

## Supporting information

for

### Syntheses of quaternary ammonium containing trithiocarbonate

### RAFT agents and hemi-telechelic cationomers

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This supporting information contains a) the <sup>1</sup>H NMR and ESI spectra of synthesized compounds (Br-NMe<sub>3</sub>, Br-NBu<sub>3</sub>, RAFT-NMe<sub>3</sub>, RAFT-NBu<sub>3</sub>); b) the pseudo-first order kinetic curve of bulk styrene polymerization with RAFT-NMe<sub>3</sub> and RAFT-NBu<sub>3</sub>; c) the kinetic data of bulk styrene polymerization with RAFT-NEt<sub>3</sub> at 65 °C; d) the <sup>1</sup>H NMR data of PBA and PDMAEA.

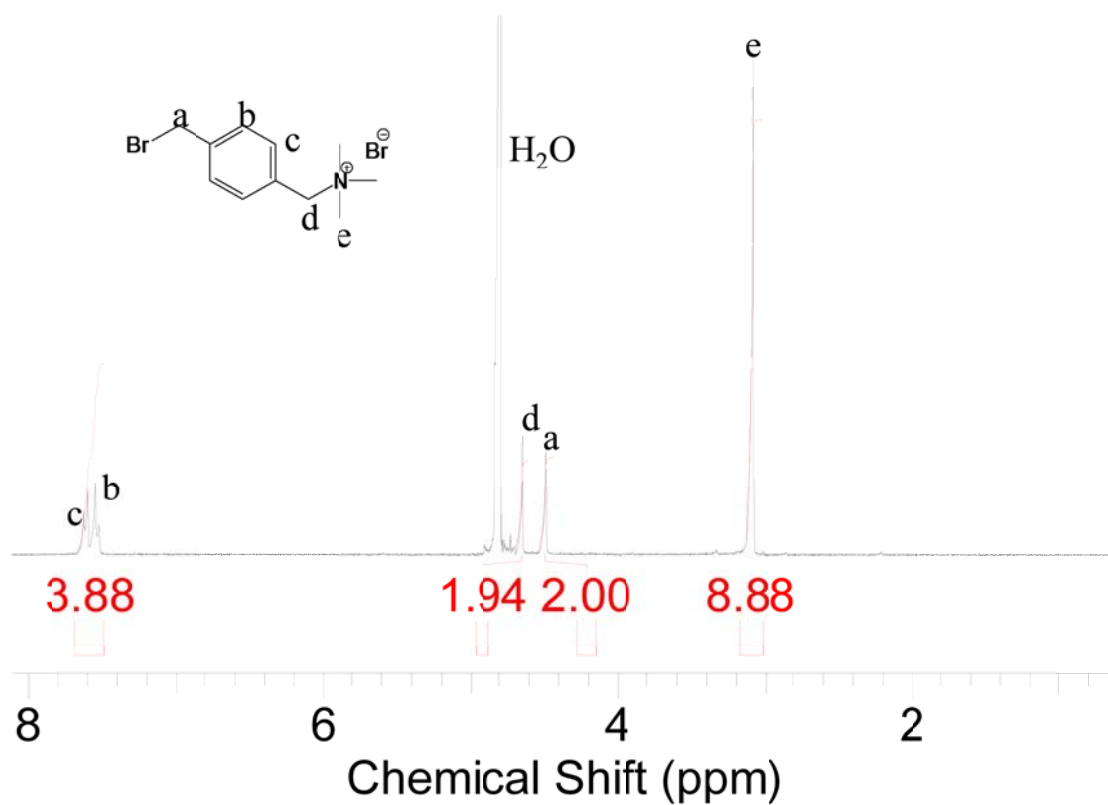


Figure S1. <sup>1</sup>H NMR spectrum in CDCl<sub>3</sub> of Br- Ph-NMe<sub>3</sub>.

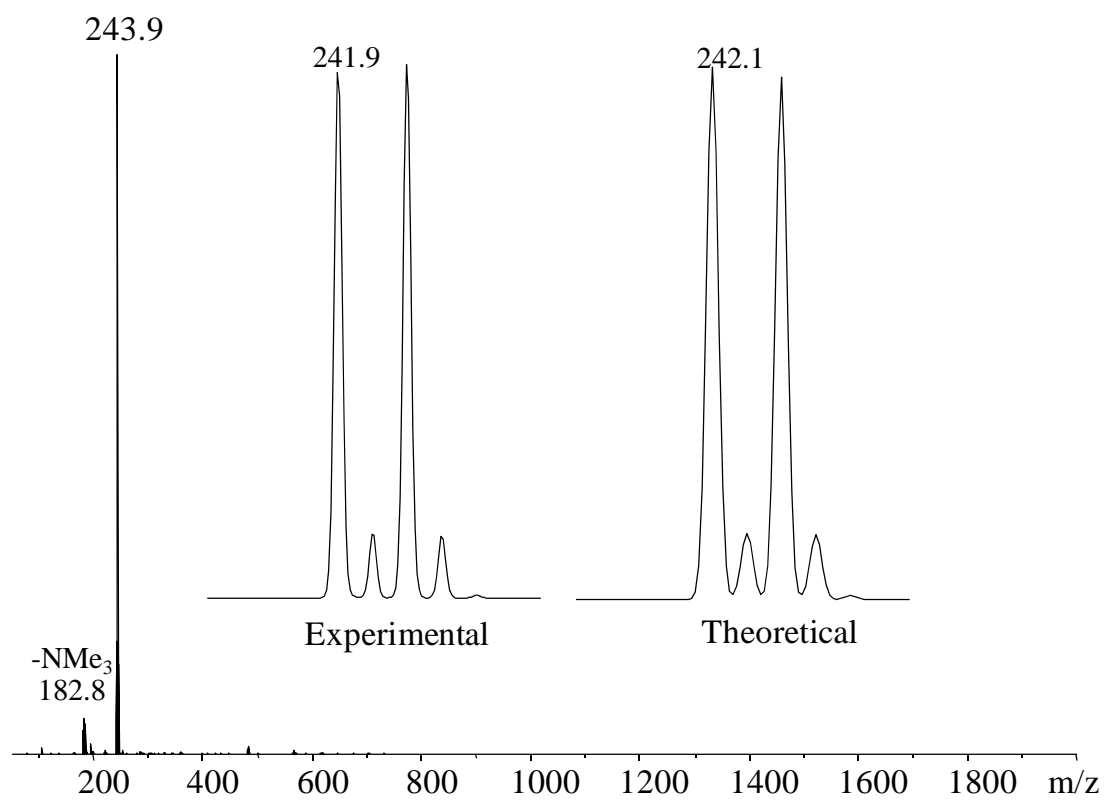


Figure S2. ESI mass spectrum of Br- Ph-NMe<sub>3</sub>.

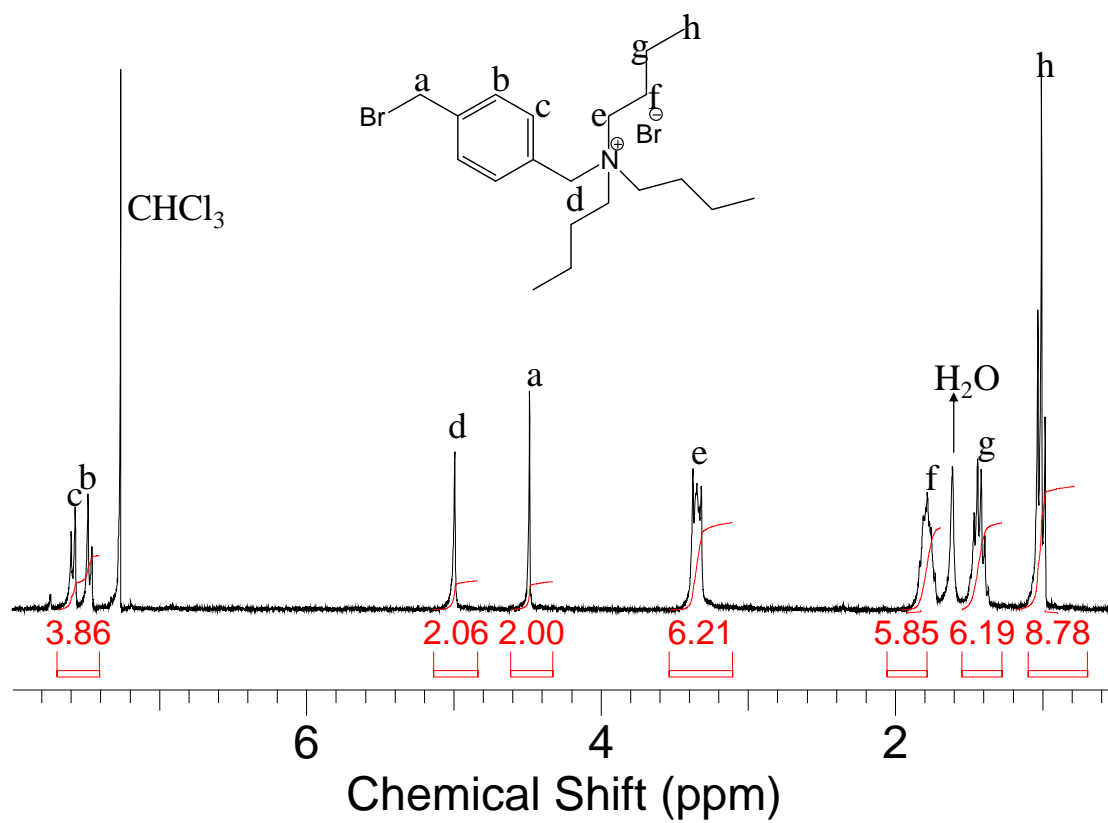


Figure S3.  $^1\text{H}$  NMR spectrum in  $\text{CDCl}_3$  of  $\text{Br- Ph-NBu}_3$ .

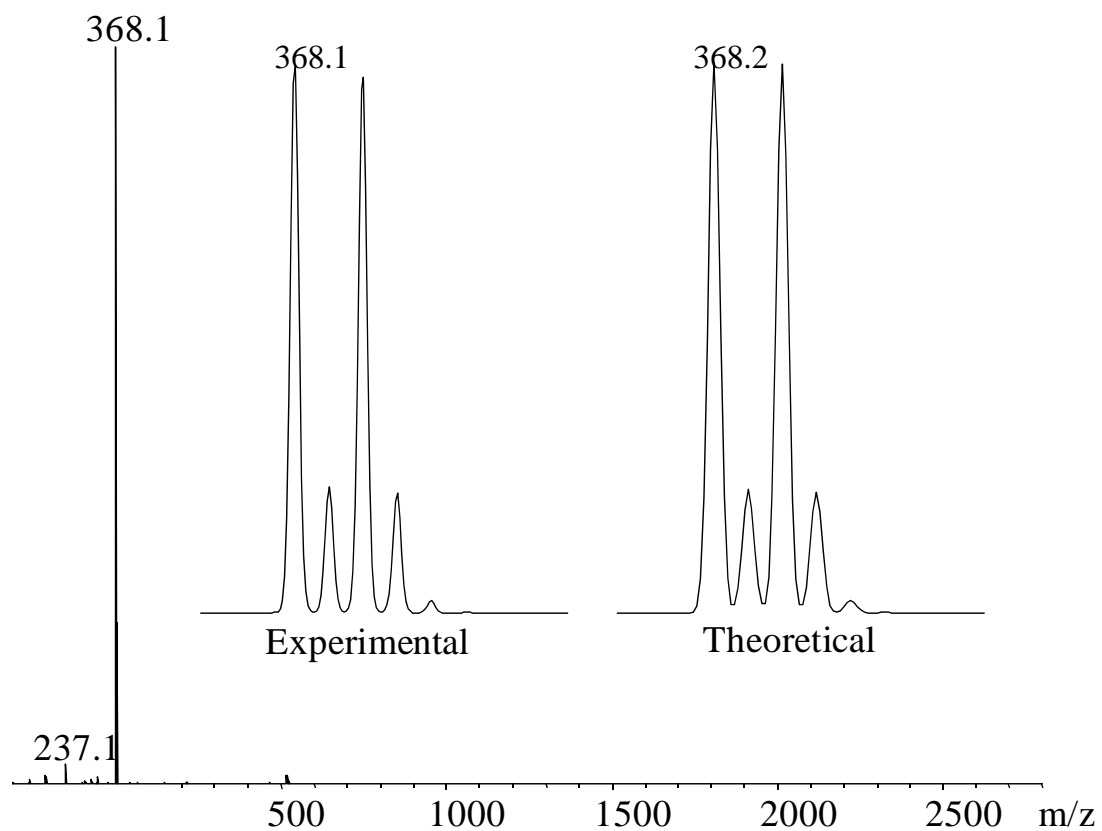


Figure S4. ESI mass spectrum of Br- Ph-NBu<sub>3</sub>. The peak at  $m/z$  237.1 is due to the di-substituted compounds.

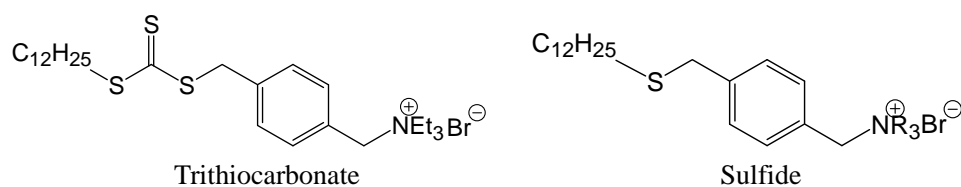


Figure S5. Chemical Structure of RAFT-NEt<sub>3</sub> and the potential sulfide by-product.

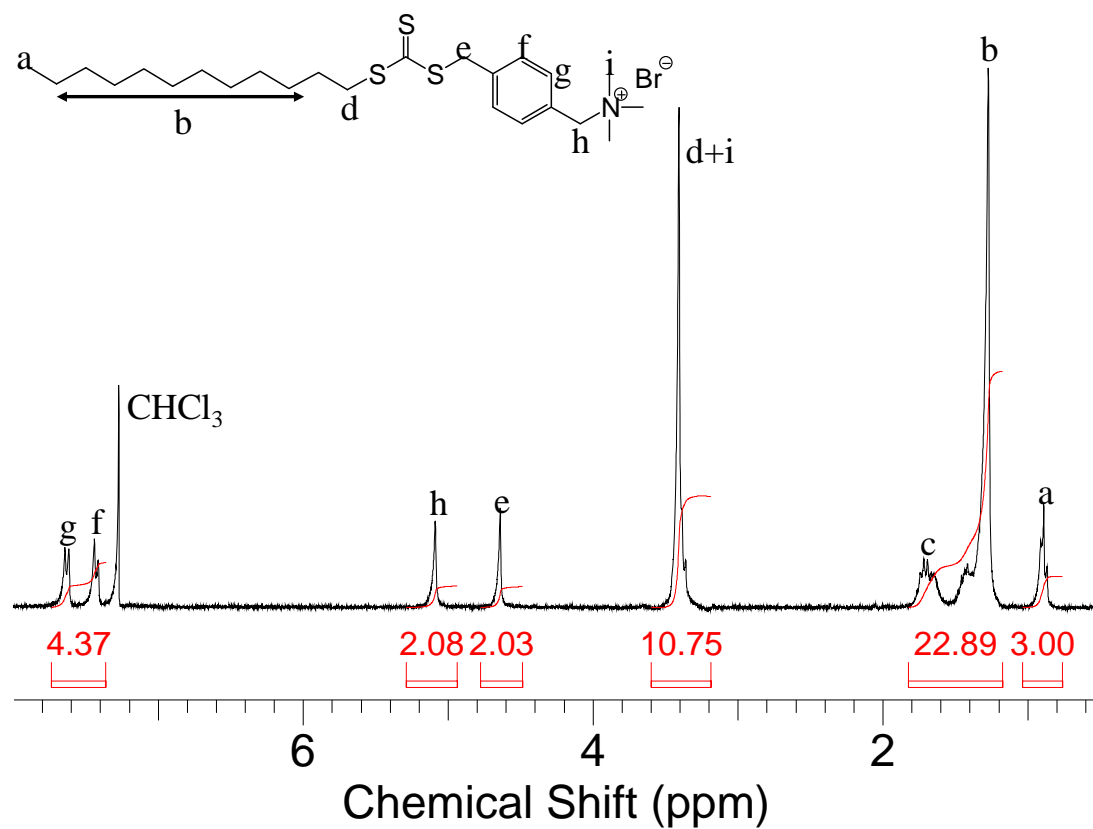


Figure S6. <sup>1</sup>H NMR spectrum in CDCl<sub>3</sub> of RAFT-NMe<sub>3</sub>.

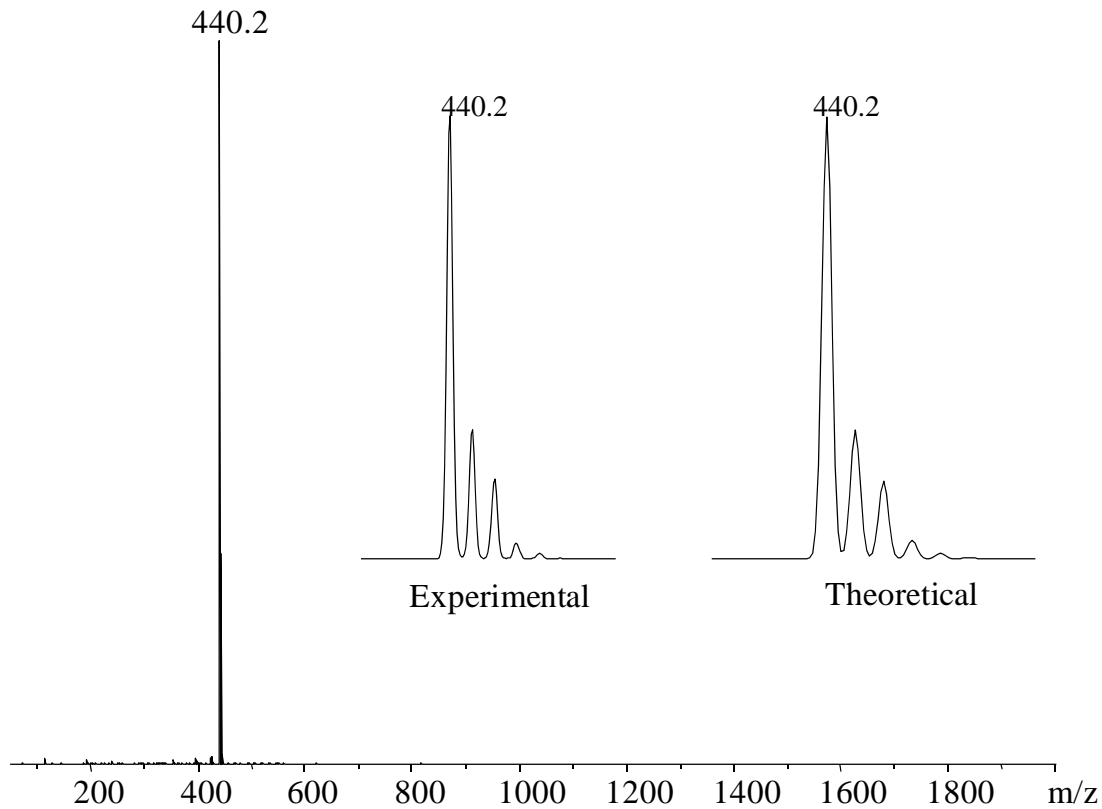


Figure S7. ESI mass spectrum of RAFT-NMe<sub>3</sub>.

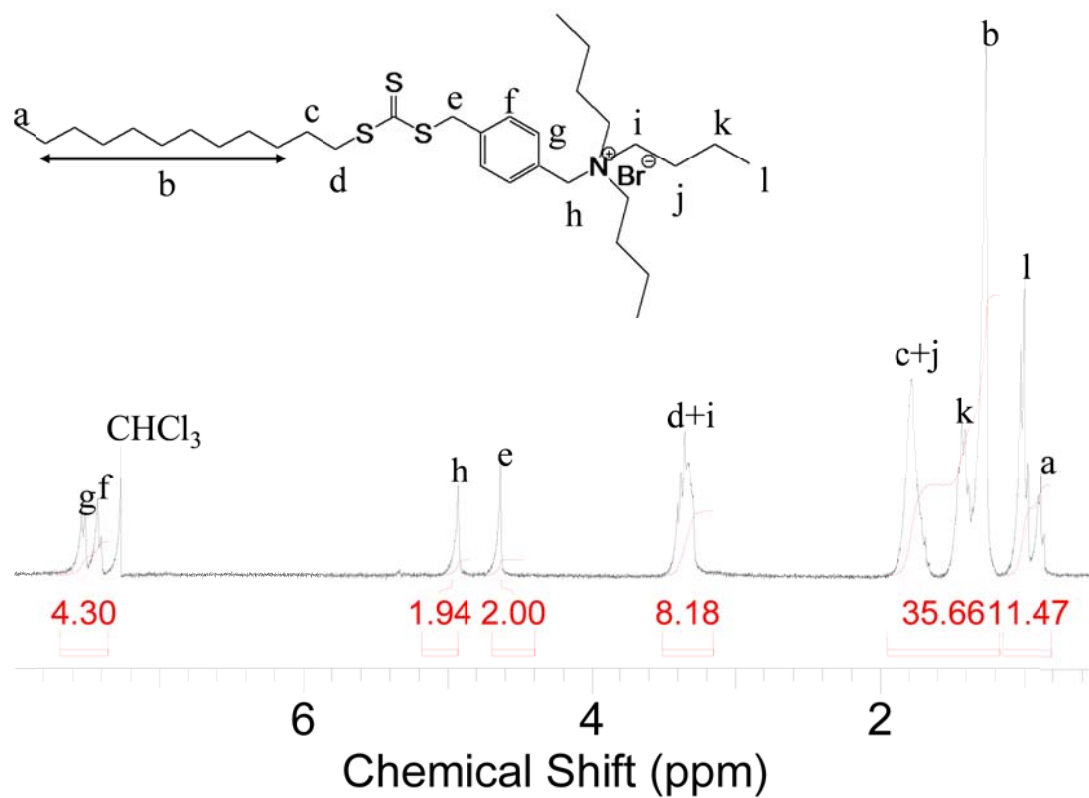


Figure S8. <sup>1</sup>H NMR spectrum in CDCl<sub>3</sub> of RAFT-NBu<sub>3</sub>.

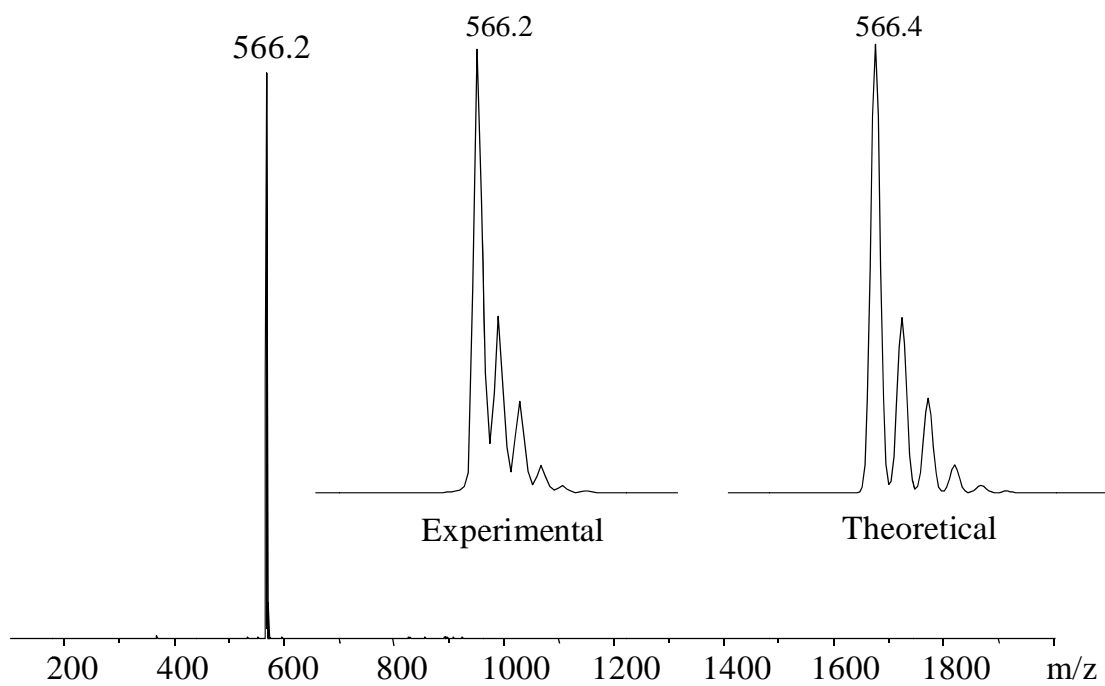


Figure S9. ESI mass spectrum of RAFT-NBu<sub>3</sub>.

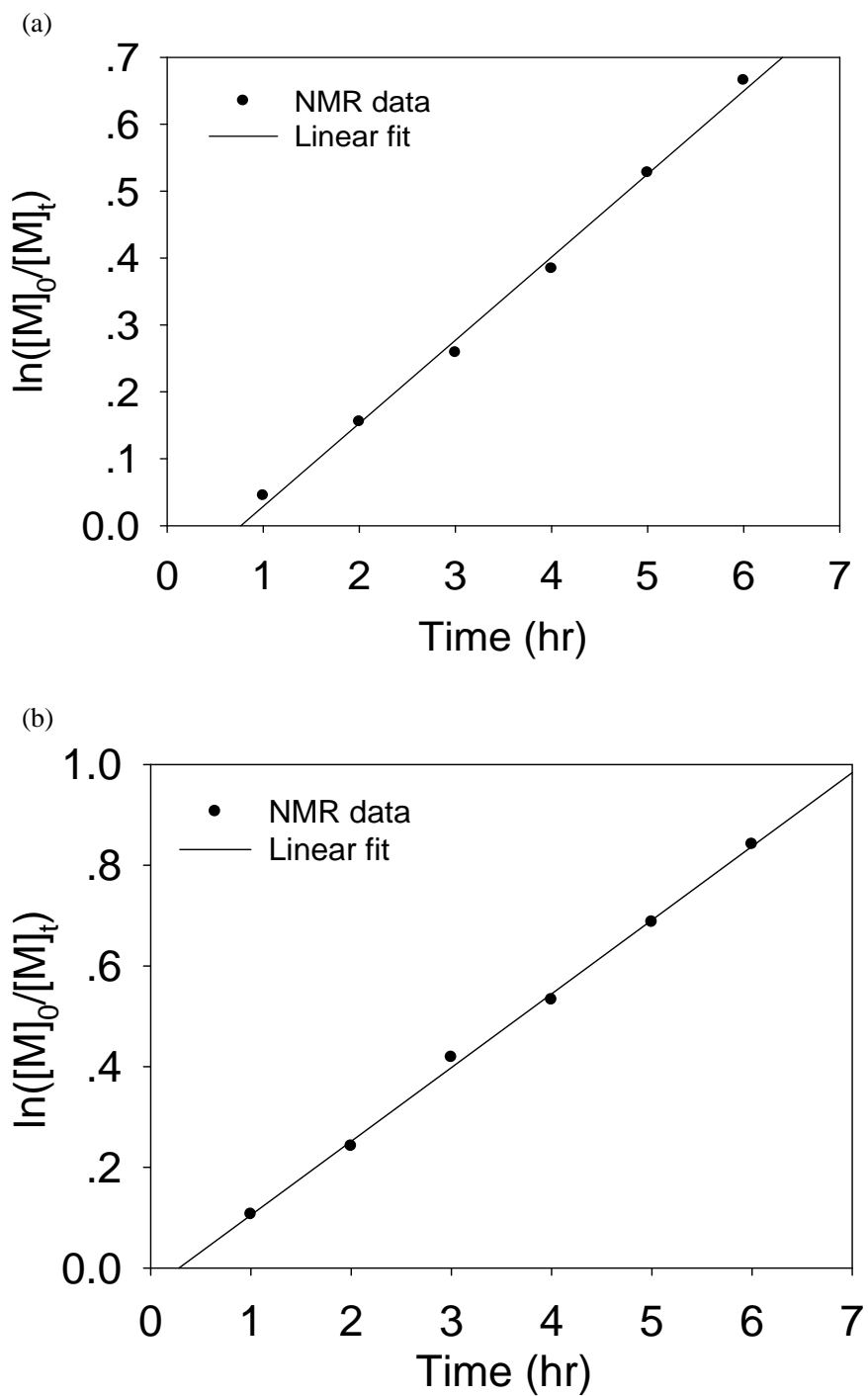


Figure S10. Pseudo first-order kinetic plot for the RAFT bulk polymerization of styrene at 120 °C with a) RAFT-NMe<sub>3</sub> and b) RAFT-NBu<sub>3</sub>. Target molecular weight is 25 kDa. The solid line is a linear fit to the data.



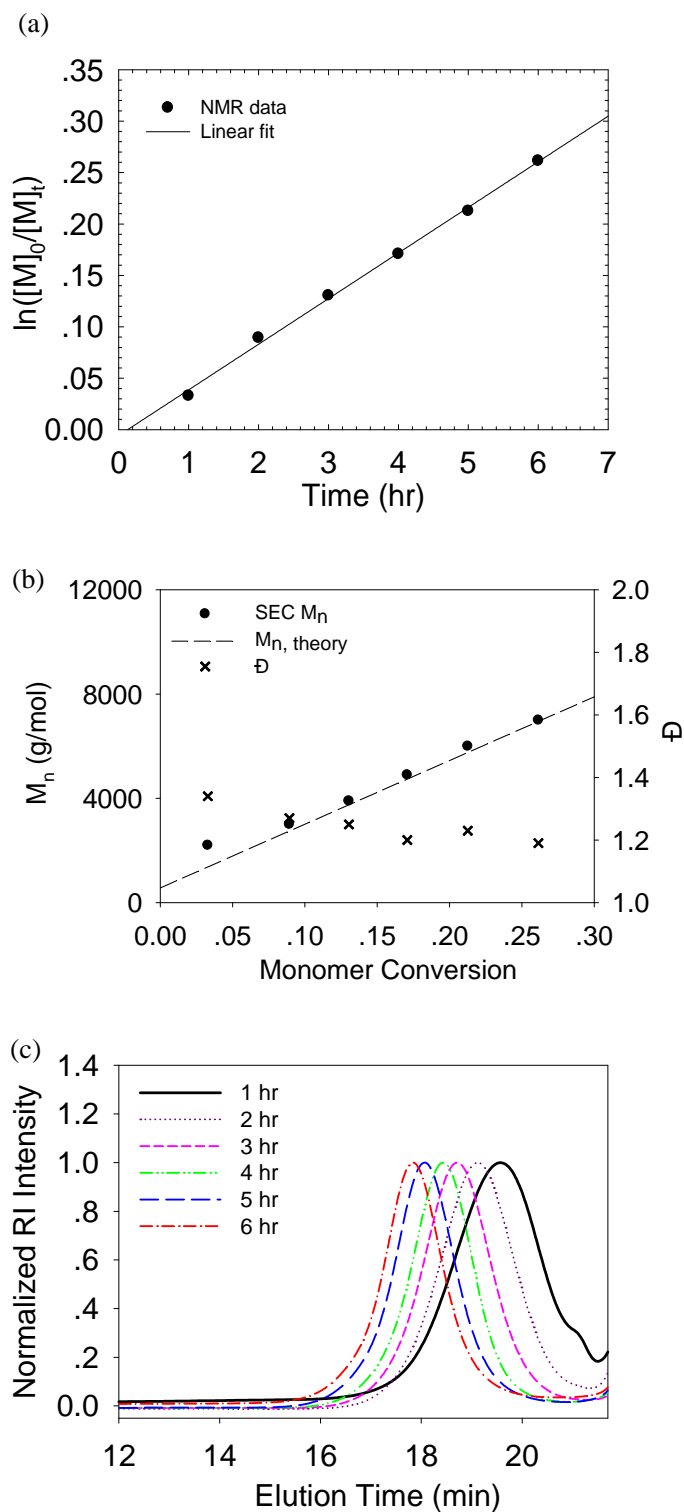


Figure S11. (a) Pseudo first-order kinetic plot for the RAFT bulk polymerization of styrene at 65 °C with RAFT-NEt<sub>3</sub>. Target molecular weight is 25 kDa. The solid line is a linear fit to the data. (b) Plot of  $M_n$  (SEC) and  $\bar{D}$  versus monomer conversion and (c) SEC traces as a function of polymerization time for the same polymerization.

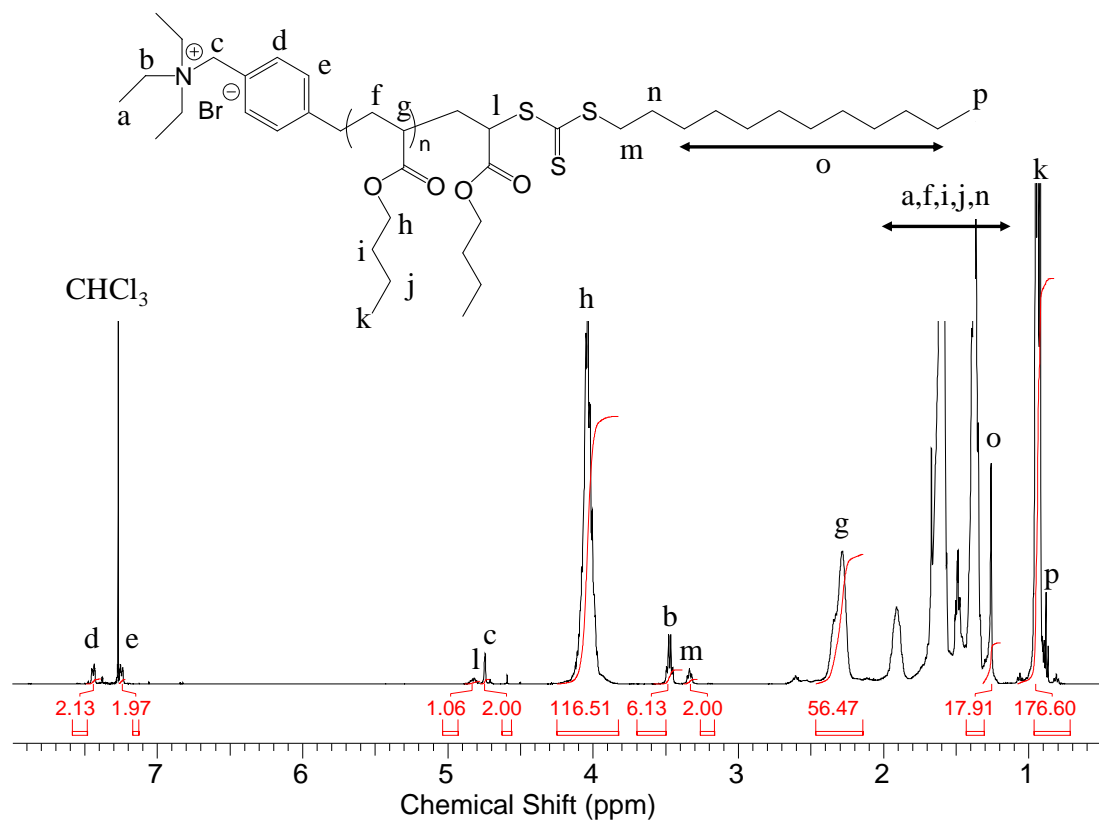


Figure S12. <sup>1</sup>H NMR spectrum of purified PBA (acetone fraction).

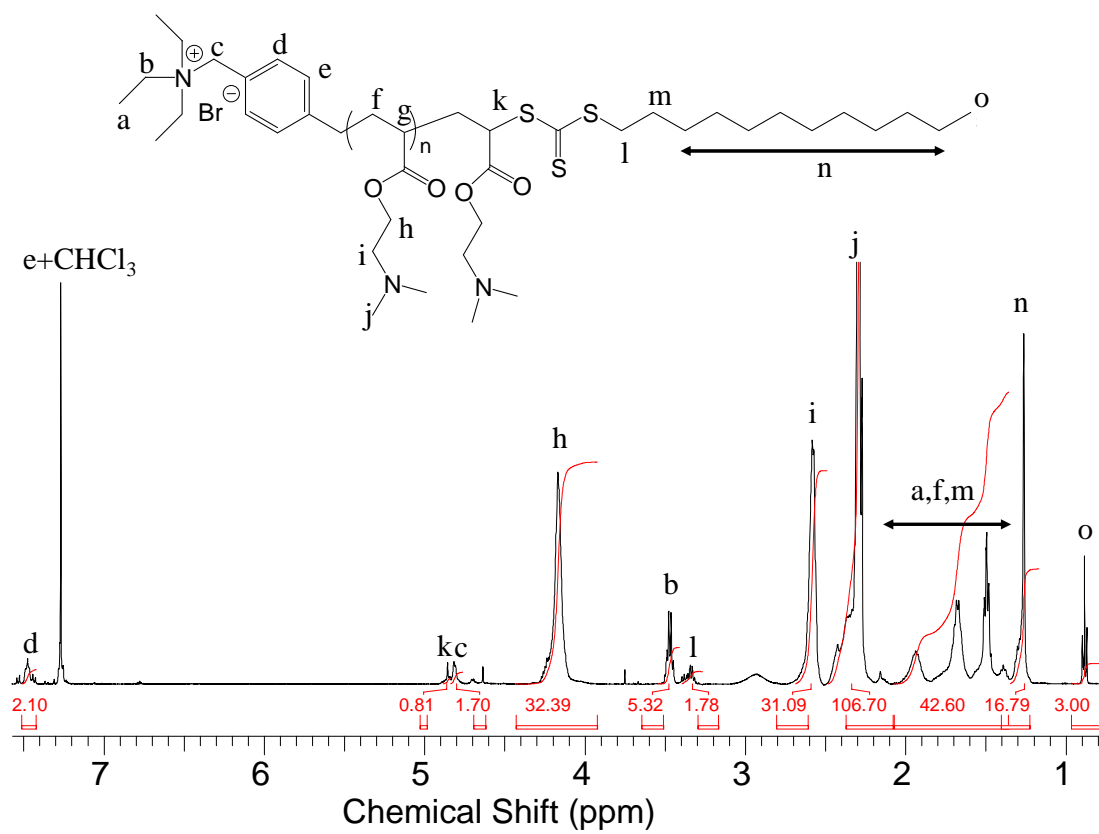


Figure S13. <sup>1</sup>H NMR spectrum of PDMAEA.