

Supporting Information

Rare-earth Metal-Catalyzed Highly 3,4-Regioselective Polymerization of Polar 1-Phenyl-1,3-Butadiene Derivates

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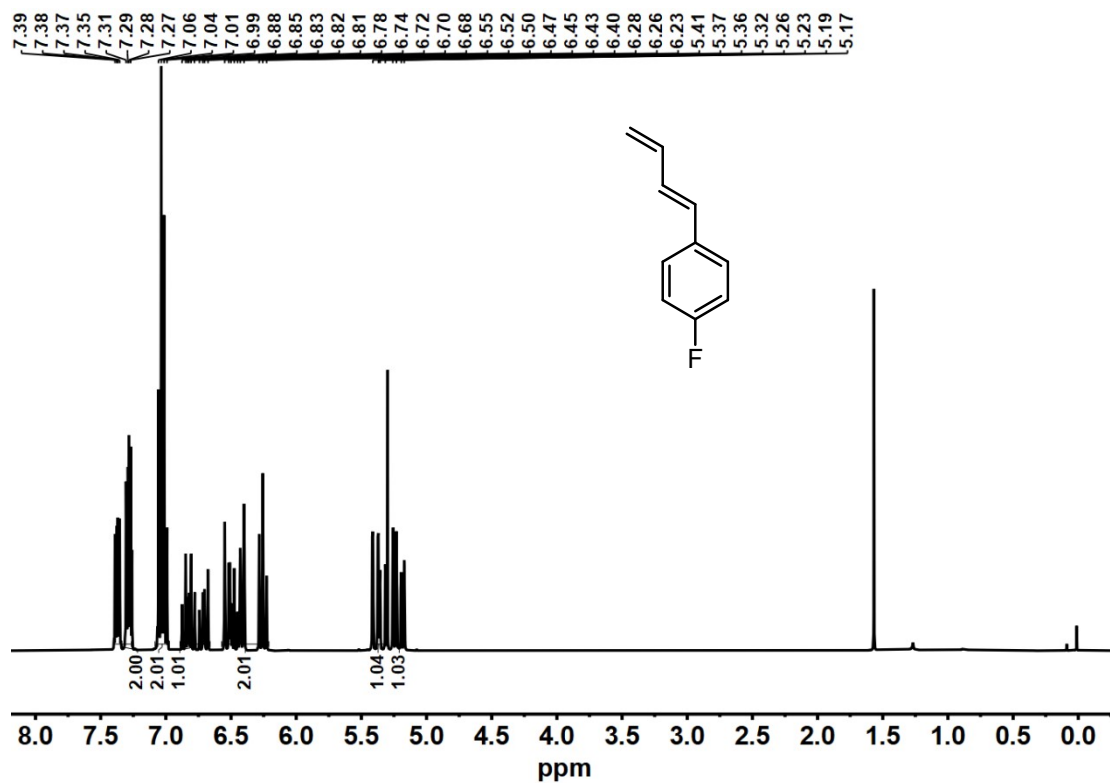


Figure S1. ¹H NMR spectrum of monomer *p*-FPB. (400 MHz, CDCl₃, 25 °C)

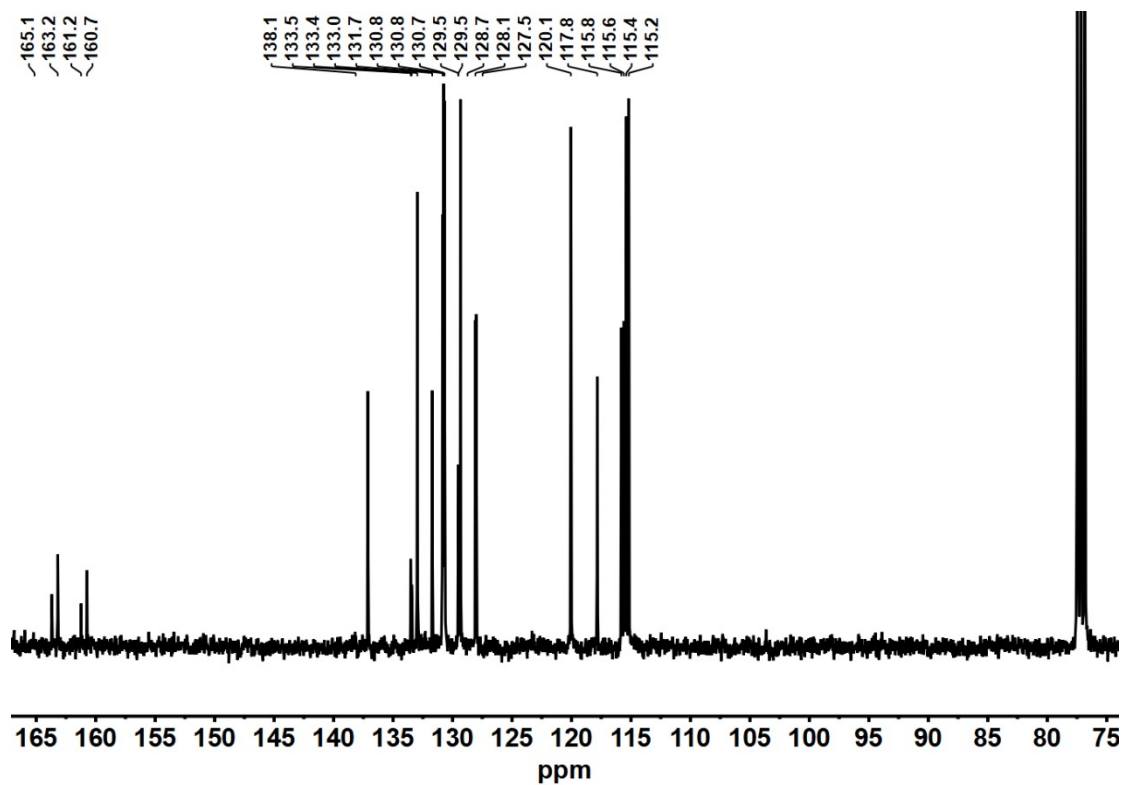


Figure S2. ¹³C NMR spectrum of monomer *p*-FPB. (400 MHz, CDCl₃, 25 °C)

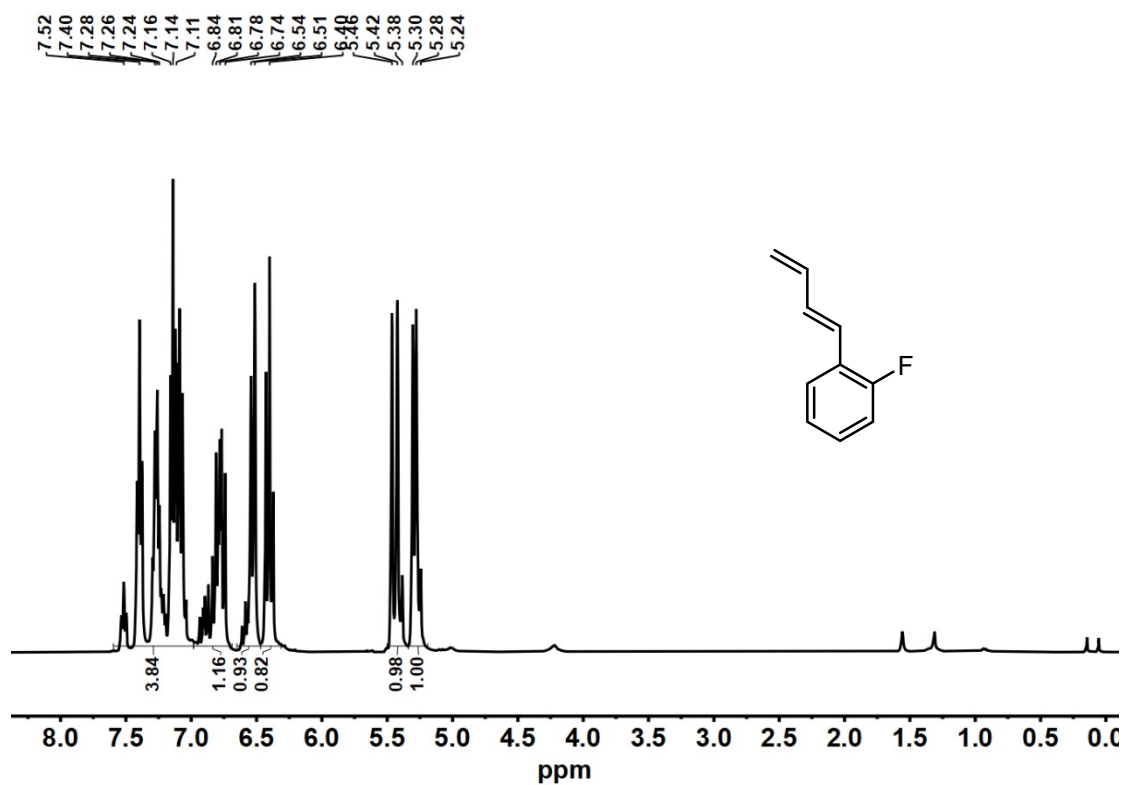


Figure S3. ¹H NMR spectrum of monomer *o*-FPB. (400 MHz, CDCl₃, 25 °C)

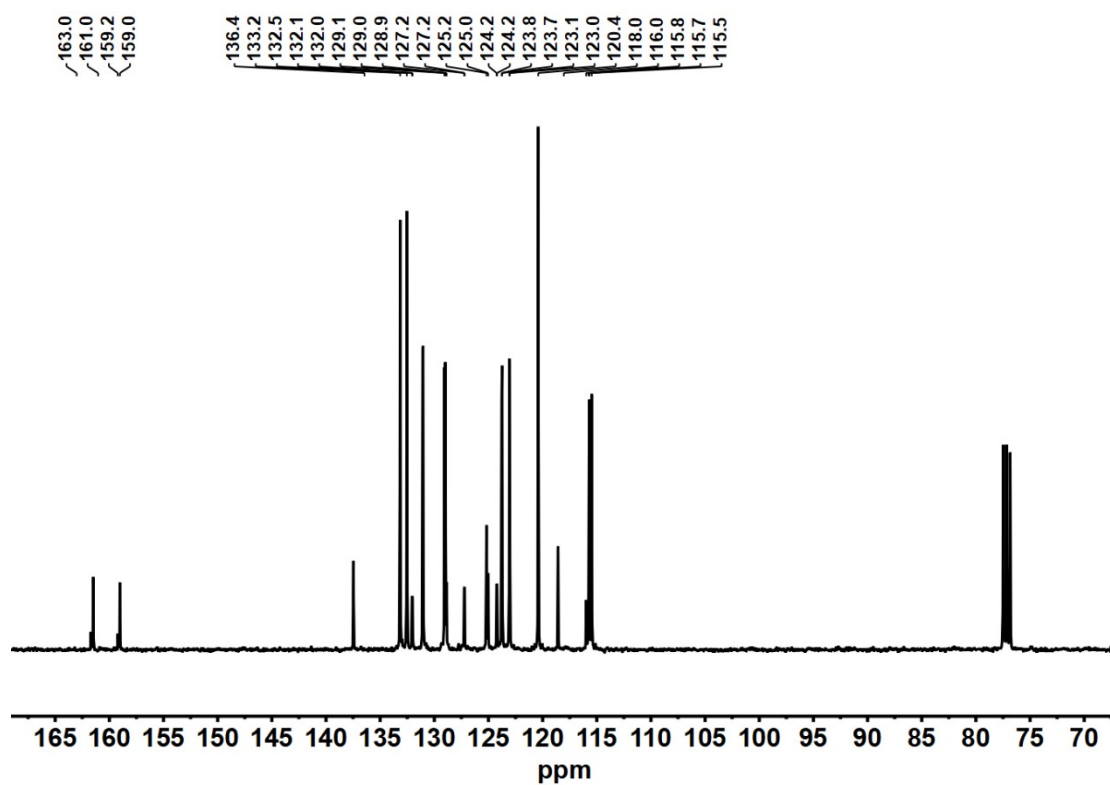


Figure S4. ¹³C NMR spectrum of monomer *o*-FPB. (400 MHz, CDCl₃, 25 °C)

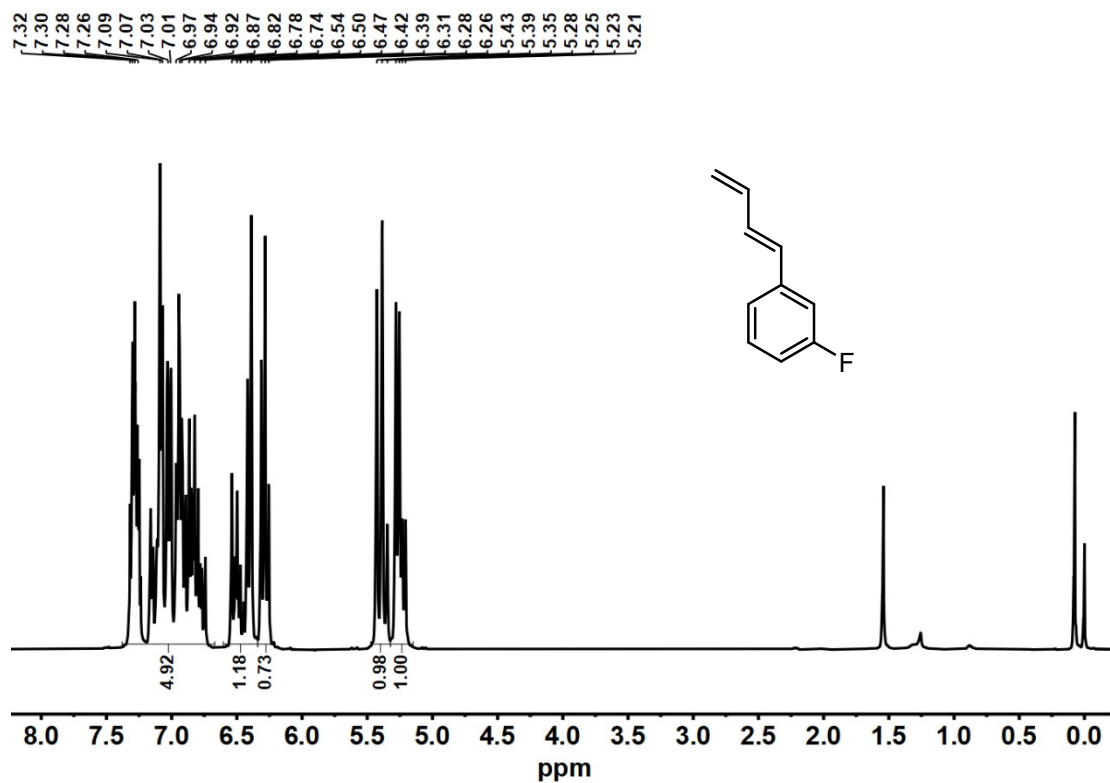


Figure S5. ^1H NMR spectrum of monomer *m*-FPB. (400 MHz, CDCl_3 , 25 $^\circ\text{C}$)

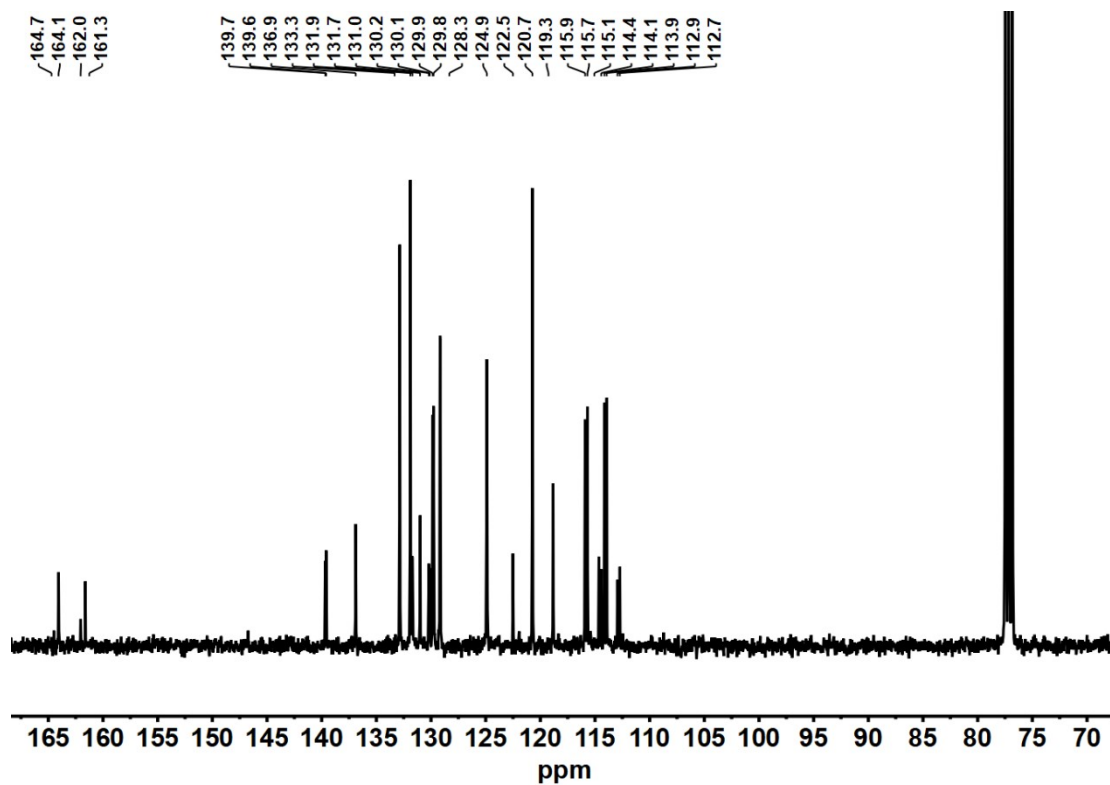


Figure S6. ^{13}C NMR spectrum of monomer *m*-FPB. (400 MHz, CDCl_3 , 25 $^\circ\text{C}$)

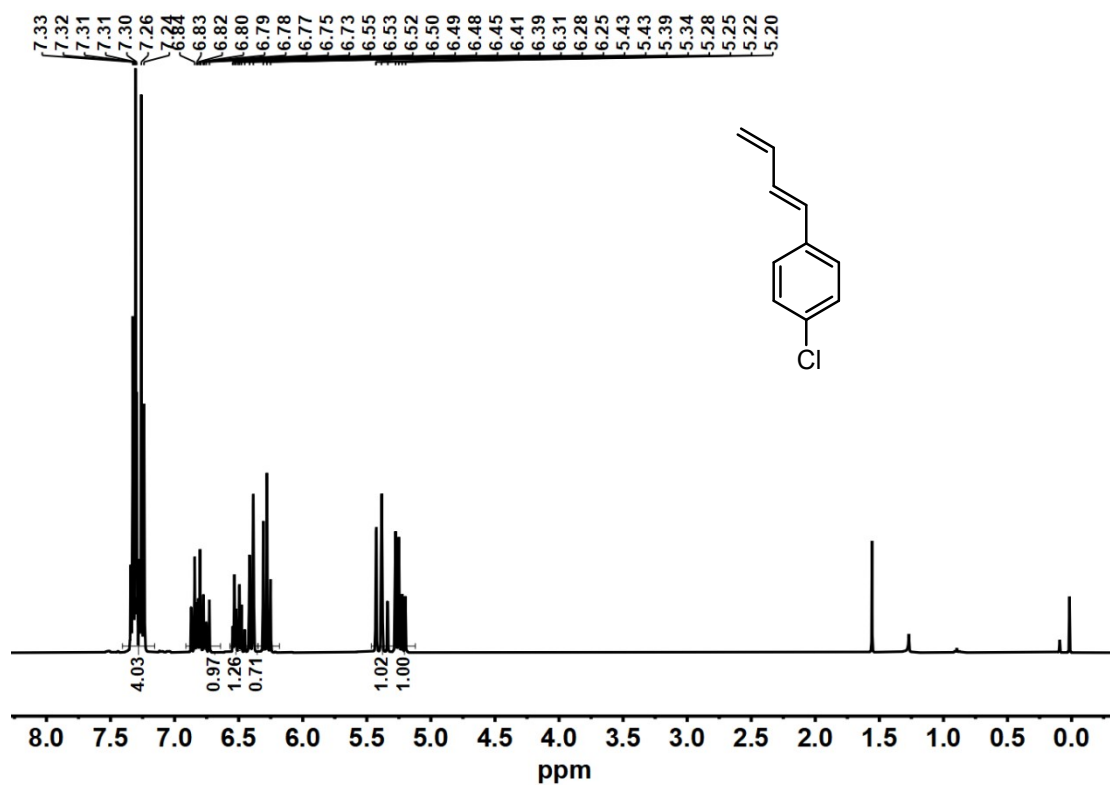


Figure S7. ^1H NMR spectrum of monomer *p*-CIPB. (400 MHz, CDCl_3 , 25 $^\circ\text{C}$)

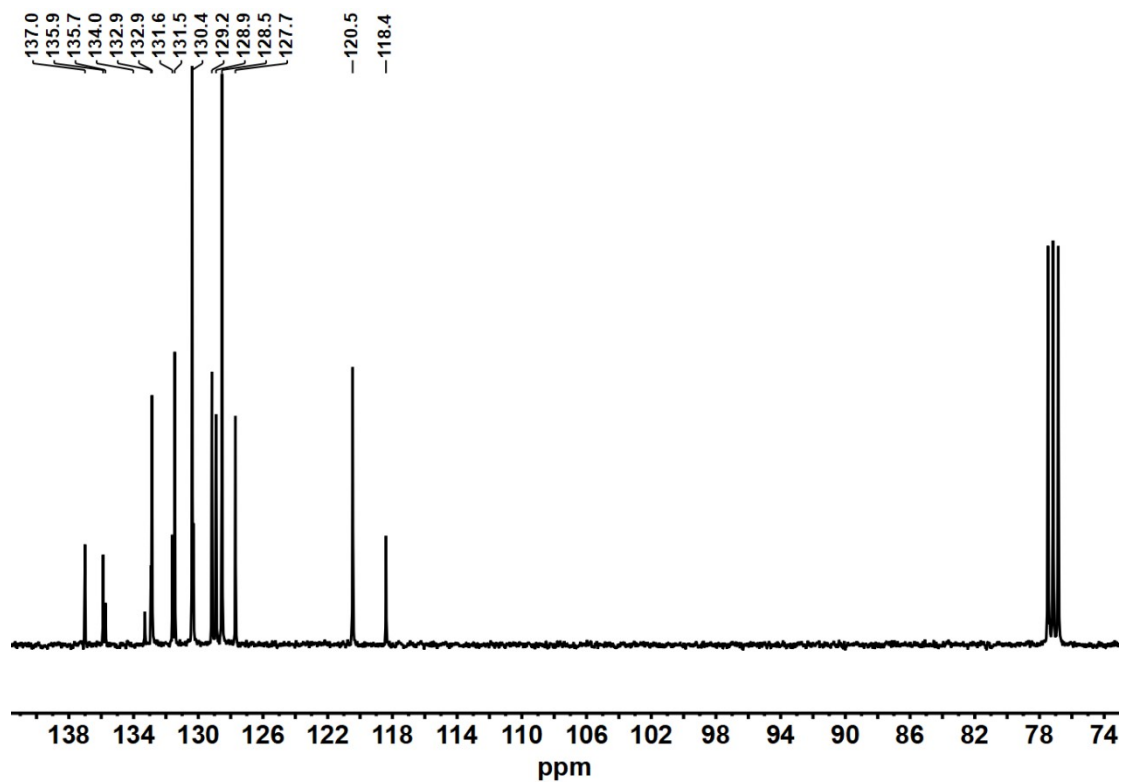


Figure S8. ^{13}C NMR spectrum of monomer *p*-CIPB. (400 MHz, CDCl_3 , 25 $^\circ\text{C}$)

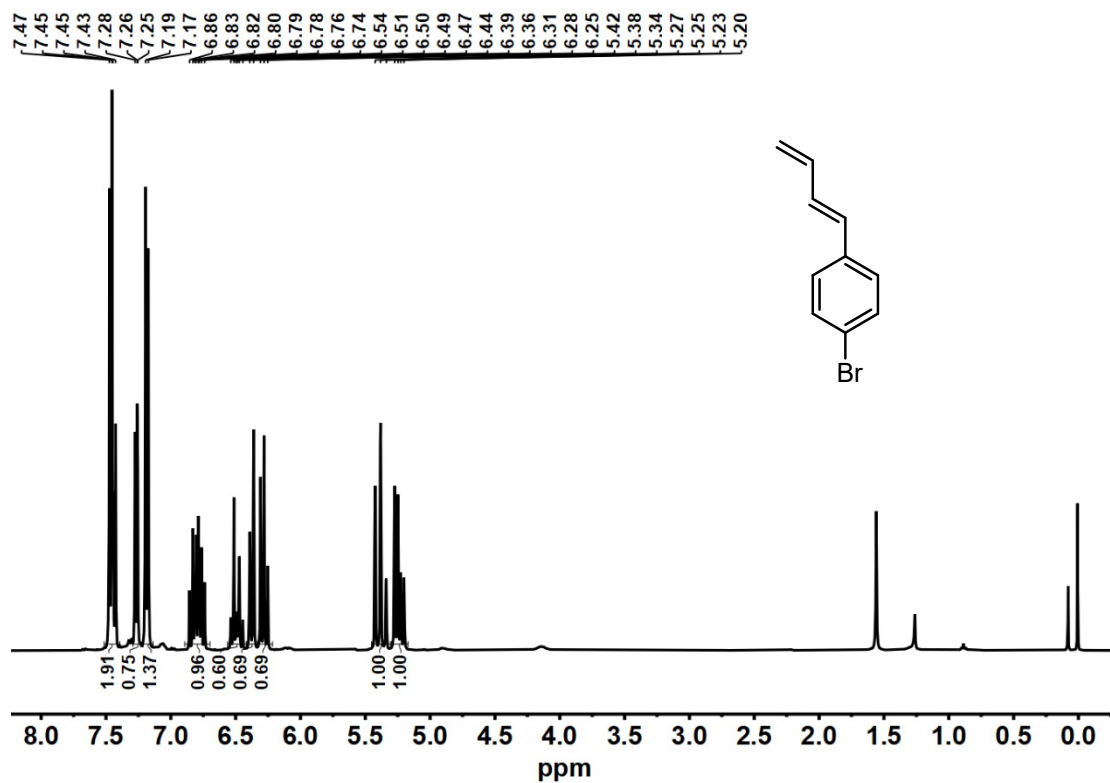


Figure S9. ¹H NMR spectrum of monomer *p*-BrPB. (400 MHz, CDCl₃, 25 °C)

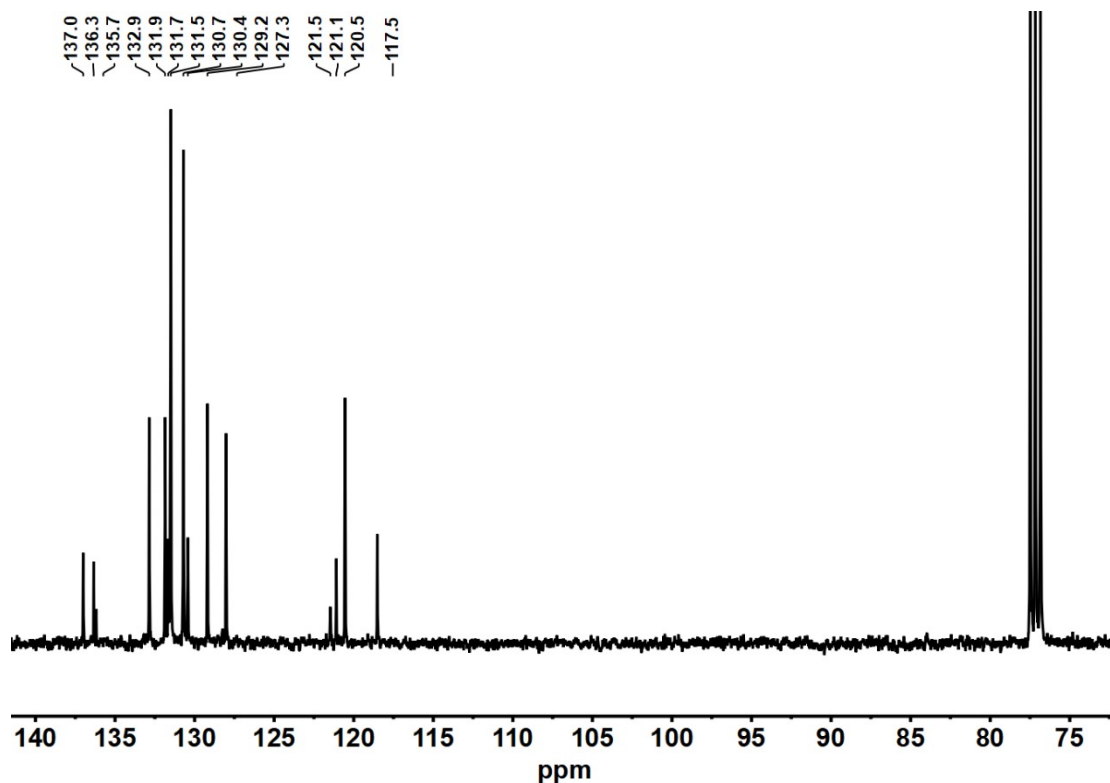


Figure S10. ¹³C NMR spectrum of monomer *p*-BrPB. (400 MHz, CDCl₃, 25 °C)

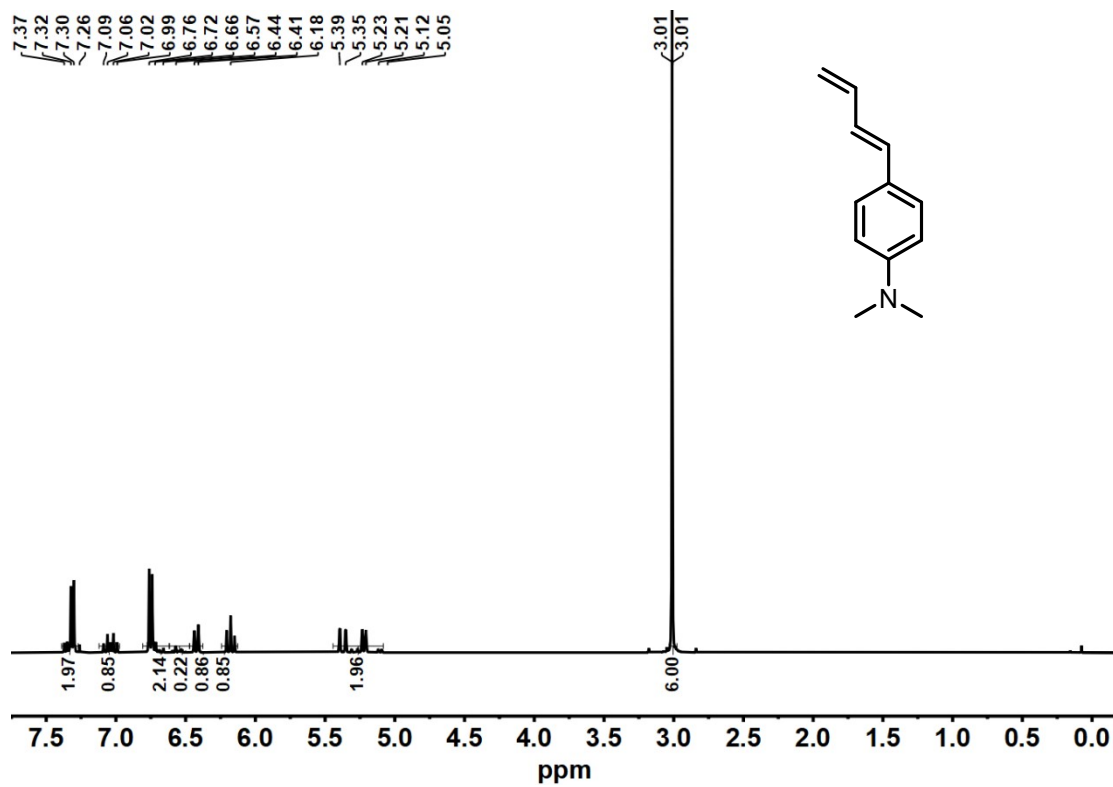


Figure S11. ¹H NMR spectrum of monomer *p*-NPB. (400 MHz, CDCl₃, 25 °C)

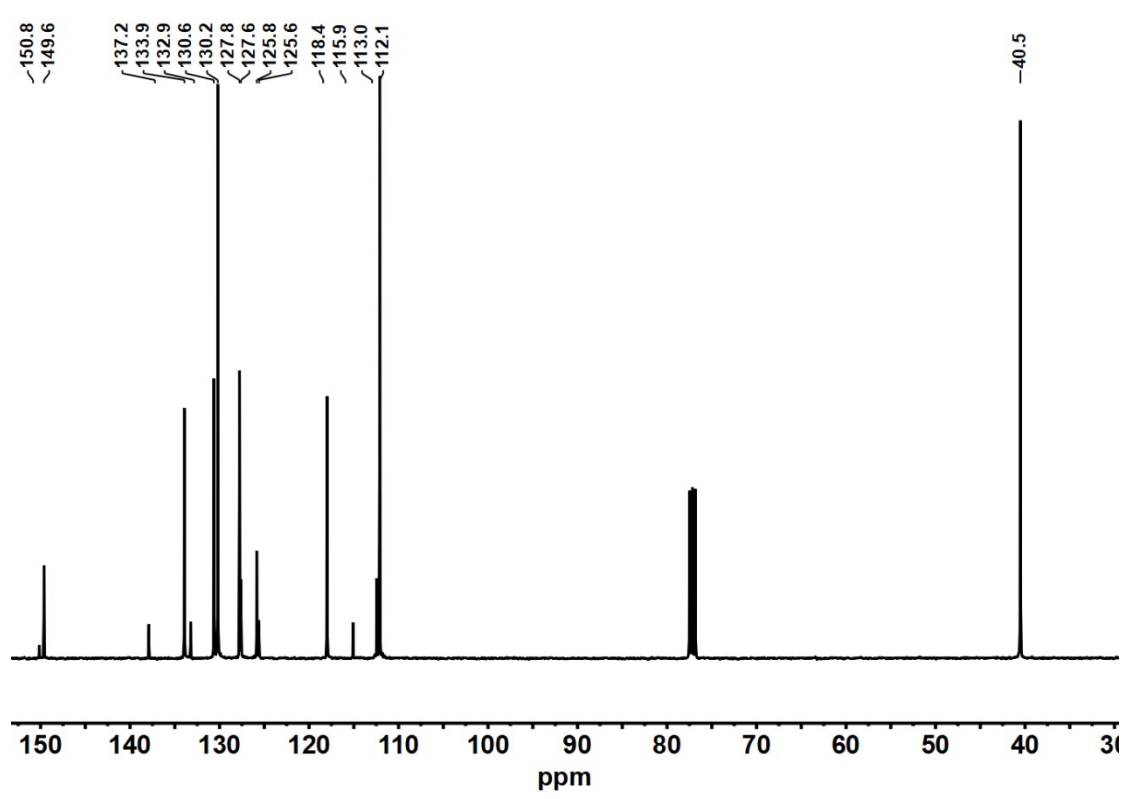


Figure S12. ¹³C NMR spectrum of monomer *p*-NPB. (400 MHz, CDCl₃, 25 °C)

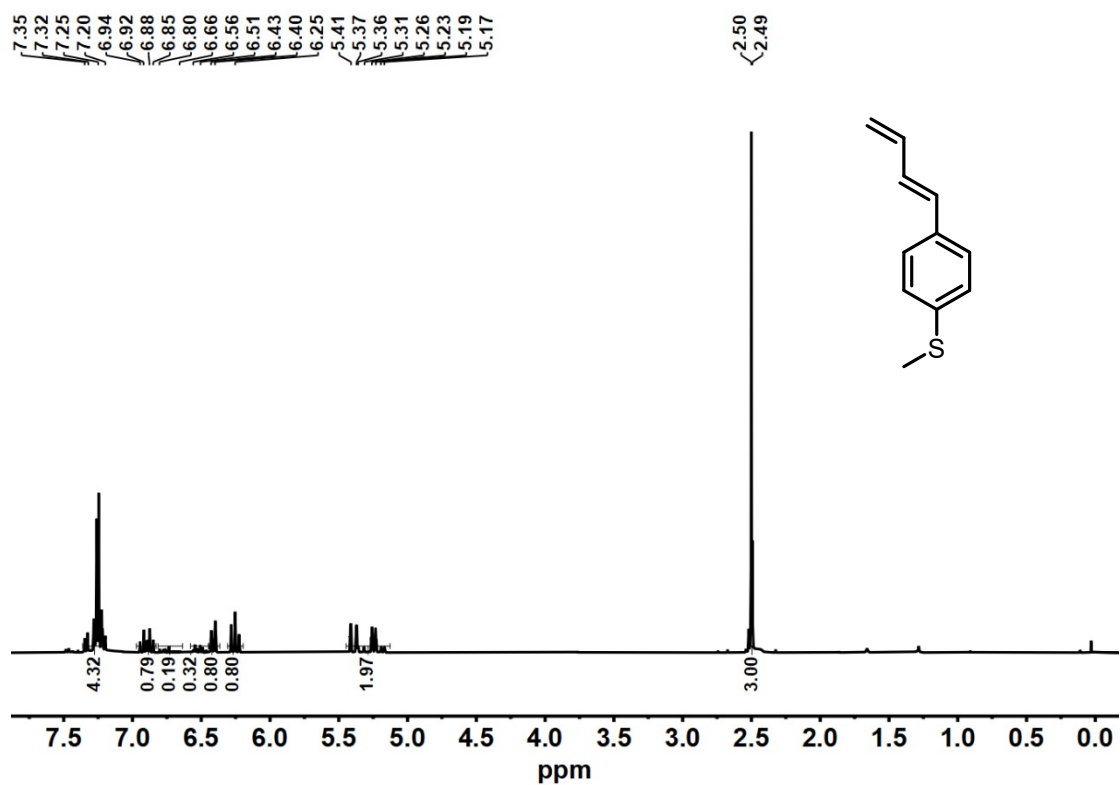


Figure S13. ^1H NMR spectrum of monomer *p*-SPB. (400 MHz, CDCl_3 , 25 °C)

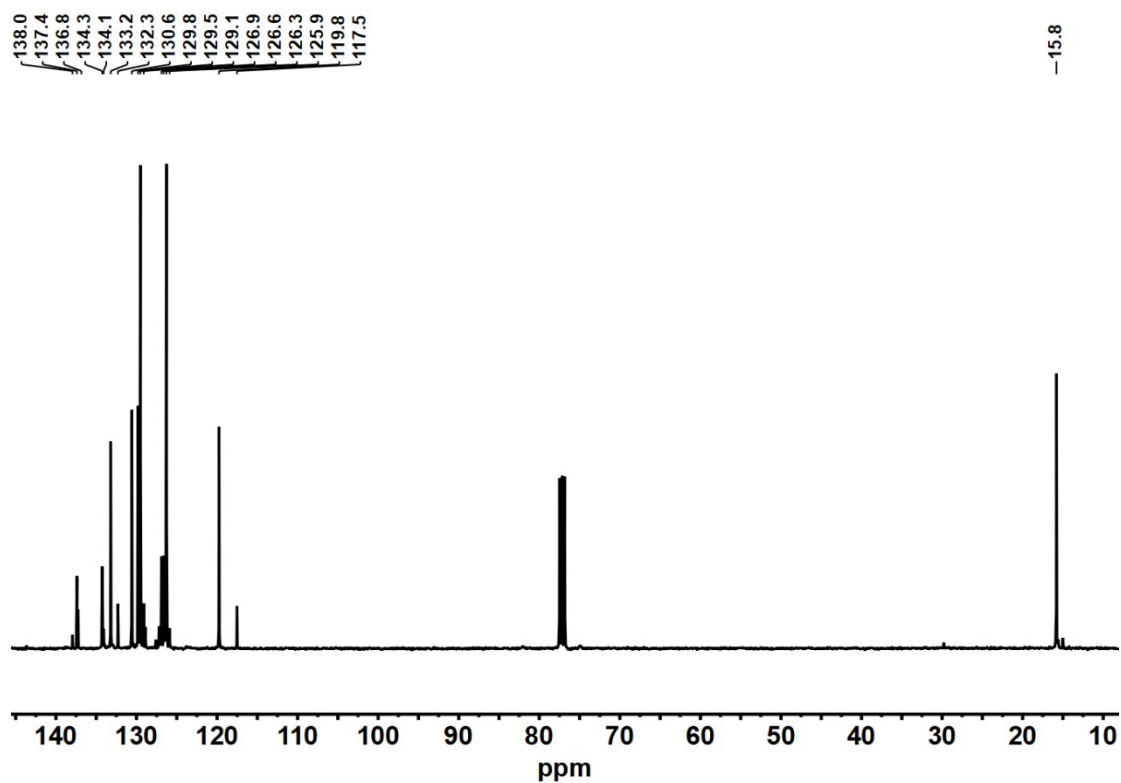


Figure S14. ^{13}C NMR spectrum of monomer *p*-SPB. (400 MHz, CDCl_3 , 25 °C)

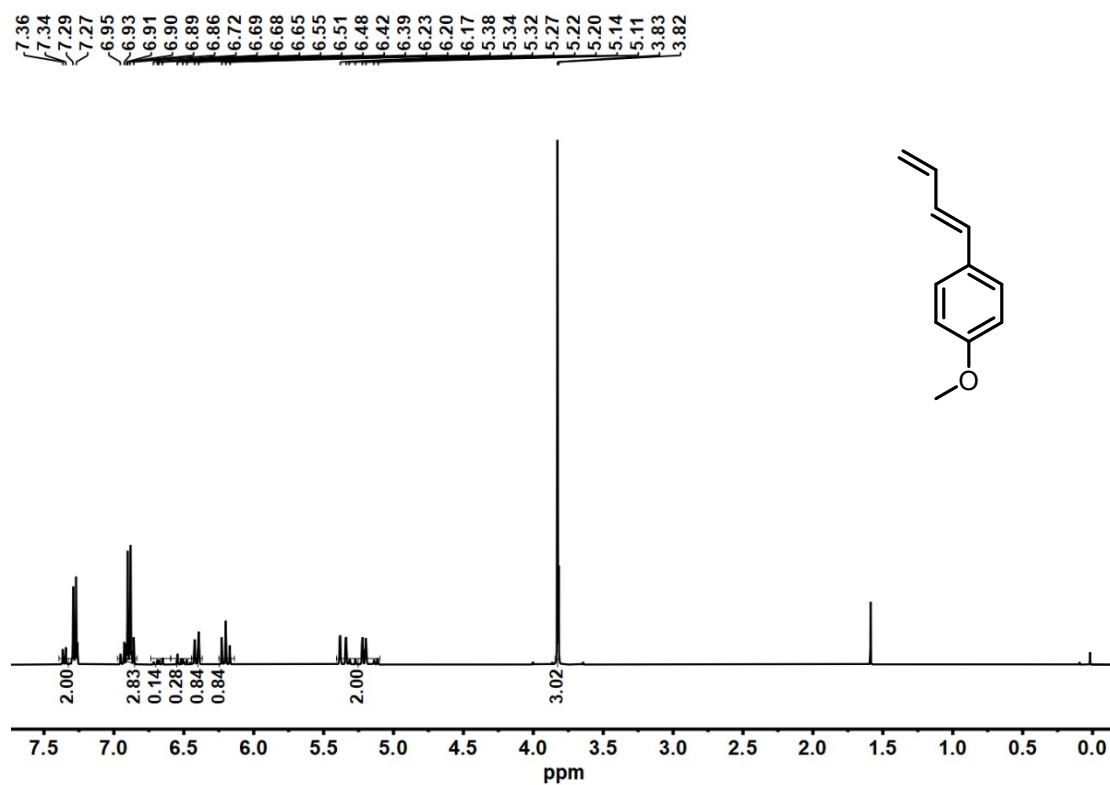


Figure S15. ^1H NMR spectrum of monomer *p*-OPB. (400 MHz, CDCl_3 , 25 $^\circ\text{C}$)

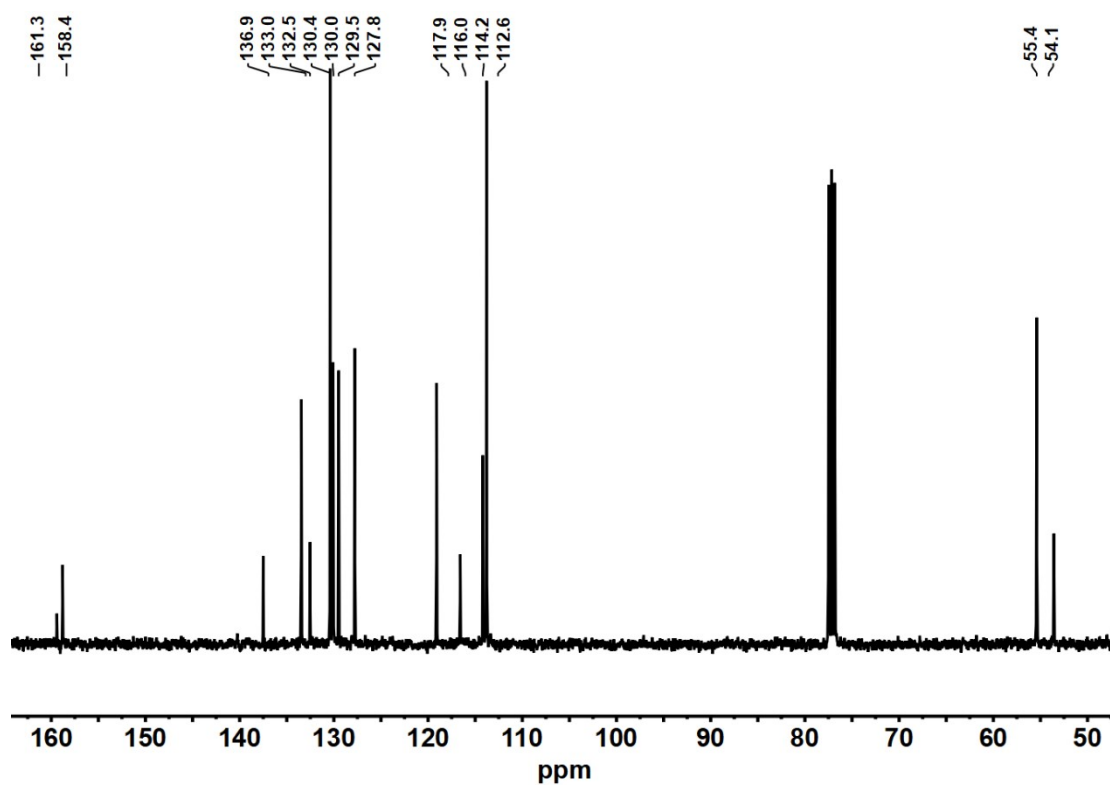


Figure S16. ^{13}C NMR spectrum of monomer *p*-OPB. (400 MHz, CDCl_3 , 25 $^\circ\text{C}$)

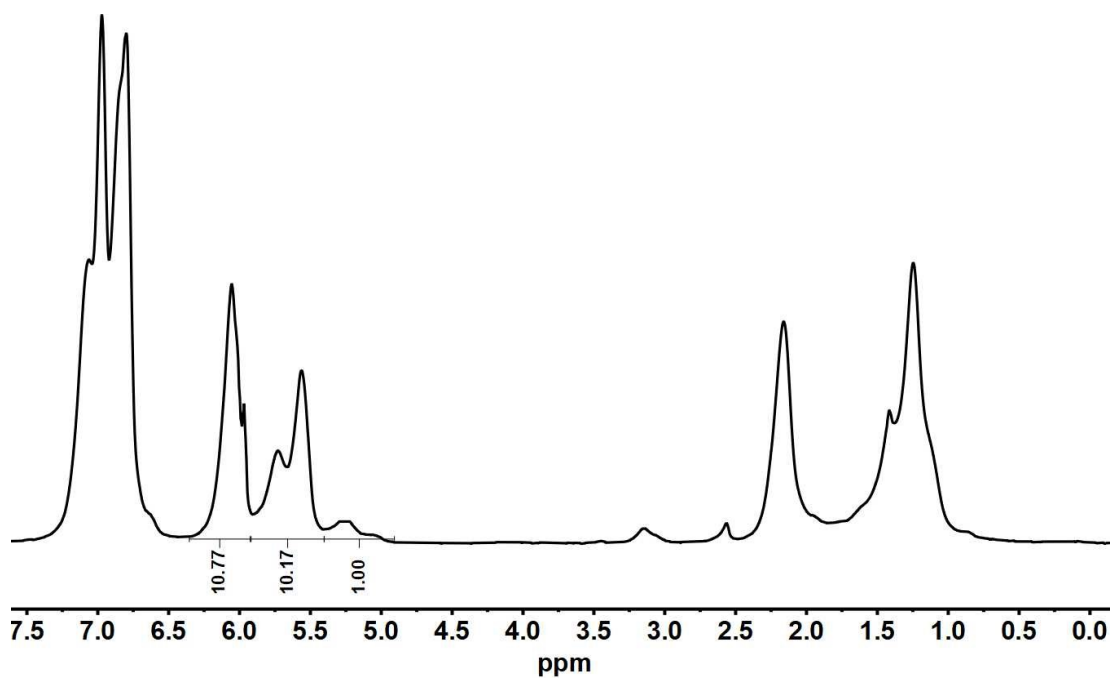


Figure S17. ^1H NMR spectrum of poly(*p*-FPB) prepared by complex **4**. (Entry 5, Table 1)

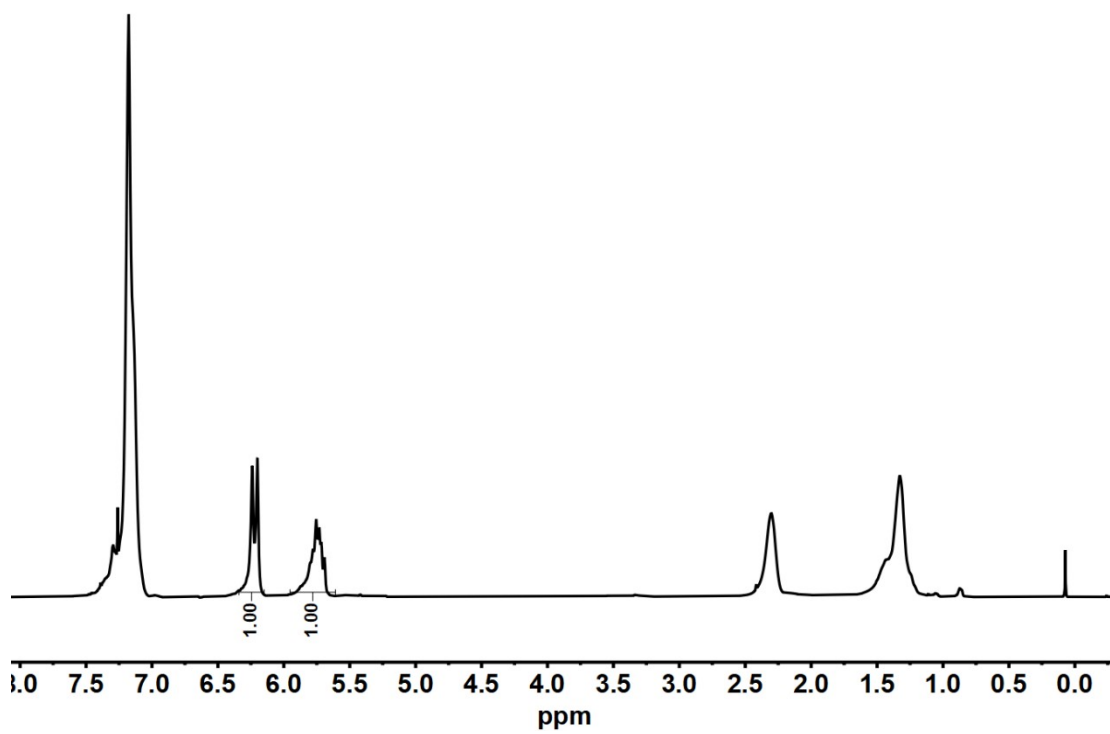


Figure S18. ^1H NMR spectrum of poly(1PB) prepared by complex **1**. (Entry 1, Table 2)

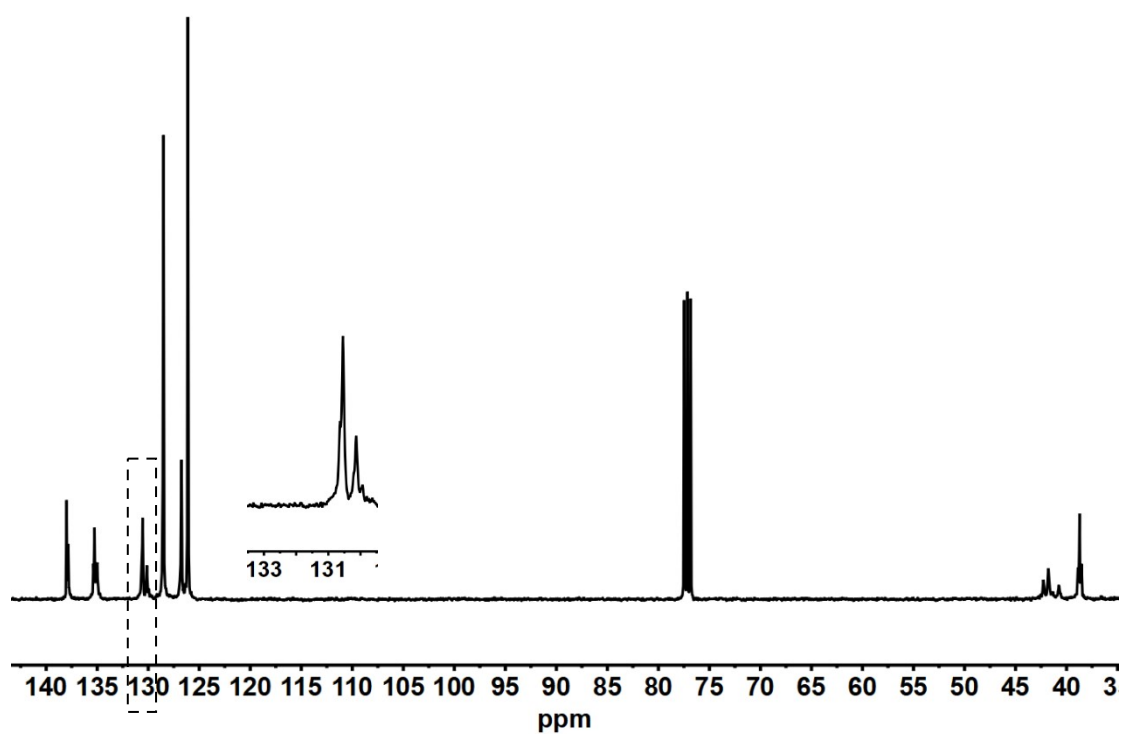


Figure S19. ^{13}C NMR spectrum of poly(**1PB**) prepared by complex **1**. (Entry 1, Table 2)

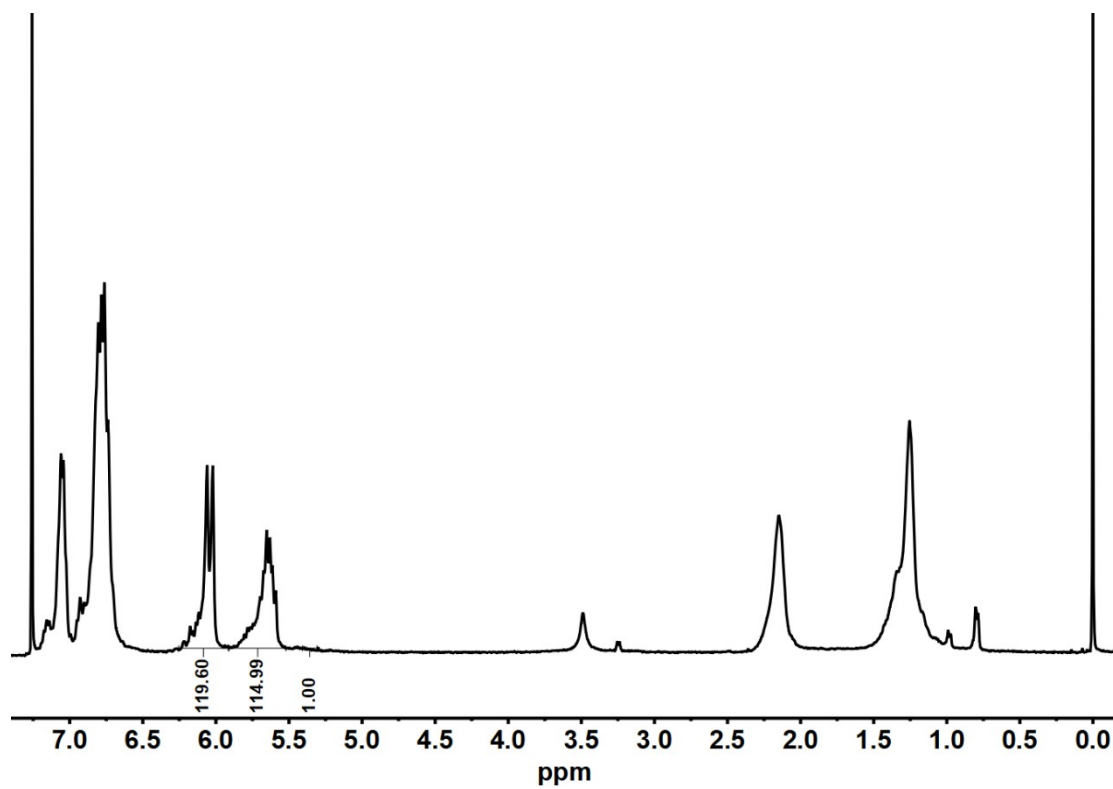


Figure S20 ^1H NMR spectrum of poly(*m*-**FPB**) prepared by complex **1**. (Entry 2, Table 2)

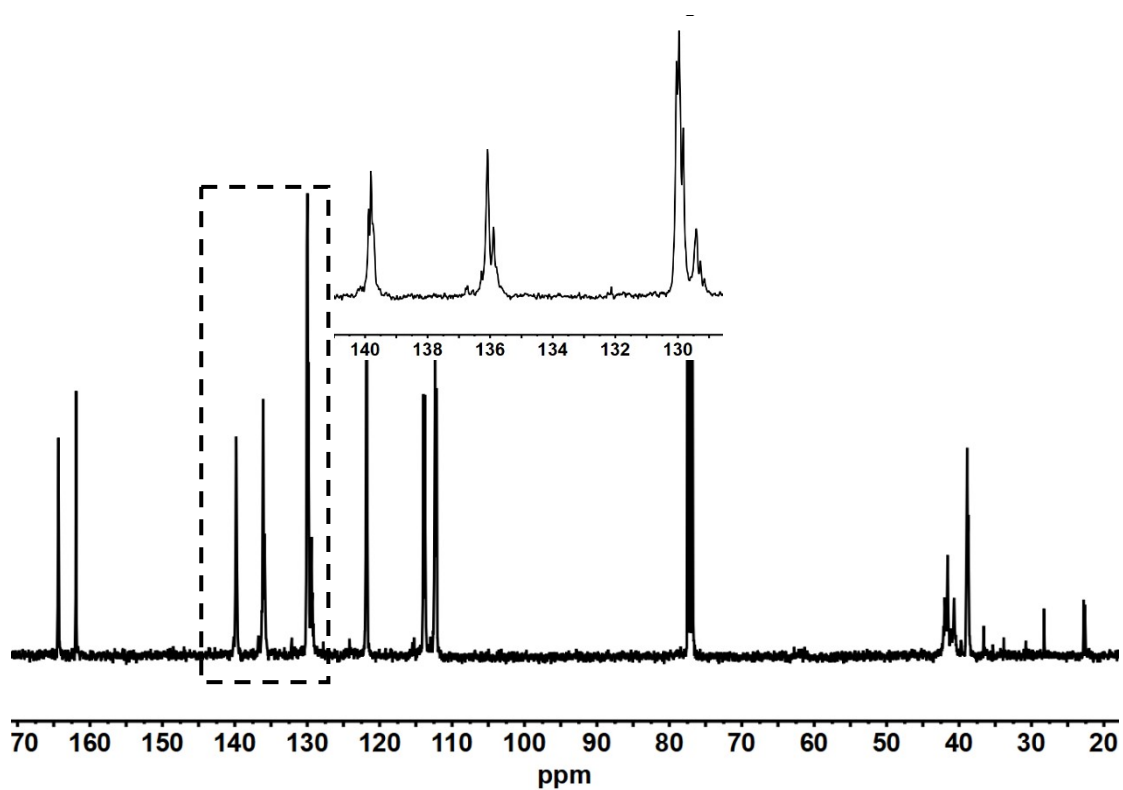


Figure S21. ^{13}C NMR spectrum of poly(*m*-FPB) prepared by complex **1**. (Entry 2, Table 2)

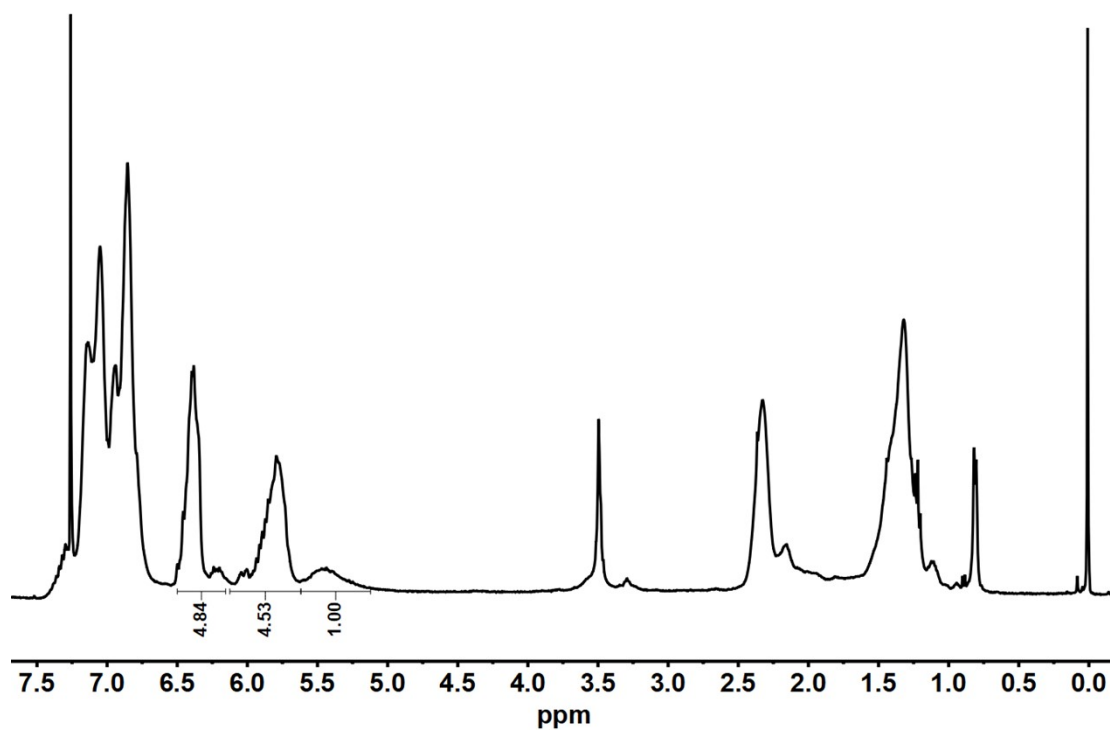


Figure S22. ^1H NMR spectrum of poly(*o*-FPB) prepared by complex **1**. (Entry 3, Table 2)

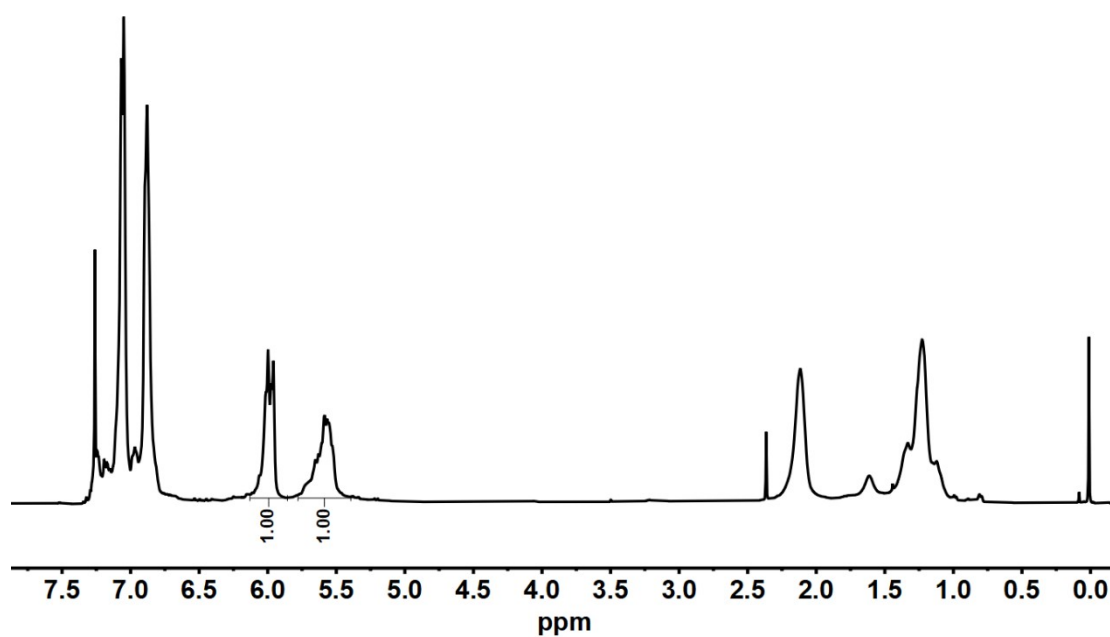


Figure S23. ^1H NMR spectrum of poly(*p*-CIPB) prepared by complex **1**. (Entry 4, Table 2)

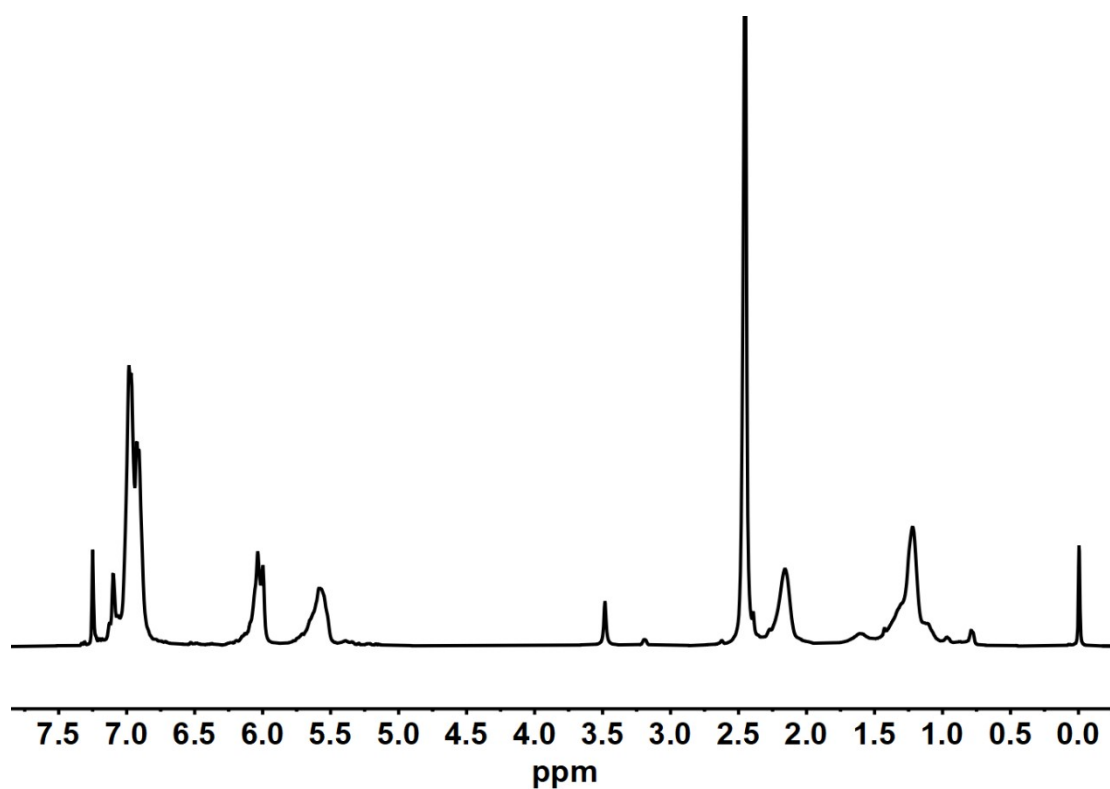


Figure S24. ^1H NMR spectrum of poly(*p*-SPB) prepared by complex **1**. (Entry 4, Table 2)

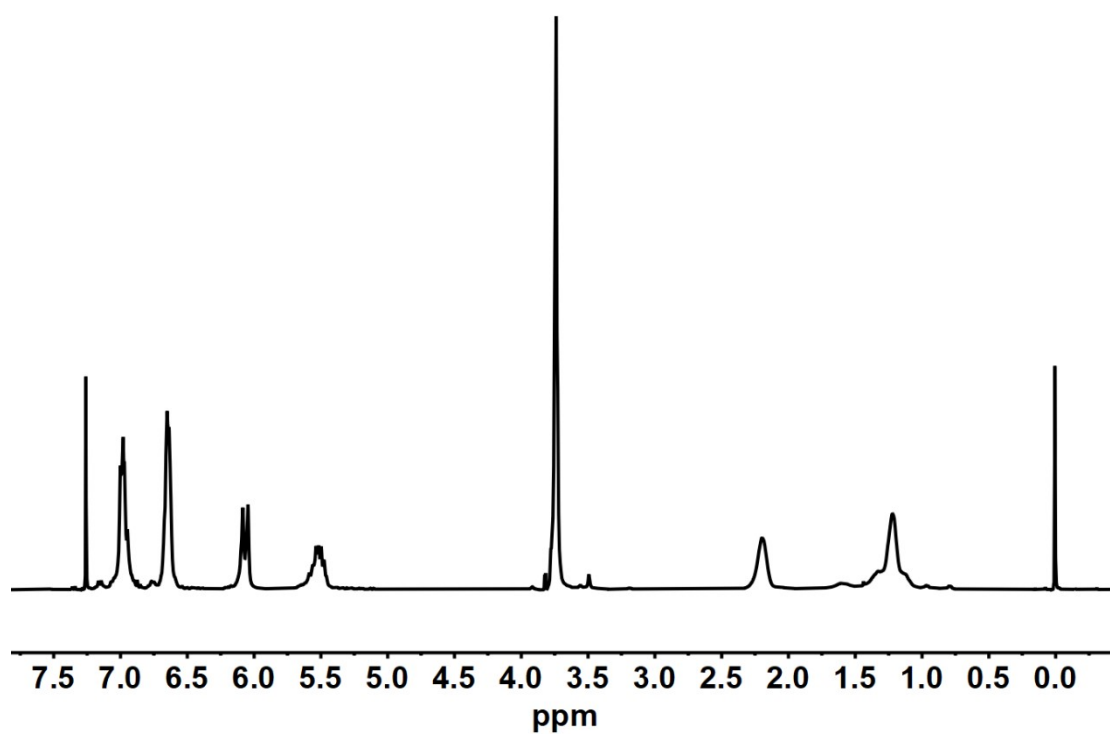
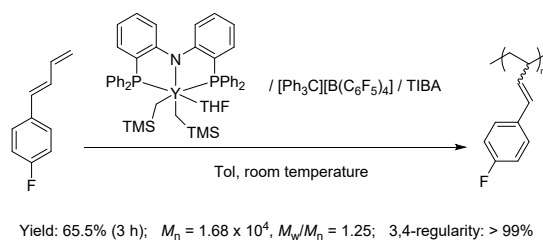


Figure S25. ^1H NMR spectrum of poly(*p*-OPB) prepared by complex **1**. (Entry 4, Table 2)

Scheme S1. Homopolymerization of 1-(4-fluorophenyl)-1,3-butadiene (*p*-FPB) with bis(phosfinophenyl)amido yttrium complex.^a



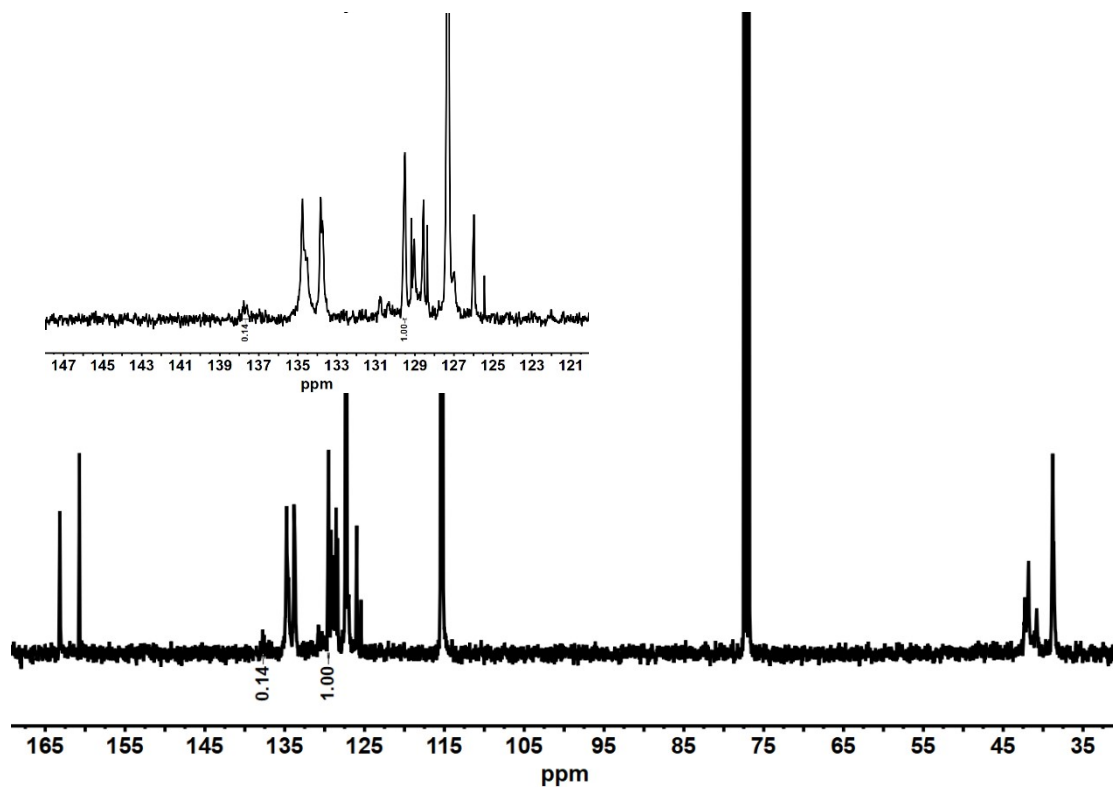


Figure S26. ^{13}C NMR spectra of copolymer prepared by complex **1**. (Entry 1, Table 3)

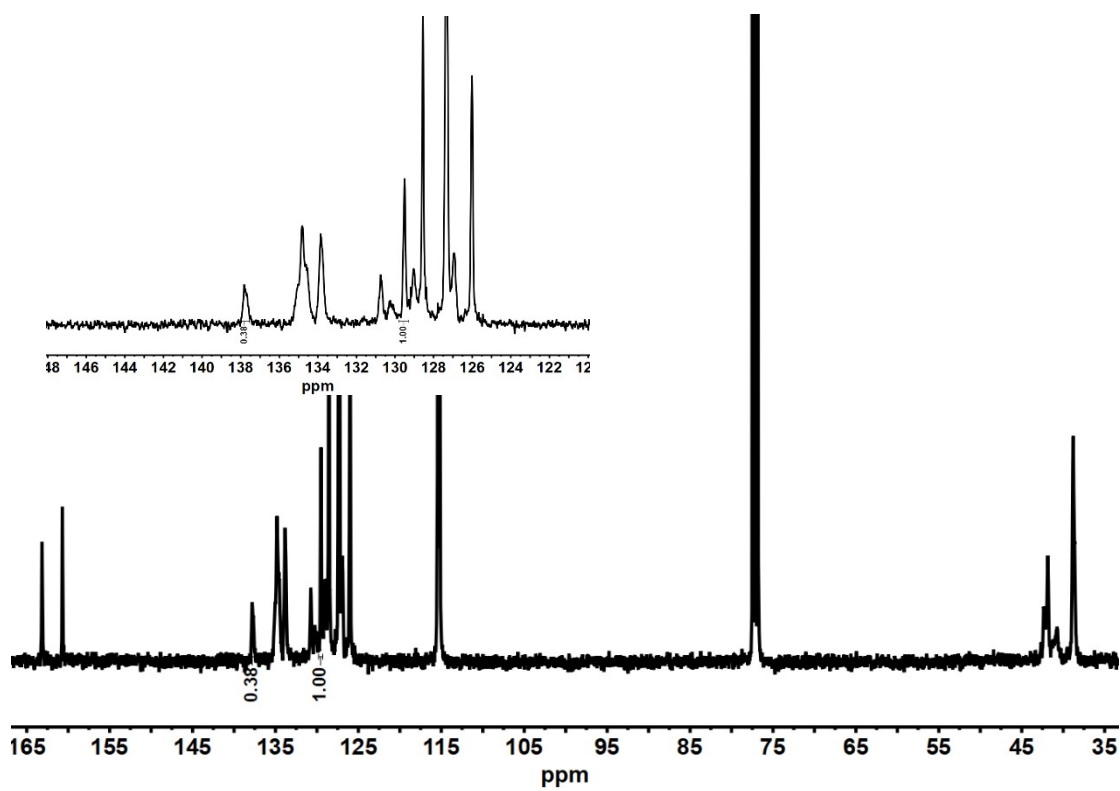


Figure S27. ^{13}C NMR spectra of copolymer prepared by complex **1**. (Entry 2, Table 3)

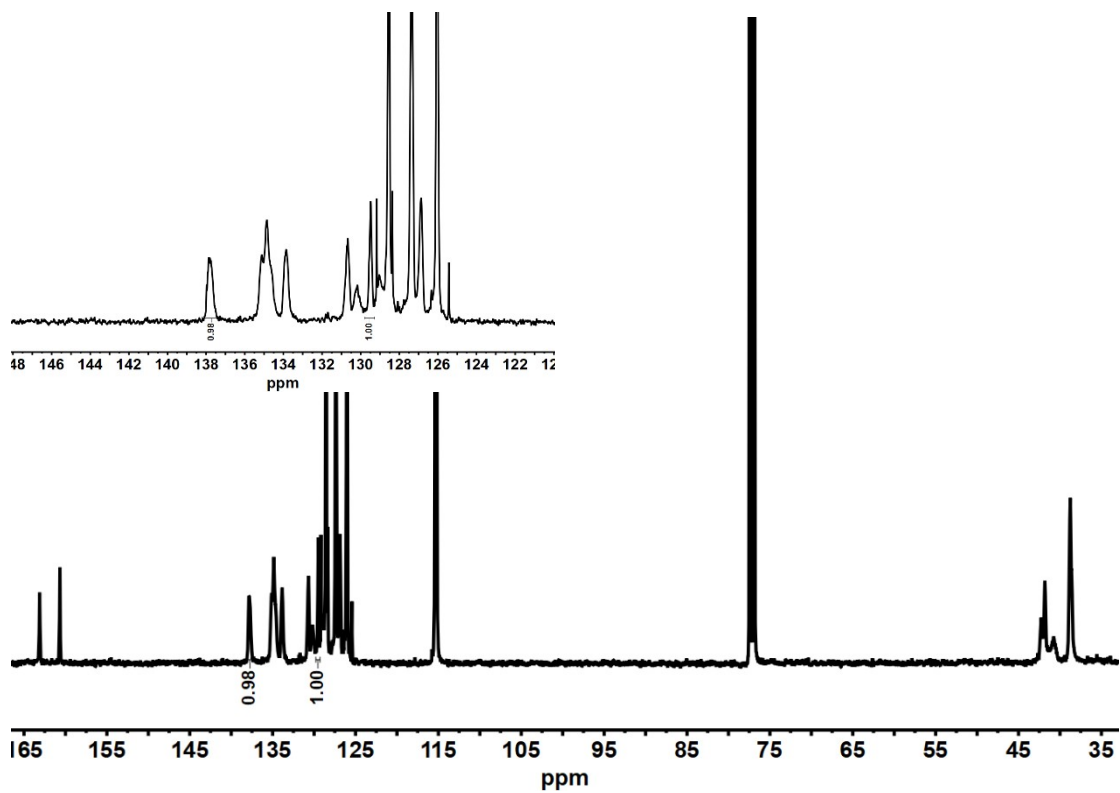


Figure S28. ^{13}C NMR spectra of copolymer prepared by complex 1. (Entry 3, Table 3)

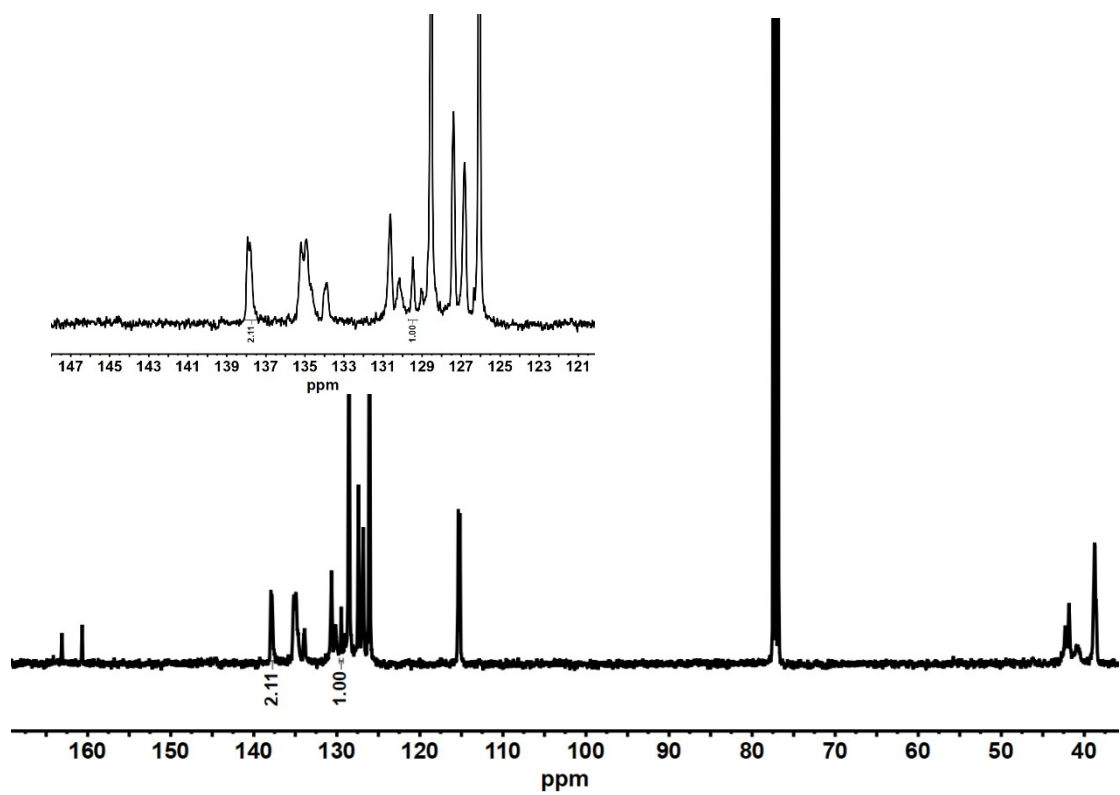


Figure S29. ^{13}C NMR spectra of copolymer prepared by complex 1. (Entry 4, Table 3)

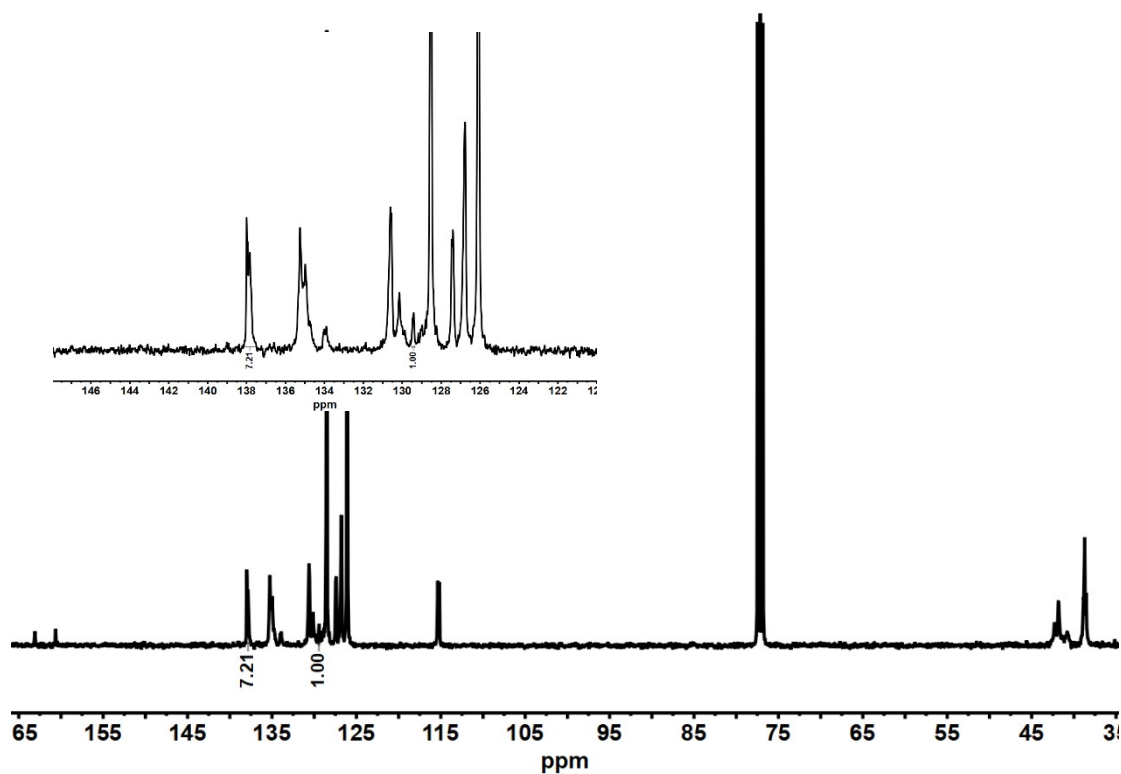


Figure S30. ^{13}C NMR spectra of copolymer prepared by complex 1. (Entry 5, Table 3)

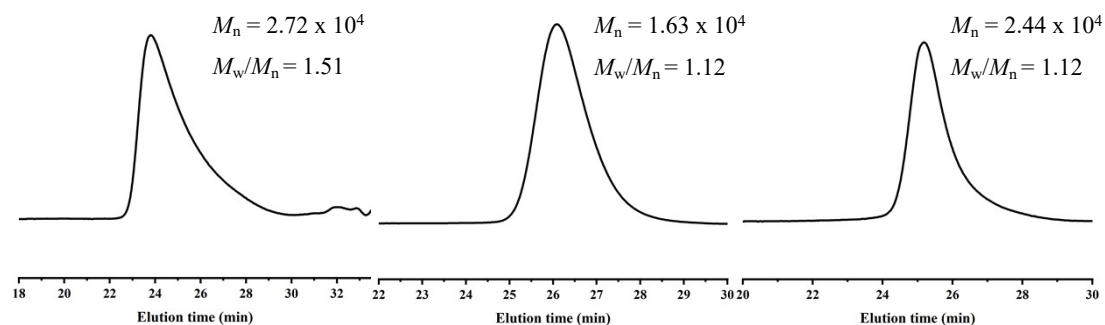


Figure S31. GPC curves of poly(*p*-FPB) prepared by complex 1. (From left to right: Entry 2, Table 1; Entry 8, Table 1; Entry 9, Table 1).

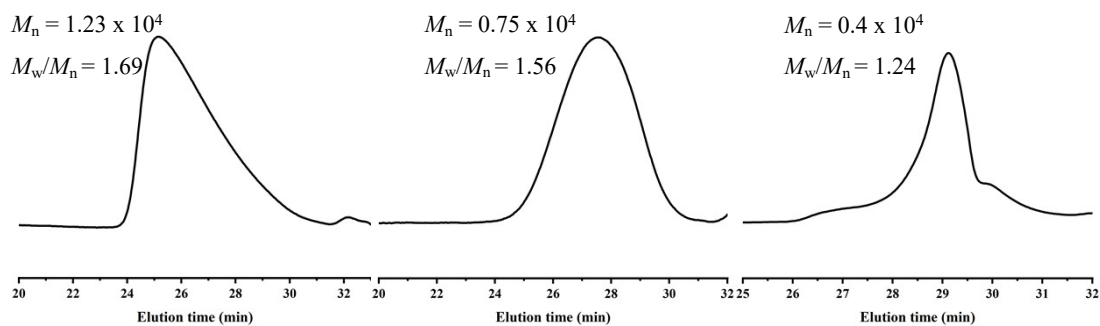


Figure S32. GPC curves of polymers with substituents at the para position of the phenyl ring prepared by complex 1. (From left to right: Entry 2, Table 2; Entry 3, Table 2; c: Entry 4, Table 2).

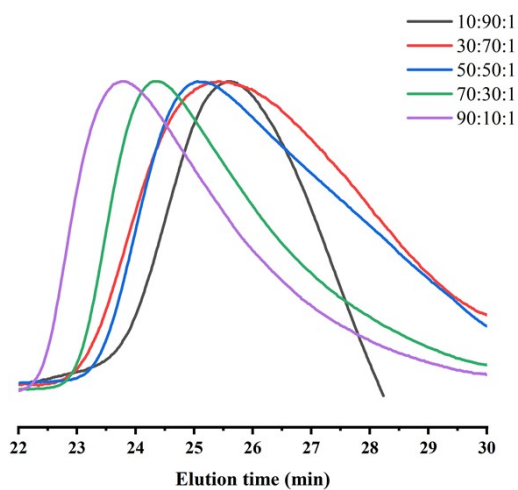


Figure S33 GPC curves of copolymers prepared by complex **1**. (Entries in Table 3).

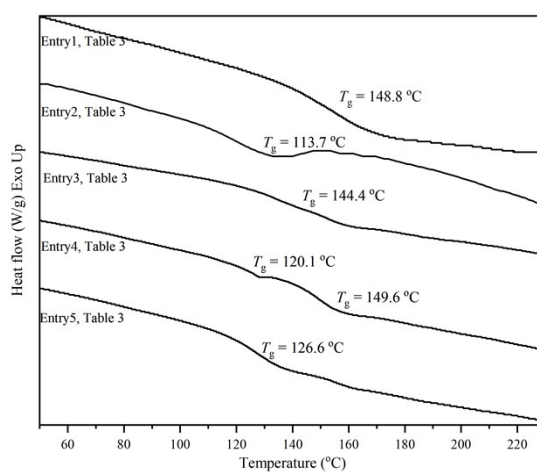


Figure S34. DSC curves of copolymers prepared by complex **1**. (Entries in Table 3).

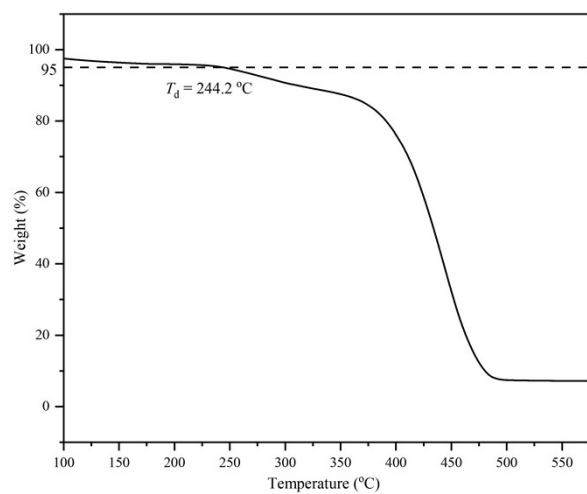


Figure S35. TGA curve of a poly(**1PB**) prepared by complex **1**. (Entry 1, Table 2).

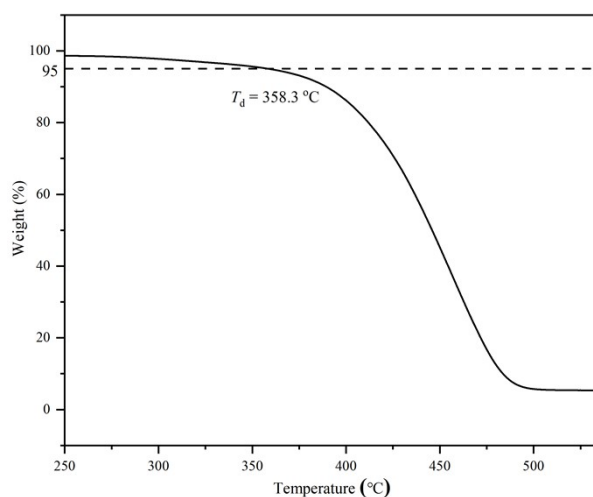


Figure S36. TGA curve of a poly(*p*-FPB) prepared by complex **1**. (Entry 7, Table 1).

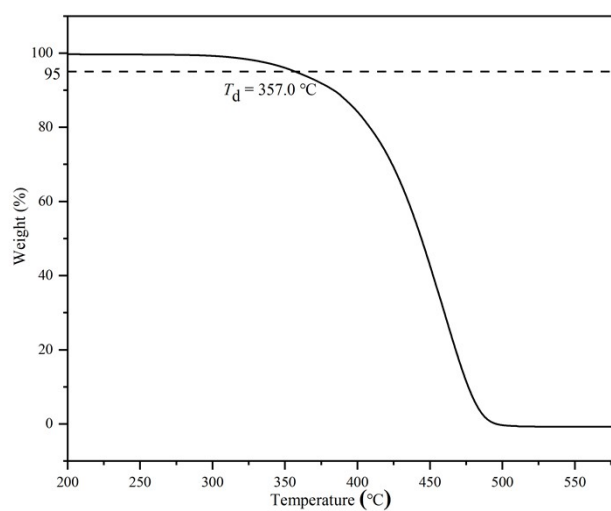


Figure S37. TGA curve of a poly(*m*-FPB) prepared by complex **1**. (Entry 2, Table 2).

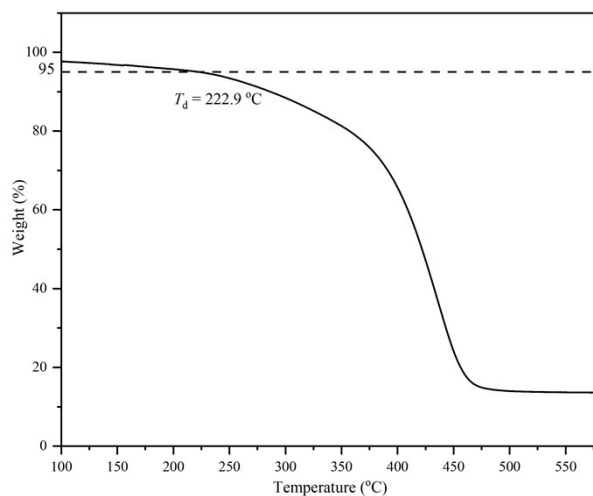


Figure S38. TGA curve of a poly(*o*-FPB) prepared by complex **1**. (Entry 3, Table 2).

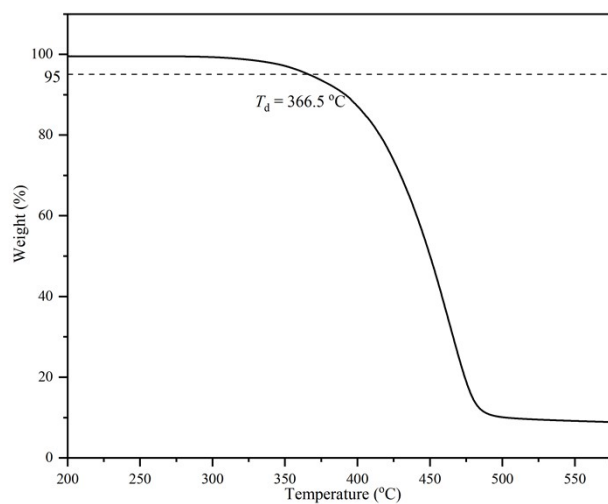


Figure S39. TGA curve of a poly(*p*-CIPB) prepared by complex 1. (Entry 4, Table 2).

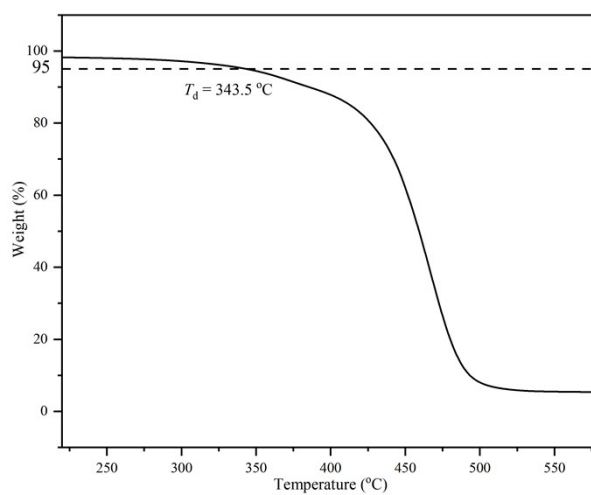


Figure S40. TGA curve of a poly(*p*-NPB) prepared by complex 1. (Entry 6, Table 2).

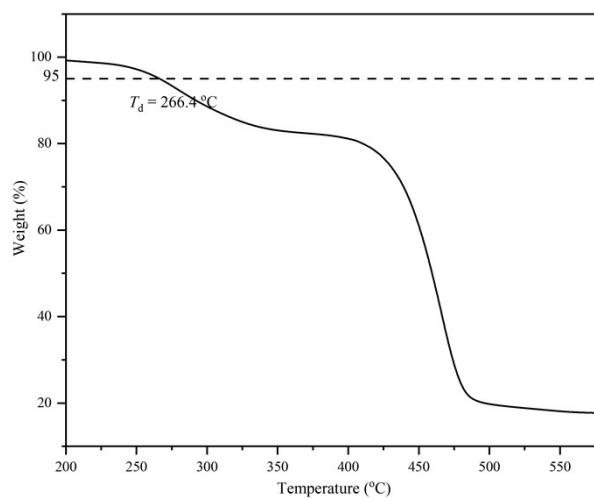


Figure S41. TGA curve of a poly(*p*-OPB) prepared by complex 1. (Entry 7, Table 2).

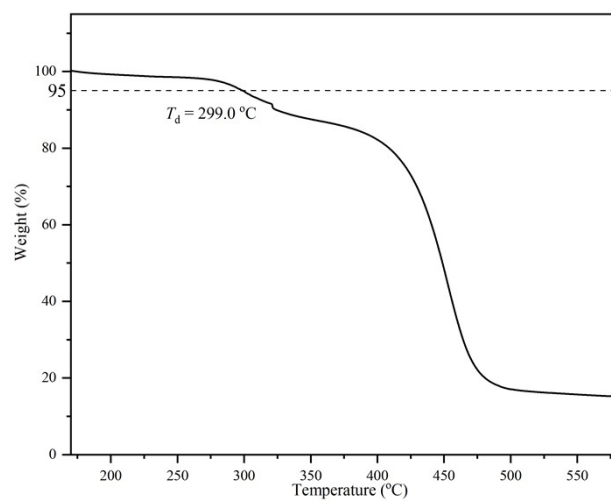


Figure S42. TGA curve of a poly(*p*-SPB) prepared by complex **1**. (Entry 8, Table 2).