

Effective Biobased Phosphorus Flame Retardants from Starch-derived *bis*-2,5-
(Hydroxymethyl)furan

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Supplemental Material
Spectra for all Compounds

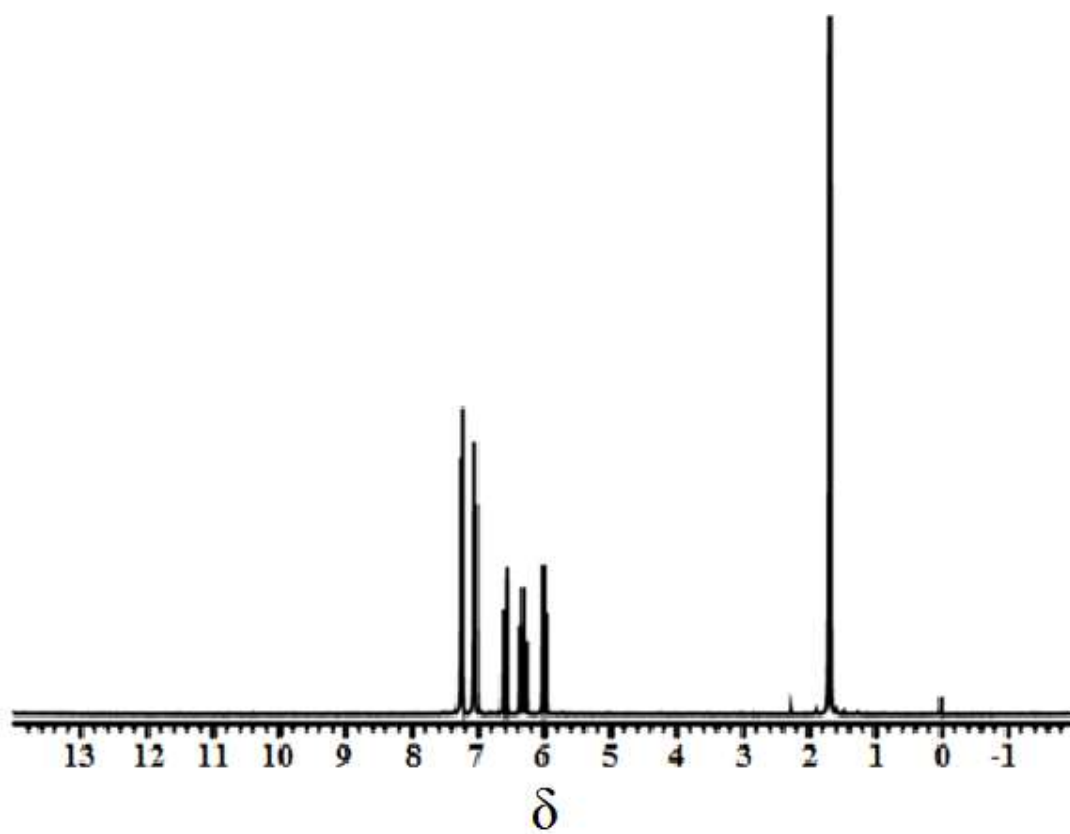


Figure S1. The ^1H NMR Spectrum for Bisphenol A Diacrylate (BPADA)

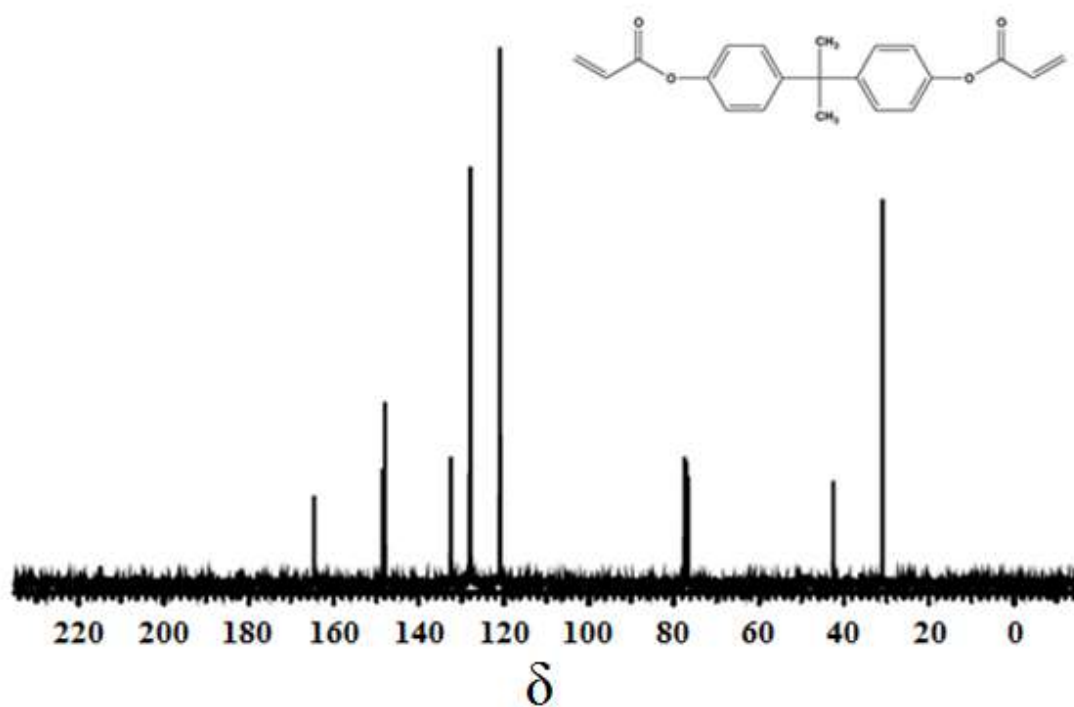


Figure S2. The ^{13}C NMR Spectrum for Bisphenol A Diacrylate (BPADA)

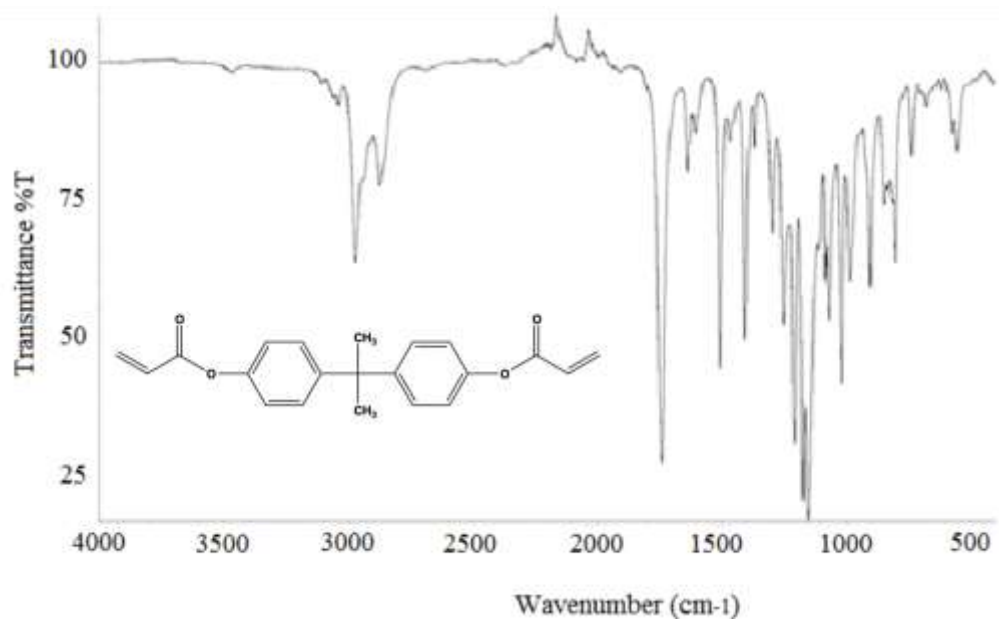


Figure S3. Infrared Spectrum of Bisphenol A Diacrylate (BPADA)

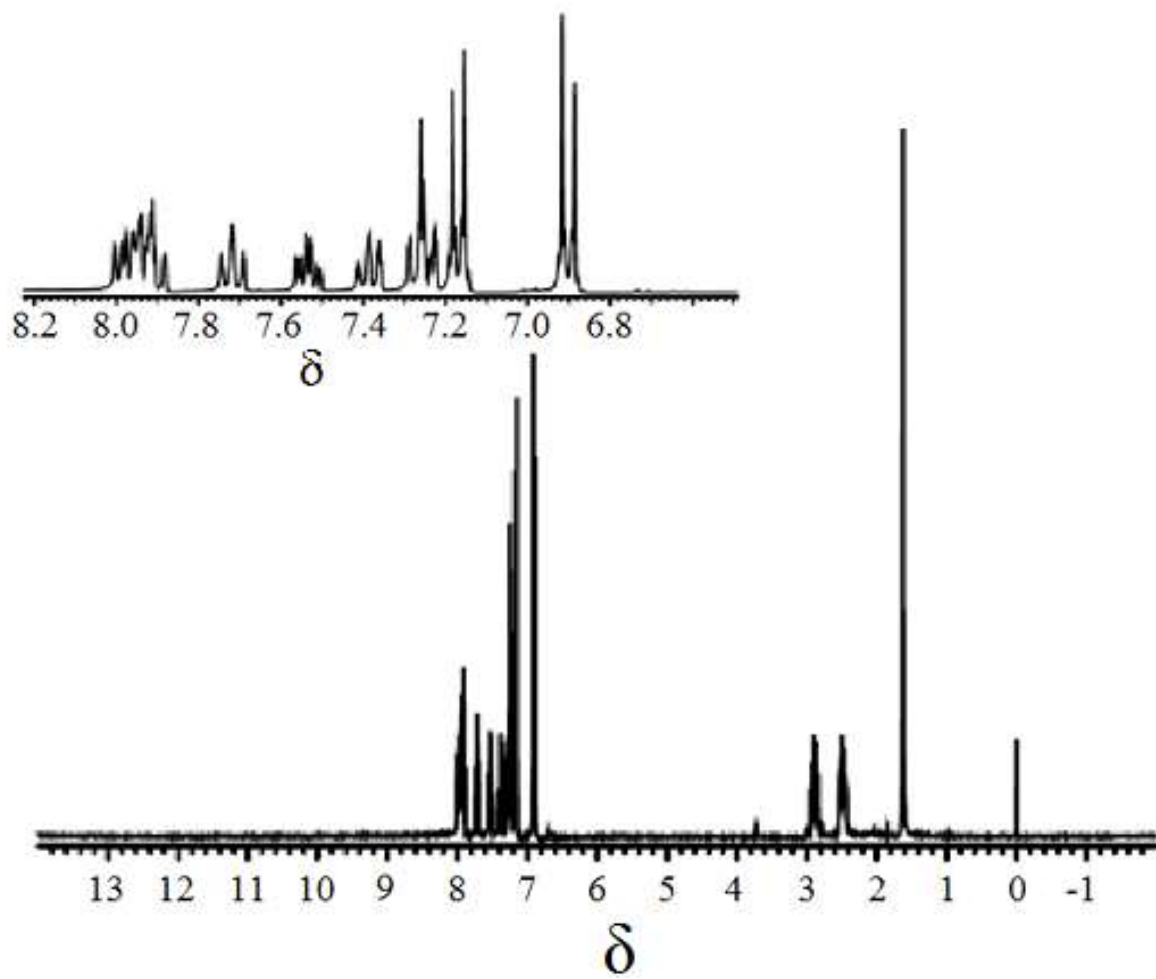


Figure S4. The ¹H NMR Spectrum of 2,2-Di[4-(3-dopylpropanoyl)phenyl]propane (DDPP)

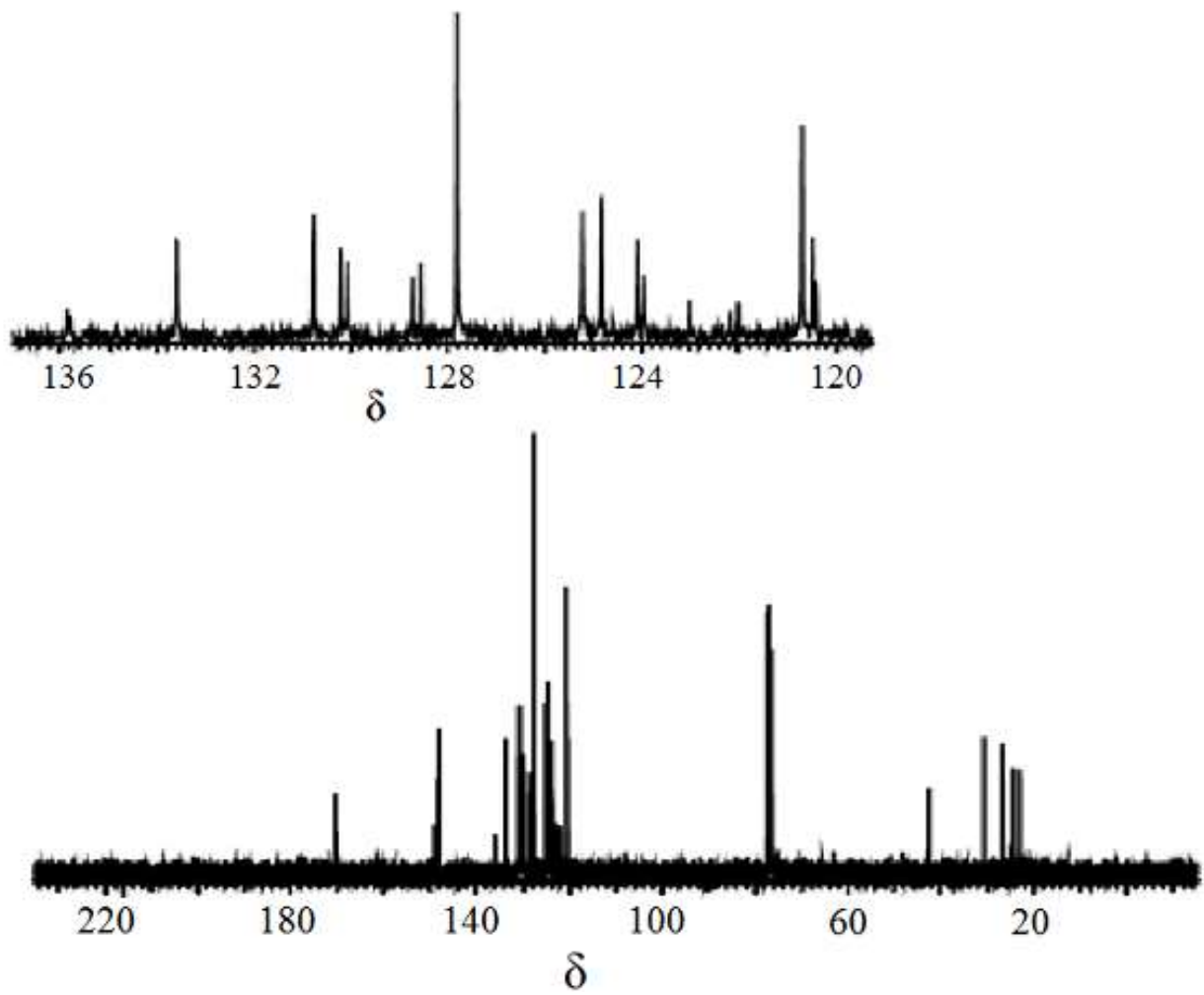


Figure S5. The ^{13}C NMR Spectrum of 2,2-Di[4-(3-dopylpropanoyl)phenyl]propane (DDPP)

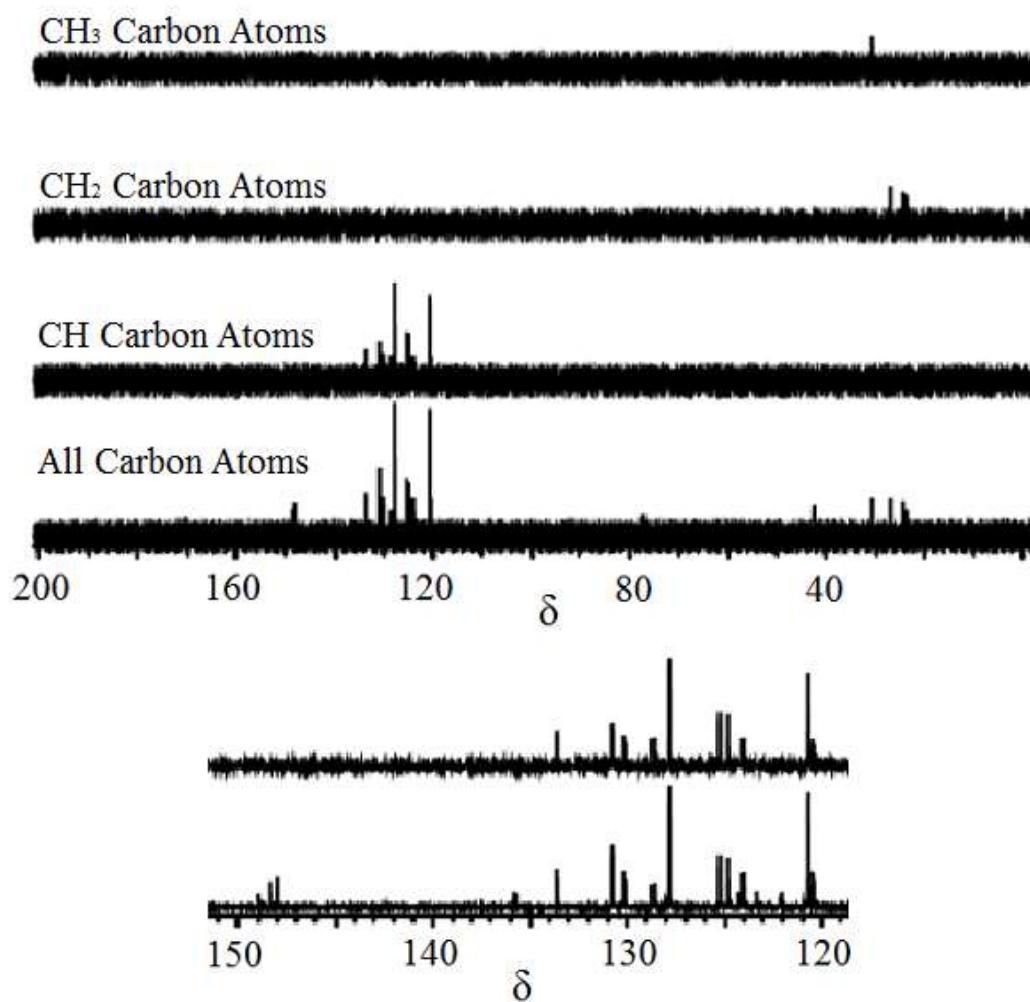


Figure S6. The DEPT NMR Spectrum of 2,2-Di[4-(3-dopylpropanoyl)phenyl]propane (DDPP)

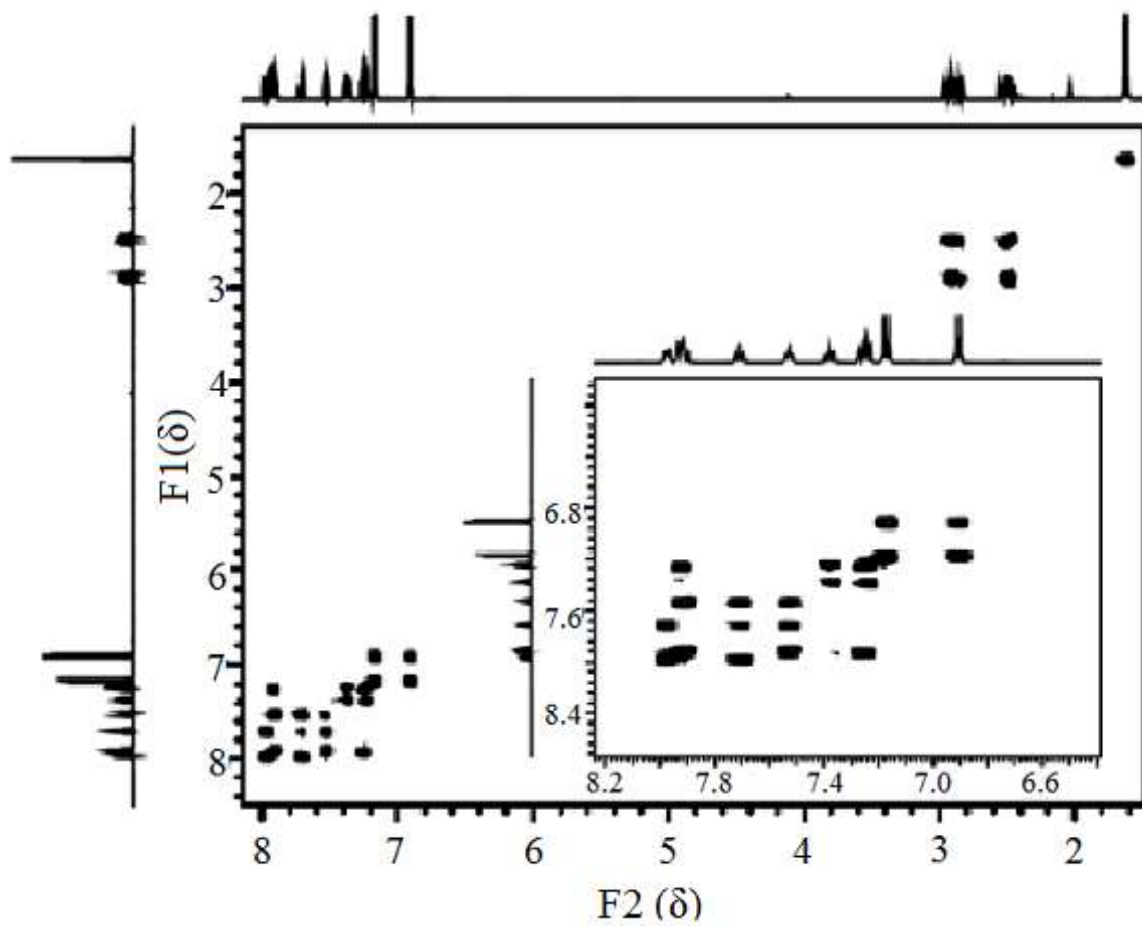


Figure S7. The gCOSY NMR Spectrum of 2,2-Di[4-(3-dopyl)propanoyl]phenyl]propane (DDPP)

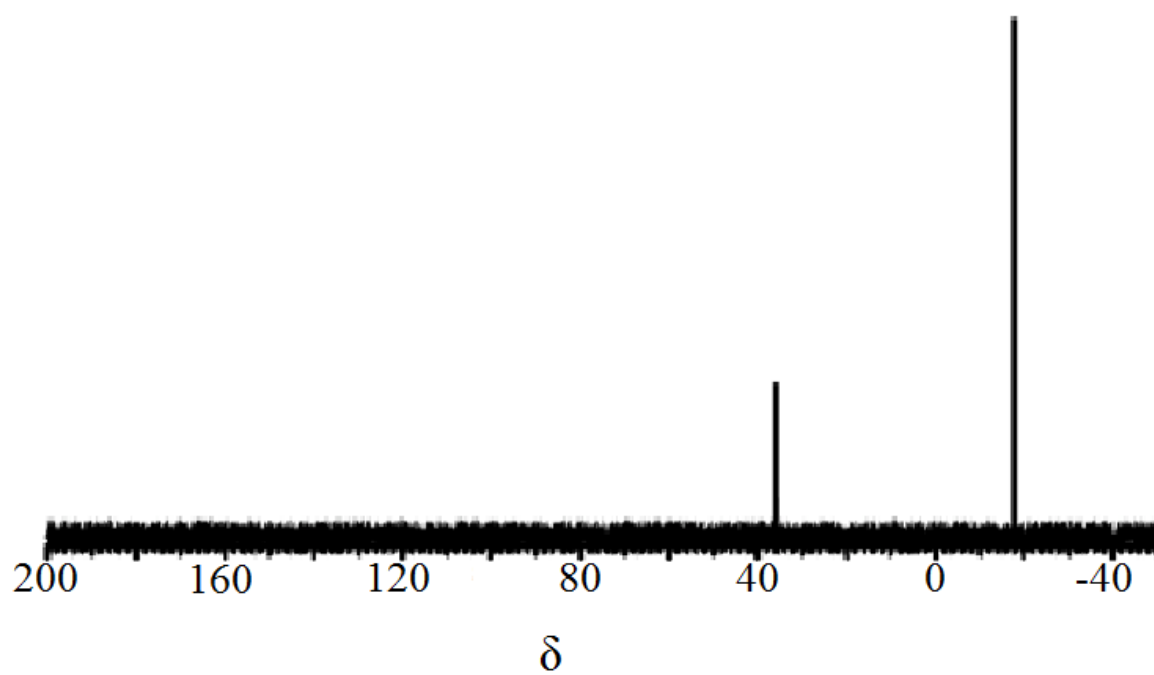


Figure S8. The ^{31}P NMR Spectrum of 2,2-Di[4-(3-dopylpropanoyl)phenyl]propane (DDPP)

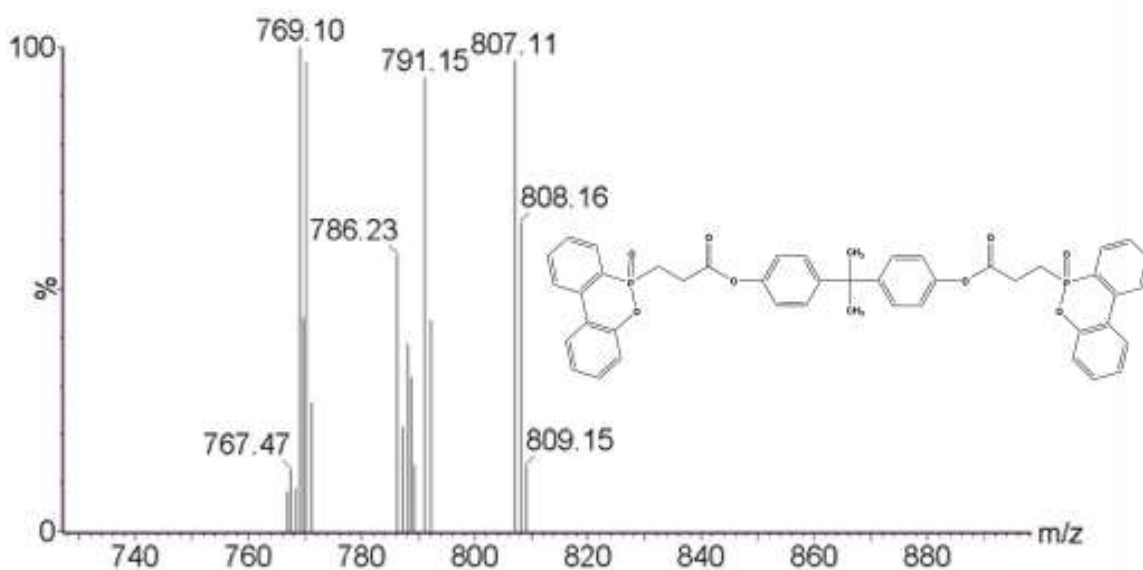


Figure S9. ESI Mass Spectrum of 2,2-Di[4-(3-dopylpropanoyl)phenyl]propane (DDPP)

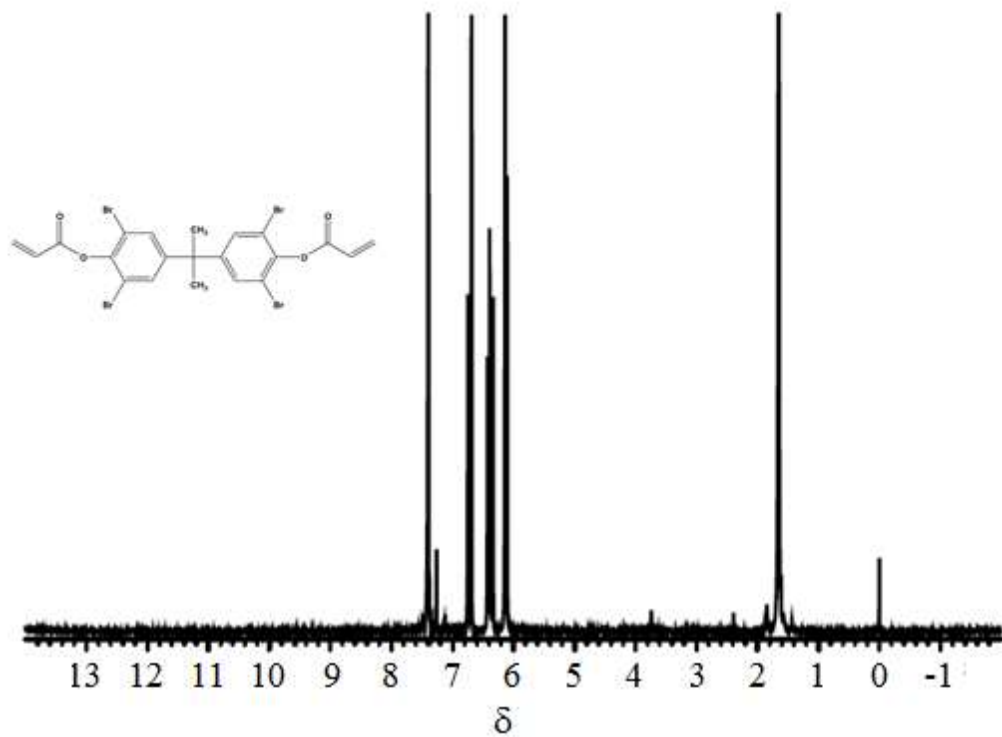


Figure S10. The ¹H NMR Spectrum for Tetrabromobisphenol A Diacrylate (BBPADA)

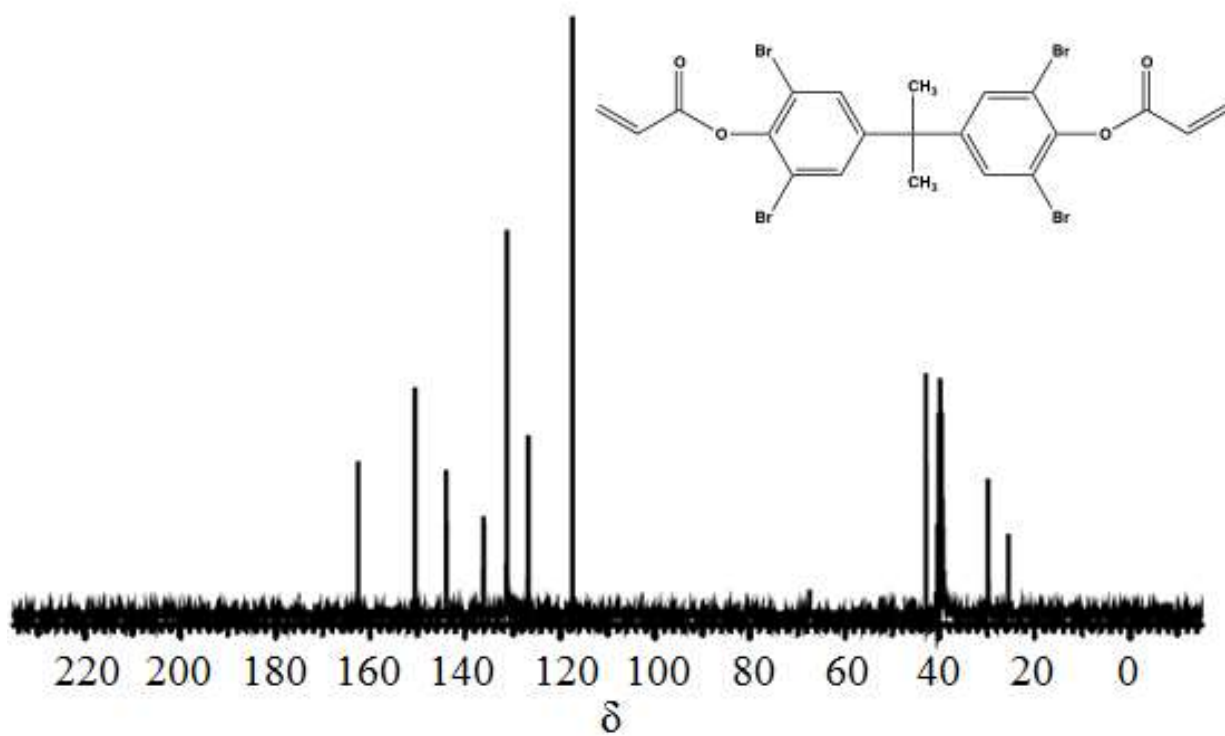


Figure S11. The ¹³C NMR Spectrum for Tetrabromobisphenol A Diacrylate (BBPADA)

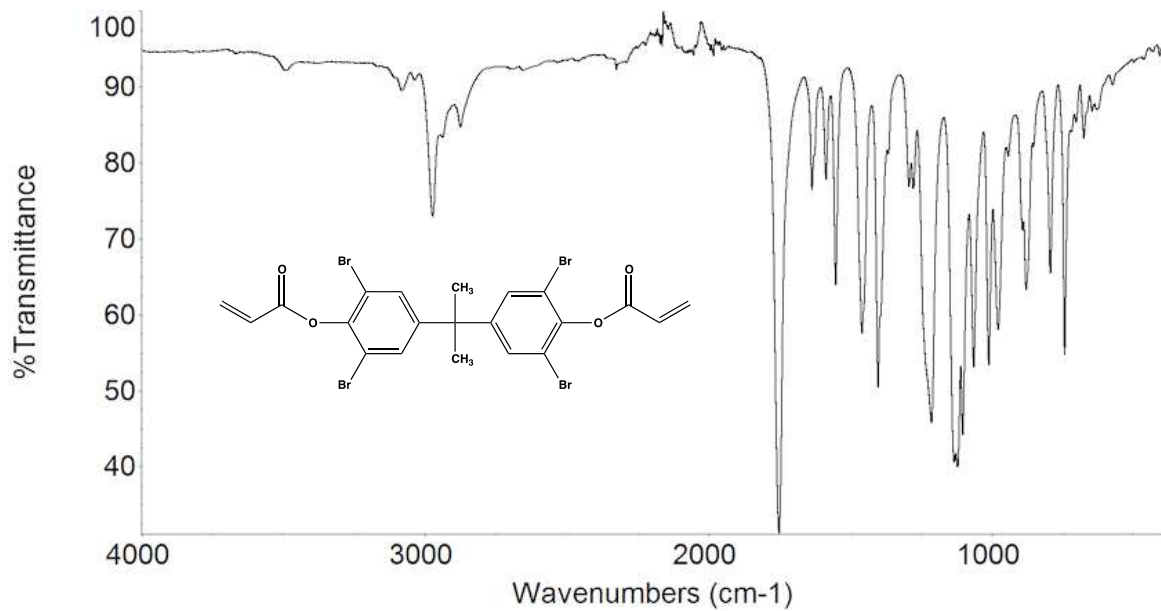


Figure S12. The Infrared Spectrum of of Tetrabromobisphenol A Diacrylate (BBPADA)

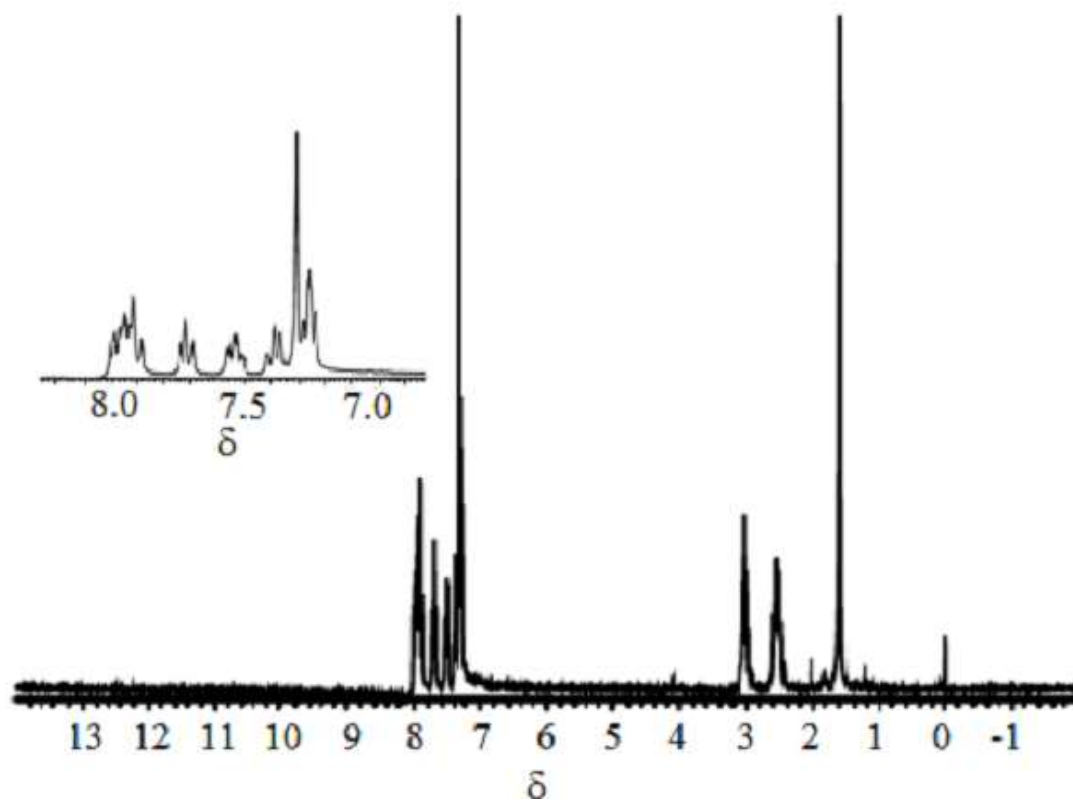


Figure S13. The ^1H NMR Spectrum 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP)

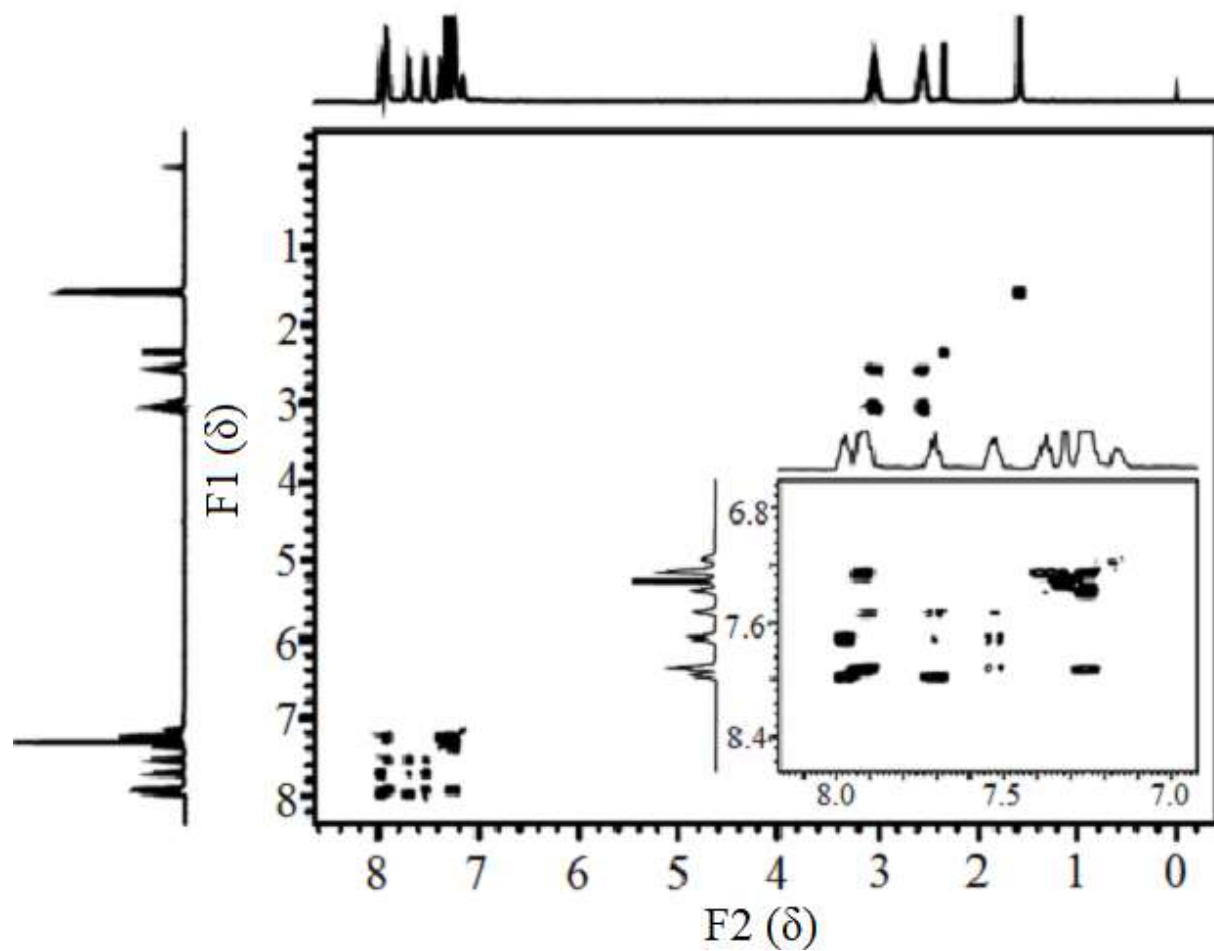


Figure S14. The gCOSY NMR Spectrum for 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP).

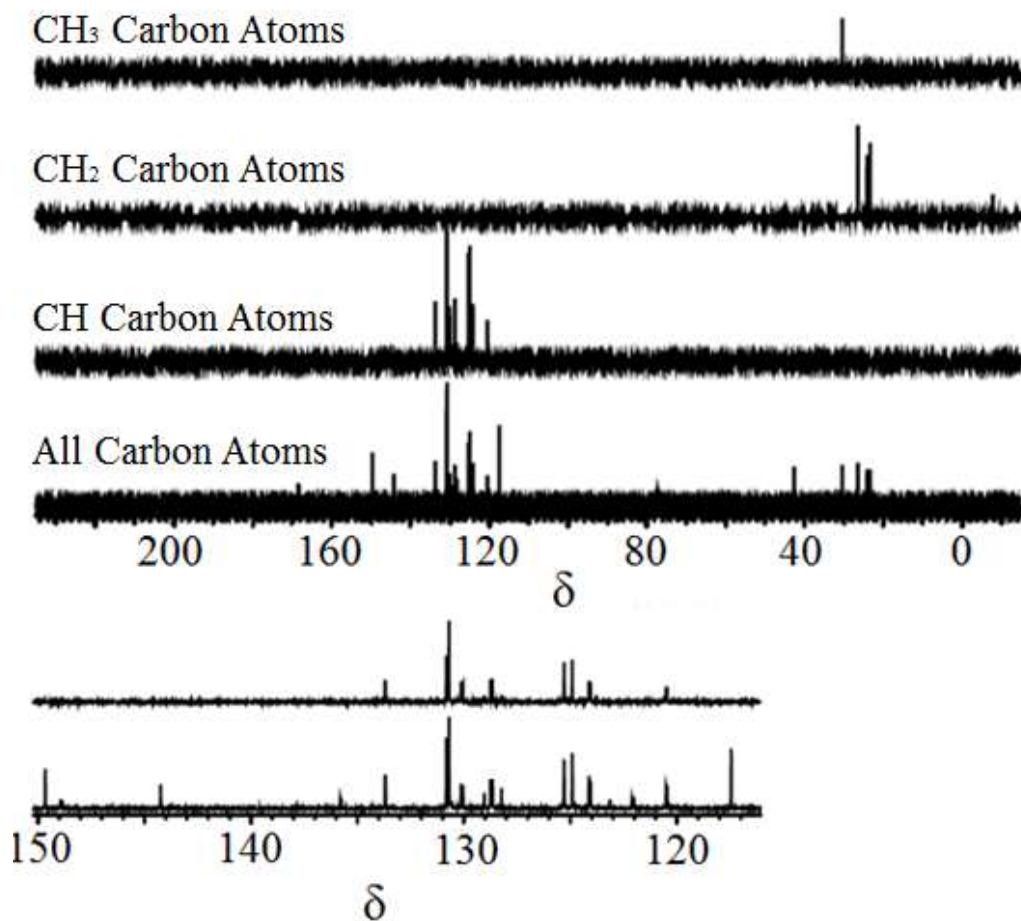


Figure S15. The DEPT NMR Spectrum for 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP).

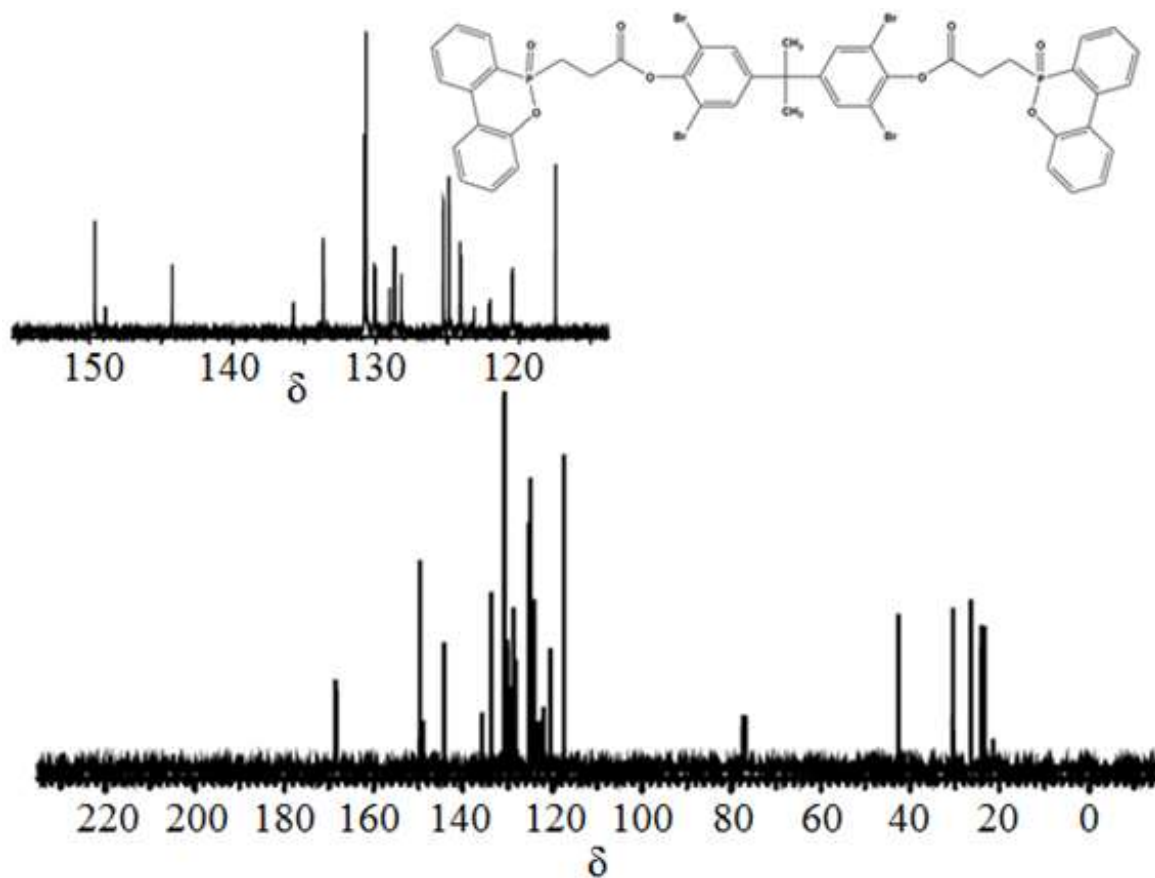


Figure S16. The ^{13}C NMR Spectrum for 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP).

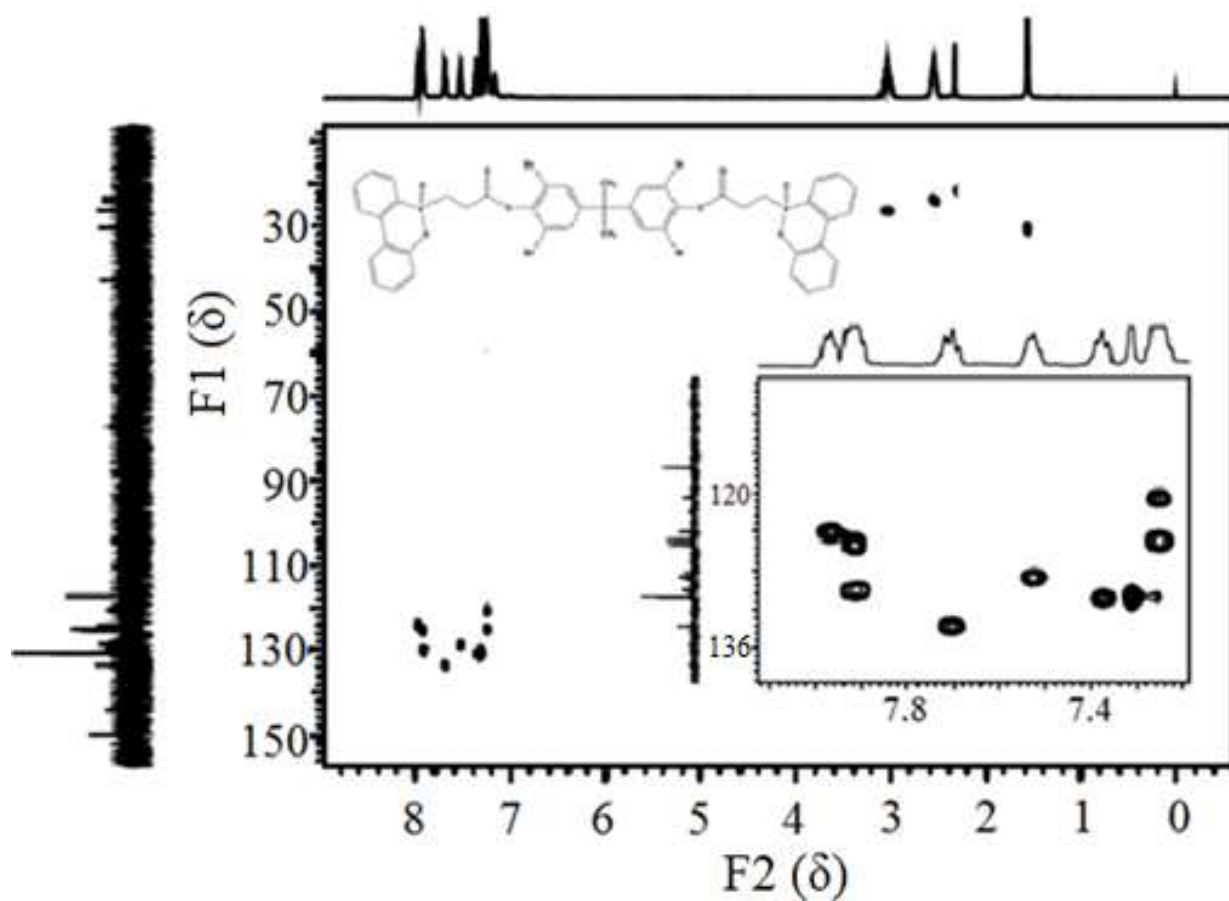


Figure S17. The HSQCAD NMR Spectrum for 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP).

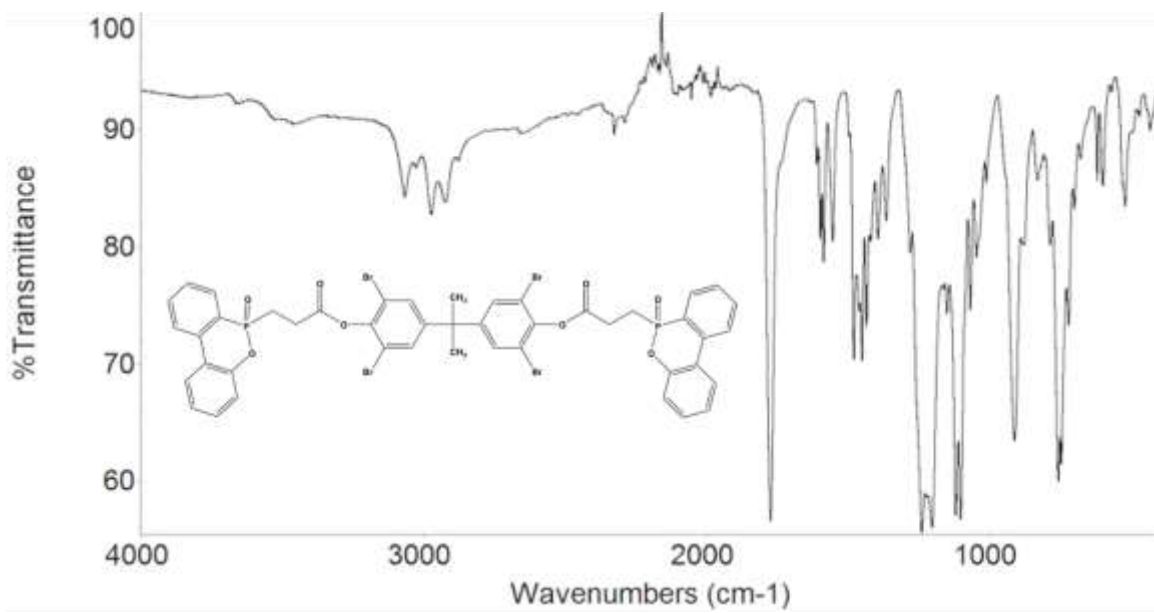


Figure S18. The Infrared Spectrum of 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP).

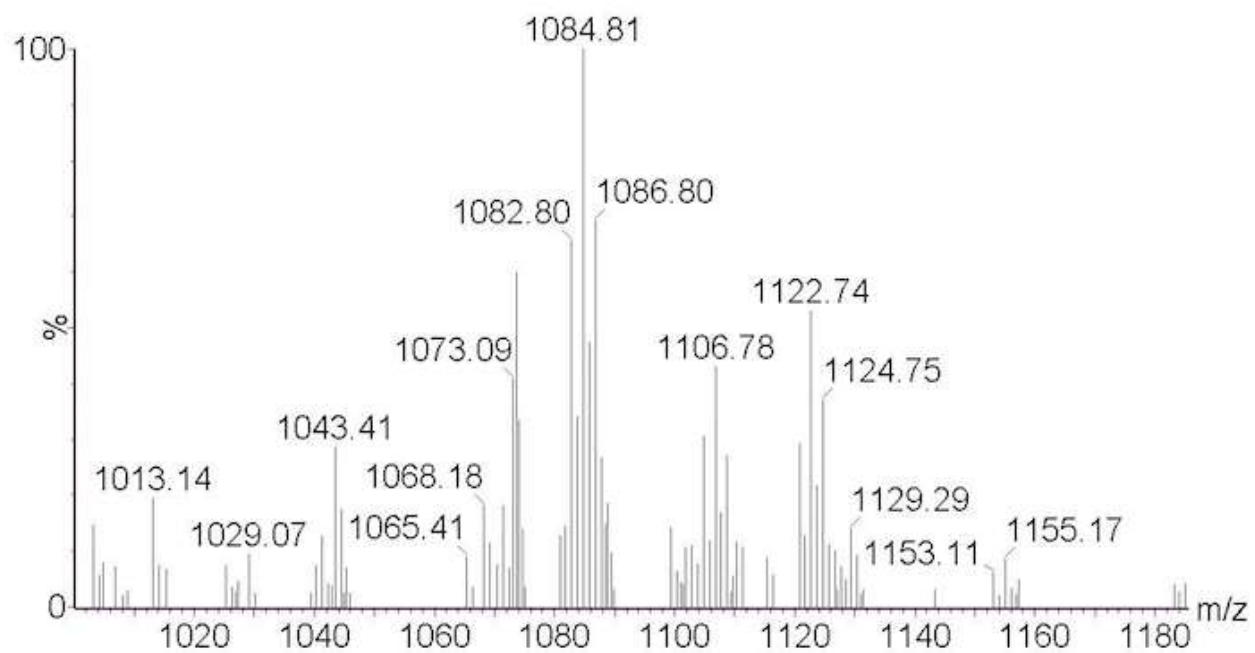


Figure S19. The ESI Mass Spectrum of 2,2-Di[3,5-dibromo-4-(3-dopylpropanoyl)phenyl]propane (DBDPP).

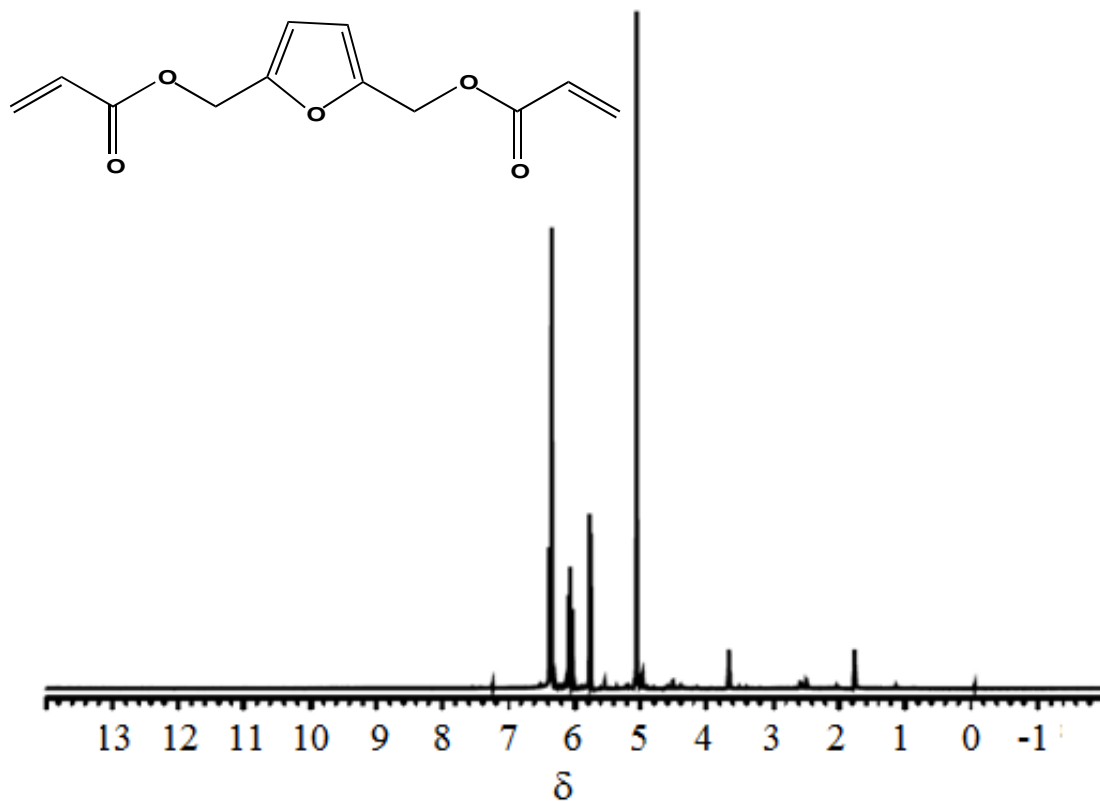


Figure S20. The ¹H NMR Spectrum for 2,5-bis-(Hydroxymethyl)furan Diacrylate (BHFDA)

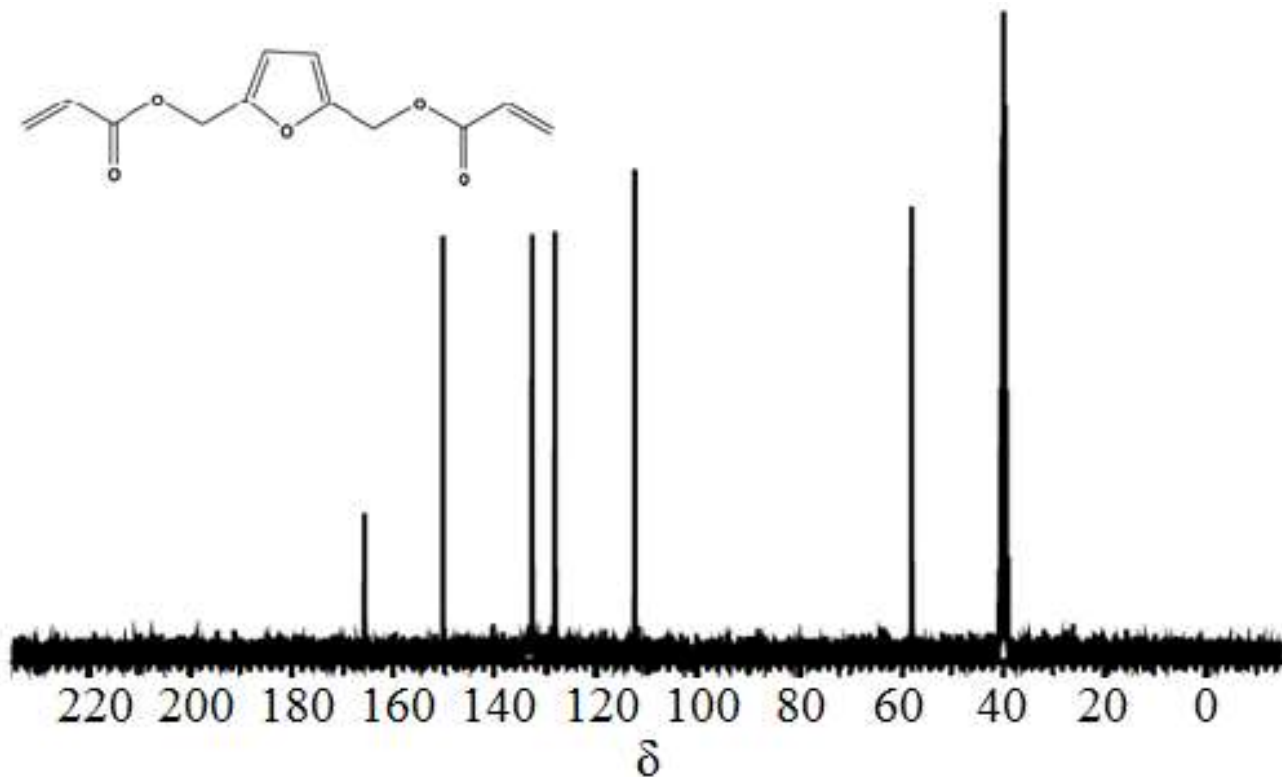


Figure S21. The ¹³C NMR Spectrum for 2,5-*bis*-(Hydroxymethyl)furan Diacrylate (BHFDA)

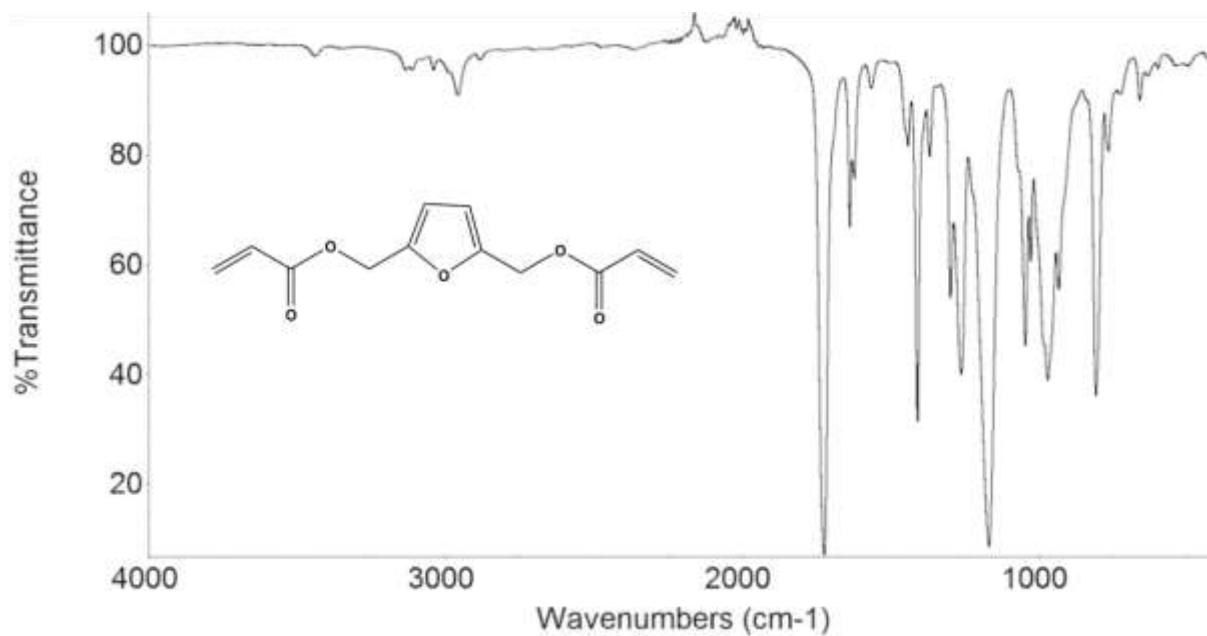


Figure S22. The Infrared Spectrum for 2,5-*bis*-(Hydroxymethyl)furan Diacrylate (BHFDA)

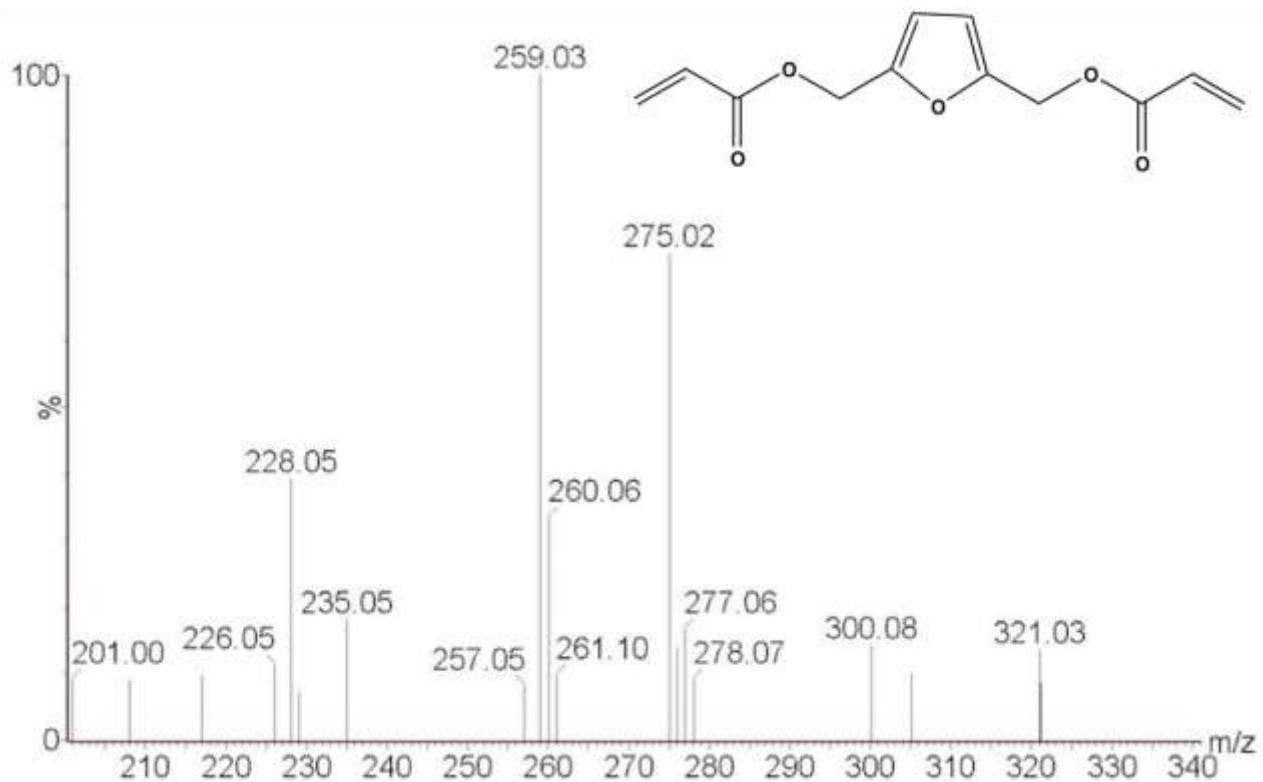


Figure S23. Mass Spectrum for 2,5-bis-(Hydroxymethyl)furan Diacrylate (BHFDA)

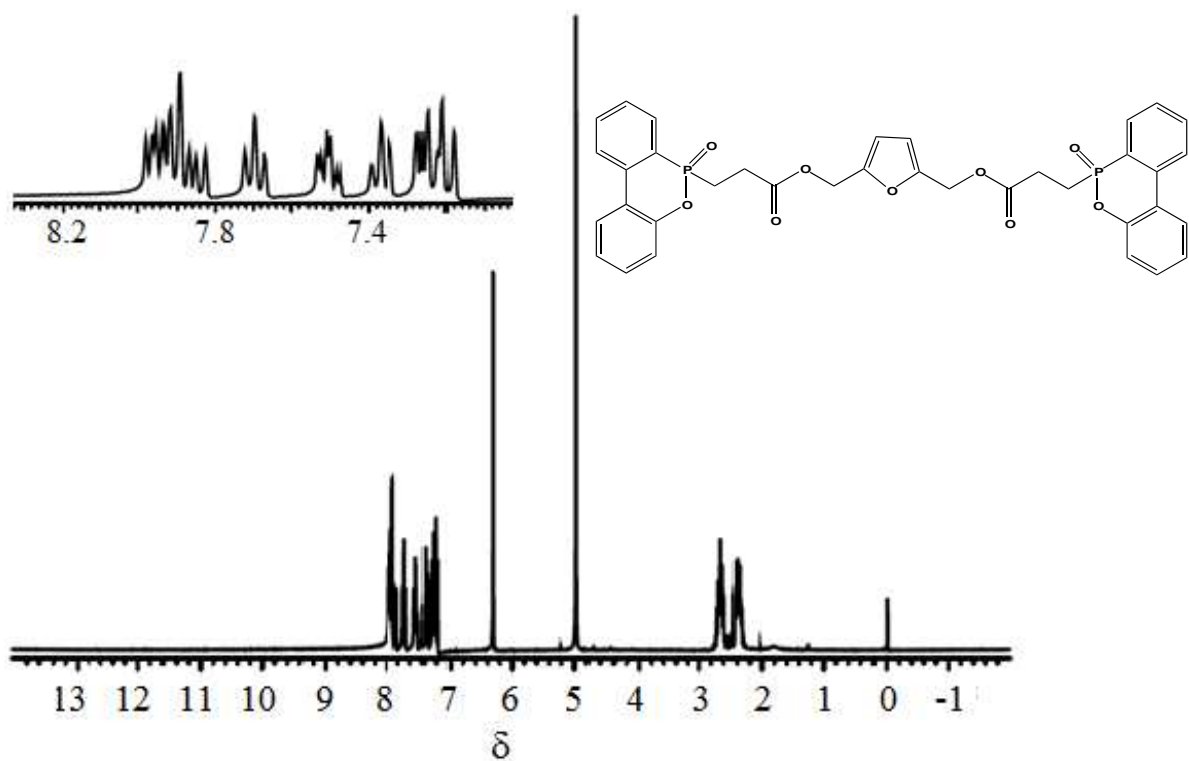


Figure S24. The ^1H NMR Spectrum for 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

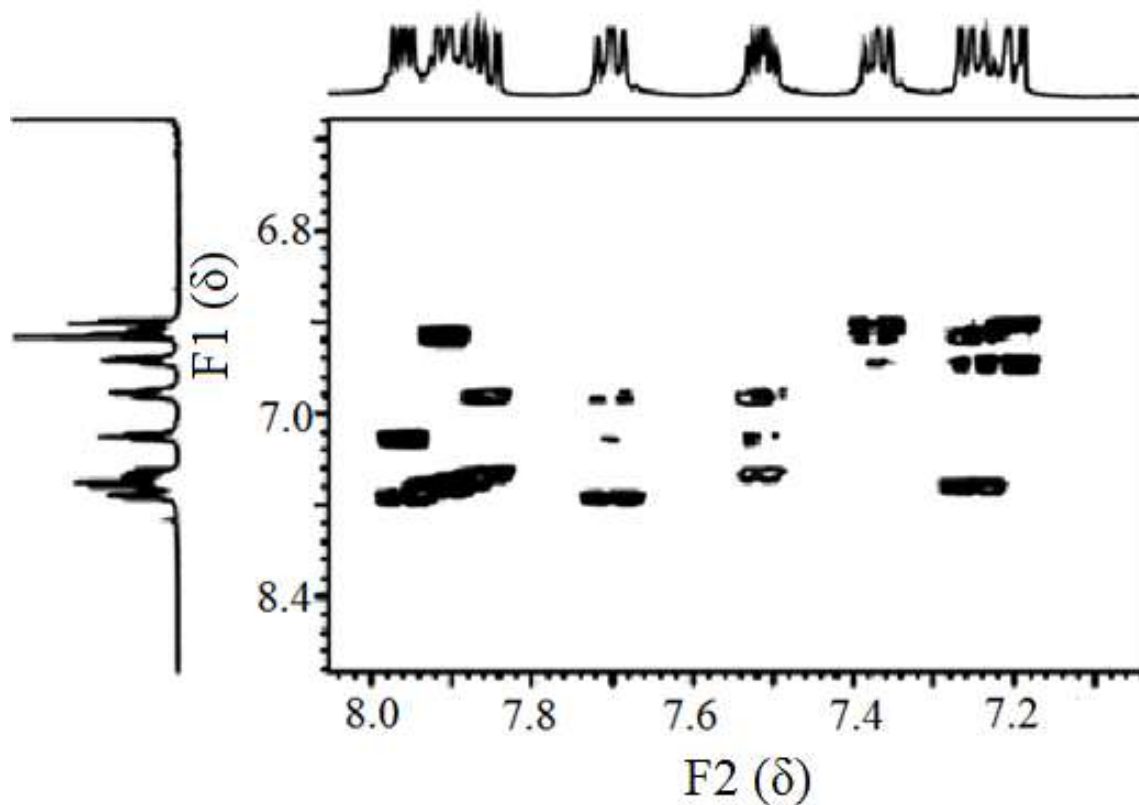


Figure S25. The gCOSY NMR Spectrum for 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

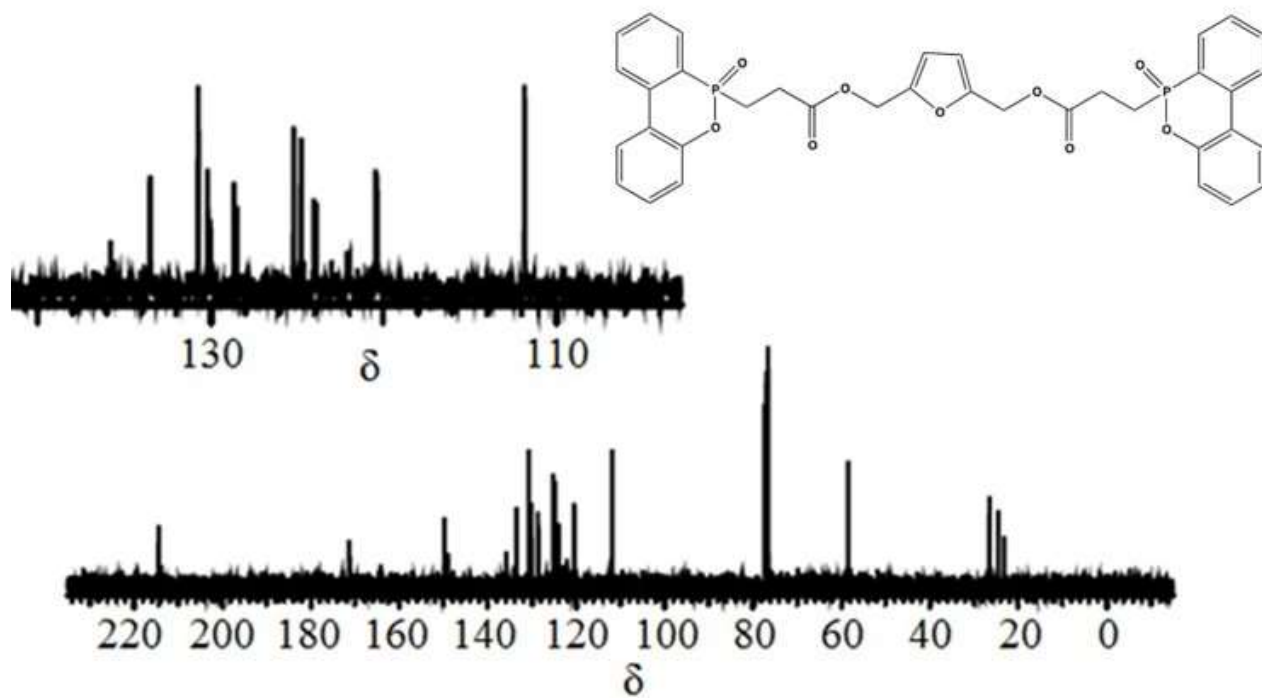


Figure S26. The ^{13}C NMR Spectrum for 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

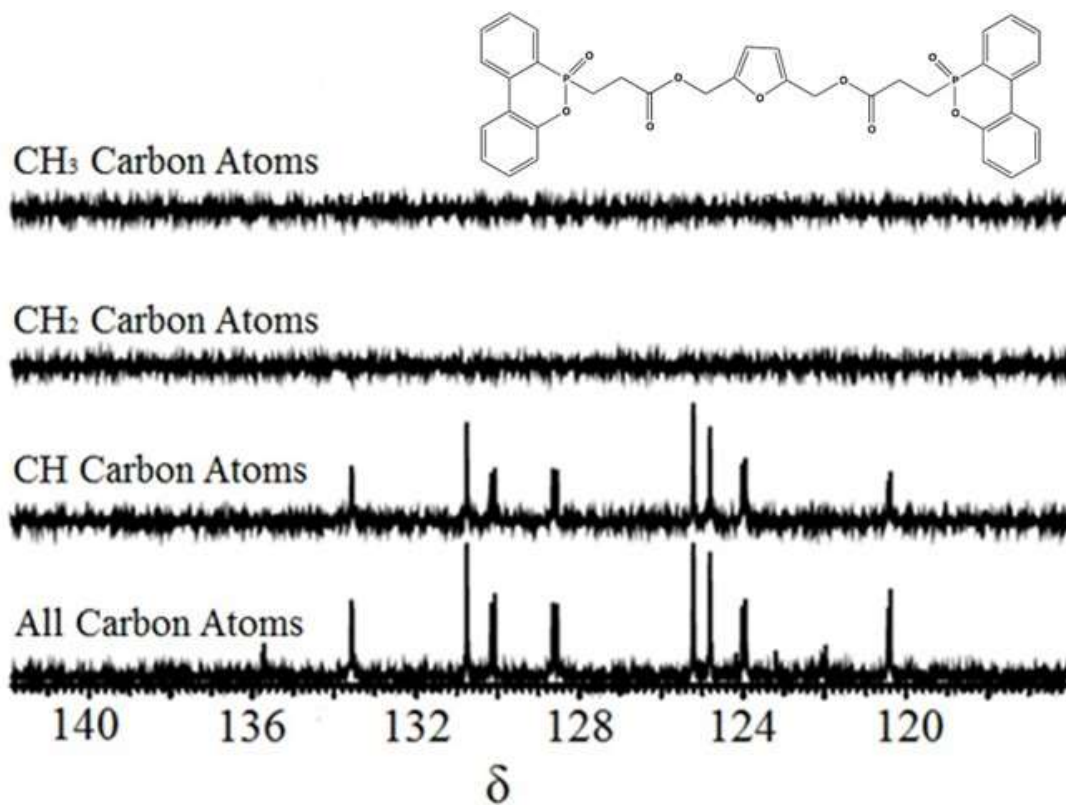


Figure S27. The DEPT NMR Spectrum for 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

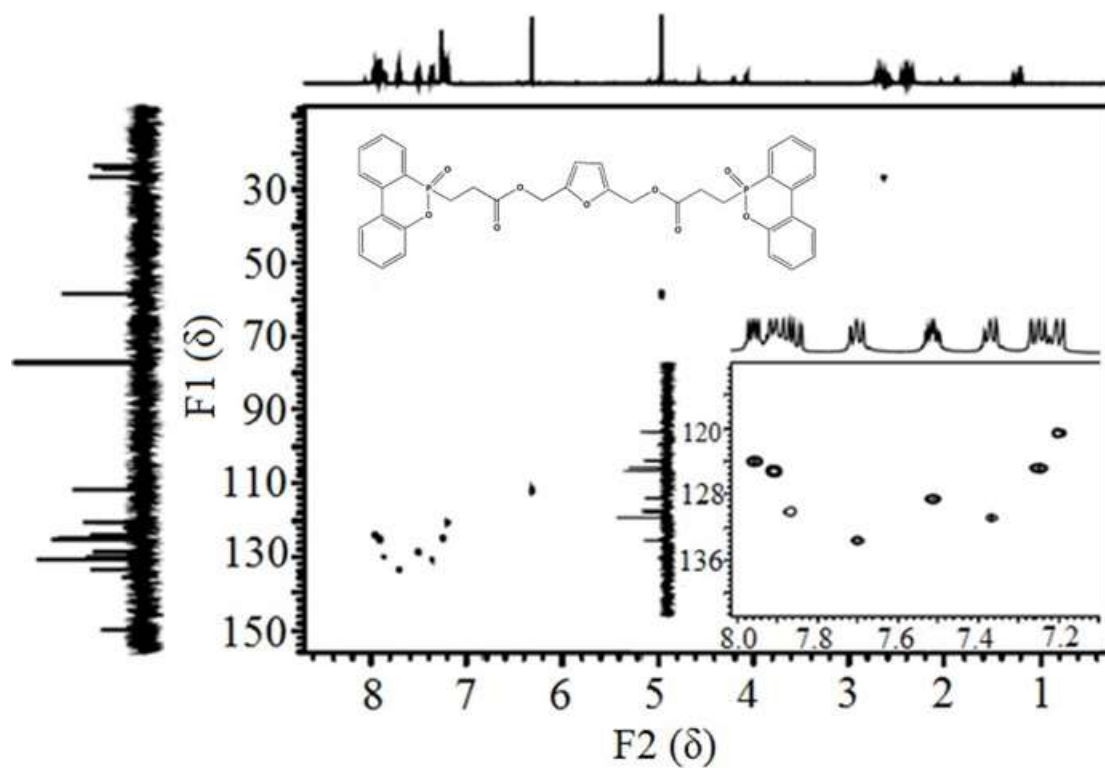


Figure S28. The HSQCDA NMR Spectrum for 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

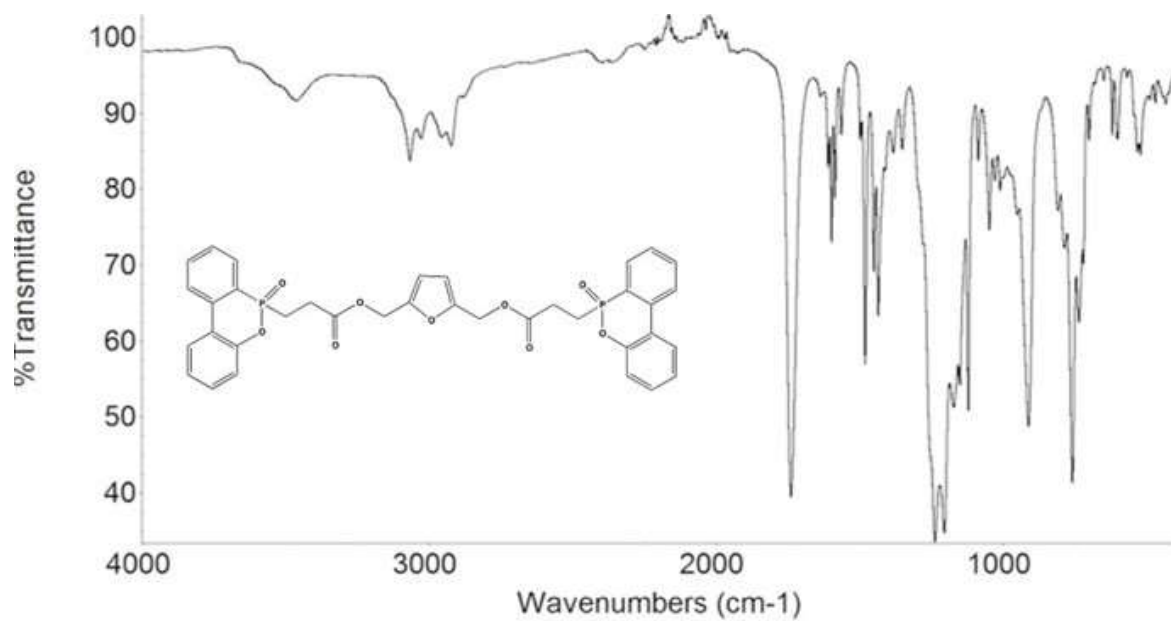


Figure S29. The Infrared Spectrum of 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

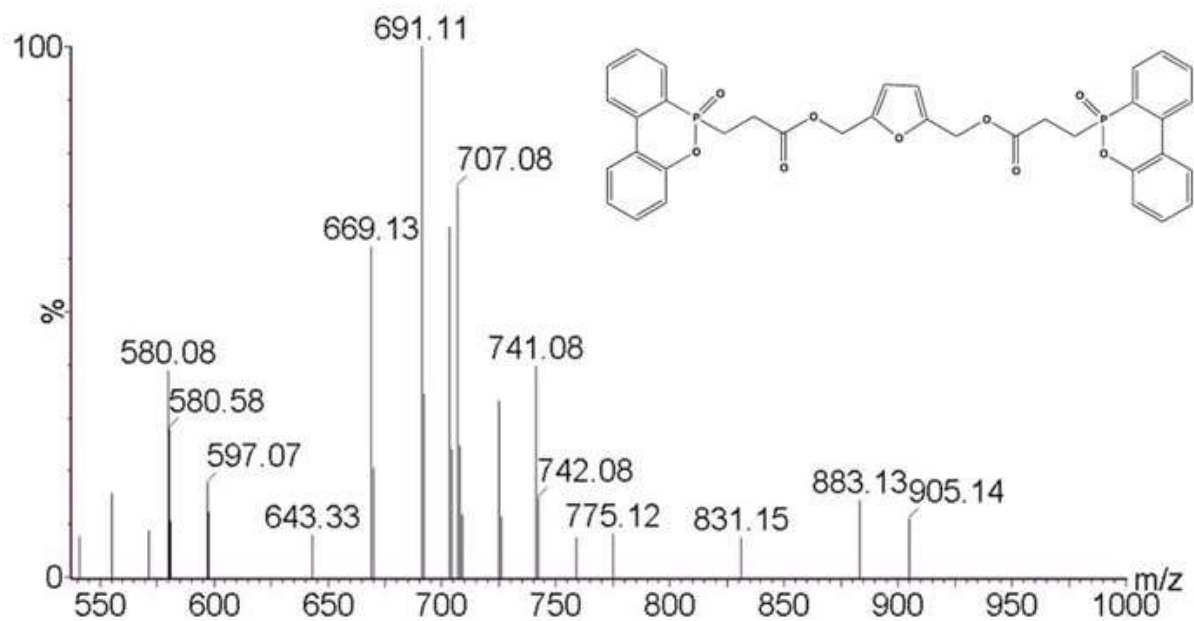


Figure S30. The ESI Mass Spectrum of 2,5-Di[(3-dopylpropanoyl)methyl]furan (DDMF)

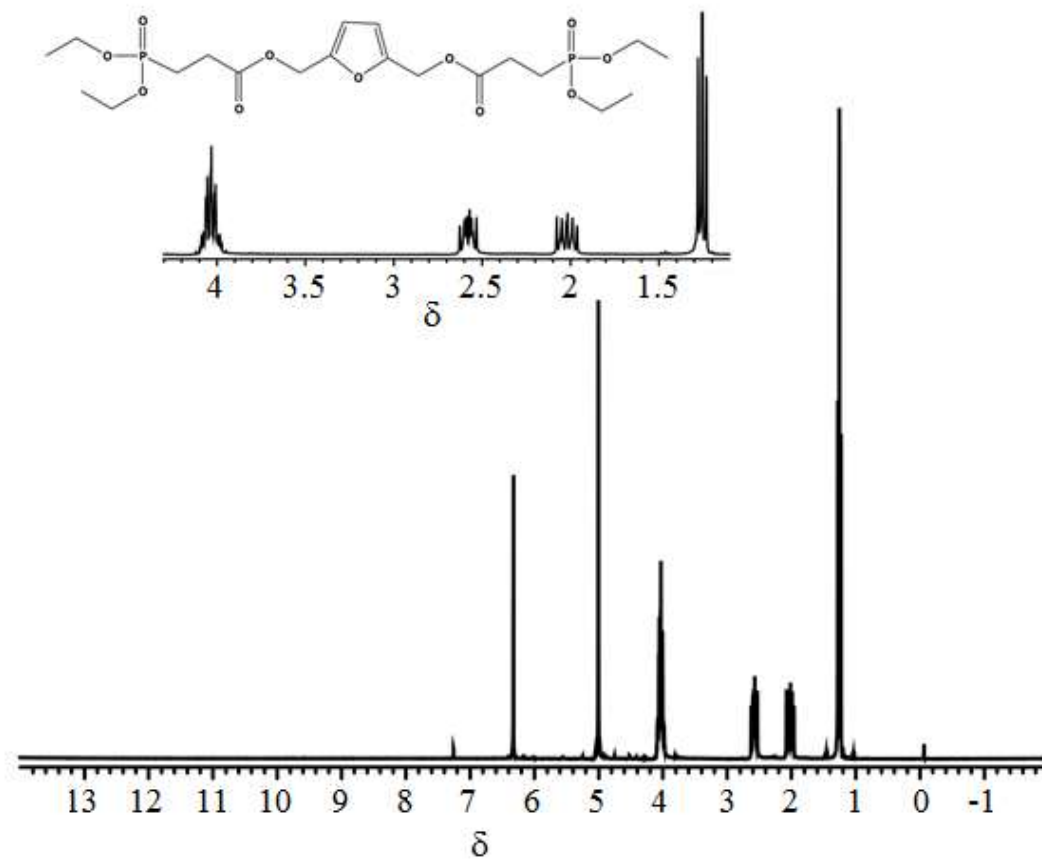


Figure S31. The ¹H NMR Spectrum for Di[(3-diethylphosphonatopropanyl)methyl]furan (DEMF)

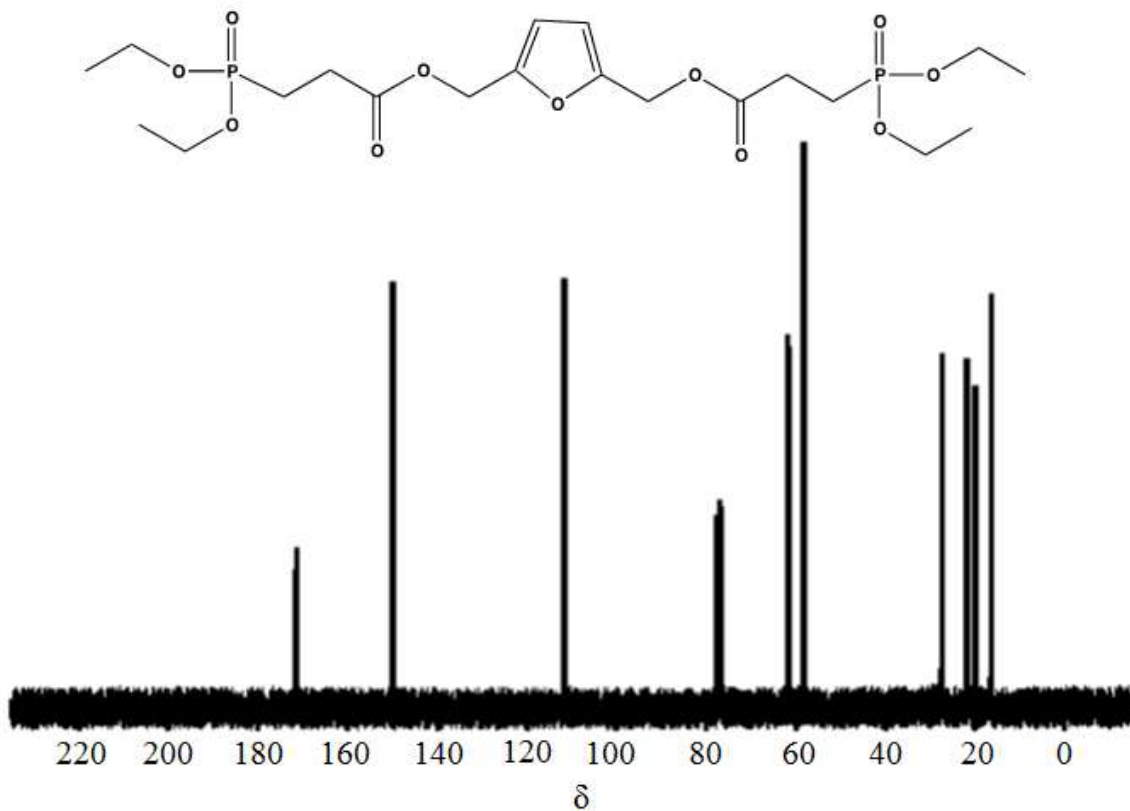


Figure S32. The ¹³C NMR Spectrum for Di[(3-diethylphosphonatopropanoyl)methyl]furan (DEMF)

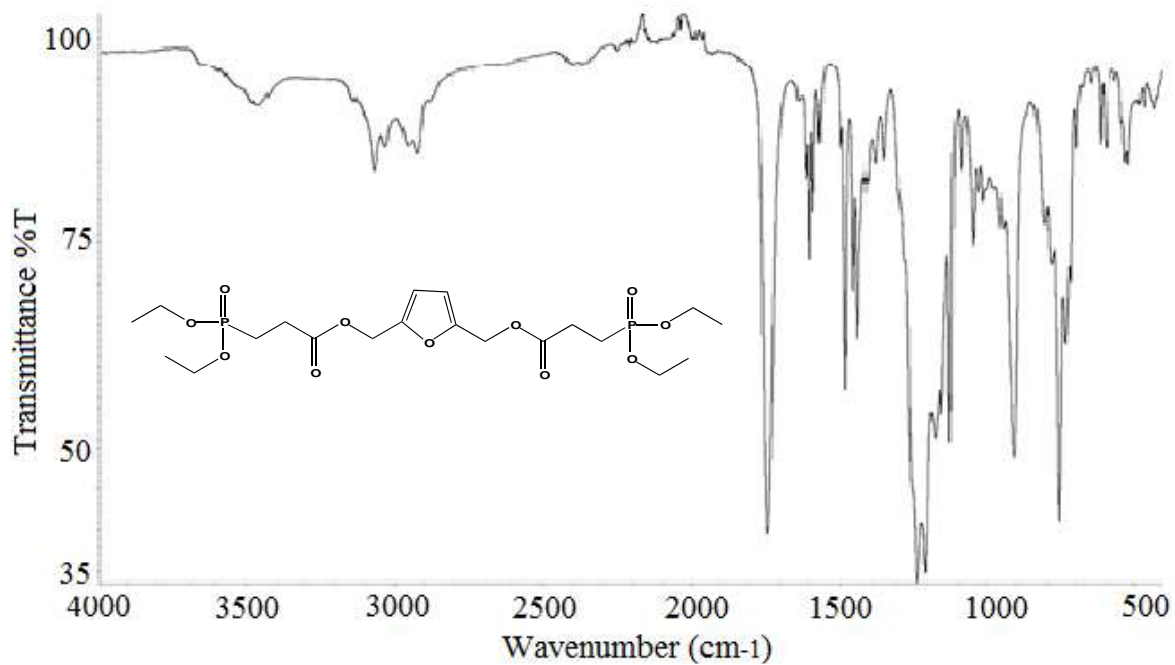


Figure S33. The Infrared Spectrum of Di[(3-diethylphosphonatopropanoyl)methyl]furan (DEMF)

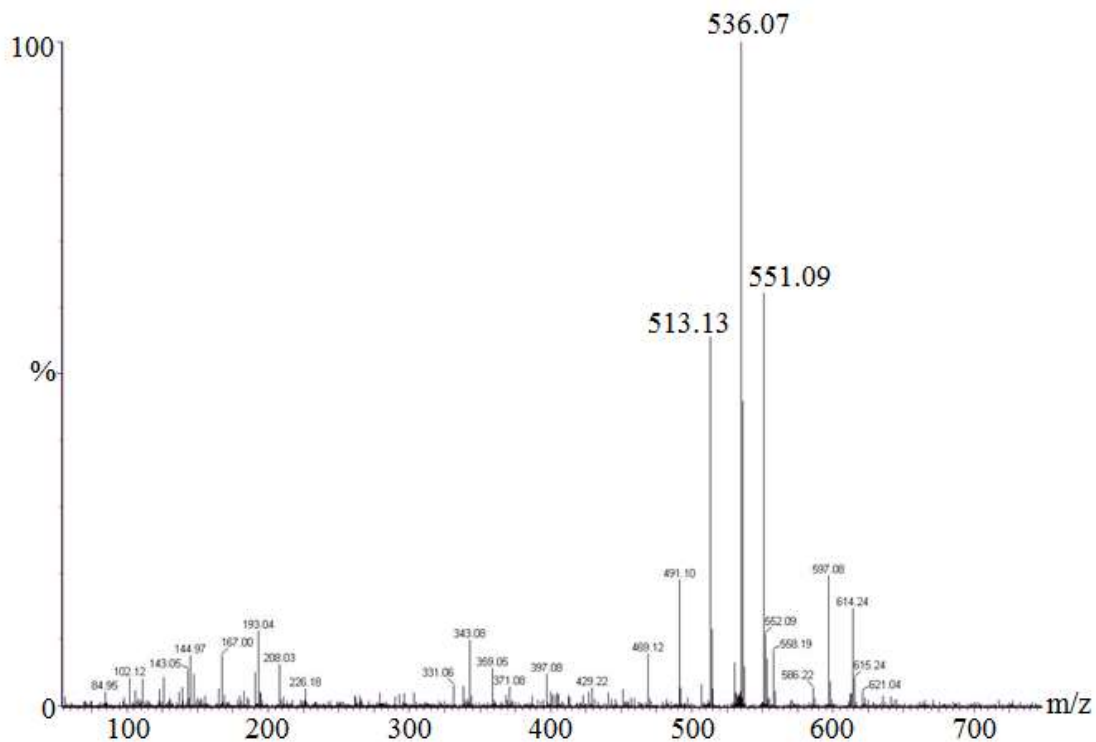


Figure S34. The ESI Mass Spectrum of Di[(3-diethylphosphonatopropanoyl)methyl]furan (DEMF)

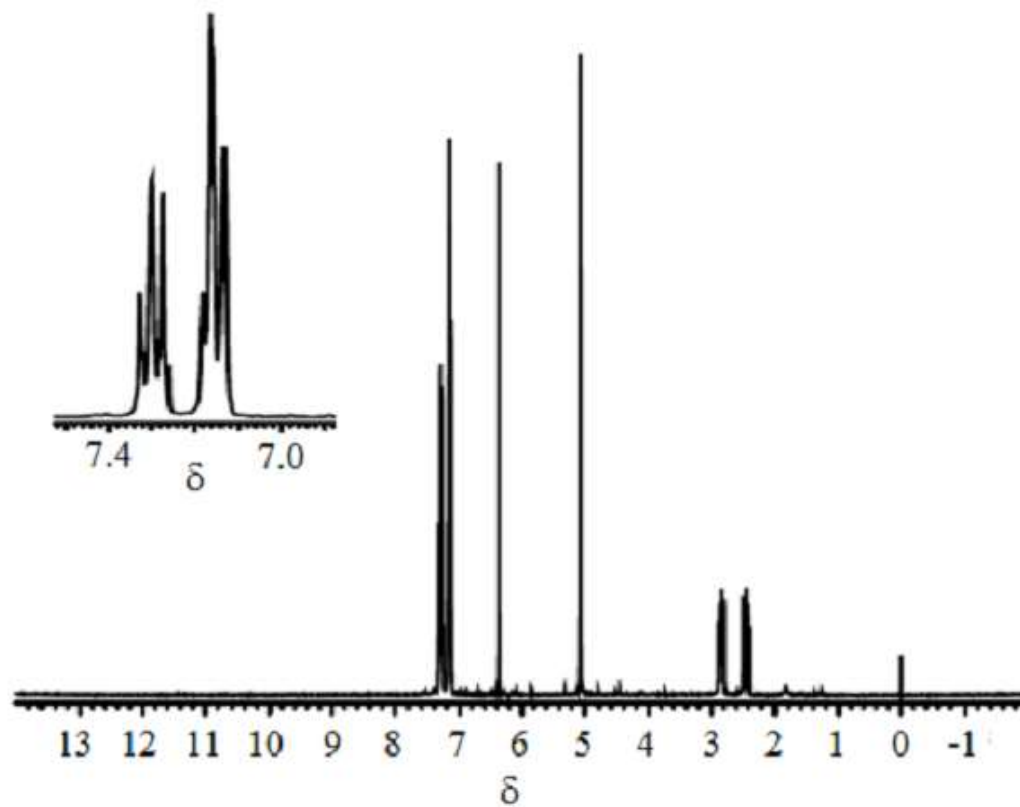


Figure S35. The ^1H NMR Spectrum for Di[(3-diphenylphosphonatopropanoyl)methyl]furan (DPMF)

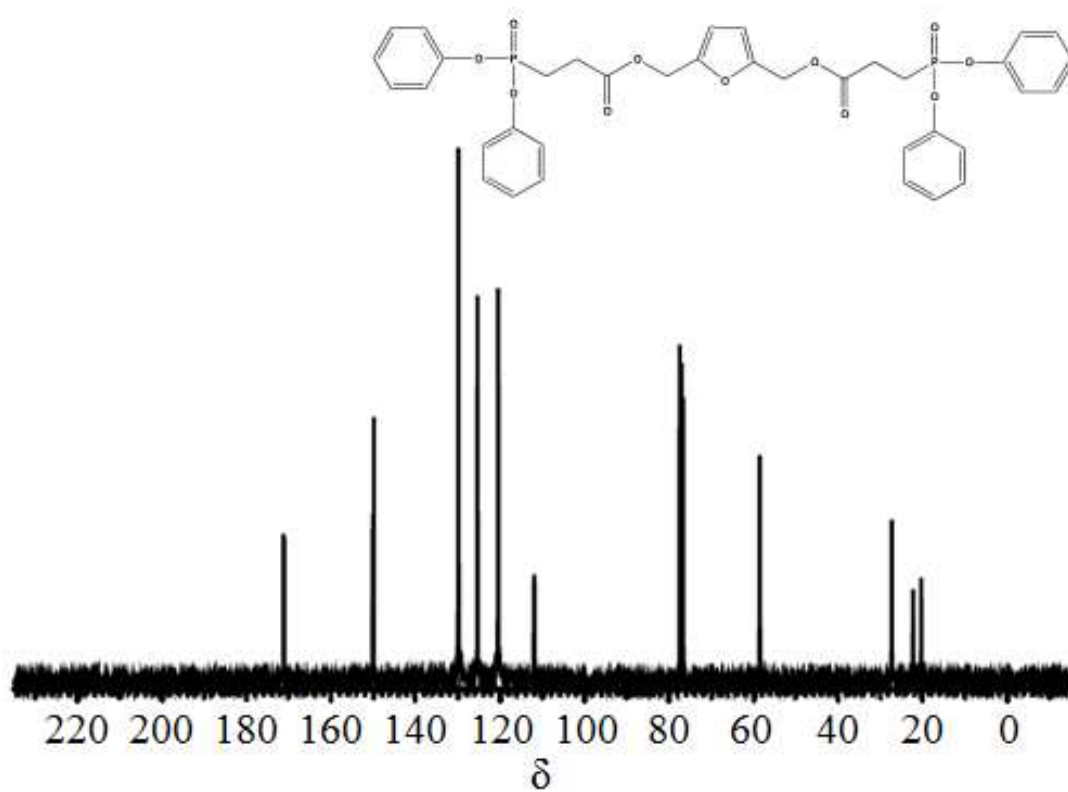


Figure S36. The ¹³C NMR Spectrum for Di[(3-diphenylphosphonatopropanoyl)methyl]furan (DPMF)

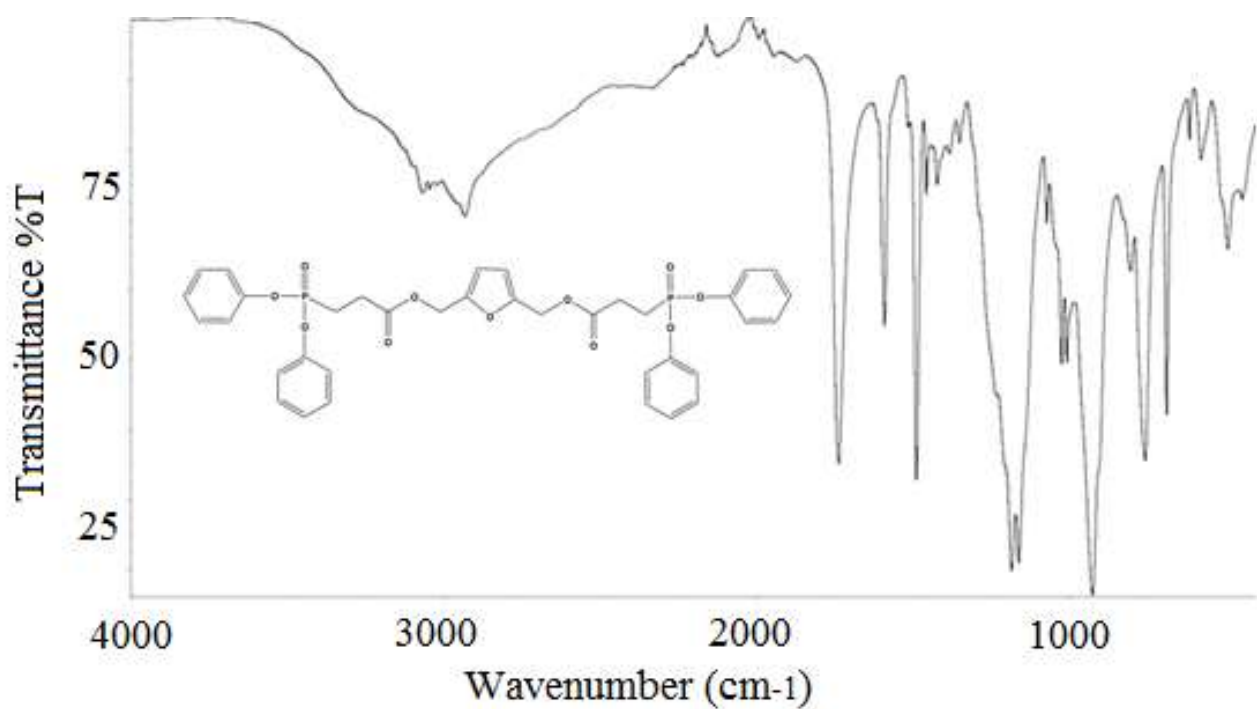


Figure S37. The Infrared Spectrum for Di[(3-diphenylphosphonatopropanoyl)methyl]furan (DPMF)

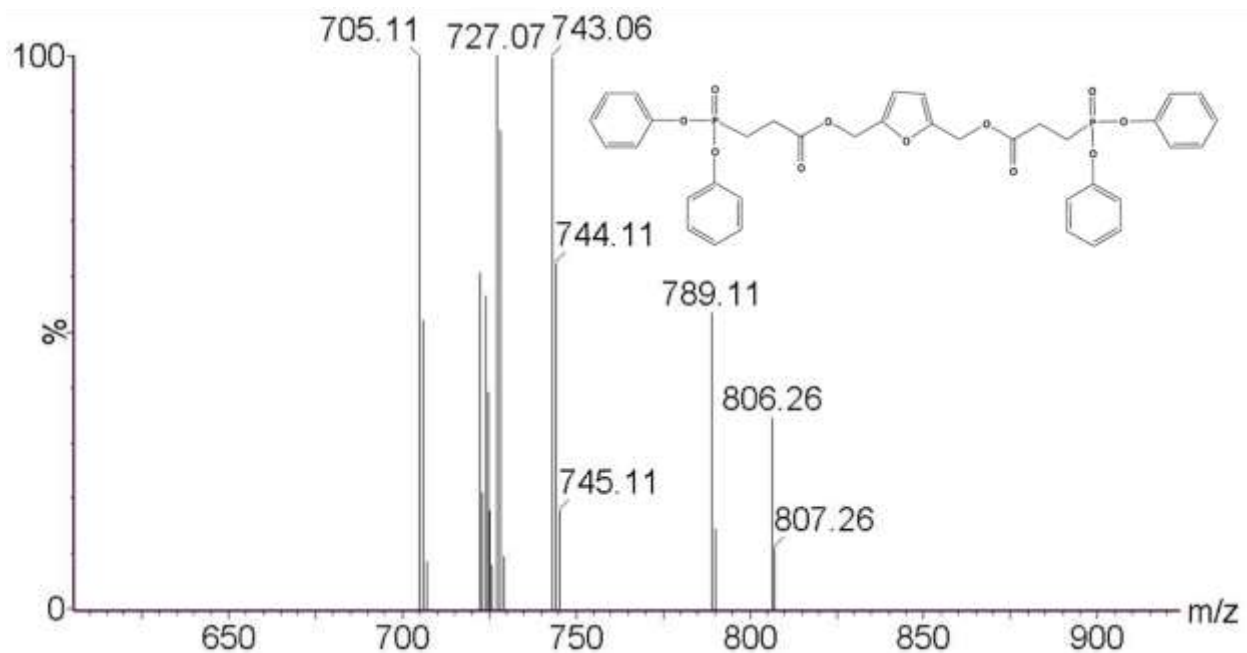


Figure S38. The ESI Mass Spectrum for Di[(3-diphenylphosphonatopropanoyl)methyl]furan (DPMF)