SUPPLEMENTARY INFORMATION

Solvated Electron-Driven Hydroamination of Olefins

Anietie W. Williams[1] and Kerry M. Gilmore*[1,2]

[1]Department of Chemistry, University of Connecticut, 55 N Eagleville Rd, Storrs, CT 06269

[2]Institute of Materials Science, University of Connecticut, Storrs, Connecticut 06269, United States

Table of Contents

List of Figures

1.0 General materials and methods

Unless otherwise noted, commercial reagents, catalysts, and solvents were purchased from Sigma-Aldrich and utilized without further purification. We used solely commercial suppliers for olefins and amines except 3,4-dimethoxystyrene, and 2,6-dimethoxystyrene which were synthesized according to standard procedures. A water bath was used to concentrate organic solutions under reduced pressure on a Büchi rotary evaporator. Utilizing flash chromatography on silica gel, products were chromatographically purified (Interchim, 230-400 mesh). Analtech Uniplate 0.25 mm silica gel plates were utilized for preparative thin layer chromatography (PTLC) for purification and visualized using a UV 254 nm light source. The UV-Vis absorption spectra were measured using Shimadzu UV-2450 Spectrometer scanned between 200 and 800 nm wavelengths. Branson CPX2800H Digital Heated Ultrasonic Cleaner was employed for sonication.

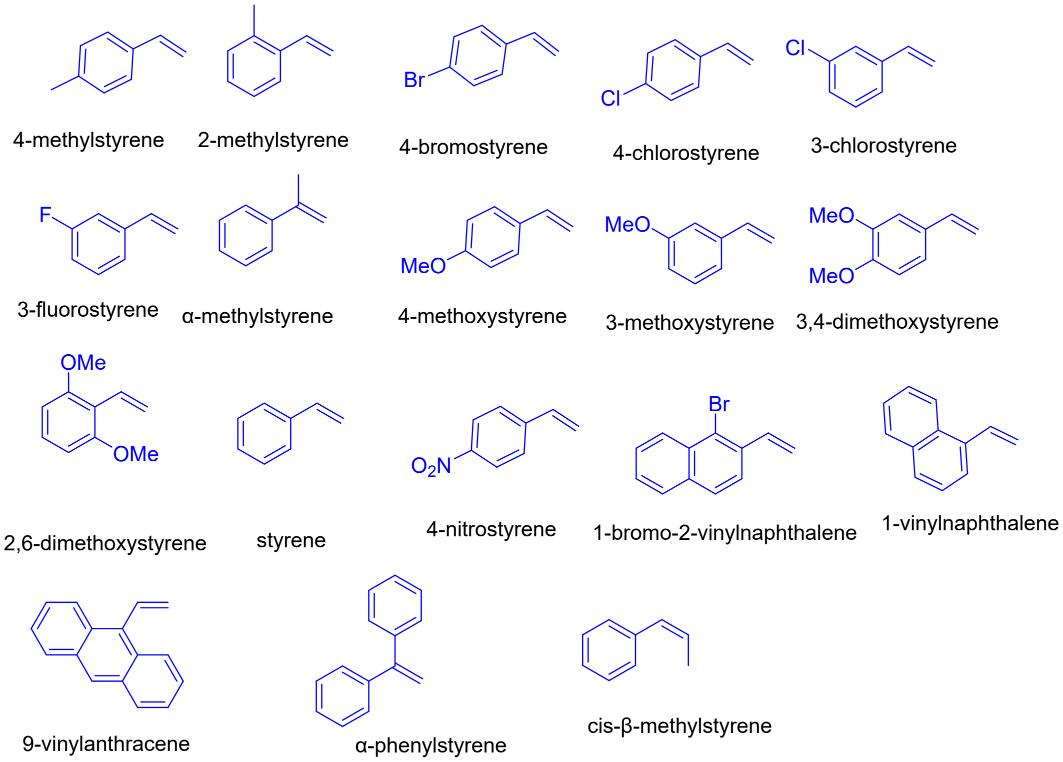
Bruker UltraShield Plus 400 (75 MHz) or 500 MHz (125 MHz) instruments were used to record the ^{1}H and ^{13}C NMR spectra, which are internally referred to the residual protio solvent signals ($CDCl_3$ referenced at 7.26 and 77.0 ppm respectively). For ^{1}H NMR, the following information is provided: chemical shift (ppm), multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, quin = quintet, m = multiplet, dd = doublet of doublets, and br = broad and its various combinations), coupling constant (Hz), and integration. No specific terminology is utilized for equivalent carbons when reporting ^{13}C NMR data; instead, data are provided in terms of chemical shift. High resolution mass spectra were obtained at the University of Connecticut mass spectrometry facilities on Agilent Technologies 6220 Time Of-Flight LC/MS with electrospray ionization method. Quantitative analysis of the material was done using ^{1}H NMR with 1,4-dinitrobenzene as the internal standard or by isolated yields.

For ^{1}H NMR quantification, a stock solution of the internal standard was prepared to a concentration of 0.05 M by dissolving 1 mmol of 1,4-dinitrobenzene (168 mg) in 20 mL of chloroform from which aliquots described in the relevant sections were taken and added to the sample for NMR quantification. Where peaks were not distinct, the materials were rather isolated, and yields were quantified.

Note: It is important to note that sonication was employed in place of using a stir bar for mixing because stir bars reacted with the solvated electrons and thus rendered the reaction inefficient. This observation has also been reported in literature.[1,2] Gratifyingly, sonication also increased the efficiency of our reaction compared to when stir bars were employed by enabling better mixing and granulation of lithium. However, there is an inherent risk due to the proximity of lithium metal within the reactor and the water bath. Those replicating this reaction should proceed with caution.

2.0 Successful substrate scope

Vinylarene scope



Amine scope

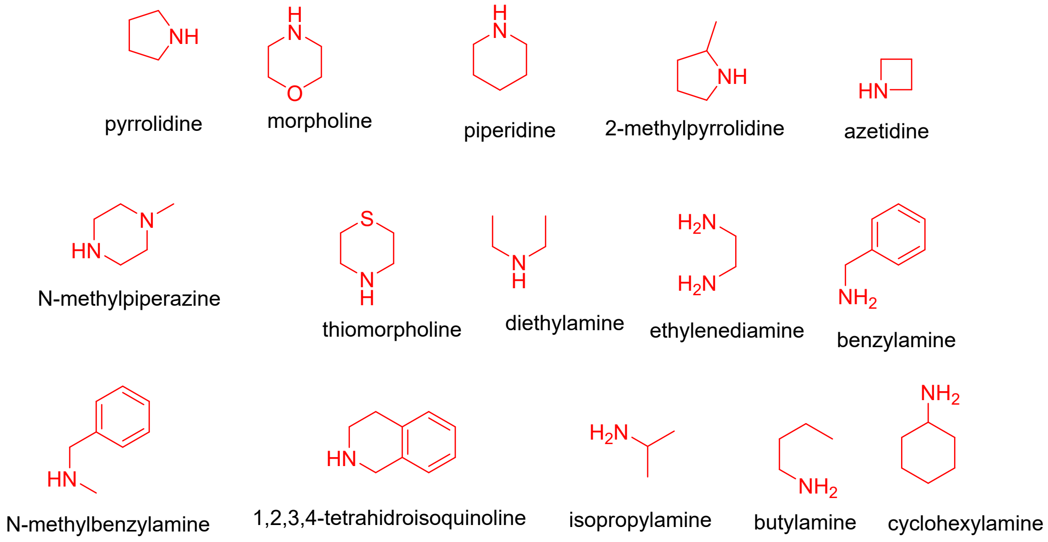


Figure S1: Successful substrate scope

3.0 General procedure for reaction optimization studies

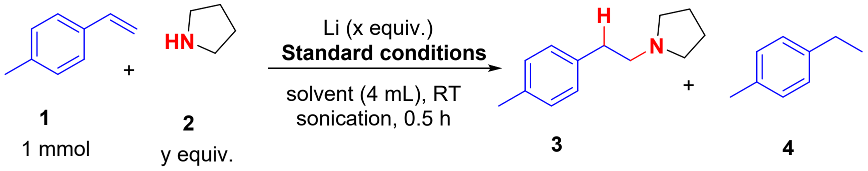
In a flame-dried two-neck round-bottom flask equipped with a septum and connected to a Schlenk line, lithium metal (designated amount, *x* equiv) and, when applicable, potassium iodide (0.5 equiv; see Table S1, entry 1) were added and dried under high vacuum for 10 minutes. The flask was then purged and backfilled with nitrogen.

Under an inert atmosphere, 4 mL of anhydrous solvent was introduced, followed by 4-methylstyrene (1 mmol, 0.13 mL) and pyrrolidine (*y* equiv), added via syringe through the septum. The resulting mixture was sonicated at room temperature for 30 minutes under nitrogen.

After sonication, the reaction mixture was cooled to 0 °C in an ice-water bath and quenched by the dropwise addition of 20 mL deionized water. The aqueous phase was extracted with diethyl ether (3 × 20 mL), and the combined organic extracts were dried over anhydrous sodium sulfate, filtered, and concentrated under reduced pressure using a rotary evaporator.

The crude product was analyzed, and yields were determined after purification by preparative thin-layer chromatography (prep TLC) using 1,4-dinitrobenzene as internal standard. Optimization results are summarized in Table S1.

Table S1. Reaction optimization table



entry	**Deviation from standard conditions**	**Lithium (x equiv.)**	**Amine (y equiv.)**	**Conv. (%)**	**Yield (%)**	
					3	**4**
1	THF + 0.5 mmol KI	1.4	2.5	>99	64	36
2	THF	1	1.5	>99	77	23
3	Triethylamine	1	1.5	79	53	47
4	Et_2O	1	1.5	77	95	5
5	1,4-dioxane	1	1.5	43	91	9
6	Pentane	1	1.5	65	61	39
7	Toluene	1	1.5	80	63	37
8	Ethyl acetate	1	1.5	S.R	-	-
9	chloroform	1	1.5	S.R	-	-
10	**2-MeTHF**	**1**	**1.5**	**>99**	**>99**	**trace**

4.0 General optimized procedure

Reactions were conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg) which is dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of 2-methyltetrahydrofuran followed by 1 mmol of olefin (**1**) and 1.5 mmol of amine (**2**) were added using a syringe and needle through the septum end. The reaction mixture was sonicated until sonication confirmed completion of the reaction (0.5 h – 2h). Afterwards, the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deionized water. Extraction was done using 3 x 20 mL of diethyl ether. The organic phase was then dried over sodium sulfate and solvent evaporated using a rotary evaporator.

5.0 Reaction scope

5.1 Successful vinylarene scope

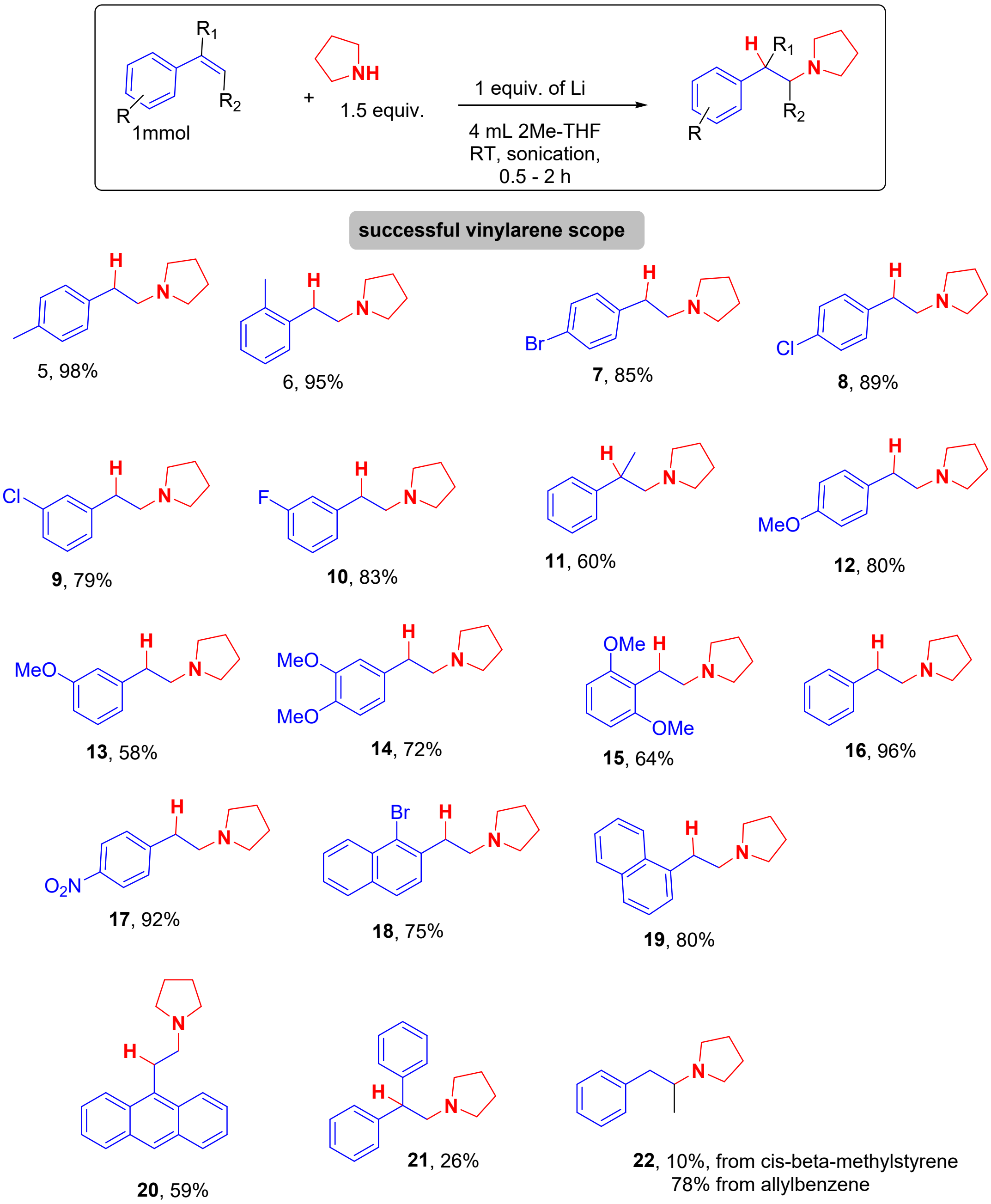


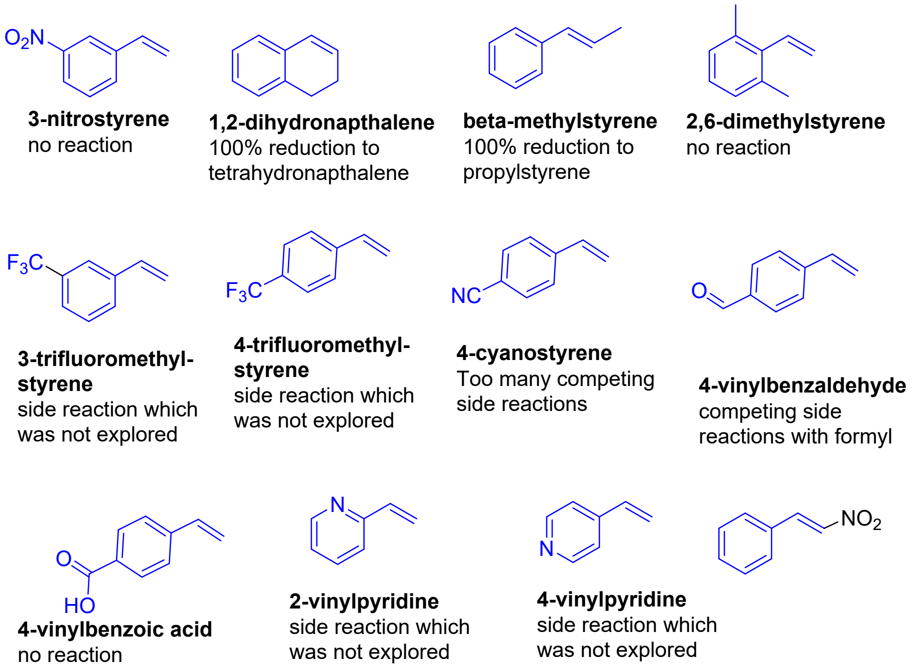
Figure S2. Vinylarene scope for the hydroamination of olefins promoted by solvated electrons. The reaction was carried out under sonication at room temperature under inert conditions for 0.5 – 2 h with 1 mmol of vinylarene and 1.5 equiv. of pyrrolidine (**2**). Yields were determined after isolation by preparative thin layer chromatography.

5.2 Unsuccessful vinylarene scope

Our substrate scope exploration extended to *meta*- and *para*-substituted nitrostyrenes. While 4-nitrostyrene underwent efficient hydroamination, 3-nitrostyrene was unreactive, likely due to the electronic influence of the *meta*-nitro group, which may hinder single-electron transfer (SET) initiation. β-Substituted styrenes such as β-methylstyrene and 1,2-dihydronaphthalene underwent complete reduction of the olefinic bond, underscoring the role of steric hindrance in diverting the reaction away from the hydroamination pathway and favoring reduction.

Sterically encumbered substrates such as 2,6-dimethylstyrene failed to react, further emphasizing the sensitivity of the hydroamination pathway to steric bulk. Substrates bearing reactive functional groups—including 3- and 4-trifluoromethylstyrene, 4-cyanostyrene, and 4-vinylbenzaldehyde—exhibited competing reactivity at the side-chain functionalities, leading to diminished or complex product mixtures.

In the case of heteroaryl olefins, 2- and 4-vinylpyridine were prone to rapid polymerization under the reaction conditions and were not investigated further. Finally, 4-vinylbenzoic acid remained unreactive, consistent with our prior observations regarding acidic substrates.[2] The strongly basic nature of the reducing system likely deprotonates such substrates to form their conjugate bases, which act as quenchers and suppress both the hydroamination and reduction pathways.



3-nitrostyrene
no reaction

1,2-dihydronapthalene
100% reduction to tetrahydronapthalene

beta-methylstyrene
100% reduction to propylstyrene

2,6-dimethylstyrene
no reaction

3-trifluoromethyl-styrene
side reaction which was not explored

4-trifluoromethyl-styrene
side reaction which was not explored

4-cyanostyrene
Too many competing side reactions

4-vinylbenzaldehyde
competing side reactions with formyl

4-vinylbenzoic acid
no reaction

2-vinylpyridine
side reaction which was not explored

4-vinylpyridine
side reaction which was not explored

Figure S3. Unsuccessful vinylarene scope including a brief discussion of our observation and conclusion.

5.3 Competing reactivity with 3-fluorostyrene

To probe the impact of solvent environment on chemoselectivity, we examined the reaction of 3-fluorostyrene under standard conditions in both THF and 2-methyltetrahydrofuran (2-MeTHF). In THF, multiple pathways were observed, including hydroamination, hydrodefluorination, and undesired side-chain amination, resulting in a complex mixture. In contrast, reactions performed in 2-MeTHF showed exclusive formation of the desired hydroamination product (compound 10), demonstrating that solvent polarity and coordination can significantly modulate chemoselectivity in this system. These results underscore the role of 2-MeTHF in suppressing undesired pathways and promoting cleaner conversions.

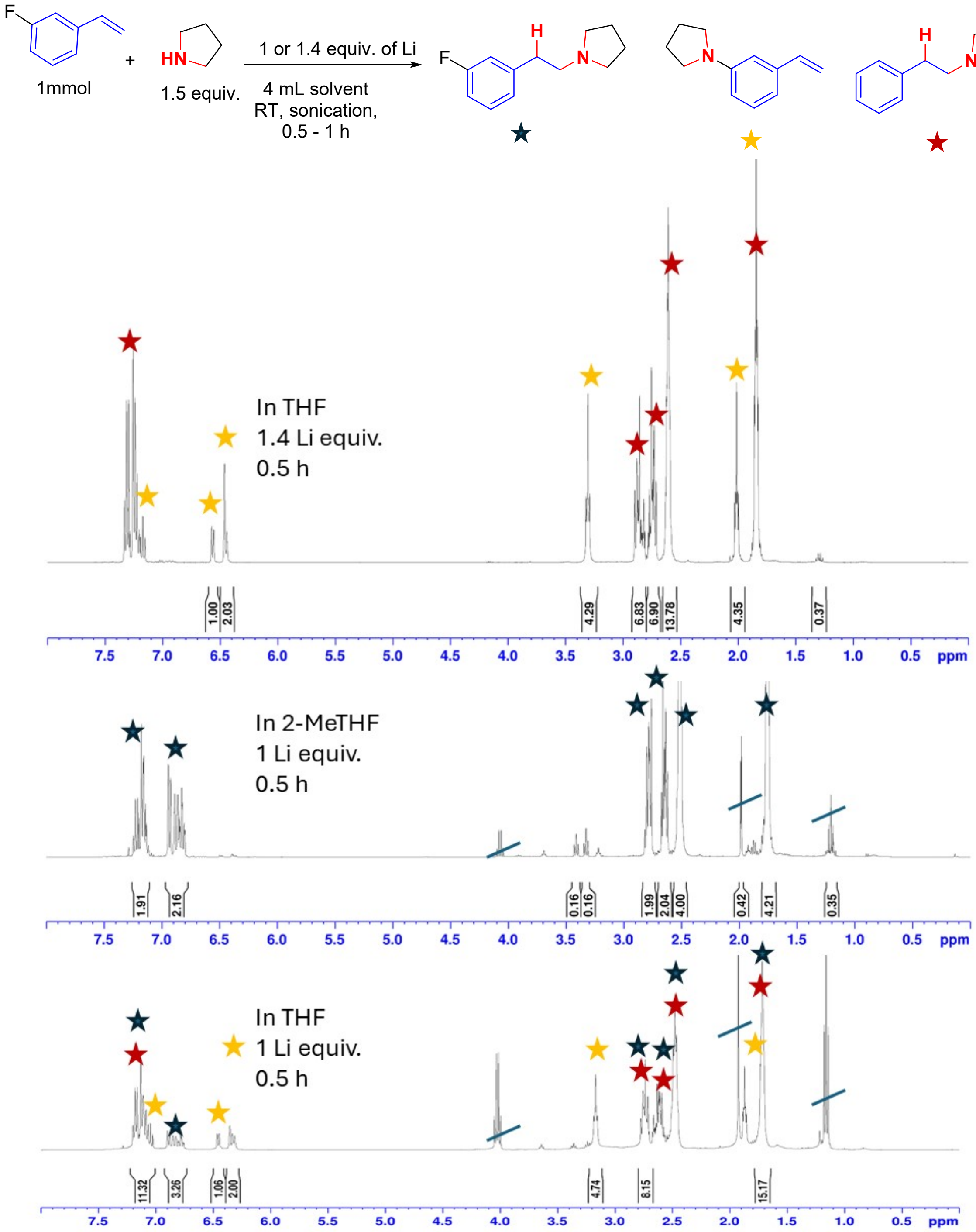


Figure S4. Competing selectivity observed during the reaction of 3-fluorostyrene in THF and 2-MeTHF. Top: In THF (1.4 equiv. Li, 0.5 h), a mixture of products arising from hydroamination, hydrodefluorination, and side-chain amination was detected. Middle: In 2-MeTHF (1 equiv. Li, 0.5 h), selective formation of the hydroamination product (compound 10) was observed. Bottom: In THF (1 equiv. Li, 0.5 h), similar competing pathways were again evident, confirming the reduced selectivity in this solvent. Colored stars indicate distinct product signals corresponding to each pathway. Crossed out peaks are ethylacetate traces from extraction procedure.

5.4 Successful amine scope

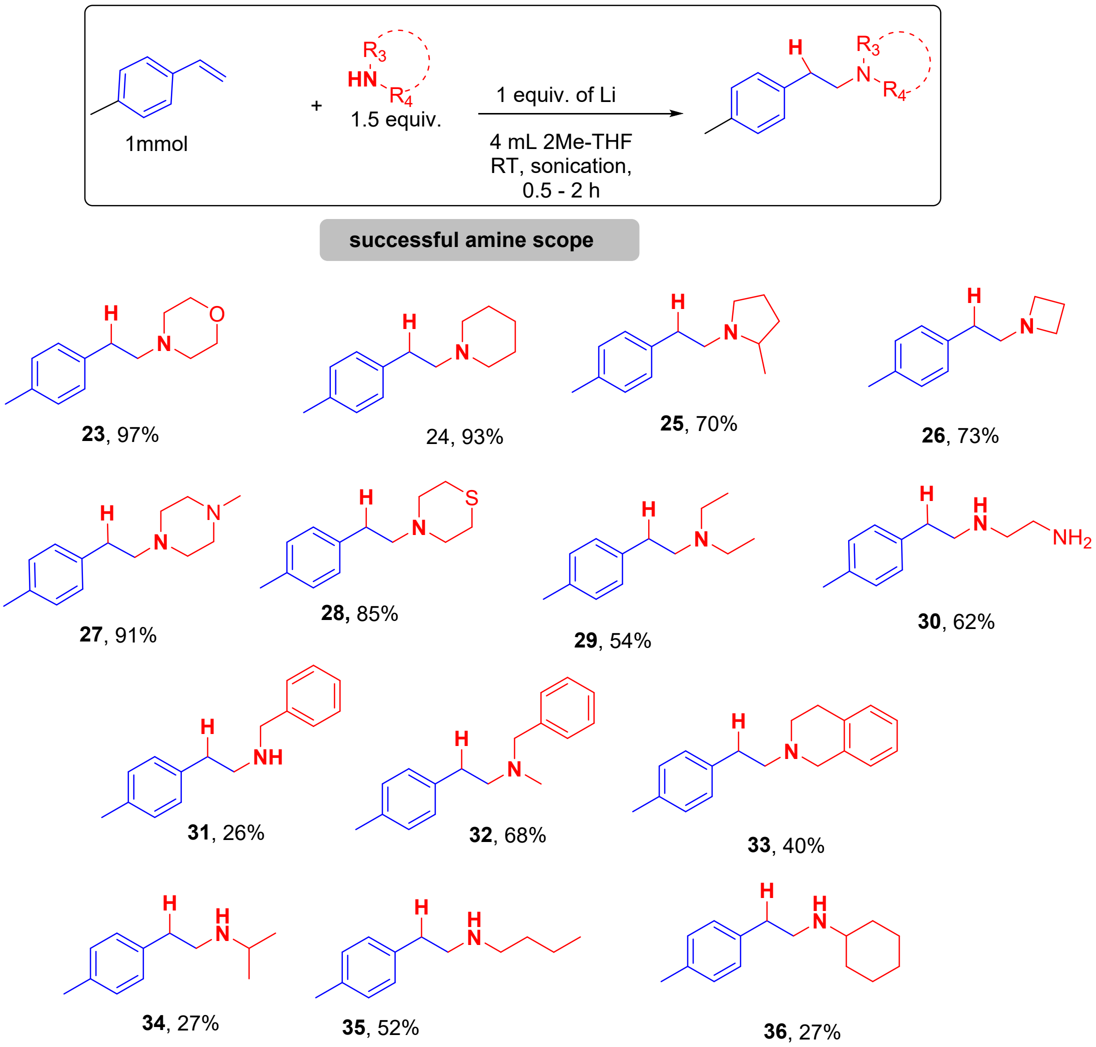
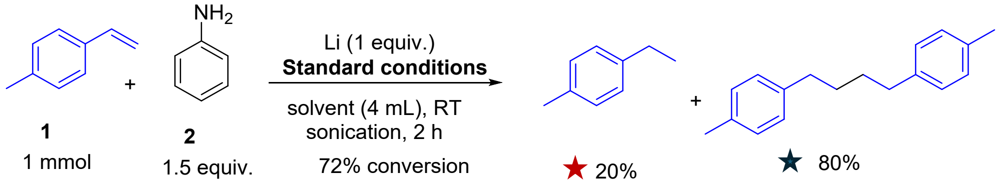
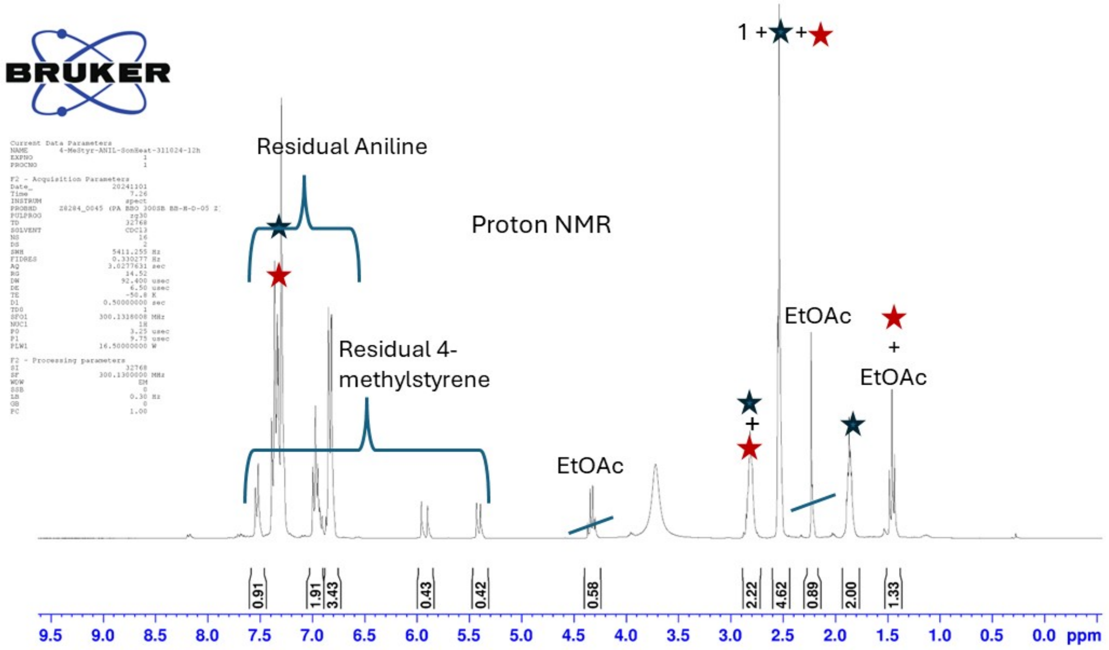


Figure S5. Amine scope for the hydroamination of olefins promoted by solvated electrons. The reaction was carried out under sonication at room temperature under inert conditions for 0.5 – 2 h with 1 mmol of 4-methylstyrene (**1**) and 1.5 equiv. of amines. Yields were determined after isolation by preparative thin layer chromatography.

5.5 Unsuccessful Aniline

To evaluate the substrate scope with less nucleophilic amines, we investigated the hydroamination of 4-methylstyrene with aniline under the optimized lithium-mediated conditions. As shown in Figure S6, 72% conversion of the starting material was observed; however, no hydroamination product was detected by ^{1}H NMR. Instead, the major products were the reduced alkane (20%) and the dimerized compound (80%), arising from radical coupling of the benzylic intermediates. The low nucleophilicity and high oxidation potential of aniline likely prevent effective nitrogen-centered addition, diverting the reaction toward reductive and radical termination pathways. These results emphasize that the hydroamination proceeds efficiently only with aliphatic amines capable of stabilizing the amide radical intermediate.





```
Current Data Parameters
NAME       4-MeStyr-ANIL-SonHeat-311024-12h
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20241101
Time                       7.26
INSTRUM                   spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                    zg30
TD                        32768
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    5411.255 Hz
FIDRES                 0.330277 Hz
AQ                    3.0277631 sec
RG                        14.52
DW                       92.400 usec
DE                         6.50 usec
TE                        -50.8 K
D1                   0.50000000 sec
TD0                           1
SFO1                300.1318008 MHz
NUC1                         1H
P0                         3.25 usec
P1                         9.75 usec
PLW1                16.50000000 W

F2 - Processing parameters
SI                        32768
SF                  300.1300000 MHz
WDW                          EM
SSB                           0
LB                         0.30 Hz
GB                            0
PC                         1.00
```

Figure S6. Reactivity of 4-methylstyrene (1) with aniline (2) under standard conditions. The reaction exhibited 72% conversion of starting material but failed to yield the desired hydroamination product. Instead, a mixture of reduced and dimerized products was obtained, consistent with lithium-mediated reduction and radical coupling pathways. Reaction conditions: 1 mmol of 4-methylstyrene (1), 1.5 equiv. aniline (2), 1 equiv. Li, 4 mL 2-MeTHF, RT, sonication, 2 h, under inert atmosphere. Yields determined by ^{1}H NMR using 1,4-dinitrobenzene as internal standard.

6.0 Mechanistic Studies

6.1 Radical quenching experiment with TEMPO

Reaction was conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg), and 1 mmol of TEMPO (156.25 mg) which are dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of tetrahydrofuran followed by 1 mmol of 4-methylstyrene (0.13 mL) and 1.5 mmol of pyrrolidine (0.13 mL) were added using a syringe and needle through the septum end. The reaction mixture was sonicated until sonicated for 0.5 h. Afterwards, the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deionized water. Extraction was done using 3 x 20 mL of ethyl acetate. The organic phase was then dried over sodium sulfate and solvent evaporated using a rotary evaporator.

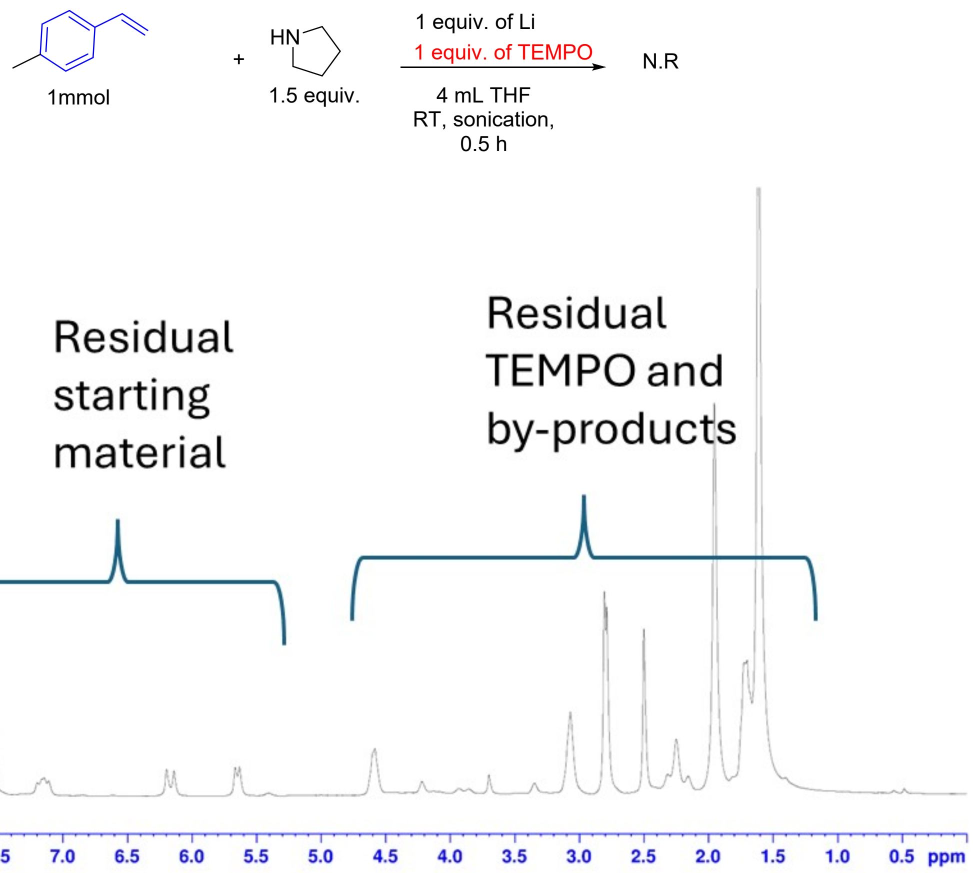


Figure S7. Radical quenching experiment using TEMPO. No desired product peaks were observed, indicating effective quenching of the reaction. The ^{1}H NMR spectrum shows residual 4-methylstyrene along with signals corresponding to TEMPO and its derivatives, confirming the suppression of the radical pathway.

6.2 D_2O Quenching experiment

Reaction was conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg) which is dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of tetrahydrofuran followed by 1 mmol of 4-methylstyrene (0.13 mL)and 1.5 mmol of pyrrolidine (0.13 mL) were added using a syringe and needle through the septum end. The reaction mixture was sonicated until sonicated for 0.5 h. Afterwards, the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deuterated water (D_2O). Extraction was done using 3 x 20 mL of ethyl acetate. The organic phase was then dried over sodium sulfate and solvent evaporated using a rotary evaporator.

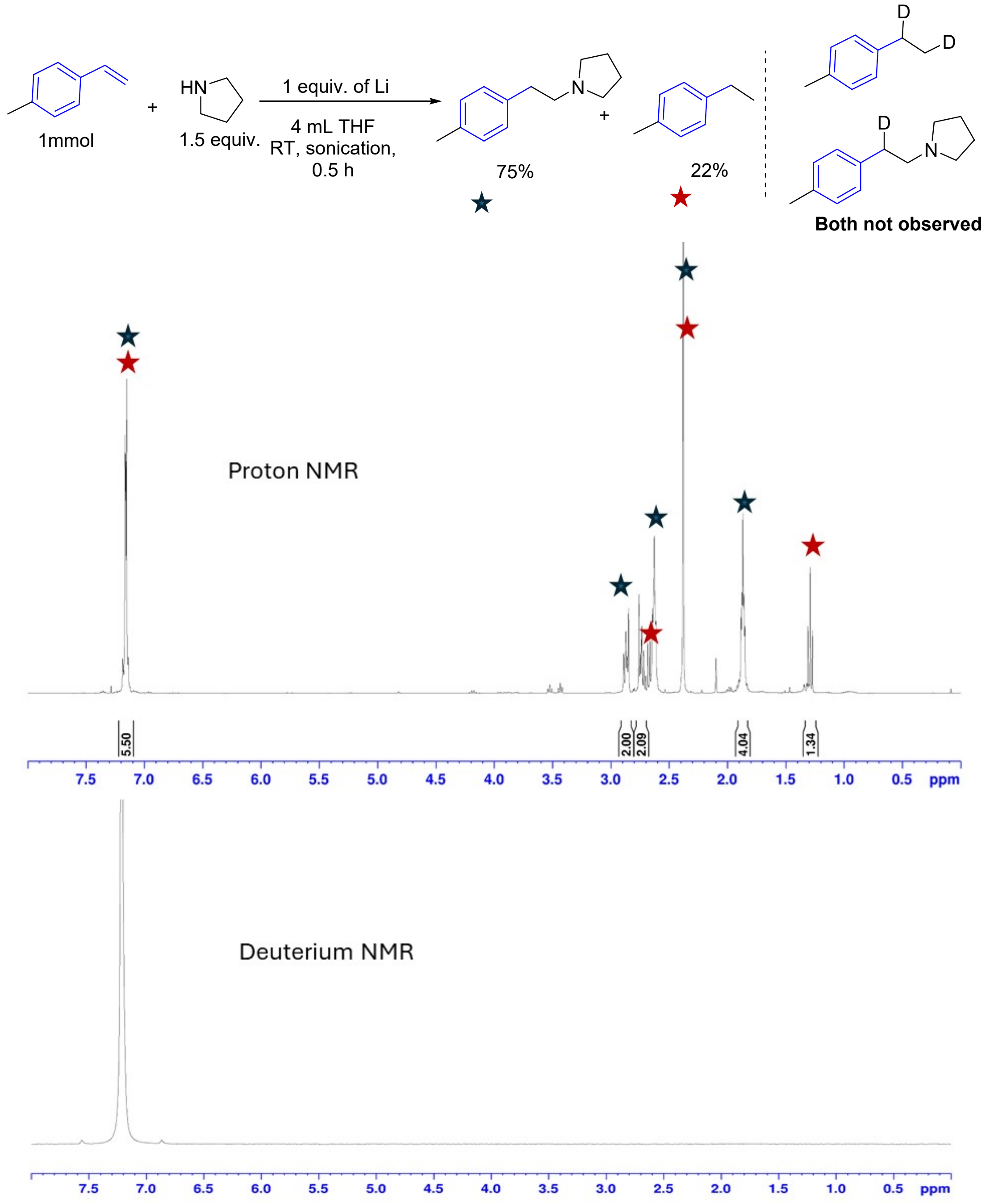


Figure S8. D_2O quenching experiment. The ^1H NMR spectrum (top) spectra shows no evidence of deuterium incorporation in either product, as indicated by unchanged proton integrations. The ^2H NMR spectrum (bottom) confirms this result, showing no detectable deuterium signals.

6.3 Deuterated solvent experiment

Reaction was conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg) which is dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of deuterated tetrahydrofuran (d8-THF) followed by 1 mmol of 4-methylstyrene (0.13 mL)and 1.5 mmol of piperidine (0.13 mL) were added using a syringe and needle through the septum end. The reaction mixture was sonicated for 0.5 h. Afterwards; the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deionized water (D_2O). Extraction was done using 3 x 20 mL of ethyl acetate. The organic phase was then dried over sodium sulfate and solvent evaporated using a rotary evaporator.

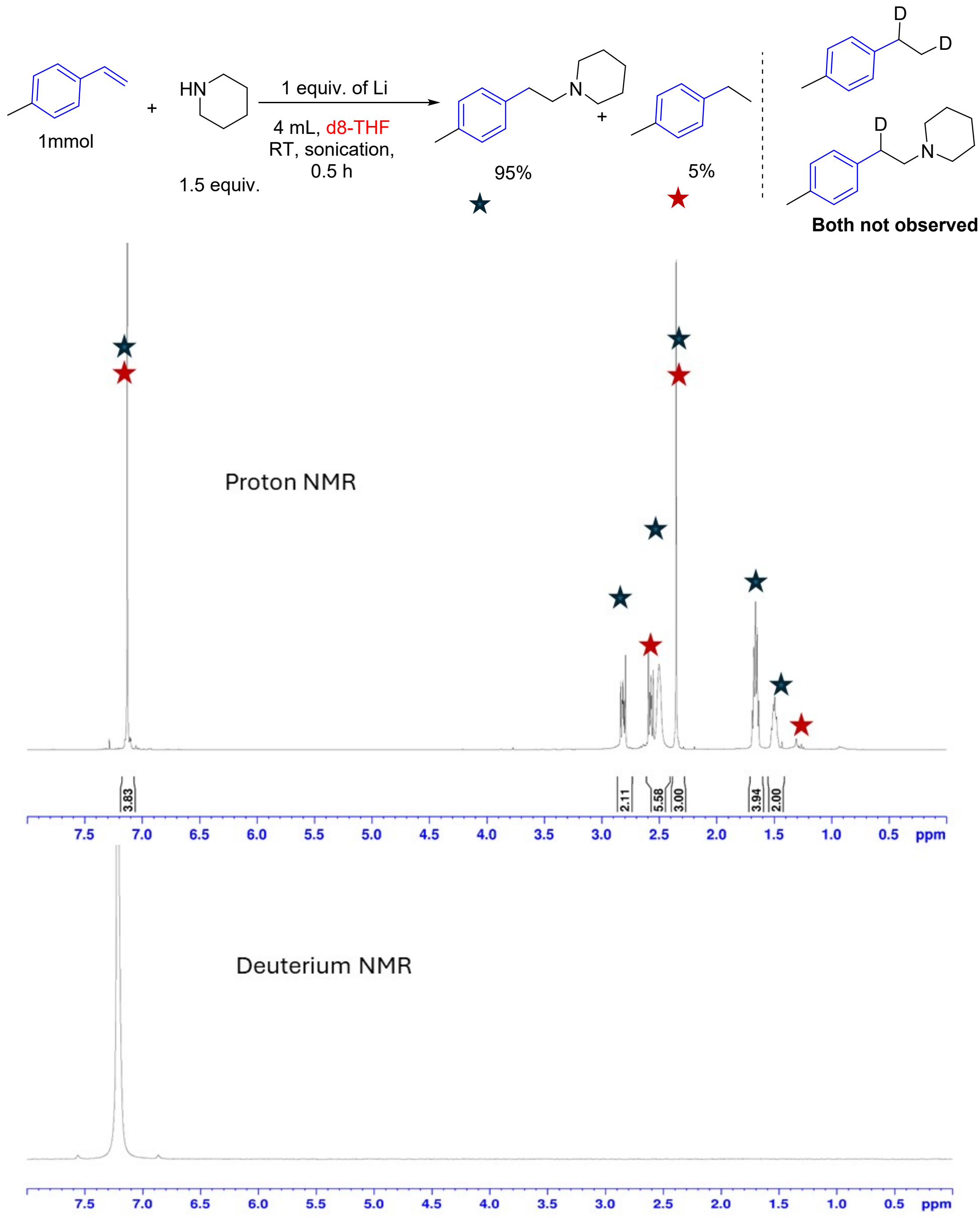


Figure S9. Deuterated solvent experiment. The ^1H NMR spectrum (top) spectra shows no evidence of deuterium incorporation in either product, as indicated by unchanged proton integrations. The ^2H NMR spectrum (bottom) confirms this result, showing no detectable deuterium signals.

6.4 Deuterated piperidine experiment

Synthesis of N-deuterated piperidine

In a flame-dried, nitrogen-flushed round-bottom flask equipped with a magnetic stir bar, piperidine (10 mmol, 0.85 mL) was dissolved in anhydrous tetrahydrofuran (THF, 10 mL) and cooled to 0 °C in an ice bath. To this solution, n-butyllithium (n-BuLi, 12 mmol, 4.8 mL of a 2.5 M solution in hexanes) was added dropwise over 2 minutes under inert atmosphere. The reaction mixture was stirred at 0 °C for 30 minutes to ensure complete deprotonation of the amine. After this period, excess D_2O (10 mL) was added dropwise to quench the reaction and introduce deuterium at the nitrogen center. The mixture was extracted with diethyl ether (3 x 10 mL) and the combined organic layers were dried over Na_2SO_4, filtered and concentrated under reduced pressure. The crude product was used without further purification. The ^1H and ^2H NMR (Figure S9) confirm successful deuterium incorporation, as evidenced by the attenuation/appearance of the N-H/N-D signals in the ^1H and ^2H NMR spectrum, respectively.

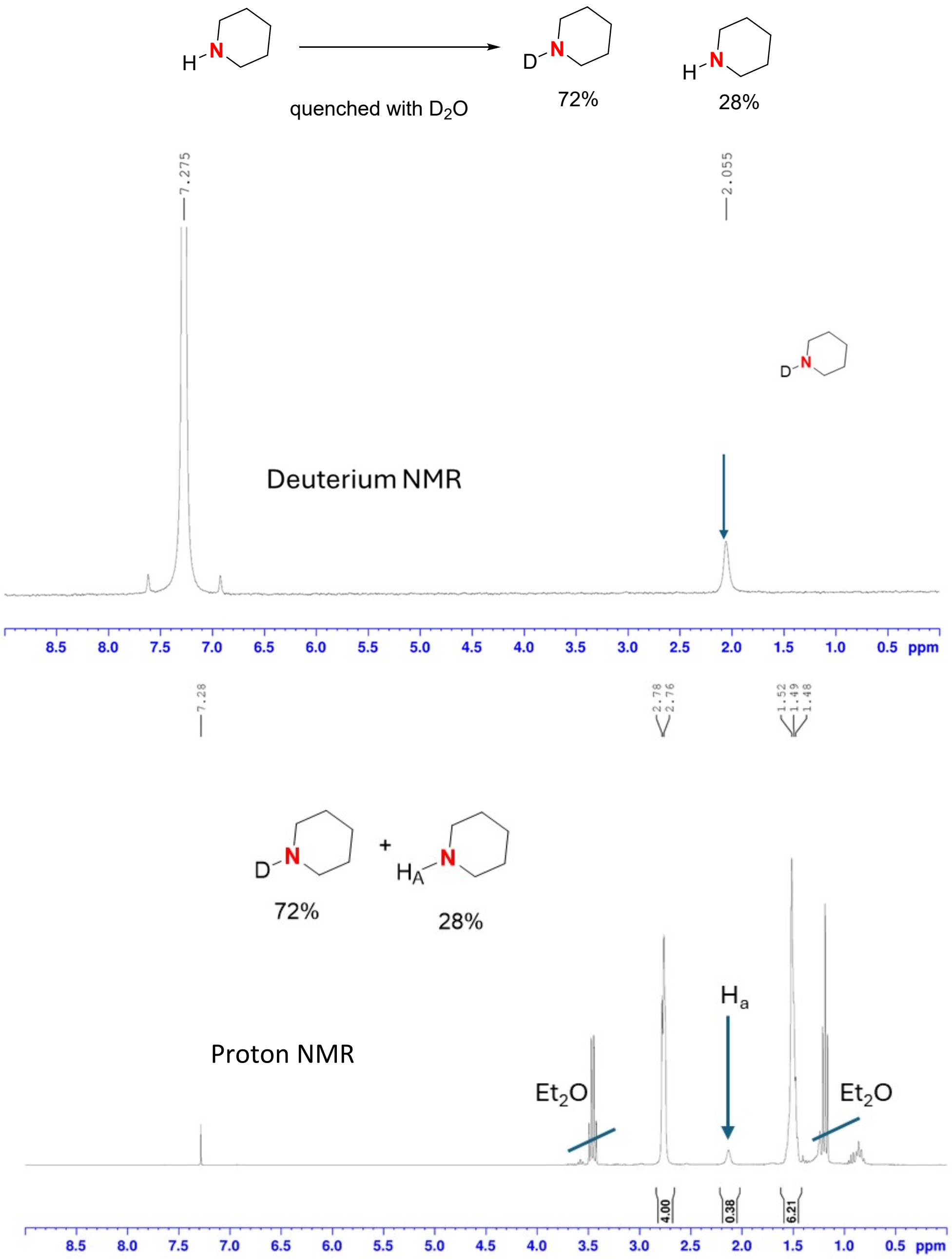
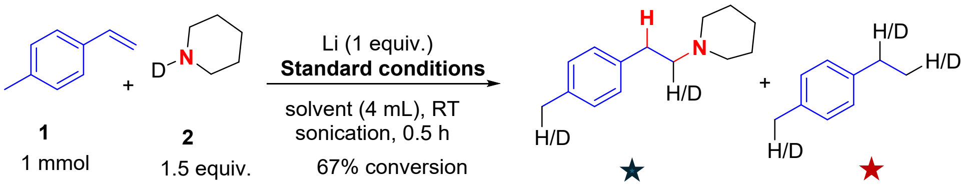


Figure S10. ^1H (top) and ^2H (bottom) NMR confirming the successful synthesis of N-deuterated piperidine. The distinct ^2H signal at δ 2.08 ppm corresponds to the N–D proton, verifying deuterium incorporation at the nitrogen position.

Procedure for the deuterated piperidine experiments.

All reactions were conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg) which is dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of deuterated tetrahydrofuran (d8-THF) followed by 1 mmol of 4-

methylstyrene (0.13 mL) and 1.5 mmol of piperidine (0.13 mL) were added using a syringe and needle through the septum end. The reaction mixture was sonicated for 0.5 h. Afterwards; the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deionized water (D_2O). Extraction was done using 3 x 20 mL of ethyl acetate. The organic phase was then dried over sodium sulfate and solvent evaporated using a rotary evaporator.



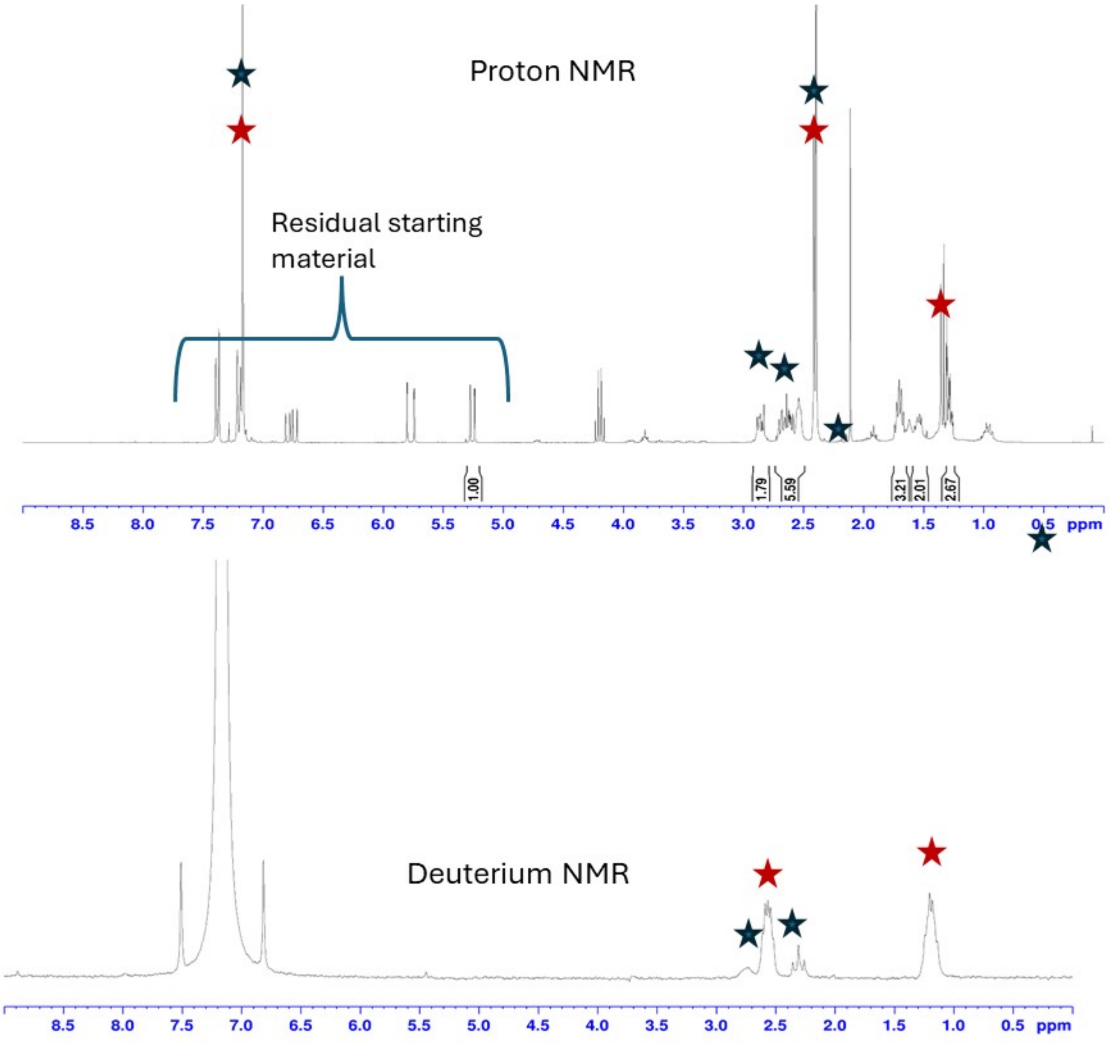
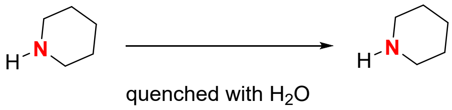


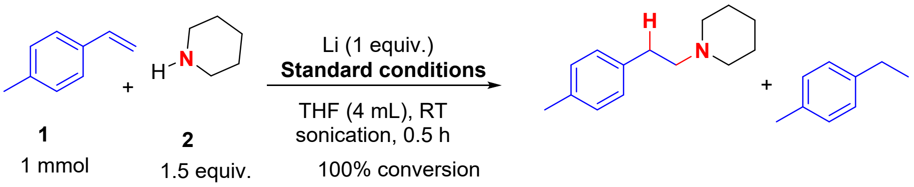
Figure S11. ^{2}H NMR (top) and ^{1}H NMR (bottom) spectra of the crude reaction mixture from the lithium-mediated hydroamination of 4-methylstyrene with N-deuterated piperidine under standard conditions. Both spectra show deuterium incorporation in both products. Residual starting 4-methylstyrene shown in the ^{1}H NMR show incomplete conversion, consistent with a kinetic isotope effect resulting from the use of N–D labeled amines.

Control reaction with N-protio piperidine (30 minutes)



N-protio piperidine was synthesized following the same procedure as for N-deuterated piperidine (see Page S14), except deionized water was used for quenching in place of D_2O. This control experiment was designed to assess whether the observed incomplete conversion in the deuterated reaction stemmed from residual impurities in the synthesized amine, rather than a true kinetic isotope effect (KIE). The results help differentiate between effects arising from isotopic substitution versus those due to reagent quality or contamination.

Reaction of 4-methylstyrene with N-protio piperidine



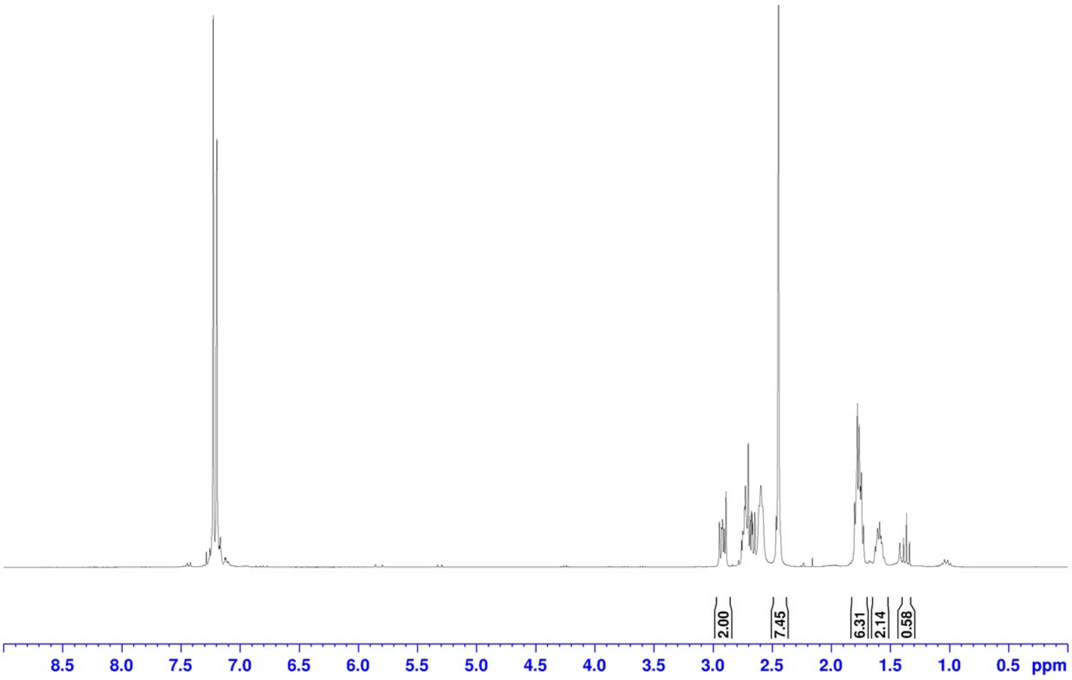


Figure S12. ^{1}H NMR spectra of the crude reaction mixture indicating full conversion of the 4-methylstyrene substrate.

N-deuterated piperidine experiments (1 hour)

To further probe the influence of reaction time on conversion, the hydroamination of 4-methylstyrene with N-deuterated piperidine was conducted under standard conditions for 1 hour. As shown in Figure S12, extending the reaction time led to complete consumption of the 4-methylstyrene substrate. These results confirm that the lower conversion observed in shorter reactions was due to the kinetic isotope effect (KIE) associated with the N–D bond, rather than incomplete reactivity or reagent instability.

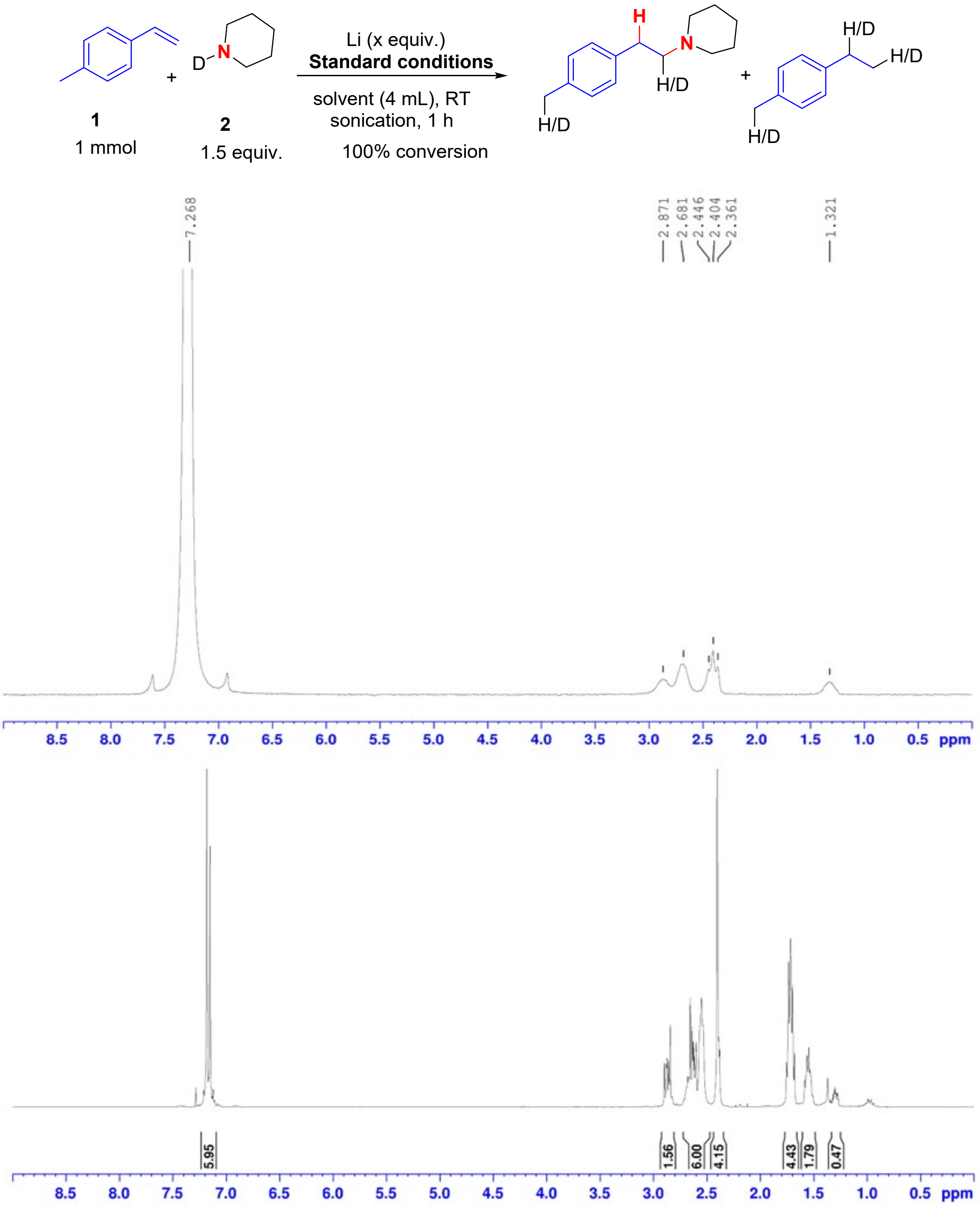


Figure S13. ^{2}H NMR (top) and ^{1}H NMR (bottom) spectra of the 1-hour reaction using N-deuterated piperidine. Complete conversion of 4-methylstyrene is observed in the ^{1}H NMR spectrum, with deuterium incorporation in both product regioisomers confirmed by distinct ^{2}H resonances, as previously described.

Isolated products

We successfully isolated both the hydroaminated and reduced products for characterization. The reduced product underwent dimerization to form the 1,4-di-p-tolylbutane, as confirmed by spectroscopic analysis. As shown in Figure S13, the ^{2}H NMR spectrum indicates deuterium incorporation at all benzylic positions, consistent with reduction followed by dimerization. The ^{1}H and ^{13}C NMR spectra further support the structure of the symmetric 1,4-di-p-tolylbutane derivative.

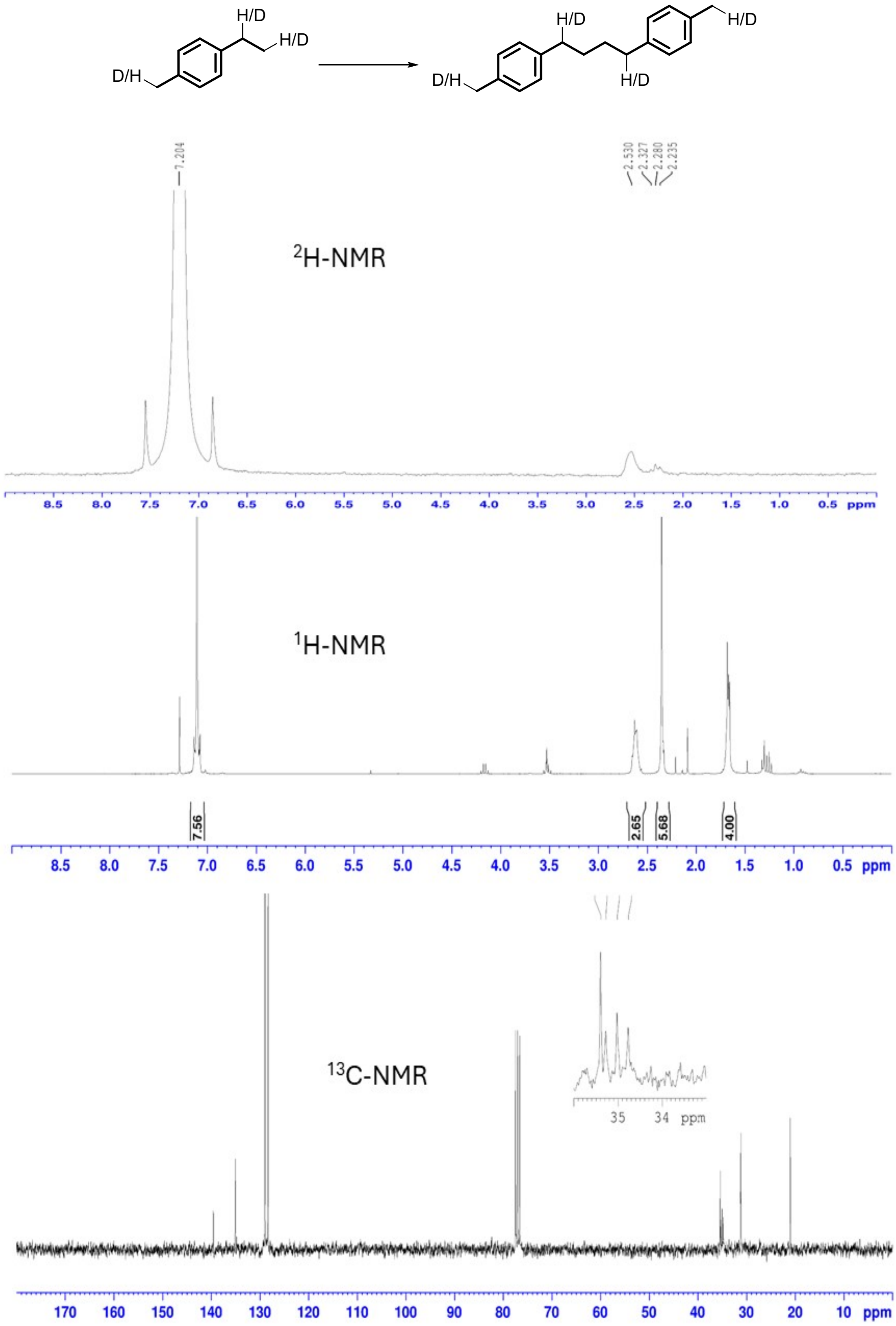


Figure S14. ^{2}H NMR (top) and ^{1}H NMR (middle) and ^{13}C NMR (bottom) spectra of the isolated reduced/dimerized product - 1,4-di-p-tolylbutane. The ^{2}H NMR confirms deuterium incorporation at all benzylic positions. The ^{1}H and ^{13}C spectra match the expected pattern for the deuterated dimer as shown.

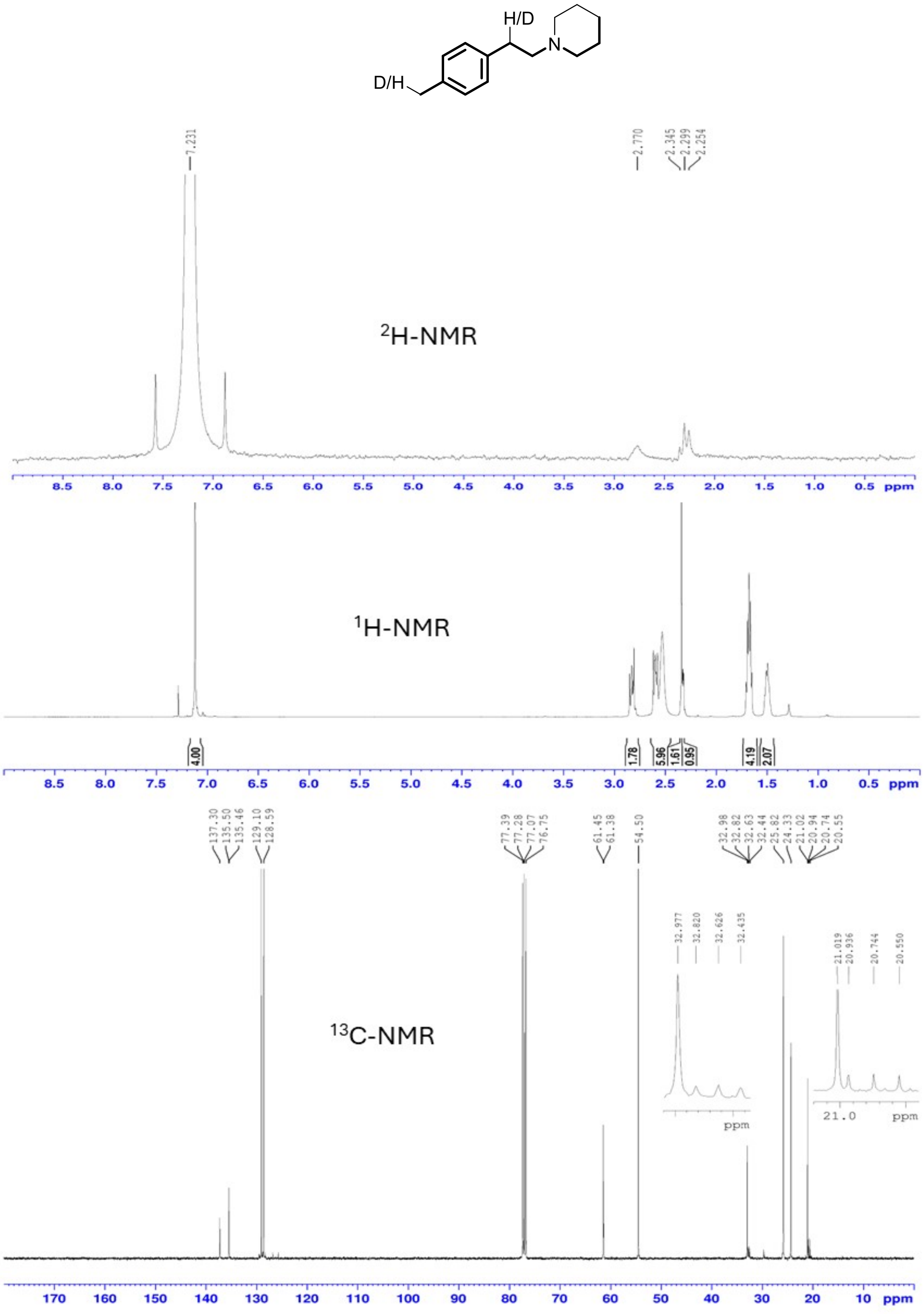


Figure S15. ^{2}H NMR (top) and ^{1}H NMR (middle) and ^{13}C NMR (bottom) spectra of the isolated reduced/dimerized product. The ^{2}H NMR confirms deuterium incorporation at all benzylic positions. The ^{1}H and ^{13}C spectra match the expected pattern for the deuterated dimer as shown.

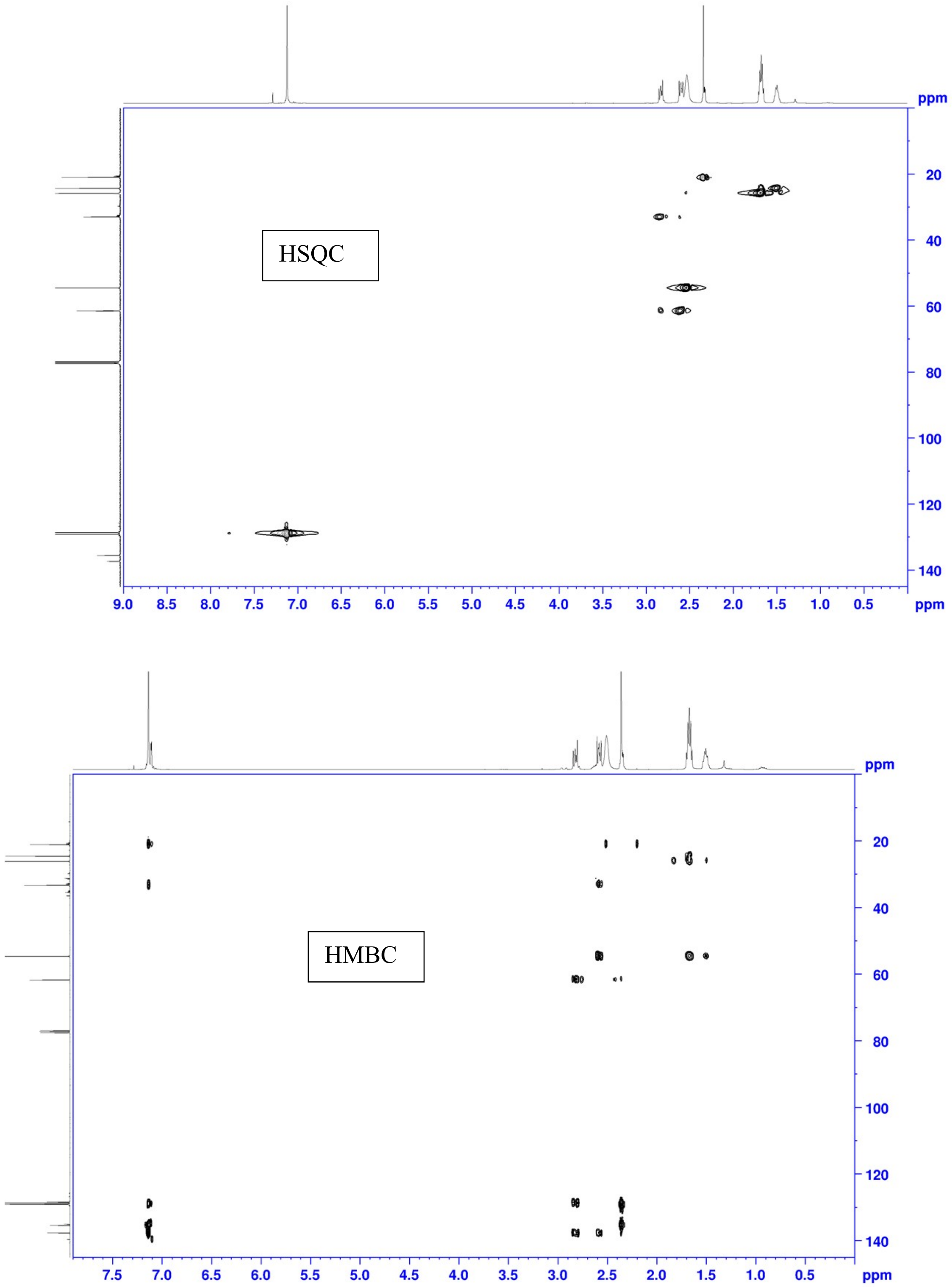
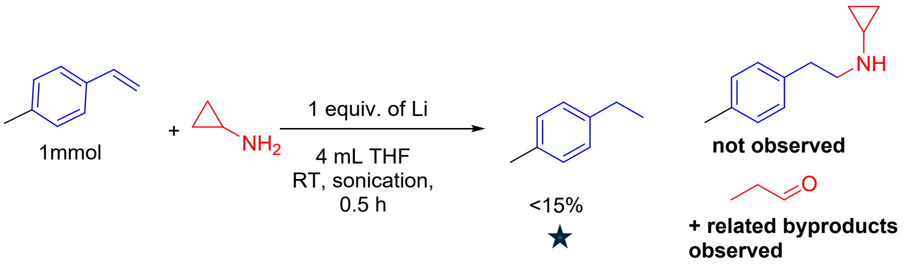


Figure S16. HSQC and HMBC NMR spectra which confirms the isolated deuterated hydroamination product.

6.5 Radical clock experiment

The reaction was conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg) which is dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of tetrahydrofuran (THF) followed by 1 mmol of 4-methylstyrene (0.13 mL) and 1.5 mmol of cyclopropylamine (0.13 mL) were added using a syringe and needle through the septum end. The reaction mixture was sonicated for 0.5 h. Afterwards; the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deionized water (D_2O). Extraction was done using 3 x 20 mL of diethyl ether, and the combined organic layers were dried over anhydrous sodium sulfate.

To prevent the loss of volatile propanal derivatives, the organic phase was analyzed directly without evaporation. An aliquot was removed and subjected to ^{1}H NMR analysis. The results (Figure S17) provide insight into whether ring-opening products indicative of radical intermediates were formed.



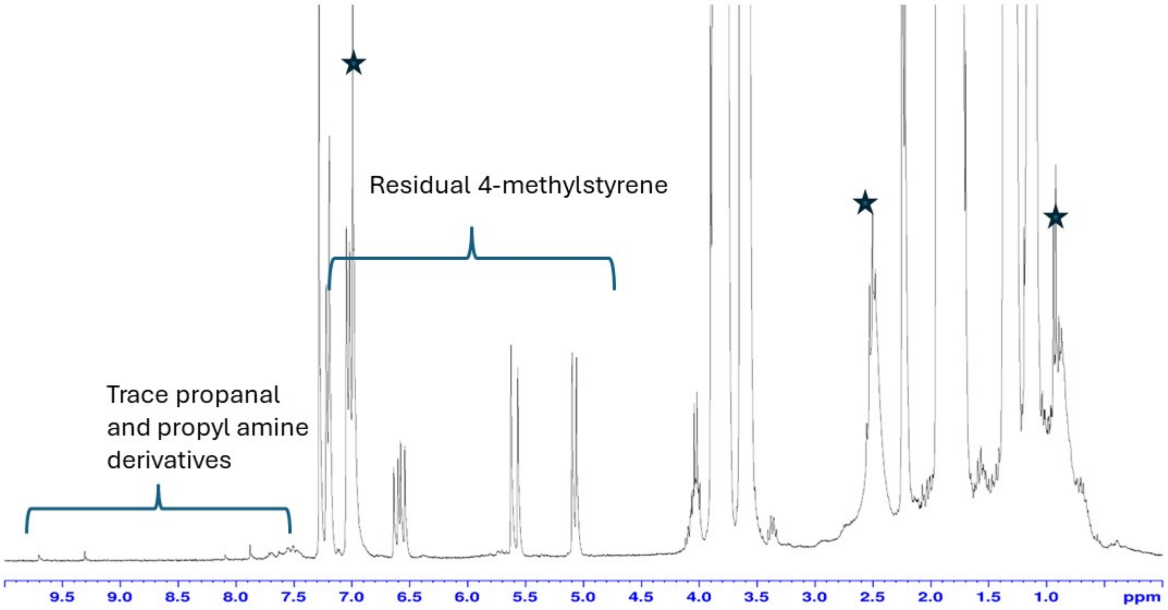
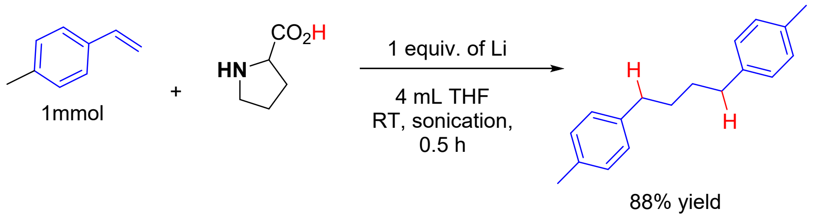


Figure S17. ^{1}H NMR spectrum of the crude reaction mixture from the radical clock experiment using cyclopropylamine. Prominent solvent peaks are observed due to the direct analysis of the non-evaporated organic phase. The spectrum shows exclusive formation of the reduced product, with no detectable signals corresponding to hydroamination product. However, trace ring opened propanal and propyl amine derivatives radical intermediacy under these conditions.

6.6 Amino acid experiment

The reaction was conducted at a concentration of 0.25 M. A two-necked round bottom flask that is sealed with a septum on one end and connected to a Schlenk line on the other is charged with 1 mmol of lithium (6.5 mg) and 1.5 equiv. of DL-proline (172.7 mg), which are dried extensively under vacuum (about 10 minutes), purged, and then filled up with nitrogen. Then 4 mL of tetrahydrofuran (THF) followed by 1 mmol of 4-methylstyrene (0.13 mL) was added using a syringe and needle through the septum end. The reaction mixture was sonicated for 0.5 h. Afterwards; the mixture was cooled to 0 °C in an ice bath and then quenched with 20 mL of deionized water (D_2O). Extraction was done using 3 x 20 mL of ethyl acetate. The organic phase was then dried over sodium sulfate and evaporated under reduced pressure using a rotary evaporator.



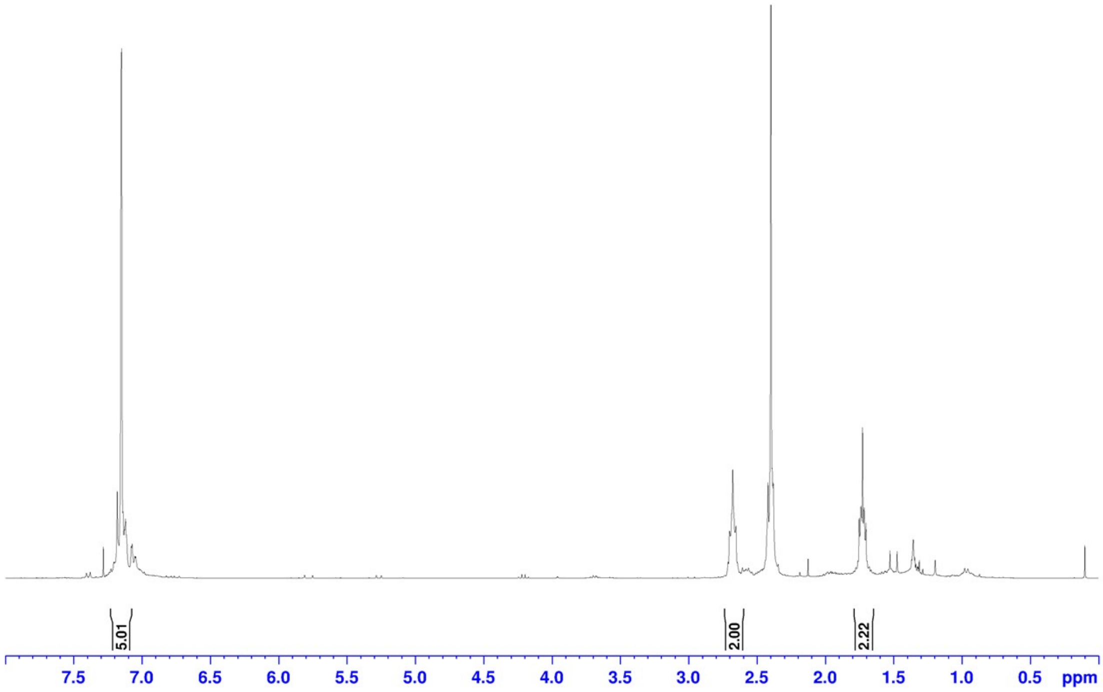
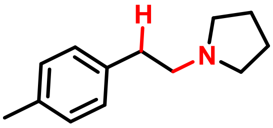


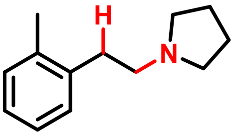
Figure S18. ^1H NMR spectrum of the crude reaction mixture from the reaction of 4-methylstyrene with DL-proline under standard conditions. The reaction expectedly yielded the dimer, 1,4-di-p-tolylbutane in 88% crude yield.

7.0 Characterization data



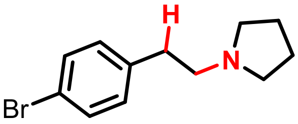
N-(2-(4-methylphenyl)ethyl)pyrrolidine, 5

Colorless oil. Yield = 98% (186 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.13 (s, 4H), 2.91-2.80 (m, 2H), 2.80-2.70 (m, 2H), 2.64 (br s, 4H), 2.36 (s, 3H), 1.85 (quin, J = 3.4 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 137.2, 135.6, 129.1, 128.5, 58.4, 54.2, 35.1, 23.5, 21.0. The data matched what was reported in literature.[3]



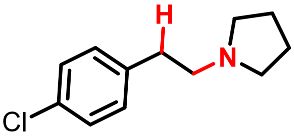
N-(2-(2-methylphenyl)ethyl)pyrrolidine, 6

Colorless oil. Yield = 95% (180 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.20-7.10 (m, 4H), 2.95-2.82 (m, 2H), 2.73-2.55 (m, 6H), 2.34 (s, 3H), 1.86 (quin, J = 3.4 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 138.6, 136.1, 130.2, 129.2, 126.2, 126.0, 57.1, 54.3, 33.1, 23.5, 19.4. The data matched what was reported in literature.[3]



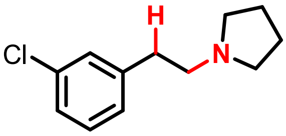
N-(2-(4-bromophenyl)ethyl)pyrrolidine, 7

Colorless oil. Yield = 85% (216 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.49-7.34 (m, 2H), 7.16-6.98 (m, 2H), 2.85-2.73 (m, 2H), 2.72-2.62 (m, 2H), 2.62-2.50 (m, 4H), 1.86-1.75 (m, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 142.9, 134.3, 129.8, 128.8, 127.1, 126.4, 58.2, 54.4, 35.7, 23.7. The data matched what was reported in literature.[4]



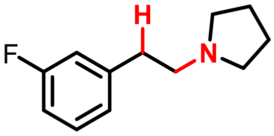
N-(2-(4-chlorophenyl)ethyl)pyrrolidine, 8

Colorless oil. Yield = 89% (187 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.25 (d, J = 8.5 Hz, 2H), 7.15 (d, J = 8.5 Hz, 2H), 2.87-2.75 (m, 2H), 2.75-2.63 (m, 2H), 2.63-2.51 (m, 4H), 1.88-1.72 (m, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 139.1, 131.7, 130.0, 128.4, 58.1, 54.2, 35.2, 23.5. The data matched what was reported in literature.[5]



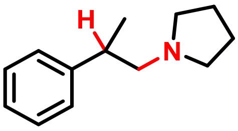
N-(2-(3-chlorophenyl)ethyl)pyrrolidine, 9

Colorless oil. Yield = 79% (166 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.27-7.02 (m, 4H), 2.92-2.76 (m, 2H), 2.77-2.64 (m, 2H), 2.64-2.50 (m, 4H), 1.88-1.74 (m, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 142.9, 134.3, 129.8, 128.8, 127.1, 126.4, 58.2, 54.4, 35.7, 23.7. The data matched what was reported in literature.[3]



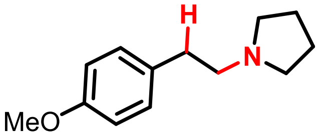
N-(2-(3-fluorophenyl)ethyl)pyrrolidine, 10

Yellow oil. Yield = 83% (160 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.26-7.11 (m, 2H), 6.96-6.79 (m, 2H), 2.84-2.73 (m, 2H), 2.70-2.59 (m, 2H), 2.57-2.46 (m, 4H), 1.81-1.69 (m, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 162.9 (d, $^1J_{CF}$ = 245.3 Hz), 143.2 (d, $^3J_{CF}$ = 7.2 Hz), 129.7 (d, $^3J_{CF}$ = 8.4 Hz), 124.3 (d, $^4J_{CF}$ = 2.7 Hz), 115.5 (d, $^2J_{CF}$ = 20.9 Hz), 112.9 (d, $^2J_{CF}$ = 21.1 Hz), 57.9, 54.3, 35.6, 23.5. The data matched what was reported in literature.[6]



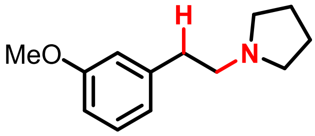
N-(2-phenylpropyl)pyrrolidine, 11

Yellow oil. Yield = 60% (114 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.37-7.20 (m, 5H), 3.02-2.85 (m, 1H), 2.81-2.65 (m, 1H), 2.60-2.36 (m, 5H), 1.76 (br s, 4H), 1.32 (d, J = 6.9 Hz, 3H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 146.6, 128.3, 127.1, 126.1, 64.5, 54.5, 39.6, 23.5, 20.3. The data matched what was reported in literature.[7]



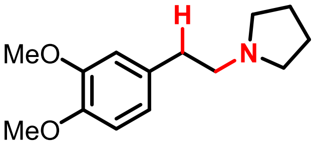
N-(2-(4-methoxyphenyl)ethyl)pyrrolidine, 12

Orange oil. Yield = 80% (164 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.15 (d, J = 8.6 Hz, 2H), 6.85 (d, J = 8.6 Hz, 2H), 3.81 (s, 3H), 2.86-2.74 (m, 2H), 2.74-2.64 (m, 2H), 2.63-2.53 (m, 4H), 1.83 (quin, J = 3.3 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 157.9, 132.7, 129.5, 113.8, 58.7, 55.3, 54.3, 35.0, 23.5. The data matched what was reported in literature.[8]



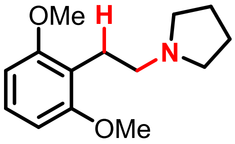
N-(2-(3-methoxyphenyl)ethyl)pyrrolidine, 13

Orange oil. Yield = 58% (119 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.21 (t, J = 7.8 Hz, 1H), 6.90-6.66 (m, 3H), 3.80 (s, 3H), 2.89-2.77 (m, 2H), 2.78-2.66 (m, 2H), 2.64-2.51 (m, 4H), 1.82 (quin, J = 3.3 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 159.7, 142.2, 129.3, 121.0, 114.5, 111.3, 58.2, 55.1, 54.2, 35.9, 23.5. The data matched what was reported in literature.[3]



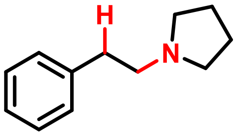
N-(2-(3,4-dimethoxyphenyl)ethyl)pyrrolidine, 14

Colorless oil. Yield = 72% (169 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 6.84-6.69 (m, 3H), 3.87 (s, 3H), 3.85 (s, 3H), 2.84-2.73 (m, 2H), 2.73-2.64 (m, 2H), 2.63-2.51 (m, 4H), 1.81 (quin, J = 3.3 Hz, 4H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 148.9, 147.4, 133.2, 120.5, 112.1, 111.3, 58.5, 55.9, 55.8, 54.2, 35.4, 23.5. The data matched what was reported in literature.[9]



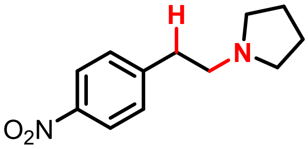
N-(2-(2,6-dimethoxyphenyl)ethyl)pyrrolidine, 15

Colorless oil. Yield = 64% (151 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 7.14 (t, J = 8.3 Hz, 1H), 6.55 (d, J= 8.3 Hz, 2H), 3.82 (s, 6H), 2.98-2.87 (m, 2H), 2.70-2.49 (m, 6H), 1.82 (quin, J = 3.4 Hz, 4H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 158.5, 126.9, 117.0, 103.7, 55.7, 55.4, 54.1, 23.5, 22.8. HRMS (ESI) calcd. for $C_{14}H_{21}NO_2$ $[M+H]^+$: 236.1645, found: 236.1675.



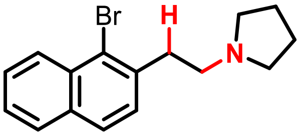
N-(2-phenylethyl)pyrrolidine, 16

Colorless oil. Yield = 96% (168 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 7.31-7.18 (m, 5H), 2.93-2.82 (m, 2H), 2.78-2.68 (m, 2H), 2.64-2.51 (m, 4H), 1.88-1.75 (m, 4H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 140.5, 128.7, 128.4, 126.0, 58.4, 54.2, 35.9, 23.6. The data matched what was reported in literature.[10]



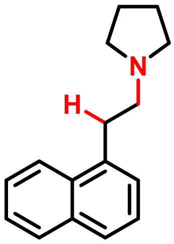
N-(2-(4-nitrophenyl)ethyl)pyrrolidine, 17

Colorless oil. Yield = 92% (203 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 8.19-8.06 (m, 2H), 7.36 (d, 2H), 2.98-2.86 (m, 2H), 2.77-2.69 (m, 2H), 2.63-2.47 (m, 4H), 1.79 (quin, J = 3.4 Hz, 4H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 148.5, 146.5, 129.4, 123.6, 57.3, 54.2, 35.6, 23.5. The data matched what was reported in literature.[11]



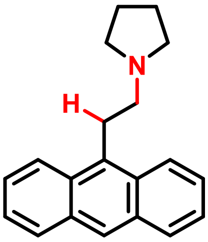
N-(2-(1-bromo-2-napthalenyl)ethyl)pyrrolidine, 18

White solid. Yield = 75% (228 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 8.34 (d, J = 8.5 Hz, 1H), 7.82 (d, J = 7.8 Hz, 1H), 7.77 (d, J = 8.4 Hz, 1H) 7.65-7.55 (m, 1H), 7.55-7.45 (m, 1H), 7.41 (d, J = 8.4 Hz, 1H), 3.40-3.10 (m, 2H), 2.89-2.60 (m, 6H), 1.94-1.79 (br. s, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 137.9, 133.3, 132.6, 128.3, 128.0, 127.7, 127.34, 127.30, 125.9, 123.9, 56.2, 54.2, 37.0, 23.6. HRMS (ESI) calcd. for $C_{16}H_{18}{}^{79}BrN$ [M+H]$^{+}$: 304.0695, found: 304.0685



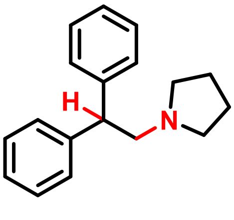
N-(2-(1-napthalenyl)ethyl)pyrrolidine, **19**

Colorless oil. Yield = 80% (180 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 8.14 (d, J = 8.3 Hz, 1H), 7.88 (d, J = 7.7 Hz, 1H), 7.76 (d, J = 7.80 Hz, 1H), 7.61-7.38 (m, 4H), 3.44-3.28 (m, 2H), 2.91-2.81 (m, 2H), 2.74-2.64 (m, 4H), 1.89 (quin, J = 3.3 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 136.7, 133.9, 132.0, 128.8, 126.9, 126.5, 125.9, 125.6, 125.5, 123.8, 57.7, 54.3, 33.0, 23.6. HRMS (ESI) calcd. for $C_{16}H_{19}N$ [M+H]$^{+}$: 226.1590, found: 226.1591



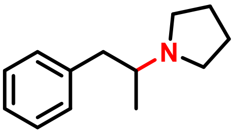
N-(2-(anthracene-9-yl)ethyl)pyrrolidine, **20**

Colorless oil Yield = 59% (163 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 8.44-8.26 (m, 3H), 8.08-7.96 (m, 2H), 7.59-7.44 (m, 4H), 4.00-3.76 (m, 2H), 2.97-2.83 (m, 2H), 2.85-2.63 (m, 4H), 1.94 (quin, J = 3.3 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 132.3, 131.7, 129.8, 129.3, 126.1, 125.7, 124.9, 124.3, 56.9, 54.3, 27.9, 23.6. The data matched what was reported in literature.[3]



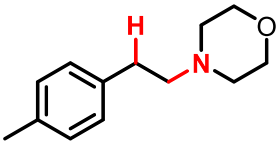
N-(2,2-diphenylethyl)pyrrolidine, 21

Colorless oil. Yield = 26% (65 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 8.19-8.06 (m, 2H), 7.39-7.17 (m, 10H), 4.24 (t, J = 7.5 Hz, 1H), 3.17 (d, J = 7.5 Hz, 2H), 2.63-2.44 (m, 4H), 1.75 (quin, J = 3.3 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 144.2, 128.4, 128.1, 126.2, 61.9, 54.6, 51.1, 23.6. The data matched what was reported in literature.[12]



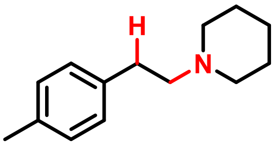
N-(1-methyl-2-phenylethyl)pyrrolidine, 22

Yellow oil. Yield = 10% (19 mg, from cis-beta-methylstyrene), 78% (148 mg, from allylbenzene). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.12 (m, 5H), 3.16 (dd, J = 12.7 Hz, 3.3 Hz, 1H), 2.82-2.63 (m, 4H), 2.64-2.49 (m, 1H), 2.52-2.35 (m, 1H), 1.84 (quin, J = 3.3 Hz, 4H), 1.01 (d, J = 6.2 Hz, 3H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 140.3, 129.4, 128.2, 125.9, 61.0, 51.4, 42.0, 23.5, 17.7. The data matched what was reported in literature.[13]



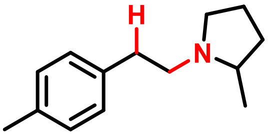
N-(4-methylphenethyl)morpholine, 23

Yellow oil. Yield = 97% (199 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.13 (br s, 4H), 3.78 (t, J = 4.7 Hz, 4H), 2.86-2.71 (m, 2H), 2.65-2.50 (m, 6H), 2.35 (s, 3H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 137.1, 135.6, 129.1, 128.6, 67.0, 61.0, 53.8, 32.9, 21.0. The data matched what was reported in literature.[14]



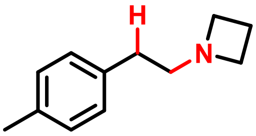
N-(4-methylphenethyl)piperidine, 24

Yellow oil. Yield = 93% (189 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.12 (br s, 4H), 2.85-2.77 (m, 2H), 2.61-2.43 (m, 6H), 2.35 (s, 3H), 1.72-1.59 (m, 4H), 1.54-1.43 (m, 2H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 137.6, 135.3, 129.1, 128.6, 61.6, 54.6, 33.3, 26.1, 24.5, 21.0. The data matched what was reported in literature.[15]



N-(4-methylphenethyl)-2-methylpyrrolidine, 25

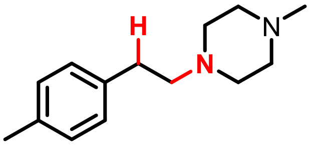
Yellow oil. Yield = 70% (142 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.13 (br s, 4H), 3.34-3.20 (m, 1H), 3.11-2.96 (m, 1H), 2.91-2.71 (m, 2H), 2.38-2.16 (m, 6H), 2.04-1.64 (m, 3H), 1.57-1.40 (m, 1H), 1.14 (d, J = 6.1 Hz, 3H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 137.6, 135.4, 129.1, 128.5, 60.1, 56.3, 54.0, 35.0, 32.7, 21.7, 21.0, 18.9. HRMS (ESI) calcd. for $C_{14}H_{21}N$ [M+H]$^{+}$: 204.1747, found: 204.1765



N-(4-methylphenethyl)azetidine, 26

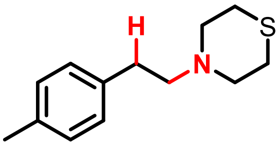
Yellow oil. Yield = 73% (128 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.13 (br s, 4H), 3.21 (t, J = 7.0 Hz, 4H), 2.62 (br s, 4H), 2.33 (s, 3H), 2.08 (quin, J = 7.0 Hz, 2H); ^{13}C NMR (CDCl$_3$, 100

MHz) δ 137.1, 135.4, 129.0, 128.5, 61.8, 55.3, 34.0, 21.0, 17.8. HRMS (ESI) calcd. for $C_{12}H_{17}N$ $[M+H]^+$: 176.1434, found: 176.1415



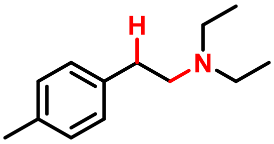
N^1-(4-methylphenethyl)-N^2-methylpiperazine, 27

Yellow oil. Yield = 91% (199 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 7.11 (br s, 4H), 2.85-2.73 (m, 2H), 2.70-2.38 (m, 10H), 2.33 (s, 3H), 2.32 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 137.3, 135.5, 129.1, 128.6, 60.7, 55.2, 53.2, 46.1, 33.2, 21.0. The data matched what was reported in literature.[14]



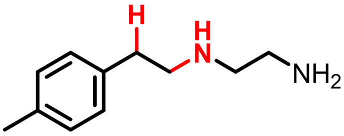
N-(4-methylphenethyl)thiomorpholine, 28

Yellow oil. Yield = 85% (188 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 7.13 (br s, 4H), 2.87-2.71 (m, 10H), 2.70-2.61 (m, 2H), 2.36 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 137.2, 135.5, 129.1, 128.6, 61.4, 55.0, 32.7, 28.1, 21.1. HRMS (ESI) calcd. for $C_{13}H_{19}NS$ $[M+H]^+$: 222.1311, found: 222.1308



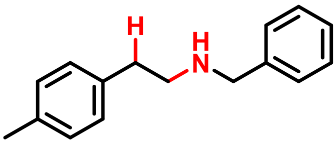
N-(4-methylphenethyl)diethylamine, 29

Yellow oil Yield = 54% (103 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 7.12 (br s, 4H), 2.78-2.68 (m, 4H), 2.64 (q, J = 7.2 Hz, 4H), 2.35 (s, 3H), 1.09 (t, J = 7.2 Hz, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 137.7, 135.4, 129.1, 128.6, 55.1, 46.9, 32.9, 21.0, 11.8. The data matched what was reported in literature.[16]



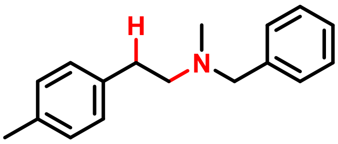
N-(4-methylphenethyl)ethylenediamine, 30

Yellow oil. Yield = 62% (111 mg). ^1H NMR ($CDCl_3$, 400 MHz) δ 7.12 (br s, 4H), 2.89 (t, J = 6.8 Hz, 2H), 2.79 (q, J = 5.8 Hz, 4H), 2.70 (t, J = 5.9 Hz, 2H), 2.34 (s, 3H), 1.43 (br s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 137.0, 135.6, 129.2, 128.6, 52.5, 51.2, 41.8, 36.0, 21.0. HRMS (ESI) calcd. for $C_{11}H_{18}N_2$ $[M + CO + H]^+$: 207.1492, found: 207.1486



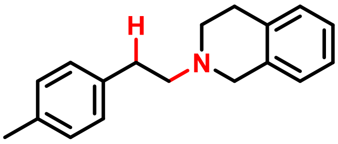
N-(4-methylphenethyl)benzylamine, 31

Yellow oil. Yield = 26% (59 mg). ^{1}H NMR ($CDCl_3$, 400 MHz) δ 7.37-7.23 (m, 5H), 7.12 (br s, 4H), 3.84 (s, 2H), 3.00-2.75 (m, 4H), 2.34 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 139.9, 136.7, 135.7, 129.2, 128.7, 128.4, 128.2, 127.0, 53.7, 50.5, 35.7, 21.0. The date matched what was reported in literature.[5]



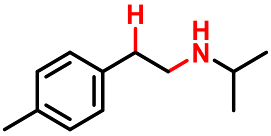
N-(4-methylphenethyl)-N-methylbenzylamine, 32

Yellow oil. Yield = 68% (163 mg).^{1}H NMR ($CDCl_3$, 400 MHz) δ 7.38-7.27 (m, 5H), 7.14 (br s, 4H), 3.61 (s, 2H), 2.91-2.81 (m, 2H), 2.74-2.65 (m, 2H), 2.37 (s, 3H), 2.33 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 139.1, 137.5, 135.4, 129.07, 129.05, 128.7, 128.3, 127.0, 62.2, 59.4, 42.2, 33.5, 21.1. The date matched what was reported in literature.[3]



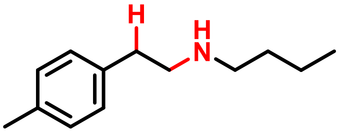
N-(4-methylphenethyl)-1,2,3,4-tetrahydroisoquinoline, 33

Yellow oil. Yield = 40% (101 mg). ^{1}H NMR ($CDCl_3$, 400 MHz) δ 7.25-7.14 (m, 7H), 7.14-7.04 (m, 1H), 3.78 (s, 2H), 3.04-2.91 (m, 4H), 2.91-2.77 (m, 4H), 2.39 (s, 3H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 137.3, 135.6, 134.8, 134.3, 129.2, 128.71, 128.67, 126.7, 126.2, 125.7, 60.5, 56.2, 51. 1, 33.6, 29.2, 21.1. HRMS (ESI) calcd. for $C_{18}H_{21}N$ $[M + H]^+$: 252.1747, found: 252.1739



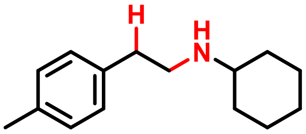
N-(4-methylphenethyl)isopropylamine, 34

Yellow oil. Yield = 27% (48 mg). ^{1}H NMR ($CDCl_3$, 400 MHz) δ 7.13 (br s, 4H), 2.96-2.79 (m, 5H), 2.50 (br s, 1H), 2.34 (s, 3H), 1.11 (d, J = 6.3 Hz, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 136.6, 135.7, 129.2, 128.6, 48.7, 48.6, 35.6, 22.5, 21.0. HRMS (ESI) calcd. for $C_{12}H_{19}N$ $[M + H]^+$: 178.1590, found: 178.1563



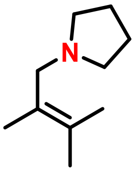
N-(4-methylphenethyl)butylamine, 35

Yellow oil. Yield = 52% (100 mg). ^{1}H NMR ($CDCl_3$, 400 MHz) δ 7.12 (br s, 4H), 2.96-2.77 (m, 4H), 2.66 (t, J = 7.3, 2H), 2.34 (s, 3H), 1.57-1.43 (m, 2H), 1.38-1.27 (m, 3H), 0.92 (t, J = 7.2 Hz, 6H); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 136.8, 135.7, 129.2, 128.6, 51.1, 49.4, 35.6, 31.9, 21.0, 20.5, 14.0. HRMS (ESI) calcd. for $C_{13}H_{21}N$ $[M + H]^+$: 192.1747, found: 192.1741



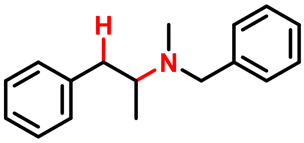
N-(4-methylphenethyl)cyclohexylamine, 36

Yellow oil. Yield = 27% (59 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.12 (br s, 4H), 2.98-2.89 (m, 2H), 2.89-2.80 (m, 2H), 2.58-2.46 (m, 1H), 2.34 (s, 3H), 1.93 (d, J = 11.9 Hz, 2H), 1.81-1.70 (m, 2H), 1.64 (d, J = 11.4 Hz, 1H), 1.34-1.08 (m, 6H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 136.6, 135.7, 129.2, 128.6, 56.8, 48.0, 35.6, 32.9, 26.0, 25.0, 21.0. HRMS (ESI) calcd. for $C_{15}H_{23}N$ [M + H]$^+$: 218.1909, found: 218.1899



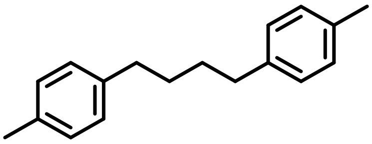
1-(2,3-Dimethyl-2-buten-1-yl)pyrrolidine, 37

Colorless oil. Yield = 46% (71 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 3.06 (s, 2H), 2.55-2.40 (m, 4H), 1.81-1.65 (m, 13 H). The data matched what was reported in literature.[17]



Benzphetamine, 38

White solid. Yield = 64% (153 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.43-7.19 (m, 10H), 3.69 (q, J = 11.3 Hz, 2H), 3.16-3.01 (m, 2H), 2.58 (q, J = 8.3 Hz, 1H), 2.33 (s, 3H), 1.09 (d, J = 6.4 Hz, 3H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 140.9, 140.2, 129.3, 129.1, 128.7, 128.2, 126.8, 125.8, 59.9, 57.8, 39.5, 36.9, 14.1. The data matched what was reported in literature.[18]



1,4-di-p-tolylbutane, 39

White solid. Yield = 88% (210 mg). ^{1}H NMR (CDCl$_3$, 400 MHz) δ 7.16-7.05 (m, 8H), 2.62 (t, J = 6.9 Hz, 4H), 2.34 (s, 6H), 1.67 (quin, J = 3.7 Hz, 4H); ^{13}C NMR (CDCl$_3$, 100 MHz) δ 139.6, 135.0, 128.9, 128.3, 35.4, 31.3, 21.0. The data matched what was reported in literature.[19]

Bibliography

(1) de los Reyes, C. A.; Smith McWilliams, A. D.; Hernández, K.; Walz-Mitra, K. L.; Ergülen, S.; Pasquali, M.; Martí, A. A. Adverse Effect of PTFE Stir Bars on the Covalent Functionalization of Carbon and Boron Nitride Nanotubes Using Billups–Birch Reduction Conditions. *ACS Omega* **2019**, *4* (3), 5098–5106. https://doi.org/10.1021/acsomega.8b03677.

(2) Williams, A. W.; Gilmore, K. M. Transition-Metal Free Amination and Hydrodefluorination of Aryl Fluorides Promoted by Solvated Electrons. *Chem. Eur. J.* **2024**, *30* (70), e202403410.

(3) Germain, S.; Schulz, E.; Hannedouche, J. Anti-Markovnikov Hydroamination of Aromatic Alkenes with Secondary Amines Catalyzed by Easily Accessible Yttrium Complexes. *ChemCatChem* **2014**, *6* (7), 2065–2073. https://doi.org/10.1002/cctc.201402012.

(4) Taylor, N. J.; Emer, E.; Preshlock, S.; Schedler, M.; Tredwell, M.; Verhoog, S.; Mercier, J.; Genicot, C.; Gouverneur, V. Derisking the Cu-Mediated 18F-Fluorination of Heterocyclic Positron Emission Tomography Radioligands. *J. Am. Chem. Soc.* **2017**, *139* (24), 8267–8276. https://doi.org/10.1021/jacs.7b03131.

(5) Barrett, A. G.; Brinkmann, C.; Crimmin, M. R.; Hill, M. S.; Hunt, P.; Procopiou, P. A. Heavier Group 2 Metals and Intermolecular Hydroamination: A Computational and Synthetic Assessment. *J. Am. Chem. Soc.* **2009**, *131* (36), 12906–12907.

(6) Banister, S. D.; Rendina, L. M.; Kassiou, M. 7-Azabicyclo[2.2.1]Heptane as a Scaffold for the Development of Selective Sigma-2 (Σ2) Receptor Ligands. *Bioorg. Med. Chem. Lett.* **2012**, *22* (12), 4059–4063. https://doi.org/10.1016/j.bmcl.2012.04.077.

(7) Harrison, W.; Jiang, G.; Zhang, Z.; Li, M.; Chen, H.; Zhao, H. Photoenzymatic Asymmetric Hydroamination for Chiral Alkyl Amine Synthesis. *J. Am. Chem. Soc.* **2024**, *146* (15), 10716–10722. https://doi.org/10.1021/jacs.4c00620.

(8) Song, Q.; Wang, S.; Lei, X.; Liu, Y.; Wen, X.; Wang, Z. One-Pot Route from Halogenated Amides to Piperidines and Pyrrolidines. *Molecules* **2022**, *27* (15), 4698. https://doi.org/10.3390/molecules27154698.

(9) Orejarena Pacheco, J. C.; Lipp, A.; Nauth, A. M.; Acke, F.; Dietz, J.-P.; Opatz, T. A Highly Active System for the Metal-Free Aerobic Photocyanation of Tertiary Amines with Visible Light: Application to the Synthesis of Tetraponerines and Crispine A. *Chem. – Eur. J.* **2016**, *22* (15), 5409–5415. https://doi.org/10.1002/chem.201504845.

(10) Zhang, X.-Y.; Zhai, D.-D.; Liu, Y.-F.; Guan, B.-T. A Potassium Magnesiate Complex: Synthesis, Structure and Catalytic Intermolecular Hydroamination of Styrenes. *J. Organomet. Chem.* **2022**, *961*, 122254. https://doi.org/10.1016/j.jorganchem.2022.122254.

(11) Alunni, S.; Tijskens, P. *Study on the Effect of the Structure of the Leaving Group in the E1cb Mechanism of Base-Promoted .beta.-Elimination Reactions from N-[2-(p-Nitrophenyl)ethyl]alkylammonium Ions*. ACS Publications. https://doi.org/10.1021/jo00131a011.

(12) Matviiuk, T.; Menendez, C.; Carayon, C.; Saffon, N.; Voitenko, Z.; Lherbet, C.; Baltas, M. LiAlH4-Promoted Tandem Reduction/Oxidation of Fluorenyl Derivatives under Air. *Eur. J. Org. Chem.* **2014**, *2014* (29), 6538–6546. https://doi.org/10.1002/ejoc.201402642.

(13) Hamid, M. H. S. A.; Allen, C. L.; Lamb, G. W.; Maxwell, A. C.; Maytum, H. C.; Watson, A. J. A.; Williams, J. M. J. Ruthenium-Catalyzed N-Alkylation of Amines and Sulfonamides

Using Borrowing Hydrogen Methodology. *J. Am. Chem. Soc.* **2009**, *131* (5), 1766–1774. https://doi.org/10.1021/ja807323a.

(14) Mulks, F. F.; Bole, L. J.; Davin, L.; Hernán-Gómez, A.; Kennedy, A.; García-Álvarez, J.; Hevia, E. Ambient Moisture Accelerates Hydroamination Reactions of Vinylarenes with Alkali-Metal Amides under Air. *Angew. Chem. Int. Ed.* **2020**, *59* (43), 19021–19026. https://doi.org/10.1002/anie.202008512.

(15) Otsuka, M.; Yokoyama, H.; Endo, K.; Shibata, T. Ru-Catalyzed β-Selective and Enantioselective Addition of Amines to Styrenes Initiated by Direct Arene-Exchange. *Org. Biomol. Chem.* **2012**, *10* (19), 3815–3818. https://doi.org/10.1039/C2OB25457C.

(16) Sakae, R.; Hirano, K.; Satoh, T.; Miura, M. Formal Anti-Markovnikov Hydroamination of Terminal Aryl Alkynes with Pinacolborane and Hydroxylamines via Zr/Cu Sequential Catalysis. *Chem. Lett.* **2013**, *42* (10), 1128–1130. https://doi.org/10.1246/cl.130485.

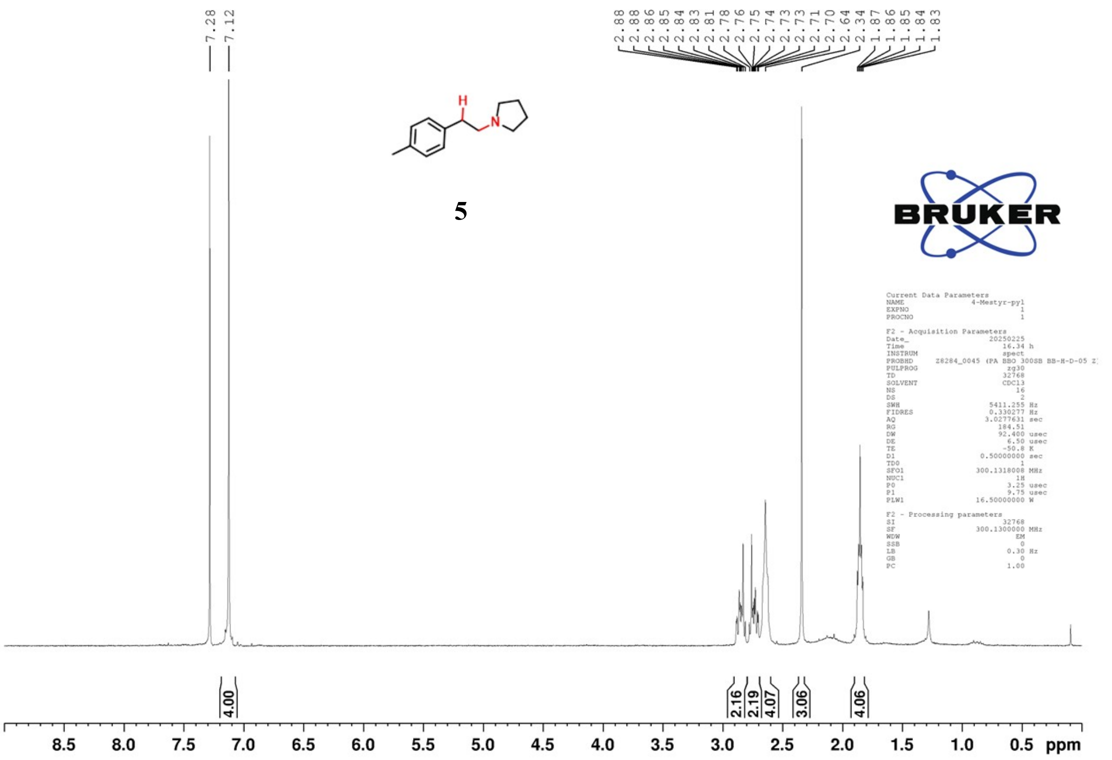
(17) Kuchenbeiser, G.; Shaffer, A. R.; Zingales, N. C.; Beck, J. F.; Schmidt, J. A. R. Palladium(II) 3-Iminophosphine (3IP) Complexes: Active Precatalysts for the Intermolecular Hydroamination of 1,2-Dienes (Allenes) and 1,3-Dienes with Aliphatic Amines under Mild Conditions. *J. Organomet. Chem.* **2011**, *696* (1), 179–187. https://doi.org/10.1016/j.jorganchem.2010.08.033.

(18) Ma, Y.; Gao, S.-S.; Li, X.; Wu, J.; Bao, J.; Wang, L.; Cui, C. Engineered Imine Reductase Catalyzed Enantiodivergent Synthesis of Alkylated Amphetamines. *Org. Lett.* **2024**, *26* (36), 7565–7570. https://doi.org/10.1021/acs.orglett.4c02600.

(19) Gevorgyan, A.; Mkrtchyan, S.; Grigoryan, T.; Iaroshenko, V. O. Application of Silicon-Initiated Water Splitting for the Reduction of Organic Substrates. *ChemPlusChem* **2018**, *83* (5), 375–382. https://doi.org/10.1002/cplu.201800131.

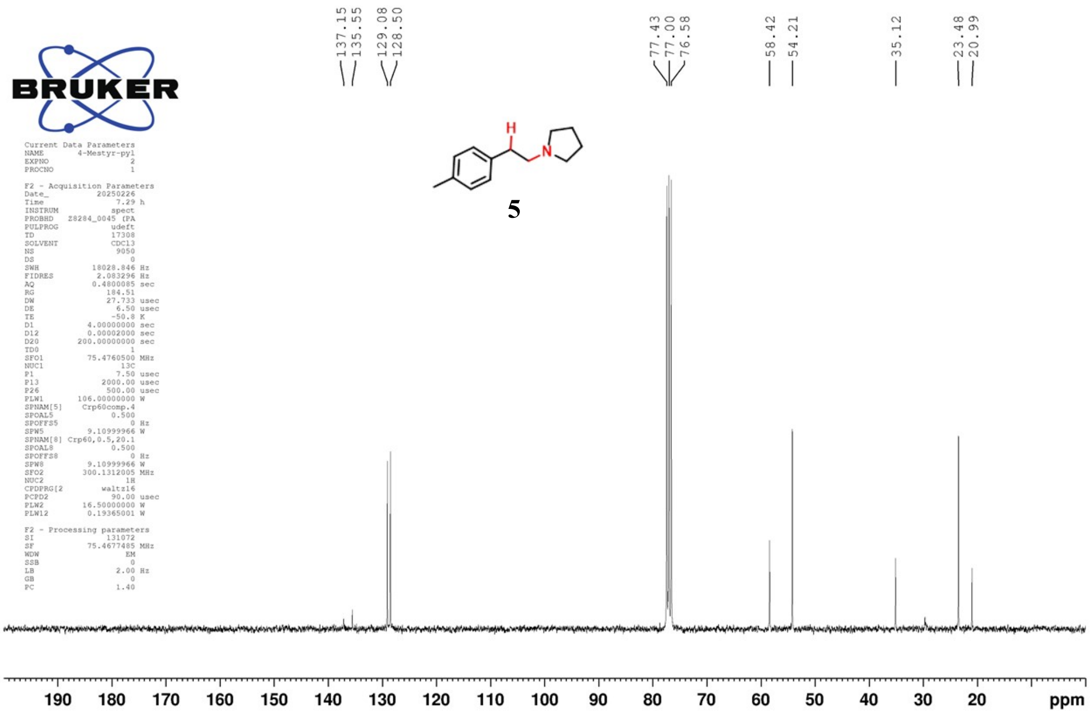
^{1}H and ^{13}C NMR Spectra

N-(2-(4-methylphenyl)ethyl)pyrrolidine



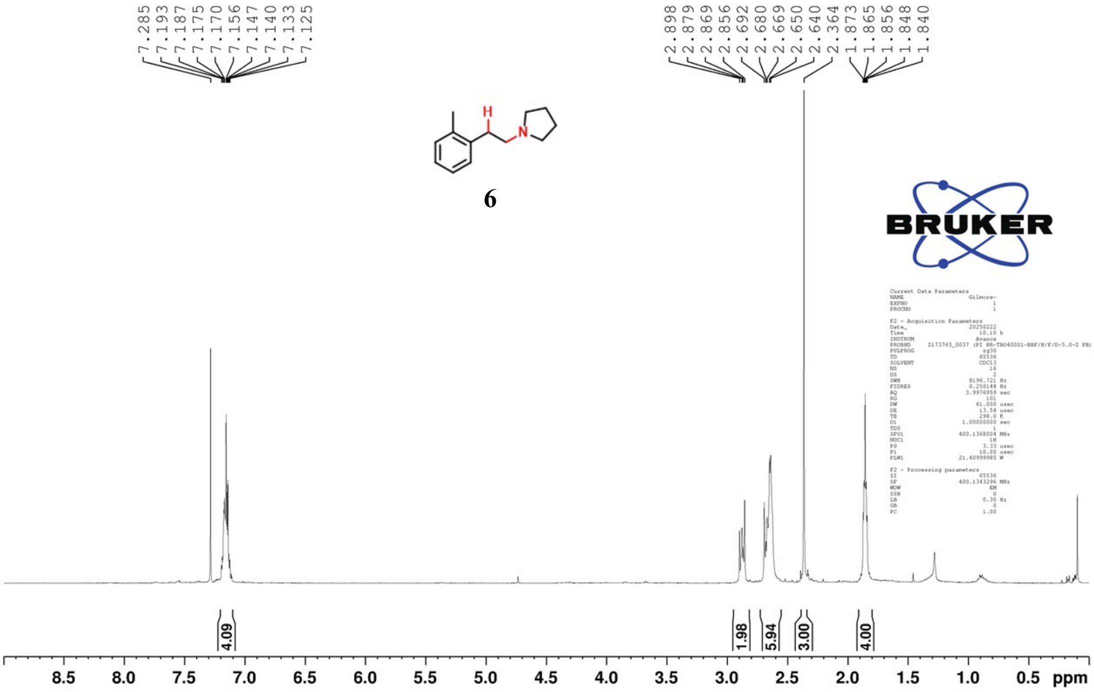
5

N-(2-(4-methylphenyl)ethyl)pyrrolidine

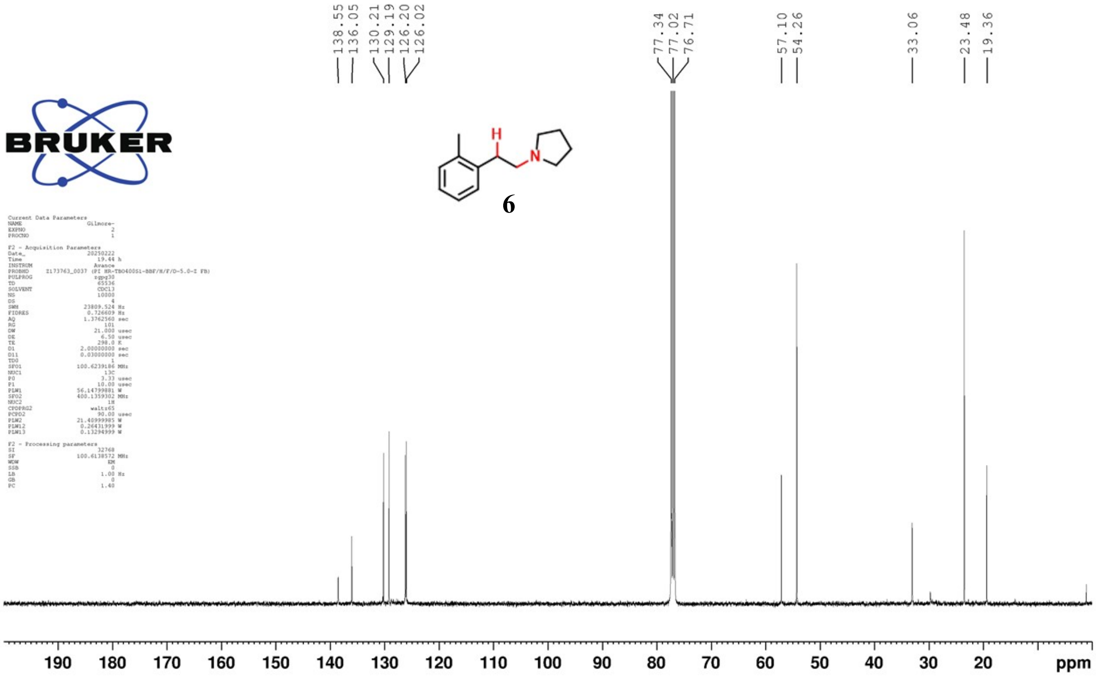


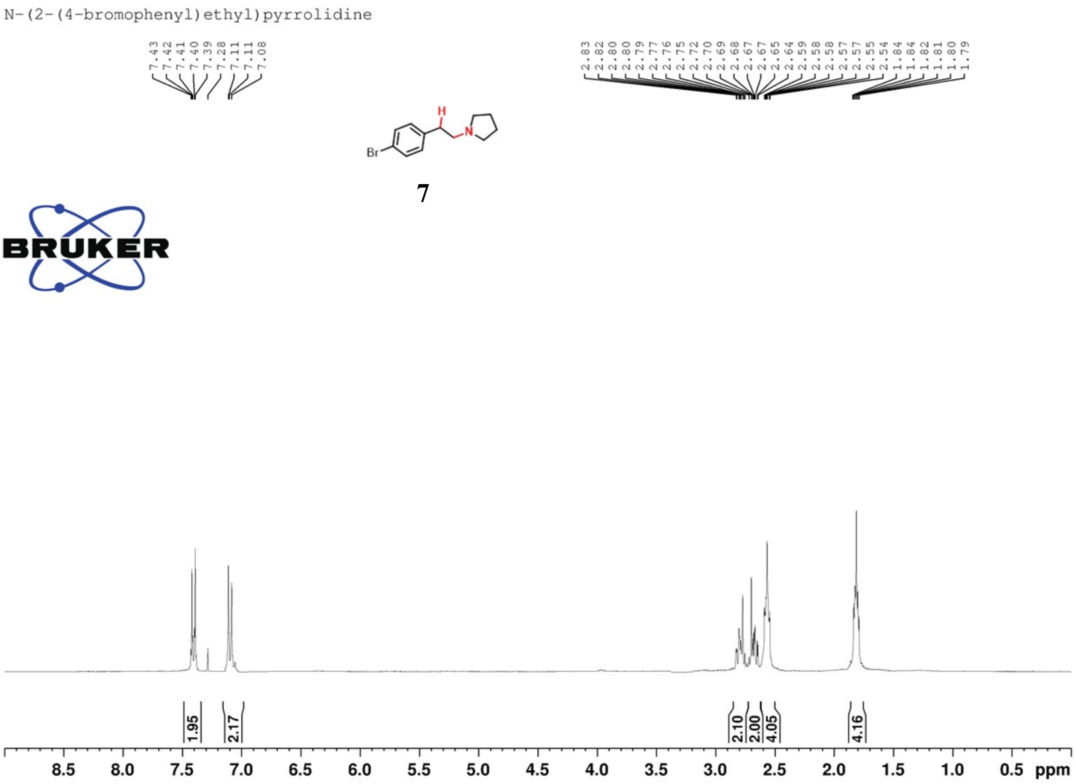
5

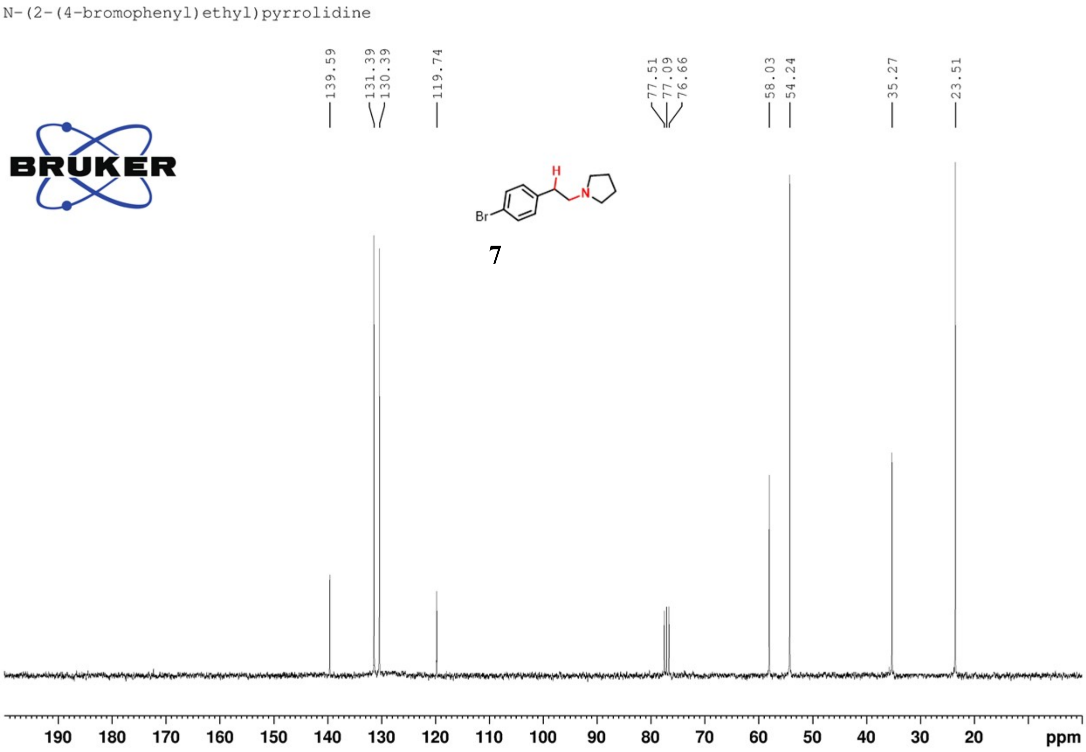
N-(2-(2-methylphenyl)ethyl)pyrrolidine


6

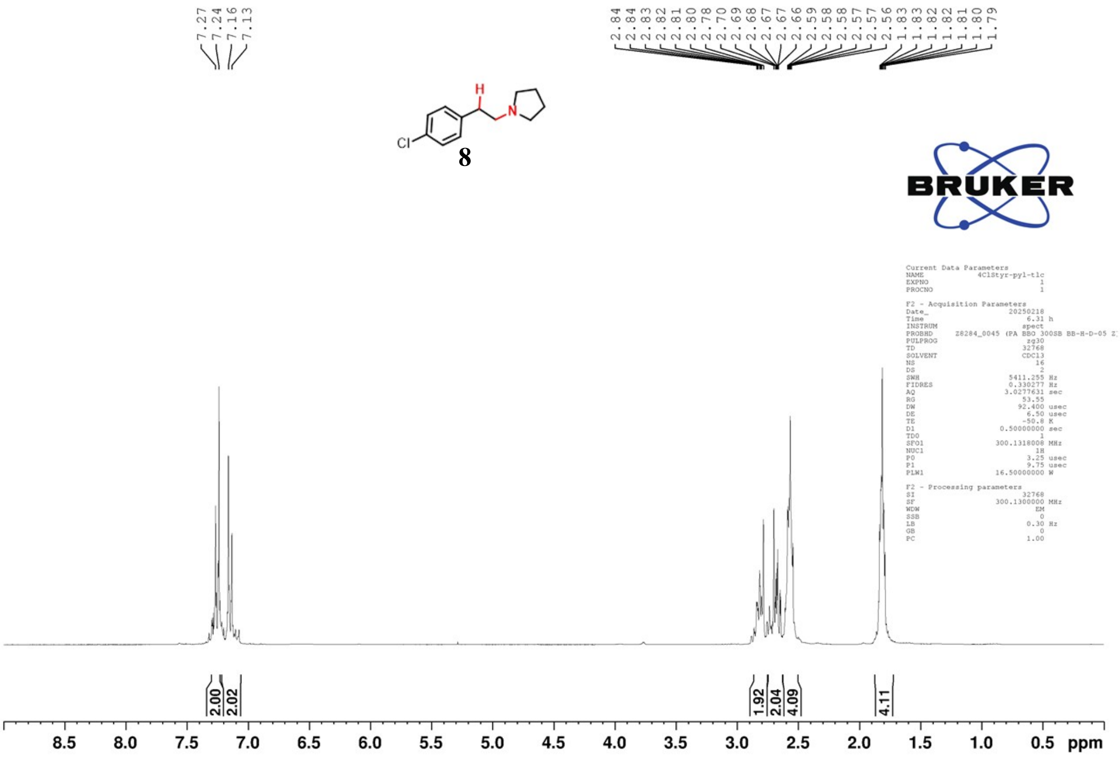
N-(2-(2-methylphenyl)ethyl)pyrrolidine


6


N-(2-(4-bromophenyl)ethyl)pyrrolidine
7.43
7.42
7.41
7.40
7.39
7.28
7.11
7.11
7.08
2.83
2.82
2.80
2.79
2.77
2.76
2.75
2.72
2.70
2.69
2.68
2.67
2.67
2.65
2.64
2.59
2.58
2.58
2.57
2.57
2.55
2.54
1.84
1.82
1.81
1.80
1.79
H
N
Br
7
BRUKER
1.95
2.17
2.10
2.00
4.05
4.16
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm

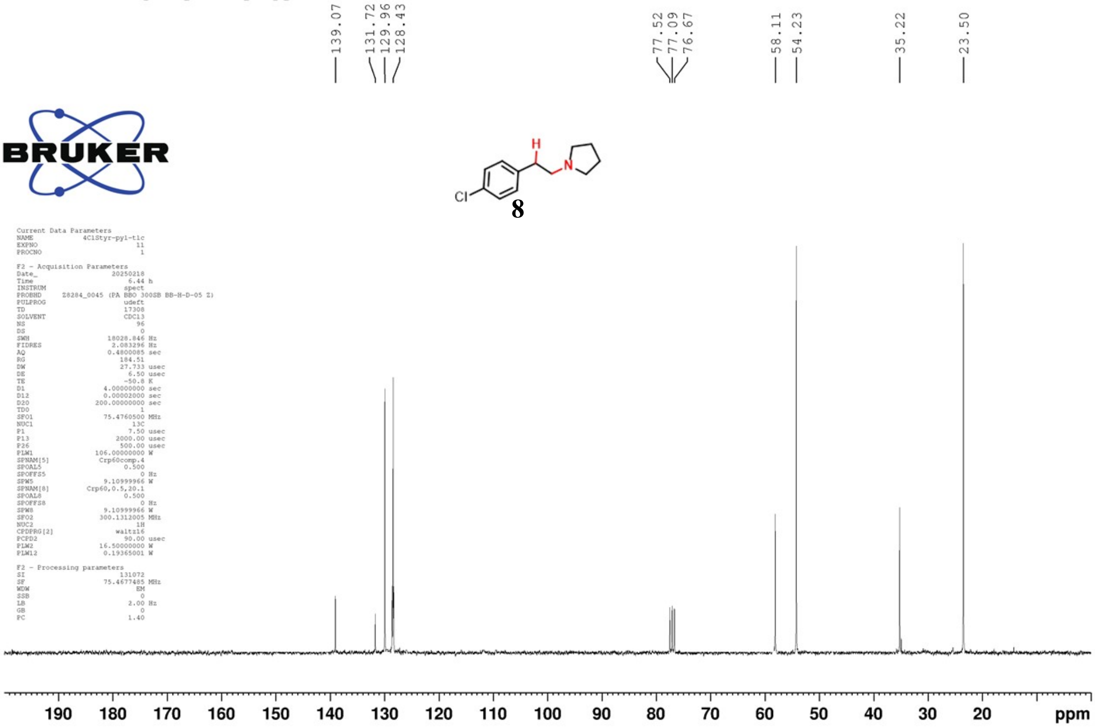

N-(2-(4-bromophenyl)ethyl)pyrrolidine
139.59
131.39
130.39
119.74
77.51
77.09
76.66
58.03
54.24
35.27
23.51
BRUKER
H
N
Br
7
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm

N-(2-(4-chlorophenyl)ethyl)pyrrolidine



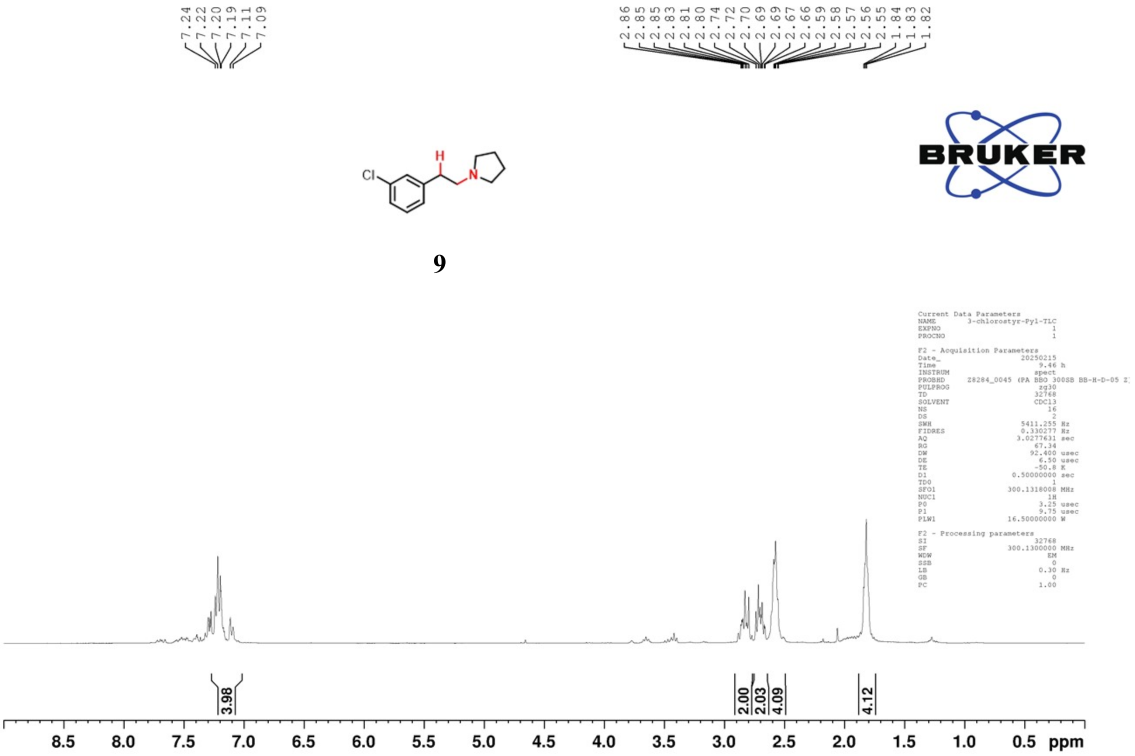
```
Current Data Parameters
NAME             4ClStyr-pyl-tlc
EXPNO                          1
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250218
Time                      6.31 h
INSTRUM                    spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                     zg30
TD                         32768
SOLVENT                    CDCl3
NS                            16
DS                             2
SWH                     5411.255 Hz
FIDRES                  0.330277 Hz
AQ                     3.0277631 sec
RG                         53.55
DW                        92.400 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    0.50000000 sec
TD0                            1
SFO1                 300.1318008 MHz
NUC1                          1H
P0                          3.25 usec
P1                          9.75 usec
PLW1                 16.50000000 W

F2 - Processing parameters
SI                         32768
SF                   300.1300000 MHz
WDW                           EM
SSB                            0
LB                          0.30 Hz
GB                             0
PC                          1.00
```

N-(2-(4-chlorophenyl)ethyl)pyrrolidine



```
Current Data Parameters
NAME             4ClStyr-pyl-tlc
EXPNO                         11
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250218
Time                      6.44 h
INSTRUM                    spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                    udeft
TD                         17308
SOLVENT                    CDCl3
NS                            96
DS                             0
SWH                    18028.846 Hz
FIDRES                  2.083296 Hz
AQ                     0.4800085 sec
RG                        184.51
DW                        27.733 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    4.00000000 sec
D12                   0.00002000 sec
D20                 200.00000000 sec
TD0                            1
SFO1                  75.4760500 MHz
NUC1                         13C
P1                          7.50 usec
P13                      2000.00 usec
P26                       500.00 usec
PLW1                106.00000000 W
SPNAM[5]             Crp60comp.4
SPOAL5                     0.500
SPOFFS5                        0 Hz
SPW5                  9.10999966 W
SPNAM[8]          Crp60,0.5,20.1
SPOAL8                     0.500
SPOFFS8                        0 Hz
SPW8                  9.10999966 W
SFO2                 300.1312005 MHz
NUC2                          1H
CPDPRG[2]                waltz16
PCPD2                      90.00 usec
PLW2                 16.50000000 W
PLW12                 0.19365001 W

F2 - Processing parameters
SI                        131072
SF                    75.4677485 MHz
WDW                           EM
SSB                            0
LB                          2.00 Hz
GB                             0
PC                          1.40
```

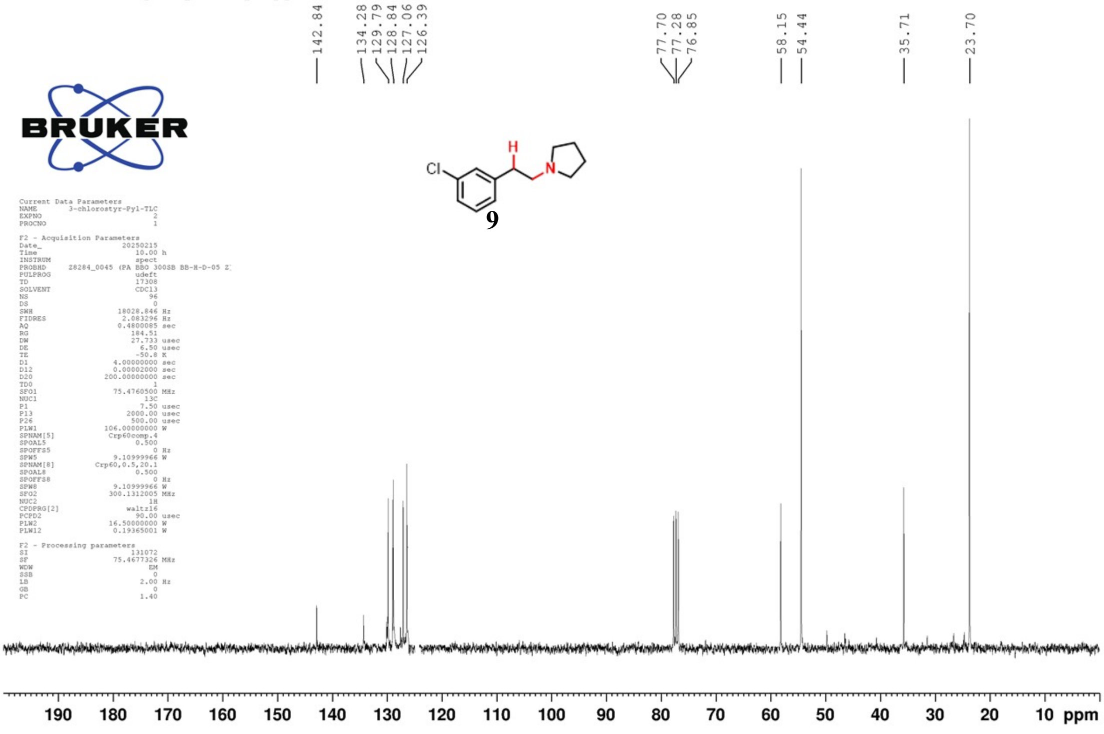
N-(2-(3-chlorophenyl)ethyl)pyrrolidine



9

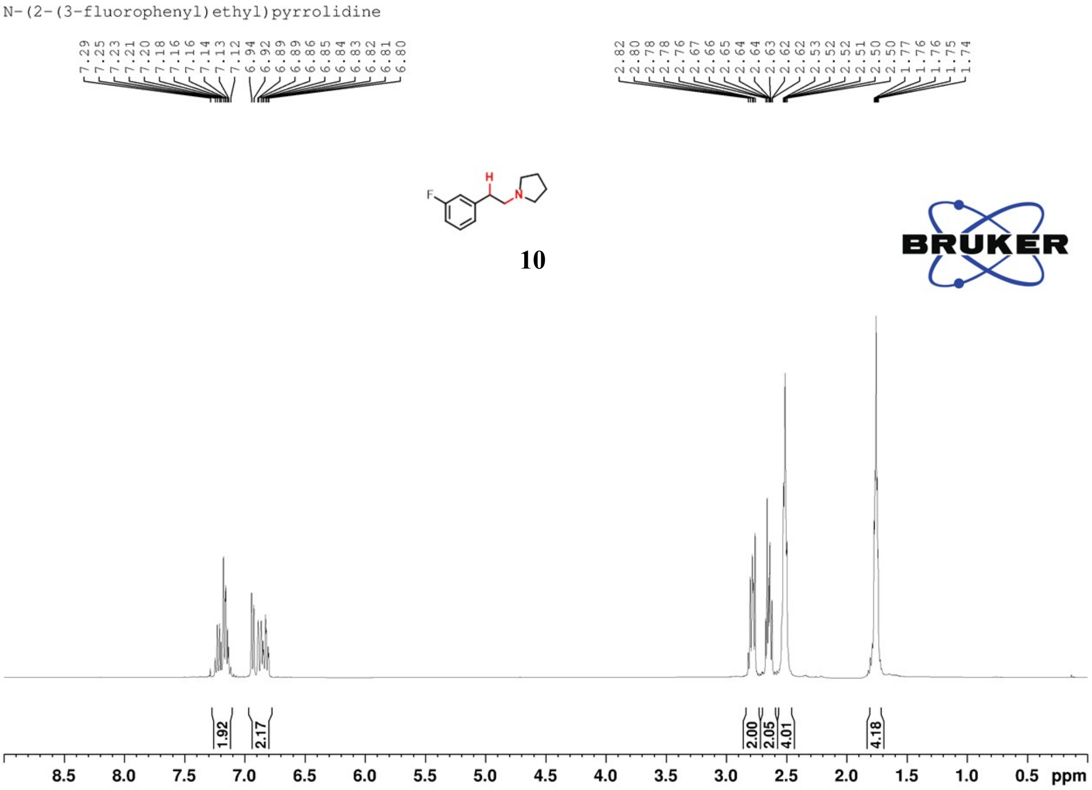
```
Current Data Parameters
NAME        3-chlorostyr-Pyl-TLC
EXPNO                          1
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250215
Time                      9.46 h
INSTRUM                    spect
PROBHD      Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                     zg30
TD                         32768
SOLVENT                    CDCl3
NS                            16
DS                             2
SWH                     5411.255 Hz
FIDRES                  0.330277 Hz
AQ                     3.0277631 sec
RG                         67.34
DW                        92.400 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    0.50000000 sec
TD0                            1
SFO1                 300.1318008 MHz
NUC1                          1H
P0                          3.25 usec
P1                          9.75 usec
PLW1                 16.50000000 W

F2 - Processing parameters
SI                         32768
SF                   300.1300000 MHz
WDW                           EM
SSB                            0
LB                          0.30 Hz
GB                             0
PC                          1.00
```

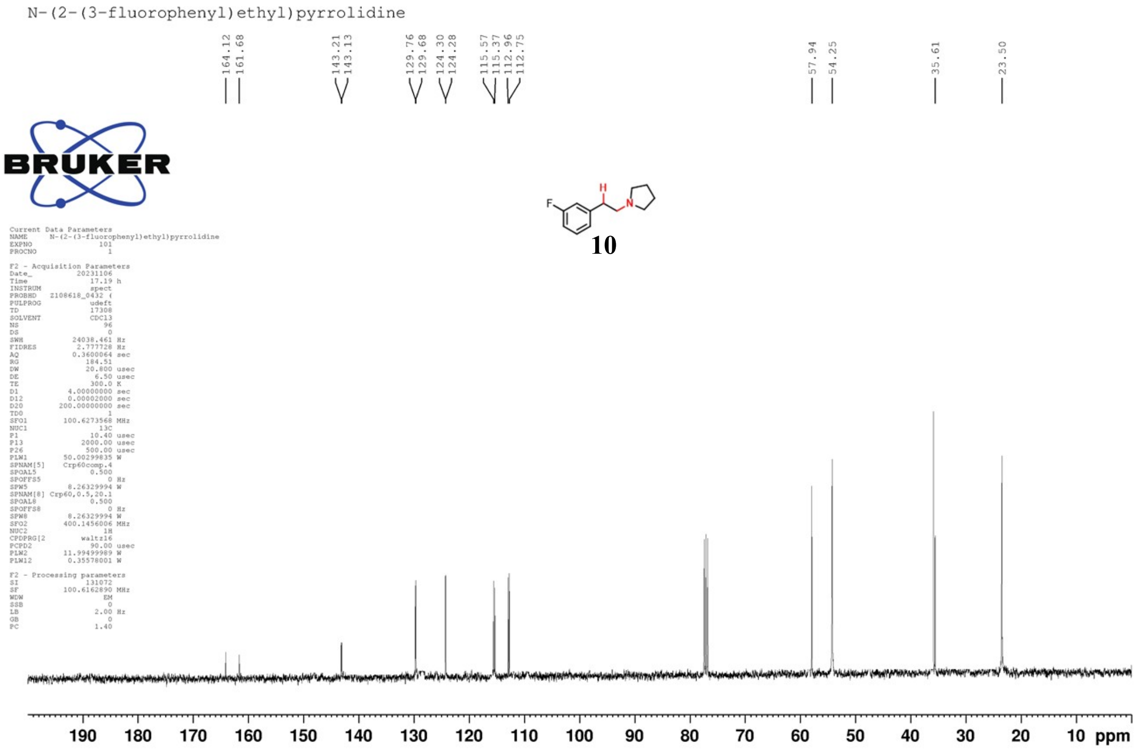
N-(2-(3-chlorophenyl)ethyl)pyrrolidine



9

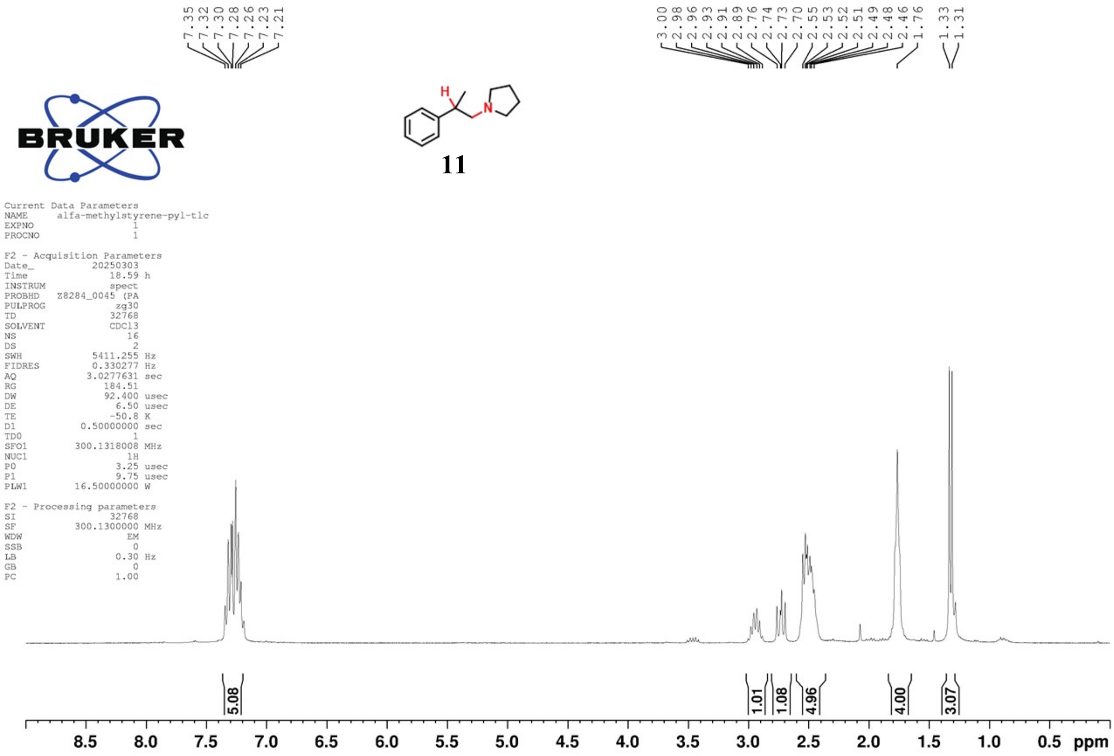
```
Current Data Parameters
NAME        3-chlorostyr-Pyl-TLC
EXPNO                          2
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250215
Time                     10.00 h
INSTRUM                    spect
PROBHD      Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                    udeft
TD                         17308
SOLVENT                    CDCl3
NS                            96
DS                             0
SWH                    18028.846 Hz
FIDRES                  2.083296 Hz
AQ                     0.4800085 sec
RG                        184.51
DW                        27.733 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    4.00000000 sec
D12                   0.00002000 sec
D20                 200.00000000 sec
TD0                            1
SFO1                  75.4760500 MHz
NUC1                         13C
P1                          7.50 usec
P13                      2000.00 usec
P26                       500.00 usec
PLW1                106.00000000 W
SPNAM[5]             Crp60comp.4
SPOAL5                     0.500
SPOFFS5                        0 Hz
SPW5                  9.10999966 W
SPNAM[8]          Crp60,0.5,20.1
SPOAL8                     0.500
SPOFFS8                        0 Hz
SPW8                  9.10999966 W
SFO2                 300.1312005 MHz
NUC2                          1H
CPDPRG[2]               waltz16
PCPD2                      90.00 usec
PLW2                 16.50000000 W
PLW12                 0.19365001 W

F2 - Processing parameters
SI                        131072
SF                    75.4677326 MHz
WDW                           EM
SSB                            0
LB                          2.00 Hz
GB                             0
PC                          1.40
```





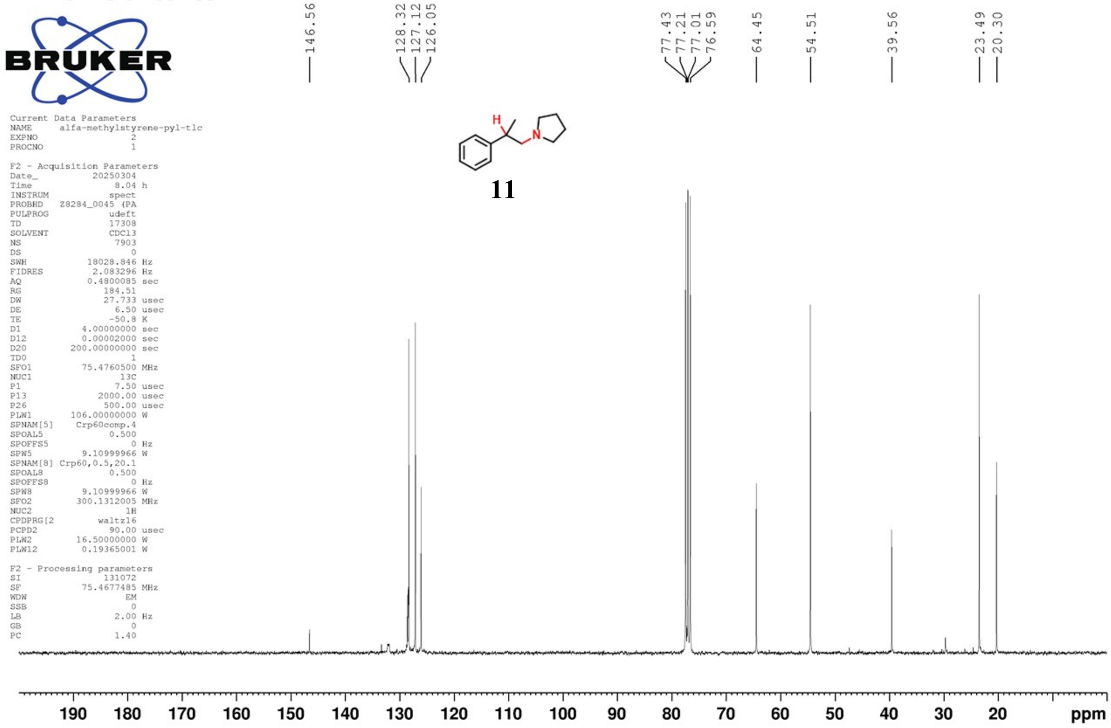
```
Current Data Parameters
NAME     N-(2-(3-fluorophenyl)ethyl)pyrrolidine
EXPNO              101
PROCNO               1

F2 - Acquisition Parameters
Date_          20231106
Time              17.19 h
INSTRUM           spect
PROBHD   Z108618_0432 (
PULPROG           udeft
TD                17308
SOLVENT           CDCl3
NS                   96
DS                    0
SWH           24038.461 Hz
FIDRES         2.777728 Hz
AQ            0.3600064 sec
RG               184.51
DW               20.800 usec
DE                 6.50 usec
TE                300.0 K
D1           4.00000000 sec
D12          0.00002000 sec
D20        200.00000000 sec
TD0                   1
SFO1        100.6273568 MHz
NUC1                13C
P1                10.40 usec
P13             2000.00 usec
P26              500.00 usec
PLW1        50.00299835 W
SPNAM[5]    Crp60comp.4
SPOAL5            0.500
SPOFFS5               0 Hz
SPW5         8.26329994 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8            0.500
SPOFFS8               0 Hz
SPW8         8.26329994 W
SFO2        400.1456006 MHz
NUC2                 1H
CPDPRG[2        waltz16
PCPD2             90.00 usec
PLW2        11.99499989 W
PLW12        0.35578001 W

F2 - Processing parameters
SI               131072
SF          100.6162890 MHz
WDW                  EM
SSB                   0
LB                 2.00 Hz
GB                    0
PC                 1.40
```

N-(2-phenylpropyl)pyrrolidine



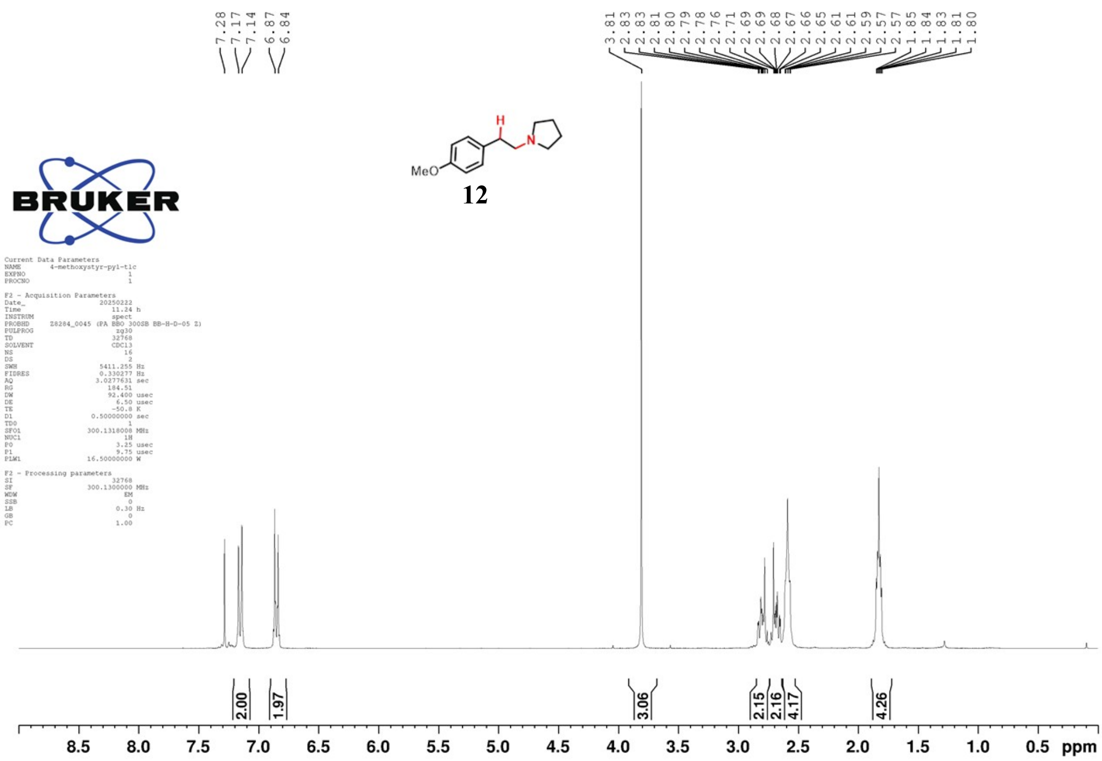
```
Current Data Parameters
NAME     alfa-methylstyrene-pyl-tlc
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_             20250303
Time                 18.59 h
INSTRUM              spect
PROBHD   Z8284_0045 (PA
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               5411.255 Hz
FIDRES            0.330277 Hz
AQ               3.0277631 sec
RG                  184.51
DW                  92.400 usec
DE                    6.50 usec
TE                   -50.8 K
D1              0.50000000 sec
TD0                      1
SFO1           300.1318008 MHz
NUC1                    1H
P0                    3.25 usec
P1                    9.75 usec
PLW1           16.50000000 W

F2 - Processing parameters
SI                   32768
SF             300.1300000 MHz
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```

N-(2-phenylpropyl)pyrrolidine



```
Current Data Parameters
NAME     alfa-methylstyrene-pyl-tlc
EXPNO                    2
PROCNO                   1

F2 - Acquisition Parameters
Date_             20250304
Time                  8.04 h
INSTRUM              spect
PROBHD   Z8284_0045 (PA
PULPROG              udeft
TD                   17308
SOLVENT              CDCl3
NS                    7903
DS                       0
SWH              18028.846 Hz
FIDRES            2.083296 Hz
AQ               0.4800085 sec
RG                  184.51
DW                  27.733 usec
DE                    6.50 usec
TE                   -50.8 K
D1              4.00000000 sec
D12             0.00002000 sec
D20           200.00000000 sec
TD0                      1
SFO1            75.4760500 MHz
NUC1                   13C
P1                    7.50 usec
P13                2000.00 usec
P26                 500.00 usec
PLW1          106.00000000 W
SPNAM[5]     Crp60comp.4
SPOAL5               0.500
SPOFFS5                  0 Hz
SPW5            9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8               0.500
SPOFFS8                  0 Hz
SPW8            9.10999966 W
SFO2           300.1312005 MHz
NUC2                    1H
CPDPRG[2           waltz16
PCPD2                90.00 usec
PLW2           16.50000000 W
PLW12           0.19365001 W

F2 - Processing parameters
SI                  131072
SF              75.4677485 MHz
WDW                     EM
SSB                      0
LB                    2.00 Hz
GB                       0
PC                    1.40
```

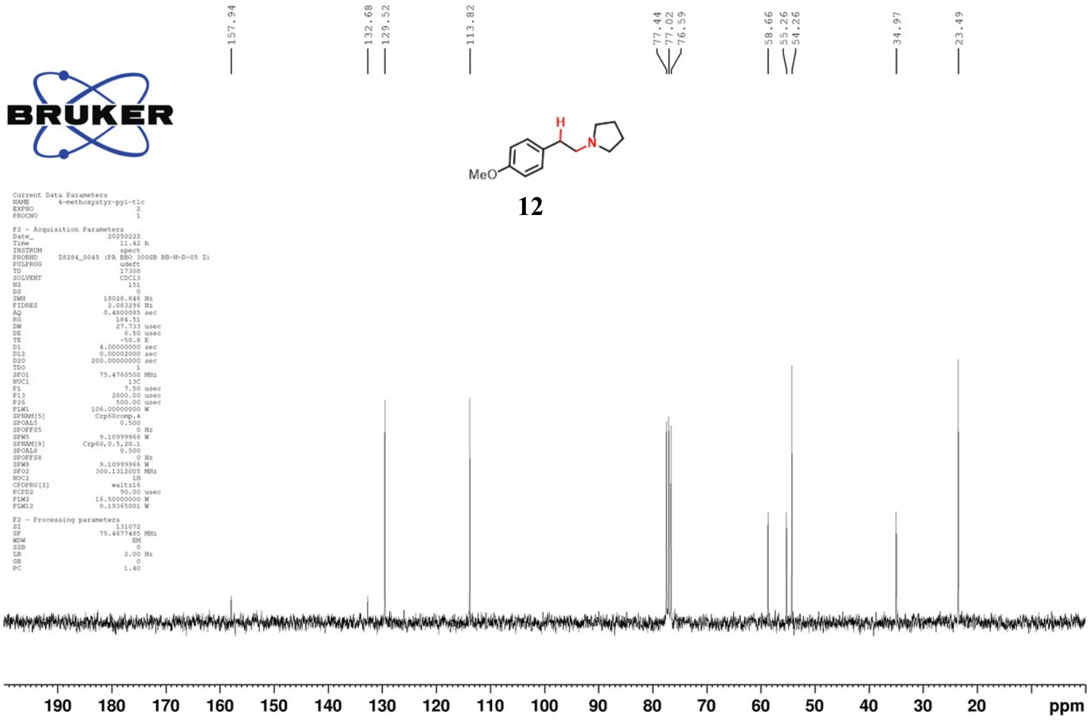
N-(2-(4-methoxyphenyl)ethyl)pyrrolidine



12

```
Current Data Parameters
NAME        4-methoxystyr-pyl-tlc
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20250222
Time                     11.24 h
INSTRUM                  spect
PROBHD      Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                   zg30
TD                       32768
SOLVENT                  CDC13
NS                          16
DS                           2
SWH                   5411.255 Hz
FIDRES                0.330277 Hz
AQ                   3.0277631 sec
RG                      184.51
DW                      92.400 usec
DE                        6.50 usec
TE                       -50.8 K
D1                  0.50000000 sec
TD0                          1
SFO1               300.1318008 MHz
NUC1                        1H
P0                        3.25 usec
P1                        9.75 usec
PLW1               16.50000000 W

F2 - Processing parameters
SI                       32768
SF                 300.1300000 MHz
WDW                         EM
SSB                          0
LB                        0.30 Hz
GB                           0
PC                        1.00
```

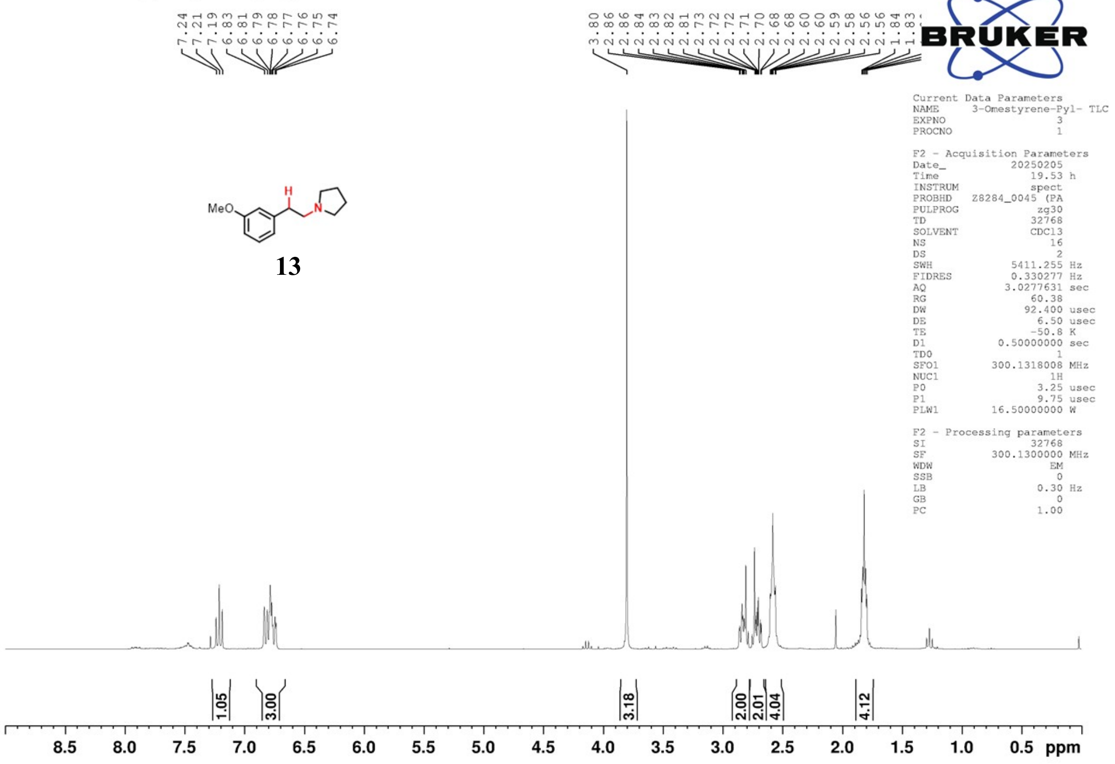
N-(2-(4-methoxyphenyl)ethyl)pyrrolidine



12

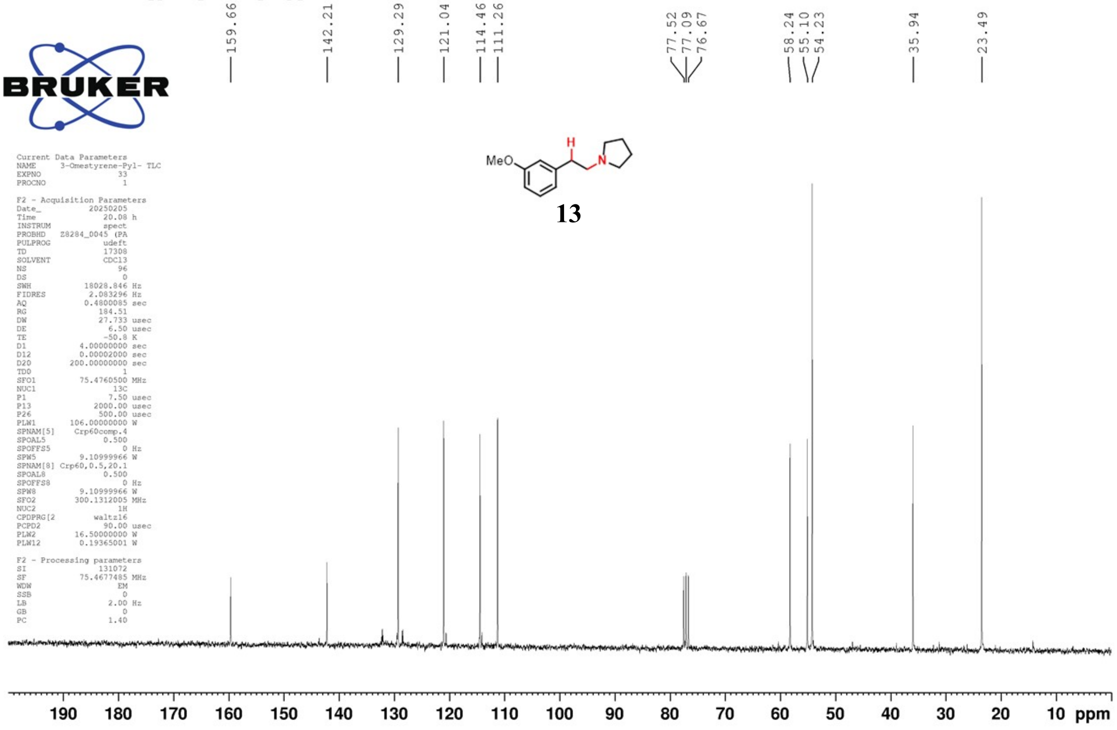
```
Current Data Parameters
NAME        4-methoxystyr-pyl-tlc
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20250222
Time                     11.42 h
INSTRUM                  spect
PROBHD      Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                  udeft
TD                       17308
SOLVENT                  CDC13
NS                         151
DS                           0
SWH                  18028.846 Hz
FIDRES                2.083296 Hz
AQ                   0.4800085 sec
RG                      184.51
DW                      27.733 usec
DE                        6.50 usec
TE                       -50.8 K
D1                  4.00000000 sec
D12                 0.00002000 sec
D20               200.00000000 sec
TD0                          1
SFO1                75.4760500 MHz
NUC1                       13C
P1                        7.50 usec
P13                    2000.00 usec
P26                     500.00 usec
PLW1              106.00000000 W
SPNAM[5]           Crp60comp.4
SPOAL5                   0.500
SPOFFS5                      0 Hz
SPW5                9.10999966 W
SPNAM[8]        Crp60,0.5,20.1
SPOAL8                   0.500
SPOFFS8                      0 Hz
SPW8                9.10999966 W
SFO2               300.1312005 MHz
NUC2                        1H
CPDPRG[2]             waltz16
PCPD2                    90.00 usec
PLW2               16.50000000 W
PLW12               0.19365001 W

F2 - Processing parameters
SI                      131072
SF                  75.4677485 MHz
WDW                         EM
SSB                          0
LB                        2.00 Hz
GB                           0
PC                        1.40
```

N-(2-(3-methoxyphenyl)ethyl)pyrrolidine



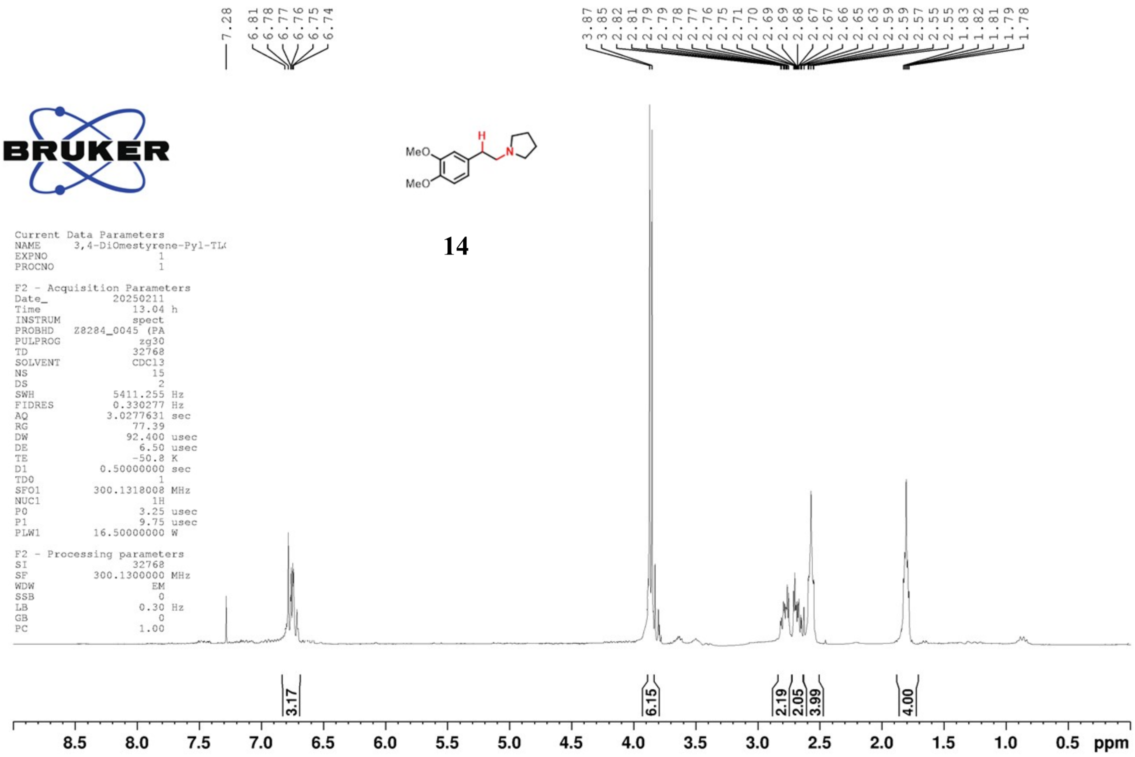
```
Current Data Parameters
NAME     3-Omestyrene-Pyl- TLC
EXPNO                        3
PROCNO                       1

F2 - Acquisition Parameters
Date_             20250205
Time                 19.53 h
INSTRUM              spect
PROBHD   Z8284_0045 (PA
PULPROG               zg30
TD                   32768
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               5411.255 Hz
FIDRES            0.330277 Hz
AQ               3.0277631 sec
RG                   60.38
DW                  92.400 usec
DE                    6.50 usec
TE                   -50.8 K
D1              0.50000000 sec
TD0                      1
SFO1           300.1318008 MHz
NUC1                    1H
P0                    3.25 usec
P1                    9.75 usec
PLW1           16.50000000 W

F2 - Processing parameters
SI                   32768
SF             300.1300000 MHz
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```

N-(2-(3-methoxyphenyl)ethyl)pyrrolidine



```
Current Data Parameters
NAME     3-Omestyrene-Pyl- TLC
EXPNO                       33
PROCNO                       1

F2 - Acquisition Parameters
Date_             20250205
Time                 20.08 h
INSTRUM              spect
PROBHD   Z8284_0045 (PA
PULPROG              udeft
TD                   17308
SOLVENT              CDCl3
NS                      96
DS                       0
SWH              18028.846 Hz
FIDRES            2.083296 Hz
AQ               0.4800085 sec
RG                  184.51
DW                  27.733 usec
DE                    6.50 usec
TE                   -50.8 K
D1              4.00000000 sec
D12             0.00002000 sec
D20           200.00000000 sec
TD0                      1
SFO1            75.4760500 MHz
NUC1                   13C
P1                    7.50 usec
P13                2000.00 usec
P26                 500.00 usec
PLW1          106.00000000 W
SPNAM[5]      Crp60comp.4
SPOAL5               0.500
SPOFFS5                  0 Hz
SPW5            9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8               0.500
SPOFFS8                  0 Hz
SPW8            9.10999966 W
SFO2           300.1312005 MHz
NUC2                    1H
CPDPRG[2           waltz16
PCPD2                90.00 usec
PLW2           16.50000000 W
PLW12           0.19365001 W

F2 - Processing parameters
SI                  131072
SF              75.4677485 MHz
WDW                     EM
SSB                      0
LB                    2.00 Hz
GB                       0
PC                    1.40
```

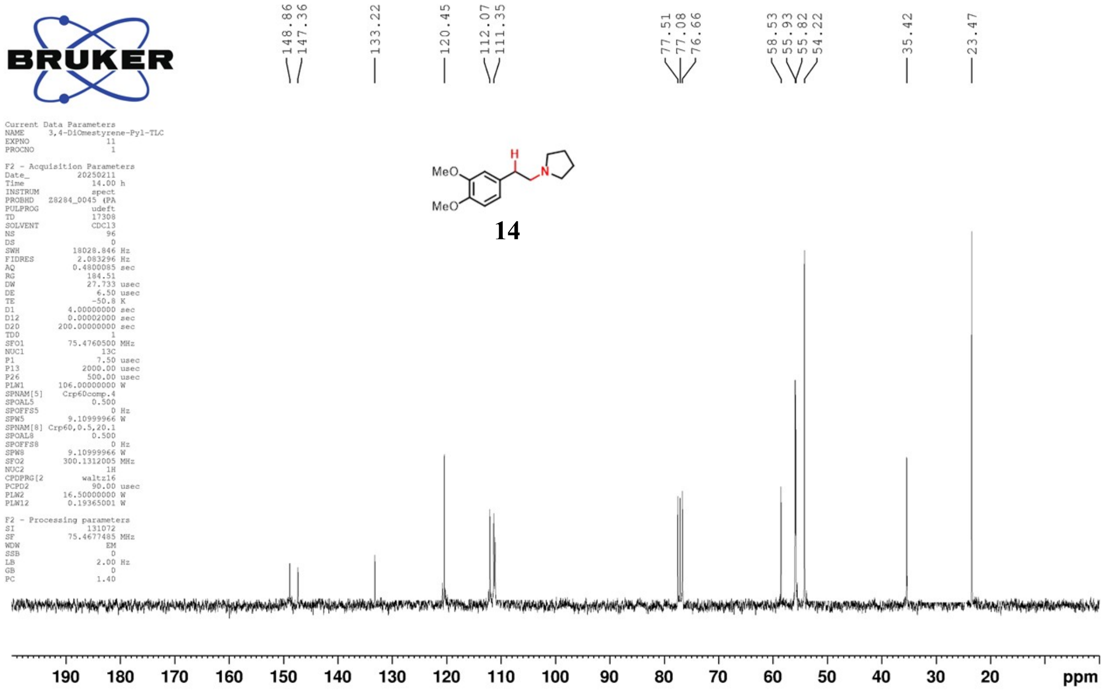
N-(2-(3,4-dimethoxyphenyl)ethyl)pyrrolidine



14

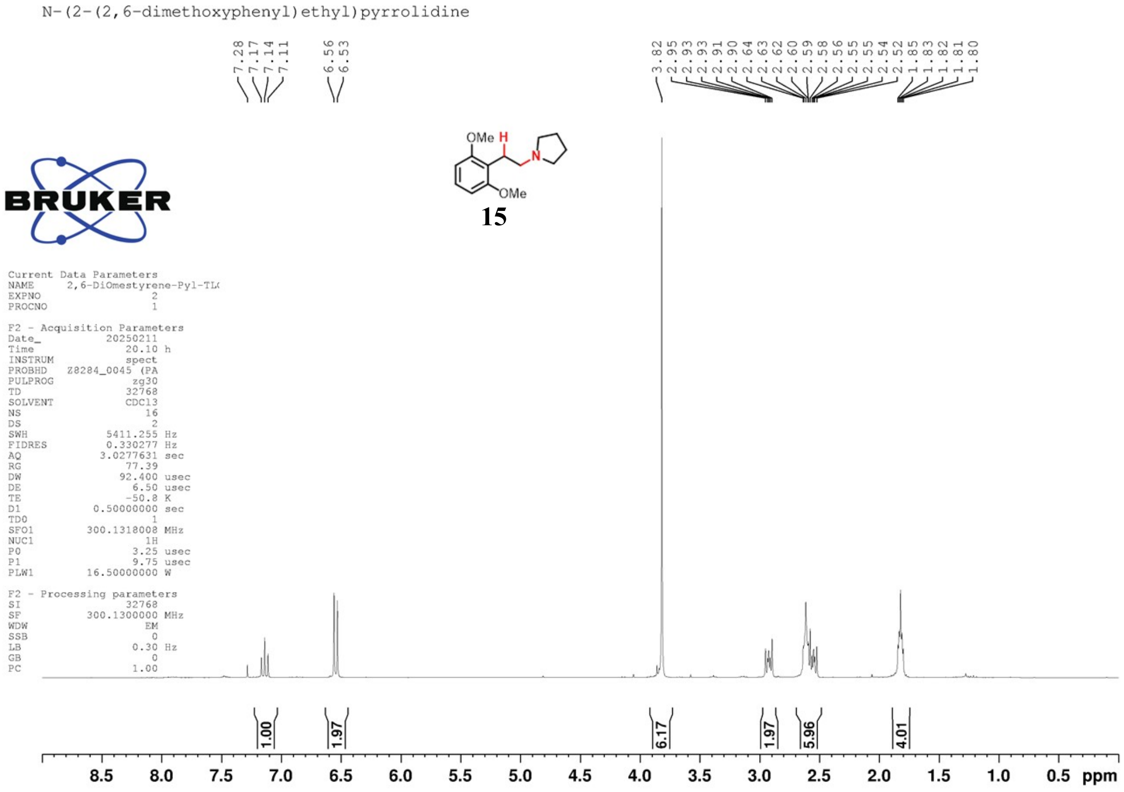
```
Current Data Parameters
NAME      3,4-DiOmestyrene-Pyl-TLC
EXPNO               1
PROCNO              1

F2 - Acquisition Parameters
Date_          20250211
Time              13.04 h
INSTRUM           spect
PROBHD   Z8284_0045 (PA
PULPROG            zg30
TD                32768
SOLVENT           CDCl3
NS                   15
DS                    2
SWH            5411.255 Hz
FIDRES         0.330277 Hz
AQ            3.0277631 sec
RG                77.39
DW               92.400 usec
DE                 6.50 usec
TE                -50.8 K
D1           0.50000000 sec
TD0                   1
SFO1        300.1318008 MHz
NUC1                 1H
P0                 3.25 usec
P1                 9.75 usec
PLW1        16.50000000 W

F2 - Processing parameters
SI                32768
SF          300.1300000 MHz
WDW                  EM
SSB                   0
LB                 0.30 Hz
GB                    0
PC                 1.00
```

N-(2-(3,4-dimethoxyphenyl)ethyl)pyrrolidine

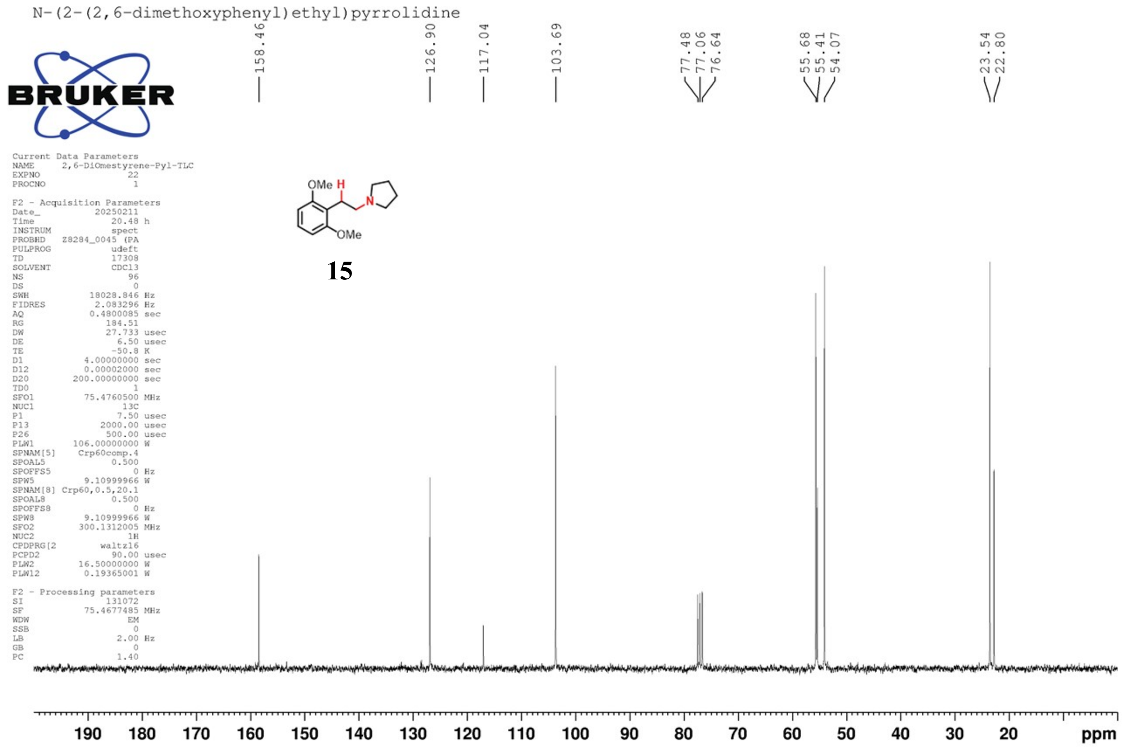


14

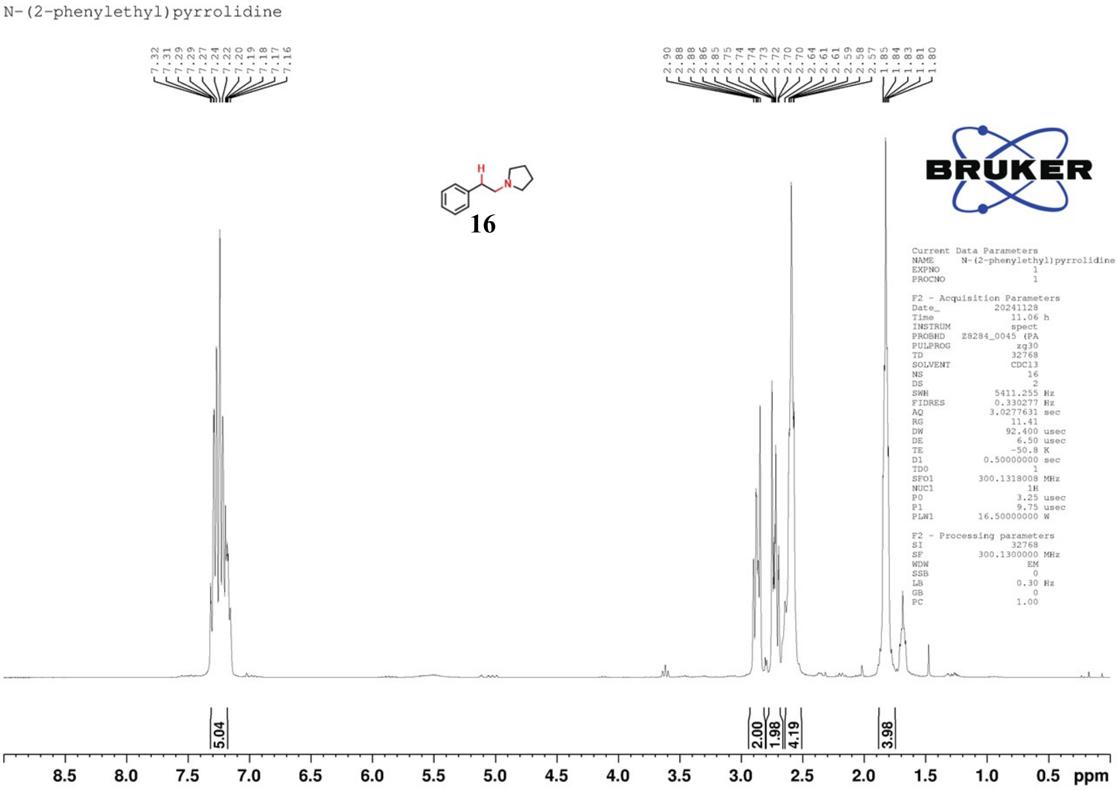
```
Current Data Parameters
NAME      3,4-DiOmestyrene-Pyl-TLC
EXPNO              11
PROCNO              1

F2 - Acquisition Parameters
Date_          20250211
Time              14.00 h
INSTRUM           spect
PROBHD   Z8284_0045 (PA
PULPROG           udeft
TD                17308
SOLVENT           CDCl3
NS                   96
DS                    0
SWH           18028.846 Hz
FIDRES         2.083296 Hz
AQ            0.4800085 sec
RG               184.51
DW               27.733 usec
DE                 6.50 usec
TE                -50.8 K
D1           4.00000000 sec
D12          0.00002000 sec
D20        200.00000000 sec
TD0                   1
SFO1         75.4760500 MHz
NUC1                13C
P1                 7.50 usec
P13             2000.00 usec
P26              500.00 usec
PLW1       106.00000000 W
SPNAM[5]    Crp60comp.4
SPOAL5            0.500
SPOFFS5               0 Hz
SPW5         9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8            0.500
SPOFFS8               0 Hz
SPW8         9.10999966 W
SFO2        300.1312005 MHz
NUC2                 1H
CPDPRG[2        waltz16
PCPD2             90.00 usec
PLW2        16.50000000 W
PLW12        0.19365001 W

F2 - Processing parameters
SI               131072
SF           75.4677485 MHz
WDW                  EM
SSB                   0
LB                 2.00 Hz
GB                    0
PC                 1.40
```

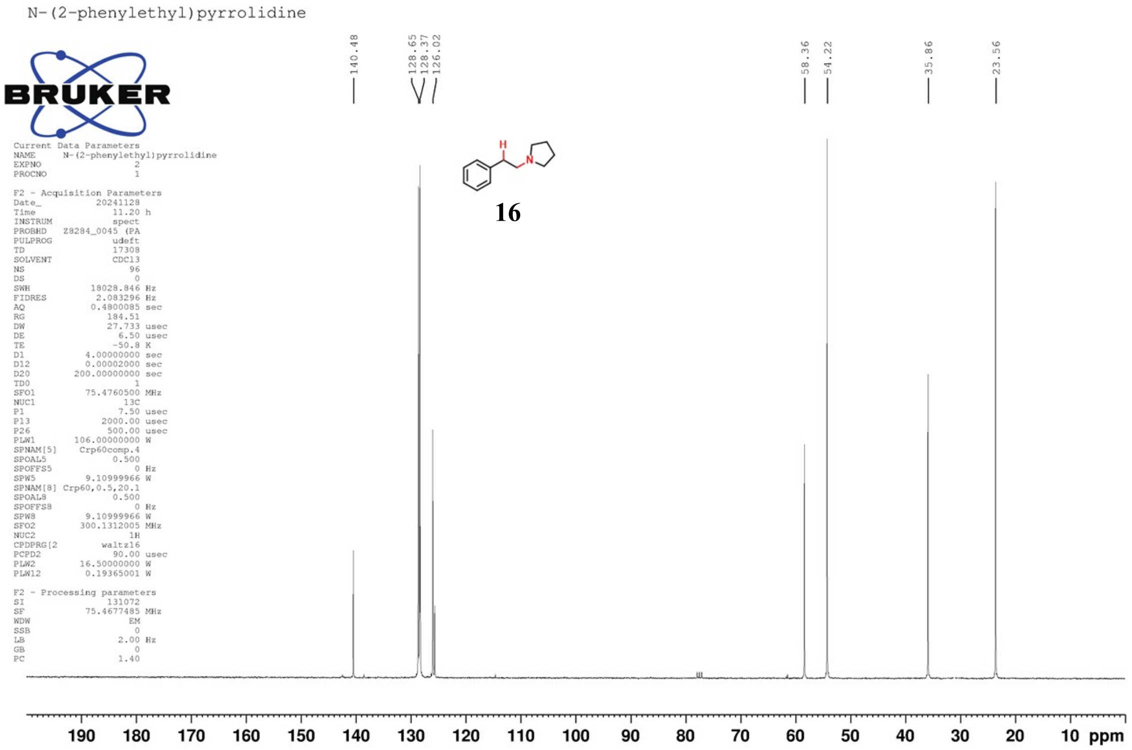

N-(2-(2,6-dimethoxyphenyl)ethyl)pyrrolidine
7.28
7.17
7.14
7.11
6.56
6.53
3.82
2.95
2.93
2.93
2.91
2.90
2.64
2.63
2.62
2.60
2.59
2.58
2.56
2.55
2.55
2.54
2.52
1.85
1.83
1.82
1.81
1.80
OMe
H
N
OMe
BRUKER
Current Data Parameters
NAME 2,6-DiOmestyrene-Pyl-TLC
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20250211
Time 20.10 h
INSTRUM spect
PROBHD Z8284_0045 (PA
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 5411.255 Hz
FIDRES 0.330277 Hz
AQ 3.0277631 sec
RG 77.39
DW 92.400 usec
DE 6.50 usec
TE -50.8 K
D1 0.50000000 sec
TD0 1
SFO1 300.1318008 MHz
NUC1 1H
P0 3.25 usec
P1 9.75 usec
PLW1 16.50000000 W
F2 - Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
1.00
1.97
6.17
1.97
5.96
4.01
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm

15

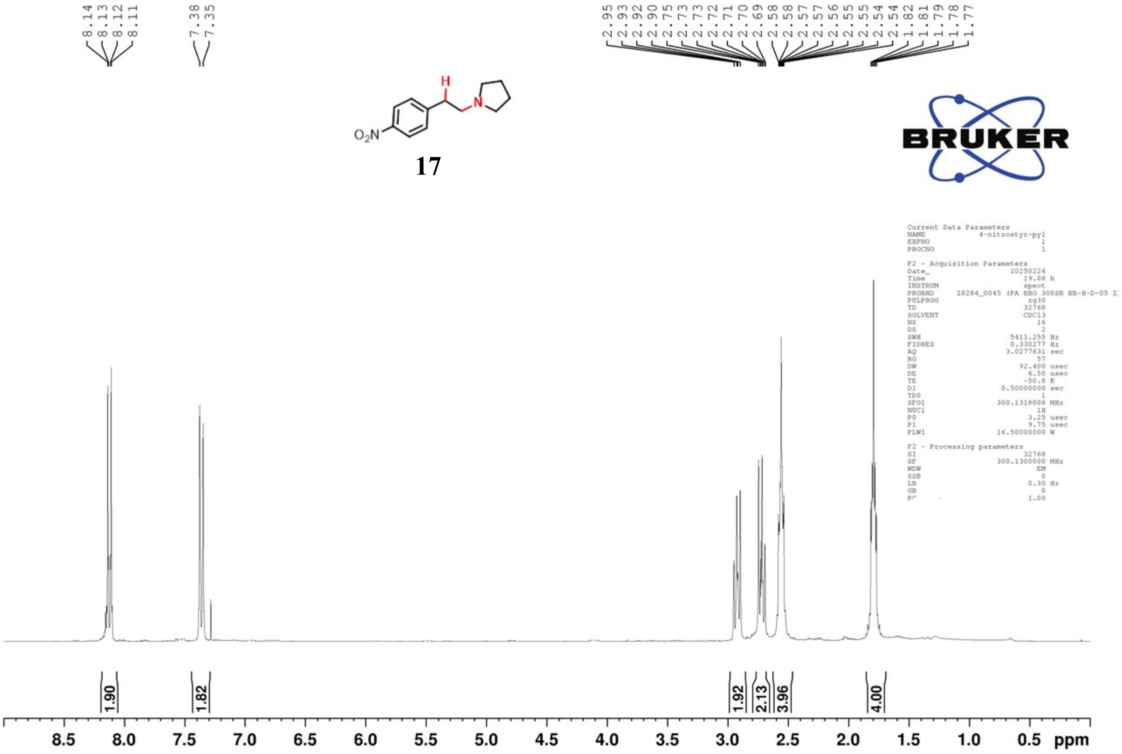

N-(2-(2,6-dimethoxyphenyl)ethyl)pyrrolidine
158.46
126.90
117.04
103.69
77.48
77.06
76.64
55.68
55.41
54.07
23.54
22.80
BRUKER
OMe
H
N
OMe
Current Data Parameters
NAME 2,6-DiOmestyrene-Pyl-TLC
EXPNO 22
PROCNO 1
F2 - Acquisition Parameters
Date_ 20250211
Time 20.48 h
INSTRUM spect
PROBHD Z8284_0045 (PA
PULPROG udeft
TD 17308
SOLVENT CDCl3
NS 96
DS 0
SWH 18028.846 Hz
FIDRES 2.083296 Hz
AQ 0.4800085 sec
RG 184.51
DW 27.733 usec
DE 6.50 usec
TE -50.8 K
D1 4.00000000 sec
D12 0.00002000 sec
D20 200.00000000 sec
TD0 1
SFO1 75.4760500 MHz
NUC1 13C
P1 7.50 usec
P13 2000.00 usec
P26 500.00 usec
PLW1 106.00000000 W
SPNAM[5] Crp60comp.4
SPOAL5 0.500
SPOFFS5 0 Hz
SPW5 9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8 0.500
SPOFFS8 0 Hz
SPW8 9.10999966 W
SFO2 300.1312005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 16.50000000 W
PLW12 0.19365001 W
F2 - Processing parameters
SI 131072
SF 75.4677485 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 1.40
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm

15


N-(2-phenylethyl)pyrrolidine
7.32
7.31
7.29
7.29
7.27
7.24
7.22
7.20
7.19
7.18
7.17
7.16
2.90
2.88
2.88
2.86
2.85
2.75
2.74
2.74
2.73
2.72
2.70
2.70
2.64
2.61
2.61
2.59
2.58
2.57
1.85
1.84
1.83
1.81
1.80
H
N
16
Current Data Parameters
NAME N-(2-phenylethyl)pyrrolidine
EXPNO 1
PROCNO 1
F2 - Acquisition Parameters
Date_ 20241128
Time 11.06 h
INSTRUM spect
PROBHD Z8284_0045 (PA
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 16
DS 2
SWH 5411.255 Hz
FIDRES 0.330277 Hz
AQ 3.0277631 sec
RG 11.41
DW 92.400 usec
DE 6.50 usec
TE -50.8 K
D1 0.50000000 sec
TD0 1
SFO1 300.1318008 MHz
NUC1 1H
P0 3.25 usec
P1 9.75 usec
PLW1 16.50000000 W
F2 - Processing parameters
SI 32768
SF 300.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
5.04
2.00
1.98
4.19
3.98
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm

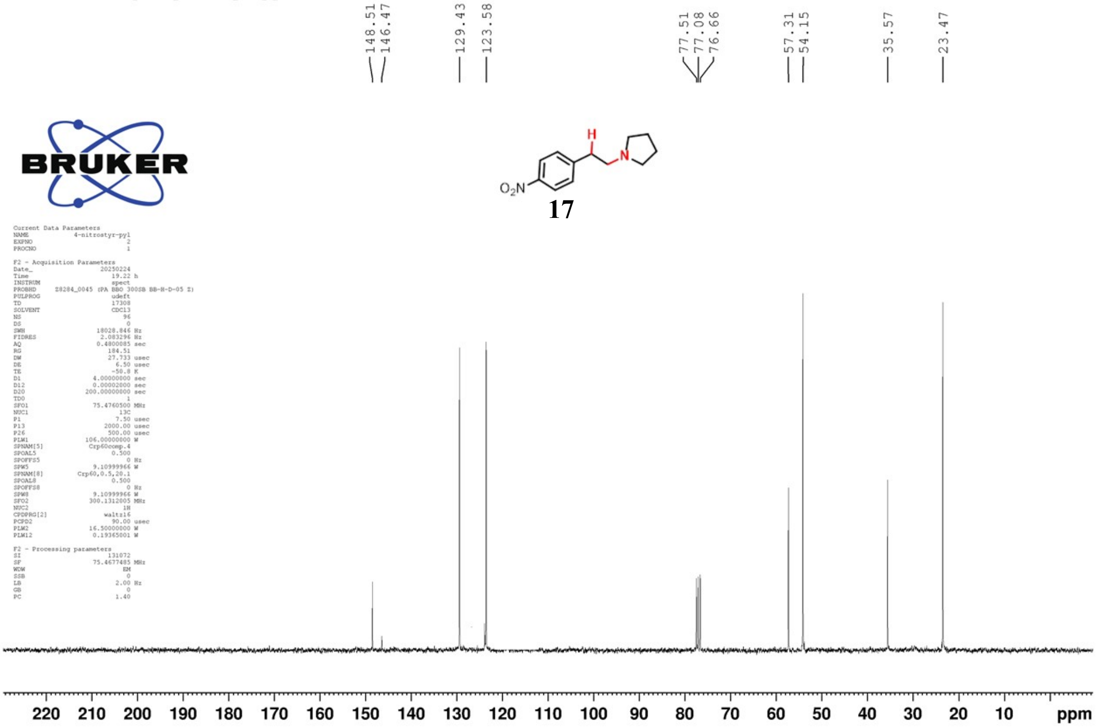

N-(2-phenylethyl)pyrrolidine
140.48
128.65
128.37
126.02
58.36
54.22
35.86
23.56
H
N
16
Current Data Parameters
NAME N-(2-phenylethyl)pyrrolidine
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20241128
Time 11.20 h
INSTRUM spect
PROBHD Z8284_0045 (PA
PULPROG udeft
TD 17308
SOLVENT CDCl3
NS 96
DS 0
SWH 18028.846 Hz
FIDRES 2.083296 Hz
AQ 0.4800085 sec
RG 184.51
DW 27.733 usec
DE 6.50 usec
TE -50.8 K
D1 4.00000000 sec
D12 0.00002000 sec
D20 200.00000000 sec
TD0 1
SFO1 75.4760500 MHz
NUC1 13C
P1 7.50 usec
P13 2000.00 usec
P26 500.00 usec
PLW1 106.00000000 W
SPNAM[5] Crp60comp.4
SPOAL5 0.500
SPOFFS5 0 Hz
SPW5 9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8 0.500
SPOFFS8 0 Hz
SPW8 9.10999966 W
SFO2 300.1312005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 16.50000000 W
PLW12 0.19365001 W
F2 - Processing parameters
SI 131072
SF 75.4677485 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 1.40
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm

N-(2-(4-nitrophenyl)ethyl)pyrrolidine

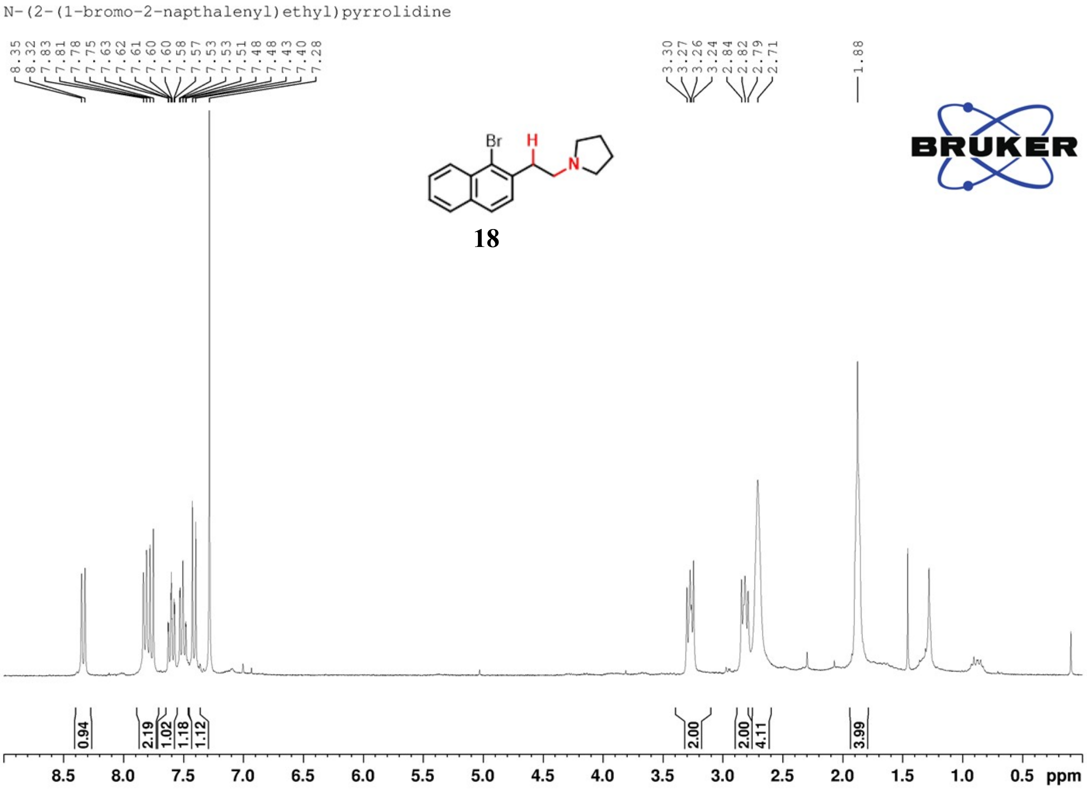


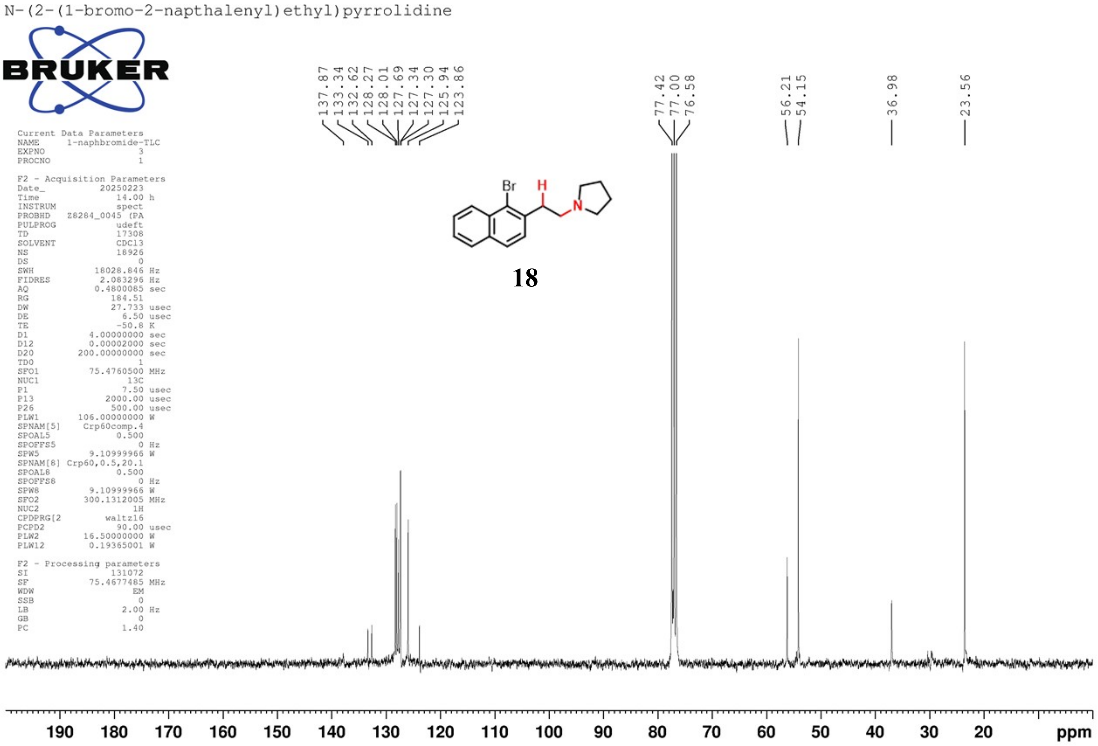
```
Current Data Parameters
NAME              4-nitrostyr-pyl
EXPNO                           1
PROCNO                          1

F2 - Acquisition Parameters
Date_                    20250224
Time                      19.08 h
INSTRUM                     spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                      zg30
TD                          32768
SOLVENT                     CDCl3
NS                             16
DS                              2
SWH                      5411.255 Hz
FIDRES                   0.330277 Hz
AQ                      3.0277631 sec
RG                             57
DW                         92.400 usec
DE                           6.50 usec
TE                          -50.8 K
D1                     0.50000000 sec
TD0                             1
SFO1                  300.1318008 MHz
NUC1                           1H
P0                           3.25 usec
P1                           9.75 usec
PLW1                  16.50000000 W

F2 - Processing parameters
SI                          32768
SF                    300.1300000 MHz
WDW                            EM
SSB                             0
LB                           0.30 Hz
GB                              0
PC                           1.00
```

N-(2-(4-nitrophenyl)ethyl)pyrrolidine



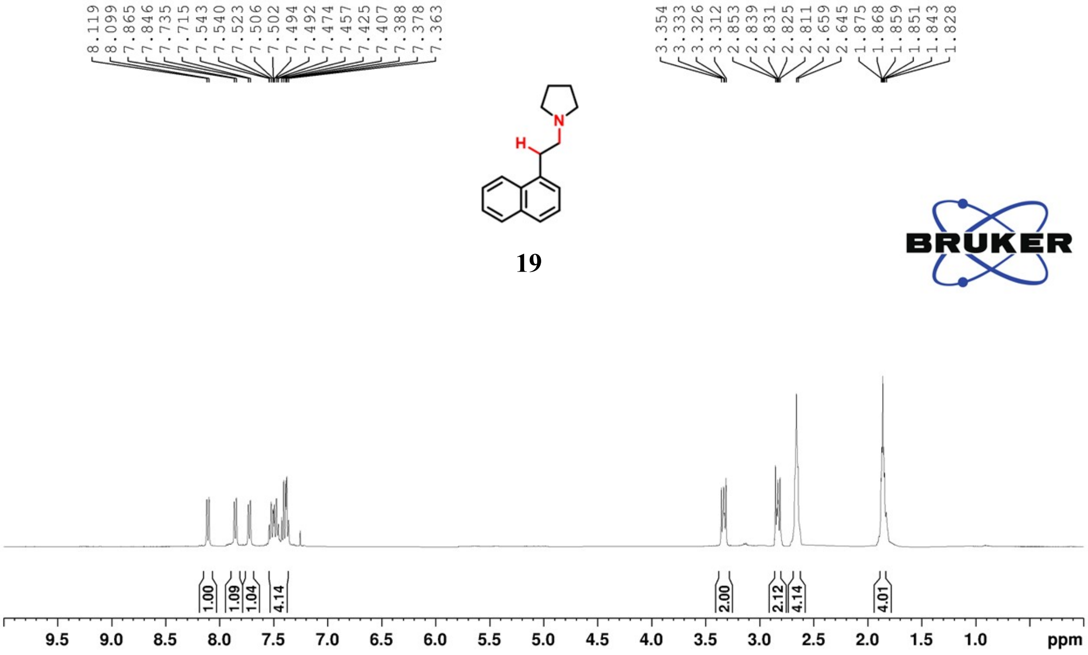
```
Current Data Parameters
NAME              4-nitrostyr-pyl
EXPNO                           2
PROCNO                          1

F2 - Acquisition Parameters
Date_                    20250224
Time                      19.22 h
INSTRUM                     spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                     udeft
TD                          17308
SOLVENT                     CDCl3
NS                             96
DS                              0
SWH                     18028.846 Hz
FIDRES                   2.083296 Hz
AQ                      0.4800085 sec
RG                         184.51
DW                         27.733 usec
DE                           6.50 usec
TE                          -50.8 K
D1                     4.00000000 sec
D12                    0.00002000 sec
D20                  200.00000000 sec
TD0                             1
SFO1                   75.4760500 MHz
NUC1                          13C
P1                           7.50 usec
P13                       2000.00 usec
P26                        500.00 usec
PLW1                 106.00000000 W
SPNAM[5]              Crp60comp.4
SPOAL5                      0.500
SPOFFS5                         0 Hz
SPW5                   9.10999966 W
SPNAM[8]           Crp60,0.5,20.1
SPOAL8                      0.500
SPOFFS8                         0 Hz
SPW8                   9.10999966 W
SFO2                  300.1312005 MHz
NUC2                           1H
CPDPRG[2]                 waltz16
PCPD2                       90.00 usec
PLW2                  16.50000000 W
PLW12                  0.19365001 W

F2 - Processing parameters
SI                         131072
SF                     75.4677485 MHz
WDW                            EM
SSB                             0
LB                           2.00 Hz
GB                              0
PC                           1.40
```





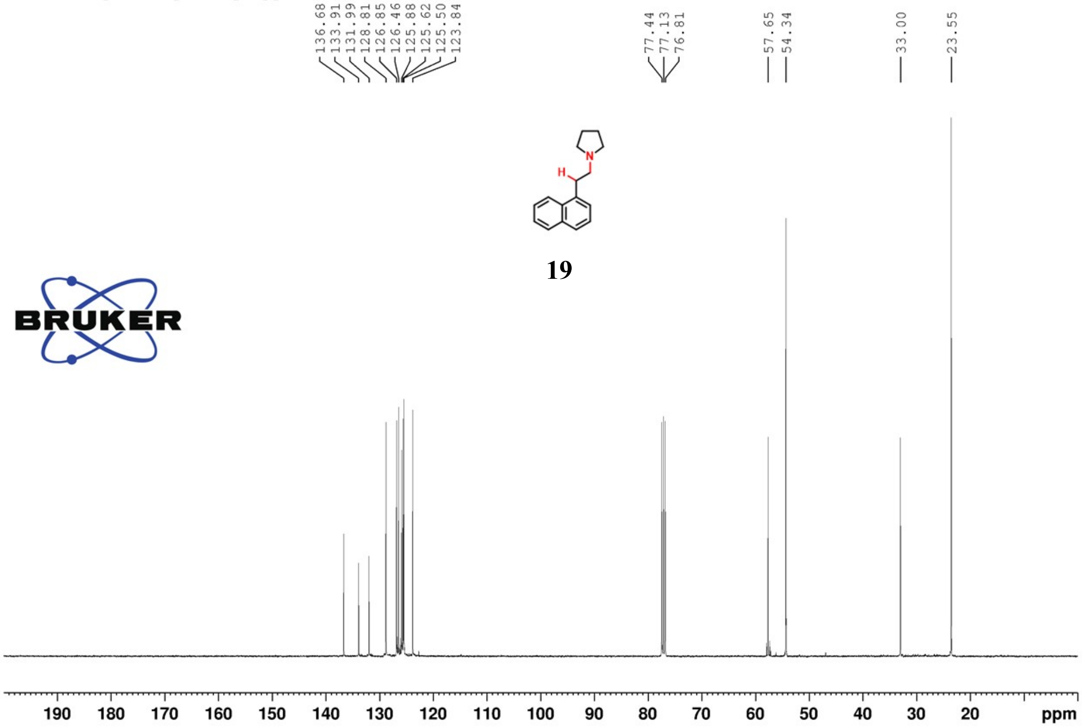
```
Current Data Parameters
NAME     1-naphbromide-TLC
EXPNO                    3
PROCNO                   1

F2 - Acquisition Parameters
Date_             20250223
Time                 14.00 h
INSTRUM              spect
PROBHD    Z8284_0045 (PA
PULPROG              udeft
TD                   17308
SOLVENT              CDCl3
NS                   18926
DS                       0
SWH              18028.846 Hz
FIDRES            2.083296 Hz
AQ               0.4800085 sec
RG                  184.51
DW                  27.733 usec
DE                    6.50 usec
TE                   -50.8 K
D1              4.00000000 sec
D12             0.00002000 sec
D20           200.00000000 sec
TD0                      1
SFO1            75.4760500 MHz
NUC1                   13C
P1                    7.50 usec
P13                2000.00 usec
P26                 500.00 usec
PLW1          106.00000000 W
SPNAM[5]     Crp60comp.4
SPOAL5               0.500
SPOFFS5                  0 Hz
SPW5            9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8               0.500
SPOFFS8                  0 Hz
SPW8            9.10999966 W
SFO2           300.1312005 MHz
NUC2                    1H
CPDPRG[2           waltz16
PCPD2                90.00 usec
PLW2           16.50000000 W
PLW12           0.19365001 W

F2 - Processing parameters
SI                  131072
SF              75.4677485 MHz
WDW                     EM
SSB                      0
LB                    2.00 Hz
GB                       0
PC                    1.40
```

N-(2-(1-napthalenyl)ethyl)pyrrolidine



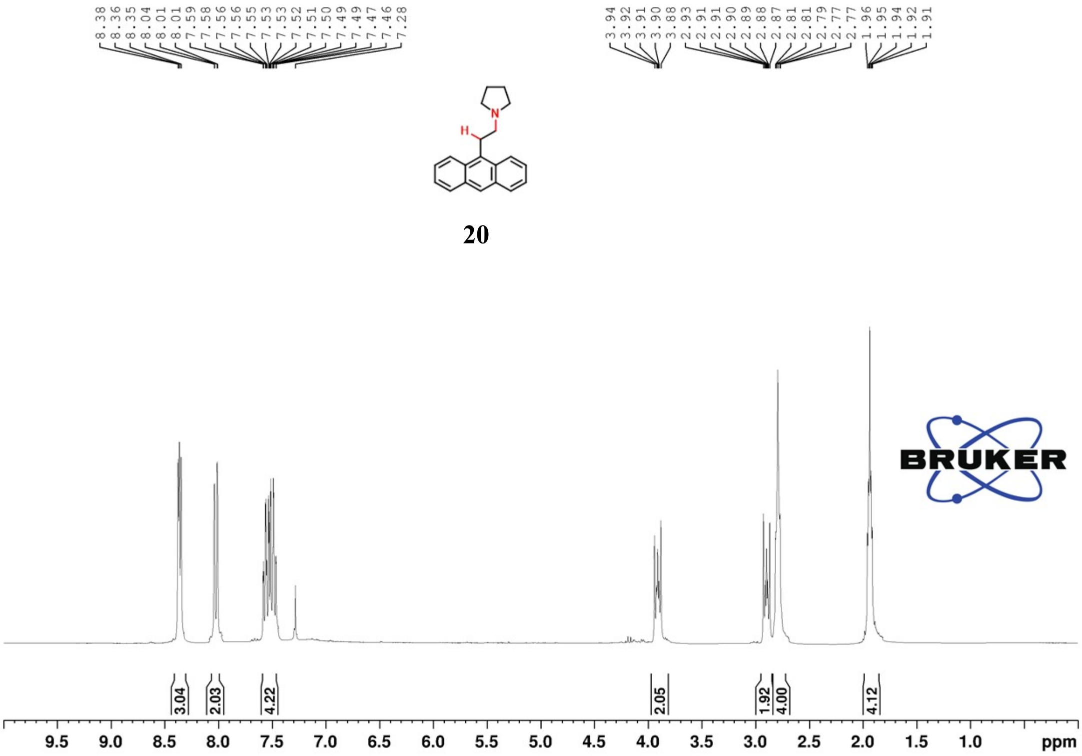
19

N-(2-(1-napthalenyl)ethyl)pyrrolidine

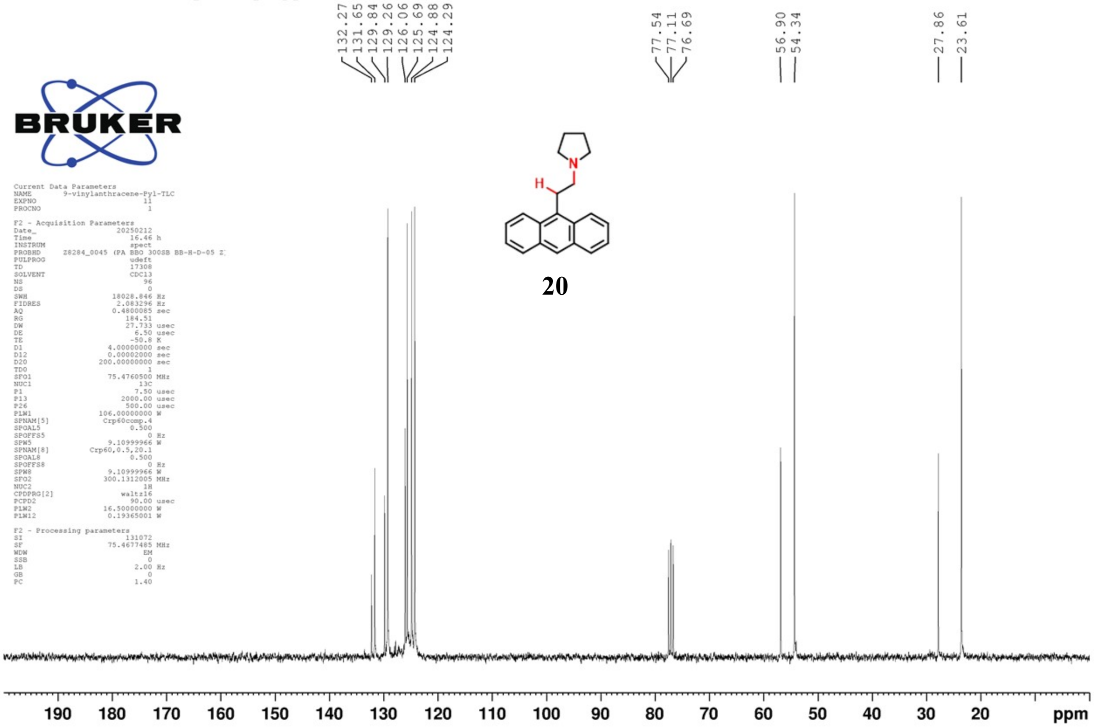


19

N-(2-(anthracene-9-yl)ethyl)pyrrolidine

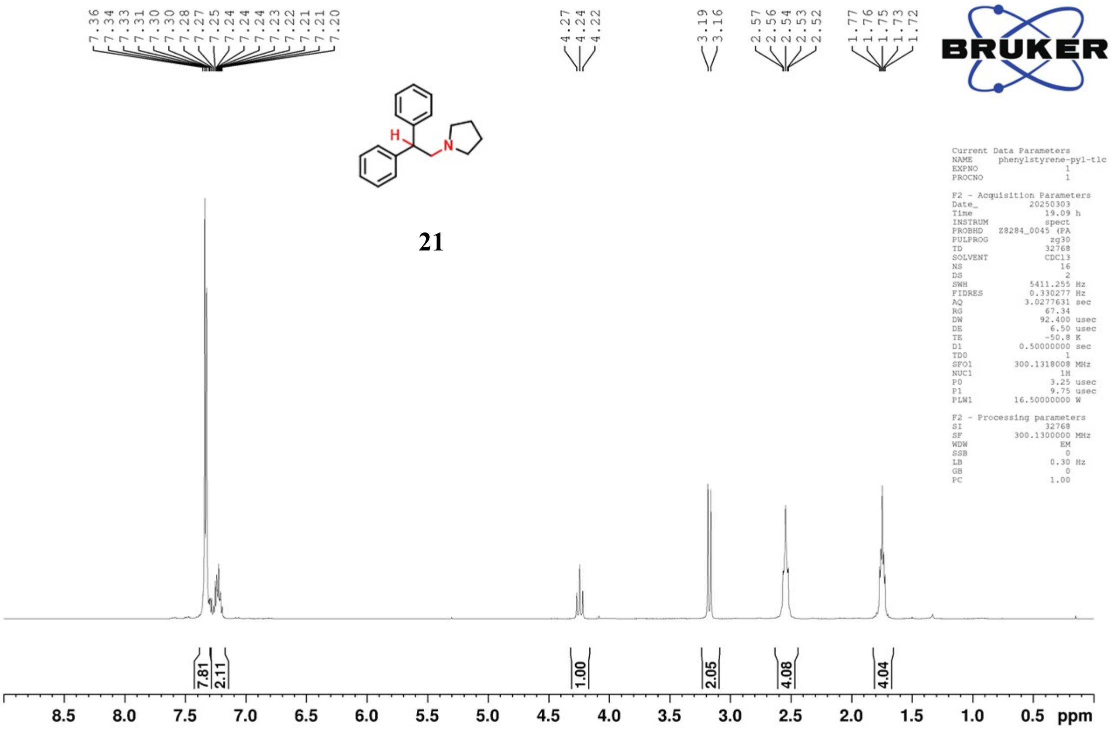


N-(2-(anthracene-9-yl)ethyl)pyrrolidine



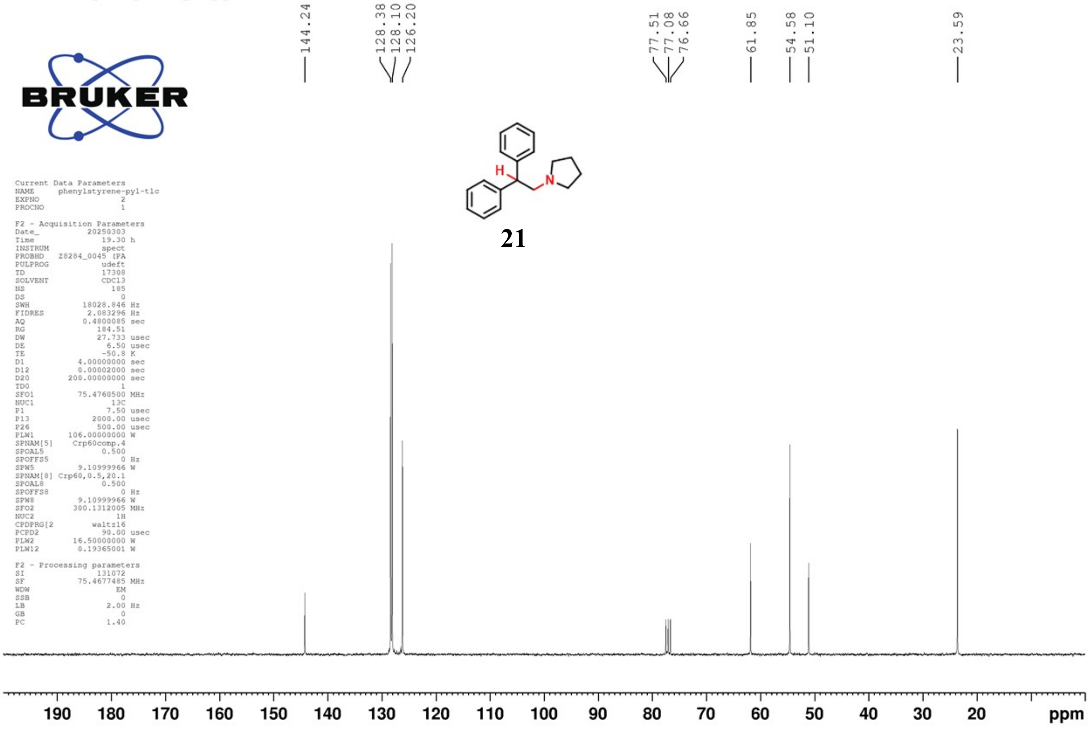
```
Current Data Parameters
NAME        9-vinylanthracene-Pyl-TLC
EXPNO                          11
PROCNO                          1

F2 - Acquisition Parameters
Date_                    20250212
Time                        16.46 h
INSTRUM                     spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                     udeft
TD                          17308
SOLVENT                     CDCl3
NS                             96
DS                              0
SWH                     18028.846 Hz
FIDRES                   2.083296 Hz
AQ                      0.4800085 sec
RG                         184.51
DW                         27.733 usec
DE                           6.50 usec
TE                          -50.8 K
D1                     4.00000000 sec
D12                    0.00002000 sec
D20                  200.00000000 sec
TD0                             1
SFO1                   75.4760500 MHz
NUC1                          13C
P1                           7.50 usec
P13                       2000.00 usec
P26                        500.00 usec
PLW1                 106.00000000 W
SPNAM[5]              Crp60comp.4
SPOAL5                      0.500
SPOFFS5                         0 Hz
SPW5                   9.10999966 W
SPNAM[8]           Crp60,0.5,20.1
SPOAL8                      0.500
SPOFFS8                         0 Hz
SPW8                   9.10999966 W
SFO2                  300.1312005 MHz
NUC2                           1H
CPDPRG[2]                 waltz16
PCPD2                       90.00 usec
PLW2                  16.50000000 W
PLW12                  0.19365001 W

F2 - Processing parameters
SI                         131072
SF                     75.4677485 MHz
WDW                            EM
SSB                             0
LB                           2.00 Hz
GB                              0
PC                           1.40
```

N-(2,2-Diphenylethyl)pyrrolidine



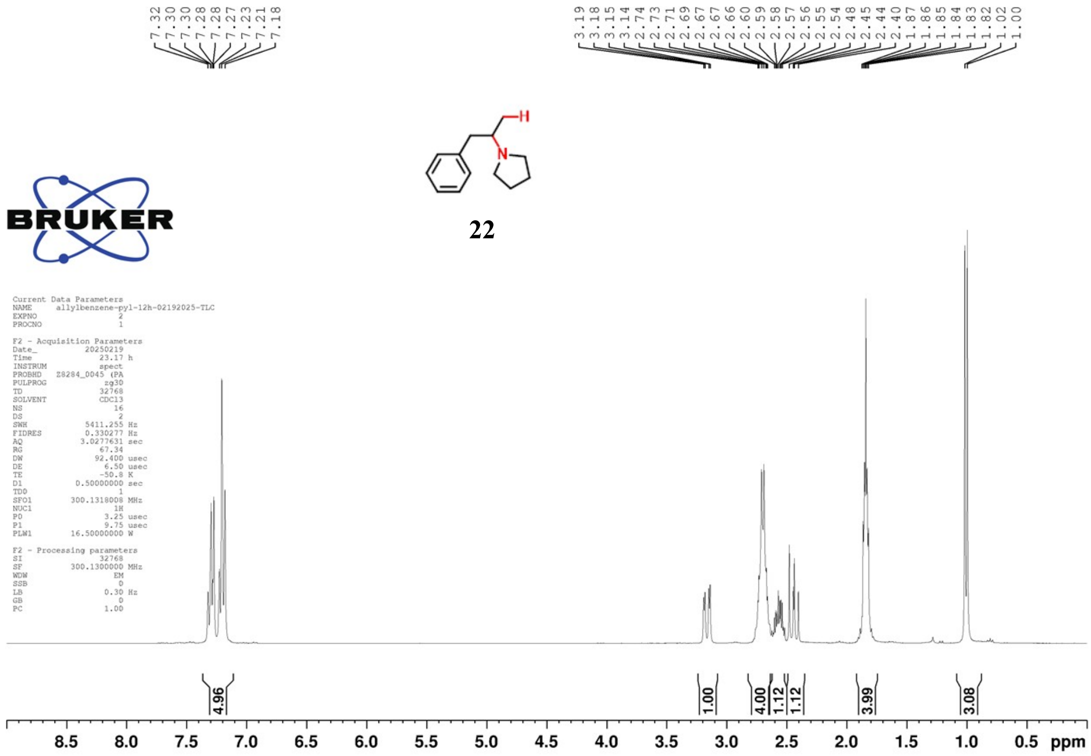
```
Current Data Parameters
NAME      phenylstyrene-pyl-tlc
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20250303
Time                  19.09 h
INSTRUM               spect
PROBHD   Z8284_0045 (PA
PULPROG                zg30
TD                    32768
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                5411.255 Hz
FIDRES             0.330277 Hz
AQ                3.0277631 sec
RG                    67.34
DW                   92.400 usec
DE                     6.50 usec
TE                    -50.8 K
D1               0.50000000 sec
TD0                       1
SFO1            300.1318008 MHz
NUC1                     1H
P0                     3.25 usec
P1                     9.75 usec
PLW1            16.50000000 W

F2 - Processing parameters
SI                    32768
SF              300.1300000 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
```

N-(2,2-diphenylethyl)pyrrolidine

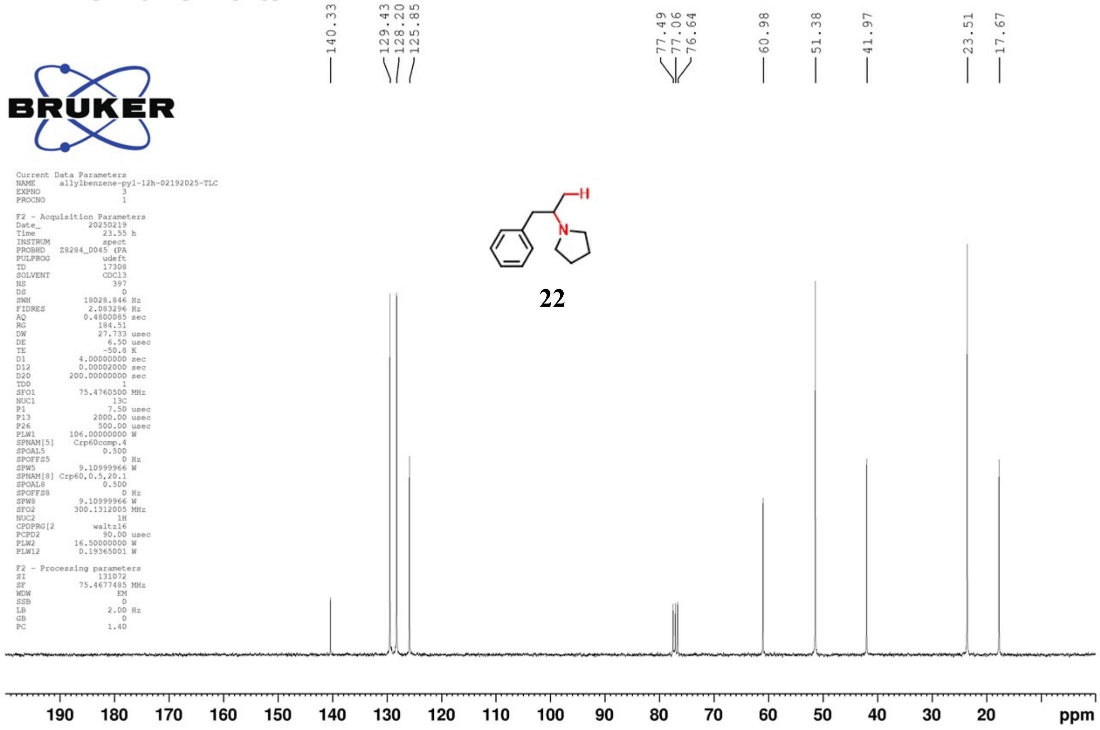


```
Current Data Parameters
NAME      phenylstyrene-pyl-tlc
EXPNO                     2
PROCNO                    1

F2 - Acquisition Parameters
Date_              20250303
Time                  19.30 h
INSTRUM               spect
PROBHD   Z8284_0045 (PA
PULPROG               udeft
TD                    17308
SOLVENT               CDCl3
NS                      185
DS                        0
SWH               18028.846 Hz
FIDRES             2.083296 Hz
AQ                0.4800085 sec
RG                   184.51
DW                   27.733 usec
DE                     6.50 usec
TE                    -50.8 K
D1               4.00000000 sec
D12              0.00002000 sec
D20            200.00000000 sec
TD0                       1
SFO1             75.4760500 MHz
NUC1                    13C
P1                     7.50 usec
P13                 2000.00 usec
P26                  500.00 usec
PLW1           106.00000000 W
SPNAM[5]     Crp60comp.4
SPOAL5                0.500
SPOFFS5                   0 Hz
SPW5             9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8                0.500
SPOFFS8                   0 Hz
SPW8             9.10999966 W
SFO2            300.1312005 MHz
NUC2                     1H
CPDPRG[2           waltz16
PCPD2                 90.00 usec
PLW2            16.50000000 W
PLW12            0.19365001 W

F2 - Processing parameters
SI                   131072
SF               75.4677485 MHz
WDW                      EM
SSB                       0
LB                     2.00 Hz
GB                        0
PC                     1.40
```

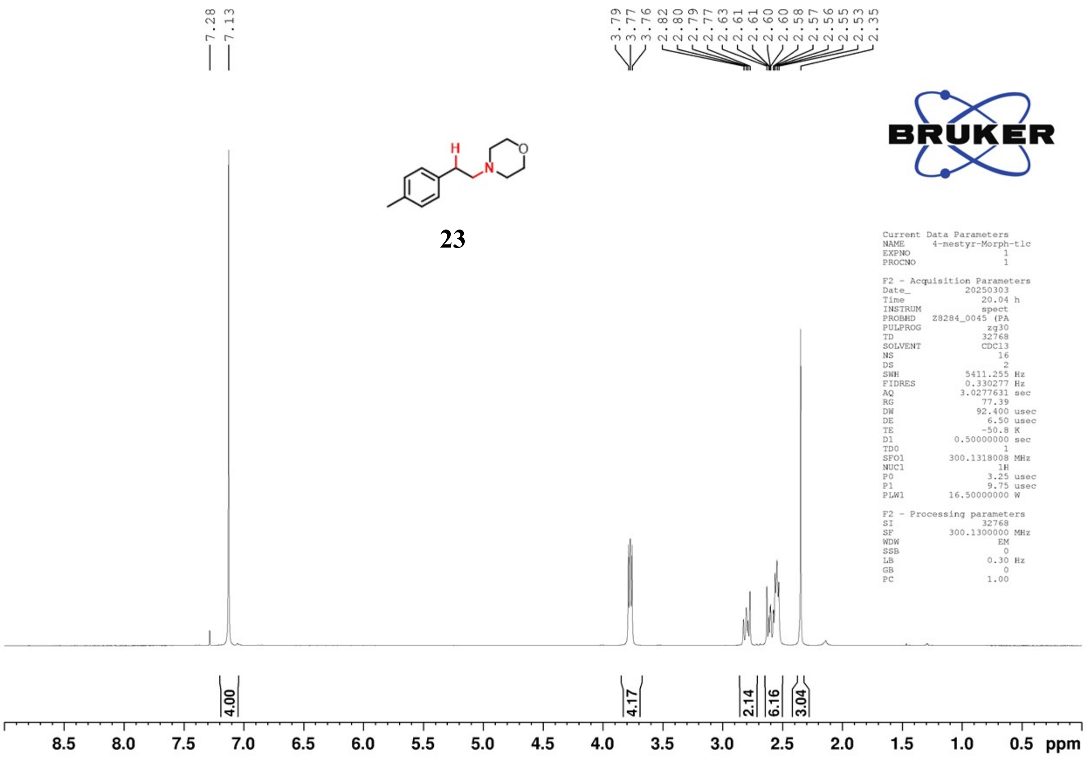
N-(1-methyl-2-phenylethyl)pyrrolidine



N-(1-methyl-2-phenylethyl)pyrrolidine



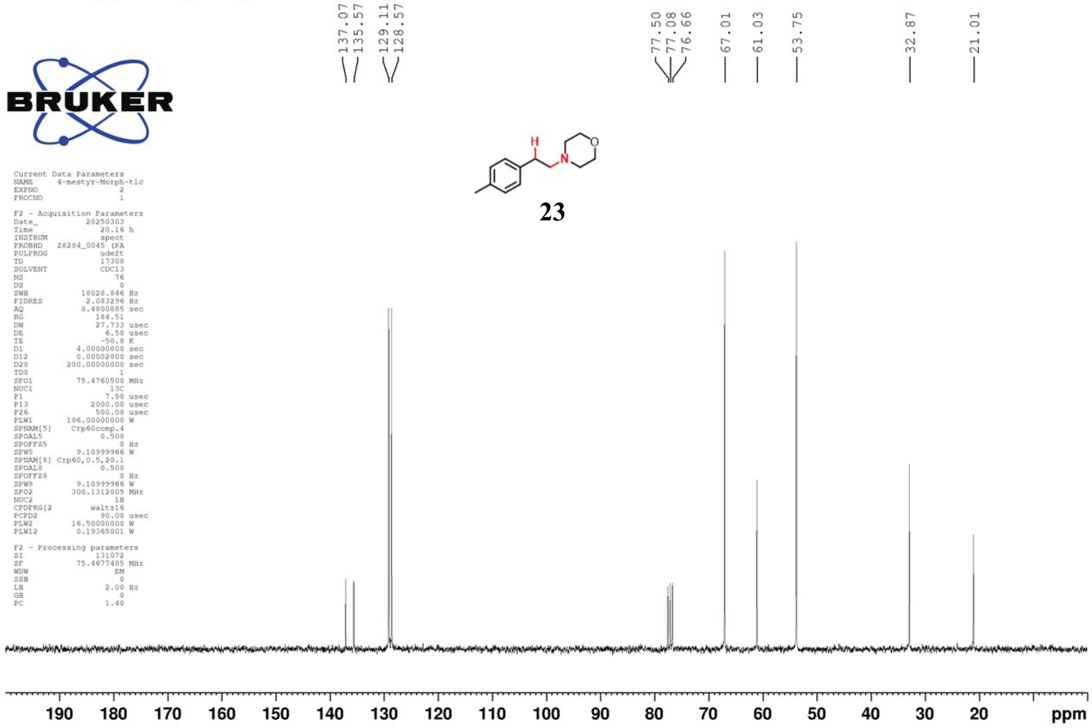
N-(4-methylphenethyl)morpholine



23

```
Current Data Parameters
NAME     4-mestyr-Morph-tlc
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20250303
Time                  20.04 h
INSTRUM               spect
PROBHD   Z8284_0045 (PA
PULPROG                zg30
TD                    32768
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                5411.255 Hz
FIDRES             0.330277 Hz
AQ                3.0277631 sec
RG                    77.39
DW                   92.400 usec
DE                     6.50 usec
TE                    -50.8 K
D1               0.50000000 sec
TD0                       1
SFO1            300.1318008 MHz
NUC1                     1H
P0                     3.25 usec
P1                     9.75 usec
PLW1            16.50000000 W

F2 - Processing parameters
SI                    32768
SF              300.1300000 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
```

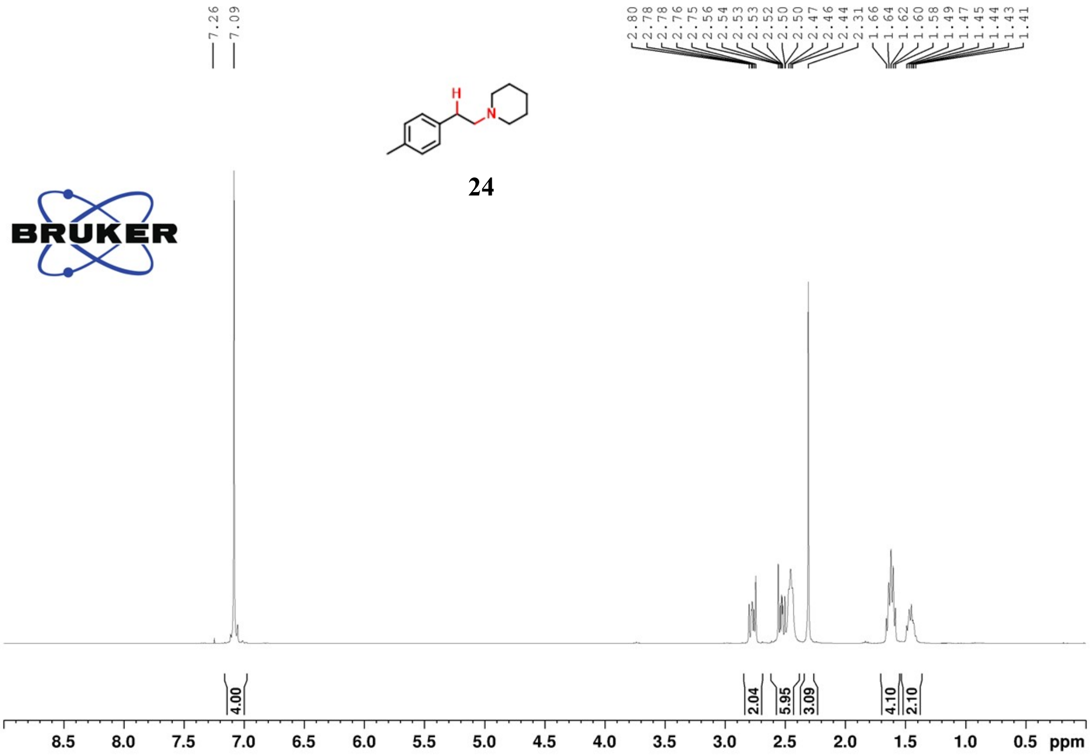
N-(4-methylphenethyl)morpholine



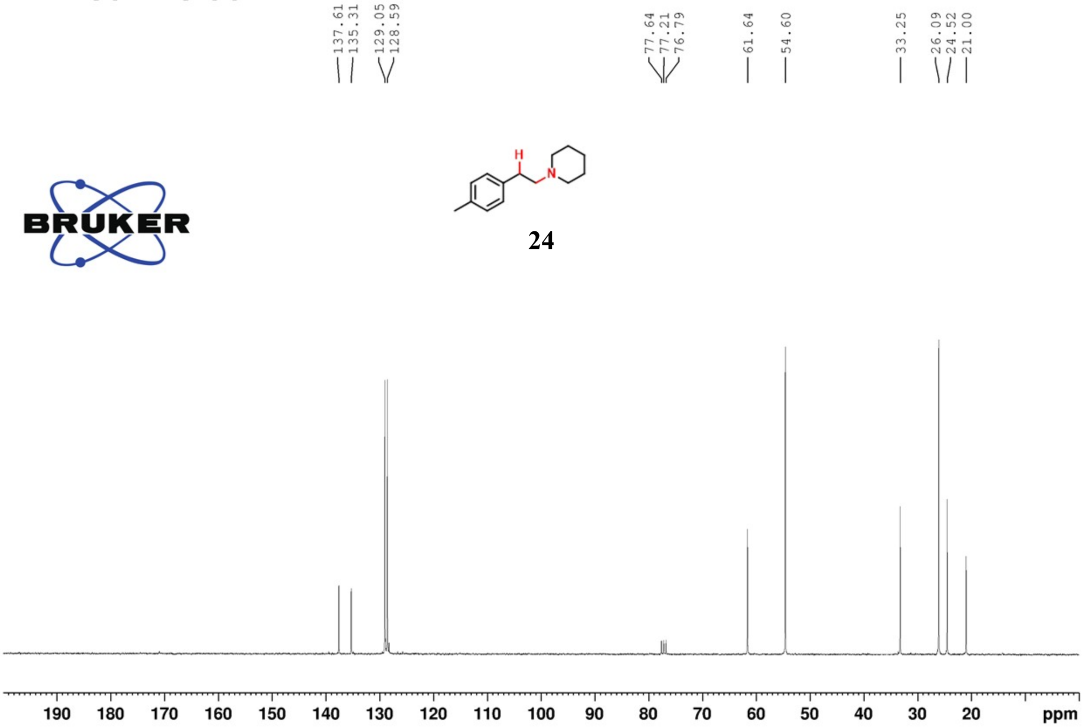
23

```
Current Data Parameters
NAME     4-mestyr-Morph-tlc
EXPNO                     2
PROCNO                    1

F2 - Acquisition Parameters
Date_              20250303
Time                  20.16 h
INSTRUM               spect
PROBHD   Z8284_0045 (PA
PULPROG               udeft
TD                    17308
SOLVENT               CDCl3
NS                       76
DS                        0
SWH               18028.846 Hz
FIDRES             2.083296 Hz
AQ                0.4800085 sec
RG                   184.51
DW                   27.733 usec
DE                     6.50 usec
TE                    -50.8 K
D1               4.00000000 sec
D12              0.00002000 sec
D20            200.00000000 sec
TD0                       1
SFO1             75.4760500 MHz
NUC1                    13C
P1                     7.50 usec
P13                 2000.00 usec
P26                  500.00 usec
PLW1           106.00000000 W
SPNAM[5]       Crp60comp.4
SPOAL5                0.500
SPOFFS5                   0 Hz
SPW5             9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8                0.500
SPOFFS8                   0 Hz
SPW8             9.10999966 W
SFO2            300.1312005 MHz
NUC2                     1H
CPDPRG[2            waltz16
PCPD2                 90.00 usec
PLW2            16.50000000 W
PLW12            0.19365001 W

F2 - Processing parameters
SI                   131072
SF               75.4677485 MHz
WDW                      EM
SSB                       0
LB                     2.00 Hz
GB                        0
PC                     1.40
```

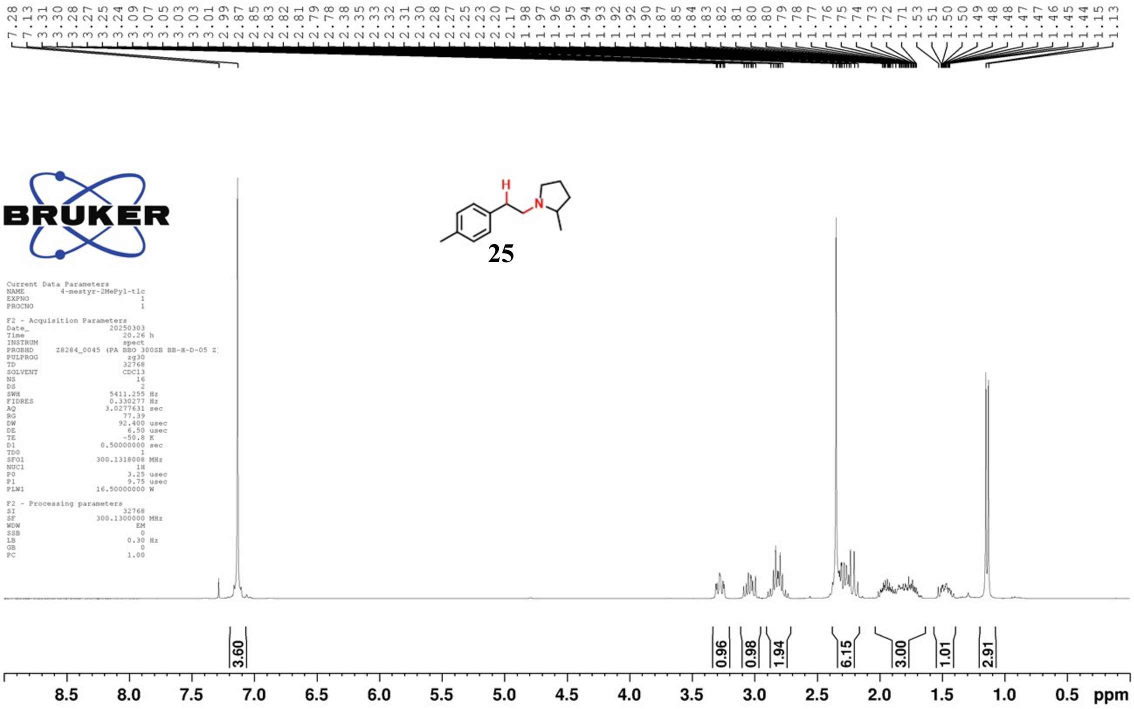
1-(4-methylphenethyl)piperidine



1-(4-methylphenethyl)piperidine

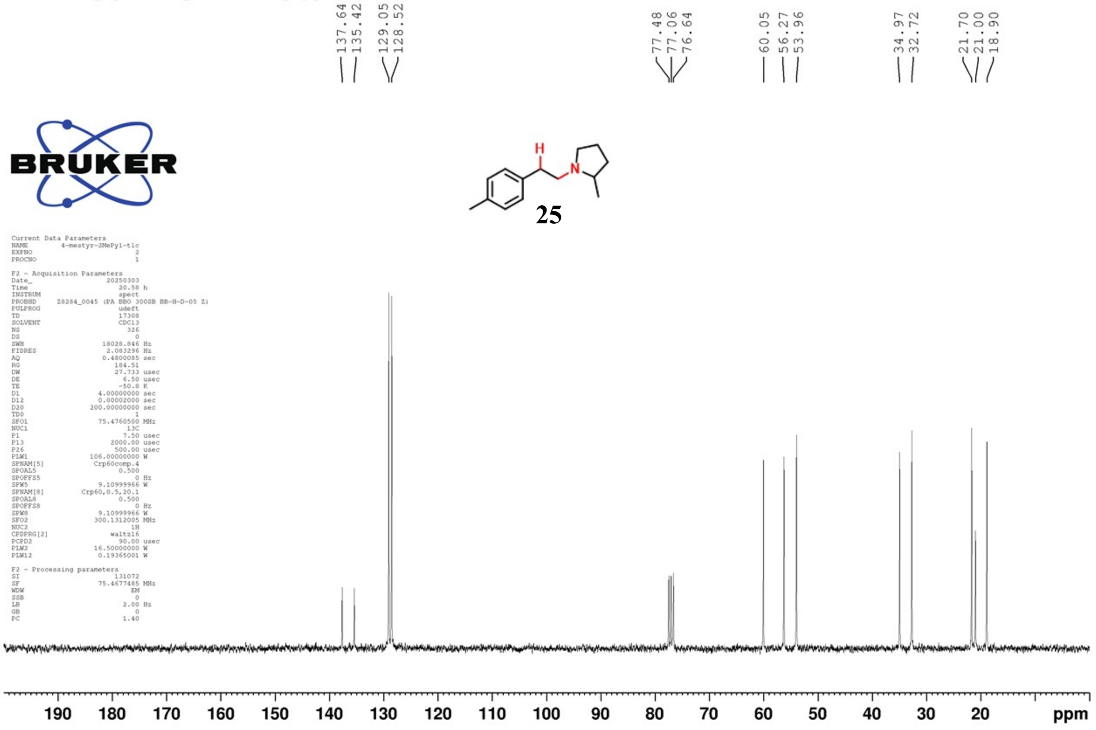


N-(4-methylphenethyl)-2-methylpyrrolidine

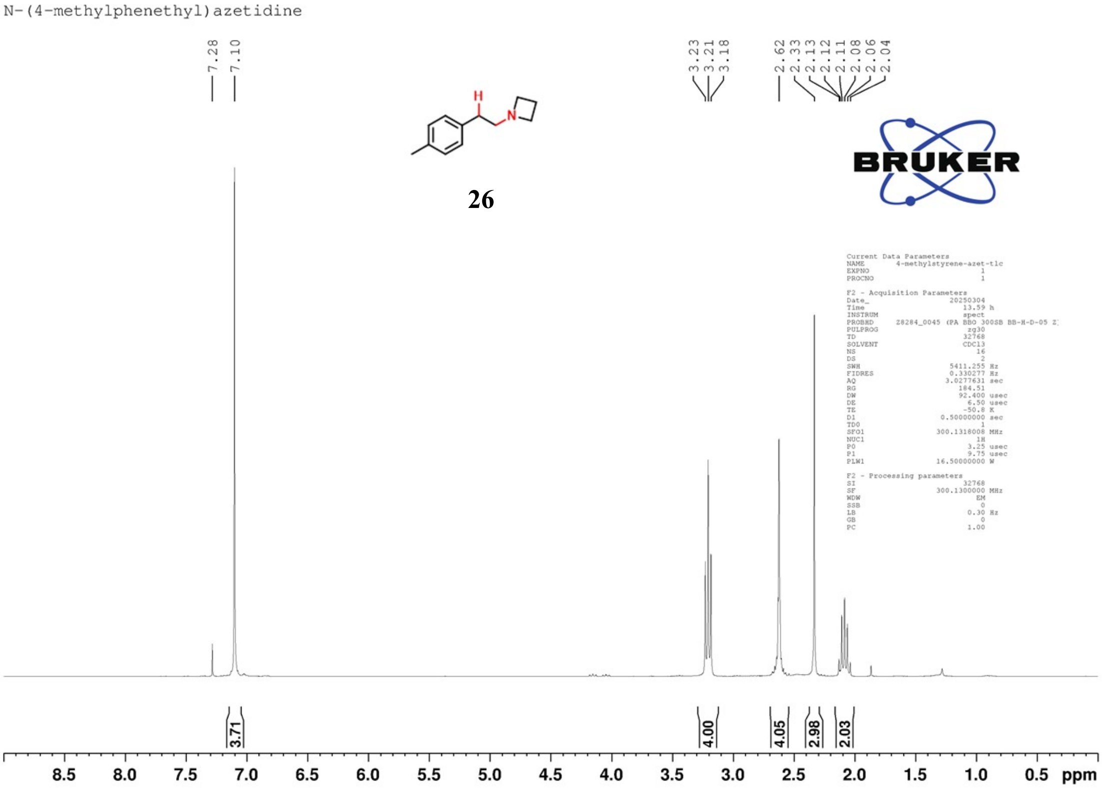


```
Current Data Parameters
NAME         4-mestyr-2MePyl-tlc
EXPNO                          1
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250303
Time                       20.26 h
INSTRUM                    spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                     zg30
TD                         32768
SOLVENT                    CDCl3
NS                            16
DS                             2
SWH                     5411.255 Hz
FIDRES                  0.330277 Hz
AQ                     3.0277631 sec
RG                         77.39
DW                        92.400 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    0.50000000 sec
TD0                            1
SFO1                 300.1318008 MHz
NUC1                          1H
P0                          3.25 usec
P1                          9.75 usec
PLW1                 16.50000000 W

F2 - Processing parameters
SI                         32768
SF                   300.1300000 MHz
WDW                           EM
SSB                            0
LB                          0.30 Hz
GB                             0
PC                          1.00
```

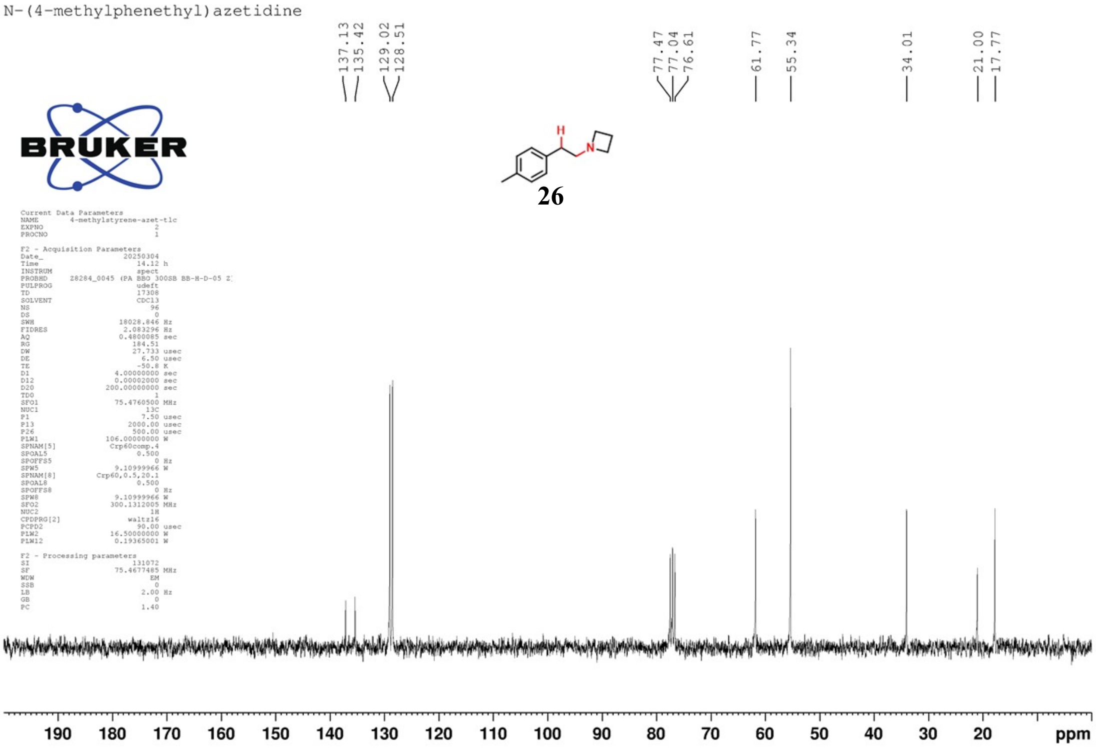
N-(4-methylphenethyl)-2-methylpyrrolidine



```
Current Data Parameters
NAME         4-mestyr-2MePyl-tlc
EXPNO                          2
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250303
Time                       20.58 h
INSTRUM                    spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                    udeft
TD                         17308
SOLVENT                    CDCl3
NS                           326
DS                             0
SWH                    18028.846 Hz
FIDRES                  2.083296 Hz
AQ                     0.4800085 sec
RG                        184.51
DW                        27.733 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    4.00000000 sec
D12                   0.00002000 sec
D20                 200.00000000 sec
TD0                            1
SFO1                  75.4760500 MHz
NUC1                         13C
P1                          7.50 usec
P13                      2000.00 usec
P26                       500.00 usec
PLW1                106.00000000 W
SPNAM[5]            Crp60comp.4
SPOAL5                     0.500
SPOFFS5                        0 Hz
SPW5                  9.10999966 W
SPNAM[8]          Crp60,0.5,20.1
SPOAL8                     0.500
SPOFFS8                        0 Hz
SPW8                  9.10999966 W
SFO2                 300.1312005 MHz
NUC2                          1H
CPDPRG[2]               waltz16
PCPD2                      90.00 usec
PLW2                 16.50000000 W
PLW12                 0.19365001 W

F2 - Processing parameters
SI                        131072
SF                    75.4677485 MHz
WDW                           EM
SSB                            0
LB                          2.00 Hz
GB                             0
PC                          1.40
```

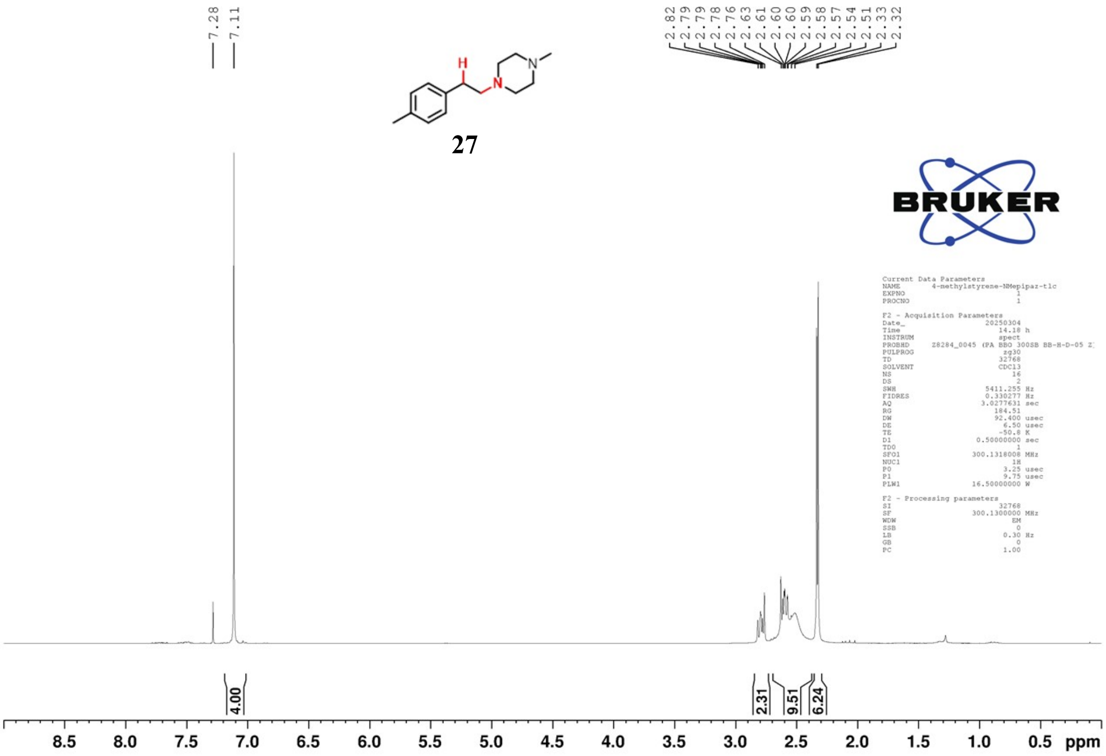


```
Current Data Parameters
NAME          4-methylstyrene-azet-tlc
EXPNO                        1
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20250304
Time                     13.59 h
INSTRUM                  spect
PROBHD       Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                   zg30
TD                       32768
SOLVENT                  CDCl3
NS                          16
DS                           2
SWH                   5411.255 Hz
FIDRES                0.330277 Hz
AQ                   3.0277631 sec
RG                      184.51
DW                      92.400 usec
DE                        6.50 usec
TE                       -50.8 K
D1                  0.50000000 sec
TD0                          1
SFO1               300.1318008 MHz
NUC1                        1H
P0                        3.25 usec
P1                        9.75 usec
PLW1               16.50000000 W

F2 - Processing parameters
SI                       32768
SF                 300.1300000 MHz
WDW                         EM
SSB                          0
LB                        0.30 Hz
GB                           0
PC                        1.00
```



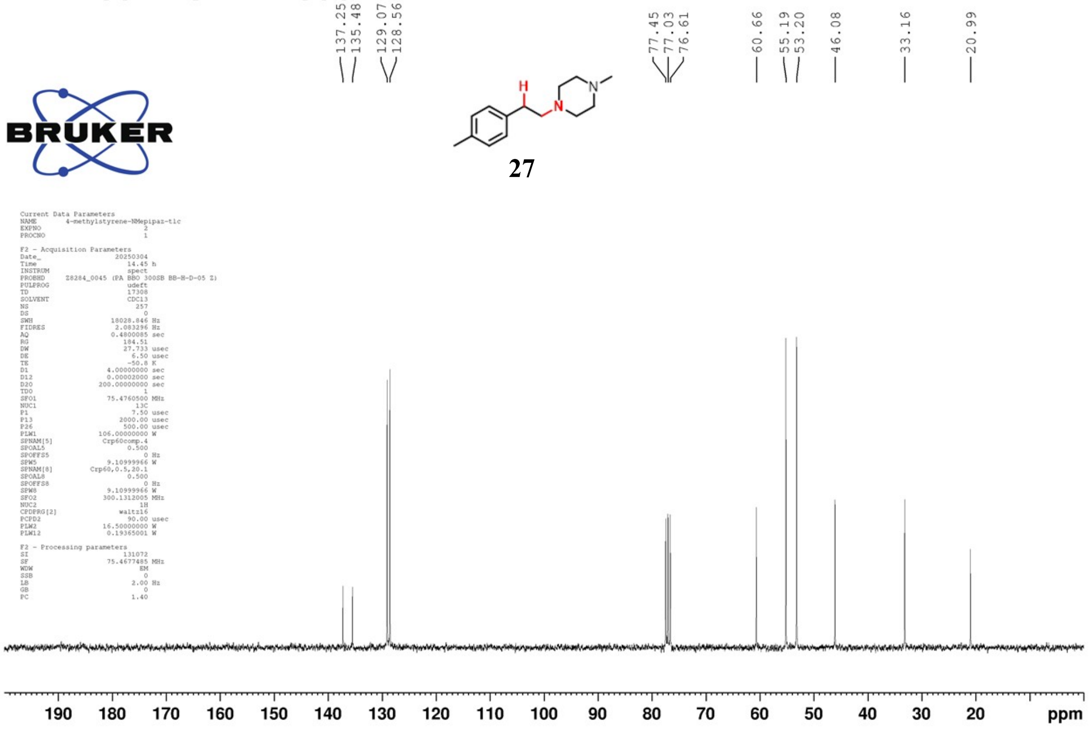
```
Current Data Parameters
NAME          4-methylstyrene-azet-tlc
EXPNO                        2
PROCNO                       1

F2 - Acquisition Parameters
Date_                 20250304
Time                     14.12 h
INSTRUM                  spect
PROBHD       Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                  udeft
TD                       17308
SOLVENT                  CDCl3
NS                          96
DS                           0
SWH                  18028.846 Hz
FIDRES                2.083296 Hz
AQ                   0.4800085 sec
RG                      184.51
DW                      27.733 usec
DE                        6.50 usec
TE                       -50.8 K
D1                  4.00000000 sec
D12                 0.00002000 sec
D20               200.00000000 sec
TD0                          1
SFO1                75.4760500 MHz
NUC1                       13C
P1                        7.50 usec
P13                    2000.00 usec
P26                     500.00 usec
PLW1              106.00000000 W
SPNAM[5]          Crp60comp.4
SPOAL5                   0.500
SPOFFS5                      0 Hz
SPW5                9.10999966 W
SPNAM[8]        Crp60,0.5,20.1
SPOAL8                   0.500
SPOFFS8                      0 Hz
SPW8                9.10999966 W
SFO2               300.1312005 MHz
NUC2                        1H
CPDPRG[2]              waltz16
PCPD2                    90.00 usec
PLW2               16.50000000 W
PLW12               0.19365001 W

F2 - Processing parameters
SI                      131072
SF                  75.4677485 MHz
WDW                         EM
SSB                          0
LB                        2.00 Hz
GB                           0
PC                        1.40
```

N1-(4-methylphenethyl)-N2-methylpiperazine



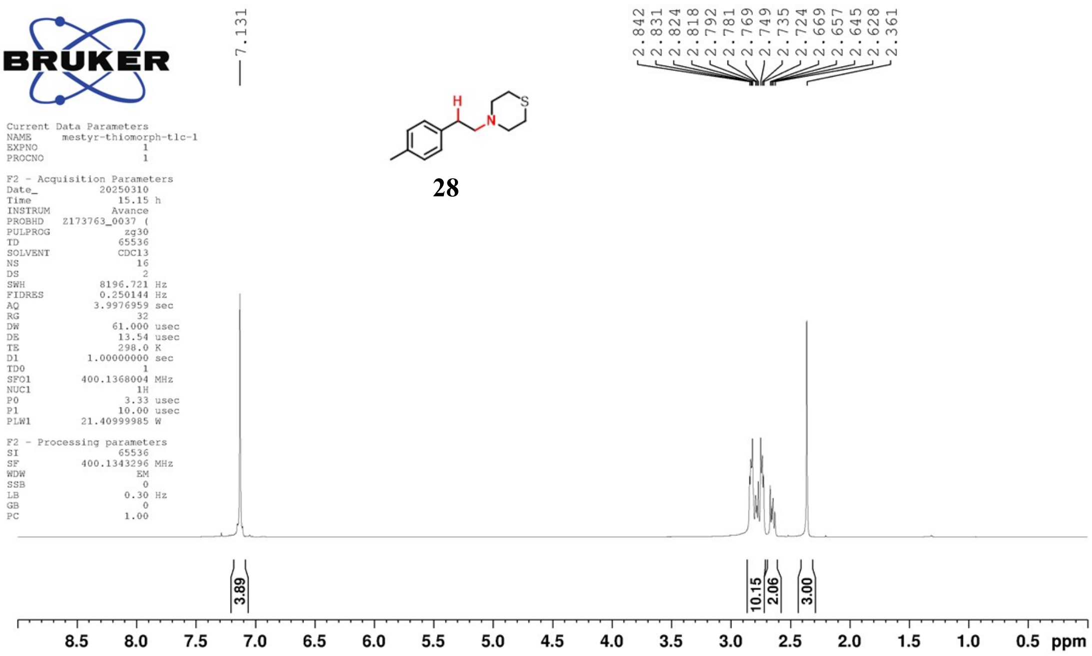
```
Current Data Parameters
NAME       4-methylstyrene-NMepipaz-tlc
EXPNO                         1
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20250304
Time                      14.18 h
INSTRUM                   spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                    zg30
TD                        32768
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                    5411.255 Hz
FIDRES                 0.330277 Hz
AQ                    3.0277631 sec
RG                       184.51
DW                       92.400 usec
DE                         6.50 usec
TE                        -50.8 K
D1                   0.50000000 sec
TD0                           1
SFO1                300.1318008 MHz
NUC1                         1H
P0                         3.25 usec
P1                         9.75 usec
PLW1                16.50000000 W

F2 - Processing parameters
SI                        32768
SF                  300.1300000 MHz
WDW                          EM
SSB                           0
LB                         0.30 Hz
GB                            0
PC                         1.00
```

N1-(4-methylphenethyl)-N2-methylpiperazine



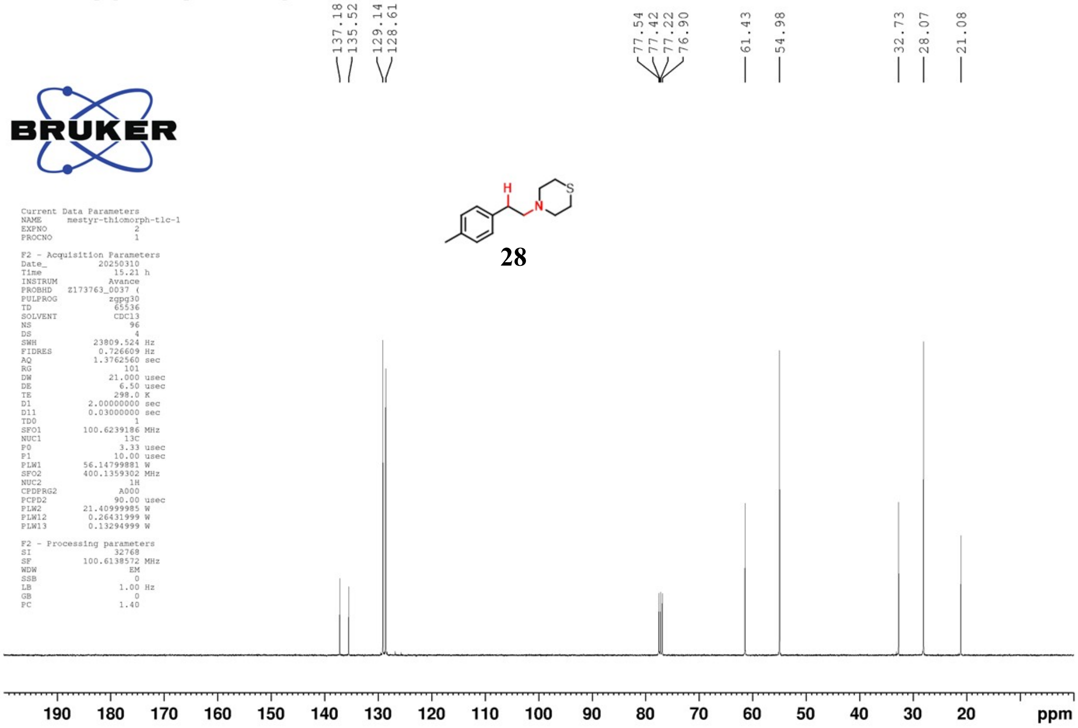
```
Current Data Parameters
NAME       4-methylstyrene-NMepipaz-tlc
EXPNO                         2
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20250304
Time                      14.45 h
INSTRUM                   spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                   udeft
TD                        17308
SOLVENT                   CDCl3
NS                          257
DS                            0
SWH                   18028.846 Hz
FIDRES                 2.083296 Hz
AQ                    0.4800085 sec
RG                       184.51
DW                       27.733 usec
DE                         6.50 usec
TE                        -50.8 K
D1                   4.00000000 sec
D12                  0.00002000 sec
D20                200.00000000 sec
TD0                           1
SFO1                 75.4760500 MHz
NUC1                        13C
P1                         7.50 usec
P13                     2000.00 usec
P26                      500.00 usec
PLW1               106.00000000 W
SPNAM[5]            Crp60comp.4
SPOAL5                    0.500
SPOFFS5                       0 Hz
SPW5                 9.10999966 W
SPNAM[8]         Crp60,0.5,20.1
SPOAL8                    0.500
SPOFFS8                       0 Hz
SPW8                 9.10999966 W
SFO2                300.1312005 MHz
NUC2                         1H
CPDPRG[2]               waltz16
PCPD2                     90.00 usec
PLW2                16.50000000 W
PLW12                0.19365001 W

F2 - Processing parameters
SI                       131072
SF                   75.4677485 MHz
WDW                          EM
SSB                           0
LB                         2.00 Hz
GB                            0
PC                         1.40
```

N-(4-methylphenethyl)thiomorpholine



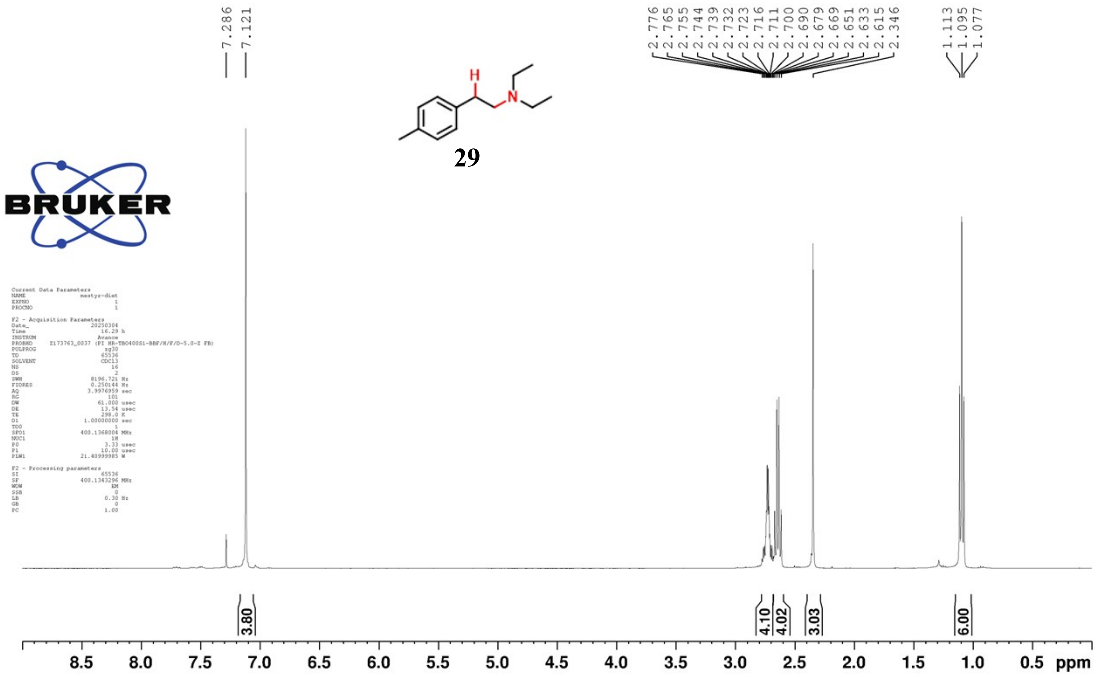
```
Current Data Parameters
NAME      mestyr-thiomorph-tlc-1
EXPNO                    1
PROCNO                   1

F2 - Acquisition Parameters
Date_             20250310
Time                 15.15 h
INSTRUM             Avance
PROBHD   Z173763_0037 (
PULPROG               zg30
TD                   65536
SOLVENT              CDCl3
NS                      16
DS                       2
SWH               8196.721 Hz
FIDRES            0.250144 Hz
AQ               3.9976959 sec
RG                      32
DW                  61.000 usec
DE                   13.54 usec
TE                   298.0 K
D1              1.00000000 sec
TD0                      1
SFO1           400.1368004 MHz
NUC1                    1H
P0                    3.33 usec
P1                   10.00 usec
PLW1           21.40999985 W

F2 - Processing parameters
SI                   65536
SF             400.1343296 MHz
WDW                     EM
SSB                      0
LB                    0.30 Hz
GB                       0
PC                    1.00
```

N-(4-methylphenethyl)thiomorpholine

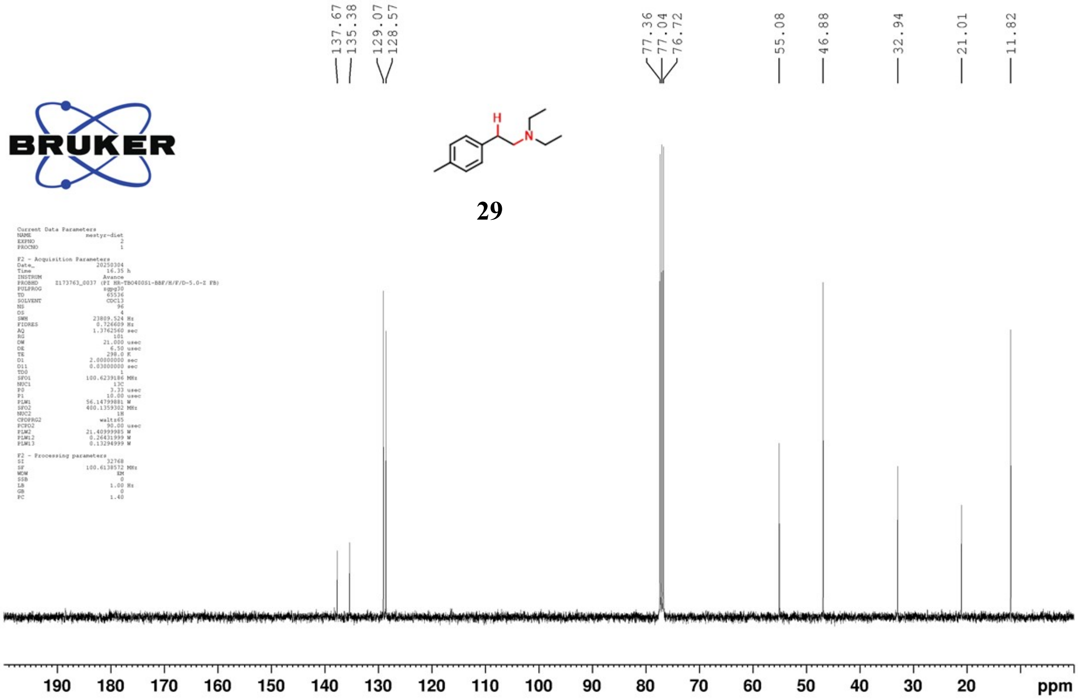


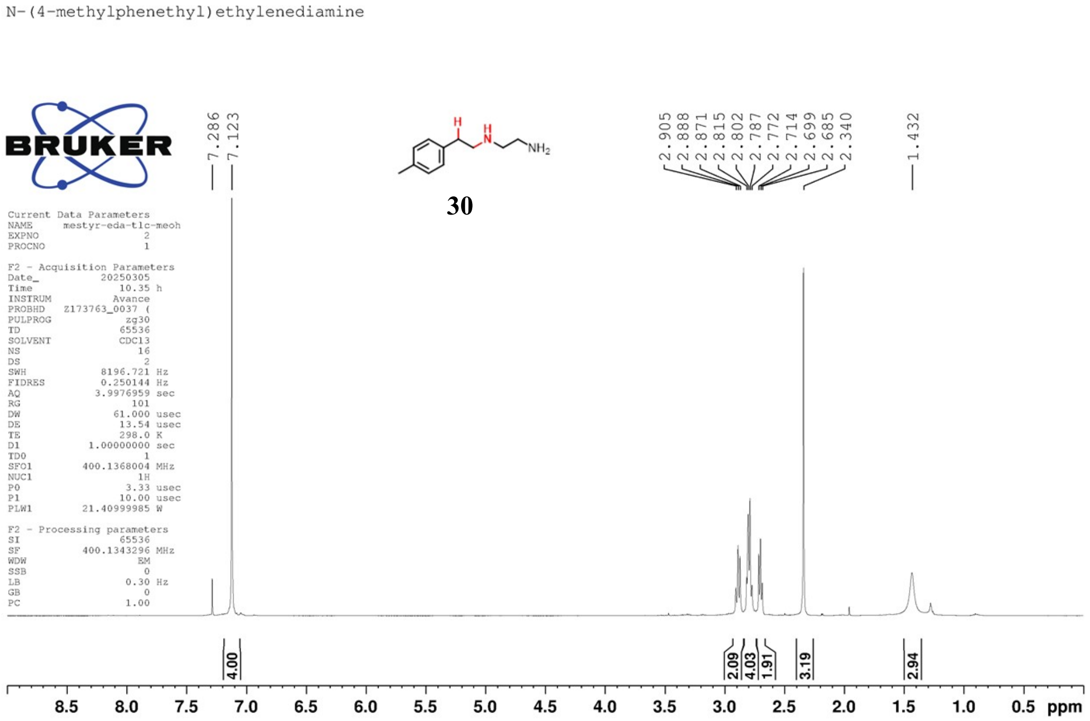
```
Current Data Parameters
NAME      mestyr-thiomorph-tlc-1
EXPNO                    2
PROCNO                   1

F2 - Acquisition Parameters
Date_             20250310
Time                 15.21 h
INSTRUM             Avance
PROBHD   Z173763_0037 (
PULPROG             zgpg30
TD                   65536
SOLVENT              CDCl3
NS                      96
DS                       4
SWH              23809.524 Hz
FIDRES            0.726609 Hz
AQ               1.3762560 sec
RG                     101
DW                  21.000 usec
DE                    6.50 usec
TE                   298.0 K
D1              2.00000000 sec
D11             0.03000000 sec
TD0                      1
SFO1           100.6239186 MHz
NUC1                   13C
P0                    3.33 usec
P1                   10.00 usec
PLW1           56.14799881 W
SFO2           400.1359302 MHz
NUC2                    1H
CPDPRG2               A000
PCPD2                90.00 usec
PLW2           21.40999985 W
PLW12           0.26431999 W
PLW13           0.13294999 W

F2 - Processing parameters
SI                   32768
SF             100.6138572 MHz
WDW                     EM
SSB                      0
LB                    1.00 Hz
GB                       0
PC                    1.40
```

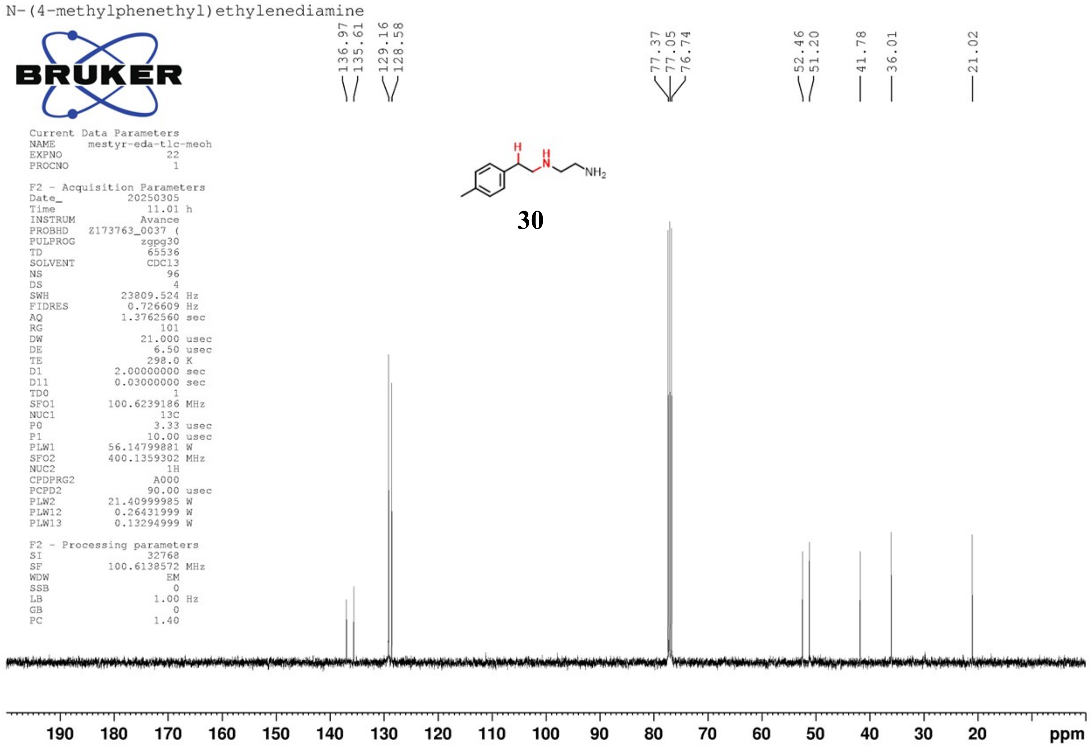
N-(4-methylphenethyl)diethylamine



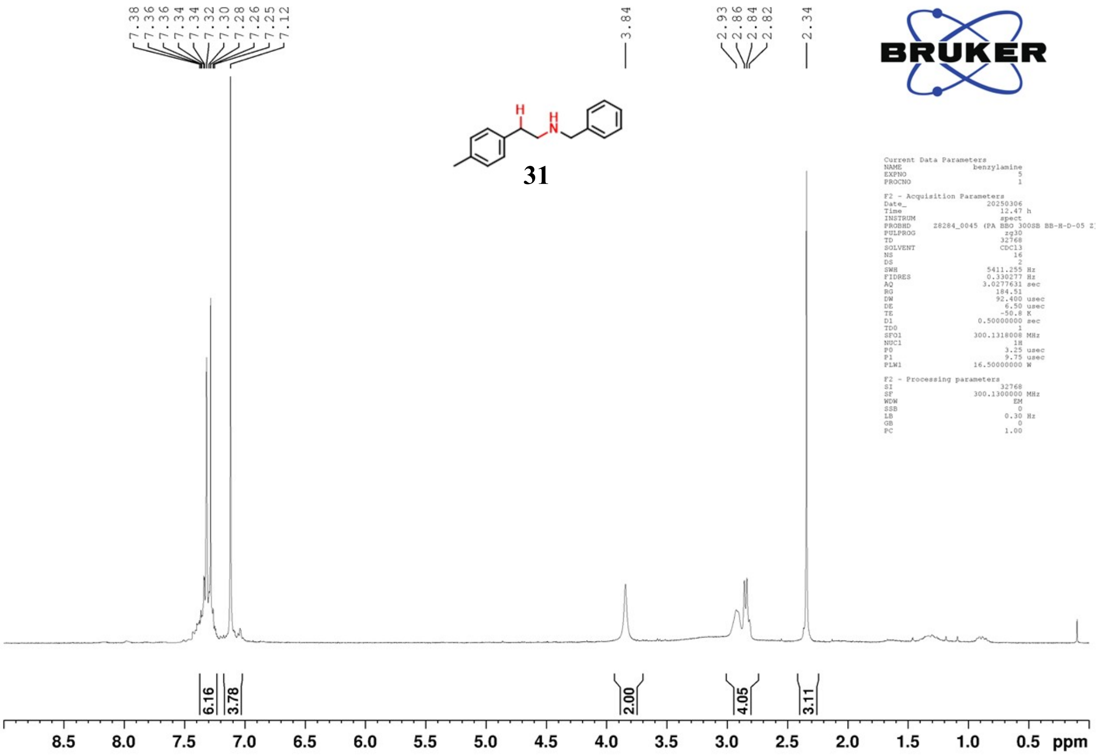
N-(4-methylphenethyl)diethylamine




N-(4-methylphenethyl)ethylenediamine
BRUKER
7.286
7.123
2.905
2.888
2.871
2.815
2.802
2.787
2.772
2.714
2.699
2.685
2.340
1.432
30
Current Data Parameters
NAME mestyr-eda-tlc-meoh
EXPNO 2
PROCNO 1
F2 - Acquisition Parameters
Date_ 20250305
Time 10.35 h
INSTRUM Avance
PROBHD Z173763_0037 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8196.721 Hz
FIDRES 0.250144 Hz
AQ 3.9976959 sec
RG 101
DW 61.000 usec
DE 13.54 usec
TE 298.0 K
D1 1.00000000 sec
TD0 1
SFO1 400.1368004 MHz
NUC1 1H
P0 3.33 usec
P1 10.00 usec
PLW1 21.40999985 W
F2 - Processing parameters
SI 65536
SF 400.1343296 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
4.00
2.09
4.03
1.91
3.19
2.94
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm

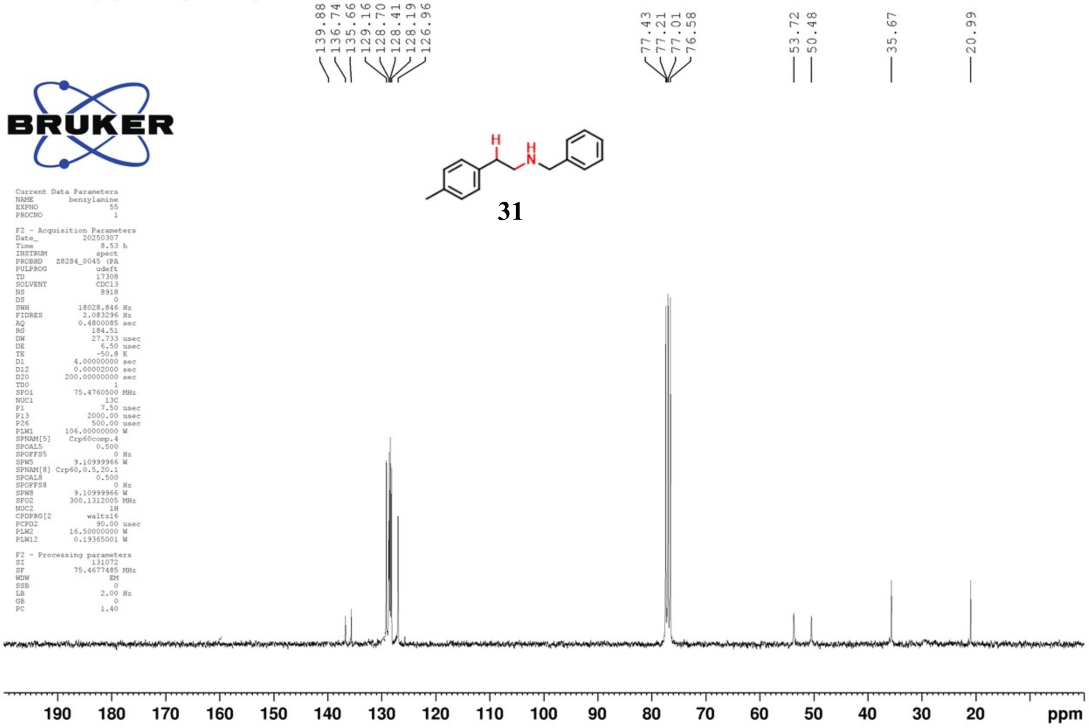

N-(4-methylphenethyl)ethylenediamine
BRUKER
136.97
135.61
129.16
128.58
77.37
77.05
76.74
52.46
51.20
41.78
36.01
21.02
30
Current Data Parameters
NAME mestyr-eda-tlc-meoh
EXPNO 22
PROCNO 1
F2 - Acquisition Parameters
Date_ 20250305
Time 11.01 h
INSTRUM Avance
PROBHD Z173763_0037 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 96
DS 4
SWH 23809.524 Hz
FIDRES 0.726609 Hz
AQ 1.3762560 sec
RG 101
DW 21.000 usec
DE 6.50 usec
TE 298.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6239186 MHz
NUC1 13C
P0 3.33 usec
P1 10.00 usec
PLW1 56.14799881 W
SFO2 400.1359302 MHz
NUC2 1H
CPDPRG2 A000
PCPD2 90.00 usec
PLW2 21.40999985 W
PLW12 0.26431999 W
PLW13 0.13294999 W
F2 - Processing parameters
SI 32768
SF 100.6138572 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
ppm

N-(4-methylphenethyl)benzylamine



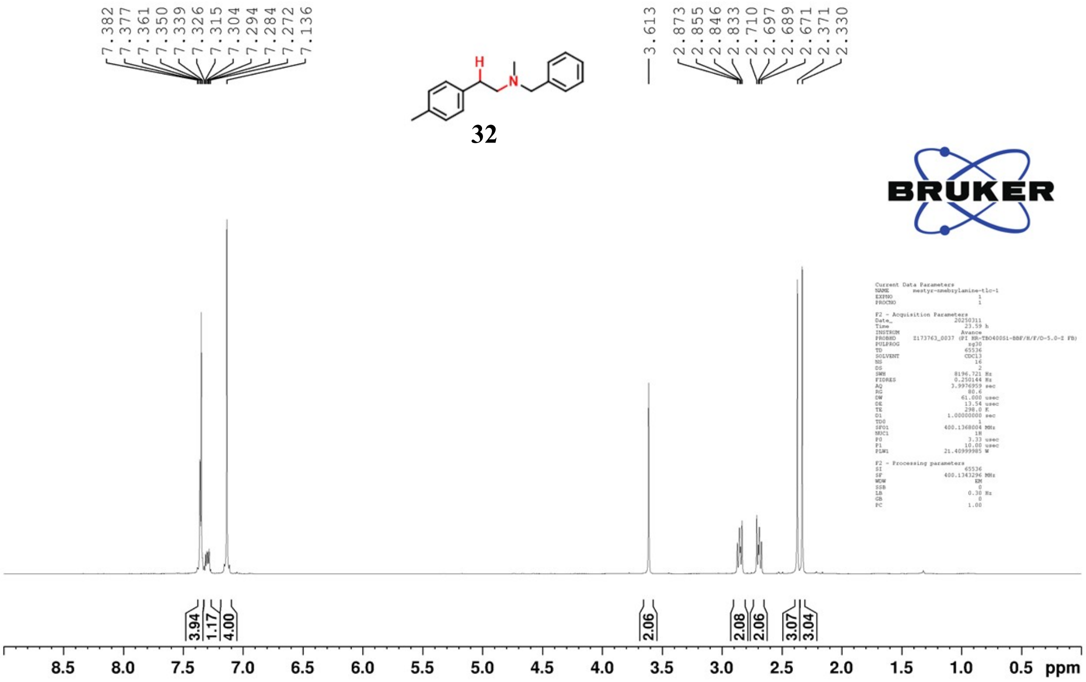
```
Current Data Parameters
NAME                benzylamine
EXPNO                         5
PROCNO                        1

F2 - Acquisition Parameters
Date_                  20250306
Time                    12.47 h
INSTRUM                   spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z)
PULPROG                    zg30
TD                        32768
SOLVENT                   CDCl3
NS                           16
DS                            2
SWH                5411.255 Hz
FIDRES             0.330277 Hz
AQ                3.0277631 sec
RG                       184.51
DW                   92.400 usec
DE                     6.50 usec
TE                      -50.8 K
D1               0.50000000 sec
TD0                           1
SFO1            300.1318008 MHz
NUC1                         1H
P0                     3.25 usec
P1                     9.75 usec
PLW1              16.50000000 W

F2 - Processing parameters
SI                        32768
SF              300.1300000 MHz
WDW                          EM
SSB                           0
LB                      0.30 Hz
GB                            0
PC                         1.00
```

N-(4-methylphenethyl)benzylamine



```
Current Data Parameters
NAME         benzylamine
EXPNO                 55
PROCNO                 1

F2 - Acquisition Parameters
Date_           20250307
Time              8.53 h
INSTRUM            spect
PROBHD   Z8284_0045 (PA
PULPROG            udeft
TD                 17308
SOLVENT            CDCl3
NS                  8918
DS                     0
SWH            18028.846 Hz
FIDRES          2.083296 Hz
AQ             0.4800085 sec
RG                184.51
DW                27.733 usec
DE                  6.50 usec
TE                 -50.8 K
D1            4.00000000 sec
D12           0.00002000 sec
D20         200.00000000 sec
TD0                    1
SFO1          75.4760500 MHz
NUC1                 13C
P1                  7.50 usec
P13              2000.00 usec
P26               500.00 usec
PLW1        106.00000000 W
SPNAM[5]     Crp60comp.4
SPOAL5             0.500
SPOFFS5                0 Hz
SPW5          9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8             0.500
SPOFFS8                0 Hz
SPW8          9.10999966 W
SFO2         300.1312005 MHz
NUC2                  1H
CPDPRG[2        waltz16
PCPD2              90.00 usec
PLW2         16.50000000 W
PLW12         0.19365001 W

F2 - Processing parameters
SI                131072
SF            75.4677485 MHz
WDW                   EM
SSB                    0
LB                  2.00 Hz
GB                     0
PC                  1.40
```

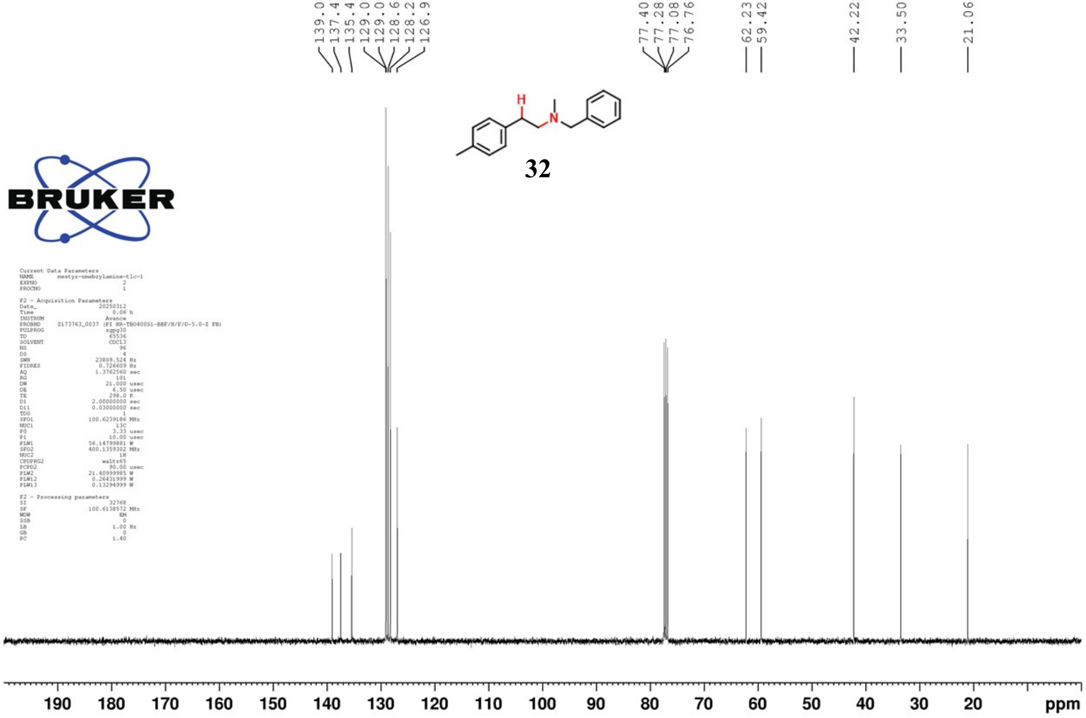
N-(4-methylphenethyl)-N-methylbenzylamine



32

```
Current Data Parameters
NAME       mestyr-nmebzylamine-tlc-1
EXPNO                          1
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250311
Time                       23.59 h
INSTRUM                   Avance
PROBHD     Z173763_0037 (PI HR-TBO400S1-BBF/H/F/D-5.0-Z FB)
PULPROG                     zg30
TD                         65536
SOLVENT                    CDCl3
NS                            16
DS                             2
SWH                     8196.721 Hz
FIDRES                  0.250144 Hz
AQ                     3.9976959 sec
RG                          80.6
DW                        61.000 usec
DE                         13.54 usec
TE                         298.0 K
D1                    1.00000000 sec
TD0                            1
SFO1                 400.1368004 MHz
NUC1                          1H
P0                          3.33 usec
P1                         10.00 usec
PLW1                 21.40999985 W

F2 - Processing parameters
SI                         65536
SF                   400.1343296 MHz
WDW                           EM
SSB                            0
LB                          0.30 Hz
GB                             0
PC                          1.00
```

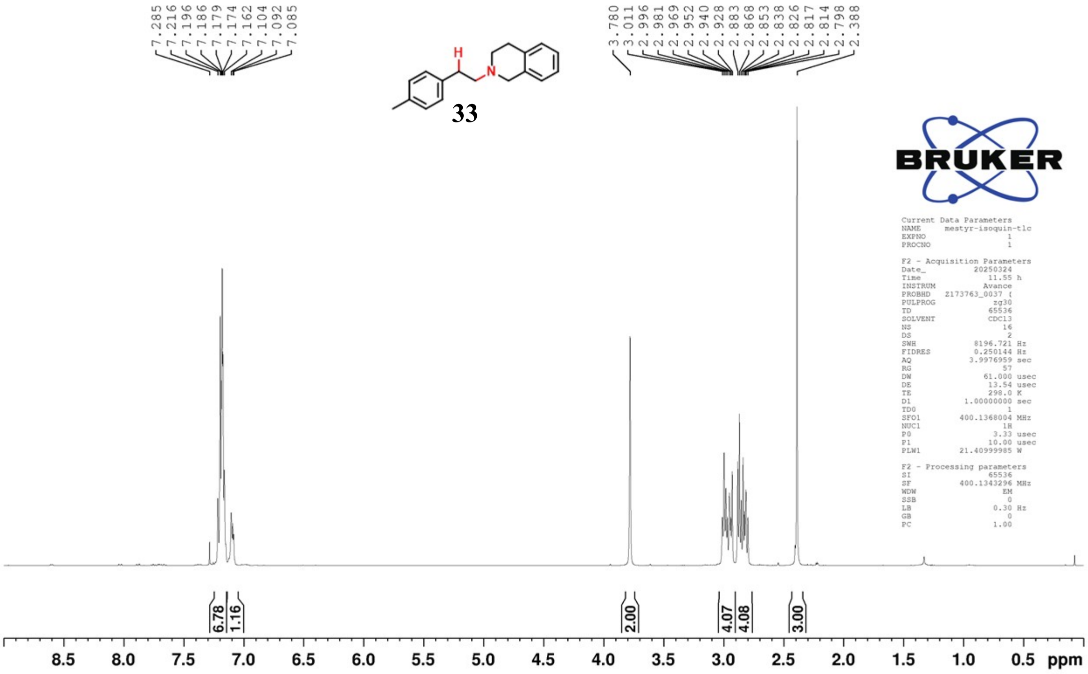
N-(4-methylphenethyl)-N-methylbenzylamine



32

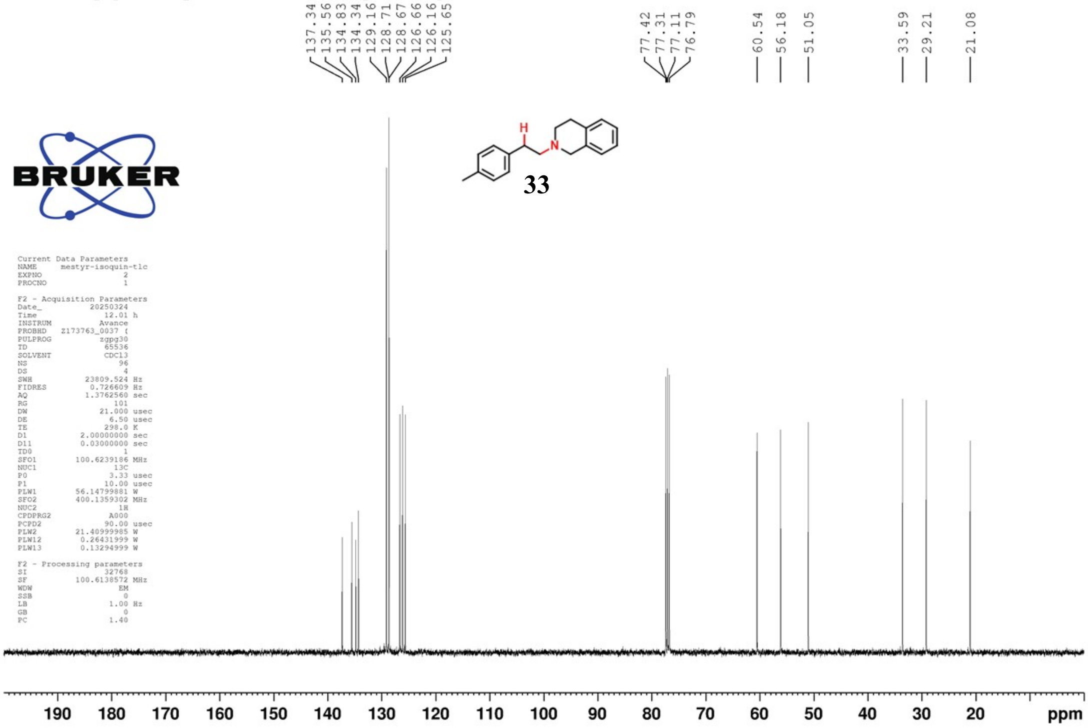
```
Current Data Parameters
NAME       mestyr-nmebzylamine-tlc-1
EXPNO                          2
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20250312
Time                        0.06 h
INSTRUM                   Avance
PROBHD     Z173763_0037 (PI HR-TBO400S1-BBF/H/F/D-5.0-Z FB)
PULPROG                   zgpg30
TD                         65536
SOLVENT                    CDCl3
NS                            96
DS                             4
SWH                    23809.524 Hz
FIDRES                  0.726609 Hz
AQ                     1.3762560 sec
RG                           101
DW                        21.000 usec
DE                          6.50 usec
TE                         298.0 K
D1                    2.00000000 sec
D11                   0.03000000 sec
TD0                            1
SFO1                 100.6239186 MHz
NUC1                         13C
P0                          3.33 usec
P1                         10.00 usec
PLW1                 56.14799881 W
SFO2                 400.1359302 MHz
NUC2                          1H
CPDPRG2                  waltz65
PCPD2                      90.00 usec
PLW2                 21.40999985 W
PLW12                 0.26431999 W
PLW13                 0.13294999 W

F2 - Processing parameters
SI                         32768
SF                   100.6138572 MHz
WDW                           EM
SSB                            0
LB                          1.00 Hz
GB                             0
PC                          1.40
```

N-(4-methylphenethyl)-1,2,3,4-tetrahydroisoquinoline



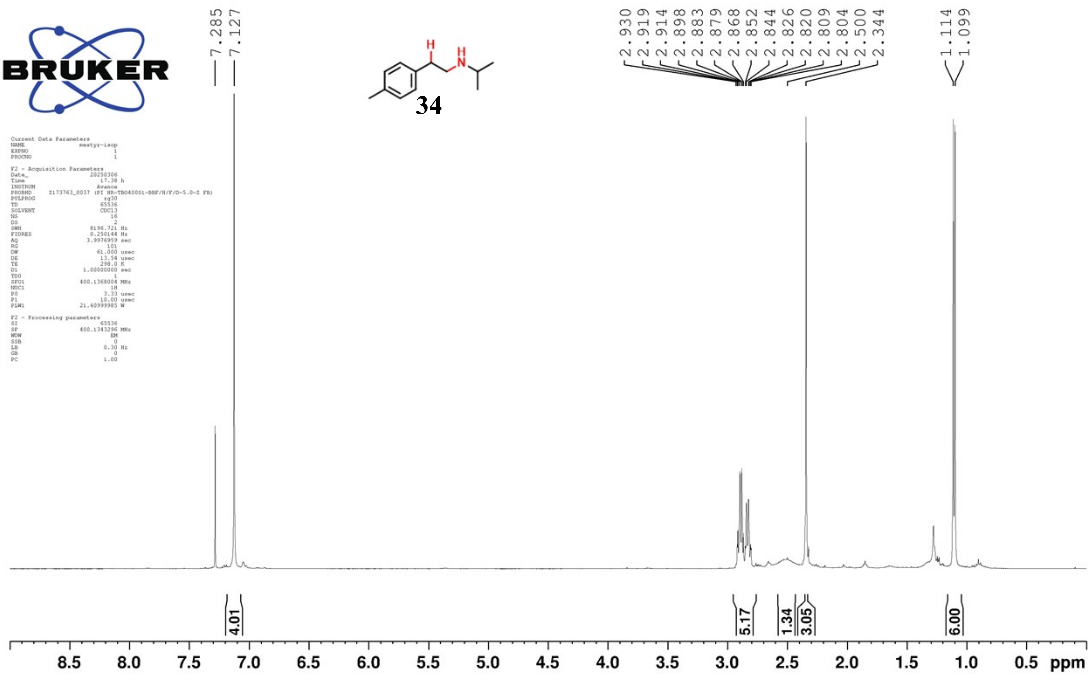
```
Current Data Parameters
NAME     mestyr-isoquin-tlc
EXPNO                     1
PROCNO                    1

F2 - Acquisition Parameters
Date_              20250324
Time                  11.55 h
INSTRUM              Avance
PROBHD   Z173763_0037 (
PULPROG                zg30
TD                    65536
SOLVENT               CDCl3
NS                       16
DS                        2
SWH                8196.721 Hz
FIDRES             0.250144 Hz
AQ                3.9976959 sec
RG                       57
DW                   61.000 usec
DE                    13.54 usec
TE                    298.0 K
D1               1.00000000 sec
TD0                       1
SFO1            400.1368004 MHz
NUC1                     1H
P0                     3.33 usec
P1                    10.00 usec
PLW1            21.40999985 W

F2 - Processing parameters
SI                    65536
SF              400.1343296 MHz
WDW                      EM
SSB                       0
LB                     0.30 Hz
GB                        0
PC                     1.00
```

N-(4-methylphenethyl)-1,2,3,4-tetrahydroisoquinoline

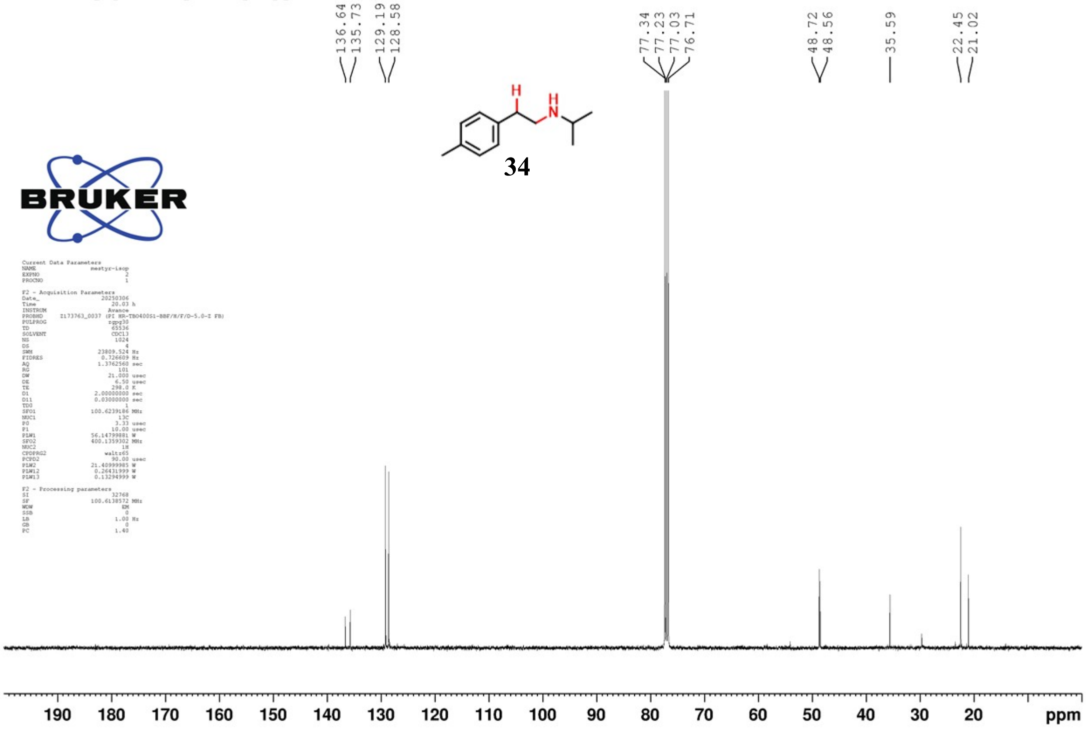


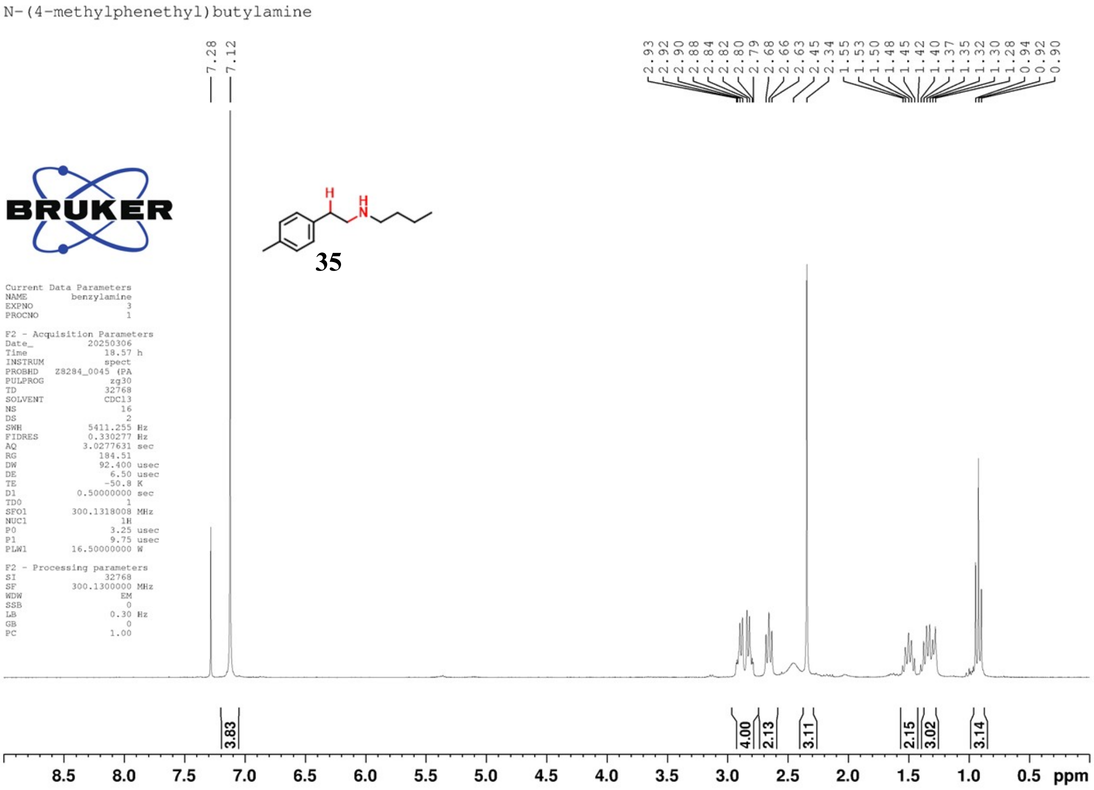
```
Current Data Parameters
NAME     mestyr-isoquin-tlc
EXPNO                     2
PROCNO                    1

F2 - Acquisition Parameters
Date_              20250324
Time                  12.01 h
INSTRUM              Avance
PROBHD   Z173763_0037 (
PULPROG             zgpg30
TD                    65536
SOLVENT               CDCl3
NS                       96
DS                        4
SWH               23809.524 Hz
FIDRES             0.726609 Hz
AQ                1.3762560 sec
RG                      101
DW                   21.000 usec
DE                     6.50 usec
TE                    298.0 K
D1               2.00000000 sec
D11              0.03000000 sec
TD0                       1
SFO1            100.6239186 MHz
NUC1                    13C
P0                     3.33 usec
P1                    10.00 usec
PLW1            56.14799881 W
SFO2            400.1359302 MHz
NUC2                     1H
CPDPRG2                A000
PCPD2                 90.00 usec
PLW2            21.40999985 W
PLW12            0.26431999 W
PLW13            0.13294999 W

F2 - Processing parameters
SI                    32768
SF              100.6138572 MHz
WDW                      EM
SSB                       0
LB                     1.00 Hz
GB                        0
PC                     1.40
```

N-(4-methylphenethyl)isopropylamine

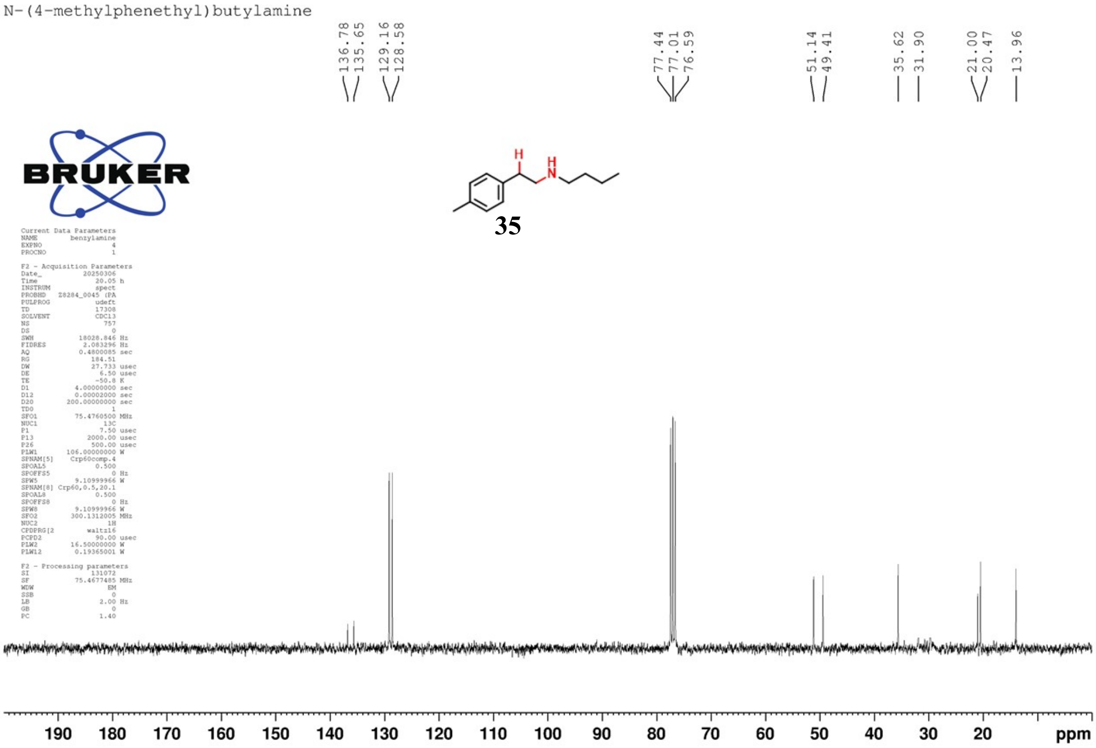


N-(4-methylphenethyl)isopropylamine



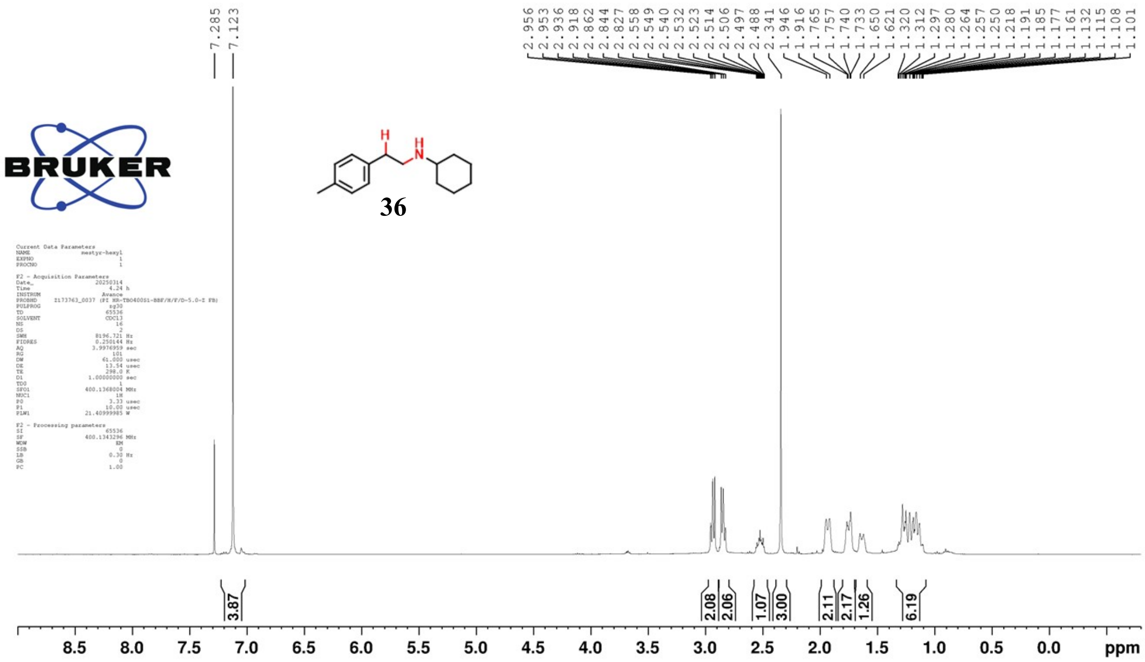


```
Current Data Parameters
NAME          benzylamine
EXPNO                   3
PROCNO                  1

F2 - Acquisition Parameters
Date_            20250306
Time                18.57 h
INSTRUM             spect
PROBHD   Z8284_0045 (PA
PULPROG              zg30
TD                  32768
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              5411.255 Hz
FIDRES           0.330277 Hz
AQ              3.0277631 sec
RG                 184.51
DW                 92.400 usec
DE                   6.50 usec
TE                  -50.8 K
D1             0.50000000 sec
TD0                     1
SFO1          300.1318008 MHz
NUC1                   1H
P0                   3.25 usec
P1                   9.75 usec
PLW1          16.50000000 W

F2 - Processing parameters
SI                  32768
SF            300.1300000 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```



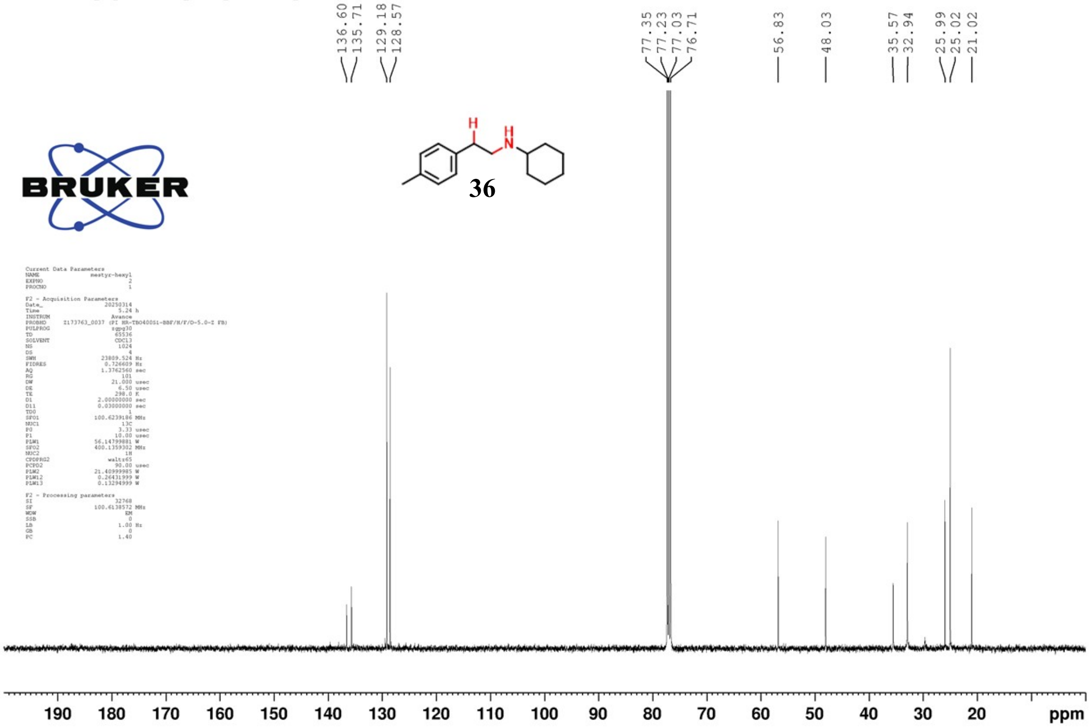
```
Current Data Parameters
NAME          benzylamine
EXPNO                   4
PROCNO                  1

F2 - Acquisition Parameters
Date_            20250306
Time                20.05 h
INSTRUM             spect
PROBHD   Z8284_0045 (PA
PULPROG             udeft
TD                  17308
SOLVENT             CDCl3
NS                    757
DS                      0
SWH             18028.846 Hz
FIDRES           2.083296 Hz
AQ              0.4800085 sec
RG                 184.51
DW                 27.733 usec
DE                   6.50 usec
TE                  -50.8 K
D1             4.00000000 sec
D12            0.00002000 sec
D20          200.00000000 sec
TD0                     1
SFO1           75.4760500 MHz
NUC1                  13C
P1                   7.50 usec
P13               2000.00 usec
P26                500.00 usec
PLW1         106.00000000 W
SPNAM[5]     Crp60comp.4
SPOAL5              0.500
SPOFFS5                 0 Hz
SPW5           9.10999966 W
SPNAM[8] Crp60,0.5,20.1
SPOAL8              0.500
SPOFFS8                 0 Hz
SPW8           9.10999966 W
SFO2          300.1312005 MHz
NUC2                   1H
CPDPRG[2         waltz16
PCPD2               90.00 usec
PLW2          16.50000000 W
PLW12          0.19365001 W

F2 - Processing parameters
SI                 131072
SF             75.4677485 MHz
WDW                    EM
SSB                     0
LB                   2.00 Hz
GB                      0
PC                   1.40
```

N-(4-methylphenethyl)cyclohexylamine



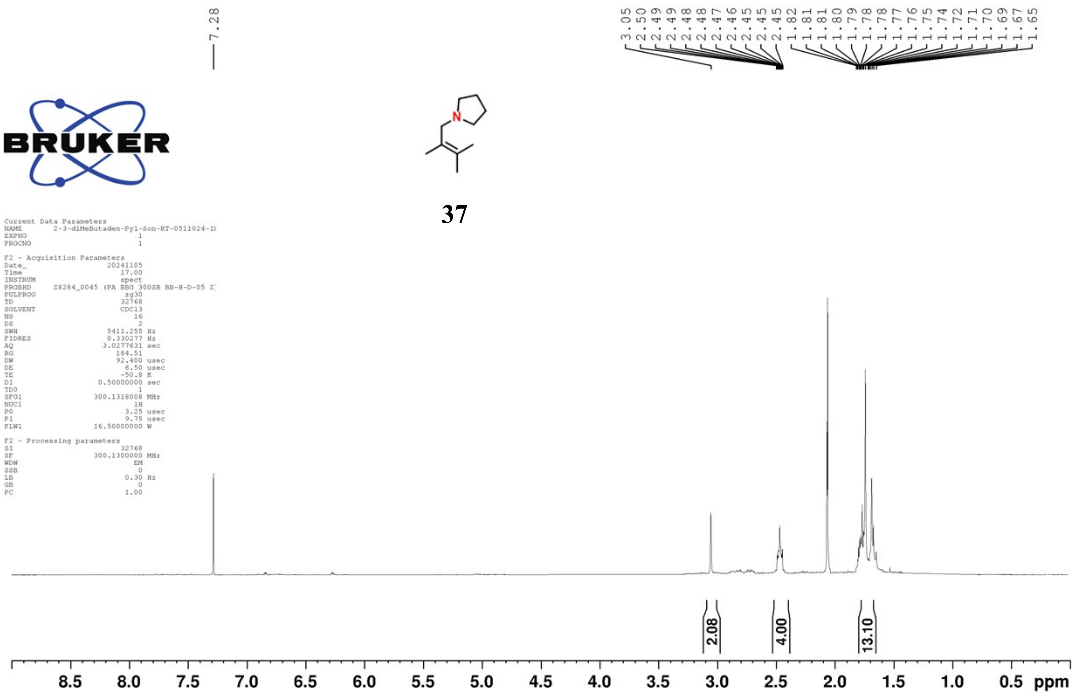
```
Current Data Parameters
NAME             mestyr-hexyl
EXPNO                       1
PROCNO                      1

F2 - Acquisition Parameters
Date_                20250314
Time                   4.24 h
INSTRUM                Avance
PROBHD     Z173763_0037 (PI HR-TBO400S1-BBF/H/F/D-5.0-Z FB)
PULPROG                  zg30
TD                      65536
SOLVENT                 CDCl3
NS                         16
DS                          2
SWH                  8196.721 Hz
FIDRES               0.250144 Hz
AQ                  3.9976959 sec
RG                        101
DW                     61.000 usec
DE                      13.54 usec
TE                      298.0 K
D1                 1.00000000 sec
TD0                         1
SFO1              400.1368004 MHz
NUC1                       1H
P0                       3.33 usec
P1                      10.00 usec
PLW1              21.40999985 W

F2 - Processing parameters
SI                      65536
SF                400.1343296 MHz
WDW                        EM
SSB                         0
LB                       0.30 Hz
GB                          0
PC                       1.00
```

N-(4-methylphenethyl)cyclohexylamine



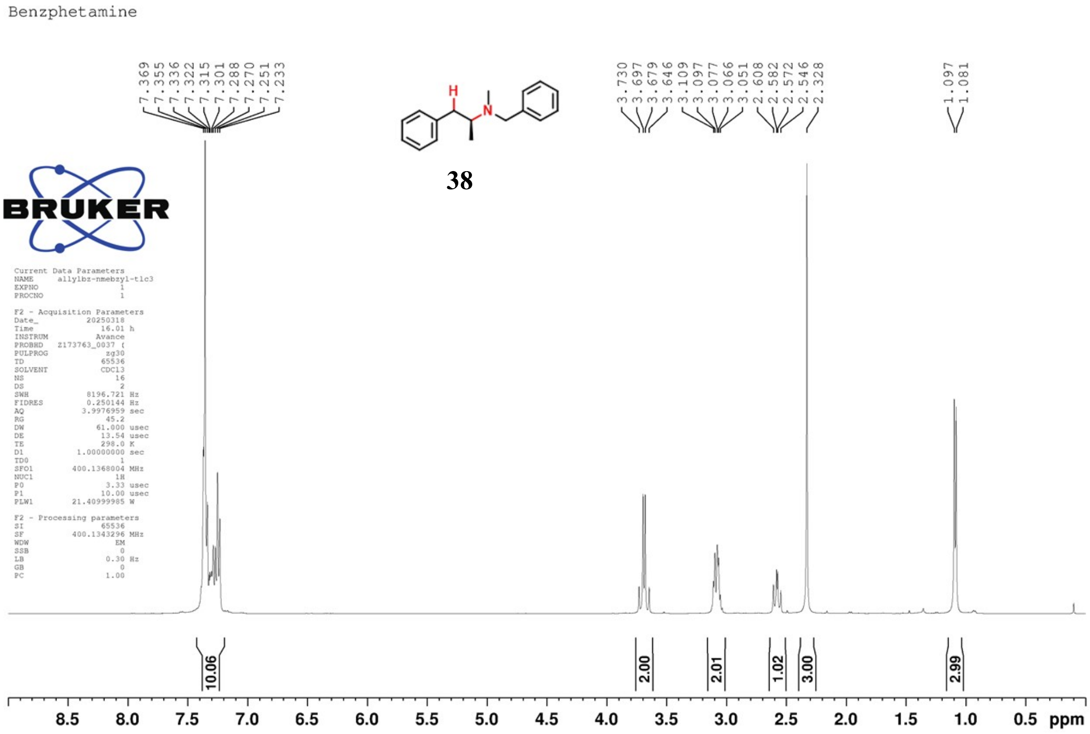
```
Current Data Parameters
NAME             mestyr-hexyl
EXPNO                       2
PROCNO                      1

F2 - Acquisition Parameters
Date_                20250314
Time                   5.24 h
INSTRUM                Avance
PROBHD     Z173763_0037 (PI HR-TBO400S1-BBF/H/F/D-5.0-Z FB)
PULPROG               zgpg30
TD                      65536
SOLVENT                 CDCl3
NS                       1024
DS                          4
SWH                 23809.524 Hz
FIDRES               0.726609 Hz
AQ                  1.3762560 sec
RG                        101
DW                     21.000 usec
DE                       6.50 usec
TE                      298.0 K
D1                 2.00000000 sec
D11                0.03000000 sec
TD0                         1
SFO1              100.6239186 MHz
NUC1                      13C
P0                       3.33 usec
P1                      10.00 usec
PLW1              56.14799881 W
SFO2              400.1359302 MHz
NUC2                       1H
CPDPRG2               waltz65
PCPD2                   90.00 usec
PLW2              21.40999985 W
PLW12              0.26431999 W
PLW13              0.13294999 W

F2 - Processing parameters
SI                      32768
SF                100.6138572 MHz
WDW                        EM
SSB                         0
LB                       1.00 Hz
GB                          0
PC                       1.40
```

1-(2,3-Dimethyl-2-buten-1-yl)pyrrolidine



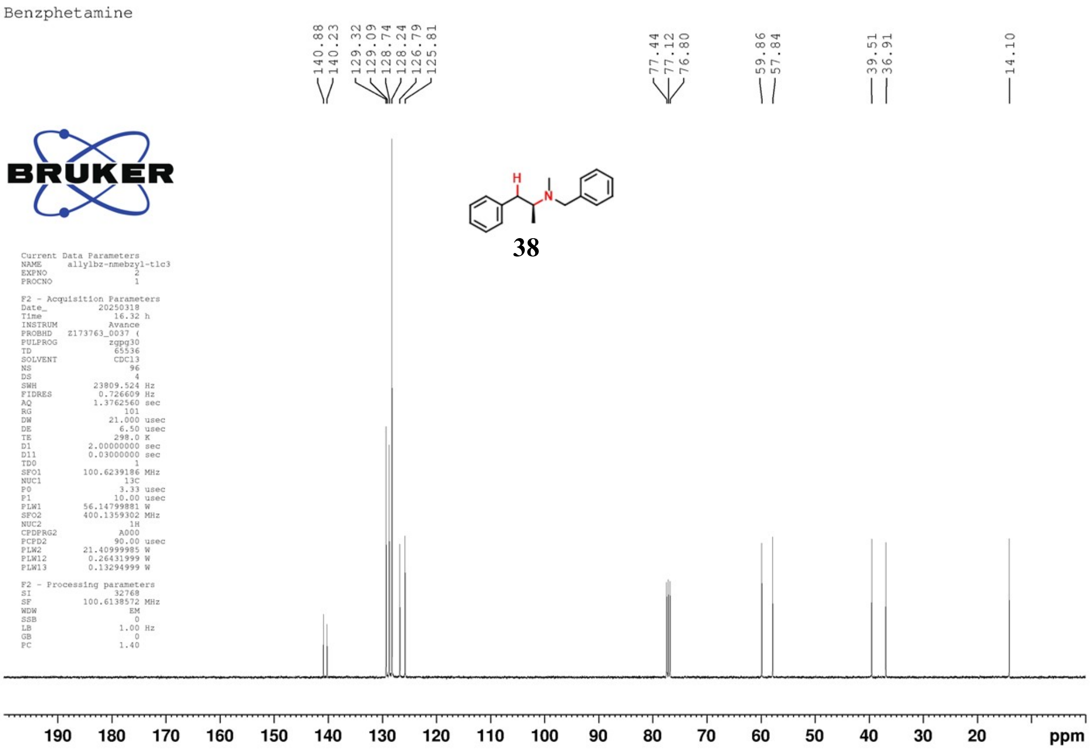
37

```
Current Data Parameters
NAME       2-3-diMeButaden-Pyl-Son-RT-0511024-1
EXPNO                          1
PROCNO                         1

F2 - Acquisition Parameters
Date_                   20241105
Time                       17.00
INSTRUM                    spect
PROBHD     Z8284_0045 (PA BBO 300SB BB-H-D-05 Z
PULPROG                     zg30
TD                         32768
SOLVENT                    CDCl3
NS                            16
DS                             2
SWH                     5411.255 Hz
FIDRES                  0.330277 Hz
AQ                     3.0277631 sec
RG                        184.51
DW                        92.400 usec
DE                          6.50 usec
TE                         -50.8 K
D1                    0.50000000 sec
TD0                            1
SFO1                 300.1318008 MHz
NUC1                          1H
P0                          3.25 usec
P1                          9.75 usec
PLW1                 16.50000000 W

F2 - Processing parameters
SI                         32768
SF                   300.1300000 MHz
WDW                           EM
SSB                            0
LB                          0.30 Hz
GB                             0
PC                          1.00
```



38

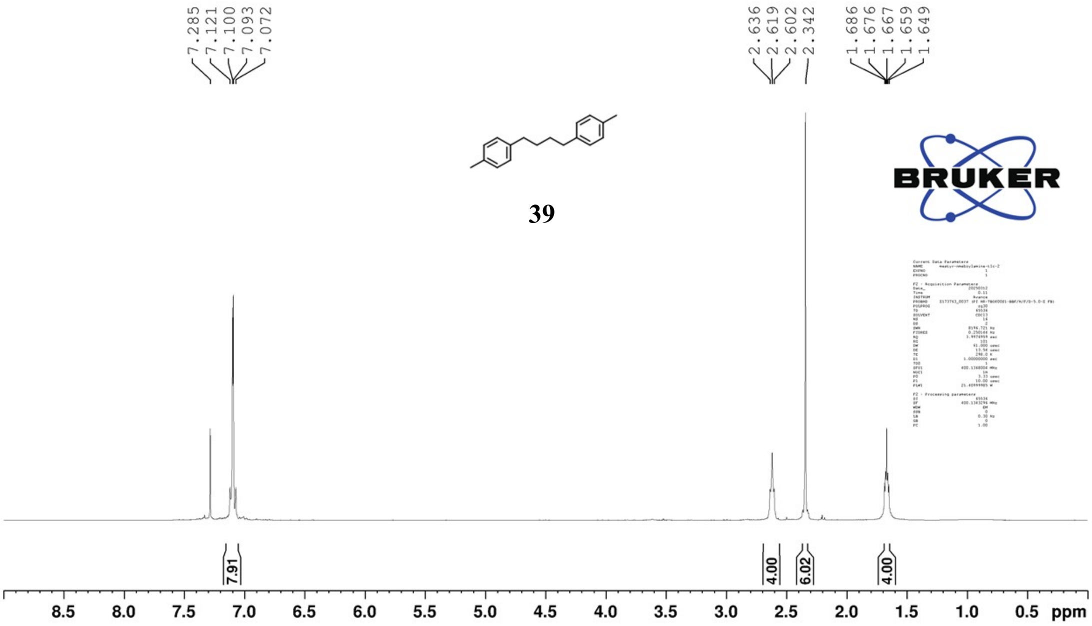
```
Current Data Parameters
NAME     allylbz-nmebzyl-tlc3
EXPNO                   1
PROCNO                  1

F2 - Acquisition Parameters
Date_            20250318
Time                16.01 h
INSTRUM            Avance
PROBHD   Z173763_0037 (
PULPROG              zg30
TD                  65536
SOLVENT             CDCl3
NS                     16
DS                      2
SWH              8196.721 Hz
FIDRES           0.250144 Hz
AQ              3.9976959 sec
RG                   45.2
DW                 61.000 usec
DE                  13.54 usec
TE                  298.0 K
D1             1.00000000 sec
TD0                     1
SFO1          400.1368004 MHz
NUC1                   1H
P0                   3.33 usec
P1                  10.00 usec
PLW1          21.40999985 W

F2 - Processing parameters
SI                  65536
SF            400.1343296 MHz
WDW                    EM
SSB                     0
LB                   0.30 Hz
GB                      0
PC                   1.00
```



38

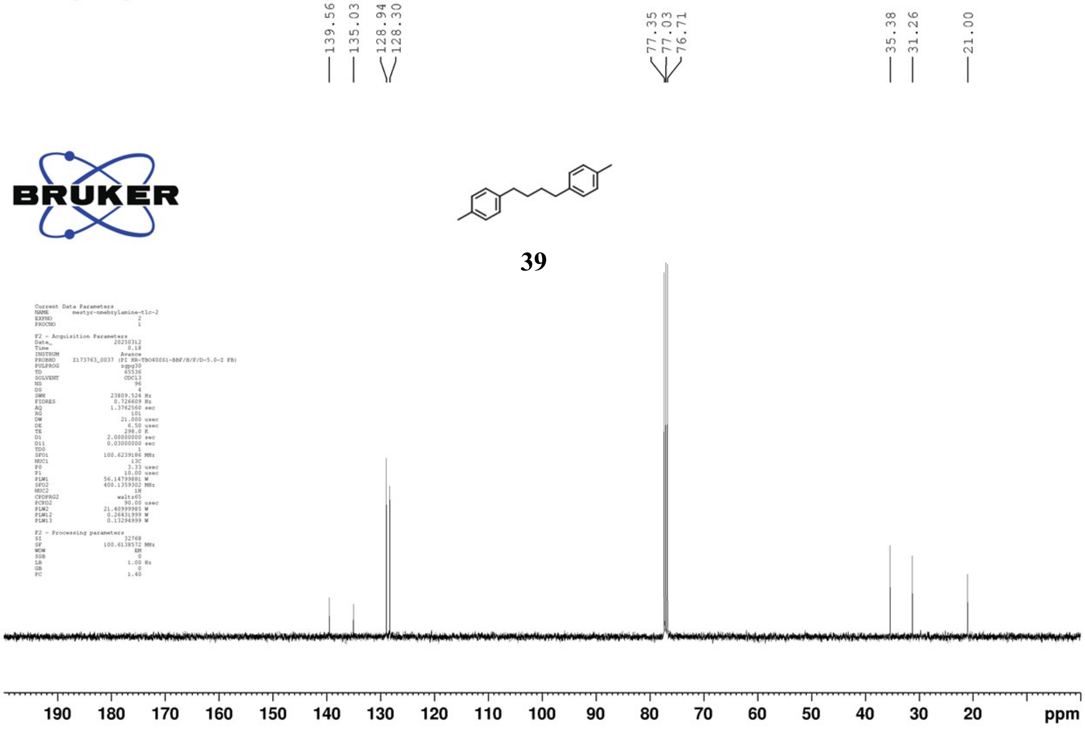
```
Current Data Parameters
NAME     allylbz-nmebzyl-tlc3
EXPNO                   2
PROCNO                  1

F2 - Acquisition Parameters
Date_            20250318
Time                16.32 h
INSTRUM            Avance
PROBHD   Z173763_0037 (
PULPROG            zgpg30
TD                  65536
SOLVENT             CDCl3
NS                     96
DS                      4
SWH             23809.524 Hz
FIDRES           0.726609 Hz
AQ              1.3762560 sec
RG                    101
DW                 21.000 usec
DE                   6.50 usec
TE                  298.0 K
D1             2.00000000 sec
D11            0.03000000 sec
TD0                     1
SFO1          100.6239186 MHz
NUC1                  13C
P0                   3.33 usec
P1                  10.00 usec
PLW1          56.14799881 W
SFO2          400.1359302 MHz
NUC2                   1H
CPDPRG2              A000
PCPD2               90.00 usec
PLW2          21.40999985 W
PLW12          0.26431999 W
PLW13          0.13294999 W

F2 - Processing parameters
SI                  32768
SF            100.6138572 MHz
WDW                    EM
SSB                     0
LB                   1.00 Hz
GB                      0
PC                   1.40
```

1,4-di-p-tolylbutane



```
Current Data Parameters
NAME       mestyr-nmebzylamine-tlc-2
EXPNO                      1
PROCNO                     1

F2 - Acquisition Parameters
Date_               20250312
Time                    0.11
INSTRUM               Avance
PROBHD    Z173763_0037 (PI HR-TBO400S1-BBF/H/F/D-5.0-Z FB)
PULPROG                 zg30
TD                     65536
SOLVENT                CDCl3
NS                        16
DS                         2
SWH                 8196.721 Hz
FIDRES              0.250168 Hz
AQ                 3.9976959 sec
RG                       101
DW                    61.000 usec
DE                     13.50 usec
TE                     298.0 K
D1                1.00000000 sec
TD0                        1
SFO1             400.1368004 MHz
NUC1                      1H
P0                      3.33 usec
P1                     10.00 usec
PLW1             21.40999985 W

F2 - Processing parameters
SI                     65536
SF               400.1343296 MHz
WDW                       EM
SSB                        0
LB                      0.30 Hz
GB                         0
PC                      1.00
```

1,4-di-p-tolylbutane



```
Current Data Parameters
NAME       mestyr-nmebzylamine-tlc-2
EXPNO                      2
PROCNO                     1

F2 - Acquisition Parameters
Date_               20250312
Time                    0.18
INSTRUM               Avance
PROBHD    Z173763_0037 (PI HR-TBO400S1-BBF/H/F/D-5.0-Z FB)
PULPROG              zgpg30
TD                     65536
SOLVENT                CDCl3
NS                        96
DS                         4
SWH                23809.524 Hz
FIDRES              0.726609 Hz
AQ                 1.3762560 sec
RG                       101
DW                    21.000 usec
DE                      6.50 usec
TE                     298.0 K
D1                2.00000000 sec
D11               0.03000000 sec
TD0                        1
SFO1             100.6239186 MHz
NUC1                     13C
P0                      3.33 usec
P1                     10.00 usec
PLW1             56.14799881 W
SFO2             400.1359302 MHz
NUC2                      1H
CPDPRG2              waltz65
PCPD2                  90.00 usec
PLW2             21.40999985 W
PLW12             0.26431999 W
PLW13             0.13294999 W

F2 - Processing parameters
SI                     32768
SF               100.6138572 MHz
WDW                       EM
SSB                        0
LB                      1.00 Hz
GB                         0
PC                      1.40
```