Supporting Information

E-H Bond Activation Reactions (E = H, C, Si, Ge) at Ru: Terminal Phosphides, Silylenes, and Germylenes

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Figure S9. NMR spectra for **10b**.

Figure S10. NMR spectra for **12**.

Figure S11. NMR spectra for **13**.

Figure S1. Fully labeled diagram of $[SiP^{Ph}{}_3]Ru(H)(\eta^2\text{-}H_2SiPh_2)$ (**9**) and co-crystallized solvent.

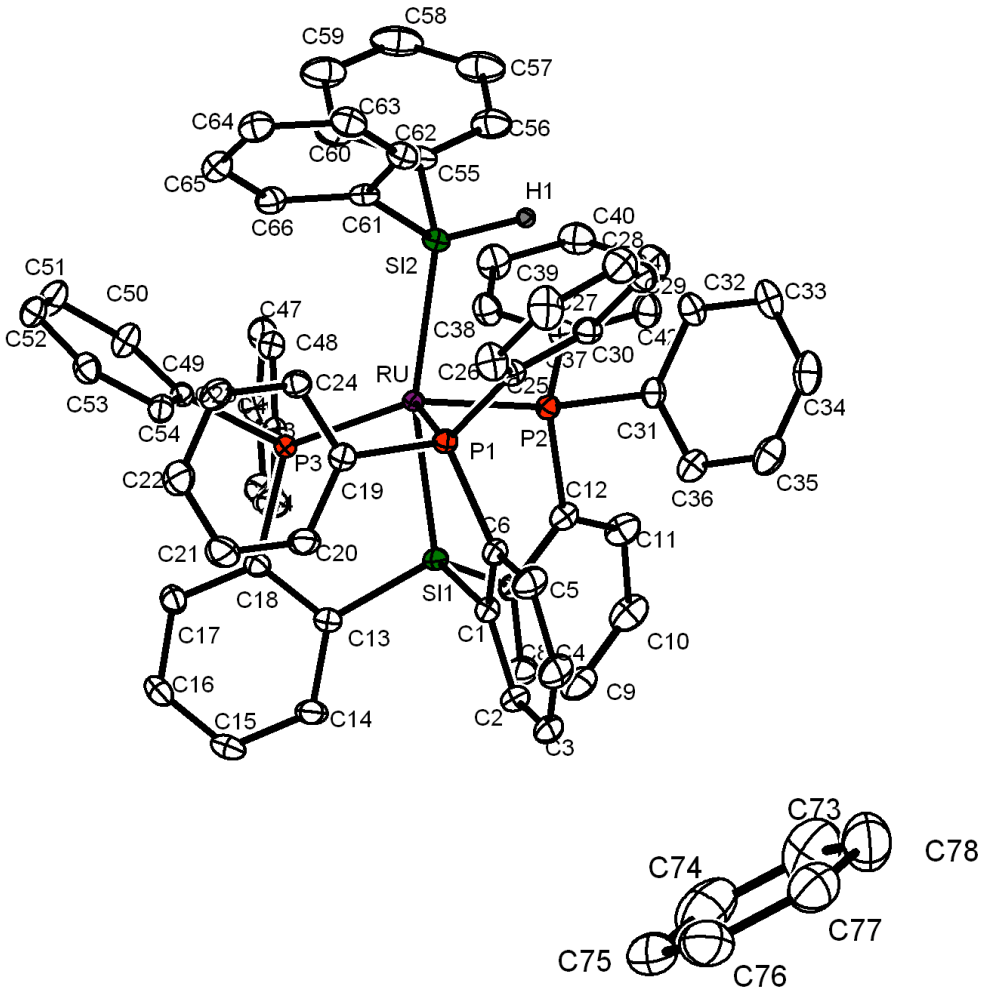


Figure S2. ^{1}H-^{29}Si HSQC spectrum of **13** of upfield peak in d^{8}-THF.

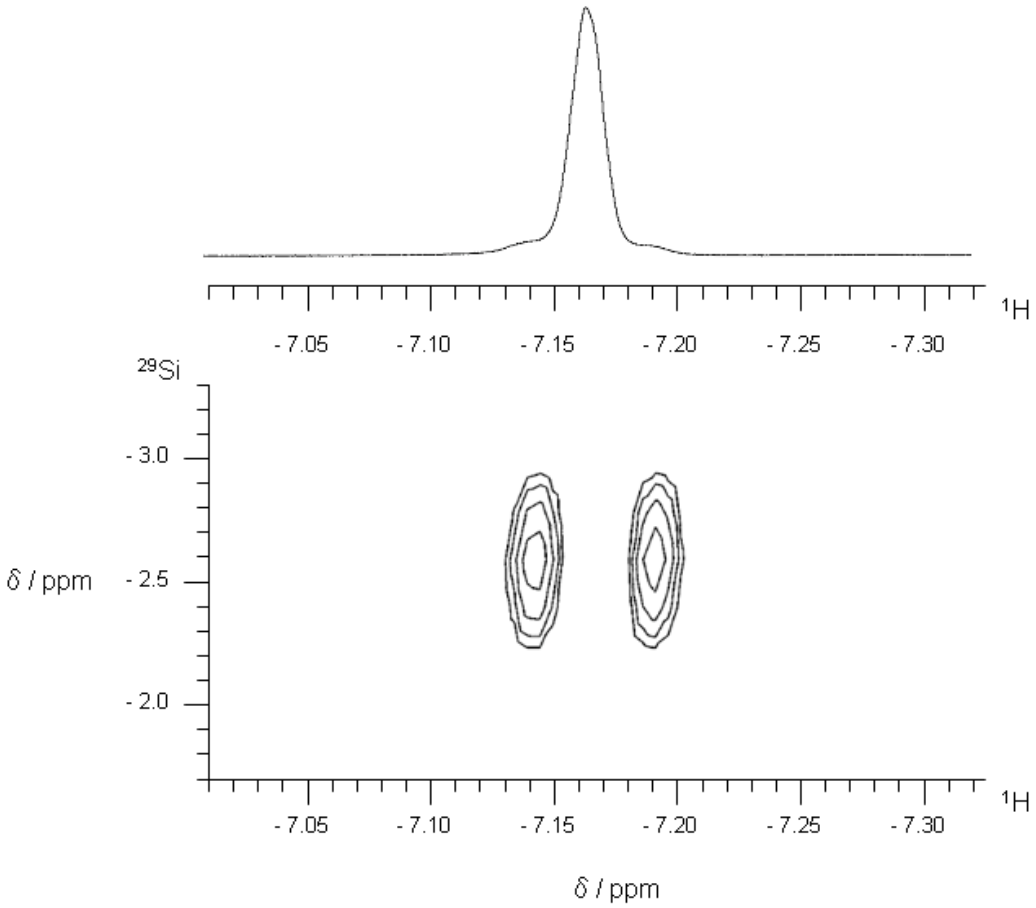


Table S1. Kinetic data for Eyring plot.

T(K)	rate constant(/hr)
298.2	0.0164(4)
308.2	0.0463(15)
318.2	0.138(4)
328.2	0.393(17)

Figure S3. Eyring plot for the decay of **5**.

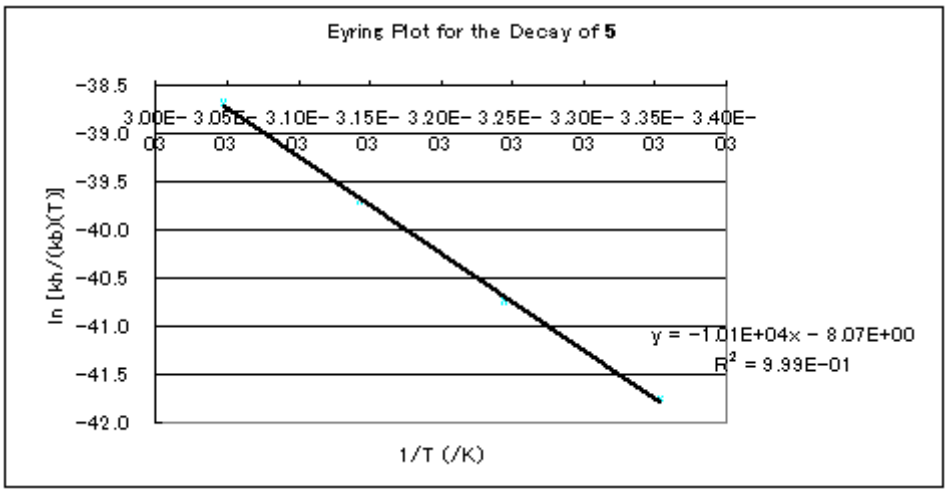
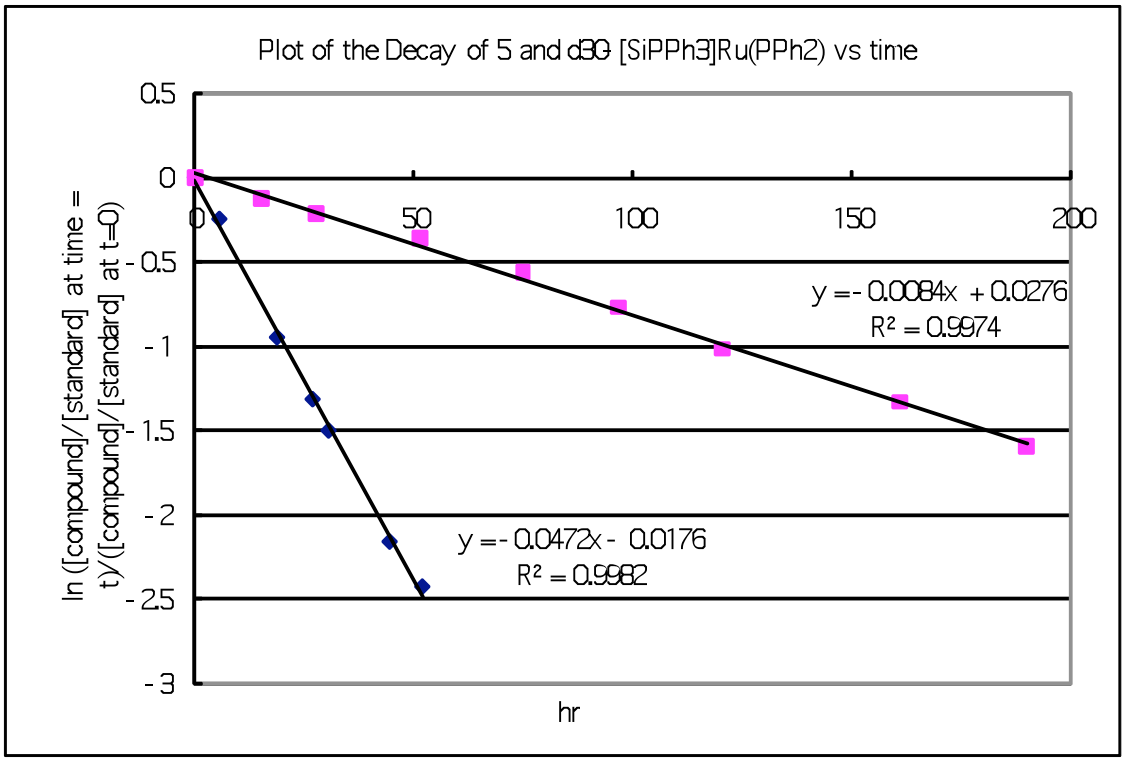


Figure S4. Typical decay behavior of **5** vs ***d*$_{30}$-[SiP$^{Ph}_3$]Ru(PPh$_2$)** at 35°C.

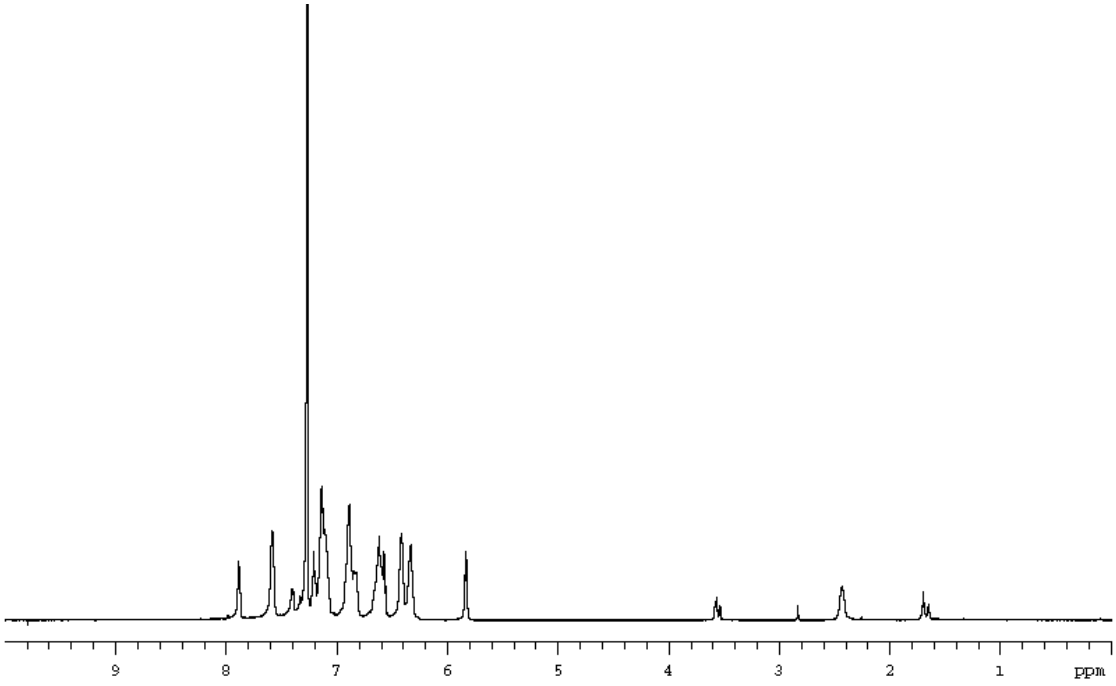


Blue: **5**

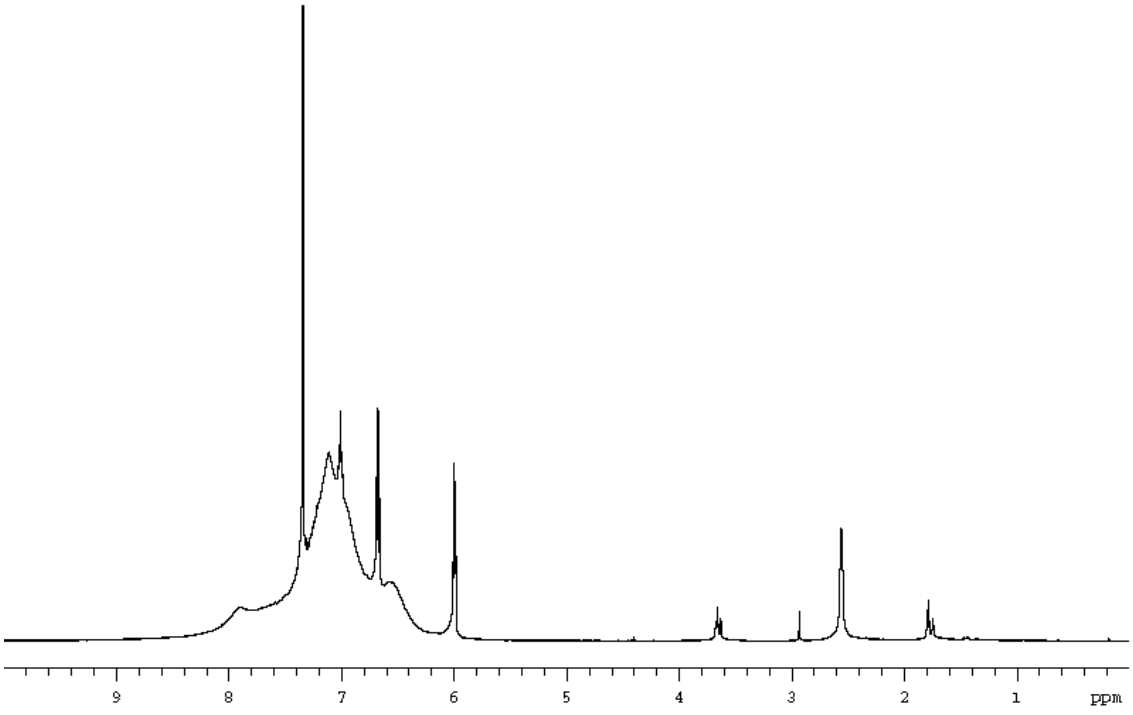
Pink: ***d*$_{30}$-[SiP$^{Ph}_3$]Ru(PPh$_2$)**

Figure S5. NMR spectra for **4**.

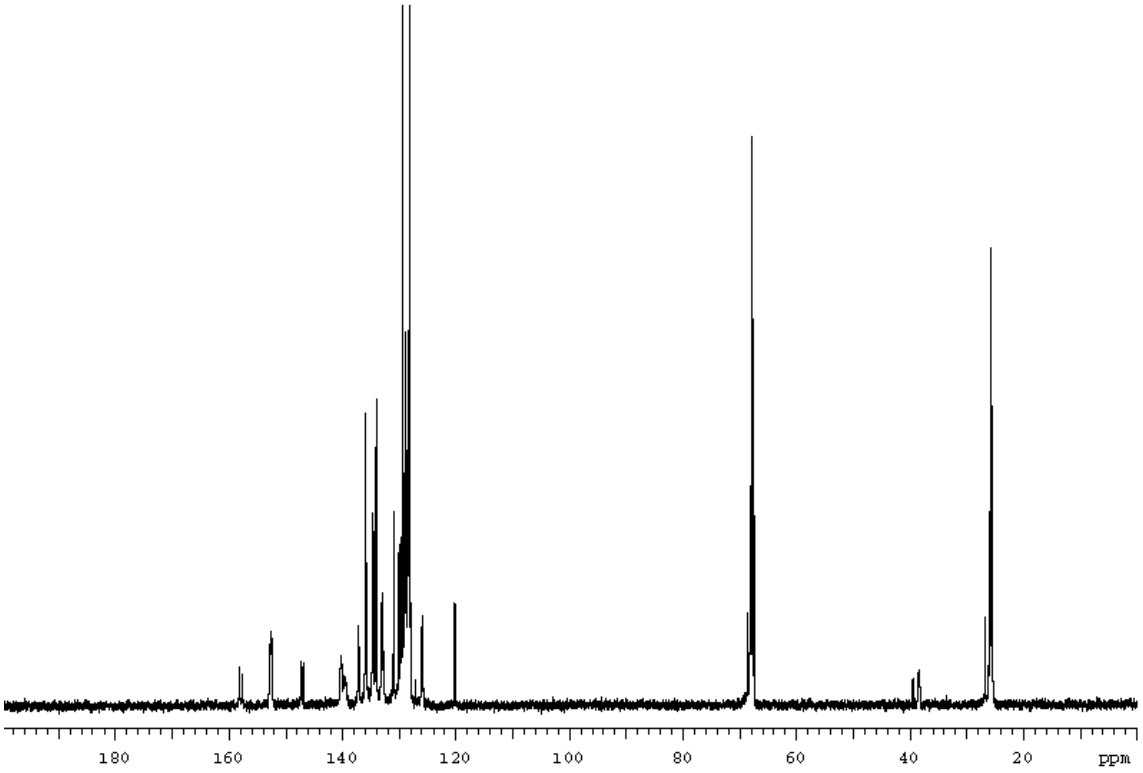
^{1}H at -20 ^{o}C in d_8-THF.



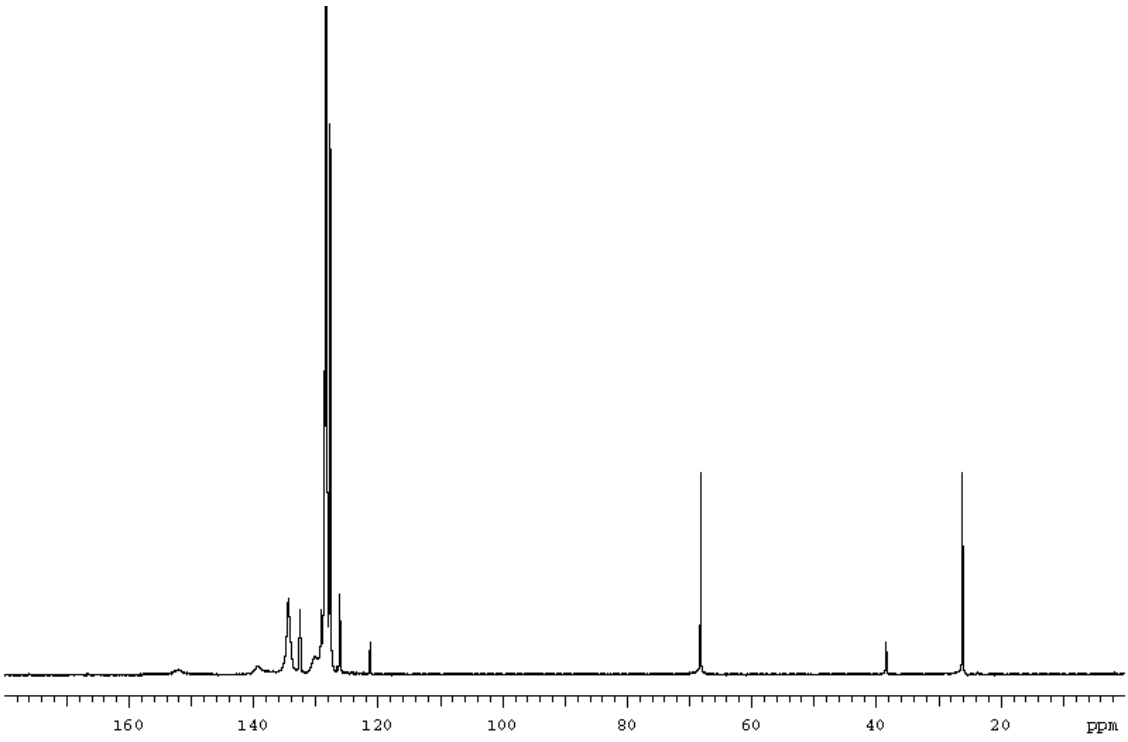
^{1}H at RT in d_8-THF.



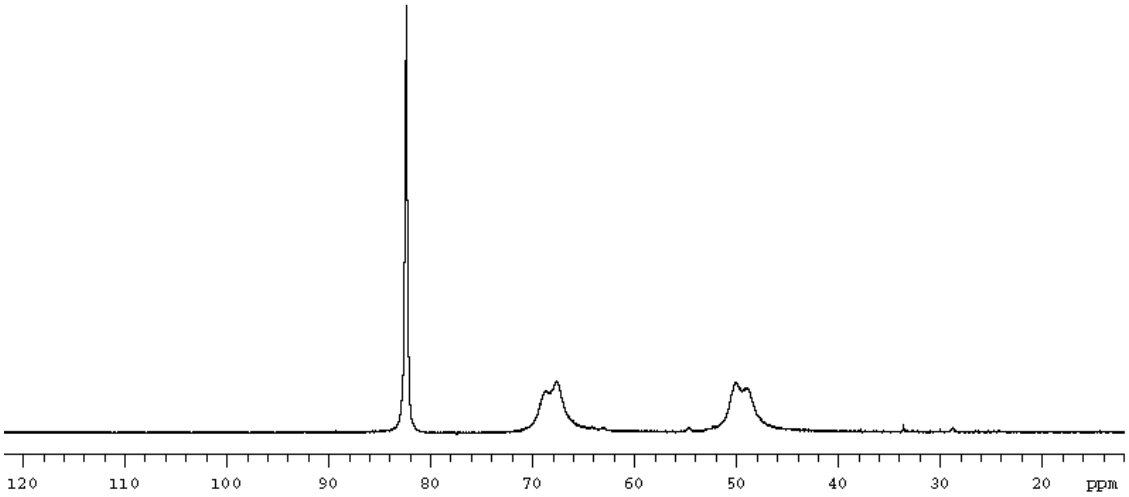
$^{13}C\{^{1}H\}$ at -20 ^{o}C in d_8-THF.



$^{13}C\{^{1}H\}$ at RT in C_6D_6.



$^{31}P\{^{1}H\}$ at -80 ^{o}C in d_8-THF.



$^{31}P\{^{1}H\}$ at RT in d_8-THF.

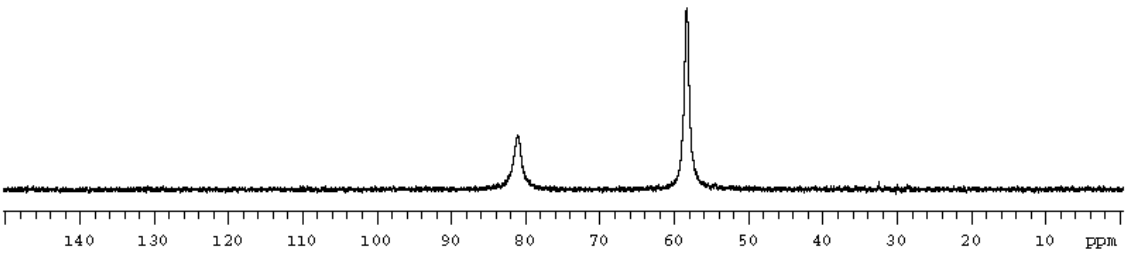
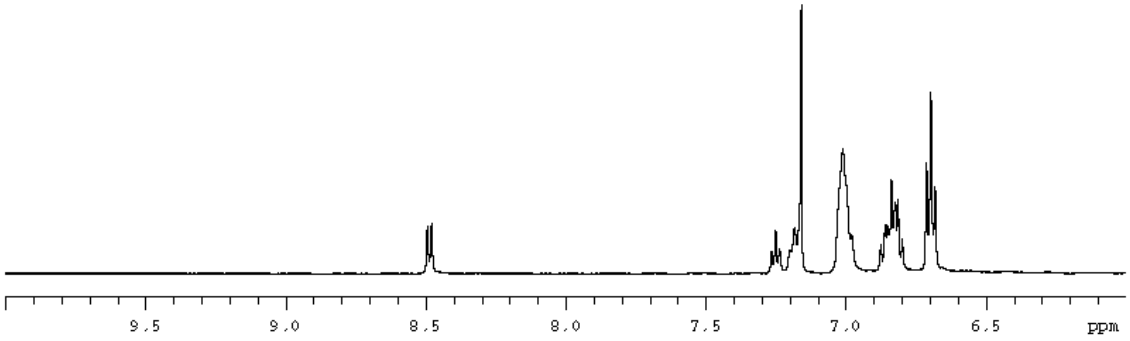
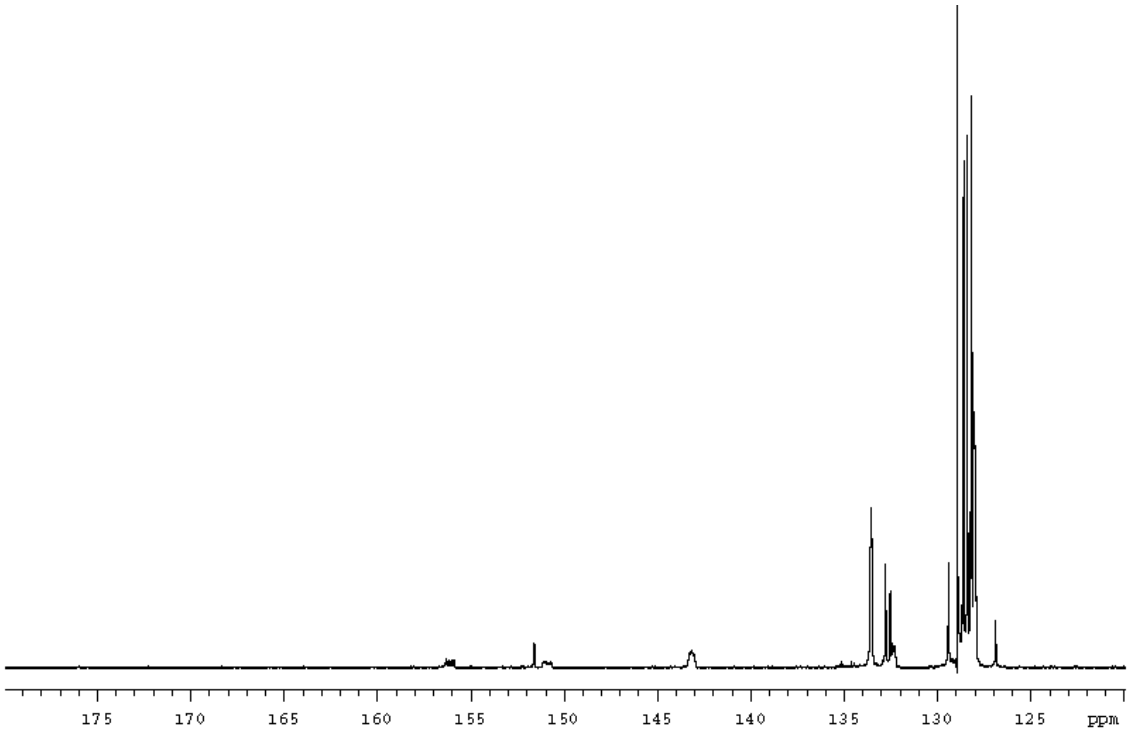


Figure S6. NMR spectra for **5**.

^{1}H at RT in C_6D_6.



$^{13}C\{^{1}H\}$ at RT in C_6D_6.



$^{31}P\{^{1}H\}$ at RT in C_6D_6.

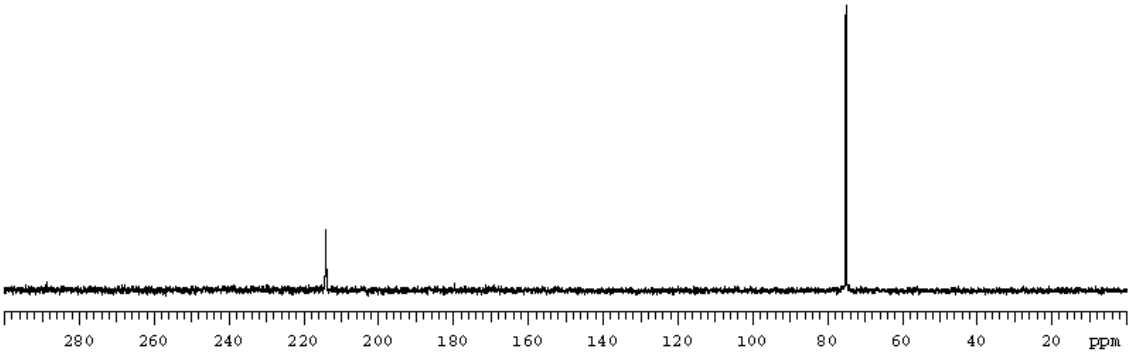
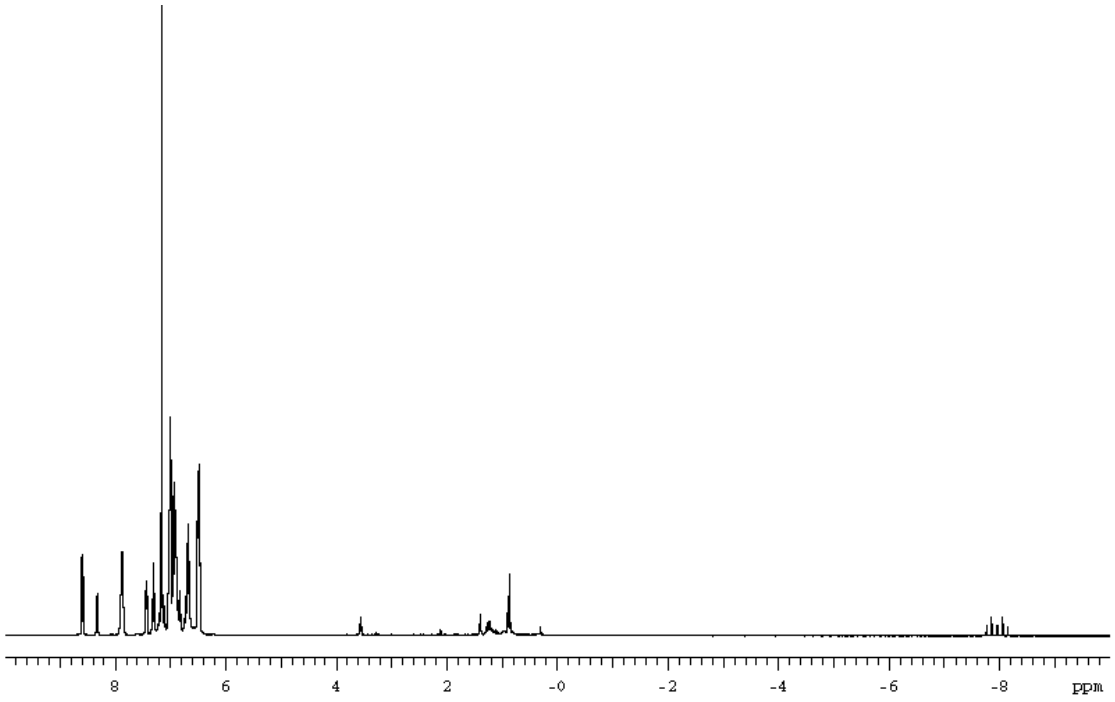
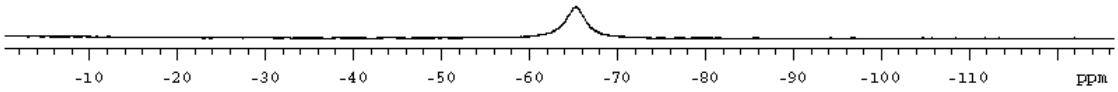


Figure S7. NMR spectra for **8**.

^{1}H at RT in C_6D_6.



$^{15}N\{^{1}H\}$ at RT in C_6D_6.



$^{31}P\{^{1}H\}$ at RT in C_6D_6.

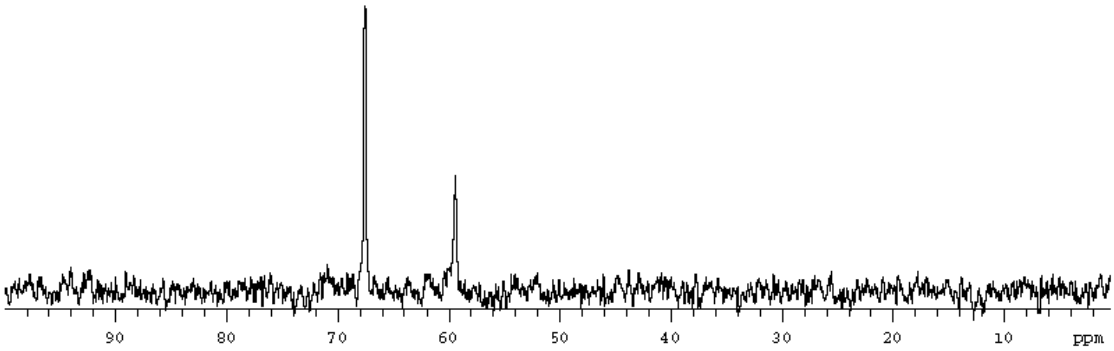
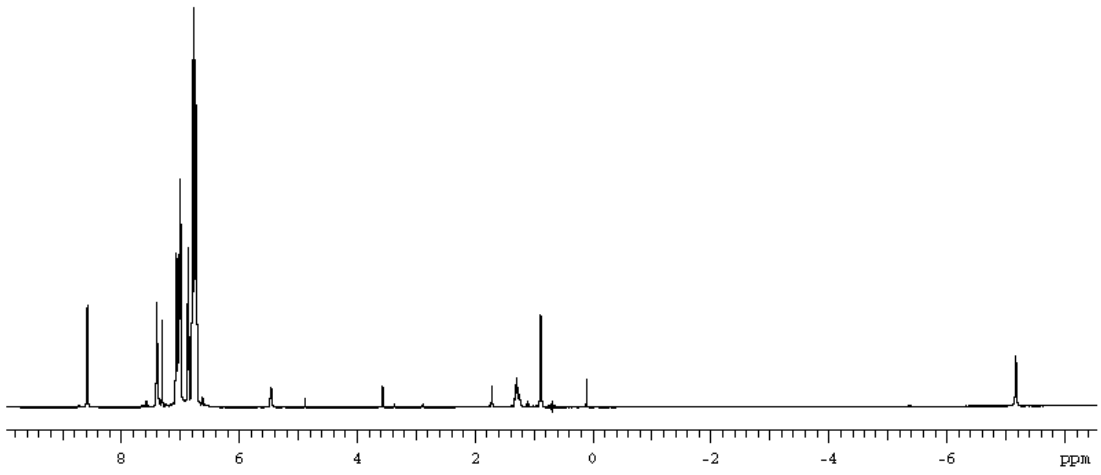
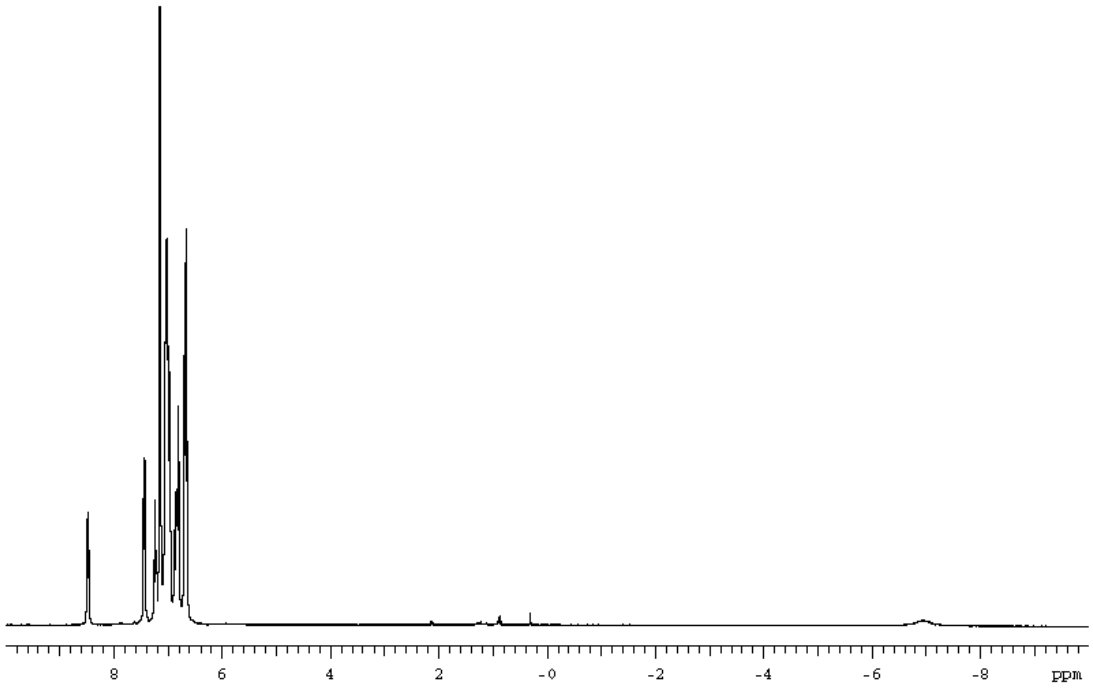


Figure S8. NMR spectra for **9**.

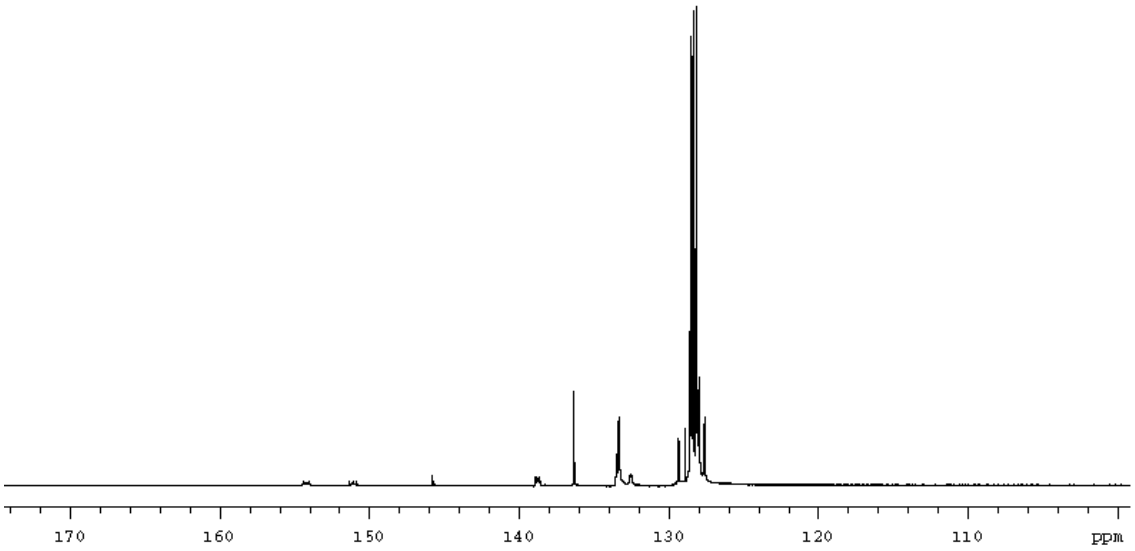
^{1}H at -20 ^{o}C in d_8-THF.



^{1}H at RT in C_6D_6.



$^{13}C\{^{1}H\}$ at RT in C_6D_6.



$^{31}P\{^{1}H\}$ at RT in C_6D_6.

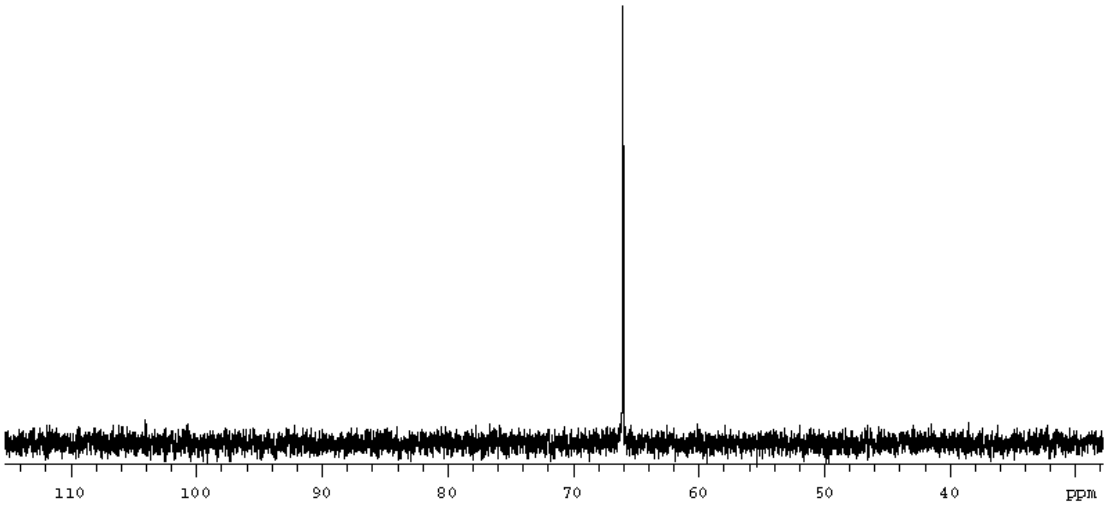
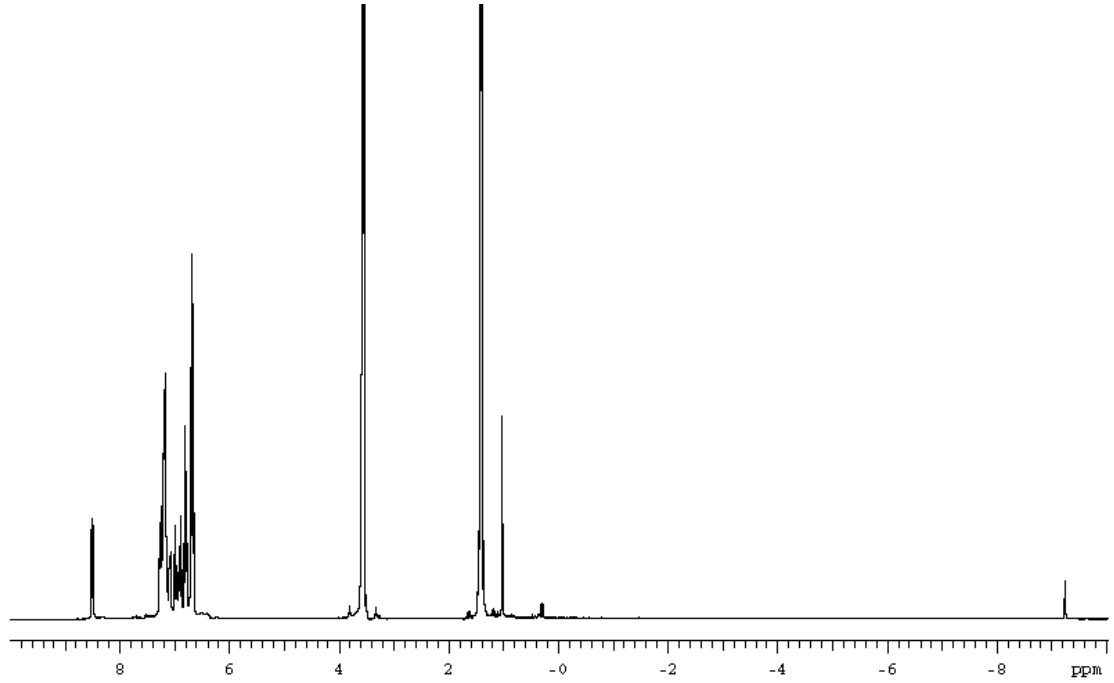
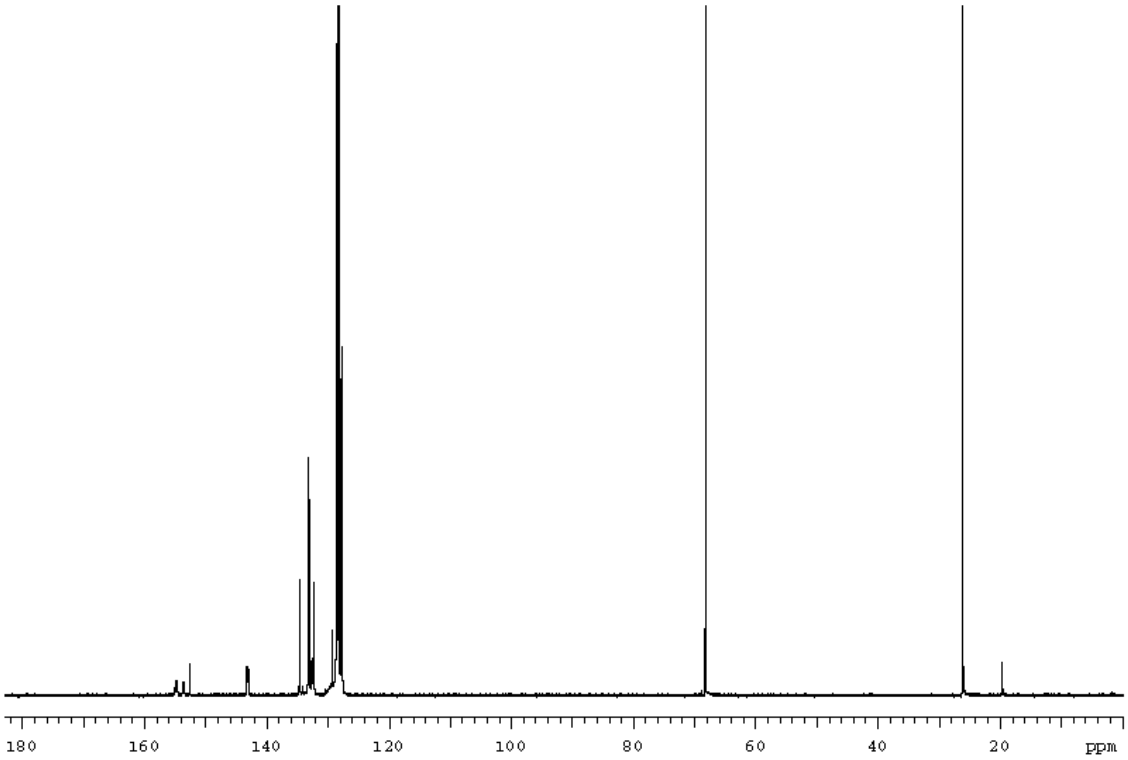


Figure S9. NMR spectra for **10b**.

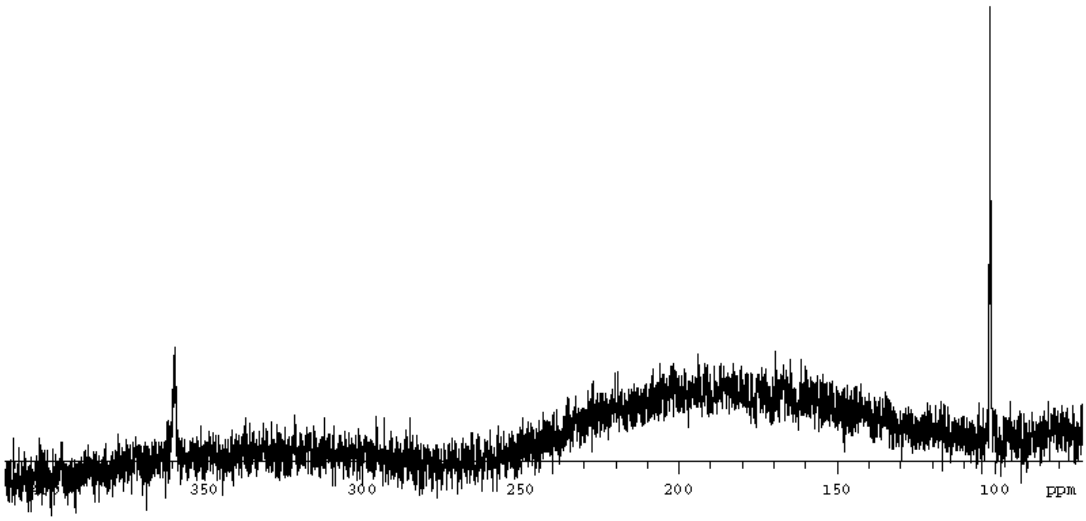
^{1}H at RT in C_6D_6.



$^{13}C\{^{1}H\}$ at RT in C_6D_6.



$^{29}Si\{^{1}H\}$ at RT in C_6D_6.



$^{31}P\{^{1}H\}$ at RT in C_6D_6.

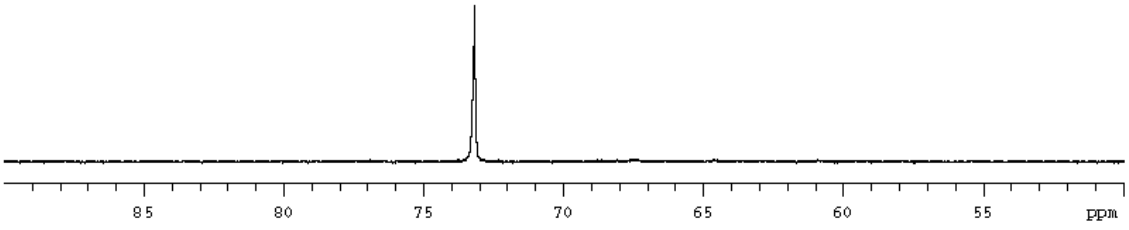
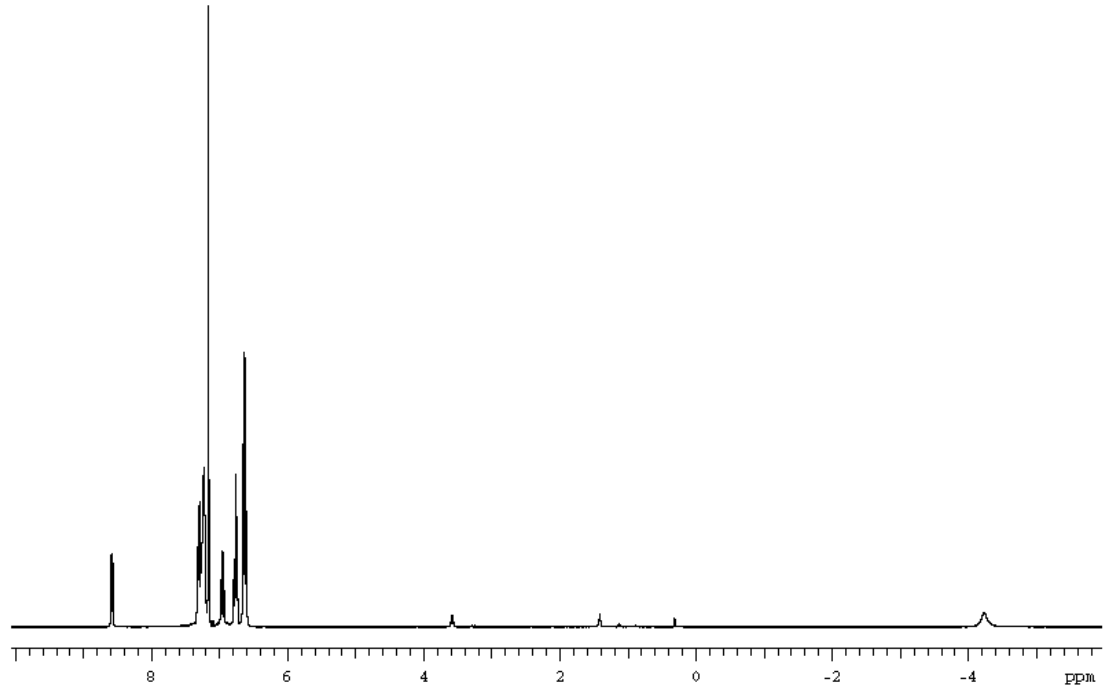


Figure S10. NMR spectra for **12**.

^{1}H at RT in C_6D_6.



$^{31}P\{^{1}H\}$ at RT in C_6D_6.

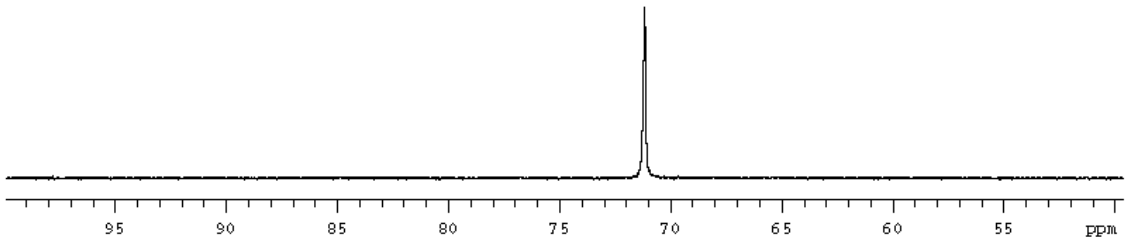
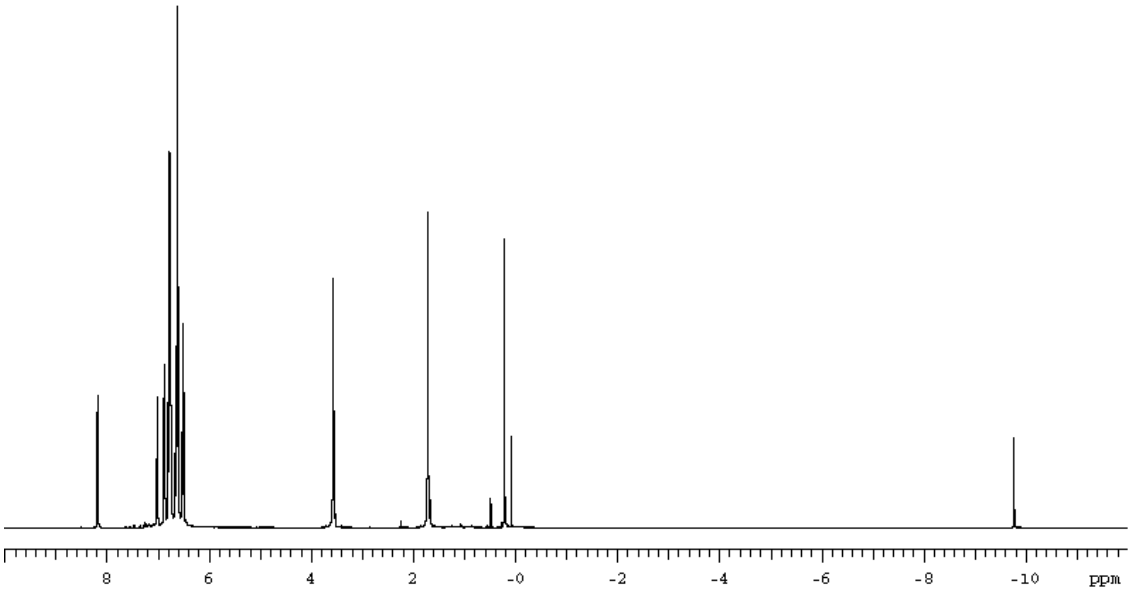
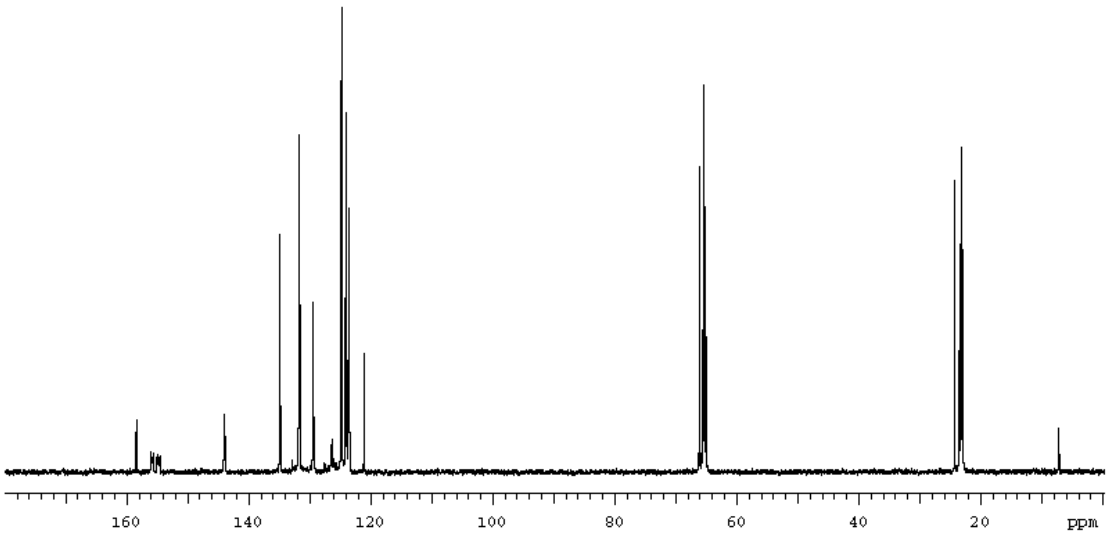


Figure S11. NMR spectra for **13**.

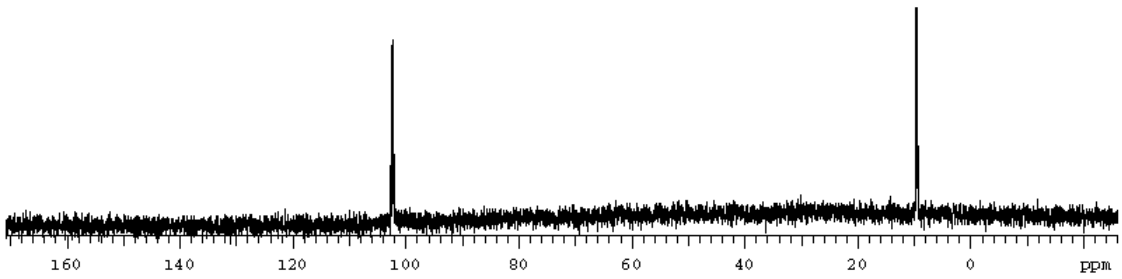
^{1}H at RT in d_8-THF.



^{13}C{^{1}H} at RT in d_8-THF.



$^{29}Si\{^{1}H\}$ at RT in d_8-THF.



$^{31}P\{^{1}H\}$ at RT in d_8-THF.