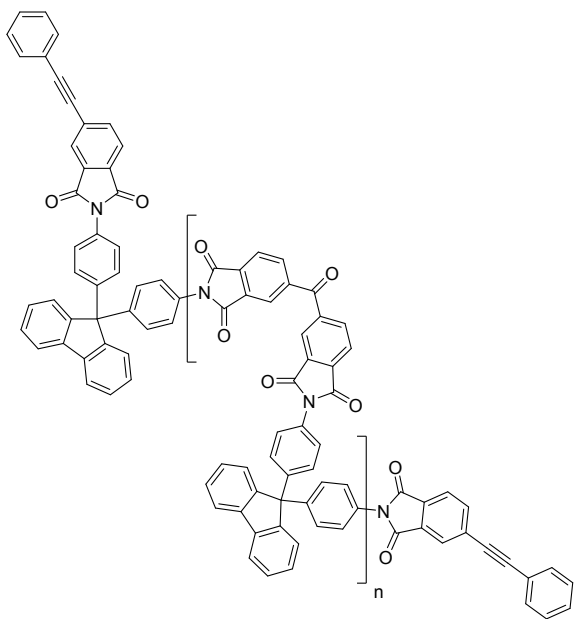


Figure ESI 33: Structure of PI-4

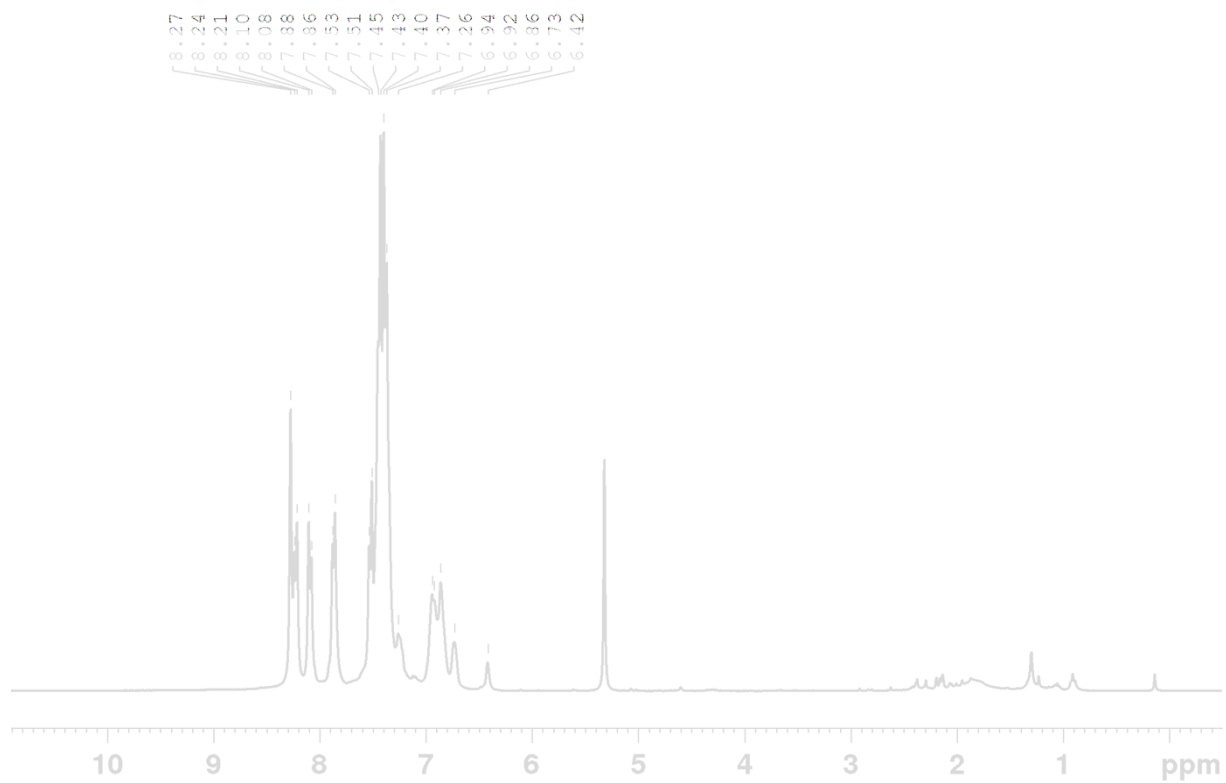


Figure ESI 34: ¹H-NMR of PI-4 in CD₂Cl₂

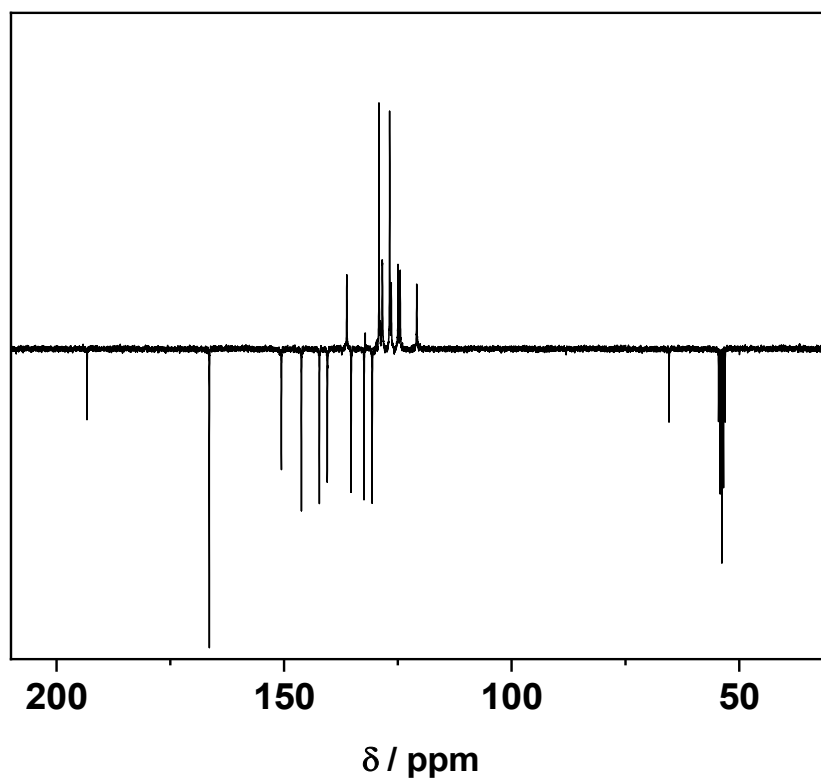


Figure ESI 35: ^{13}C -NMR of PI-4 in CD_2Cl_2

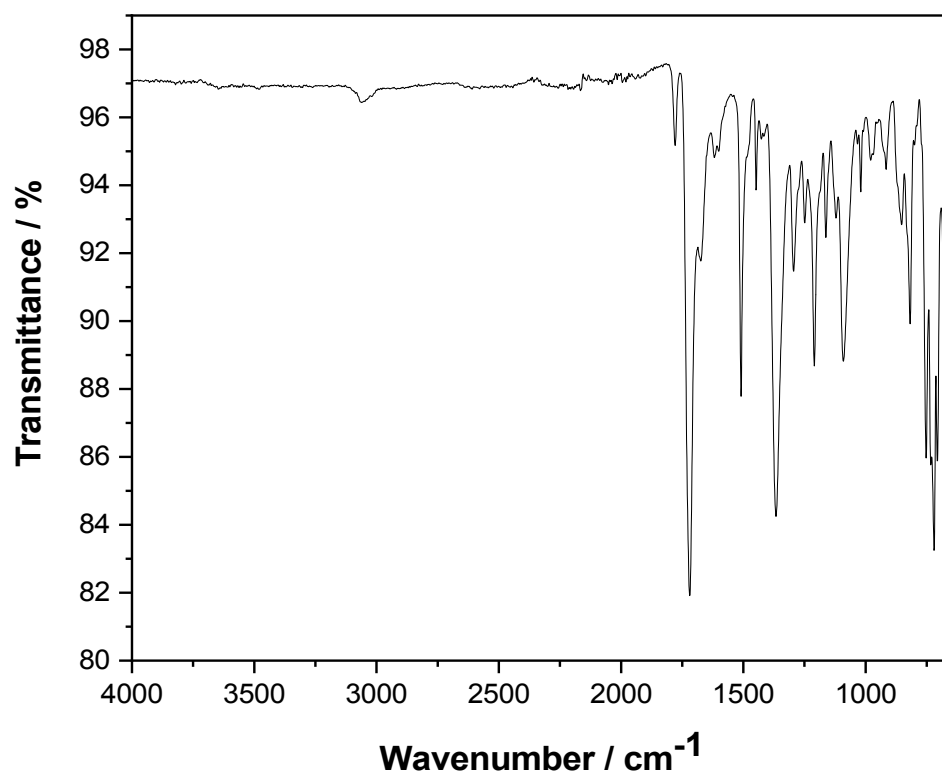


Figure ESI 36: FTIR-ATR of PI-4

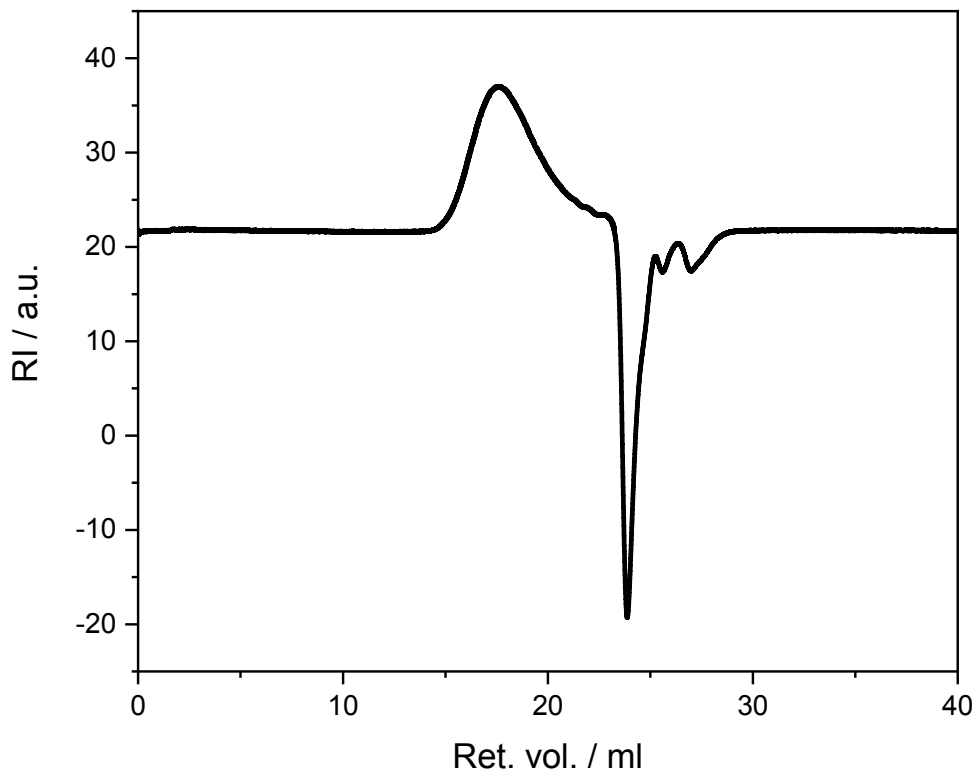


Figure ESI 37: Refractive index detector response of SEC of **PI-4**

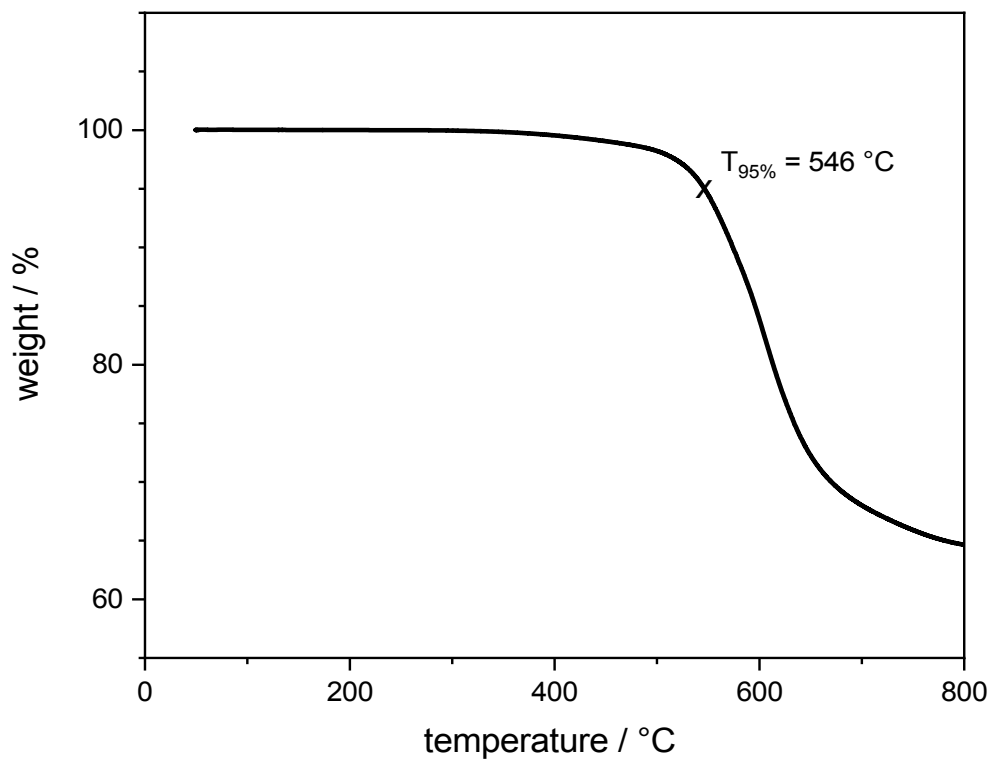


Figure ESI 38: TGA curve of **PI-4** (heating rate 10 °C/min)

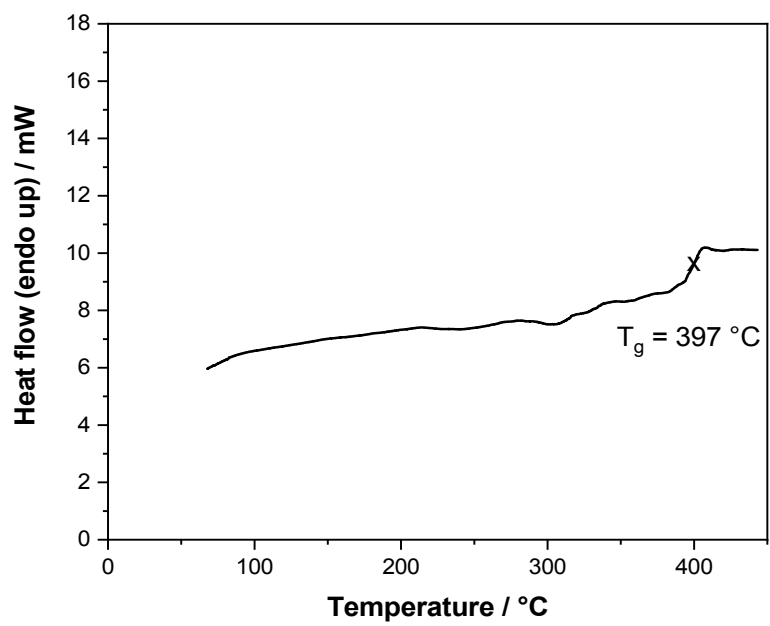


Figure ESI 39: DSC measurement of **PI-4** (second heating cycle, endo up)

PI-5

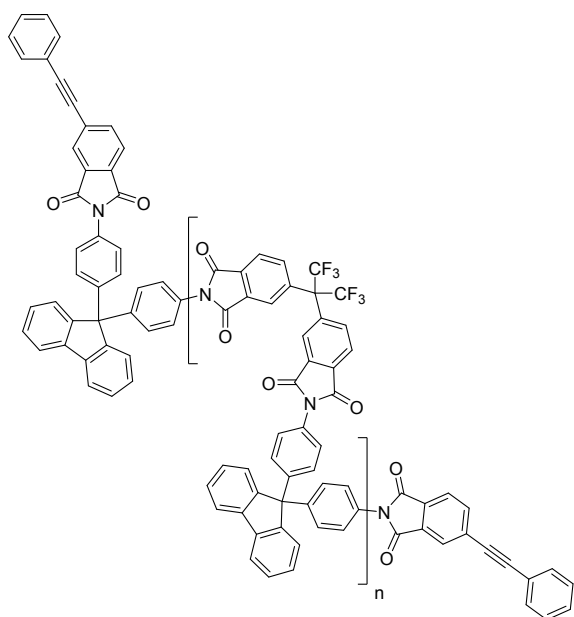


Figure ESI 40: Structure of PI-5

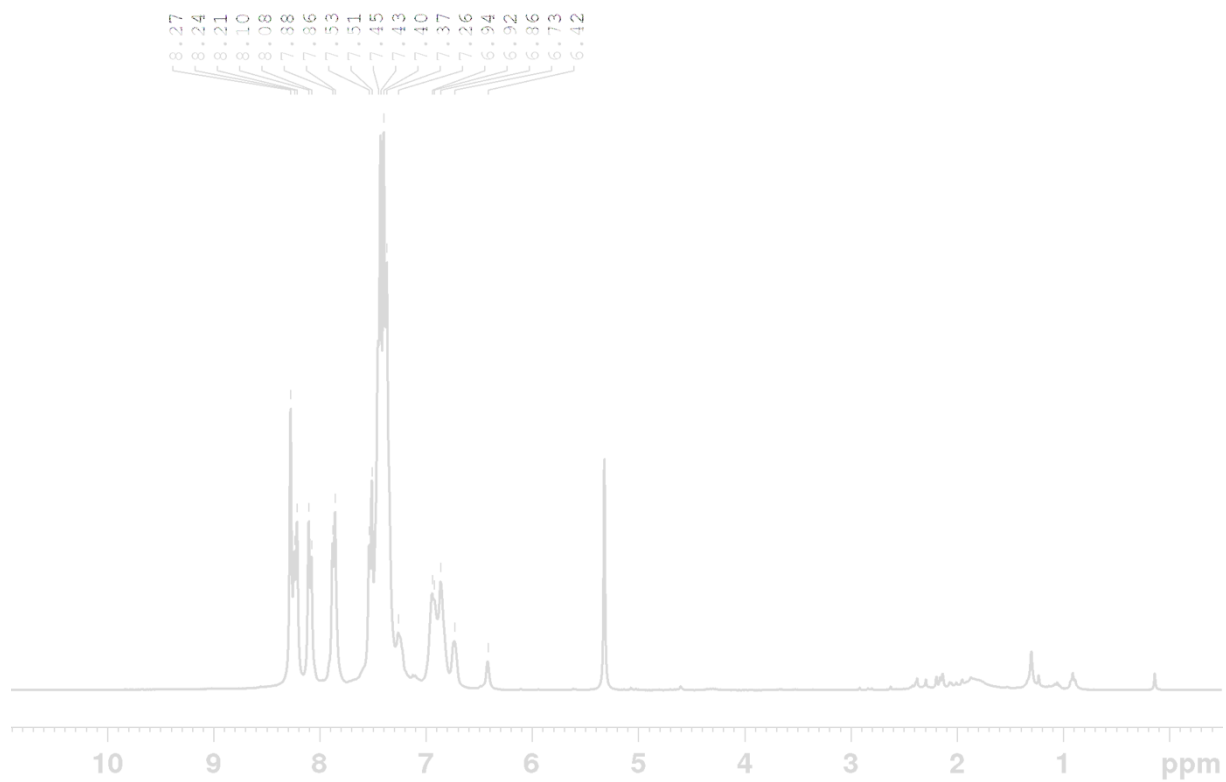


Figure ESI 41: ¹H-NMR of PI-5 in CD₂Cl₂

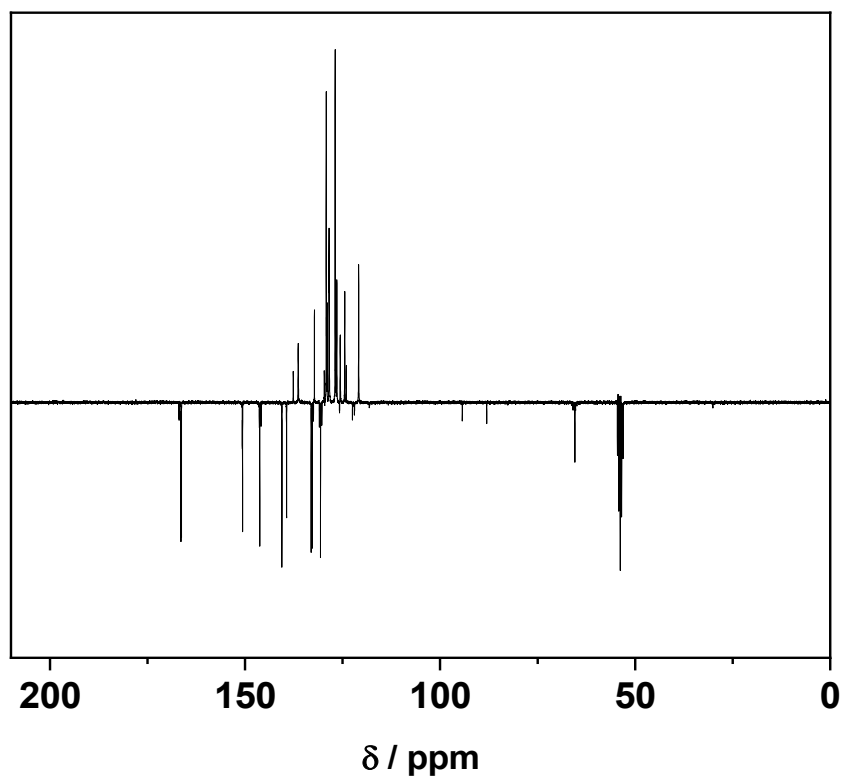


Figure ESI 42: ^{13}C -NMR of PI-5 in CD_2Cl_2

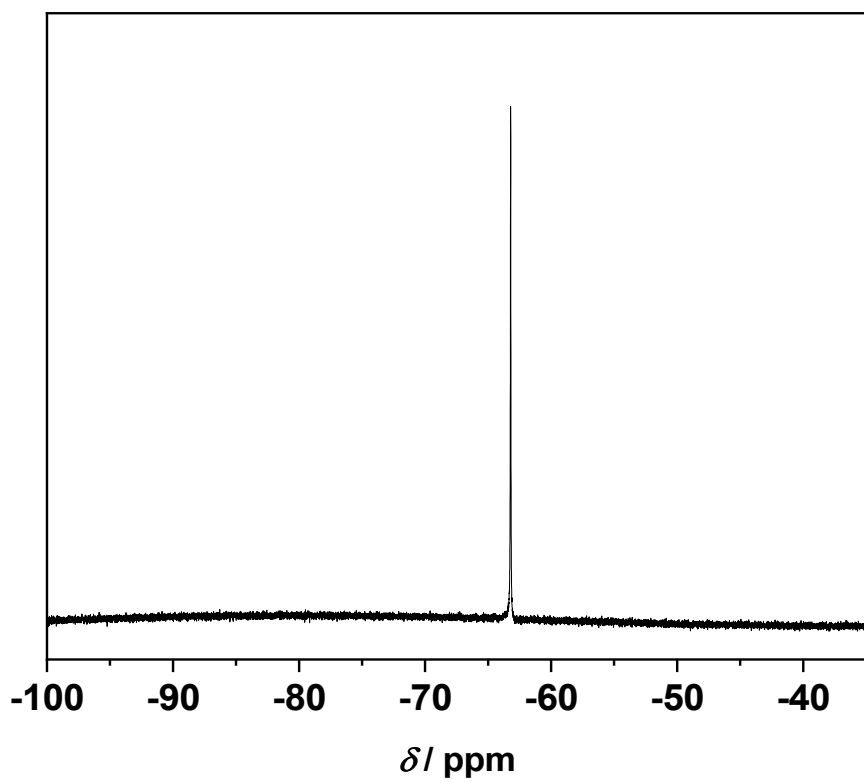


Figure ESI 43: ^{19}F -NMR of PI-5 in CDCl_3

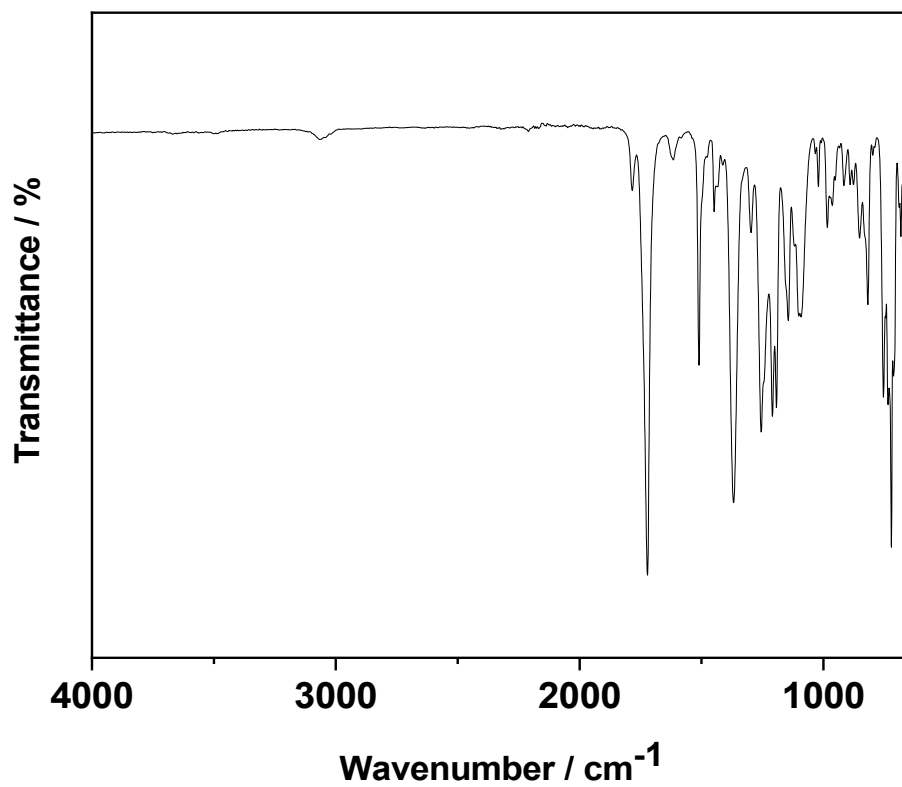


Figure ESI 44: FTIR-ATR of PI-5

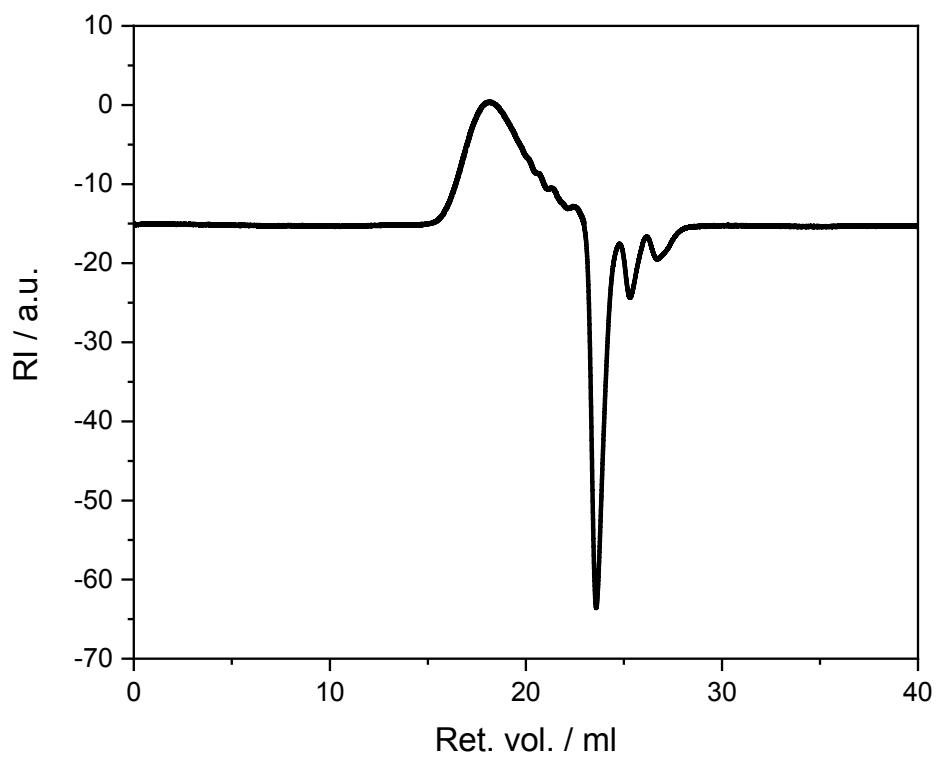


Figure ESI 45: Refractive index detector response of SEC of PI-5

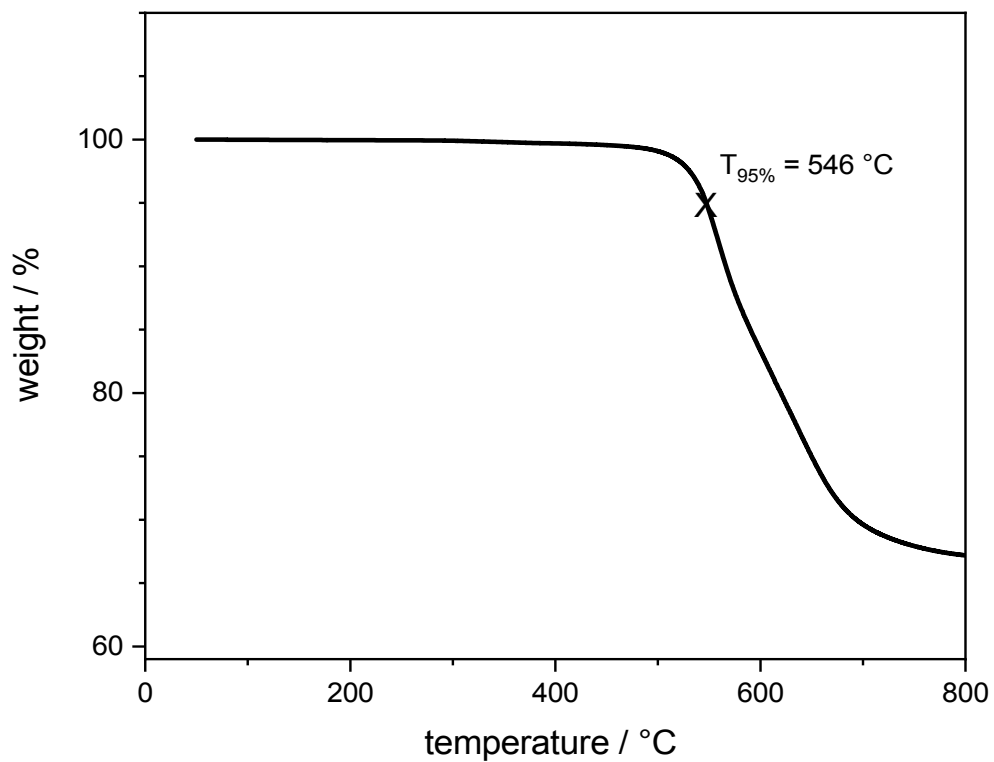


Figure ESI 46: TGA curve of **PI-5** (heating rate 10 °C/min)

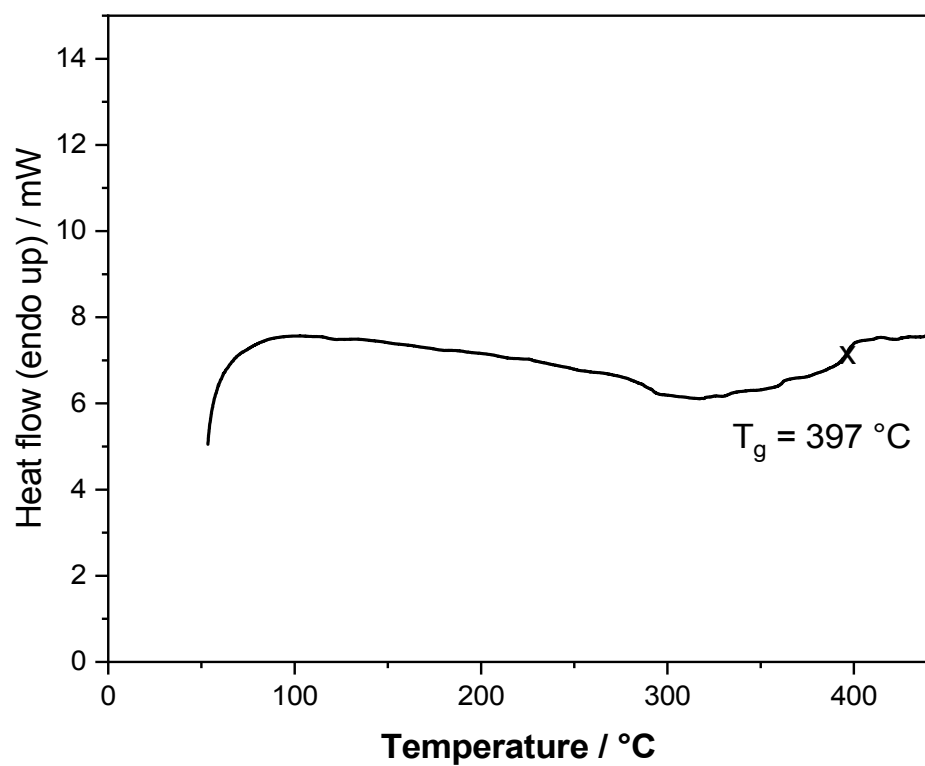


Figure ESI 47: DSC measurement of **PI-5** (second heating cycle, endo up)

PI-6

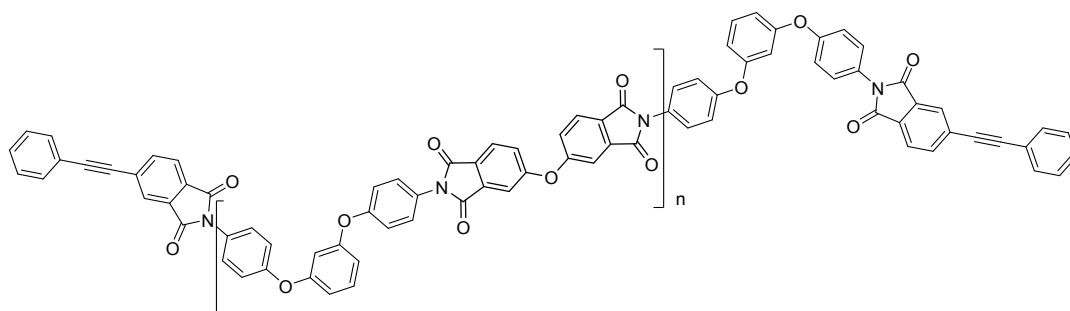


Figure ESI 48: Structure of PI-6

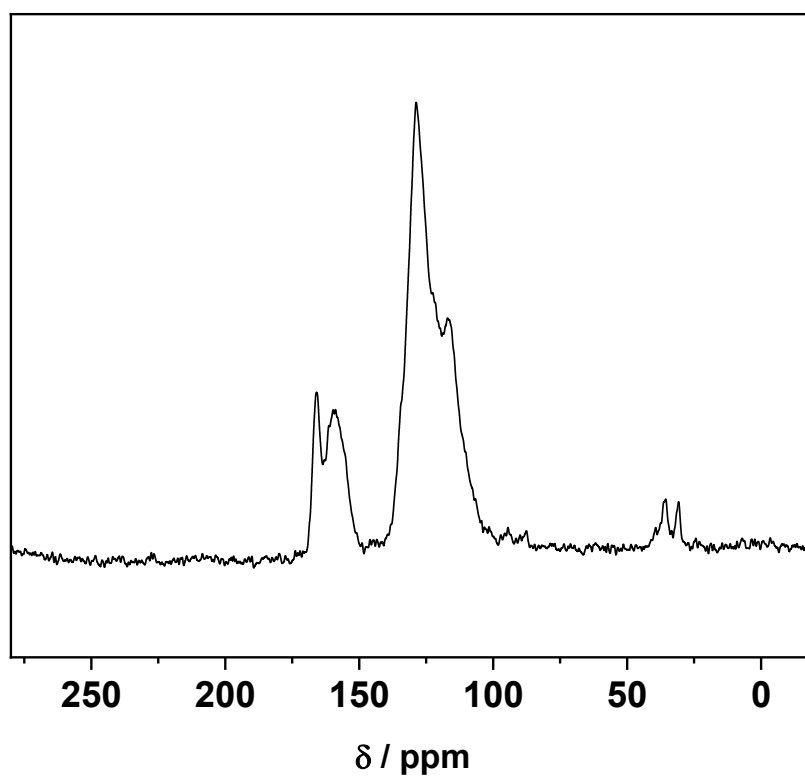


Figure ESI 49: Solid state ^{13}C -NMR of PI-6

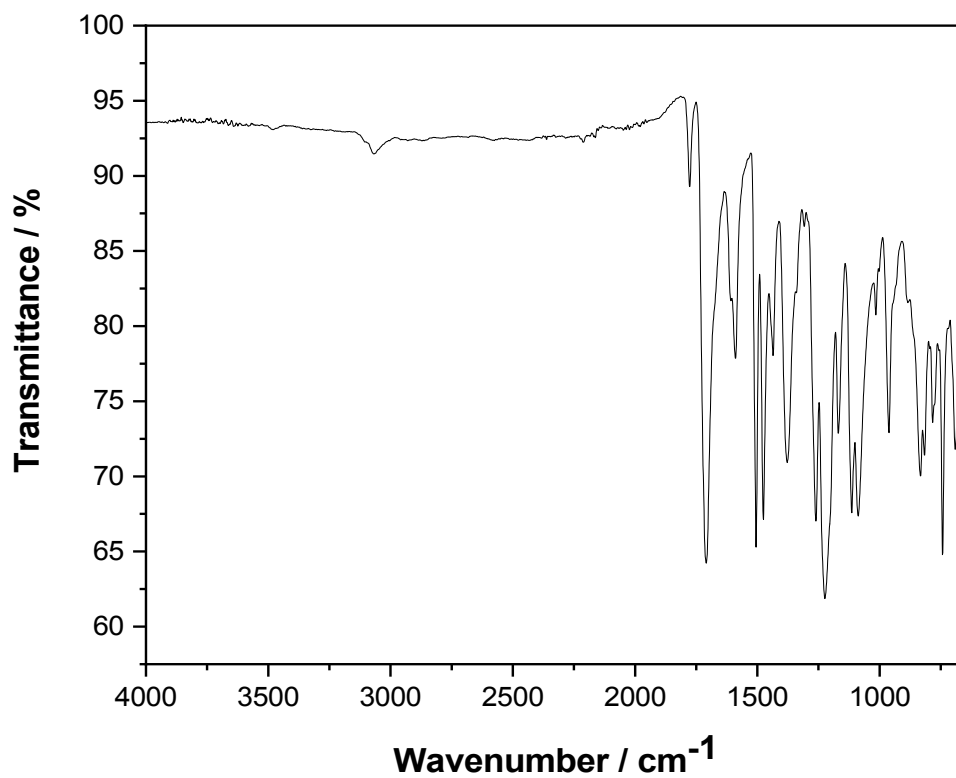


Figure ESI 50: FTIR-ATR of PI-6

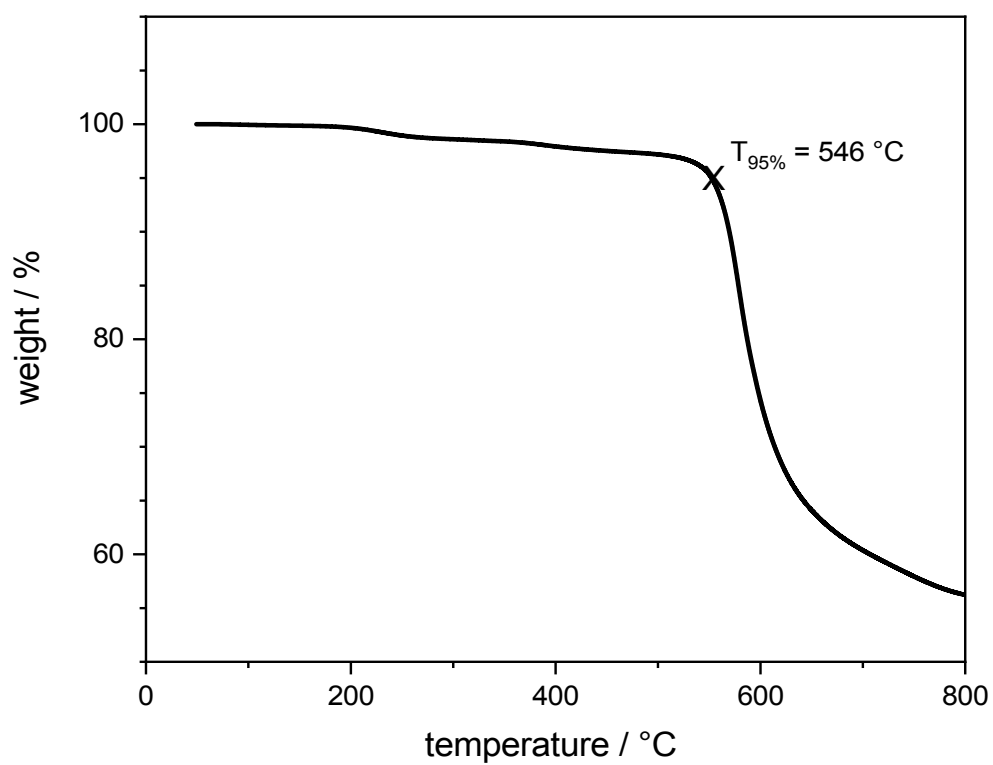


Figure ESI 51: TGA curve of PI-6 (heating rate 10 °C/min)

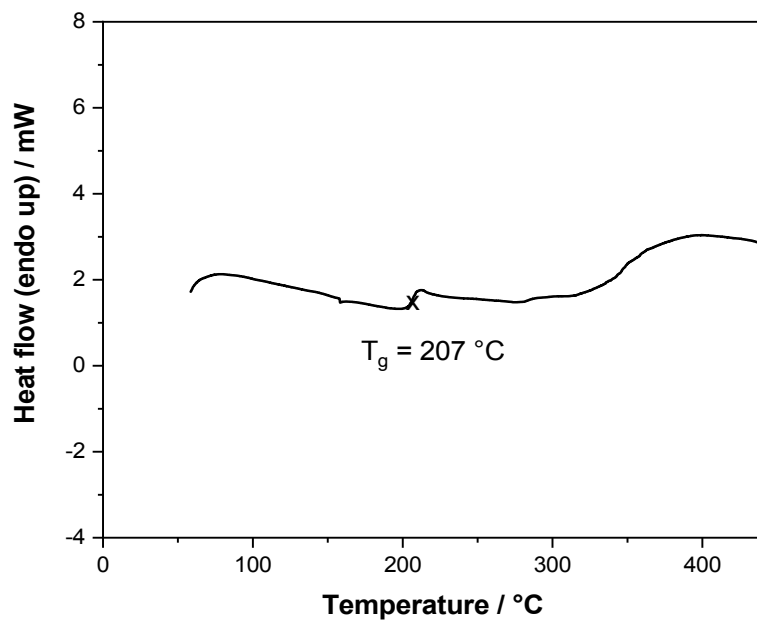


Figure ESI 52: DSC measurement of **PI-6** (second heating cycle, endo up)

PI-7

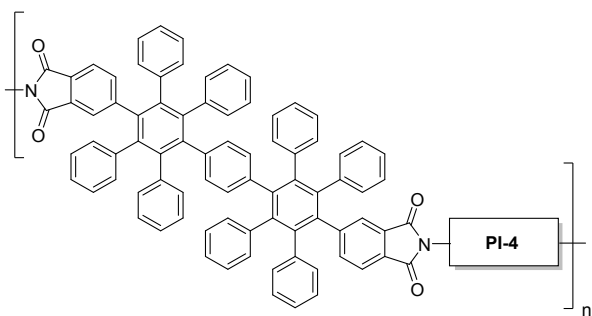


Figure ESI 53: Structure of **PI-7**

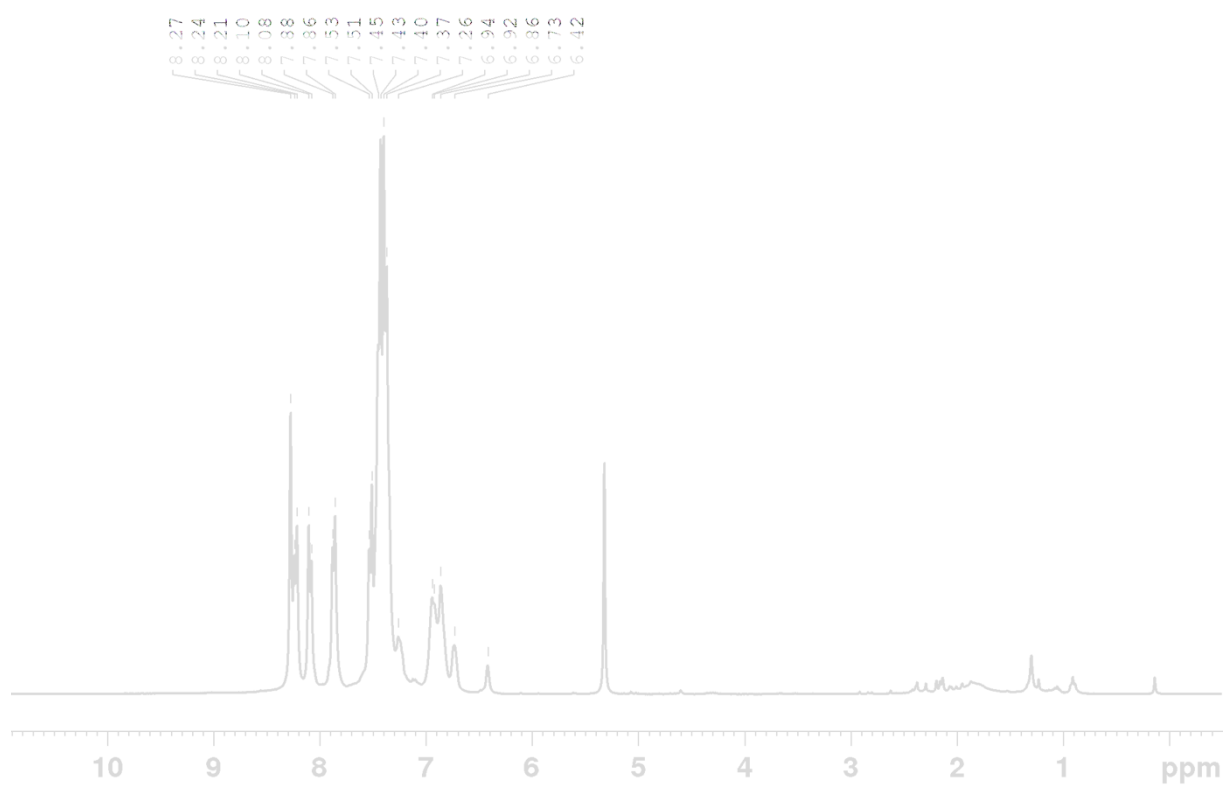


Figure ESI 54: ¹H-NMR of **PI-7** in CD₂Cl₂

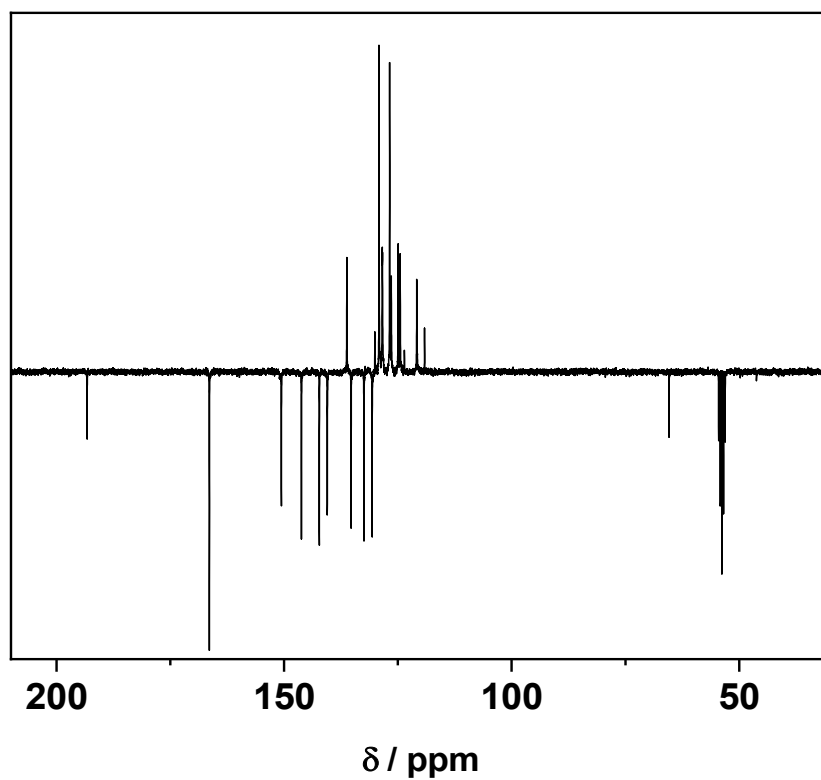


Figure ESI 55: ^{13}C -NMR of PI-7 in CD_2Cl_2

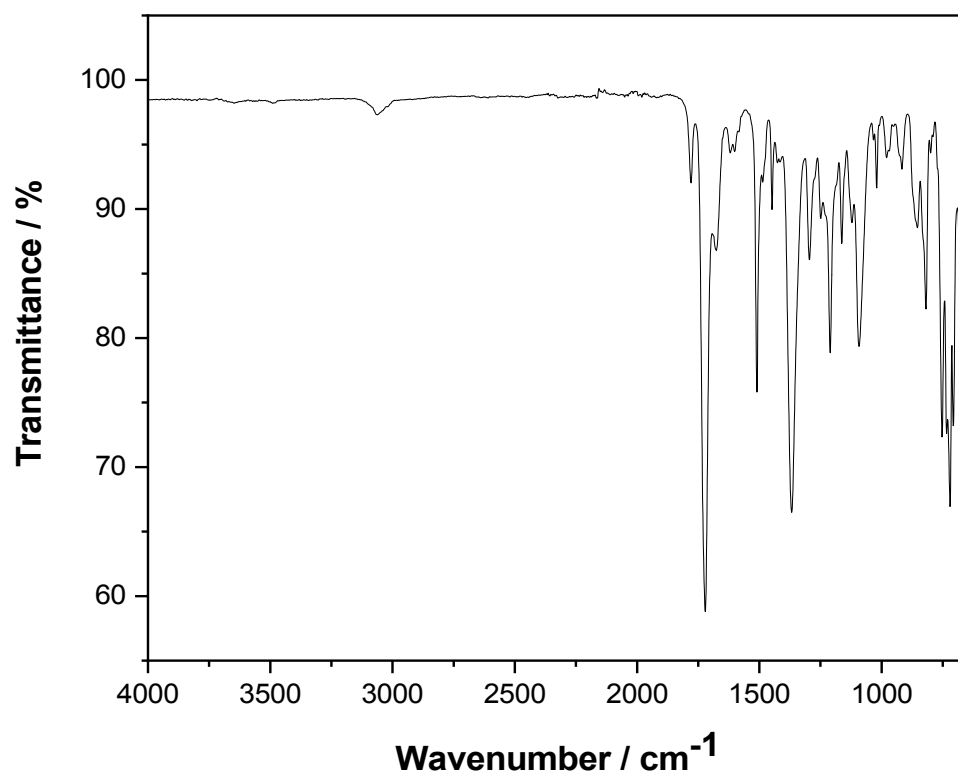


Figure ESI 56: FTIR-ATR of PI-7

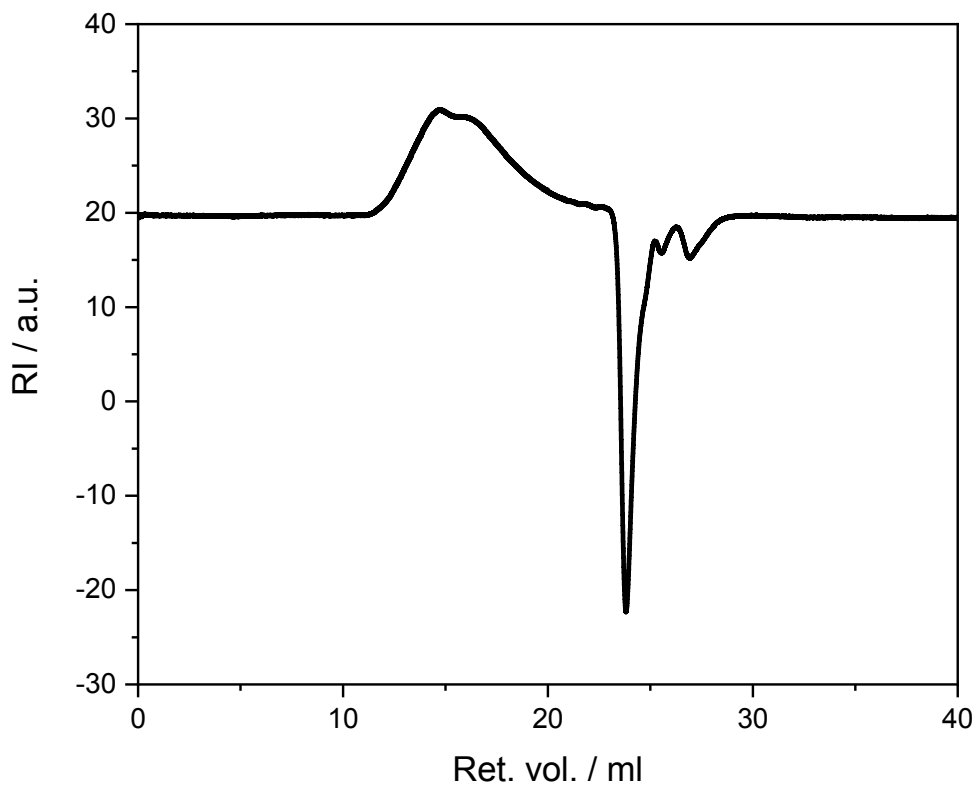


Figure ESI 57: Refractive index detector response of SEC of PI-7

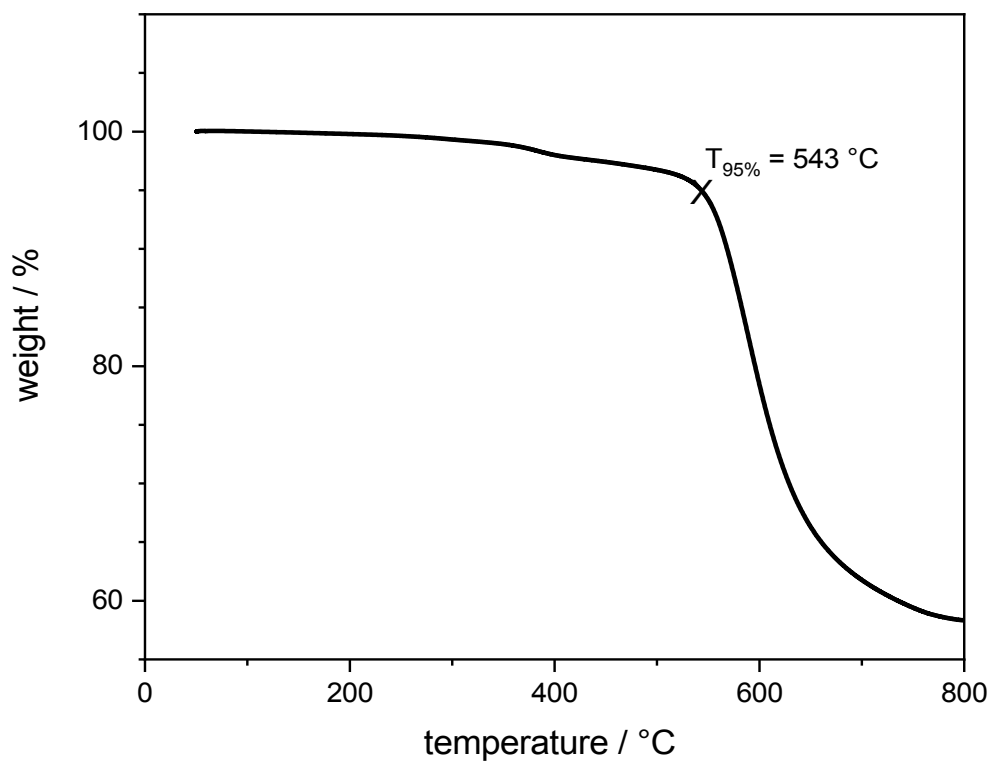


Figure ESI 58: TGA curve of PI-7 (heating rate 10 °C/min)

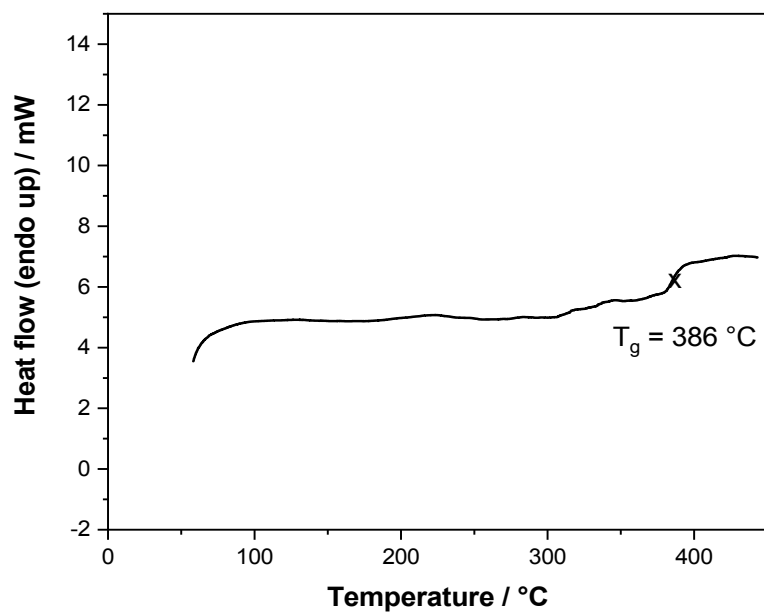


Figure ESI 59: DSC measurement of PI-7(second heating cycle, endo up)

PI-8

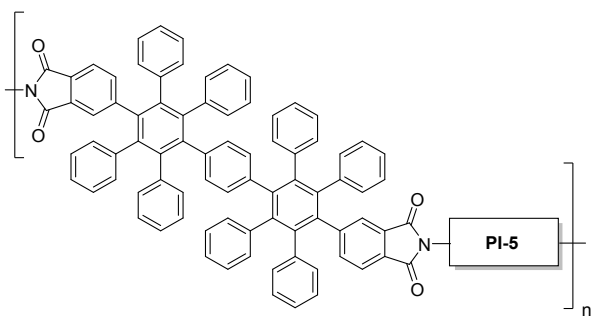


Figure ESI 60: Structure of **PI-8**

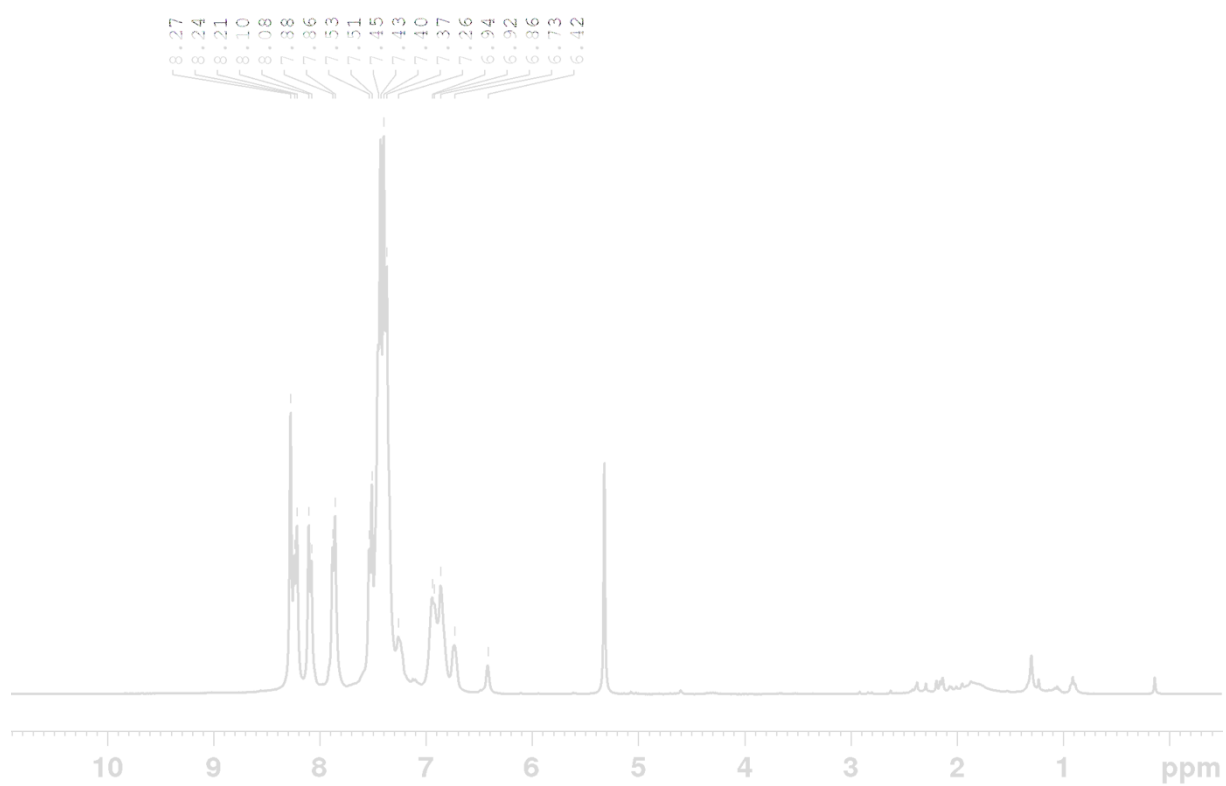


Figure ESI 61: ¹H-NMR of **PI-8** in CD₂Cl₂

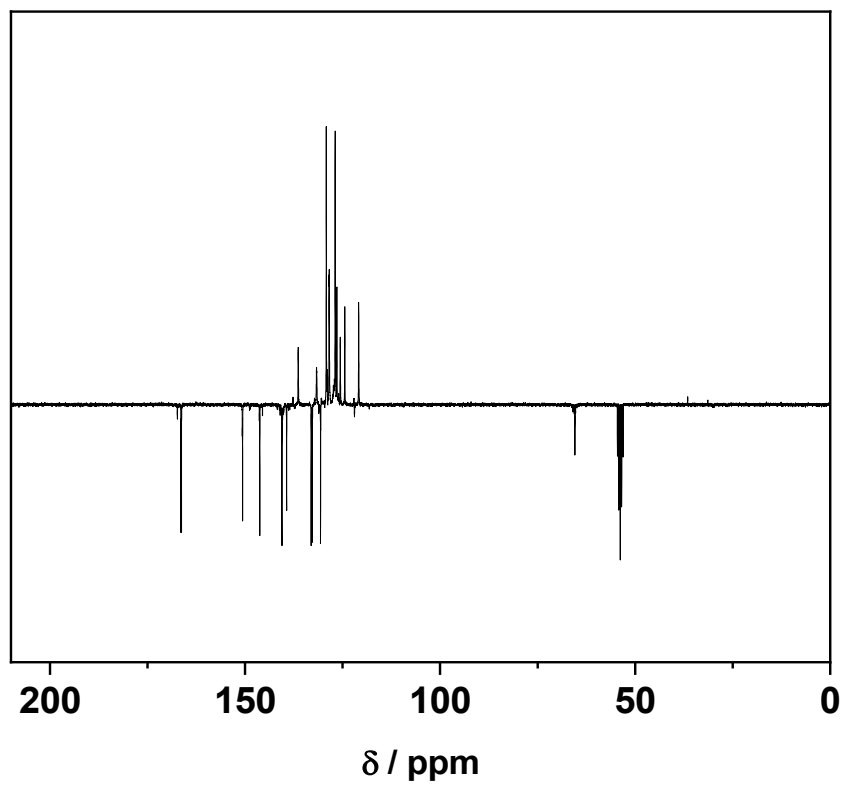


Figure ESI 62: ^{13}C -NMR of **PI-8** in CD_2Cl_2

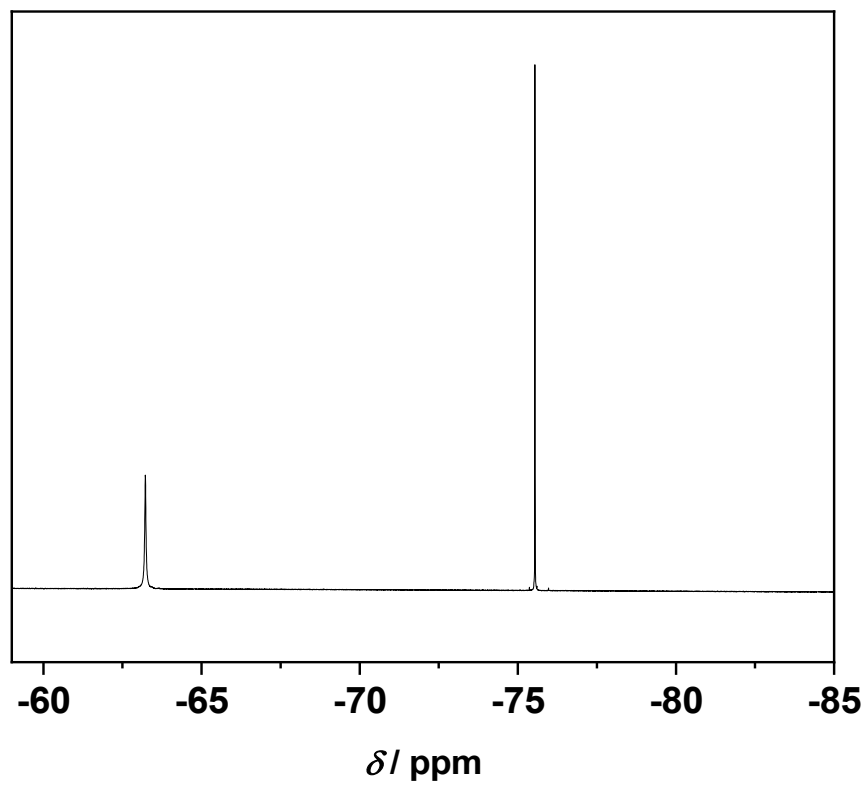


Figure ESI 63: ^{19}F NMR of **PI-8** in CDCl_3 (peak at -75.5 ppm originates from TFA used as internal standard)

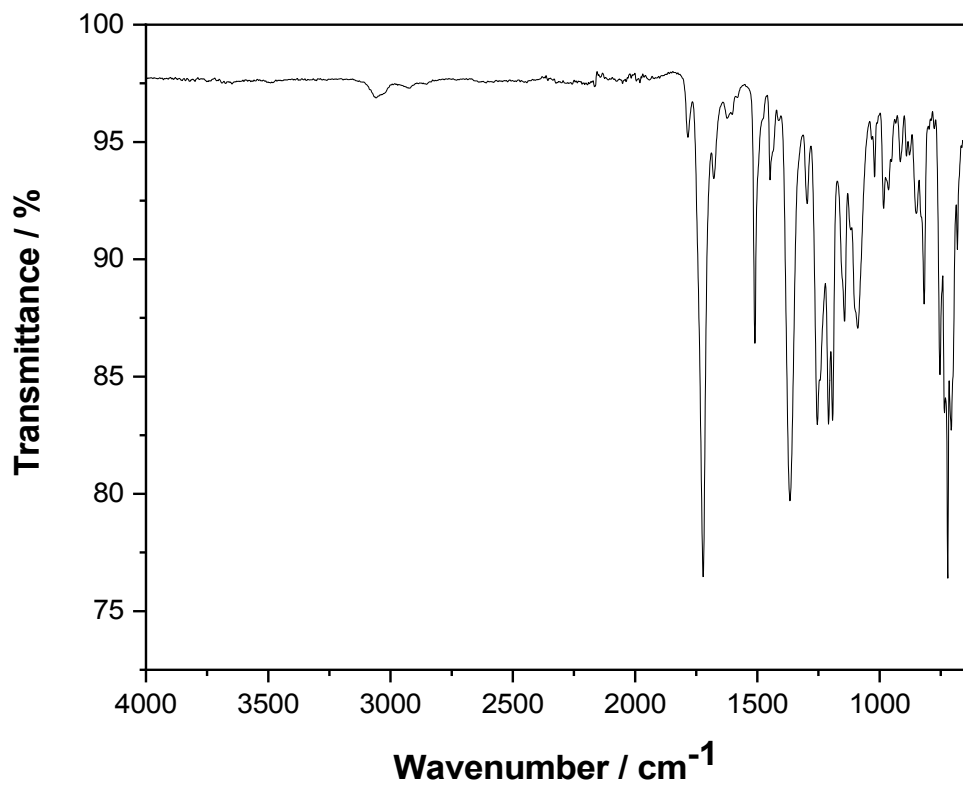


Figure ESI 64: FTIR-ATR of PI-8

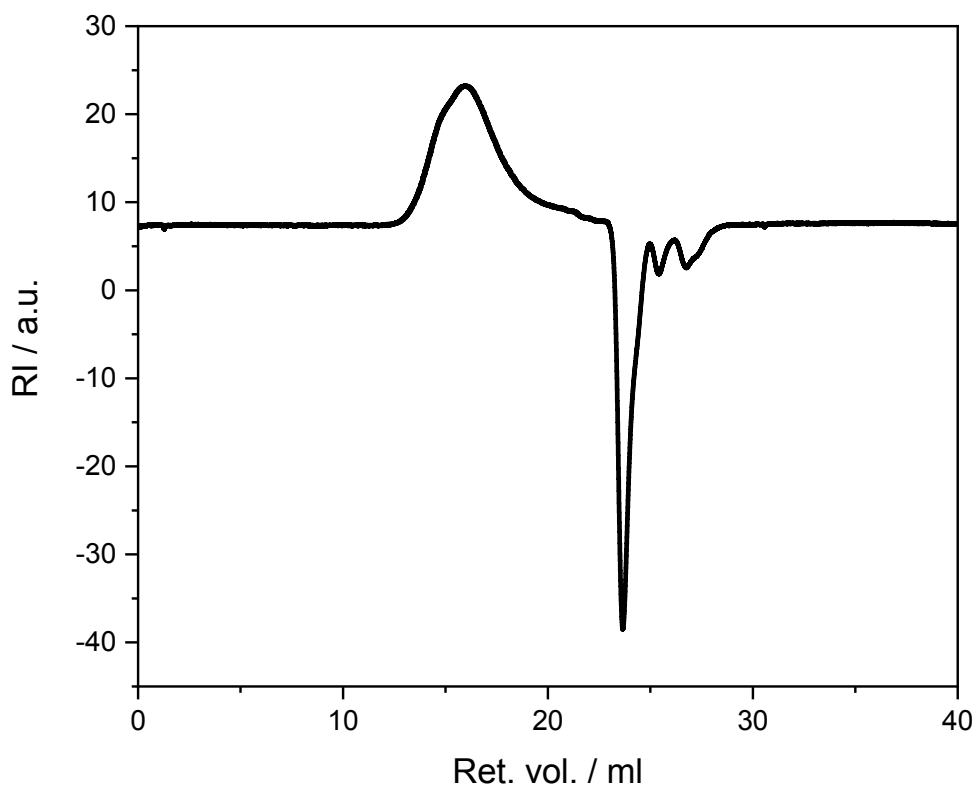


Figure ESI 65: Refractive index detector response of SEC of PI-8

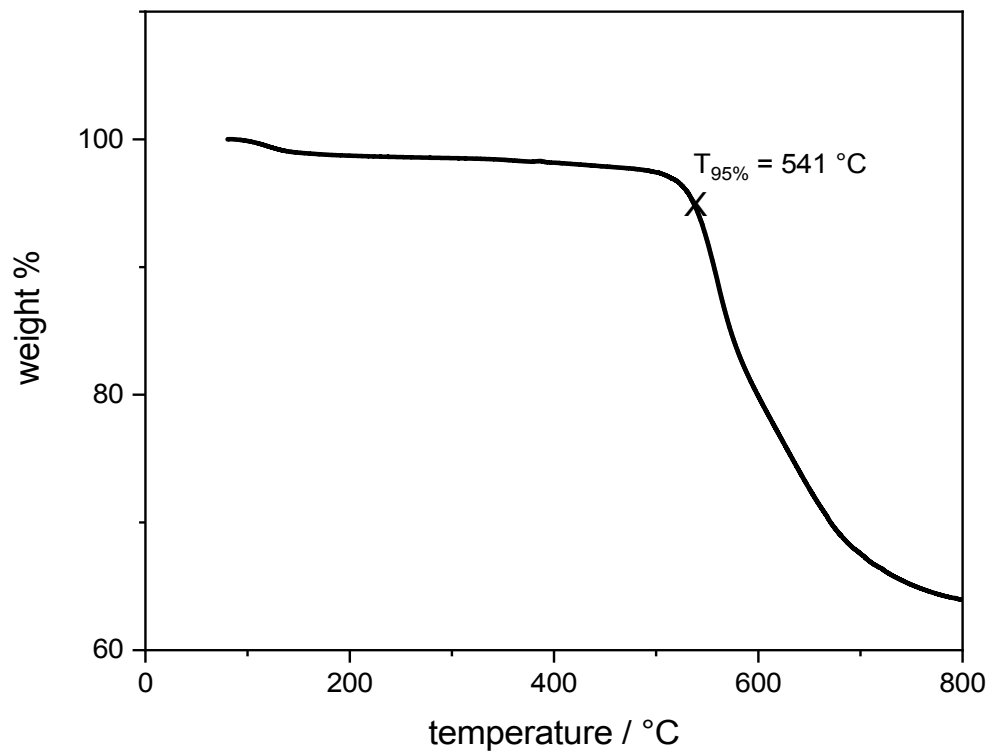


Figure ESI 66: TGA curve of **PI-8** (heating rate 10 °C/min)

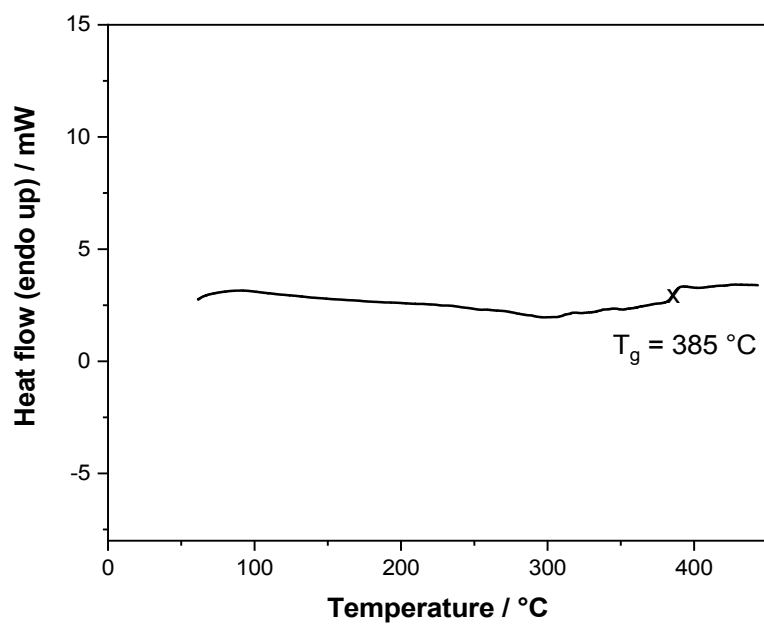


Figure ESI 67: DSC measurement of **PI-7**(second heating cycle, endo up)

PI-9

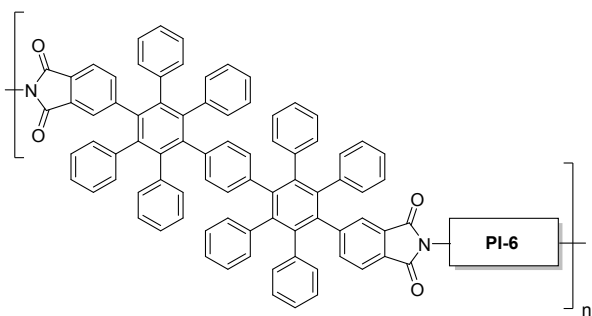


Figure ESI 68: Structure of **PI-9**

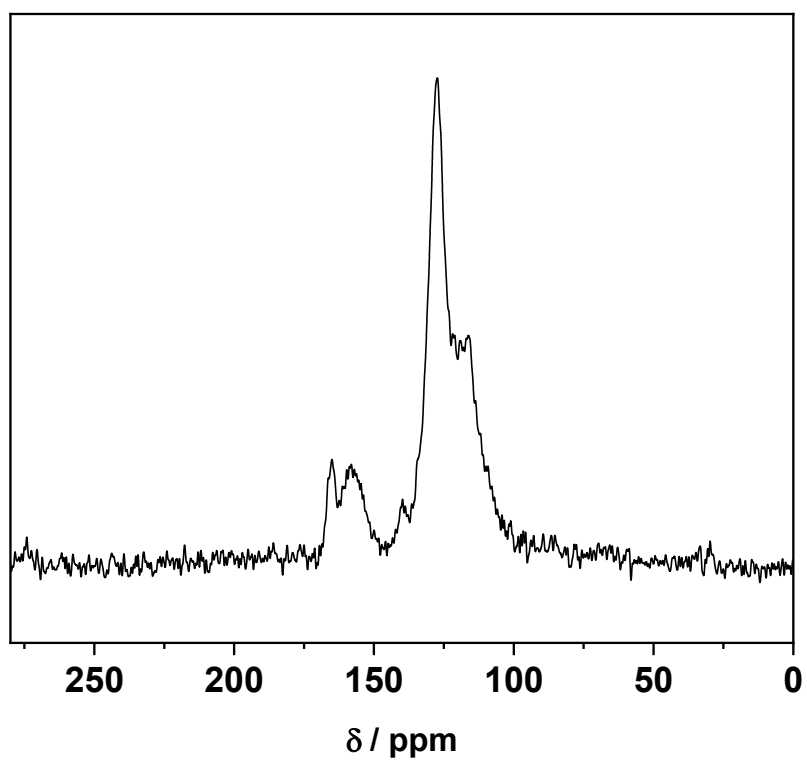


Figure ESI 69: Solid state ^{13}C -NMR of **PI-9**

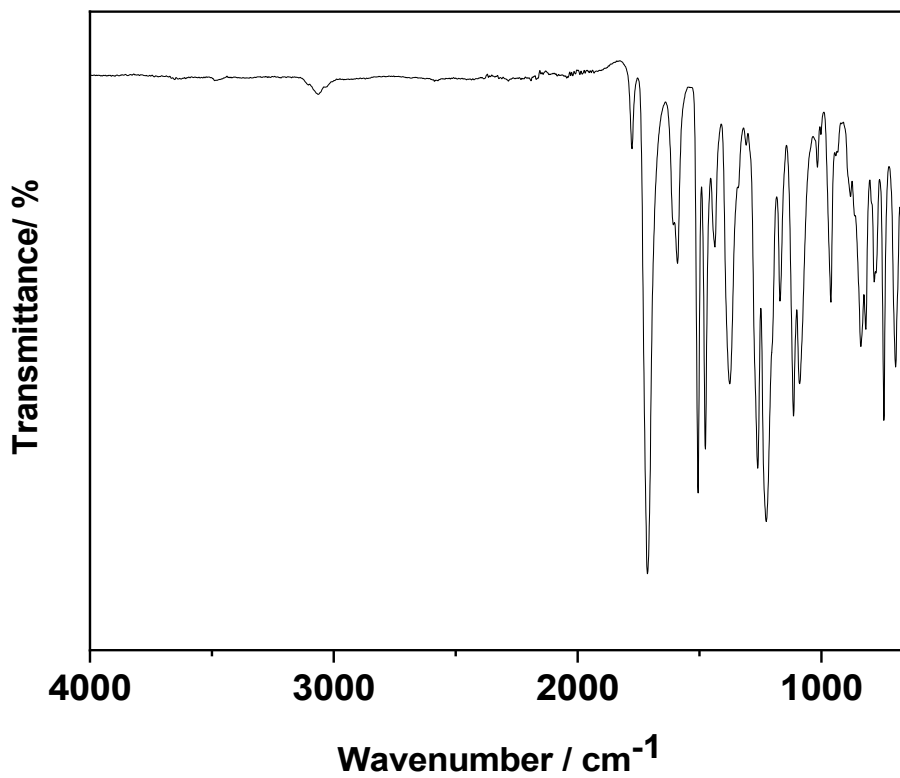


Figure ESI 70: FTIR-ATR of PI-9

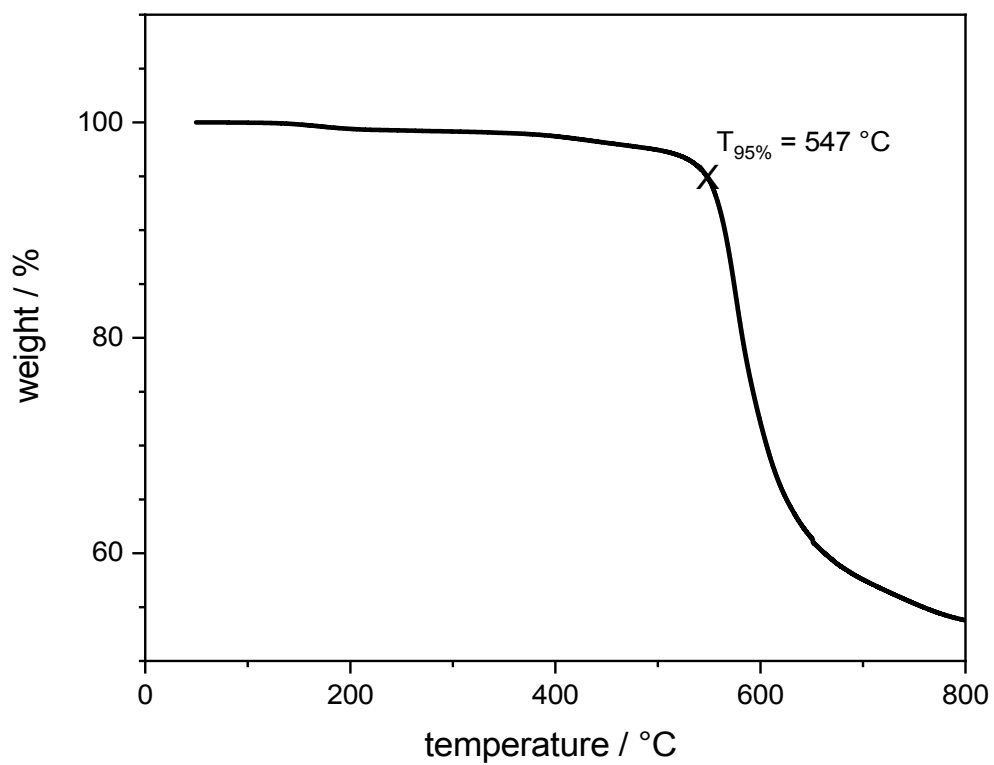


Figure ESI 71: TGA curve of PI-9 (heating rate 10 °C/min)

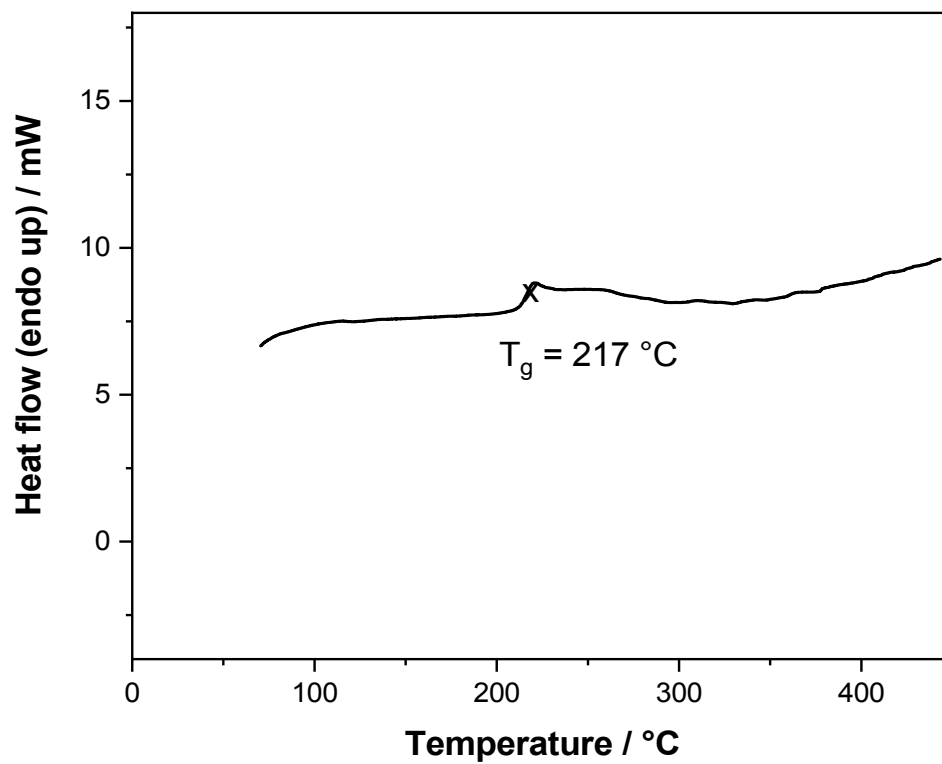


Figure ESI 72: DSC measurement of **PI-9** (second heating cycle, endo up)

PI-10

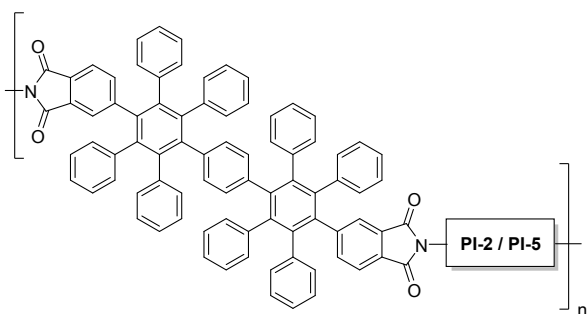


Figure ESI 73: Structure of PI-10

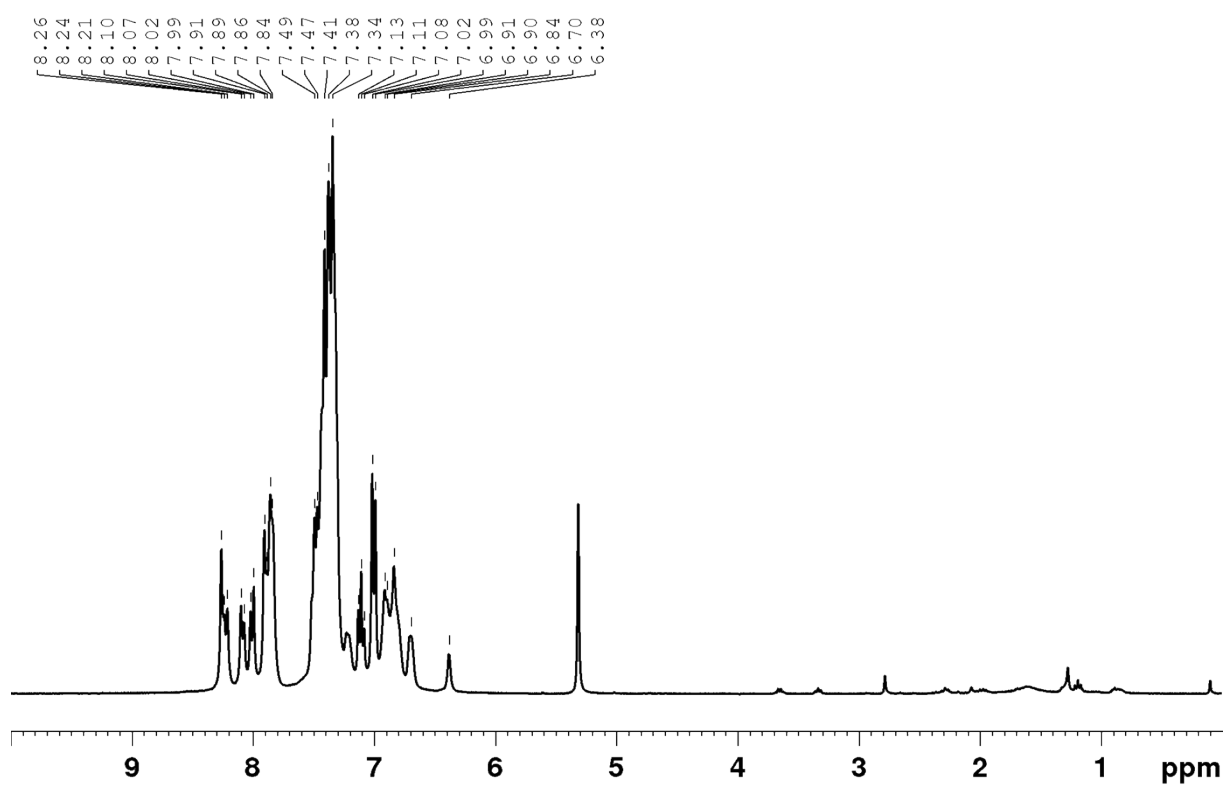


Figure ESI 74: ¹H-NMR of PI-10 in CD₂Cl₂

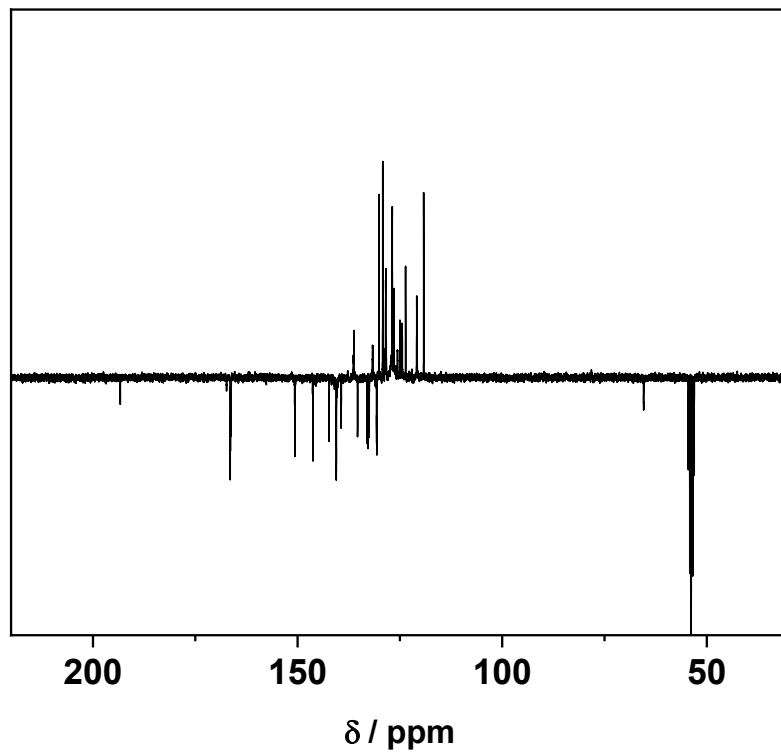


Figure ESI 75: ^{13}C -NMR of **PI-10** in CD_2Cl_2

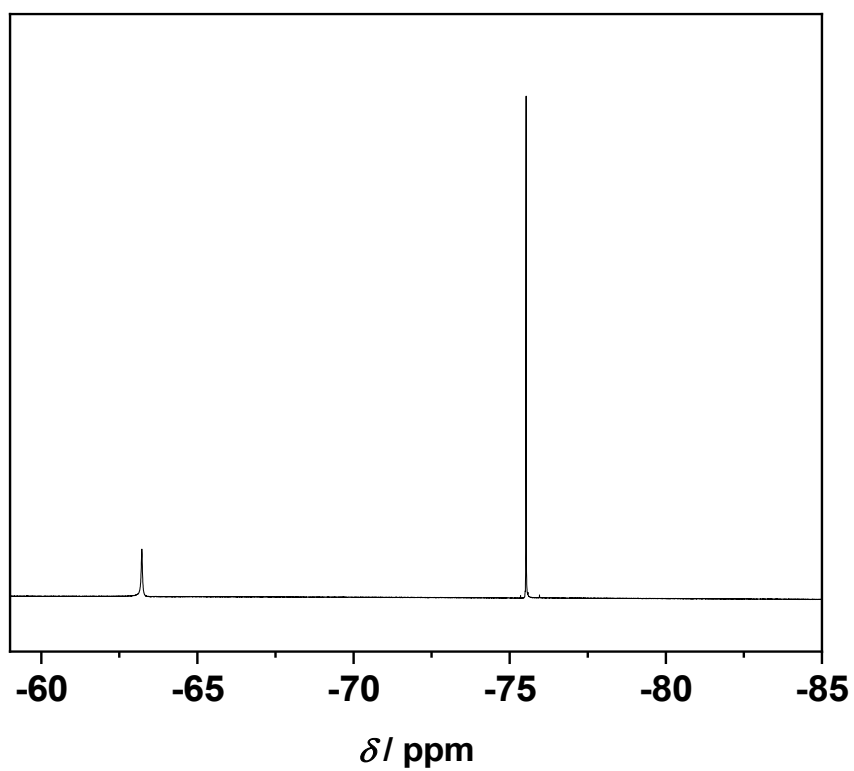


Figure ESI 76: ^{19}F -NMR of **PI-10** in CDCl_3 (peak at -75.5 ppm originates from TFA used as internal standard)

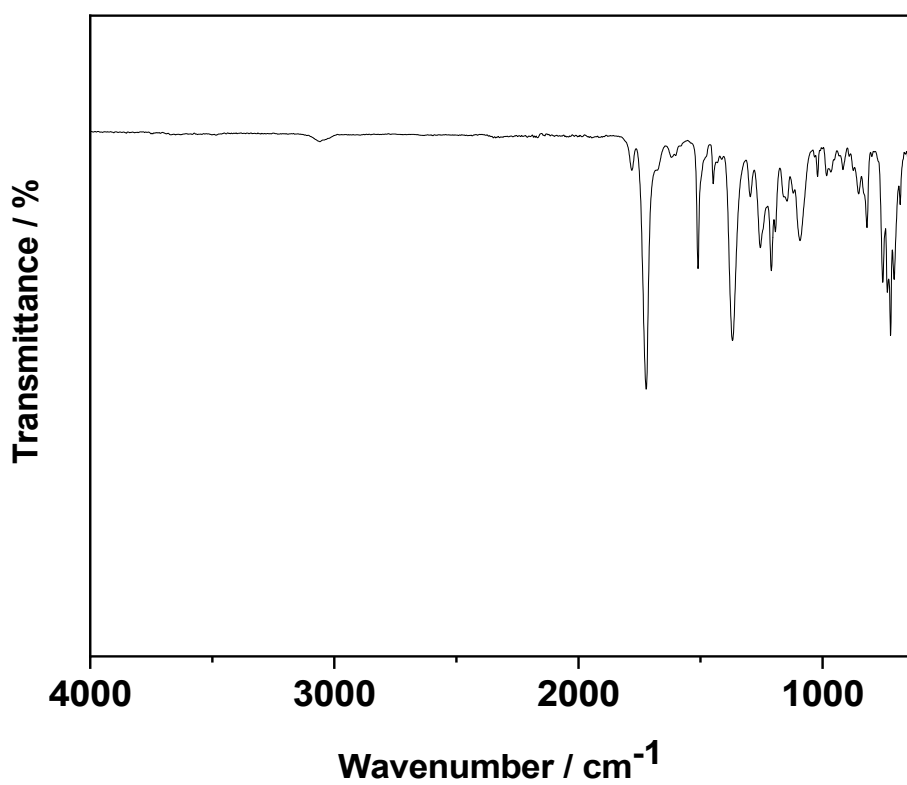


Figure ESI 77: FTIR-ATR of PI-10

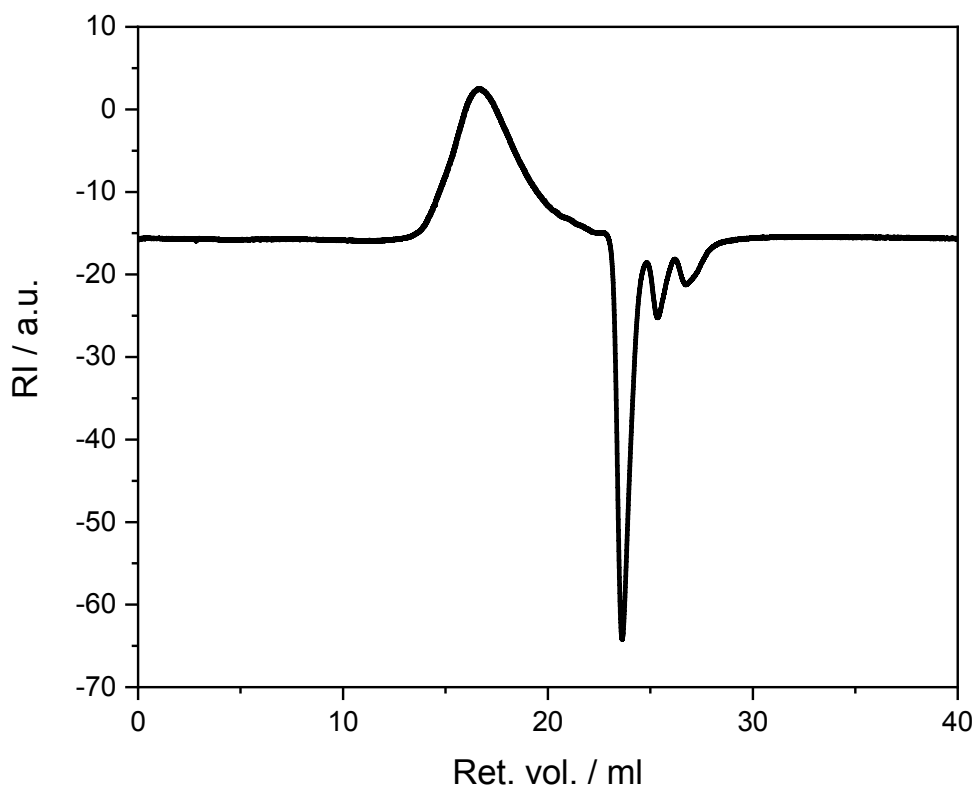


Figure ESI 78: Refractive index detector response of SEC of PI-10

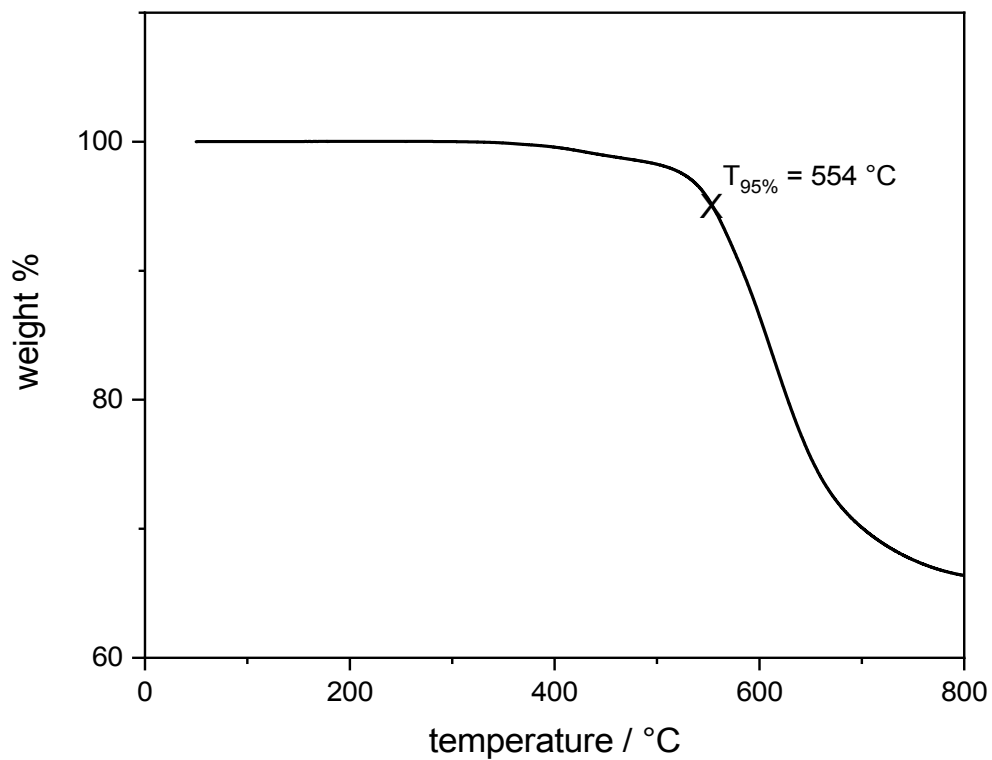


Figure ESI 79: TGA curve of **PI-10** (heating rate 10 °C/min)

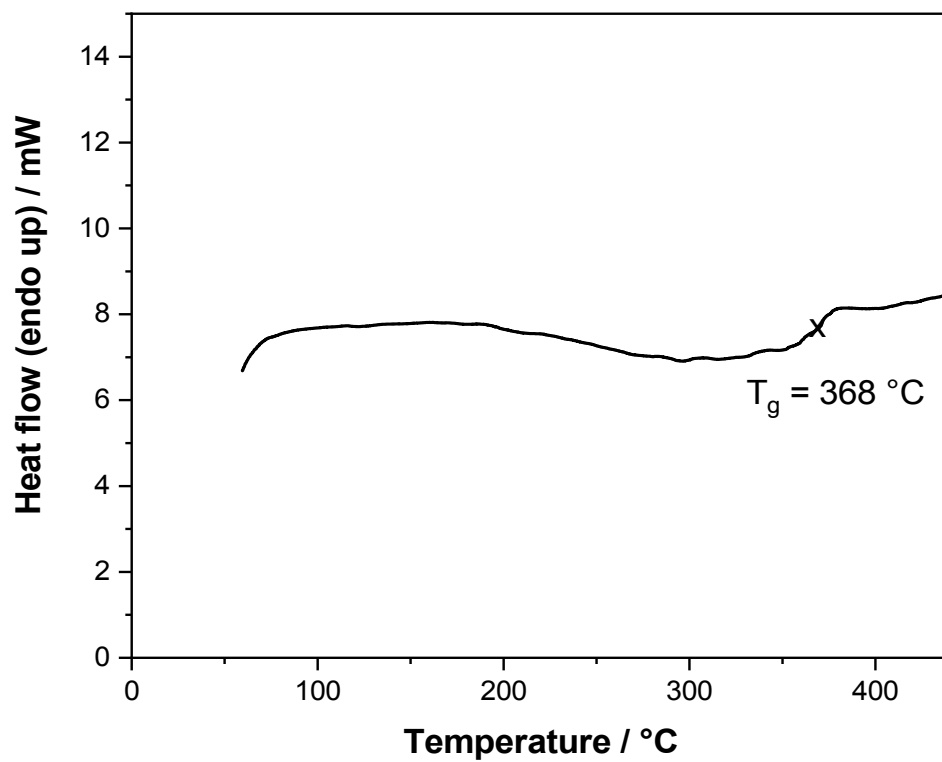


Figure ESI 80: DSC measurement of **PI-10** (second heating cycle, endo up)

PI-11

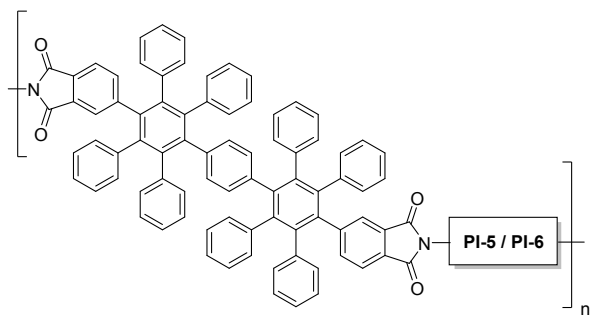


Figure ESI 81: Structure of **PI-11**

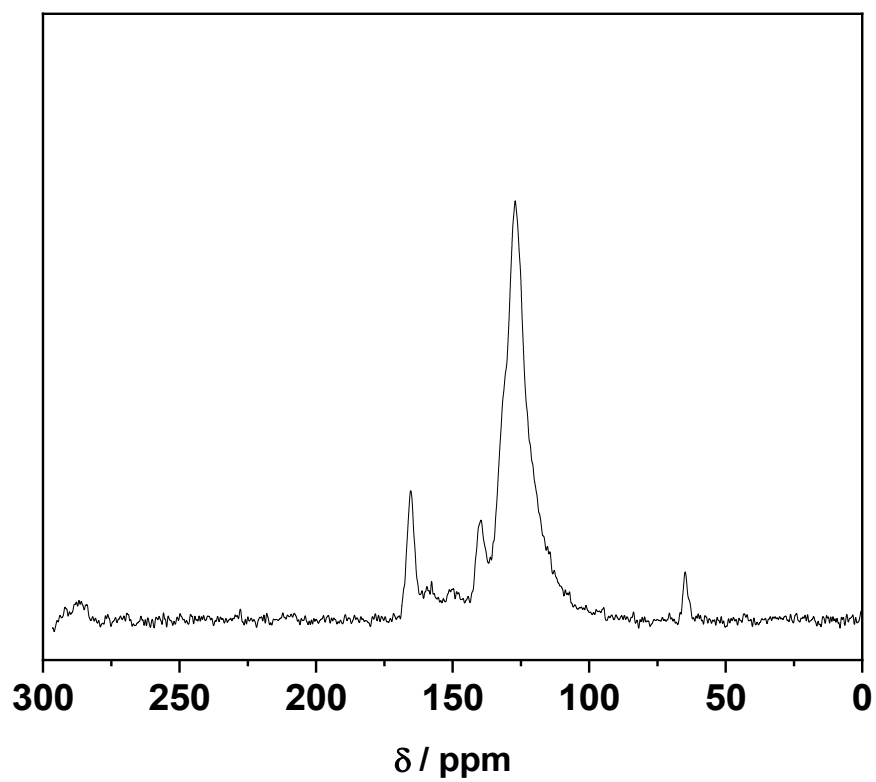


Figure ESI 82: Solid state ¹³C-NMR of **PI-11**

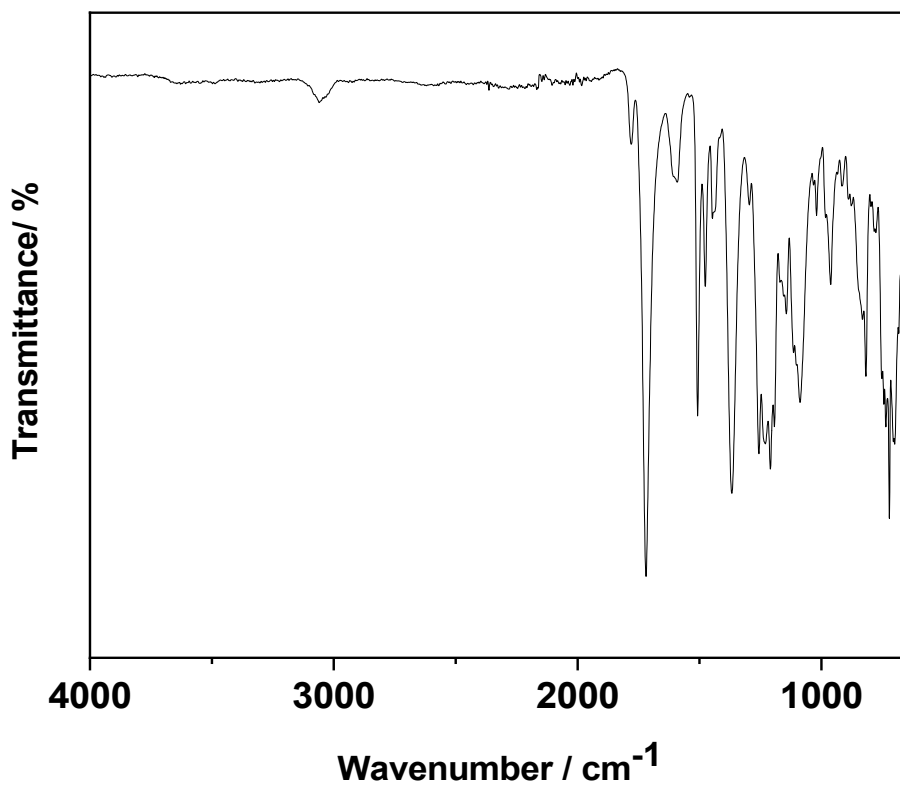


Figure ESI 83: FTIR-ATR of **PI-11**

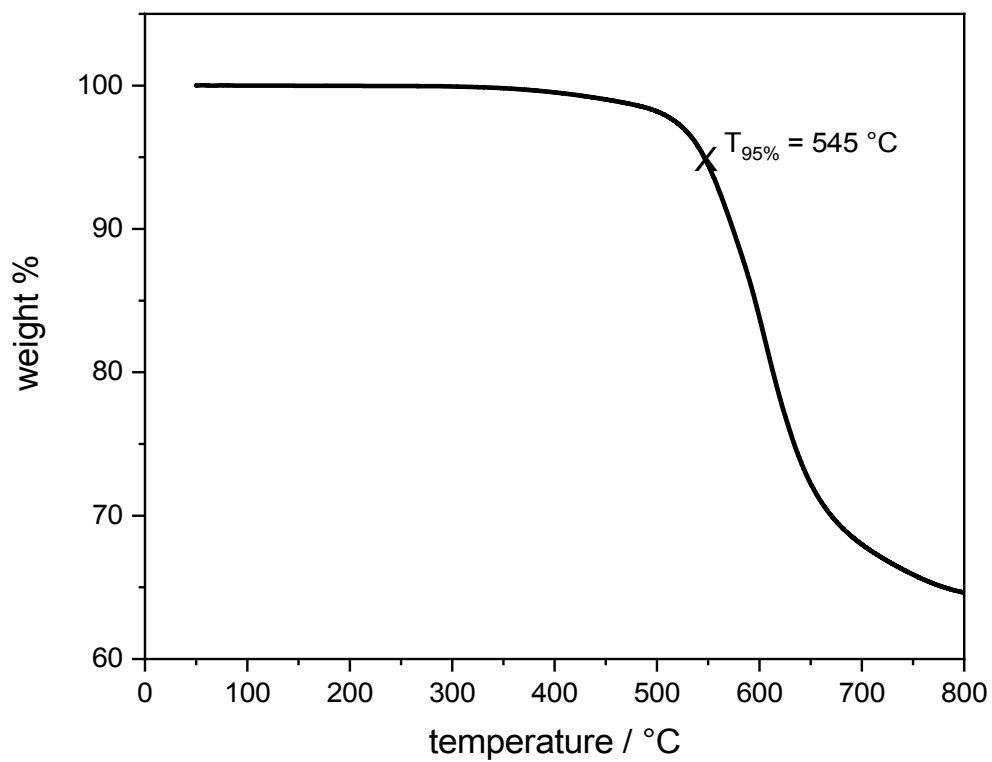


Figure ESI 84: TGA curve of **PI-11** (heating rate 10 °C/min)

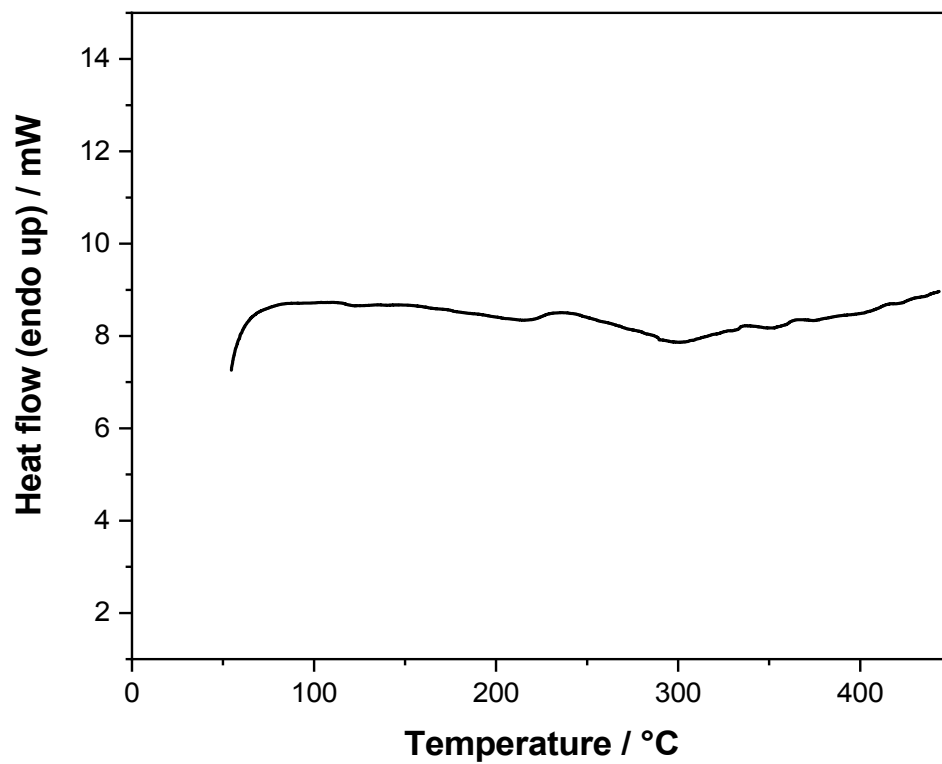


Figure ESI 85: DSC measurement of **PI-11** (second heating cycle, endo up)

Comparisons / Overlays / Tables

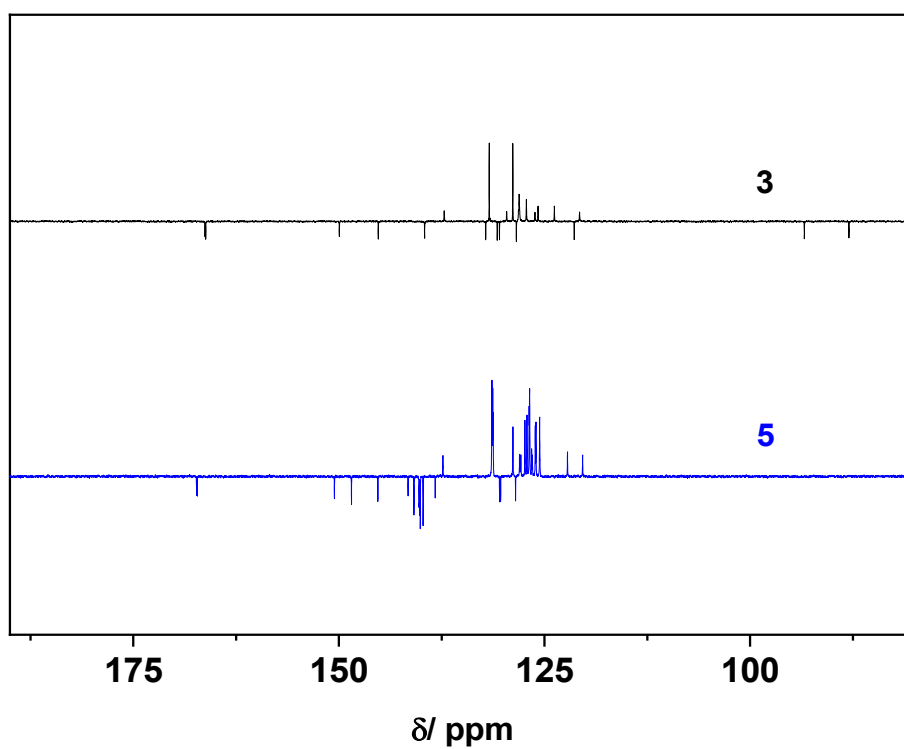


Figure ESI 86: ¹³C-NMR of compound **3** (top) and compound **5** (bottom)

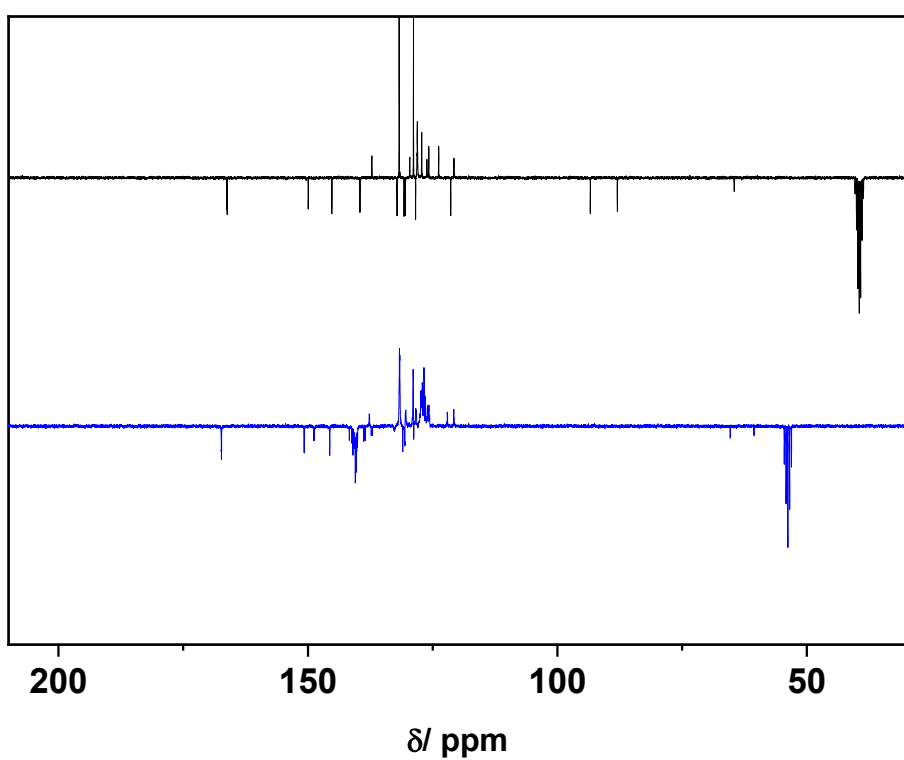


Figure ESI 87: ¹³C-NMR of compound **3** (top) and **PI-1** (bottom).

Table ESI 1: Solubility of polymers.

Polymer	DMF	NMP	DMSO	CHCl ₃	Acetone
PI-1	+	+	+	+	-
PI-2	+	+	+	+	-
PI-3	+	+	+	+	-
PI-4	+	+	+	+	-
PI-5	+	+	+	+	+
PI-6	-	-	-	-	-
PI-7	+	+	+	+	-
PI-8	+	+	+	+	+
PI-9	-	-	-	-	-
PI-10	+	+	+	+	-
PI-11	-	-	-	-	-