

Electronic Supporting Information

Highly efficient one-pot synthesis of COS-based block copolymers by using organic Lewis pairs

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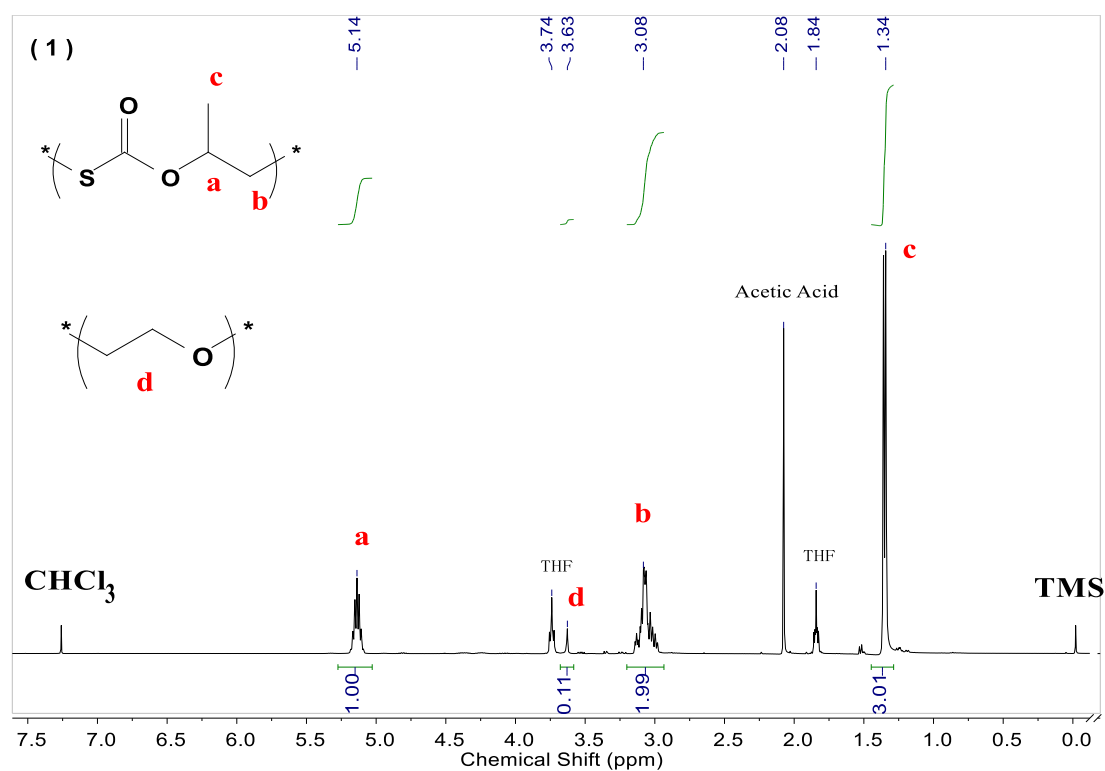
Catalogue

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Typical NMR Spectra

Typical NMR spectra are presented here to give a comprehensive information. Figures S1-S12 are the NMR spectra corresponded to entries 1-12 in Table 1 respectively. TEB and DTMeAB were used as Lewis pair in the presence of chain transfer agents (MPEG750 and PEG2000) with various feeding ratio. Figures S13-S24 reported the effects of different factors (entries 1-11 in Table 2). Figure S25-S30 are the results of block copolymers from several kinds of Lewis pairs.

Spectra of results listed in Table 1.



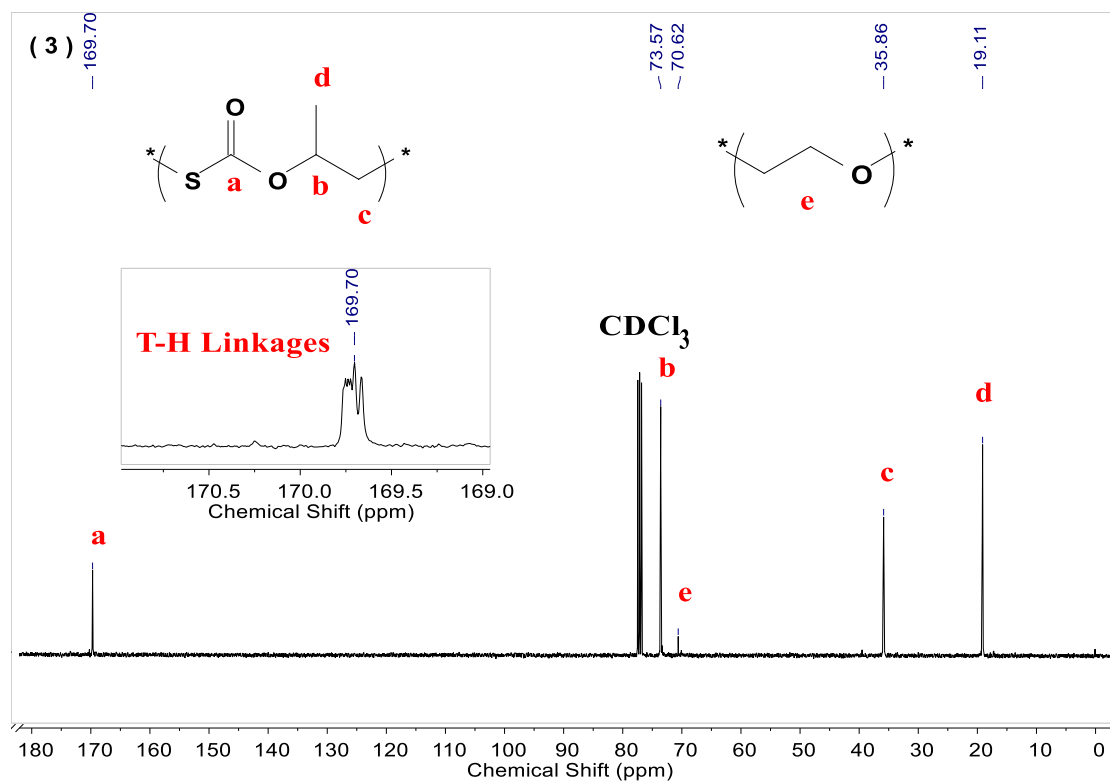
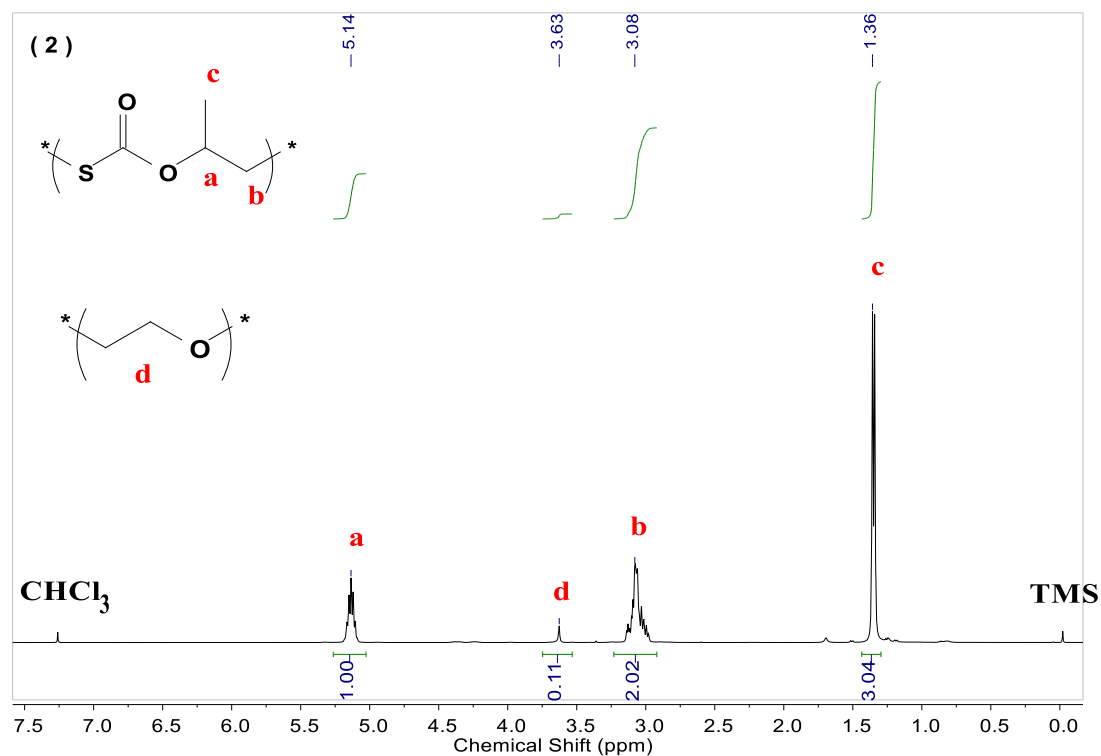
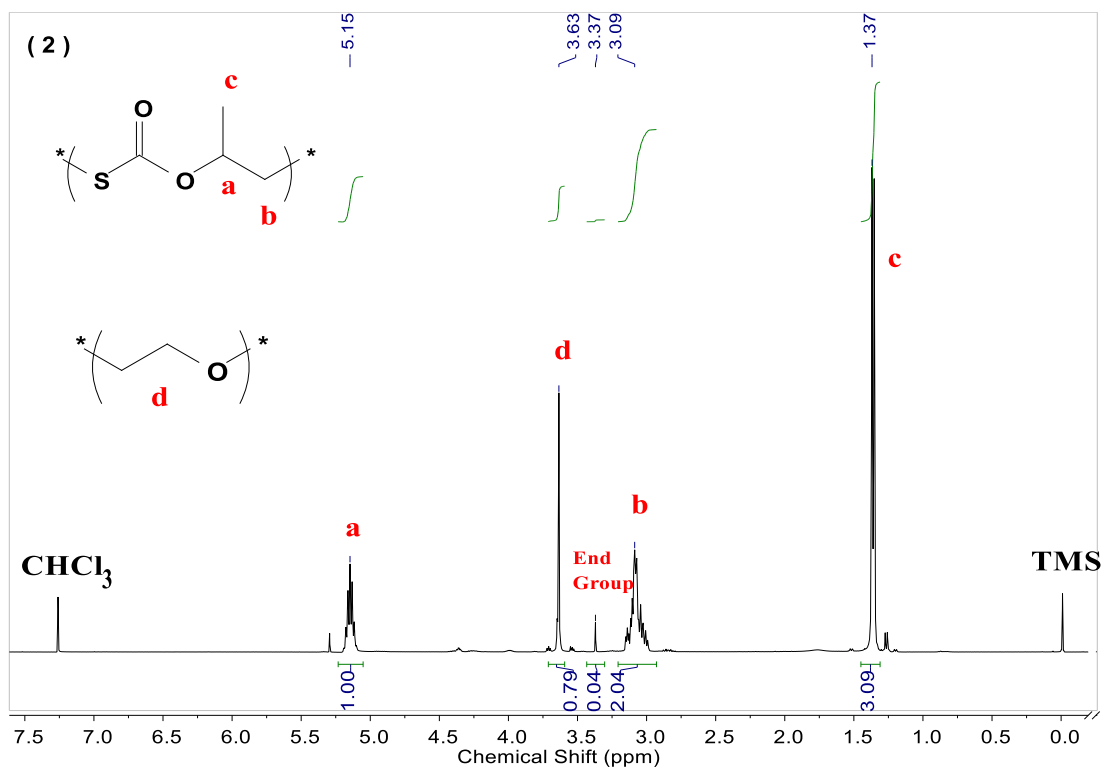
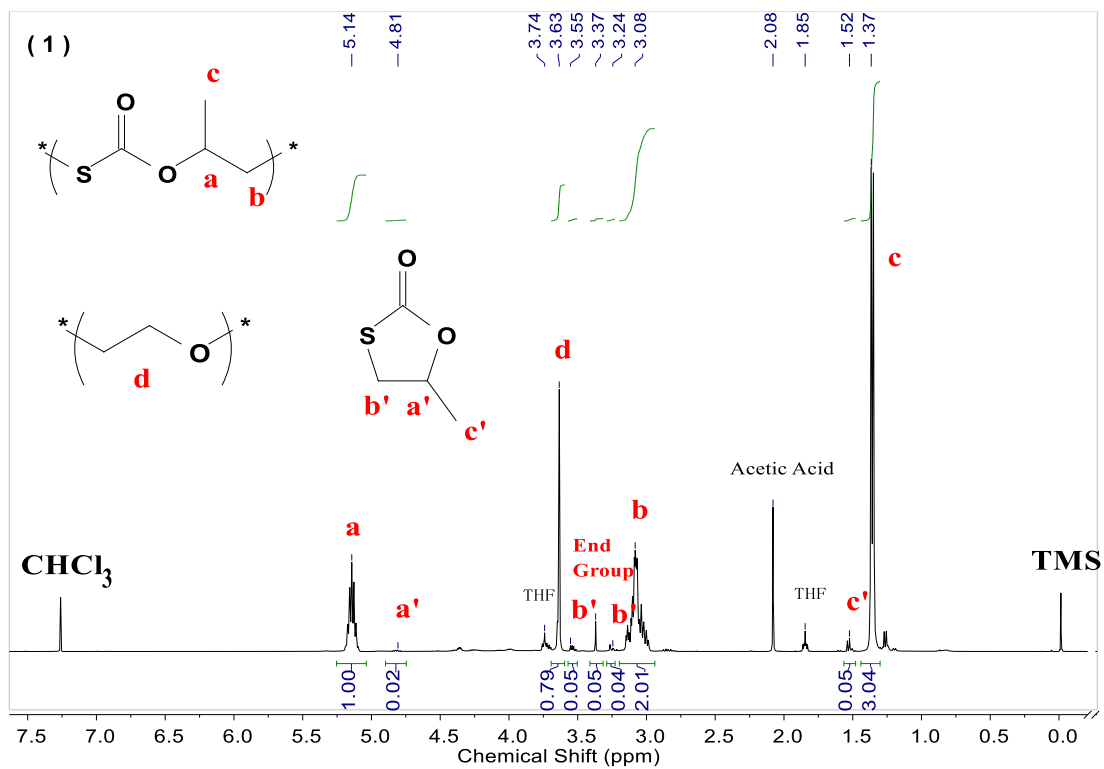


Figure S1. (1) ^1H NMR spectrum of the crude product of entry 1, Table 1; (2) ^1H NMR spectrum of the purified product of entry 1, Table 1; (3) ^{13}C NMR spectrum of the purified product of entry 1, Table 1.



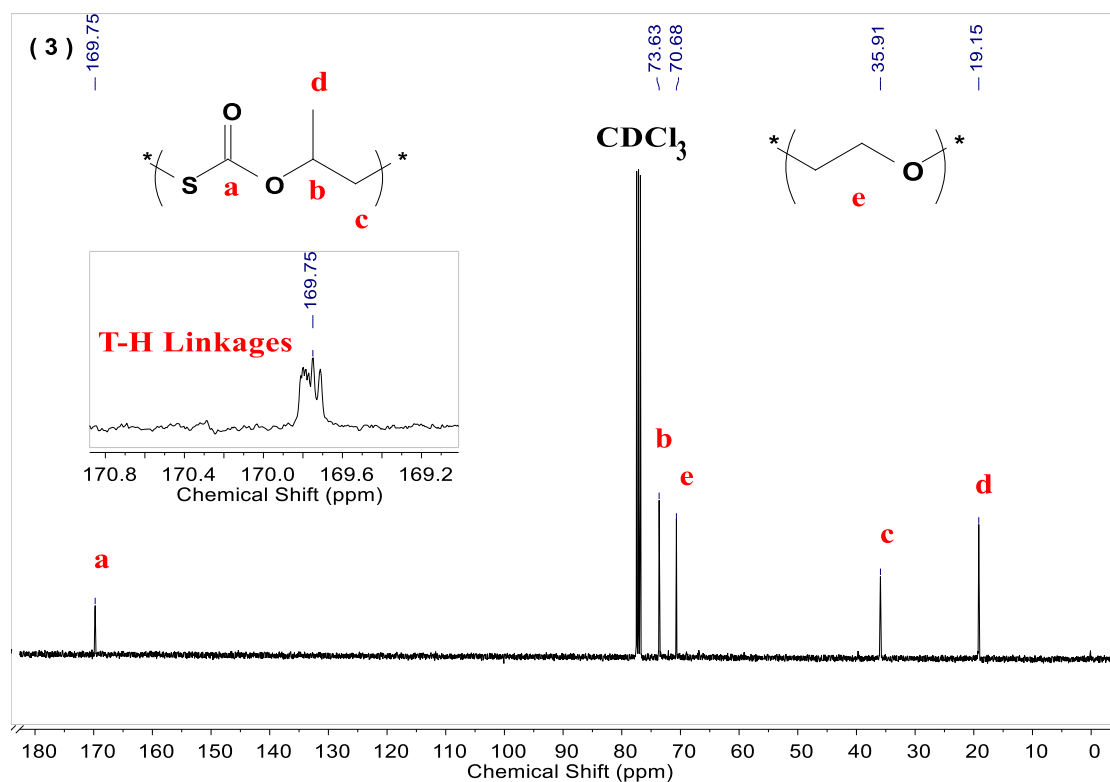
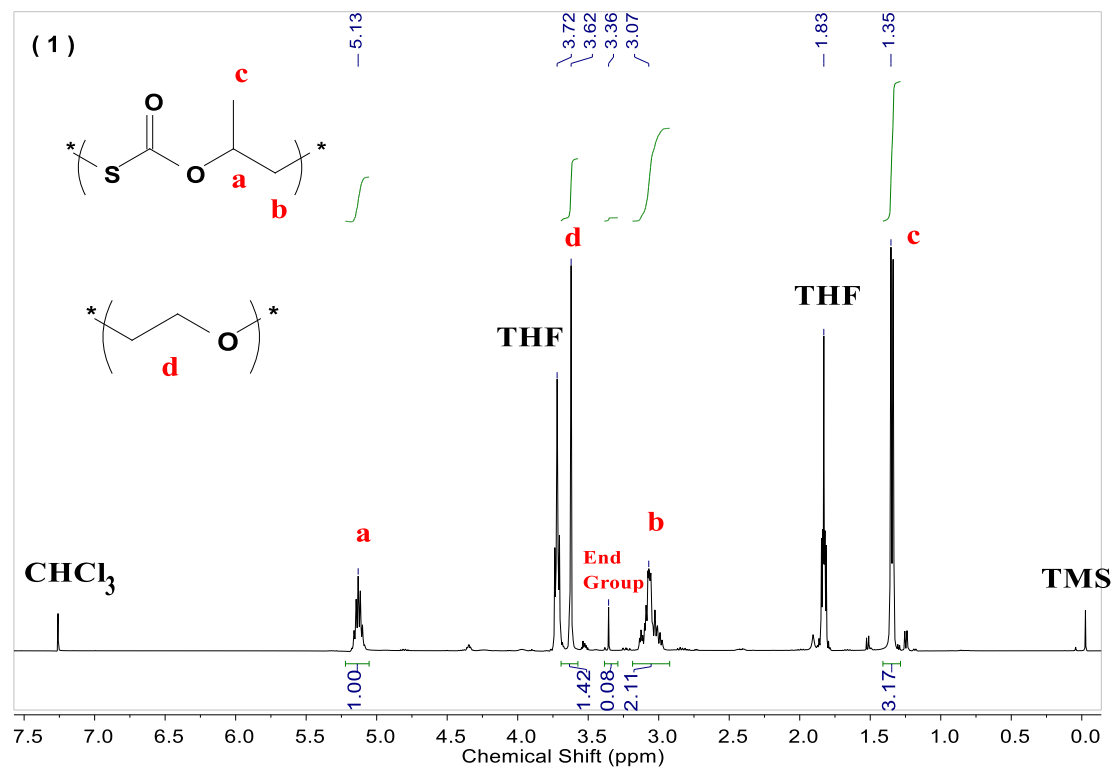


Figure S2. (1) ¹H NMR spectrum of the crude product of entry 2, Table 1; (2) ¹H NMR spectrum of the purified product of entry 2, Table 1; (3) ¹³C NMR spectrum of the purified product of entry 2, Table 1.



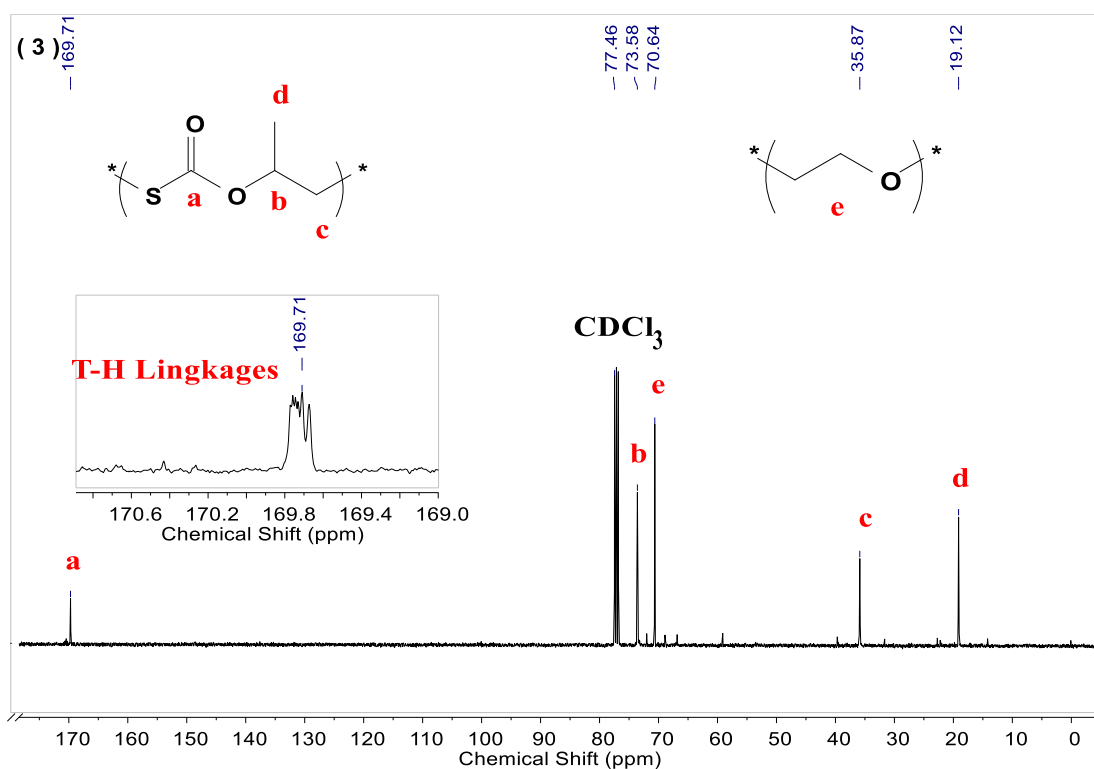
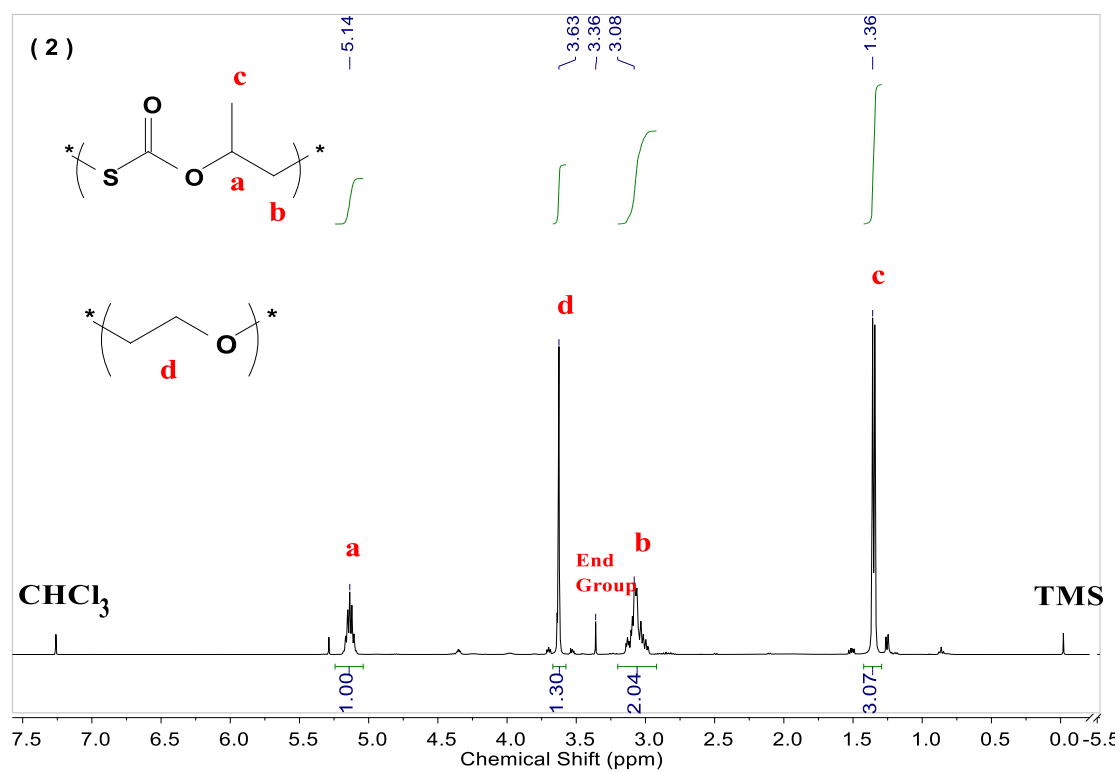
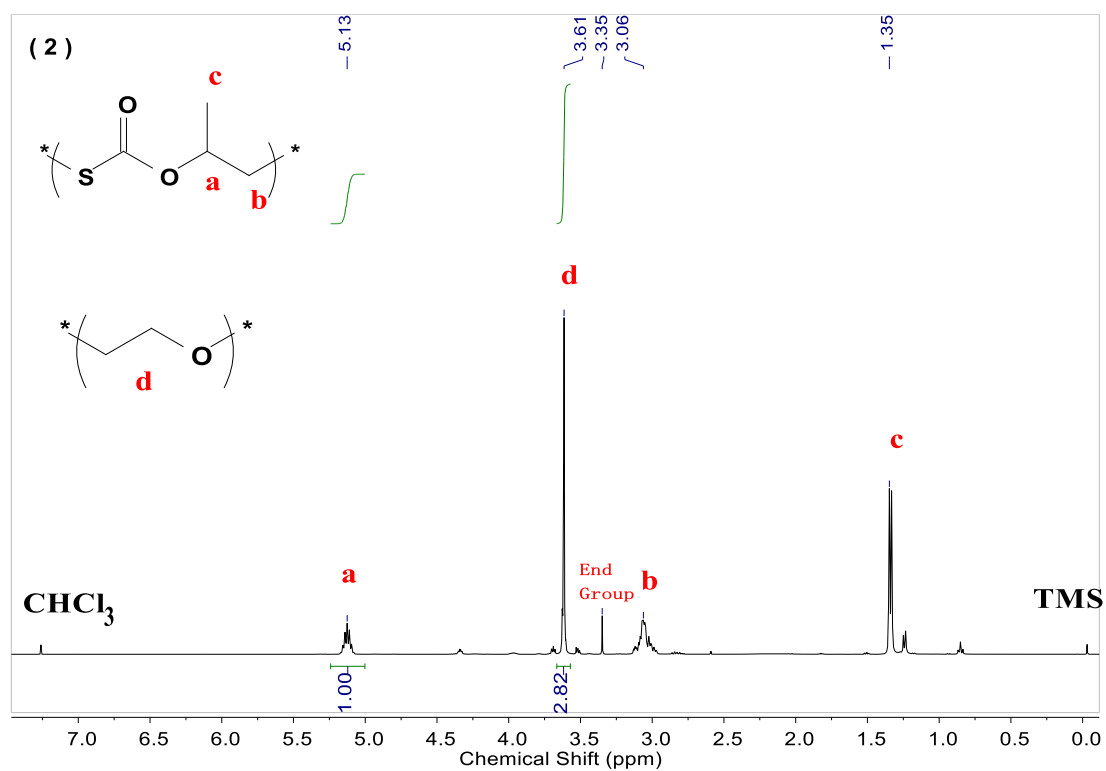
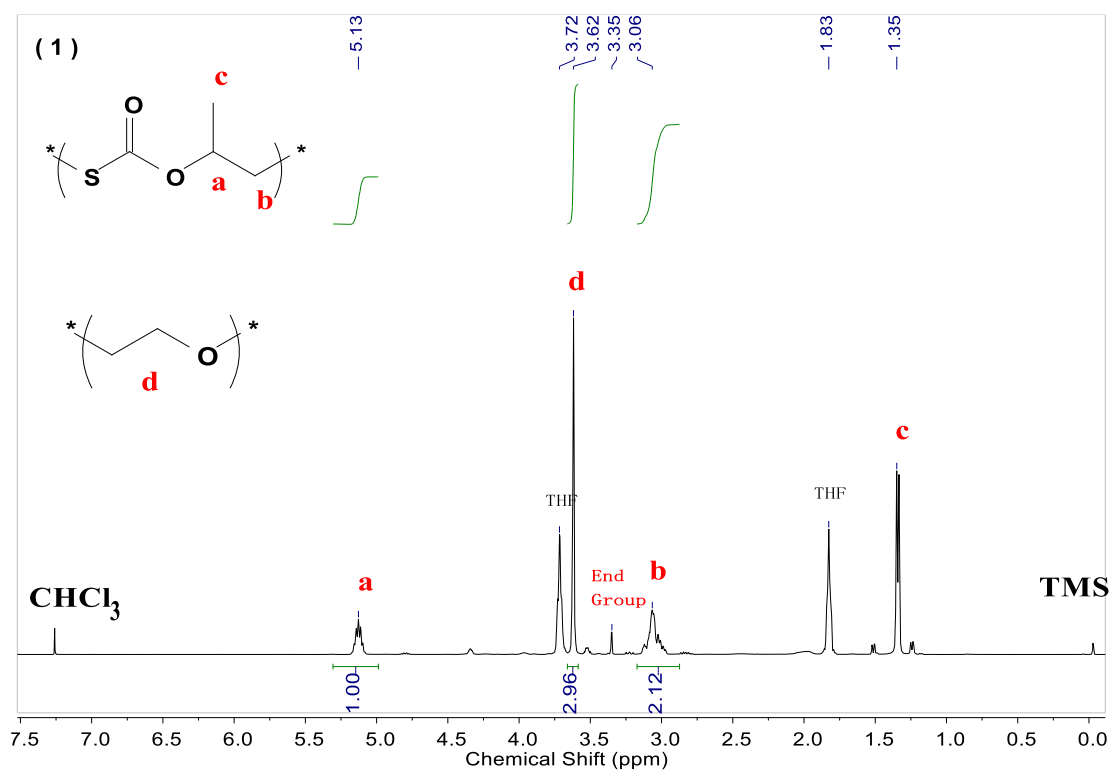


Figure S3. (1) ^1H NMR spectrum of the crude product of entry 3, Table 1; (2) ^1H NMR spectrum of the purified product of entry 3, Table 1; (3) ^{13}C NMR spectrum of the purified product of entry 3, Table 1.



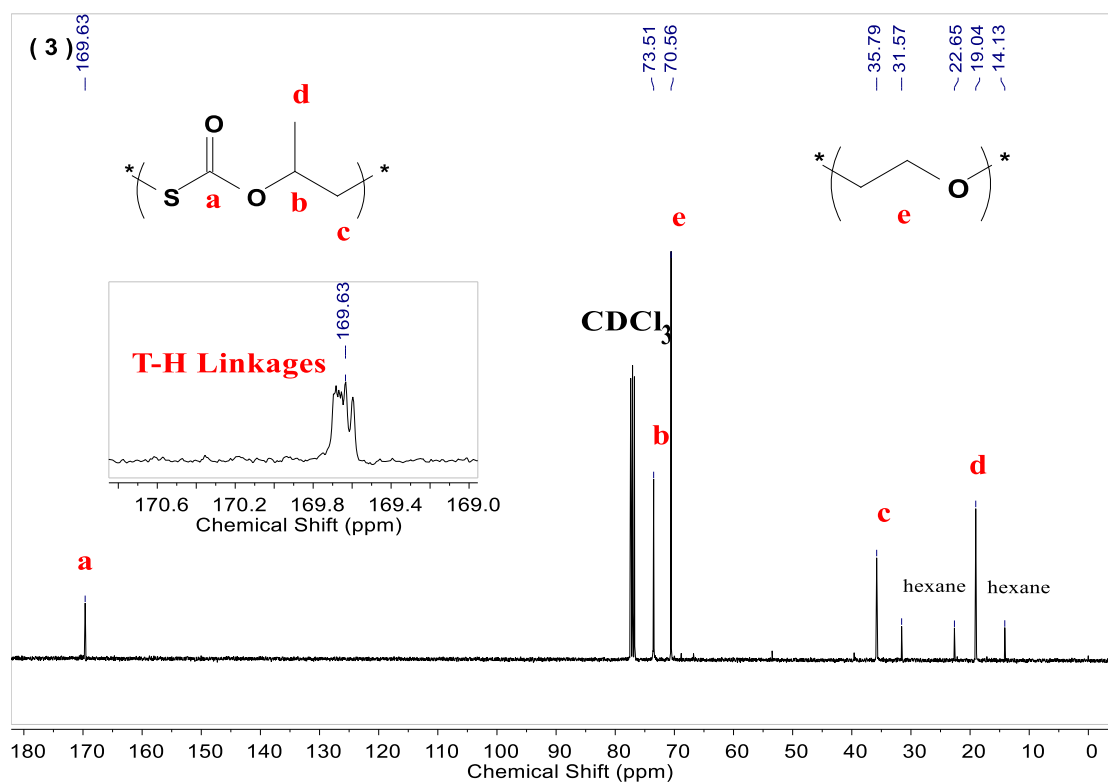
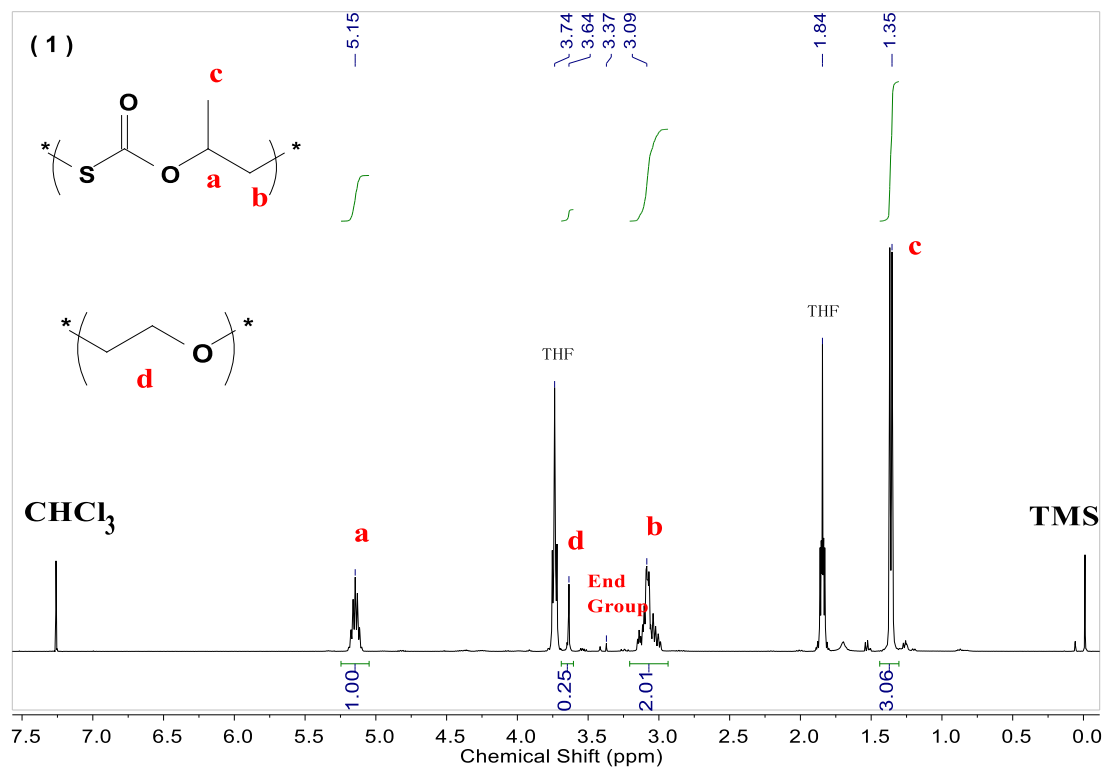


Figure S4. (1) ^1H NMR spectrum of the crude product of entry 4, Table 1; (2) ^1H NMR spectrum of the purified product of entry 4, Table 1; (3) ^{13}C NMR spectrum of the purified product of entry 4, Table 1.



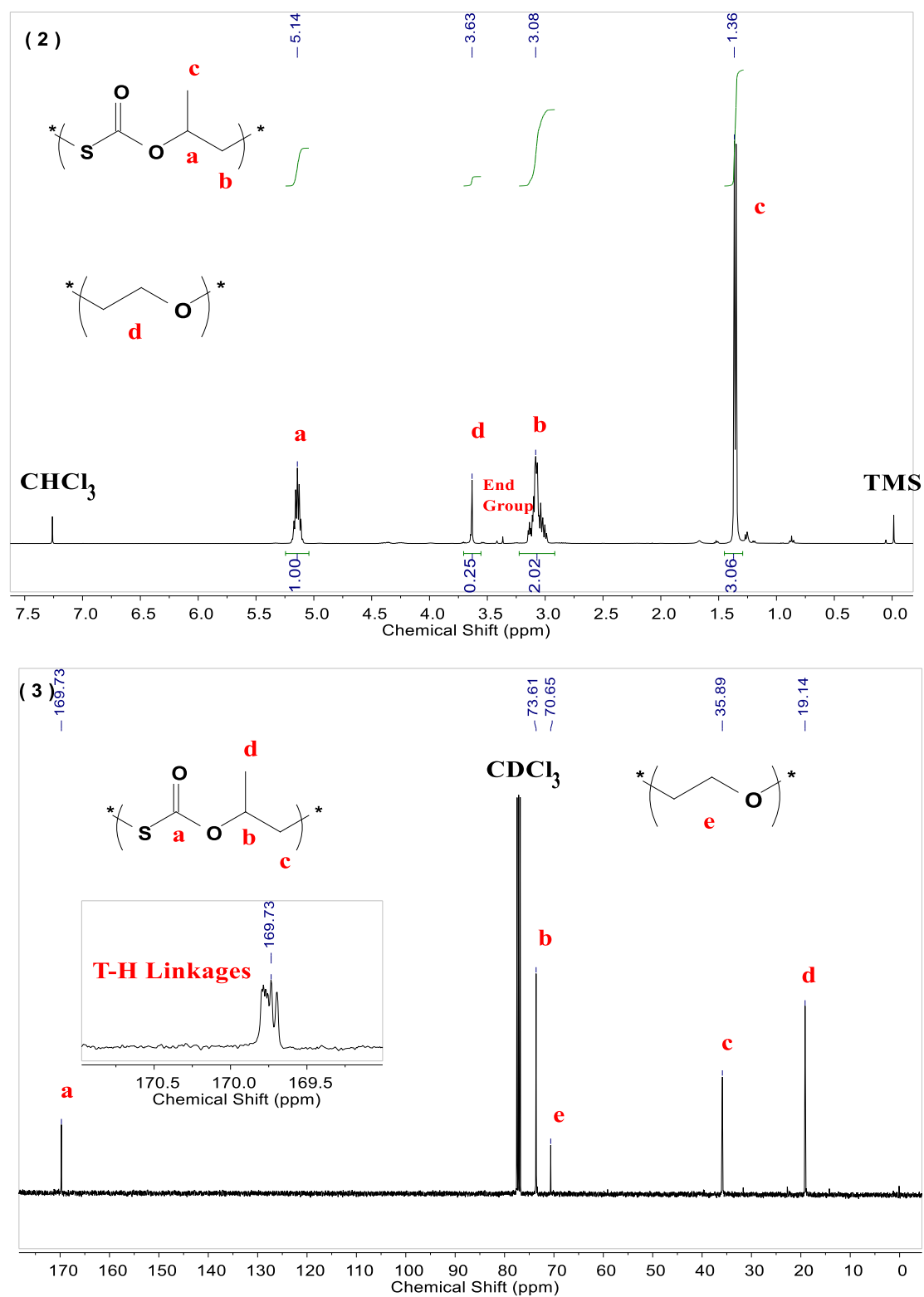
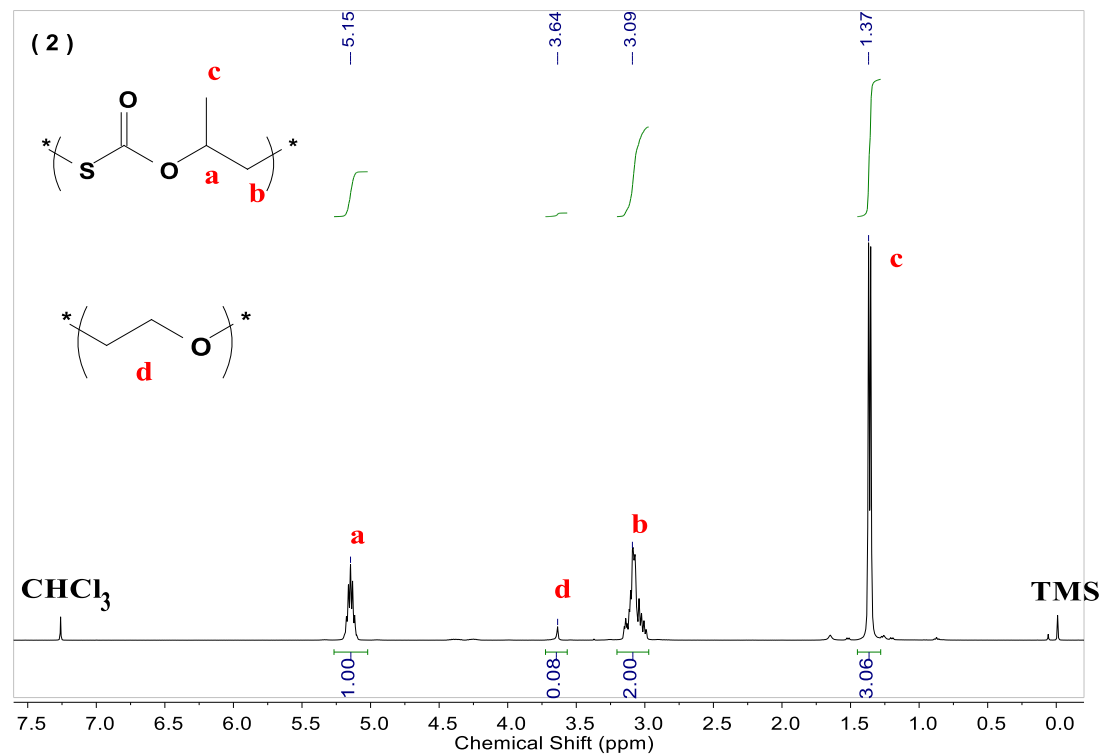
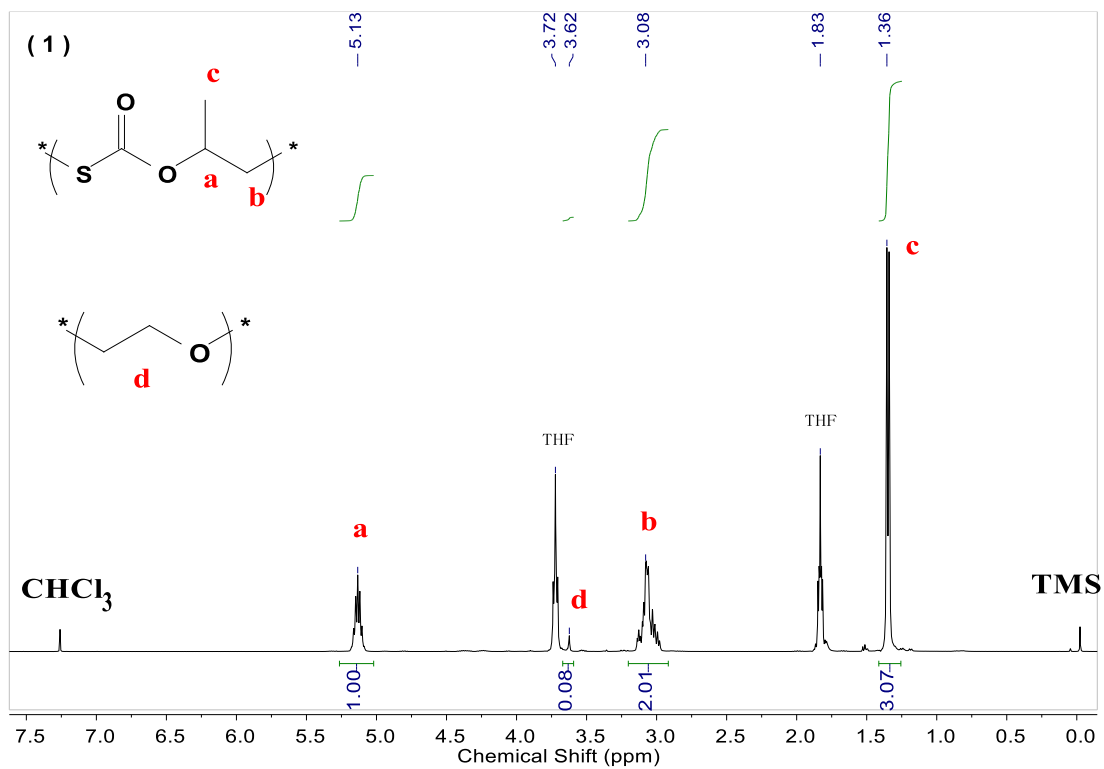


Figure S5. (1) ^1H NMR spectrum of the crude product of entry 5, Table 1; (2) ^1H NMR spectrum of the purified product of entry 5, Table 1; (3) ^{13}C NMR spectrum of the purified product of entry 5, Table 1.



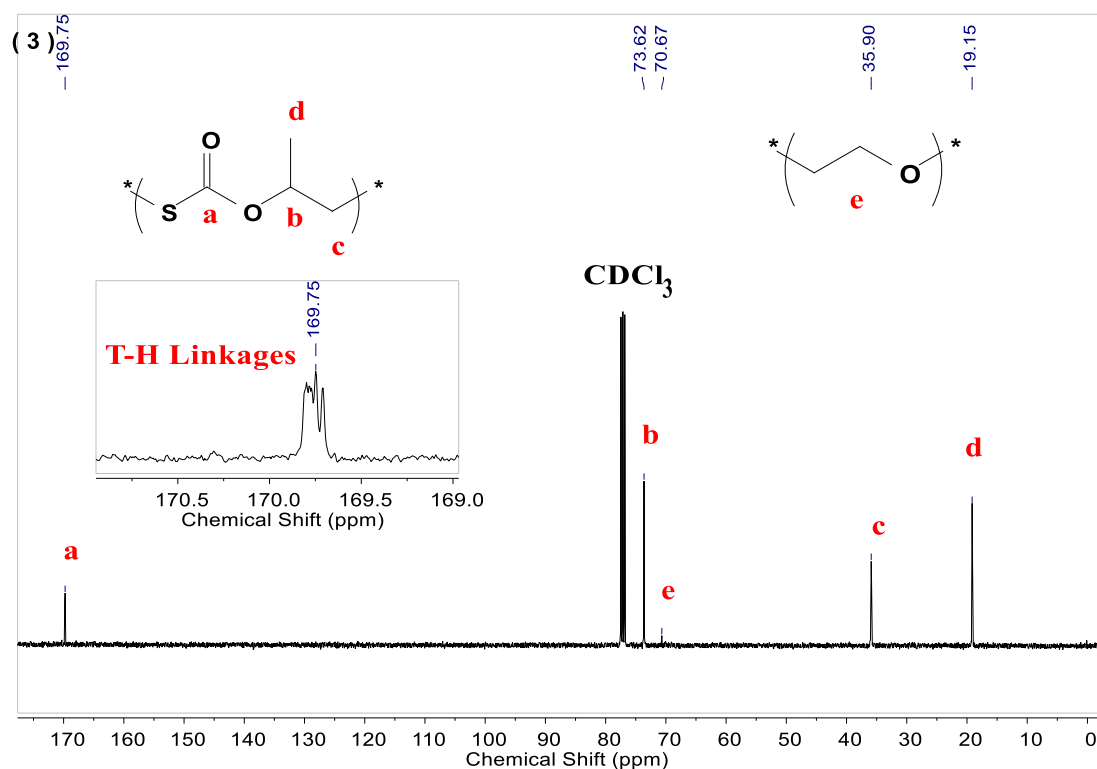
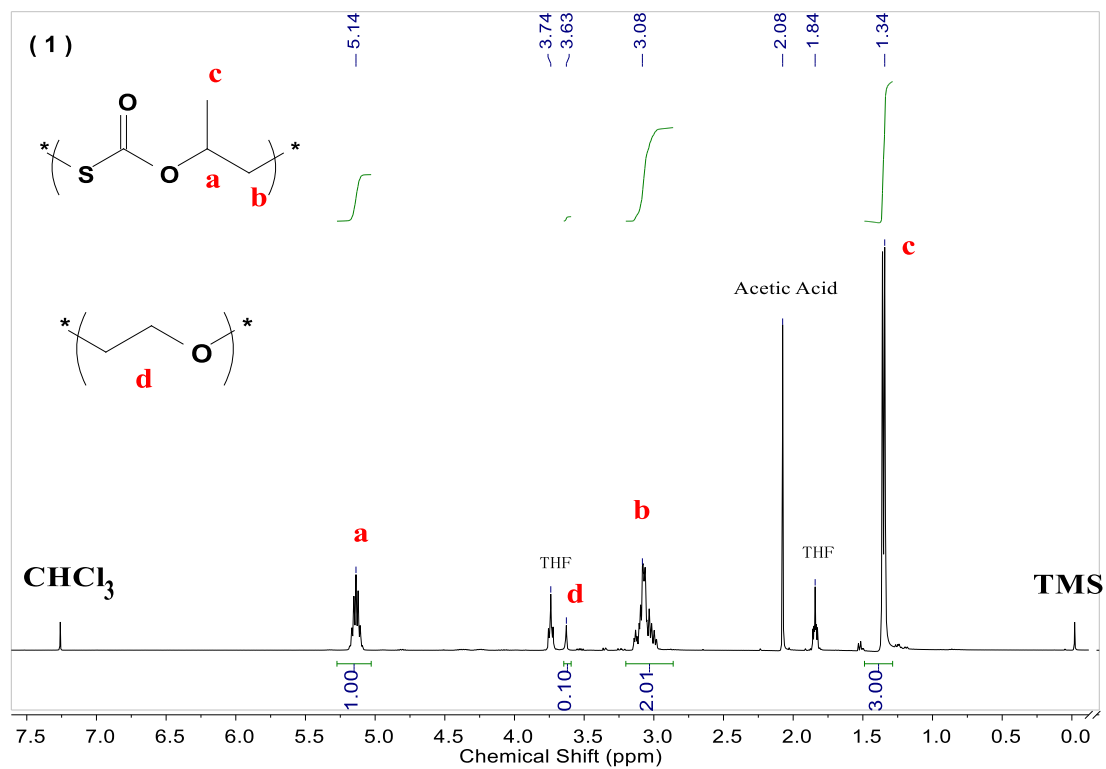


Figure S6. (1) ¹H NMR spectrum of the crude product of entry 6, Table 1; (2) ¹H NMR spectrum of the purified product of entry 6, Table 1; (3) ¹³C NMR spectrum of the purified product of entry 6, Table 1.



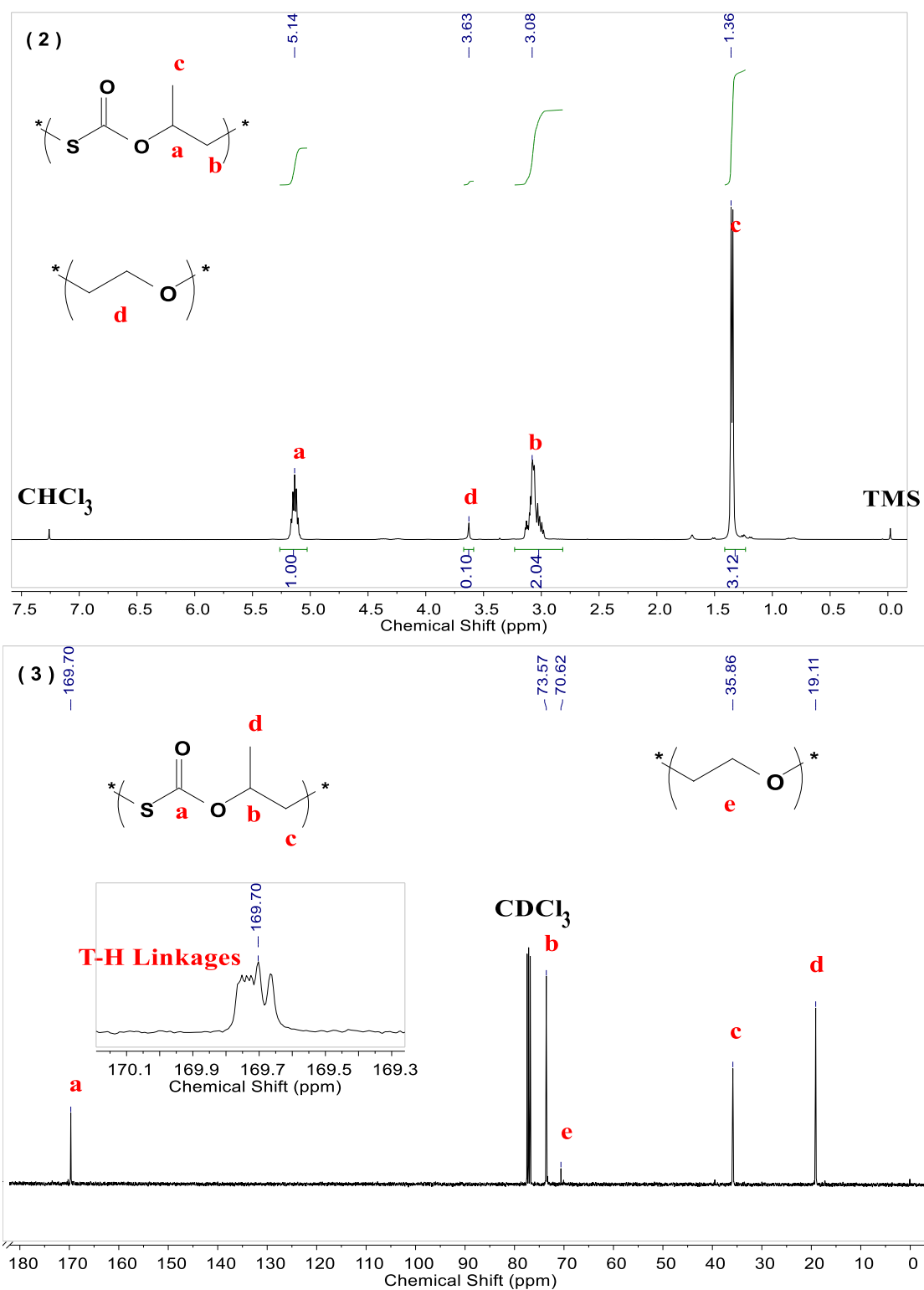
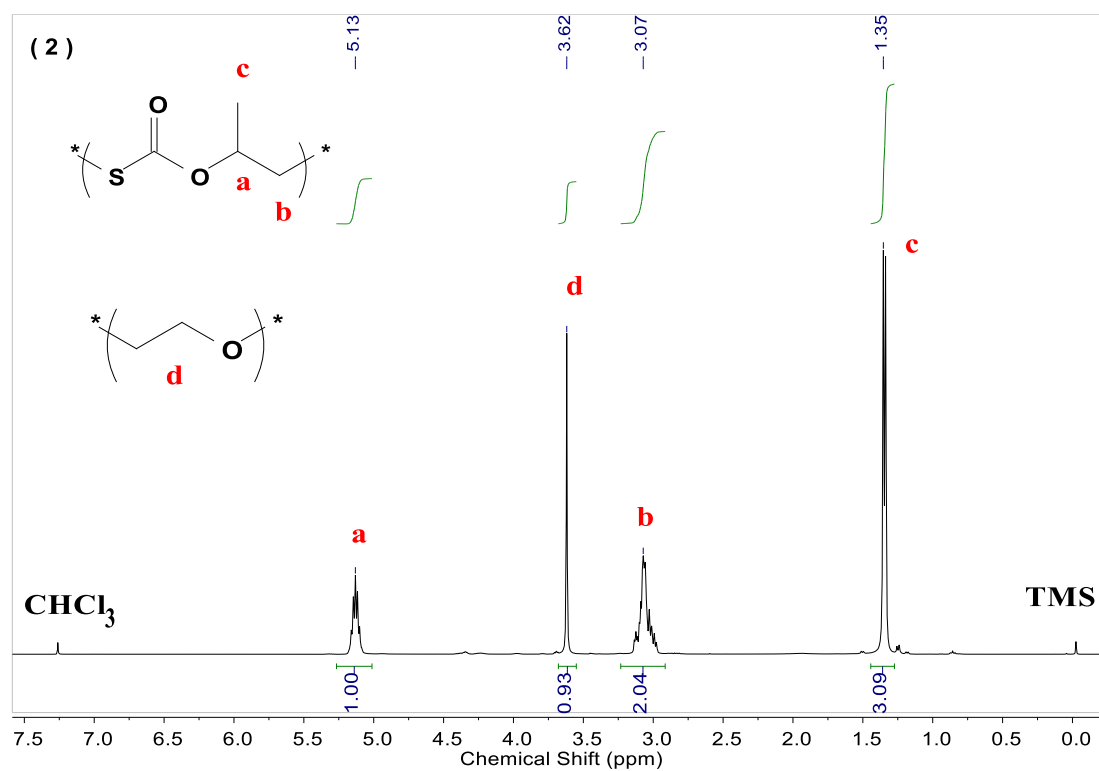
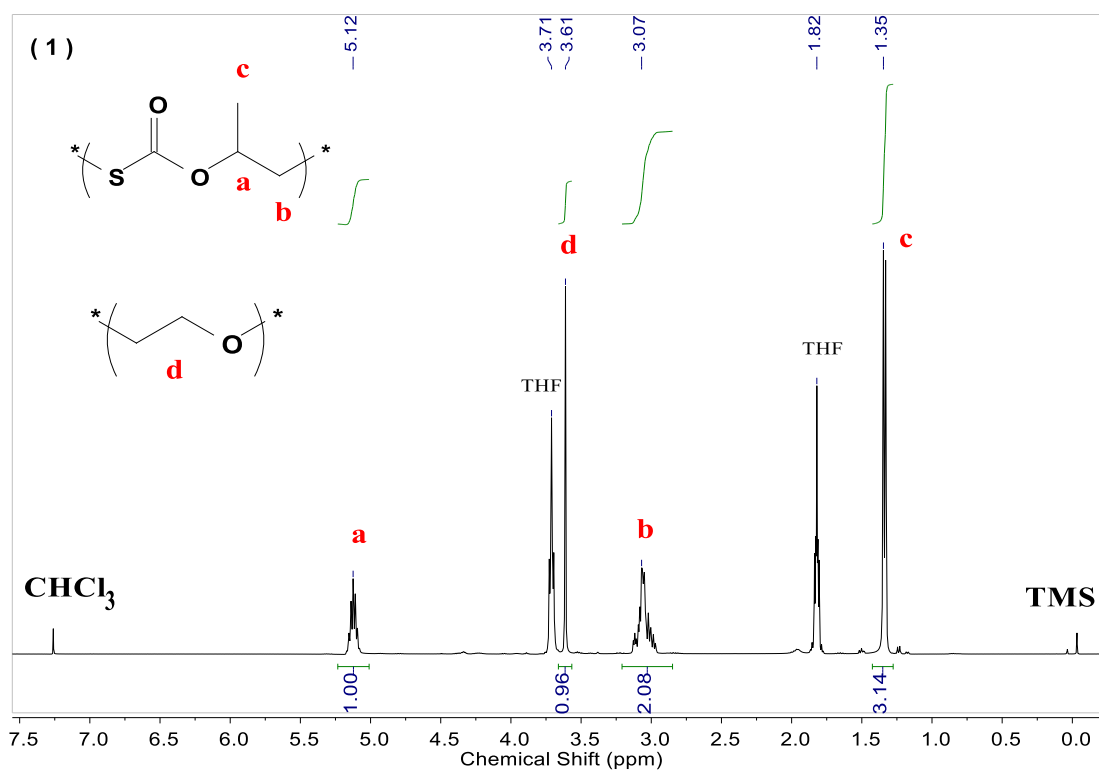


Figure S7. (1) ¹H NMR spectrum of the crude product of entry 7, Table 1; (2) ¹H NMR spectrum of the purified product of entry 7, Table 1; (3) ¹³C NMR spectrum of the purified product of entry 7, Table 1.



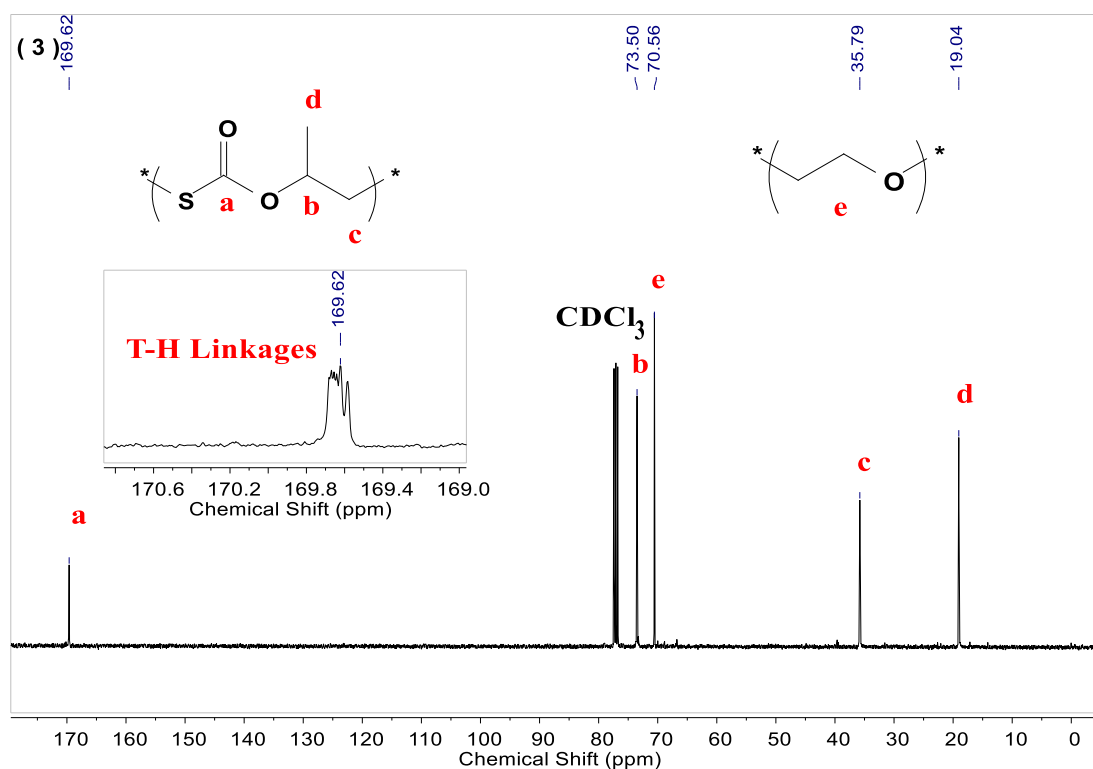
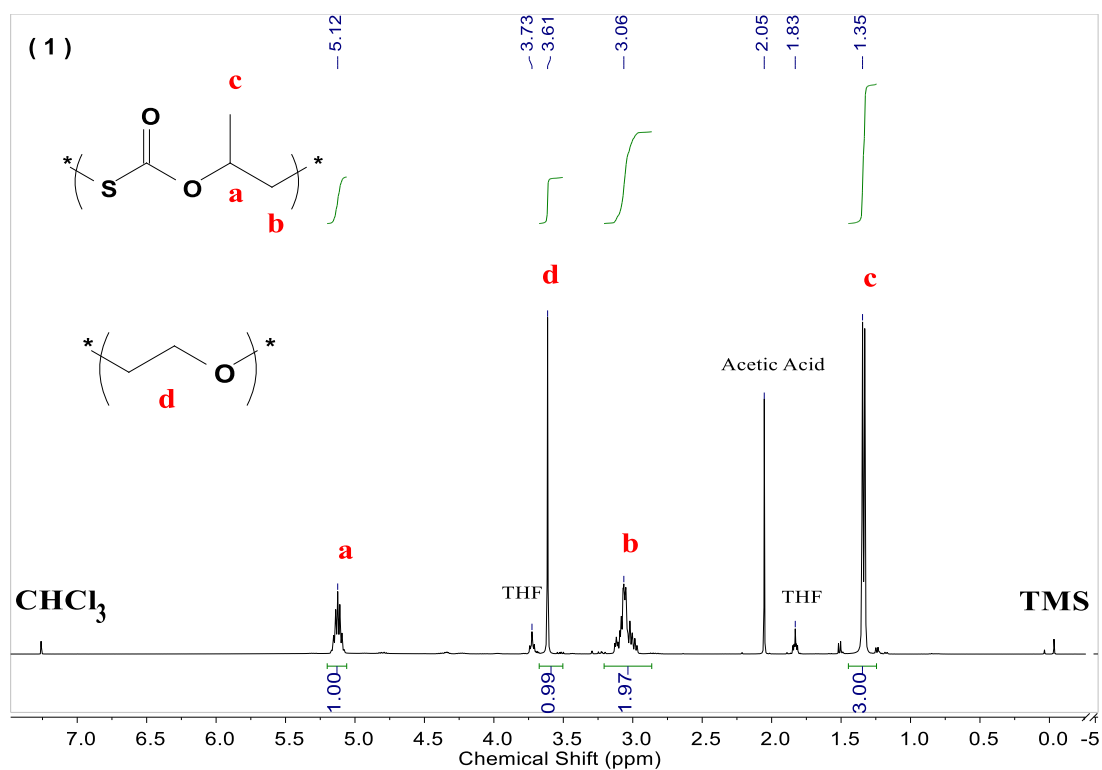


Figure S8. (1) ^1H NMR spectrum of the crude product of entry 8, Table 1; (2) ^1H NMR spectrum of the purified product of entry 8, Table 1; (3) ^{13}C NMR spectrum of the purified product of entry 8, Table 1.



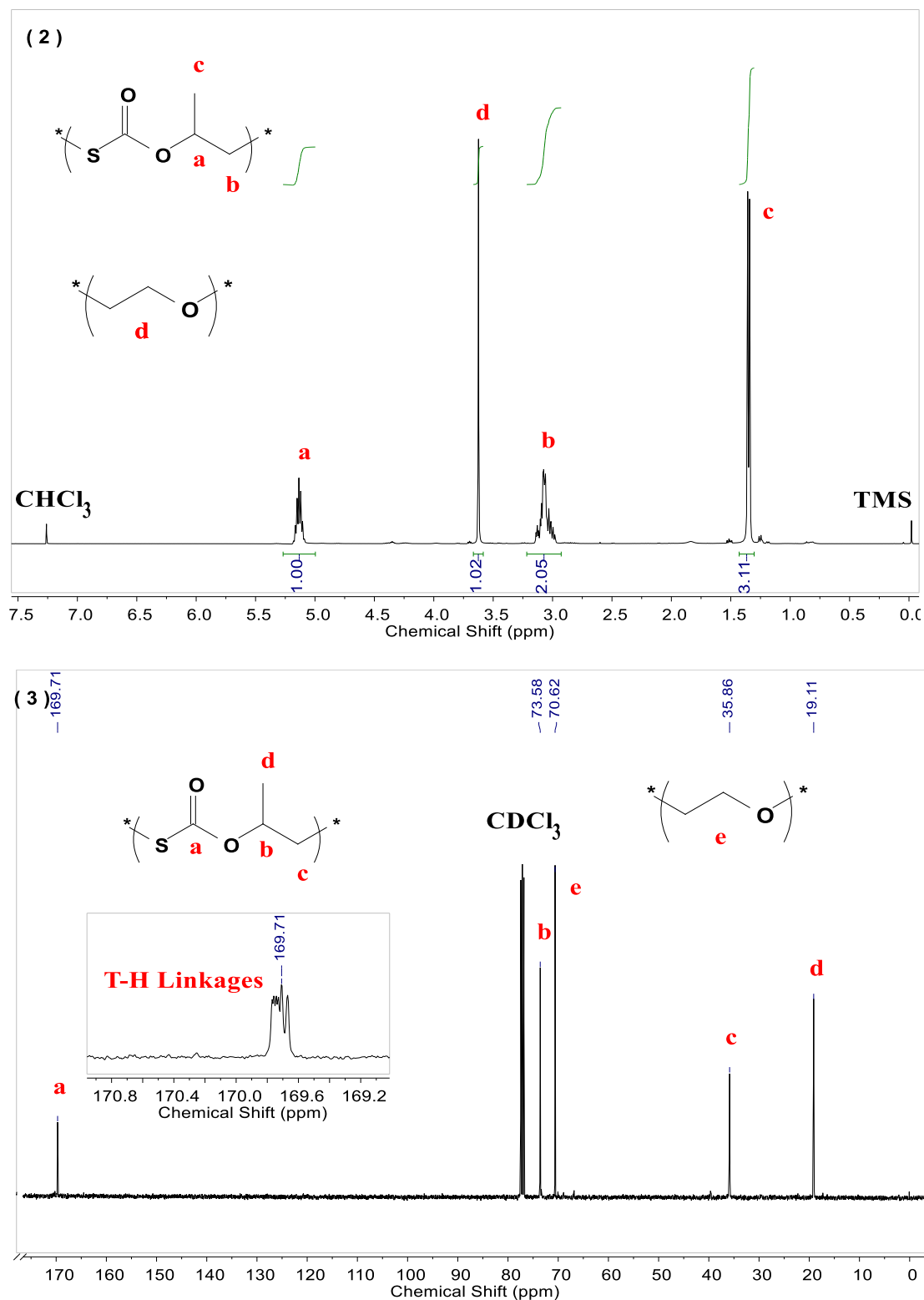
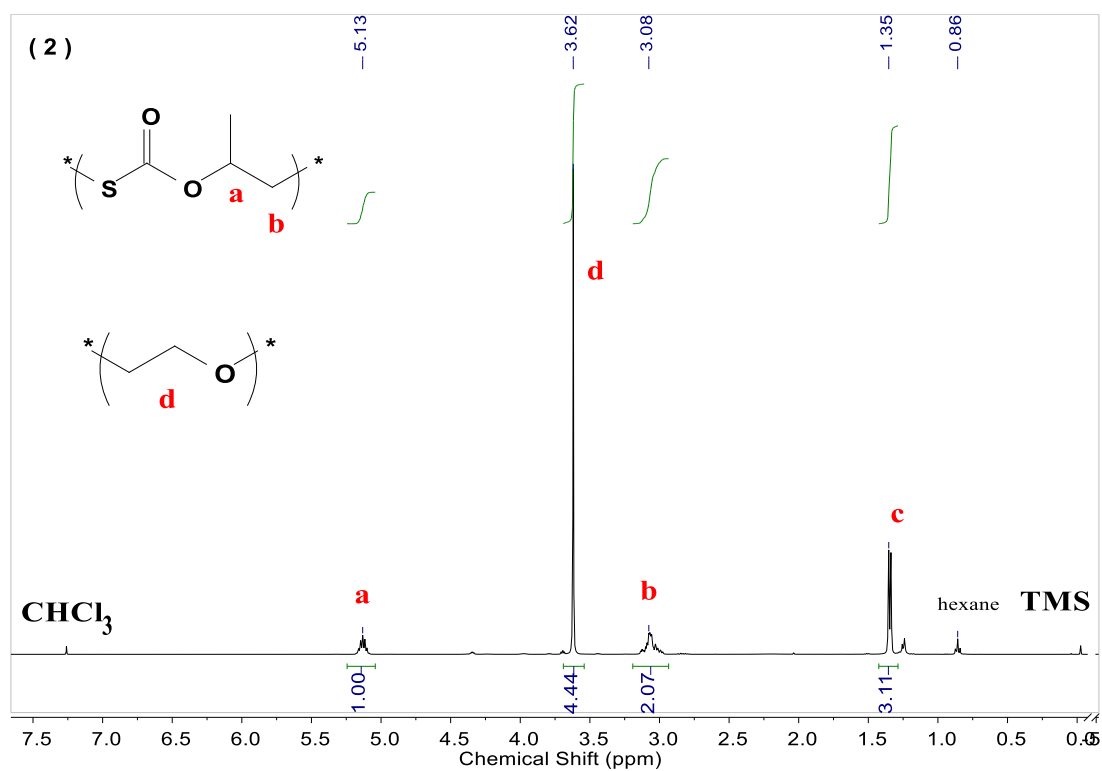
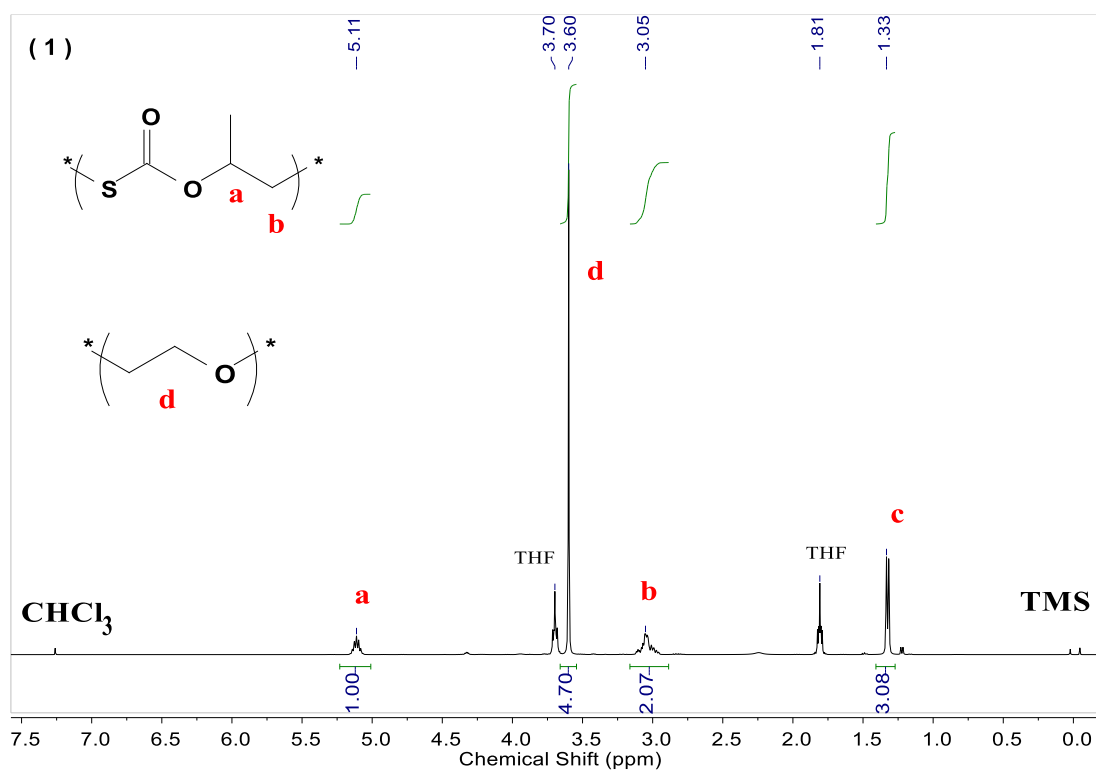


Figure S9. (1) ¹H NMR spectrum of the crude product of entry 9, Table 1; (2) ¹H NMR spectrum of the purified product of entry 9, Table 1; (3) ¹³C NMR spectrum of the purified product of entry 9, Table 1.



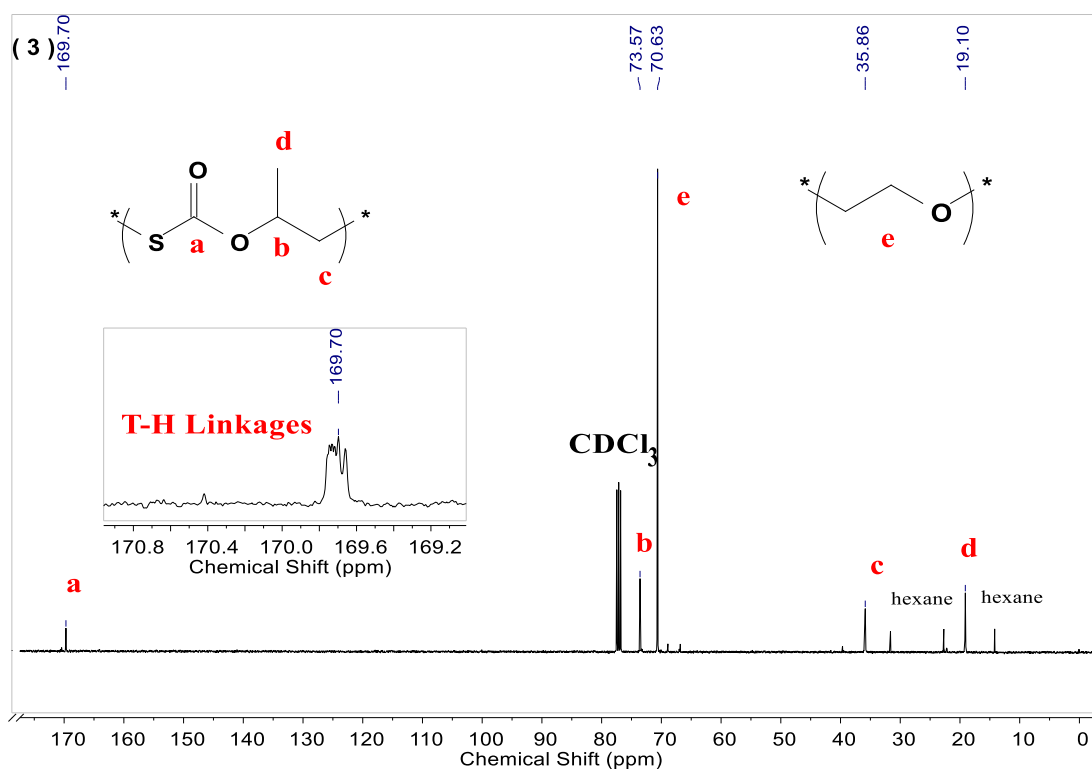
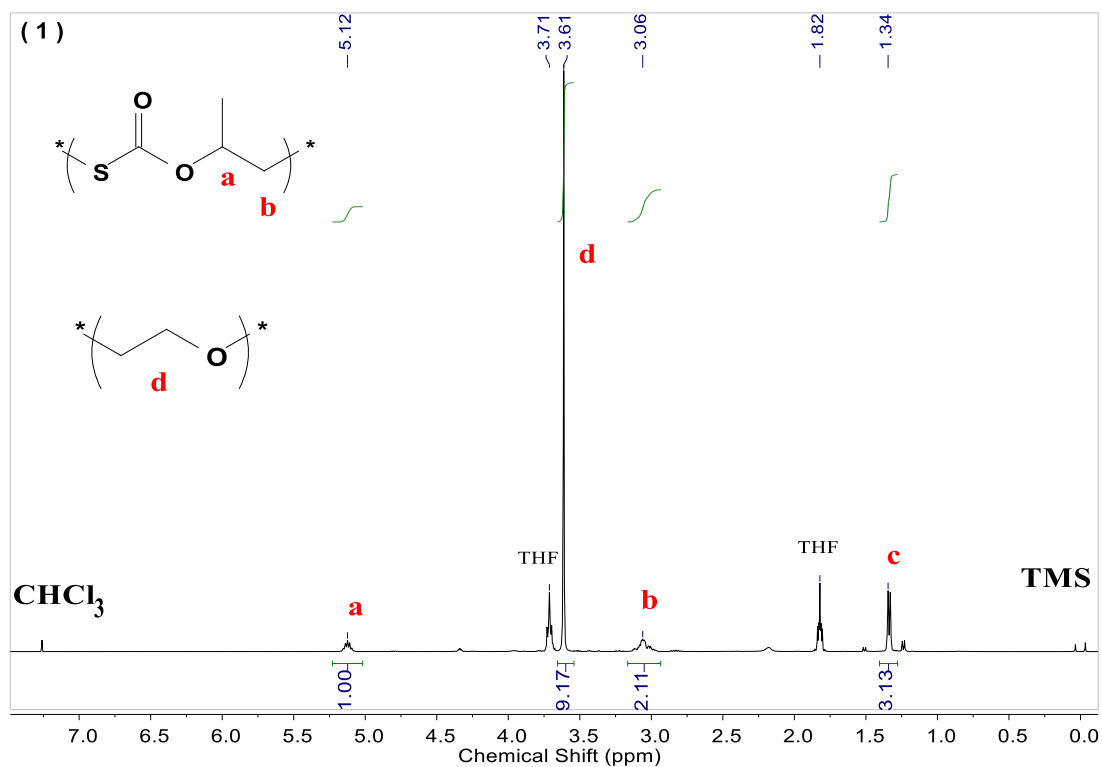


Figure S10. (1) ^1H NMR spectrum of the crude product of entry 10, Table 1; (2) ^1H NMR spectrum of the purified product of entry 10, Table 1; (3) ^{13}C NMR spectrum of the purified product of entry 10, Table 1.



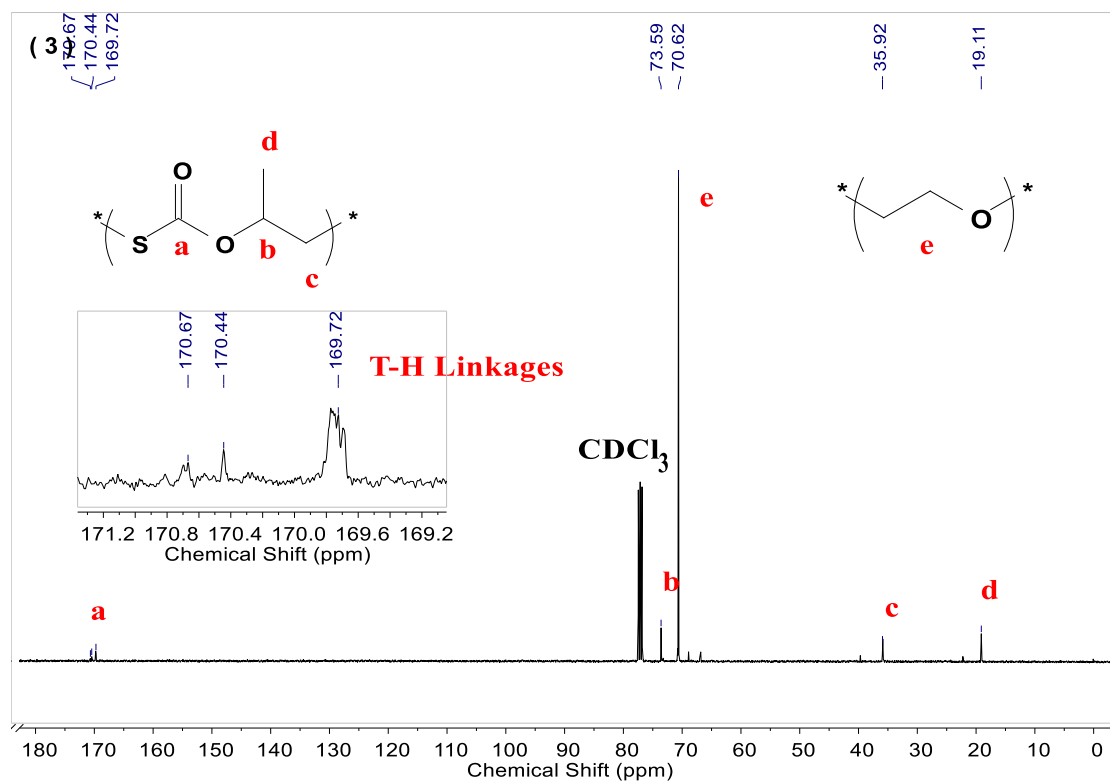
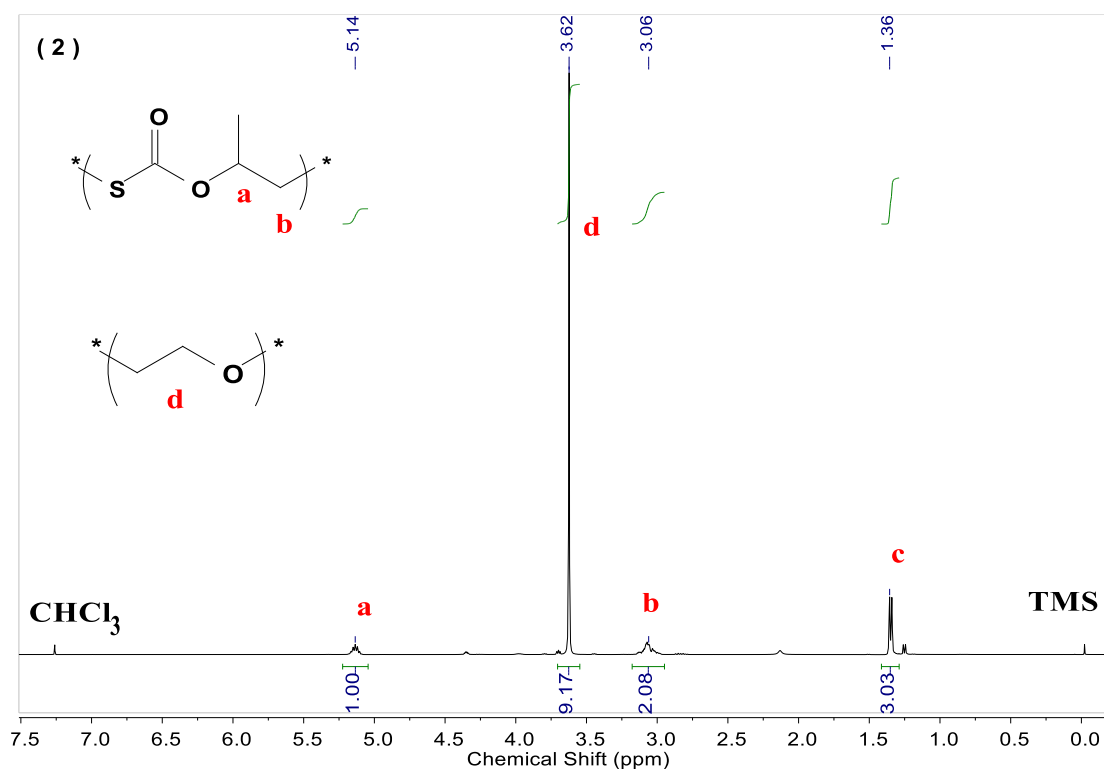
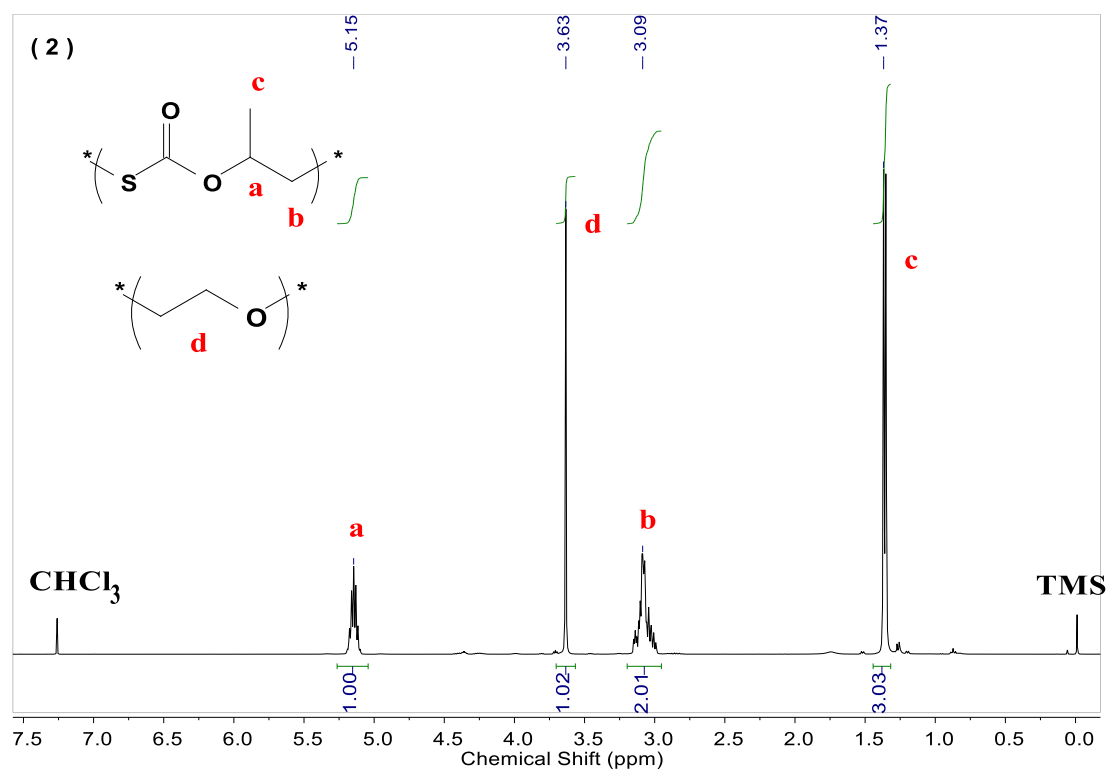
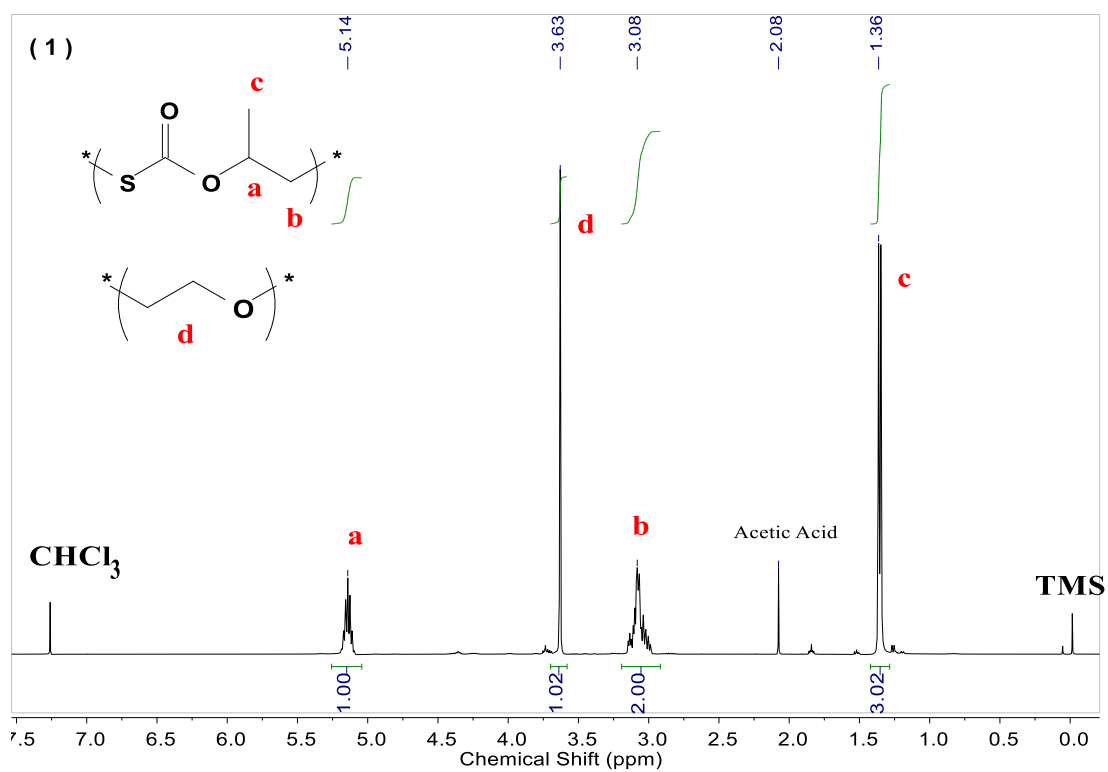


Figure S11. (1)¹H NMR spectrum of the crude product of entry 11, Table 1; (2) ¹H NMR spectrum of the purified product of entry 11, Table 1; (3) ¹³C NMR spectrum of the purified product of entry 11, Table 1.



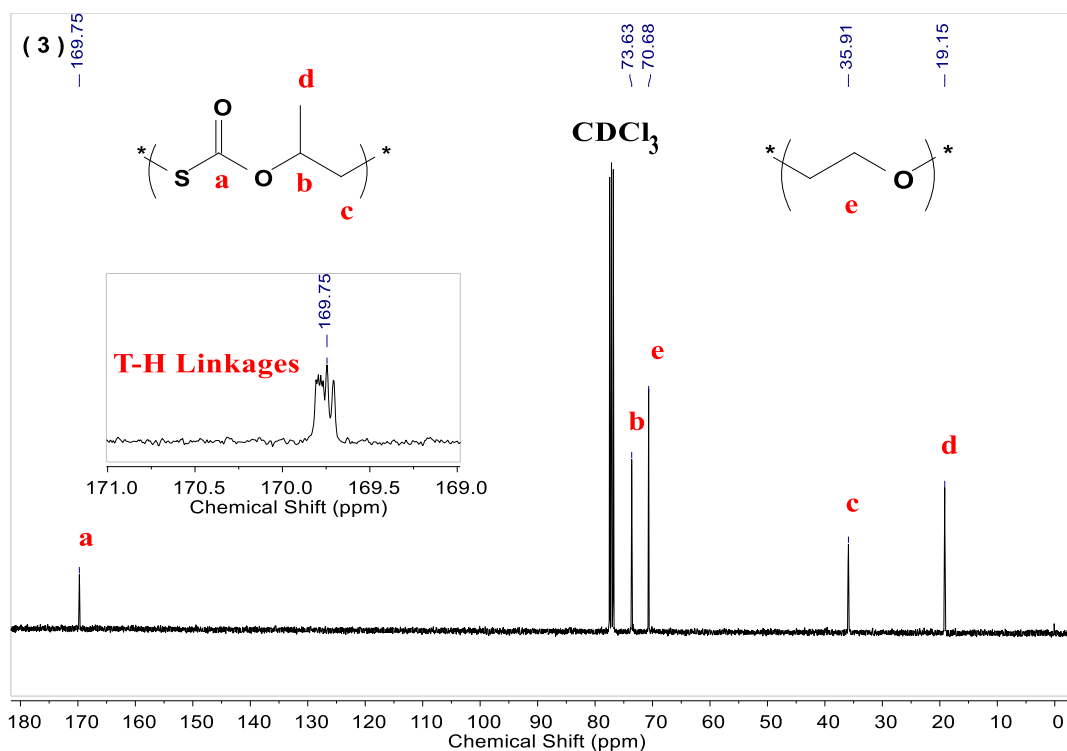
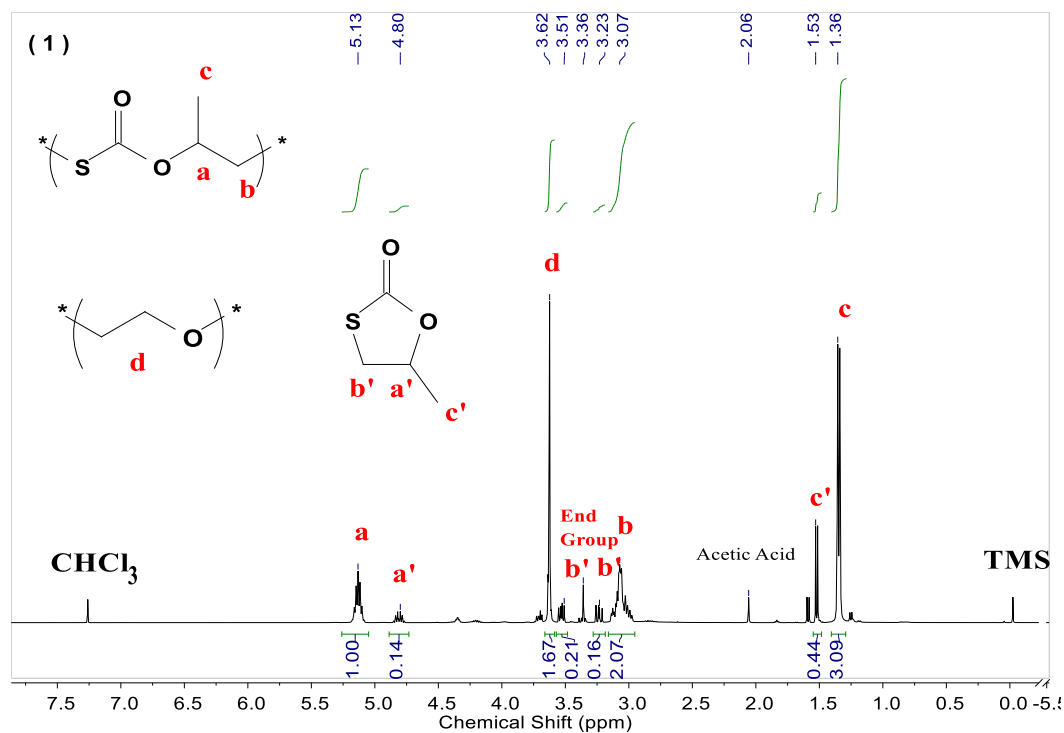


Figure S12. (1) ¹H NMR spectrum of the crude product of entry 12, Table 1; (2) ¹H NMR spectrum of the purified product of entry 12, Table 1; (3) ¹³C NMR spectrum of the purified product of entry 12, Table 1.

Spectra of results listed in Table 2.



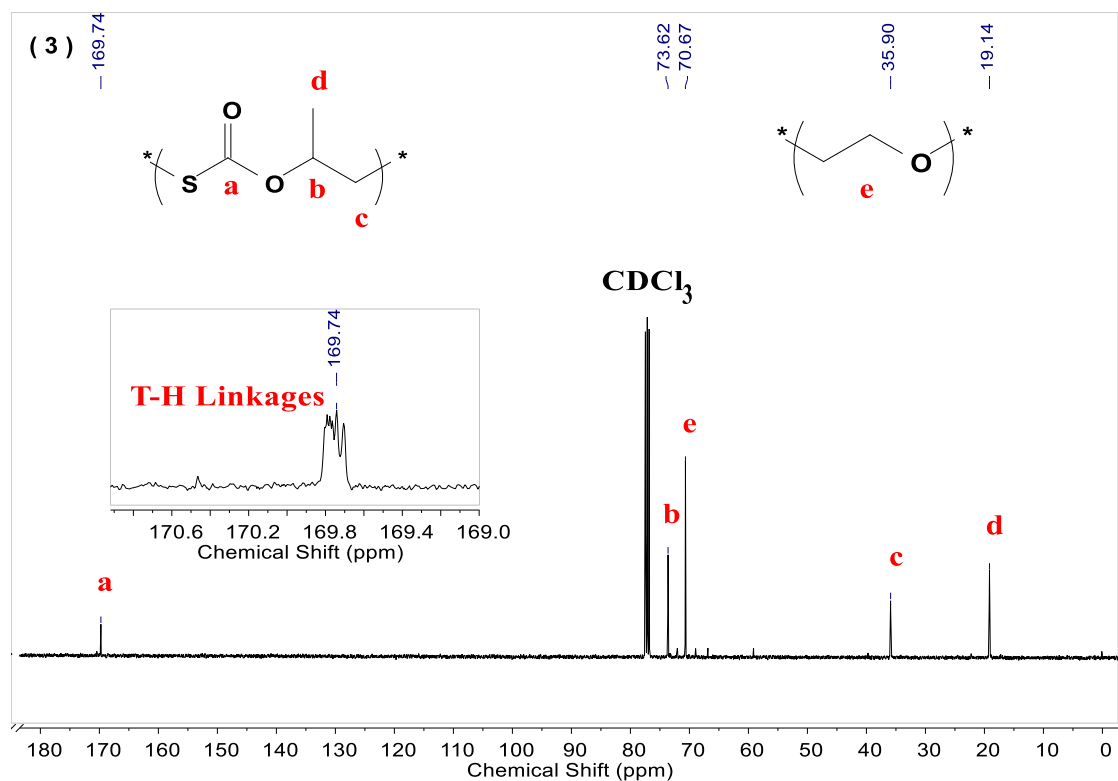
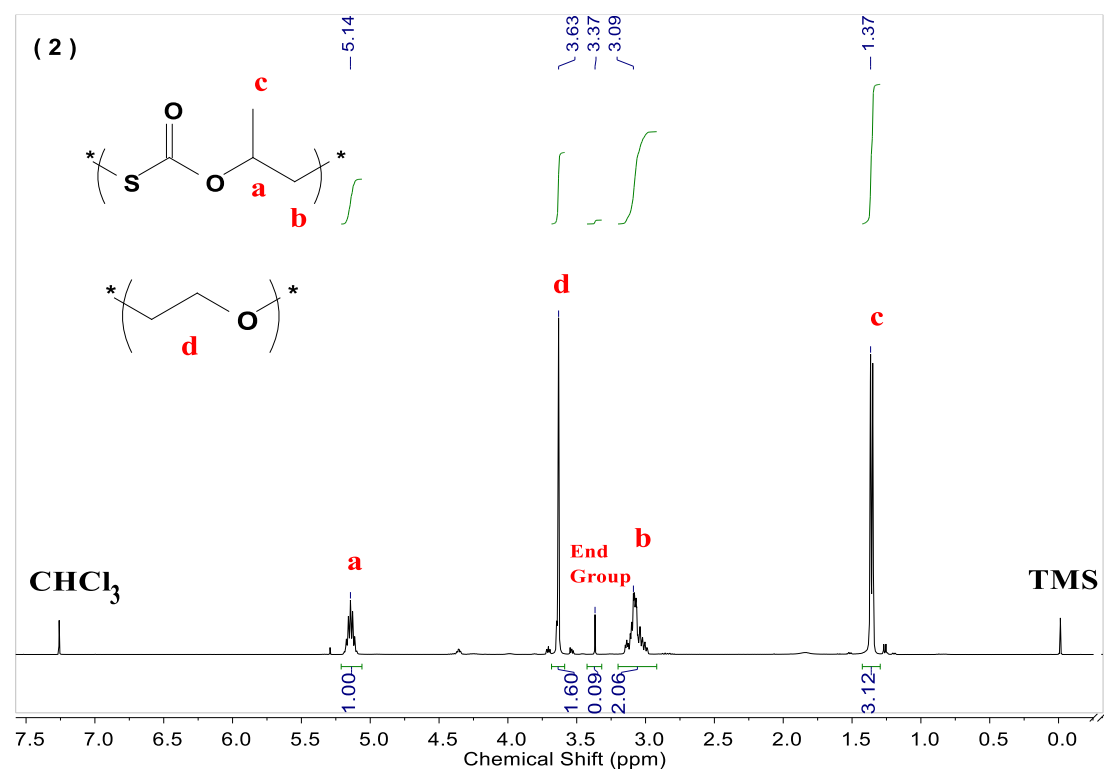


Figure S13. (1) ¹H NMR spectrum of the crude product of entry 1, Table 2; (2) ¹H NMR spectrum of the purified product of entry 1, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 1, Table 2.

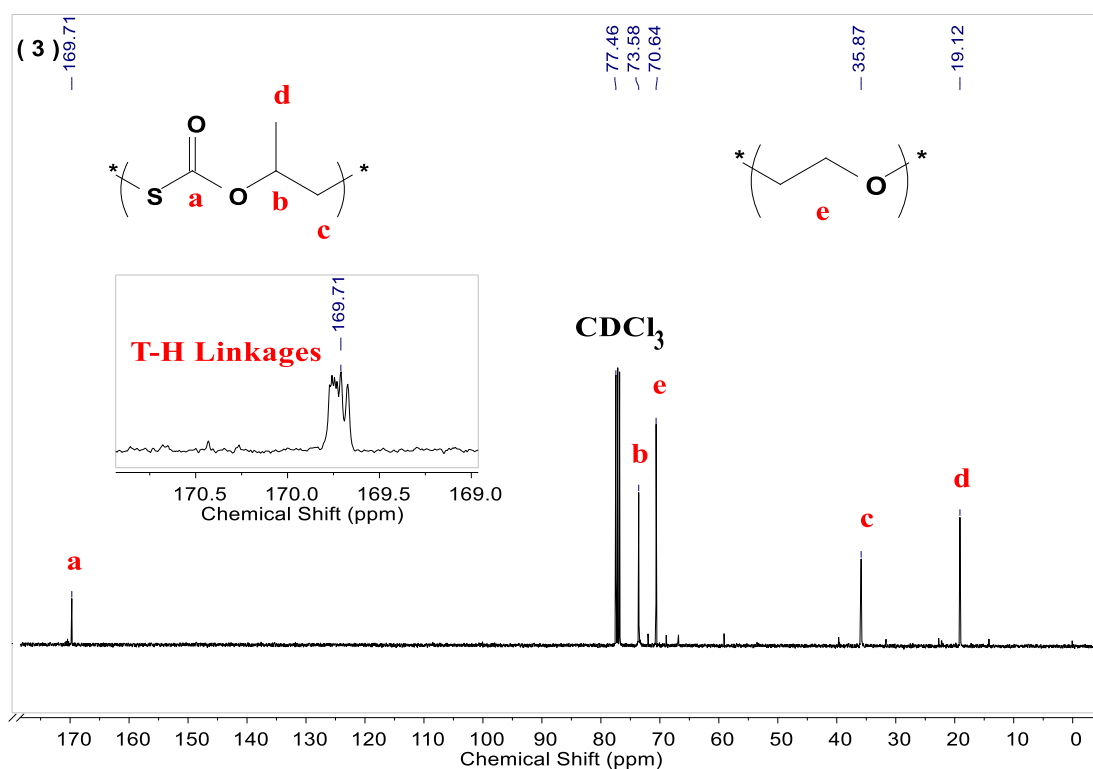
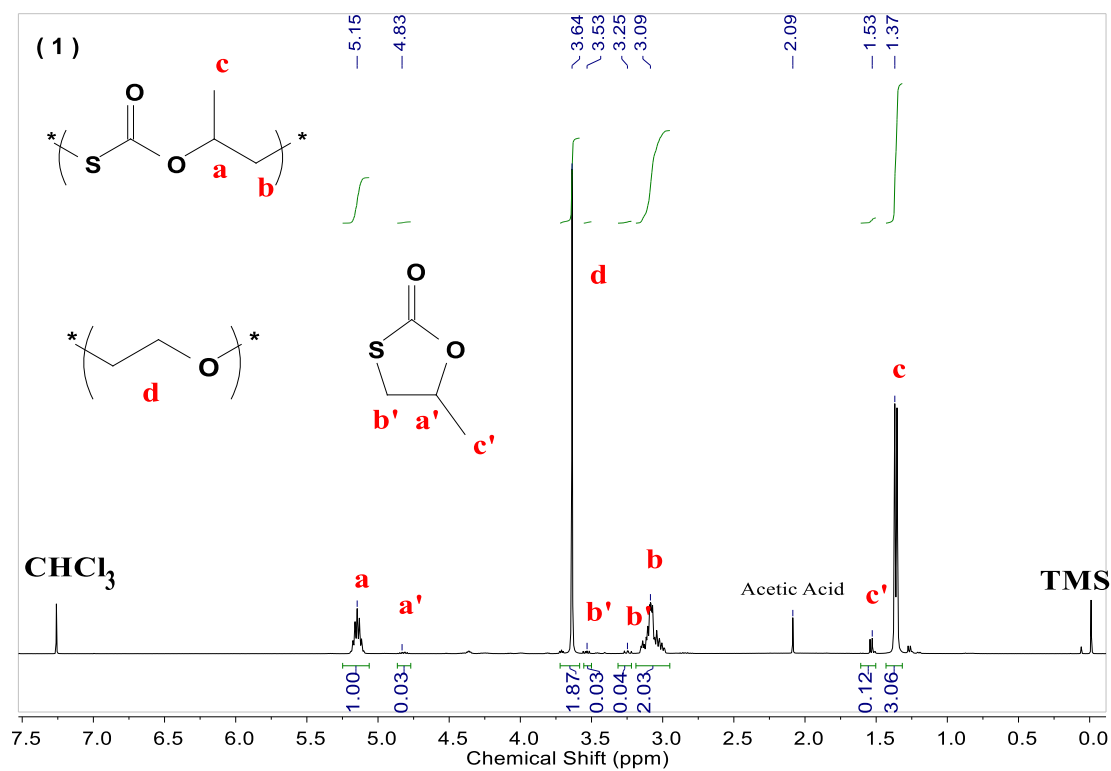


Figure S14. (1) ¹H NMR spectrum of the crude product of entry 2, Table 2; (2) ¹H NMR spectrum of the purified product of entry 2, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 2, Table 2.



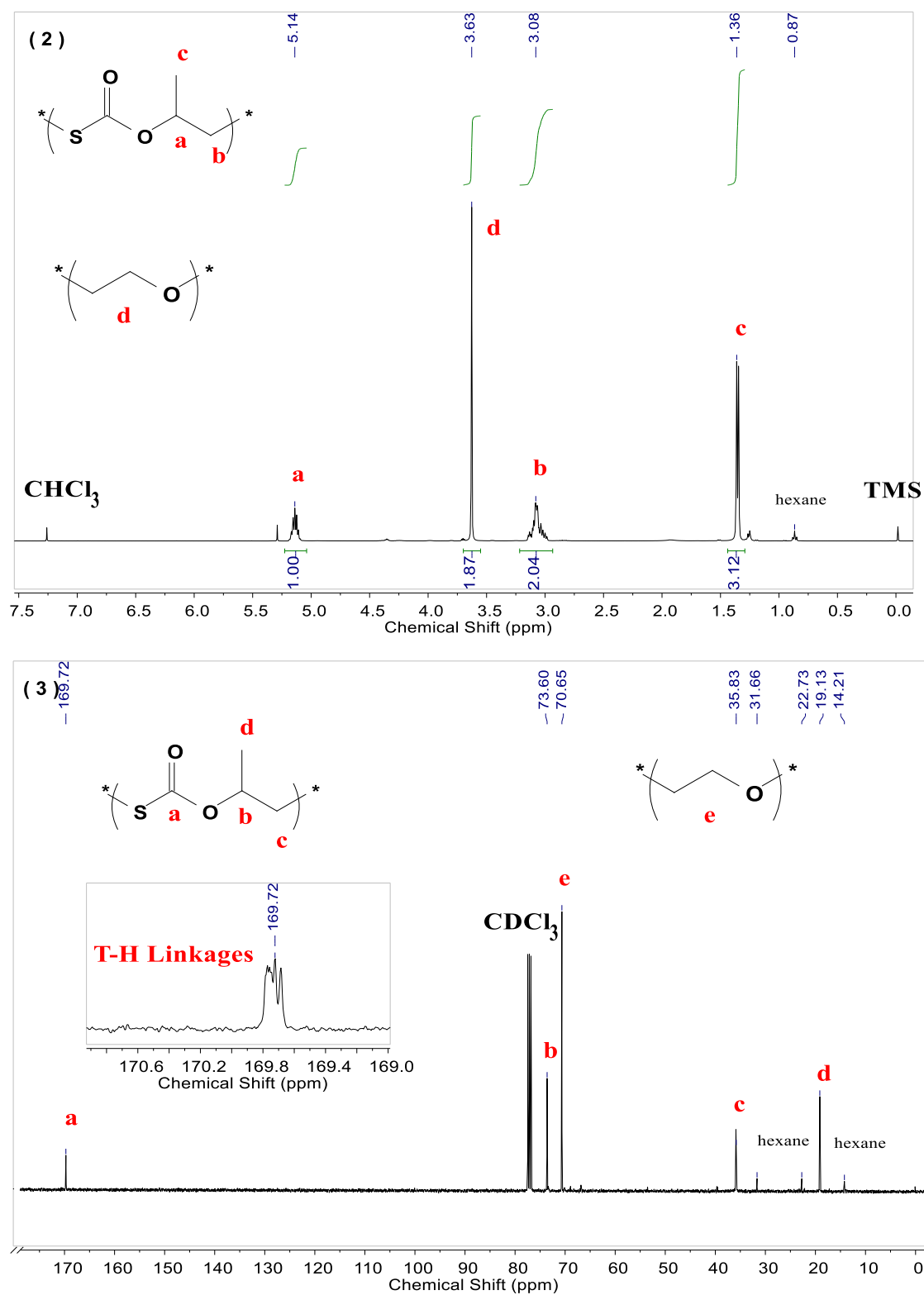
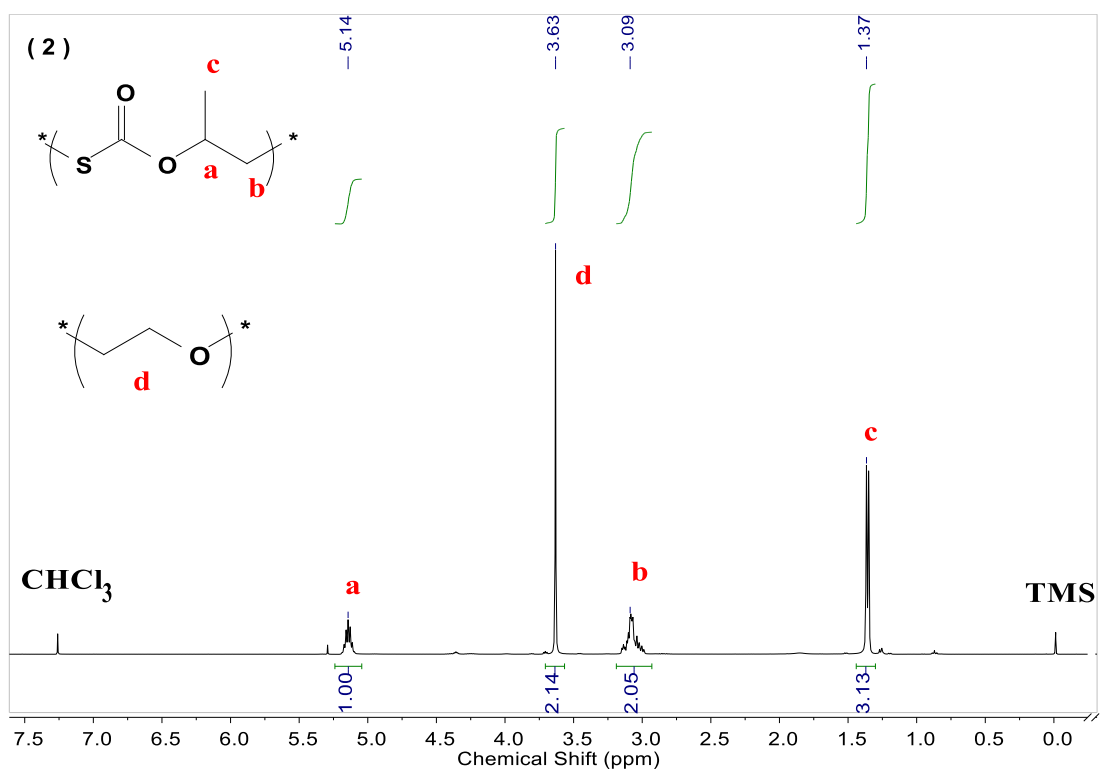
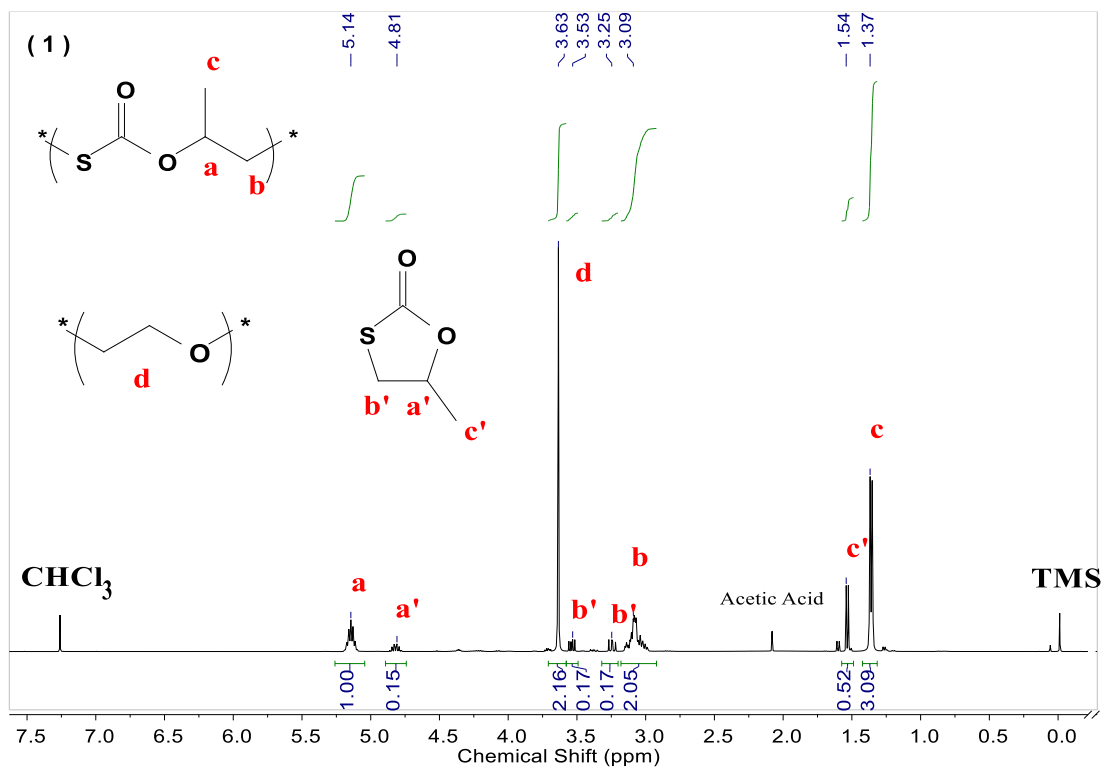


Figure S15. (1) ^1H NMR spectrum of the crude product of entry 3, Table 2; (2) ^1H NMR spectrum of the purified product of entry 3, Table 2; (3) ^{13}C NMR spectrum of the purified product of entry 3, Table 2.



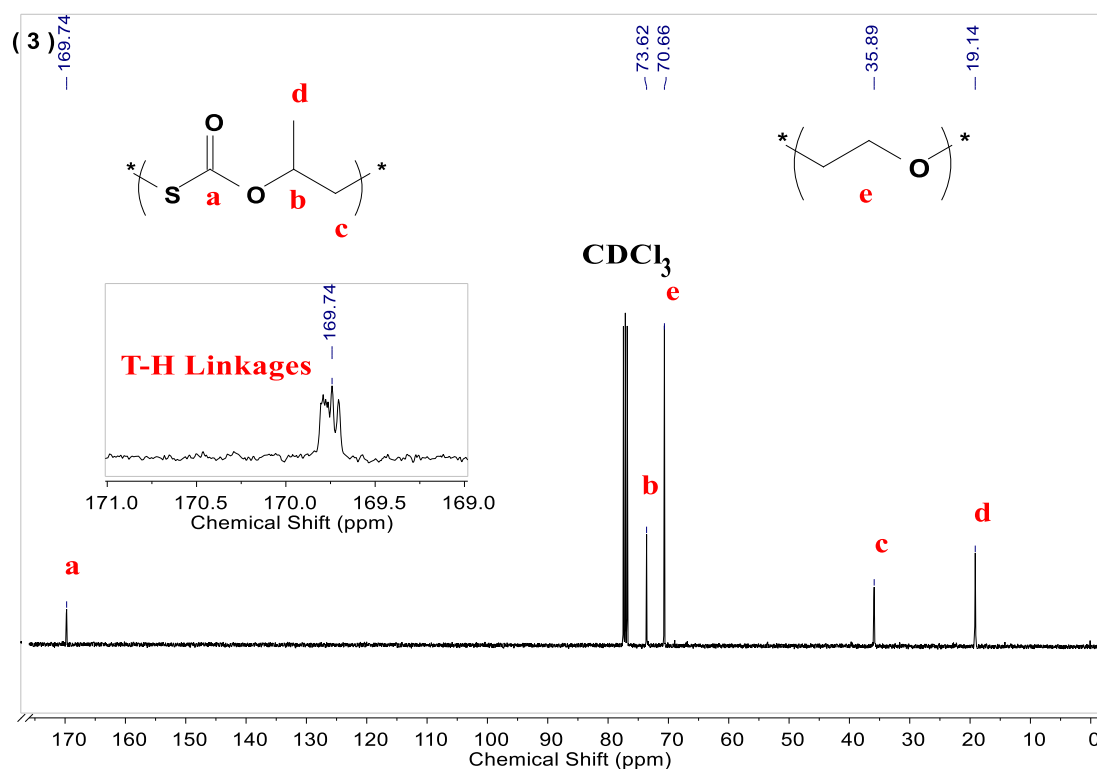
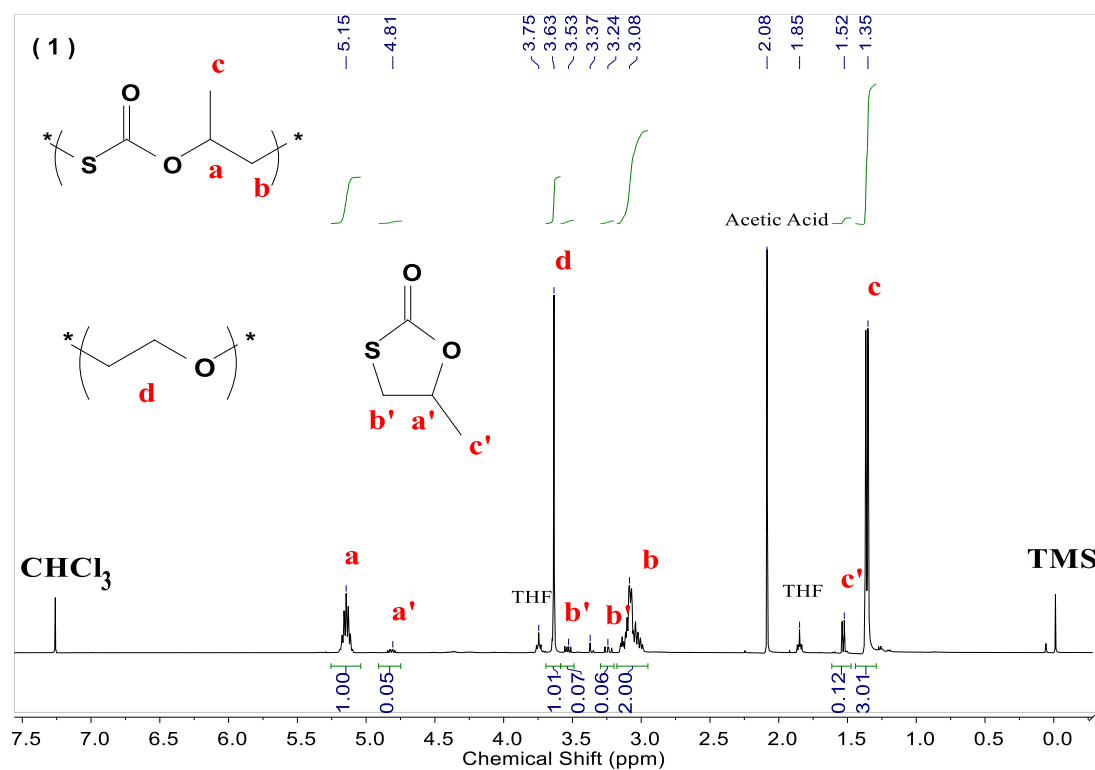


Figure S16. (1) ¹H NMR spectrum of the crude product of entry 4, Table 2; (2) ¹H NMR spectrum of the purified product of entry 4, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 4, Table 2.



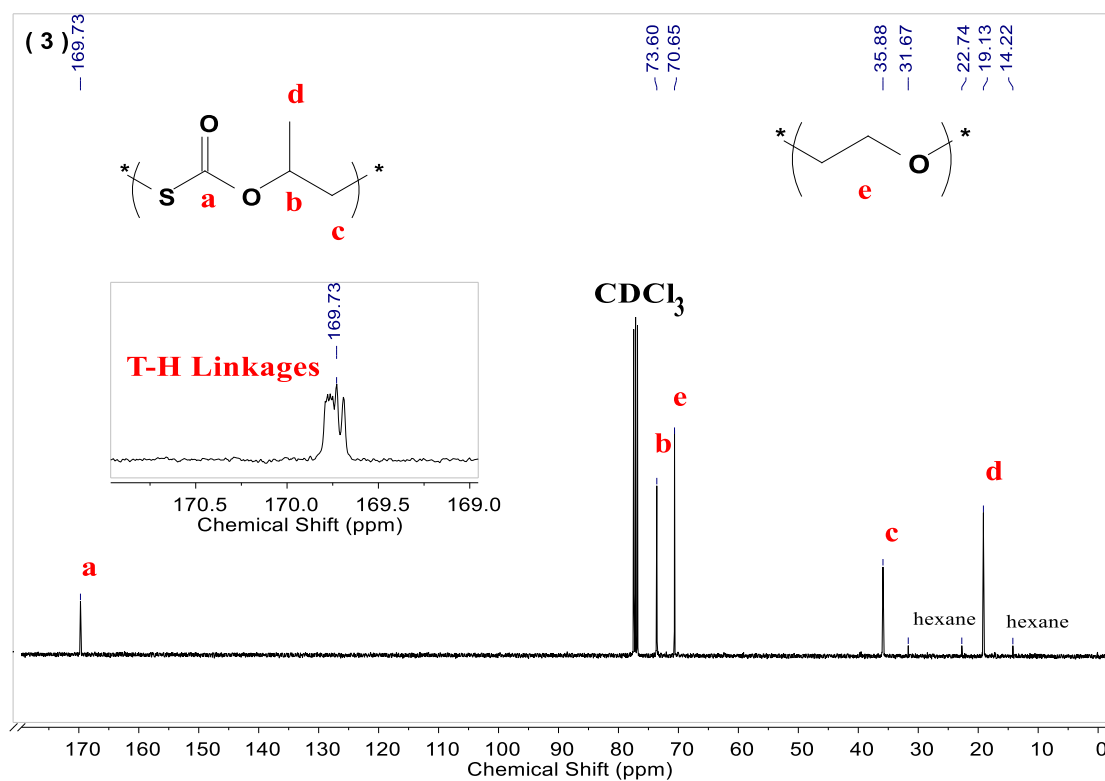
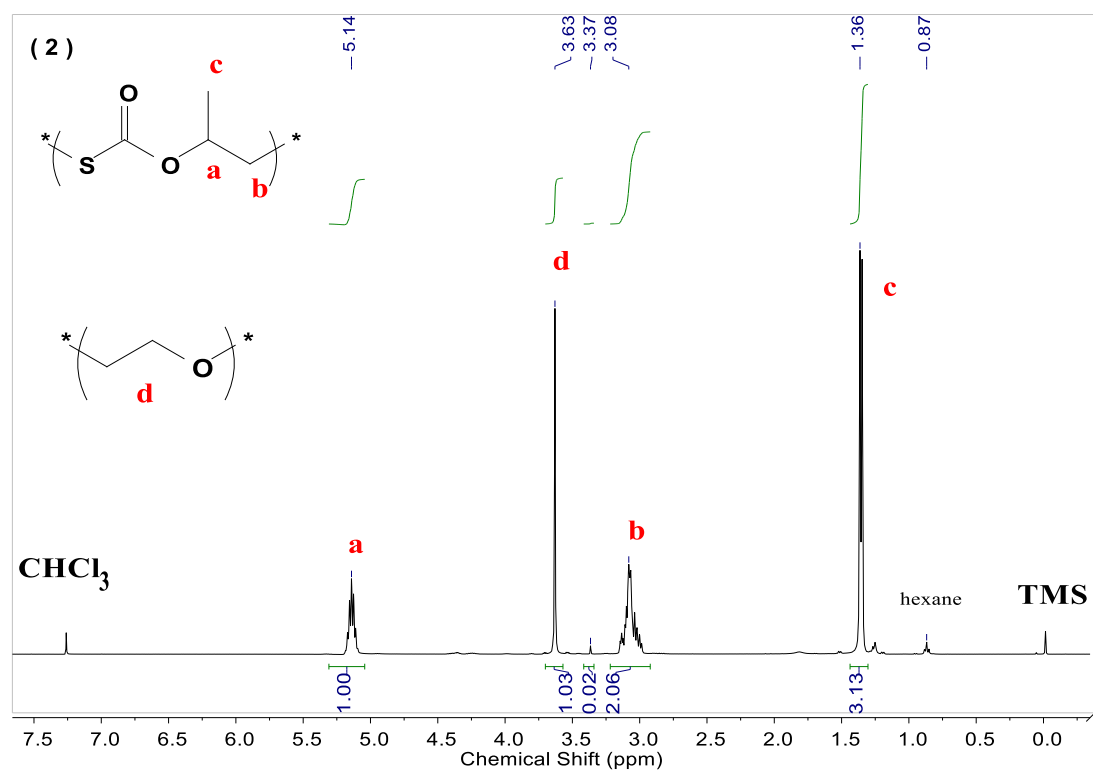
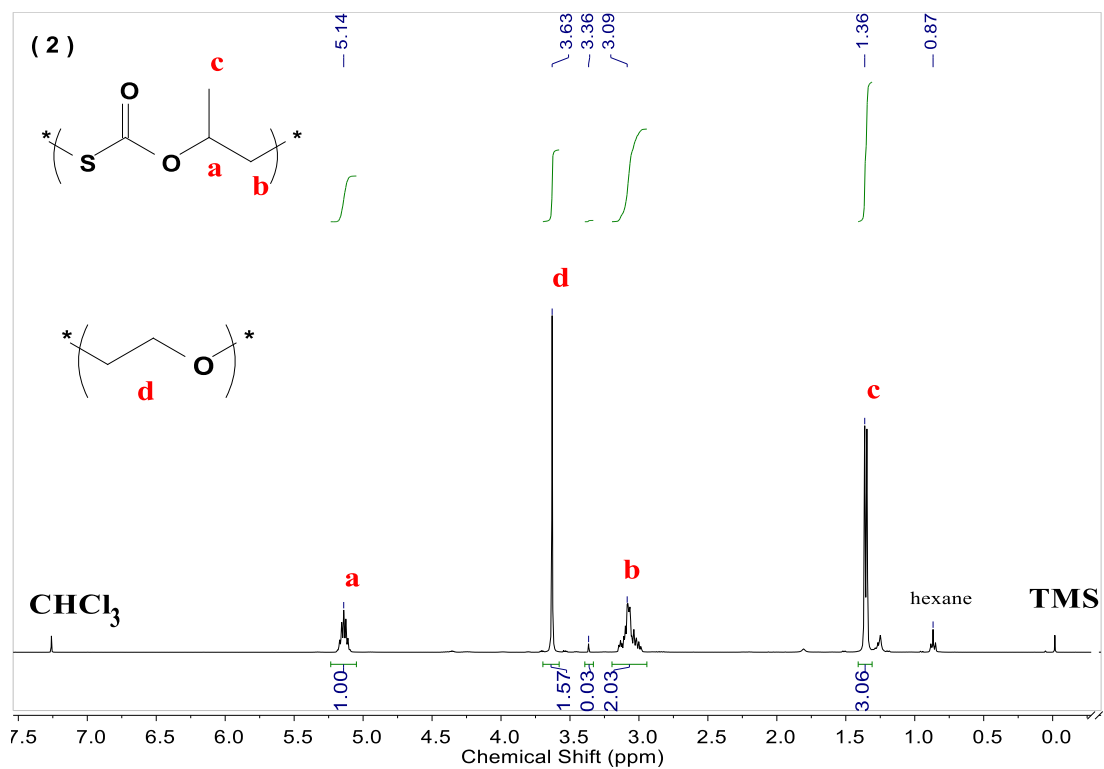
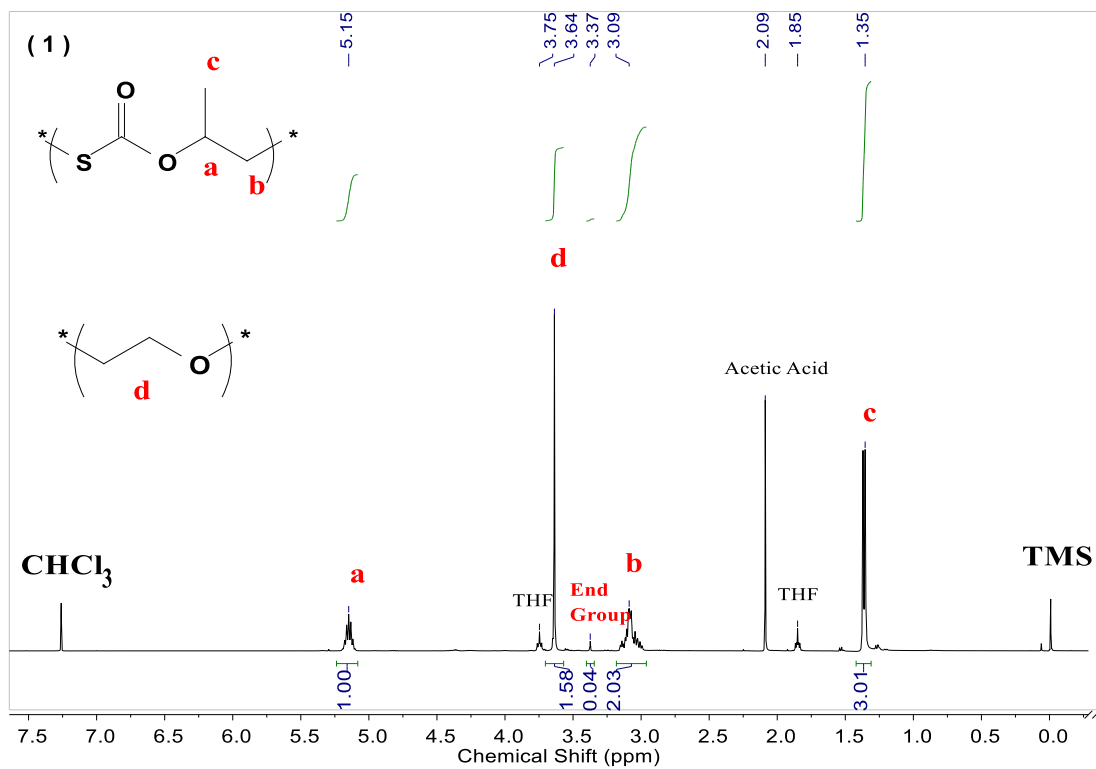


Figure S17. (1) ¹H NMR spectrum of the crude product of entry 5, Table 2; (2) ¹H NMR spectrum of the purified product of entry 5, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 5, Table 2.



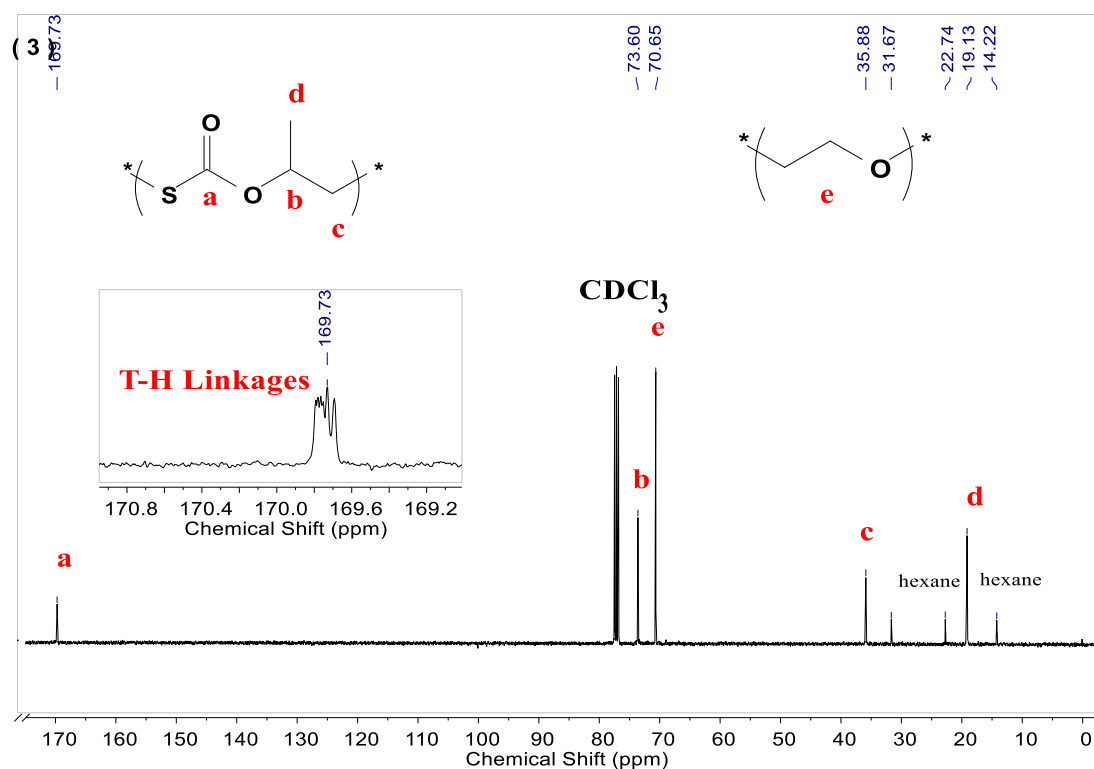
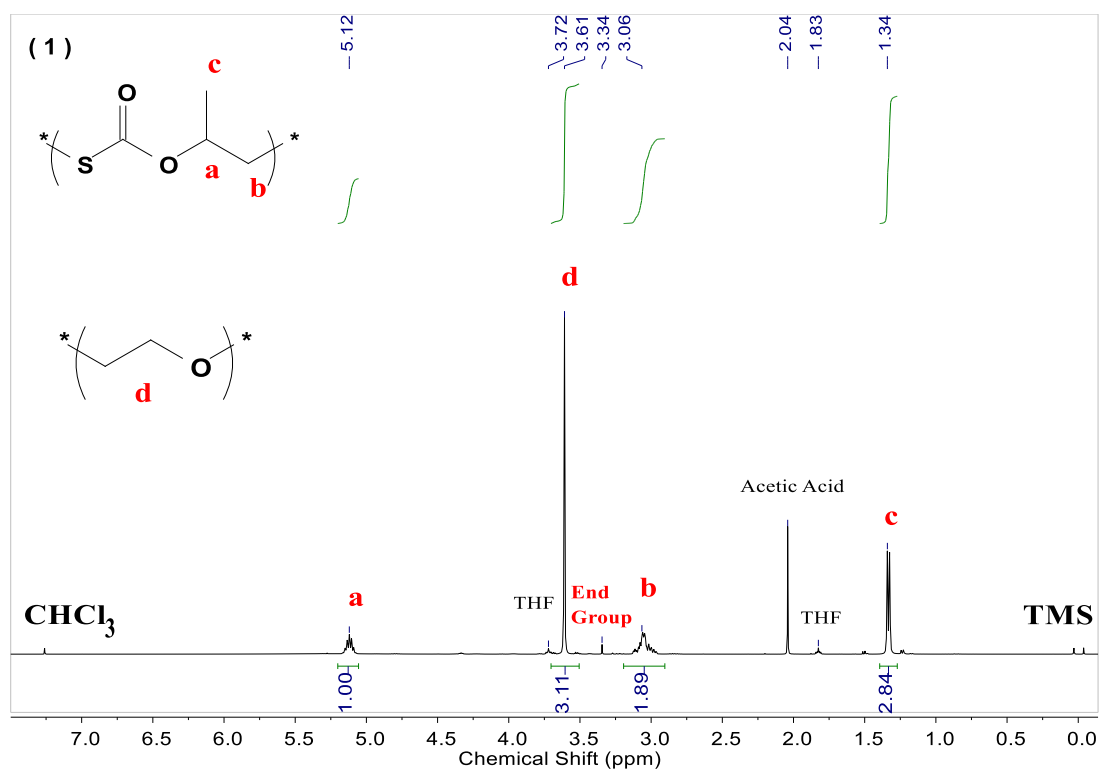


Figure S18. (1) ^1H NMR spectrum of the crude product of entry 6, Table 2; (2) ^1H NMR spectrum of the purified product of entry 6, Table 2; (3) ^{13}C NMR spectrum of the purified product of entry 6, Table 2.



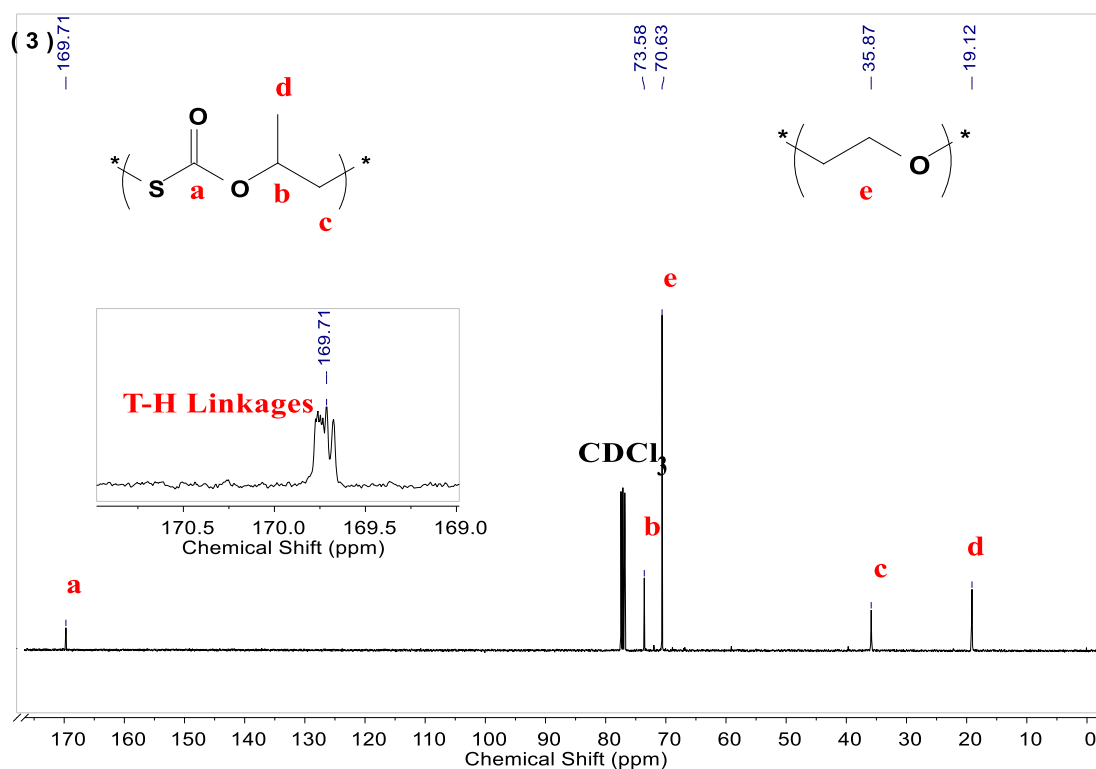
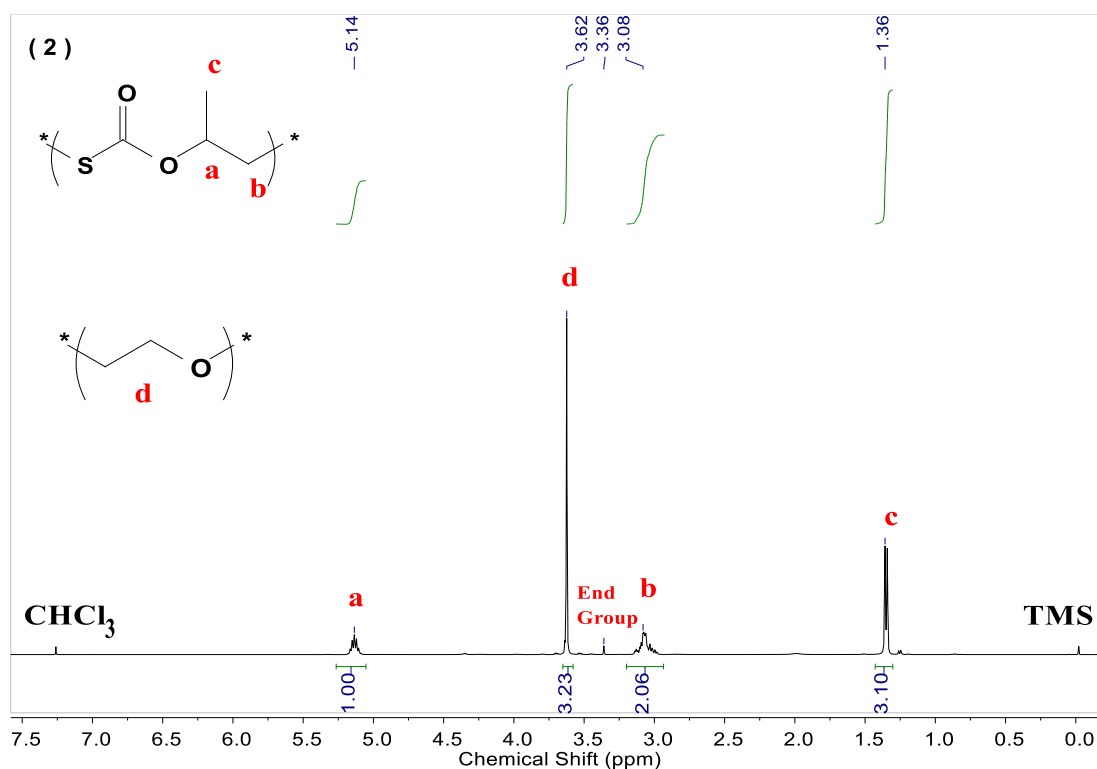
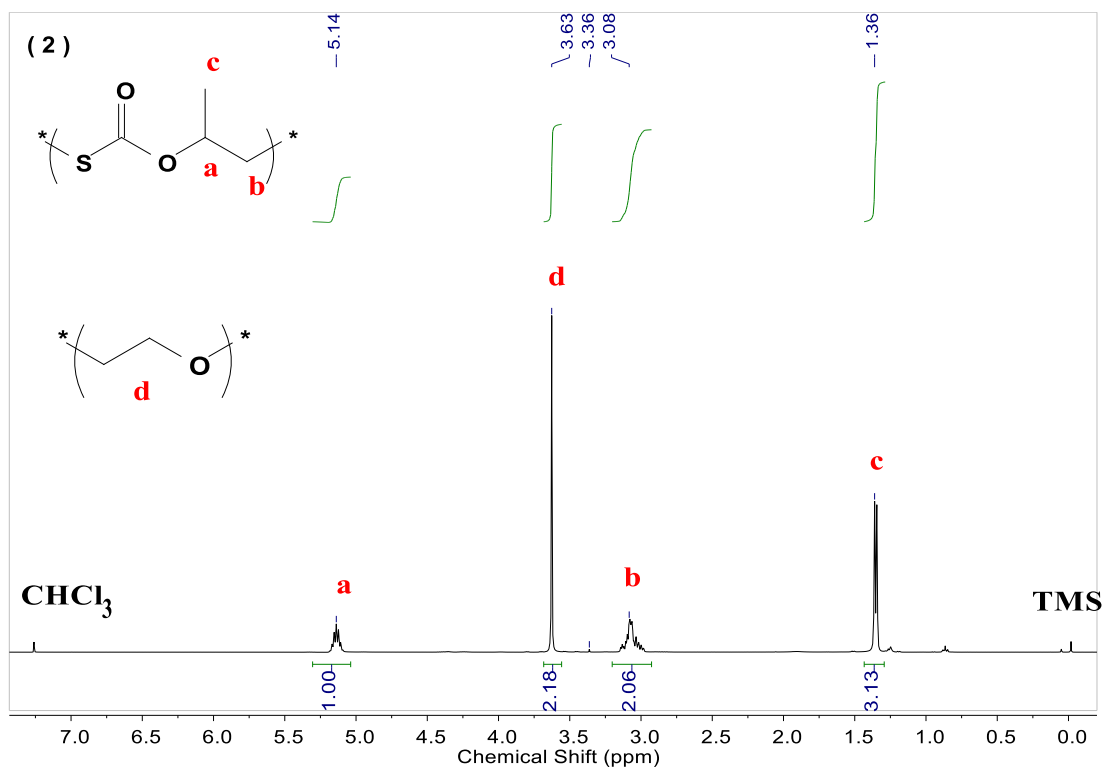
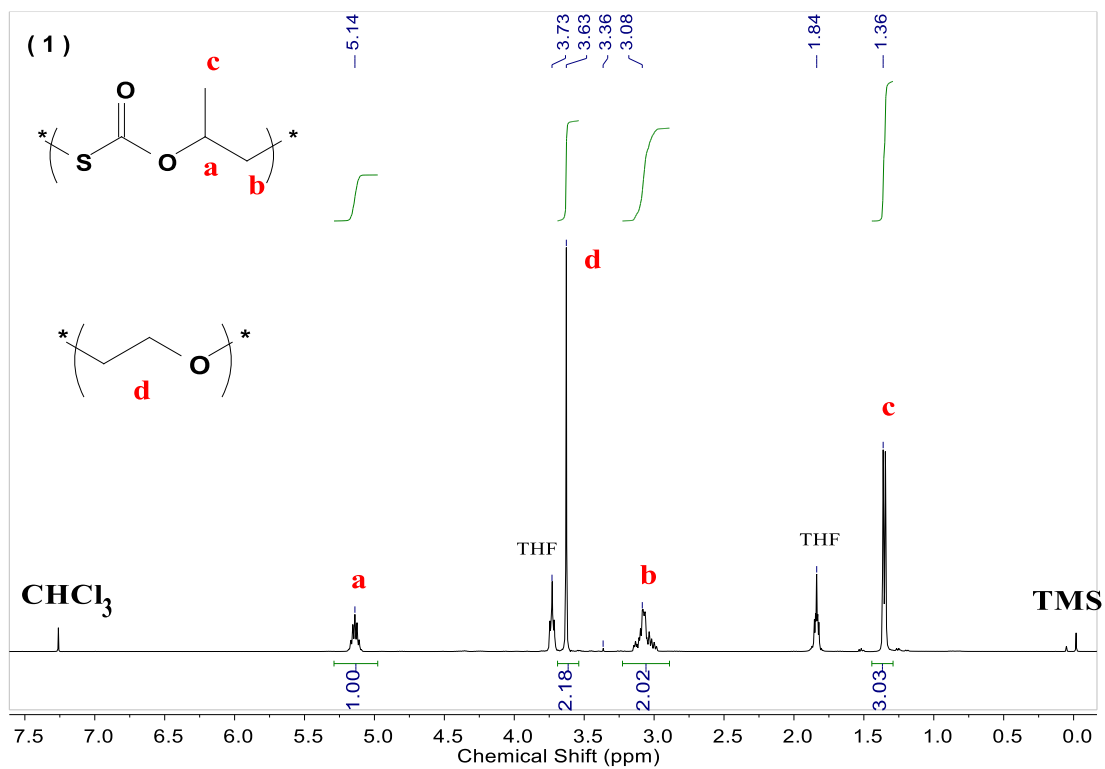


Figure S19. (1) ^1H NMR spectrum of the crude product of entry 7, Table 2; (2) ^1H NMR spectrum of the purified product of entry 7, Table 2; (3) ^{13}C NMR spectrum of the purified product of entry 7, Table 2.



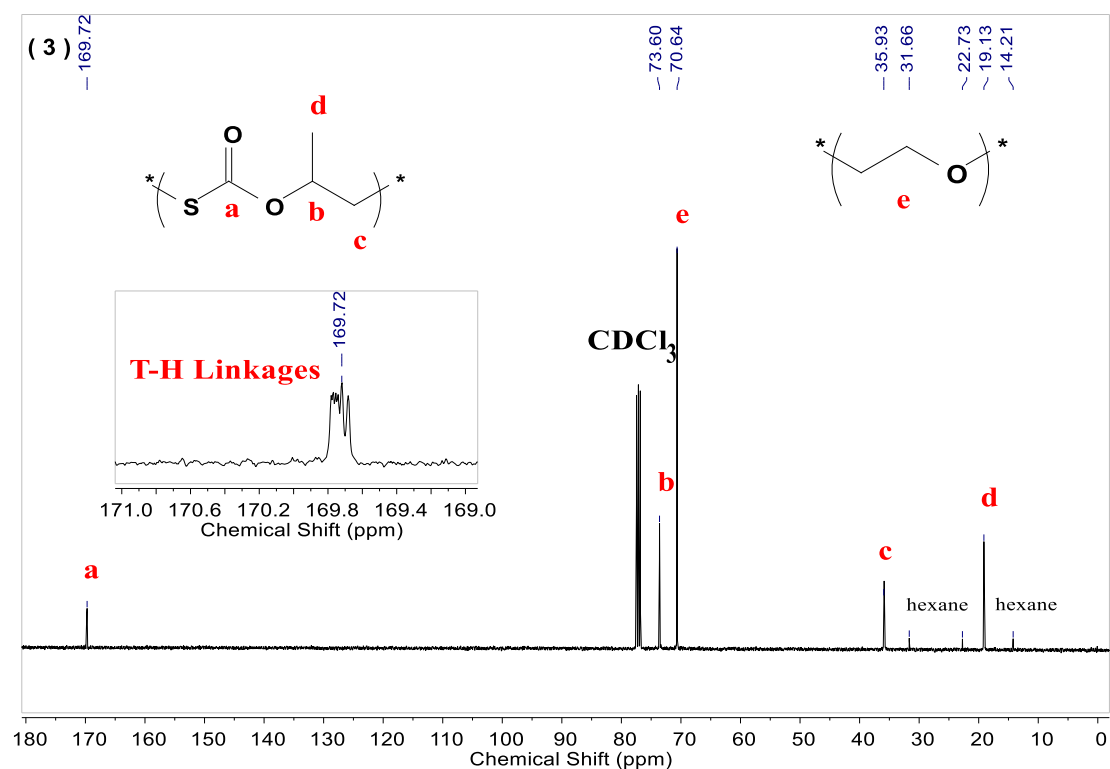
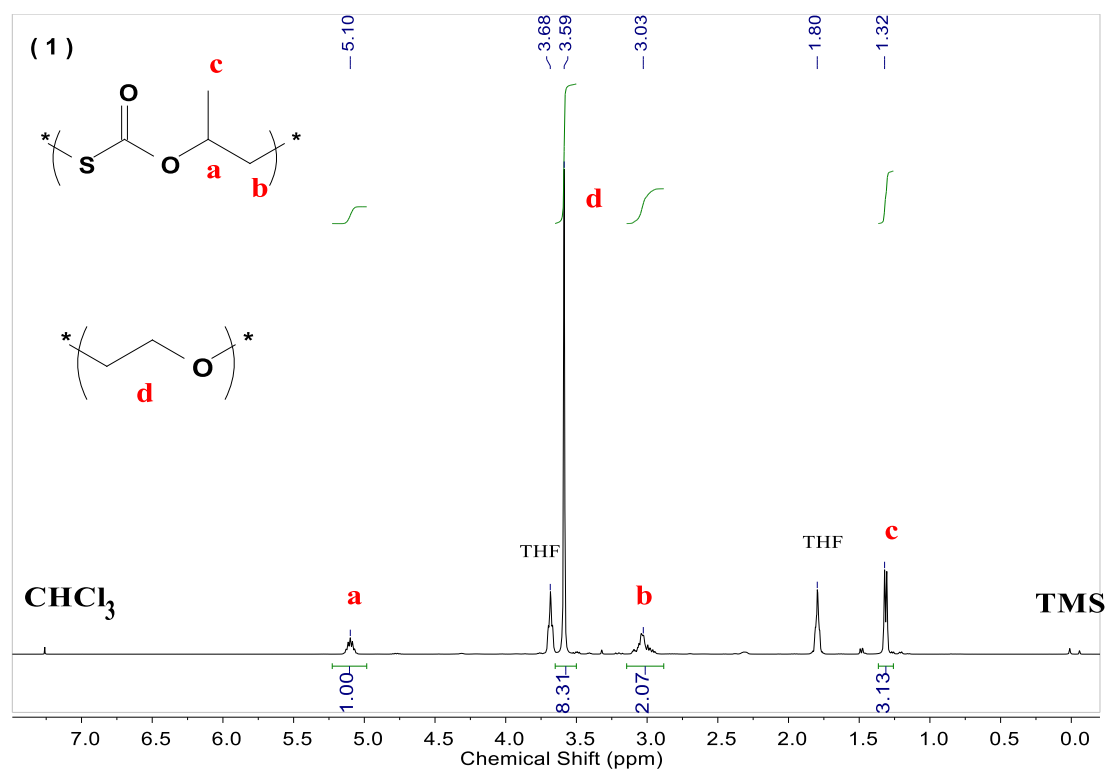


Figure S20. (1) ¹H NMR spectrum of the crude product of entry 8, Table 2; (2) ¹H NMR spectrum of the purified product of entry 8, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 8, Table 2.



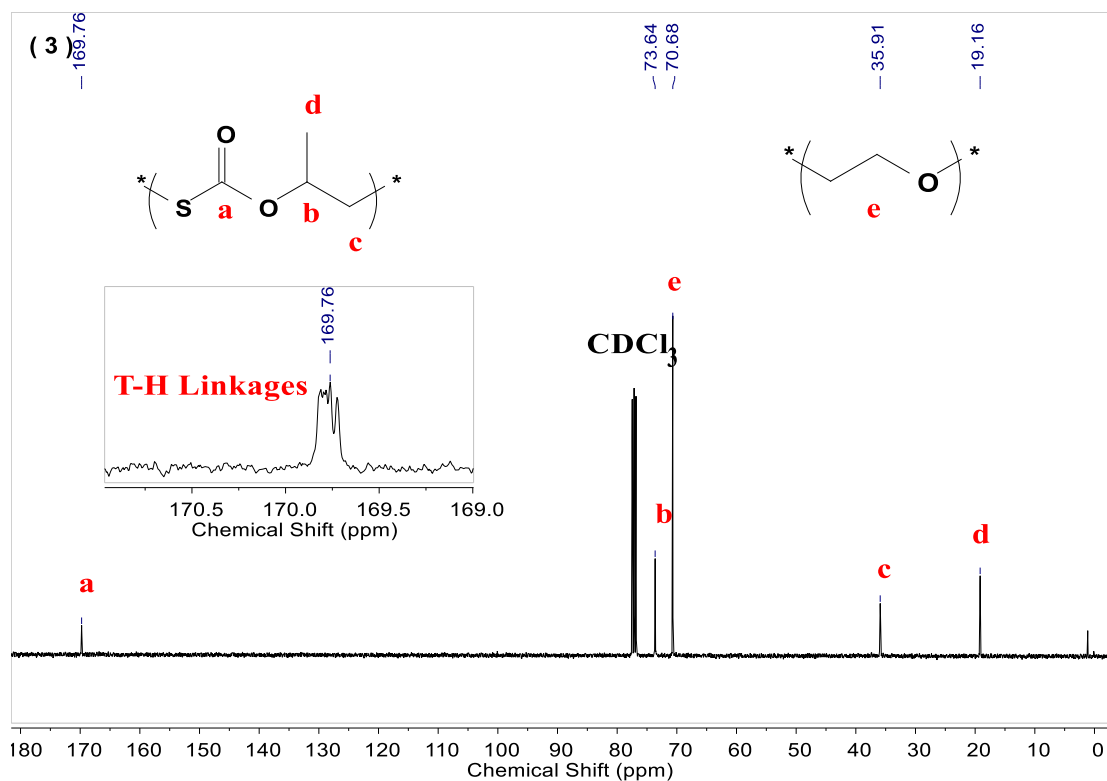
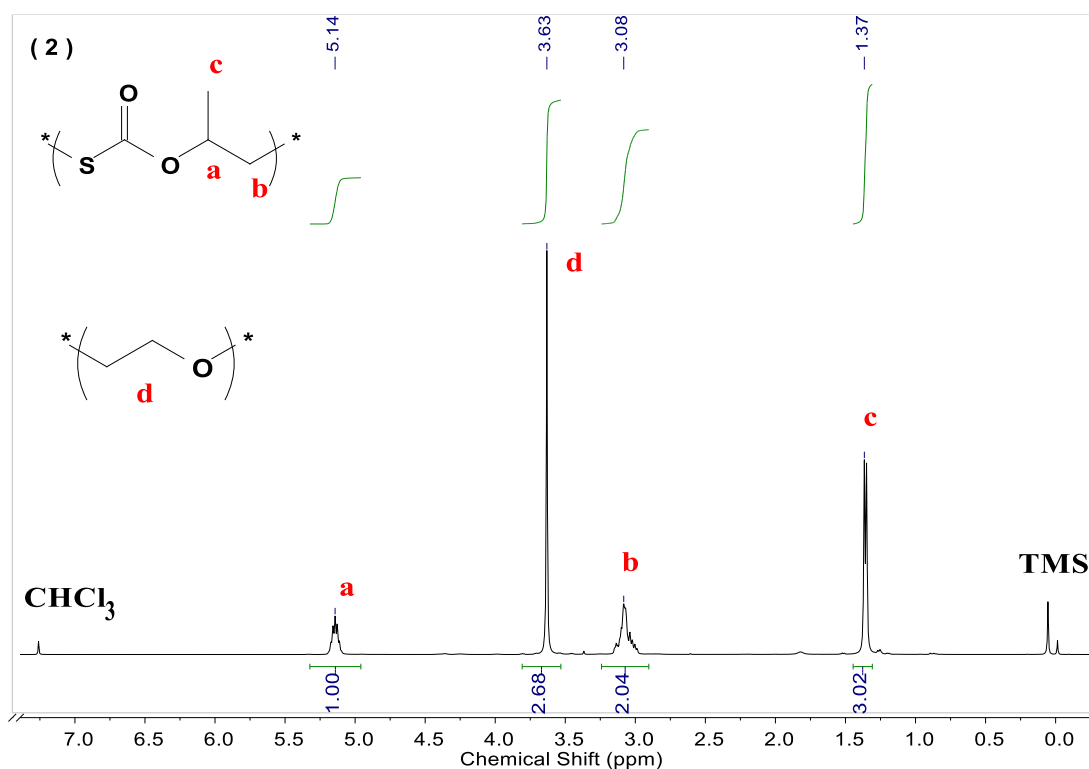
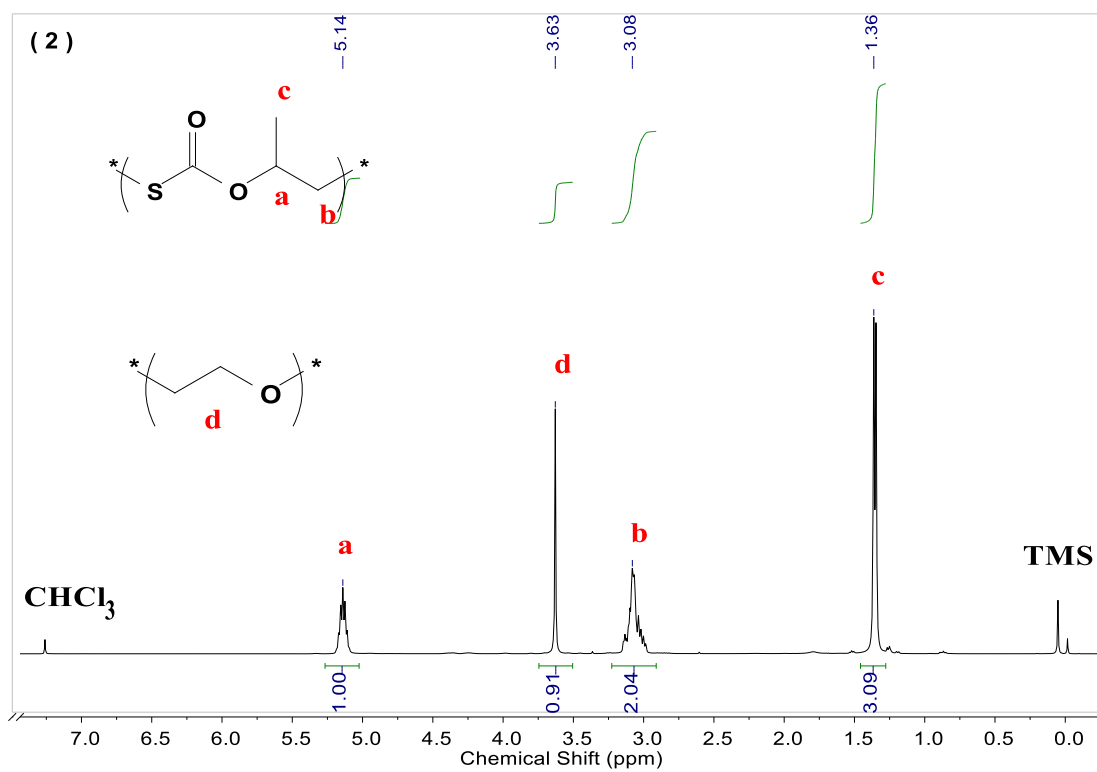
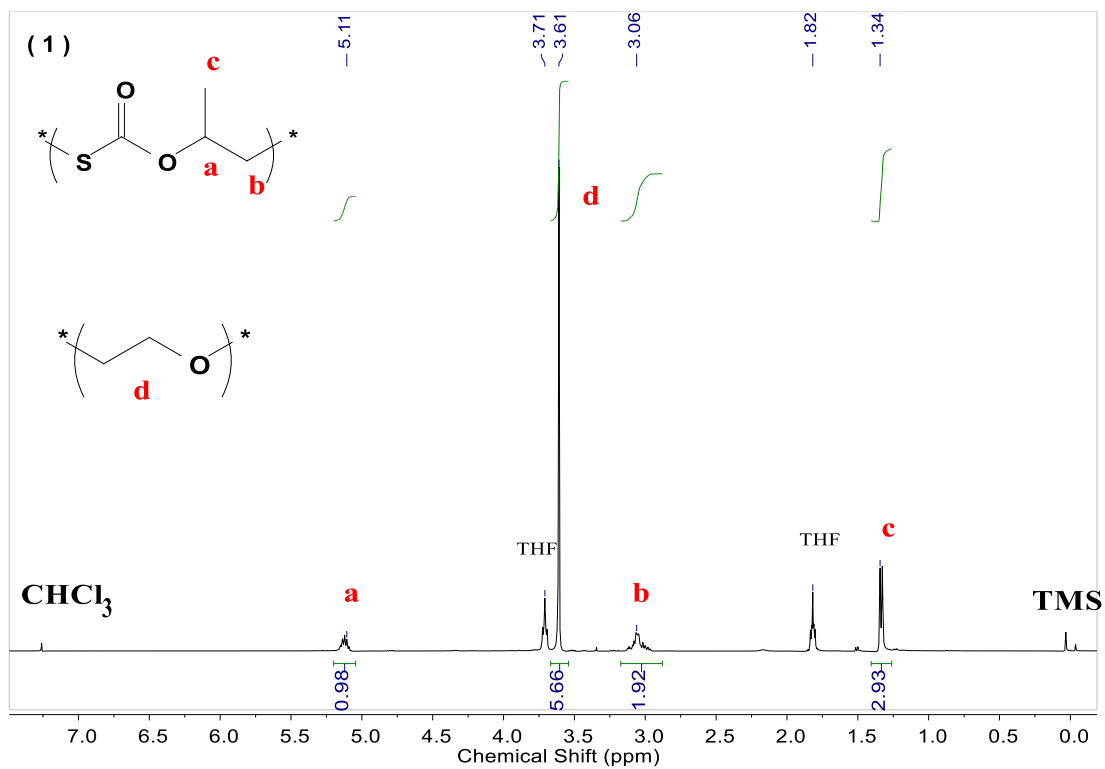


Figure S21. (1) ^1H NMR spectrum of the crude product of entry 9, Table 2; (2) ^1H NMR spectrum of the purified product of entry 9, Table 2; (3) ^{13}C NMR spectrum of the purified product of entry 9, Table 2.



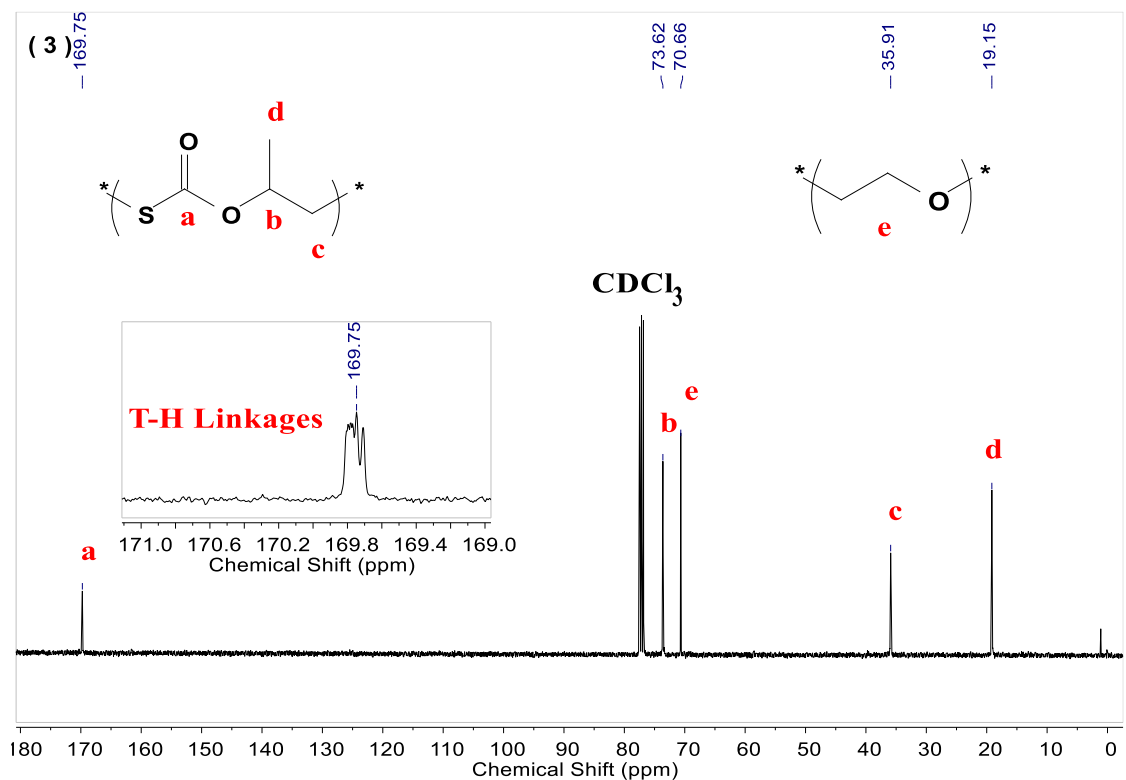
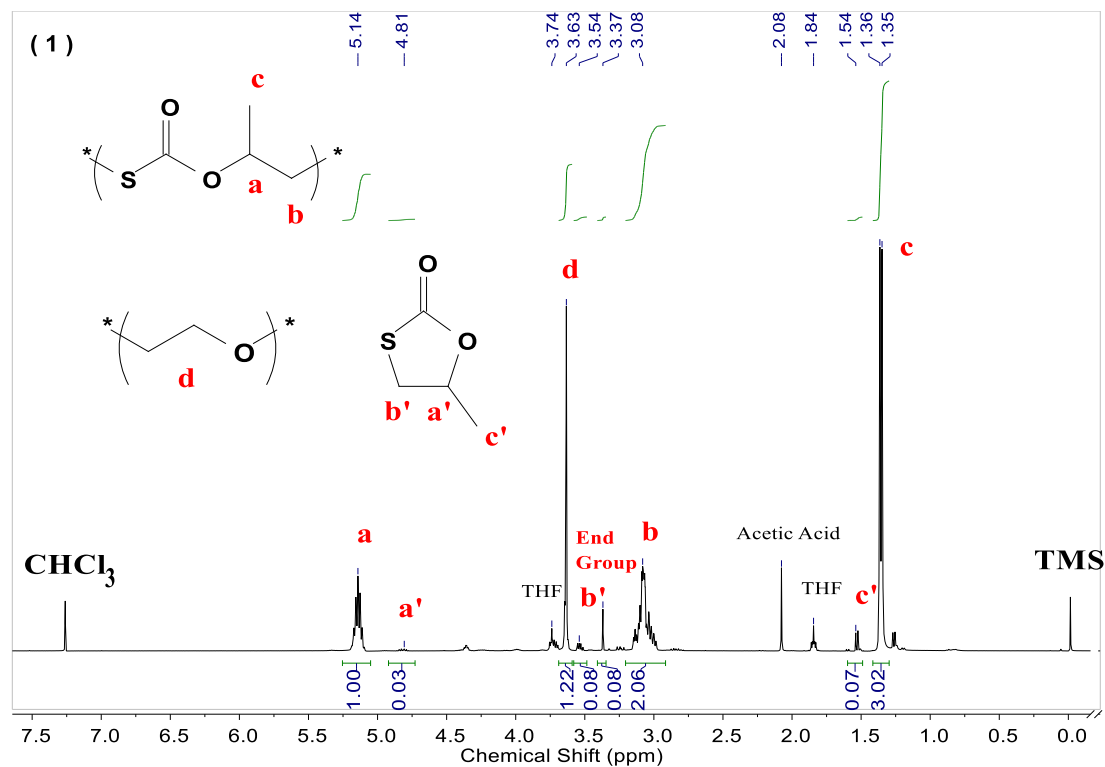


Figure S22. (1) ¹H NMR spectrum of the crude product of entry 10, Table 2; (2) ¹H NMR spectrum of the purified product of entry 10, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 10, Table 2.



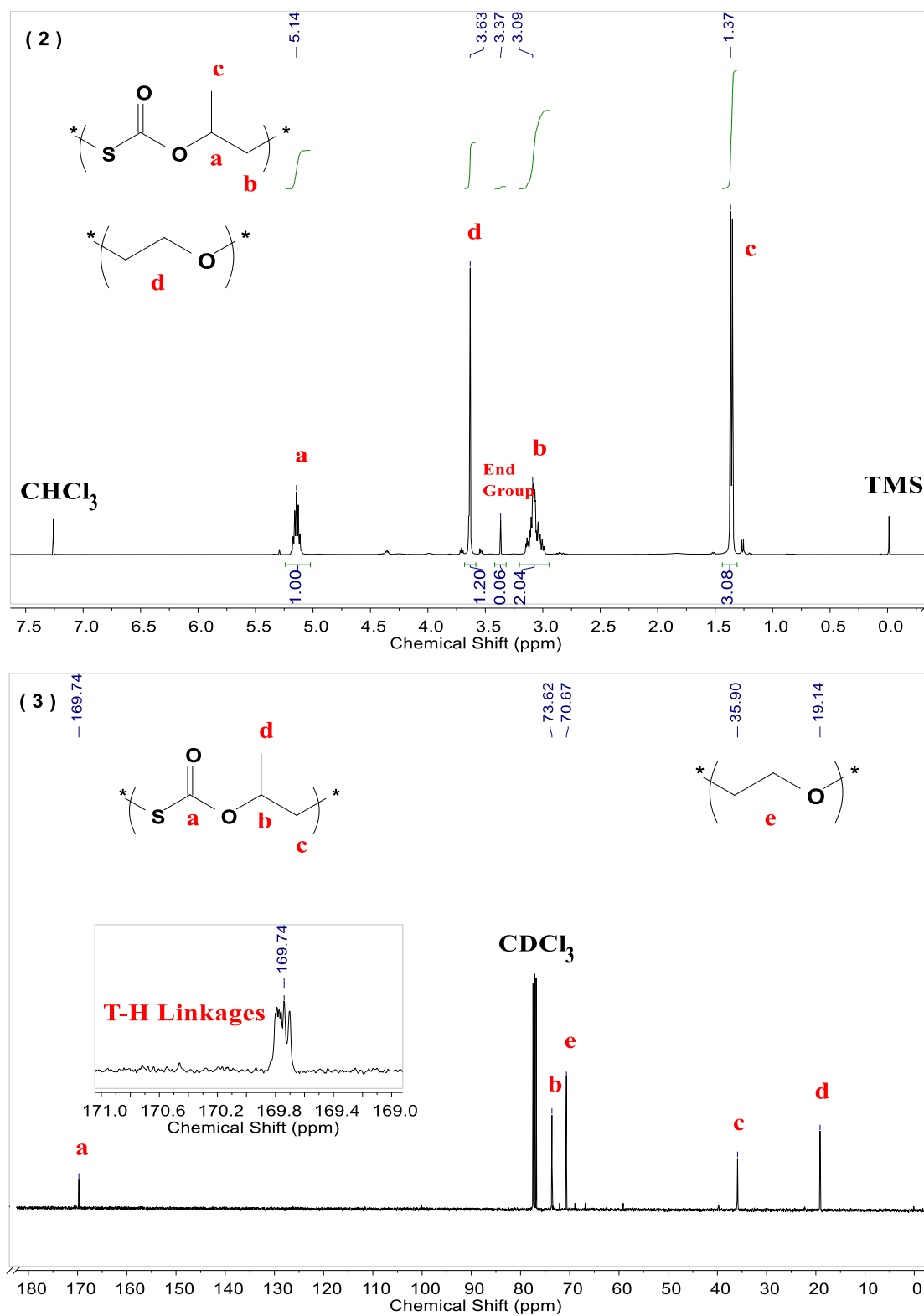
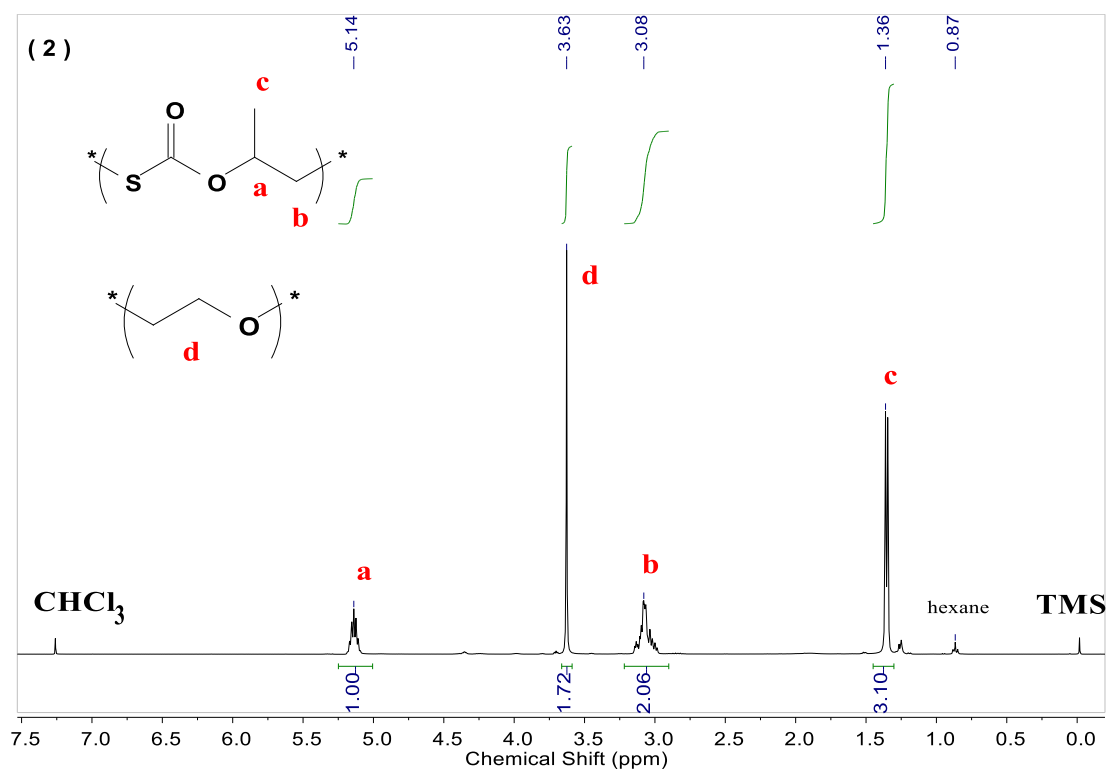
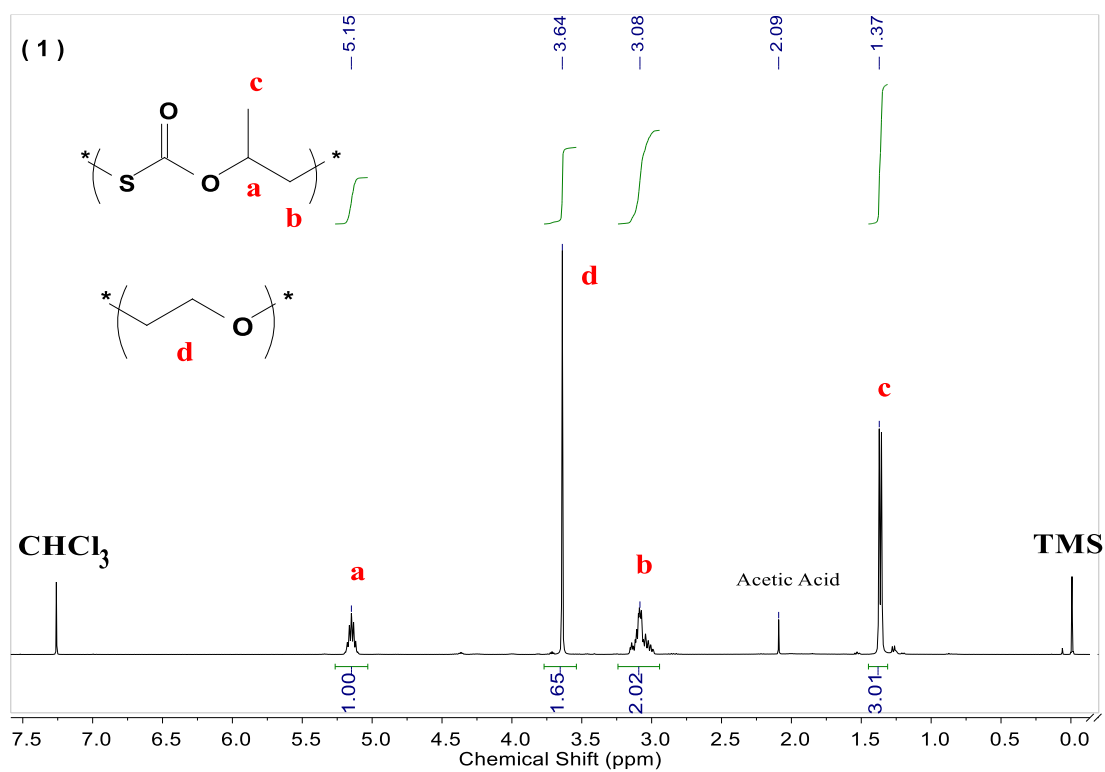


Figure S23. (1) ¹H NMR spectrum of the crude product of entry 11, Table 2; (2) ¹H NMR spectrum of the purified product of entry 11, Table 2; (3) ¹³C NMR spectrum of the purified product of entry 11, Table 2.



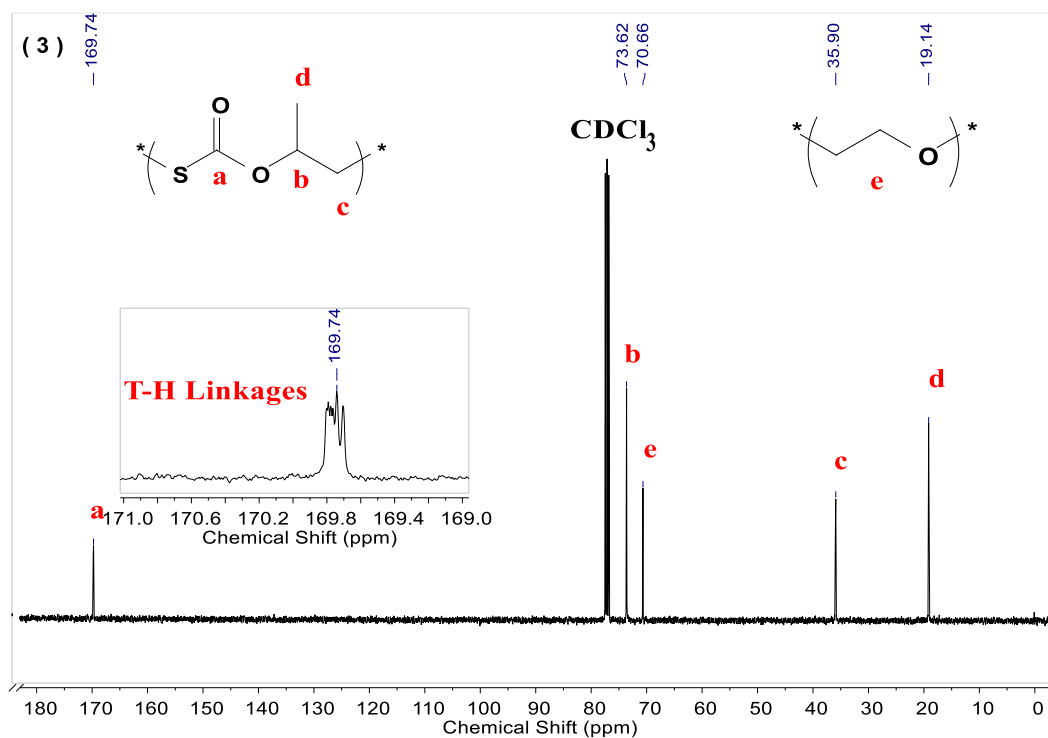
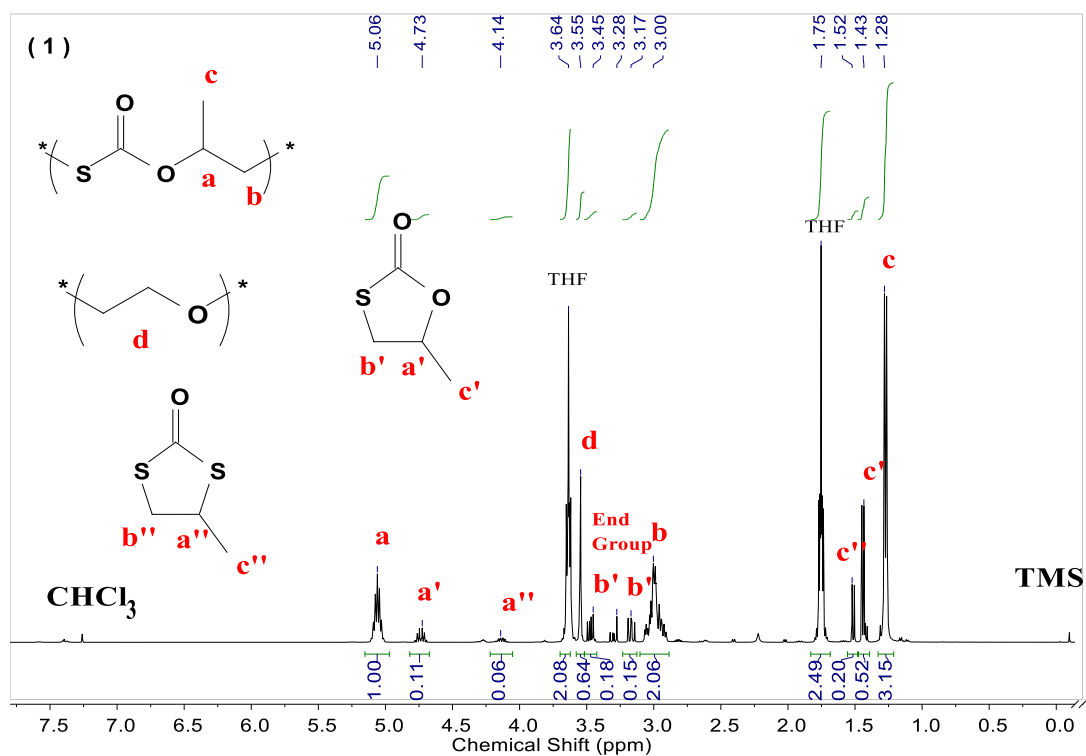


Figure S24. (1) ^1H NMR spectrum of the crude product of entry 12, Table 2; (2) ^1H NMR spectrum of the purified product of entry 12, Table 2; (3) ^{13}C NMR spectrum of the purified product of entry 12, Table 2.

Spectra of results listed in Table 3.



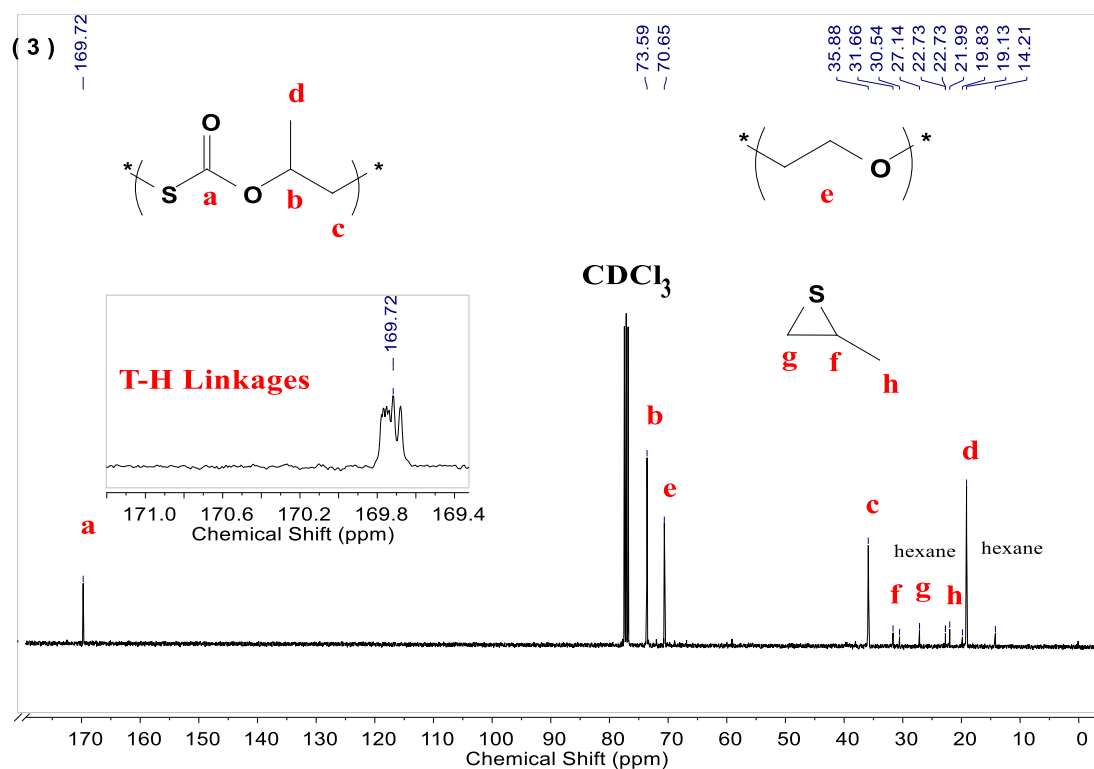
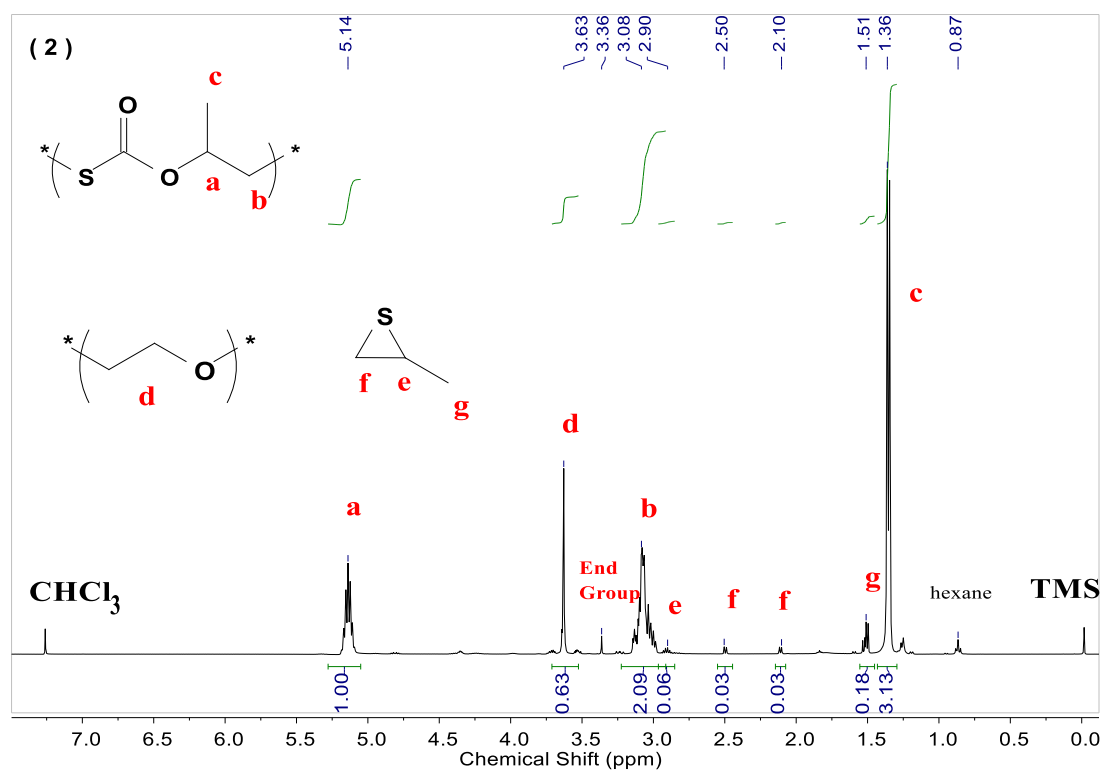
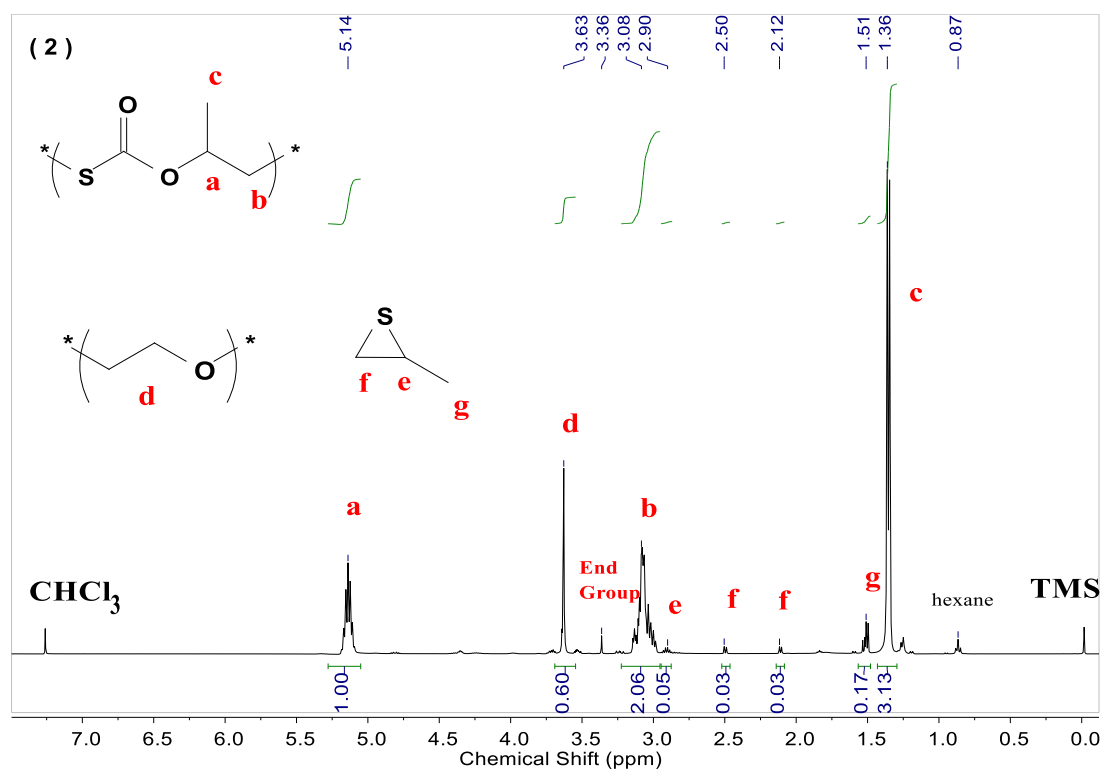
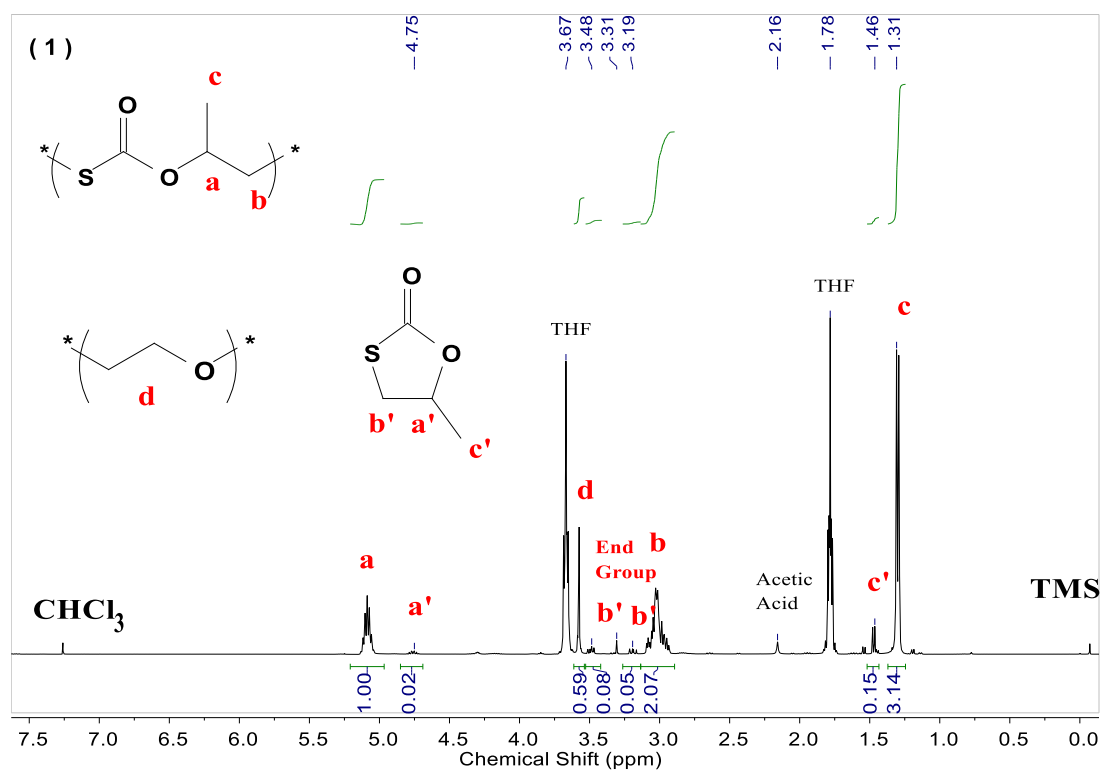


Figure S25. (1) ^1H NMR spectrum of the crude product of entry 1, Table 3; (2) ^1H NMR spectrum of the purified product of entry 1, Table 3; (3) ^{13}C NMR spectrum of the purified product of entry 1, Table 3.



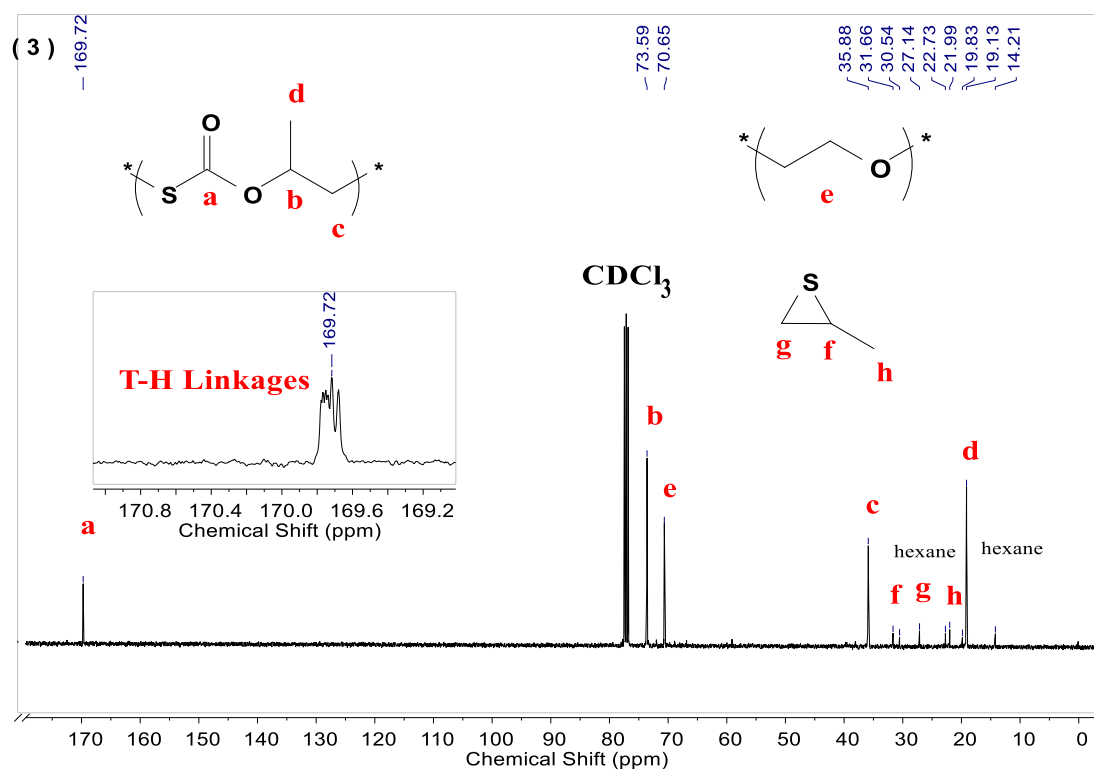
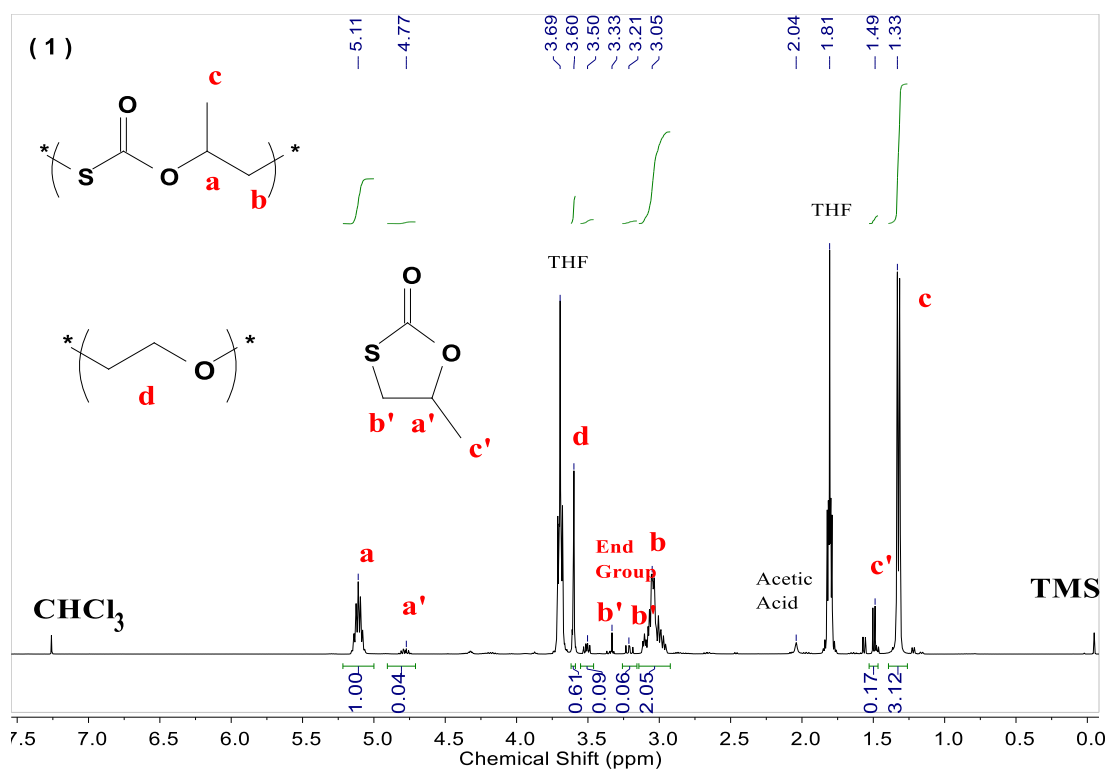


Figure S26. (1) ¹H NMR spectrum of the crude product of entry 2, Table 3; (2) ¹H NMR spectrum of the purified product of entry 2, Table 3; (3) ¹³C NMR spectrum of the purified product of entry 2, Table 3.



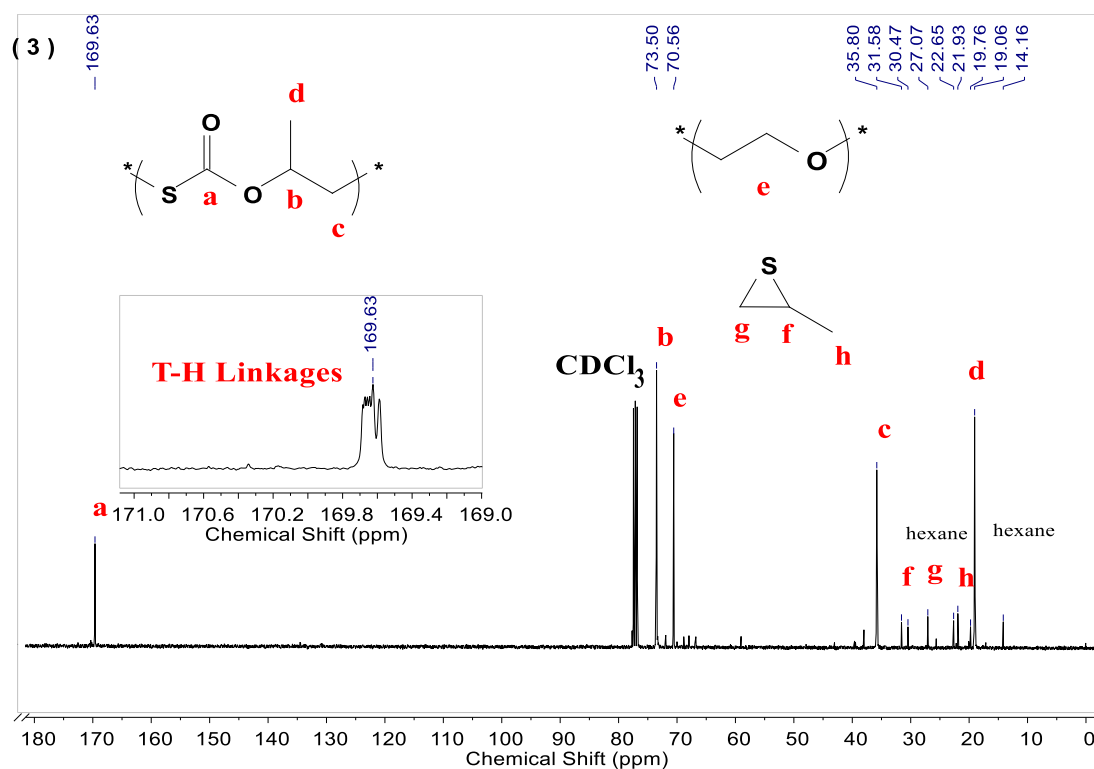
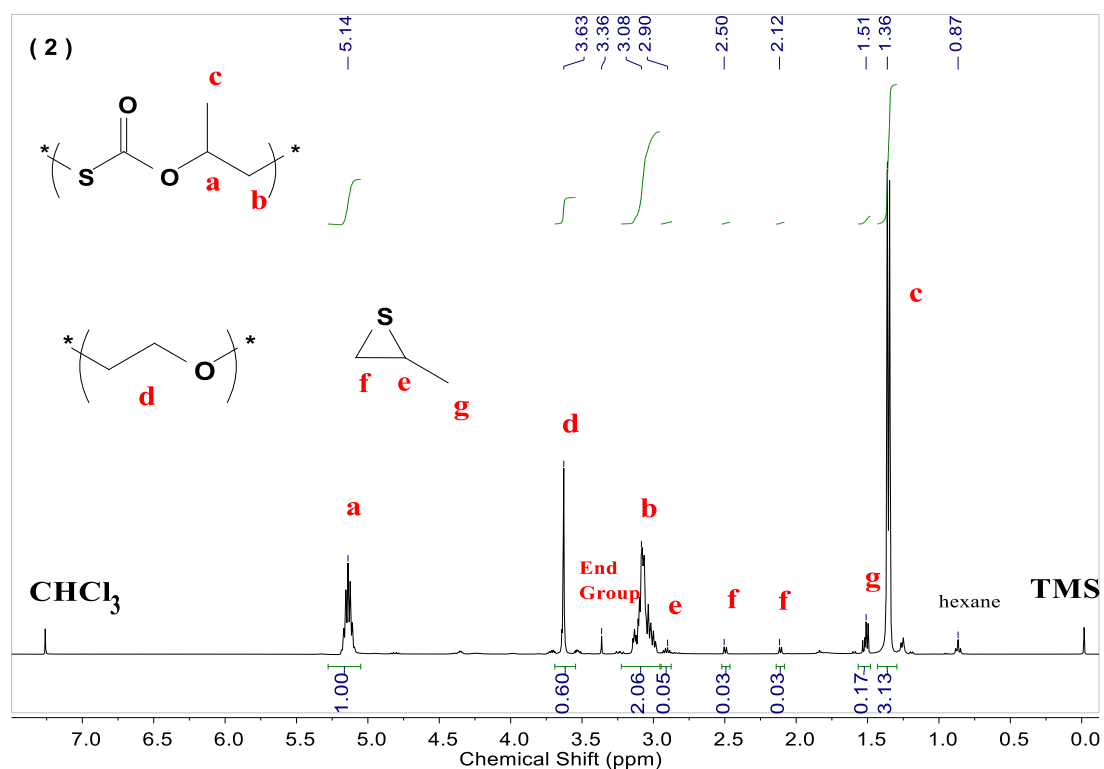


Figure S27. (1) ^1H NMR spectrum of the crude product of entry 3, Table 3; (2) ^1H NMR spectrum of the purified product of entry 3, Table 3; (3) ^{13}C NMR spectrum of the purified product of entry 3, Table 3.

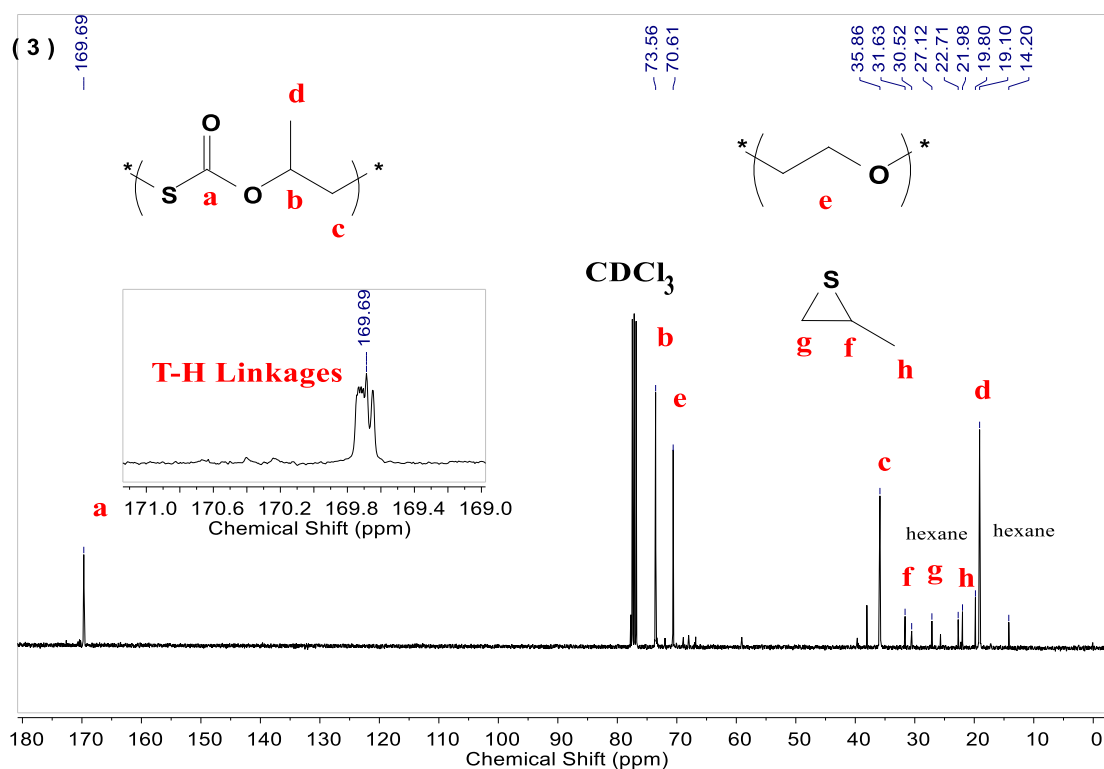
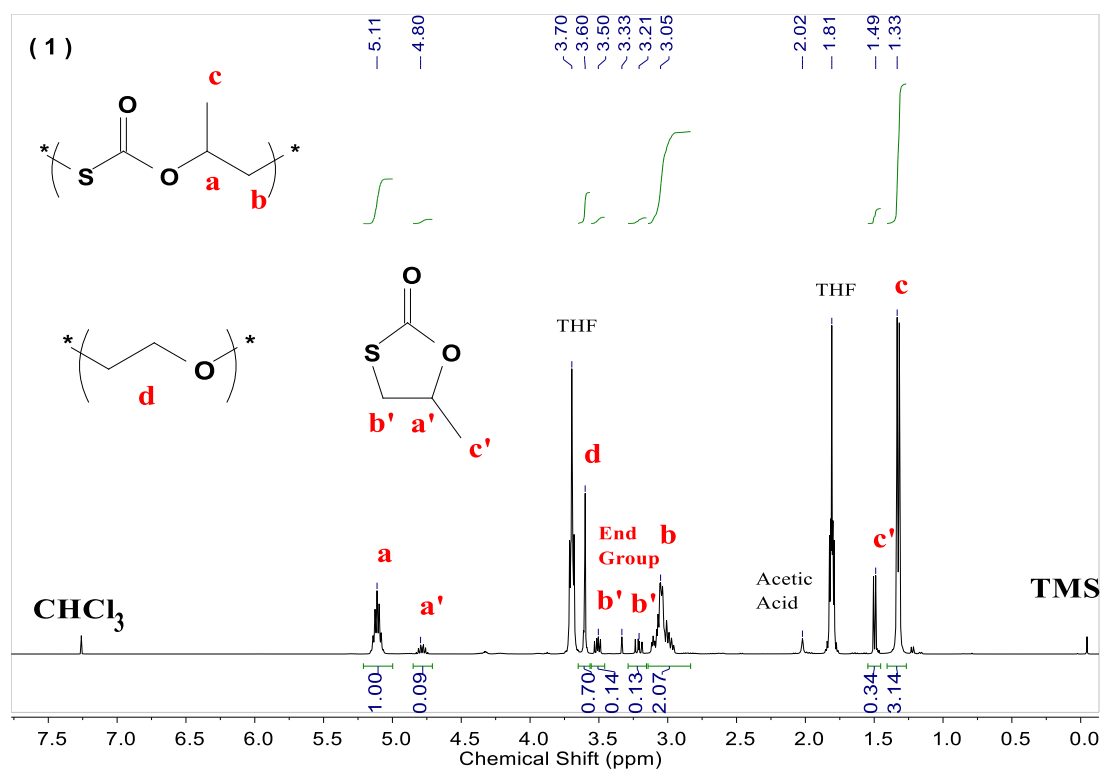


Figure S28. (1) ¹H NMR spectrum of the crude product of entry 4, Table 3; (2) ¹H NMR spectrum of the purified product of entry 4, Table 3; (3) ¹³C NMR spectrum of the purified product of entry 4, Table 3.



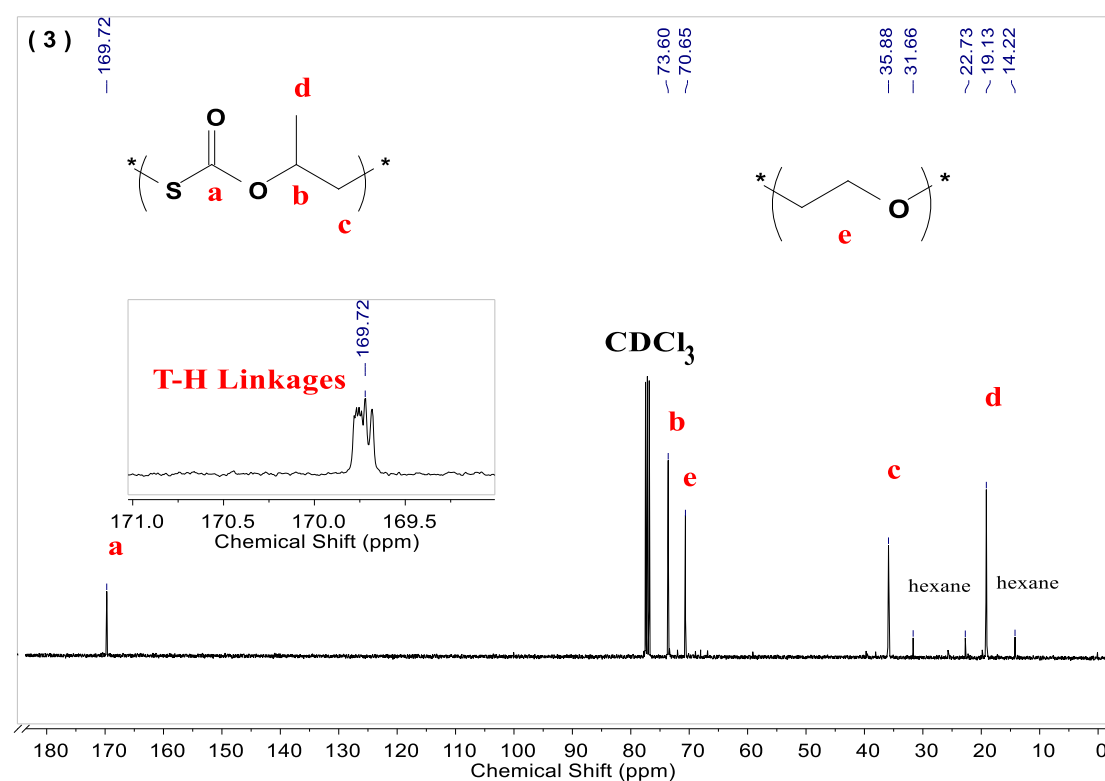
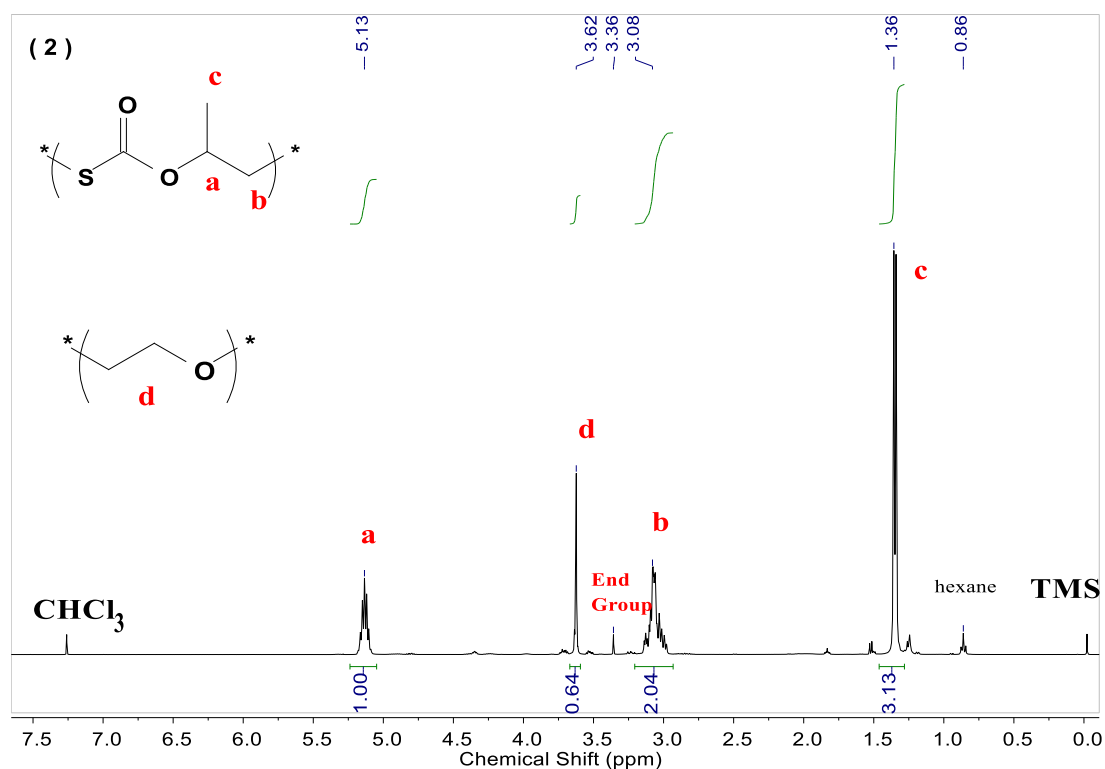


Figure S29. (1) ^1H NMR spectrum of the crude product of entry 5, Table 3; (2) ^1H NMR spectrum of the purified product of entry 5, Table 3; (3) ^{13}C NMR spectrum of the purified product of entry 5, Table 3.

TGA curve of tri-block copolymer

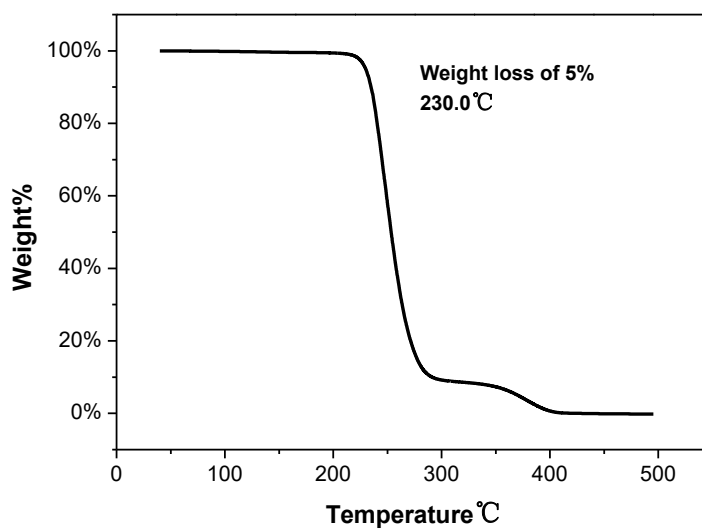


Figure S30. TGA curve of the ABA tri-block copolymer, entry 3, Table2