Supporting Information

Preparation of Half- and Post-metallocene Hafnium Complexes with Tetrahydroquinoline and Tetrahydrophenanthroline Frameworks for Olefin Polymerization

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Figure S1. ^{1}H and ^{13}C NMR spectra of **1**.

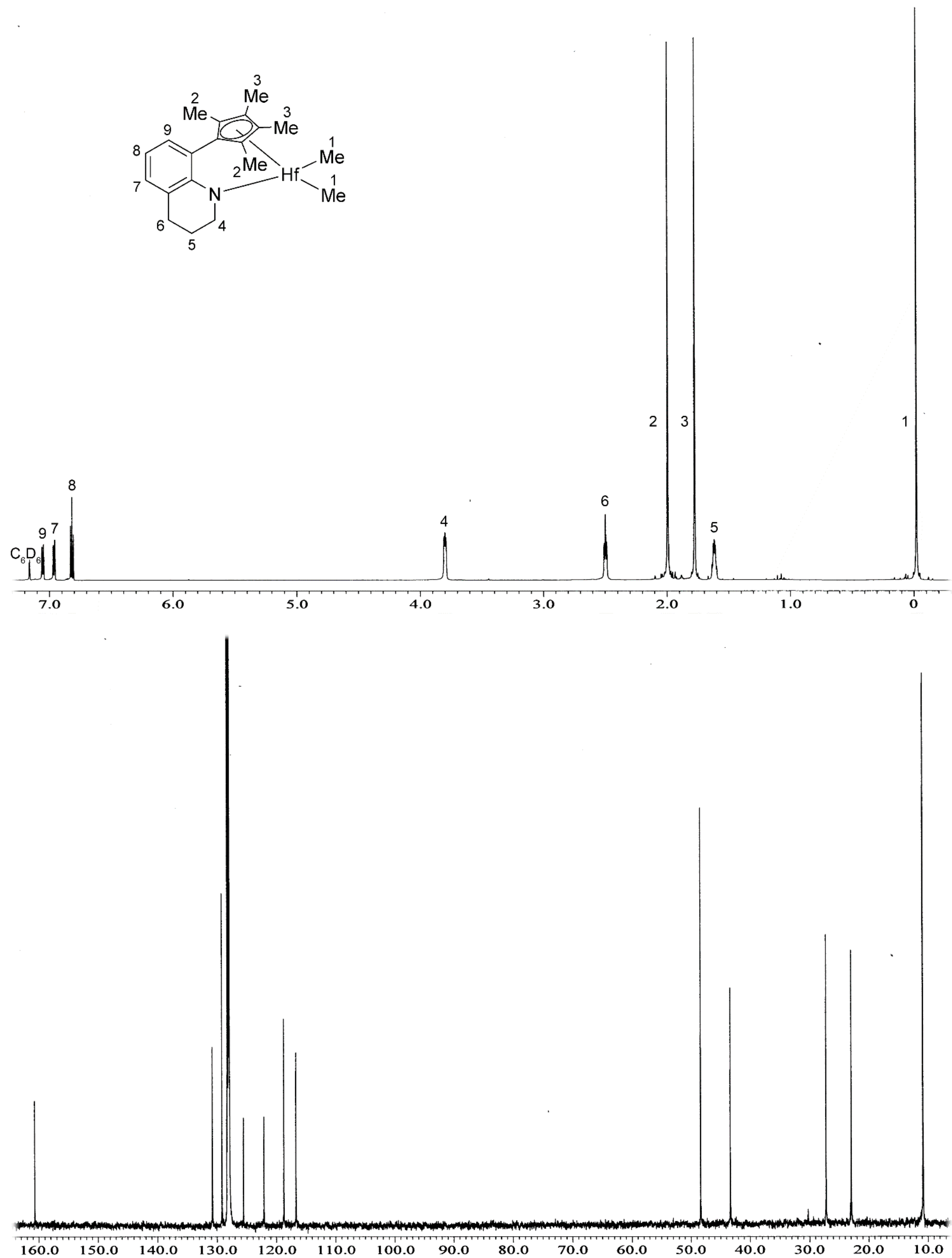


Figure S2. ^{1}H and ^{13}C NMR spectra of **2**.

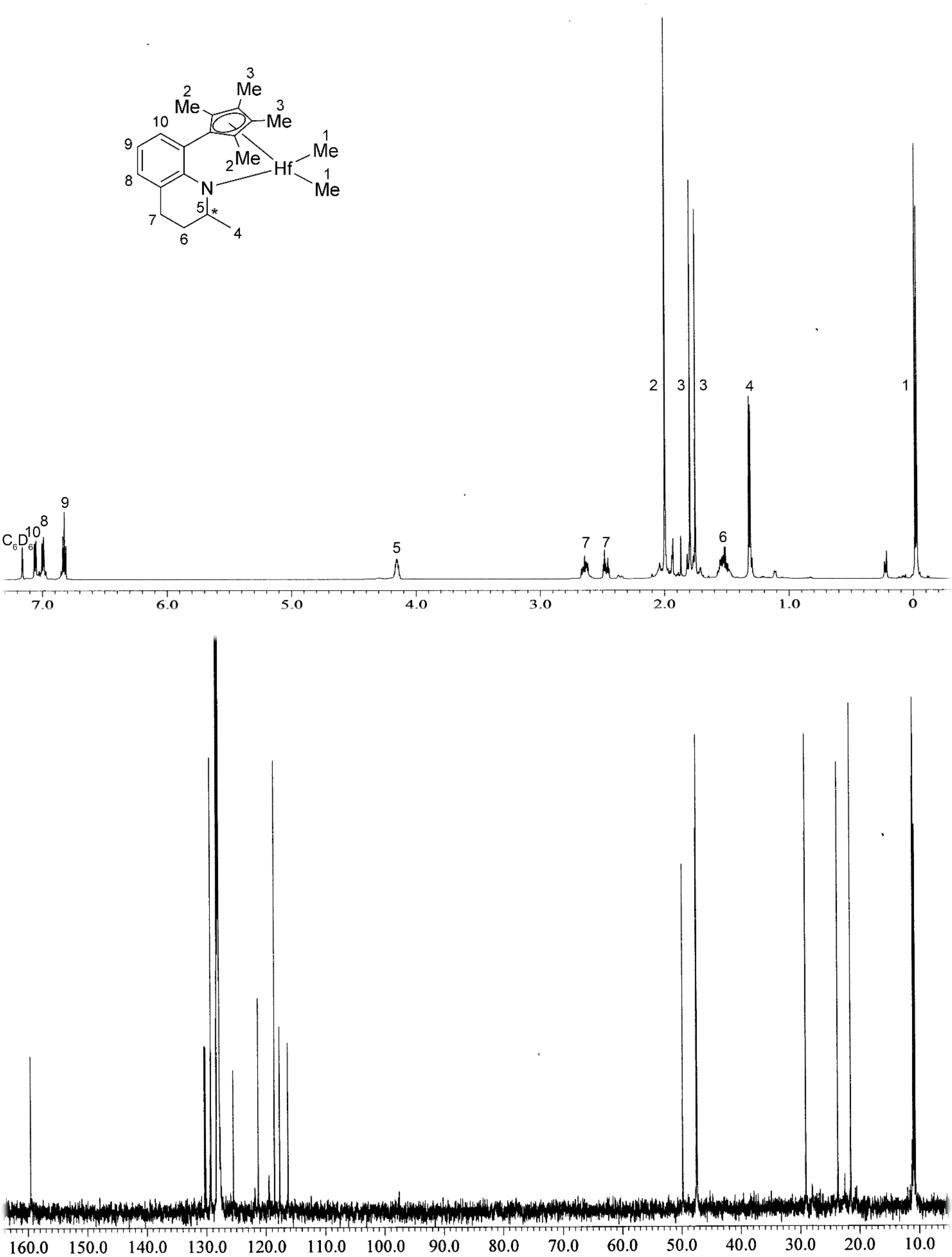


Figure S3. ^{1}H and ^{13}C NMR spectra of **3**.

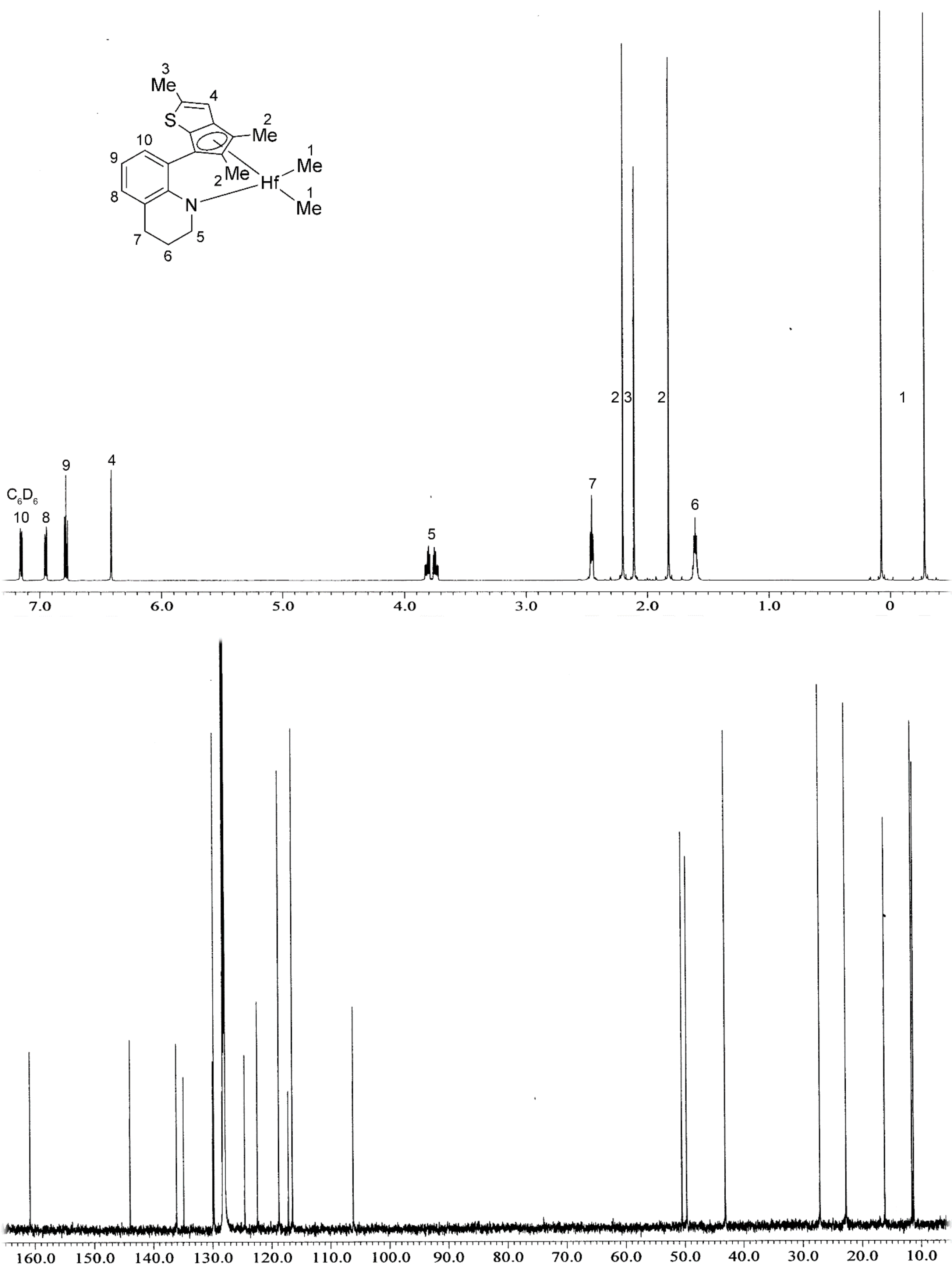
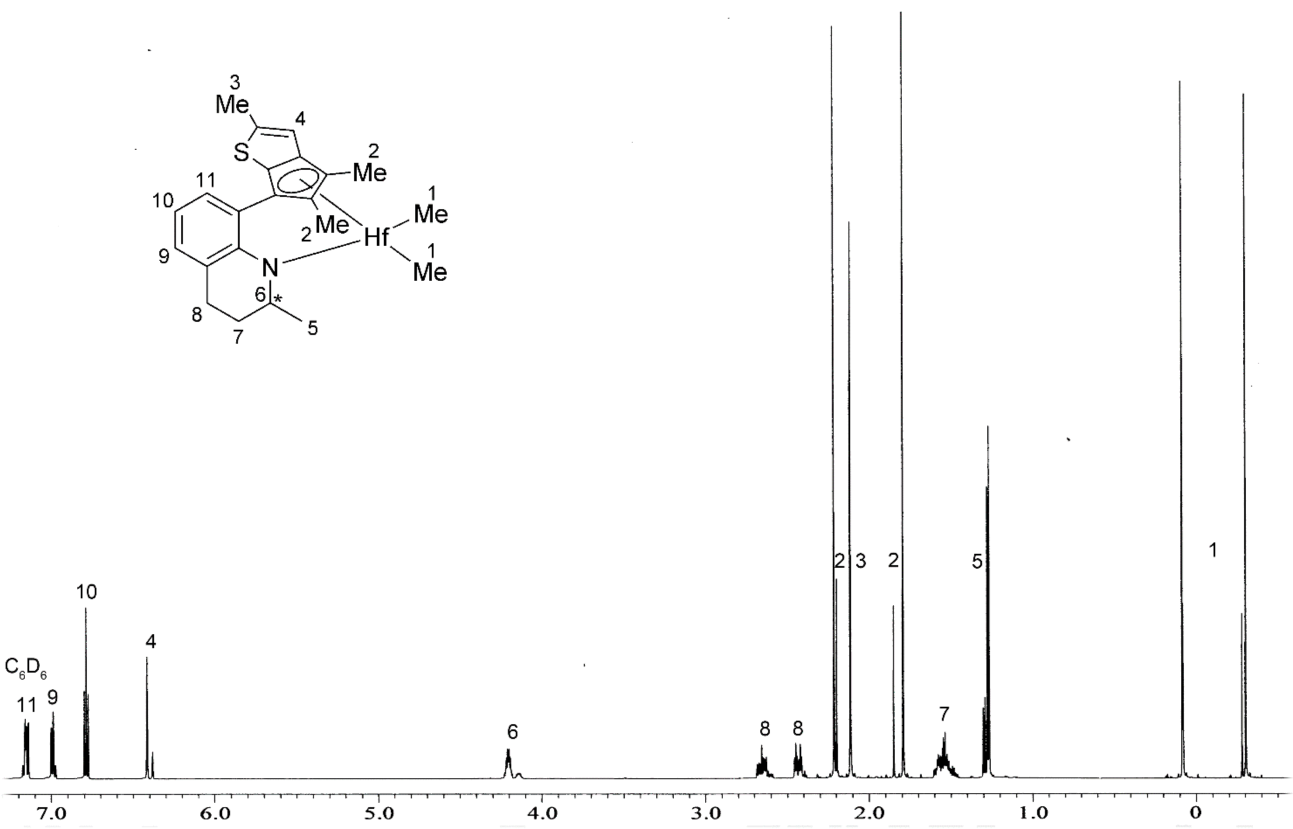


Figure S4. ^{1}H and ^{13}C NMR spectra of **4**.



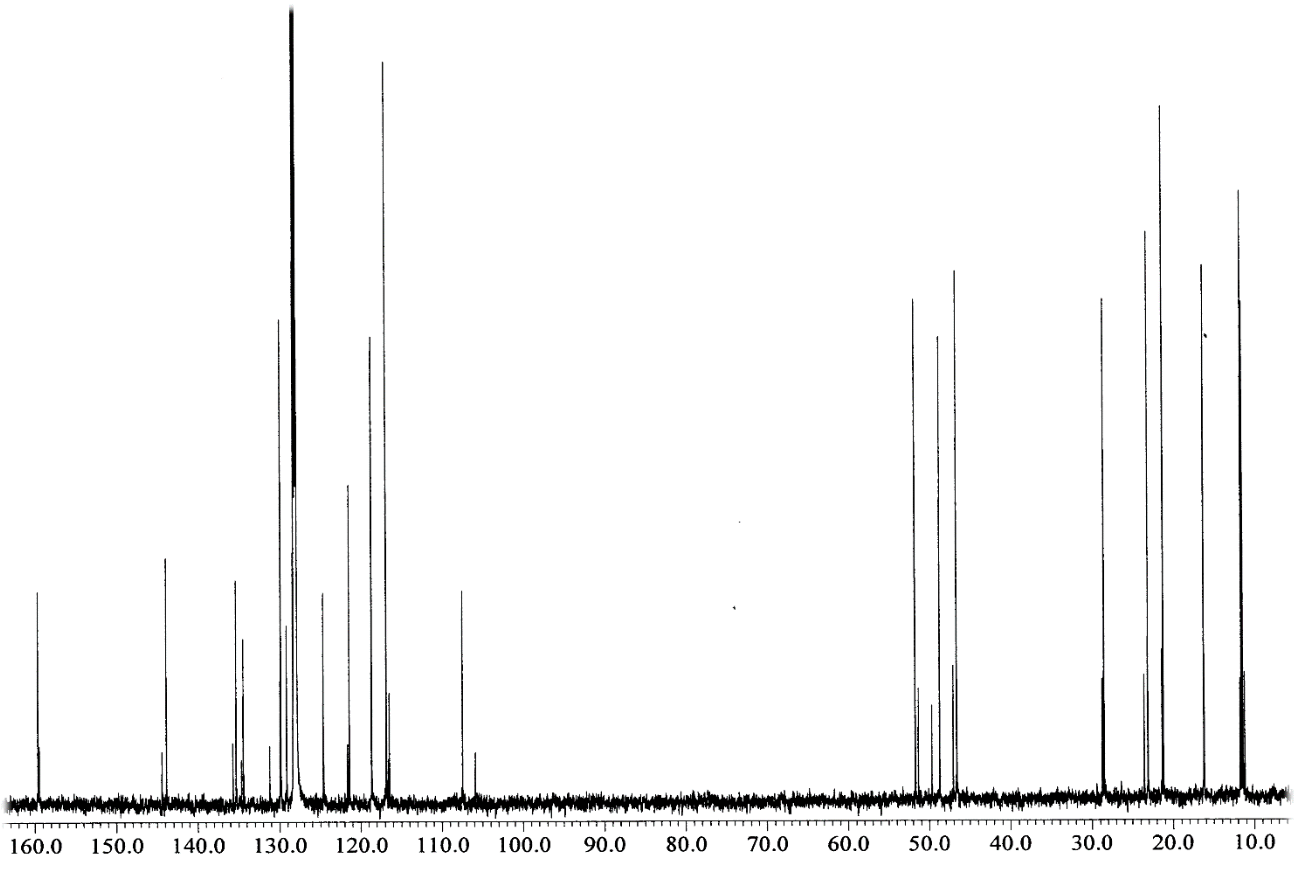


Figure S5. ^{1}H and ^{13}C NMR spectra of **5**.

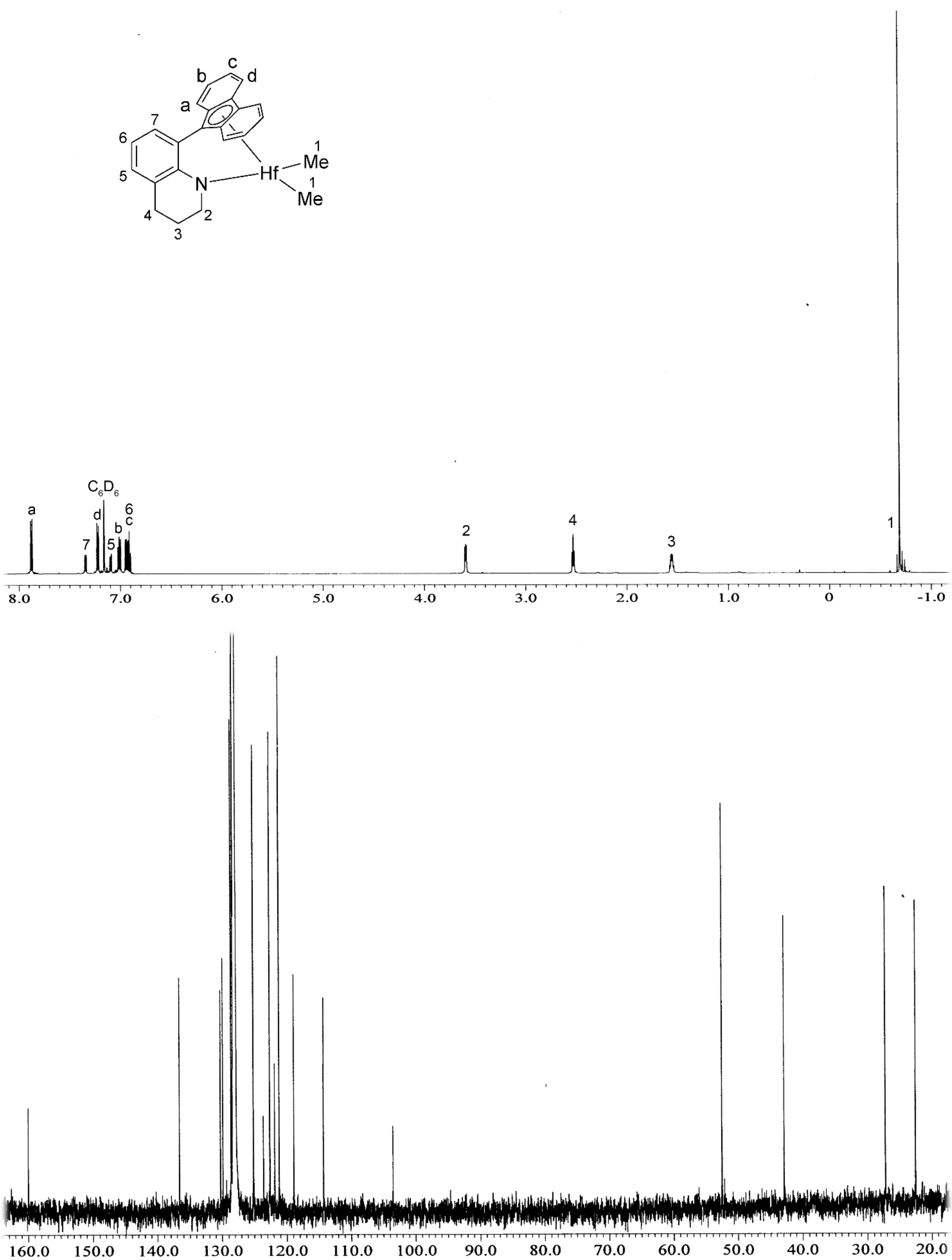


Figure S6. ^1H and ^{13}C NMR spectra of **6**.

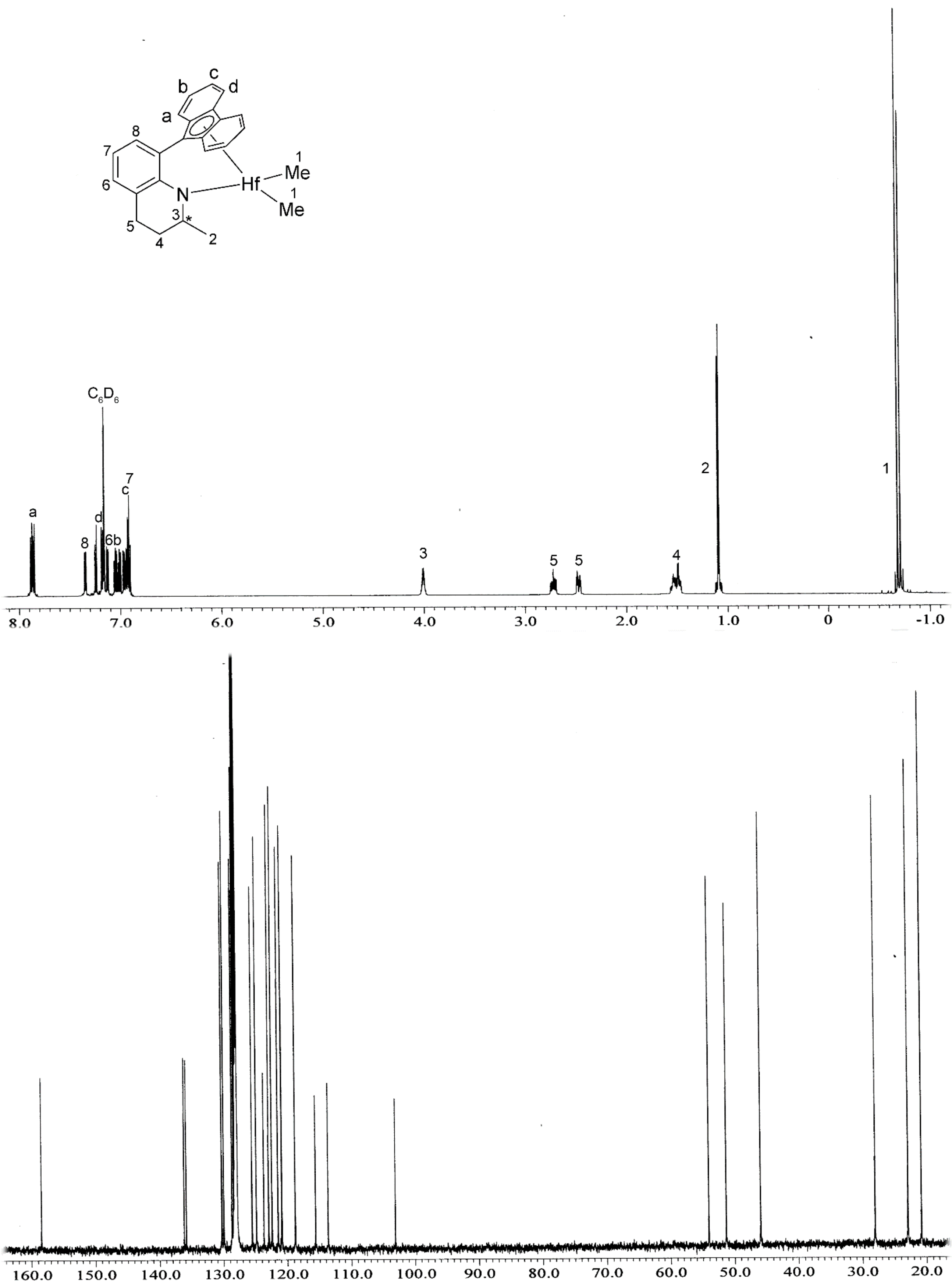


Figure S7. ^{1}H and ^{13}C NMR spectra of **9**.

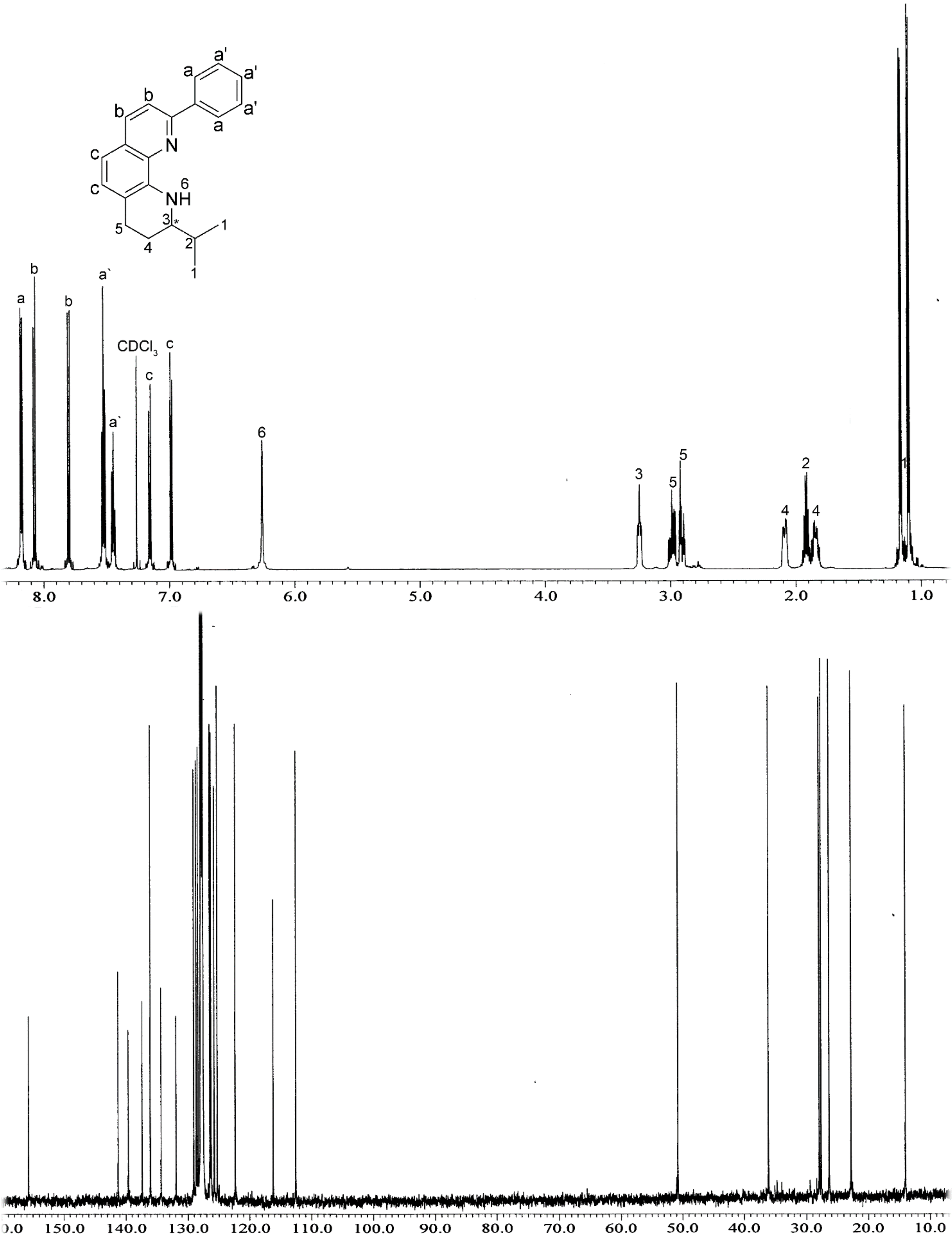
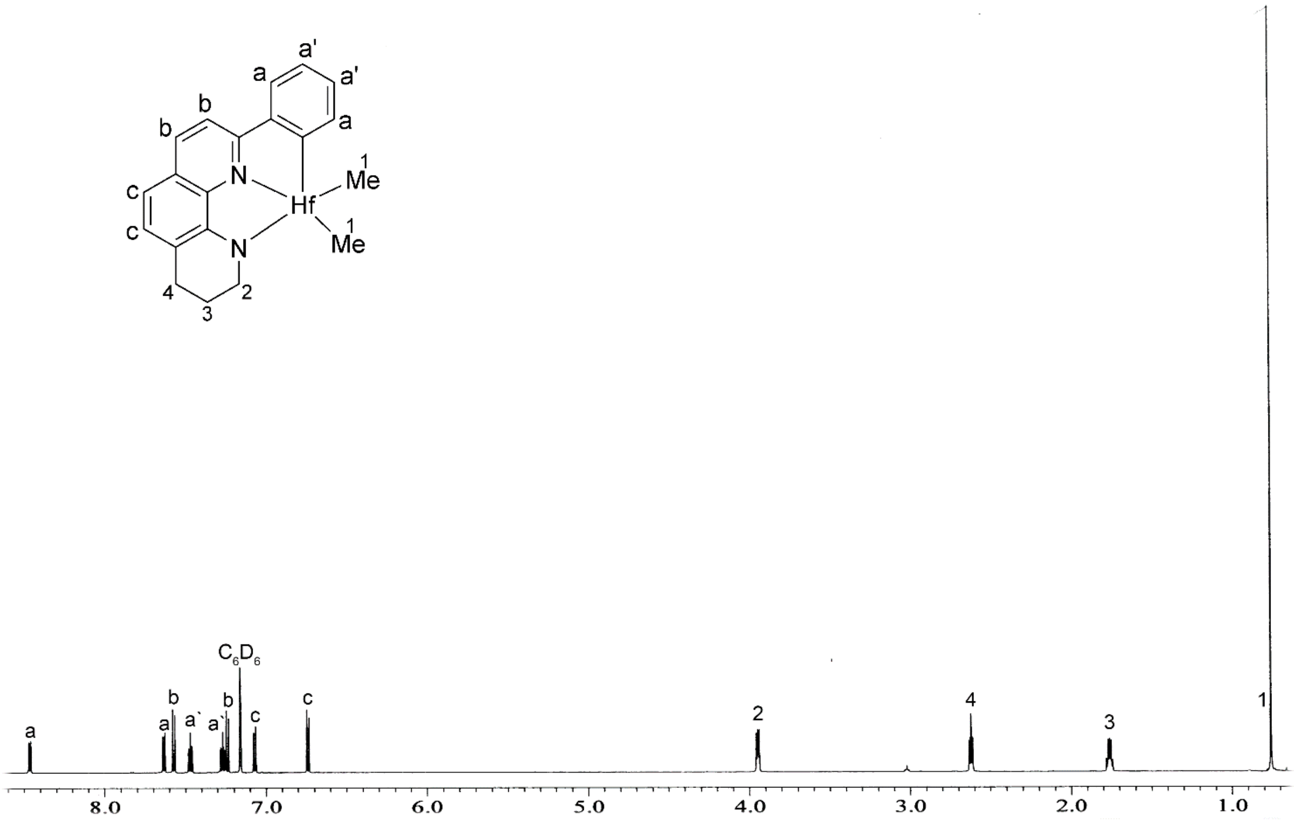


Figure S8. ^{1}H and ^{13}C NMR spectra of **10**.



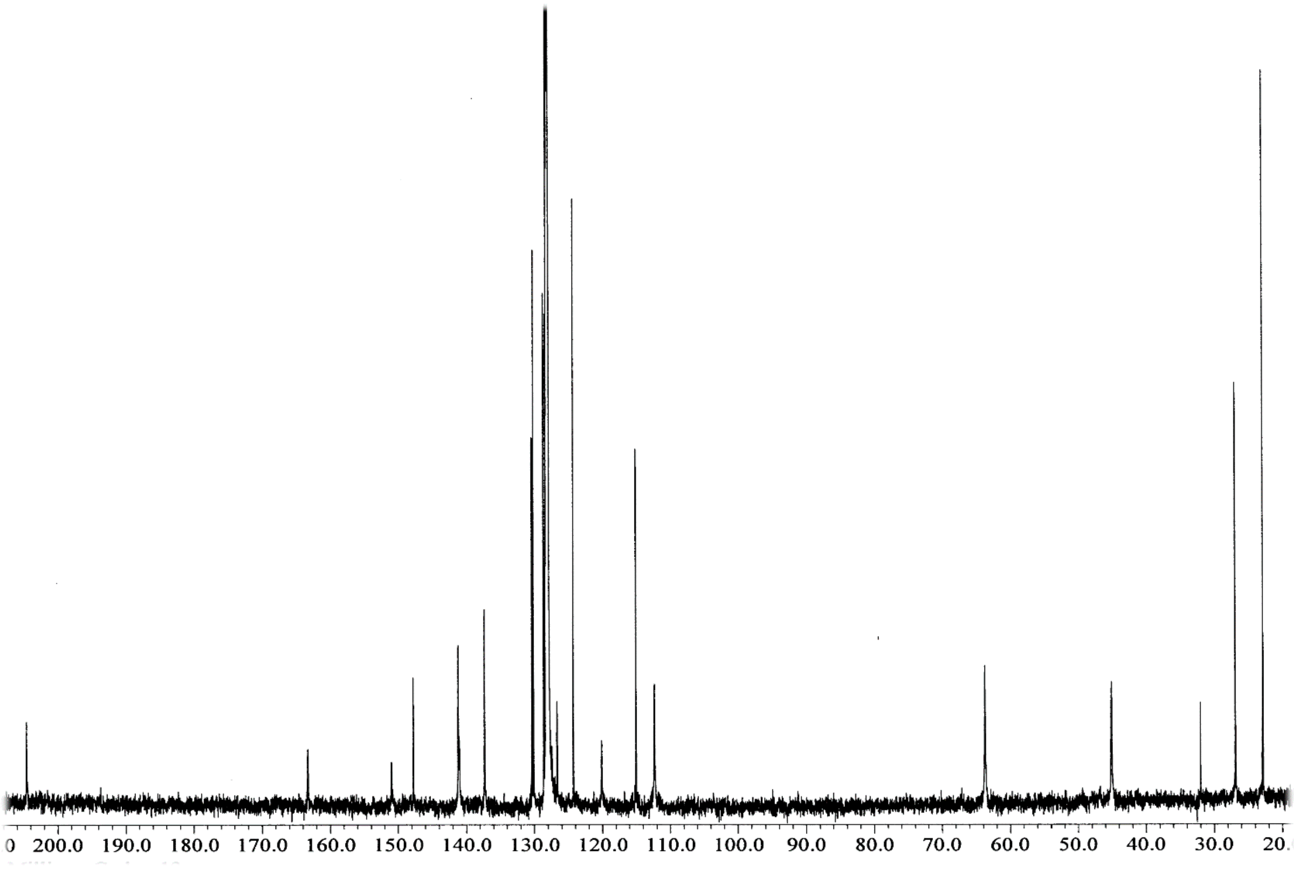
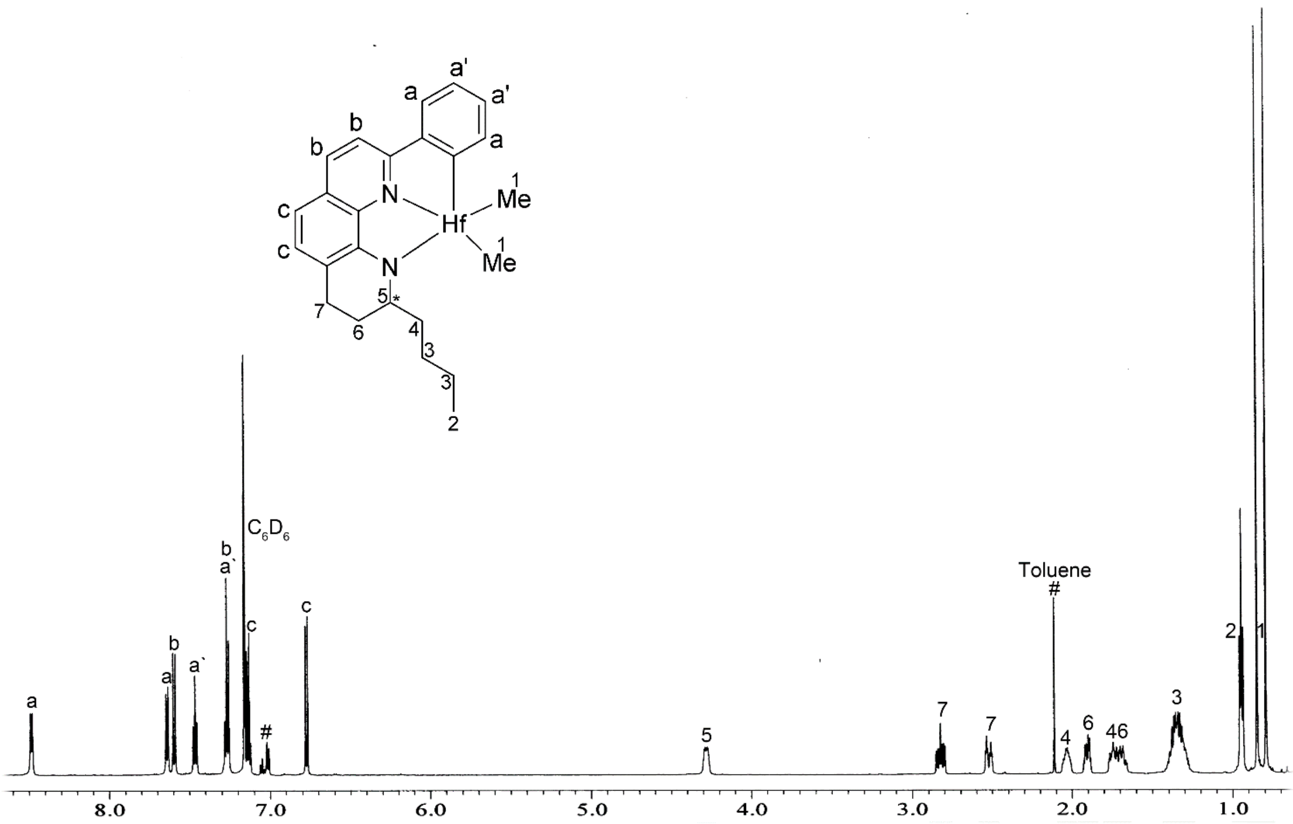


Figure S9. ^{1}H and ^{13}C NMR spectra of **11**.



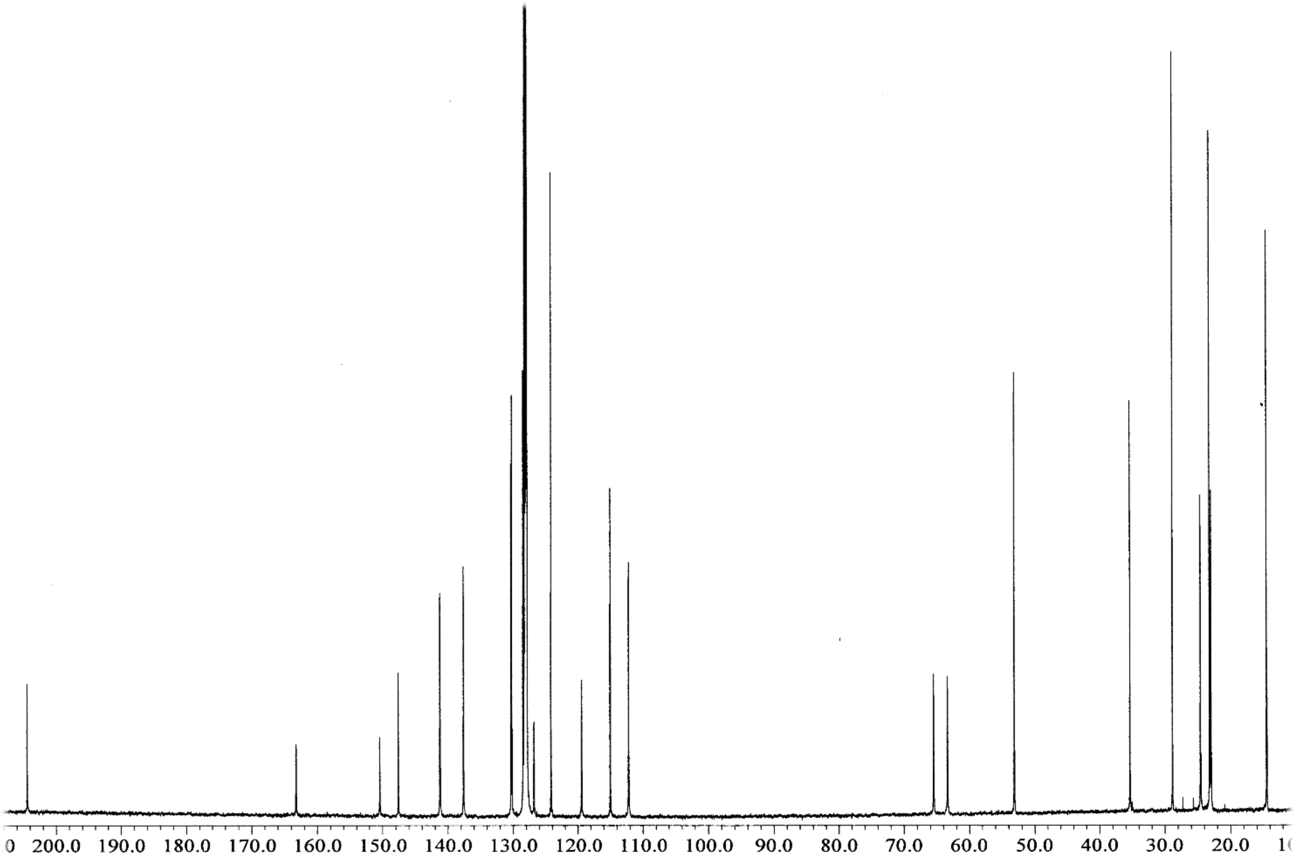


Figure S10. ^{1}H and ^{13}C NMR spectra of **12**.

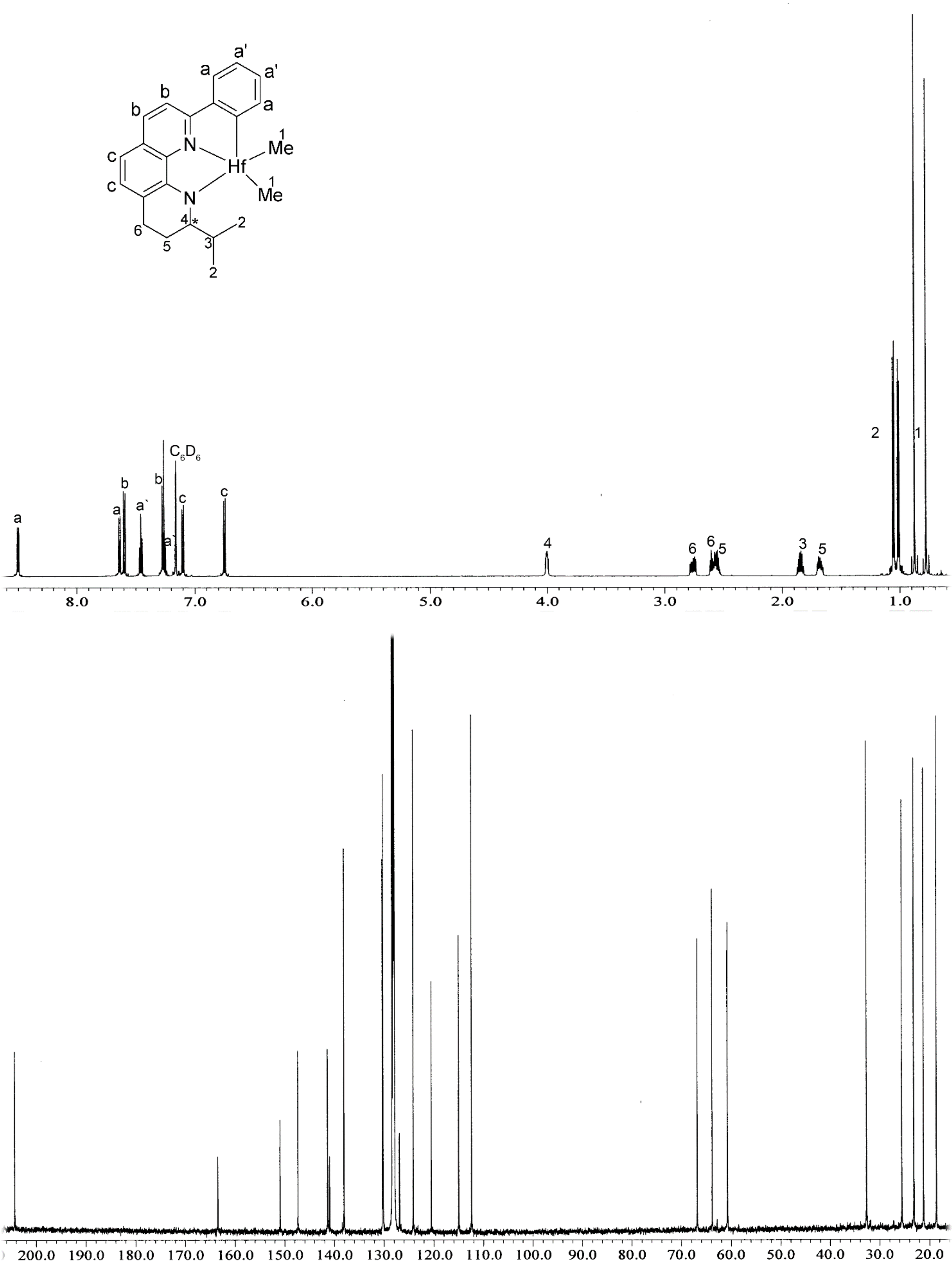


Figure S11. ^{1}H and ^{13}C NMR spectra of **13**.

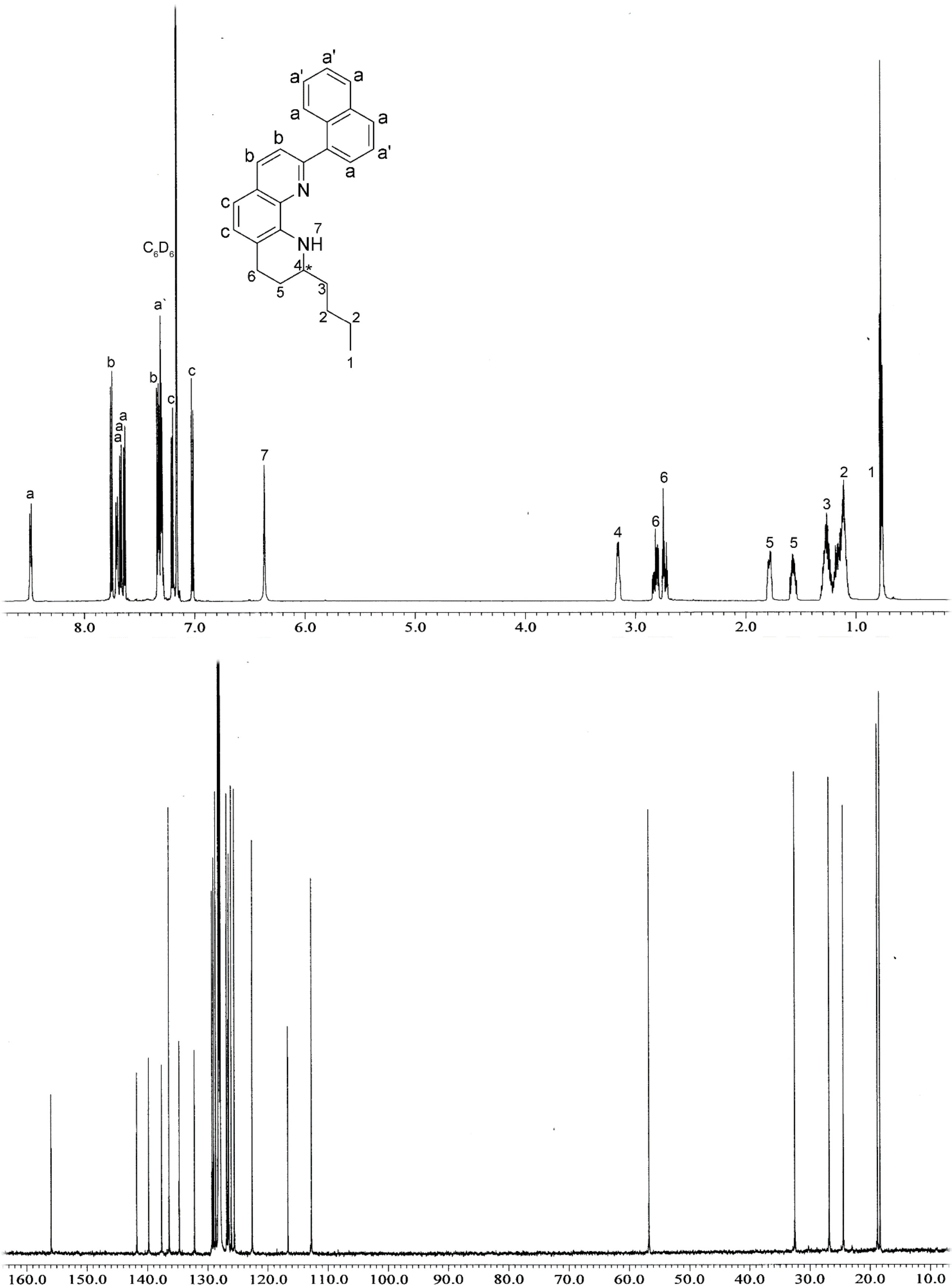
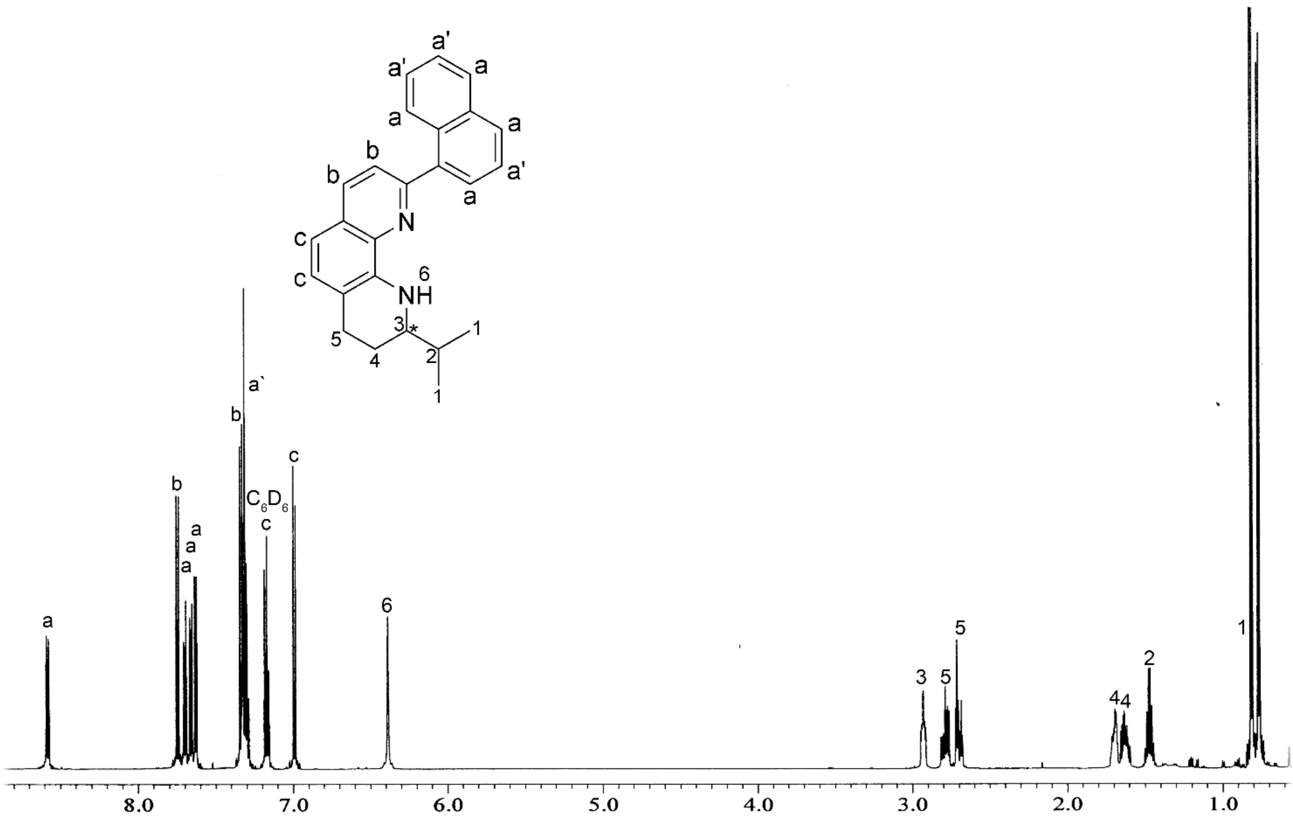


Figure S12. ^{1}H and ^{13}C NMR spectra of **14**.



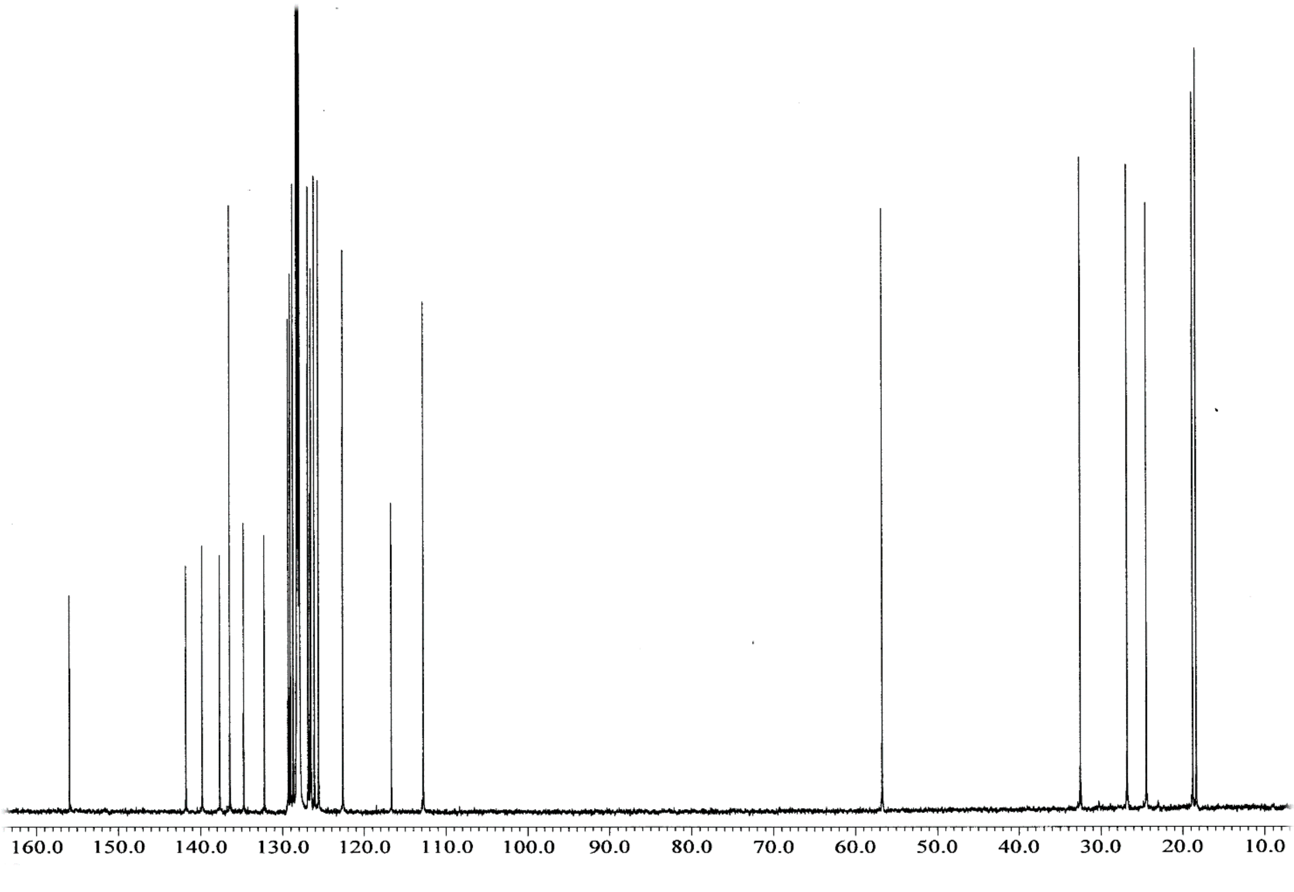
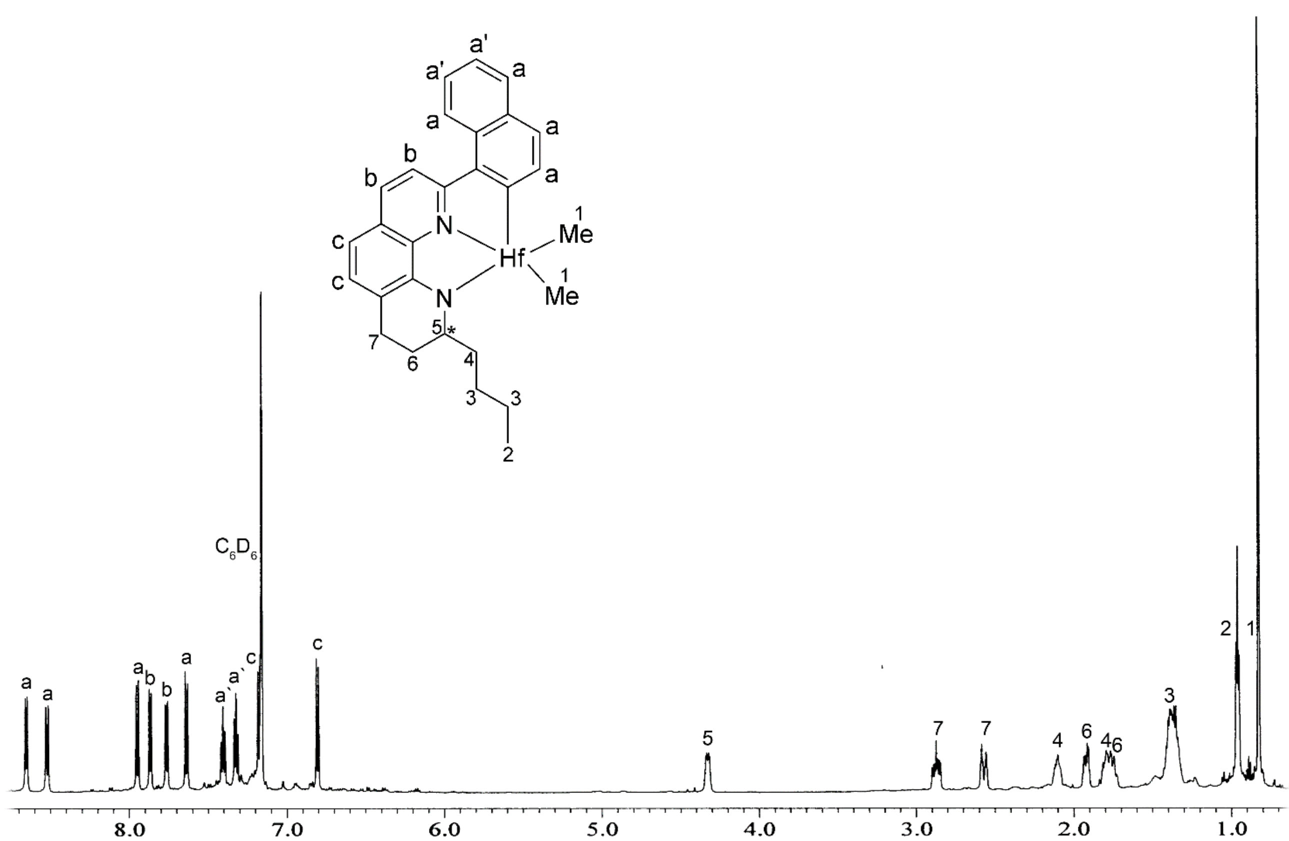


Figure S13. ^{1}H and ^{13}C NMR spectra of **15**.



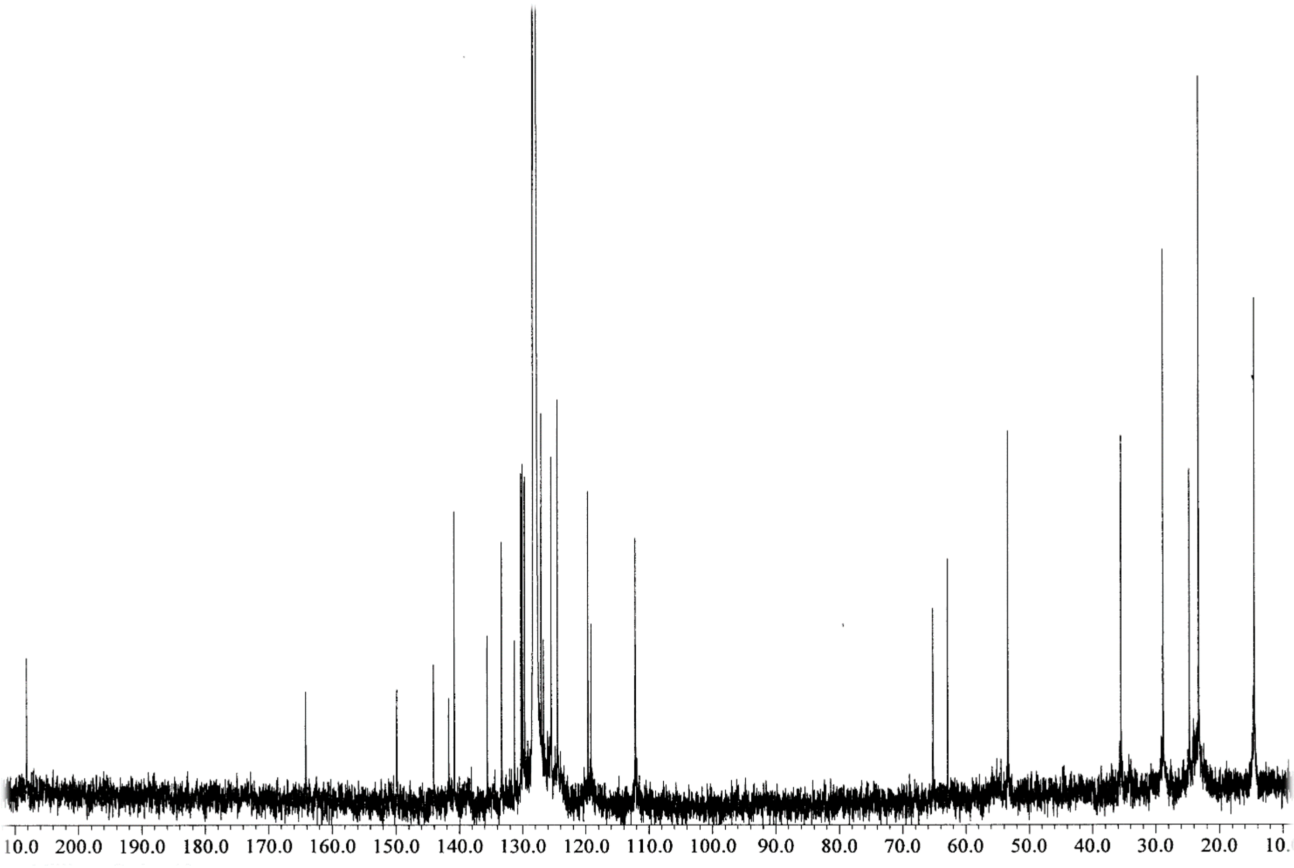


Figure S14. ^{1}H and ^{13}C NMR spectra of **16**.

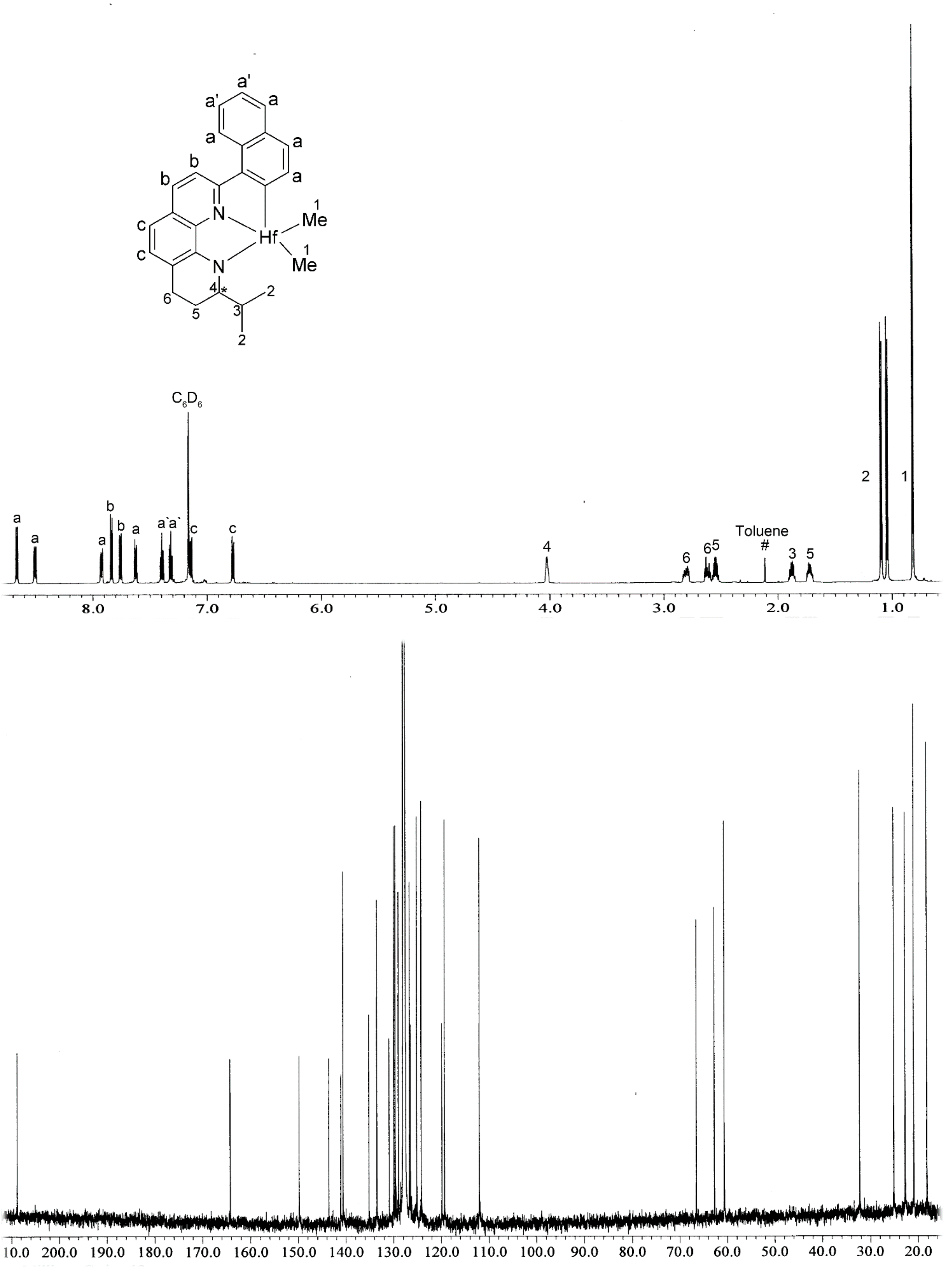


Figure S15. ^{1}H and ^{13}C NMR spectra recorded on the reaction of **1** with $[(C_{18}H_{37})_2N(H)Me]^{+}[B(C_6F_5)_4]^{-}$ at 3 h.

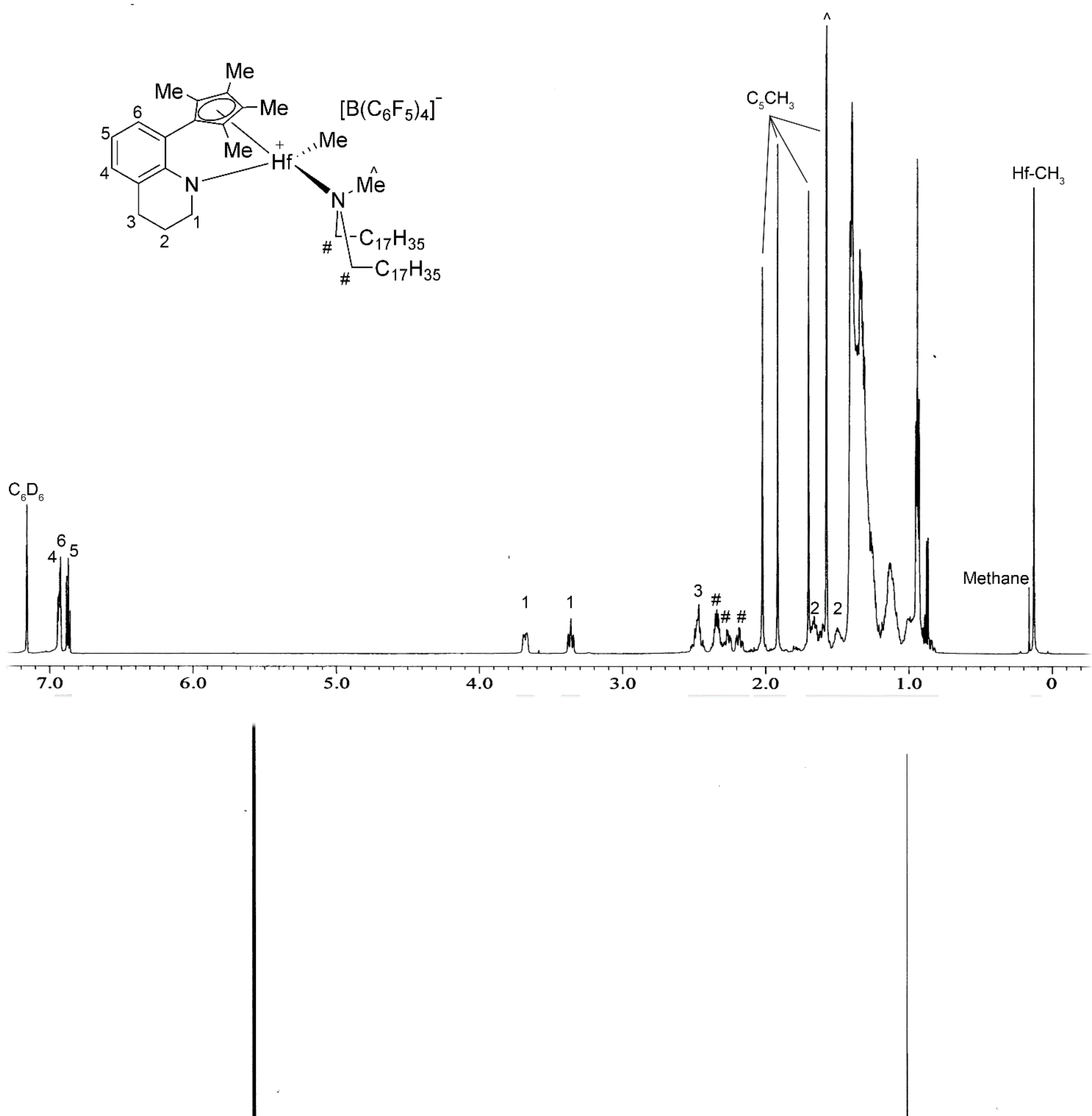


Figure S16. ^{1}H NMR spectrum recorded on the reaction of **2** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 3 h.

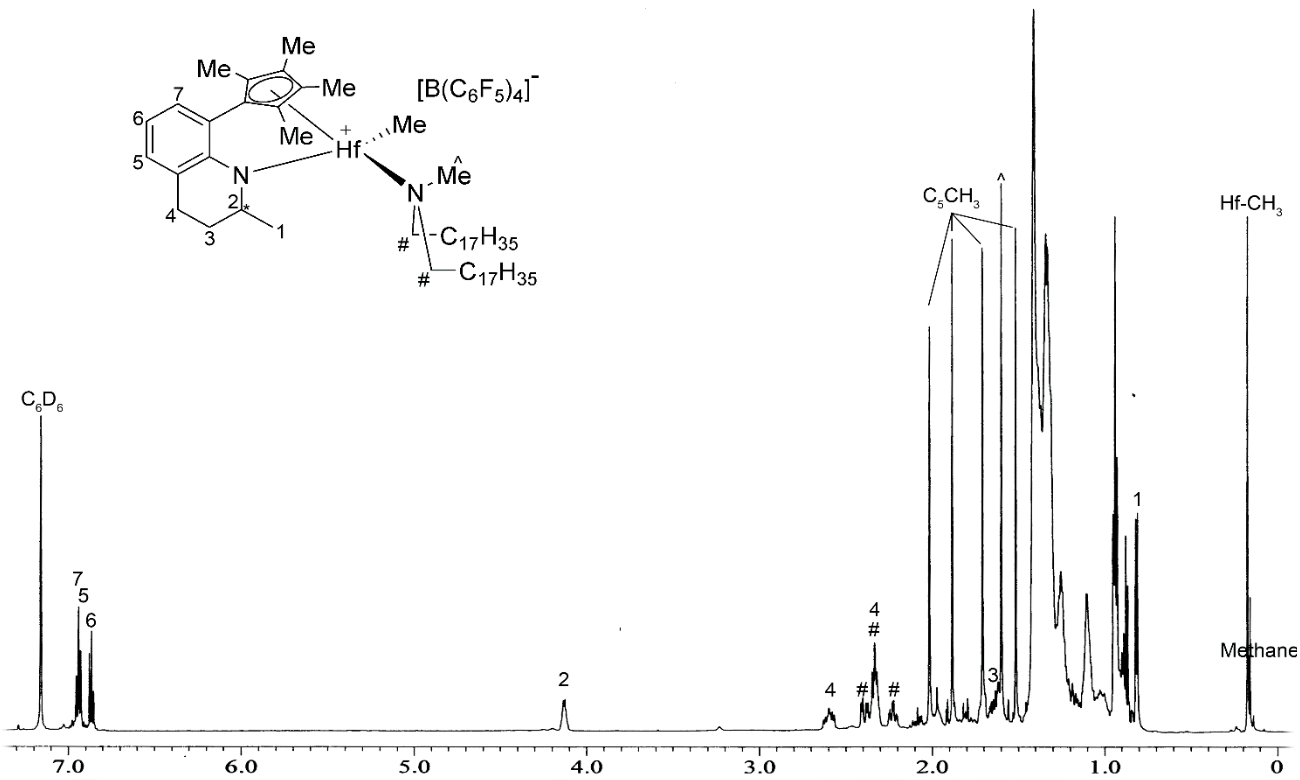


Figure S17. ^{1}H NMR spectrum recorded on the reaction of **3** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 5 h.

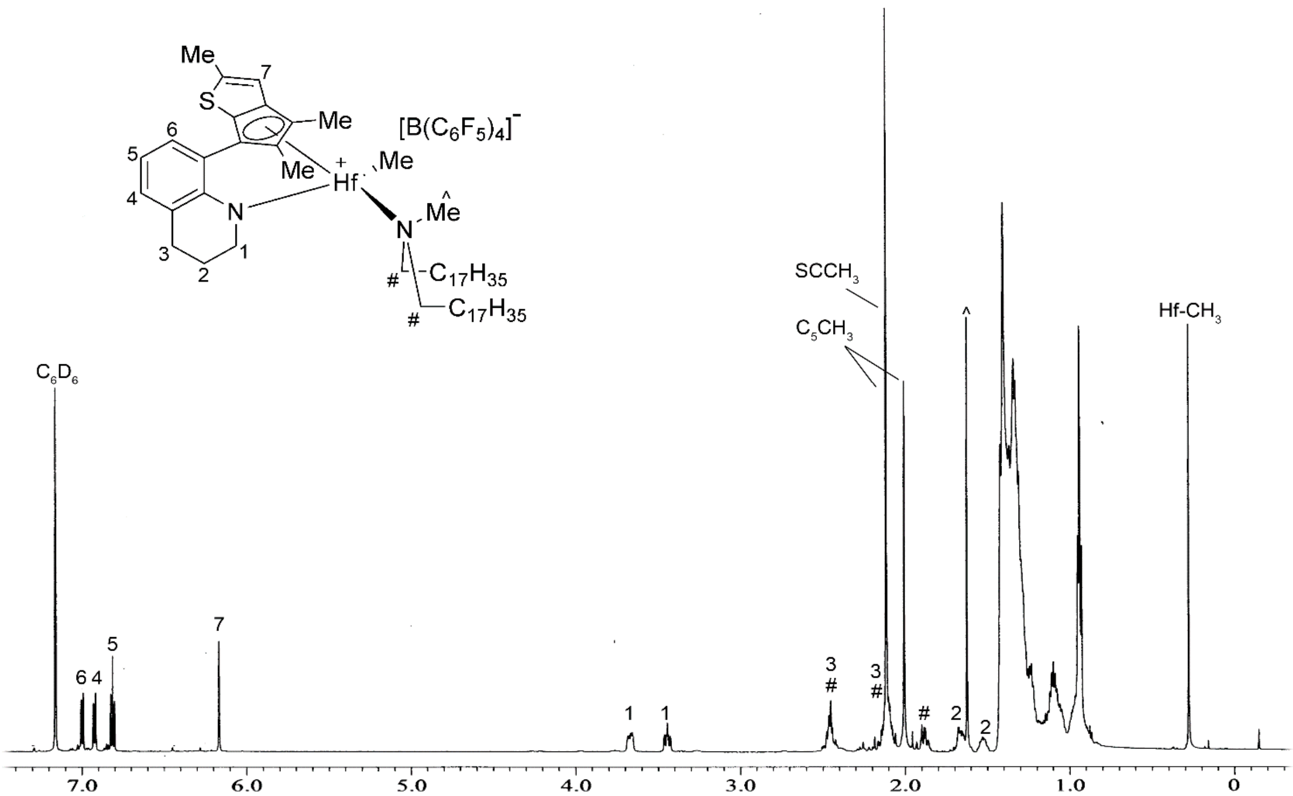


Figure S18. ^{1}H NMR spectrum recorded on the reaction of **4** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 5 h.

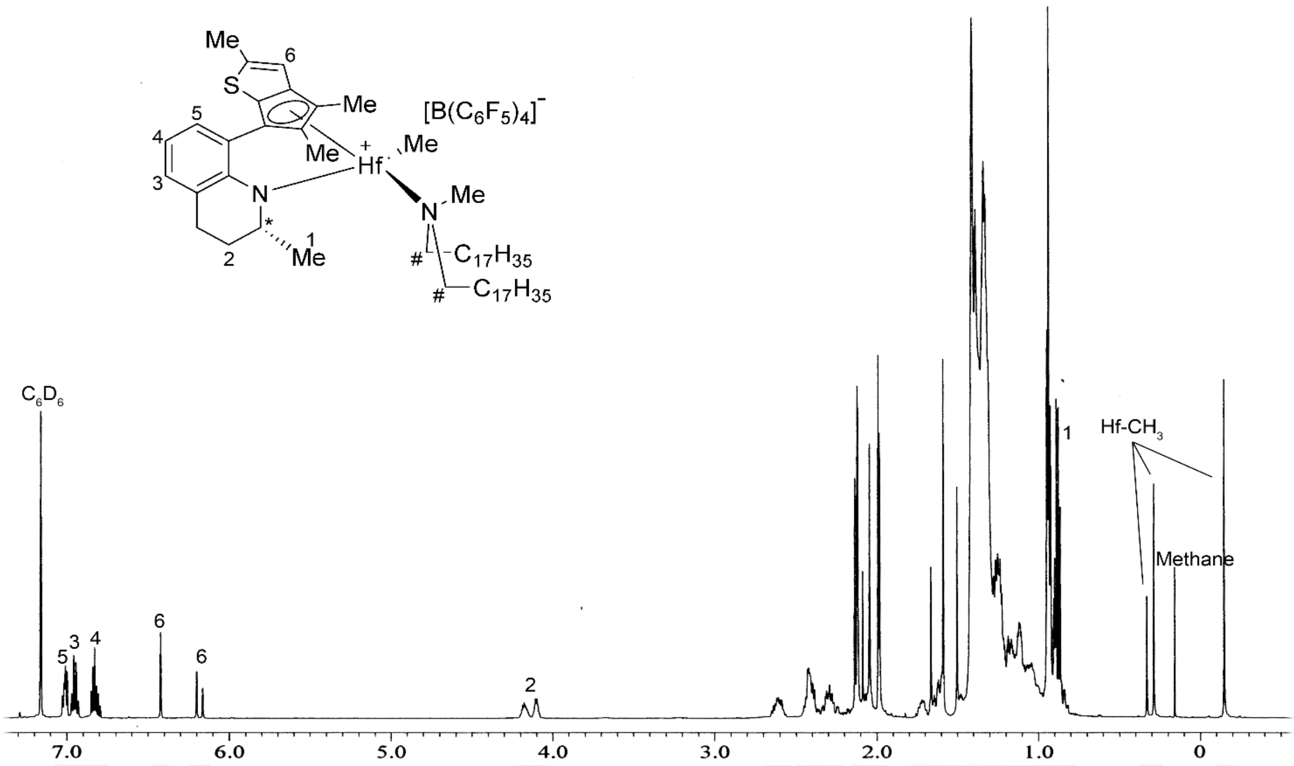


Figure S19. ^{1}H NMR spectrum recorded on the reaction of **5** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 3 h.

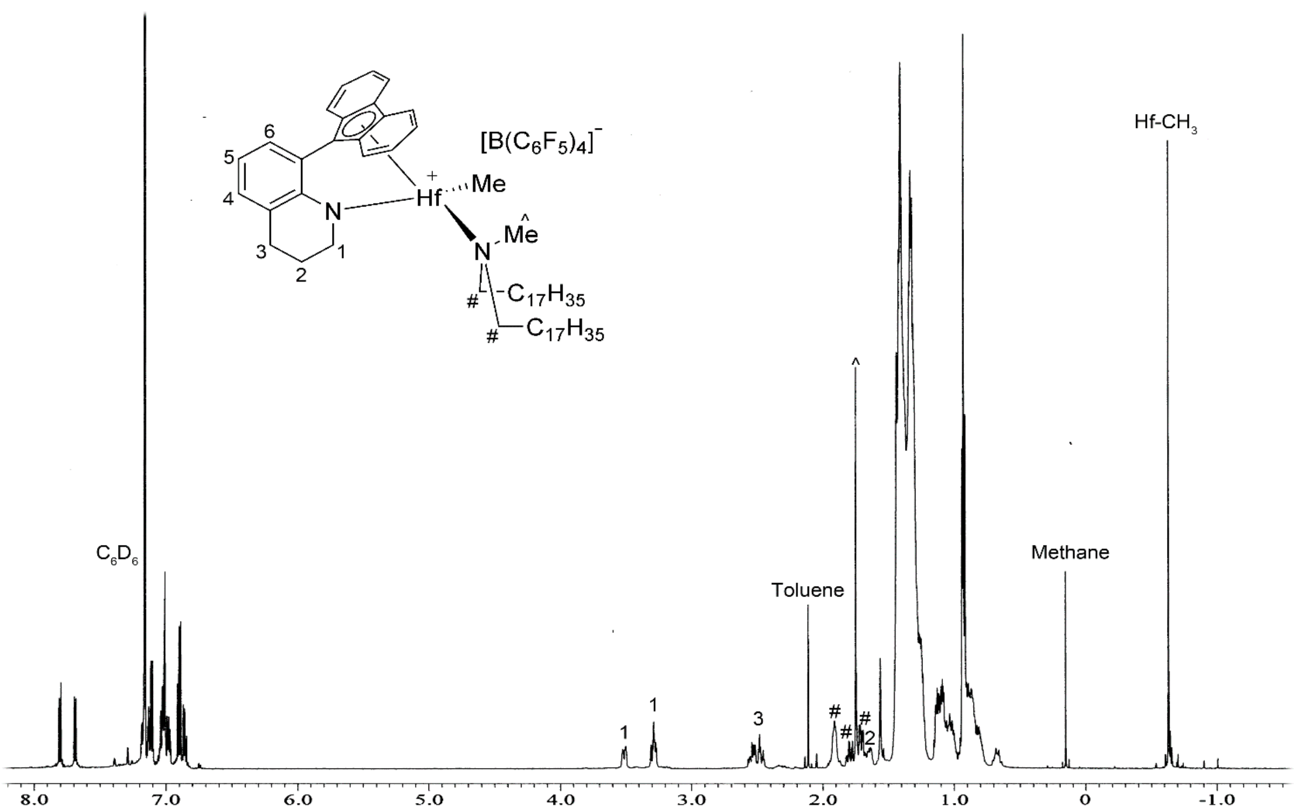


Figure S20. ^{1}H NMR spectrum recorded on the reaction of **6** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 3 h.

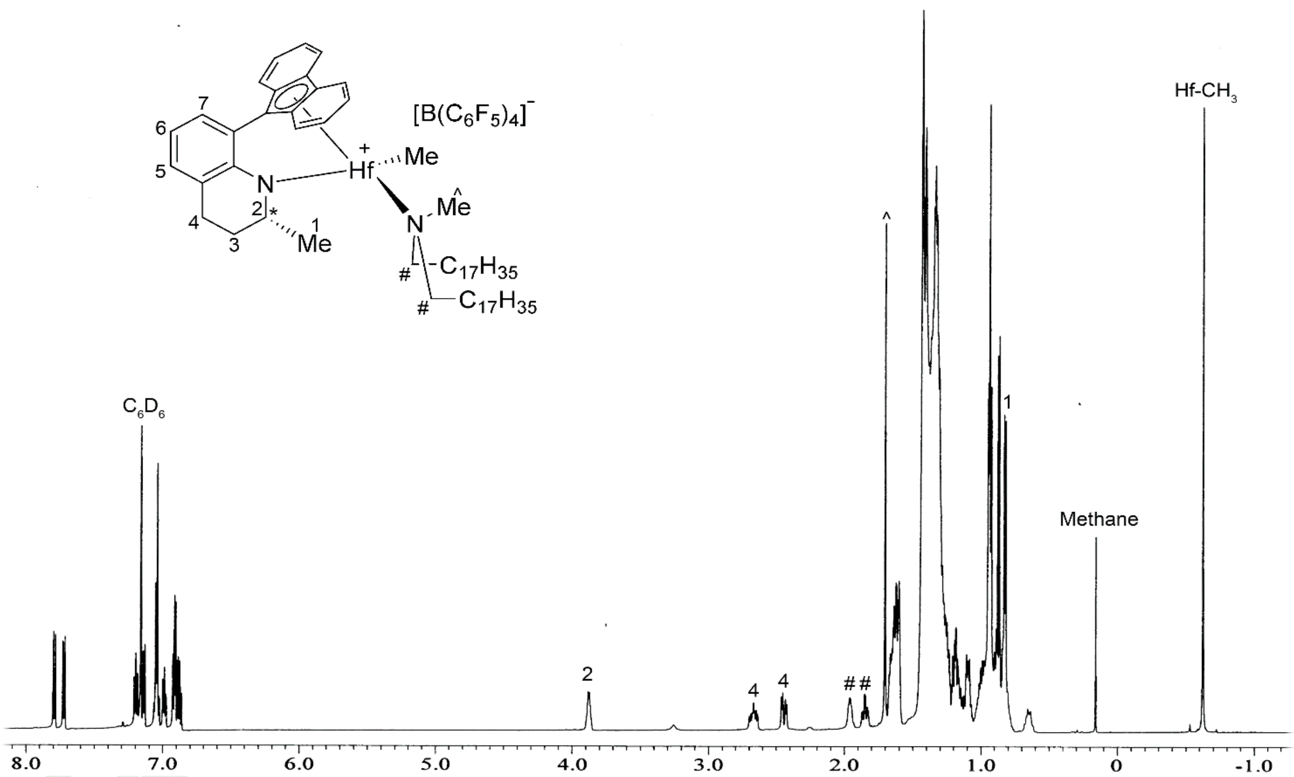


Figure S21. ^{1}H NMR spectrum recorded on the reaction of **10** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 0.5 h.

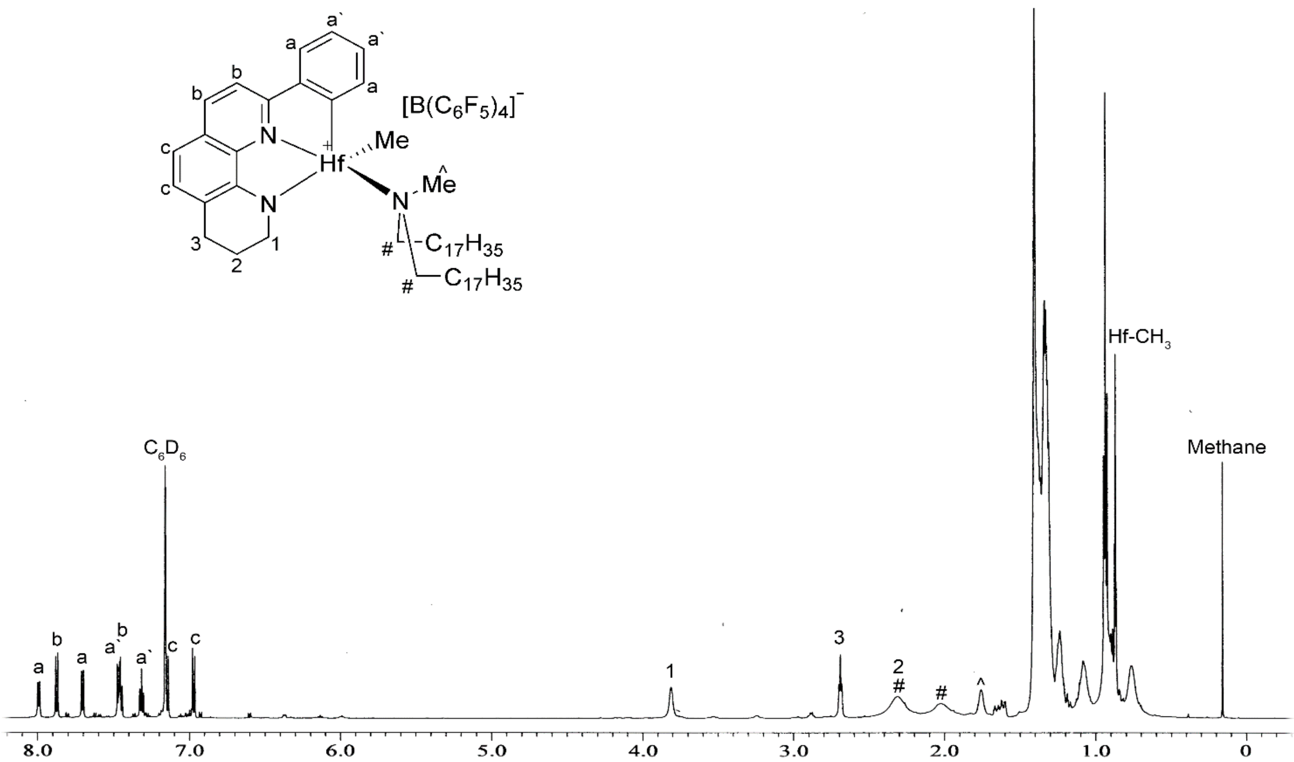


Figure S22. ^{1}H NMR spectrum recorded on the reaction of **11** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 0.5 h.

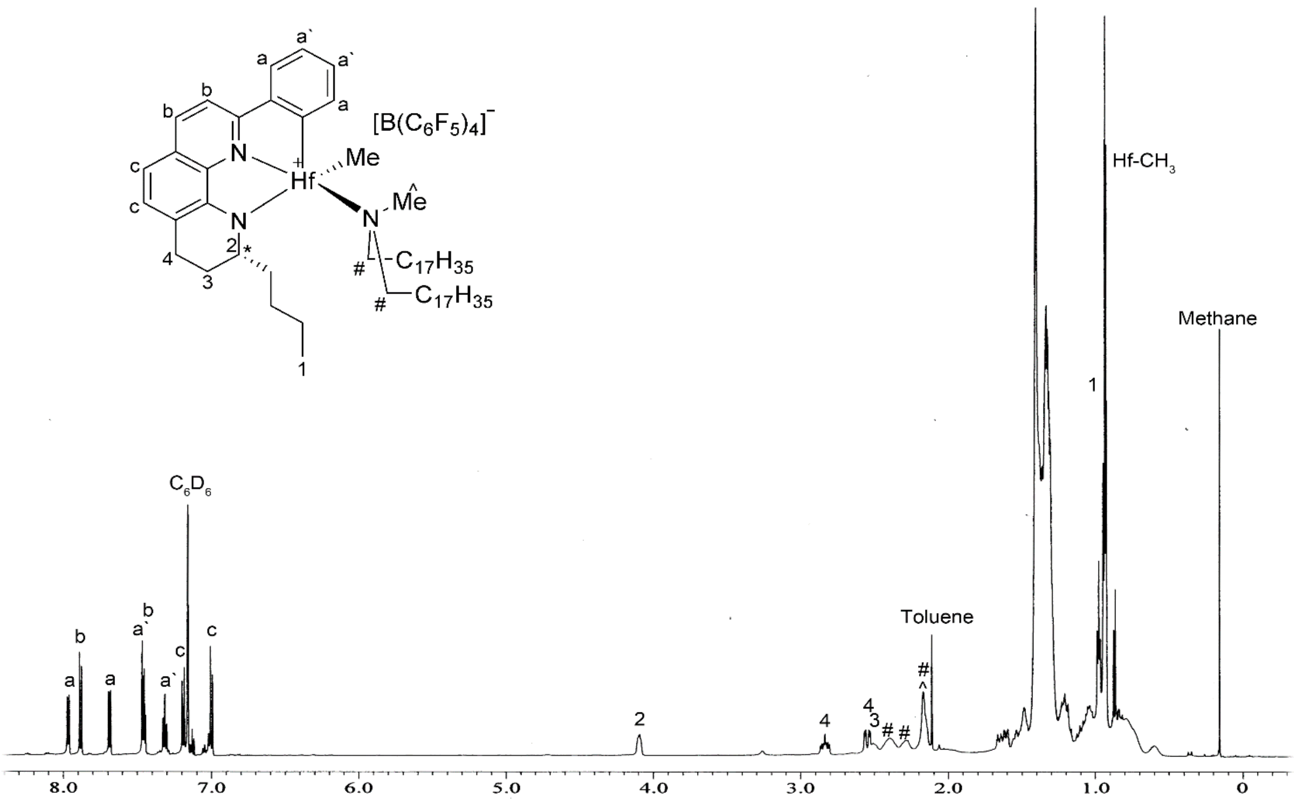


Figure S23. ^{1}H and ^{13}C NMR spectra recorded on the reaction of **12** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 0.5 h.

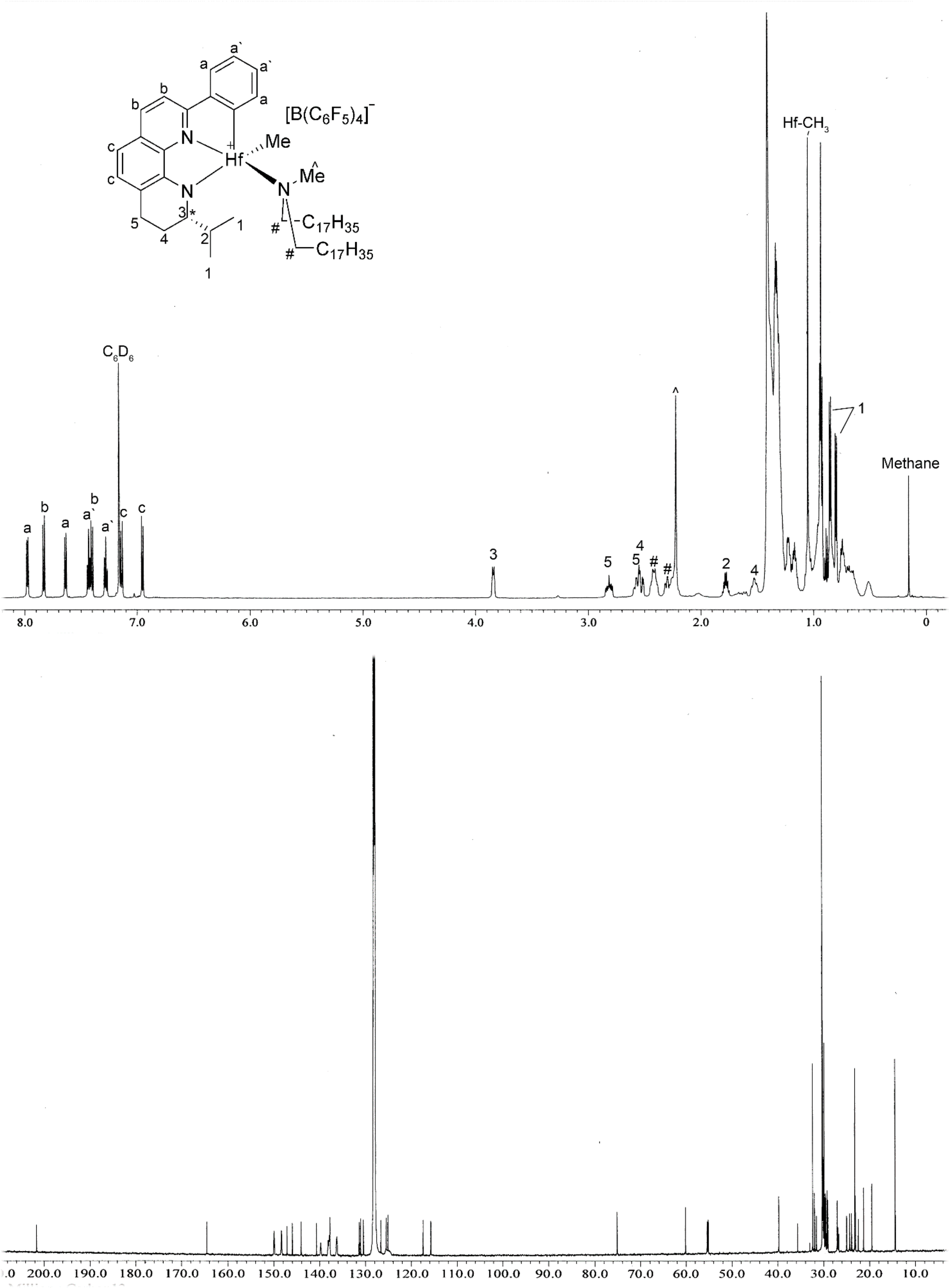


Figure S24. [1]H NMR spectrum recorded on the reaction of **15** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 1 h..

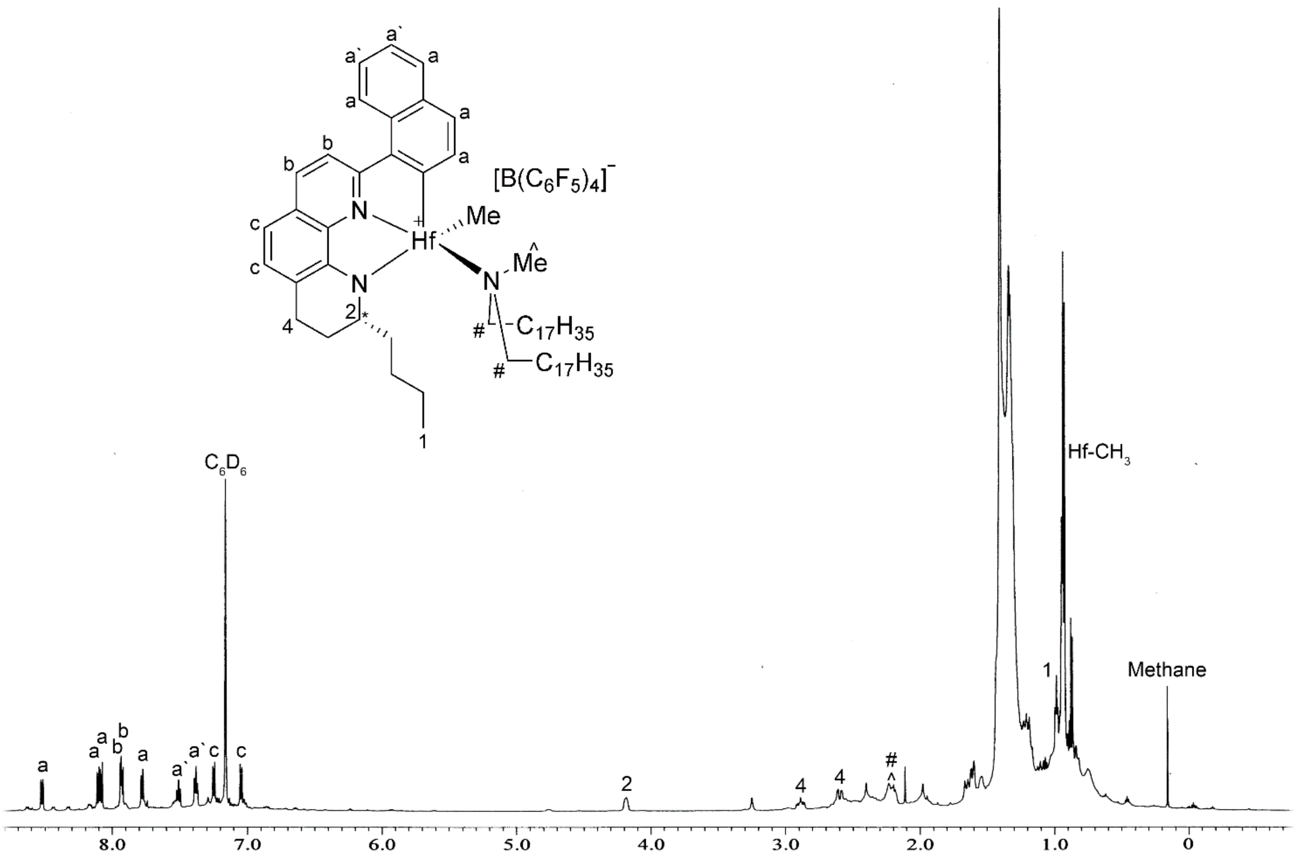


Figure S25. [1]H NMR spectrum recorded on the reaction of **16** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ at 1 h.

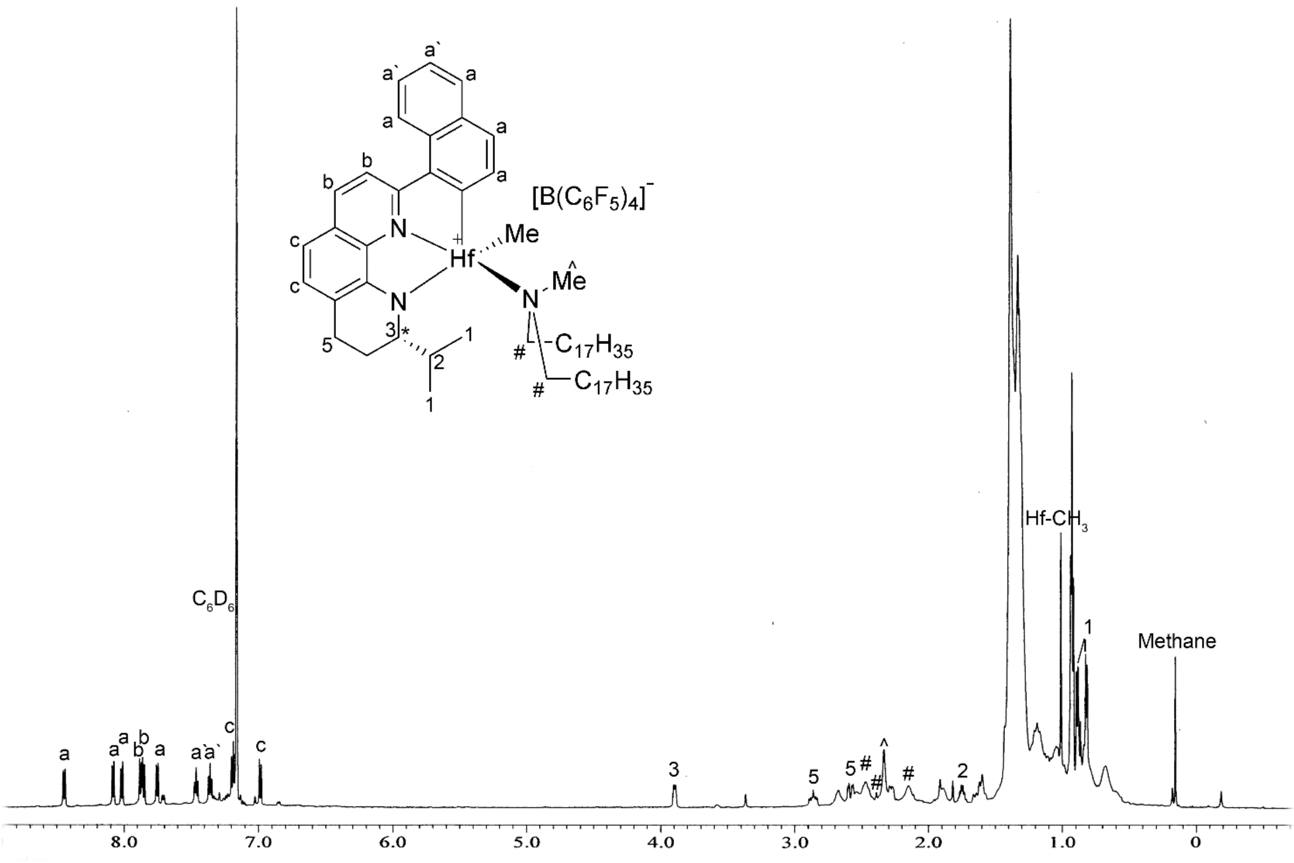


Figure S26. ^{1}H NMR spectrum recorded on the reaction of **16** with $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ containing water at 1 h.

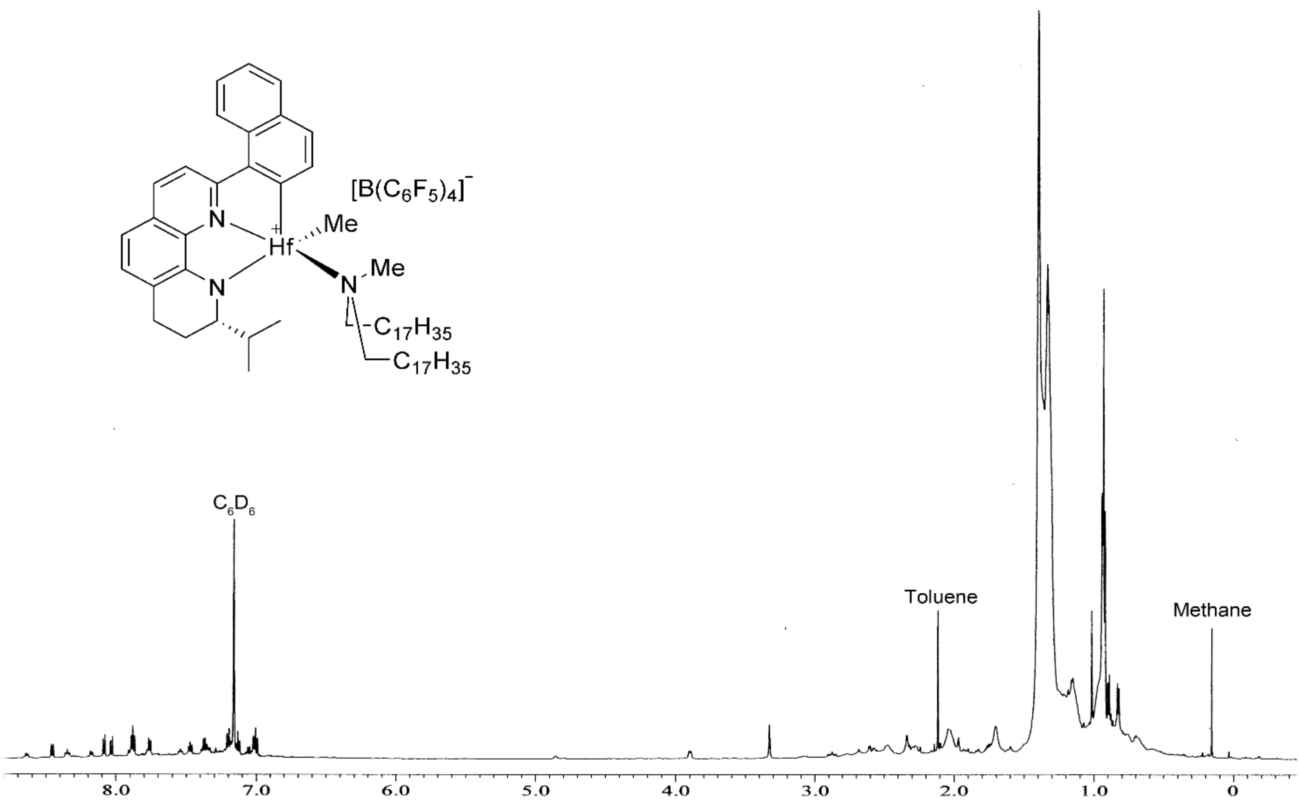


Figure S27. ^{1}H NMR spectrum of anhydrous $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ prepared in this work.

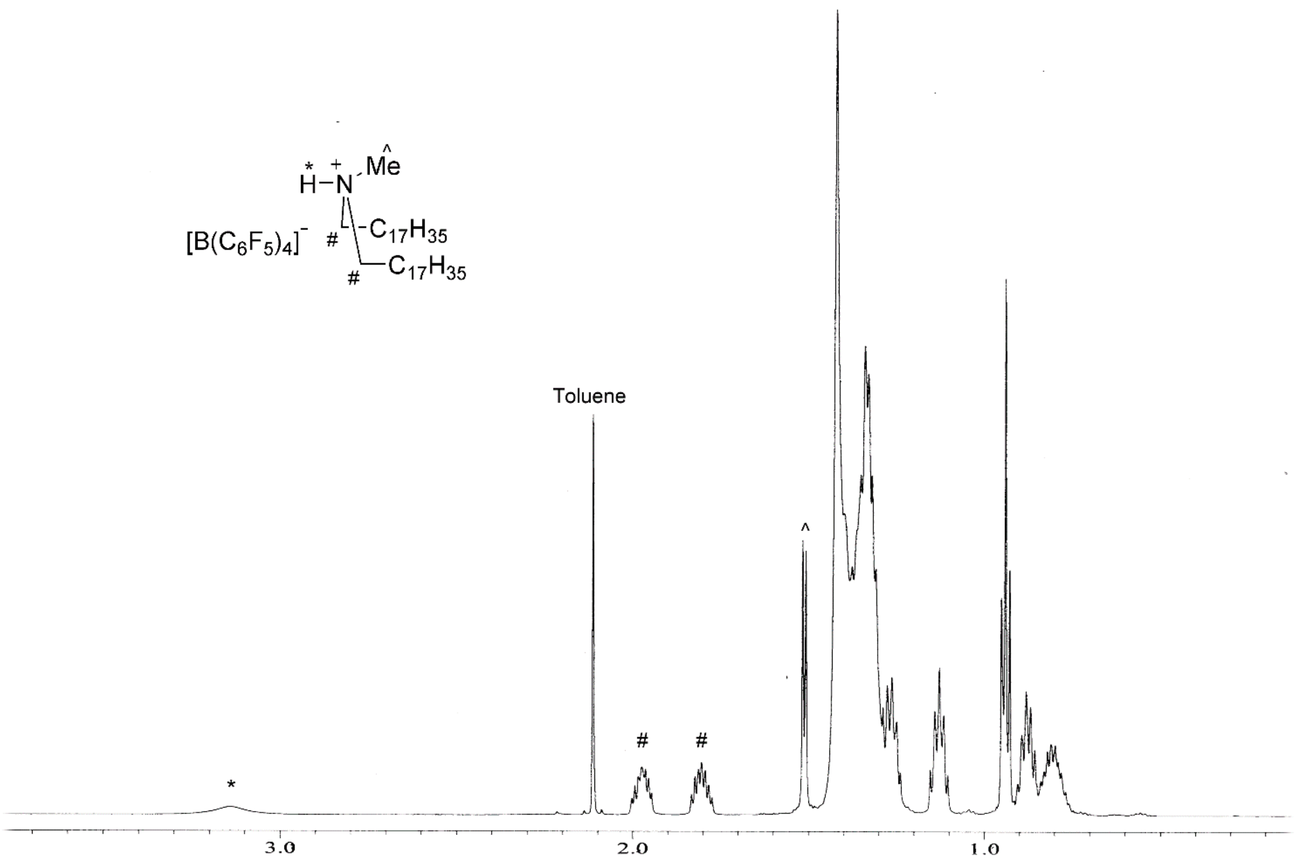


Figure S28. ^{1}H NMR spectrum of $[(C_{18}H_{37})_2N(H)Me]^+[B(C_6F_5)_4]^-$ containing water prepared by the method reported in patent.

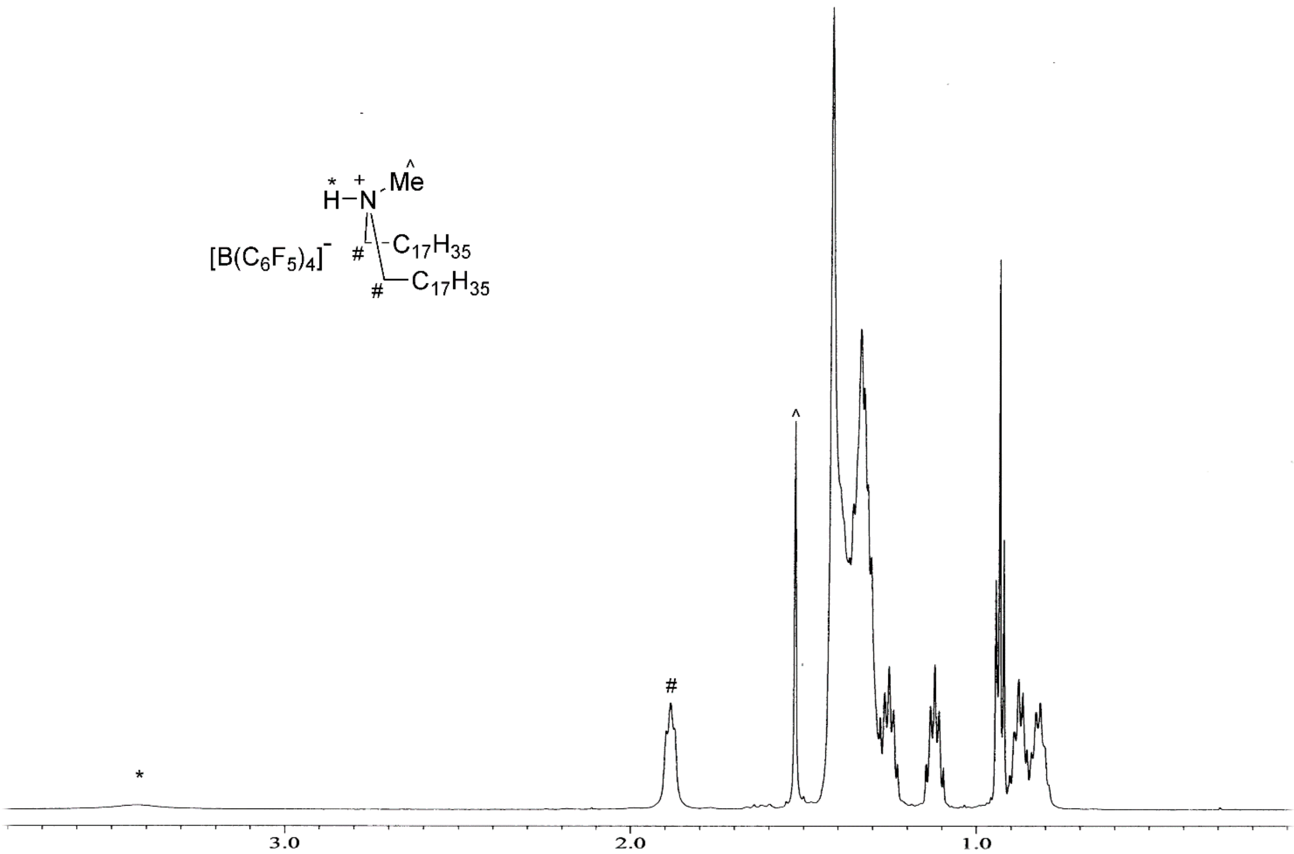


Figure S29. ^{1}H NMR spectrum of polymer (entry 3 in Table 1).

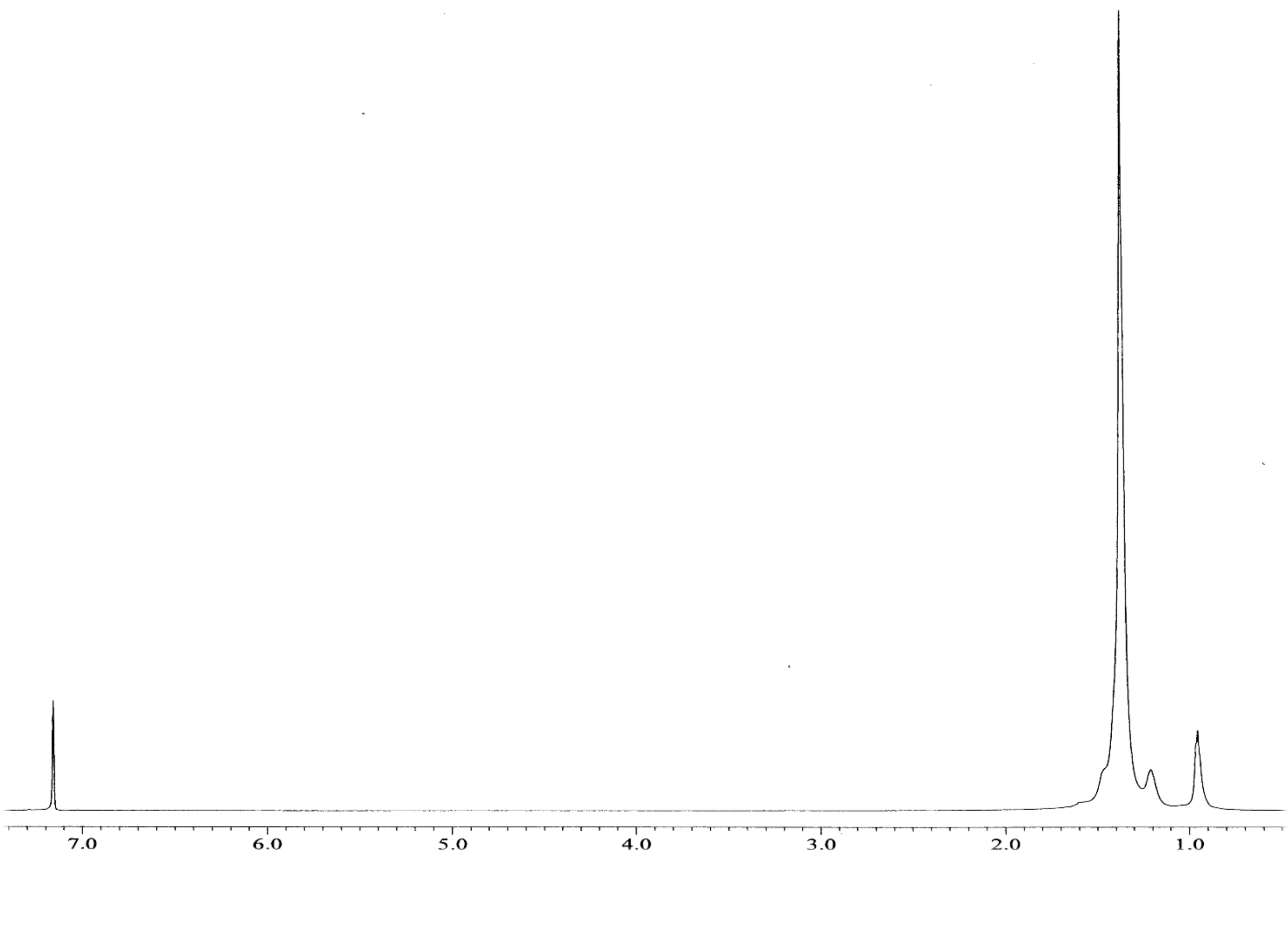


Figure S30. ^{1}H NMR spectrum of Polymer (entry 5 in Table 1).

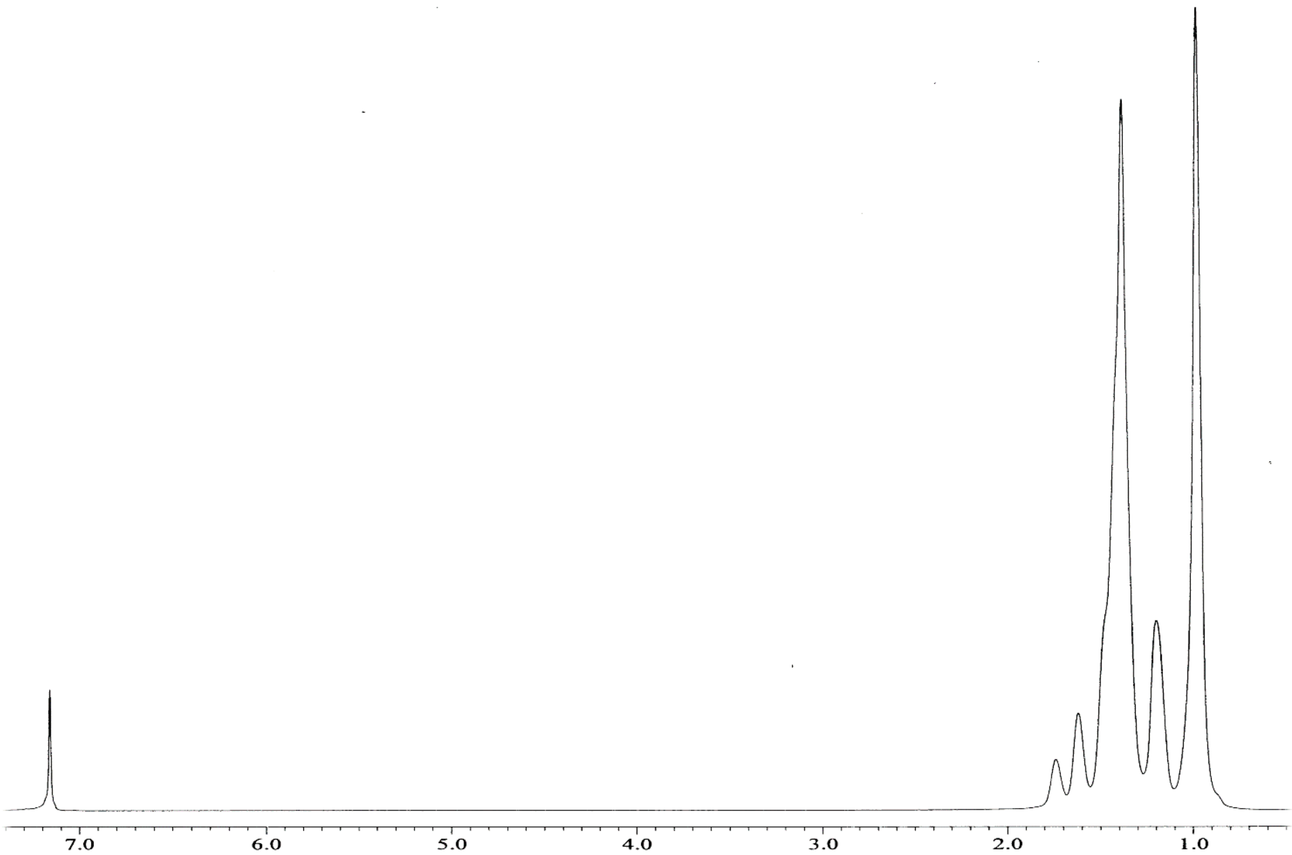
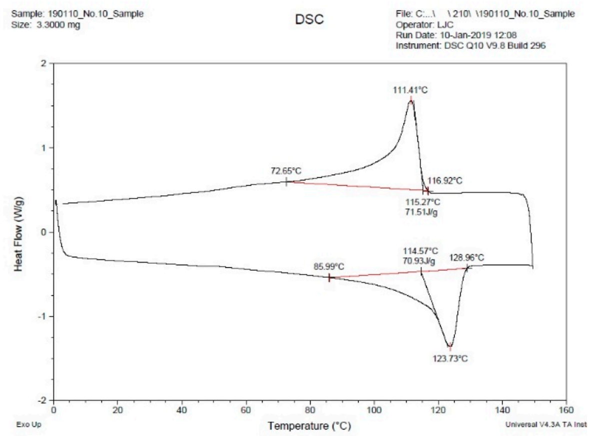


Figure S31. DSC Thermograms

<Entry 1 in Table 1>



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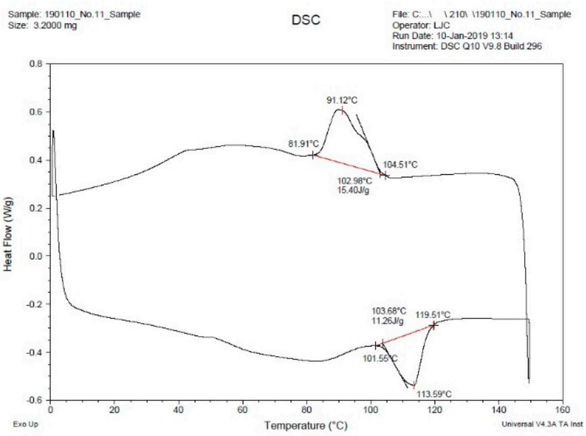
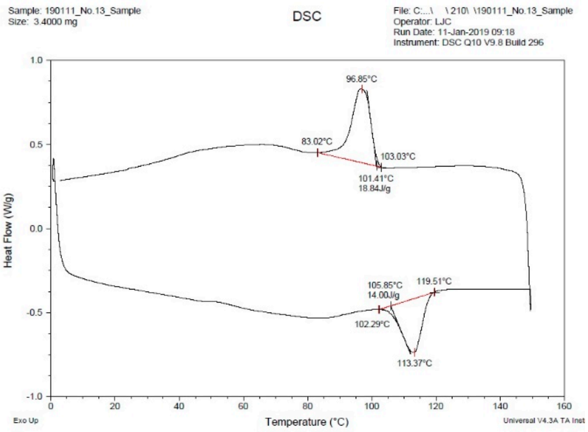


<Entry 3 in Table 1>



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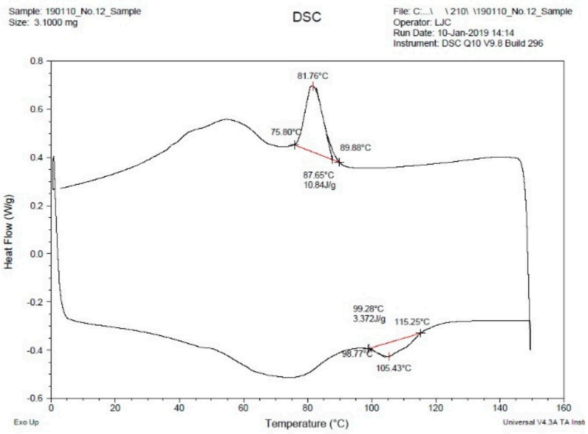

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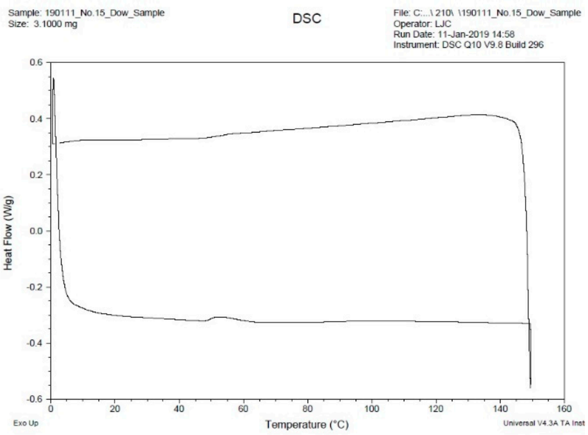

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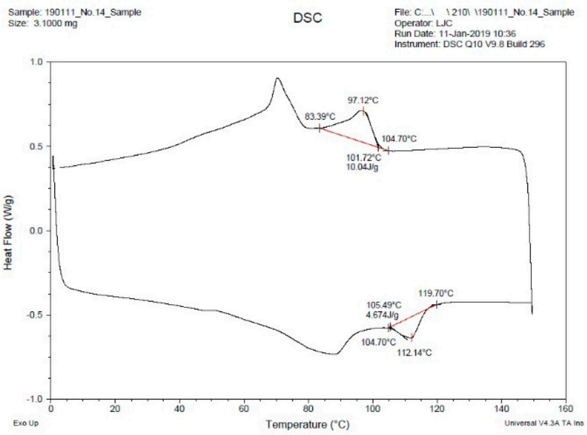

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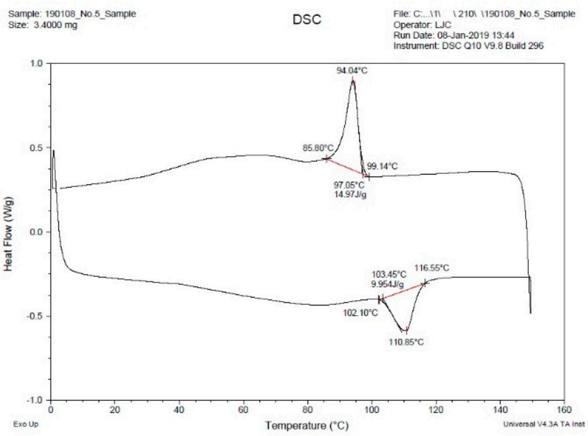

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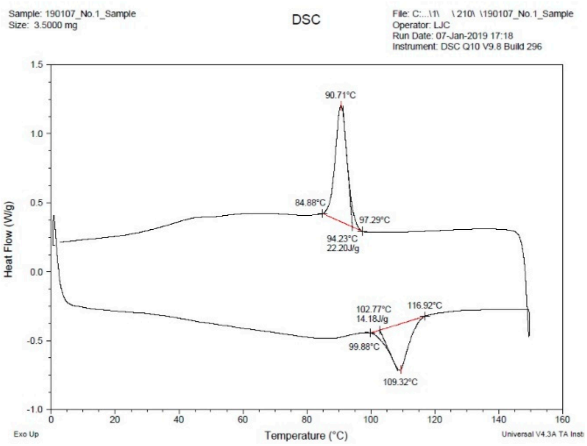

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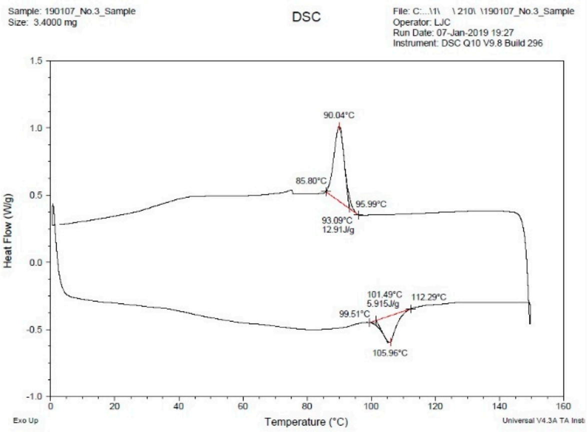

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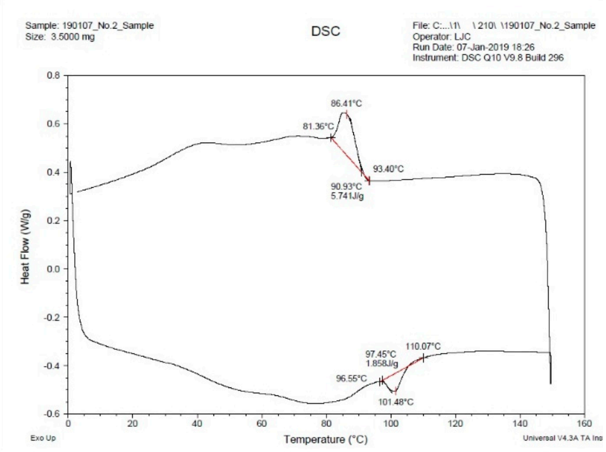

<Entry 11 in Table 1>