

Supporting Information for the Paper

Cesium Carbonate-Catalyzed Reduction of Amides with Hydrosilanes

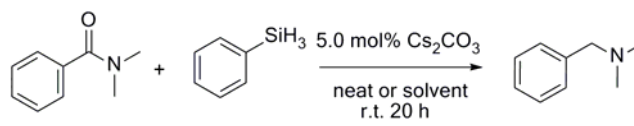
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Solvent Effects of the Reduction	S2
Investigation of Possible Activation Mechanism	S2
NMR Spectra of the Amides	S4
NMR Spectra of the Amines.	S10

Solvent Effects of the Reduction

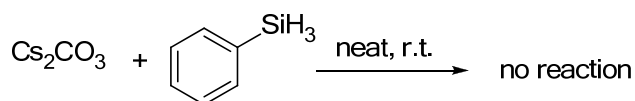
Table S1. Solvent effect of Cs₂CO₃-catalyzed tertiary amides.^a



Entry	Solvent	Conv. [%]
1 ^b	-	86
2 ^c	THF (1M)	41
3 ^c	Tol (1M)	5

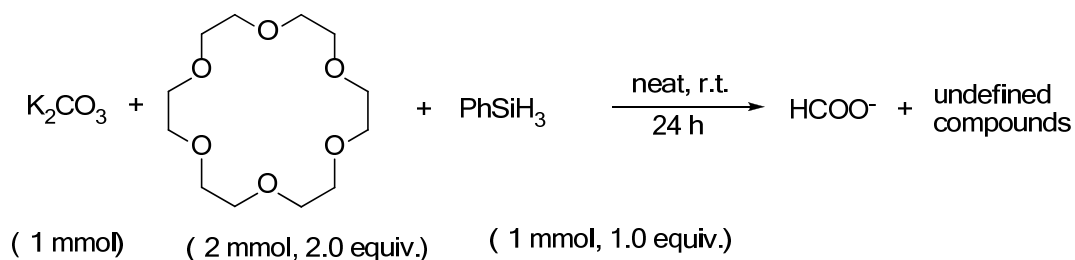
^aReaction conditions: amide (3.0 mmol) with 49 mg of Cs₂CO₃ (5.0 mol%) in 325 mg (3.0 mmol) of PhSiH₃, 20 h. Conversion was determined by ¹H NMR spectroscopy of the crude reaction mixture. ^bSolvent-free. ^c3.0 mL of the solvent used.

Investigation of the Possible Activation Mechanism



Scheme 1

¹HNMR spectrum indicated that no reaction took place under this condition.



Scheme 2

¹HNMR spectrum indicated that K₂CO₃ can react with PhSiH₃ in the presence of 18-crown-6 and the reaction generates formic anion.

xwl-2013-11-04-K2CO3-2equiv18-crown-6-PhSiH3-rt-24h
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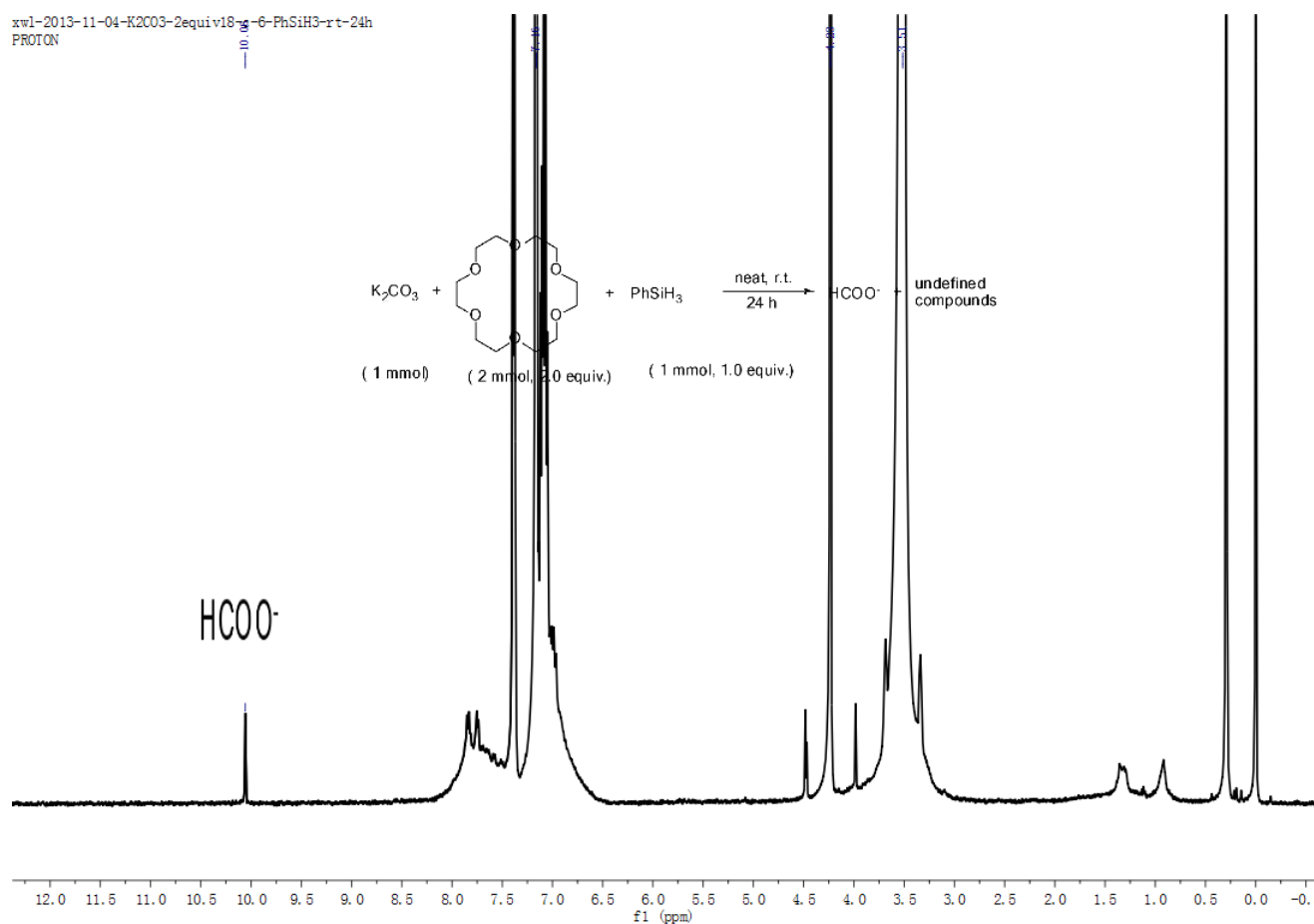
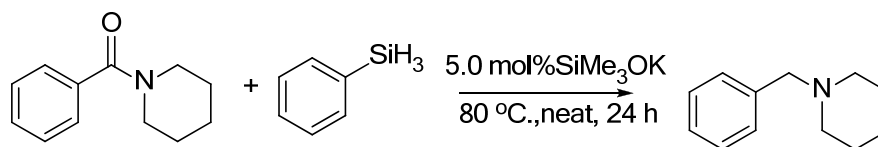


Figure S1. ^1H NMR spectrum of K_2CO_3 can react with PhSiH_3 in the presence of 18-crown-6.



Scheme 3

The complete reduction can also be achieved using SiMe_3OK as the catalyst.

NMR Spectra of the Amides

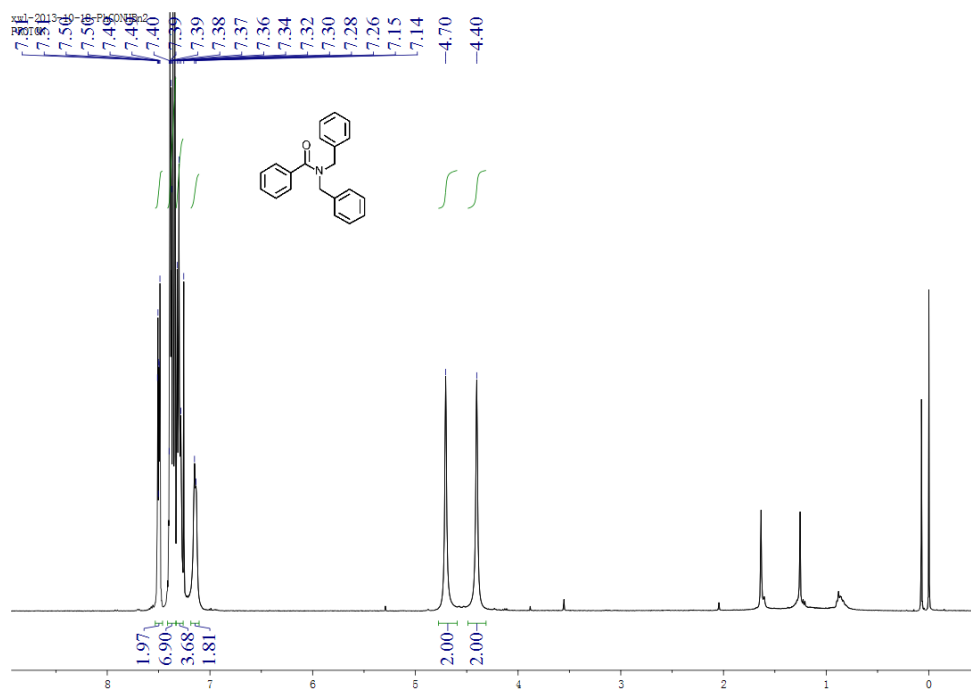


Figure S2. ^1H NMR spectrum of **N,N-dibenzylbenzamide (c)**.

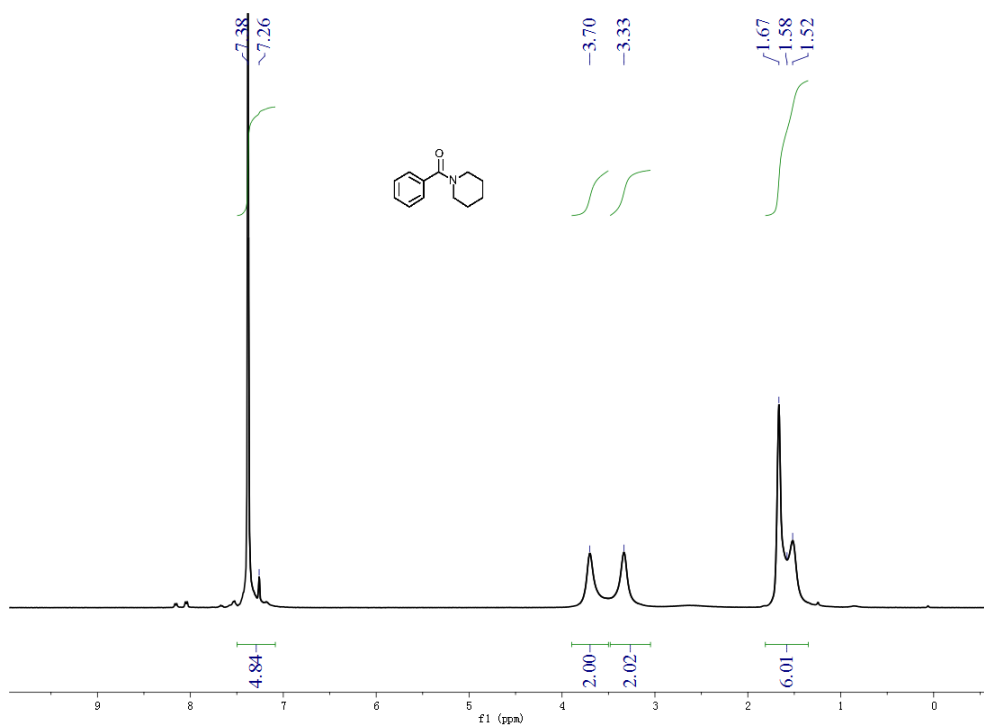


Figure S3. ^1H NMR spectrum of **Phenyl(piperidin-1-yl)methanone (h)**.

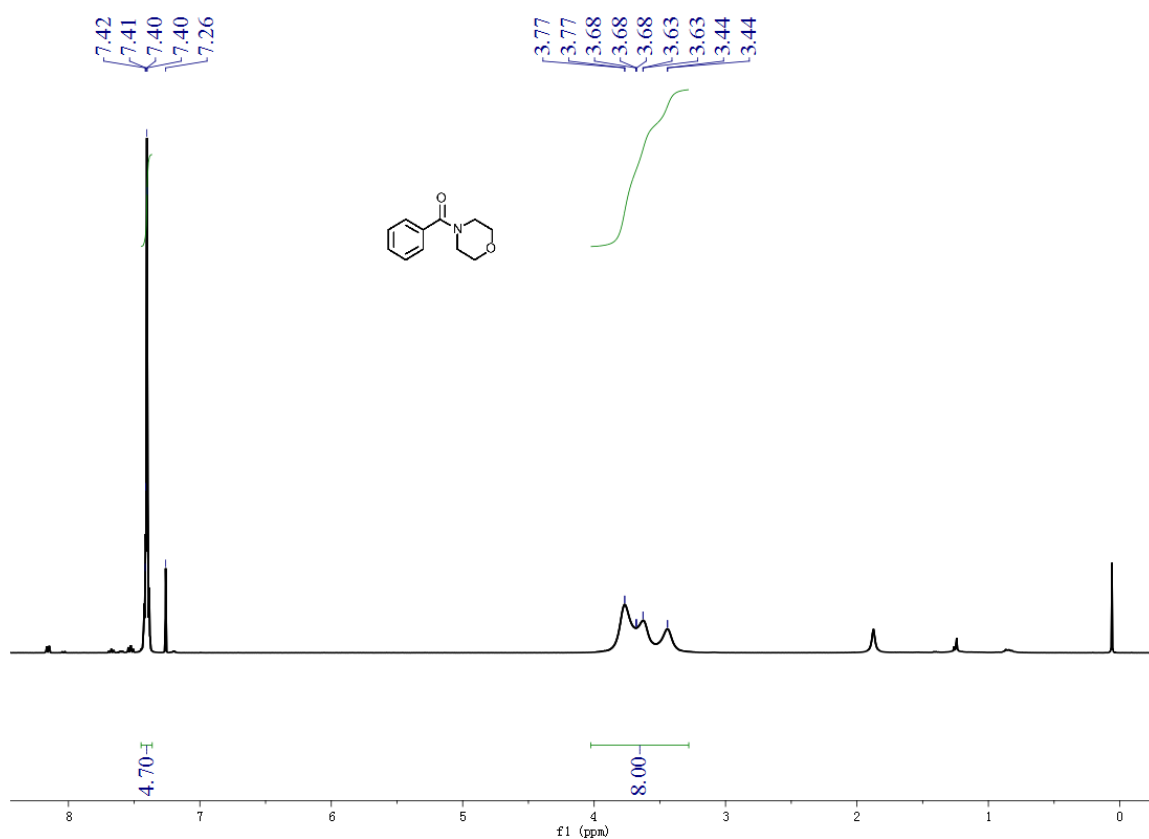


Figure S4. ¹H NMR spectrum of **Morpholino(phenyl)methanone (i).**

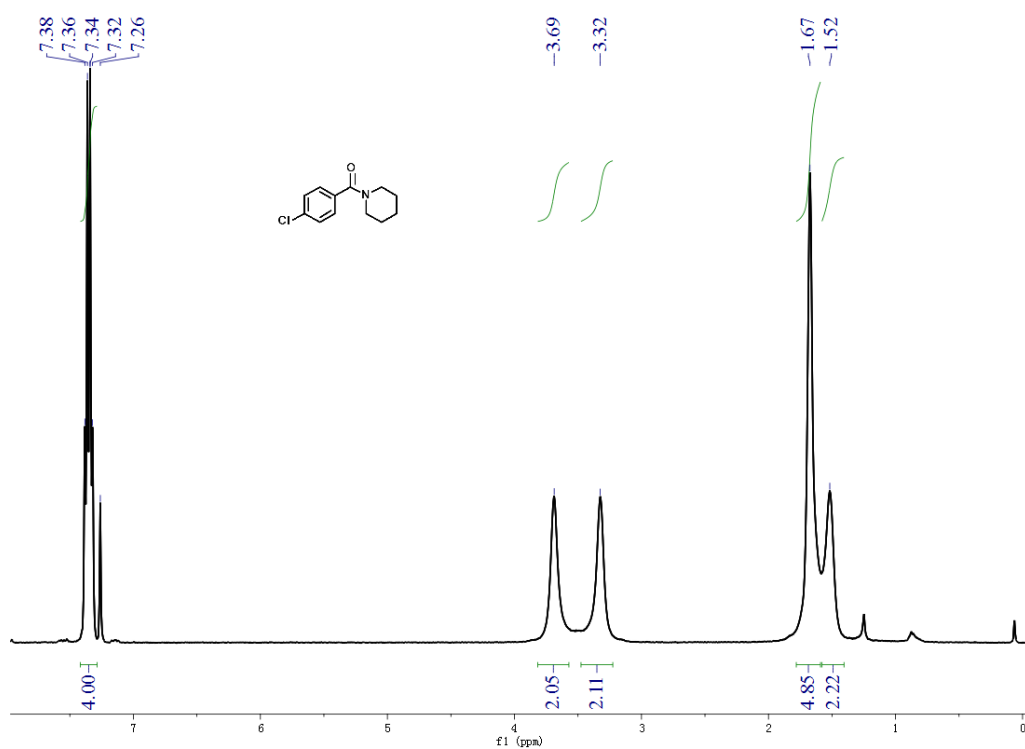


Figure S5. ¹H NMR spectrum of **(4-chlorophenyl)(piperidin-1-yl)methanone (j).**

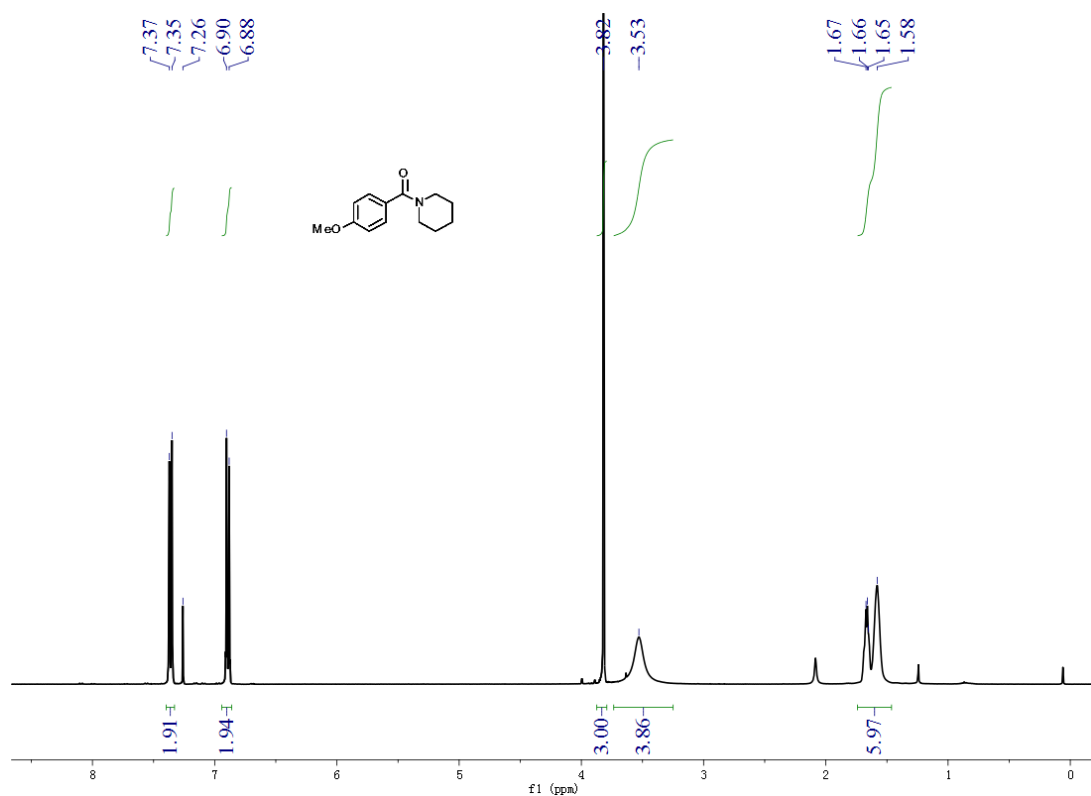


Figure S6. ¹H NMR spectrum of (4-methoxyphenyl)(piperidin-1-yl)methanone (k).

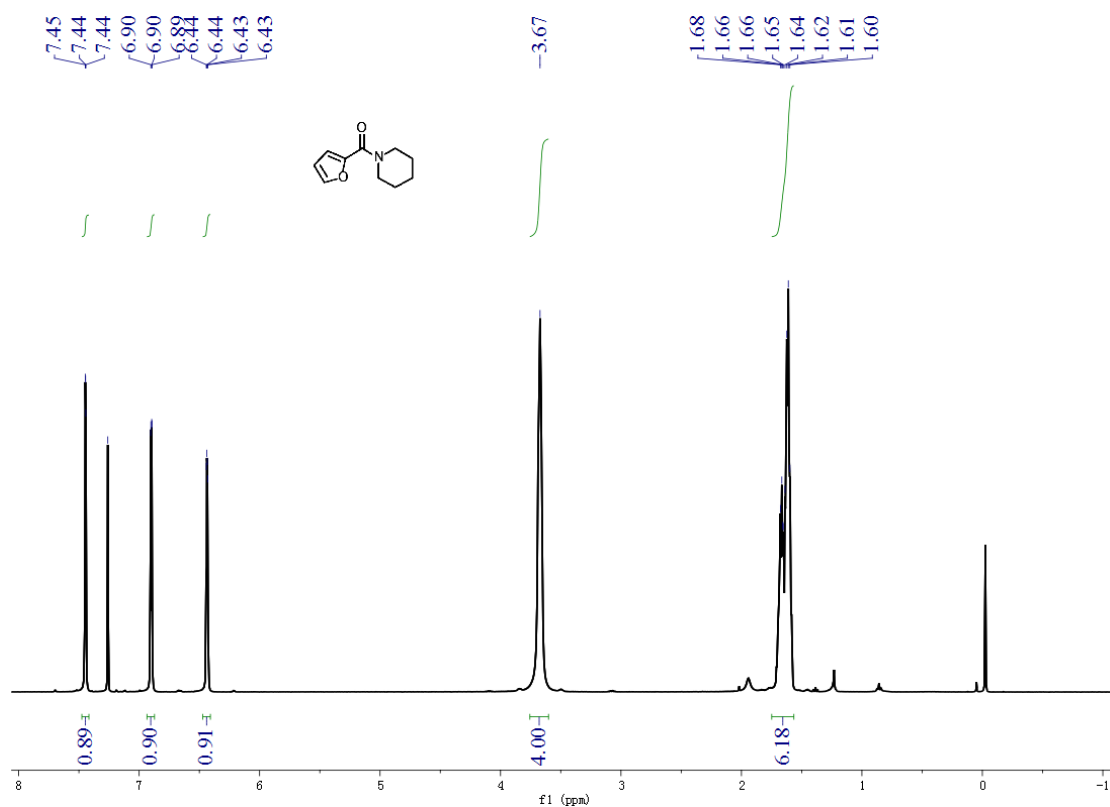


Figure S7. ¹H NMR spectrum of Furan-2-yl(piperidin-1-yl)methanone (l).

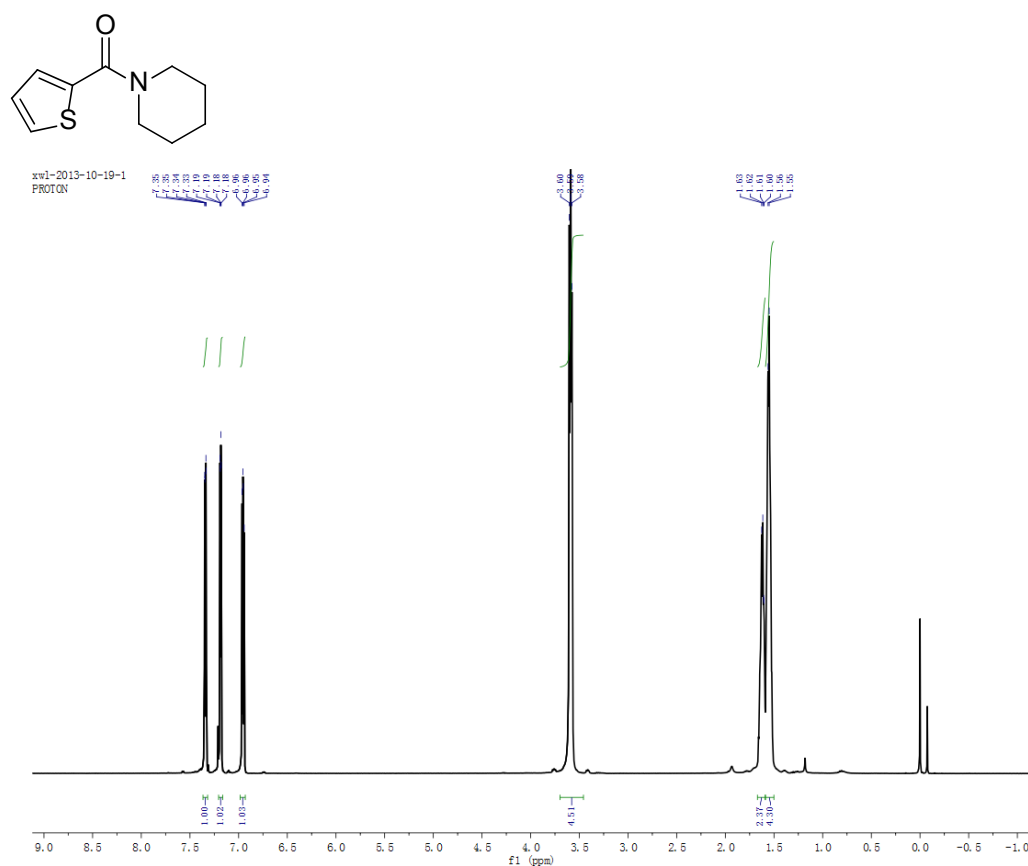


Figure S8. ^1H NMR spectrum of **Piperidin-1-yl(thiophen-2-yl)methanone (m)**.

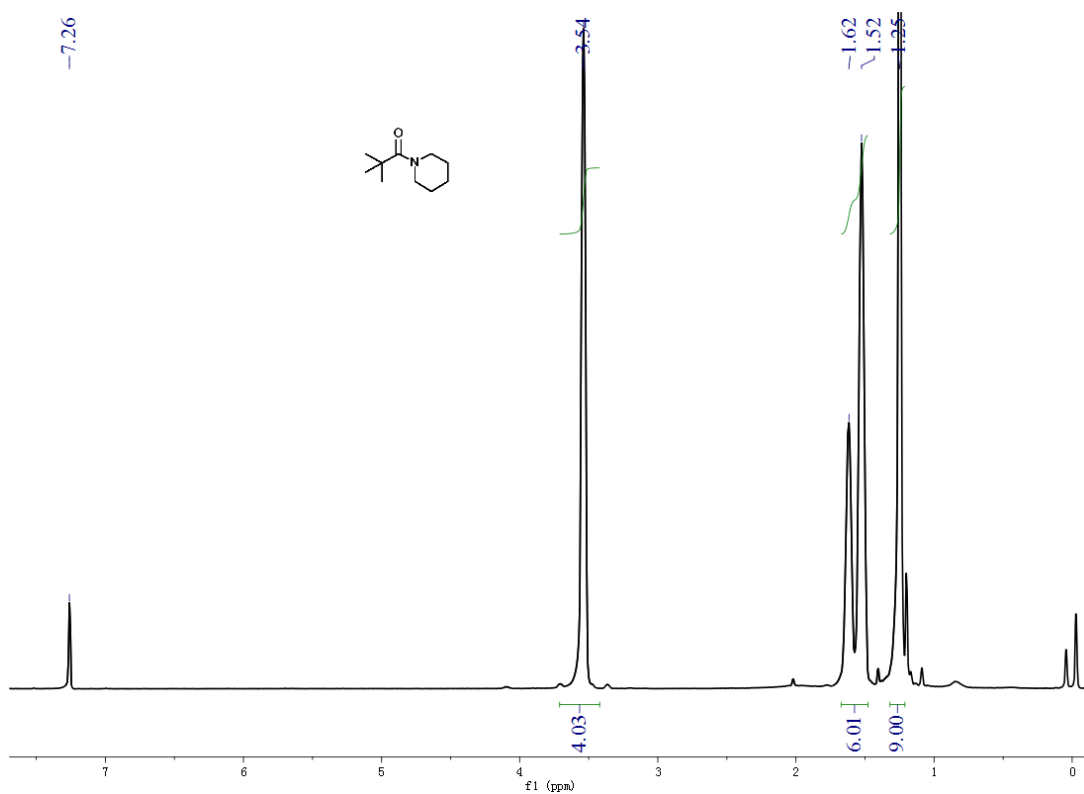


Figure S9. ^1H NMR spectrum of **2,2-dimethyl-1-(piperidin-1-yl)propan-1-one (o)**.

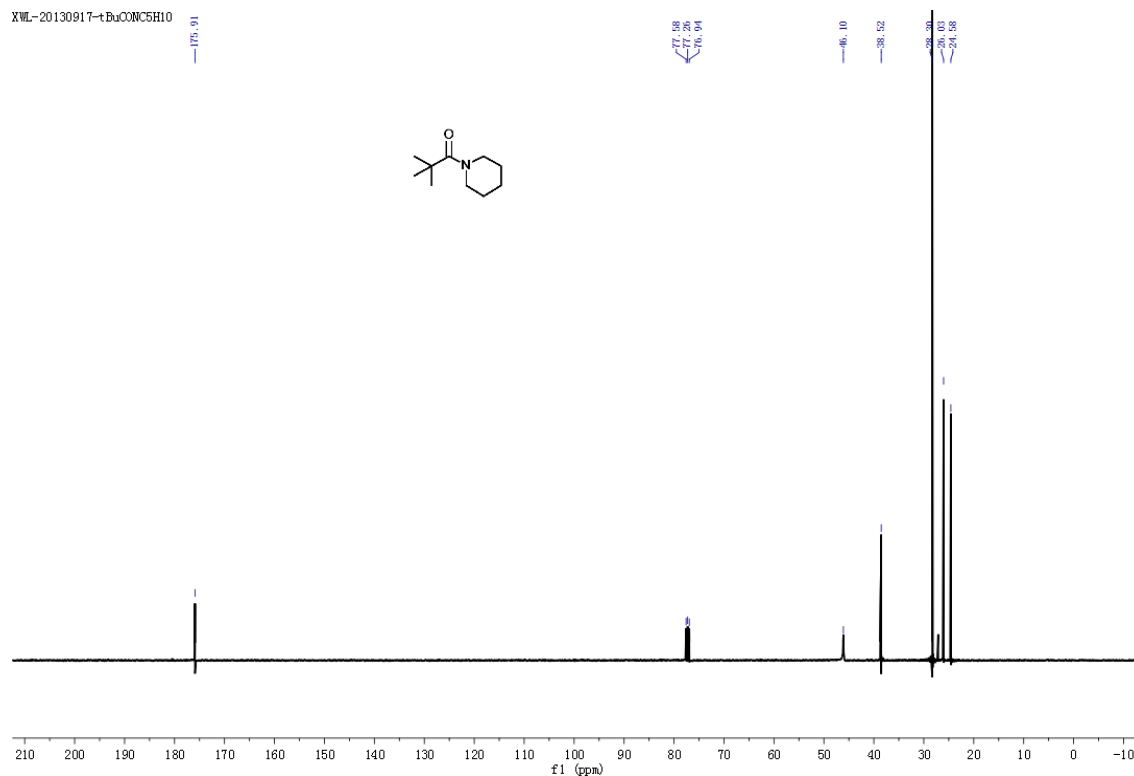


Figure S10. ^{13}C NMR spectrum of 2,2-dimethyl-1-(piperidin-1-yl)propan-1-one (o).

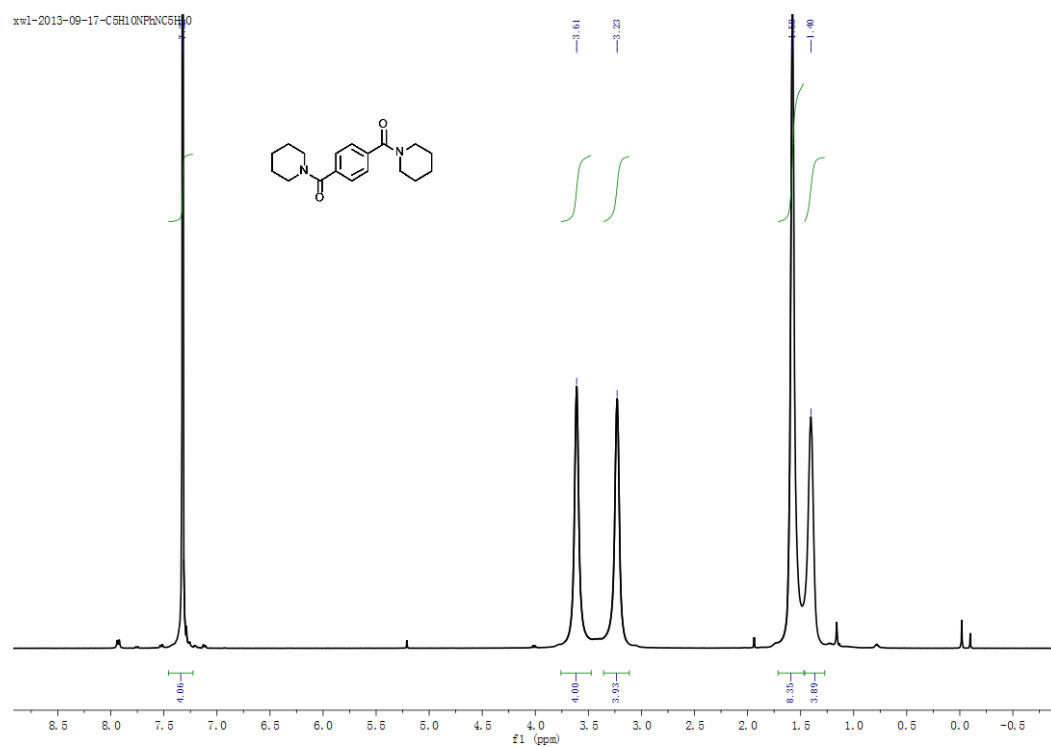


Figure S11. ^1H NMR spectrum of 1,4-phenylenebis(piperidin-1-ylmethanone) (p).

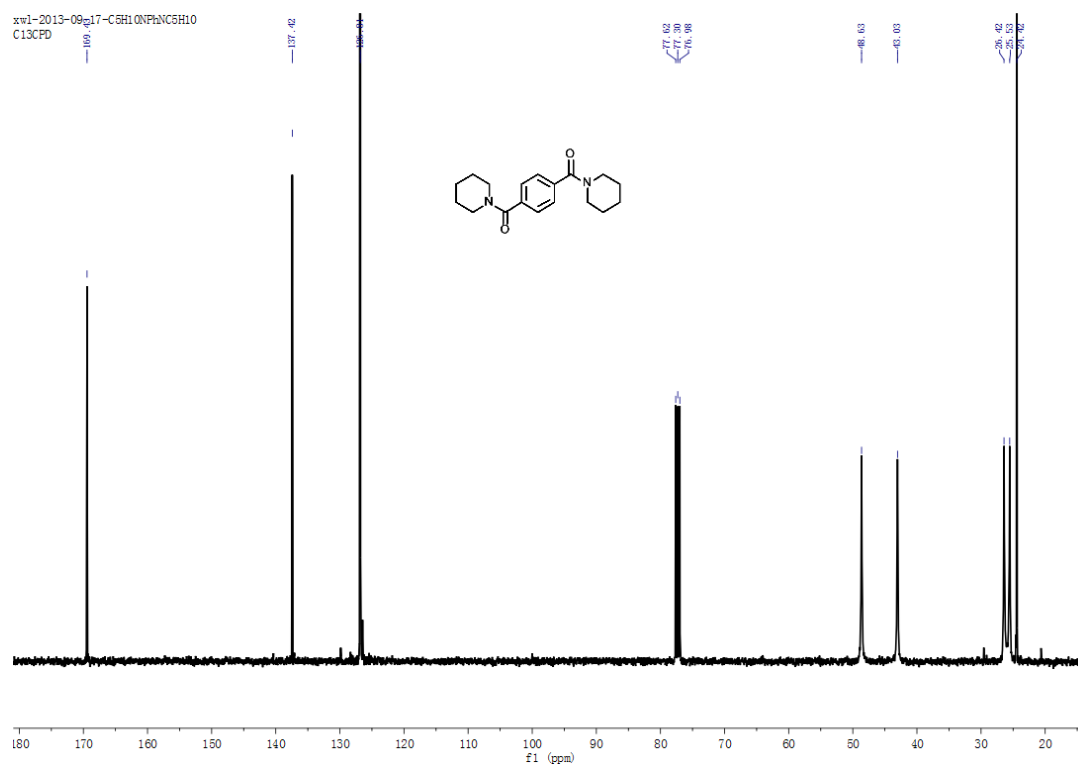


Figure S12. ^{13}C NMR spectrum of 1,4-phenylenebis(piperidin-1-ylmethanone) (p).

NMR Spectra of the Amines.

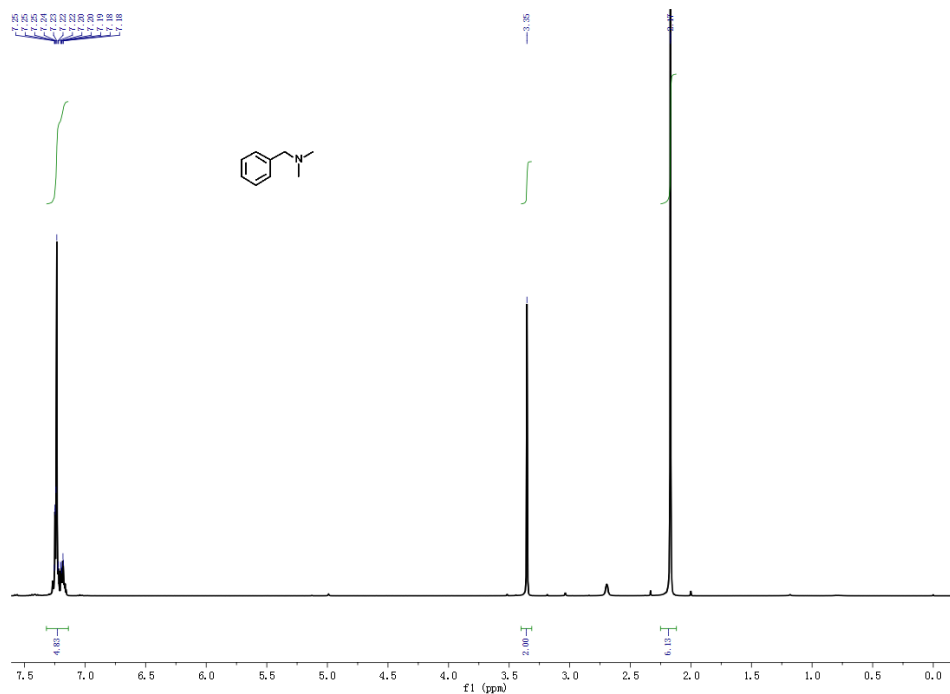


Figure S13. ^1H NMR spectrum of N,N-dimethyl-1-phenylmethanamine.

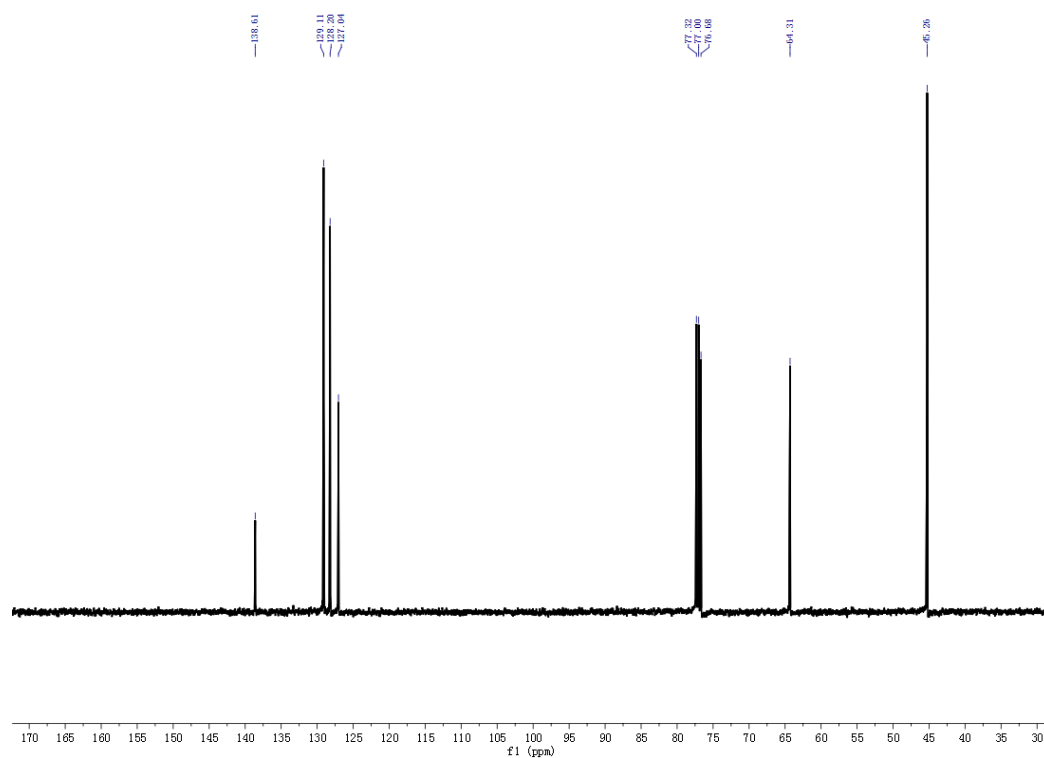


Figure S14. ^{13}C NMR spectrum of N,N-dimethyl-1-phenylmethanamine.

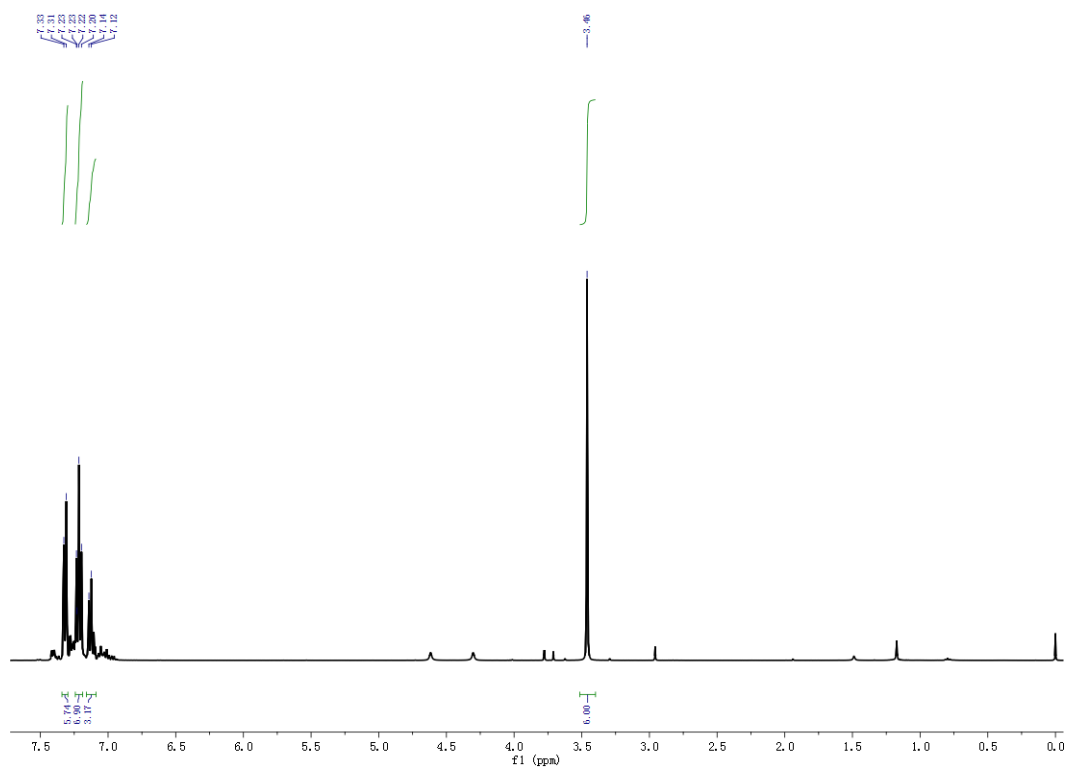


Figure S17. ¹H NMR spectrum of **Tribenzylamine**.

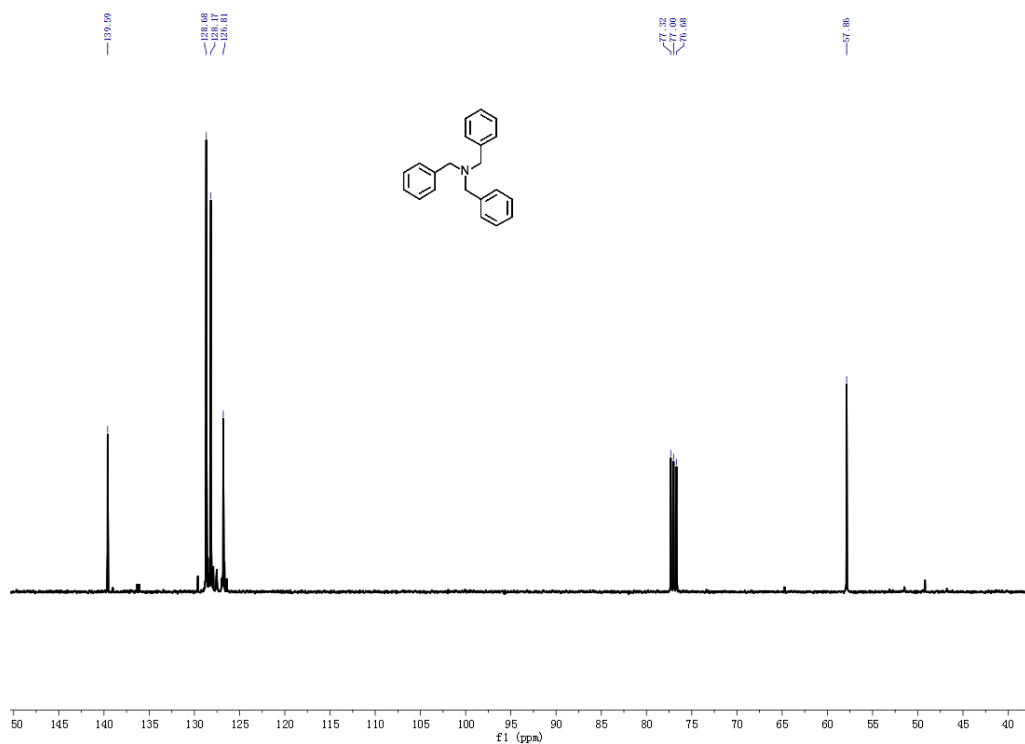


Figure S18. ¹³C NMR spectrum of **Tribenzylamine**.

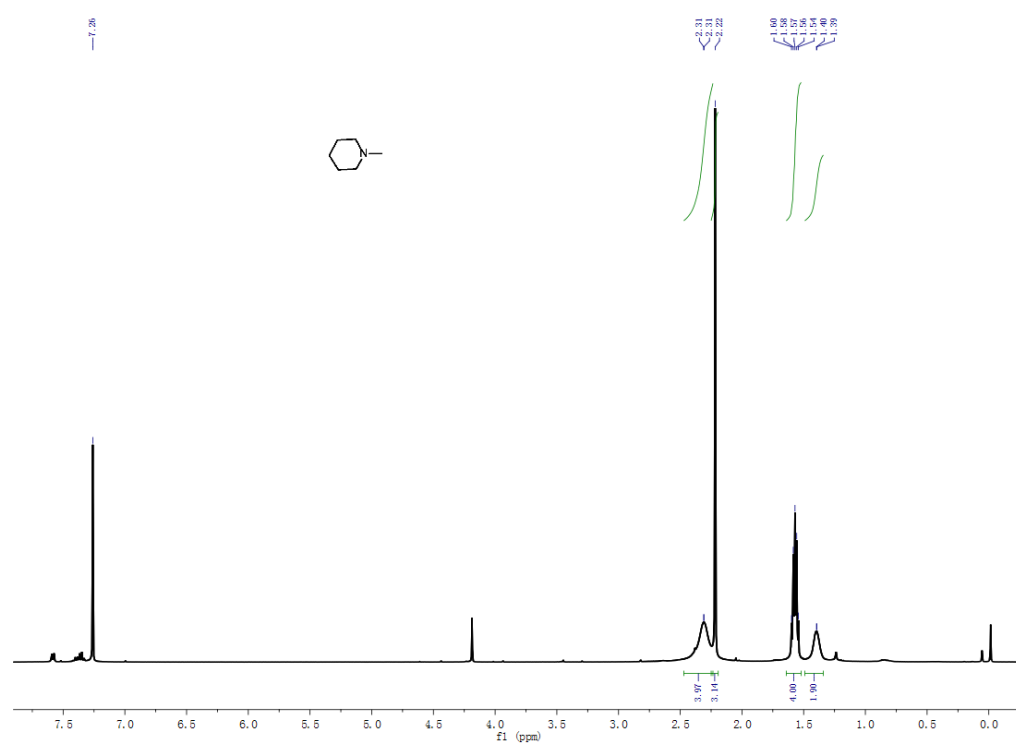


Figure S19. ¹H NMR spectrum of **1-methylpiperidine**.

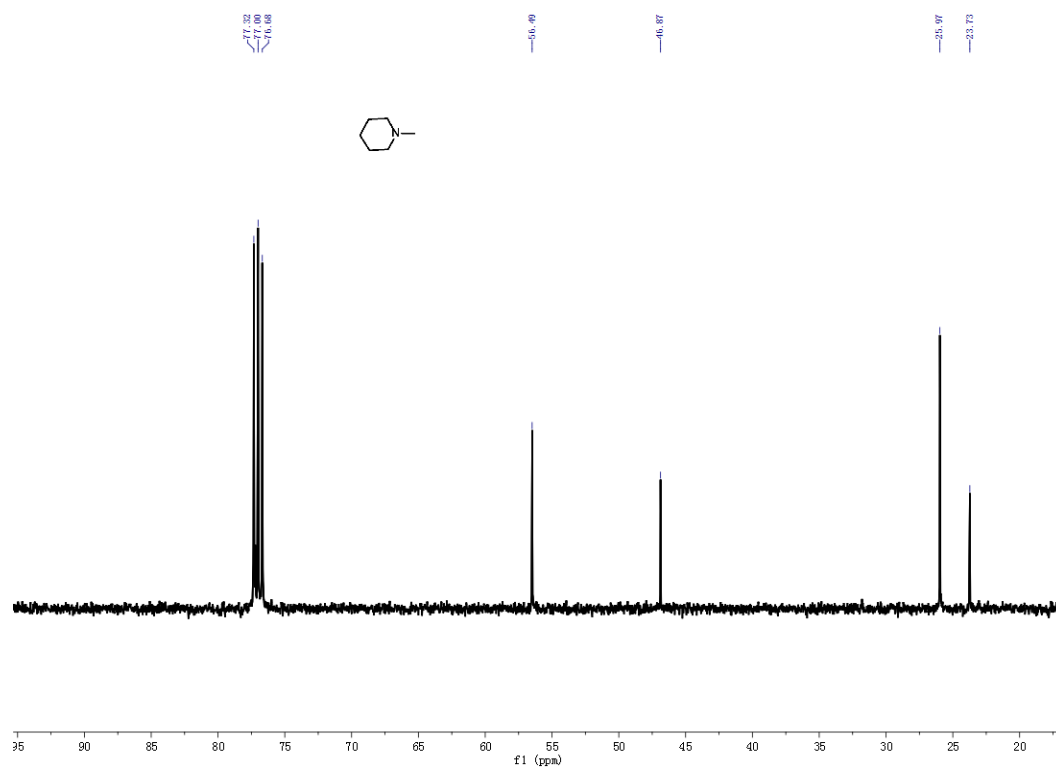


Figure S20. ¹³C NMR spectrum of **1-methylpiperidine**.

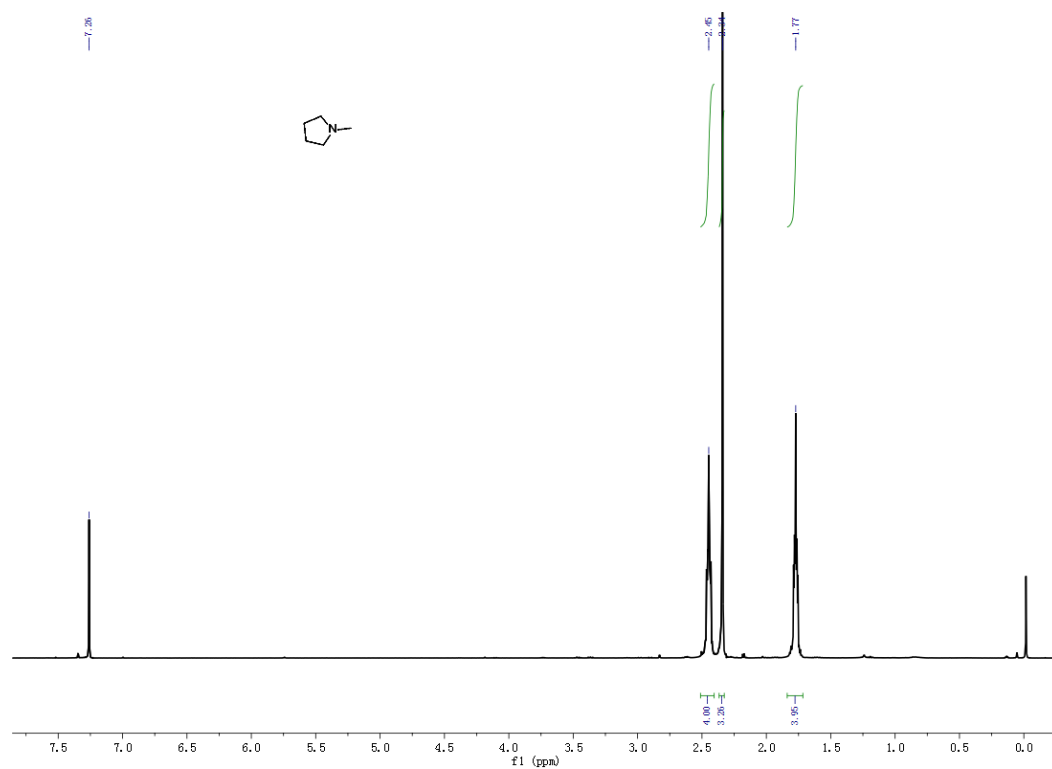


Figure S21. ^1H NMR spectrum of **1-methylpyrrolidine**.

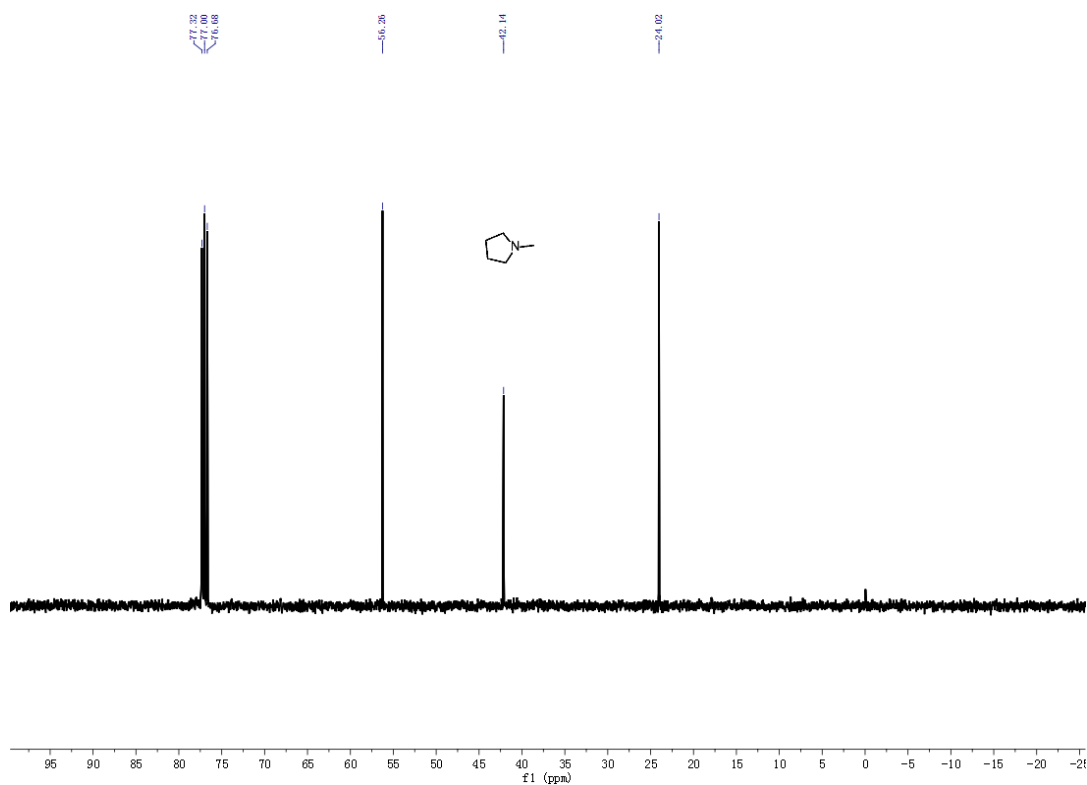


Figure S22. ^{13}C NMR spectrum of **1-methylpyrrolidine**.

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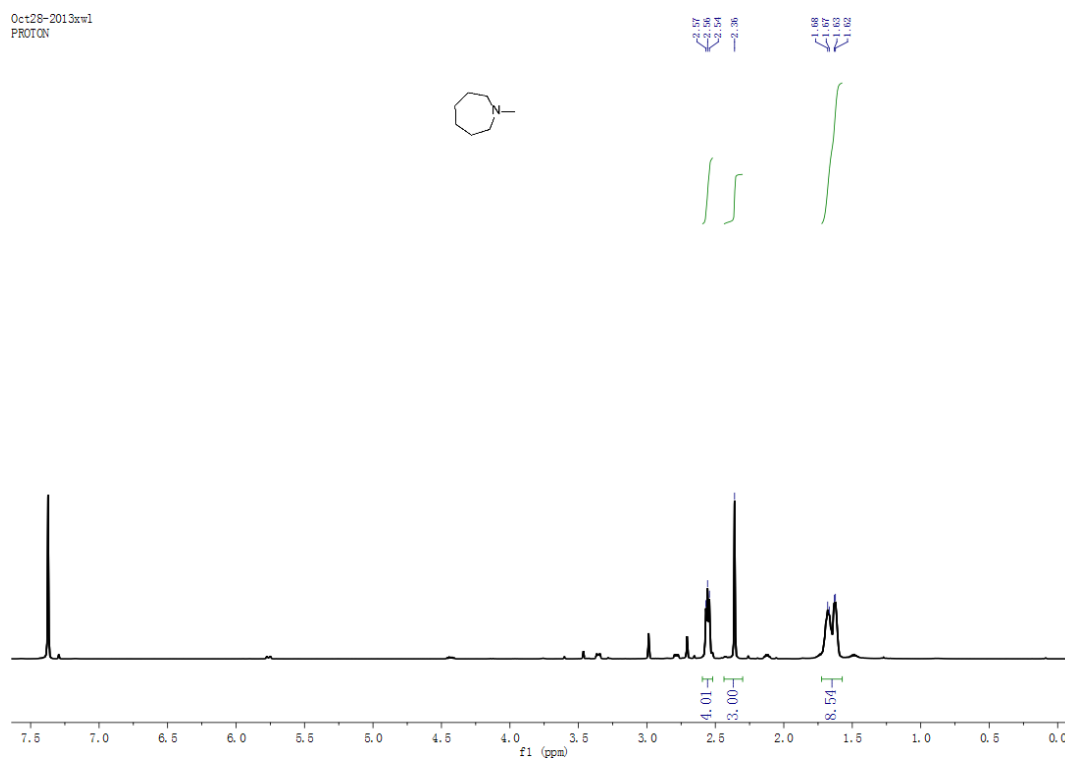


Figure S23. ^1H NMR spectrum of **1-methylazepane**.

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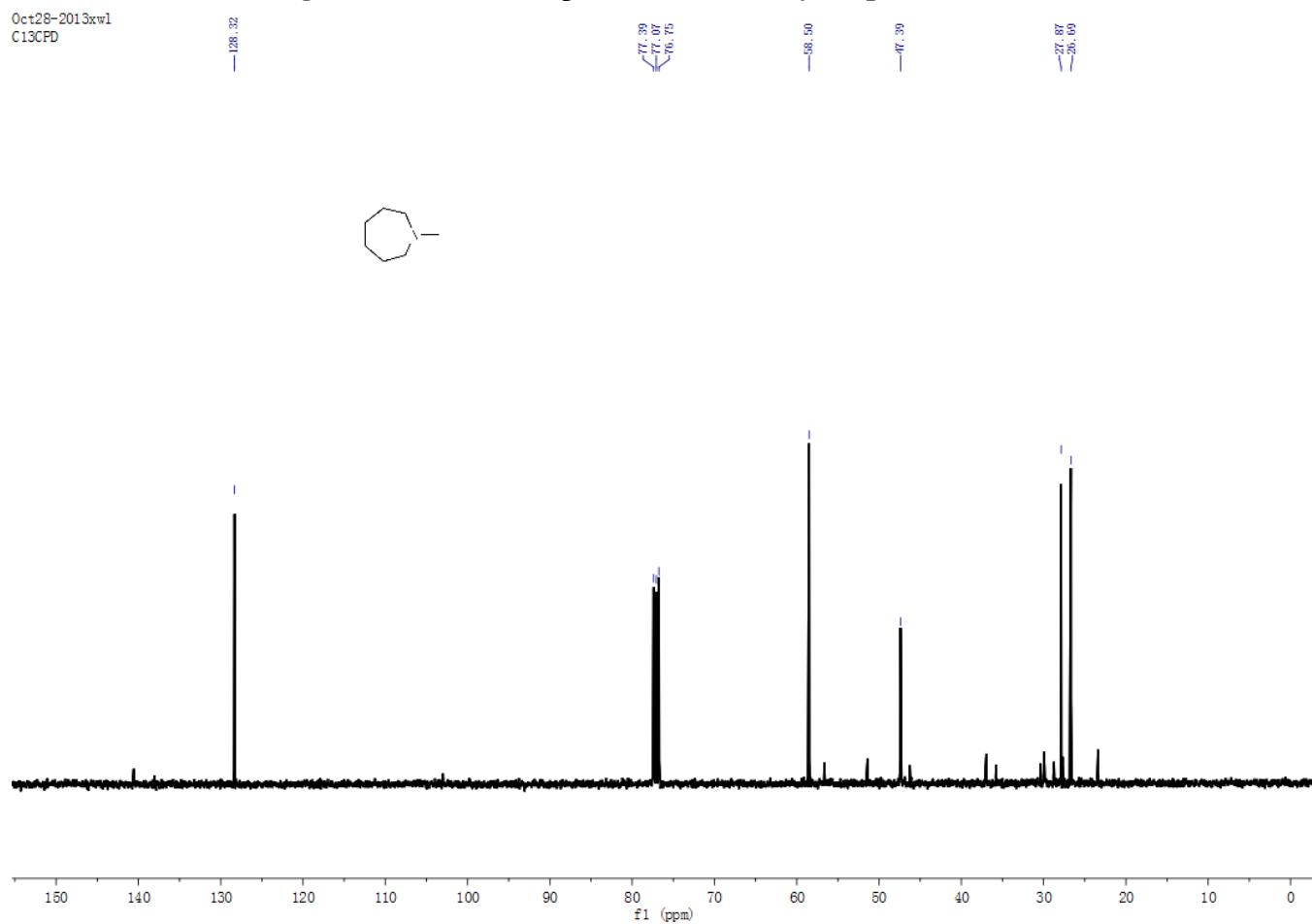


Figure S24. ^{13}C NMR spectrum of **1-methylazepane**.

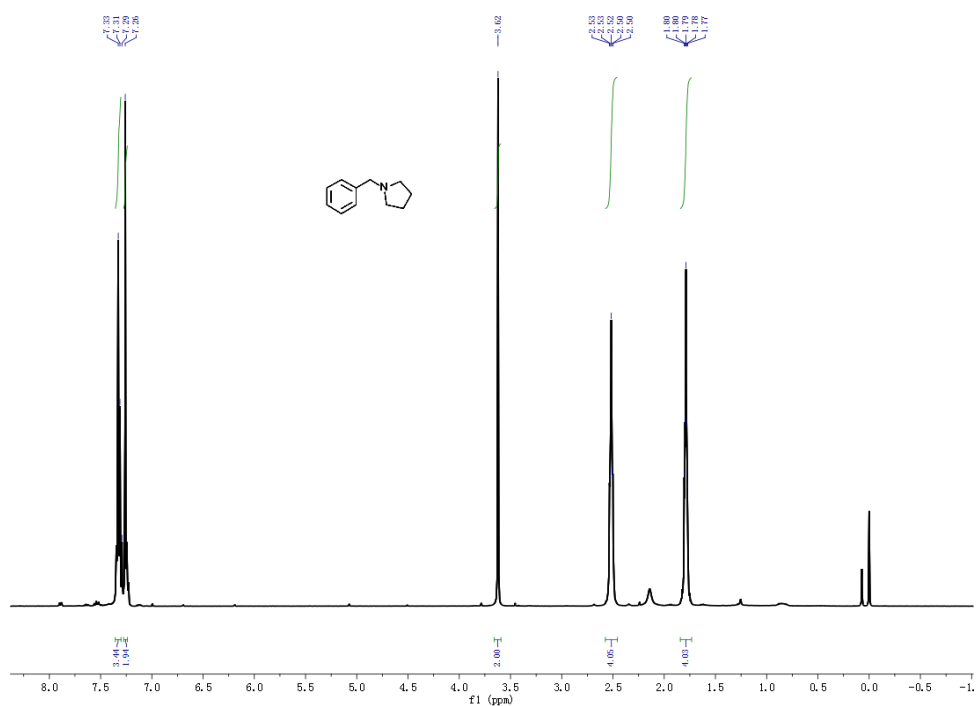


Figure S25. ^1H NMR spectrum of 1-benzylpyrrolidine.

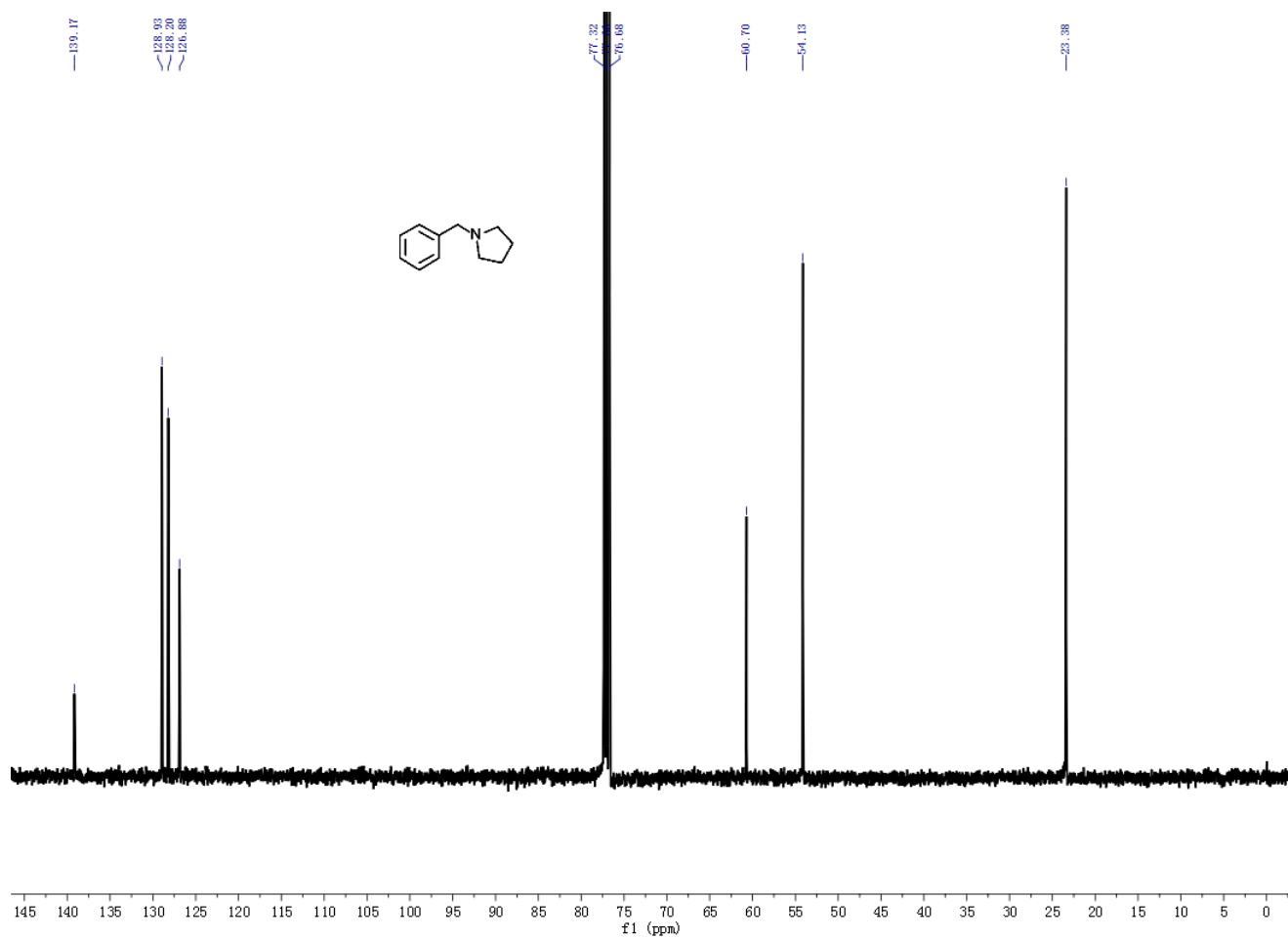


Figure S26. ^{13}C NMR spectrum of 1-benzylpyrrolidine.

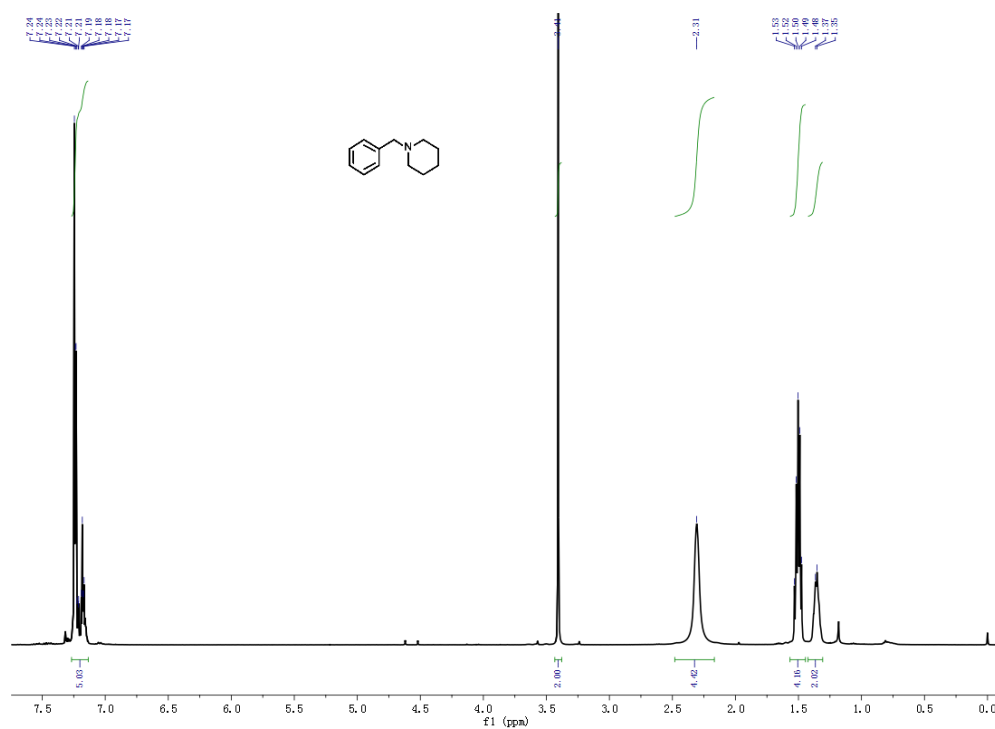


Figure S27. ¹H NMR spectrum of 1-benzylpiperidine.

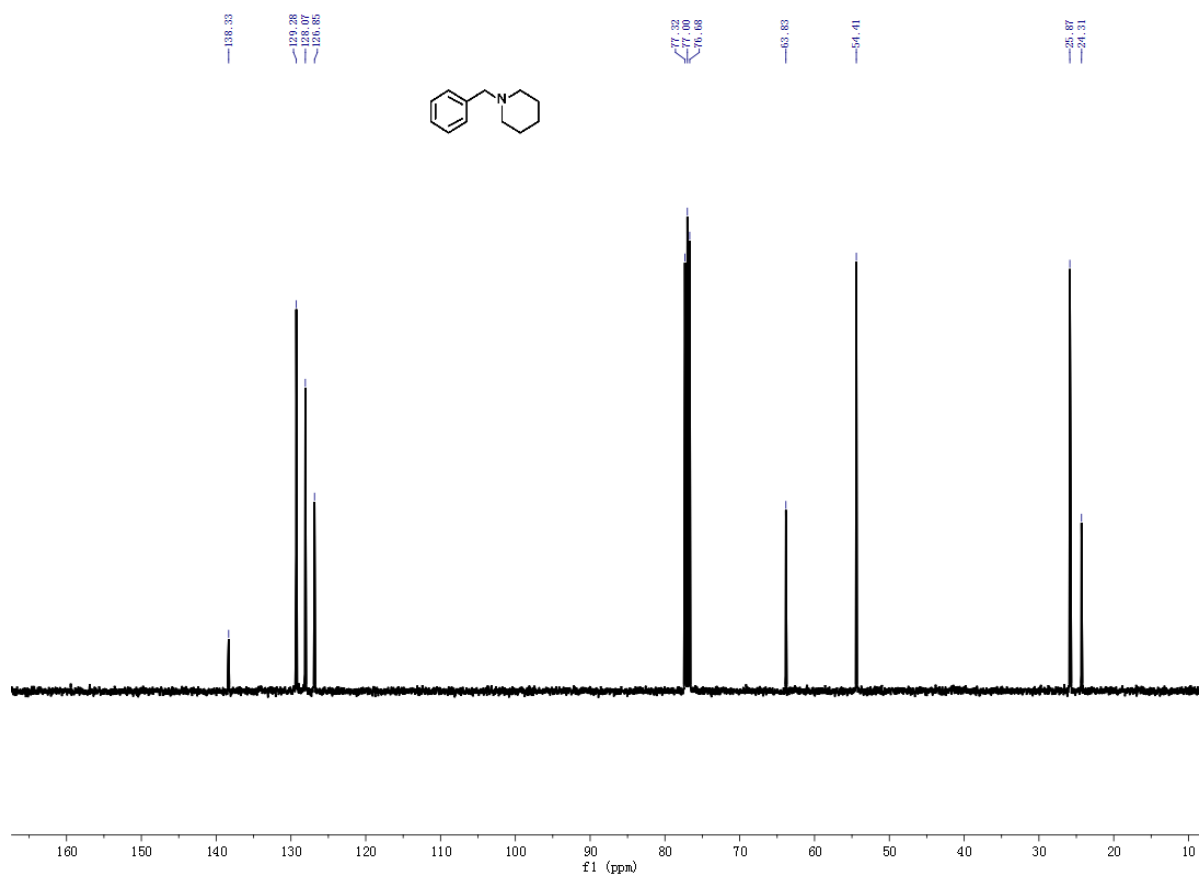


Figure S28. ¹³C NMR spectrum of 1-benzylpiperidine.

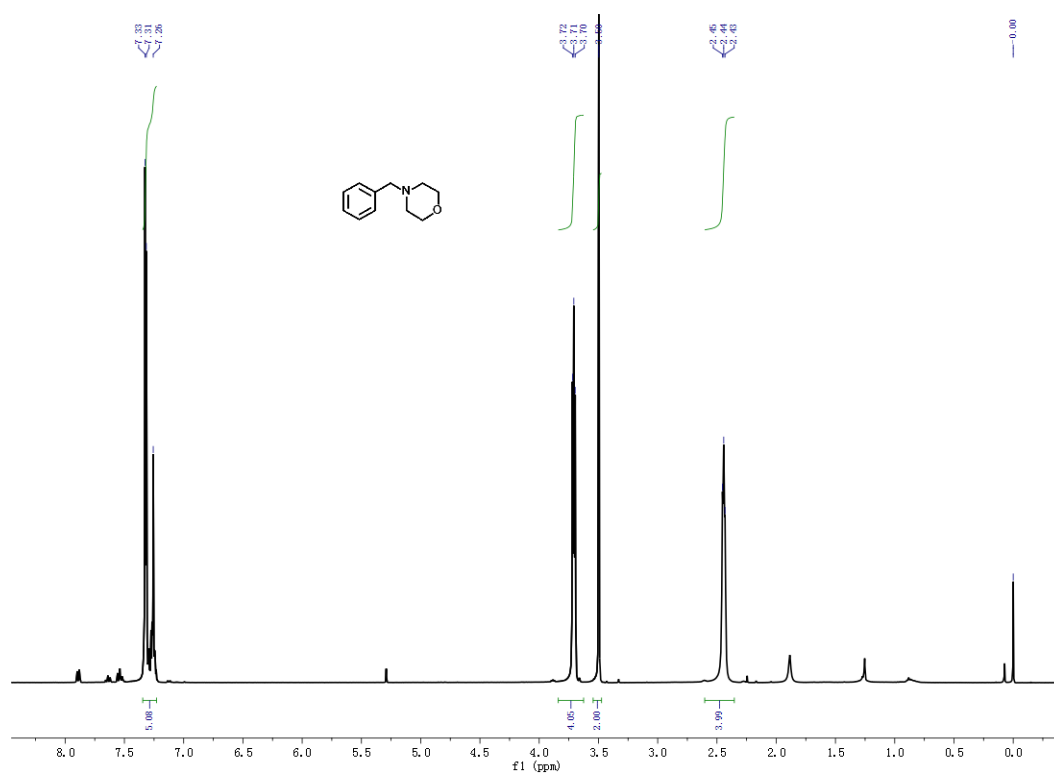


Figure S29. ¹H NMR spectrum of 4-benzylmorpholine.

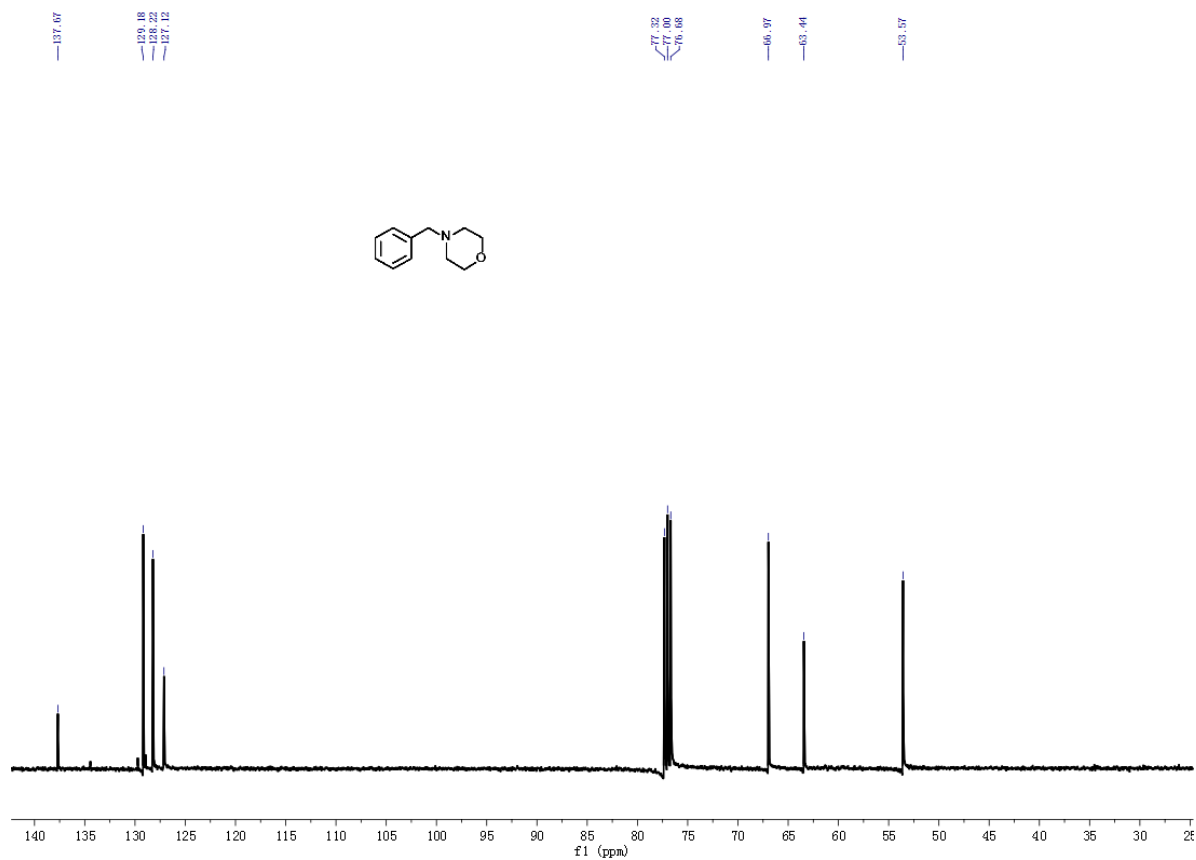


Figure S30. ¹³C NMR spectrum of 4-benzylmorpholine.

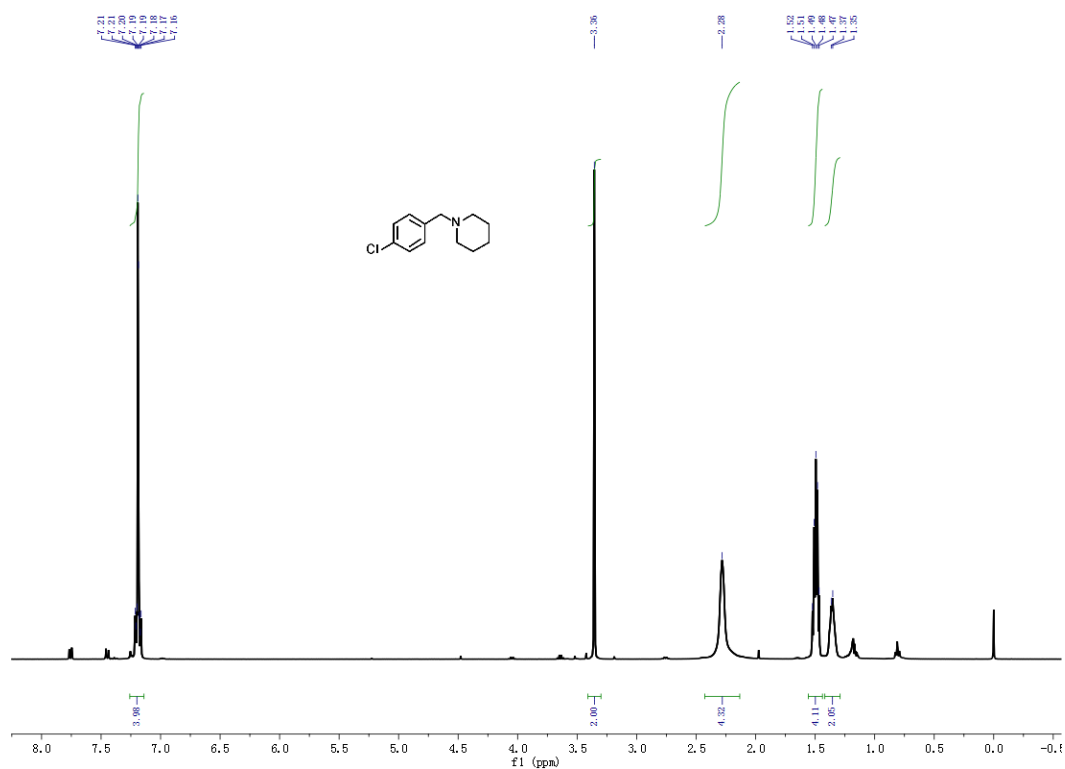


Figure S31. ¹H NMR spectrum of 1-(4-chlorobenzyl)piperidine.

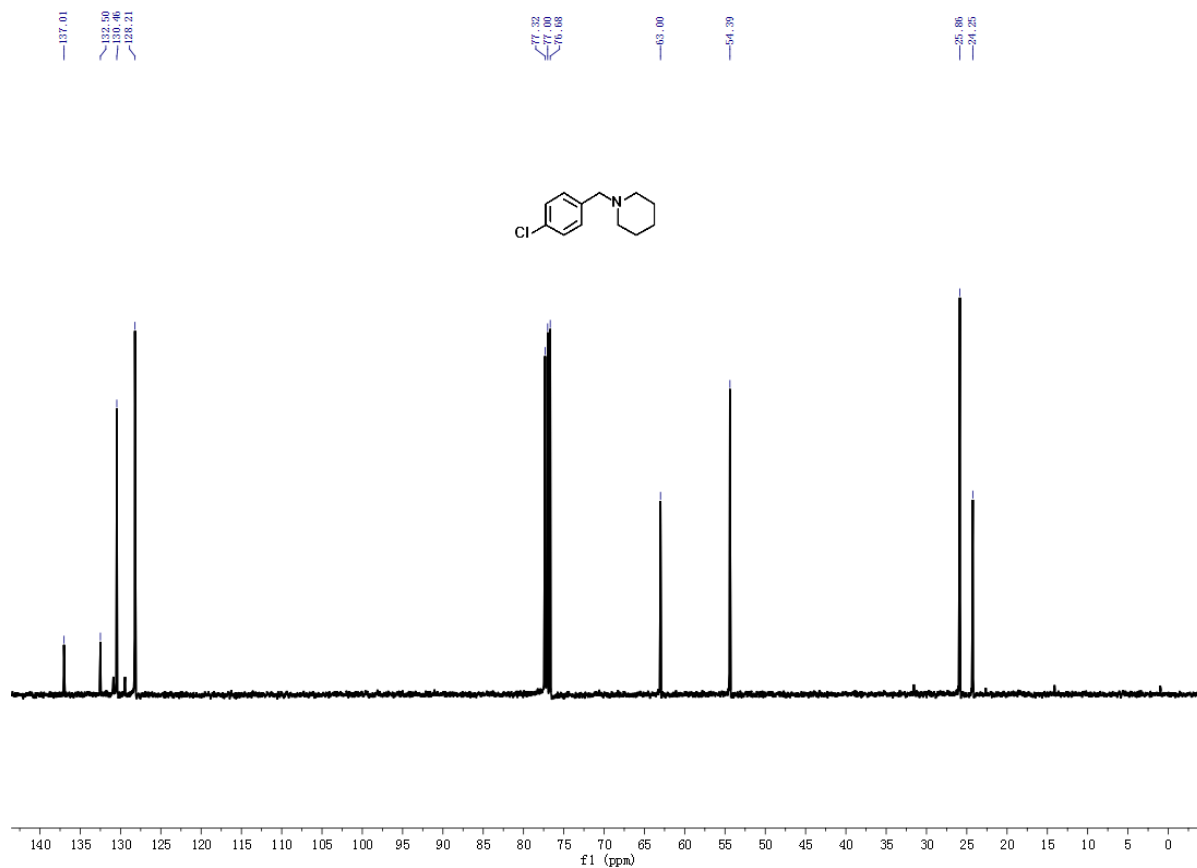


Figure S32. ¹³C NMR spectrum of 1-(4-chlorobenzyl)piperidine.

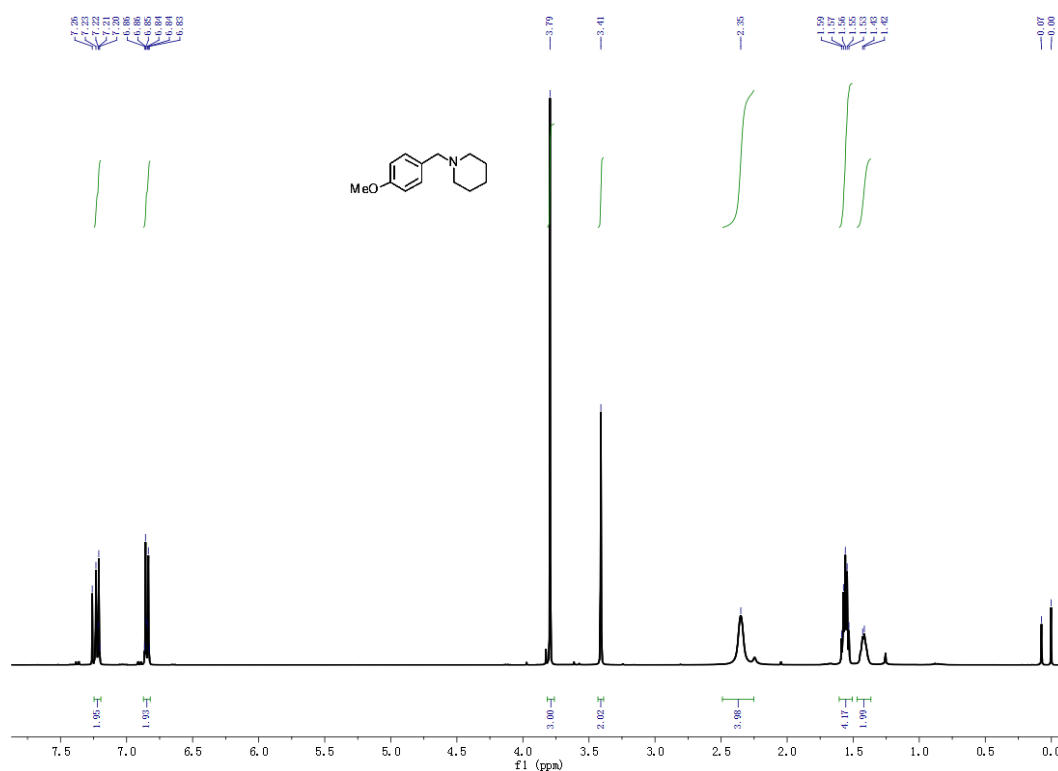


Figure S33. ^1H NMR spectrum of 1-(4-methoxybenzyl)piperidine.

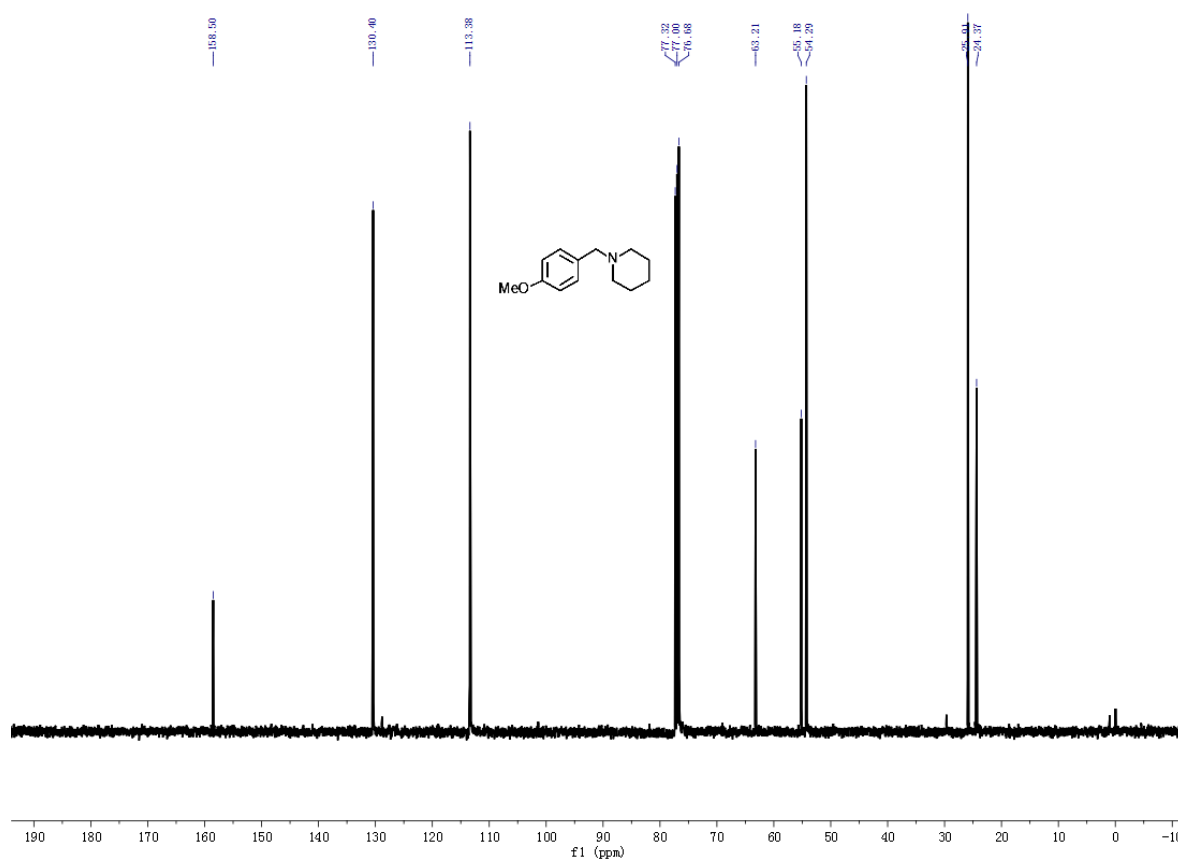


Figure S34. ^{13}C NMR spectrum of 1-(4-methoxybenzyl)piperidine.

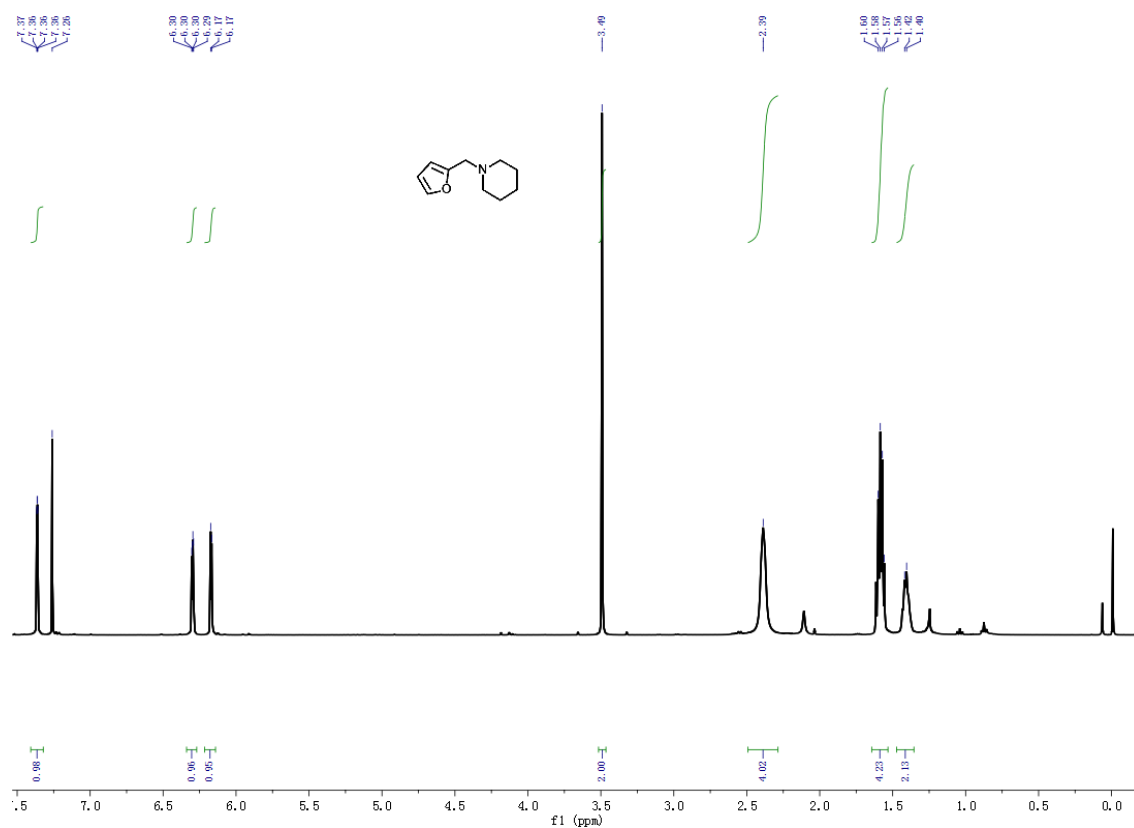


Figure S35. ^1H NMR spectrum of 1-(furan-2-ylmethyl)piperidine.

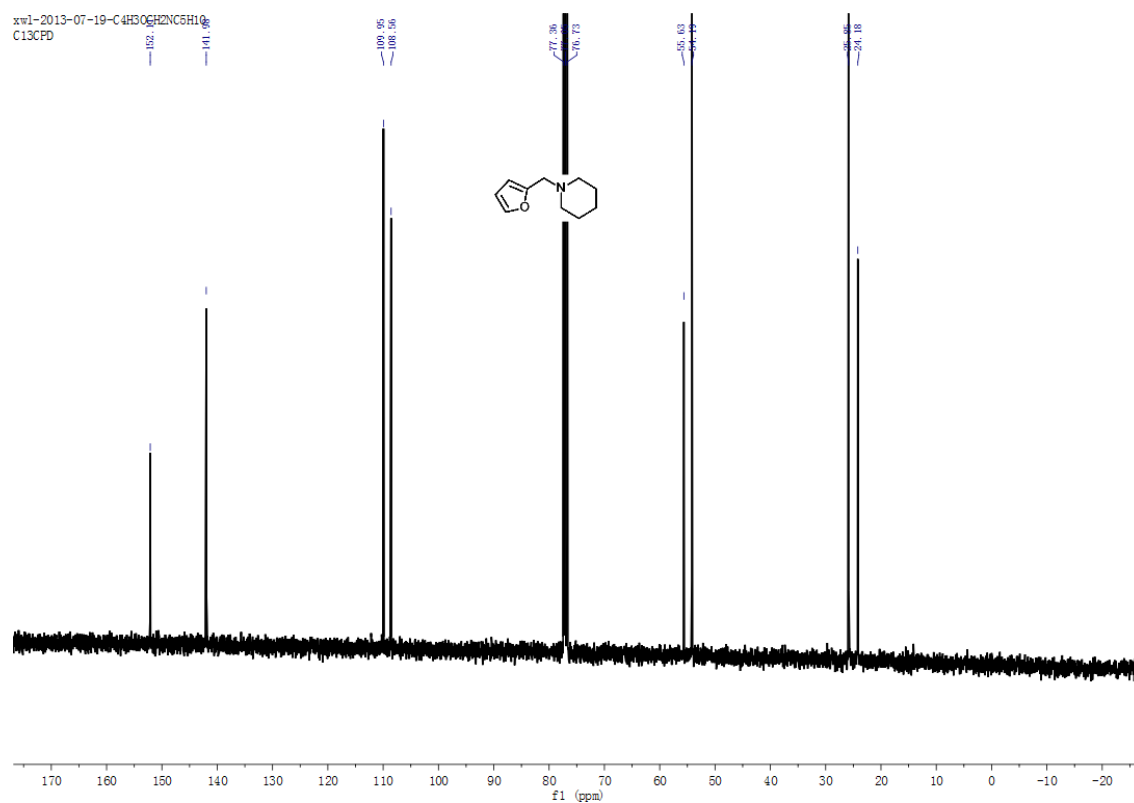
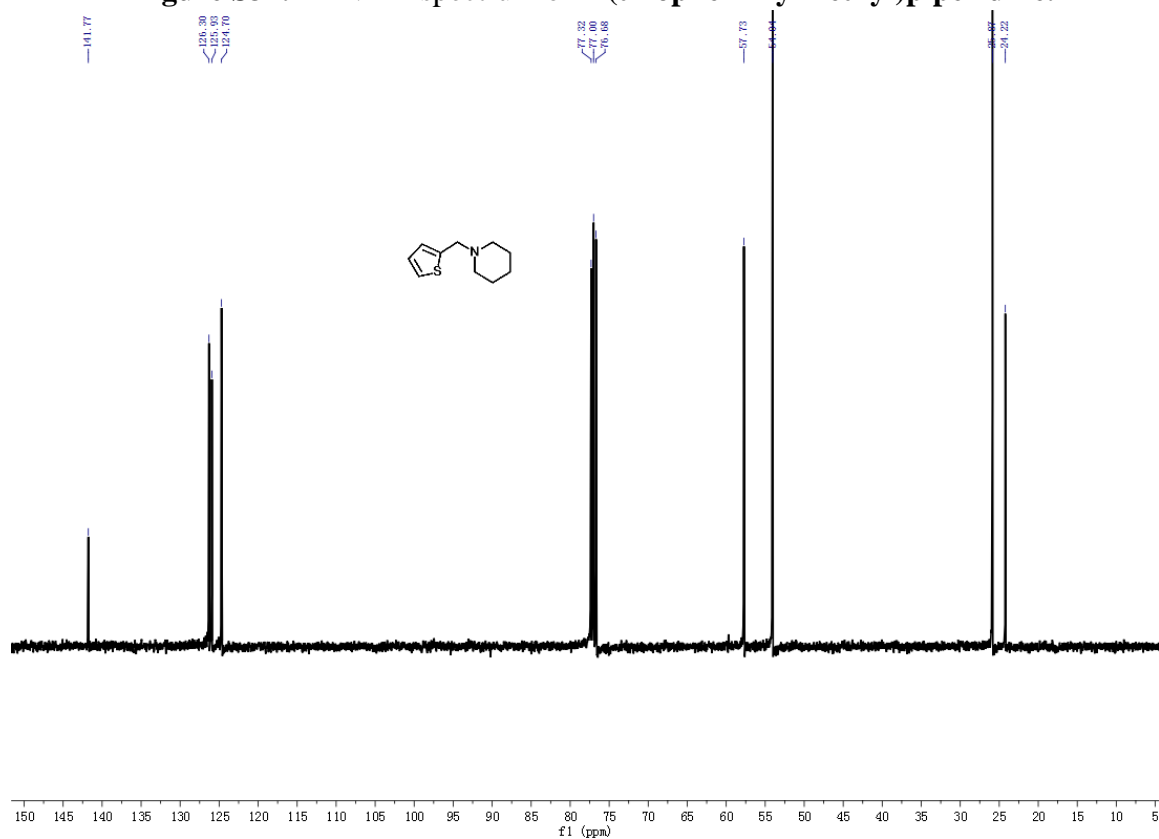
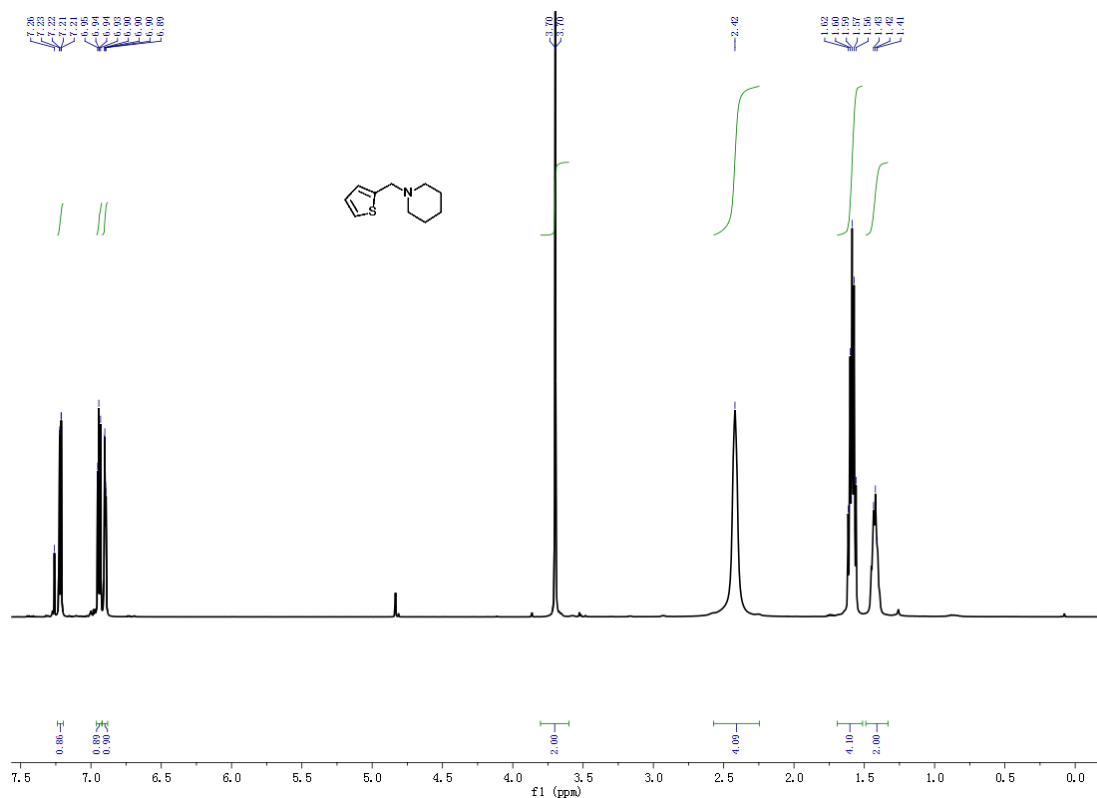


Figure S36. ^{13}C NMR spectrum of 1-(furan-2-ylmethyl)piperidine.



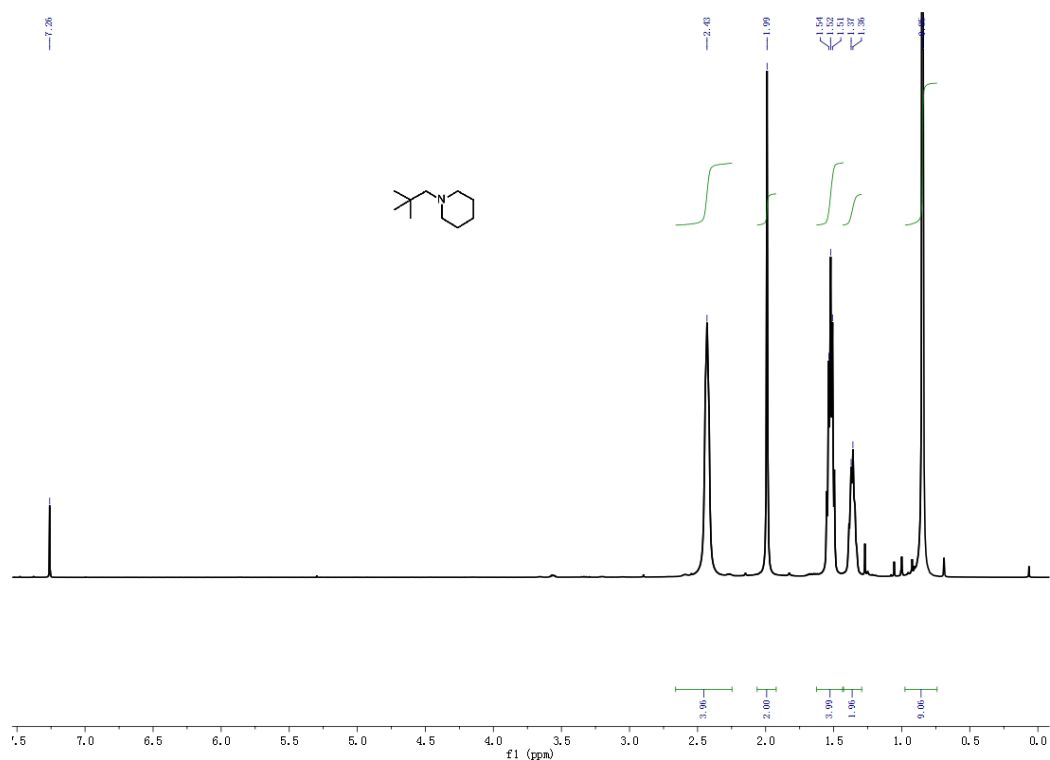


Figure S39. ¹H NMR spectrum of **1-neopentylpiperidine**.

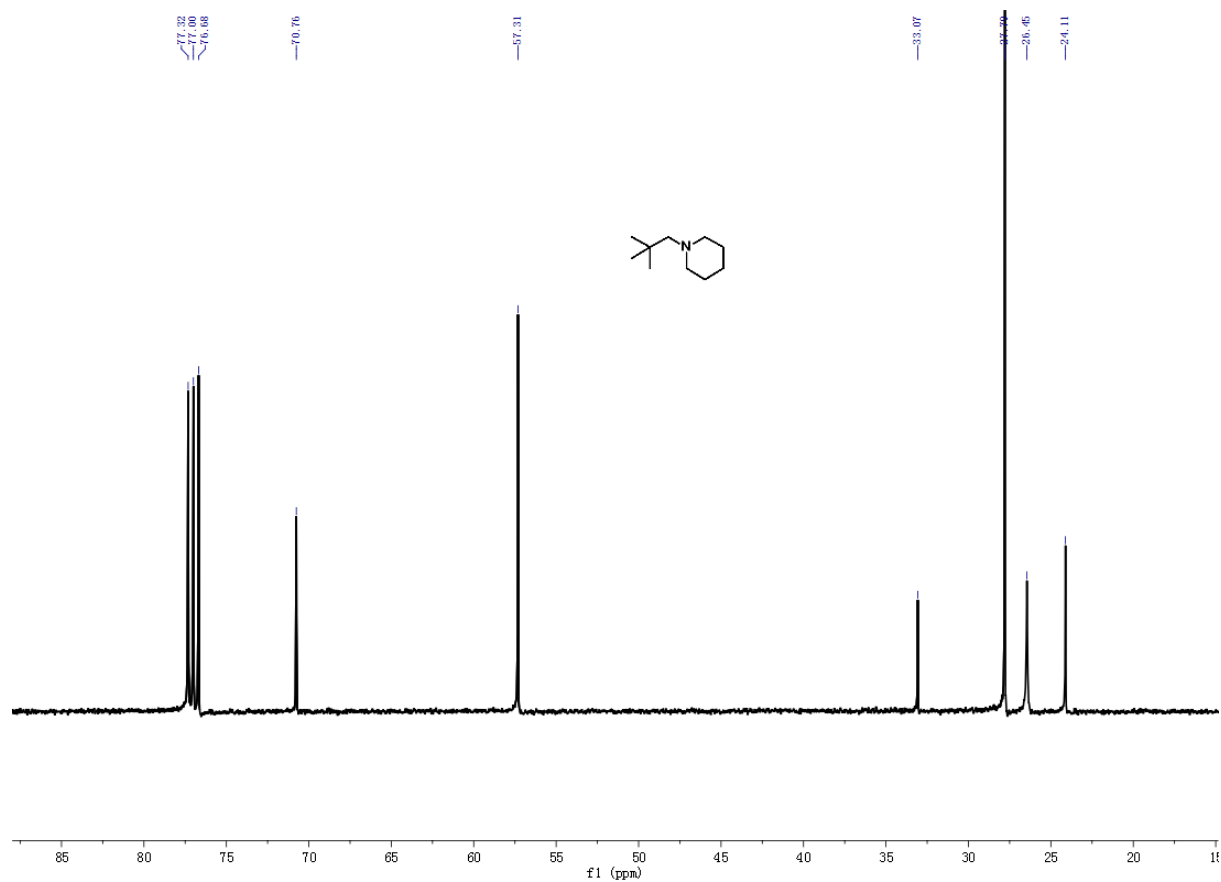


Figure S40. ¹³C NMR spectrum of **1-neopentylpiperidine**.

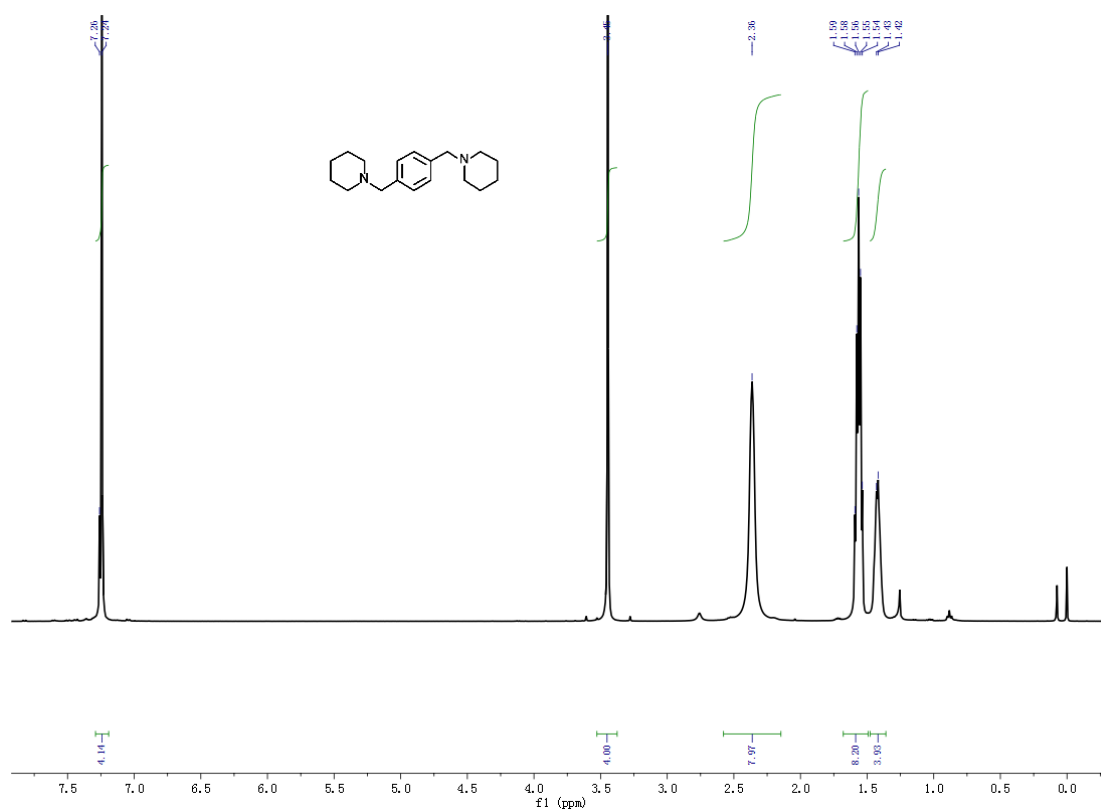


Figure S41. ¹H NMR spectrum of 1,4-bis(piperidin-1-ylmethyl)benzene.

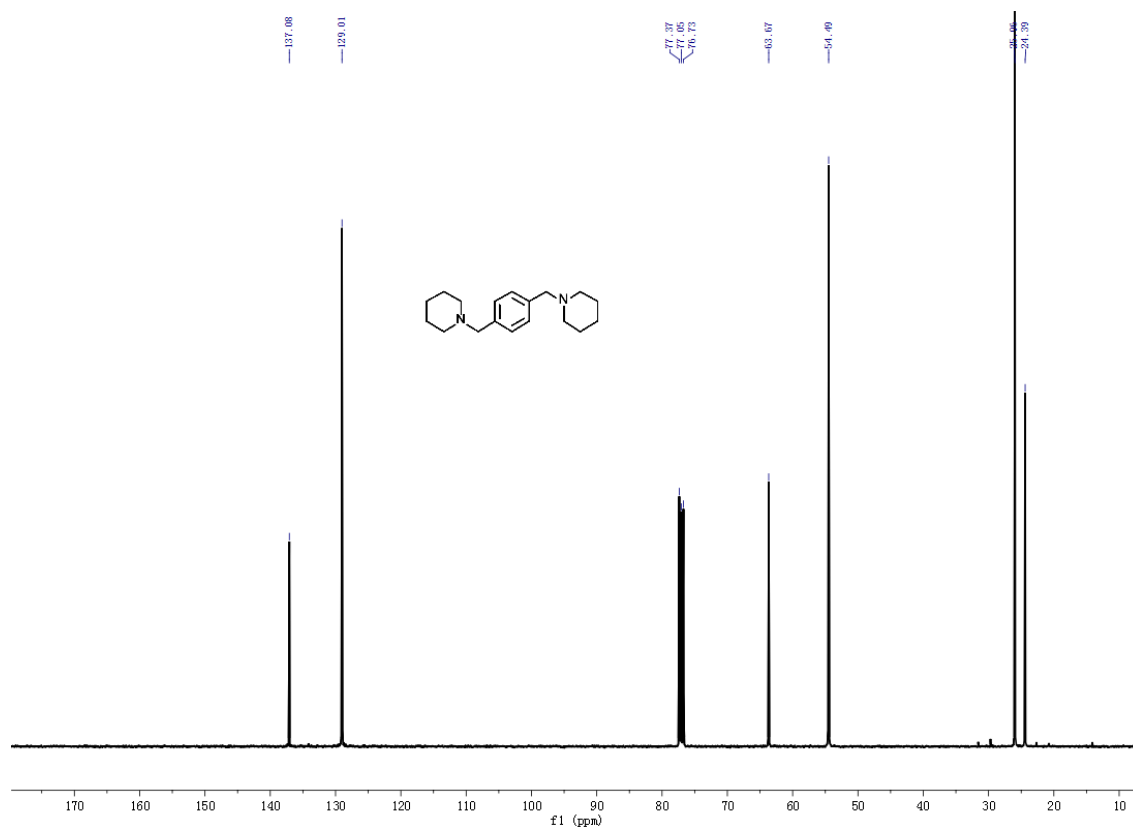


Figure S42. ¹³C NMR spectrum of 1,4-bis(piperidin-1-ylmethyl)benzene.