

Supporting information

Bio-based Non-isocyanate Poly(hydroxy urethane)s (PHU) Derived from Vanillin and CO₂

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^1H and ^{13}C NMR spectra

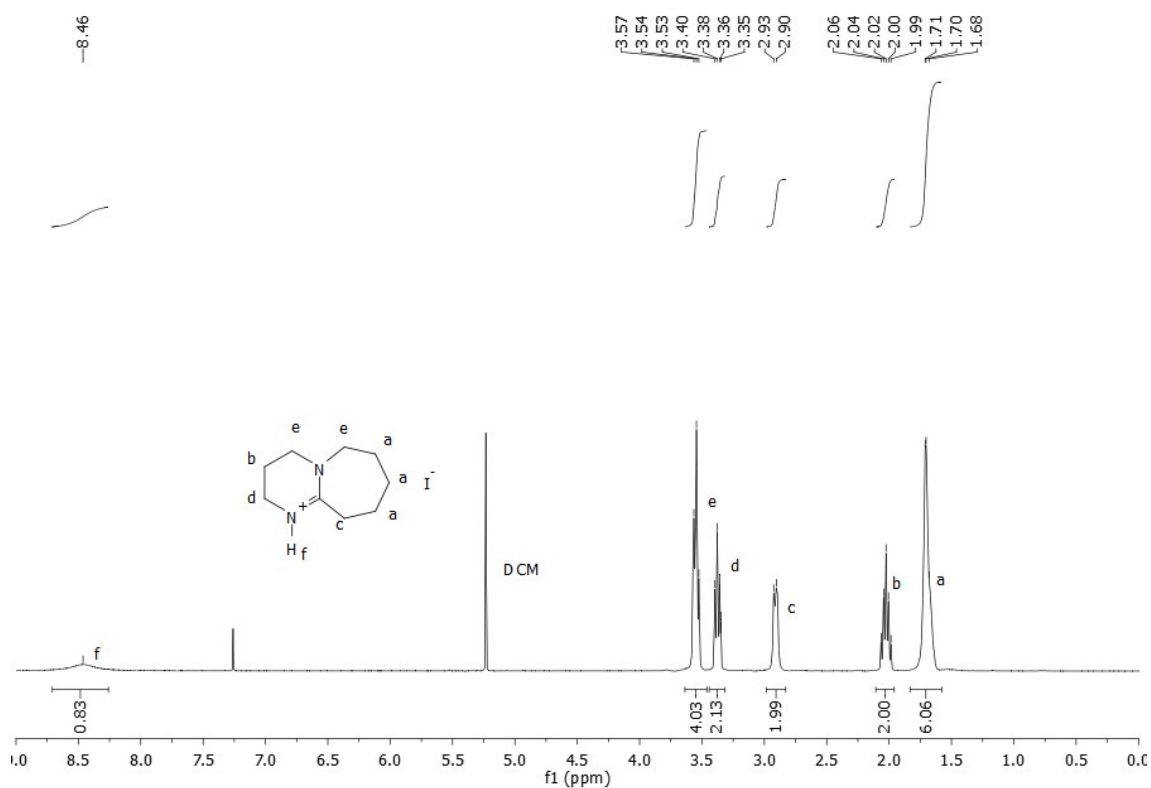


Figure S1. ^1H NMR spectrum of [HDBU]I (300 MHz, 298 K, CDCl_3).

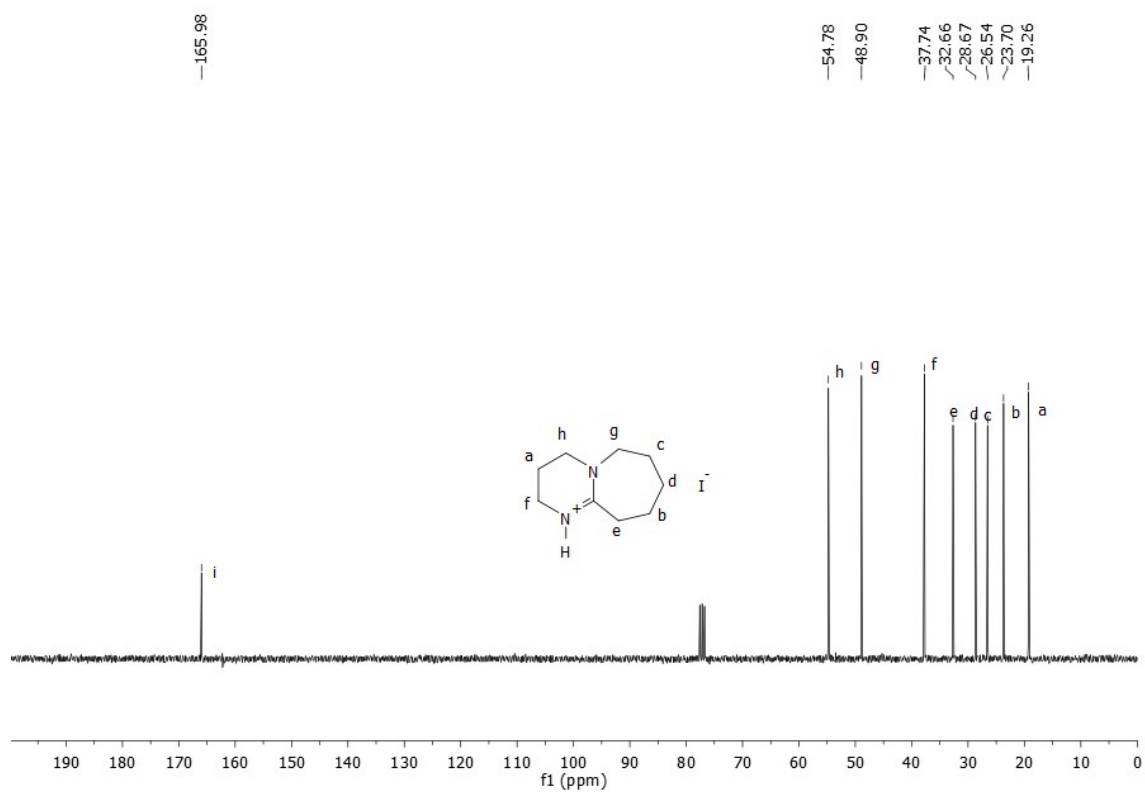


Figure S2. ^{13}C APT NMR spectrum of [HDBU]I (75 MHz, 298 K, CDCl_3).

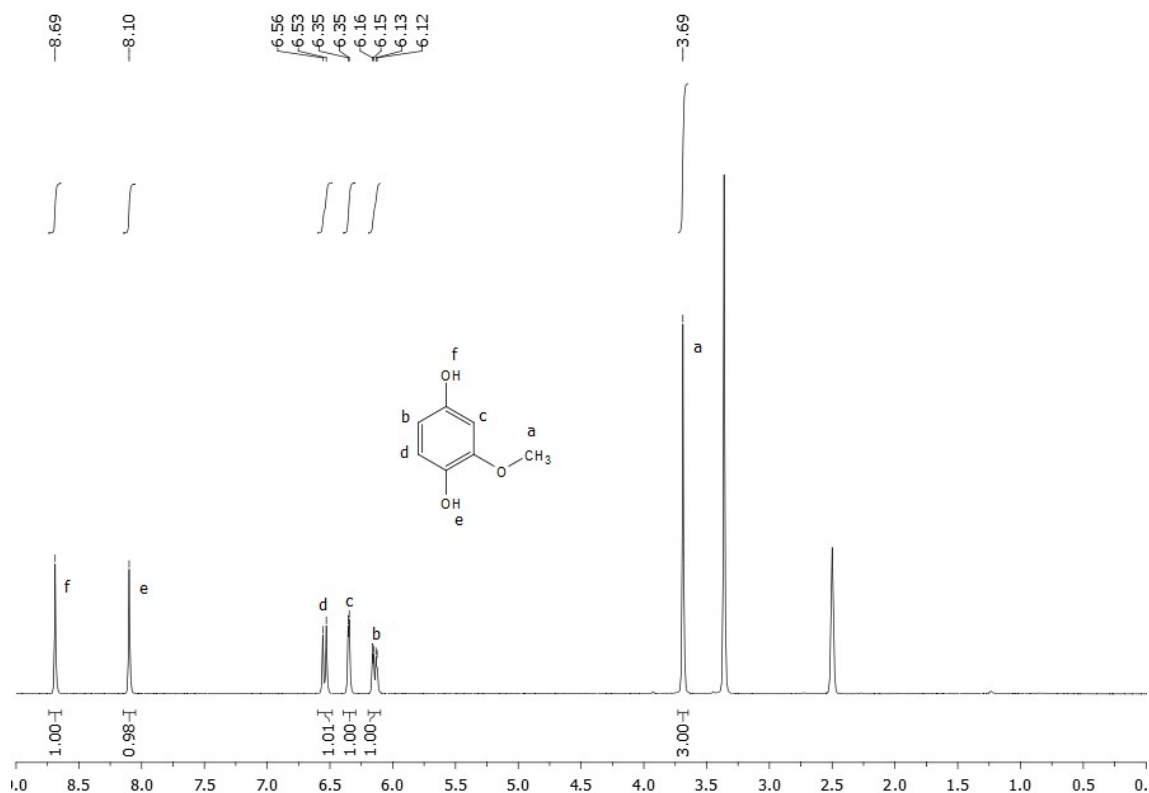


Figure S3. ^1H NMR spectrum of **2** (300 MHz, 298 K, DMSO).

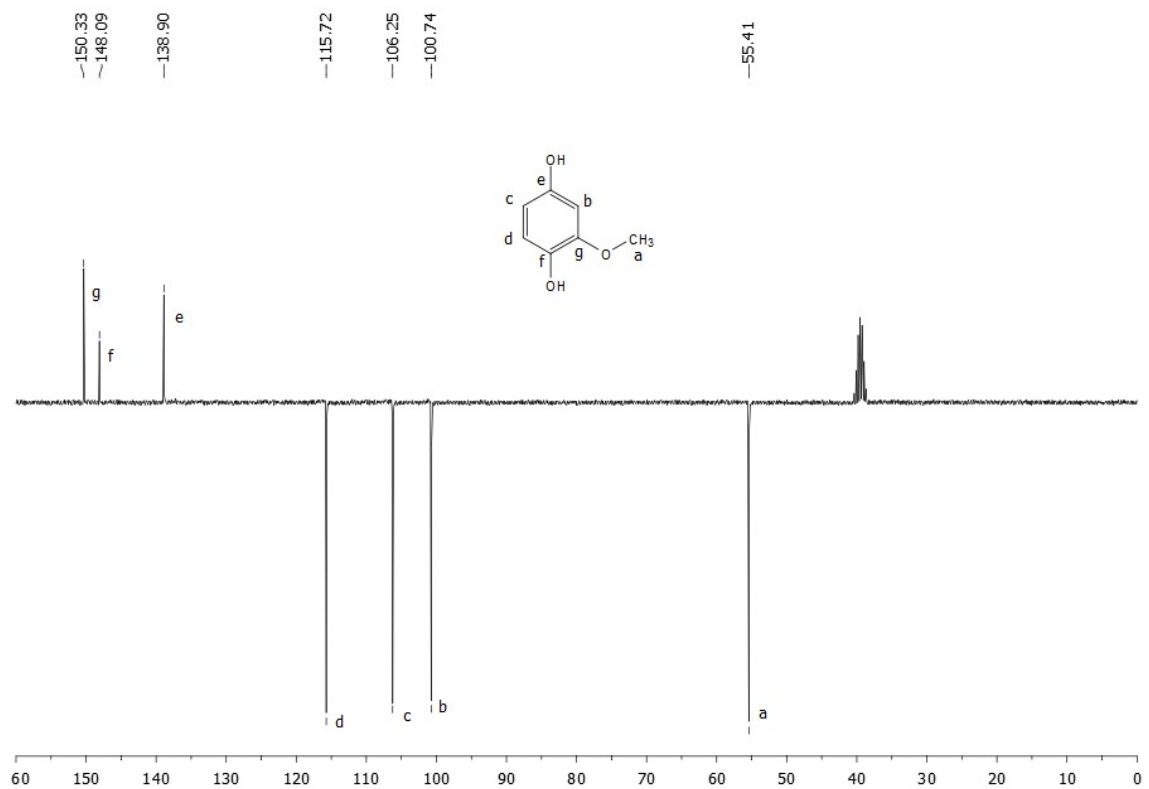


Figure S4. ^{13}C APT NMR spectrum of **2** (75 MHz, 298 K, DMSO).

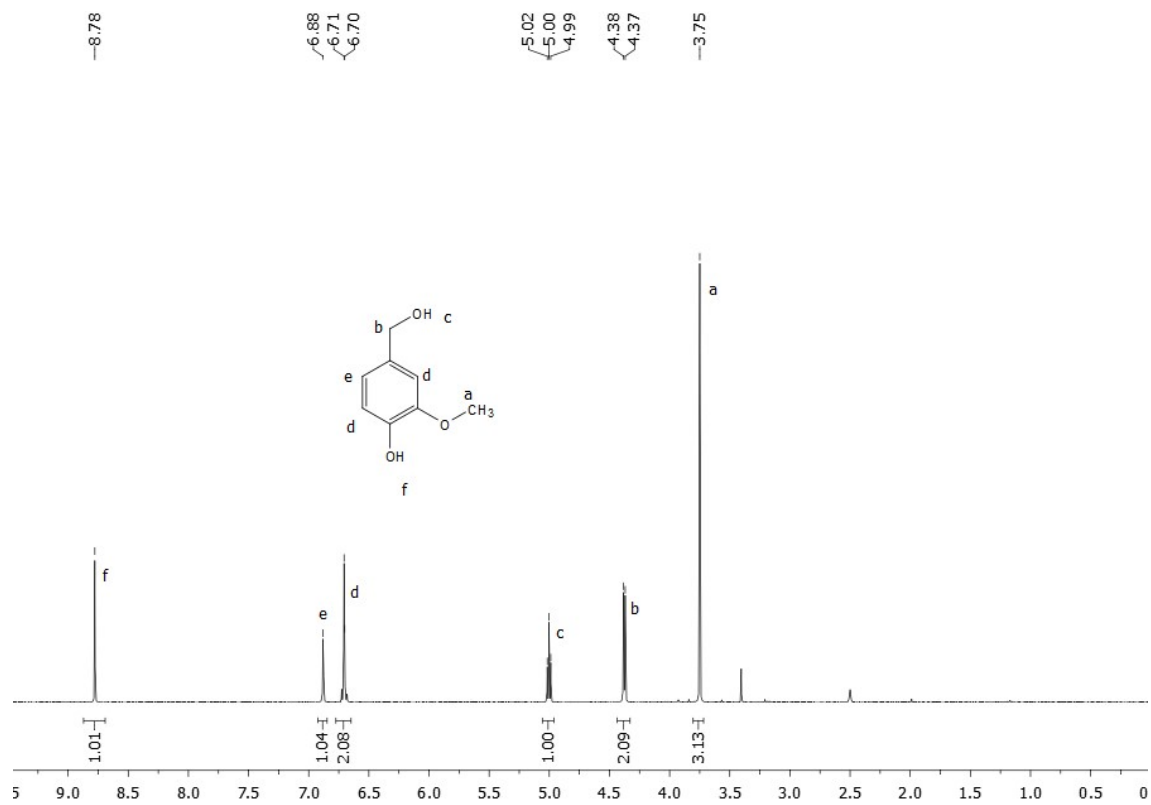


Figure S5. ^1H NMR spectrum of **4** (300 MHz, 298 K, DMSO).

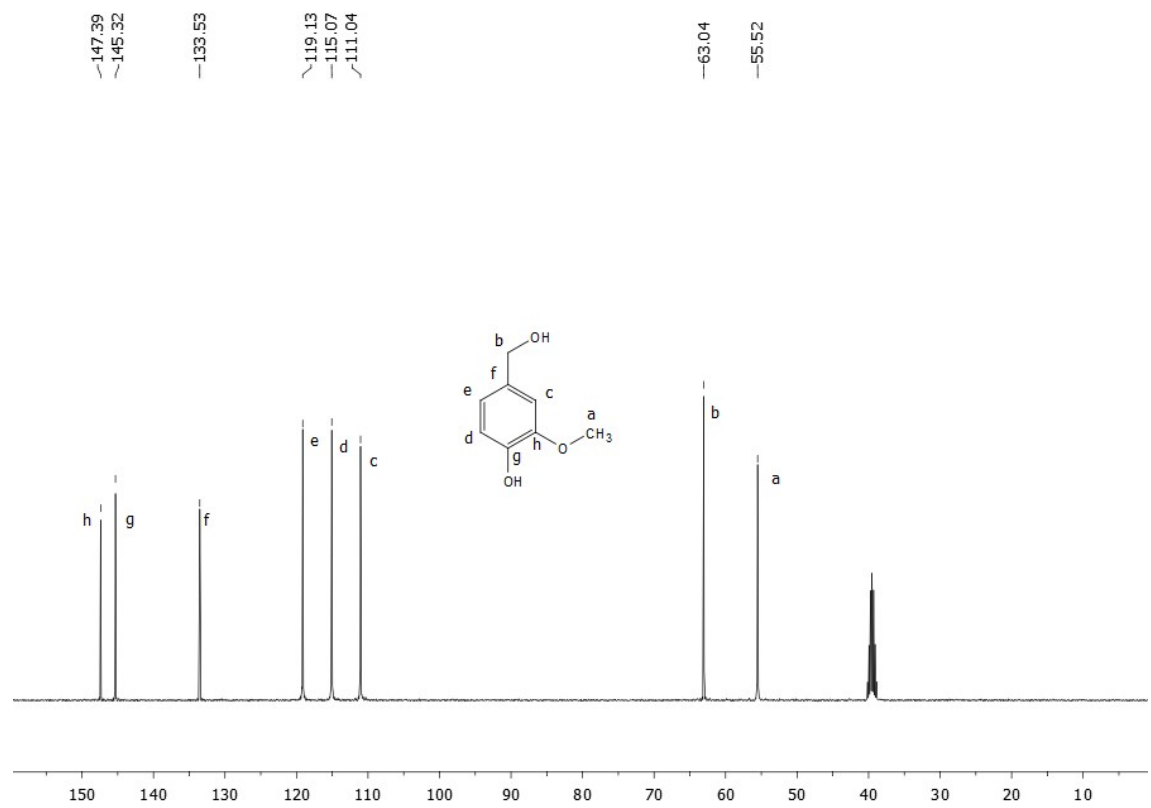


Figure S6. ^{13}C APT NMR spectrum of **4** (75 MHz, 298 K, DMSO).

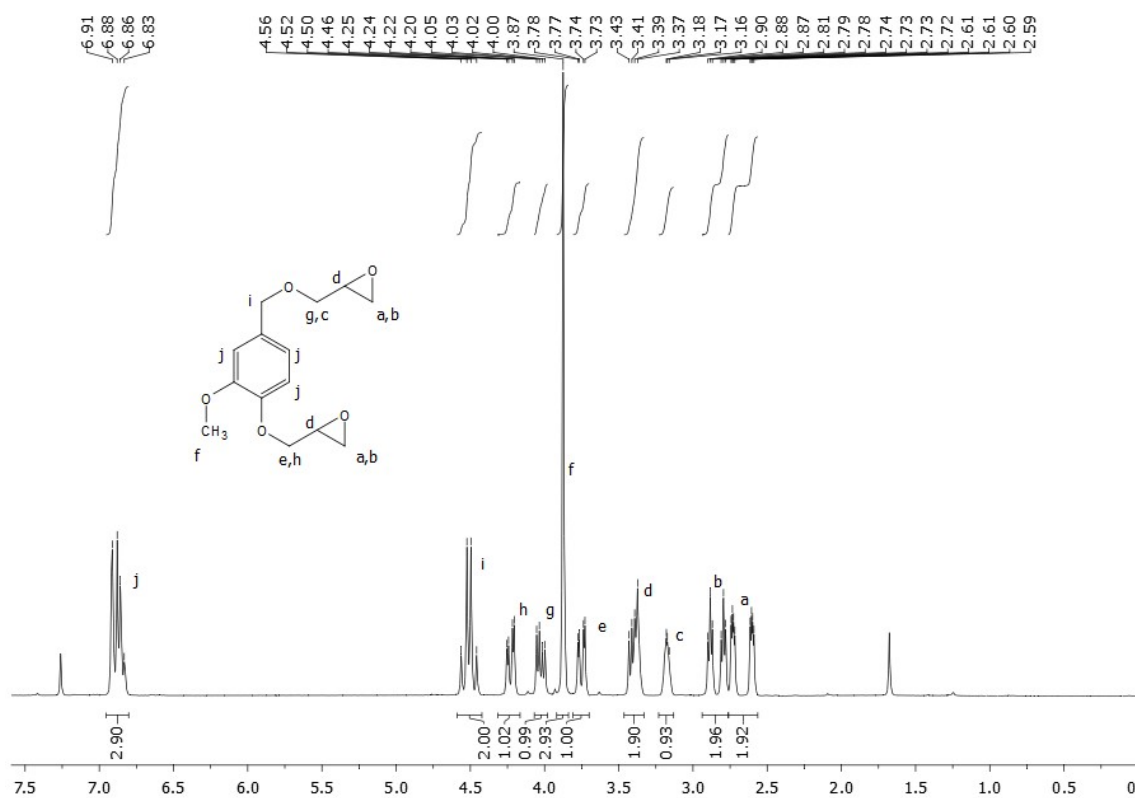


Figure S7. ^1H NMR spectrum of **5** (300 MHz, 298 K, CDCl_3).

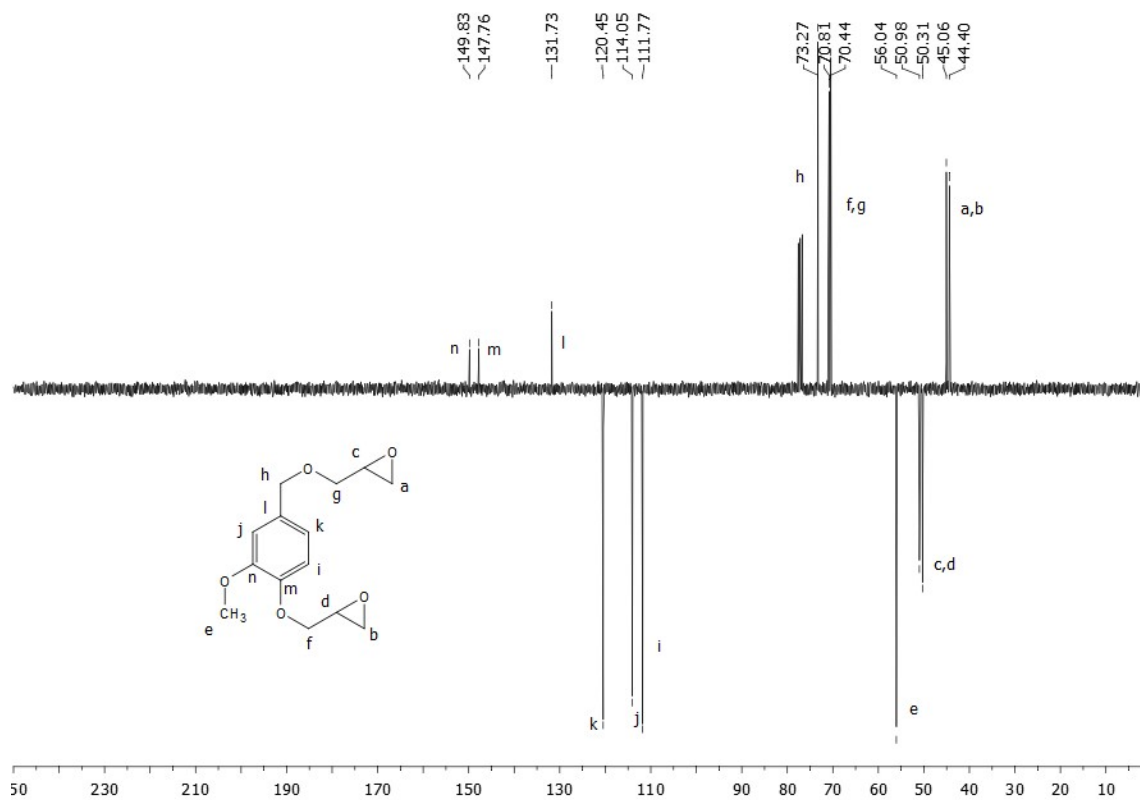


Figure S8. ^{13}C APT NMR spectrum of **5** (75 MHz, 298 K, CDCl_3).

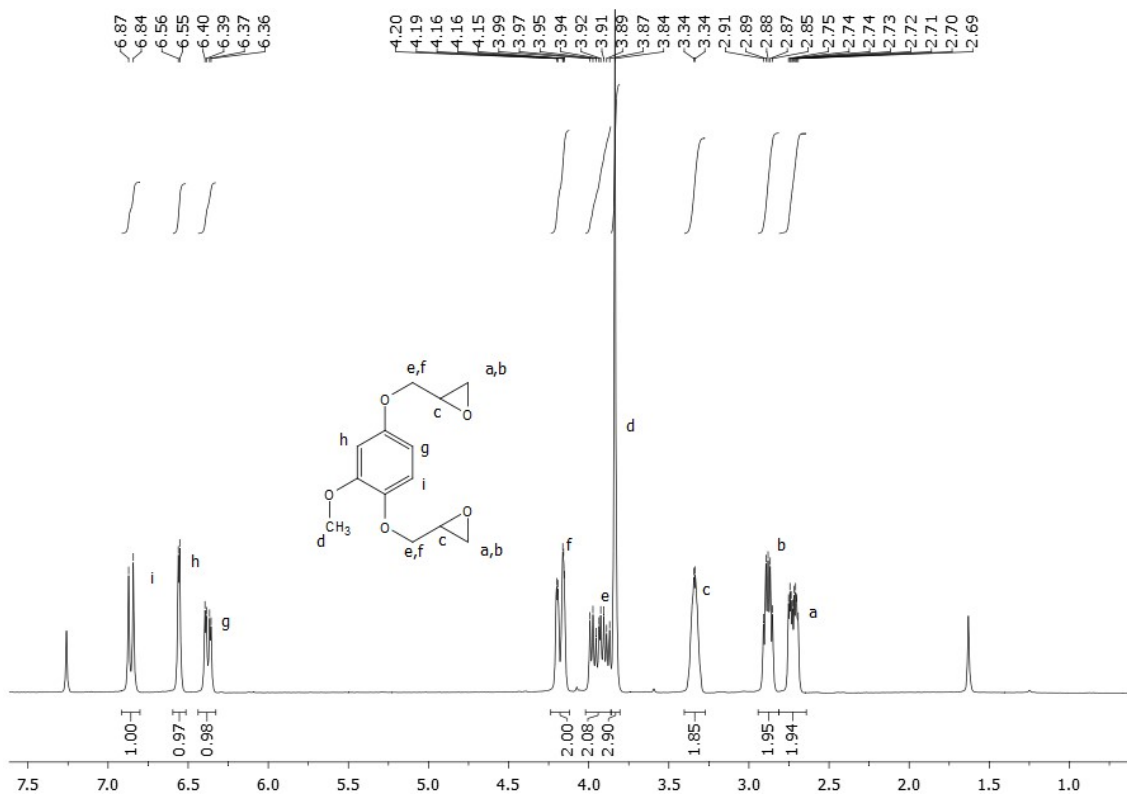


Figure S9. ^1H NMR spectrum of **6** (300 MHz, 298 K, CDCl_3).

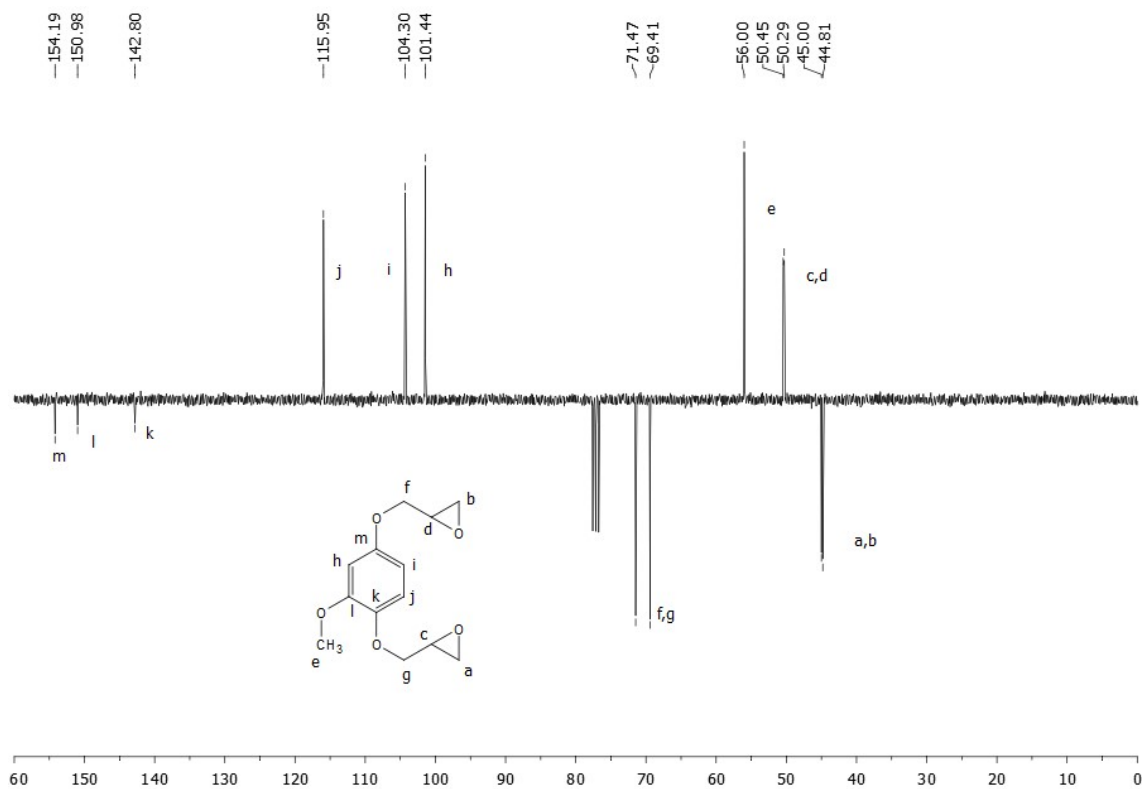


Figure S10. ^{13}C APT NMR spectrum of **6** (75 MHz, 298 K, CDCl_3).

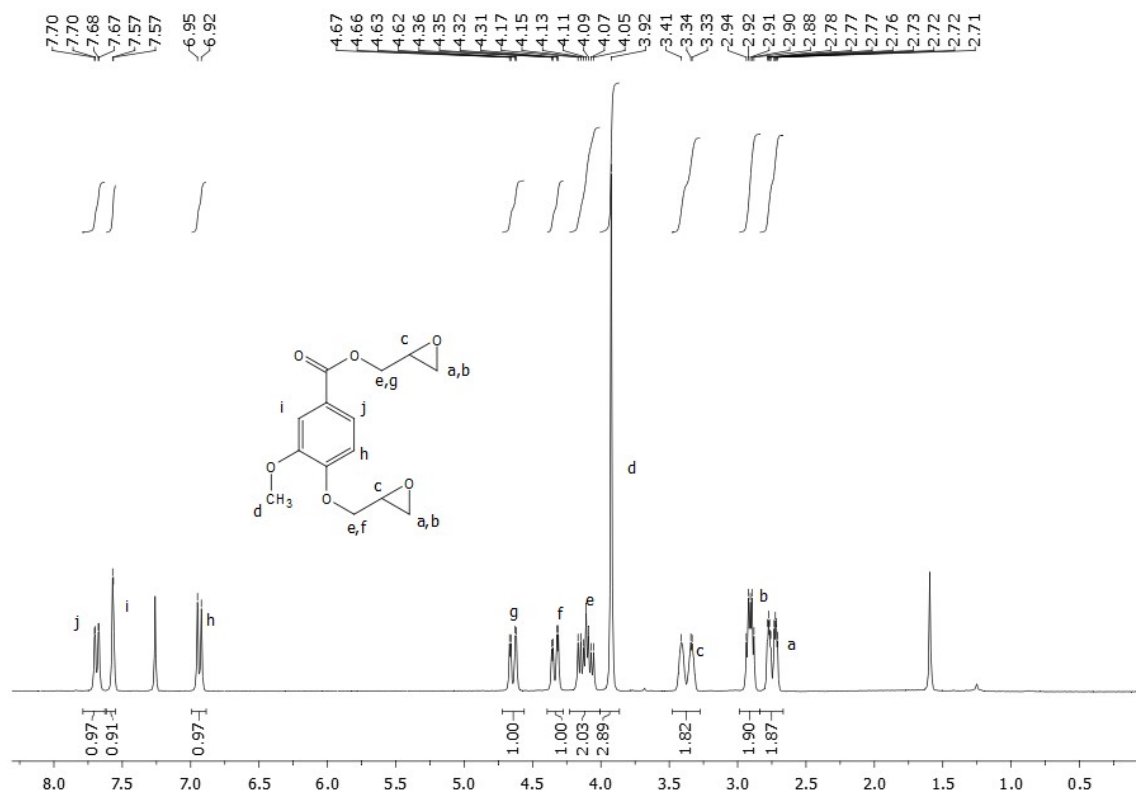


Figure S11. ^1H NMR spectrum of 7 (300 MHz, 298 K, CDCl_3).

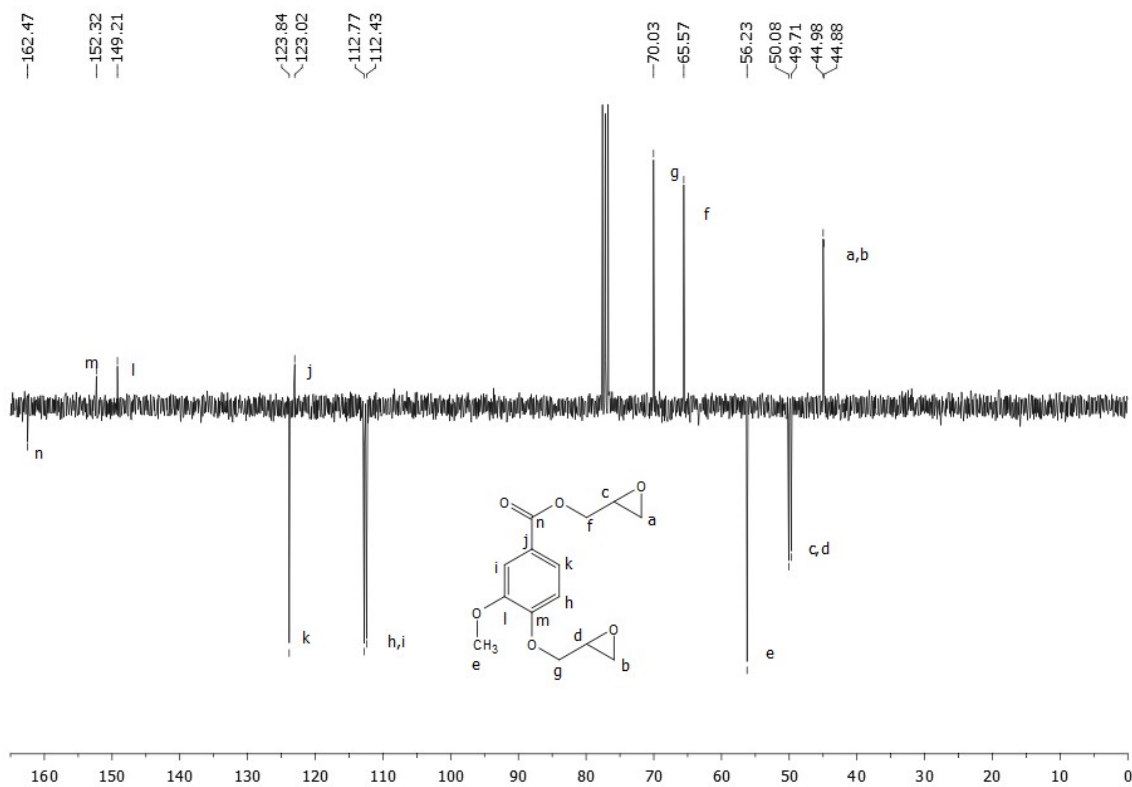


Figure S12. ^{13}C APT NMR spectrum of 7 (75 MHz, 298 K, CDCl_3).

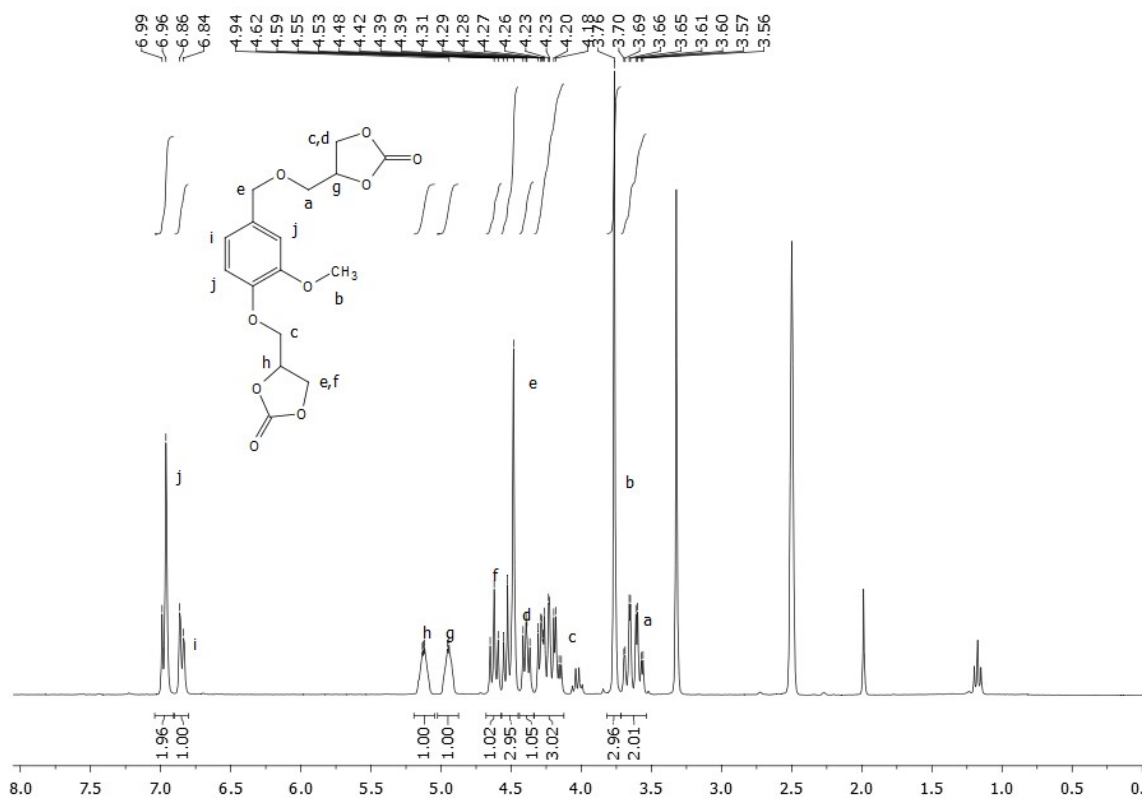


Figure S17. ^1H NMR spectrum of **8** (300 MHz, 298 K, DMSO).

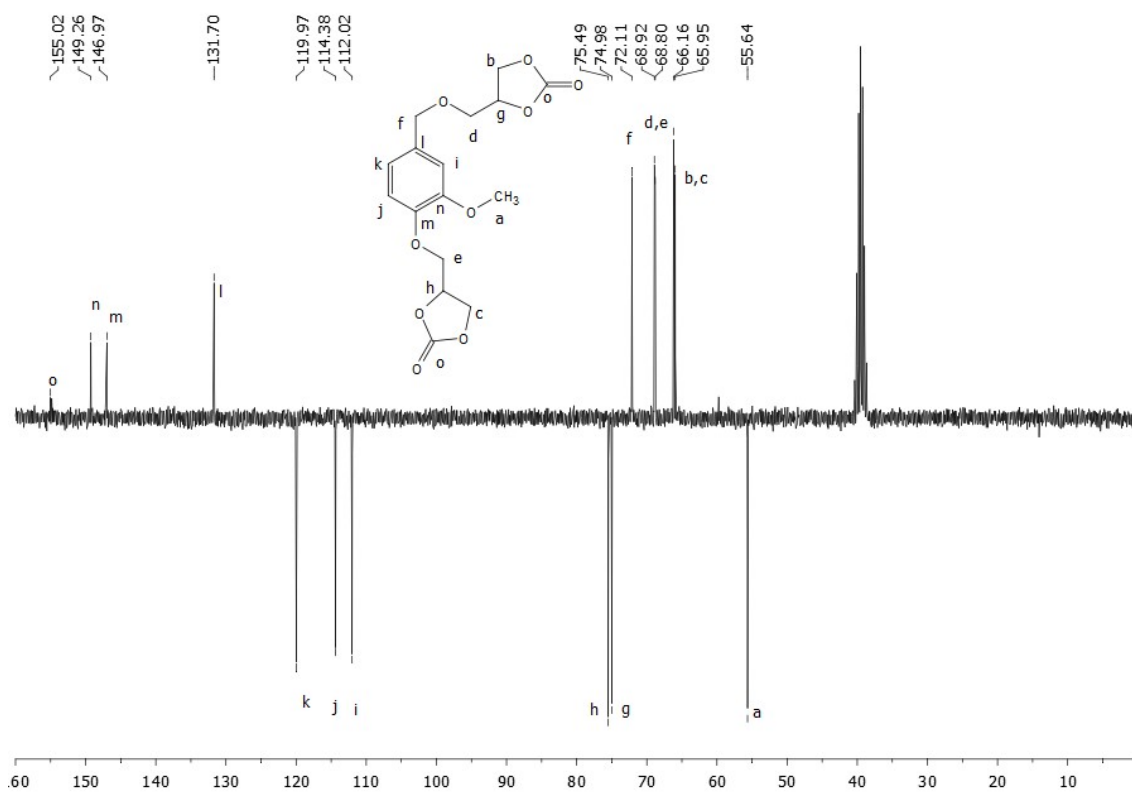


Figure S18. ^{13}C APT NMR spectrum of **8** (75 MHz, 298 K, DMSO).

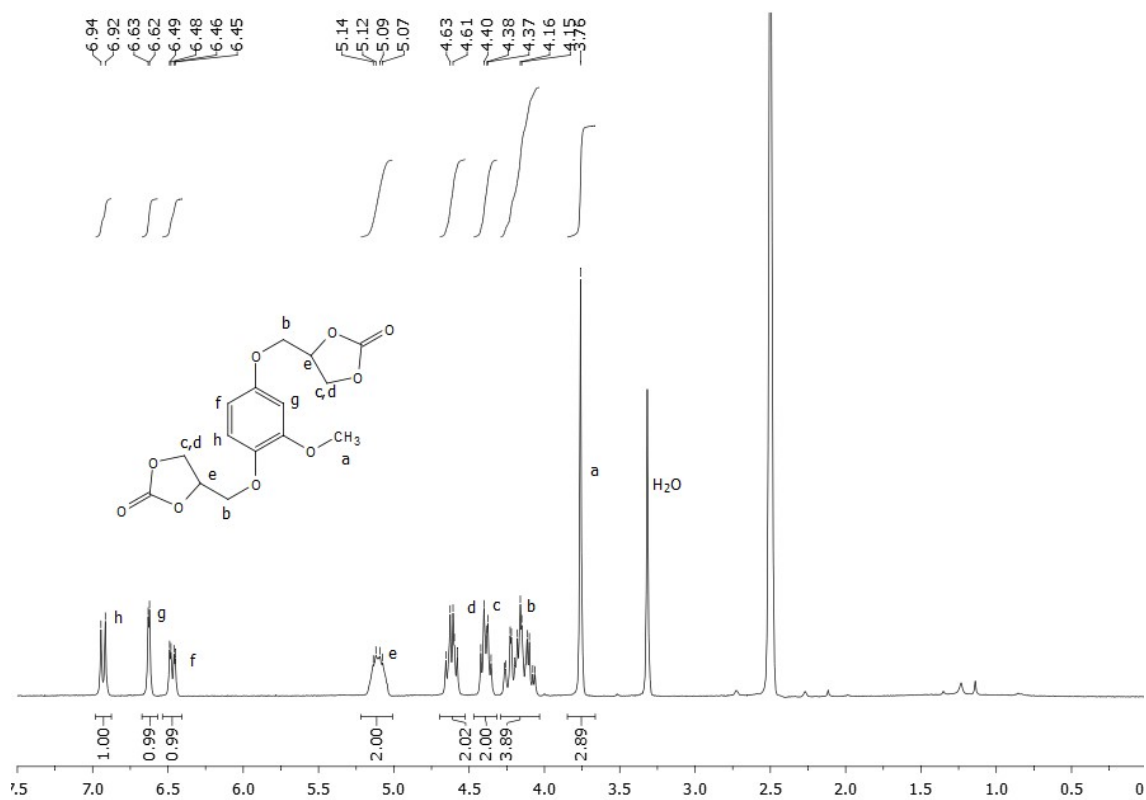


Figure S19. ^1H NMR spectrum of **9** (300 MHz, 298 K, DMSO).

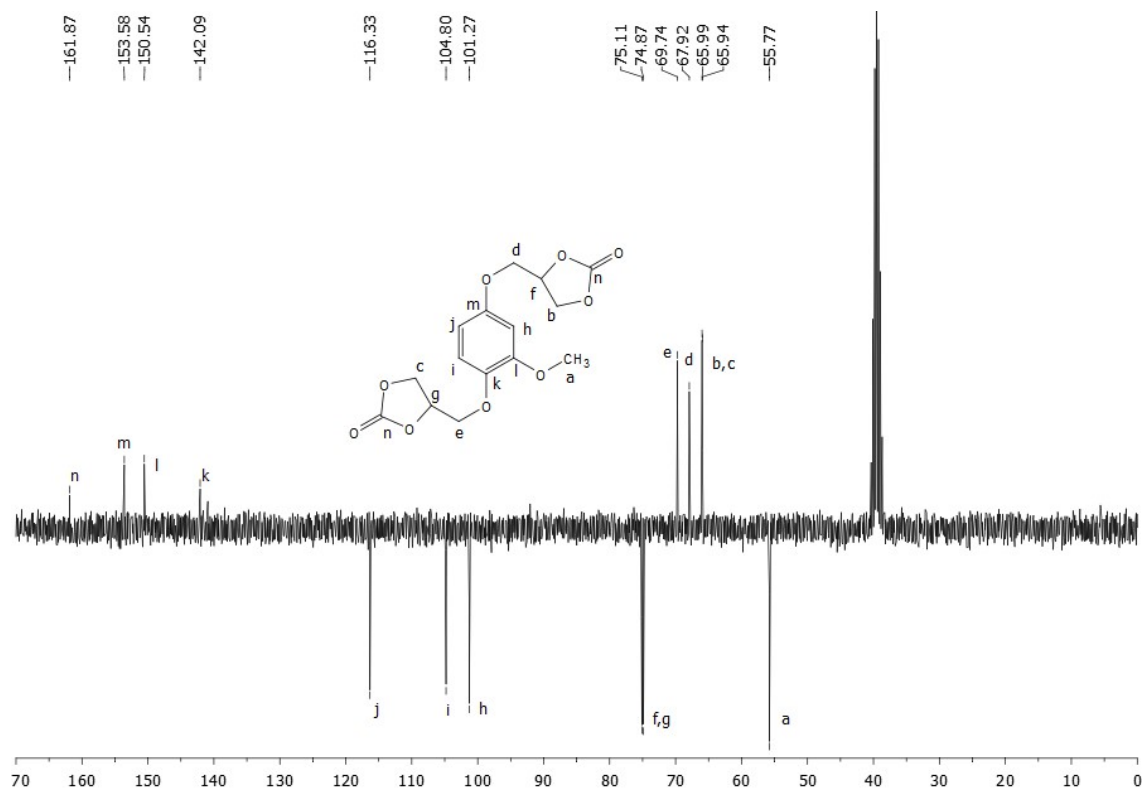


Figure S20. ^{13}C NMR spectrum of **9** (75 MHz, 298 K, DMSO).

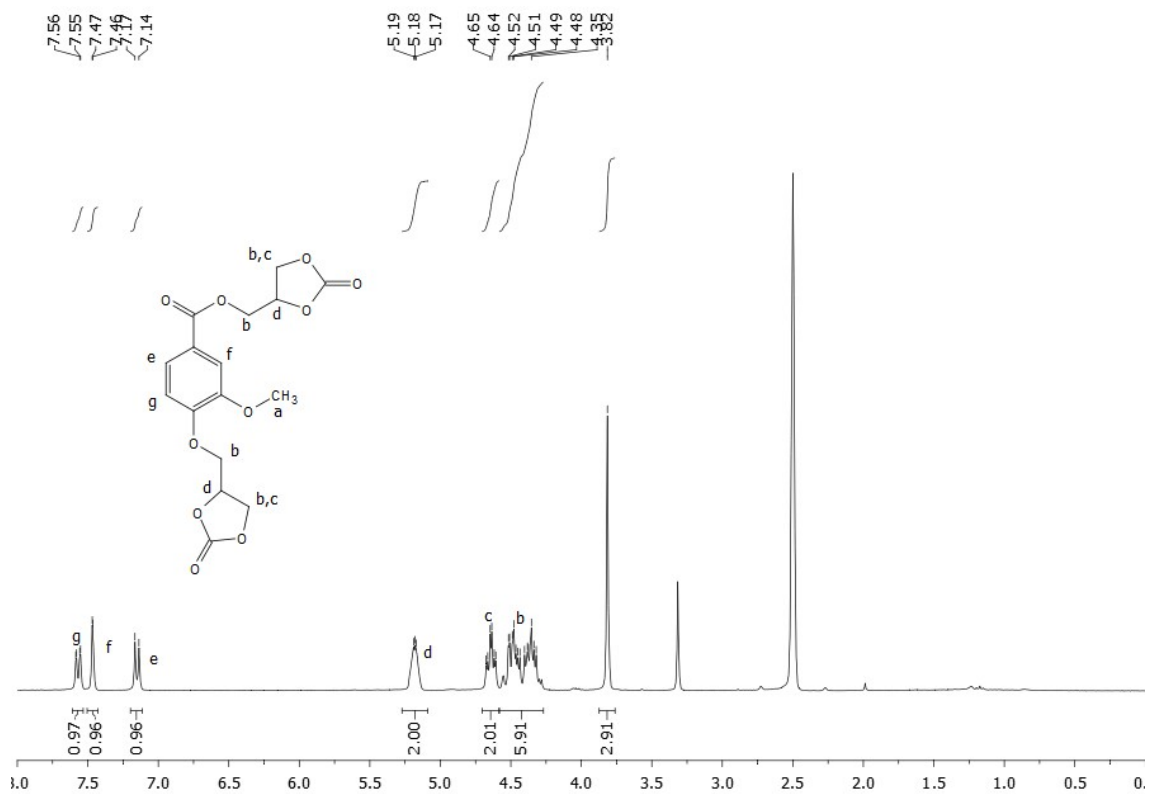


Figure S21. ¹H NMR spectrum of **10** (300 MHz, 298 K, DMSO).

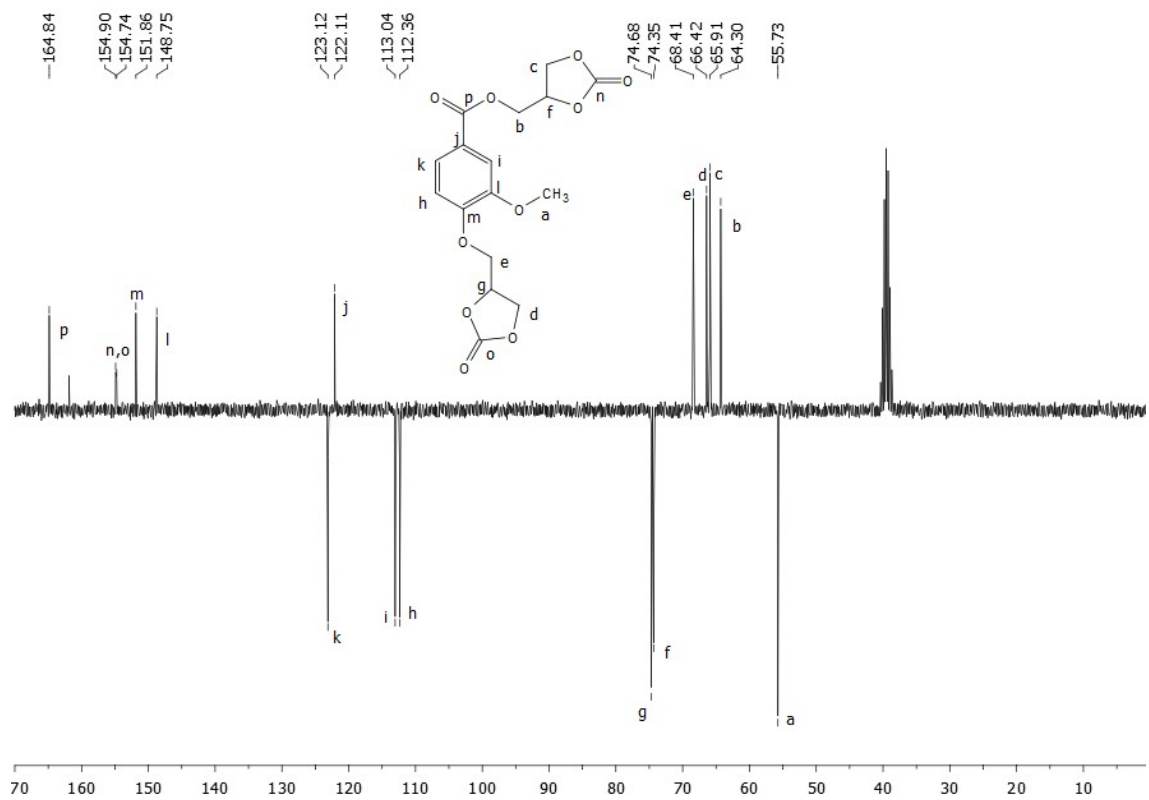


Figure S22. ¹³C APT NMR spectrum of **10** (75 MHz, 298 K, DMSO).

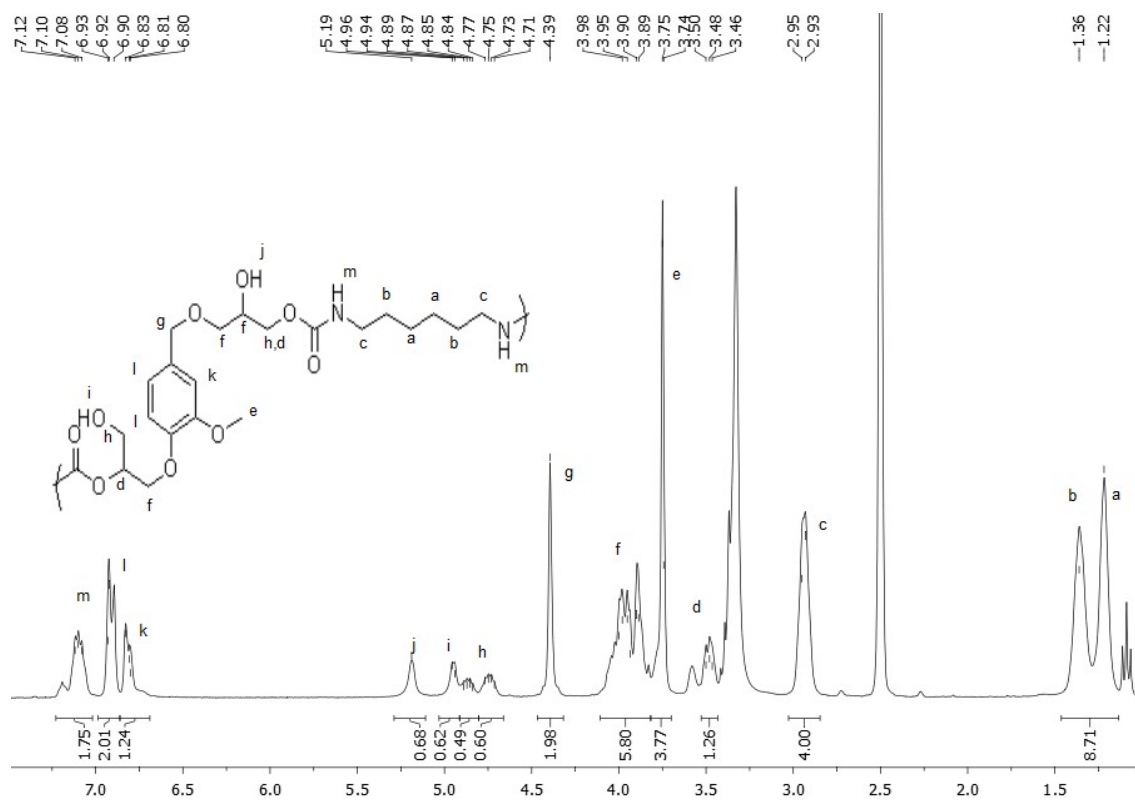


Figure S23. ^1H NMR spectrum of NIPU 11 (300 MHz, 298 K, DMSO).

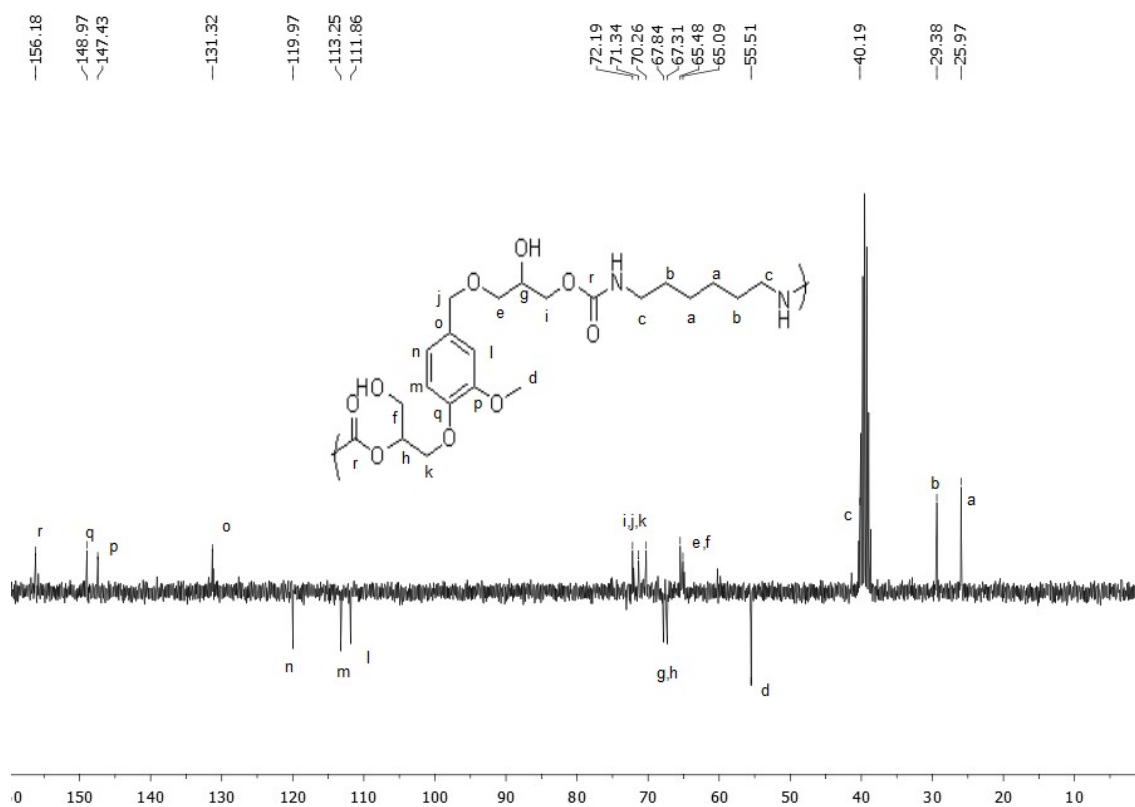


Figure S24. ^{13}C APT NMR spectrum of NIPU 11 (75 MHz, 298 K, DMSO).

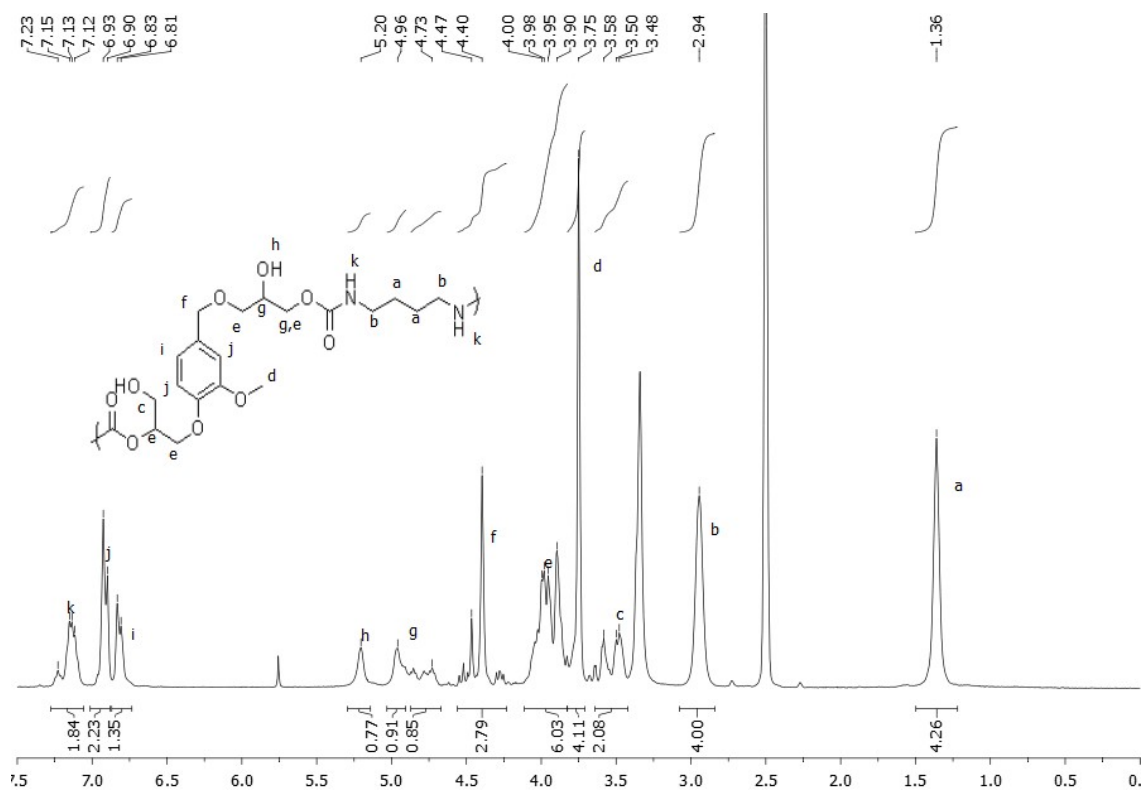


Figure S25. ^1H NMR spectrum of NIPU 12 (300 MHz, 298 K, DMSO).

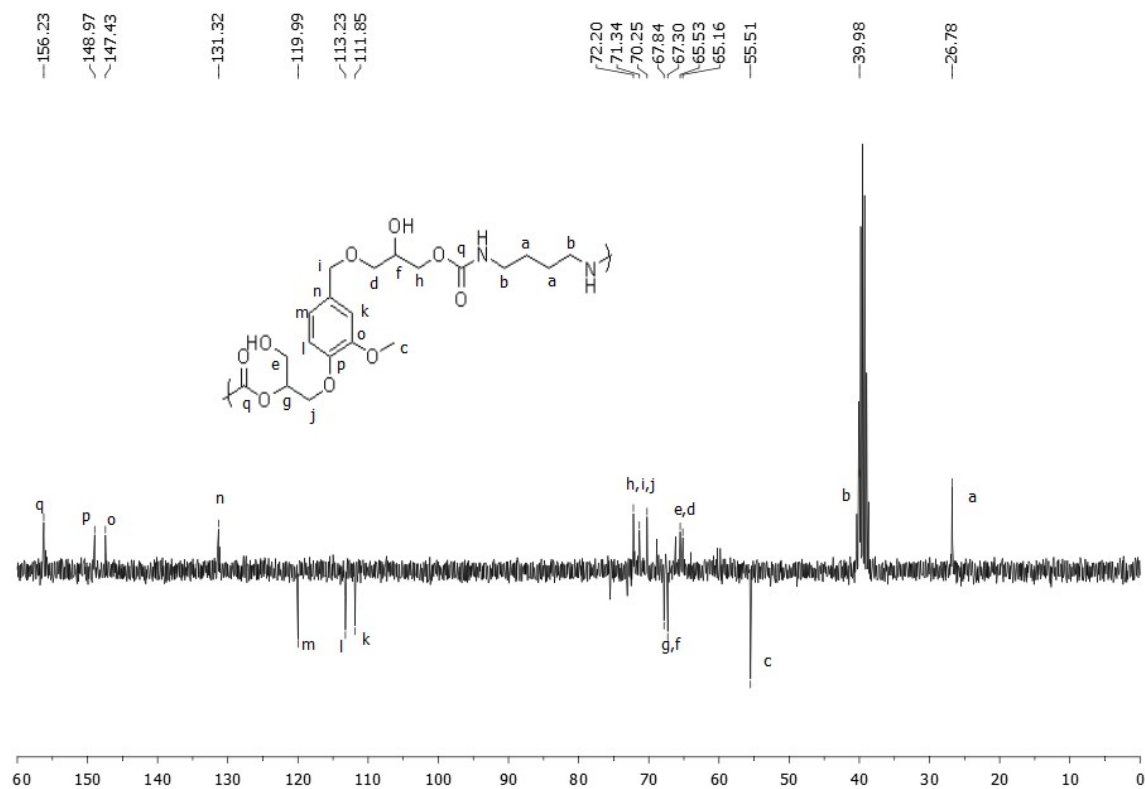


Figure S26. ^{13}C APT NMR spectrum of NIPU 12 (75 MHz, 298 K, DMSO).

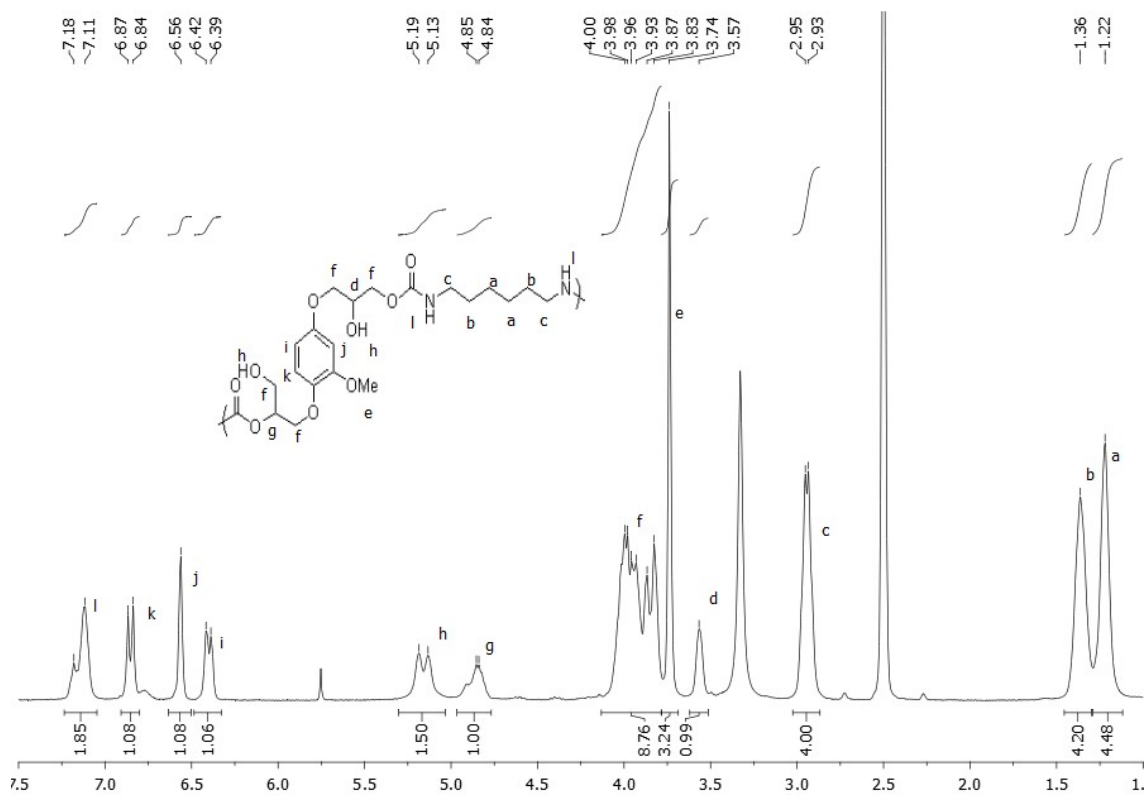


Figure S27. ^1H NMR spectrum of NIPU **13** (300 MHz, 298 K, DMSO).

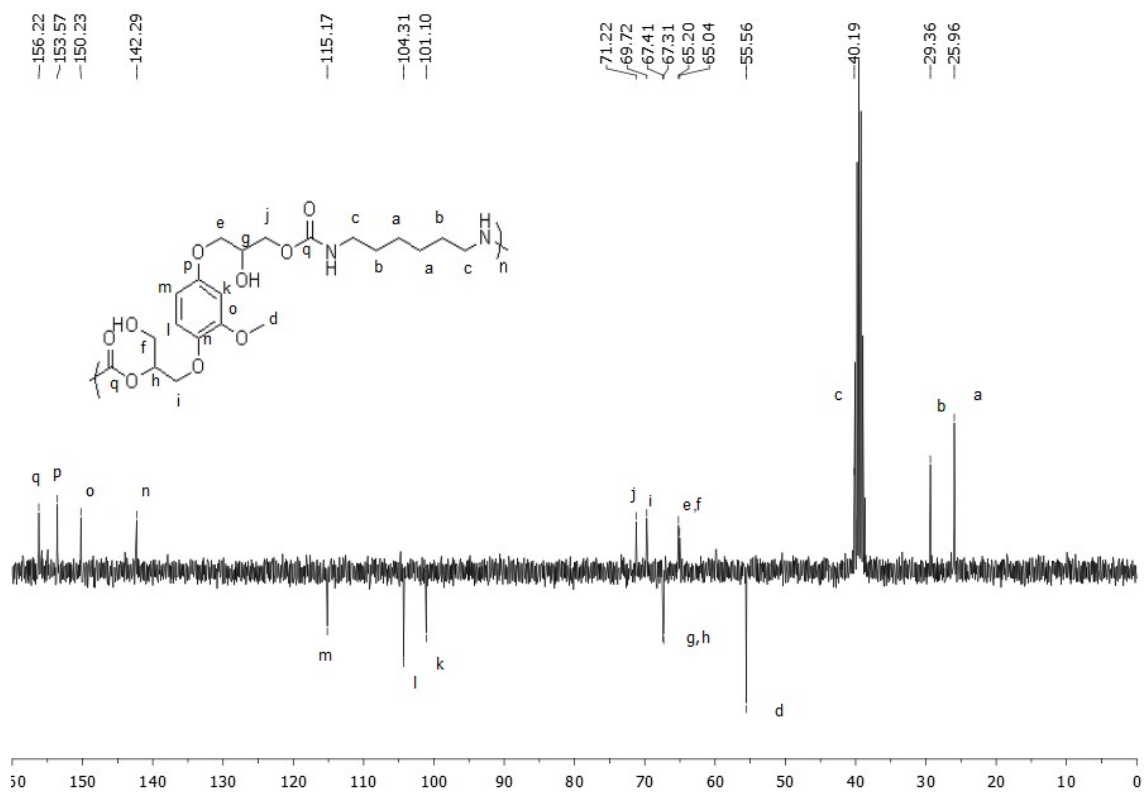


Figure S28. ^{13}C APT NMR spectrum of NIPU **13** (75 MHz, 298 K, DMSO).

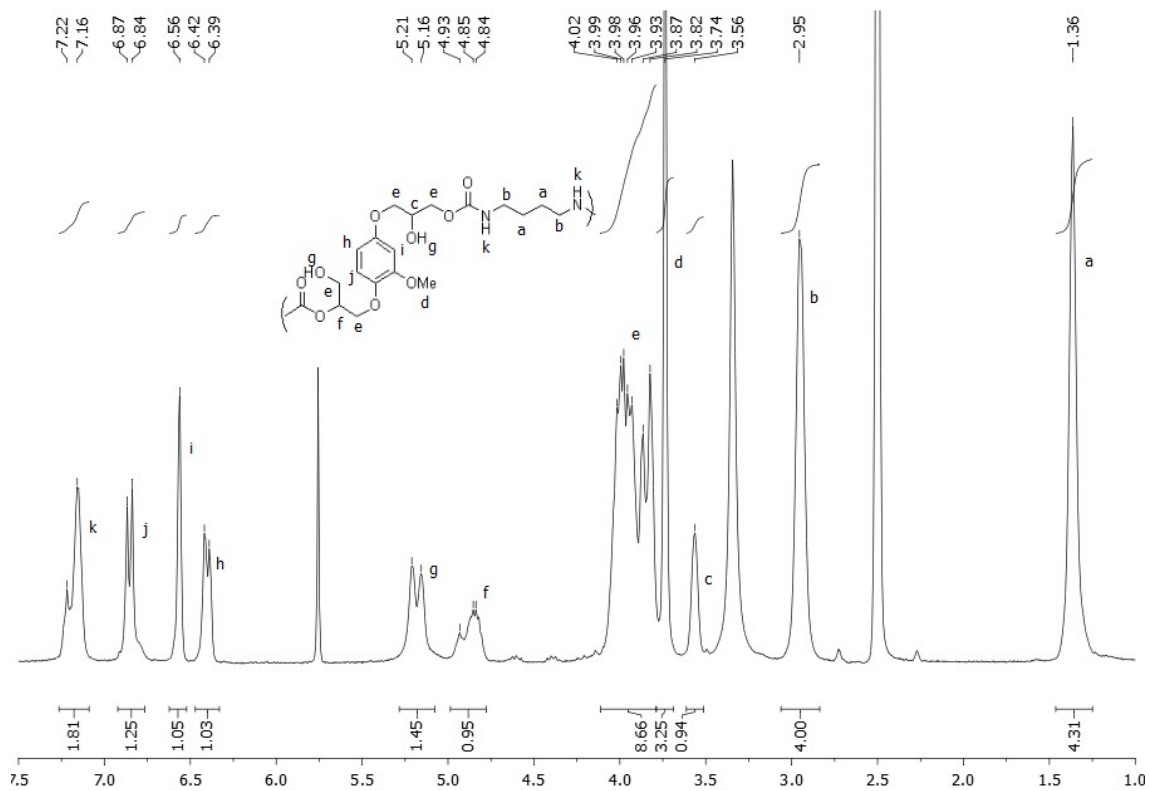


Figure S29. ^1H NMR spectrum of NIPU **14** (300 MHz, 298 K, DMSO).

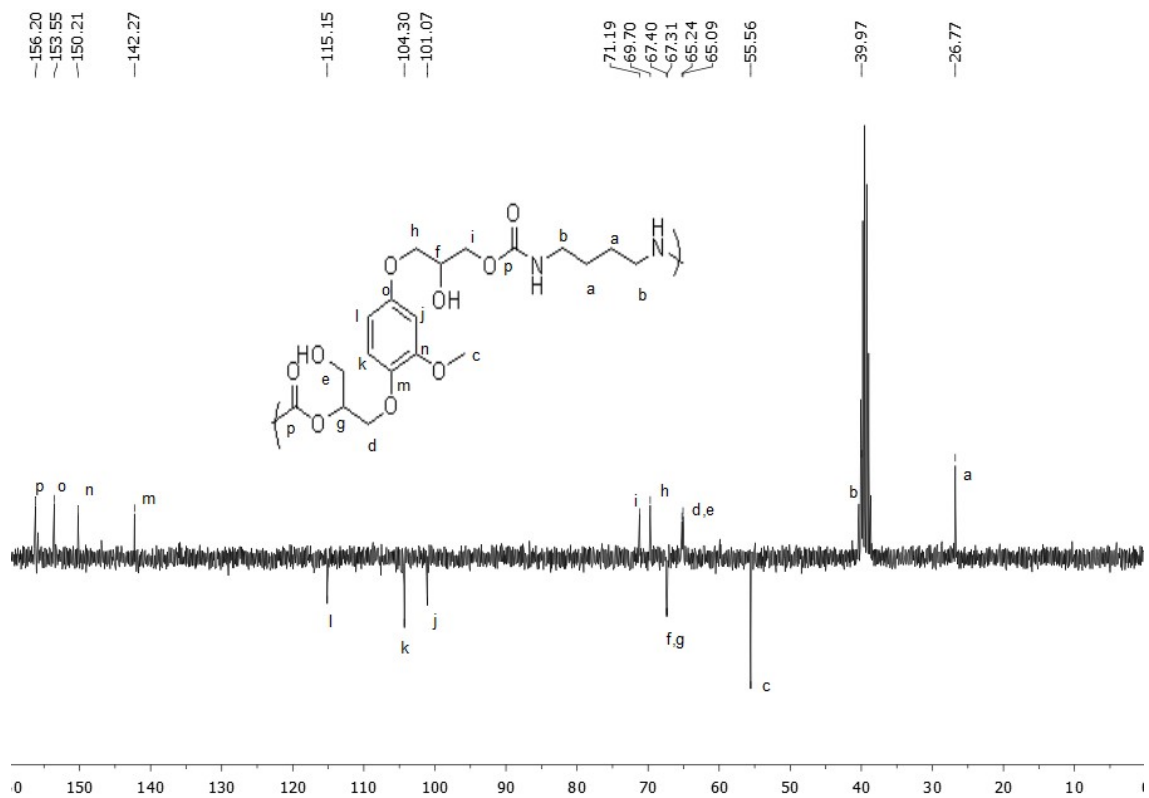


Figure S30. ^{13}C APT NMR spectrum of NIPU **14** (75 MHz, 298 K, DMSO).

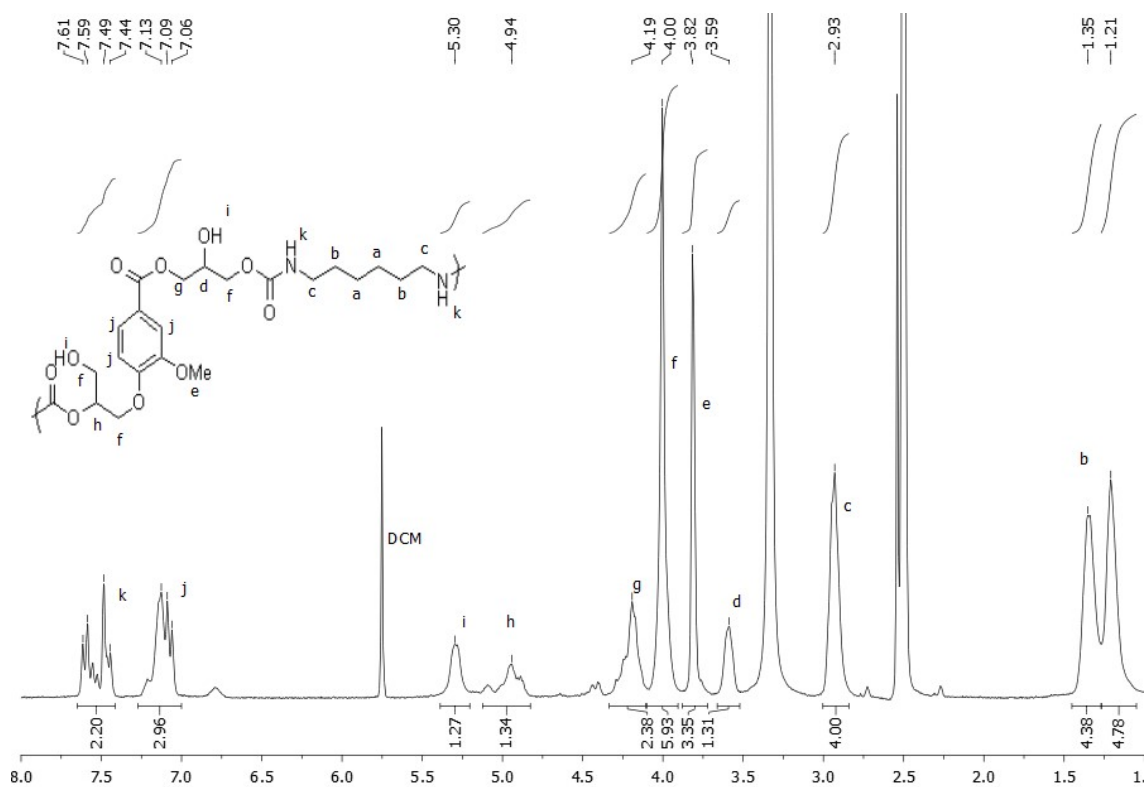


Figure S31. ^1H NMR spectrum of NIPU 15 (300 MHz, 298 K, DMSO).

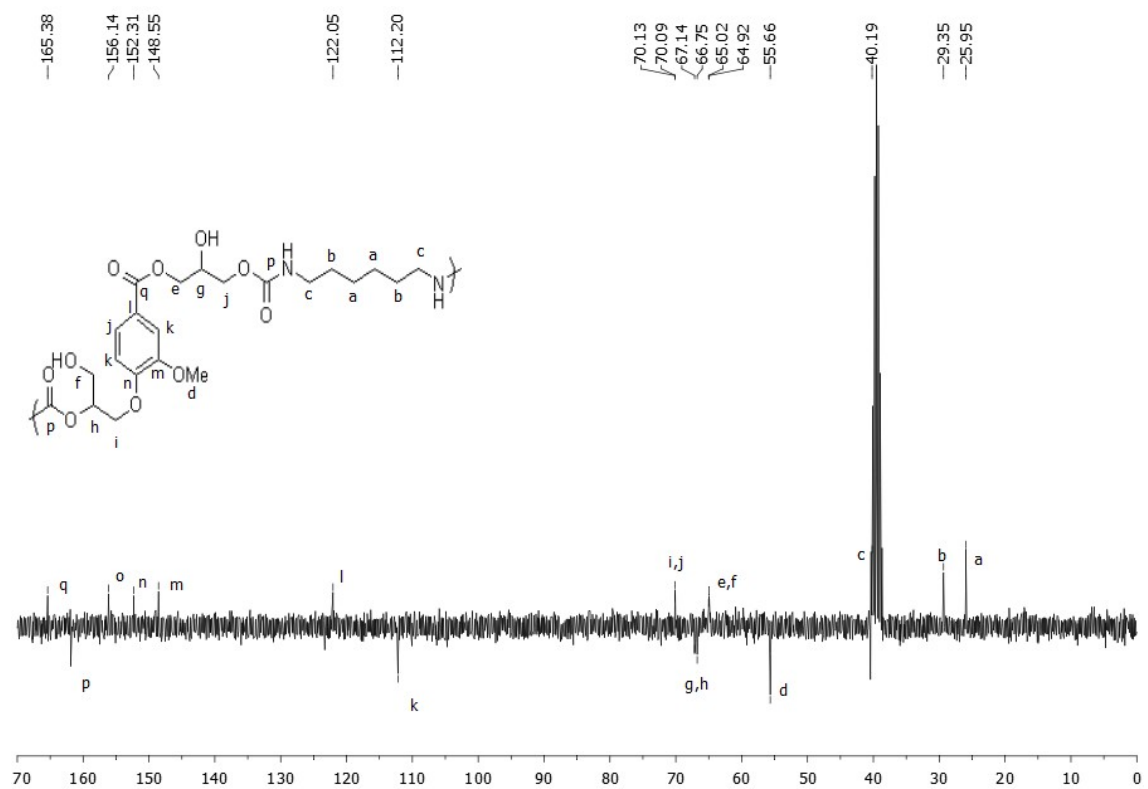


Figure S32. ^{13}C APT NMR spectrum of NIPU 15 (75 MHz, 298 K, DMSO).

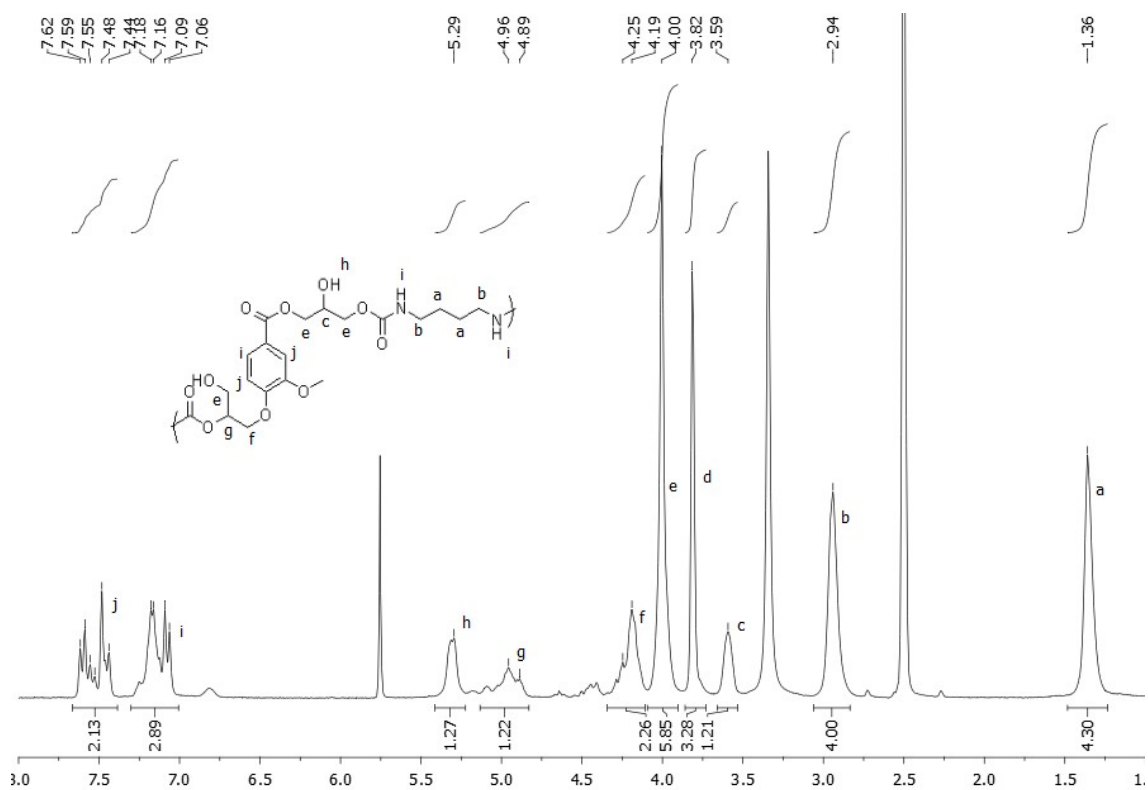


Figure S33. ^1H NMR spectrum of NIPU 16 (300 MHz, 298 K, DMSO).

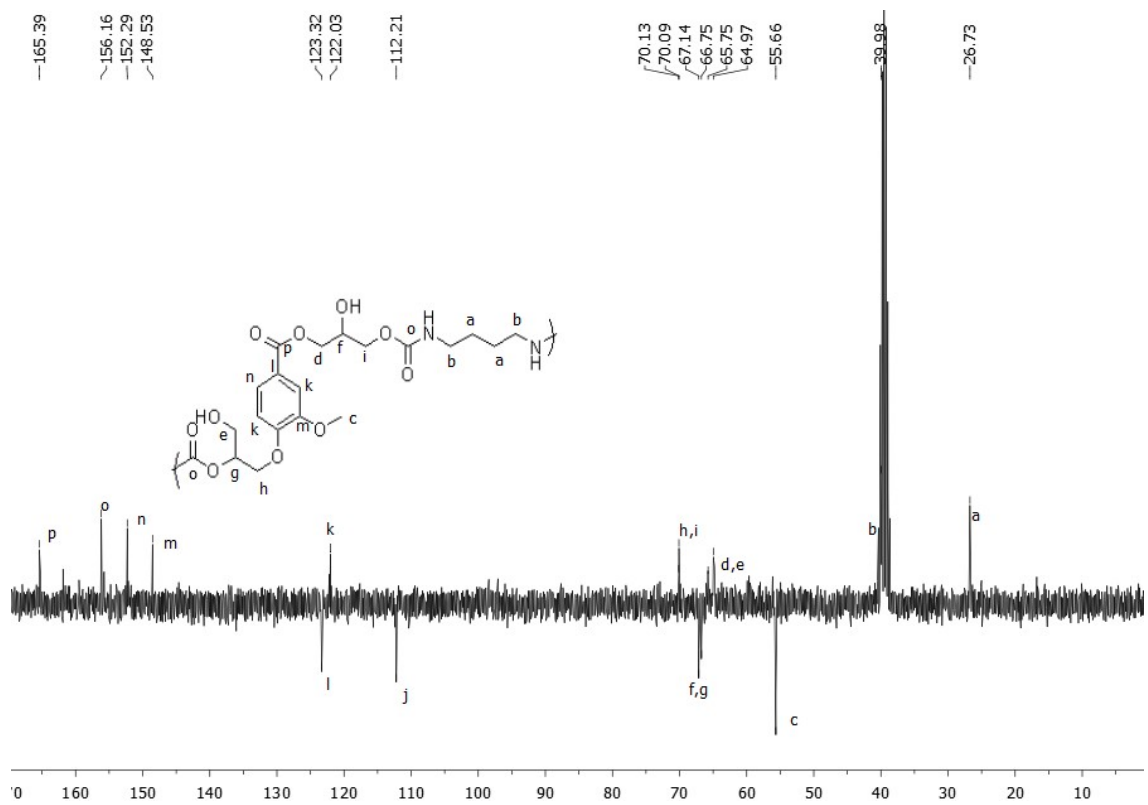


Figure S34. ^{13}C APT NMR spectrum of NIPU 16 (75 MHz, 298 K, DMSO).

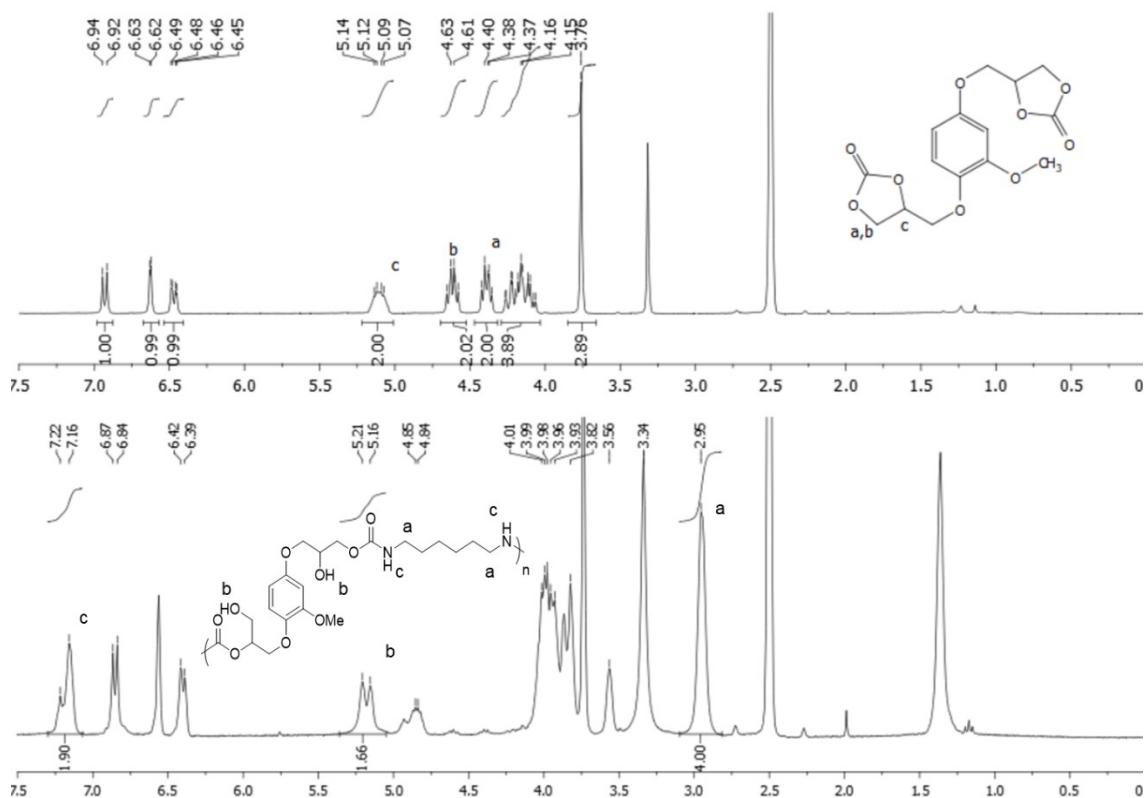


Figure S35. ¹H NMR spectrum of hydroquinone-based bis-carbonate (9) (top) and the resultant hydroquinone-based NIPHU (13) (bottom) by reaction of 9 and HDMA in DMSO at 80 °C for 24 h (300 MHz, 298 K, DMSO).

FTIR spectra

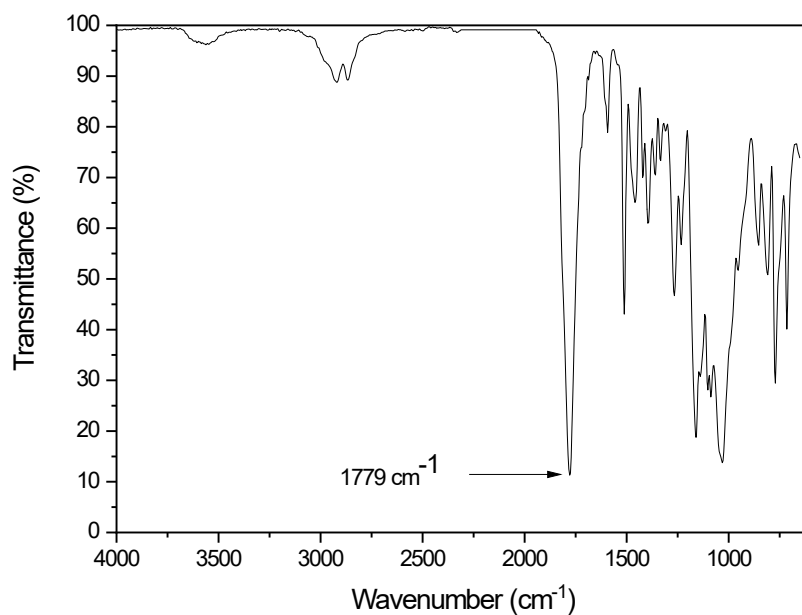


Figure S36. FT-IR spectrum of 8.

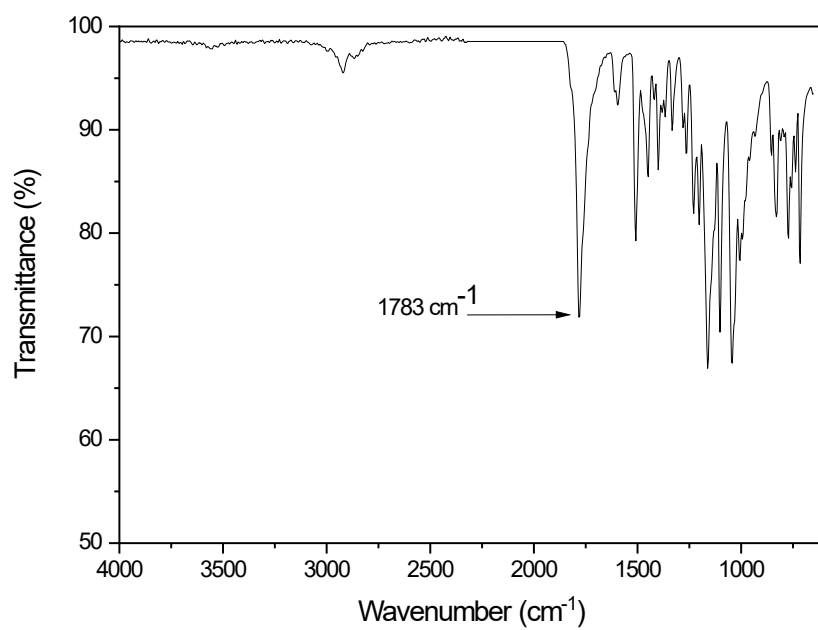


Figure S37. FT-IR spectrum of **9**.

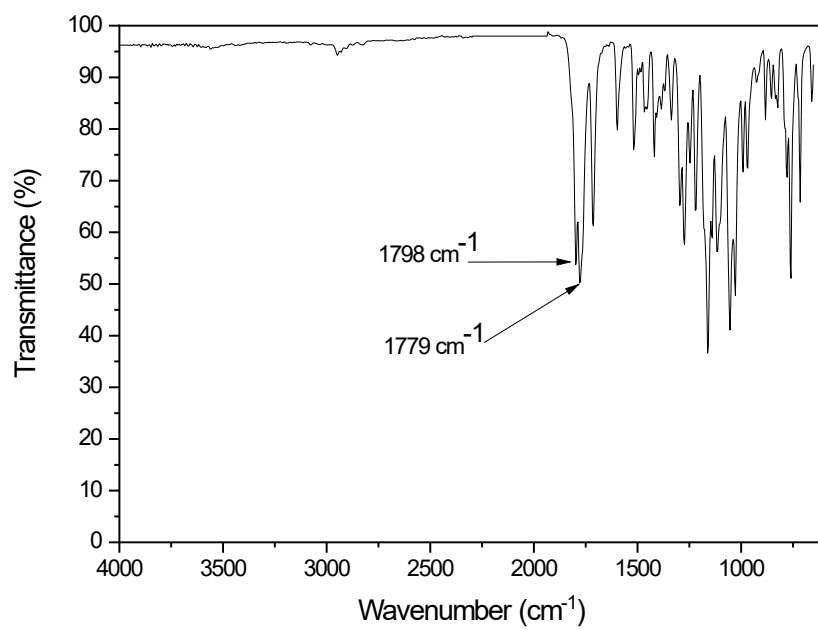


Figure S38. FT-IR spectrum of **10**.

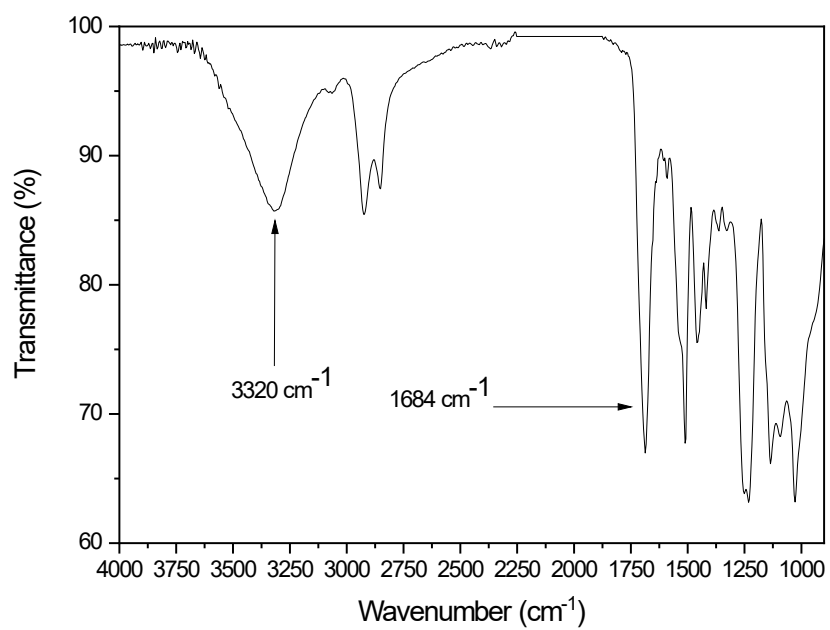


Figure S39. FT-IR spectrum of PHU 11.

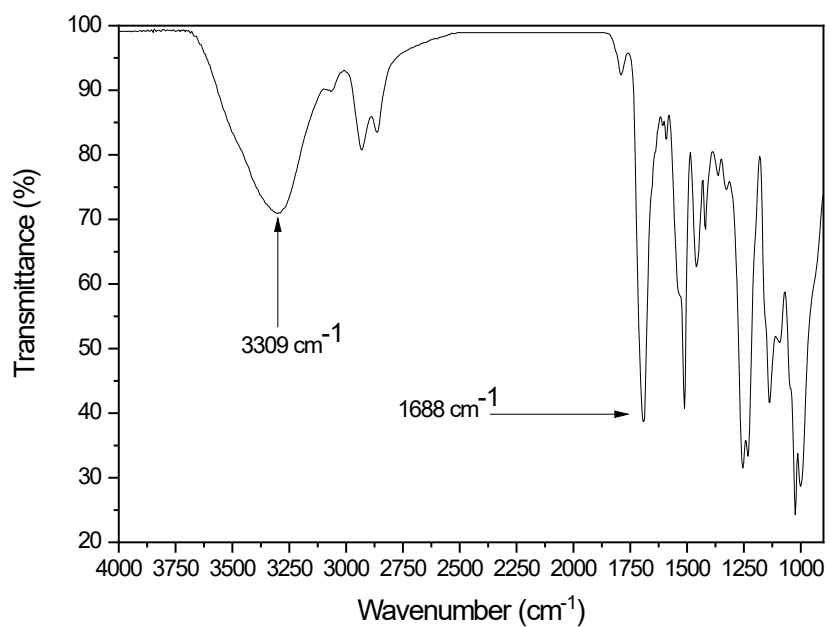


Figure S40. FT-IR spectrum of PHU 12.

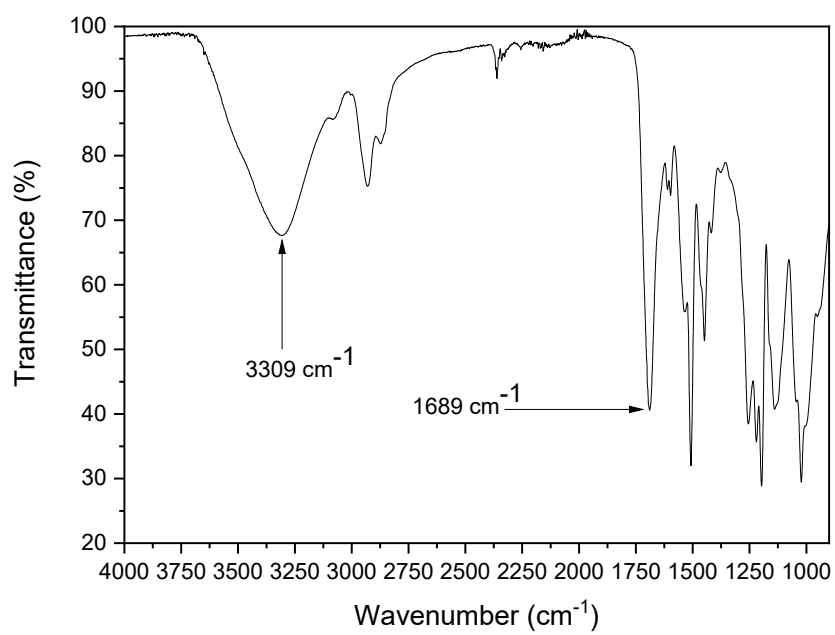


Figure S41. FT-IR spectrum of PHU 14.

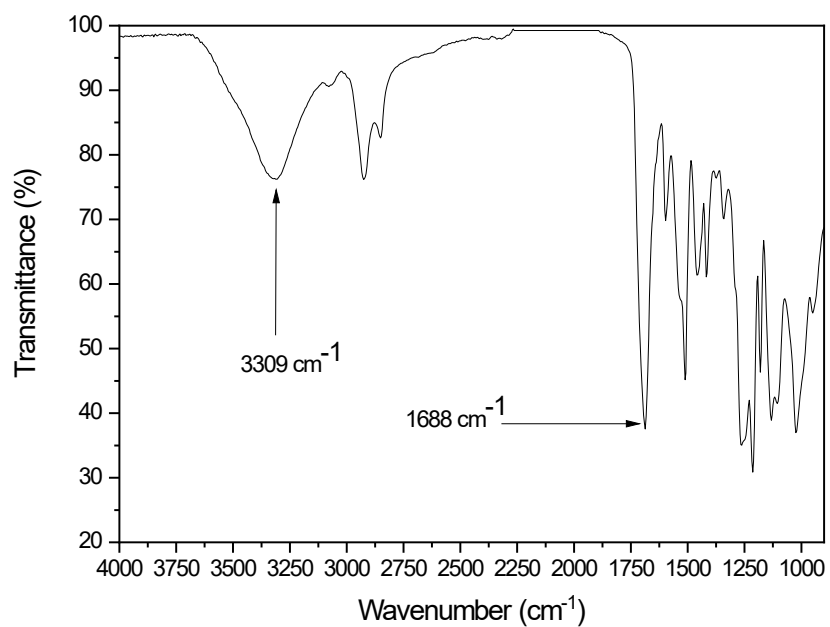


Figure S42. FT-IR spectrum of PHU 15.

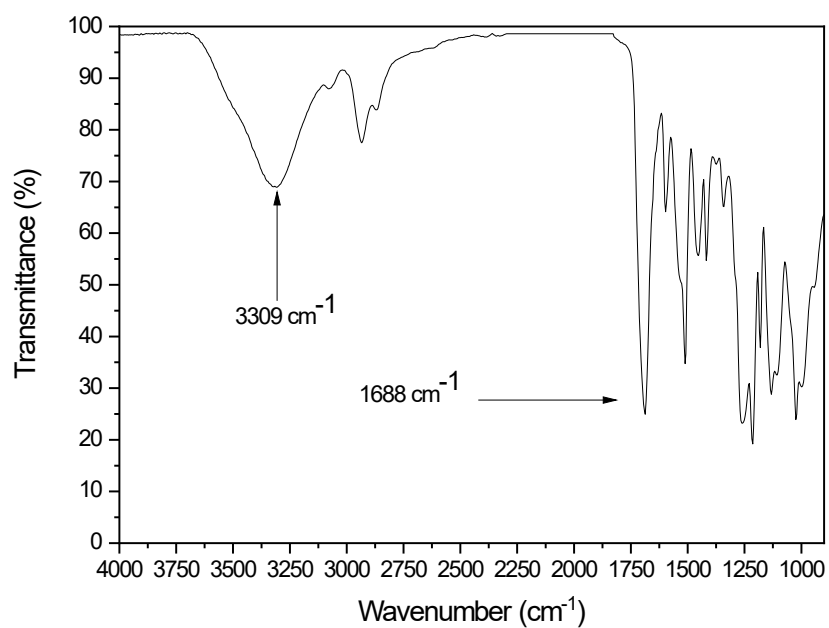


Figure S43. FT-IR spectrum of PHU 16.

References

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2. M. Fache, E. Darroman, V. Besse, R. Auvergne, S. Caillol and B. Boutevin, *Green Chem.*, 2014, **16**, 1987-1998.
3. Z. Lu, C. Hu, J. Guo, J. Li, Y. Cui and Y. Jia, *Org Lett*, 2010, **12**, 480-483.