Supporting Information

Direct Electrochemical Reductive Amination between Aldehydes and Amines with H/D-Donor Solvent

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A. General Methods

Unless otherwise noted, all the chemicals were purchased commercially, and used without further purification. Technical grade petroleum ether (40-60°C bp.) and ethyl acetate were used for chromatography column. ^{1}H and ^{13}C NMR spectra were recorded on a Bruker Advance III 500 spectrometers using $CDCl_3$ as solvent with TMS as the internal standard. The chemical shifts are referenced to signals at 7.26 and 77.0 ppm, respectively. Chemical shift (δ) and coupling constants (J) are given in ppm and in Hz, respectively. The peak patterns are indicated as follows: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet. Electrolysis reactions were conducted using ElectraSyn 2.0 Package supply purchased from IKA Instruments. Cathode and anode electrodes were Graphite SK-50 electrodes provided by IKA electrochemical kit. Cyclic voltammetry (CV) analysis was performed on ElectraSyn 2.0 Package, using a glassy carbon electrode as working electrode, a platinum plated electrode as counter electrode and Ag/AgCl electrode as a reference electrode. Cyclic voltammograms were recorded at 0.2 V/s scan rate. Mass spectra were recorded on a Shimadzu GCMS-QP2020 gas chromatograph-mass spectrometer. The data of HRMS was carried out on a high-resolution mass spectrometer (Thermo Scientific Q Exactive-UltiMate3000). TLC was performed by using commercially prepared 100-400 mesh silica gel plates and visualization was affected at 254 nm. Deuterium incorporation was determined by integration of the residual formyl proton in ^{1}H NMR. The GC yield was determined using *n*-dodecane as the internal standard in the mechanistic studies.

B. General Procedures

General procedure A: the synthesis of products 3aa-3ta and 3ab-3ar: A mixture of **1** (0.5 mmol), **2** (0.6 mmol), $^{n}Bu_4NHSO_4$ (1 equiv) in 5 mL DMSO was added to an electrolytic cell (10 mL). The electrolytic cell was equipped with graphite anode and graphite cathode. The solution was electrolyzed in an undivided cell at ambient temperature under a constant current (10 mA) for 5 h. After electrolysis, the mixture was poured into water and extracted with ethyl acetate twice. The combined organic layer was washed with brine (10 mL) and dried over $MgSO_4$, filtered and

concentrated. The resulting mixture was purified by silica gel column chromatography to afford **3**.

General procedure B: the synthesis of products 3as: A mixture of **1a** (0.5 mmol), **2s** (1.5 mmol), $^{n}Bu_4NHSO_4$ (1 equiv) in 5 mL DMSO was added to an electrolytic cell (10 mL). The electrolytic cell was equipped with graphite anode and graphite cathode. The solution was electrolyzed in an undivided cell at ambient temperature under a constant current (10 mA) for 5 h. After electrolysis, the mixture was poured into water and extracted with ethyl acetate twice. The combined organic layer was washed with brine (10 mL) and dried over $MgSO_4$, filtered and concentrated. The resulting mixture was purified by silica gel column chromatography to afford **3as**.

General procedure C: the synthesis of products 3-d_1: A mixture of **1** (0.3 mmol), **2** (0.6 mmol), $^{n}Bu_4NHSO_4$ (1 equiv) in 3 mL DMSO-d_6 was added to an electrolytic cell (10 mL). The electrolytic cell was equipped with graphite anode and graphite cathode. The solution was electrolyzed in an undivided cell at ambient temperature under a constant current (10 mA) for 3 h. After electrolysis, the mixture was poured into water and extracted with ethyl acetate twice. The combined organic layer was washed with brine (10 mL) and dried over $MgSO_4$, filtered and concentrated. The resulting mixture was purified by silica gel column chromatography to afford **3-d_1**.

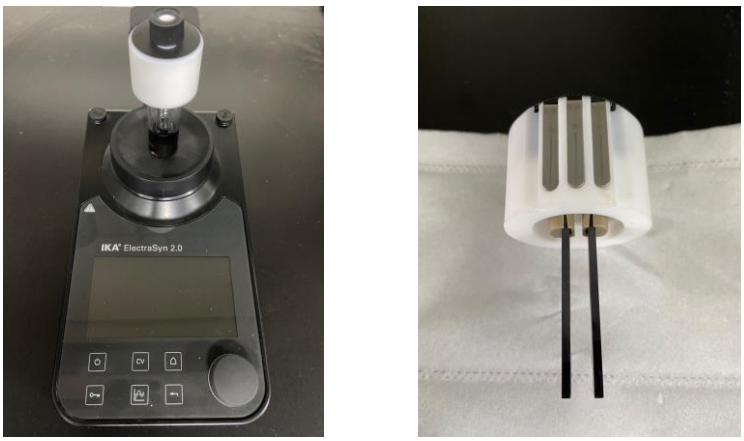


Fig S1. Reaction setup for the electrochemical reductive amination

General procedure D: the synthesis of aryl sulfonyl tertiary amine products products 5a: In air, a 50 mL round flask was charged with *N*-benzylaniline (0.5 mmol), 4-methylbenzenesulfonyl chloride (0.6 mmol), triethylamine (0.5 mmol) and

2 mL DCM. The reaction was allowed to stir at 0 °C for 24 h. After concentrating the reaction solution, methanol was added for recrystallization to obtain white crystal.

General procedure E: the synthesis of aryl sulfonyl tertiary amine products 5b-5c: In air, a 50 mL round bottom was charged with substituted *N*-benzylaniline (0.2 mmol), *N*-acetylsulfanilyl chloride (0.24 mmol) and 3 mL pyridine. The reaction was allowed to stir at 60 °C for 4 h. After that, water was added and extracted with ethyl acetate twice. The combined organic phase was dried over Na_2SO_4 and concentrated. The residue was purified by flash column chromatography on silica gel with petroleum ether/ethyl acetate (PE/EA = 1:5) as the eluent to afford the desired product.

General procedure F: the synthesis of ^{n}Bu$_4$NDSO$_4$: ^{n}Bu$_4$NOH solution (40 wt% in MeOH, 648.68mg) was added into a round bottom flask for concentration and drying. After adding D_2O (1 mL) to dissolve the ^{n}Bu$_4$NOH solid, D_2SO_4 (96%-98% in D_2O, 100.09 mg) was added for reaction. After stirring the mixture for 20 min, drying and removing D_2O to give the desired product ^{n}Bu$_4$NDSO$_4$.

C. Cyclic Voltammograms

In order to analyze the reaction process in depth, cyclic voltammetry (CV) experiments were performed at room temperature (Fig S2). The electrochemical reductive amination between benzaldehyde and aniline did not proceed without the addition of an electrolyte (Fig S2, a), which indicated that electrolyte played a key role in this transformation. After the addition of ^{n}Bu$_4$NHSO$_4$ as the electrolyte, the reduction peak was observed at -0.0566 V *vs* Ag/AgCl and the oxidation peak were observed at 0.0378 V *vs* Ag/AgCl (Fig S2, b). In the system with the addition of ^{n}Bu$_4$NHSO$_4$ as the electrolyte, the reduction peak of benzaldehyde was observed at -0.4647V *vs* Ag/AgCl (Fig S2, d). Under the condition of adding ^{n}Bu$_4$NHSO$_4$ as the electrolyte, no reduction peak of aniline was observed (Fig S2, f). With DMSO as a solvent, the reduction peak of (*E*)-*N*-benzylideneaniline **4aa** was observed as -0.0706V *vs* Ag/AgCl. After adding ^{n}Bu$_4$NHSO$_4$ as the electrolyte, the reduction peak of **4aa** dropped to -0.3183V *vs* Ag/AgCl.

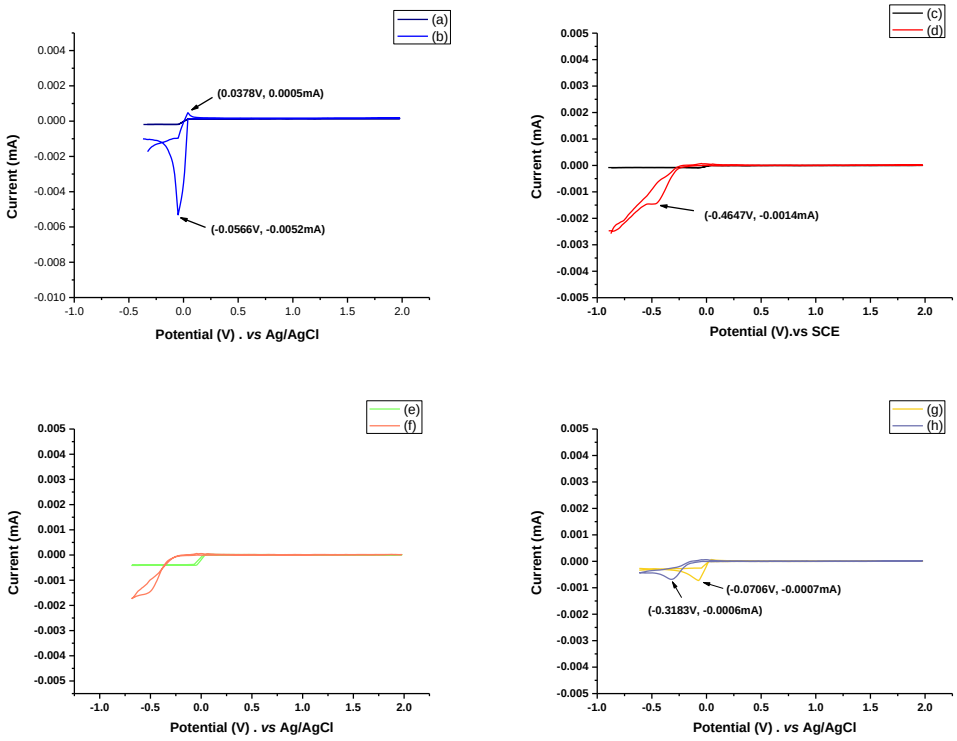
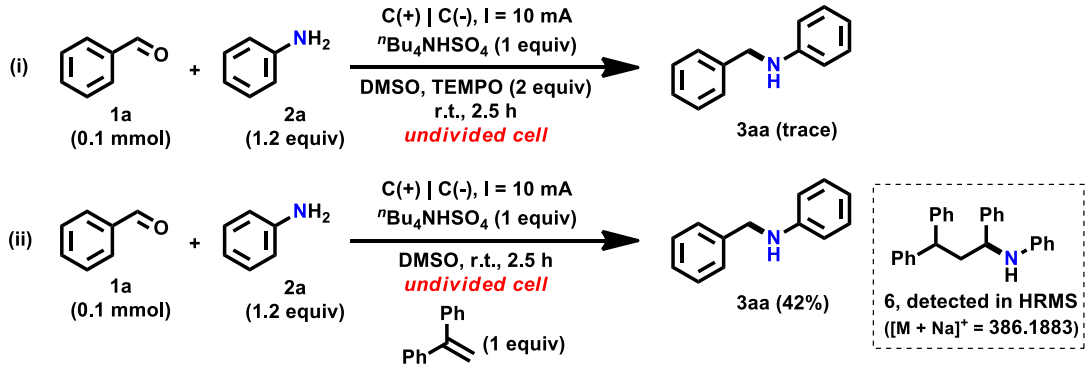


Fig S2. Cyclic voltammograms at room temperature: (a) after addition of benzaldehyde **1a** (0.1 M) and aniline **2a** (0.12 M) in DMSO; (b) after addition of benzaldehyde **1a** (0.1 M), aniline **2a** (0.12 M) and $^{n}Bu_4NHSO_4$ (0.1 M) in DMSO; (c) after addition of benzaldehyde **1a** (0.1 M) in DMSO; (d) after addition of benzaldehyde **1a** (0.1 M) and $^{n}Bu_4NHSO_4$ (0.1 M) in DMSO; (e) after addition of aniline **2a** (0.12 M) in DMSO; (f) after addition of aniline **2a** (0.12 M) and $^{n}Bu_4NHSO_4$ (0.1 M) in DMSO; (g) after addition of (*E*)-*N*-benzylideneaniline **4aa** (0.1 M) in DMSO; (h) after addition of (*E*)-*N*-benzylideneaniline **4aa** (0.1 M) and $^{n}Bu_4NHSO_4$ (0.1 M) in DMSO. The voltammogram was obtained at a scan rate of 0.2 V/s with glassy carbon electrode as working electrode, Pt electrode as counter electrode and Ag/AgCl electrode as a reference electrode.

D. Free Radical Trapping Experiments

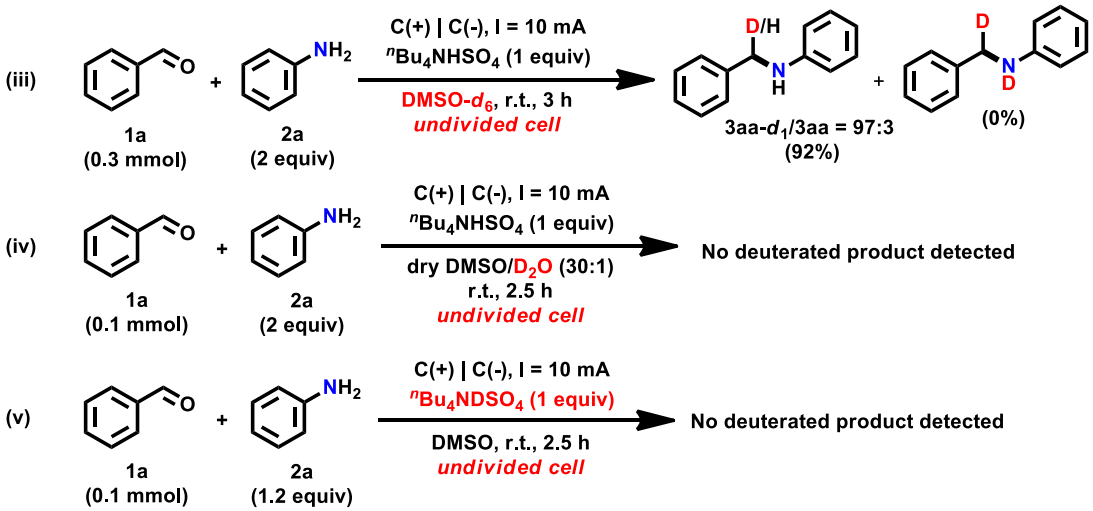
To verify the reaction process further, we conducted several free radical trapping experiments. We had tried to add the free radical inhibitor TEMPO into the reaction, and only a trace of **3aa** was detected after 2.5 h of reaction. Meanwhile, we had also added 1,1-diphenylethylene into the reaction to try to trap free radicals, and a trace of trapping product **6** was detected, where trapping product **6** ($[M + Na]^+$ = 386.1883) had been confirmed by HRMS. The above experiments proved that the reaction could undergo a free radical process.



Scheme S1. Free radical trapping experiments. Reaction conditions: (i) benzaldehyde **1a** (0.1 mmol), aniline **2a** (0.12 mmol), $^{n}Bu_4NHSO_4$ (1 equiv), TEMPO (2 equiv), DMSO (2 mL). (ii) benzaldehyde **1a** (0.1 mmol), aniline **2a** (0.12 mmol), $^{n}Bu_4NHSO_4$ (1 equiv), 1,1-diphenylethylene (1 equiv), DMSO (2 mL). The electrolysis was conducted in an undivided cell at room temperature under air for 2.5 h. The yields of product **3aa** was determined by GC yields with *n*-dodecane as the internal standard, and the free radical trapping product **6** was confirmed by HRMS analysis: HRMS (ESI) (m/z): calcd for $C_{27}H_{25}NNa$ $[M+Na]^+$: 386.1879, found: 386.1883.

E. Deuterium-labeling Experiments

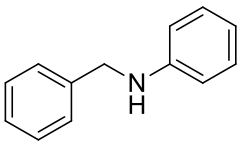
Through the following deuterium-labeling experiments, we considered that the hydrogen atom on the N-H site was derived from aniline.



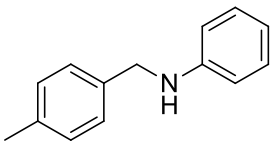
Scheme S2. Deuterium-labeling experiments. Reaction conditions: (iii) benzaldehyde **1a** (0.3 mmol), aniline **2a** (0.6 mmol), $^{n}Bu_4NHSO_4$ (1 equiv), DMSO-d_6. (iv) benzaldehyde **1a** (0.1 mmol), aniline **2a** (0.2 mmol), $^{n}Bu_4NHSO_4$ (1 equiv), dry DMSO/D_2O (30/1 v/v). (v) benzaldehyde **1a** (0.1 mmol), aniline **2a** (0.12 mmol), $^{n}Bu_4NDSO_4$ (1 equiv), DMSO. The electrolysis was

conducted in an undivided cell at room temperature under air for 2.5-3 h. The ratio of **3aa-d_1** and **3aa** was confirmed by ^{1}H NMR to be 97:3 among 92% isolated yield.

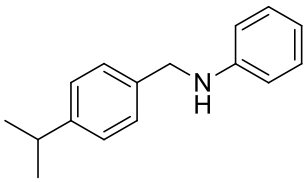
F. Characterization Data for Products



***N*-Benzylaniline (3aa).** Yellow solid, yield: 88 mg (96%), mp 36-37 ºC. ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.50-7.44 (m, 4H), 7.40 (ddd, J = 6.9, 4.0, 1.7 Hz, 1H), 7.32-7.28 (m, 2H), 6.85 (td, J = 7.3, 1.0 Hz, 1H), 6.77-6.72 (m, 2H), 4.42 (s, 2H), 3.99 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 139.6, 129.4, 128.8, 127.7, 127.4, 117.7, 113.0, 48.4. MS (EI, 70 eV) *m/z*: 183, 152, 115, 91. HRMS (ESI) (m/z): calcd for $C_{13}H_{14}N$ $[M+H]^+$: 184.1120, found: 184.1117.

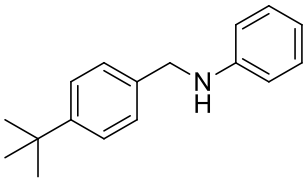


***N*-(4-Methylbenzyl)aniline (3ba).** Orange oil, yield: 61 mg (62%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.28 (d, J = 7.9 Hz, 2H), 7.21-7.16 (m, 4H), 6.76-6.71 (m, 1H), 6.65 (dd, J = 8.6, 0.9 Hz, 2H), 4.30 (s, 2H), 4.00 (s, 1H), 2.36 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 136.9, 136.4, 129.4, 129.3, 127.6, 117.5, 112.8, 48.1, 21.2. MS (EI, 70 eV) *m/z*: 197, 180, 152, 118, 105. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}N$ $[M+H]^+$: 198.1277, found: 198.1273.

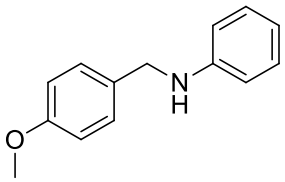


***N*-(4-Isopropylbenzyl)aniline (3ca).** Orange oil, yield: 96 mg (85%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.35 (d, J = 7.9 Hz, 2H), 7.27-7.21 (m, 4H), 6.76 (dd, J = 10.6, 4.1 Hz, 1H), 6.70-6.68 (m, 2H), 4.33 (s, 2H), 4.03 (s, 1H), 2.95 (dt, J = 13.8, 6.9 Hz, 1H), 1.30 (d, J = 6.9 Hz, 6H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 148.0, 136.8, 129.3, 127.7, 126.7, 117.5, 112.8, 48.1, 33.8, 24.1. MS

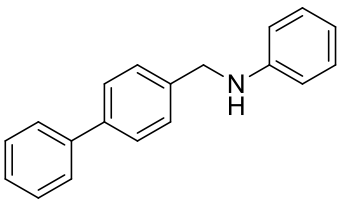
(EI, 70 eV) *m/z*: 225, 133, 105. HRMS (ESI) (m/z): calcd for $C_{16}H_{20}N$ $[M+H]^+$: 226.1590, found: 226.1585.



***N*-(4-(*tert*-Butyl)benzyl)aniline (3da).** Orange oil, yield: 117 mg (98%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.40 (m, 2H), 7.34 (d, J = 8.5 Hz, 2H), 7.21 (m, 2H), 6.75 (tt, J = 7.4, 1.0 Hz, 1H), 6.68 (dd, J = 8.6, 1.0 Hz, 2H), 4.32 (s, 2H), 4.16 (s, 1H), 1.35 (s, 9H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 150.3, 148.3, 136.4, 129.3, 127.4, 125.6, 117.5, 112.8, 48.0, 34.5, 31.4. MS (EI, 70 eV) *m/z*: 239, 147, 117. HRMS (ESI) (m/z): calcd for $C_{17}H_{22}N$ $[M+H]^+$: 240.1747, found: 240.1741.

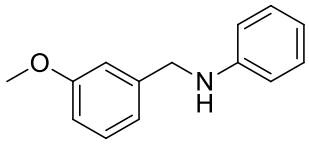


***N*-(4-Methoxybenzyl)aniline (3ea).** Yellow oil, yield: 62 mg (58%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.33 (m, 2H), 7.22 (m, 2H), 6.92 (m, 2H), 6.75 (m, 1H), 6.68 (m, 2H), 4.29 (s, 2H), 4.00 (s, 1H), 3.84 (d, J = 2.3 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 158.9, 148.2, 131.4, 129.3, 128.8, 117.5, 114.0, 112.8, 55.3, 47.8. MS (EI, 70 eV) *m/z*: 213, 121, 91. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}NO$ $[M+H]^+$: 214.1226, found: 214.1224.

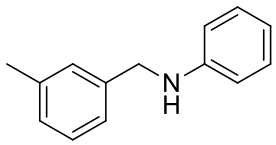


***N*-([1,1'-Biphenyl]-4-ylmethyl)aniline (3fa).** Orange oil, yield: 127 mg (98%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.64 (dd, J = 11.7, 4.6 Hz, 4H), 7.51-7.47 (m, 4H), 7.40 (t, J = 7.4 Hz, 1H), 7.24 (dd, J = 8.2, 7.5 Hz, 2H), 6.78 (t, J = 7.3 Hz, 1H), 6.73-6.70 (m, 2H), 4.42 (s, 2H), 4.13 (s, 1H). ^{13}C NMR (126 MHz,

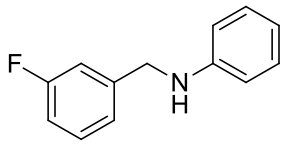
$CDCl_3$, ppm) δ = 148.2, 140.9, 140.2, 138.6, 129.4, 128.9, 128.0, 127.4, 127.3, 127.1, 117.7, 112.9, 48.0. MS (EI, 70 eV) *m/z*: 259, 167, 152, 129, 104. HRMS (ESI) (m/z): calcd for $C_{19}H_{18}N$ $[M+H]^+$: 260.1434, found: 260.1429.



***N*-(3-Methoxybenzyl)aniline (3ga).** Orange oil, yield: 88 mg (83%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.29 (d, *J* = 7.3 Hz, 1H), 7.21 (m, 2H), 6.99 (m, 2H), 6.86 (dd, *J* = 8.2, 2.4 Hz, 1H), 6.76 (t, *J* = 7.3 Hz, 1H), 6.67 (dd, *J* = 8.5, 0.8 Hz, 2H), 4.34 (s, 2H), 4.09 (s, 1H), 3.83 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 159.9, 148.2, 141.2, 129.7, 129.3, 119.8, 117.6, 113.0, 112.9, 112.7, 55.2, 48.3. MS (EI, 70 eV) *m/z*: 213, 121, 91. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}NO$ $[M+H]^+$: 214.1226, found: 214.1222.

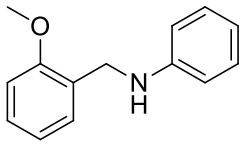


***N*-(3-Methylbenzyl)aniline (3ha).** Orange oil, yield: 51 mg (52%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.27 (d, *J* = 7.5 Hz, 1H), 7.22 (dd, *J* = 8.5, 7.4 Hz, 4H), 7.13 (d, *J* = 7.5 Hz, 1H), 6.75 (m, 1H), 6.68 (dd, *J* = 8.6, 0.9 Hz, 2H), 4.32 (s, 2H), 4.04 (s, 1H), 2.39 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 139.4, 138.4, 129.3, 128.6, 128.3, 128.0, 124.6, 117.5, 112.8, 48.4, 21.5. MS (EI, 70 eV) *m/z*: 197, 180, 152, 118, 105. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}N$ $[M+H]^+$: 198.1277, found: 198.1274.

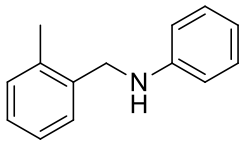


***N*-(3-Fluorobenzyl)aniline (3ia).** Yellow oil, yield: 89 mg (89%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.35 (dd, *J* = 7.9, 6.0 Hz, 1H), 7.26-7.19 (m, 3H), 7.15 (d, *J* = 9.8 Hz, 1H), 7.02 (td, *J* = 8.4, 2.2 Hz, 1H), 6.80 (t, *J* = 7.3 Hz, 1H), 6.67 (d, *J* = 7.7 Hz, 2H), 4.39 (s, 2H), 4.14 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$,

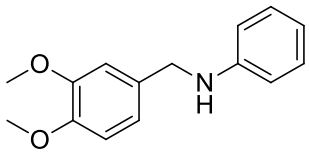
ppm) δ = 163.2 (d, J = 246.1 Hz), 147.9, 142.4 (d, J = 6.7 Hz), 130.2 (d, J = 8.2 Hz), 129.4, 122.8 (d, J = 2.7 Hz), 117.8, 114.2 (d, J = 14.1 Hz), 114.1 (d, J = 13.5 Hz), 112.9, 47.8. MS (EI, 70 eV) *m/z*: 201, 180, 152, 109. HRMS (ESI) (m/z): calcd for $C_{13}H_{13}FN$ $[M+H]^+$: 202.1026, found: 202.1023.



***N*-(2-Methoxybenzyl)aniline (3ja).** Orange oil, yield: 103 mg (97%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.34 (dd, J = 7.4, 1.5 Hz, 1H), 7.27 (d, J = 6.5 Hz, 1H), 7.19 (ddd, J = 7.4, 5.7, 2.1 Hz, 2H), 6.94 (m, 2H), 6.73 (m, 1H), 6.68 (dt, J = 3.2, 1.6 Hz, 2H), 4.36 (s, 2H), 4.17 (s, 1H), 3.89 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 157.4, 148.4, 129.2, 128.9, 128.3, 127.3, 120.5, 117.4, 113.1, 110.2, 55.3, 43.5. MS (EI, 70 eV) *m/z*: 213, 121, 91. HRMS (ESI) (m/z): calcd for $C_{13}H_{16}NO$ $[M+H]^+$: 214.1226, found: 214.1223.

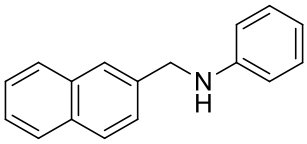


***N*-(2-Methylbenzyl)aniline (3ka).** Orange oil, yield: 84 mg (85%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (d, J = 7.1 Hz, 1H), 7.25 (m, 5H), 6.78 (t, J = 7.3 Hz, 1H), 6.69 (m, 2H), 4.32 (s, 2H), 3.90 (s, 1H), 2.42 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 137.0, 136.4, 130.4, 129.3, 128.3, 127.5, 126.2, 117.5, 112.7, 46.4, 19.0. MS (EI, 70 eV) *m/z*: 197, 180, 152, 105. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}N$ $[M+H]^+$: 198.1277, found: 198.1273.

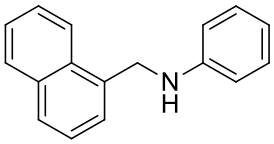


***N*-(3,4-Dimethoxybenzyl)aniline (3la).** Brown oil, yield: 104 mg (86%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.26-7.20 (m, 2H), 6.96 (d, J = 5.8 Hz, 2H), 6.88 (dd, J = 8.5, 2.4 Hz, 1H), 6.77 (t, J = 6.6 Hz, 1H), 6.69 (d, J = 6.9 Hz, 2H), 4.29 (s, 2H), 4.02 (s, 1H), 3.91 (d, J = 3.0 Hz, 6H). ^{13}C NMR (126 MHz,

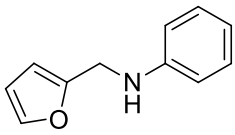
$CDCl_3$, ppm) δ = 149.2, 148.3, 148.2, 132.0, 129.3, 119.7, 117.6, 112.9, 111.2, 110.8, 56.0, 55.9, 48.3. MS (EI, 70 eV) *m/z*: 243, 151, 121, 107. HRMS (ESI) (m/z): calcd for $C_{15}H_{18}NO_2$ $[M+H]^+$: 244.1332, found: 244.1328.



***N*-(Naphthalen-2-ylmethyl)aniline (3ma).** Orange oil, yield: 108 mg (93%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.96-7.90 (m, 4H), 7.62-7.56 (m, 3H), 7.31 (t, *J* = 7.7 Hz, 2H), 6.87 (td, *J* = 7.3, 0.7 Hz, 1H), 6.78 (d, *J* = 7.7 Hz, 2H), 4.56 (s, 2H), 4.19 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 137.1, 133.6, 132.9, 129.4, 128.5, 127.9, 127.8, 126.3, 126.0, 125.9, 117.7, 113.1, 48.6. HRMS (ESI) (m/z): calcd for $C_{17}H_{16}N$ $[M+H]^+$: 234.1277, found: 234.1272.

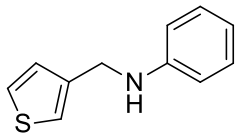


***N*-(Naphthalen-1-ylmethyl)aniline (3na).** Orange oil, yield: 82 mg (70%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 8.14 (d, *J* = 7.5 Hz, 1H), 7.97 (dd, *J* = 5.0, 2.3 Hz, 1H), 7.89 (d, *J* = 8.1 Hz, 1H), 7.60 (m, 3H), 7.50 (m, 1H), 7.29 (m, 2H), 6.84 (t, *J* = 7.3 Hz, 1H), 6.75 (d, *J* = 7.3 Hz, 2H), 4.79 (s, 2H), 4.05 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 134.4, 133.9, 131.6, 129.4, 128.9, 128.3, 126.4, 126.1, 125.9, 125.6, 123.7, 117.6, 112.8, 46.5. MS (EI, 70 eV) *m/z*: 233, 141, 115, 104. HRMS (ESI) (m/z): calcd for $C_{17}H_{15}NNa$ $[M+Na]^+$: 256.1097, found: 256.1096.

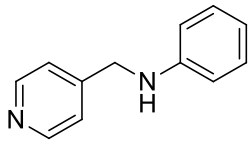


***N*-(Furan-2-ylmethyl)aniline (3oa).** Orange oil, yield: 43 mg (50%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.53-7.50 (m, 1H), 7.37-7.33 (m, 2H), 6.91 (t, *J* = 7.3 Hz, 1H), 6.81 (dd, *J* = 8.6, 0.9 Hz, 2H), 6.47 (dd, *J* = 3.2, 1.9 Hz, 1H), 6.37 (d, *J* = 3.2 Hz, 1H), 4.43 (s, 2H), 4.14 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 153.0, 147.8, 142.1, 129.4, 118.1, 113.3, 110.6, 107.2, 41.5. MS (EI, 70 eV) *m/z*:

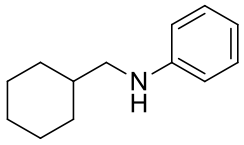
173, 145, 115, 81. HRMS (ESI) (m/z): calcd for $C_{11}H_{12}NO$ $[M+H]^+$: 174.0913, found: 174.0911.



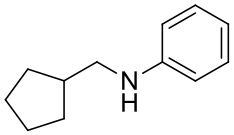
***N*-(Thiophen-3-ylmethyl)aniline (3pa).** Orange oil, yield: 29 mg (31%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.47 (dt, J = 4.9, 3.0 Hz, 1H), 7.43-7.38 (m, 2H), 7.33 (s, 1H), 7.26 (t, J = 4.4 Hz, 1H), 6.96 (q, J = 6.8 Hz, 1H), 6.83 (dd, J = 6.6, 4.7 Hz, 2H), 4.47 (s, 2H), 4.10 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 140.8, 129.6, 127.5, 126.4, 122.0, 117.9, 113.2, 43.9. MS (EI, 70 eV) *m/z*: 189, 156, 115, 97. HRMS (ESI) (m/z): calcd for $C_{11}H_{12}NS$ $[M+H]^+$: 190.0685, found: 190.0681.



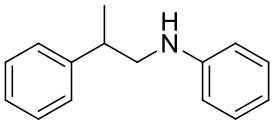
***N*-(Pyridin-4-ylmethyl)aniline (3qa).** Orange oil, yield: 11 mg (12%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 8.56 (dd, J = 4.5, 1.5 Hz, 2H), 7.32 (d, J = 6.0 Hz, 2H), 7.19 (m, 2H), 6.76 (m, 1H), 6.60 (dd, J = 8.6, 1.0 Hz, 2H), 4.40 (s, 2H), 4.10 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 149.9, 149.2, 147.5, 129.4, 122.1, 118.0, 112.9, 47.0. MS (EI, 70 eV) *m/z*: 184, 106, 79. HRMS (ESI) (m/z): calcd for $C_{12}H_{12}NNa$ $[M+Na]^+$: 207.0893, found: 207.0889.



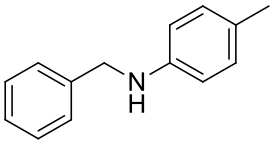
***N*-(Cyclohexylmethyl)aniline (3ra).** Orange oil, yield: 42 mg (44%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.20 (m, 2H), 6.71 (m, 1H), 6.63 (dd, J = 8.5, 0.9 Hz, 2H), 3.75 (s, 1H), 2.99 (d, J = 6.7 Hz, 2H), 1.86 (dd, J = 13.6, 1.8 Hz, 2H), 1.78 (m, 2H), 1.72 (m, 1H), 1.61 (m, 1H), 1.28 (m, 3H), 1.02 (dt, J = 12.1, 9.2 Hz, 2H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.6, 129.2, 116.9, 112.7, 50.6, 37.6, 31.3, 26.6, 26.0. MS (EI, 70 eV) *m/z*: 189, 144, 117, 106. HRMS (ESI) (m/z): calcd for $C_{13}H_{19}NNa$ $[M+Na]^+$: 212.1410, found: 212.1414.



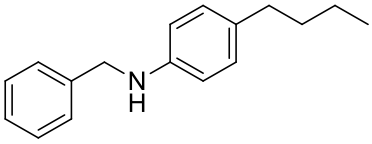
***N*-(Cyclopentylmethyl)aniline (3sa).** Orange oil, yield: 10.5 mg (12%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.20 (m, 2H), 6.72 (dd, *J* = 10.5, 4.1 Hz, 1H), 6.65 (m, 2H), 3.81 (s, 1H), 3.06 (d, *J* = 7.2 Hz, 2H), 2.19 (dt, *J* = 15.1, 7.6 Hz, 1H), 1.84 (m, 2H), 1.67 (m, 3H), 1.60 (m, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.5, 129.2, 117.2, 112.8, 49.6, 39.5, 30.7, 25.3. MS (EI, 70 eV) *m/z*: 175, 106, 77, 65, 51. HRMS (ESI) (m/z): calcd for $C_{12}H_{18}N$ $[M+H]^+$: 176.1434, found: 176.1428.



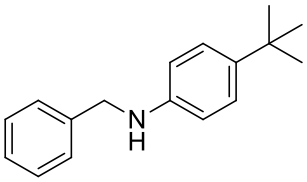
***N*-(2-Phenylpropyl)aniline (3ta).** Yellow oil, yield: 86 mg (82%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.37 (t, *J* = 7.5 Hz, 2H), 7.28 (m, 3H), 7.20 (m, 2H), 6.73 (t, *J* = 7.2 Hz, 1H), 6.62 (d, *J* = 7.7 Hz, 2H), 3.81 (s, 1H), 3.33 (m, 2H), 3.10 (dd, *J* = 14.3, 7.0 Hz, 1H), 1.38 (d, *J* = 6.9 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.0, 144.5, 129.3, 128.7, 127.3, 126.7, 117.4, 113.1, 51.0, 39.2, 19.8. MS (EI, 70 eV) *m/z*: 211, 117, 106. HRMS (ESI) (m/z): calcd for $C_{15}H_{17}NNa$ $[M+Na]^+$: 234.1253, found: 234.1257.



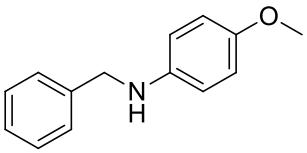
***N*-Benzyl-4-methylaniline (3ab).** Orange oil, yield: 97 mg (98%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.64-7.59 (m, 4H), 7.55 (t, *J* = 6.5 Hz, 1H), 7.28 (d, *J* = 8.4 Hz, 2H), 6.82 (d, *J* = 8.3 Hz, 2H), 4.53 (s, 2H), 4.10 (s, 1H), 2.55 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.3, 140.0, 130.1, 128.9, 127.8, 127.4, 126.9, 113.3, 48.8, 20.8. MS (EI, 70 eV) *m/z*: 197, 120, 91, 77, 65. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}N$ $[M+H]^+$: 198.1277, found: 198.1267.



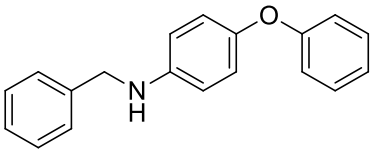
***N*-Benzyl-4-butylaniline (3ac).** Orange oil, yield: 117 mg (98%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.39 (dt, J = 12.9, 7.4 Hz, 4H), 7.31 (t, J = 7.2 Hz, 1H), 7.03 (d, J = 8.4 Hz, 2H), 6.62 (d, J = 8.4 Hz, 2H), 4.34 (s, 2H), 2.54 (m, 2H), 1.58 (m, 2H), 1.38 (m, 2H), 0.95 (t, J = 7.3 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.2, 139.7, 132.1, 129.2, 128.6, 127.6, 127.2, 112.9, 48.7, 34.7, 34.0, 22.4, 14.0. MS (EI, 70 eV) *m/z*: 239, 196, 91, 77, 65. HRMS (ESI) (m/z): calcd for $C_{17}H_{21}NNa$ $[M+Na]^+$: 262.1566, found: 262.1566.



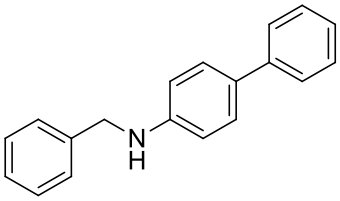
***N*-Benzyl-4-(tert-butyl)aniline (3ad).** Orange oil, yield: 103 mg (86%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.42 (m, 4H), 7.34 (td, J = 6.8, 1.4 Hz, 1H), 7.28 (m, 2H), 6.67 (m, 2H), 4.37 (s, 2H), 3.85 (m, 1H), 1.35 (s, 9H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 145.9, 140.4, 139.7, 128.7, 127.6, 127.2, 126.1, 112.6, 48.7, 33.9, 31.6. MS (EI, 70 eV) *m/z*: 239, 146, 132, 91, 65. HRMS (ESI) (m/z): calcd for $C_{17}H_{21}NNa$ $[M+Na]^+$: 262.1566, found: 262.1571.



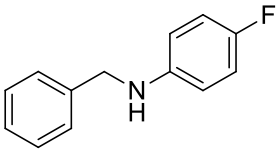
***N*-Benzyl-4-methoxyaniline (3ae).** Orange oil, yield: 50 mg (47%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (m, 4H), 7.31 (dt, J = 4.5, 1.9 Hz, 1H), 6.81 (m, 2H), 6.64 (m, 2H), 4.31 (s, 2H), 3.97 (s, 1H), 3.77 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 152.2, 142.3, 139.6, 128.6, 127.6, 127.2, 114.9, 114.2, 55.8, 49.3. MS (EI, 70 eV) *m/z*: 213, 198, 122, 91, 65. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}NONa$ $[M+Na]^+$: 236.1046, found: 236.1049.



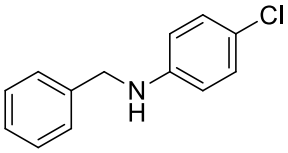
***N*-Benzyl-4-phenoxyaniline (3af).** Orange oil, yield: 127 mg (92%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.48 (q, J = 7.1 Hz, 4H), 7.39 (m, 3H), 7.12 (td, J = 7.4, 0.6 Hz, 1H), 7.06 (m, 2H), 7.02 (m, 2H), 6.72 (d, J = 8.7 Hz, 2H), 4.40 (s, 2H), 3.93 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 159.2, 147.8, 144.9, 139.5, 129.7, 128.8, 127.7, 127.4, 122.1, 121.4, 117.2, 114.0, 48.9. MS (EI, 70 eV) *m/z*: 275, 91, 77, 65, 51. HRMS (ESI) (m/z): calcd for $C_{19}H_{17}NONa$ $[M+Na]^+$: 298.1202, found: 298.1210.



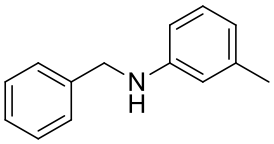
***N*-Benzyl-[1,1'-biphenyl]-4-amine (3ag).** Orange solid, yield: 80 mg (62%), mp 100-101 ºC. ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.67 (d, J = 7.4 Hz, 2H), 7.57 (d, J = 8.2 Hz, 2H), 7.55-7.45 (m, 6H), 7.45-7.34 (m, 2H), 6.81 (d, J = 8.2 Hz, 2H), 4.46 (s, 2H), 4.16 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 147.5, 141.3, 139.3, 130.5, 128.7, 128.7, 128.0, 127.6, 127.4, 126.4, 126.1, 113.2, 48.4. MS (EI, 70 eV) *m/z*: 259, 115, 91, 65, 51. HRMS (ESI) (m/z): calcd for $C_{19}H_{17}NNa$ $[M+Na]^+$: 282.1253, found: 282.1258.



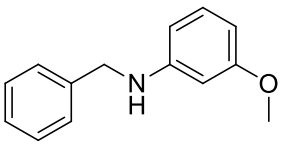
***N*-Benzyl-4-fluoroaniline (3ah).** Yellow oil, yield: 61 mg (61%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.46-7.43 (m, 4H), 7.37 (ddd, J = 11.0, 5.5, 3.1 Hz, 1H), 6.99-6.95 (m, 2H), 6.65-6.62 (m, 2H), 4.35 (s, 2H), 4.01 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 155.9 (d, J = 234.6 Hz), 144.6 (d, J = 1.6 Hz), 139.4, 128.8, 127.6, 127.4, 115.8 (d, J = 22.4 Hz), 113.7 (d, J = 7.4 Hz), 48.9. MS (EI, 70 eV) *m/z*: 201, 91, 75, 65, 51. HRMS (ESI) (m/z): calcd for $C_{13}H_{13}FN$ $[M+H]^+$: 202.1026, found: 202.1017.



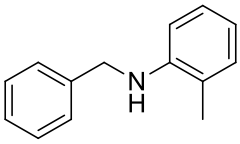
***N*-Benzyl-4-chloroaniline (3ai).** Orange oil, yield: 71 mg (65%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (d, J = 4.4 Hz, 4H), 7.32 (dd, J = 8.4, 4.1 Hz, 1H), 7.14 (m, 2H), 6.58 (m, 2H), 4.33 (s, 2H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.6, 138.9, 129.1, 128.7, 127.5, 127.4, 122.2, 114.0, 48.4. MS (EI, 70 eV) *m/z*: 217, 91, 75, 65, 51. HRMS (ESI) (m/z): calcd for $C_{13}H_{13}ClN$ $[M+H]^+$: 218.0731, found: 218.0721.



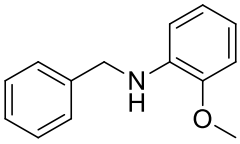
***N*-Benzyl-3-methylaniline (3aj).** Orange oil, yield: 71 mg (71%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.40 (qd, J = 8.1, 3.9 Hz, 4H), 7.32 (m, 1H), 7.12 (t, J = 7.7 Hz, 1H), 6.60 (d, J = 7.5 Hz, 1H), 6.51 (dd, J = 13.0, 5.0 Hz, 2H), 4.36 (s, 2H), 3.99 (s, 1H), 2.32 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 139.5, 139.1, 129.2, 128.7, 127.6, 127.2, 118.6, 113.7, 110.0, 48.4, 21.7. MS (EI, 70 eV) *m/z*: 197, 120, 91, 65, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}NNa$ $[M+Na]^+$: 220.1097, found: 220.1088.



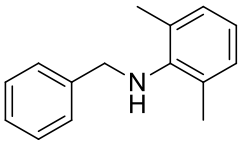
***N*-Benzyl-3-methoxyaniline (3ak).** Orange oil, yield: 55 mg (52%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.39 (qd, J = 8.1, 3.9 Hz, 4H), 7.31 (m, 1H), 7.11 (t, J = 8.1 Hz, 1H), 6.31 (m, 2H), 6.23 (t, J = 2.3 Hz, 1H), 4.35 (s, 2H), 4.09 (s, 1H), 3.78 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 160.8, 149.6, 139.3, 130.0, 128.7, 127.6, 127.3, 106.0, 102.7, 98.9, 55.1, 48.3. MS (EI, 70 eV) *m/z*: 213, 136, 91, 65, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}NO$ $[M+H]^+$: 214.1226, found: 214.1219.



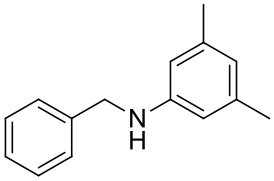
***N*-Benzyl-2-methylaniline (3al).** Orange oil, yield: 33 mg (33%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.54-7.47 (m, 4H), 7.42 (t, J = 6.8 Hz, 1H), 7.24 (dd, J = 15.3, 7.5 Hz, 2H), 6.82 (t, J = 7.4 Hz, 1H), 6.75 (d, J = 8.0 Hz, 1H), 4.50 (s, 2H), 3.99 (s, 1H), 2.30 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.2, 139.6, 130.2, 128.8, 127.7, 127.4, 127.3, 122.0, 117.3, 110.1, 48.4, 17.7. MS (EI, 70 eV) *m/z*: 197, 91, 77, 65, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{16}N$ $[M+H]^+$: 198.1277, found: 198.1269.



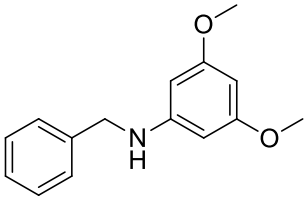
***N*-Benzyl-2-methoxyaniline (3am).** Brown oil, yield: 52 mg (49%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.55-7.52 (m, 2H), 7.49 (td, J = 7.6, 1.9 Hz, 2H), 7.42 (td, J = 6.8, 1.4 Hz, 1H), 7.02-6.98 (m, 1H), 6.95-6.92 (m, 1H), 6.87-6.82 (m, 1H), 6.77-6.73 (m, 1H), 4.79 (s, 1H), 4.49 (s, 2H), 3.97 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.9, 139.8, 138.3, 128.7, 127.7, 127.3, 121.4, 116.8, 110.2, 109.5, 55.5, 48.2. MS (EI, 70 eV) *m/z*: 213, 120, 91, 65, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}NONa$ $[M+Na]^+$: 236.1046, found: 236.1042.



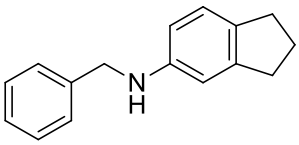
***N*-Benzyl-2,6-dimethylaniline (3an).** Yellow oil, yield: 50 mg (47%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (m, 4H), 7.32 (ddd, J = 6.9, 3.9, 1.6 Hz, 1H), 7.04 (d, J = 7.5 Hz, 2H), 6.88 (t, J = 7.5 Hz, 1H), 4.14 (s, 2H), 3.71 (s, 1H), 2.31 (s, 6H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 145.9, 140.4, 129.9, 128.9, 128.6, 128.0, 127.3, 122.2, 52.9, 18.5. MS (EI, 70 eV) *m/z*: 211, 91, 77, 65, 51. HRMS (ESI) (m/z): calcd for $C_{15}H_{18}N$ $[M+H]^+$: 212.1434, found: 212.1429.



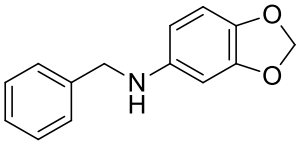
***N*-Benzyl-3,5-dimethylaniline (3ao).** Orange oil, yield: 103 mg (98%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.39 (dt, *J* = 12.2, 7.3 Hz, 4H), 7.31 (t, *J* = 6.9 Hz, 1H), 6.44 (s, 1H), 6.34 (s, 2H), 4.34 (s, 2H), 3.91 (s, 1H), 2.27 (s, 6H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 139.6, 139.0, 128.6, 127.6, 127.2, 119.7, 110.8, 48.4, 21.5. MS (EI, 70 eV) *m/z*: 211, 91, 77, 64, 39. HRMS (ESI) (m/z): calcd for $C_{15}H_{17}NNa$ $[M+Na]^+$: 234.1253, found: 234.1258.



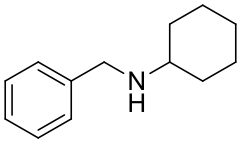
***N*-Benzyl-3,5-dimethoxyaniline (3ap).** Brown oil, yield: 37 mg (30%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (m, 5H), 7.31 (m, 1H), 5.93 (t, *J* = 2.1 Hz, 1H), 5.87 (d, *J* = 2.1 Hz, 2H), 4.33 (s, 2H), 3.87 (s, 1H), 3.76 (s, 6H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 161.7, 150.1, 139.2, 128.7, 127.6, 127.3, 91.8, 89.9, 55.2, 48.4. MS (EI, 70 eV) *m/z*: 243, 166, 91, 73, 65. HRMS (ESI) (m/z): calcd for $C_{15}H_{17}NO_2Na$ $[M+Na]^+$: 266.1152, found: 266.1161.



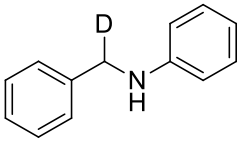
***N*-Benzyl-2,3-dihydro-1*H*-inden-5-amine (3aq).** Orange oil, yield: 56 mg (50%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.55 (dt, *J* = 12.7, 7.3 Hz, 4H), 7.50-7.45 (m, 1H), 7.24 (d, *J* = 8.0 Hz, 1H), 6.75 (d, *J* = 1.2 Hz, 1H), 6.64 (dd, *J* = 8.0, 2.2 Hz, 1H), 4.48 (s, 2H), 4.04 (s, 1H), 3.03 (dd, *J* = 14.3, 7.1 Hz, 4H), 2.28-2.22 (m, 2H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 147.0, 145.5, 139.8, 133.4, 128.6, 127.5, 127.1, 124.8, 111.3, 109.1, 48.9, 33.2, 32.0, 25.7. MS (EI, 70 eV) *m/z*: 223, 91, 77, 65, 51, 32. HRMS (ESI) (m/z): calcd for $C_{16}H_{17}NNa$ $[M+Na]^+$: 246.1253, found: 246.1258.



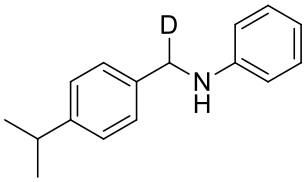
***N*-Benzylbenzo[*d*][1,3]dioxol-5-amine (3ar).** Brown oil, yield: 34 mg (30%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (dd, *J* = 10.2, 3.7 Hz, 4H), 7.32 (dd, *J* = 4.1, 2.2 Hz, 1H), 6.69 (dd, *J* = 8.3, 4.3 Hz, 1H), 6.31 (d, *J* = 2.3 Hz, 1H), 6.11 (m, 1H), 5.87 (s, 2H), 4.29 (s, 2H), 3.24 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.4, 143.9, 139.7, 139.4, 128.7, 127.6, 127.3, 108.7, 104.5, 100.6, 96.0, 49.3. MS (EI, 70 eV) *m/z*: 227, 136, 91, 65, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{13}NO_2Na$ $[M+Na]^+$: 250.0838, found: 250.0833.



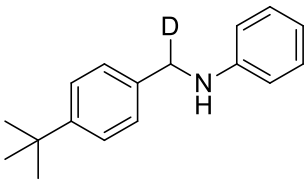
***N*-Benzylcyclohexanamine (3as).** Yellow oil, yield: 65 mg (69%). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.34 (d, *J* = 4.4 Hz, 4H), 7.28 (dd, *J* = 8.4, 3.9 Hz, 1H), 3.84 (s, 2H), 2.52 (ddd, *J* = 10.4, 6.6, 3.8 Hz, 1H), 1.95 (d, *J* = 10.1 Hz, 3H), 1.77 (m, 2H), 1.64 (d, *J* = 11.8 Hz, 1H), 1.21 (m, 6H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 140.8, 128.4, 128.2, 126.8, 56.2, 51.0, 33.5, 26.2, 25.0. MS (EI, 70 eV) *m/z*: 189, 158, 146, 132, 91. HRMS (ESI) (m/z): calcd for $C_{13}H_{19}N$ $[M+Na]^+$: 250.0838, found: 250.0833.



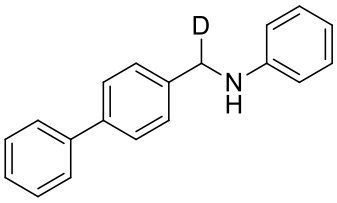
***N*-Benzylaniline-d_1 (3aa-d_1).** Yellow oil, yield: 51 mg (92%, 97%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.36 (dt, *J* = 15.0, 7.4 Hz, 4H), 7.28 (t, *J* = 7.1 Hz, 1H), 7.19 (dd, *J* = 8.4, 7.5 Hz, 2H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.66 (d, *J* = 7.7 Hz, 2H), 4.34 (s, 1H), 3.66 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.1, 139.3, 129.3, 128.7, 127.6, 127.3, 117.6, 112.9, 48.4. MS (EI, 70 eV) *m/z*: 184, 92, 77, 51. HRMS (ESI) (m/z): calcd for $C_{13}H_{13}DN$ $[M+H]^+$: 185.1184, found: 185.1174.



***N*-(4-Isopropylbenzyl)aniline-d_1 (3ca-d_1).** Yellow oil, yield: 38 mg (56%, 94%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.32 (d, *J* = 8.0 Hz, 2H), 7.21 (m, 4H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.67 (d, *J* = 7.8 Hz, 2H), 4.30 (s, 1H), 3.94 (s, 1H), 2.93 (dt, *J* = 13.8, 6.9 Hz, 1H), 1.28 (s, 3H), 1.26 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 148.0, 136.7, 129.3, 127.7, 126.7, 117.5, 112.9, 48.2, 33.8, 24.1. MS (EI, 70 eV) *m/z*: 226, 184, 134, 105, 77, 51. HRMS (ESI) (m/z): calcd for $C_{16}H_{19}DN$ $[M+H]^+$: 227.1653, found: 227.1644.

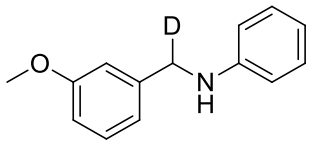


***N*-(4-(*tert*-Butyl)benzyl)aniline-d_1 (3da-d_1).** Yellow oil, yield: 57 mg (79%, 96%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.39 (m, 2H), 7.33 (d, *J* = 8.2 Hz, 2H), 7.20 (dd, *J* = 8.3, 7.5 Hz, 2H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.67 (d, *J* = 7.7 Hz, 2H), 4.31 (s, 1H), 1.34 (s, 9H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 150.3, 148.2, 136.4, 129.3, 127.4, 125.6, 117.6, 112.9, 48.1, 34.5, 31.4. MS (EI, 70 eV) *m/z*: 240, 148, 105, 77, 55. HRMS (ESI) (m/z): calcd for $C_{17}H_{21}DN$ $[M+H]^+$: 241.1810, found: 241.1802.

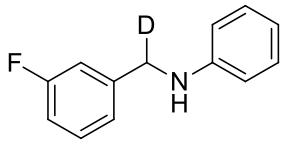


***N*-([1,1'-Biphenyl]-4-ylmethyl)aniline-d_1 (3fa-d_1).** Yellow solid, yield: 76 mg (98%, 82%-D), mp 88-90 ºC. ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.70-7.66 (m, 4H), 7.53 (t, *J* = 7.7 Hz, 4H), 7.44 (t, *J* = 7.4 Hz, 1H), 7.29 (t, *J* = 7.9 Hz, 2H), 6.84 (t, *J* = 7.3 Hz, 1H), 6.75 (d, *J* = 7.8 Hz, 2H), 4.44 (d, *J* = 9.6 Hz, 1H), 4.32-3.75 (m, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 140.9, 140.3, 138.6, 138.6, 129.4, 128.9, 128.0, 127.5, 127.4, 127.2, 117.7, 113.0, 48.1. MS (EI, 70

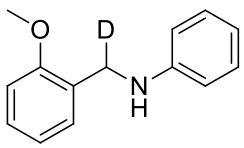
eV) *m/z*: 260, 168, 152, 115, 77, 51. HRMS (ESI) (m/z): calcd for $C_{19}H_{17}DN$ $[M+H]^+$: 261.1497, found: 261.1487.



***N*-(3-Methoxybenzyl)aniline-d_1 (3ga-d_1).** Yellow oil, yield: 48 mg (75%, 72%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.28 (m, 1H), 7.19 (t, *J* = 7.9 Hz, 2H), 6.97 (m, 2H), 6.84 (d, *J* = 8.2 Hz, 1H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.66 (d, *J* = 7.9 Hz, 2H), 4.32 (s, 1H), 4.07 (s, 1H), 3.81 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 159.9, 148.1, 141.1, 129.7, 129.3, 119.8, 117.6, 113.1, 112.9, 112.7, 55.2, 48.4. MS (EI, 70 eV) *m/z*: 214, 122, 92, 77, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}DNO$ $[M+H]^+$: 215.1289, found: 215.1279.

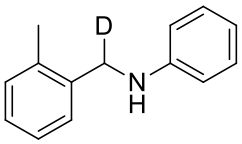


***N*-(3-Fluorobenzyl)aniline-d_1 (3ia-d_1).** Yellow oil, yield: 50 mg (82%, 94%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.42-7.38 (m, 1H), 7.33-7.29 (m, 2H), 7.25 (d, *J* = 7.4 Hz, 1H), 7.20 (d, *J* = 9.6 Hz, 1H), 7.08 (t, *J* = 8.3 Hz, 1H), 6.89-6.85 (m, 1H), 6.74-6.71 (m, 2H), 4.40 (s, 1H), 4.17 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 163.3 (d, *J* = 245.7 Hz), 148.0, 142.5 (d, *J* = 6.7 Hz), 130.2 (d, *J* = 8.2 Hz), 129.5, 122.9 (d, *J* = 2.1 Hz), 117.9, 114.3 (d, *J* = 21.5 Hz), 114.2 (d, *J* = 21.1 Hz), 113.0, 47.5. MS (EI, 70 eV) *m/z*: 202, 111, 109, 77, 51. HRMS (ESI) (m/z): calcd for $C_{13}H_{12}DFN$ $[M+H]^+$: 203.1089, found: 203.1099.

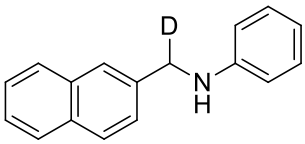


***N*-(2-Methoxybenzyl)aniline-d_1 (3ja-d_1).** Yellow oil, yield: 63 mg (98%, 91%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.32 (dd, *J* = 7.4, 1.5 Hz, 1H), 7.26 (q, *J* = 6.0 Hz, 1H), 7.17 (m, 2H), 6.92 (m, 2H), 6.69 (m, 3H), 4.34 (s, 1H), 3.87 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 157.4, 148.4, 129.2, 129.0, 128.4,

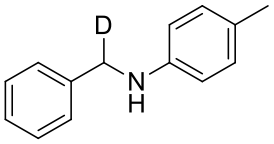
127.3, 120.5, 117.4, 113.2, 110.3, 55.3, 43.5. MS (EI, 70 eV) *m/z*: 214, 122, 93, 77, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}DNO$ $[M+H]^+$: 215.1289, found: 215.1282.



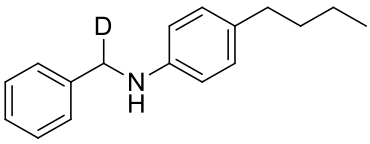
***N*-(2-Methylbenzyl)aniline-d_1 (3ka-d_1).** Yellow oil, yield: 34 mg (58%, 78%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.35 (d, *J* = 7.2 Hz, 1H), 7.21 (m, 5H), 6.75 (m, 1H), 6.66 (dt, *J* = 8.8, 1.6 Hz, 2H), 4.29 (s, 1H), 3.84 (s, 1H), 2.39 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 137.0, 136.4, 130.4, 129.3, 128.3, 127.5, 126.2, 117.5, 112.7, 46.4, 19.0. MS (EI, 70 eV) *m/z*: 198, 180, 106, 77, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}DN$ $[M+H]^+$: 199.1340, found: 199.1335.



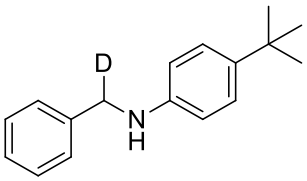
***N*-(Naphthalen-2-ylmethyl)aniline-d_1 (3ma-d_1).** Yellow solid, yield: 54 mg (77%, 86%-D), mp 62-63 ºC. ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.90 (m, 4H), 7.55 (m, 3H), 7.26 (t, *J* = 7.9 Hz, 2H), 6.82 (t, *J* = 7.3 Hz, 1H), 6.75 (d, *J* = 8.1 Hz, 2H), 4.52 (s, 1H), 4.05 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.2, 137.0, 133.6, 132.9, 129.4, 128.4, 127.8, 127.8, 126.2, 126.0, 125.8, 117.7, 113.0, 48.6. MS (EI, 70 eV) *m/z*: 234, 142.1, 116.1, 105, 77, 51. HRMS (ESI) (m/z): calcd for $C_{17}H_{15}DN$ $[M+H]^+$: 235.1340, found: 235.1331.



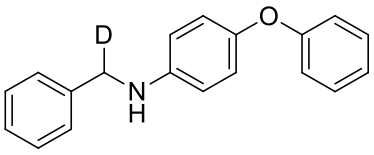
***N*-Benzyl-4-methylaniline-d_1 (3ab-d_1).** Yellow oil, yield: 45 mg (76%, 77%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.37 (m, 4H), 7.29 (t, *J* = 7.1 Hz, 1H), 7.01 (d, *J* = 7.4 Hz, 2H), 6.59 (d, *J* = 8.0 Hz, 2H), 4.33 (s, 1H), 3.86 (s, 1H), 2.26 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 145.9, 139.6, 129.8, 128.6, 127.5, 127.2, 126.8, 113.0, 48.7, 20.4. MS (EI, 70 eV) *m/z*: 198, 121, 92, 65, 51. HRMS (ESI) (m/z): calcd for $C_{14}H_{15}DN$ $[M+H]^+$: 199.1340, found: 199.1333.



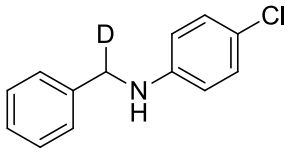
***N*-Benzyl-4-butylaniline-d_1 (3ac-d_1).** Yellow oil, yield: 50 mg (70%, 90%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.37 (m, 4H), 7.28 (t, *J* = 7.2 Hz, 1H), 7.01 (d, *J* = 8.2 Hz, 2H), 6.60 (m, 2H), 4.32 (s, 1H), 3.84 (s, 1H), 2.51 (m, 2H), 1.55 (dd, *J* = 15.3, 8.2 Hz, 2H), 1.35 (dd, *J* = 14.9, 7.4 Hz, 2H), 0.93 (d, *J* = 7.4 Hz, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.0, 139.6, 132.2, 129.2, 128.6, 127.6, 127.2, 113.0, 48.7, 34.7, 34.0, 22.4, 14.0. MS (EI, 70 eV) *m/z*: 240, 197, 92, 65, 51. HRMS (ESI) (m/z): calcd for $C_{17}H_{21}DN$ $[M+H]^+$: 241.1810, found: 241.1802.



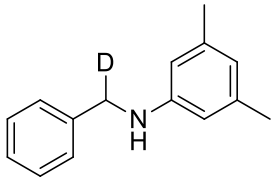
***N*-Benzyl-4-(*tert*-butyl)aniline-d_1 (3ad-d_1).** Yellow oil, yield: 54 mg (75%, 80%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.37 (m, 4H), 7.28 (t, *J* = 7.2 Hz, 1H), 7.22 (m, 2H), 6.63 (m, 2H), 4.32 (s, 1H), 29 (s, 9H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 145.6, 140.7, 139.4, 128.6, 127.7, 127.3, 126.1, 112.9, 48.8, 33.9, 31.6. MS (EI, 70 eV) *m/z*: 240, 225, 92, 65, 51. HRMS (ESI) (m/z): calcd for $C_{17}H_{21}DN$ $[M+H]^+$: 241.1810, found: 241.1802.



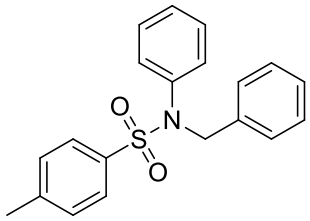
***N*-Benzyl-4-phenoxyaniline-d_1 (3af-d_1).** Yellow oil, yield: 70 mg (85%, 97%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (dt, *J* = 14.9, 7.5 Hz, 4H), 7.29 (dd, *J* = 16.3, 8.0 Hz, 3H), 7.02 (t, *J* = 7.4 Hz, 1H), 6.93 (m, 4H), 6.65 (m, 2H), 4.33 (s, 1H), 4.03 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 159.1, 147.9, 144.8, 139.3, 129.5, 128.7, 127.6, 127.4, 122.0, 121.2, 117.2, 113.9, 48.9. MS (EI, 70 eV) *m/z*: 276, 184, 129, 92, 77, 51. HRMS (ESI) (m/z): calcd for $C_{19}H_{17}DNO$ $[M+H]^+$: 277.1446, found: 277.1439.



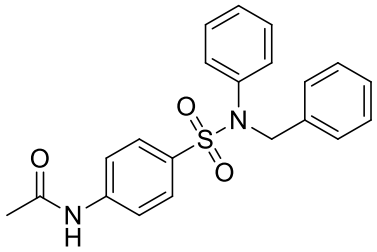
***N*-Benzyl-4-chloroaniline-d_1 (3ai-d_1).** Yellow oil, yield: 31 mg (48%, 91%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.38 (d, J = 4.4 Hz, 4H), 7.32 (dd, J = 8.9, 4.5 Hz, 1H), 7.16-7.12 (m, 2H), 6.59-6.56 (m, 2H), 4.31 (s, 1H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 146.7, 138.9, 129.1, 128.7, 127.4, 127.4, 122.1, 113.9, 48.0. MS (EI, 70 eV) *m/z*: 218, 139, 111, 91, 65, 51. HRMS (ESI) (m/z): calcd for $C_{13}H_{12}DClN$ $[M+H]^+$: 219.0794, found: 219.0793.



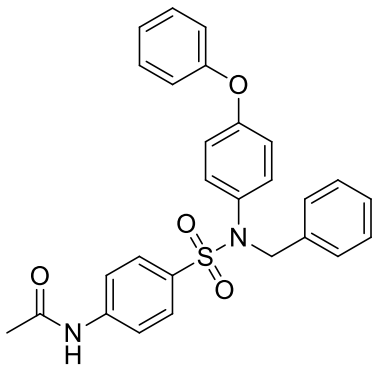
***N*-Benzyl-3,5-dimethylaniline-d_1 (3ao-d_1).** Yellow oil, yield: 43 mg (68%, 91%-D). ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.43-7.36 (m, 4H), 7.31 (dd, J = 9.5, 4.4 Hz, 1H), 6.43 (s, 1H), 6.33 (s, 2H), 4.34 (s, 1H), 2.27 (s, 6H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 148.3, 139.7, 139.0, 128.6, 127.6, 127.2, 119.6, 110.8, 48.4, 21.5. MS (EI, 70 eV) *m/z*: 212, 135, 92, 77, 51. HRMS (ESI) (m/z): calcd for $C_{15}H_{17}DN$ $[M+H]^+$: 213.1497, found: 213.1488.



***N*-Benzyl-4-methyl-*N*-phenylbenzenesulfonamide (5a).** White solid, yield: 140mg (82%), mp 144-145 ºC. ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 7.57 (d, J = 8.1 Hz, 2H), 7.30 (d, J = 8.1 Hz, 2H), 7.26-7.24 (m, 4H), 7.22 (dd, J = 5.3, 1.6 Hz, 4H), 7.00 (dd, J = 7.2, 2.3 Hz, 2H), 4.75 (s, 2H), 2.47 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 143.5, 139.0, 136.0, 135.6, 129.5, 129.0, 128.9, 128.5, 128.4, 127.8, 127.8, 127.6, 54.7, 21.6. HRMS (ESI) (m/z): calcd for $C_{20}H_{19}NO_2SNa$ $[M+Na]^+$: 360.1029, found: 360.1030.



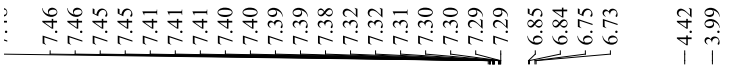
***N*-(4-(*N*-Benzyl-*N*-phenylsulfamoyl)phenyl)acetamide (5b).** White solid, yield: 55 mg (72%), mp 202-203 ºC. ^{1}H NMR (500 MHz, C_3D_6O, ppm) δ = 9.65 (s, 1H), 7.85 (m, 2H), 7.60 (m, 2H), 7.32 (m, 2H), 7.23 (m, 6H), 7.11 (m, 2H), 4.85 (s, 2H), 2.16 (s, 3H). ^{13}C NMR (126 MHz, C_3D_6O, ppm) δ = 168.9, 143.6, 139.3, 136.6, 132.3, 128.8, 128.7, 128.6, 128.3, 128.2, 127.5, 127.4, 118.5, 54.0, 23.6. HRMS (ESI) (m/z): calcd for $C_{21}H_{21}N_2O_3S$ $[M+H]^+$: 381.1267, found: 381.1259.

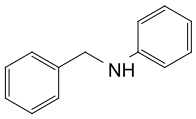


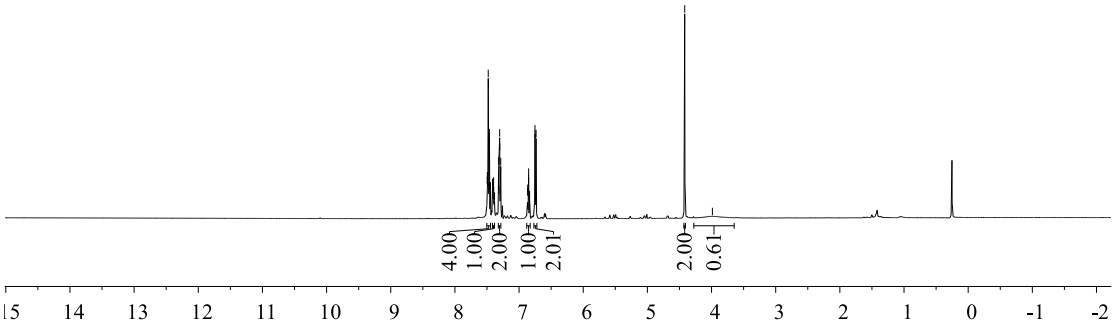
***N*-(4-(*N*-Benzyl-*N*-(4-phenoxyphenyl)sulfamoyl)phenyl)acetamide (5c).** White solid, yield: 79 mg (84%), mp 96-97 ºC. ^{1}H NMR (500 MHz, $CDCl_3$, ppm) δ = 8.45 (s, 1H), 7.70 (d, J = 8.7 Hz, 2H), 7.62 (d, J = 8.8 Hz, 2H), 7.33 (t, J = 7.8 Hz, 2H), 7.24 (m, 4H), 7.13 (t, J = 7.4 Hz, 1H), 6.97 (d, J = 8.5 Hz, 2H), 6.91 (m, 2H), 6.80 (m, 2H), 4.70 (s, 2H), 2.20 (s, 3H). ^{13}C NMR (126 MHz, $CDCl_3$, ppm) δ = 169.4, 157.2, 156.1, 142.6, 135.8, 133.4, 132.8, 130.5, 129.9, 128.8, 128.5, 128.5, 127.8, 124.0, 119.6, 119.3, 118.4, 55.2, 24.6. HRMS (ESI) (m/z): calcd for $C_{27}H_{25}N_2O_4S$ $[M+H]^+$: 473.1530, found: 473.1523.

G. NMR Spectra

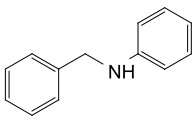
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3aa

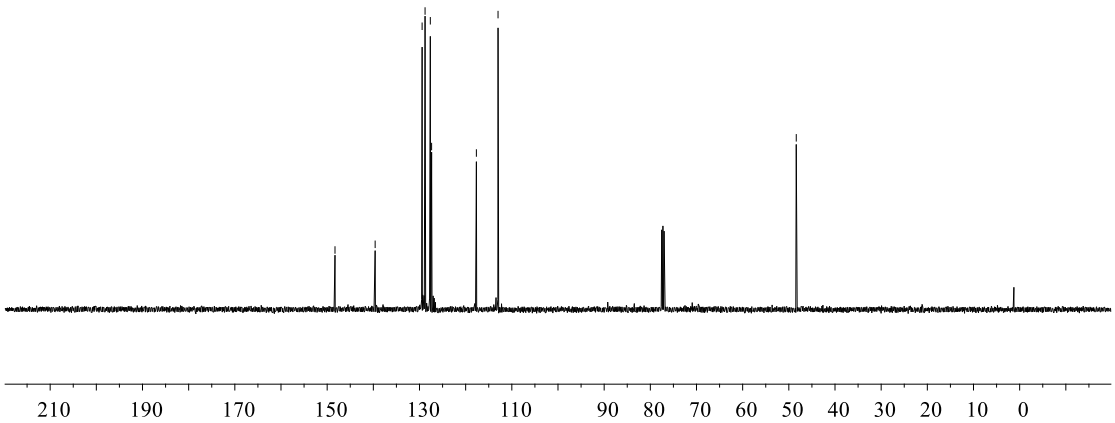




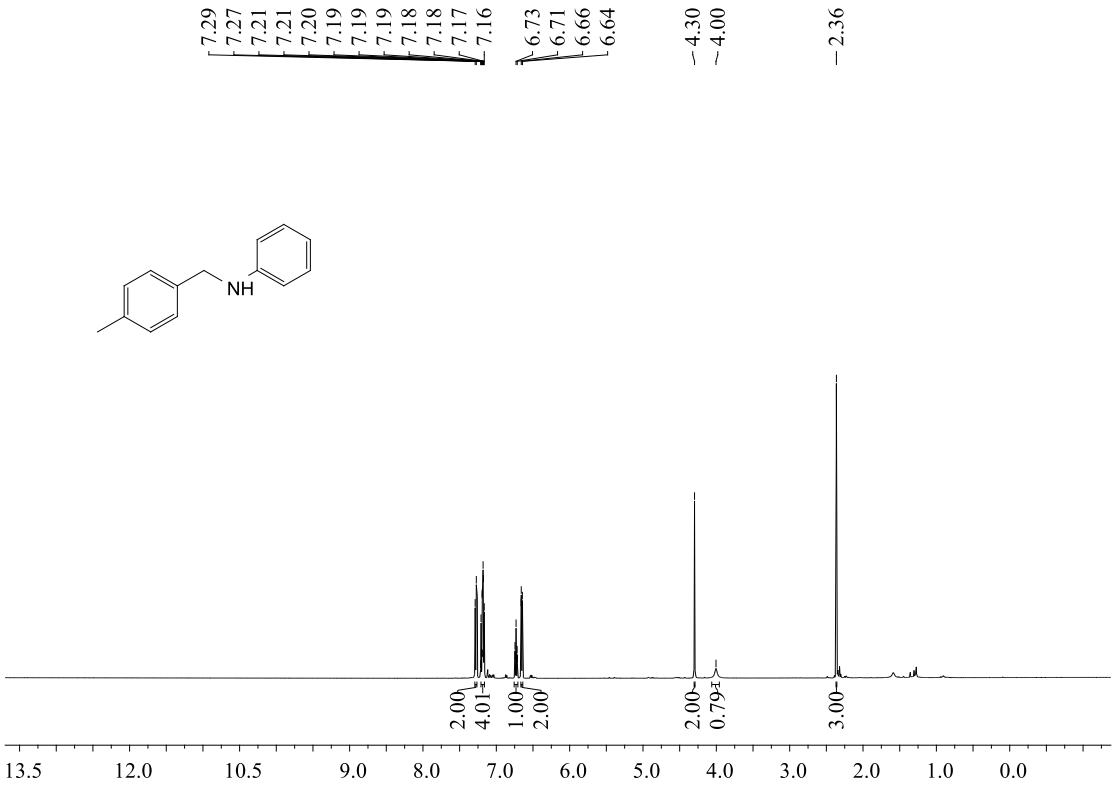


^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3aa

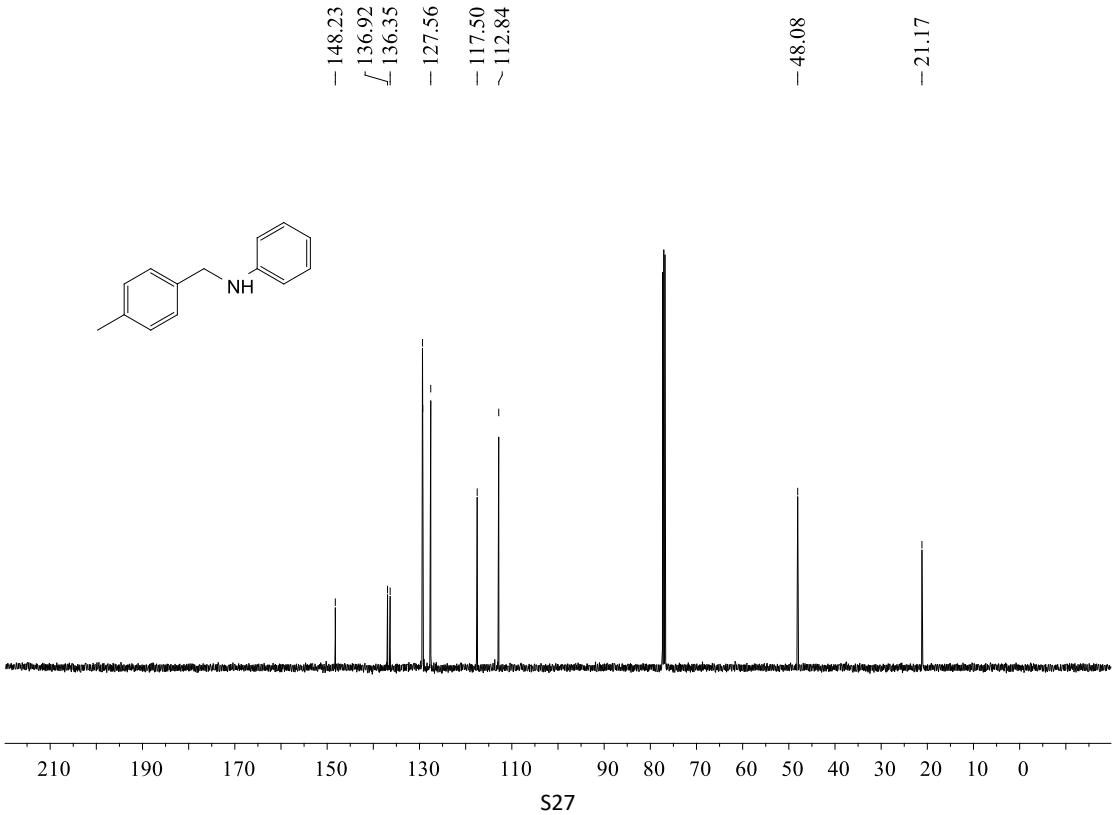




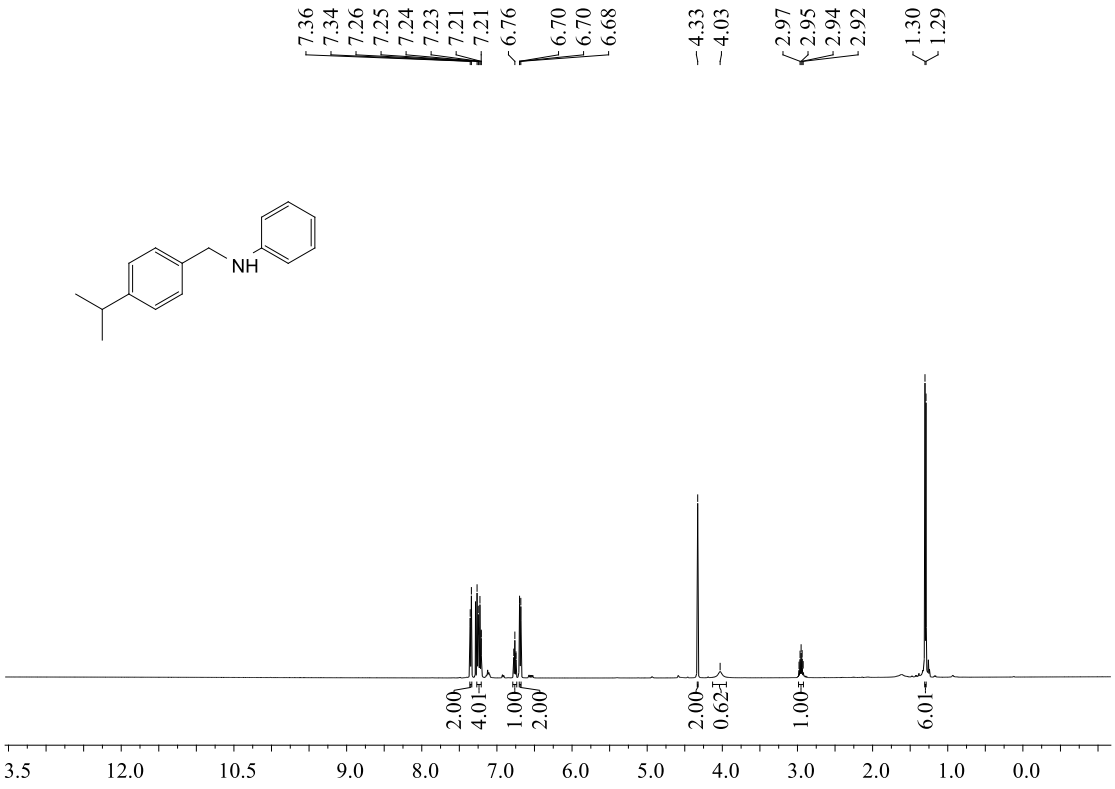
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ba



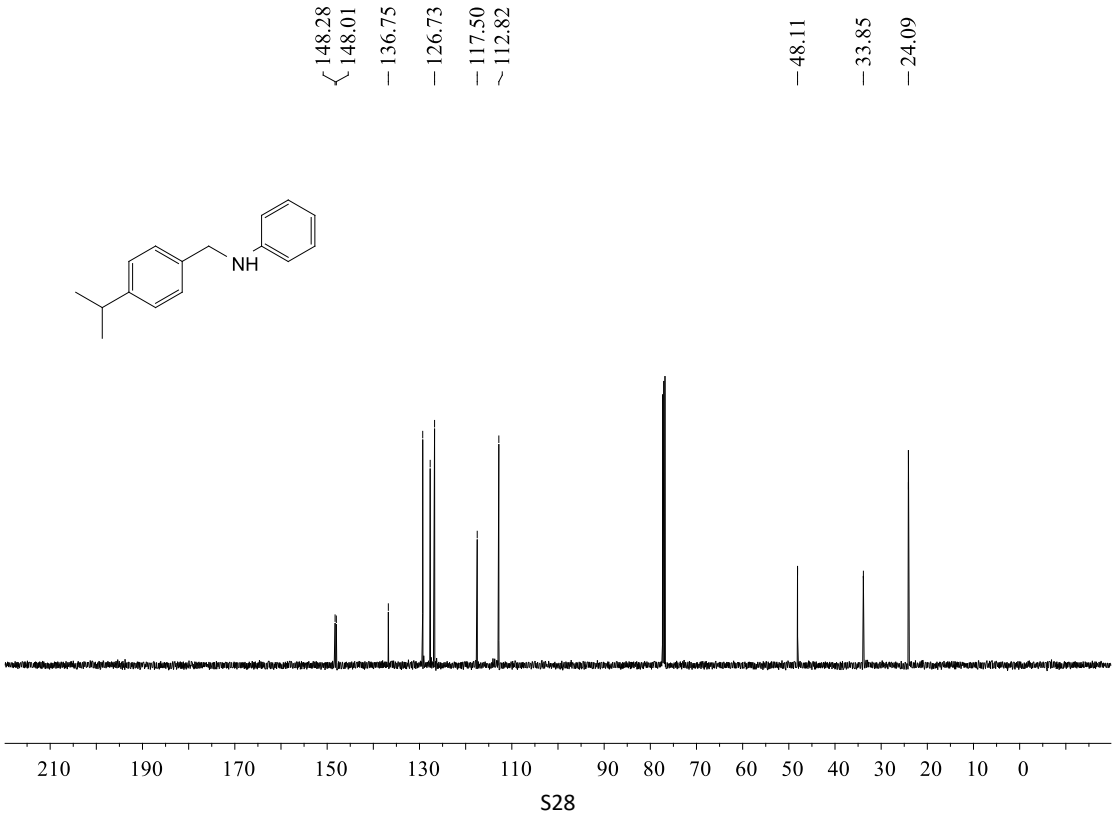
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ba



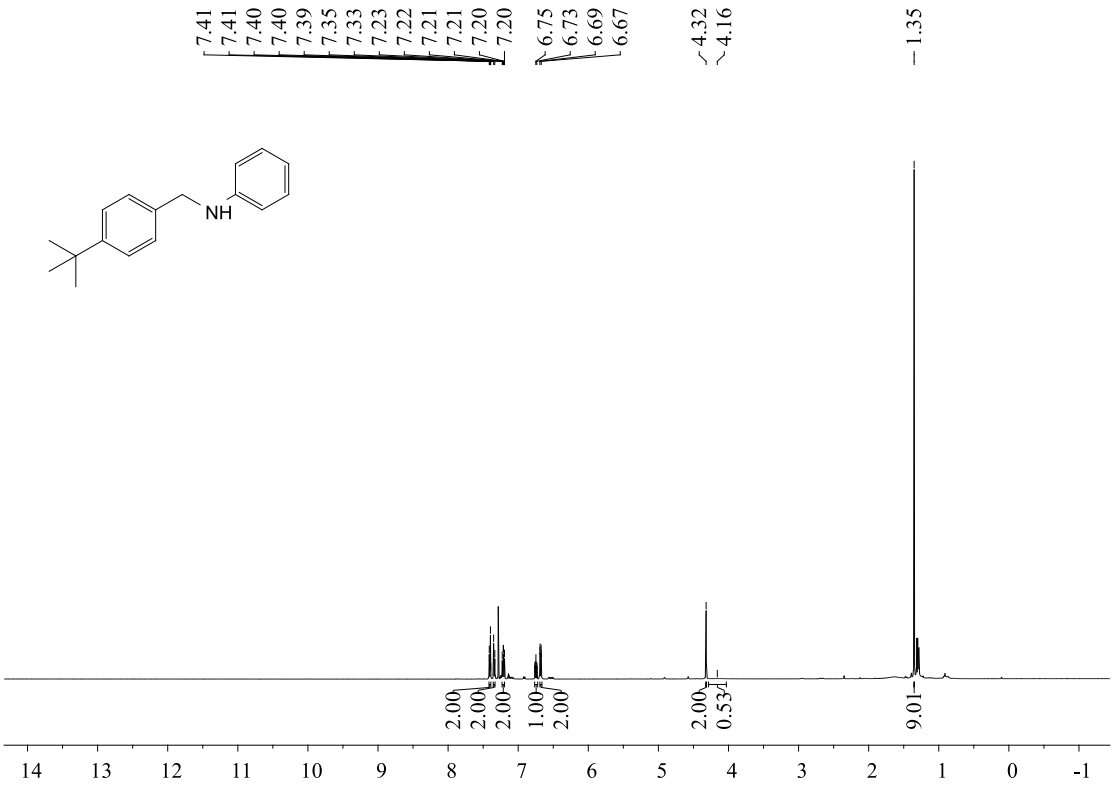
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ca



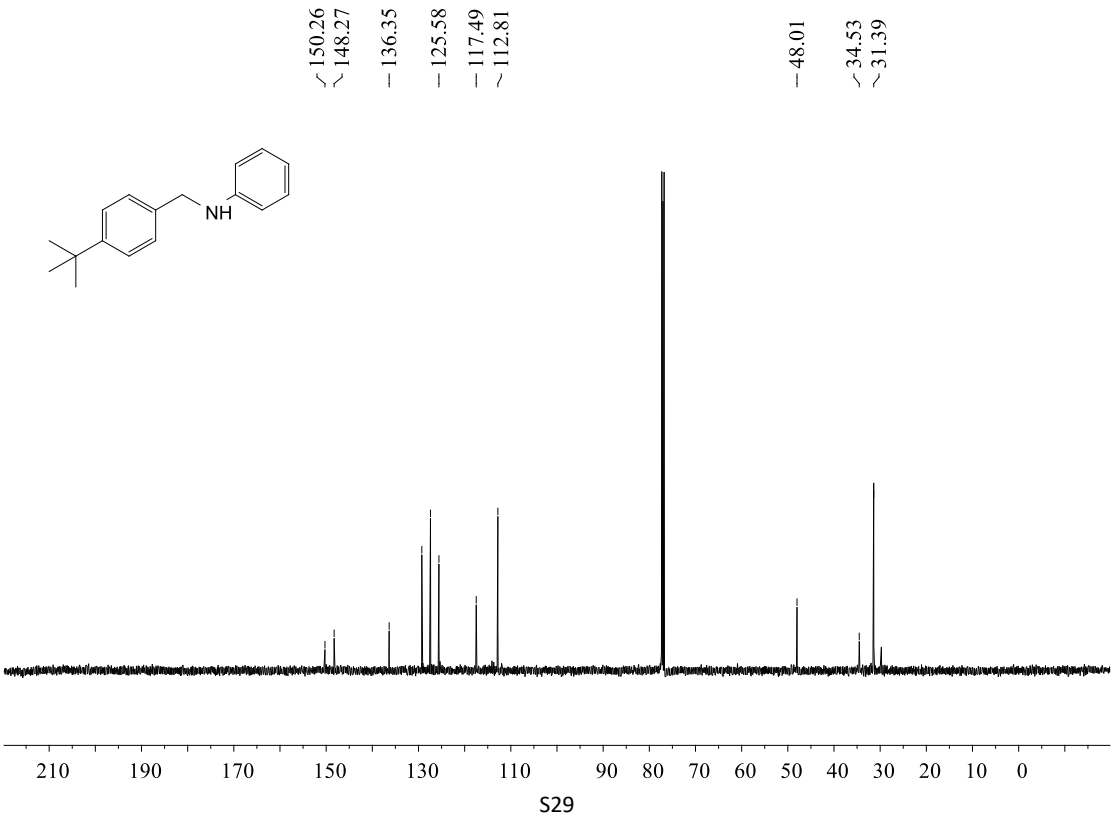
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ca



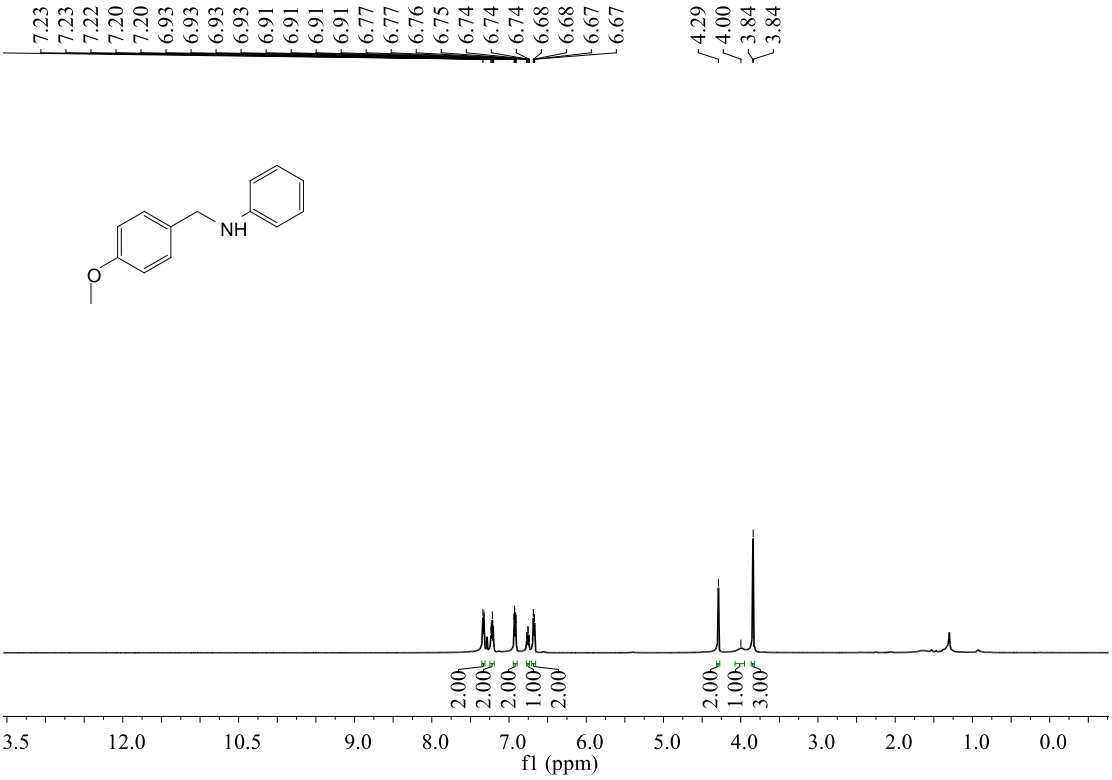
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3da



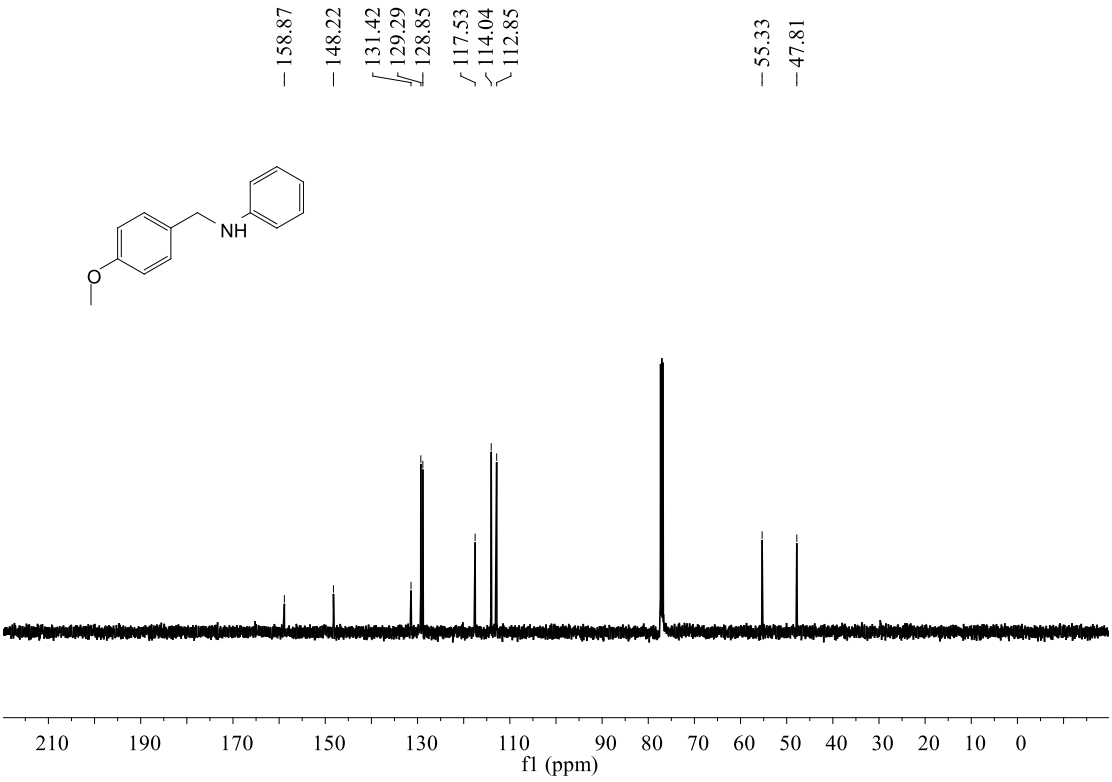
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3da



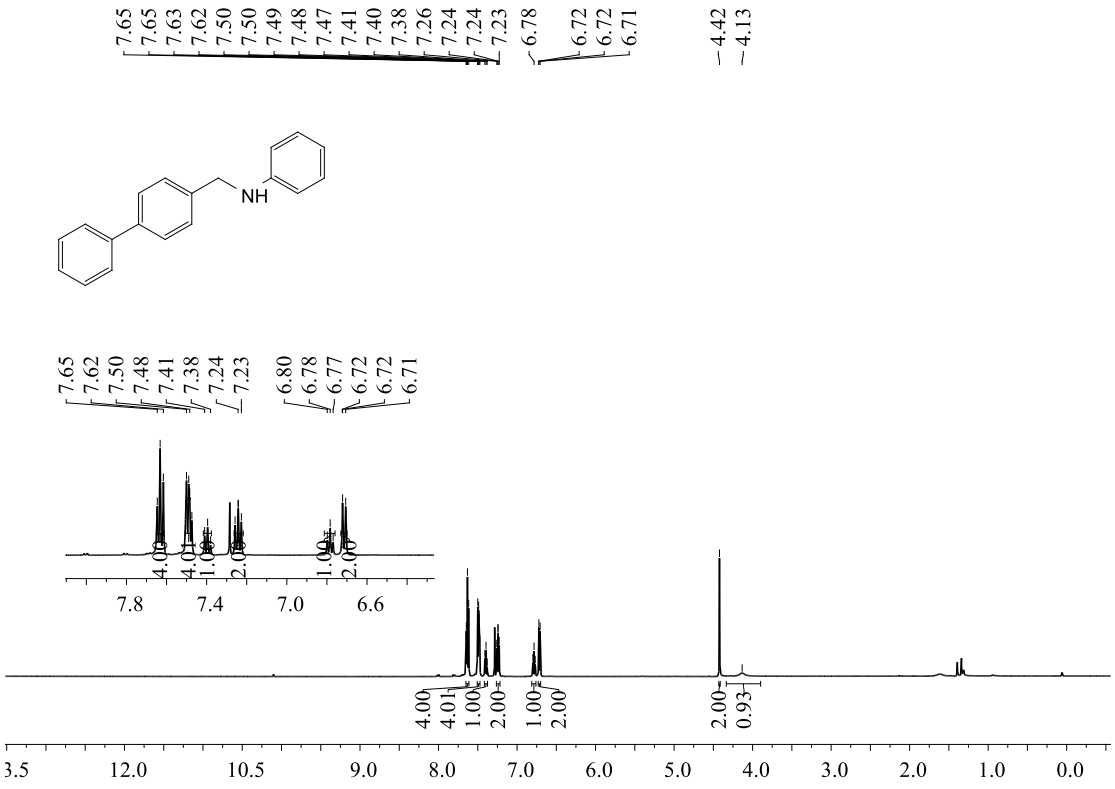
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ea



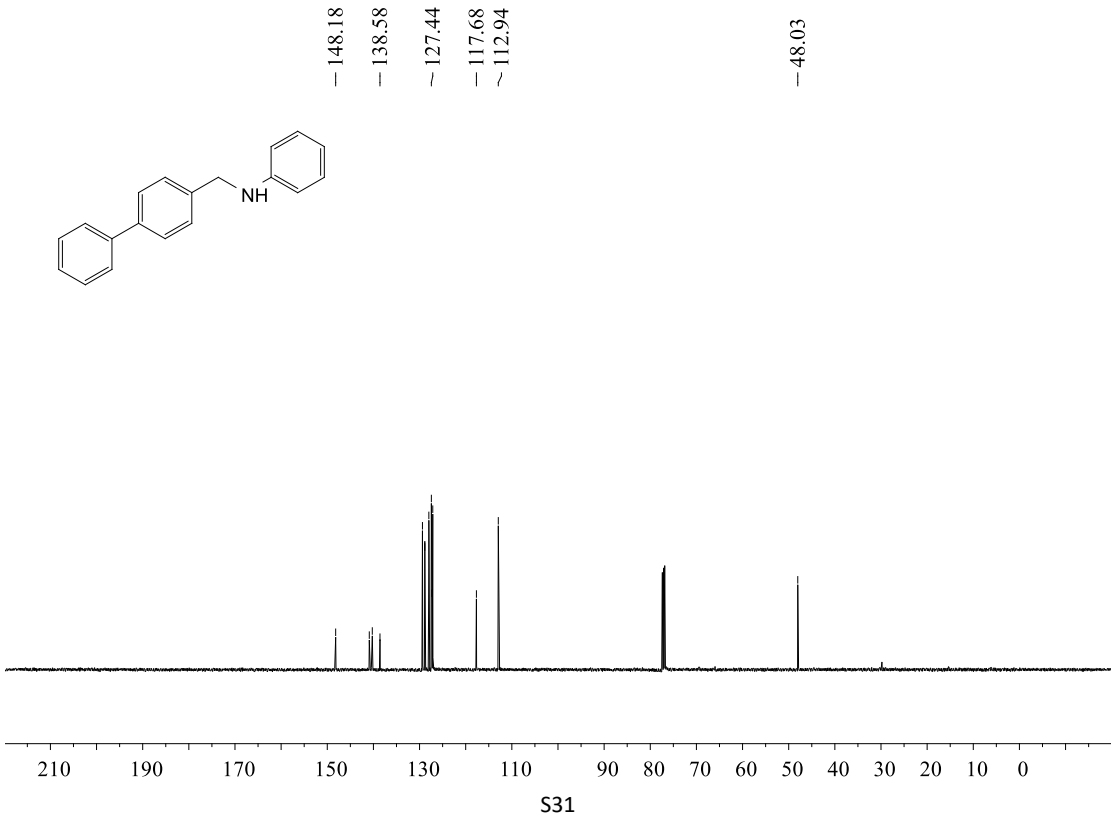
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ea



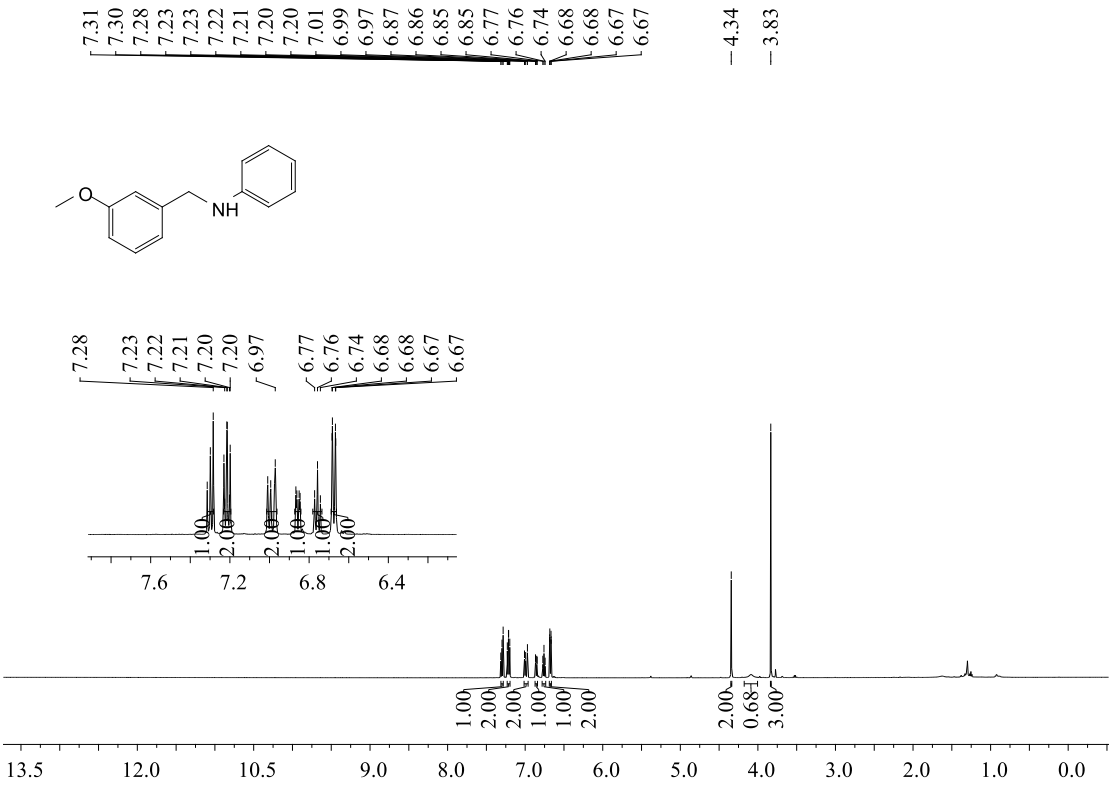
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3fa



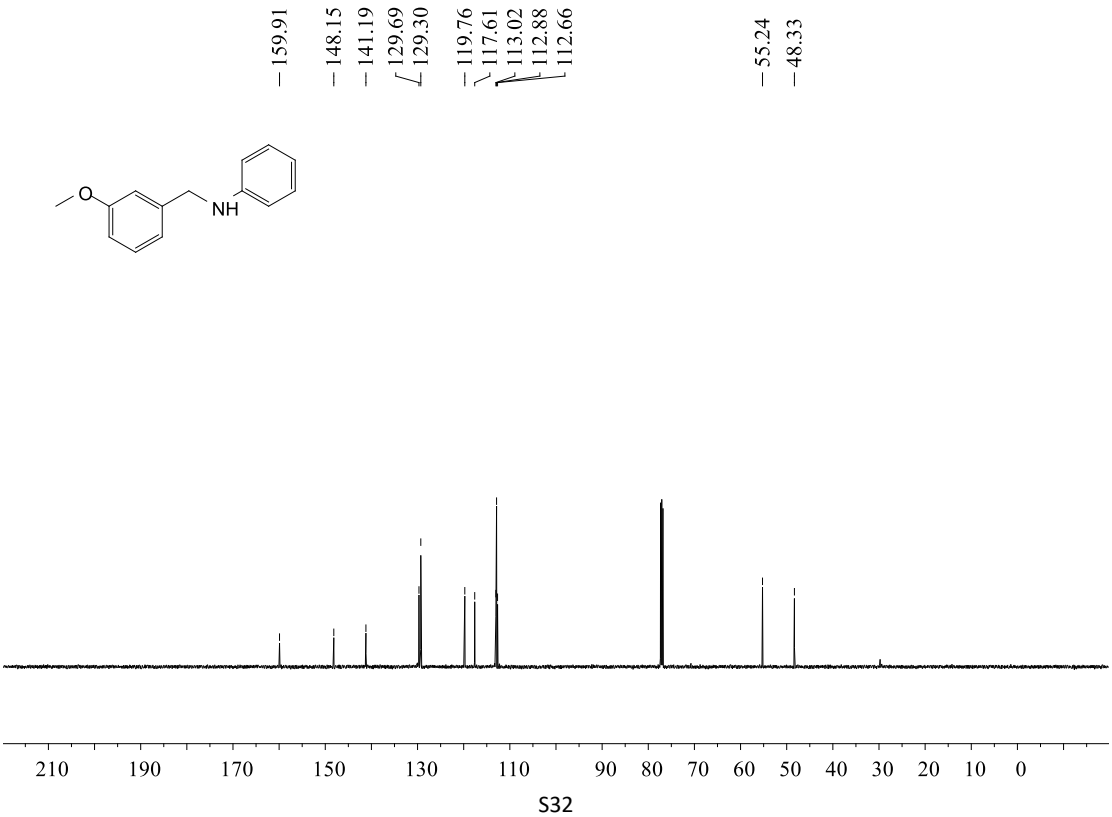
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3fa



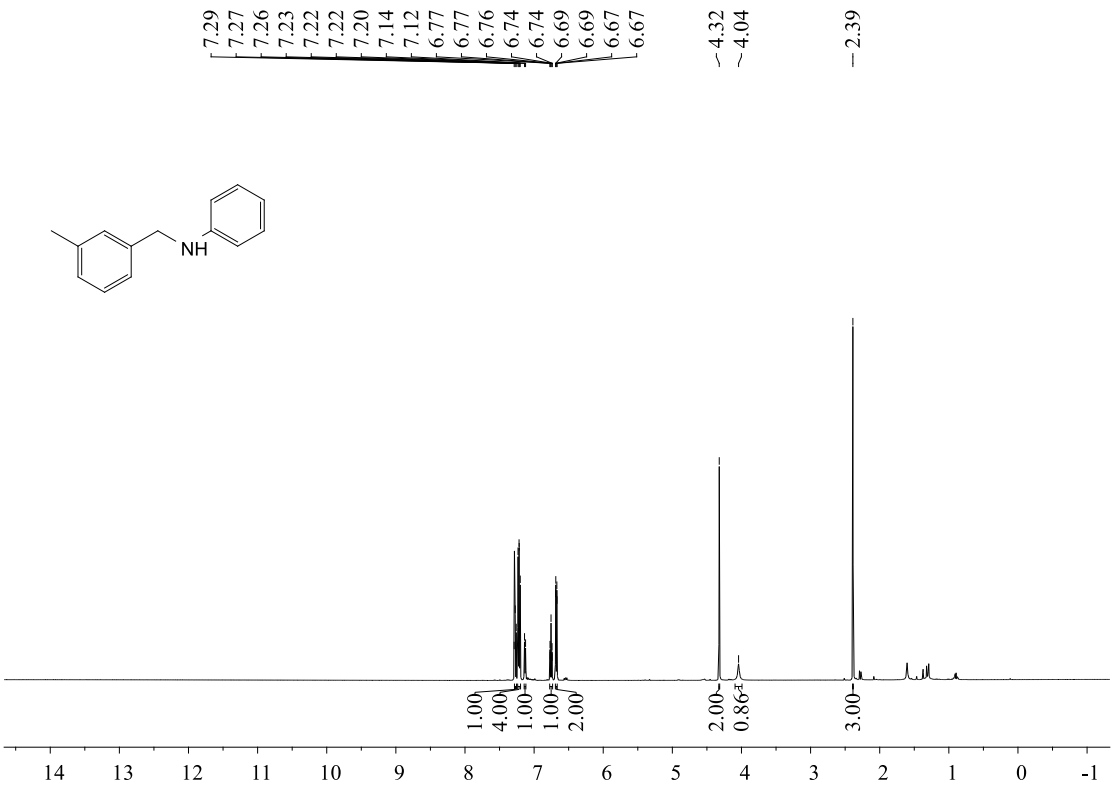
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ga



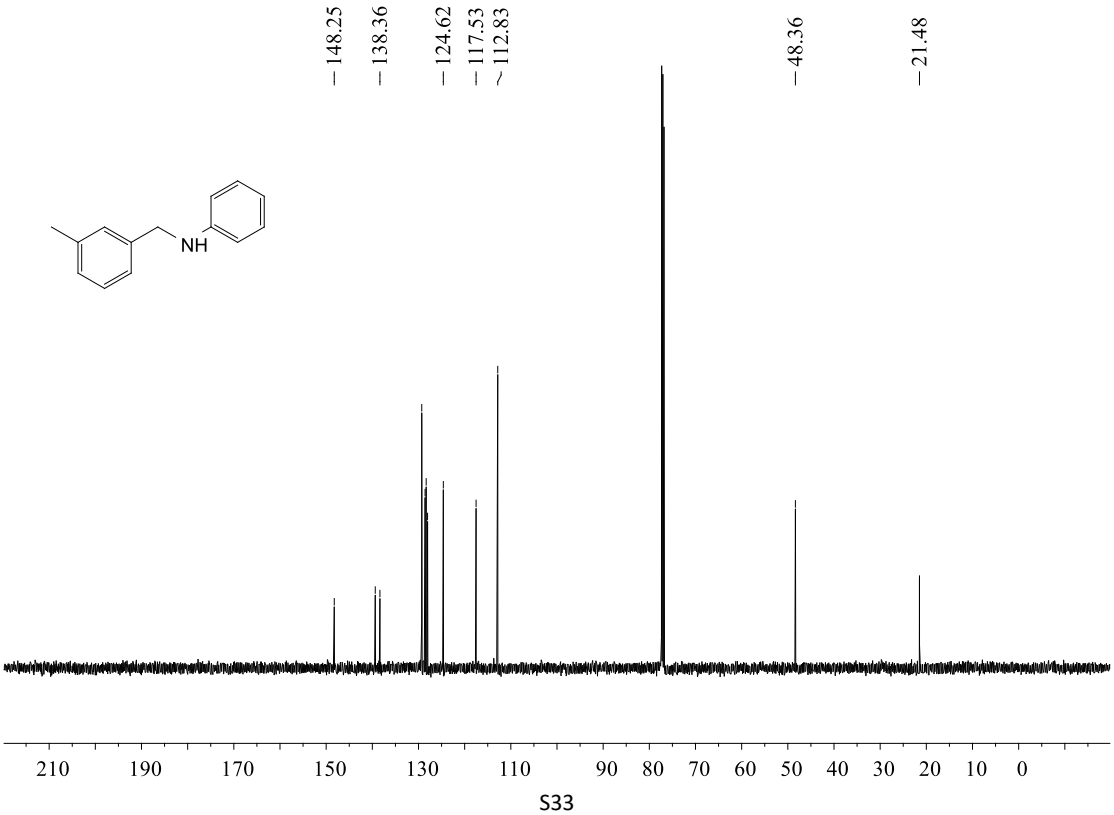
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ga



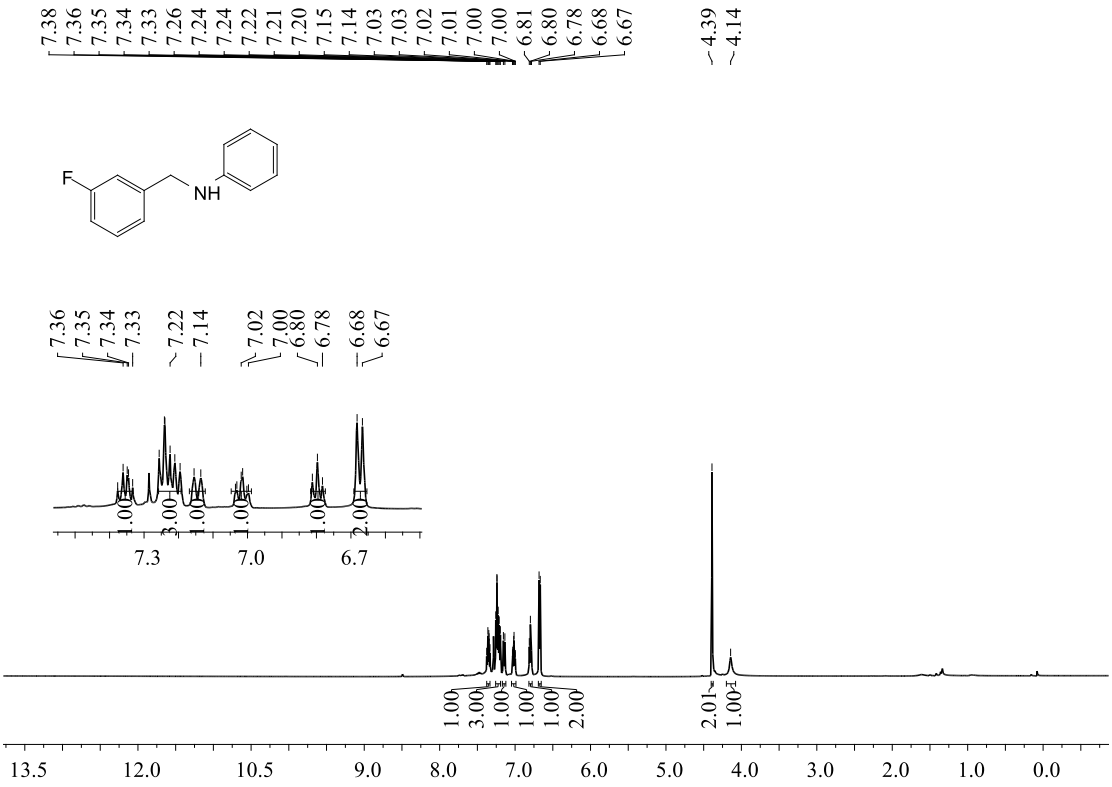
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ha



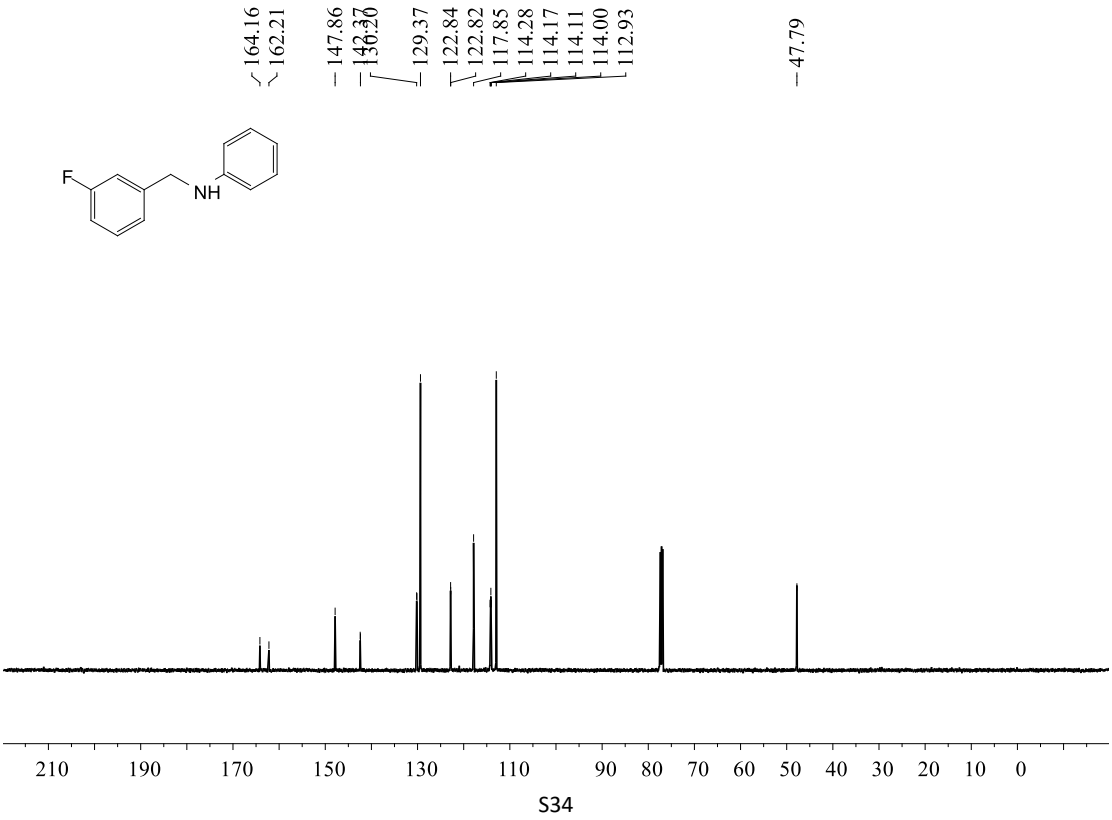
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ha



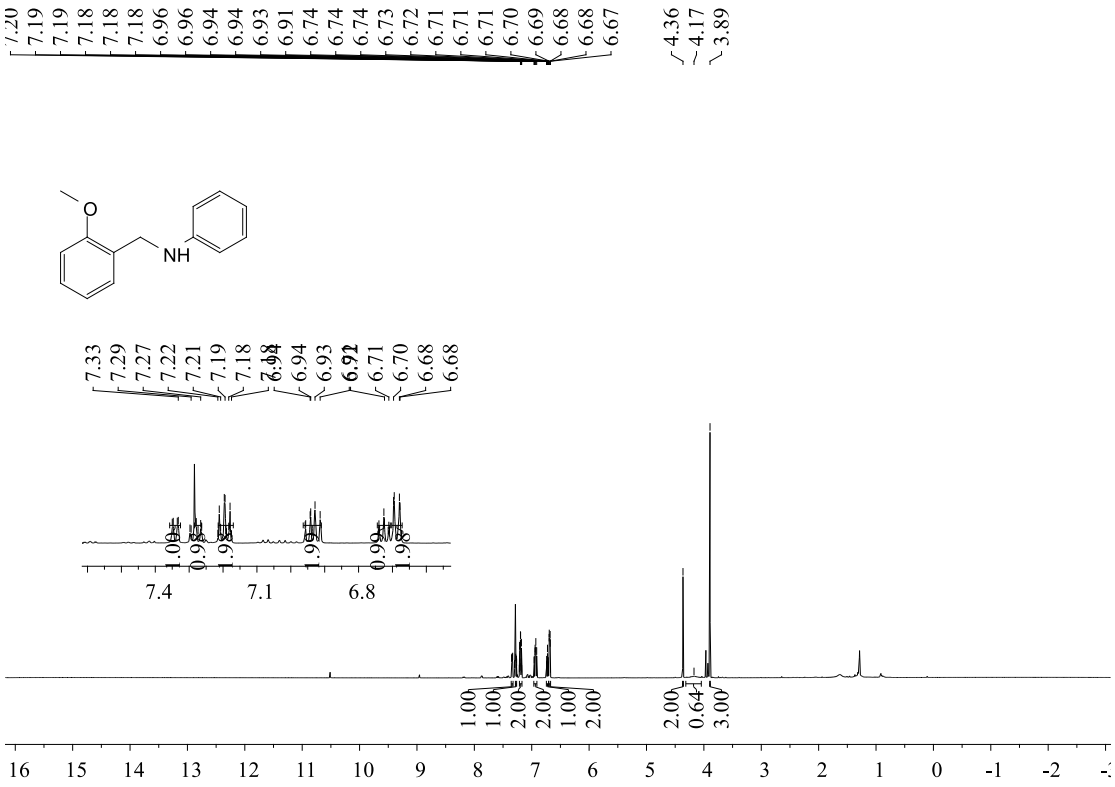
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ia



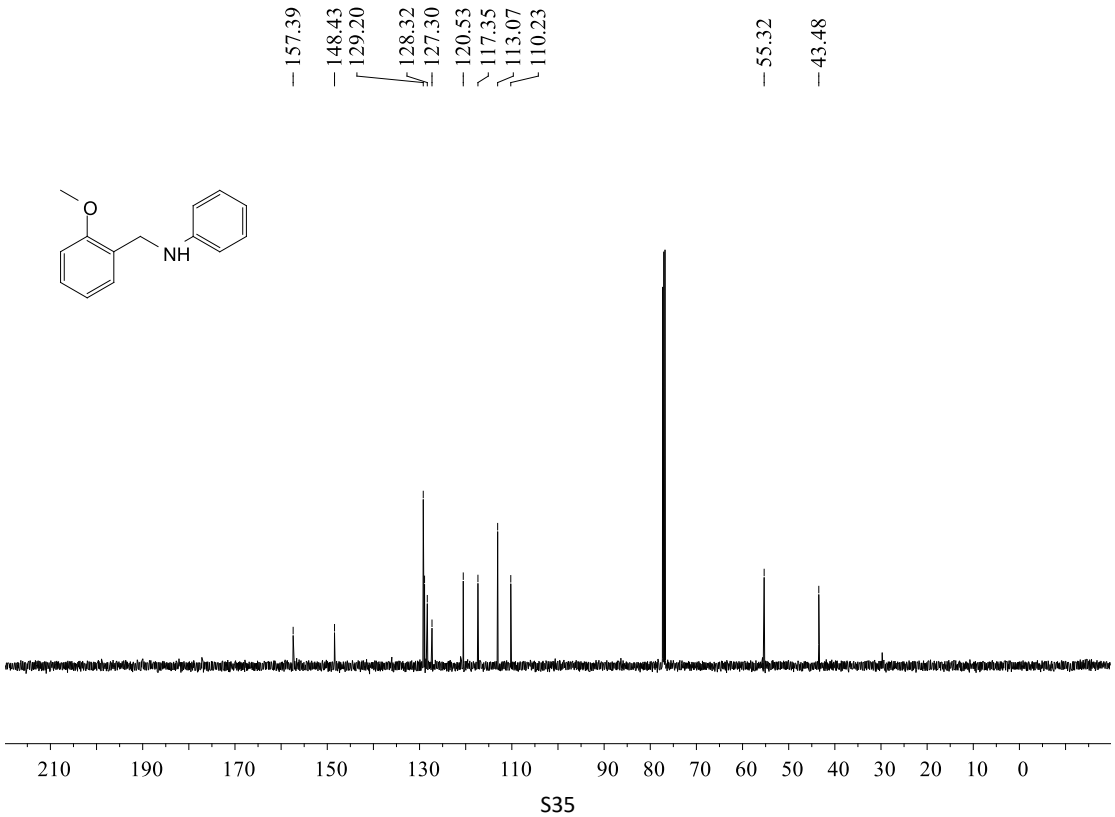
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ia



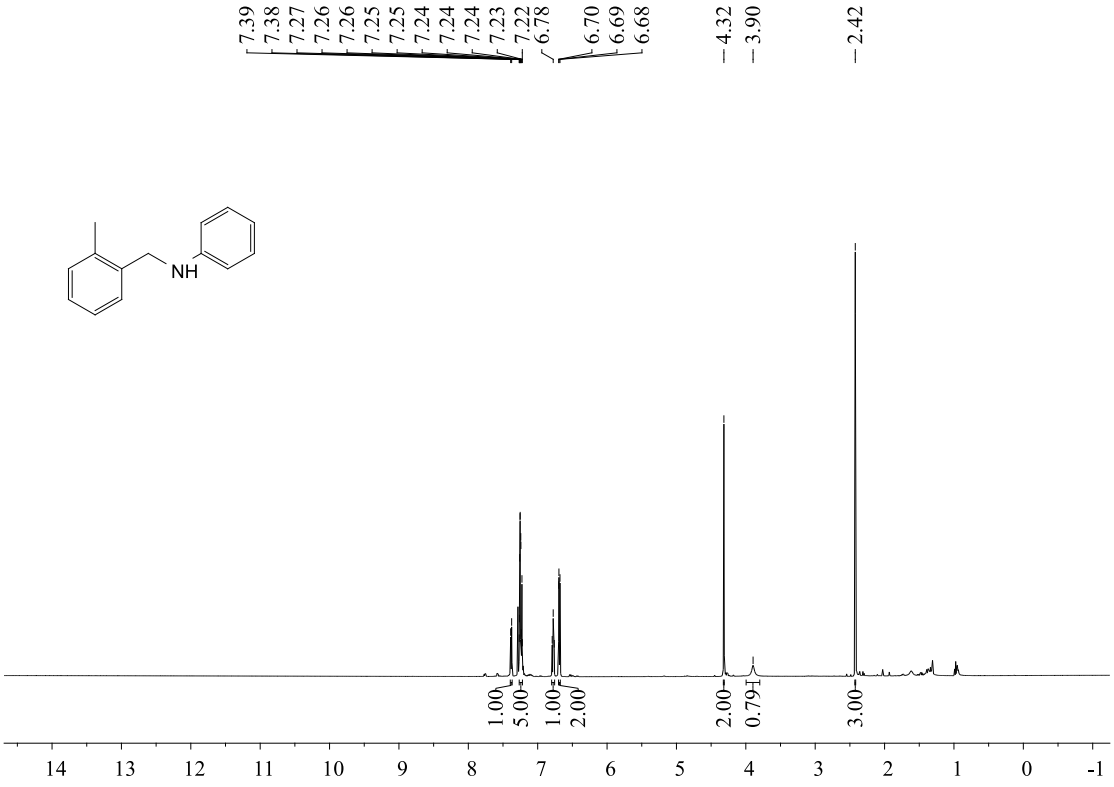
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ja



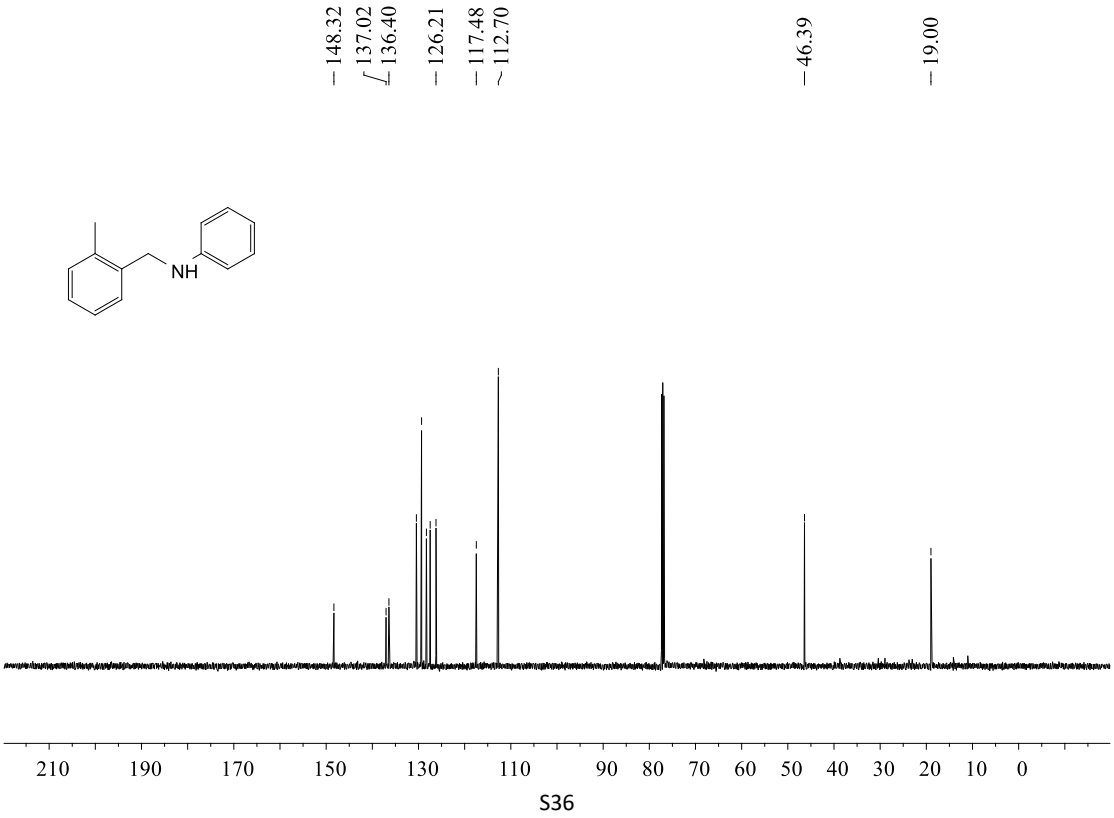
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ja



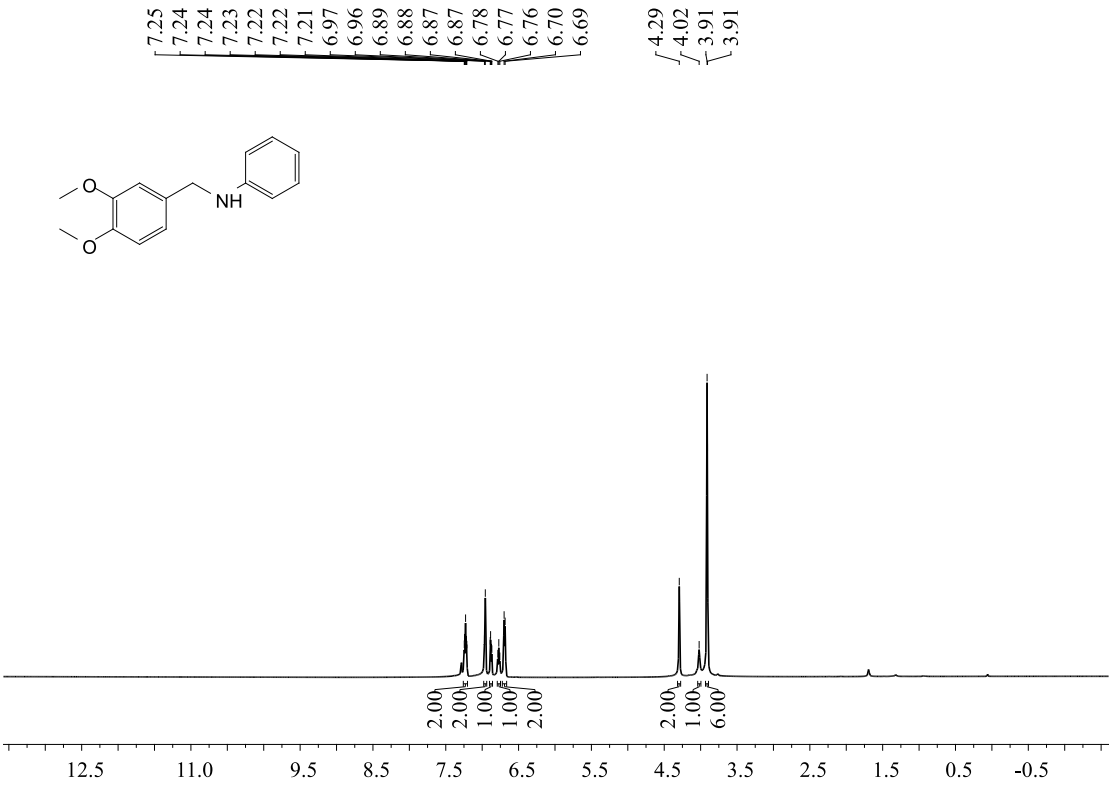
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ka



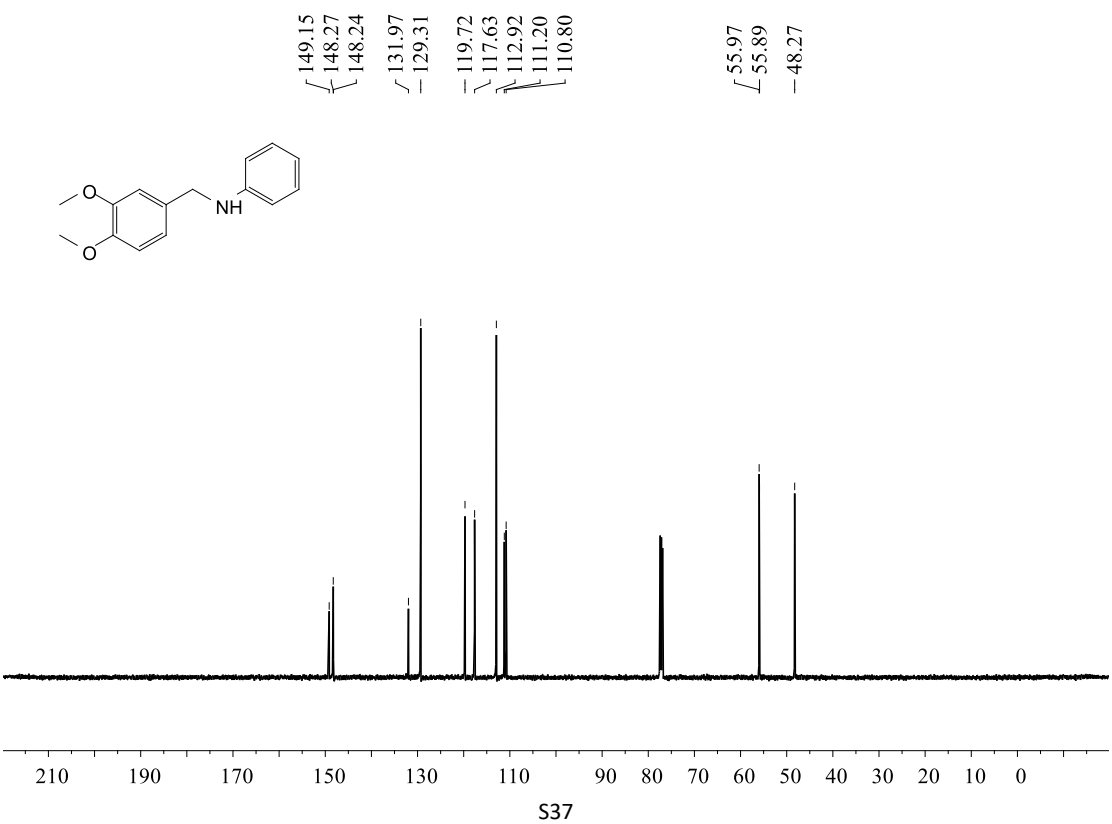
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ka



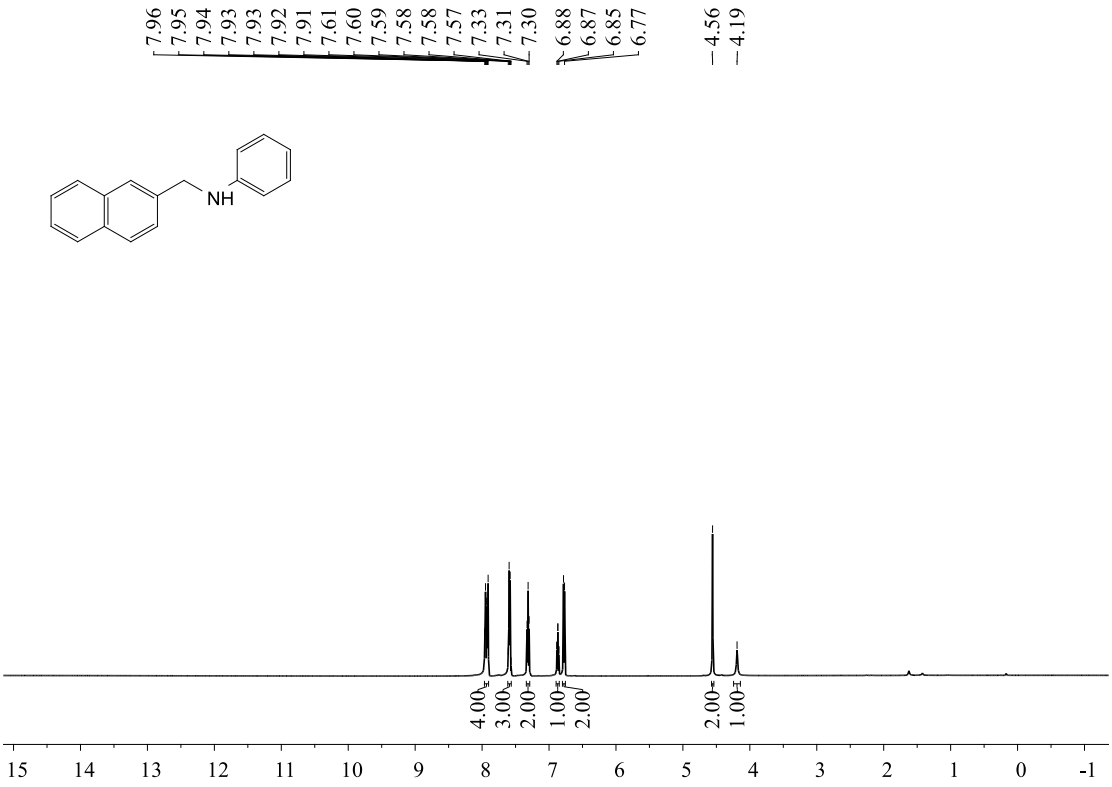
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3la



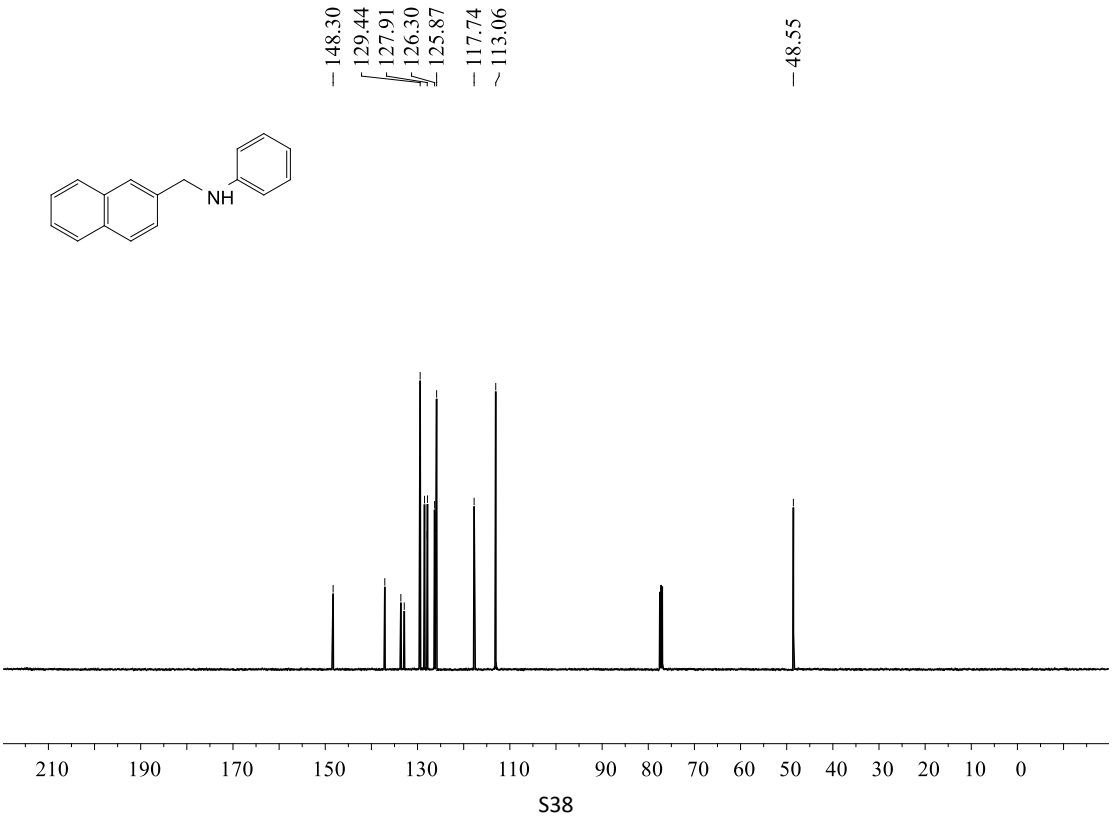
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3la



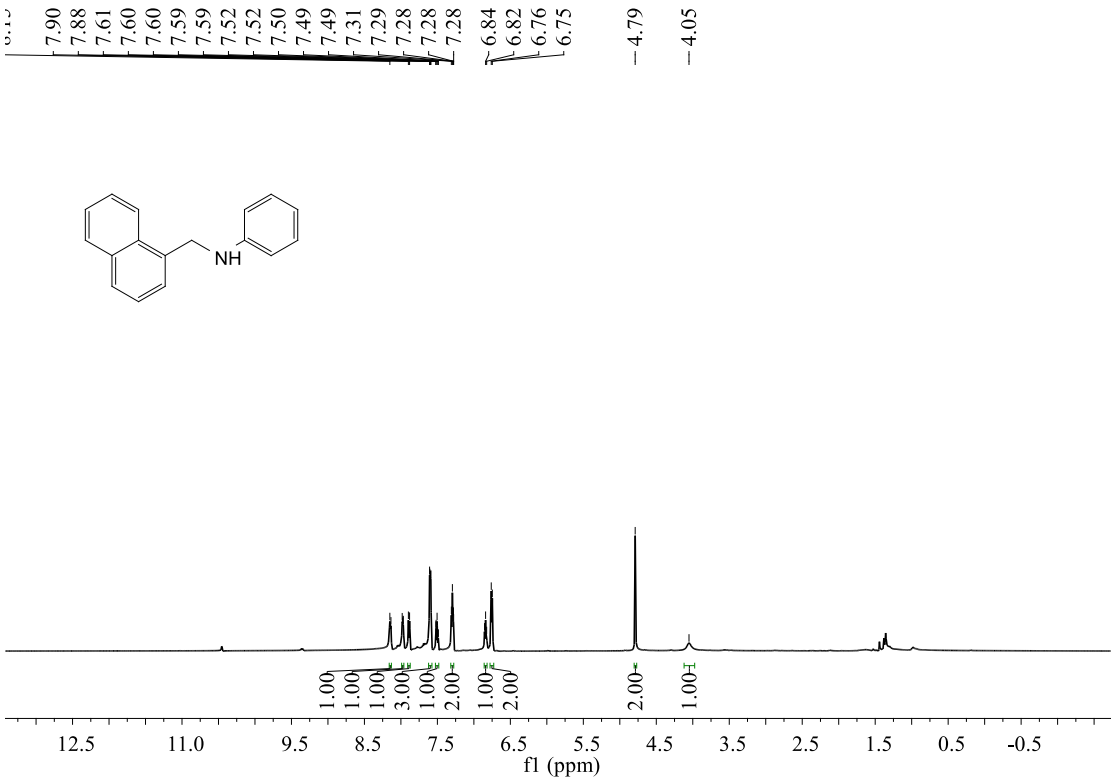
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ma



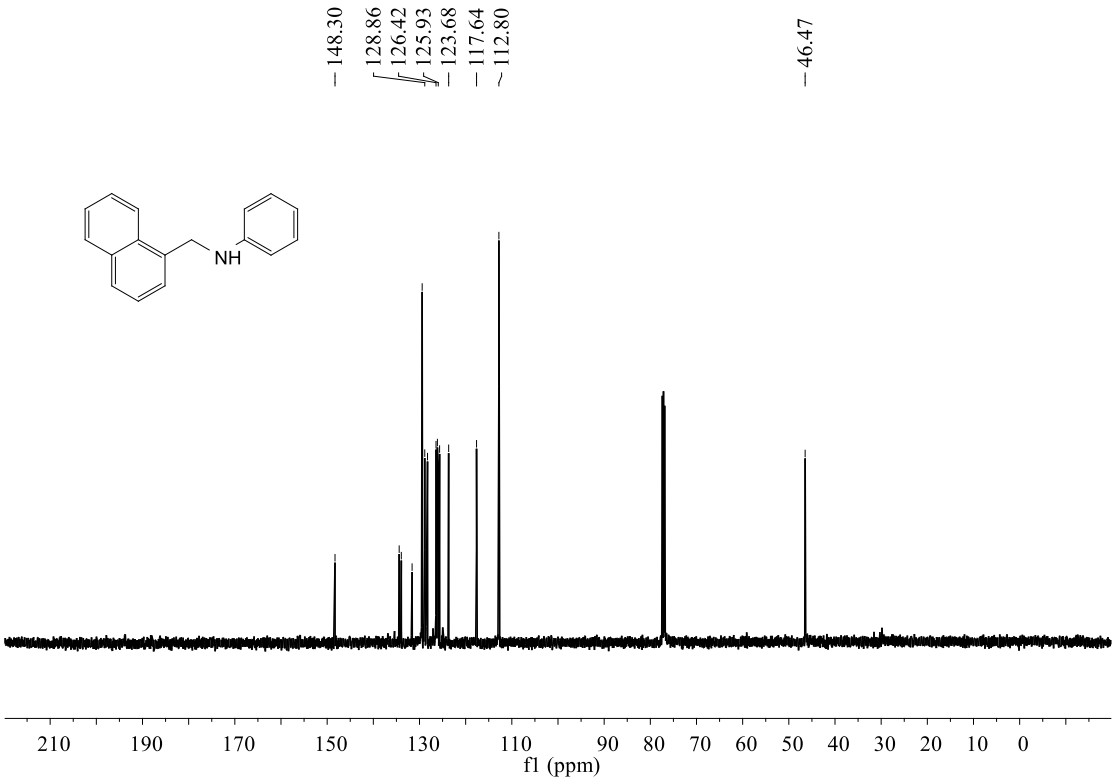
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ma



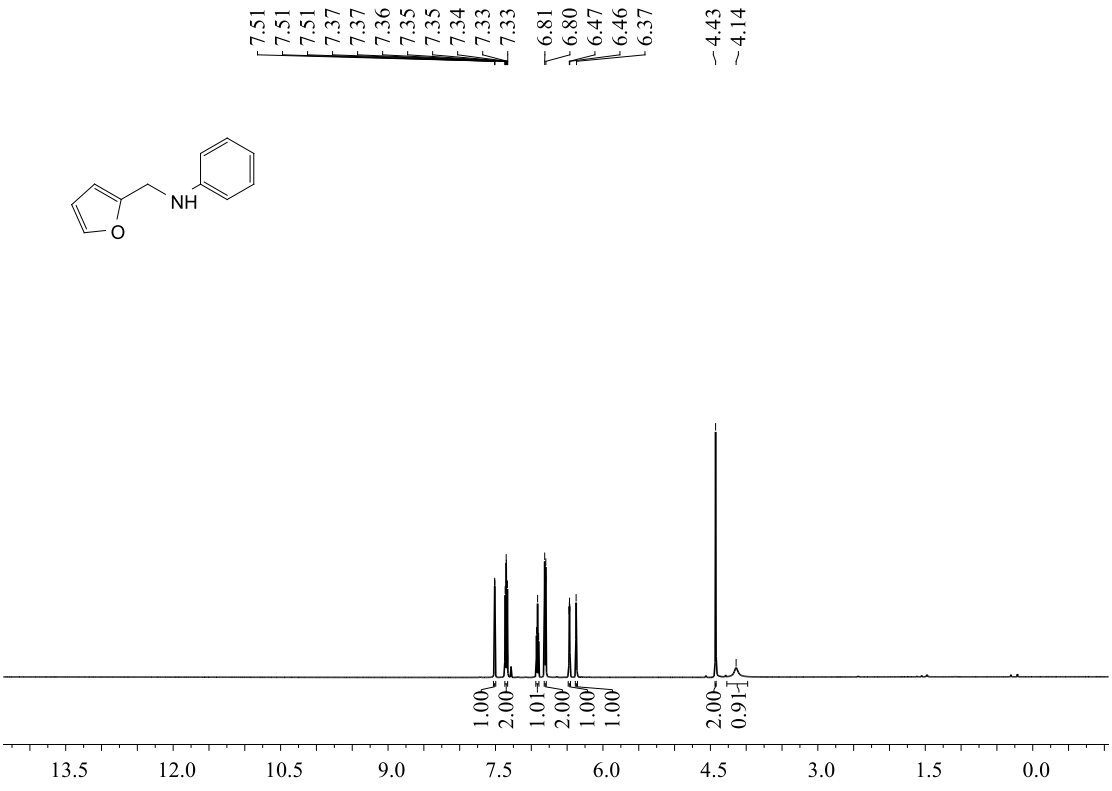
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3na



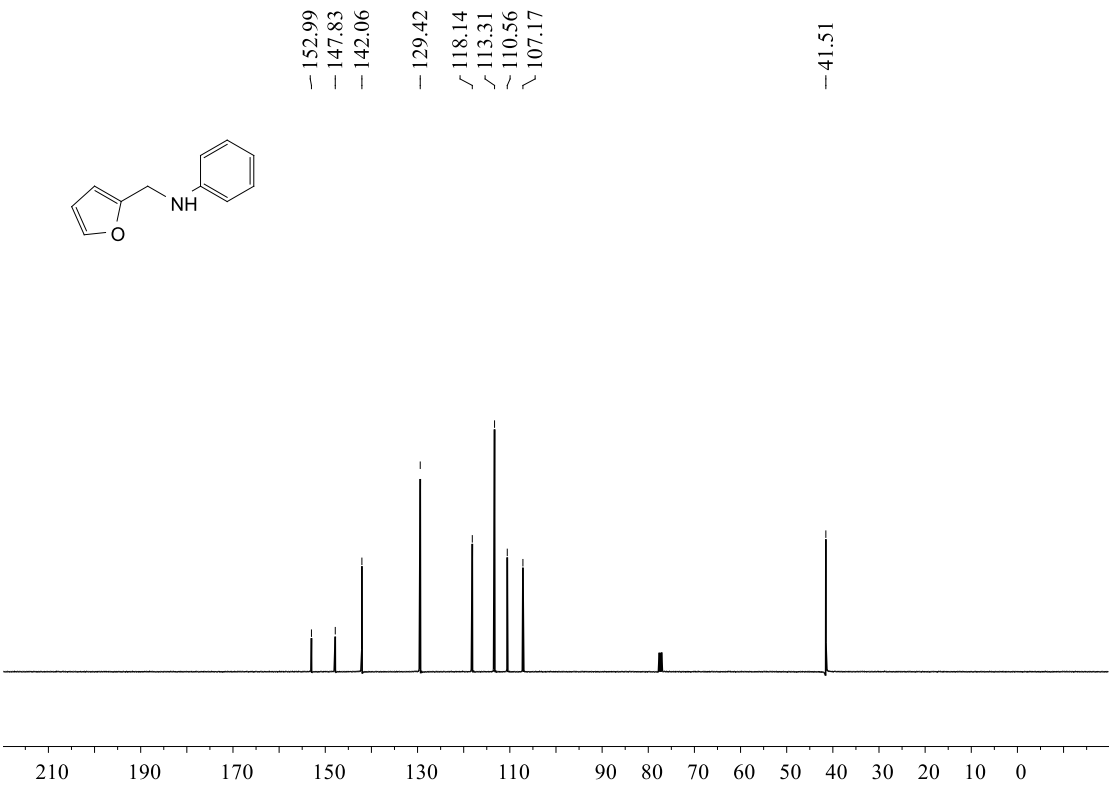
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3na



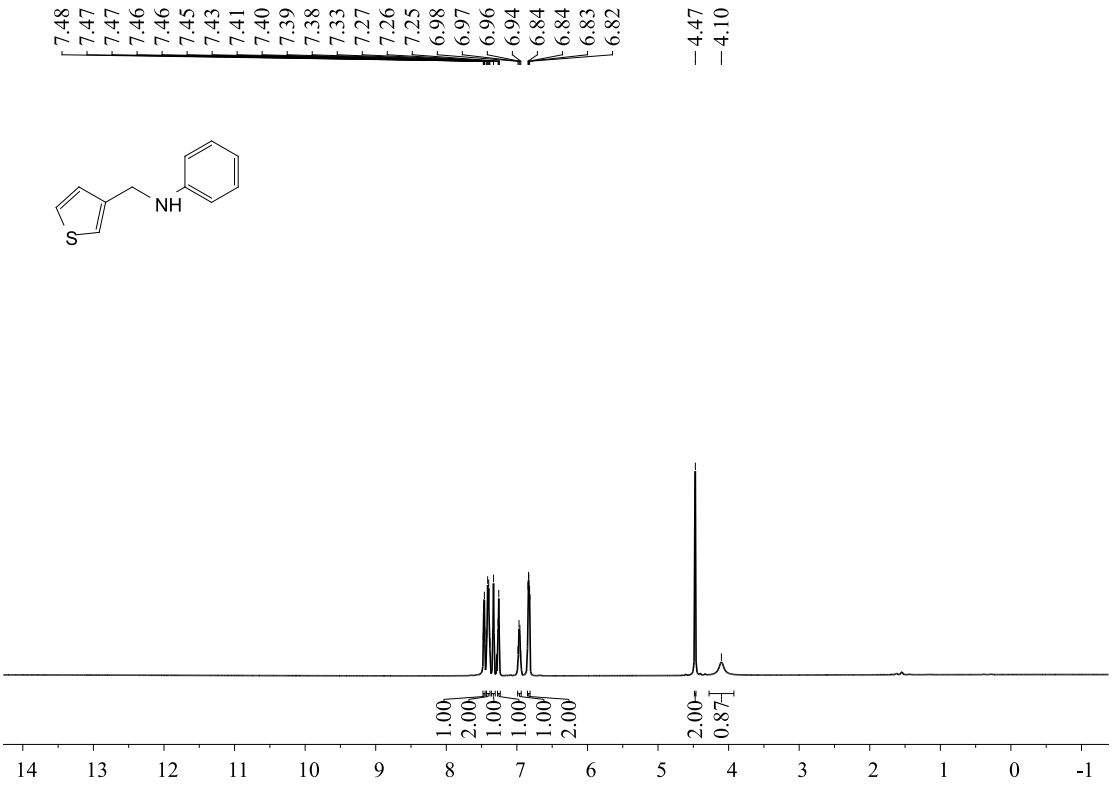
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3oa



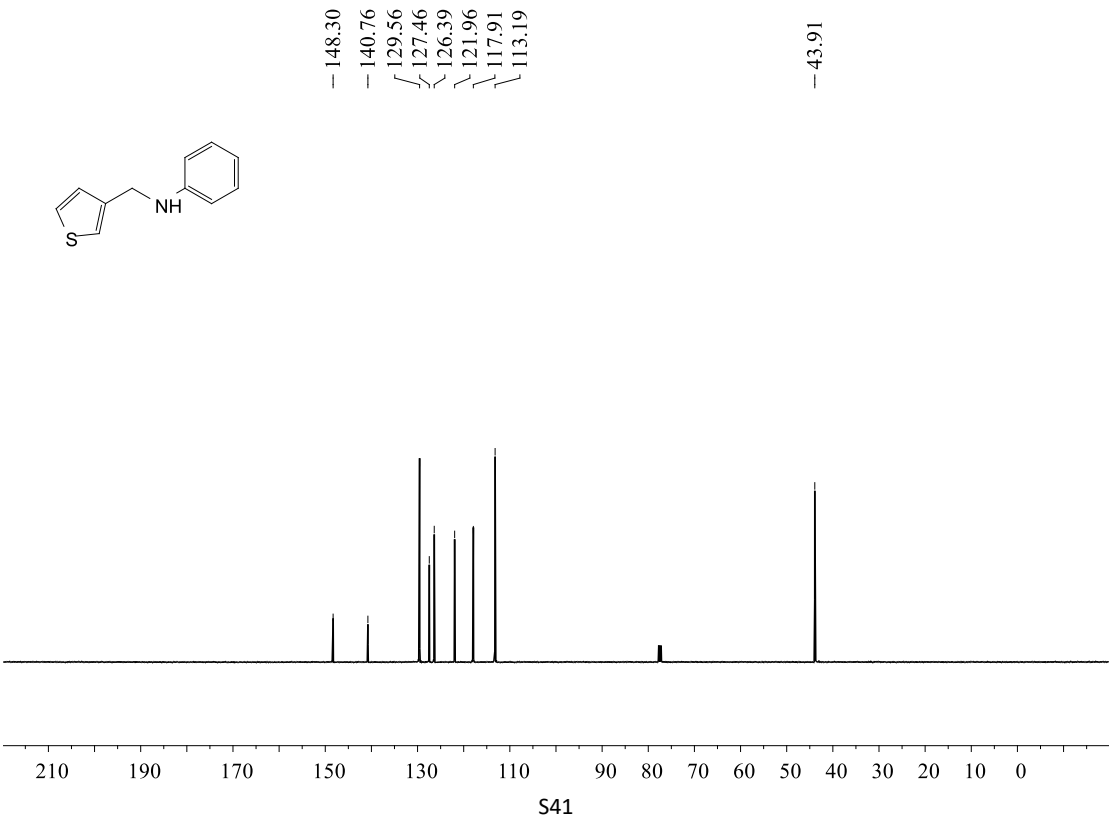
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3oa



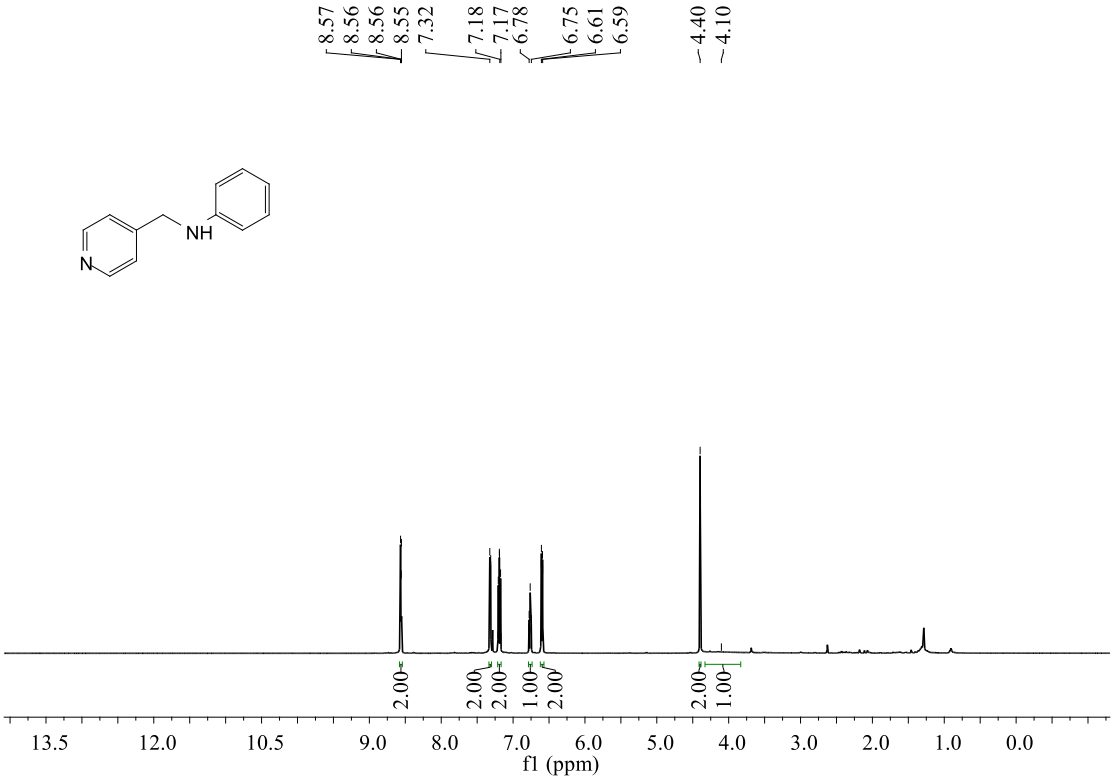
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3pa



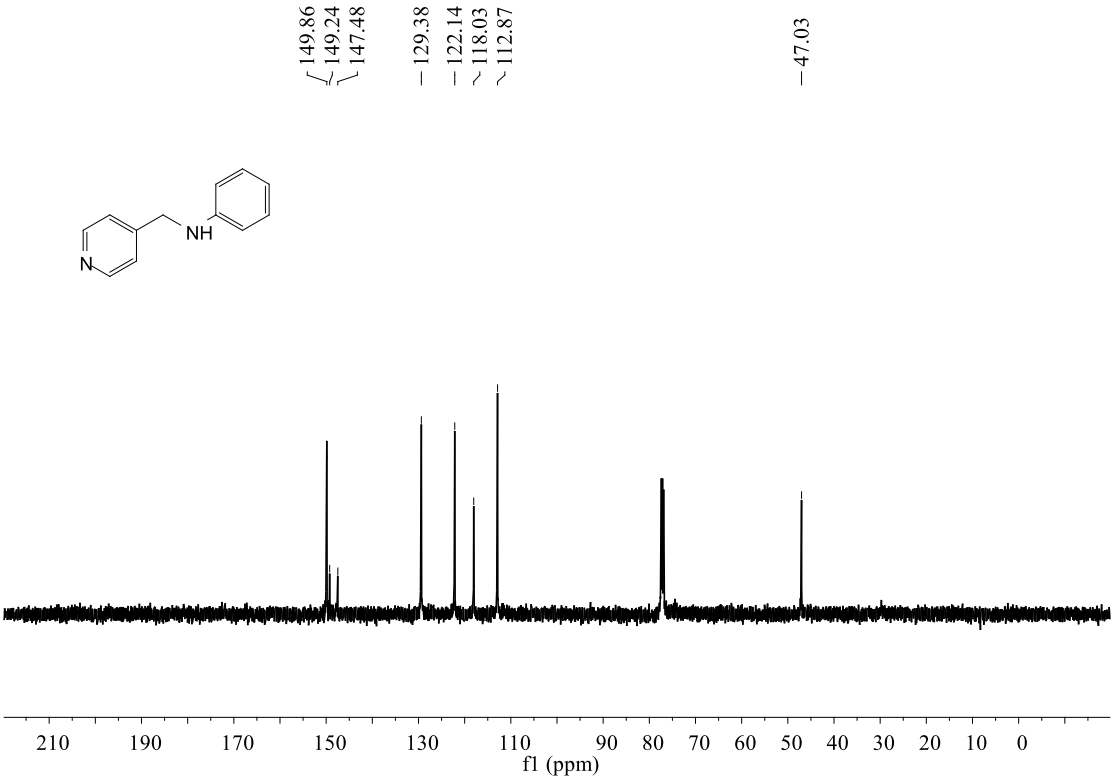
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3pa



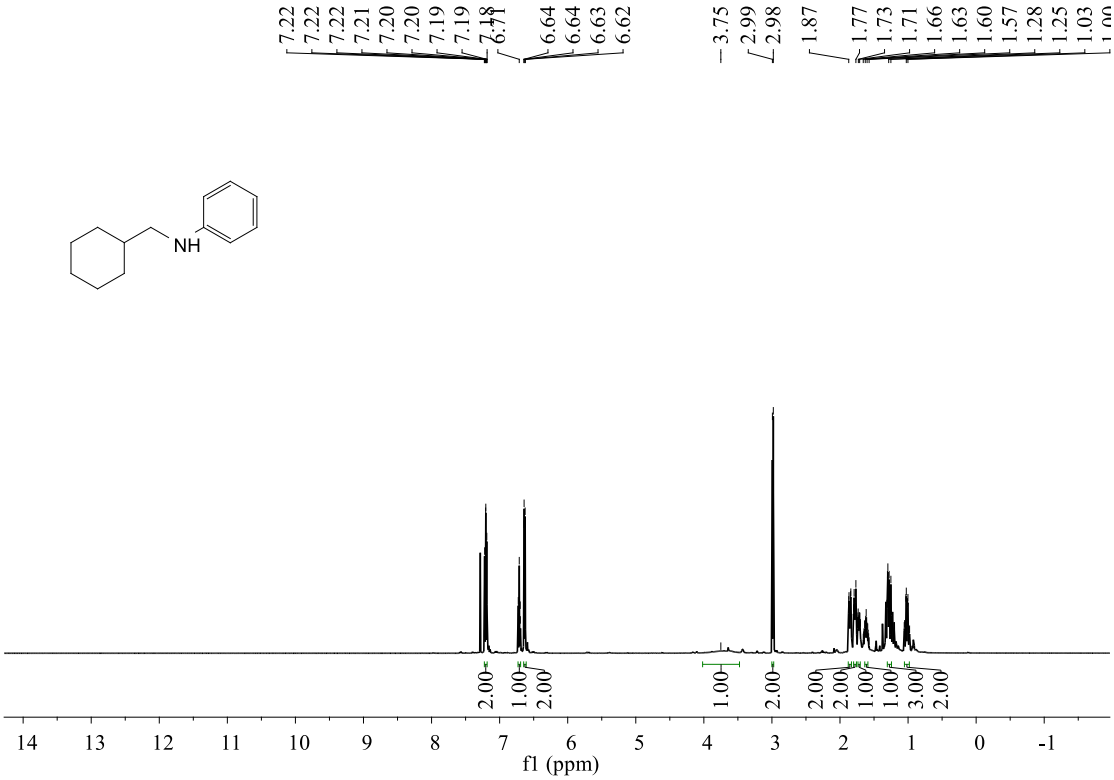
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3qa



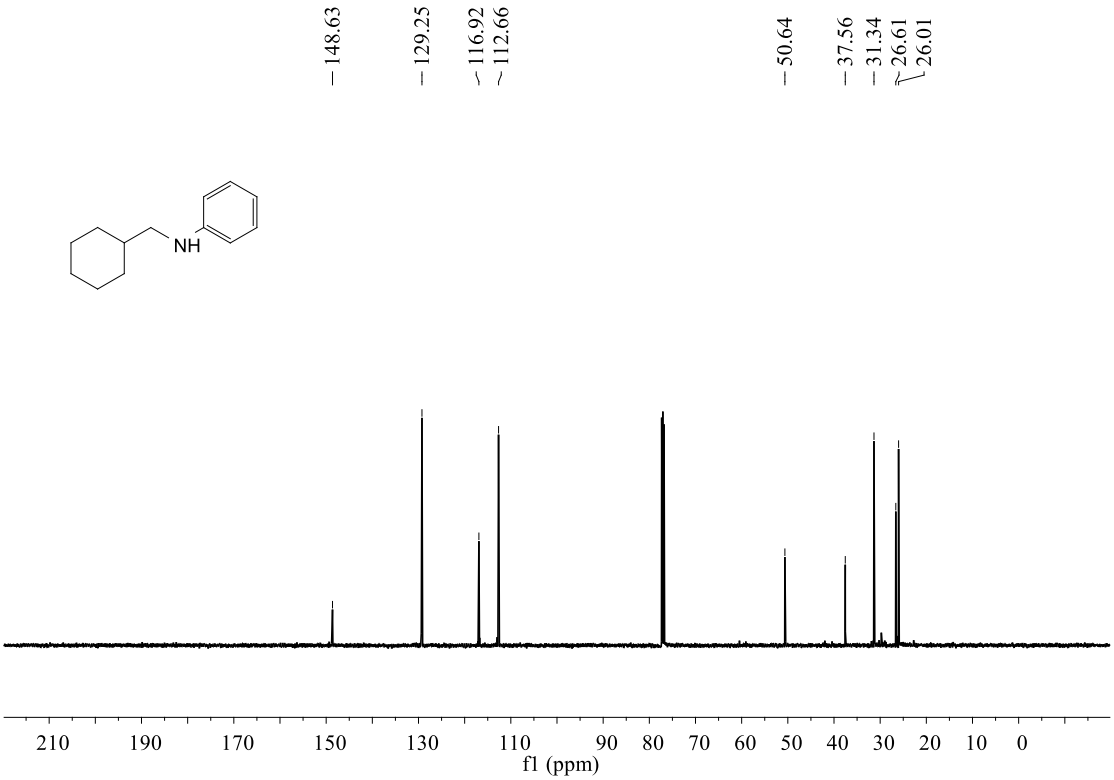
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3qa



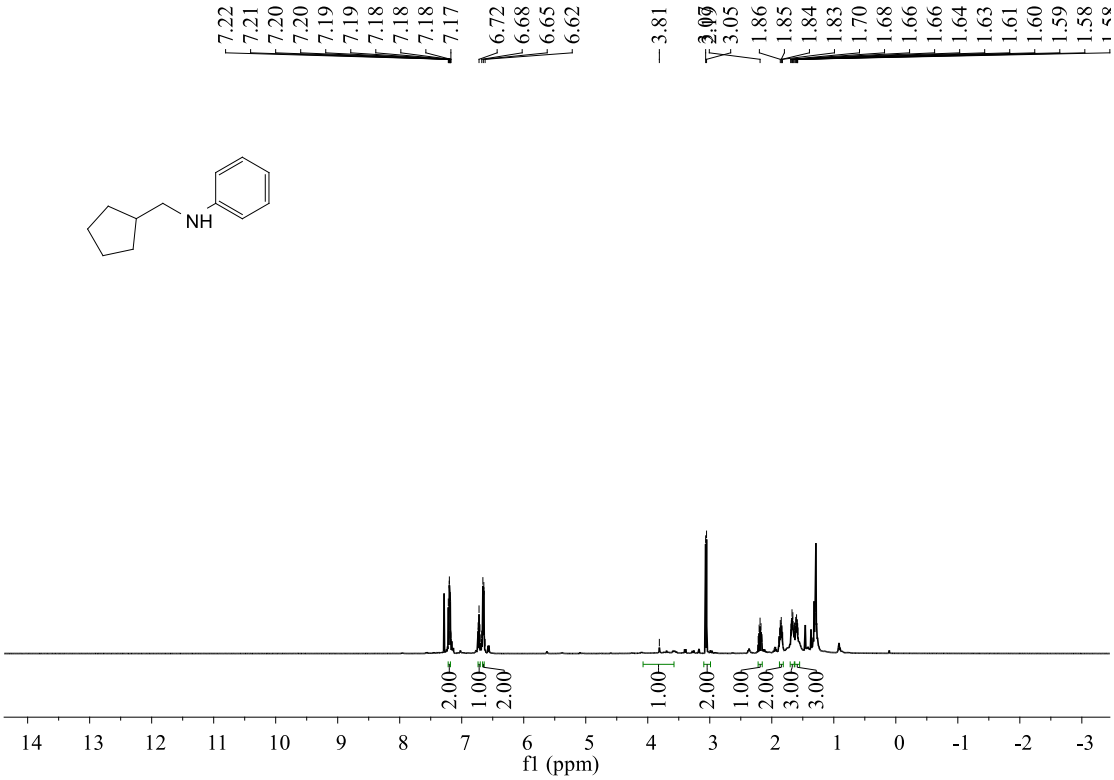
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ra



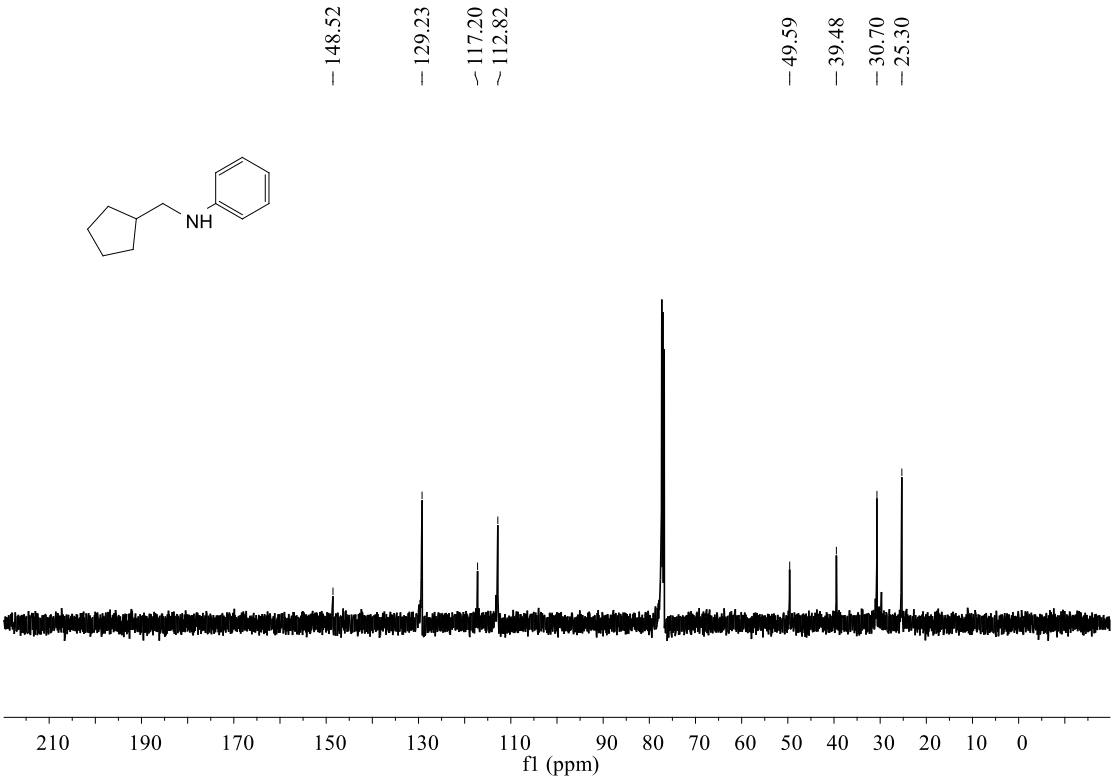
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ra



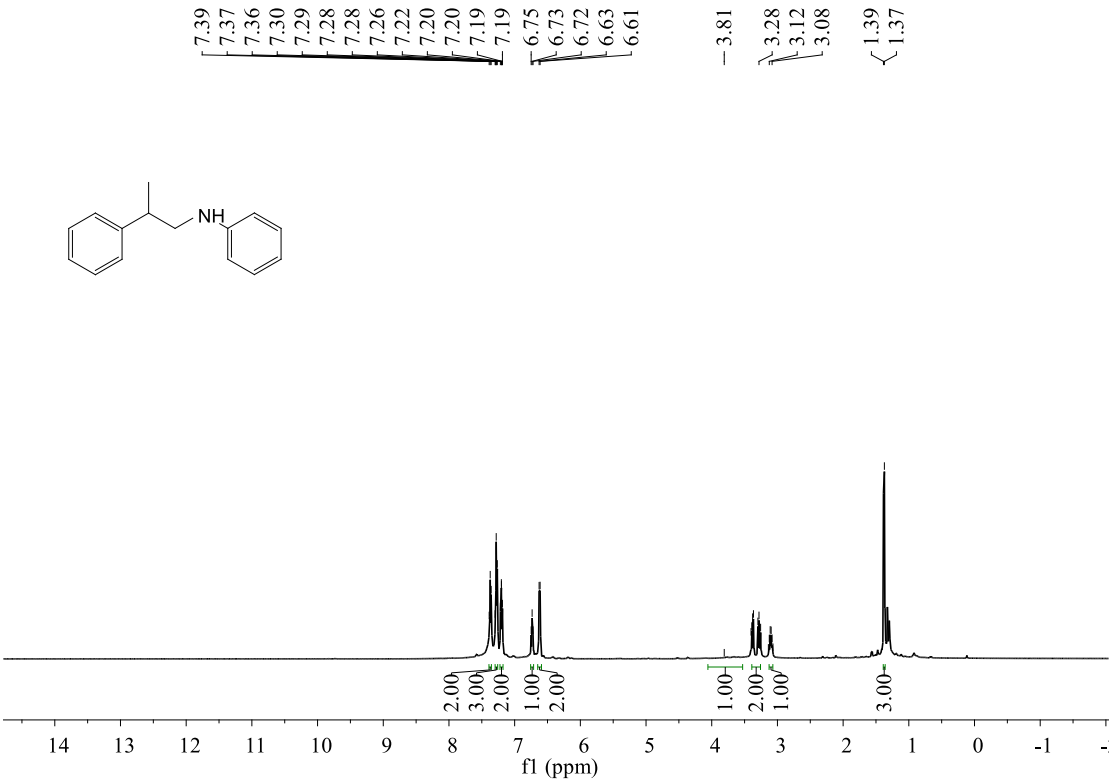
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3sa



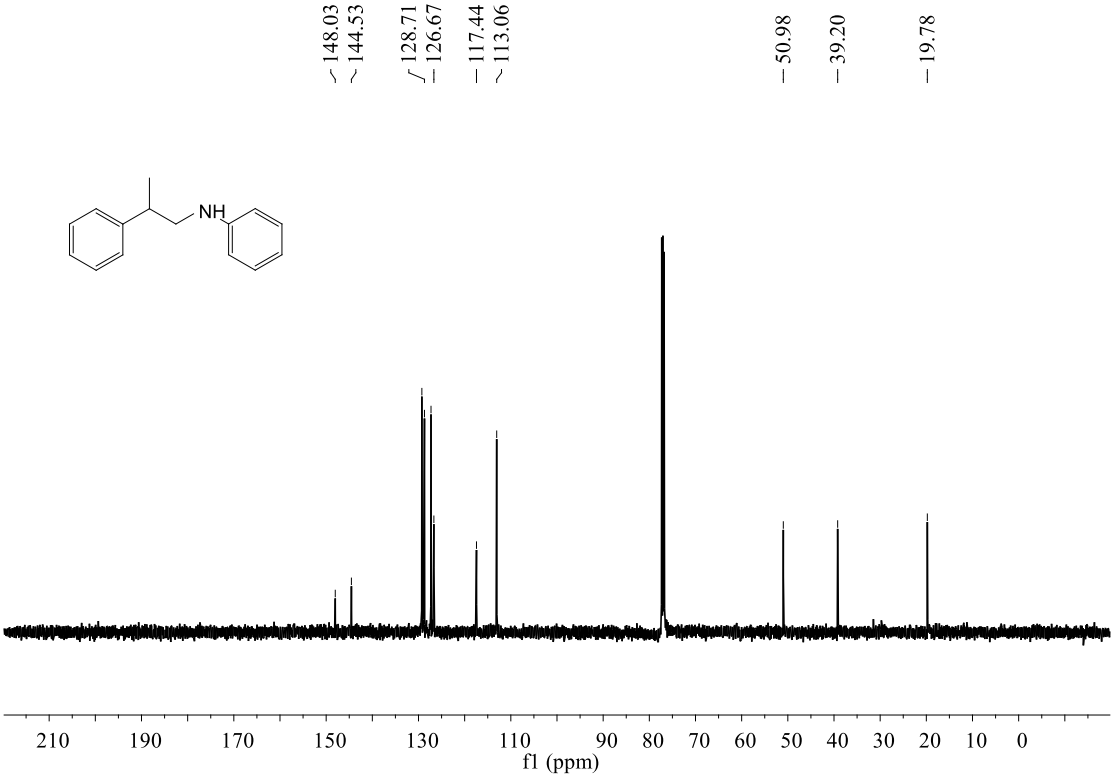
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3sa



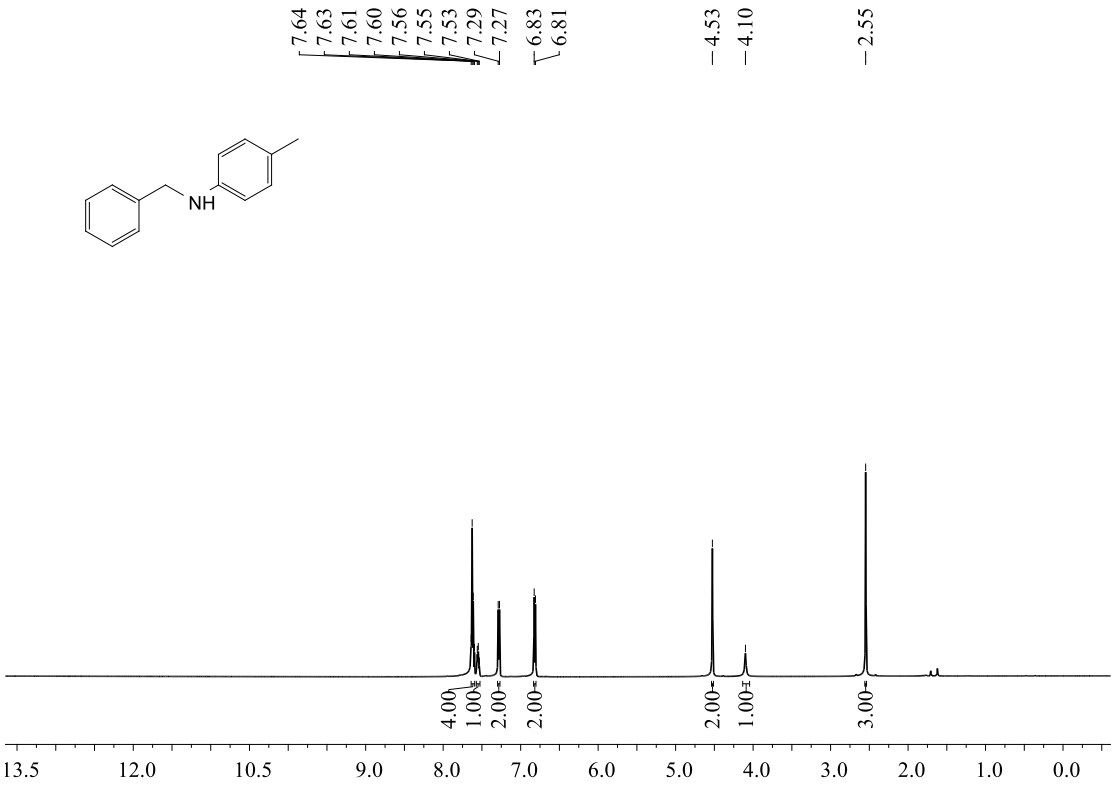
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ta



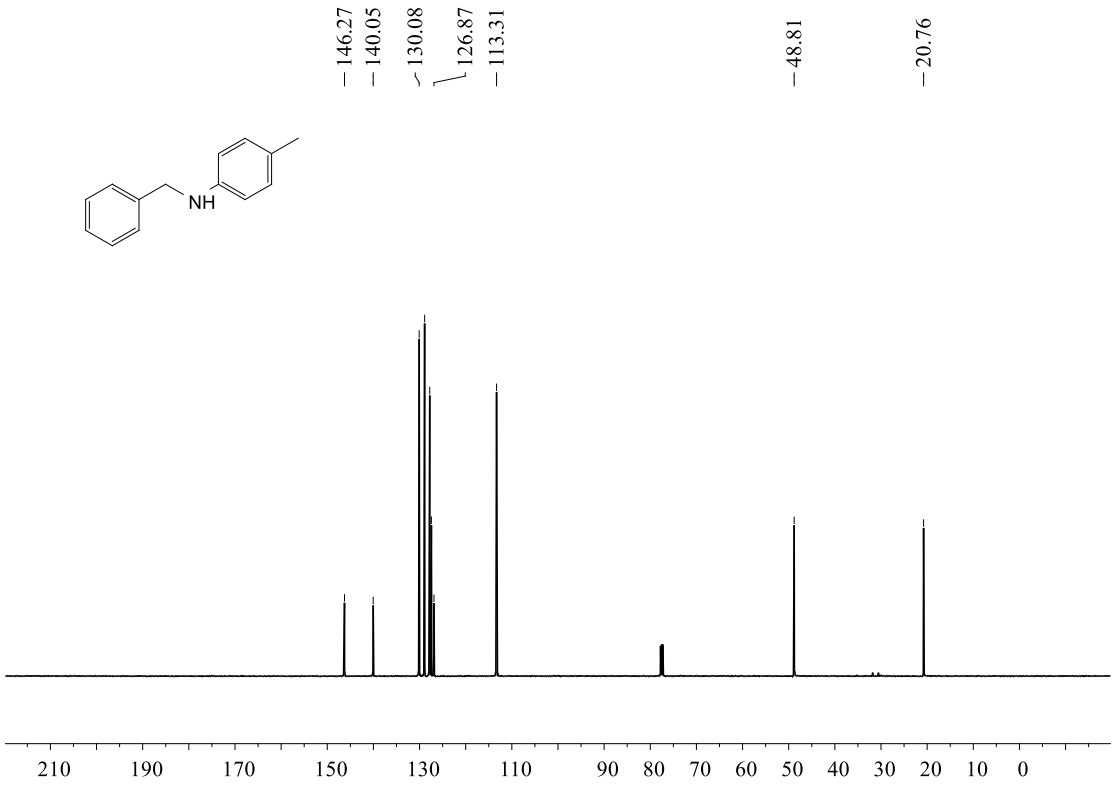
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ta



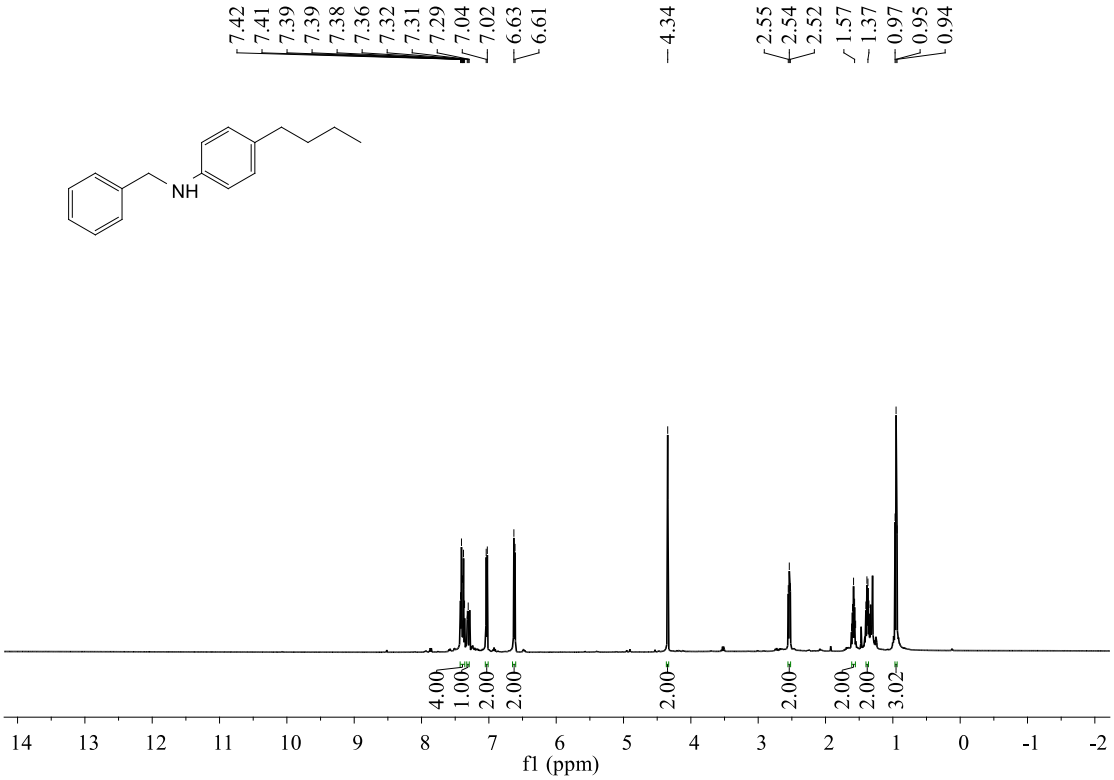
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ab



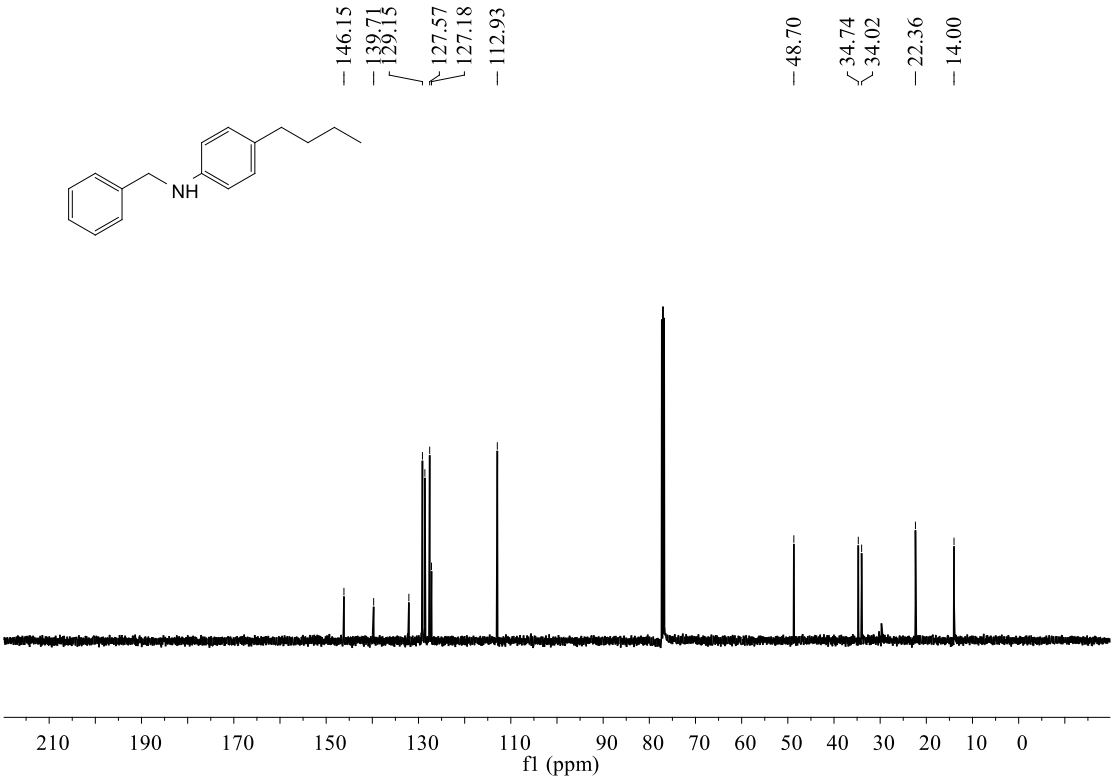
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ab



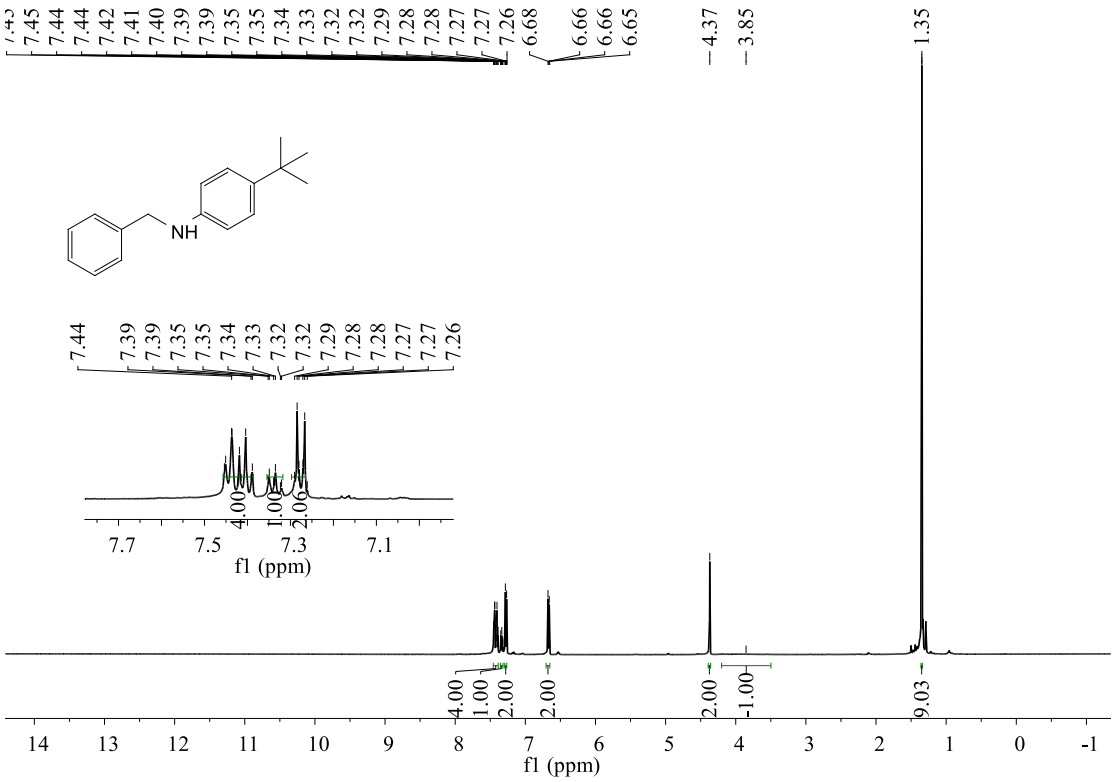
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ac



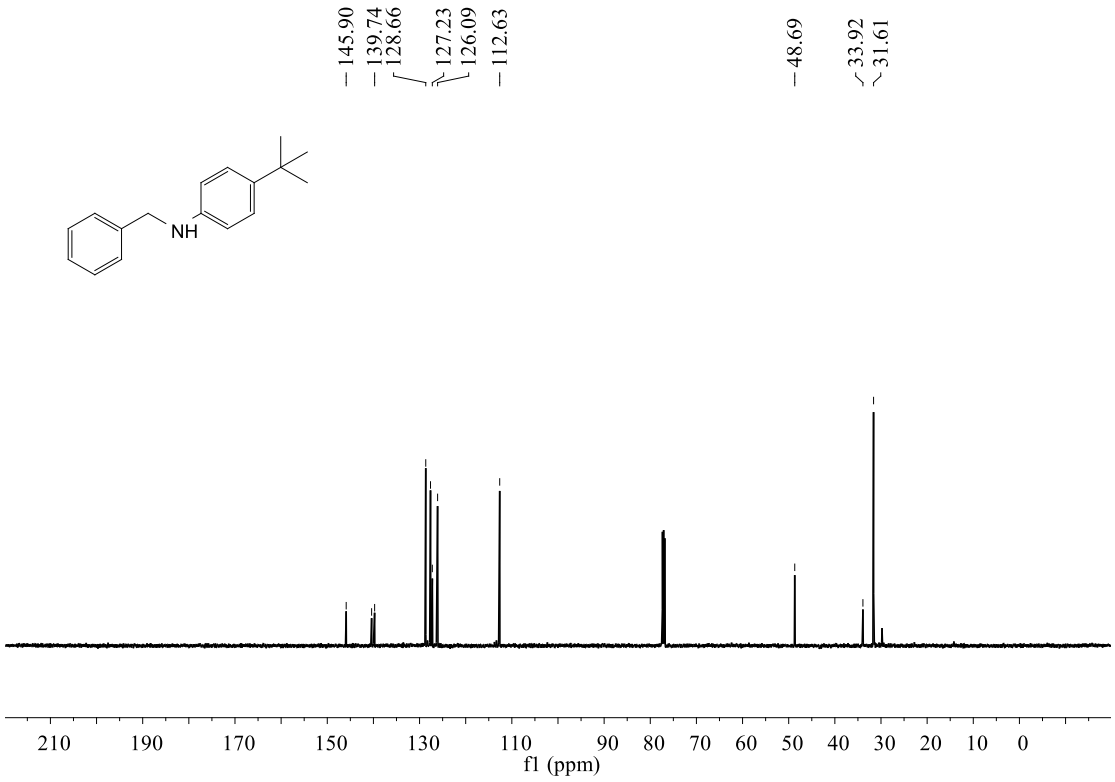
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ac



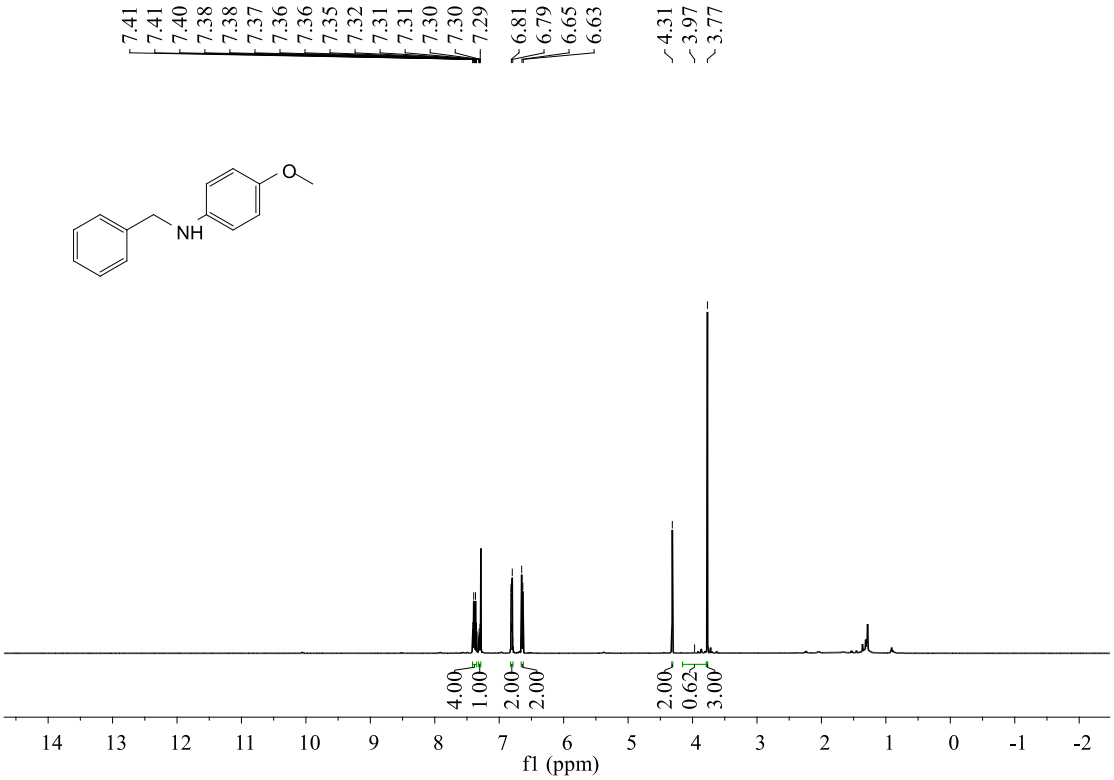
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ad



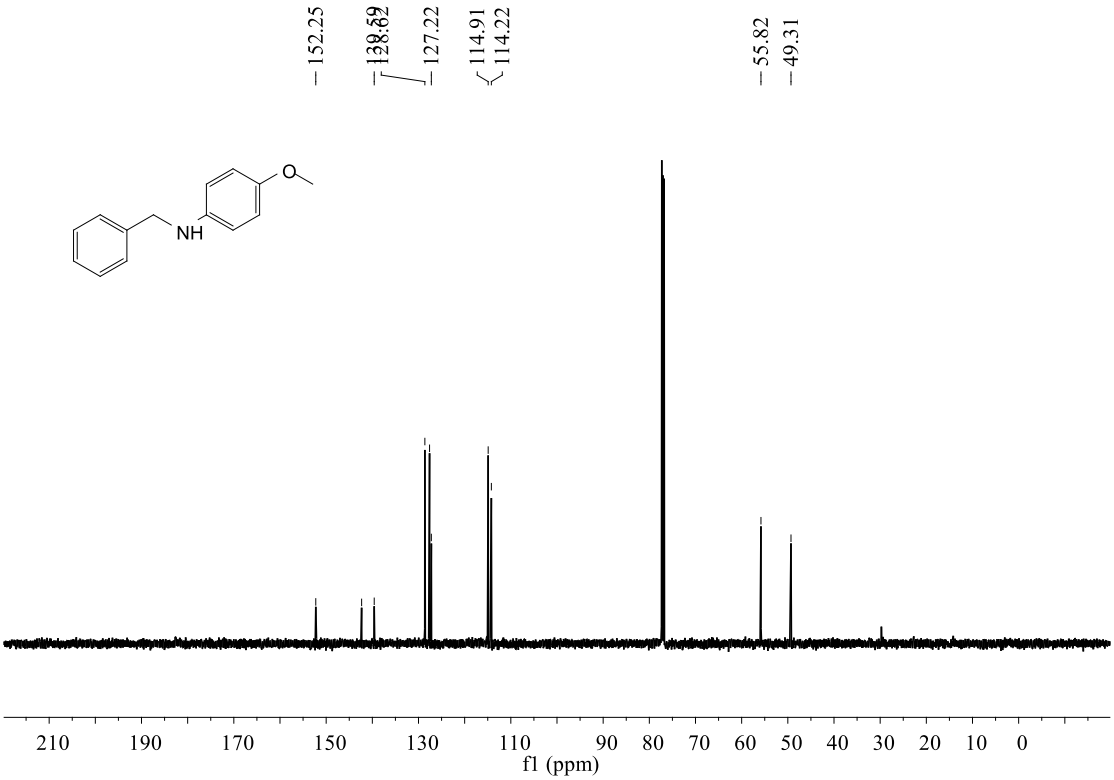
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ad



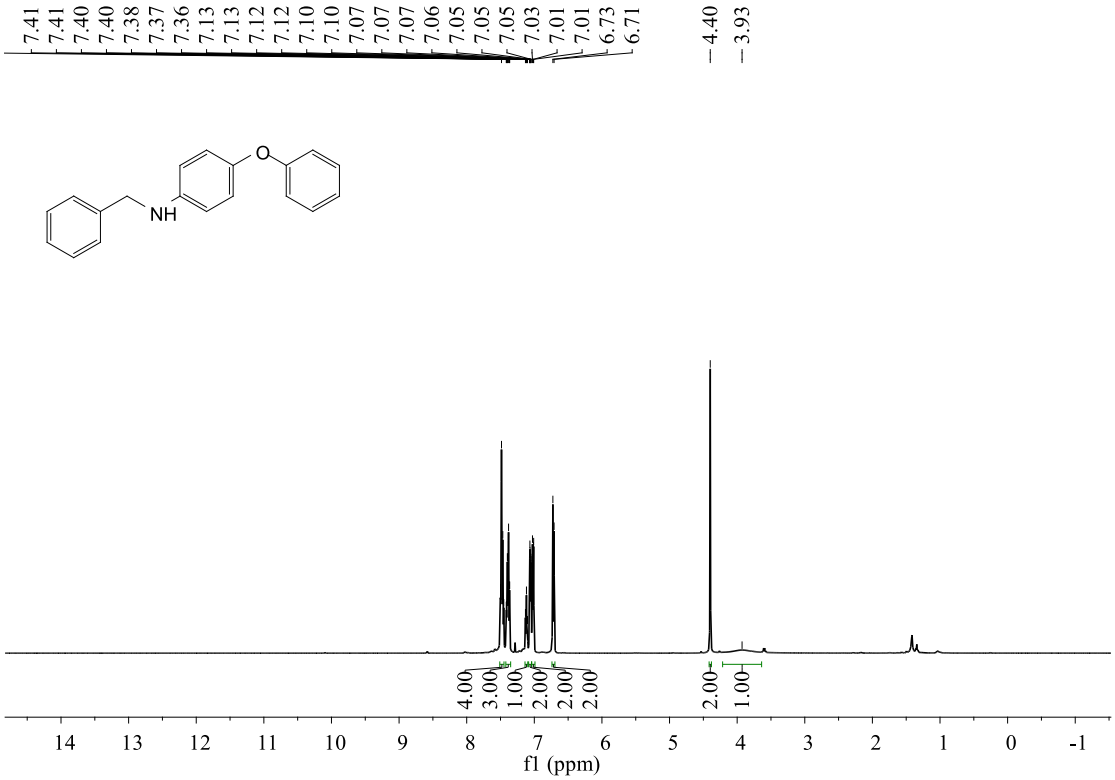
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ae



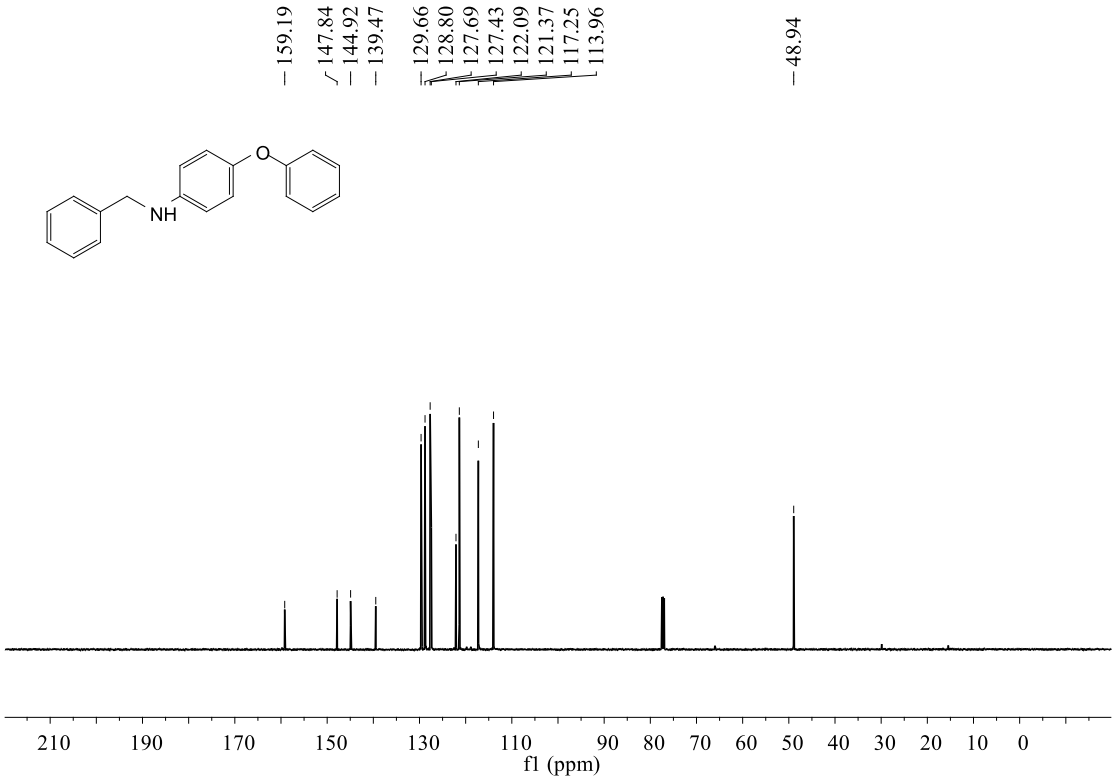
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ae



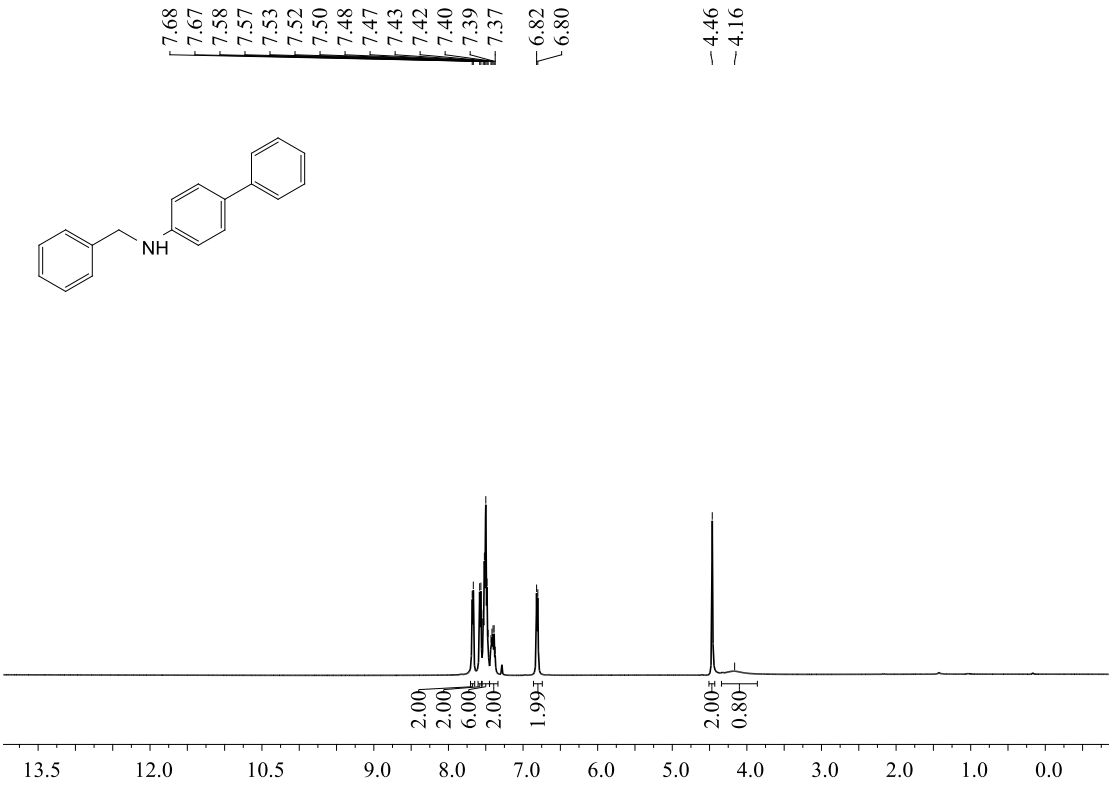
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3af



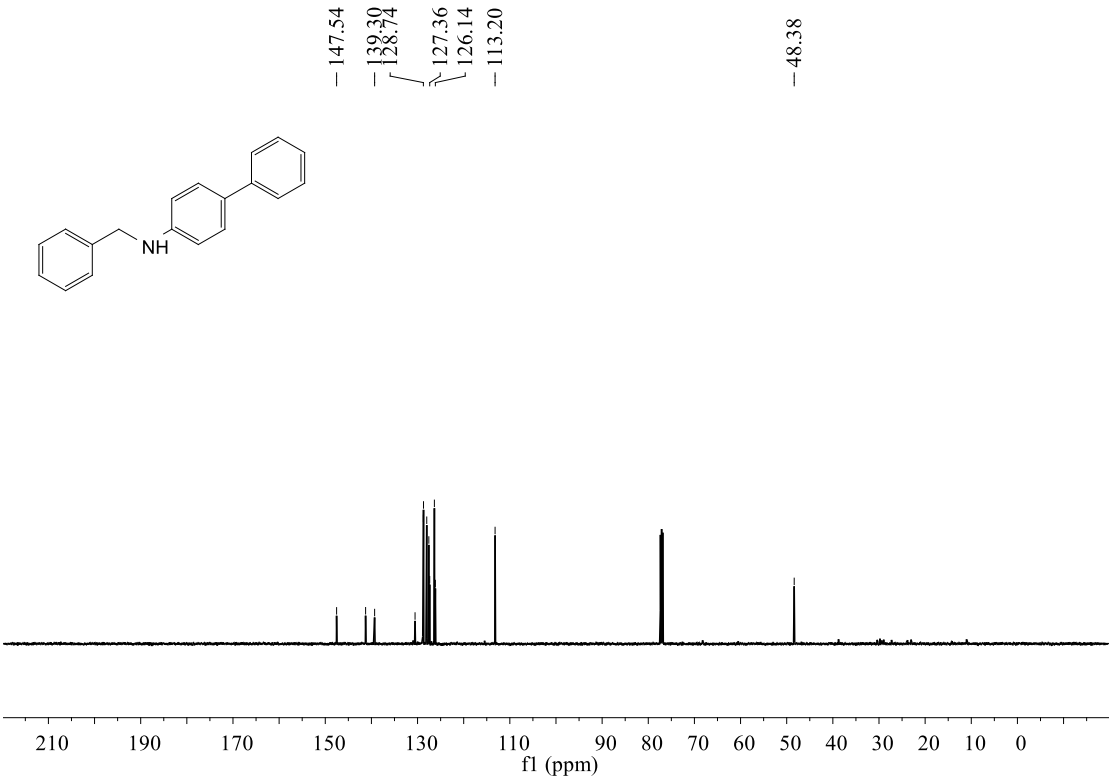
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3af



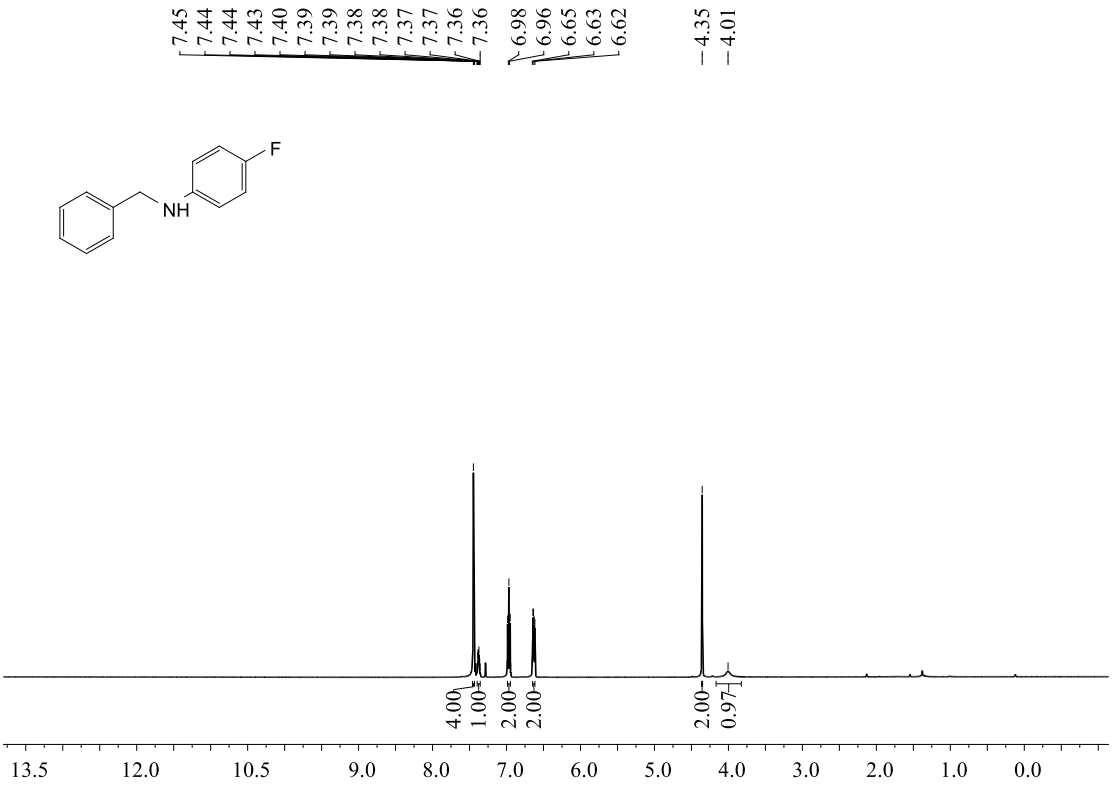
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ag



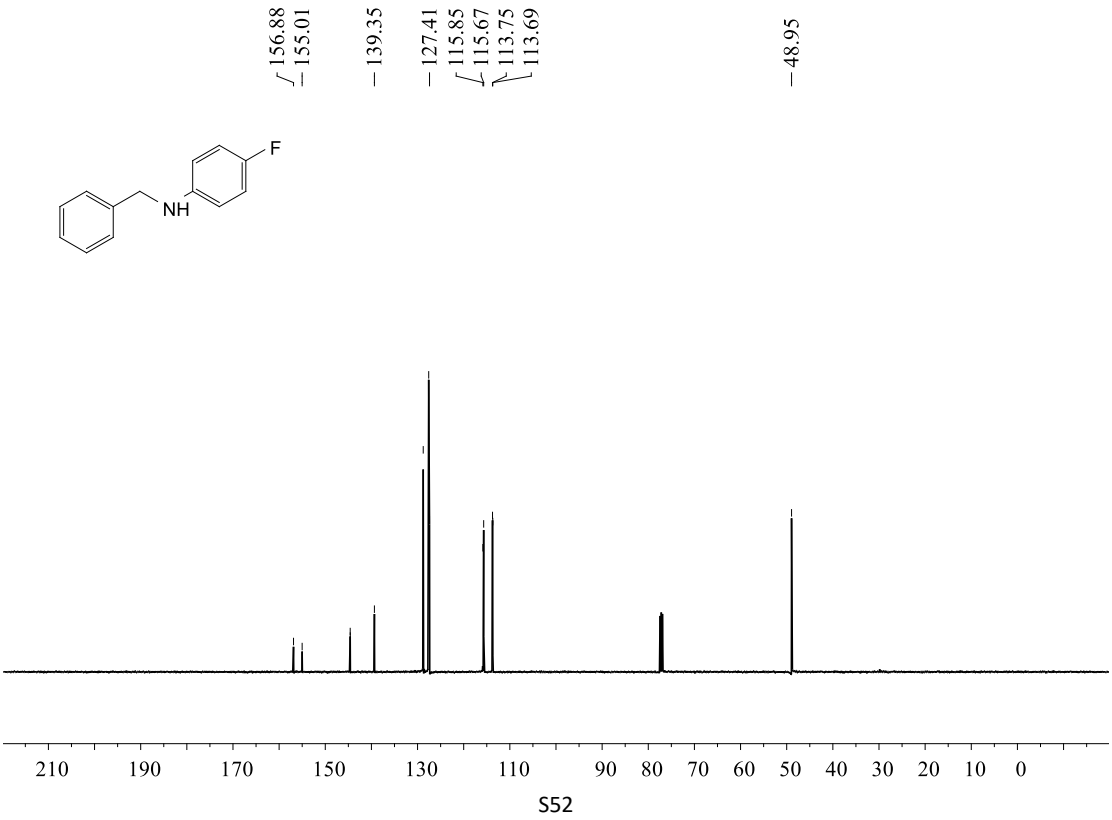
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ag



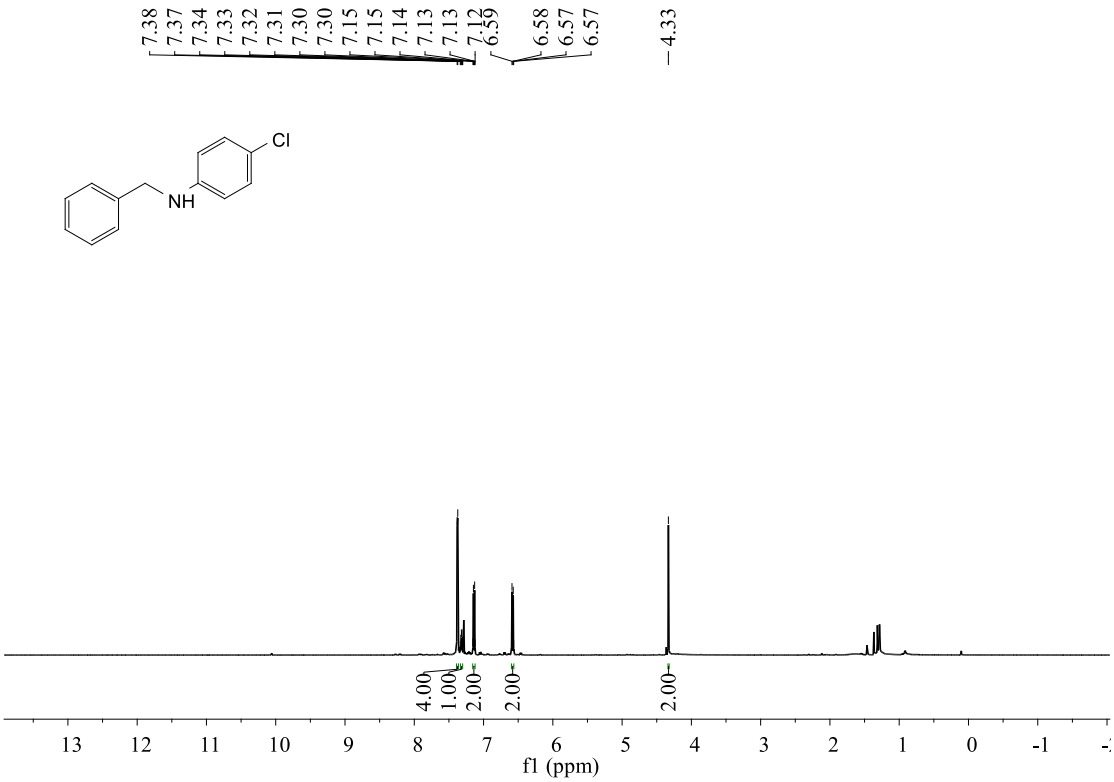
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ah



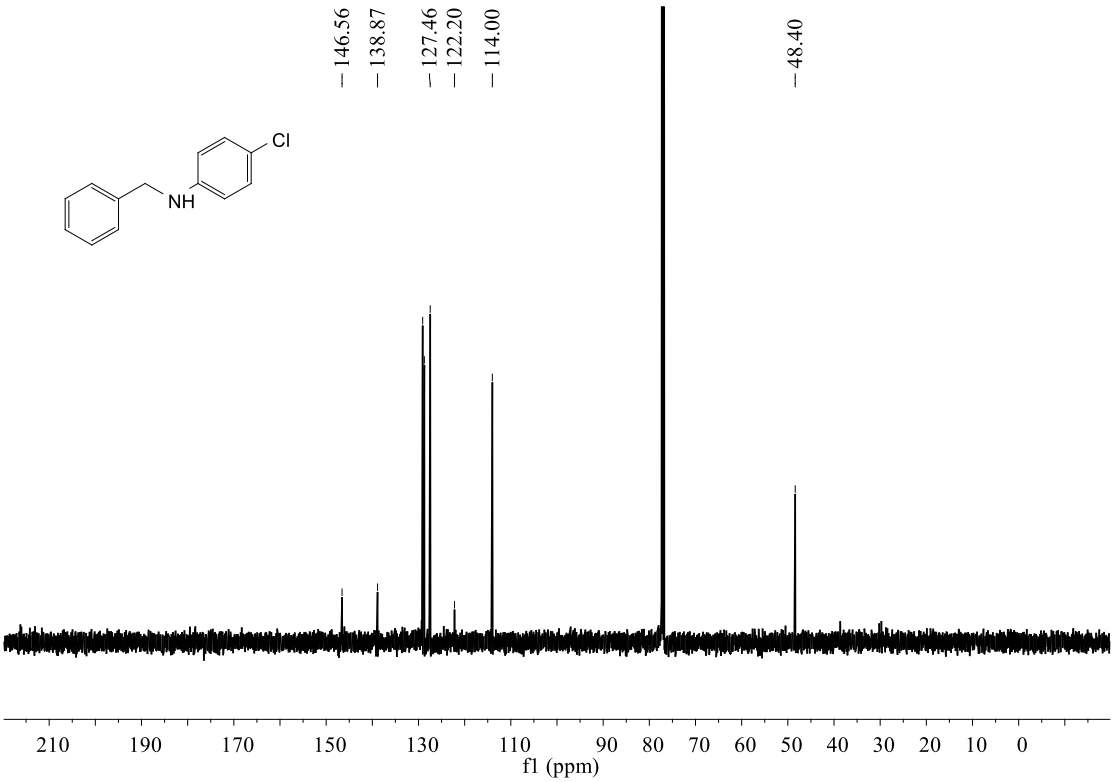
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ah



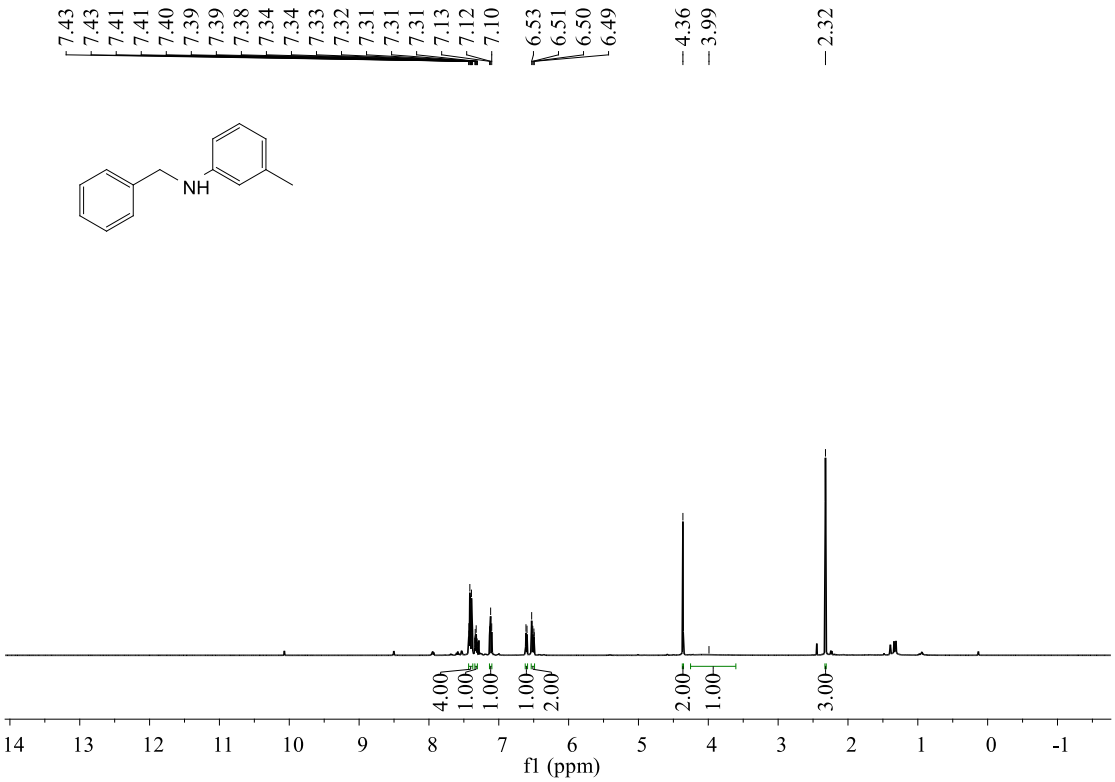
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ai



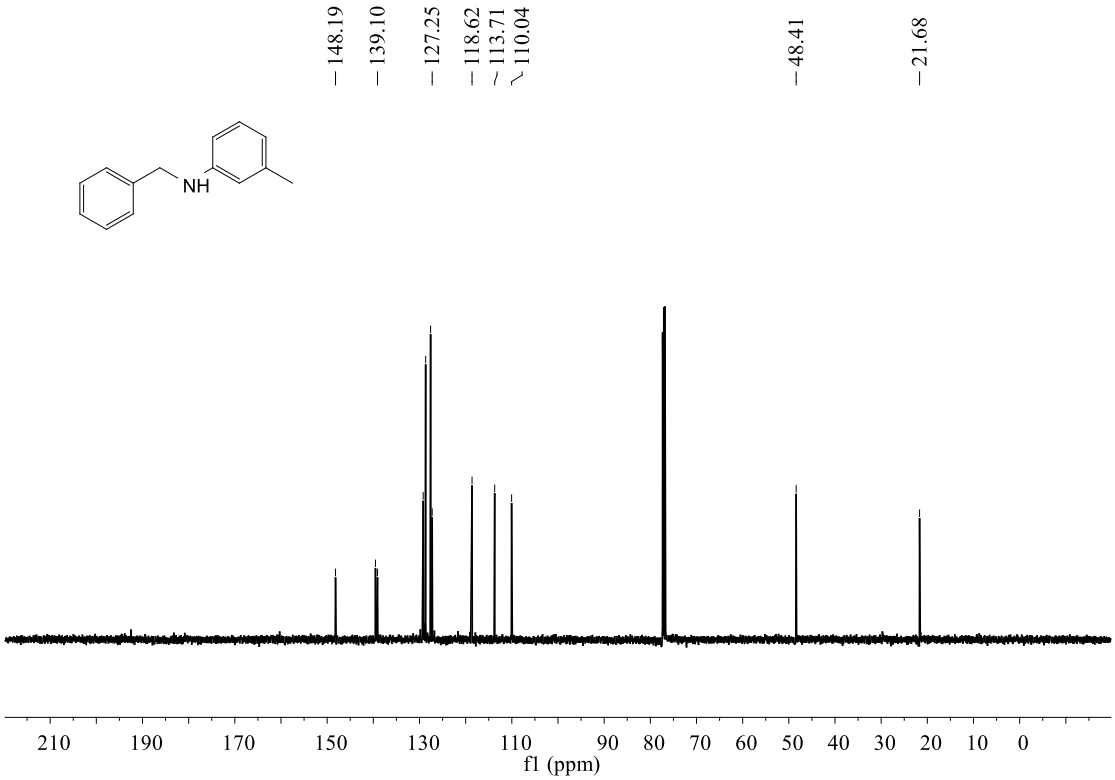
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ai



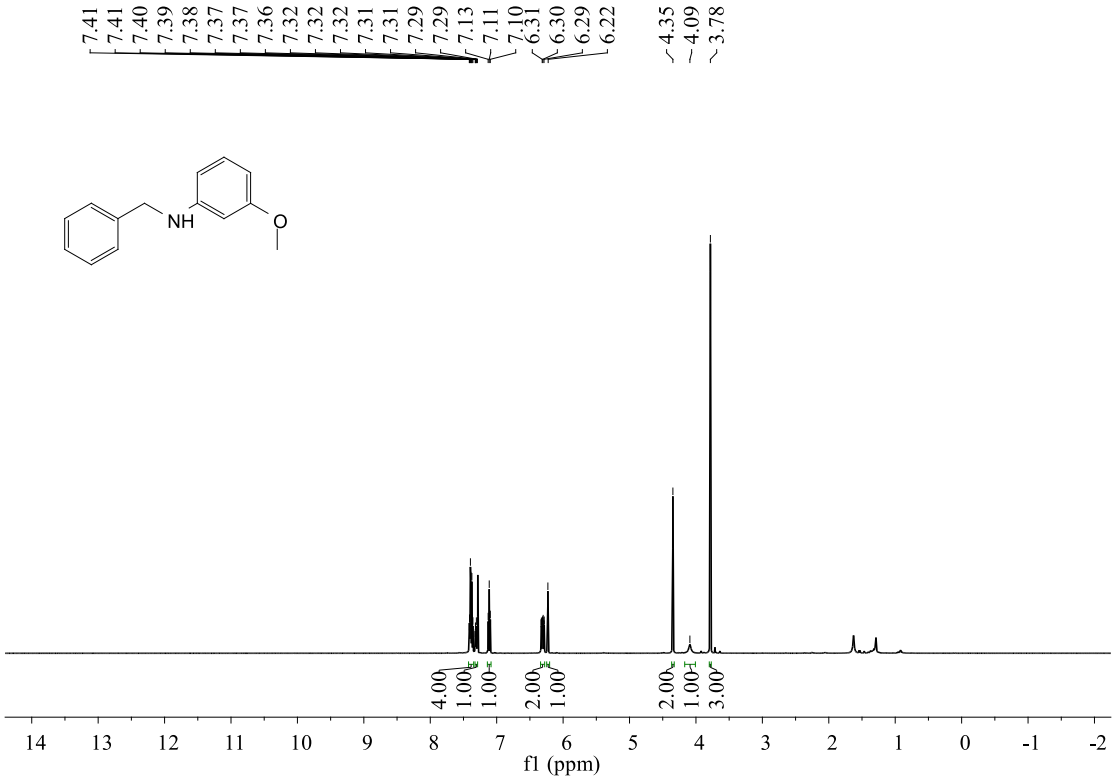
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3aj



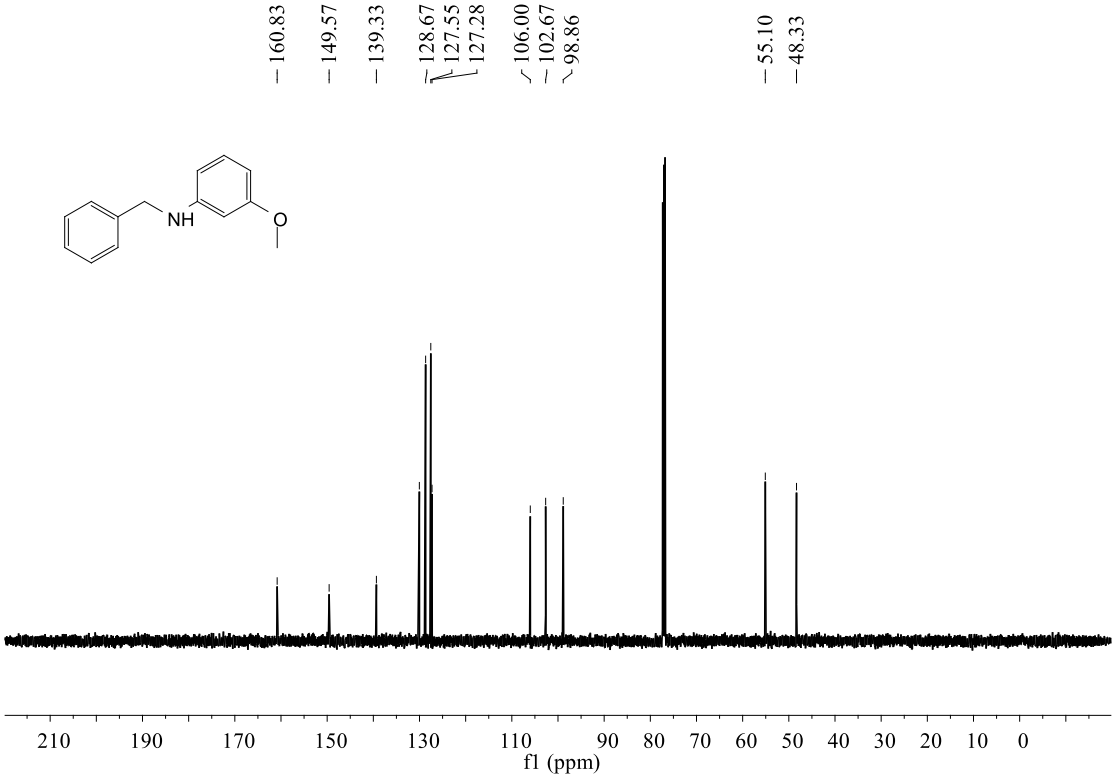
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3aj



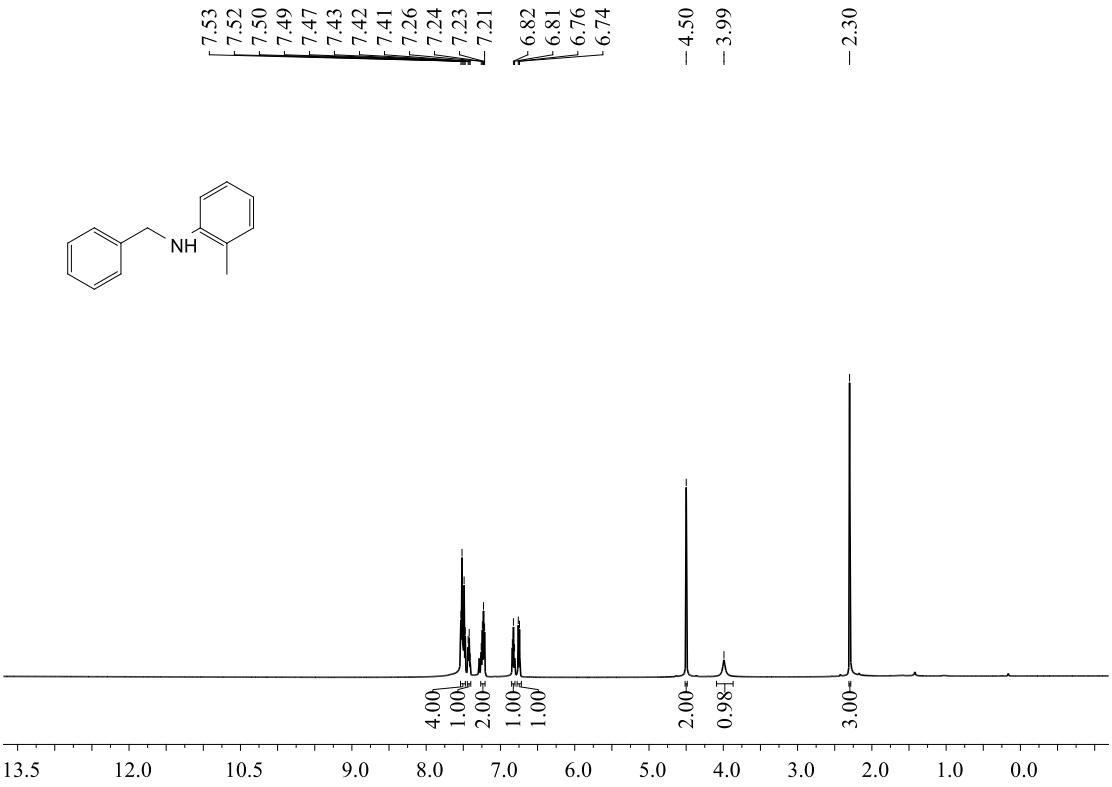
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ak



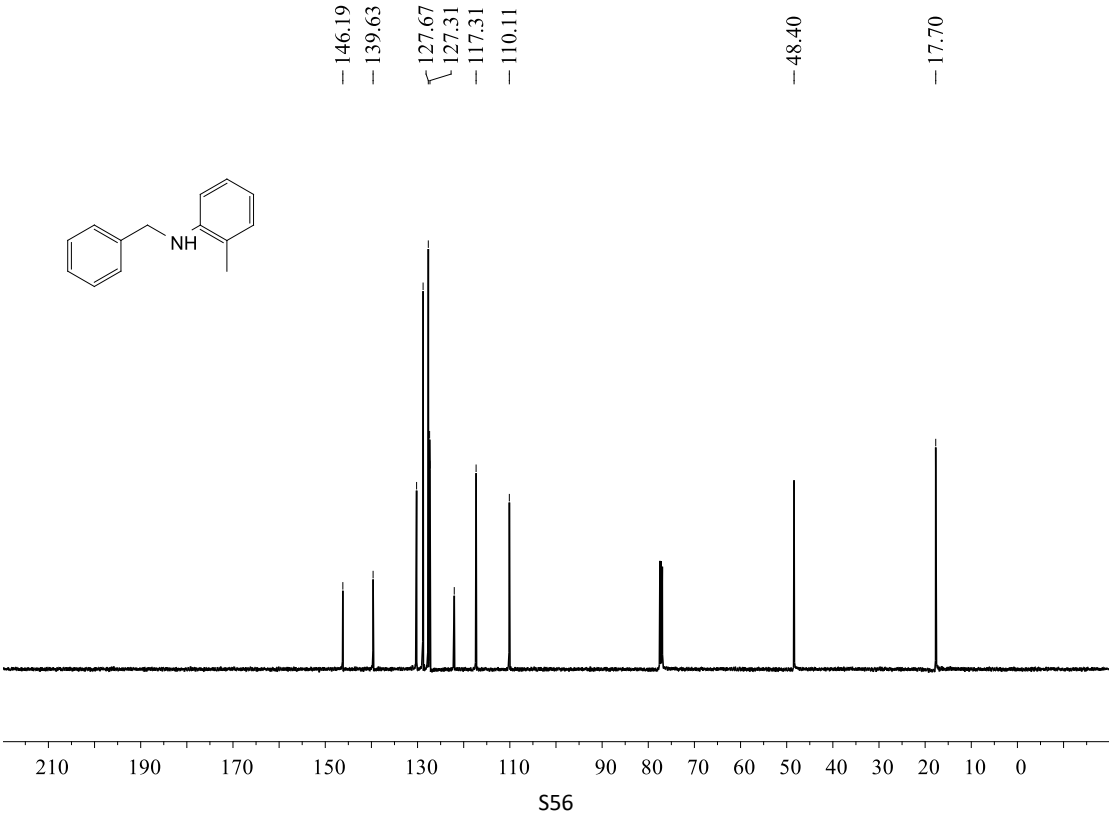
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ak



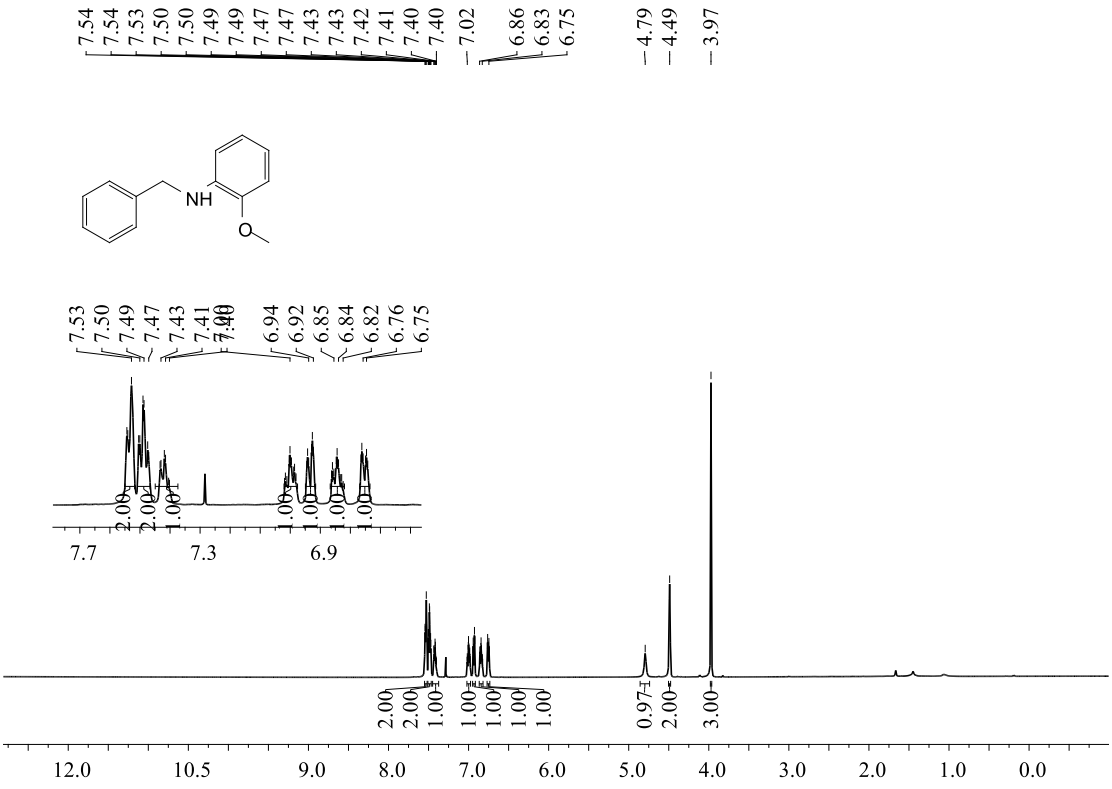
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3al



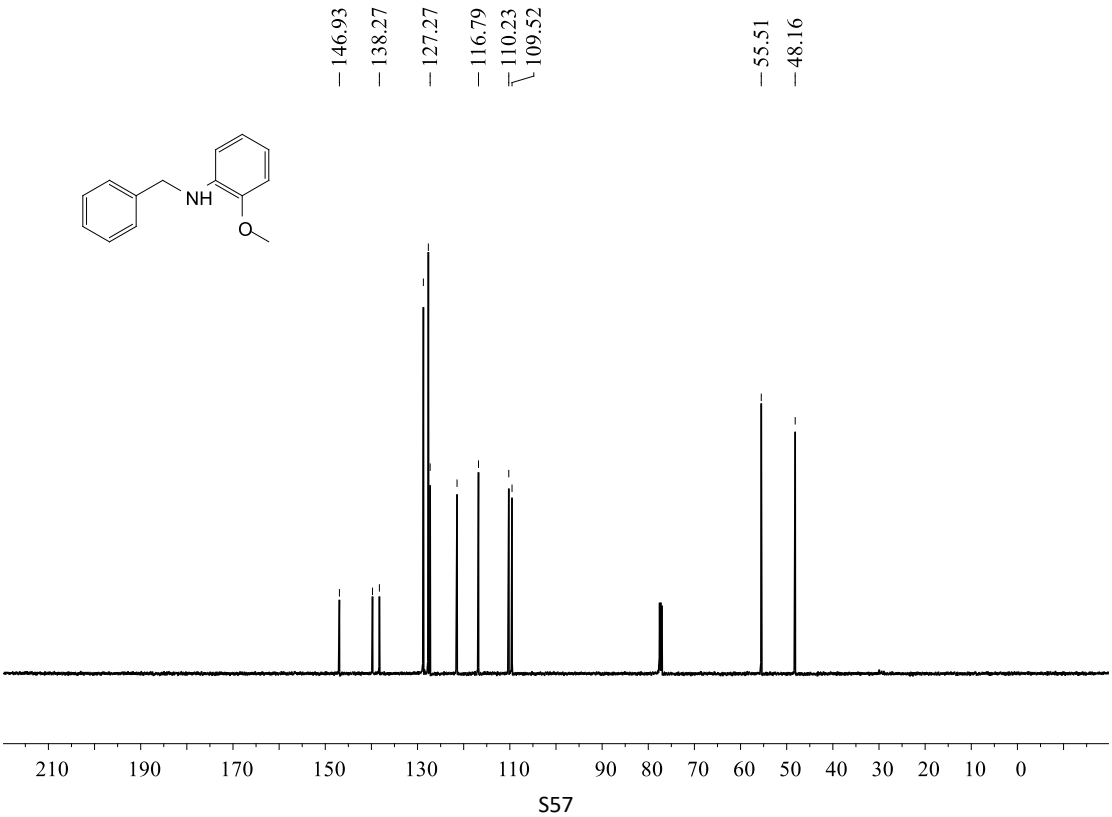
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3al



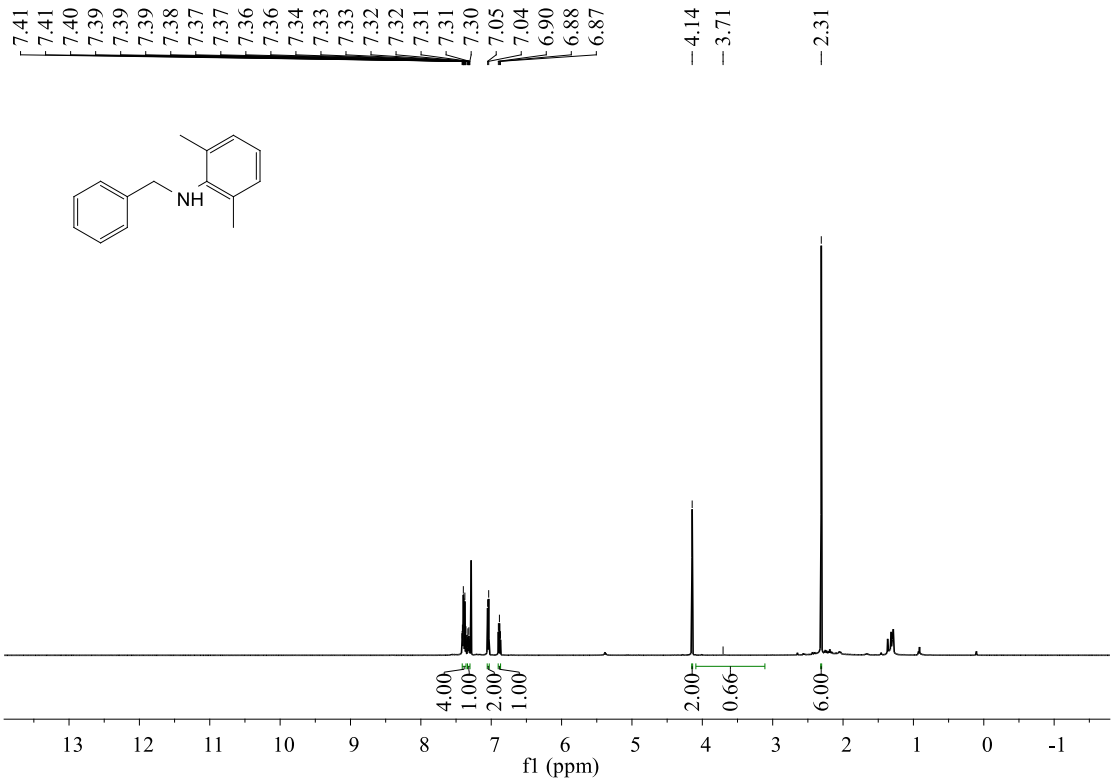
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3am



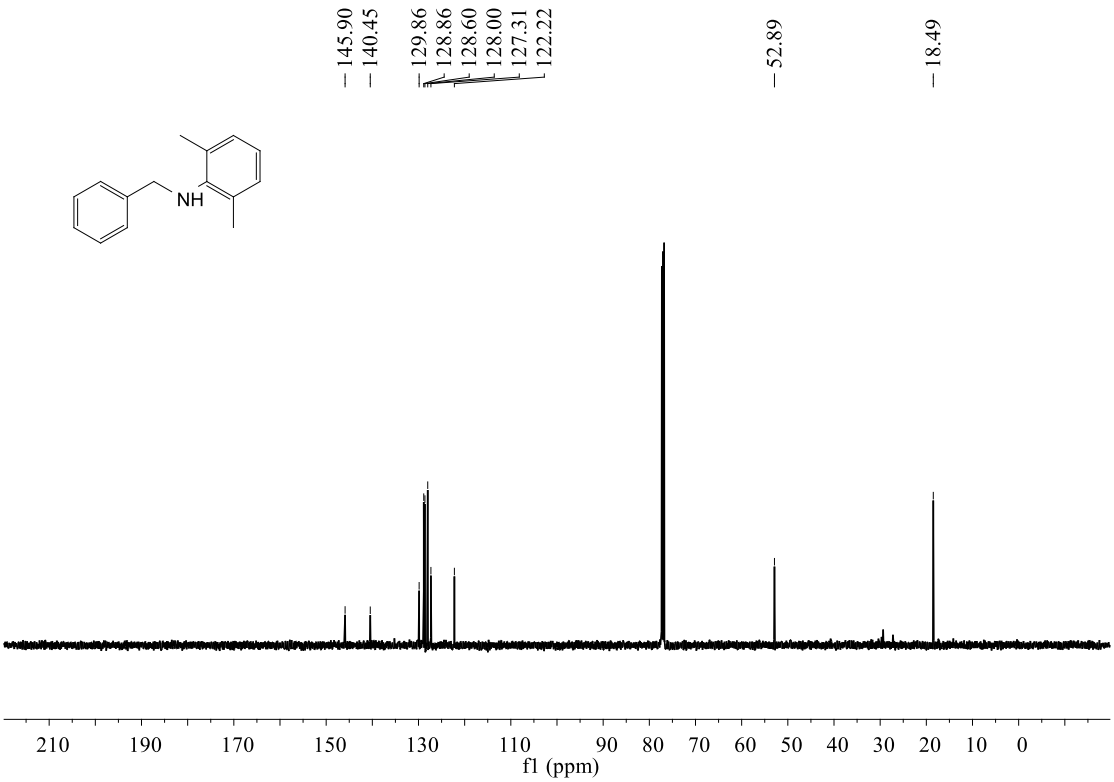
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3am



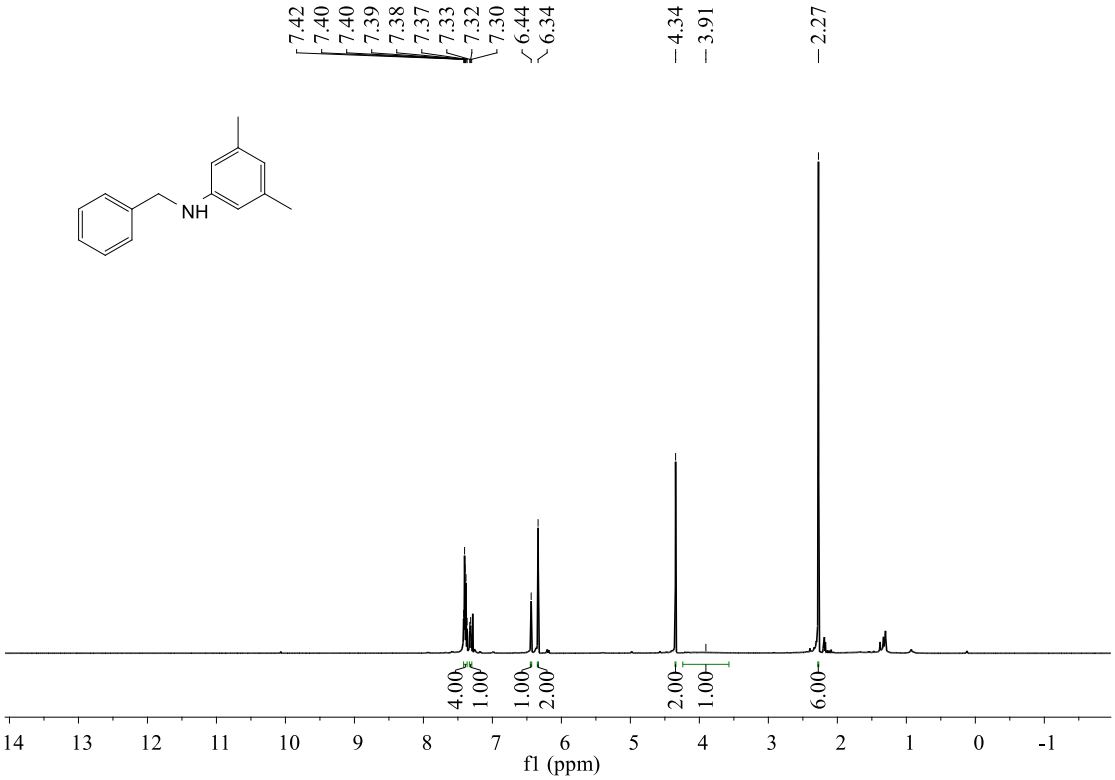
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3an



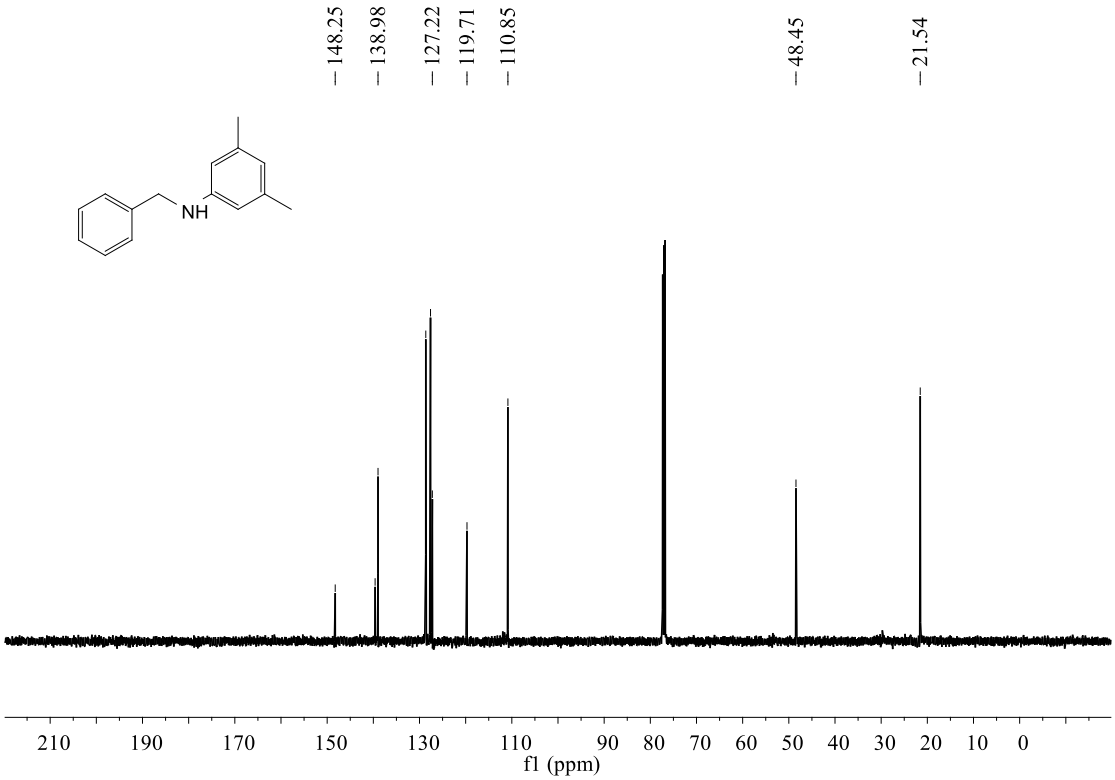
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3an



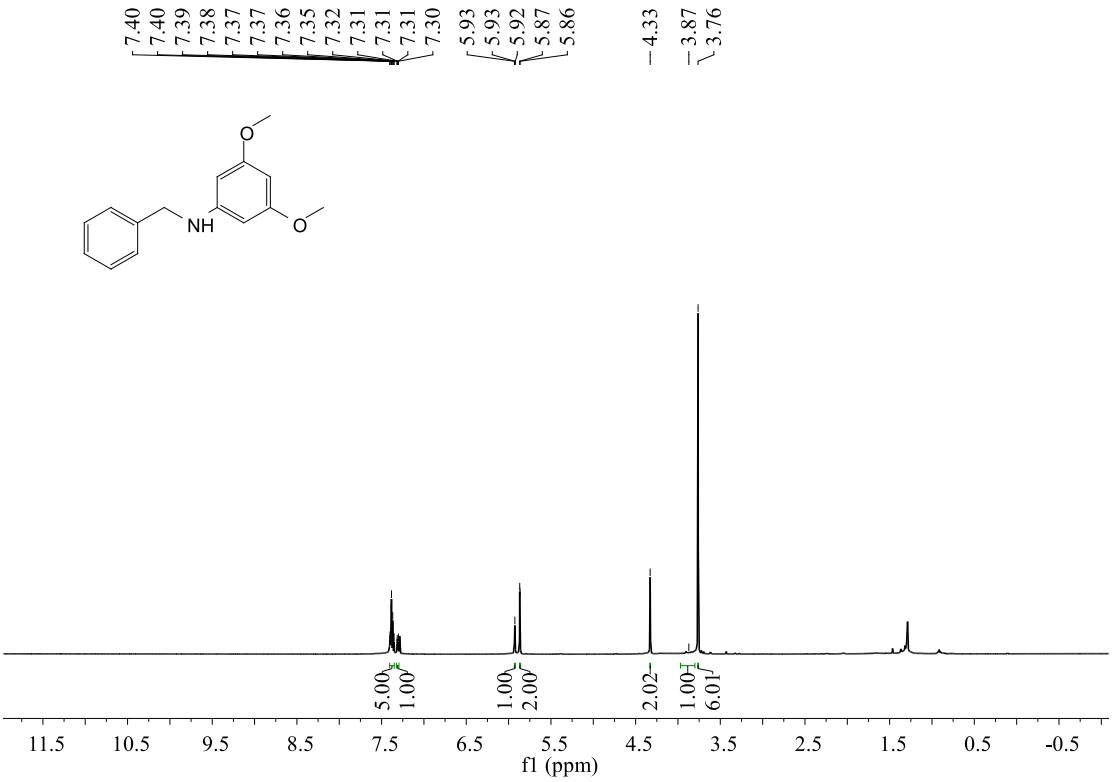
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ao



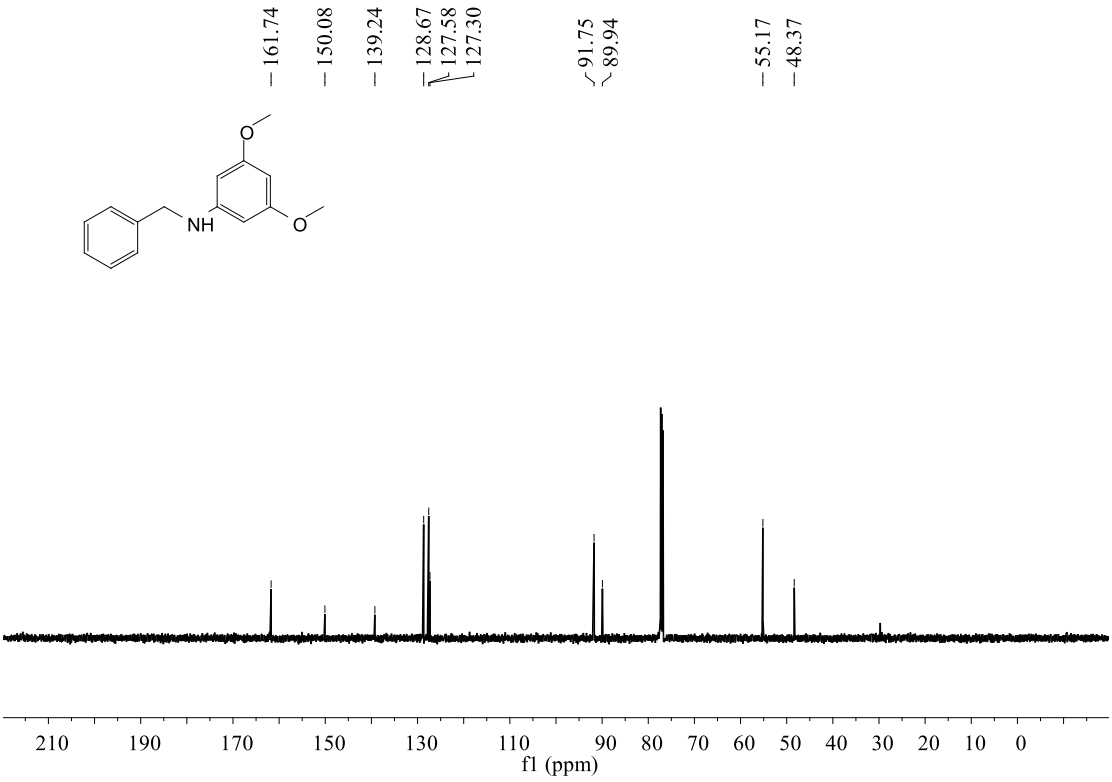
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ao



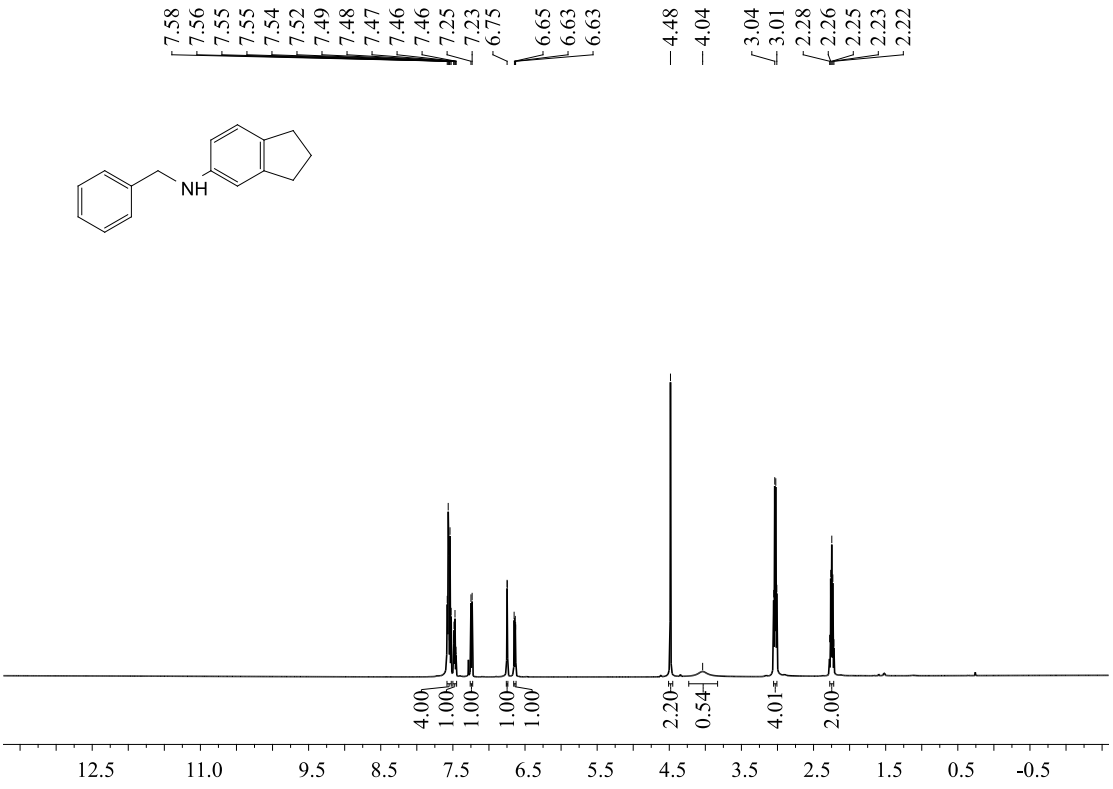
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ap



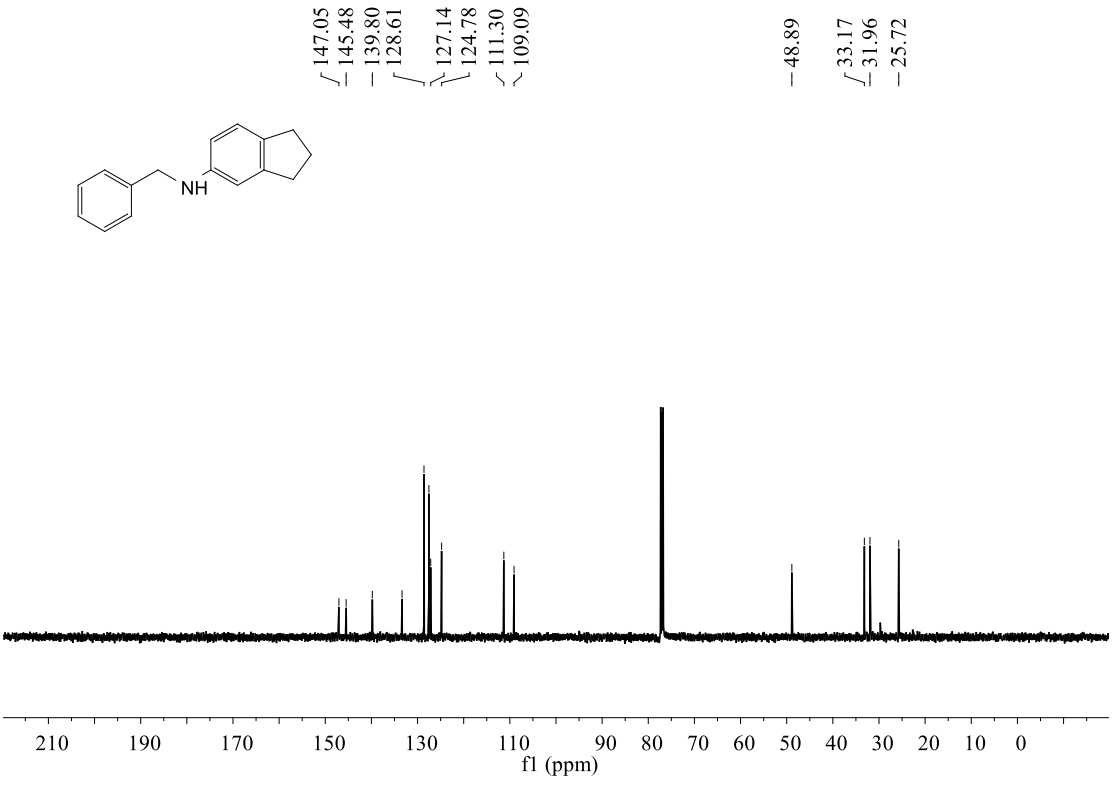
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ap



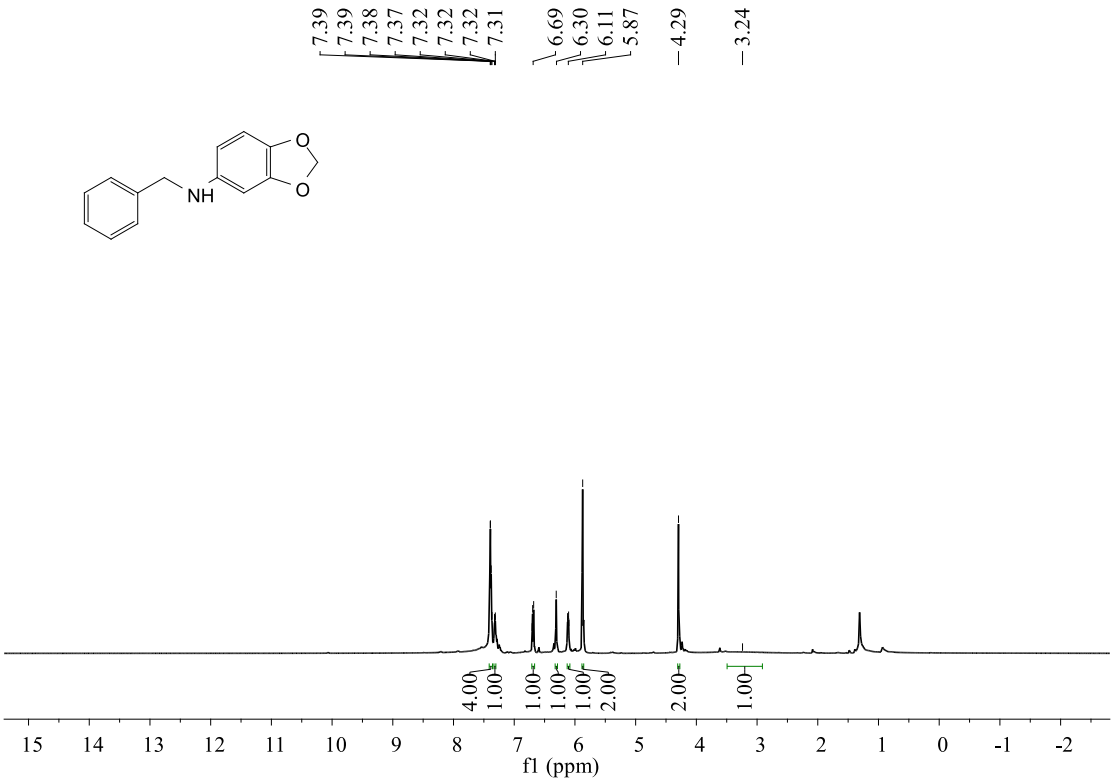
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3aq



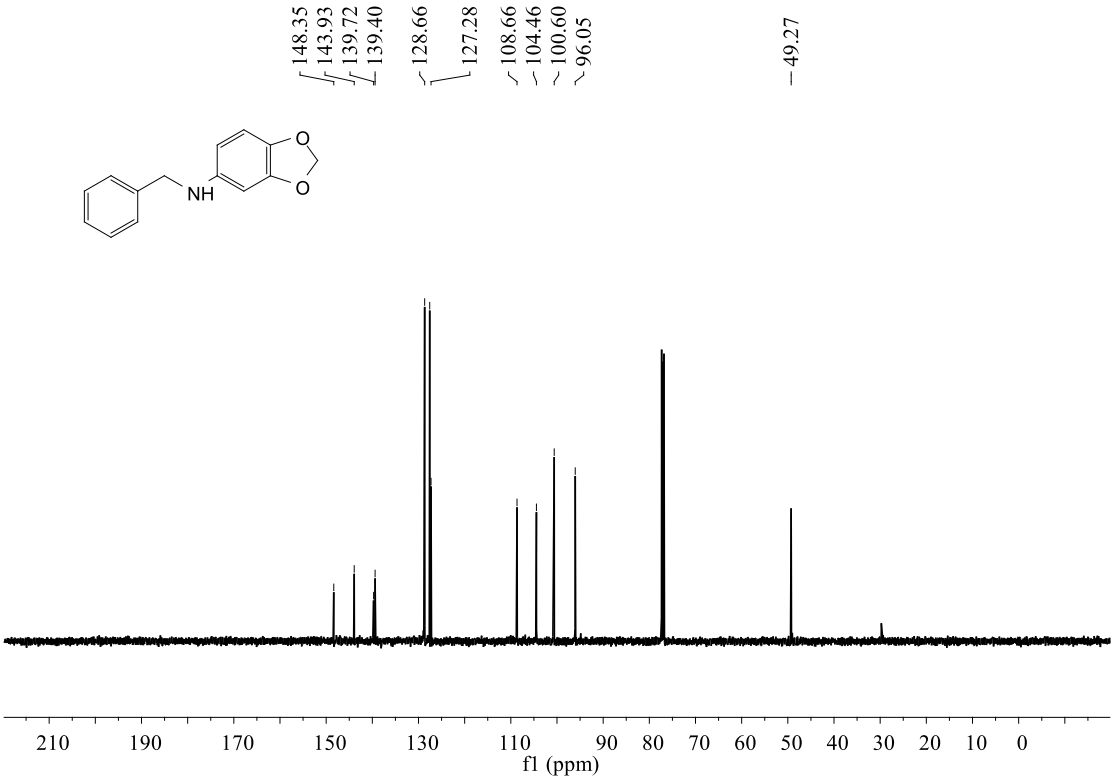
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3aq



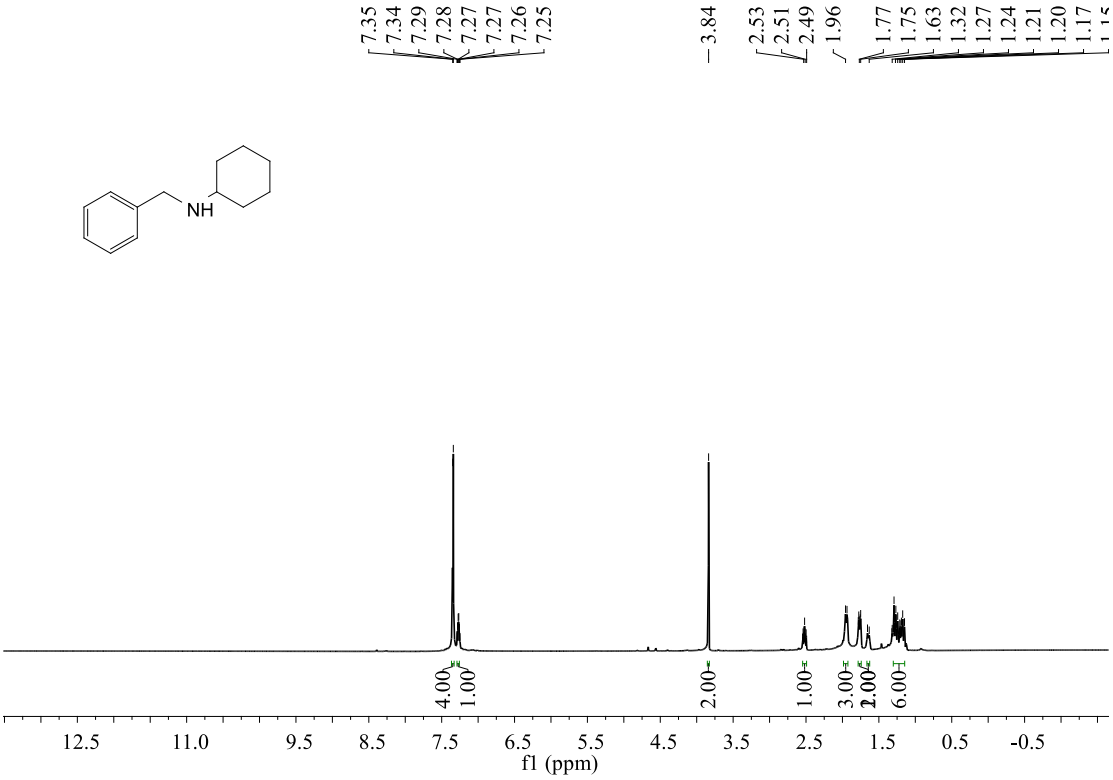
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ar



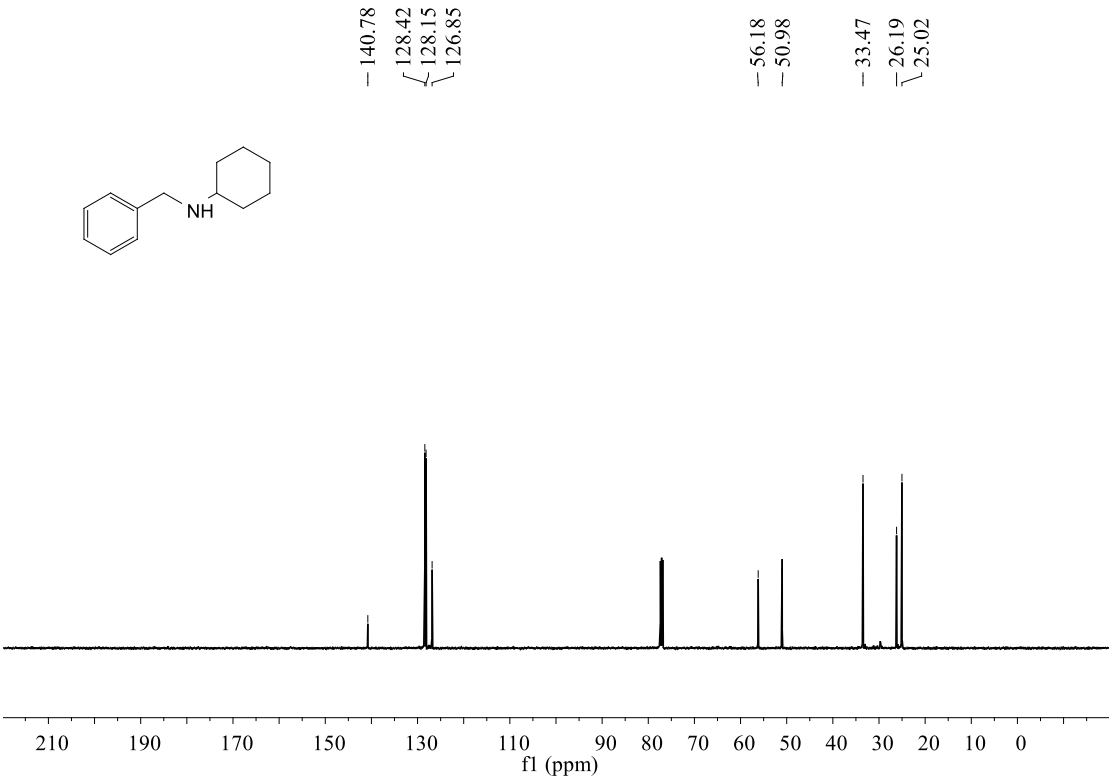
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ar



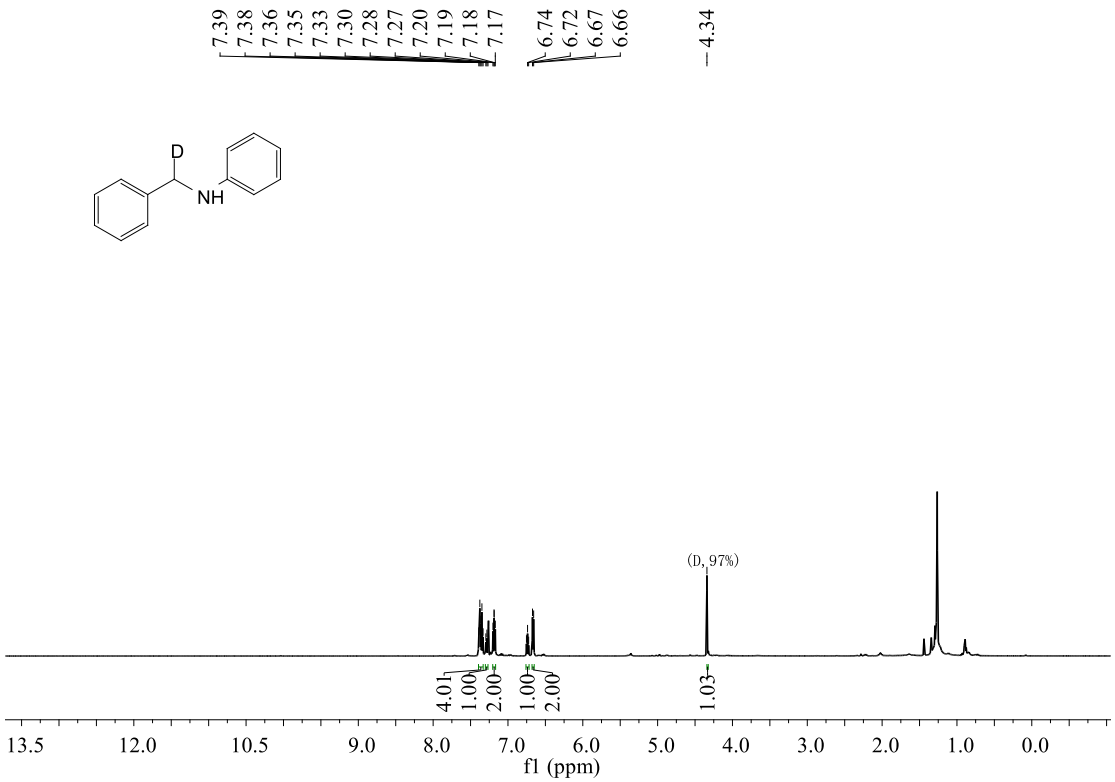
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3as



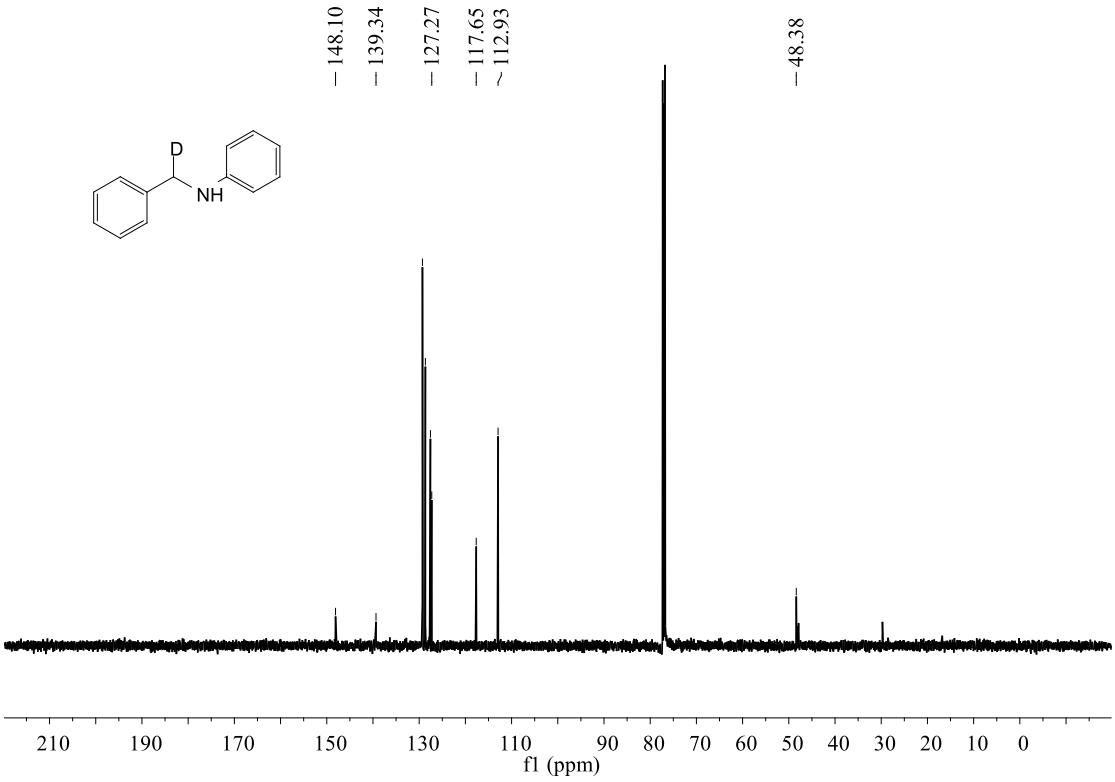
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3as



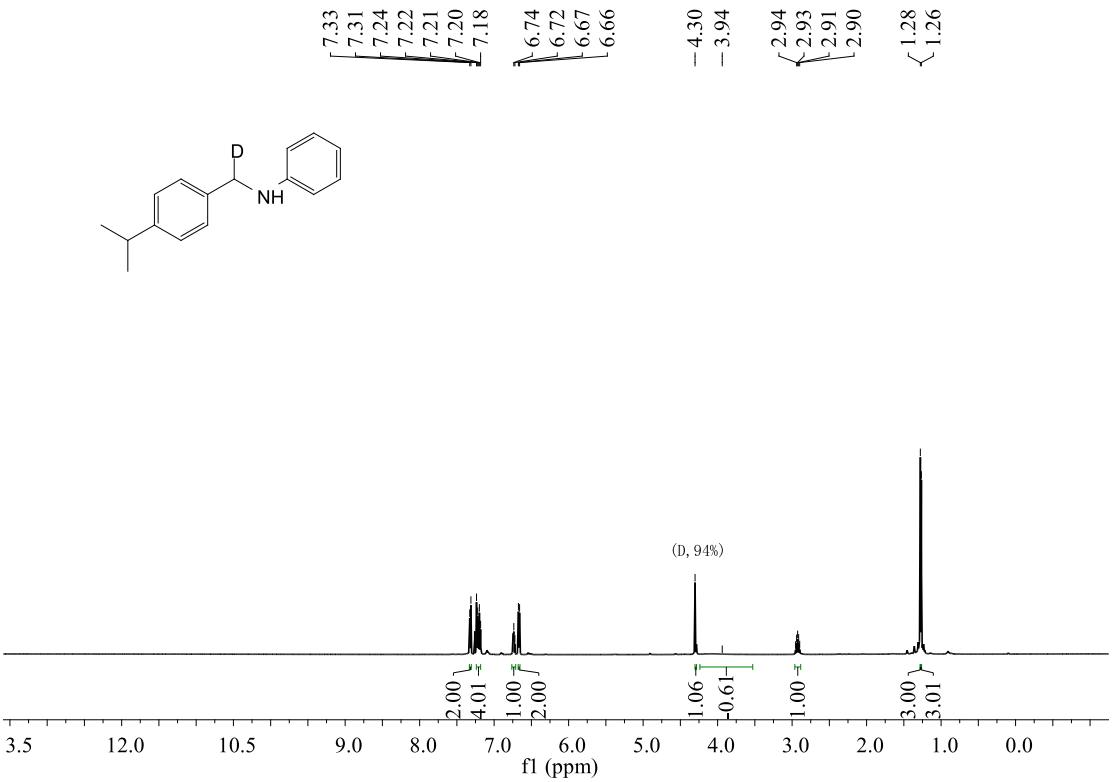
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3aa-d_1



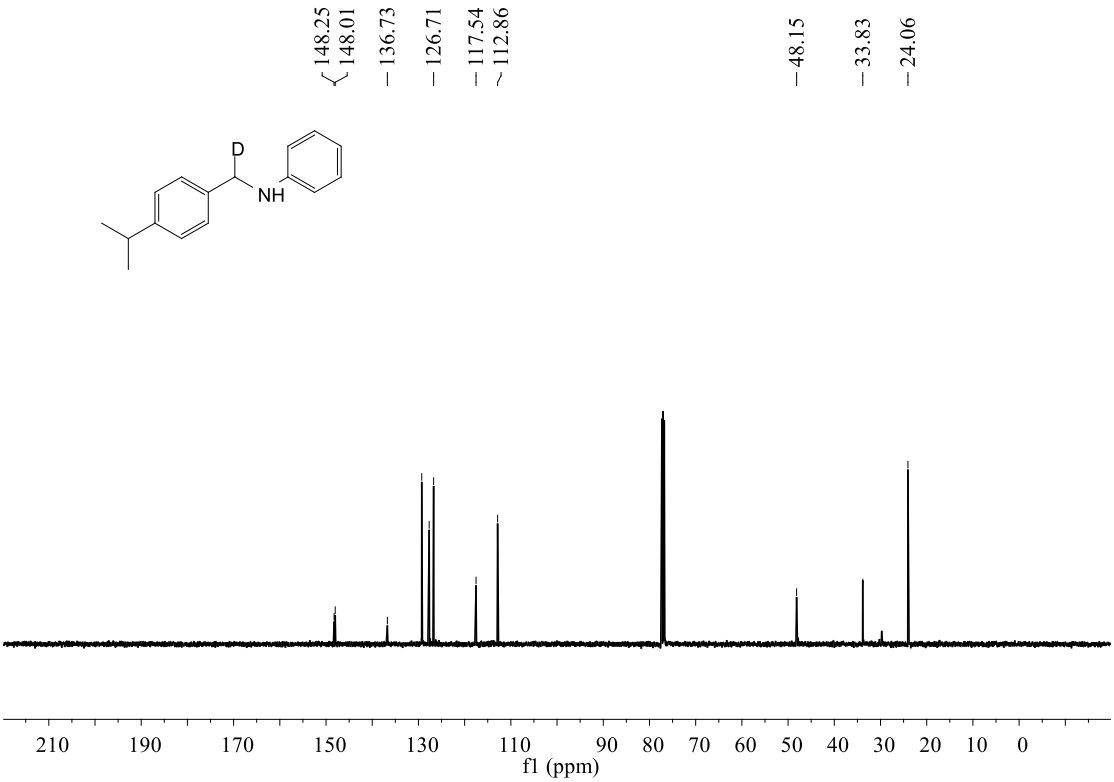
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3aa-d_1



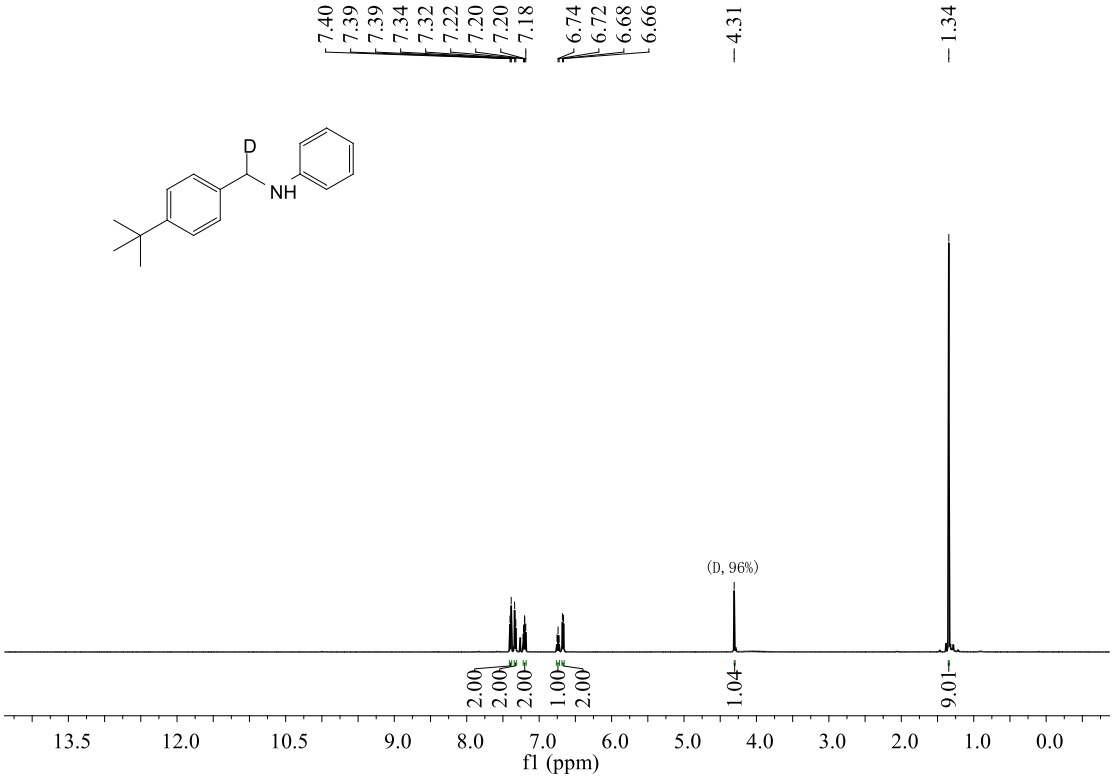
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ca-d_1



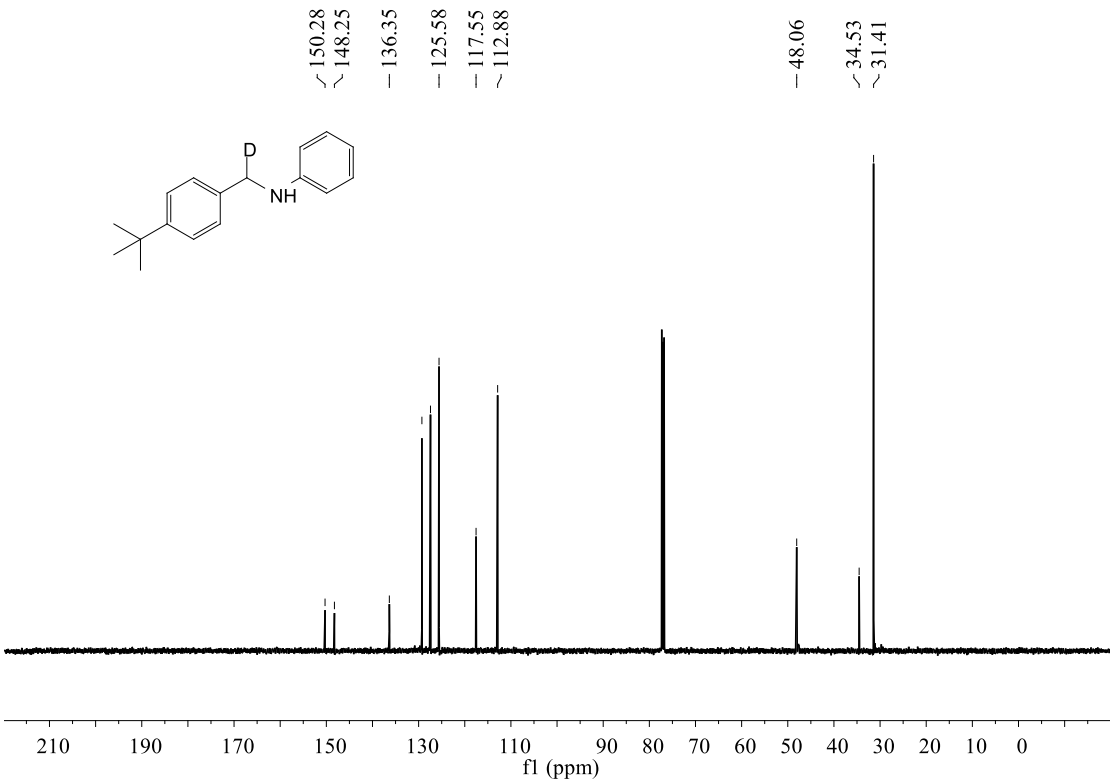
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ca-d_1



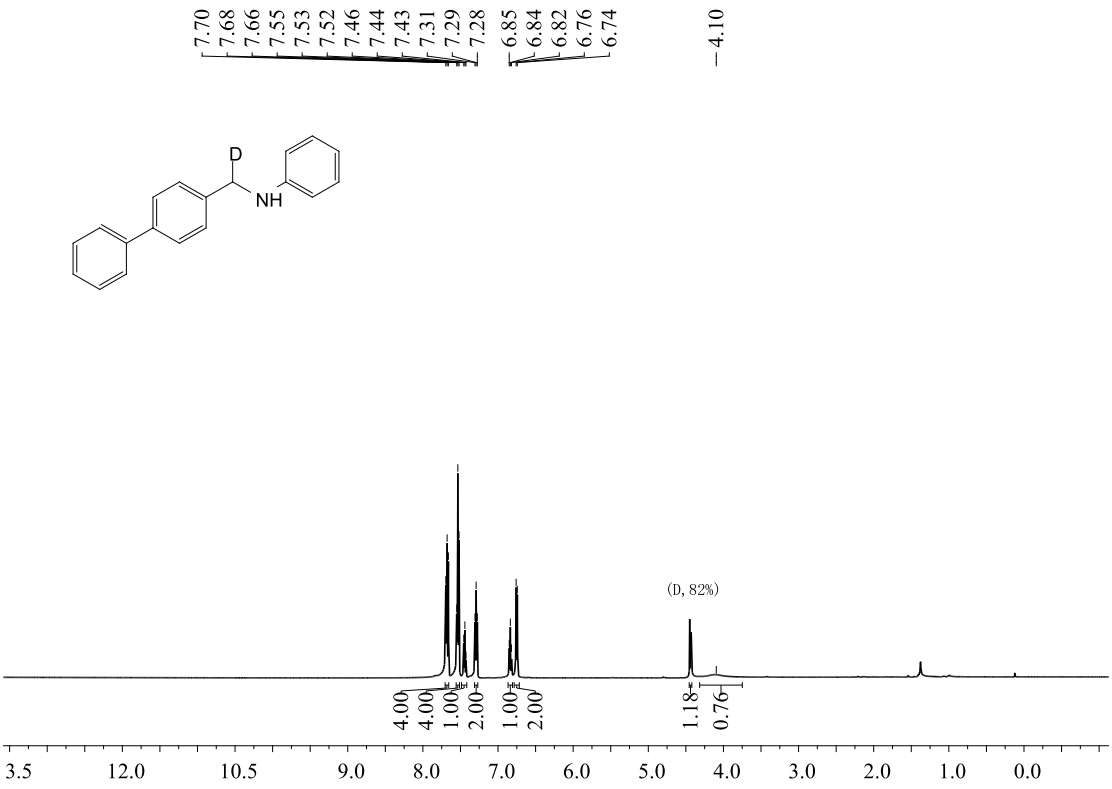
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3da-d_1



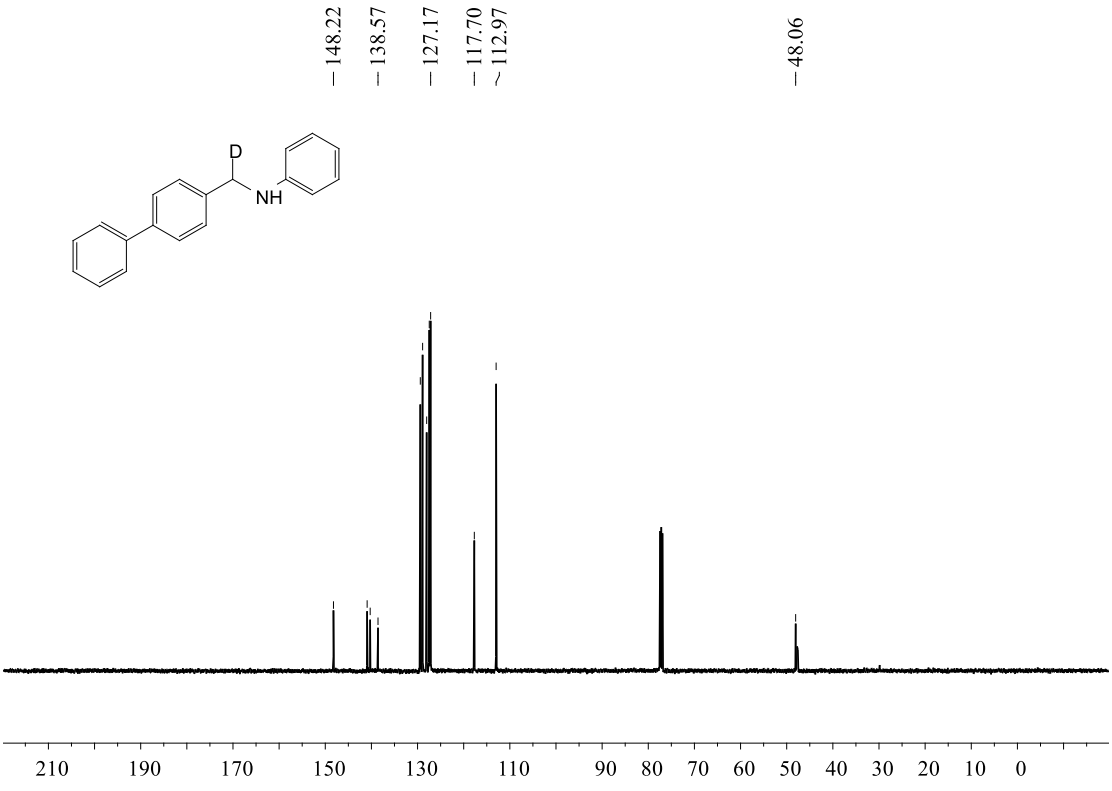
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3da-d_1



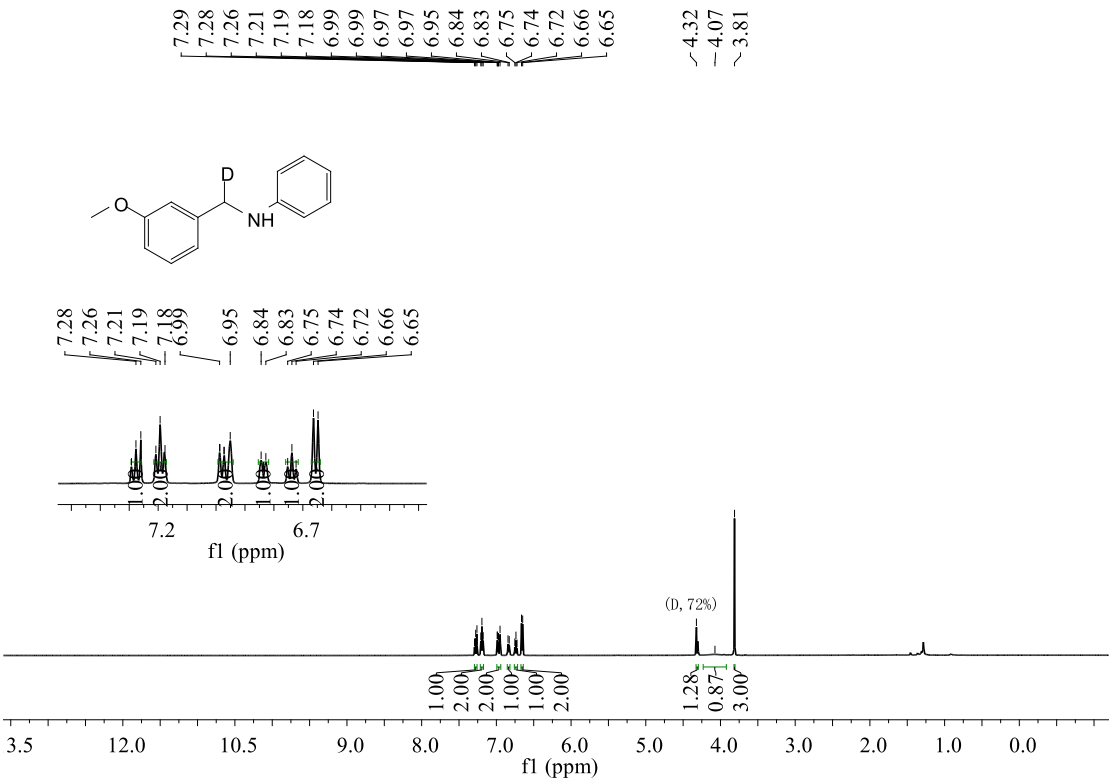
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3fa-d_1



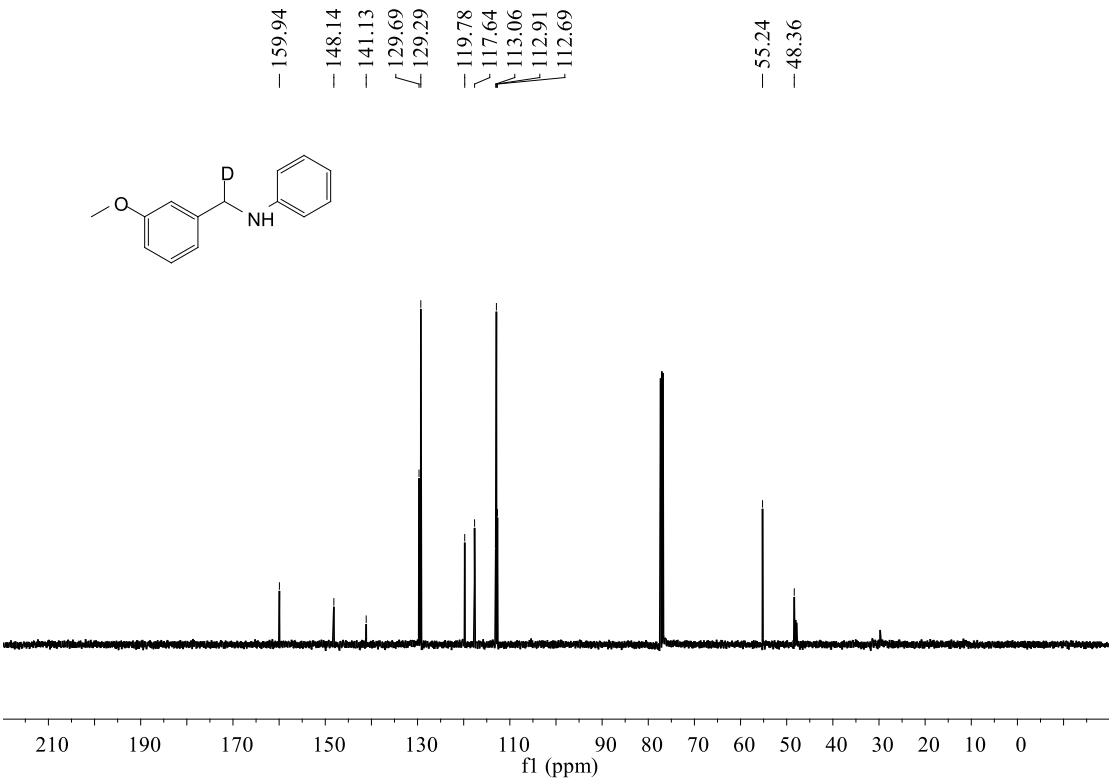
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3fa-d_1



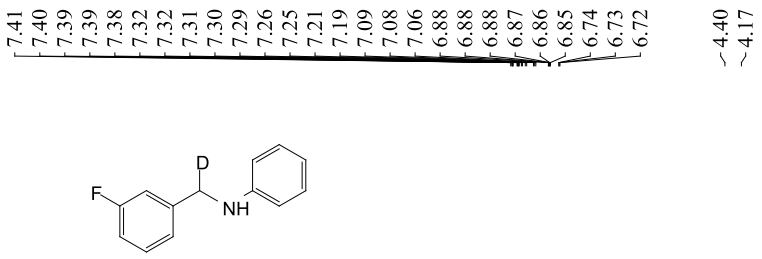
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ga-d_1

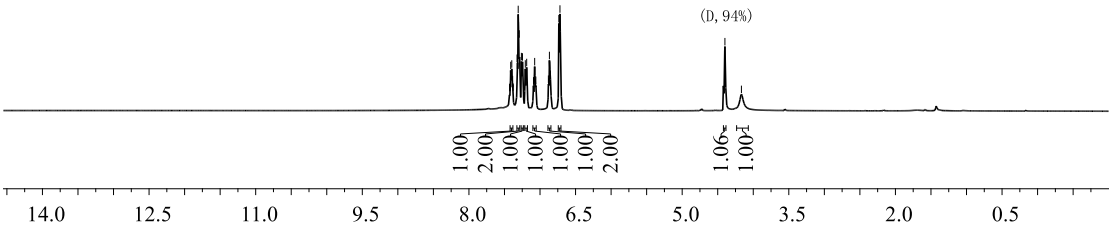


^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ga-d_1

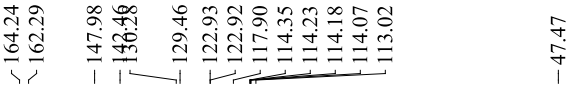


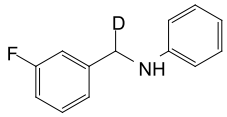
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ia-d_1

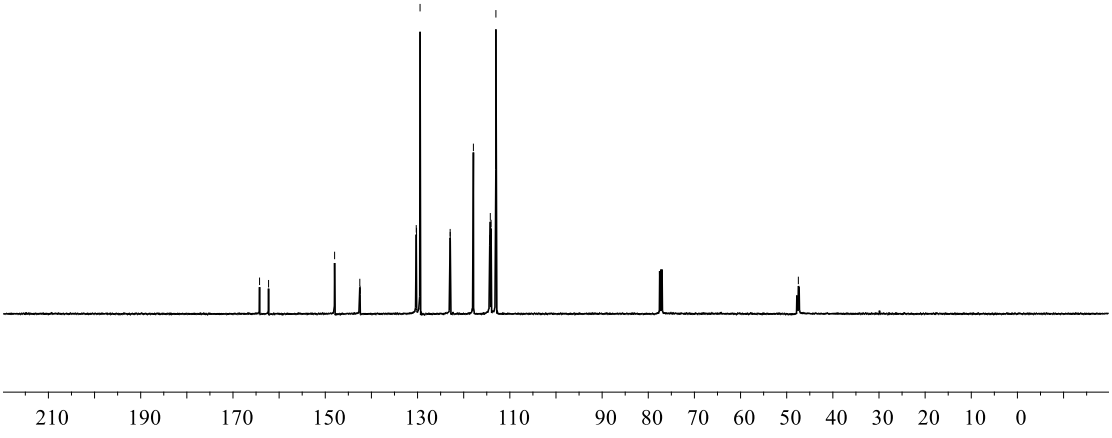




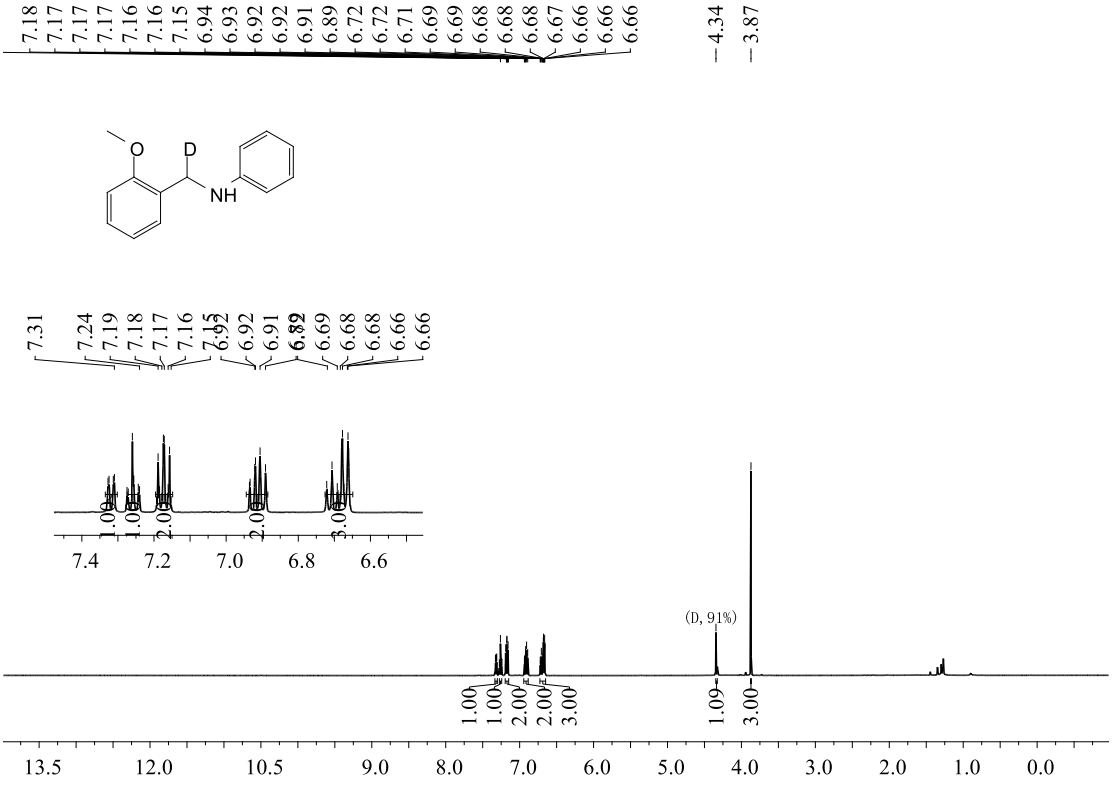
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ia-d_1



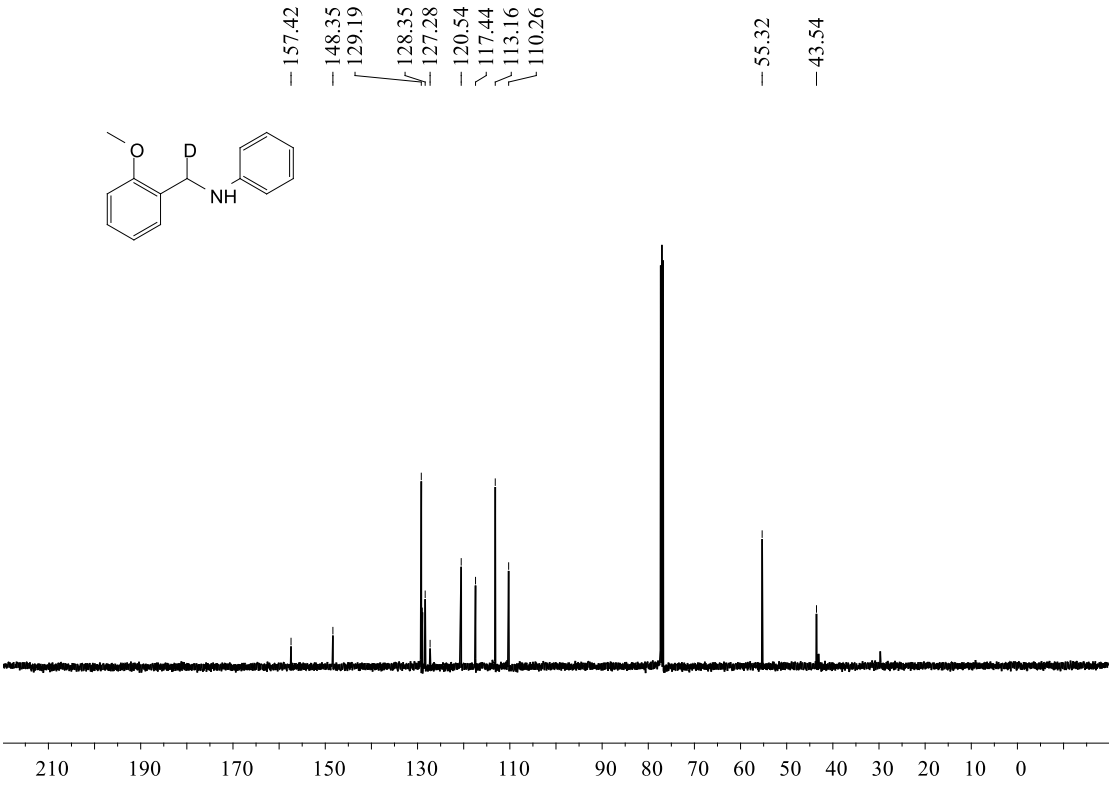




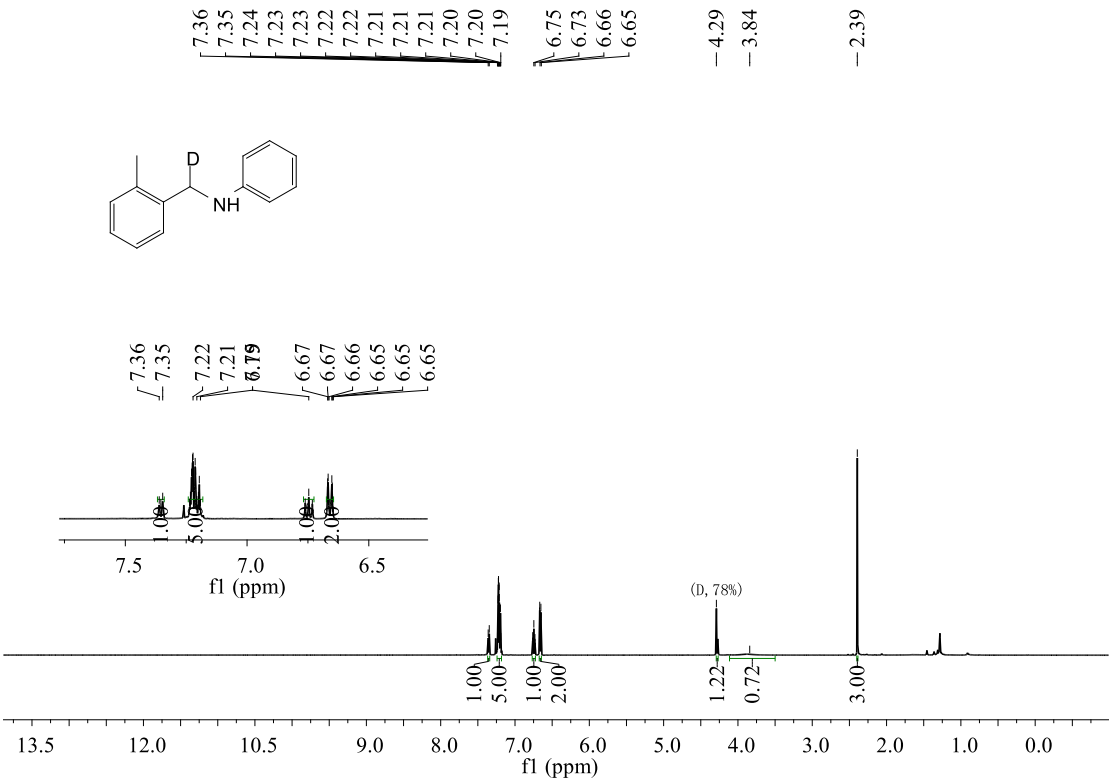
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ja-d_1



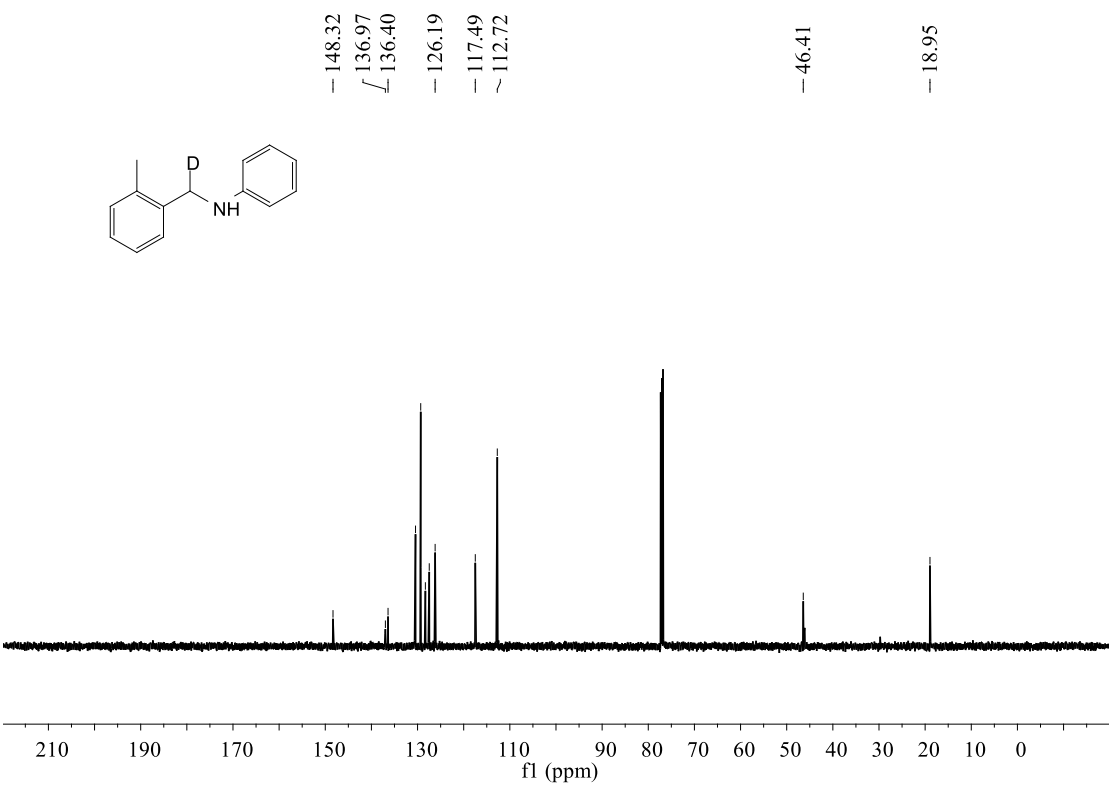
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ja-d_1



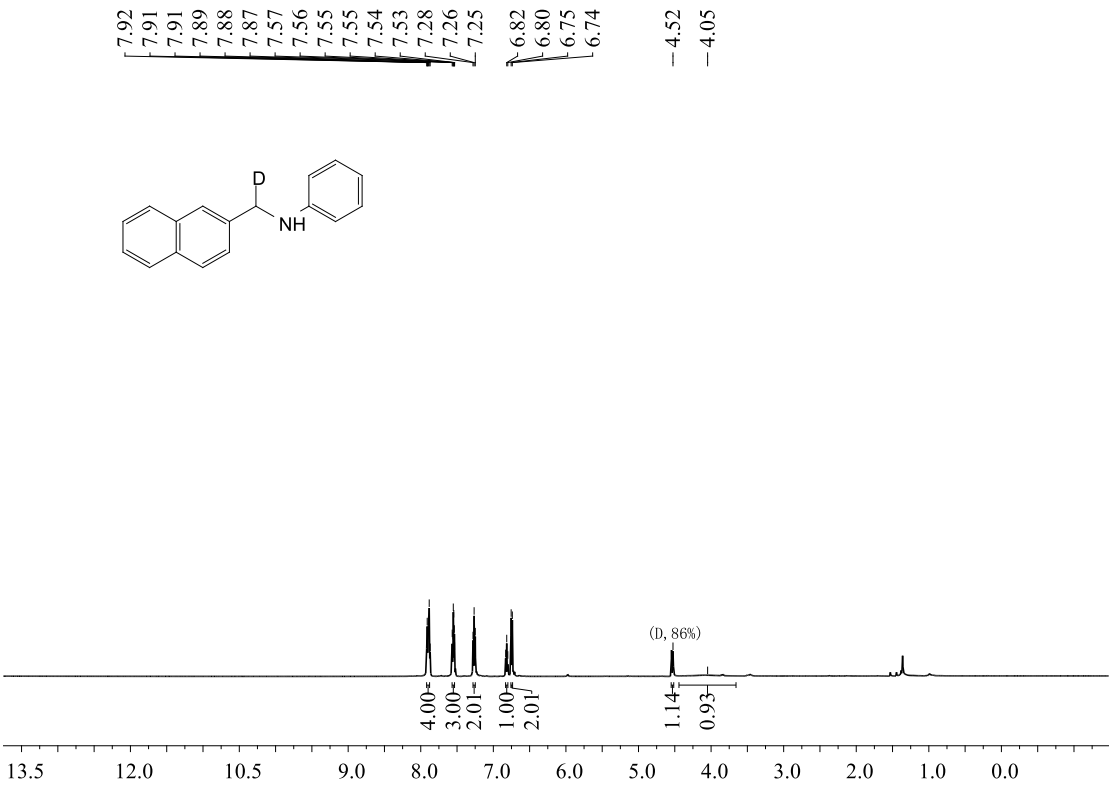
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ka-d_1



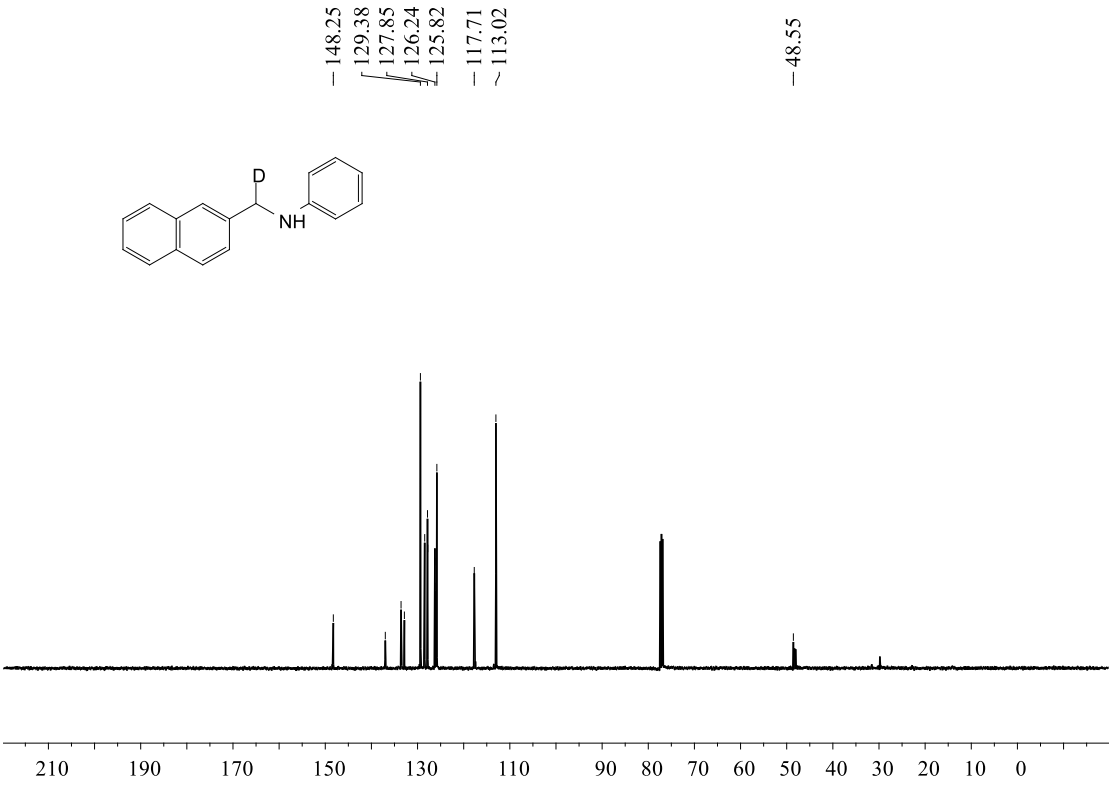
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ka-d_1



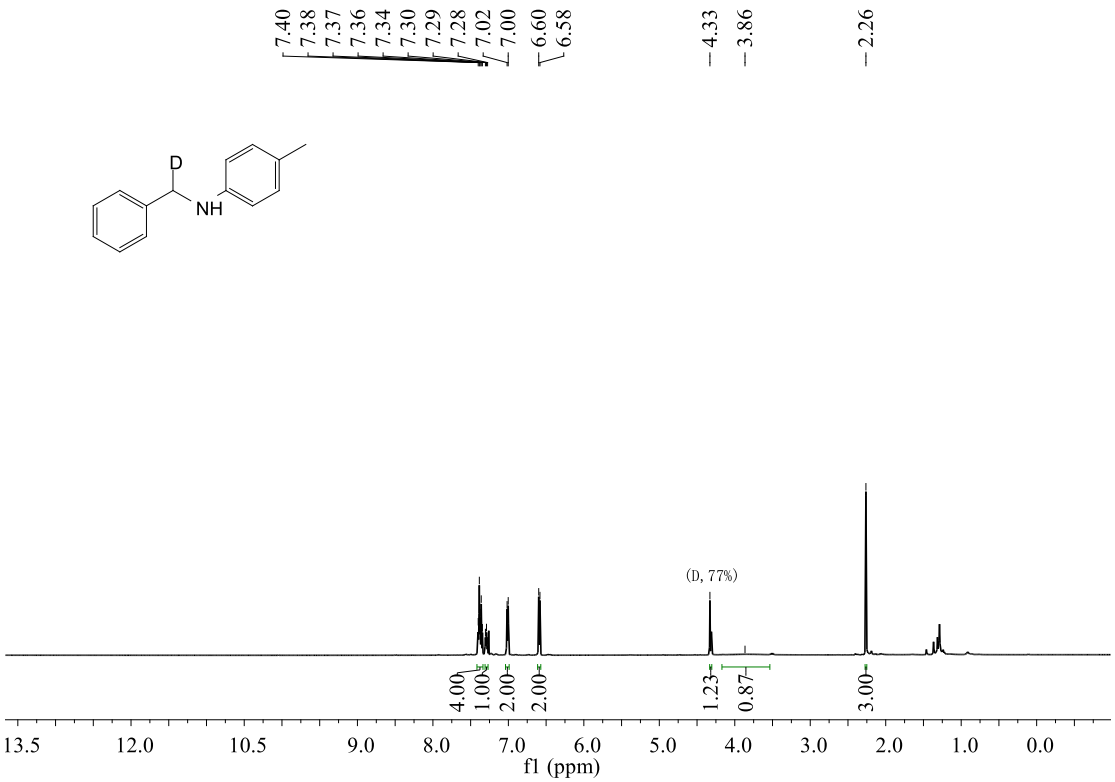
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ma-d_1



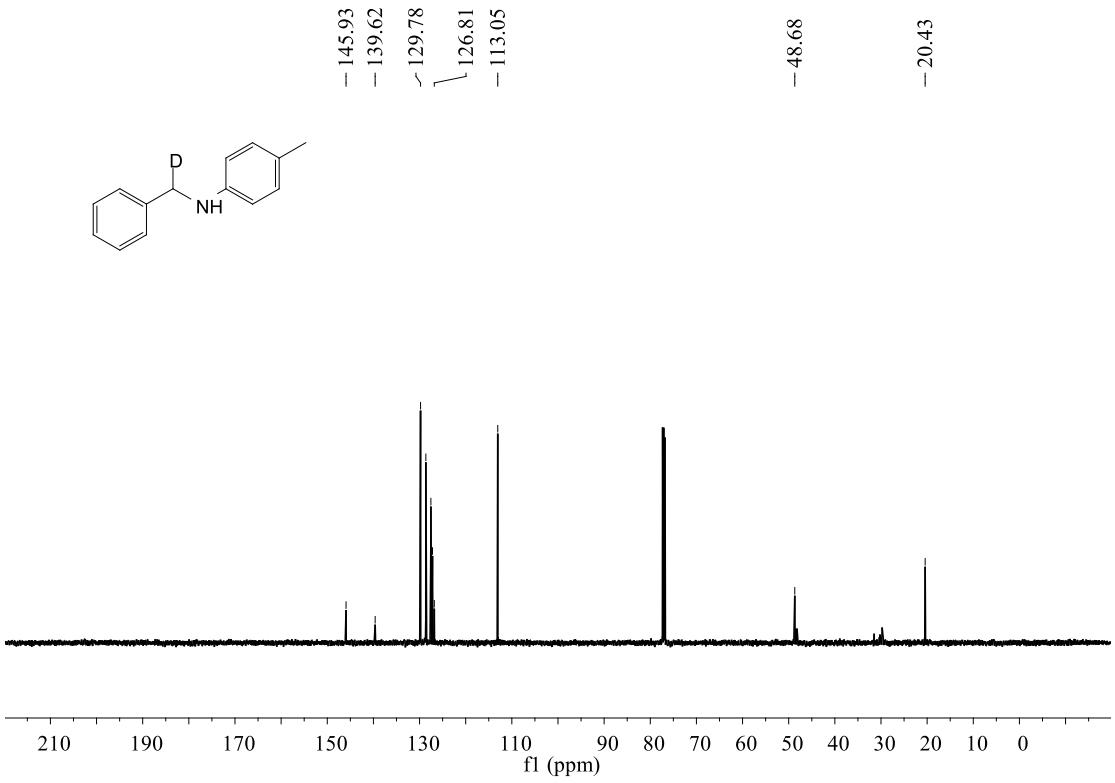
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ma-d_1



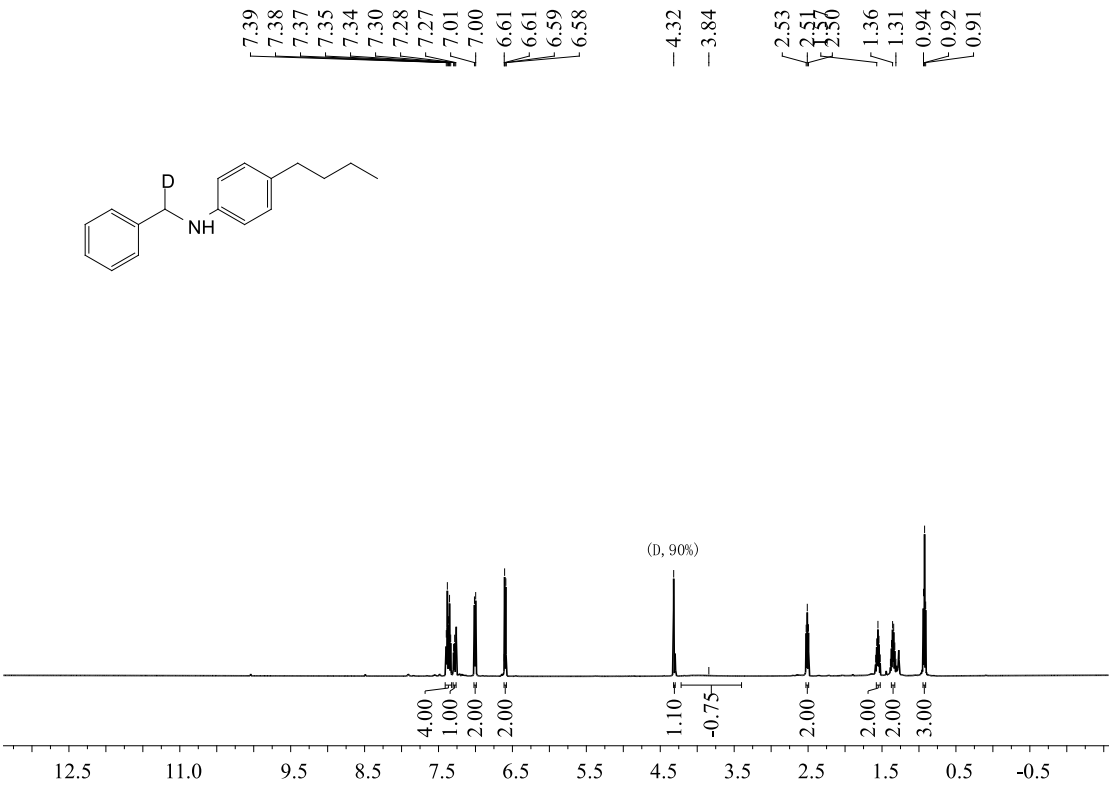
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ab-d_1



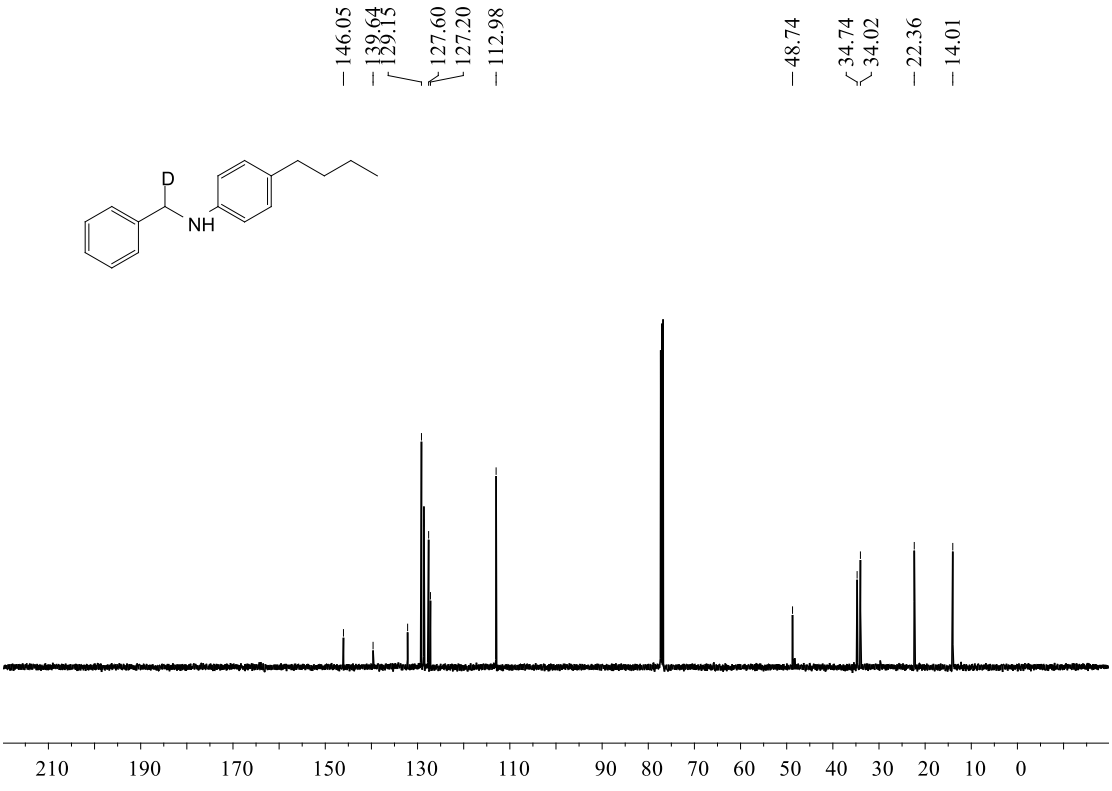
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ab-d_1



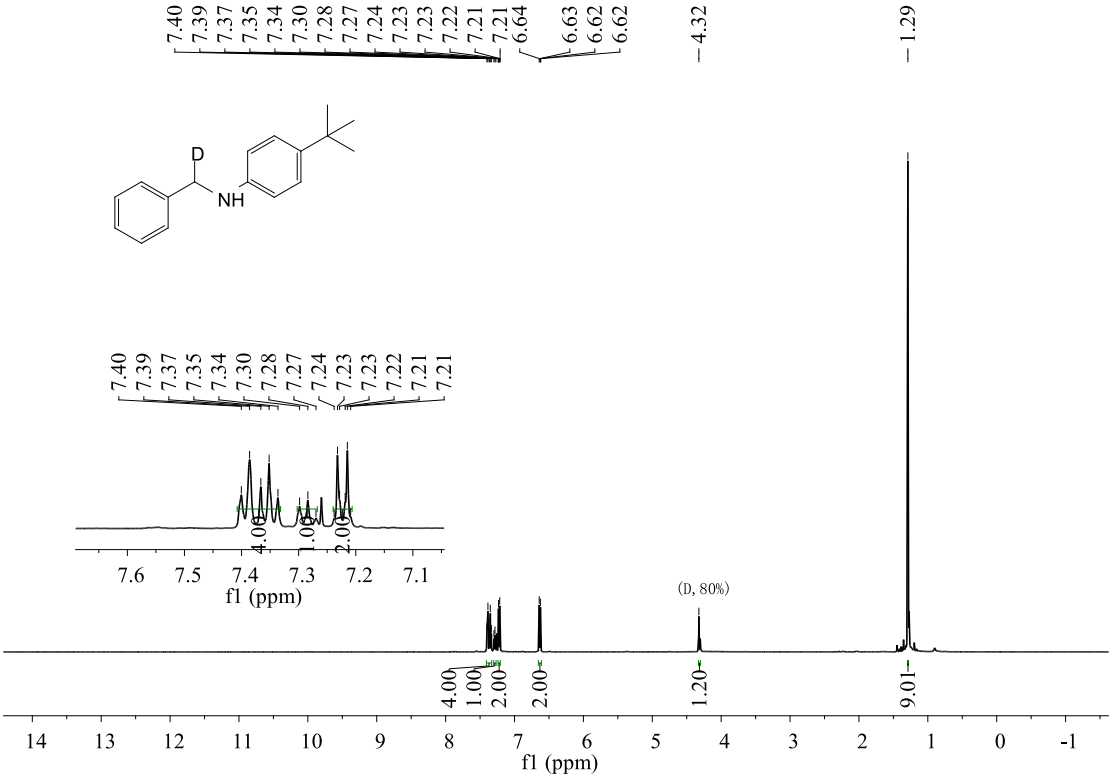
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ac-d_1



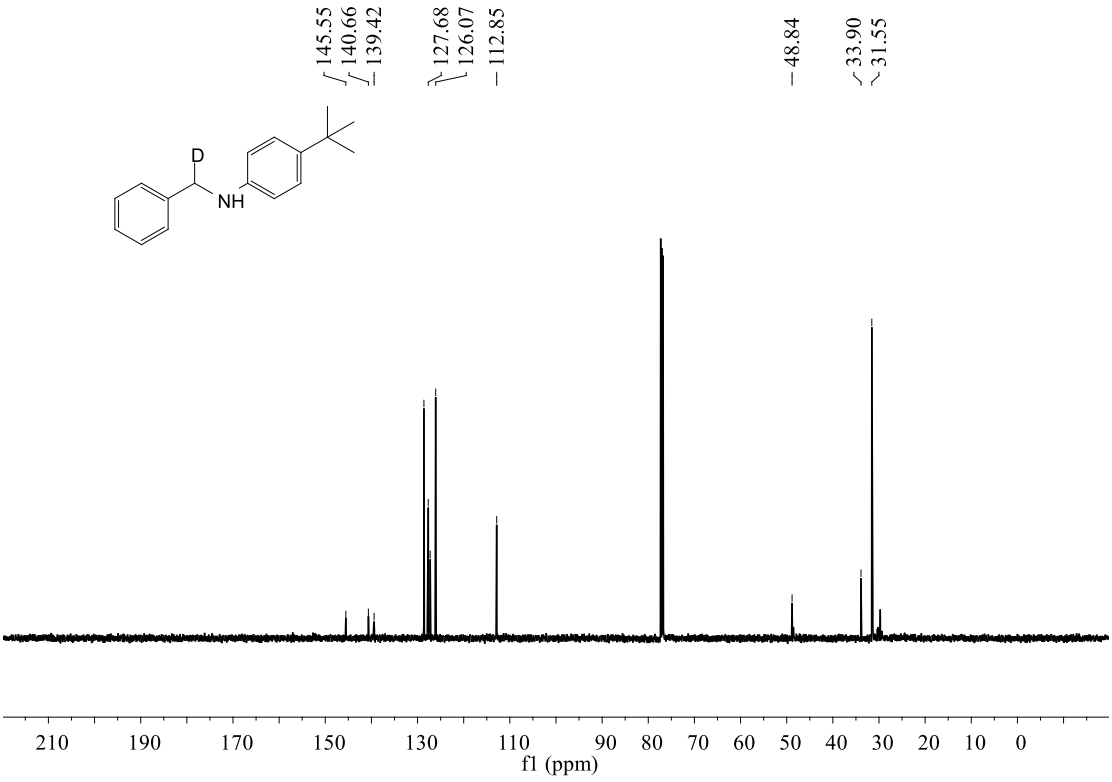
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ac-d_1



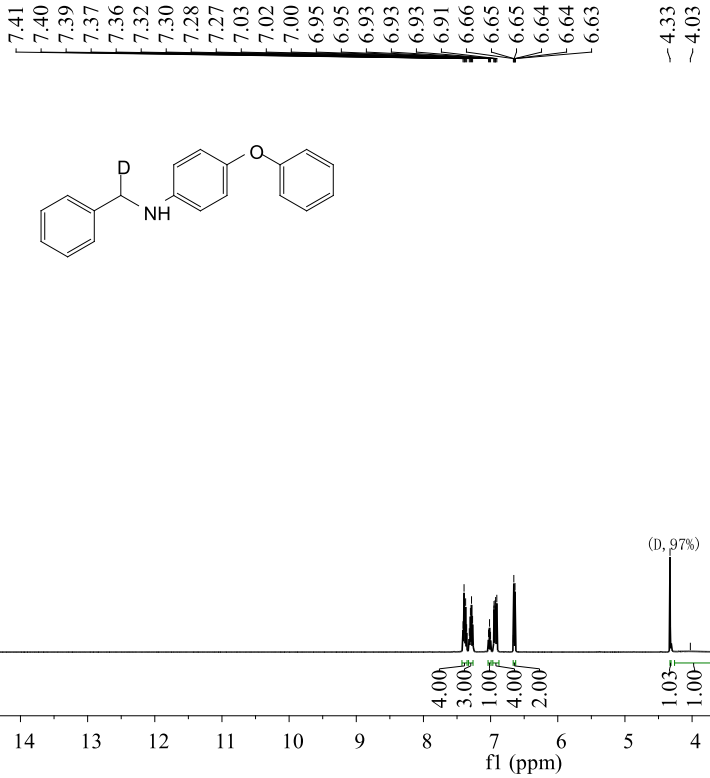
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ad-d_1



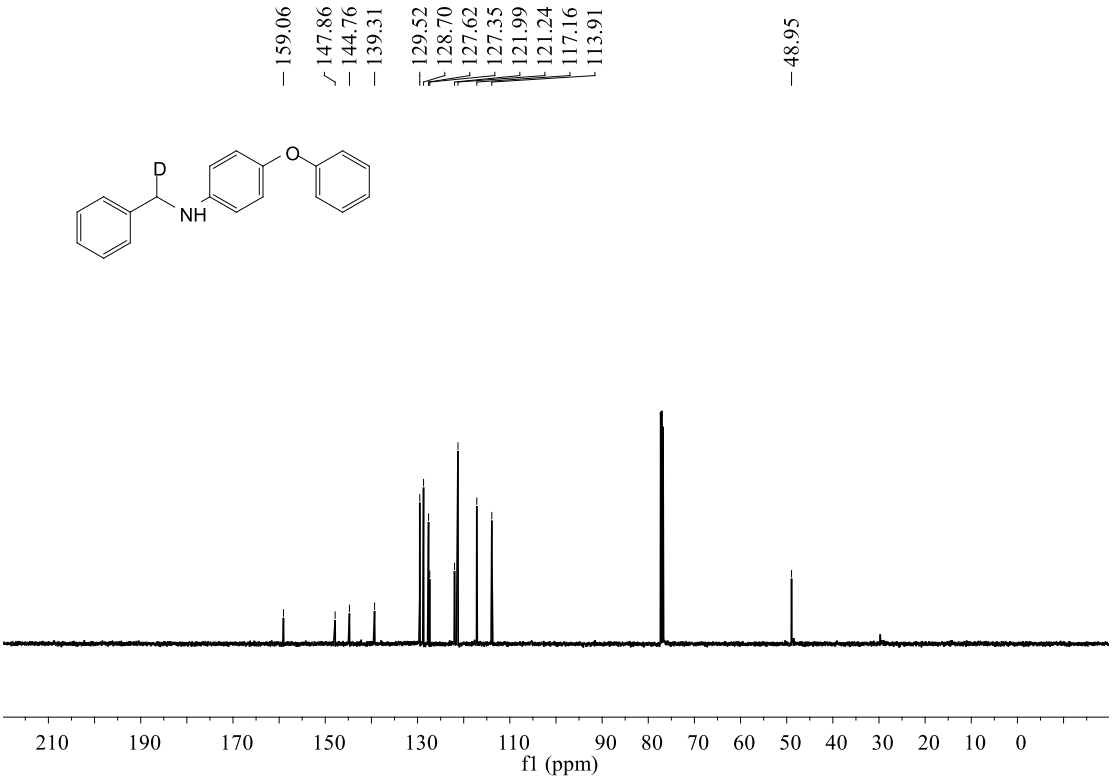
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ad-d_1



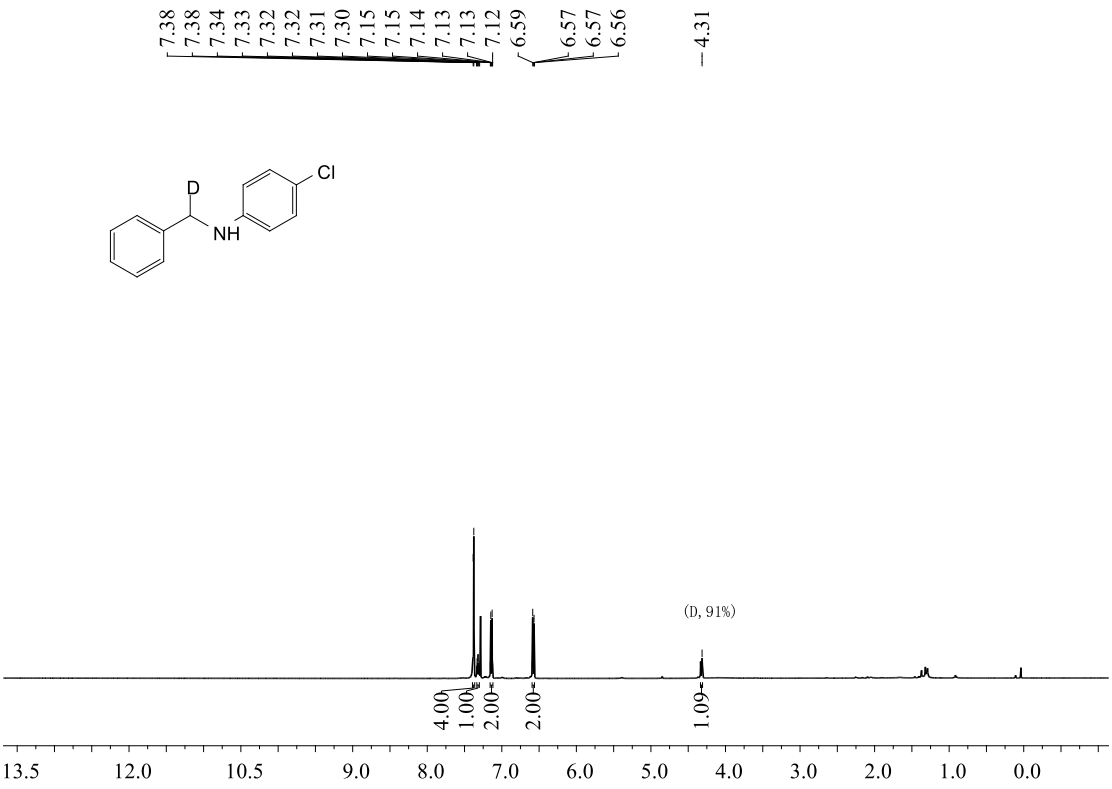
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3af-d_1



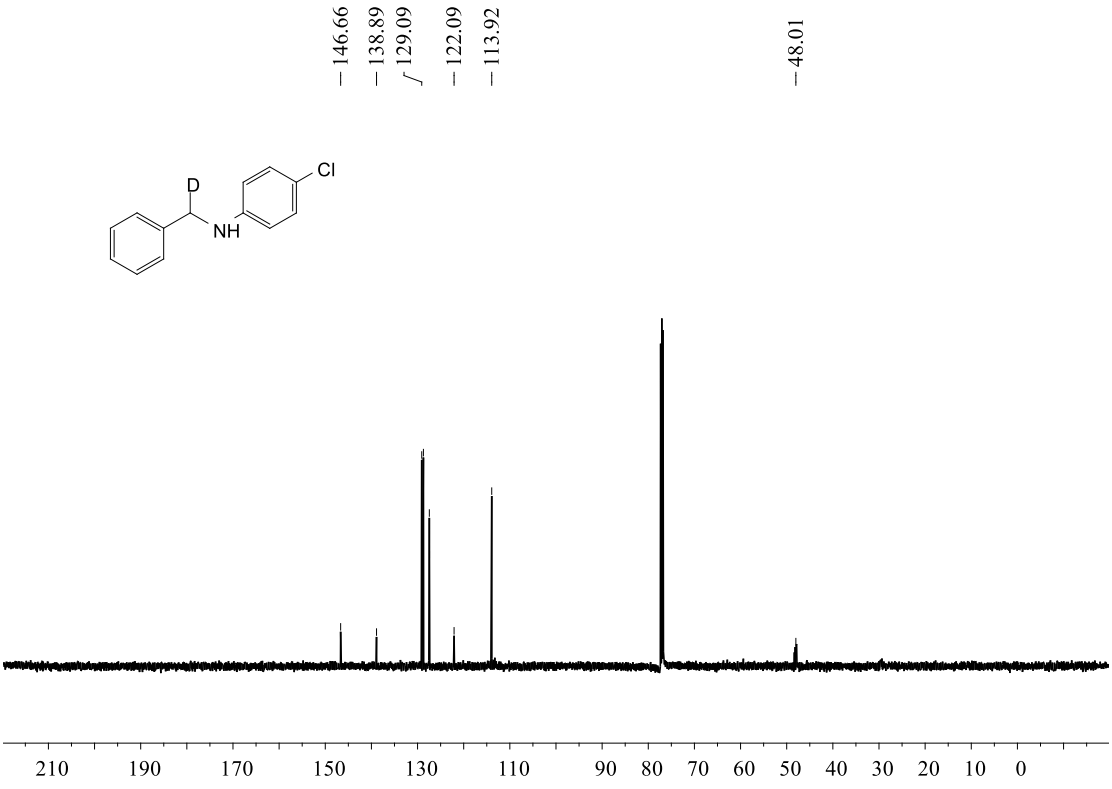
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3af-d_1



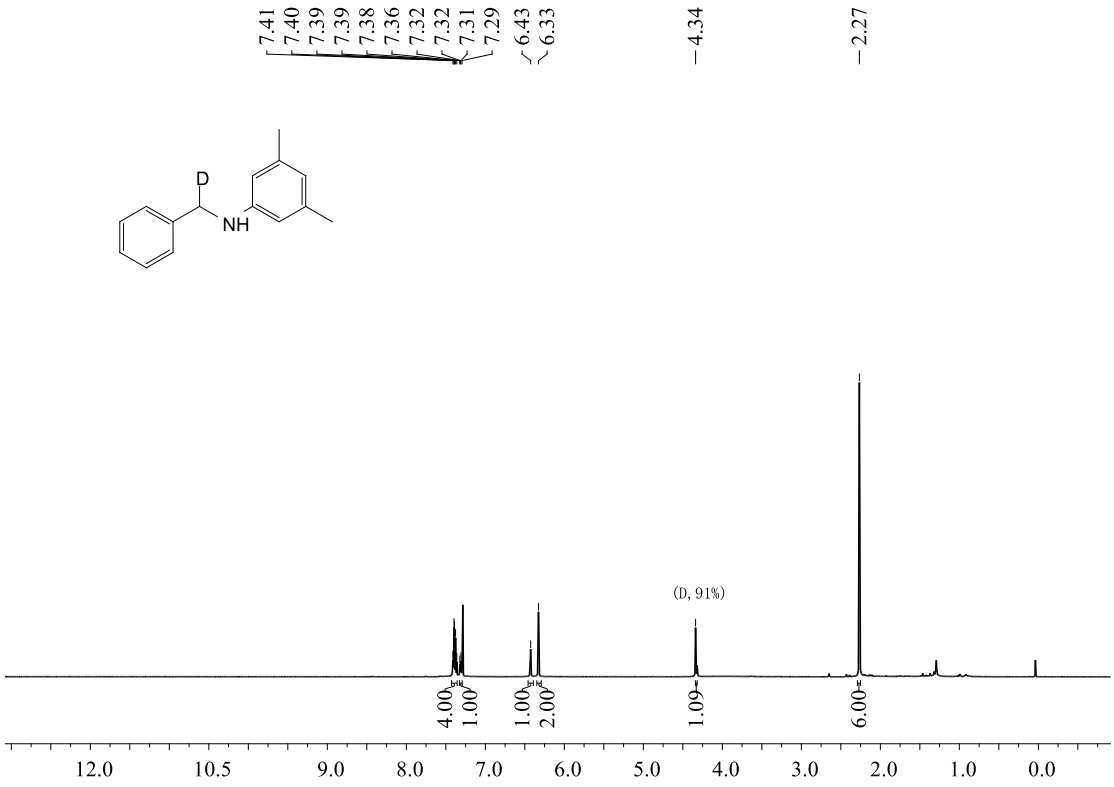
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ai-d_1



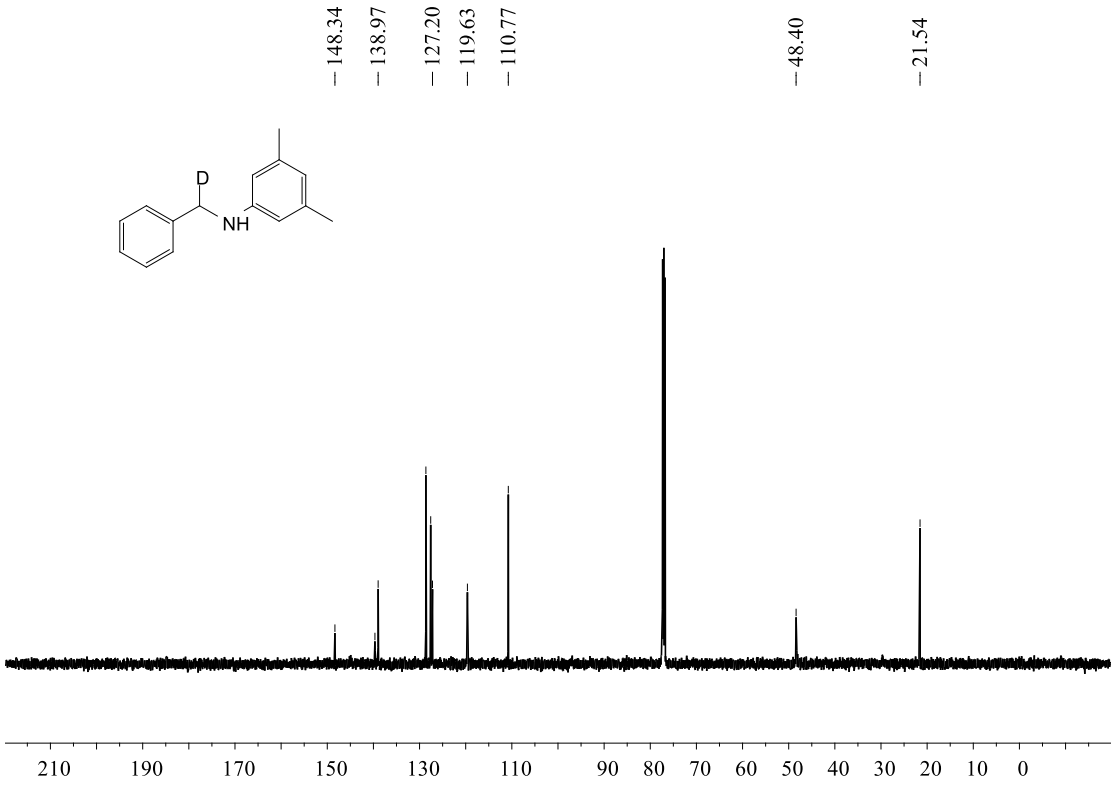
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ai-d_1



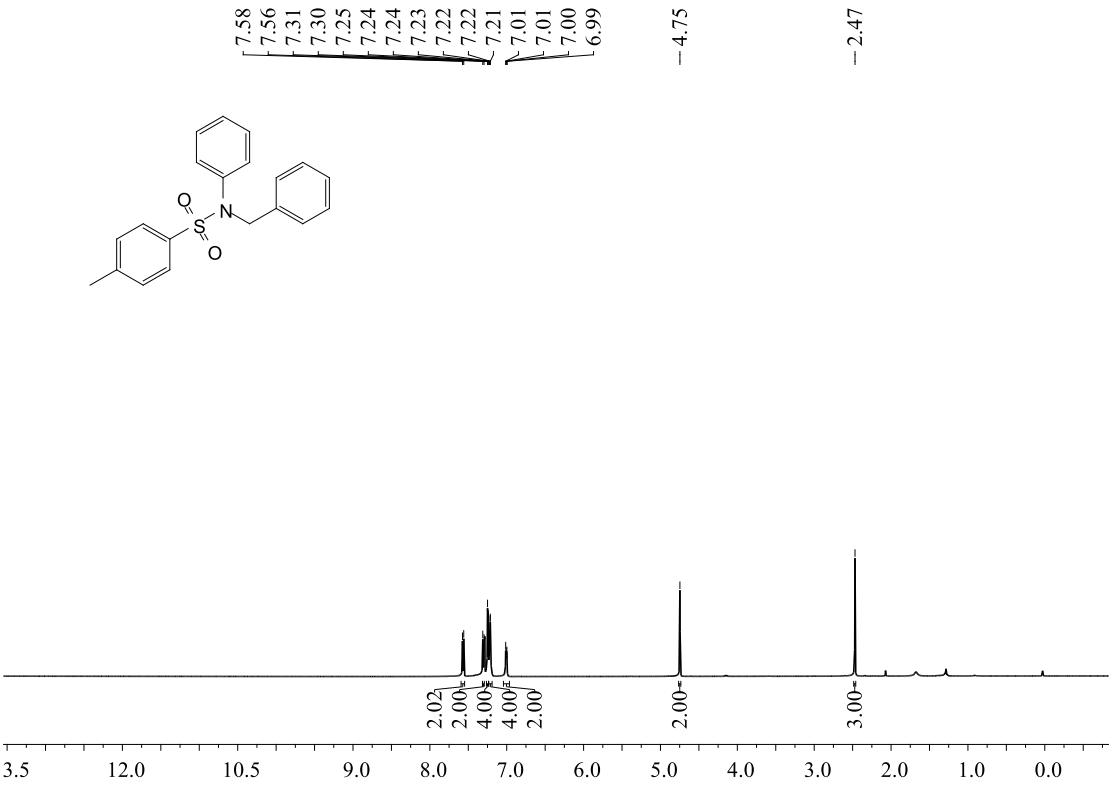
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 3ao-d_1



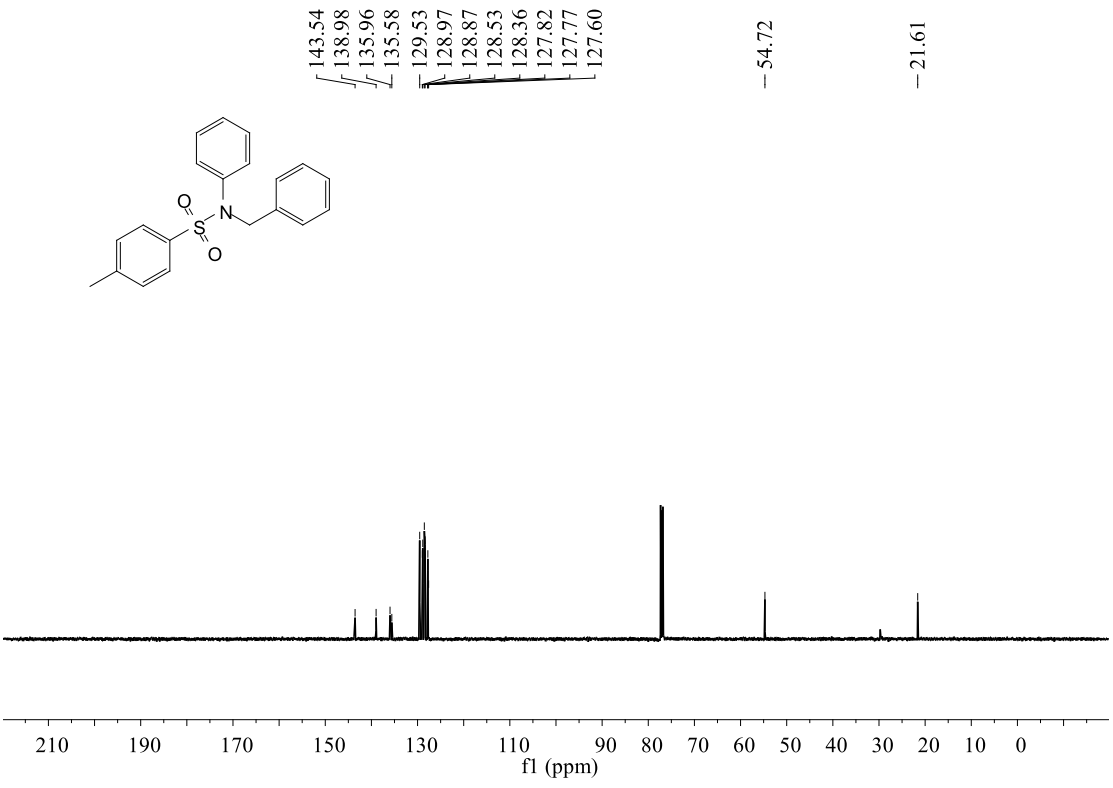
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 3ao-d_1



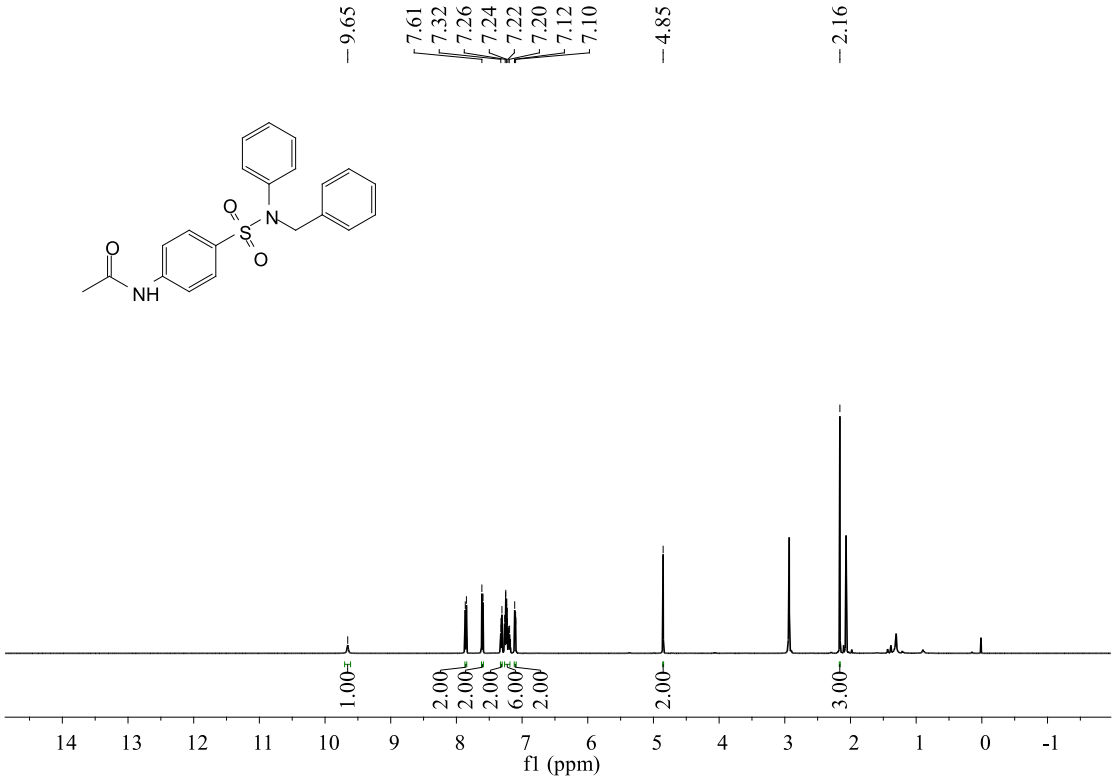
^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 5a



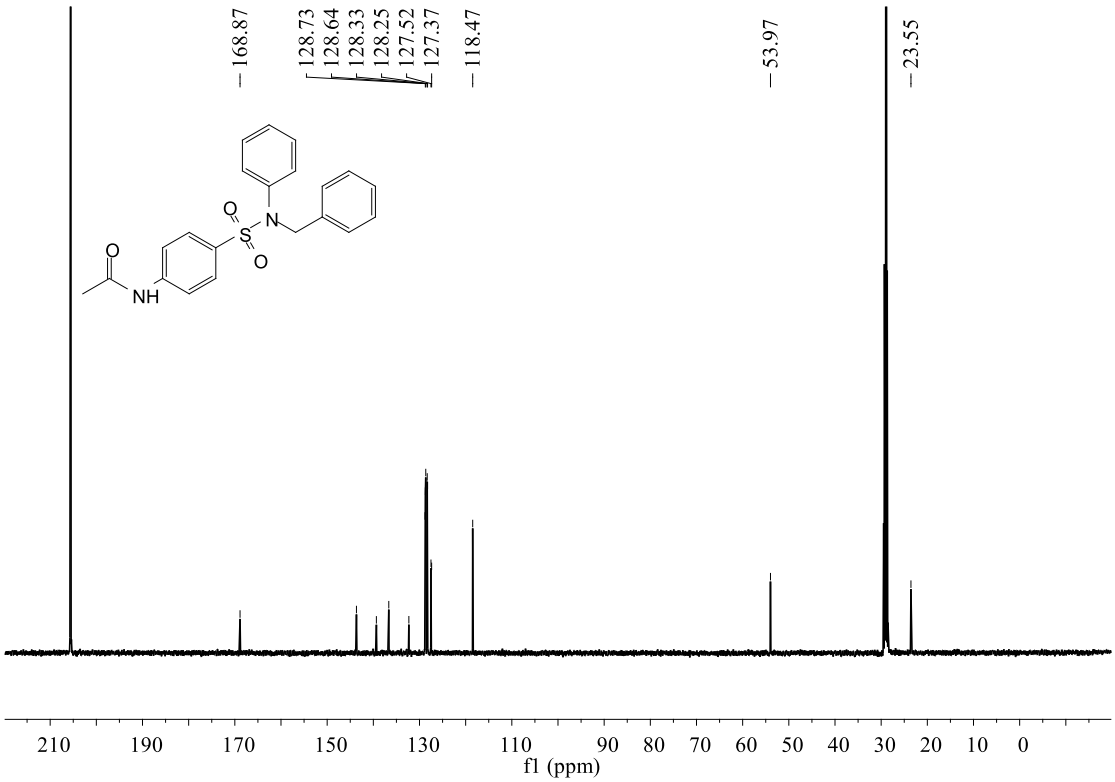
^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 5a



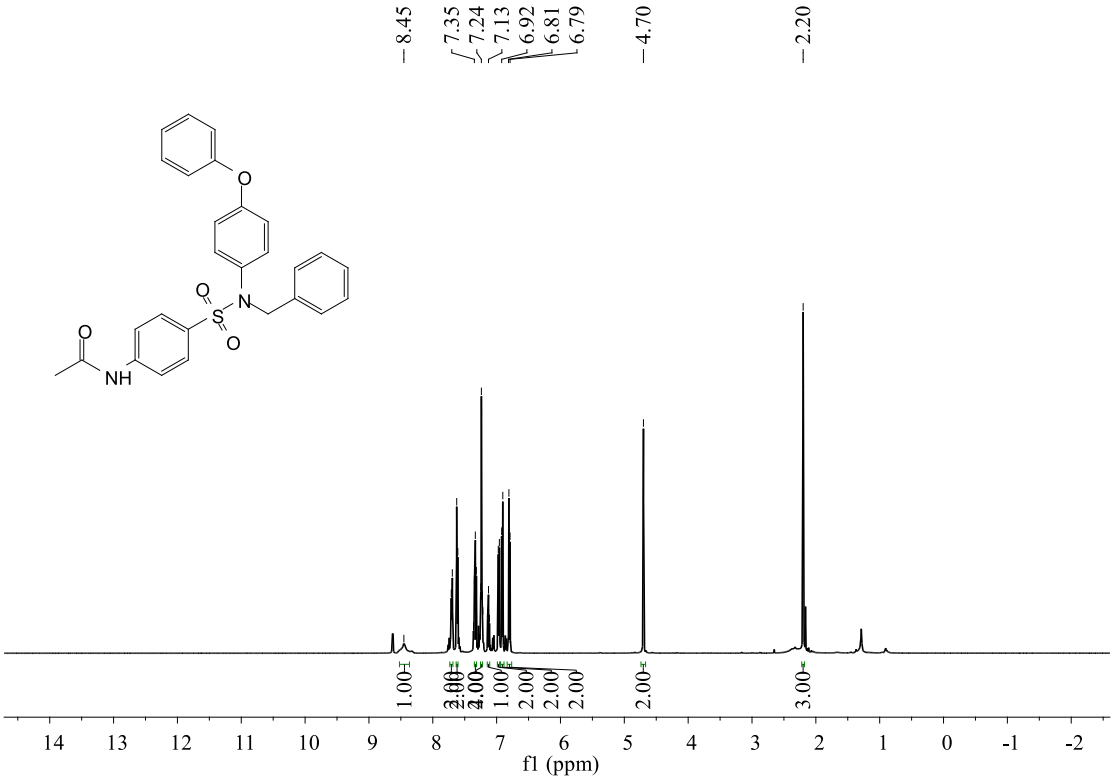
^{1}H NMR (500 MHz, C_3D_6O) spectrum of compound 5b



^{13}C NMR (126 MHz, C_3D_6O) spectrum of compound 5b



^{1}H NMR (500 MHz, $CDCl_3$) spectrum of compound 5c



^{13}C NMR (126 MHz, $CDCl_3$) spectrum of compound 5c