Supporting Information

Rare-Earth-Metal Complexes Supported by New Chiral Tetra-Azane Chelating Ligands: Synthesis, Characterization, and Catalytic Properties for Intramolecular Asymmetric Hydroamination

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Contents

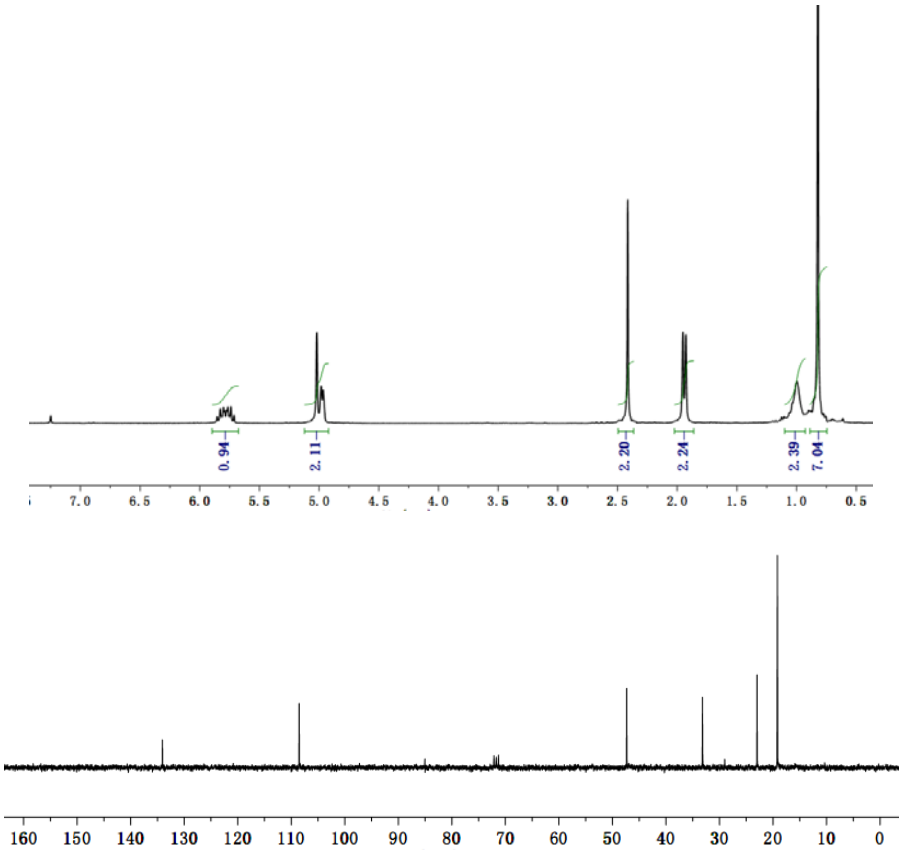


Figure S1. ^{1}H and ^{13}C NMR spectra of the substrate **S1** in $CDCl_3$

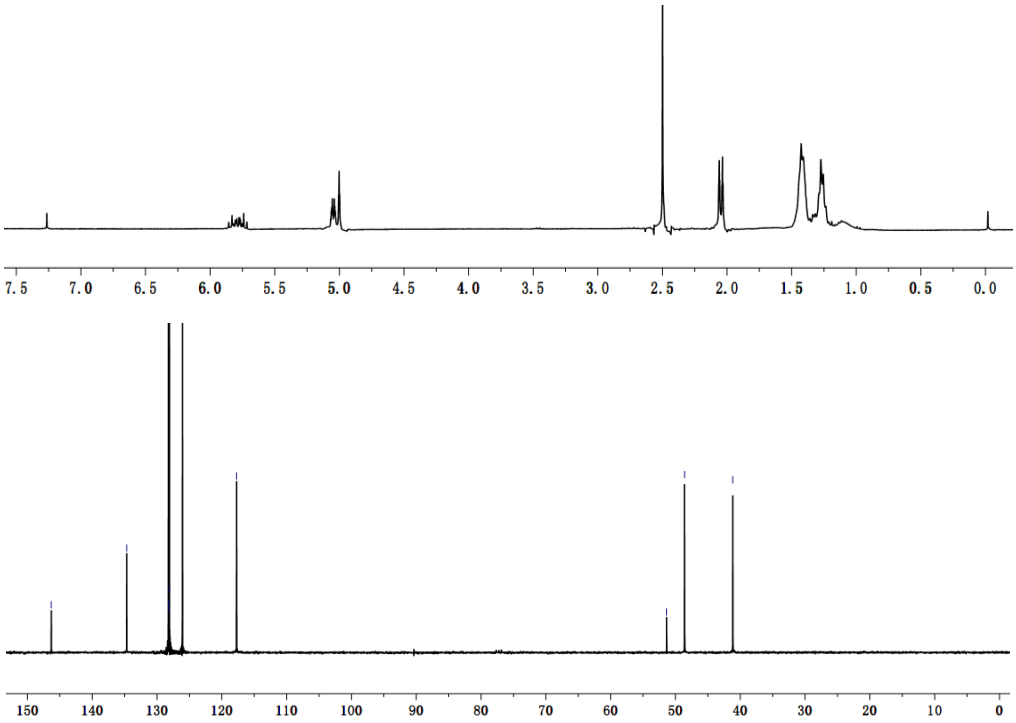


Figure S2. ^{1}H and ^{13}C NMR spectra of the substrate **S2** in $CDCl_3$.

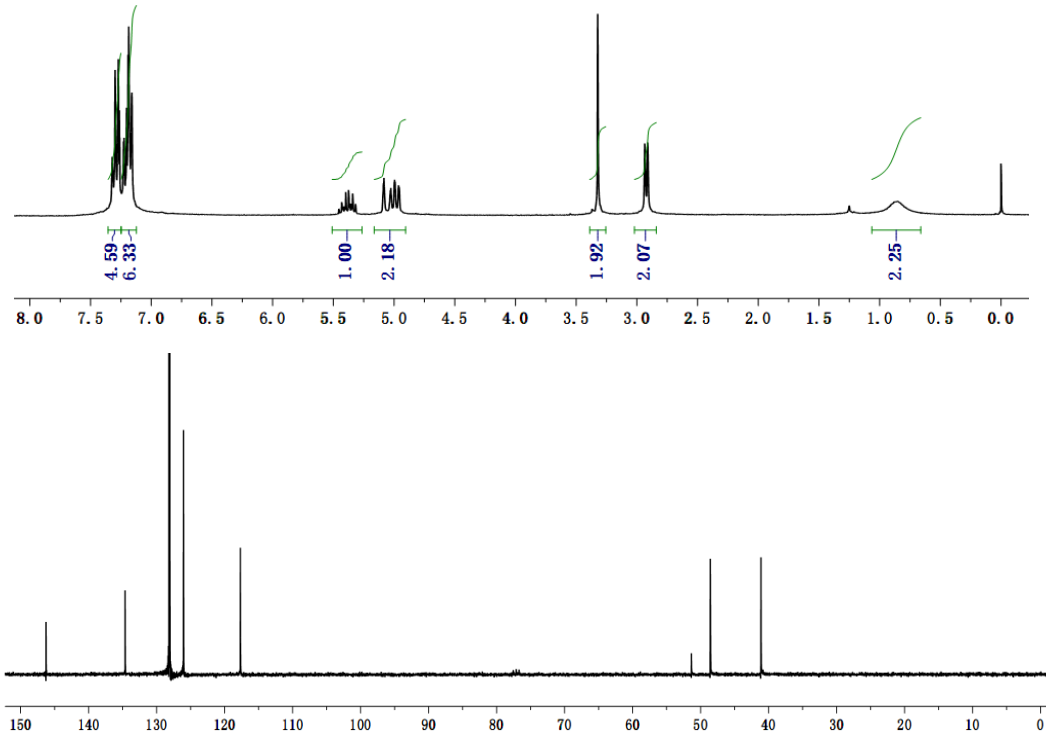


Figure S3. ^{1}H and ^{13}C NMR spectra of the substrate **S3** in $CDCl_3$.

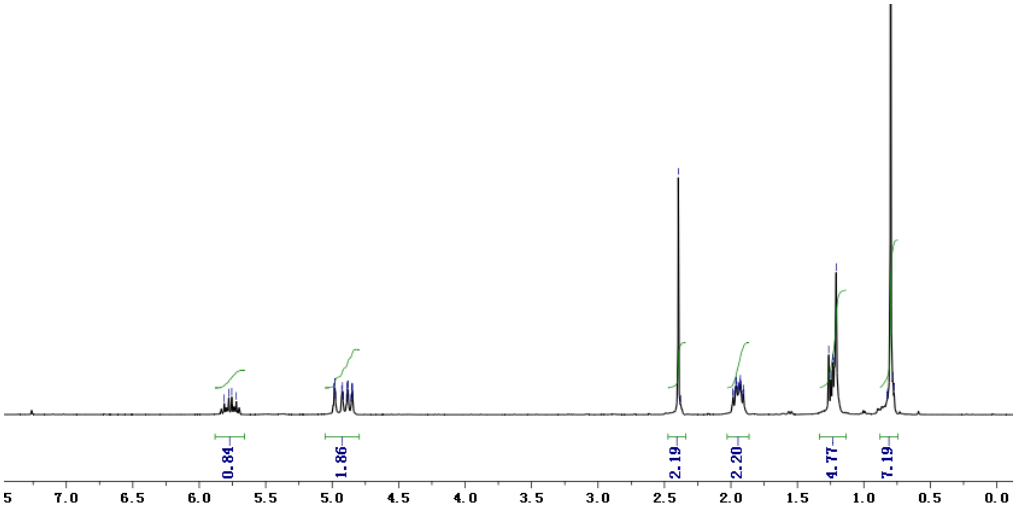


Figure S4. ^{1}H NMR spectra of the substrate **S4** in $CDCl_3$.

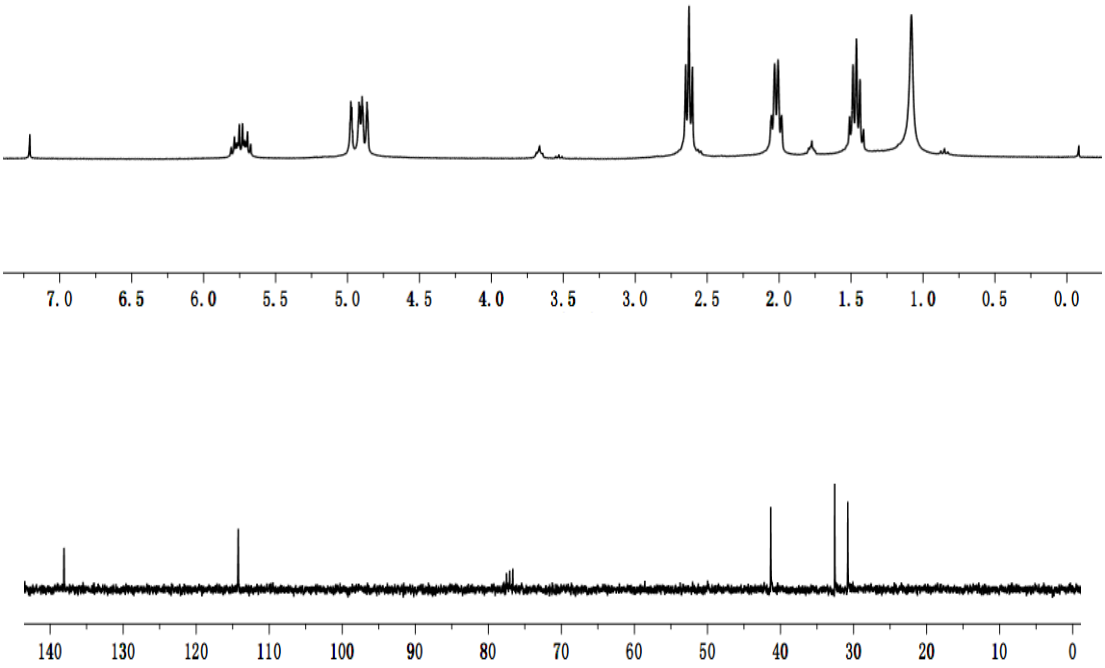


Figure S5. ^{1}H and ^{13}C NMR spectra of the substrate **S5** in $CDCl_3$.

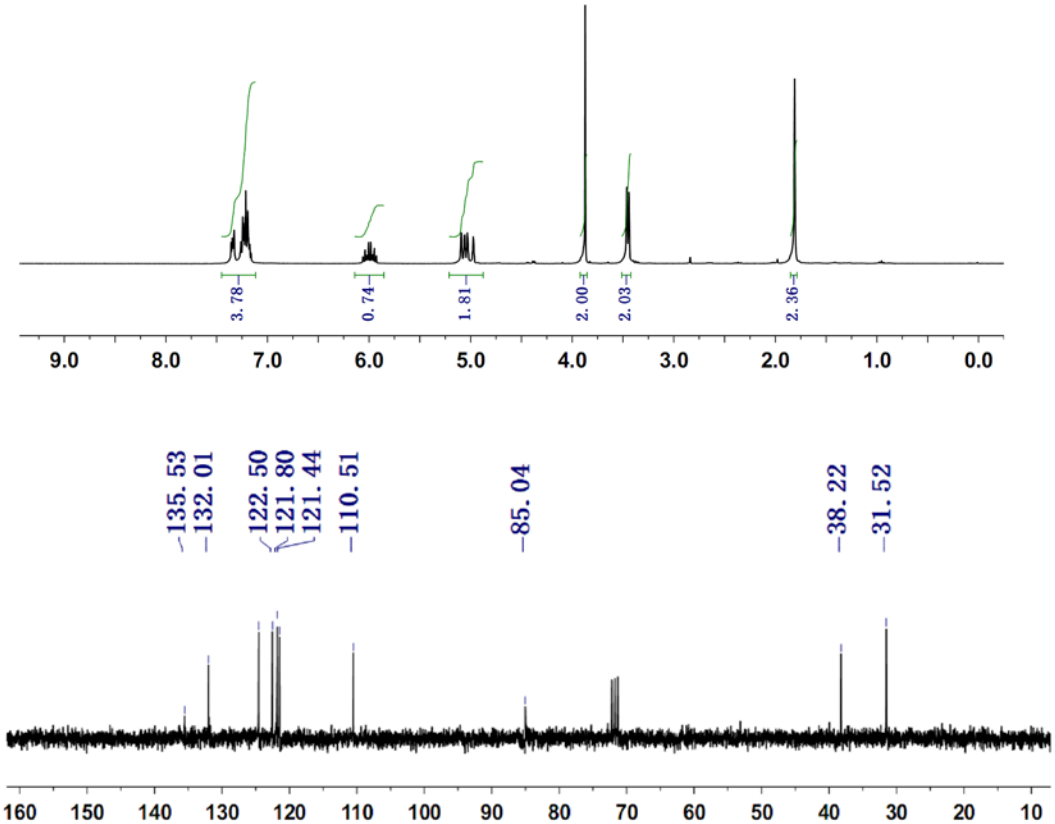


Figure S6. ^{1}H and ^{13}C NMR spectra of the substrate **S6** in $CDCl_3$.

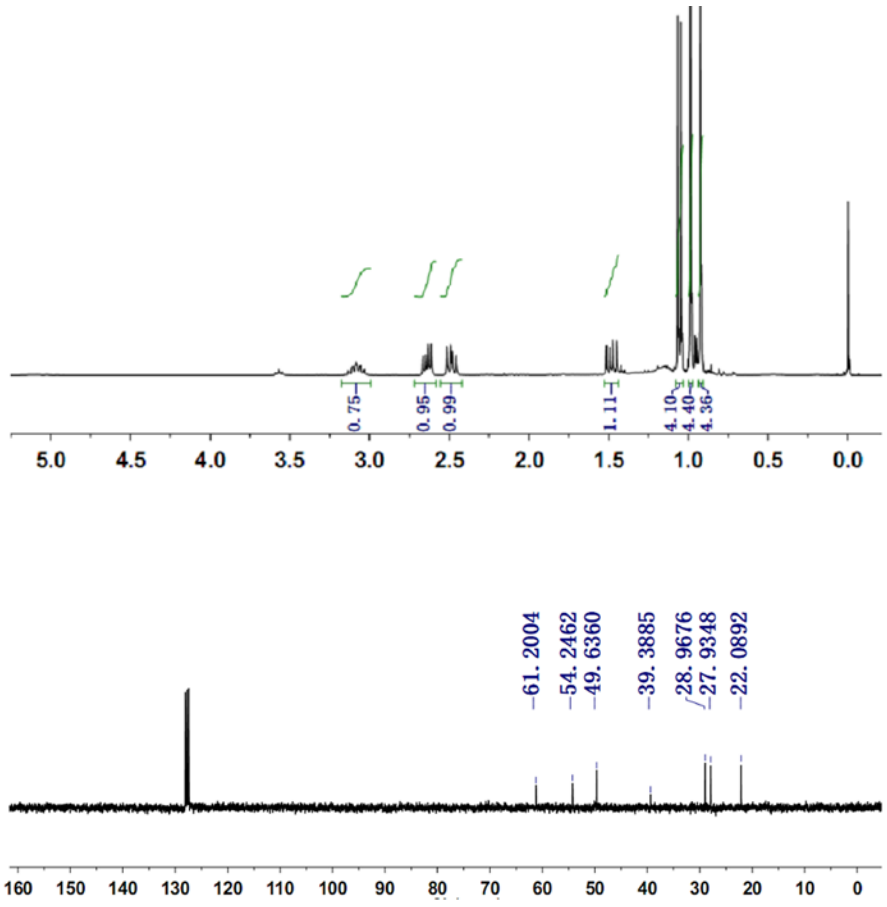


Figure S7. ^{1}H and ^{13}C NMR spectra of **P1** in C_6D_6.

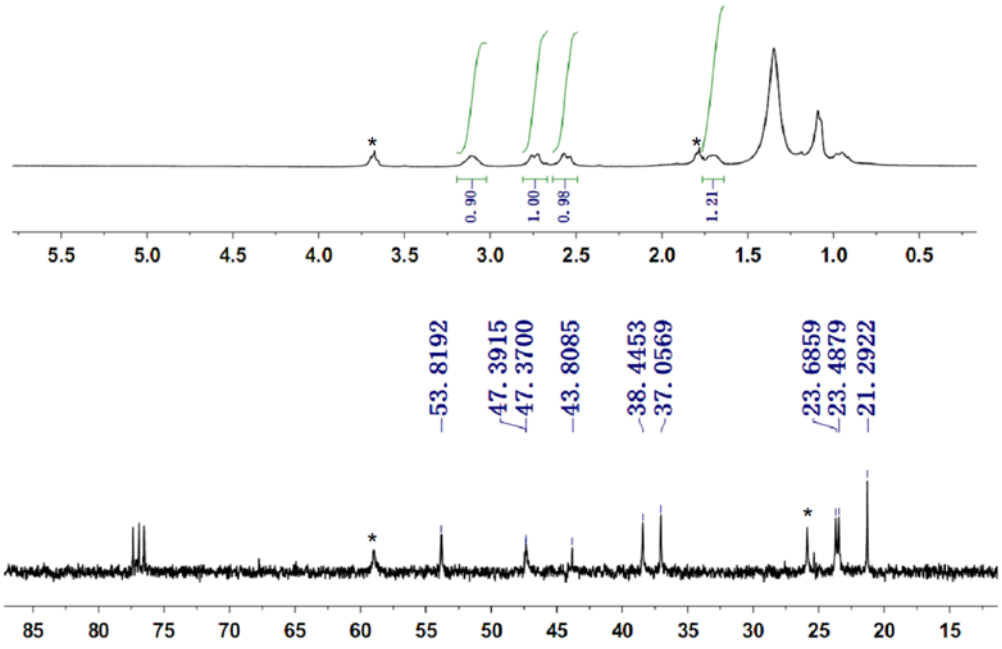


Figure S8. ^{1}H and ^{13}C NMR spectra of **P2** in $CDCl_3$.

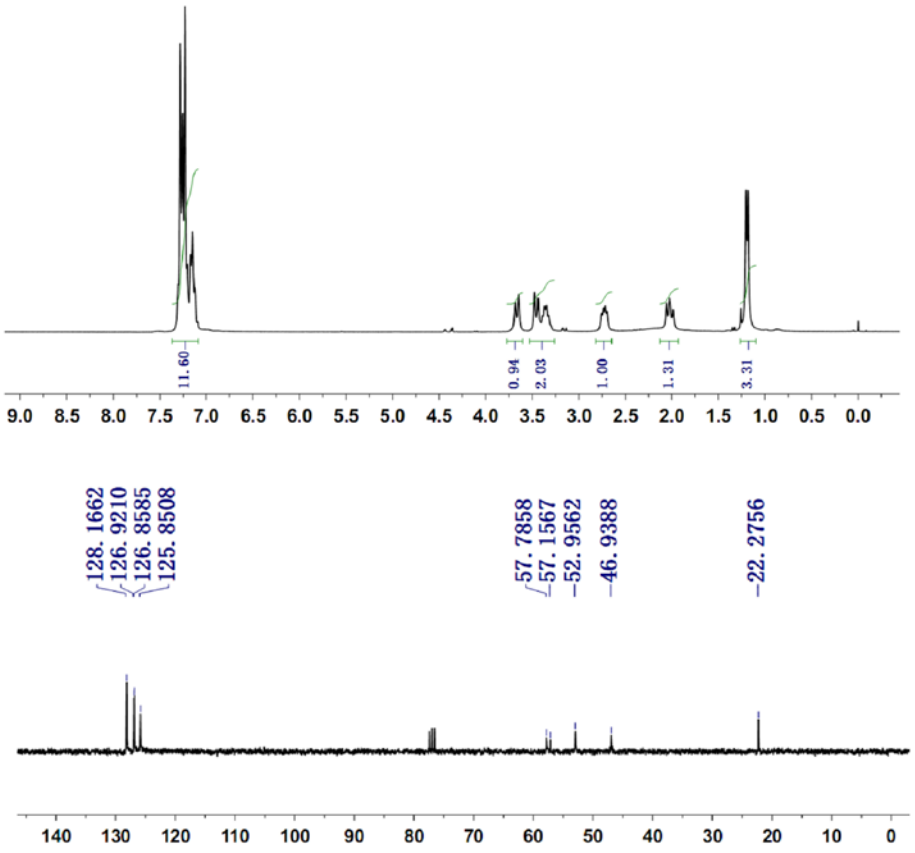


Figure S9. ^{1}H and ^{13}C NMR spectra of **P3** in $CDCl_3$

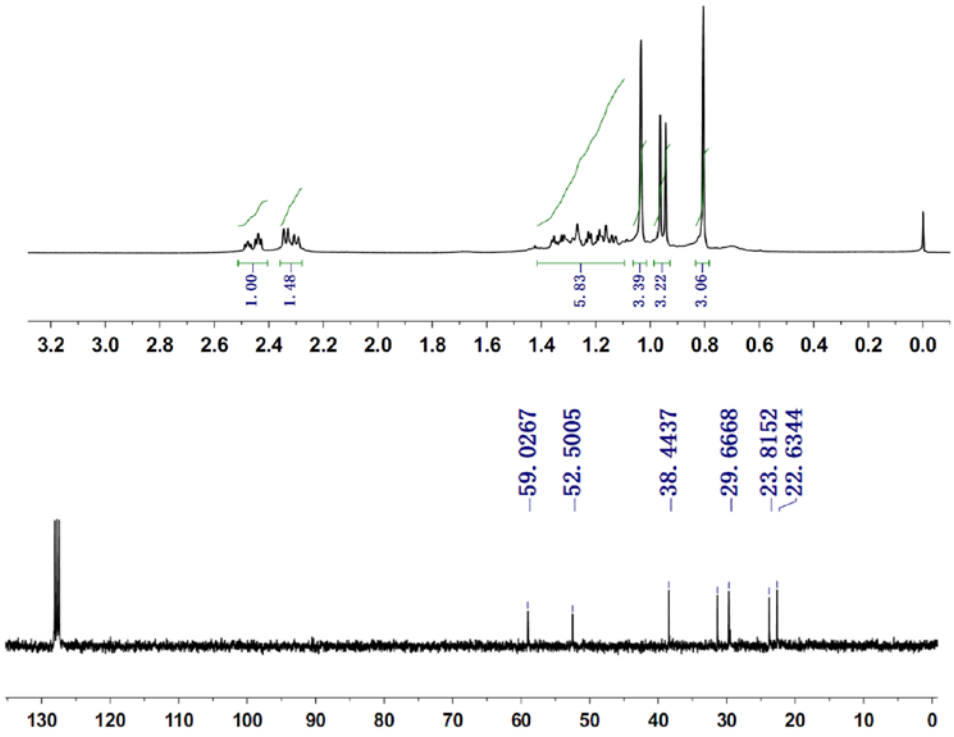
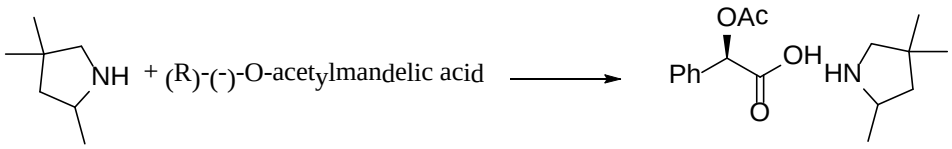


Figure S10. ^{1}H and ^{13}C NMR spectra of **P4** in C_6D_6.



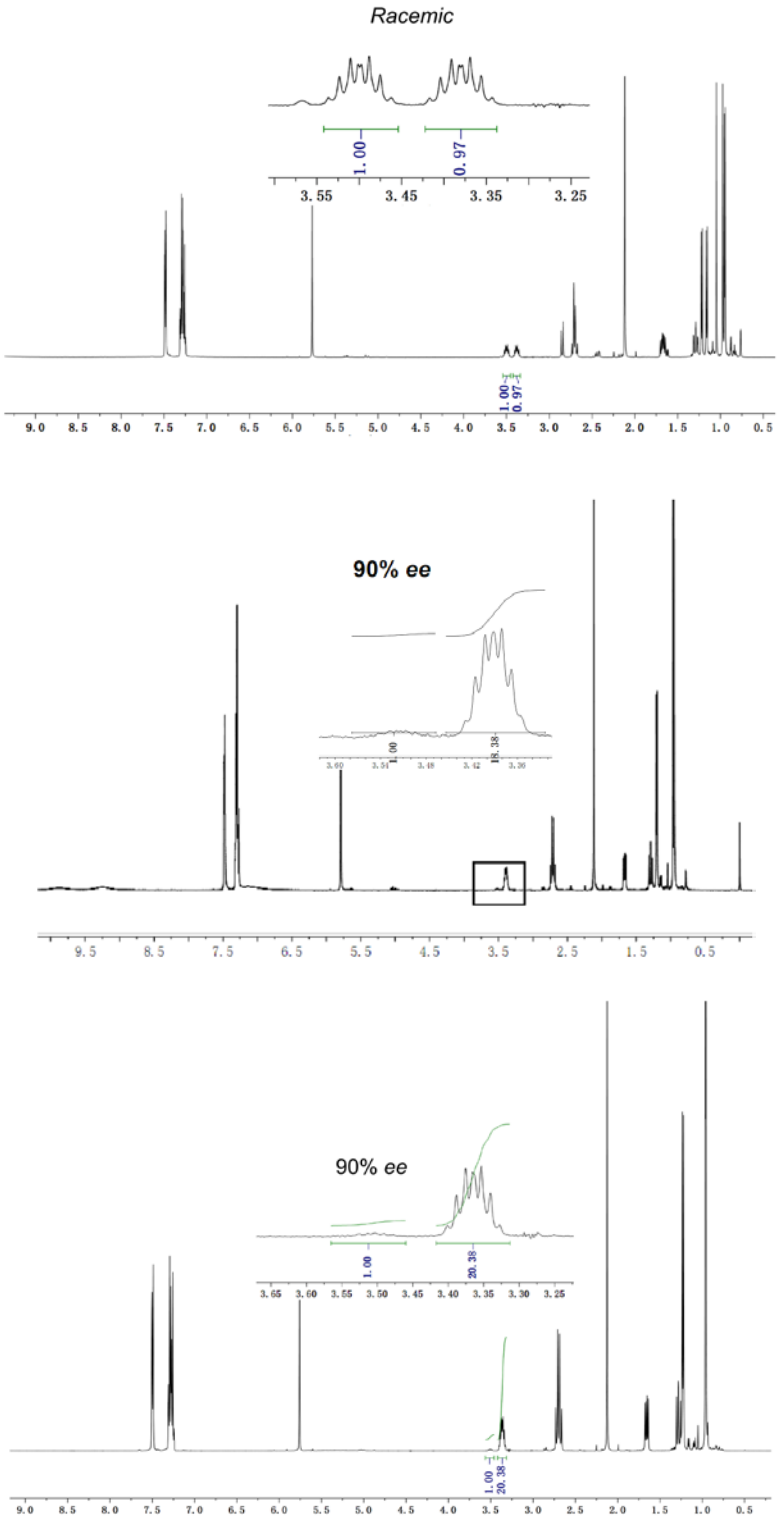


Figure S11. ^{1}H NMR spectrum of the mixture of **P1** and (R)-(-)-O-acetylmandelic acid in $CDCl_3$.

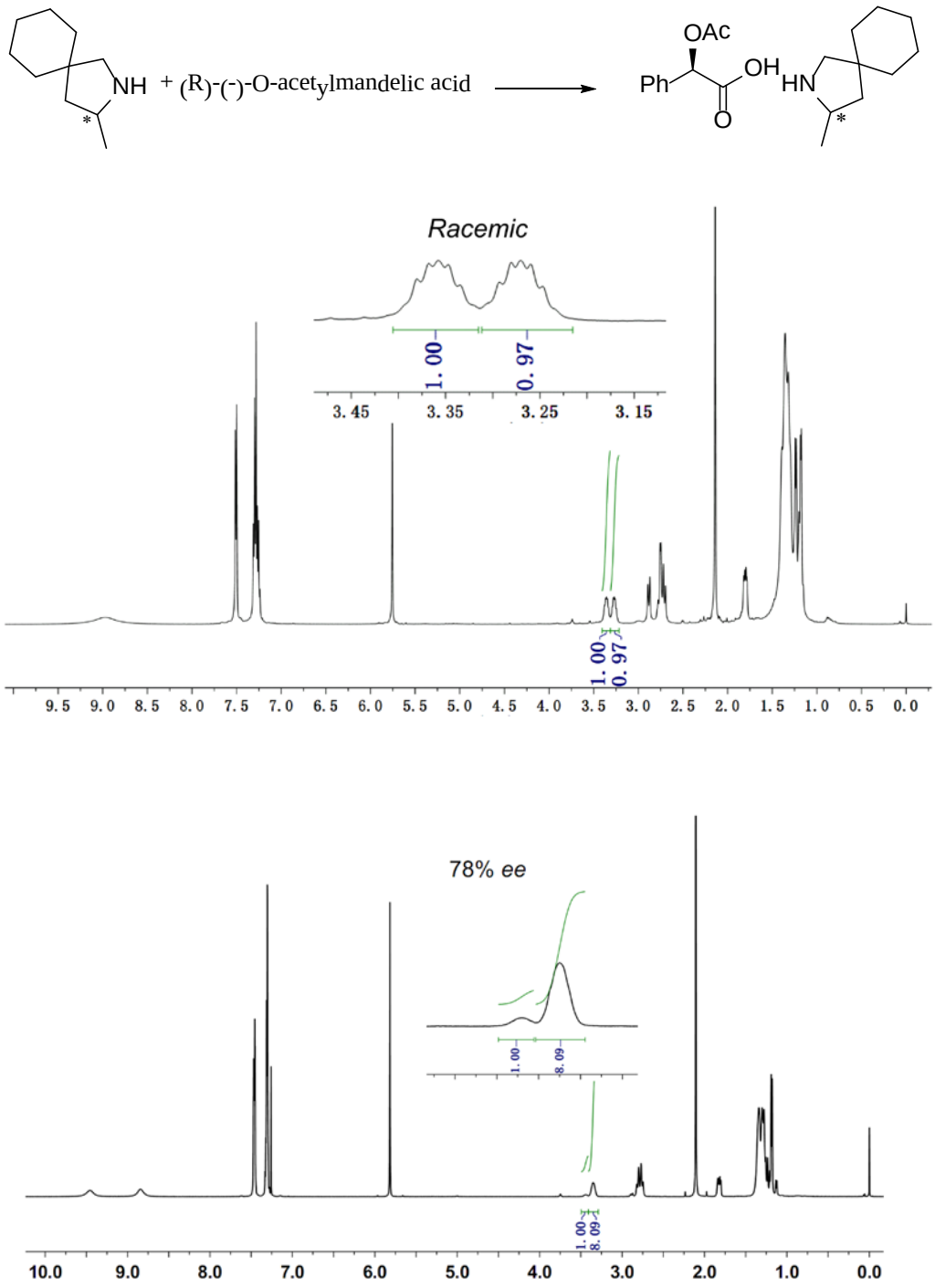


Figure S12. ^{1}H NMR spectrum of the mixture of **P2** and (R)-(-)-O-acetylmandelic acid in $CDCl_3$.

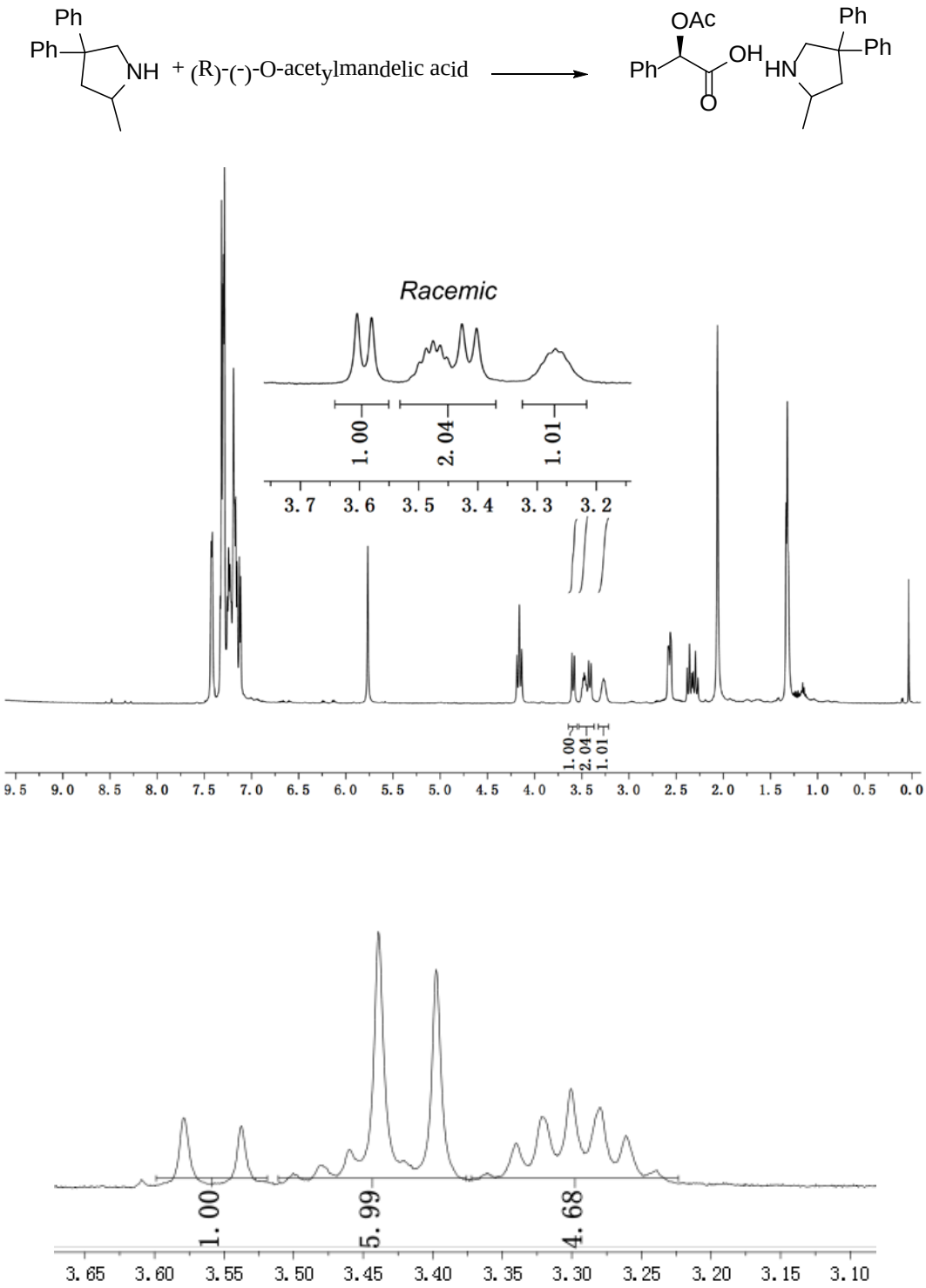


Figure S13. ^{1}H NMR spectrum of the mixture of **P3** and (R)-(-)-O-acetylmandelic acid in $CDCl_3$.

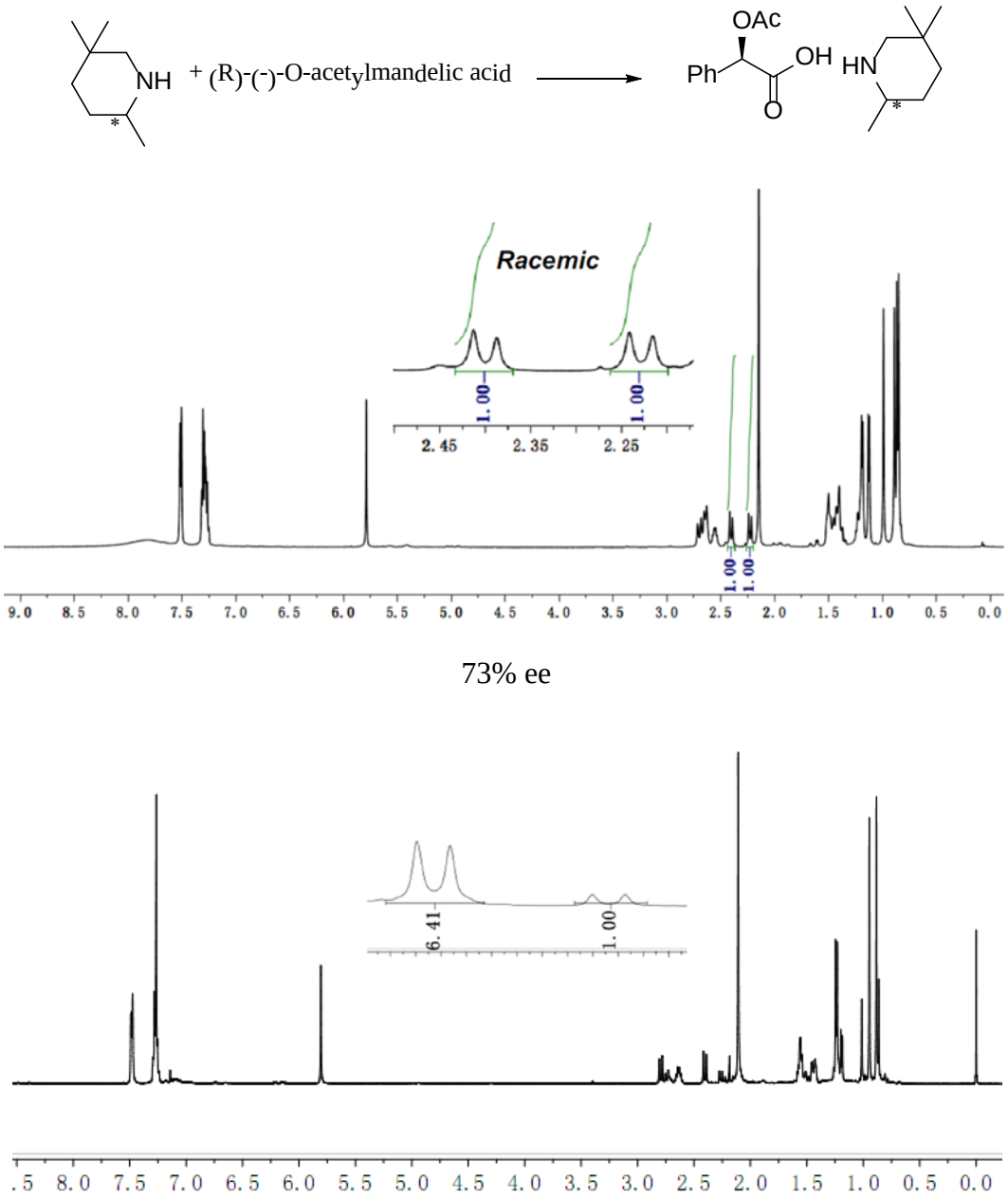
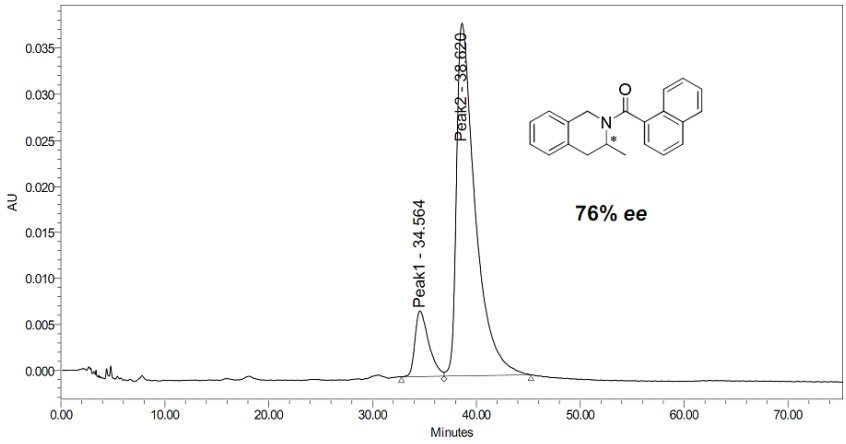


Figure S14. ^{1}H NMR spectrum of the mixture of **P4** and (R)-(-)-O-acetylmandelic acid in $CDCl_3$.



	Peak Name	RT (min)	Area (μV*sec)	% Area	Height (μV)	% Height
1	Peak1	34.564	654810	12.02	7119	15.69
2	Peak2	38.620	4793340	87.98	38252	84.31

Figure S15. HPLC trace and integration data from the naphthoylamide of **P6**.

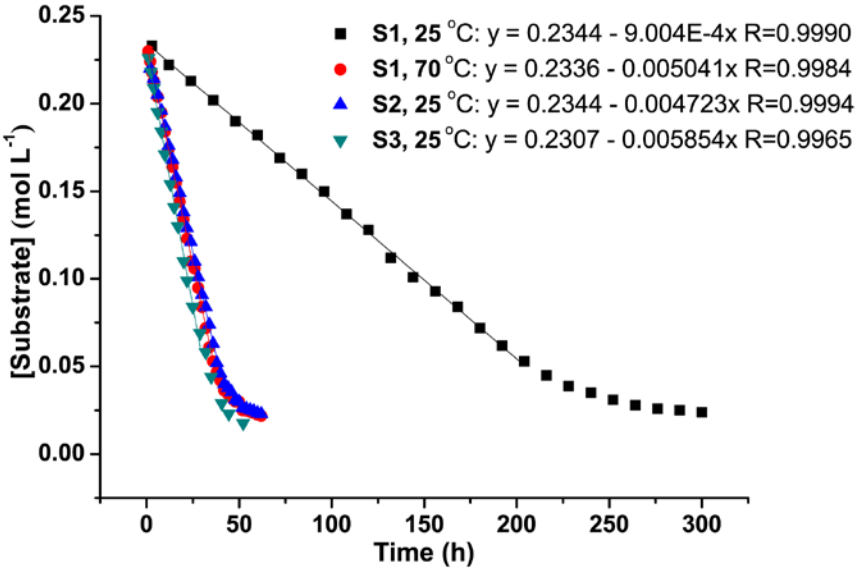


Figure S16. Time dependence of substrate concentration in the hydroamination/cyclization using complex **1**/^{n}BuLi.

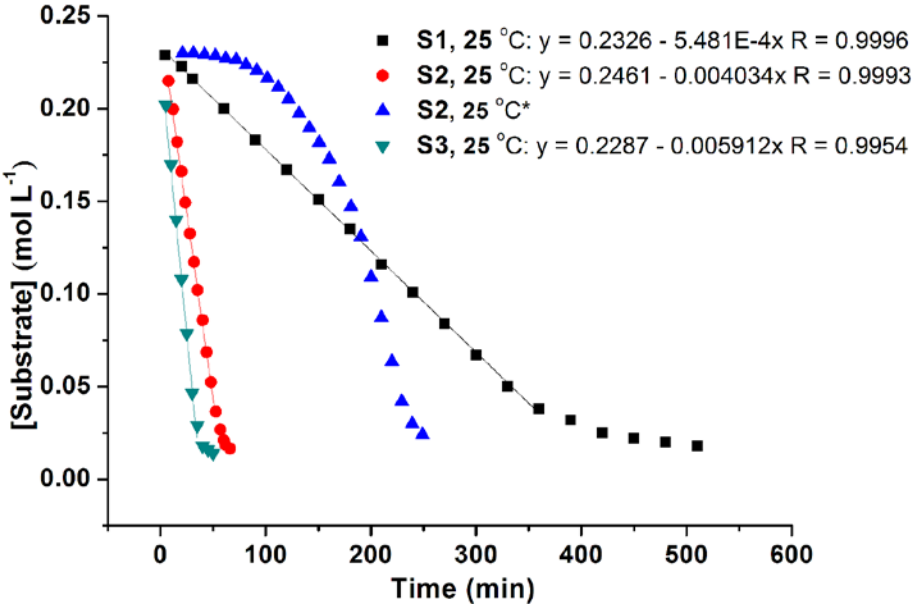


Figure S17. Time dependence of substrate concentration in the hydroamination/cyclization using complex **2**/^{n}BuLi: *The substrate **S2** was mixed with butyllithium first , and the complex **2** later.

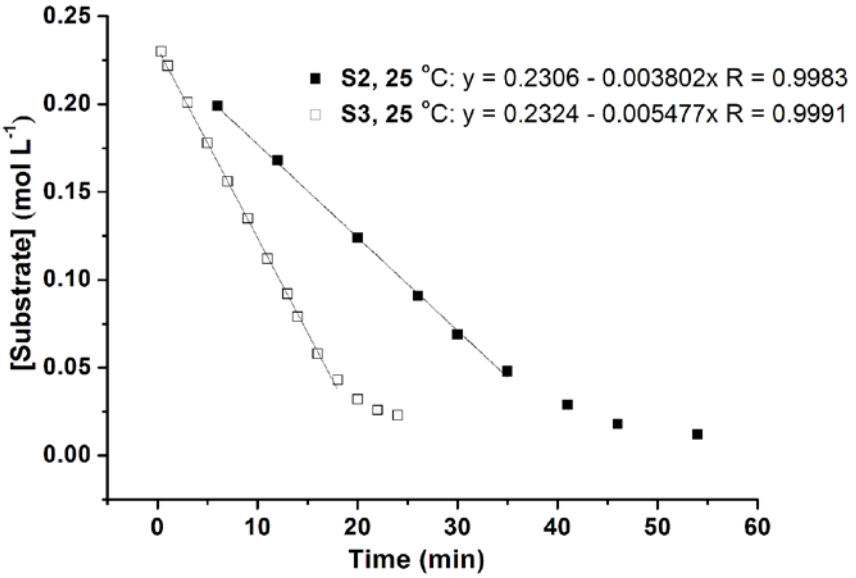


Figure S18. Time dependence of substrate concentration in the hydroamination/ cyclization using complex **3**/^{n}BuLi.

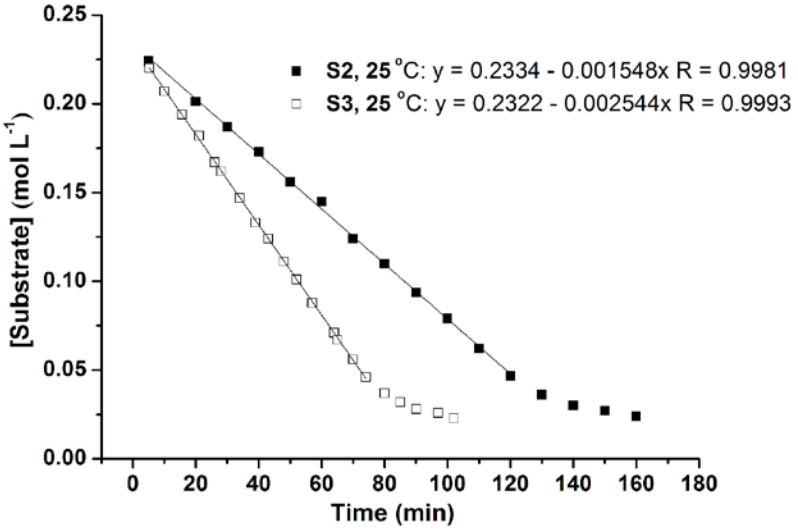


Figure S19. Time dependence of substrate concentration in the hydroamination/ cyclization using complex **4**/^{n}BuLi.

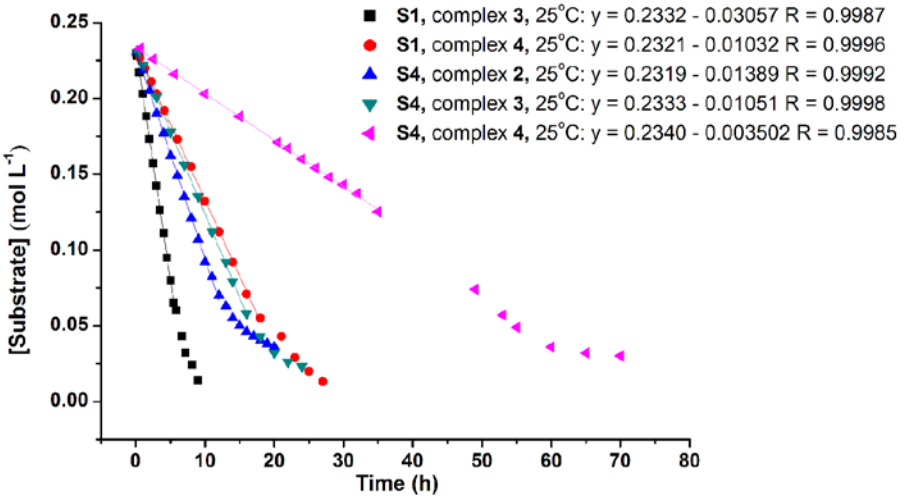


Figure S20. Time dependence of substrate concentration in the hydroamination/ cyclization.