Supporting Information

Visible-Light-Mediated Synthesis of Amides from Carboxylic Acids and Amine Boranes

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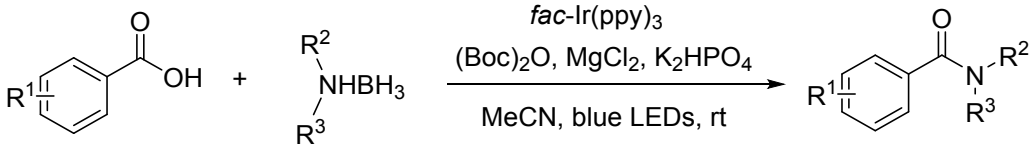
1. General information

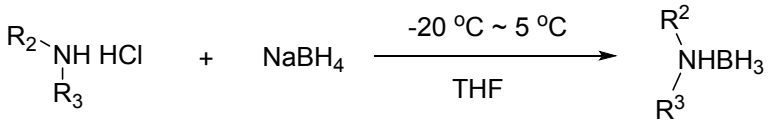
Unless otherwise noted, all commercially available reagents and solvents were used without further purification. The Blue LDEs lamp were directly purchased from the supermarket. All reactions for amidation of carboxylic acids were carried out under visible light (blue LEDs [10 W × 2]). Reactions were monitored by thin-layer chromatography (TLC) using 60 mesh silica gel plates visualized with short-wavelength UV light (254 nm). ^{1}H NMR and ^{13}C NMR spectra were recorded on a Bruker AVANCE Ⅲ–600 spectrometer using $CDCl_3$ or DMSO as solvents. Chemical shifts (δ) are reported in ppm relative to the solvent peak. The following abbreviations were used to explain the multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, with coupling constants (*J*) in hertz (Hz).

2. General procedure for the preparation of amides

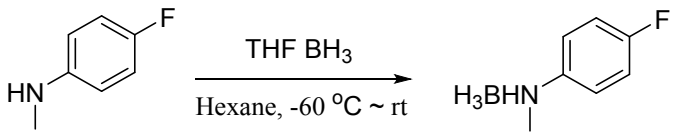


A 10 mL Schlenk-tube was charged with photocatalyst *fac*-Ir(ppy)$_3$ (0.008 mmol, 4 mol%, 5.2 mg), carboxylic acid (0.4 mmol, 2 equiv), amine borane (0.2 mmol, 1 equiv), K_2HPO_4 (0.8 mmol, 4.0 equiv, 140 mg), $(Boc)_2O$ (1.2 mmol, 6 equiv, 261 mg), $MgCl_2$ (0.4 mmol, 2 equiv, 38 mg) in CH_3CN (2 mL). The tube was placed at a distance (app. 5 cm) from 10W blue LEDs lamb and the mixture was stirred for 36 h at room temperature. The resulting mixture was diluted with EtOAc (20 mL). The organic layers were washed with brine, dried with anhydrous Na_2SO_4 and the solvent was then removed under vacuo. The residue was purified with chromatography column on silica gel to give the corresponding amides.

3. General procedure for the synthesis of amine borane[1]

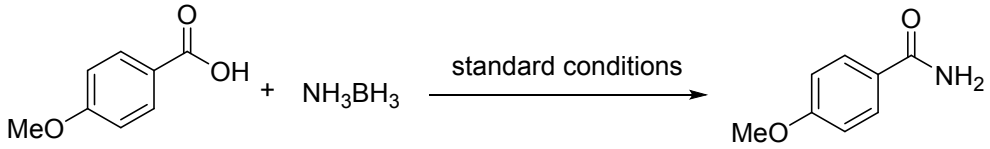


A 50 mL Schlenk-tube was charged with $NaBH_4$ (0.38 g, 10 mmol), the tube was evacuated and backfilled with argon (three times), THF (10 mL) was added by syringe under argon. Then the tube was sealed and was placed in -20 °C bath, and the corresponding hydrochloride of the amine (1.0 equiv, 10 mmol) was added into the reaction tube under argon. The reaction temperature was warmed up to 5 °C, and reacted at this temperature for 10 hours. The resulting mixture was gradually brought to rt and filtered. The solvent was removed under vacuo to give corresponding product as a white solid.



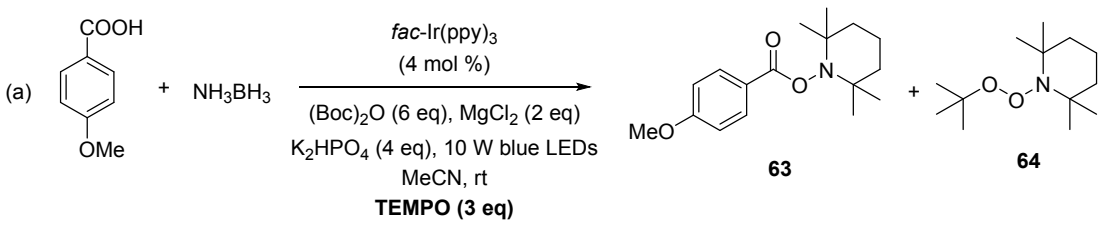
Anhydrous hexane (15 mL) was transferred to a 50 mL dry round bottom flask, charged with a magnetic stir-bar. The flask was sealed with a rubber septum and tetrahydrofuran borane (3.6 mL, 1.2 eq., 3 mmol) was added via syringe at rt. After THF BH_3 addition the solution was brought to -60 °C. Then at -60 °C 4-fluoro-N-methylaniline (375mg, 1 eq., 3 mmol) was added via syringe. The mixture was stirred and gradually brought to rt. The mixture was stirred at rt for 20 hour. The solvent was removed under vacuo to give corresponding product as a white solid.

4. Scale up procedures for the synthesis of amides



A 100 mL Schlenk-tube was charged with photocatalyst *fac*-Ir(ppy)$_3$ (0.16 mmol, 4 mol%, 105 mg), 4-methoxybenzoic acid (8 mmol, 2 equiv, 1.2 g), NH_3BH_3 (4 mmol, 1 equiv, 0.124 g), K_2HPO_4 (16 mmol, 4.0 equiv, 2.78 g), $(Boc)_2O$ (24 mmol, 6 equiv, 6.26 g), $MgCl_2$ (8 mmol, 2 equiv, 0.76 g) in CH_3CN (40 mL) with magnetic stirring. The tube was placed at a distance (app. 5 cm) from 10W blue LEDs lamb and the mixture was stirred for 36 h at room temperature. The resulting mixture was diluted with EtOAc (40 mL). The organic layers were washed with brine, dried with anhydrous Na_2SO_4 and the solvent was then removed under vacuo. The residue was purified with chromatography column on silica gel (gradient eluent of EtOAc/petroleum ether: 1/2 to 3/1) to give the 4-methoxybenzamide (0.35 g, 65% yield) as a white solid.

5. Mechanistic experiments for the amide bond formation



A 10 mL Schlenk-tube was charged with photocatalyst *fac*-Ir(ppy)$_3$ (0.004 mmol, 4 mol%, 2.63 mg), 4-methoxybenzoic acid (0.2 mmol, 2 equiv, 30.4 mg), NH_3BH_3 (0.1 mmol, 1 equiv, 3.1 mg), K_2HPO_4 (0.4 mmol, 4.0 equiv, 70 mg), $(Boc)_2O$ (0.6 mmol, 6 equiv, 130 mg), $MgCl_2$ (0.2 mmol, 2 equiv, 19 mg) and TEMPO (0.3 mmol, 3 equiv, 47 mg) in CH_3CN (2 mL) with magnetic stirring. The tube was placed at a distance (app. 5 cm) from 10W blue LEDs lamb and the mixture was stirred for 12 h at room temperature. No desired product was formed and the corresponding radical-trapping product **63** (34 mg, 58% yield) was isolated and detected by NMR and HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_{17}H_{26}NO_3$ 292.1907; found 292.1903 (Figure S1); and

64 was detected by HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_{13}H_{28}NO_2$ 230.2115; found 230.2103 (Figure S2).

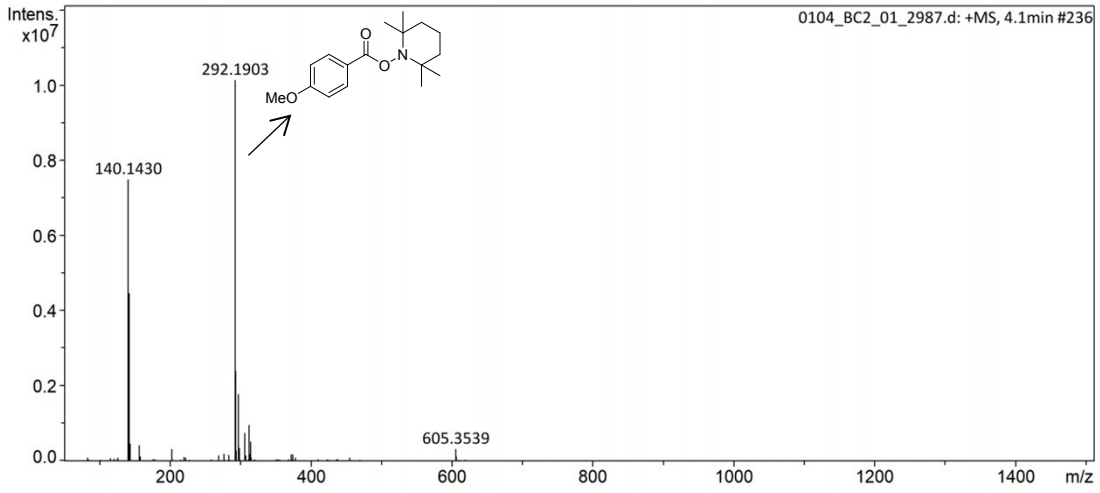


Figure S1

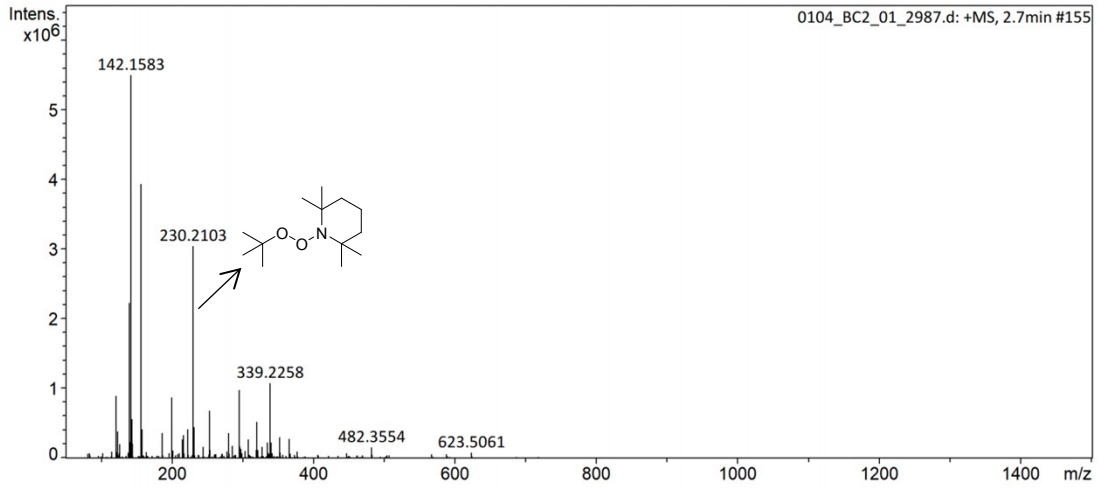
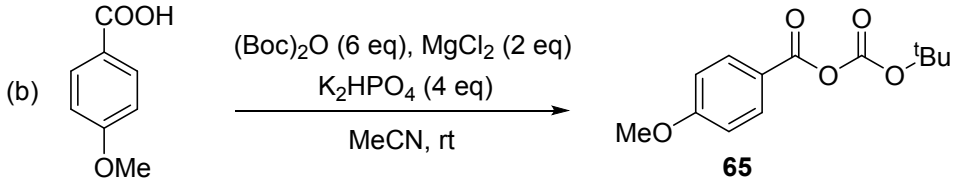
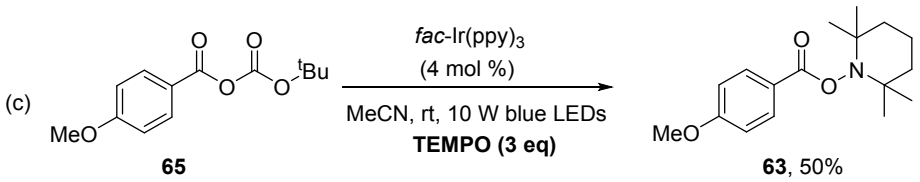


Figure S2

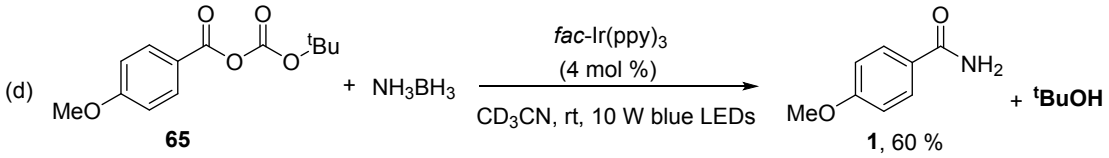


65

A 10 mL Schlenk-tube was charged with 4-methoxybenzoic acid (0.3 mmol, 1 equiv, 40.8 mg), K_2HPO_4 (1.2 mmol, 4 equiv, 210 mg), $(Boc)_2O$ (1.8 mmol, 6 equiv, 392 mg), $MgCl_2$ (0.6 mmol, 2 equiv, 57 mg) in CH_3CN (3 mL) with magnetic stirring for 12 h at room temperature. The resulting mixture was diluted with EtOAc (20 mL). The organic layer was washed with brine, dried with anhydrous Na_2SO_4 and the solvent was removed under vacuo. The residue was purified with chromatography column on silica gel (gradient eluent of EtOAc/petroleum ether: 1/30 to 1/20) to give the product **65** (25 mg, 33% yield) as a colorless liquid .



A 10 mL Schlenk-tube was charged with photocatalyst *fac*-Ir(ppy)$_3$ (0.004 mmol, 4 mol%, 2.63 mg), anhydride **65** (0.1 mmol, 2 equiv, 25 mg), TEMPO (0.3 mmol, 3 equiv, 46.8 mg) in CH_3CN (2 mL) with magnetic stirring. The tube was placed at a distance (app. 5 cm) from 10W blue LEDs lamb and the mixture was stirred for 12 h at room temperature. The generated radical-trapping product **63** (14.5 mg, 50% yield) was isolated and detected by NMR.



A 10 mL Schlenk-tube was charged with photocatalyst *fac*-Ir(ppy)$_3$ (0.004 mmol, 4 mol%, 2.63 mg), NH_3BH_3 (0.1 mmol, 1 equiv, 3.1 mg), **65** (0.2 mmol, 2 equiv, 50 mg) in CD_3CN (2 mL) with magnetic stirring. The tube was placed at a distance (app. 5 cm) from 10W blue LEDs lamb and the mixture was stirred for 24 h at room temperature. The mixture was detected by ^{1}H NMR and found a single peak at 1.177 ppm, which is consistent with *tert*-butanol in CD_3CN at 1.17 ppm. The reaction mixture was also detected by GC-MS and confirmed the formation of *tert*-butanol (Figure S3). So we hypothesized that *tert*-butanol was formed.

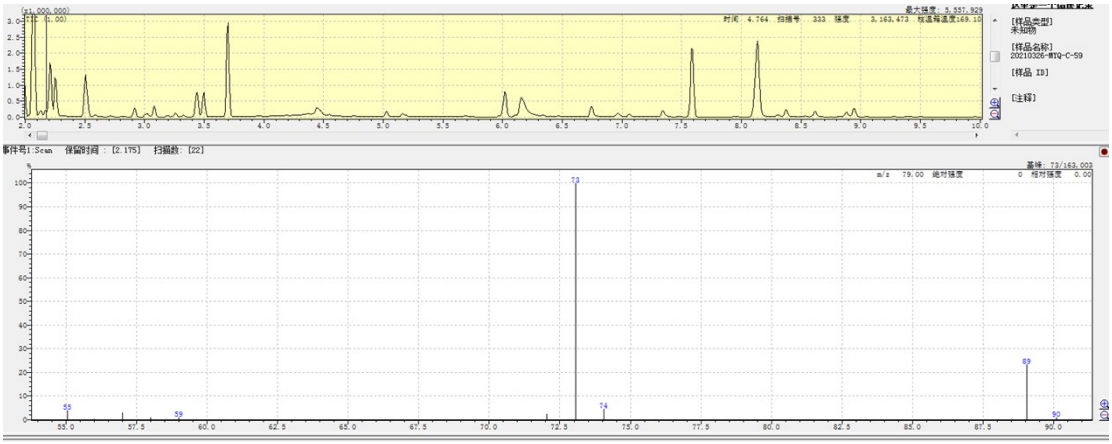
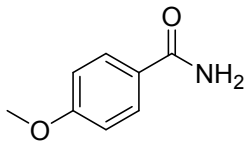


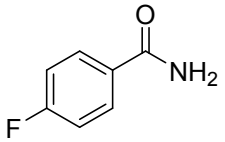
Figure S3

6. Characterization data of amides.

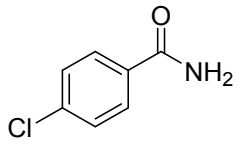


4-Methoxybenzamide (**1**): Yellow solid (21.1 mg, 70% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d$_6$) δ 7.84 (d, J = 8.7

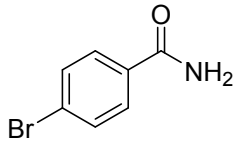
Hz, 2H), 7.82 (s, 1H), 7.16 (s, 1H), 6.97 (d, *J* = 8.7 Hz, 2H), 3.80 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 172.75, 166.81, 134.57, 131.66, 118.61, 60.52.
Characterization is in agreement with previous reports for this compound.[2]



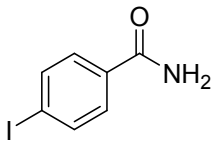
4-Fluorobenzamide (**2**): White solid (20 mg, 72% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.99 (s, 1H), 7.94 (dd, *J* = 8.5, 5.7 Hz, 3H), 7.38 (s, 1H), 7.27 (t, *J* = 8.8 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.27, 164.39 (d, *J* = 247.6 Hz), 131.21 (d, *J* = 3.0 Hz), 130.58 (d, *J* = 9.1 Hz), 115.57 (d, *J* = 21.1 Hz).
Characterization is in agreement with previous reports for this compound.[3]



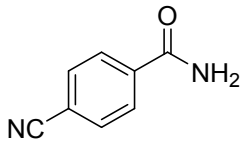
4-Chlorobenzamide (**3**): Yellow solid (20.7 mg, 67% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.04 (s, 1H), 7.89 (d, *J* = 8.5 Hz, 2H), 7.52 (d, *J* = 8.5 Hz, 2H), 7.45 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.29, 136.55, 133.50, 129.87, 128.77.
Characterization is in agreement with previous reports for this compound.[2]



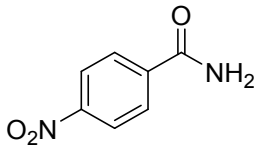
4-Bromobenzamide (**4**): White solid (21 mg, 53% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.04 (s, 1H), 7.81 (d, *J* = 8.5 Hz, 2H), 7.66 (d, *J* = 8.5 Hz, 2H), 7.45 (s, 1H). ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.41, 133.87, 131.72, 130.08, 125.49.
Characterization is in agreement with previous reports for this compound.[2]



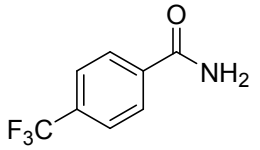
4-Iodobenzamide (**5**): White solid (24.6 mg, 50% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.21 (s, 1H), 8.05 (s, 1H), 7.88 (d, *J* = 7.6 Hz, 2H), 7.46 (s, 1H), 7.26 (t, *J* = 7.6 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.83, 140.24, 136.79, 136.47, 130.92, 127.35, 95.10.
Characterization is in agreement with previous reports for this compound.[3]



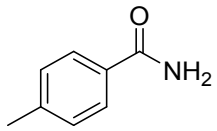
4-Cyanobenzamide (**6**): White solid (17 mg, 58% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.21 (s, 1H), 8.01 (d, *J* = 7.8 Hz, 2H), 7.94 (d, *J* = 7.5 Hz, 2H), 7.67 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.93, 138.76, 132.85, 128.73, 118.85, 114.11.
Characterization is in agreement with previous reports for this compound.[4]



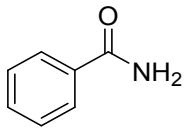
4-Nitrobenzamide (**7**): White solid (22 mg, 66% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.30 (d, *J* = 8.7 Hz, 2H), 8.28 (s, 1H), 8.09 (d, *J* = 8.7 Hz, 2H), 7.72 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.69, 149.54, 140.47, 129.39, 123.94.
Characterization is in agreement with previous reports for this compound.[2]



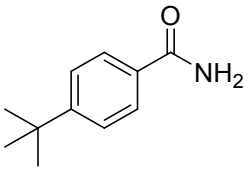
4-(Trifluoromethyl)benzamide (**8**): White solid (28 mg, 74% yield); Gradient eluent of EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.19 (s, 1H), 8.06 (d, *J* = 8.2 Hz, 2H), 7.83 (d, *J* = 8.2 Hz, 2H), 7.62 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.17, 138.56, 131.63 (q, *J* = 31.7 Hz), 128.79, 125.73 (q, *J* = 4.2 Hz), 124.44 (q, *J* = 273.3 Hz); ^{19}F NMR (565 MHz, DMSO-d_6) δ -61.34.
Characterization is in agreement with previous reports for this compound.[2]



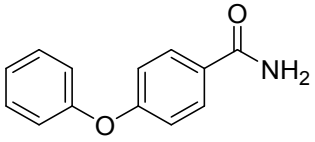
4-Methylbenzamide (**9**): Yellow solid (23.8 mg, 88% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.89 (s, 1H), 7.77 (d, *J* = 8.0 Hz, 2H), 7.26 (s, 1H), 7.24 (d, *J* = 8.0 Hz, 2H), 2.34 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.28, 141.52, 131.95, 129.19, 127.97, 21.40.
Characterization is in agreement with previous reports for this compound.[2]



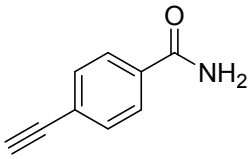
Benzamide (**10**): White solid (15.7 mg, 65% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.97 (s, 1H), 7.88 (d, *J* = 8.3 Hz, 2H), 7.51 (t, *J* = 7.2 Hz, 1H), 7.44 (t, *J* = 7.6 Hz, 2H), 7.37 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.39, 134.73, 131.68, 128.67, 127.92.
Characterization is in agreement with previous reports for this compound.[2]



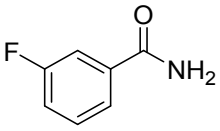
4-(*tert*-butyl)benzamide (**11**): Yellow solid (27.6 mg, 78% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.89 (s, 1H), 7.80 (d, J = 8.3 Hz, 2H), 7.45 (d, J = 8.4 Hz, 2H), 7.26 (s, 1H), 1.29 (s, 9H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.30, 154.42, 132.02, 127.80, 125.41, 35.04, 31.42.
Characterization is in agreement with previous reports for this compound.[5]



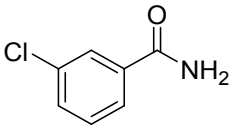
4-Phenoxybenzamide (**12**): White solid (38 mg, 89% yield); Gradient eluent of EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.90 (s, 1H), 7.89 (d, J = 8.7 Hz, 2H), 7.44 (t, J = 7.9 Hz, 2H), 7.28 (s, 1H), 7.21 (t, J = 7.4 Hz, 1H), 7.08 (d, J = 7.8 Hz, 2H), 7.00 (d, J = 8.7 Hz, 2H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.62, 159.93, 156.12, 130.71, 130.16, 129.48, 124.73, 119.96, 117.74.
Characterization is in agreement with previous reports for this compound.[6]



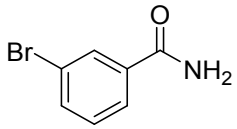
4-Ethynylbenzamide (**13**): Yellow solid (18.9 mg, 65% yield); Gradient eluent of EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.04 (s, 1H), 7.87 (d, J = 8.4 Hz, 2H), 7.55 (d, J = 8.3 Hz, 2H), 7.46 (s, 1H), 4.35 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.54, 134.82, 132.05, 128.21, 124.92, 83.40, 83.22.
Characterization is in agreement with previous reports for this compound.[7]



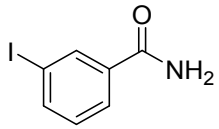
3-Fluorobenzamide (**14**): Yellow solid (15 mg, 54% yield); Gradient eluent of EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.06 (s, 1H), 7.72 (d, J = 7.5 Hz, 1H), 7.66 (d, J = 10.0 Hz, 1H), 7.56 – 7.47 (m, 2H), 7.37 (t, J = 8.3 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.00, 162.4 (d, J = 243.1 Hz), 137.18 (d, J = 6.0 Hz), 230.86 (d, J = 9.1 Hz), 124.08 (d, J = 3.1 Hz), 118.59 (d, J = 21.1 Hz), 114.68 (d, J = 22.6 Hz); ^{19}F NMR (565 MHz, DMSO-d_6) δ -112.97.
Characterization is in agreement with previous reports for this compound.[5]



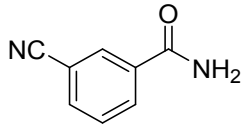
3-Chlorobenzamide (**15**): White solid (15.5 mg, 50% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.08 (s, 1H), 7.91 (s, 1H), 7.83 (d, *J* = 7.6 Hz, 1H), 7.59 (d, *J* = 7.8 Hz, 1H), 7.52 (s, 1H), 7.49 (t, *J* = 7.8 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.89, 136.78, 133.61, 131.55, 130.73, 127.77, 126.66.
Characterization is in agreement with previous reports for this compound.[5]



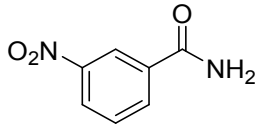
3-Bromobenzamide (**16**): White solid (18 mg, 45% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.08 (s, 1H), 8.04 (s, 1H), 7.87 (d, *J* = 7.9 Hz, 1H), 7.72 (d, *J* = 8.8 Hz, 1H), 7.51 (s, 1H), 7.42 (t, *J* = 7.9 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.81, 136.95, 134.45, 130.99, 130.65, 127.02, 122.11.
Characterization is in agreement with previous reports for this compound.[5]



3-Iodobenzamide (**17**): White solid (18 mg, 47% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.03 (s, 1H), 7.84 (d, *J* = 7.8 Hz, 2H), 7.65 (d, *J* = 7.7 Hz, 2H), 7.43 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.69, 137.59, 134.20, 131.68, 129.95, 128.67, 127.92, 99.38.
Characterization is in agreement with previous reports for this compound.[3]

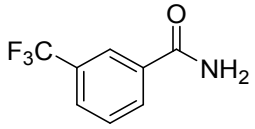


3-Cyanobenzamide (**18**): Yellow solid (13 mg, 45% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.28 (s, 1H), 8.17 (d, *J* = 8.0 Hz, 2H), 8.00 (d, *J* = 7.7 Hz, 1H), 7.69 (t, *J* = 7.8 Hz, 1H), 7.64 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.45, 135.77, 135.21, 132.70, 131.54, 130.21, 118.86, 111.92.
Characterization is in agreement with previous reports for this compound.[8]

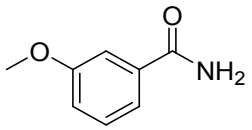


3-Nitrobenzamide (**19**): White solid (18.3 mg, 55% yield); Gradient eluent of EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.69 (s, 1H), 8.38 (d, *J* = 9.2 Hz, 1H), 8.34 (s, 1H), 8.31 (d, *J* = 7.7 Hz, 1H), 7.77 (t, *J* = 8.0 Hz, 1H), 7.71 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.20, 148.29, 136.25, 134.28, 130.55, 126.37, 122.70.

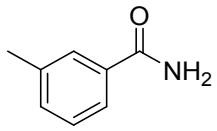
Characterization is in agreement with previous reports for this compound.[9]



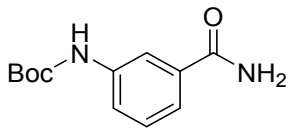
3-(Trifluoromethyl)benzamide (**20**): Yellow solid (21.5 mg, 57% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.23 (s, 1H), 8.21 (s, 1H), 8.17 (d, *J* = 7.8 Hz, 1H), 7.90 (d, *J* = 7.7 Hz, 1H), 7.71 (t, *J* = 7.8 Hz, 1H), 7.62 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.82, 135.63, 131.98, 130.05, 129.60 (q, *J* = 31.7 Hz), 128.30 (q, *J* = 3.3 Hz), 124.55 (q, *J* = 3.8 Hz), 124.49 (q, *J* = 271.8 Hz); ^{19}F NMR (565 MHz, DMSO-d_6) δ -61.15.
Characterization is in agreement with previous reports for this compound.[9]



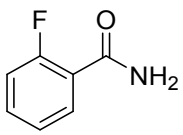
3-Methoxybenzamide (**21**): White solid (19.3 mg, 64% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.96 (s, 1H), 7.45 (d, *J* = 7.5 Hz, 1H), 7.42 (s, 1H), 7.35 (t, *J* = 6.6 Hz, 2H), 7.08 (d, *J* = 8.0 Hz, 1H), 3.79 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.10, 159.60, 136.19, 129.79, 120.15, 117.53, 113.10, 55.69.
Characterization is in agreement with previous reports for this compound.[3]



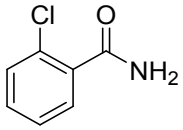
3-Methylbenzamide (**22**): Yellow solid (18.4 mg, 68% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.92 (s, 1H), 7.70 (s, 1H), 7.67 (s, 1H), 7.33 (s, 2H), 7.31 (s, 1H), 2.35 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.48, 137.89, 134.72, 132.23, 128.54, 125.05, 21.42.
Characterization is in agreement with previous reports for this compound.[5]



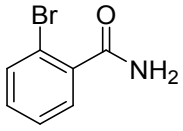
tert-Butyl (3-carbamoylphenyl)carbamate (**23**): White solid (26.4 mg, 56% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 9.44 (s, 1H), 7.97 (s, 1H), 7.86 (s, 1H), 7.52 (d, *J* = 7.8 Hz, 1H), 7.43 (d, *J* = 7.6 Hz, 1H), 7.30 (t, *J* = 7.7 Hz, 2H), 1.47 (s, 9H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.58, 153.27, 140.03, 135.57, 128.84, 121.36, 118.20, 79.64, 28.58.
HRMS (ESI-TOF) m/z: $[M + H]^+$ Calcd for $C_{12}H_{16}N_2O$ 237.1234; found: 237.1241



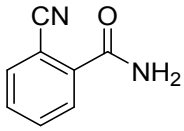
2-Fluorobenzamide (**24**): White solid (13.6 mg, 49% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.12 (t, *J* = 7.7 Hz, 1H), 7.50 (d, *J* = 6.8 Hz, 1H), 7.28 (d, *J* = 7.4 Hz, 1H), 7.13 (t, *J* = 10.0 Hz, 1H), 6.70 (s, 1H), 6.24 (s, 1H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 164.95, 160.97 (d, *J* = 249.2 Hz), 133.95 (d, *J* = 9.1 Hz), 132.32, 124.84 (d, *J* = 3.1 Hz), 120.15 (d, *J* = 12.1 Hz), 116.09 (d, *J* = 25.7 Hz); ^{19}F NMR (565 MHz, $CDCl_3$) δ -112.80.
Characterization is in agreement with previous reports for this compound.[3]



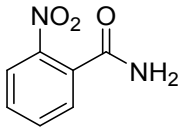
2-Chlorobenzamide (**25**): Yellow solid (14 mg, 45% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.86 (s, 1H), 7.57 (s, 1H), 7.47 (d, *J* = 7.7 Hz, 1H), 7.42 (dd, *J* = 13.3, 7.3 Hz, 2H), 7.37 (t, *J* = 6.9 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.64, 137.62, 131.03, 130.08, 129.13, 127.49.
Characterization is in agreement with previous reports for this compound.[9]



2-Bromobenzamide (**26**): White solid (13.5 mg, 34% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.85 (s, 1H), 7.63 (d, *J* = 7.8 Hz, 1H), 7.55 (s, 1H), 7.41 (q, *J* = 7.4 Hz, 2H), 7.33 (t, *J* = 7.3 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 169.53, 139.83, 133.17, 131.11, 129.02, 127.96, 119.07.
Characterization is in agreement with previous reports for this compound.[3]

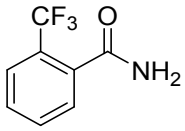


2-Cyanobenzamide (**27**): Yellow solid (11.2 mg, 40% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.16 (s, 1H), 7.91 (d, *J* = 7.1 Hz, 1H), 7.81 (d, *J* = 7.7 Hz, 1H), 7.76 (t, *J* = 7.6 Hz, 1H), 7.73 (s, 1H), 7.67 (t, *J* = 8.1 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.35, 139.26, 134.79, 133.31, 131.48, 128.69, 118.29, 110.77.
Characterization is in agreement with previous reports for this compound.[4]

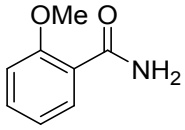


2-Nitrobenzamide (**28**): Yellow solid (13 mg, 39% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.14 (s, 1H), 7.99 (d, *J* = 8.0 Hz, 1H), 7.76 (t, *J* = 7.4 Hz, 1H), 7.68 (s, 1H), 7.66 (d, *J* = 7.5 Hz, 1H), 7.63

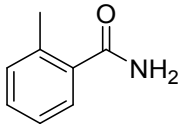
(d, J = 7.5 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.65, 147.71, 133.81, 133.05, 131.09, 129.31, 124.41.
Characterization is in agreement with previous reports for this compound.[3]



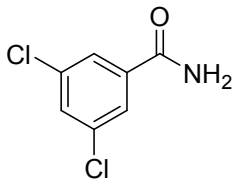
2-(Trifluoromethyl)benzamide (**29**): White solid (17 mg, 45% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO) δ 7.93 (s, 1H), 7.76 (d, J = 7.8 Hz, 1H), 7.70 (t, J = 7.5 Hz, 1H), 7.62 (t, J = 7.7 Hz, 1H), 7.58 (s, 1H), 7.53 (d, J = 7.5 Hz, 1H); ^{13}C NMR (151 MHz, DMSO) δ 169.53, 137.34, 132.84, 129.95, 128.73, 126.63 (q, J = 3.1 Hz), 126.09 (q, J = 31.7 Hz), 124.28 (q, J = 273.3 Hz); ^{19}F NMR (565 MHz, DMSO) δ -57.85.
Characterization is in agreement with previous reports for this compound.[10]



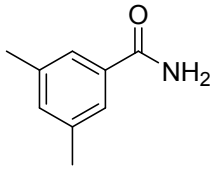
2-Methoxybenzamide (**30**): Yellow solid (15 mg, 50% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.21 (d, J = 7.6 Hz, 1H), 7.72 (s, 1H), 7.48 (t, J = 7.5 Hz, 1H), 7.08 (t, J = 7.1 Hz, 1H), 6.99 (d, J = 8.2 Hz, 1H), 6.01 (s, 1H), 3.97 (s, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 157.85, 133.41, 132.61, 121.27, 120.83, 111.38, 55.95.
Characterization is in agreement with previous reports for this compound.[2]



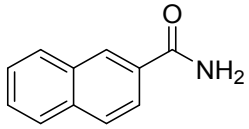
2-Methylbenzamide (**31**): White solid (18 mg, 67% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.68 (s, 1H), 7.38 – 7.28 (m, 3H), 7.21 (dd, J = 13.6, 7.1 Hz, 2H), 2.36 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 171.52, 137.55, 135.57, 130.92, 129.63, 127.47, 125.87, 20.04.
Characterization is in agreement with previous reports for this compound.[3]



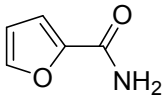
3,5-Cichlorobenzamide (**32**): Yellow solid (18 mg, 48% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.17 (s, 1H), 7.88 (s, 2H), 7.79 (s, 1H), 7.68 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 165.52, 138.00, 134.72, 131.14, 126.78.
Characterization is in agreement with previous reports for this compound.[2]



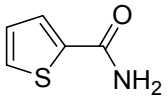
3,5-Dimethylbenzamide (**33**): White solid (17.9 mg, 60% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.85 (s, 1H), 7.48 (s, 2H), 7.24 (s, 1H), 7.13 (s, 1H), 2.30 (s, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.63, 137.72, 134.73, 132.91, 125.72, 21.32.
Characterization is in agreement with previous reports for this compound.[11]



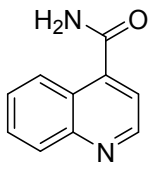
2-Naphthamide (**34**): White solid (24 mg, 70% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.31 (d, J = 8.0 Hz, 1H), 8.00 (d, J = 7.9 Hz, 2H), 7.96 (d, J = 8.8 Hz, 1H), 7.64 (d, J = 7.0 Hz, 1H), 7.59 (s, 1H), 7.55 (dt, J = 15.2, 6.7 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 171.07, 135.12, 133.67, 130.21, 128.64, 127.07, 126.59, 126.05, 125.60, 125.41.
Characterization is in agreement with previous reports for this compound.[3]



Furan-2-carboxamide (**35**): White solid (14.4 mg, 65% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.82 – 7.78 (m, 1H), 7.75 (s, 1H), 7.35 (s, 1H), 7.08 (d, J = 3.4 Hz, 1H), 6.59 (dd, J = 3.4, 1.7 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 159.86, 148.51, 145.48, 114.06, 112.24.
Characterization is in agreement with previous reports for this compound.[2]

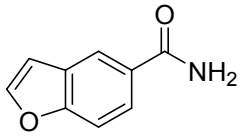


Thiophene-2-carboxamide (**36**): Yellow solid (15.7 mg, 62% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.96 (s, 1H), 7.74 (dd, J = 4.0, 3.2 Hz, 2H), 7.38 (s, 1H), 7.16 – 7.12 (m, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 163.35, 140.77, 131.44, 129.13, 128.36.
Characterization is in agreement with previous reports for this compound.[4]

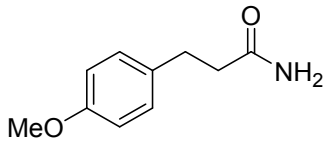


Quinoline-4-carboxamide (**37**): Yellow solid (14.5 mg, 42% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.96 (d, J = 4.3 Hz, 1H), 8.22 (d, J = 8.5 Hz, 2H), 8.07 (d, J = 8.3 Hz, 1H), 7.89 (s, 1H), 7.81 (t, J = 7.6

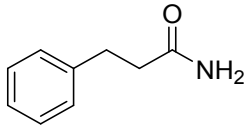
Hz, 1H), 7.67 (t, *J* = 7.6 Hz, 1H), 7.56 (d, *J* = 4.3 Hz, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 169.11, 150.72, 148.46, 142.63, 130.20, 129.79, 127.70, 126.06, 119.36.
Characterization is in agreement with previous reports for this compound.[12]



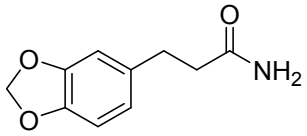
Benzofuran-5-carboxamide (**38**): White solid (19.3 mg, 60% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.12 (s, 2H), 8.03 (s, 1H), 7.81 (d, *J* = 9.3 Hz, 1H), 7.71 (d, *J* = 8.1 Hz, 1H), 7.39 (s, 1H), 7.02 (s, 1H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.22, 154.40, 148.75, 131.08, 130.35, 122.93, 121.27, 111.00, 107.30.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_9H_8NO_2$ 162.0550; found: 162.0548.



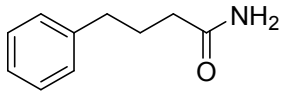
3-(4-Methoxyphenyl)propanamide (**39**): White solid (21 mg, 59% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.27 (s, 1H), 7.11 (d, *J* = 8.3 Hz, 2H), 6.82 (d, *J* = 8.3 Hz, 2H), 6.74 (s, 1H), 3.71 (s, 3H), 2.73 (t, *J* = 7.7 Hz, 2H), 2.30 (t, *J* = 7.7 Hz, 2H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 174.03, 157.93, 133.80, 129.60, 114.13, 55.43, 37.51, 30.51.
Characterization is in agreement with previous reports for this compound.[13]



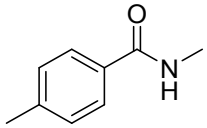
3-Phenylpropanamide (**40**): White solid (21.2 mg, 71% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.29 (s, 1H), 7.26 (t, *J* = 6.7 Hz, 2H), 7.20 (d, *J* = 7.0 Hz, 2H), 7.17 (t, *J* = 7.8 Hz, 1H), 2.82 – 2.78 (m, 2H), 2.37 – 2.33 (m, 2H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 174.34, 140.68, 128.60, 128.34, 126.34, 37.53, 31.40.
Characterization is in agreement with previous reports for this compound.[13]



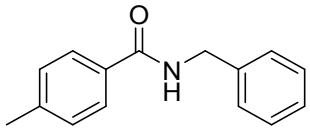
3-(Benzo[d][1,3]dioxol-5-yl)propanamide (**41**): White solid (20 mg, 52% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.26 (s, 1H), 6.79 (d, *J* = 9.4 Hz, 2H), 6.74 (s, 1H), 6.65 (d, *J* = 7.8 Hz, 1H), 5.94 (s, 2H), 2.71 (t, *J* = 7.7 Hz, 2H), 2.30 (t, *J* = 7.7 Hz, 2H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 173.93, 147.57, 145.73, 135.76, 121.43, 109.16, 108.48, 101.05, 37.45, 31.07.
Characterization is in agreement with previous reports for this compound.[13]



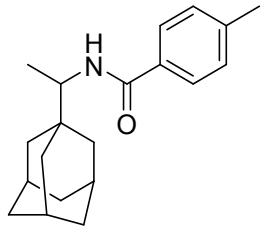
4-Phenylbutanamide (**42**): White solid (20.2 mg, 62% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.27 (t, *J* = 7.5 Hz, 3H), 7.21 – 7.15 (m, 3H), 6.72 (s, 1H), 2.55 (t, *J* = 7.7 Hz, 2H), 2.06 (t, *J* = 7.5 Hz, 2H), 1.82 – 1.74 (m, 2H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 174.55, 142.30, 128.76, 126.20, 35.17, 35.01, 27.36.
Characterization is in agreement with previous reports for this compound.[14]



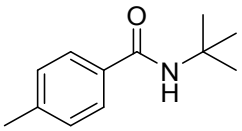
N,4-Dimethylbenzamide (**43**): White solid (22.9 mg, 77% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.65 (d, *J* = 8.1 Hz, 2H), 7.20 (d, *J* = 8.0 Hz, 2H), 6.34 (s, 1H), 2.98 (d, *J* = 4.8 Hz, 3H), 2.37 (s, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 168.28, 141.71, 131.77, 129.19, 126.86, 26.79, 21.42.
Characterization is in agreement with previous reports for this compound.[20]



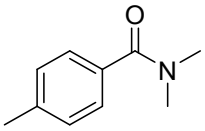
N-Benzyl-4-methylbenzamide (**44**): White solid (33.3 mg, 74% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.96 (t, *J* = 5.8 Hz, 1H), 7.81 (d, *J* = 8.0 Hz, 2H), 7.35 – 7.30 (m, 4H), 7.27 (d, *J* = 8.0 Hz, 2H), 7.23 (dq, *J* = 8.6, 3.0 Hz, 1H), 4.47 (d, *J* = 6.0 Hz, 2H), 2.35 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.57, 141.58, 140.29, 132.05, 129.33, 128.75, 127.75, 127.68, 127.18, 43.04, 21.44.
Characterization is in agreement with previous reports for this compound.[22]



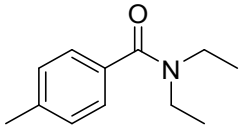
N-(1-((3r,5r,7r)-Adamantan-1-yl)ethyl)-4-methylbenzamide (**45**): white soild (29.3 mg, 52% yield). Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.80 (d, *J* = 9.4 Hz, 1H), 7.74 (d, *J* = 8.2 Hz, 2H), 7.24 (d, *J* = 7.9 Hz, 2H), 3.80 (dq, *J* = 14.0, 7.0 Hz, 1H), 2.34 (s, 3H), 1.93 (s, 3H), 1.64 (d, *J* = 11.9 Hz, 3H), 1.61 – 1.53 (m, 6H), 1.48 (d, *J* = 12.0 Hz, 3H), 1.03 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.36, 141.06, 132.82, 129.05, 127.89, 52.89, 38.66, 37.17, 36.68, 28.31, 21.40, 14.44.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_{20}H_{27}NO$ 298.2165; found: 298.2163.



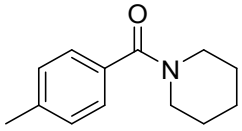
N-(*tert*-butyl)-4-methylbenzamide (**46**): White solid (26.3 mg, 69% yield); Gradient eluent: EtOAc/petroleum ether: 1/20 to 1/8; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.70 (d, J = 8.1 Hz, 2H), 7.62 (s, 1H), 7.22 (d, J = 8.0 Hz, 2H), 2.33 (s, 3H), 1.37 (s, 9H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 166.60, 140.93, 133.49, 128.98, 127.80, 51.14, 29.10, 21.38.
Characterization is in agreement with previous reports for this compound.[21]



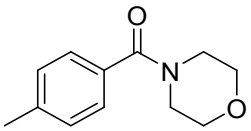
N,*N*,4-trimethylbenzamide (**47**): White solid (22.2 mg, 68% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.29 (d, J = 7.9 Hz, 2H), 7.23 (d, J = 7.9 Hz, 2H), 2.93 (d, J = 31.7 Hz, 6H), 2.33 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 170.66, 139.39, 134.04, 129.18, 127.52, 35.25, 21.37.
Characterization is in agreement with previous reports for this compound.[23]



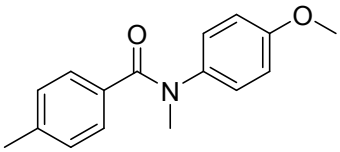
N,*N*-Diethyl-4-methylbenzamide (**48**): White solid (26.4 mg, 65% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.27 (s, 1H), 7.26 (s, 1H), 7.18 (d, J = 7.8 Hz, 2H), 3.53 (s, 2H), 3.27 (s, 2H), 2.37 (s, 3H), 1.23 (s, 3H), 1.11 (s, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.52, 139.08, 134.36, 128.98, 126.36, 43.32, 39.26, 21.35, 14.23, 12.94.
Characterization is in agreement with previous reports for this compound.[25]



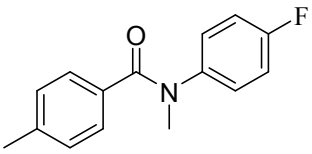
Piperidin-1-yl(*p*-tolyl)methanone (**49**): White solid (26.4 mg, 65% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.24 (q, J = 8.2 Hz, 4H), 3.55 (s, 2H), 3.27 (s, 2H), 2.33 (s, 3H), 1.62 – 1.58 (m, 2H), 1.47 (s, 4H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 169.47, 139.30, 134.07, 129.30, 127.18, 48.50, 42.85, 26.41, 25.78, 24.54, 21.35.
Characterization is in agreement with previous reports for this compound.[25]



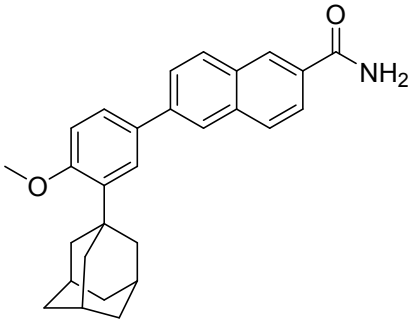
Morpholino(*p*-tolyl)methanone (**50**): White solid (27.5 mg, 67% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.28 (d, *J* = 8.1 Hz, 2H), 7.18 (d, *J* = 7.8 Hz, 2H), 3.56 (m, 8H), 2.35 (s, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.63, 140.07, 132.34, 129.14, 127.23, 66.91, 48.29, 42.69, 21.38.
Characterization is in agreement with previous reports for this compound.[24]



N-(4-Methoxyphenyl)-*N*,4-dimethylbenzamide (**51**): White solid (26.4 mg, 65% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.19 (d, *J* = 8.0 Hz, 2H), 6.96 (dd, *J* = 7.9, 4.9 Hz, 4H), 6.75 (d, *J* = 8.8 Hz, 2H), 3.75 (s, 3H), 3.44 (s, 3H), 2.26 (s, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.74, 157.80, 139.56, 138.14, 133.08, 128.81, 128.36, 128.01, 114.32, 55.38, 38.72, 21.33.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd Calcd for $C_{16}H_{18}NO_2$ 256.1332, found: 256.1333.

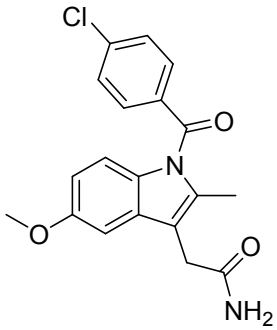


N-(4-fluorophenyl)-*N*,4-dimethylbenzamide (**52**): Colorless liquid (6.3 mg, 13% yield); Gradient eluent: EtOAc/petroleum ether: 1/4 to 1/2; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.17 (d, *J* = 8.1 Hz, 2H), 7.03 – 6.96 (m, 4H), 6.92 (t, *J* = 8.5 Hz, 2H), 3.45 (s, 3H), 2.27 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 170.64, 161.49, 159.86, 141.22 (d, *J* = 3.0 Hz), 139.87, 132.77, 128.76, 128.50 (d, *J* = 9.0 Hz), 116.08 (d, *J* = 22.7 Hz), 38.55, 21.27. ^{19}F NMR (565 MHz, $CDCl_3$) δ -115.13.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd Calcd for $C_{16}H_{18}NO_2$ 244.1132, found: 244.1137.

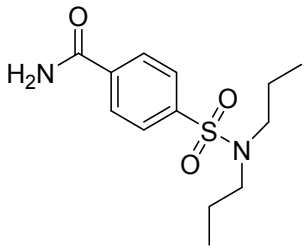


6-(3-((3r,5r,7r)-Adamantan-1-yl)-4-methoxyphenyl)-2-naphthamide (**53**): White solid (52.6 mg, 64% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.48 (s, 1H), 8.17 (s, 1H), 8.14 (s, 1H), 8.07 – 8.00 (m, 2H), 7.96 (dd, *J* = 8.6, 1.4 Hz, 1H), 7.85 (dd, *J* = 8.6, 1.6 Hz, 1H), 7.62 (dd, *J* = 8.4, 2.2 Hz, 1H), 7.56 (d, *J* = 2.2 Hz, 1H), 7.45 (s, 1H), 7.09 (d, *J* = 8.5 Hz, 1H), 3.84 (s, 3H), 2.12 (s, 6H), 2.05 (s, 3H), 1.74 (s, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 168.54, 158.97,

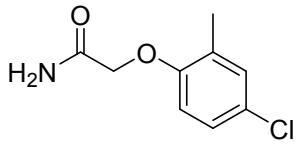
139.99, 138.51, 135.17, 132.11, 131.65, 131.39, 129.93, 128.47, 128.03, 126.27, 126.13, 125.47, 125.18, 124.49, 113.19, 55.80, 40.56, 37.04, 28.87.
Characterization is in agreement with previous reports for this compound.[15]



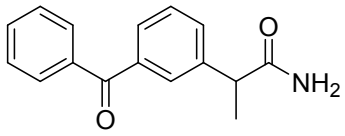
2-(1-(4-Chlorobenzoyl)-5-methoxy-2-methyl-1H-indol-3-yl)acetamide (**54**): Yellow solid (32 mg, 45% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.70 (d, *J* = 8.5 Hz, 2H), 7.64 (d, *J* = 8.2 Hz, 2H), 7.43 (s, 1H), 7.11 (d, *J* = 2.5 Hz, 1H), 6.96 (s, 1H), 6.93 (d, *J* = 9.0 Hz, 1H), 6.71 (dd, *J* = 9.0, 2.4 Hz, 1H), 3.76 (s, 3H), 3.46 (s, 2H), 2.23 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 172.01, 168.34, 156.02, 138.01, 135.59, 134.77, 131.64, 131.44, 130.79, 129.50, 115.02, 114.96, 111.61, 102.43, 55.92, 31.42, 13.82.
Characterization is in agreement with previous reports for this compound.[16]



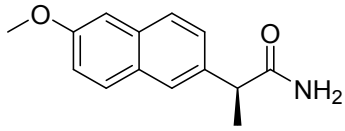
4-(*N*,*N*-Dipropylsulfamoyl)benzamide (**55**): Yellow solid (30 mg, 53% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.18 (s, 1H), 8.04 (d, *J* = 8.5 Hz, 2H), 7.86 (d, *J* = 8.5 Hz, 2H), 7.61 (s, 1H), 3.07 – 3.01 (m, 4H), 1.52 – 1.41 (m, 4H), 0.80 (t, *J* = 7.4 Hz, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 167.19, 142.22, 138.31, 128.90, 127.22, 50.10, 22.08, 11.43.
Characterization is in agreement with previous reports for this compound.[17]



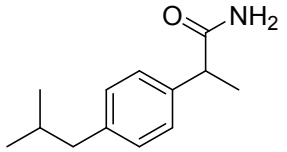
2-(4-Chloro-2-methylphenoxy)acetamide (**56**): White solid (23 mg, 58% yield). Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.40 (d, *J* = 14.3 Hz, 2H), 7.22 (d, *J* = 2.3 Hz, 1H), 7.18 (dd, *J* = 8.7, 2.7 Hz, 1H), 6.82 (d, *J* = 8.7 Hz, 1H), 4.44 (s, 2H), 2.21 (s, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 170.19, 155.25, 130.46, 129.13, 126.77, 124.77, 113.38, 67.58, 16.39.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_9H_{11}ClNO_2$ 200.0473; found: 200.0468.



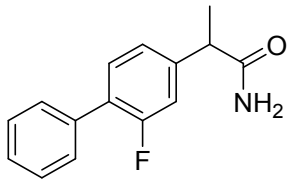
2-(3-Benzoylphenyl)propanamide (**57**): White solid (38 mg, 75% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.78 (s, 1H), 7.76 (s, 2H), 7.65 (d, *J* = 7.7 Hz, 1H), 7.60 – 7.55 (m, 2H), 7.47 (t, *J* = 7.7 Hz, 2H), 7.43 (t, *J* = 7.7 Hz, 1H), 5.92 (s, 1H), 5.67 (s, 1H), 3.67 (q, *J* = 7.1 Hz, 1H), 1.53 (d, *J* = 7.2 Hz, 3H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 196.61, 176.26, 141.75, 138.07, 137.36, 132.65, 131.54, 130.07, 129.23, 129.10, 128.80, 128.38, 46.39, 18.50.
Characterization is in agreement with previous reports for this compound.[18]



(S)-2-(6-Methoxynaphthalen-2-yl)propanamide (**58**): White solid (23.8 mg, 52% yield). Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.78 (d, *J* = 9.0 Hz, 1H), 7.76 (d, *J* = 8.5 Hz, 1H), 7.72 (s, 1H), 7.46 (dd, *J* = 8.5, 1.7 Hz, 1H), 7.43 (s, 1H), 7.28 (d, *J* = 2.4 Hz, 1H), 7.15 (dd, *J* = 8.9, 2.5 Hz, 1H), 6.85 (s, 1H), 3.87 (s, 3H), 3.71 (q, *J* = 7.0 Hz, 1H), 1.40 (d, *J* = 7.1 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 175.92, 157.43, 138.02, 133.59, 129.54, 128.85, 127.03, 126.97, 125.75, 119.02, 106.15, 55.61, 45.33, 18.91.
Characterization is in agreement with previous reports for this compound.[19]

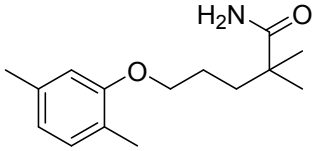


2-(4-Isobutylphenyl)propanamide (**59**): White solid (23.8 mg, 58% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.20 (d, *J* = 8.0 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 5.94 (s, 1H), 5.42 (s, 1H), 3.56 (q, *J* = 7.2 Hz, 1H), 2.50 – 2.42 (m, 2H), 1.85 (td, *J* = 13.5, 6.8 Hz, 1H), 1.50 (d, *J* = 7.2 Hz, 3H), 0.89 (d, *J* = 6.6 Hz, 6H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 177.38, 140.87, 138.43, 129.68, 127.31, 46.26, 45.01, 30.18, 22.38, 18.27.
Characterization is in agreement with previous reports for this compound.[19]

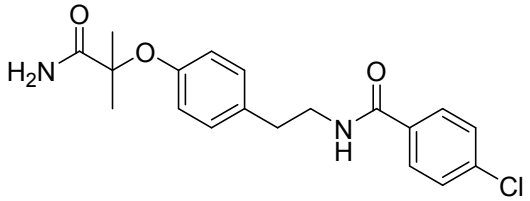


2-(2-Fluoro-[1,1'-biphenyl]-4-yl)propanamide (**60**): White solid (30.1 mg, 62% yield). Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.53 (d, *J* = 7.9 Hz, 2H), 7.46 (dd, *J* = 14.1, 7.7 Hz, 4H), 7.39 (t, *J* = 7.3 Hz, 1H), 7.25 (d, *J* = 2.7 Hz, 1H), 7.23 (s, 1H), 6.92 (s, 1H), 3.65 (q, *J* = 7.0 Hz, 1H), 1.35 (d, *J* = 7.1 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 175.20, 159.29 (d, *J* = 246.1 Hz), 144.81

(d, *J* = 7.6 Hz), 135.50, 130.91 (d, *J* = 3.0 Hz), 129.17 (d, *J* = 3.0 Hz), 129.06, 128.18, 126.79 (d, *J* = 13.6 Hz), 124.31 (d, *J* = 3.0 Hz), 115.33 (d, *J* = 22.7 Hz), 44.90, 18.69; ^{19}F NMR (565 MHz, DMSO-d_6) δ -118.86.
Characterization is in agreement with previous reports for this compound.[19]

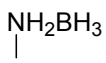


5-(2,5-Dimethylphenoxy)-2,2-dimethylpentanamide (**61**): White solid (22.4 mg, 45% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, $CDCl_3$) δ 7.00 (d, *J* = 7.5 Hz, 1H), 6.66 (d, *J* = 7.4 Hz, 1H), 6.61 (s, 1H), 5.68 (s, 1H), 5.57 (s, 1H), 3.93 (t, *J* = 6.1 Hz, 2H), 2.30 (s, 3H), 2.17 (s, 3H), 1.82 – 1.78 (m, 2H), 1.73 – 1.70 (m, 2H), 1.24 (s, 6H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 180.35, 156.91, 136.55, 130.33, 123.49, 120.80, 112.06, 67.91, 41.92, 37.54, 25.62, 25.13, 21.41, 15.83.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_{15}H_{24}NO_2$ 250.1802; found: 250.1797.

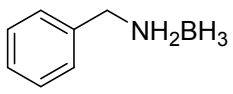


N-(4-((1-Amino-2-methyl-1-oxopropan-2-yl)oxy)phenethyl)-4-chlorobenzamide (**62**): White solid (28.8 mg, 40% yield); Gradient eluent: EtOAc/petroleum ether: 1/2 to 3/1; ^{1}H NMR (600 MHz, DMSO-d_6) δ 8.63 (t, *J* = 5.5 Hz, 1H), 7.86 – 7.80 (m, 2H), 7.56 – 7.51 (m, 2H), 7.47 (s, 1H), 7.23 (s, 1H), 7.13 (d, *J* = 8.5 Hz, 2H), 6.86 – 6.79 (m, 2H), 3.44 (dd, *J* = 14.5, 6.1 Hz, 2H), 2.80 – 2.75 (m, 2H), 1.39 (s, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 176.41, 165.55, 153.74, 136.35, 133.80, 133.41, 129.71, 129.51, 128.82, 120.21, 80.27, 41.48, 34.67, 25.38.
HRMS (ESI-TOF) m/z: $[M + H]^+$ calcd for $C_{19}H_{22}N_2ClO_3$ 361.1313; found: 361.1302.

7. Characterization data of amine boranes.

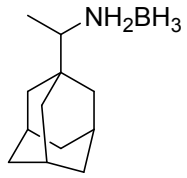


Methylamino-borane: White solid (350 mg, 78% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 5.07 (s, 2H), 2.11 (t, *J* = 6.0 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 33.99; ^{11}B NMR (193 MHz, DMSO-d_6) δ -18.57 (q, *J* = 99.9 Hz); ^{11}B{^{1}H} NMR (193 MHz, DMSO-d_6) δ -18.55; ^{1}H{^{11}B} NMR (600 MHz, DMSO-d_6) δ 5.05 (s, 2H), 2.11 (t, *J* = 5.1 Hz, 3H), 1.27 (s, 3H).

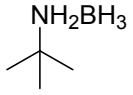


Benzylamine-borane: White solid (847 mg, 70% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 7.53 – 7.24 (m, 5H), 5.67 (s, 2H), 3.60 (s, 2H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 137.82, 128.96, 128.67, 127.88, 52.20; ^{11}B NMR (193 MHz, DMSO-d_6) δ -18.93 (q,

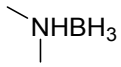
J = 95.2 Hz); $^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6) δ -18.93; $^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6) δ 7.61 – 7.23 (m, 5H), 5.66 (s, 2H), 3.61 (s, 2H), 1.42 (s, 3H).



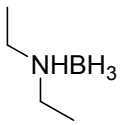
1-((3r,5r,7r)-Adamantan-1-yl)ethan-1-amine-borane: White solid (965 mg, 50% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 4.61 (d, *J* = 41.7 Hz, 2H), 2.12 – 2.05 (m, 1H), 1.92 (s, 3H), 1.63 – 1.53 (m, 9H), 1.43 (d, *J* = 18.1 Hz, 3H), 1.01 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 63.35, 37.52, 36.82, 35.57, 28.14, 11.60; ^{11}B NMR (193 MHz, DMSO-d_6) δ -18.67 (q, *J* = 93.1 Hz); $^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6) δ -18.67; $^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6) δ 4.60 (d, *J* = 40.7 Hz, 2H), 2.13 – 2.05 (m, 1H), 1.92 (s, 3H), 1.64 – 1.53 (m, 9H), 1.40 (d, *J* = 12.1 Hz, 3H), 1.34 (s, 3H), 1.01 (d, *J* = 6.7 Hz, 3H).



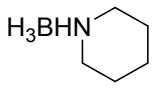
tert-Butylamine-borane: White solid (626 mg, 73% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 5.05 (s, 2H), 1.09 (s, 9H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 51.06, 27.58; ^{11}B NMR (193 MHz, DMSO-d_6) δ -22.34 (q, *J* = 95.0 Hz); $^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6) δ -22.83; $^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6) δ 5.04 (s, 2H), 1.16 (s, 3H), 1.10 (s, 9H).



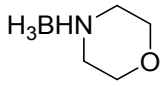
Dimethylamine-borane: White solid (472 mg, 80% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 6.05 (s, 1H), 2.26 (d, *J* = 5.5 Hz, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 44.04; ^{11}B NMR (193 MHz, DMSO-d_6) δ -13.66 (q, *J* = 94.9 Hz); $^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6) δ -13.66; $^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6) δ 6.03 (s, 1H), 2.27 (d, *J* = 5.6 Hz, 6H), 1.37 (s, 3H).



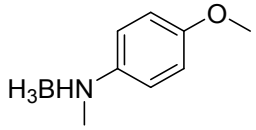
Diethylamine-borane: Colorless liquid (539 mg, 62% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 5.53 (s, 1H), 2.64 – 2.51 (m, 4H), 1.08 (t, *J* = 7.3 Hz, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 48.07, 11.14; ^{11}B NMR (193 MHz, DMSO-d_6) δ -16.73 (q, *J* = 93.0 Hz); $^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6) δ -16.73; $^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6) δ 5.51 (s, 1H), 2.63 – 2.51 (m, 4H), 1.29 (d, *J* = 3.2 Hz, 3H), 1.09 (t, *J* = 7.3 Hz, 6H).



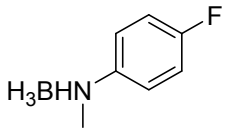
Piperidineamine-borane: White solid (673 mg, 68% yield); ^{1}H NMR (600 MHz, DMSO-d_6) δ 5.70 (s, 1H), 2.92 (d, *J* = 12.9 Hz, 2H), 2.26 (td, *J* = 13.0, 2.4 Hz, 2H), 1.70 – 1.45 (m, 6H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 52.92, 24.55, 22.72; ^{11}B NMR (193 MHz, DMSO-d_6) δ -14.64 (q, *J* = 95 Hz); ^{11}B{^{1}H} NMR (193 MHz, DMSO-d_6) δ -14.64; ^{1}H{^{11}B} NMR (600 MHz, DMSO-d_6) δ 5.69 (s, 1H), 2.93 (d, *J* = 12.9 Hz, 2H), 2.26 (dd, *J* = 23.6, 10.7 Hz, 2H), 1.73 – 1.41 (m, 6H), 1.30 (s, 3H).



Morpholineamine-borane: White solid (707 mg, 70% yield); ^{1}H NMR (600 MHz, CD_3CN) δ 4.45 (s, 1H), 3.81 (dd, *J* = 12.6, 3.5 Hz, 2H), 3.52 (t, *J* = 12.4 Hz, 2H), 2.95 (d, *J* = 13.6 Hz, 2H), 2.60 (td, *J* = 14.4, 3.3 Hz, 2H); ^{13}C NMR (151 MHz, CD_3CN) δ 65.73, 52.40; ^{11}B NMR (193 MHz, CD_3CN) δ -14.89 (q, *J* = 95 Hz); ^{11}B{^{1}H} NMR (193 MHz, CD_3CN) δ -14.89; ^{1}H{^{11}B} NMR (600 MHz, CD_3CN) δ 4.44 (s, 1H), 3.81 (dd, *J* = 12.6, 3.4 Hz, 2H), 3.52 (t, *J* = 12.4 Hz, 2H), 2.95 (d, *J* = 13.6 Hz, 2H), 2.60 (td, *J* = 14.3, 3.4 Hz, 2H), 1.35 (s, 3H).

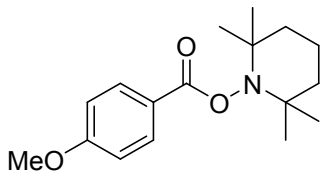


4-Methoxy-*N*-methylanilineamine-borane: White solid (830 mg, 55% yield); ^{1}H NMR (600 MHz, DMSO-d_6)) δ 8.10 (s, 1H), 7.29 (d, *J* = 9.0 Hz, 2H), 6.94 – 6.88 (m, 2H), 3.73 (s, 3H), 2.65 (d, *J* = 5.4 Hz, 3H); ^{13}C NMR (151 MHz, DMSO-d_6) δ 157.77, 141.57, 122.50, 115.18, 114.53, 55.76, 45.25; ^{11}B NMR (193 MHz, DMSO-d_6) δ -12.08 (q, *J* = 97.4 Hz); ^{11}B{^{1}H} NMR (193 MHz, DMSO-d_6) δ -12.08; ^{1}H{^{11}B} NMR (600 MHz, DMSO-d_6) δ 8.09 (s, 1H), 7.29 (d, *J* = 8.7 Hz, 2H), 6.91 (d, *J* = 8.8 Hz, 2H), 3.73 (s, 3H), 2.65 (d, *J* = 5.3 Hz, 3H), 1.64 (s, 3H).



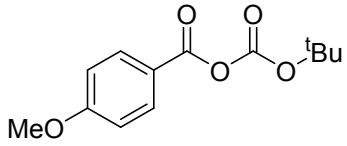
4-Fluoro-N-methylanilineamine-borane: White solid (208 mg, 50% yield); ^{1}H NMR (600 MHz, CD_3CN) δ 7.36 (dd, *J* = 7.0, 4.8 Hz, 2H), 7.12 (t, *J* = 7.9 Hz, 2H), 6.46 (s, 1H), 2.80 (d, *J* = 5.5 Hz, 3H), 1.93 – 1.38 (m, 3H). ^{13}C NMR (151 MHz, CD_3CN) δ 162.16, 160.55, 144.67 (d, *J* = 3.0 Hz), 123.29 (d, *J* = 7.6 Hz), 116.34 (d, *J* = 22.7 Hz), 116.26, 45.13. ^{11}B NMR (193 MHz, CD_3CN) δ -11.94 (q, *J* = 98.0 Hz). ^{11}B{^{1}H} NMR (193 MHz, CD_3CN) δ -11.95. ^{1}H{^{11}B} NMR (600 MHz, CD_3CN) δ 7.37 (dd, *J* = 8.0, 3.9 Hz, 2H), 7.12 (t, *J* = 7.8 Hz, 2H), 6.46 (s, 1H), 2.80 (d, *J* = 5.6 Hz, 3H), 1.70 (s, 3H). ^{19}F NMR (565 MHz, CD_3CN) δ -117.42.

8. Characterization data of the reaction intermediate



2,2,6,6-Tetramethylpiperidin-1-yl 4-methoxybenzoate (**63**): White solid (17 mg, 58% yield); Gradient eluent: EtOAc/petroleum ether: 1/30 to 1/20; ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.07 – 8.01 (m, 2H), 6.98 – 6.92 (m, 2H), 3.87 (s, 3H), 1.78 (t, *J* = 13.5 Hz, 2H), 1.74 – 1.67 (m, 1H), 1.61 – 1.55 (m, 2H), 1.46 (dd, *J* = 13.3, 3.4 Hz, 1H), 1.27 (s, 6H), 1.11 (s, 6H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.19, 163.31, 131.58, 122.01, 113.72, 60.35, 55.45, 39.06, 31.97, 20.87, 17.04.

Characterization is in agreement with previous reports for this compound.[26]



(*tert*-Butyl carbonic) 4-methoxybenzoic anhydride (**65**): Colorless liquid (37.8 mg, 50% yield); Gradient eluent: EtOAc/petroleum ether: 1/20 to 1/10; ^{1}H NMR (600 MHz, $CDCl_3$) δ 8.03 – 7.99 (m, 2H), 6.96 – 6.91 (m, 2H), 3.87 (s, 3H), 1.58 (s, 9H); ^{13}C NMR (151 MHz, $CDCl_3$) δ 164.49, 161.50, 147.51, 132.75, 120.30, 113.99, 85.39, 55.56, 27.51.

Characterization is in agreement with previous reports for this compound.[27]

9. References:

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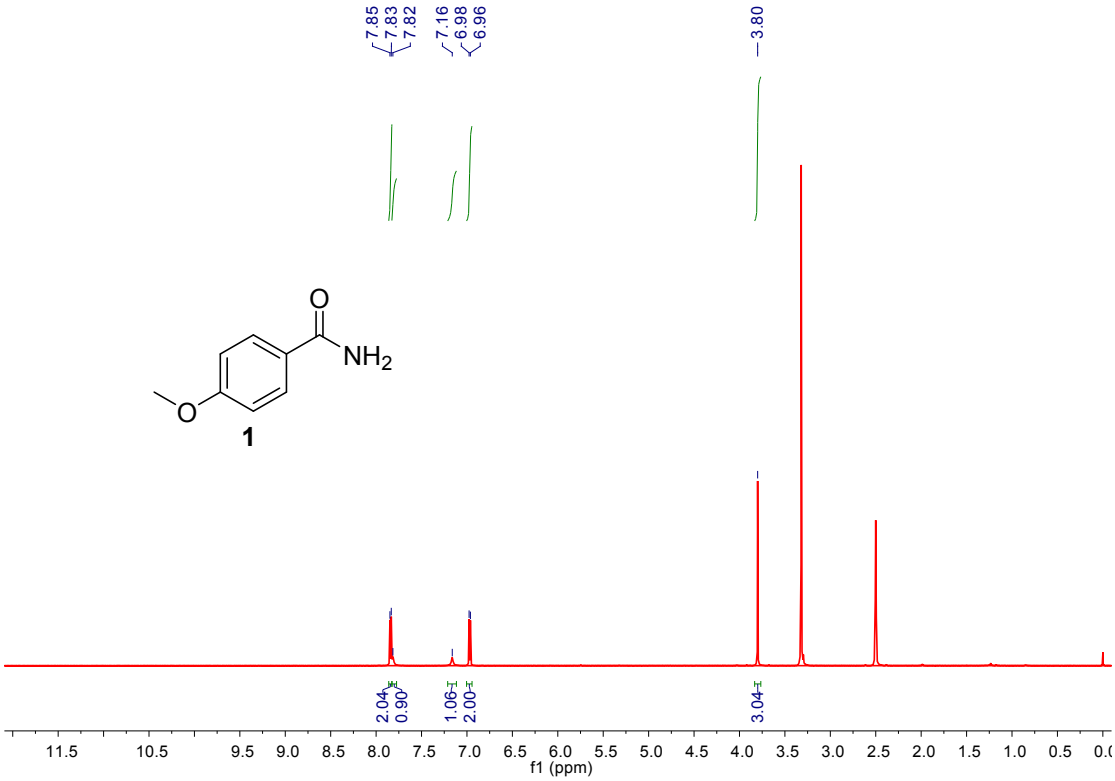
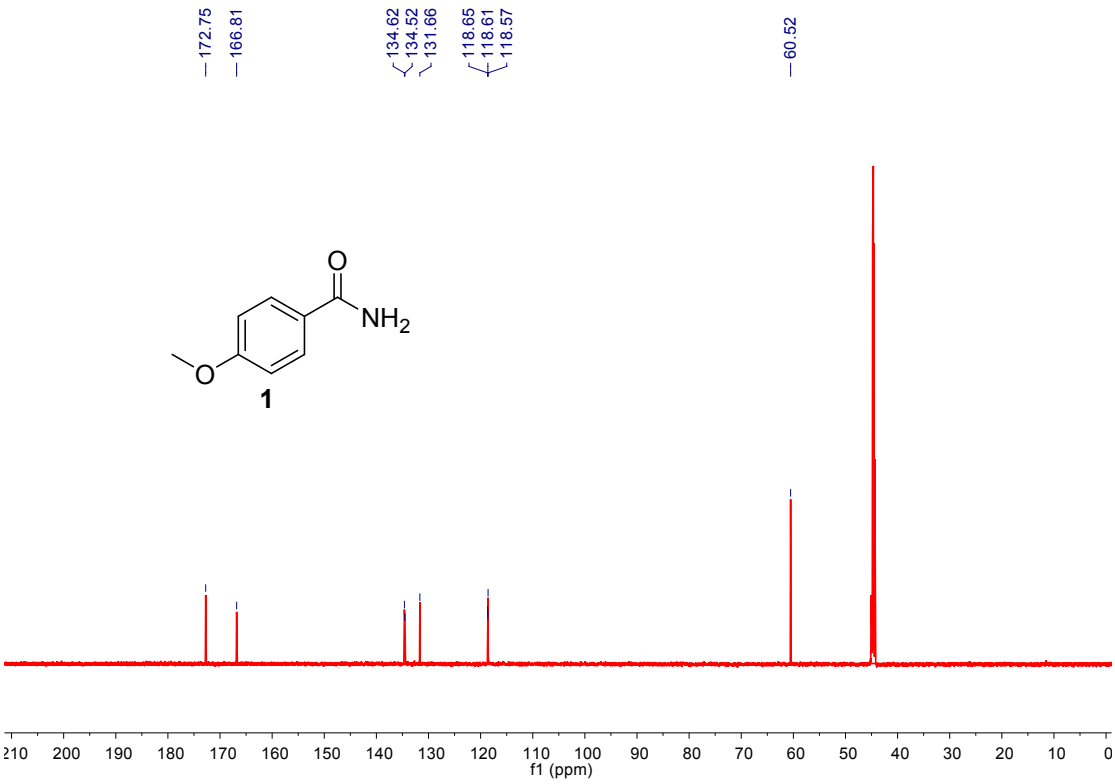
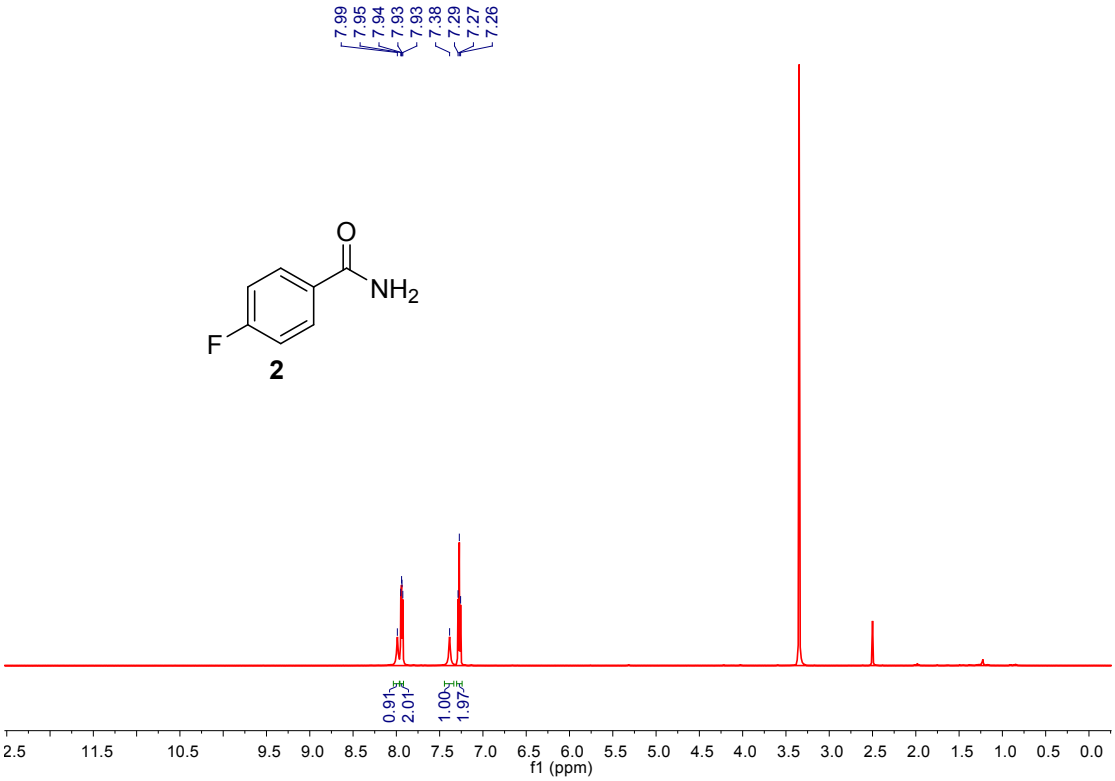
10. NMR Spectra



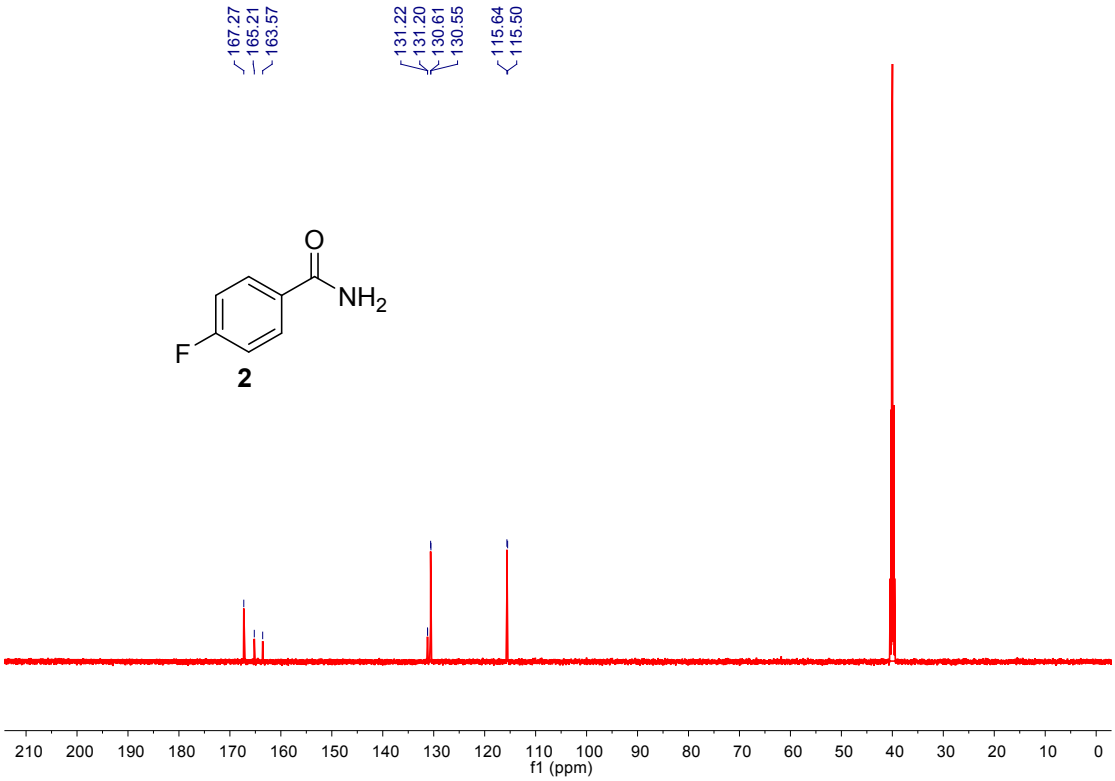
^{1}H NMR (600 MHz, DMSO-d_6)



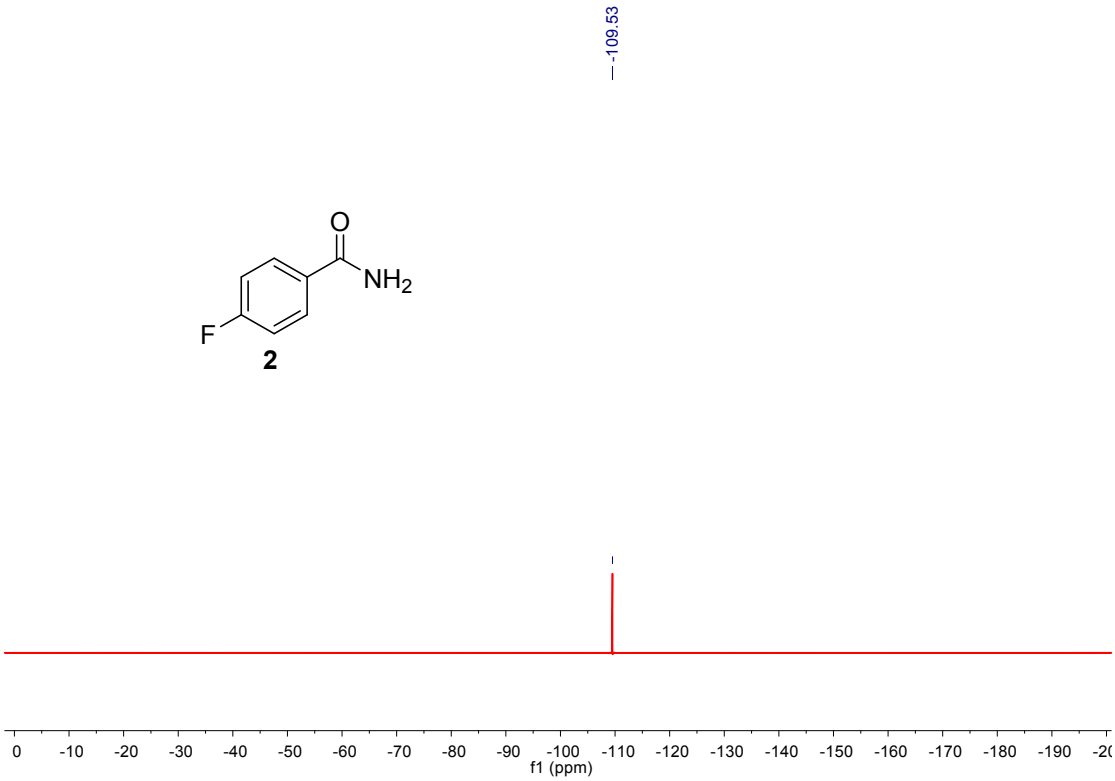
^{13}C NMR (151 MHz, DMSO-d_6)



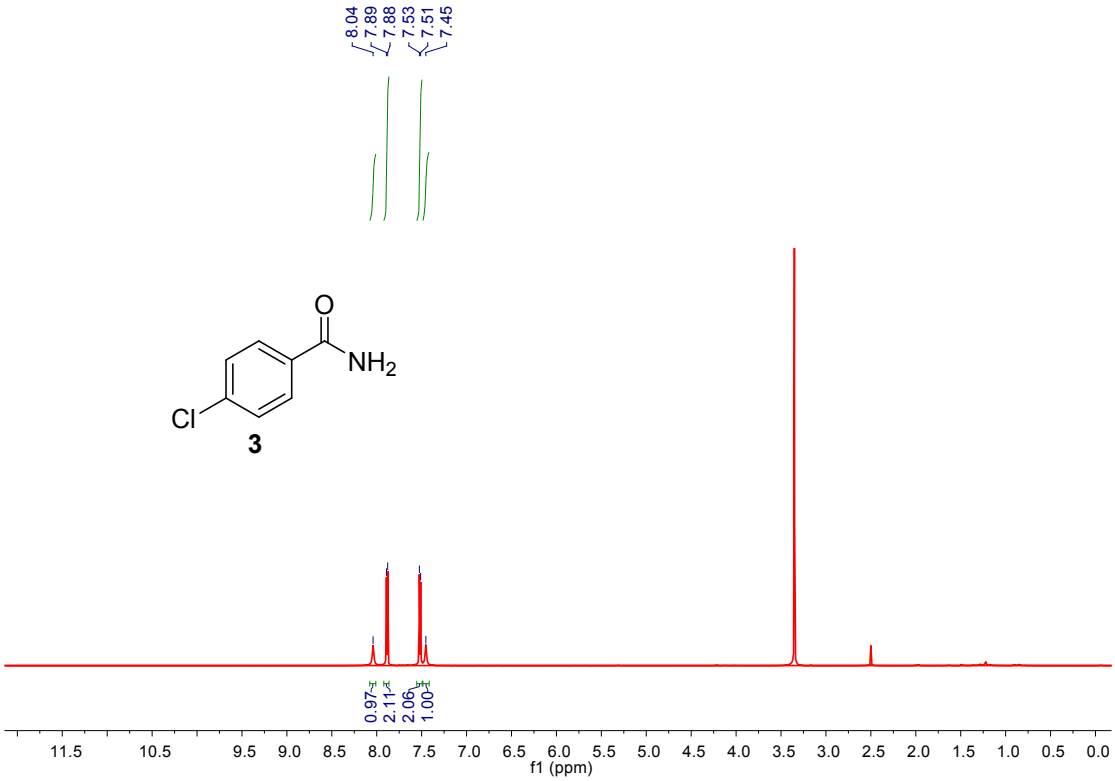
^{1}H NMR (600 MHz, DMSO-d_6)



^{13}C NMR (151 MHz, DMSO-d_6)



^{19}F NMR (565 MHz, DMSO-d_6)



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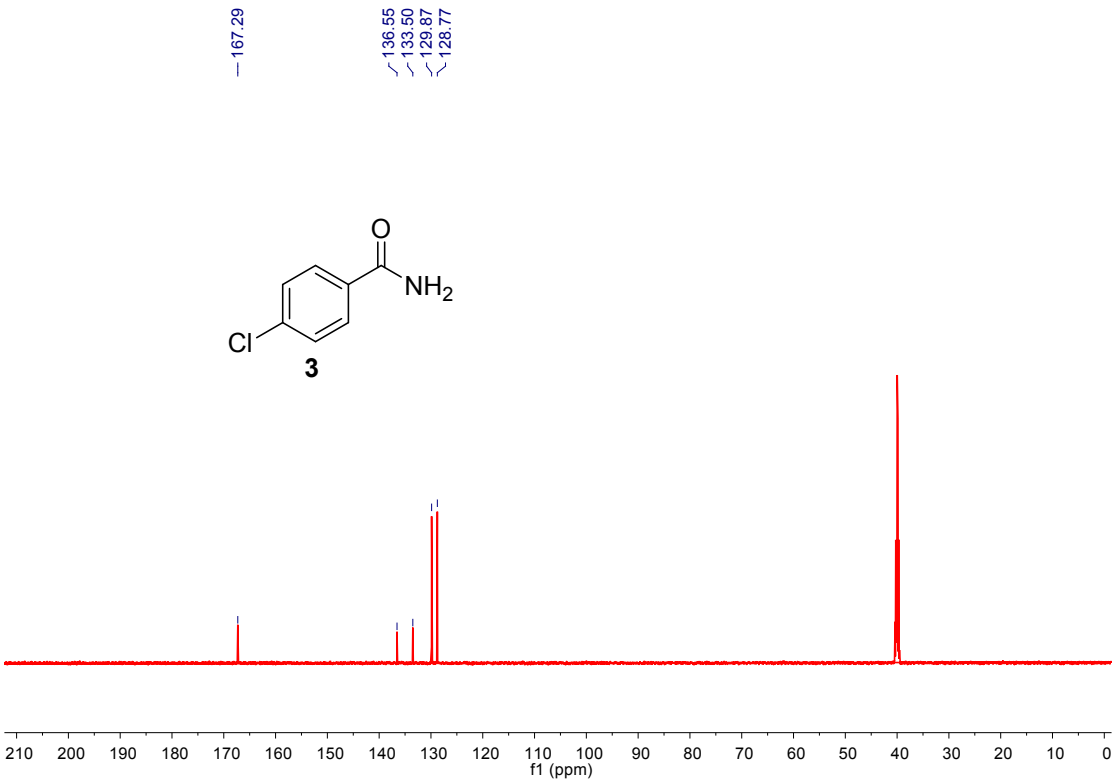
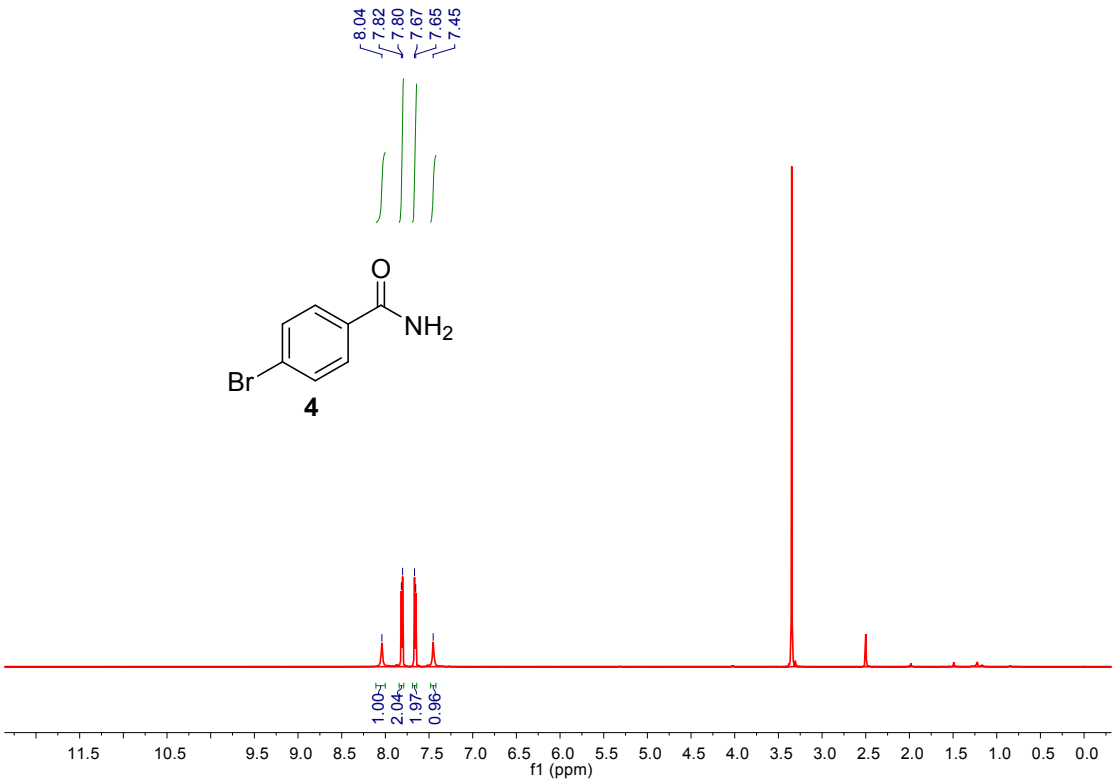


^{13}C NMR (151 MHz, DMSO-d$_6$)



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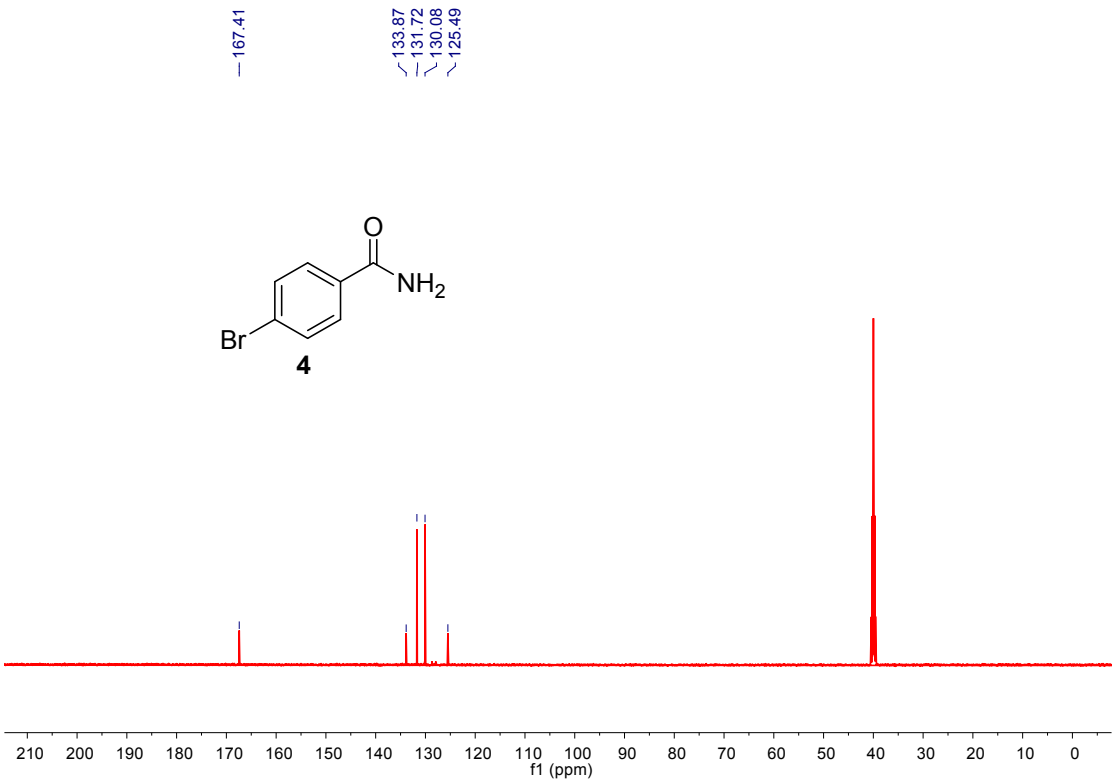

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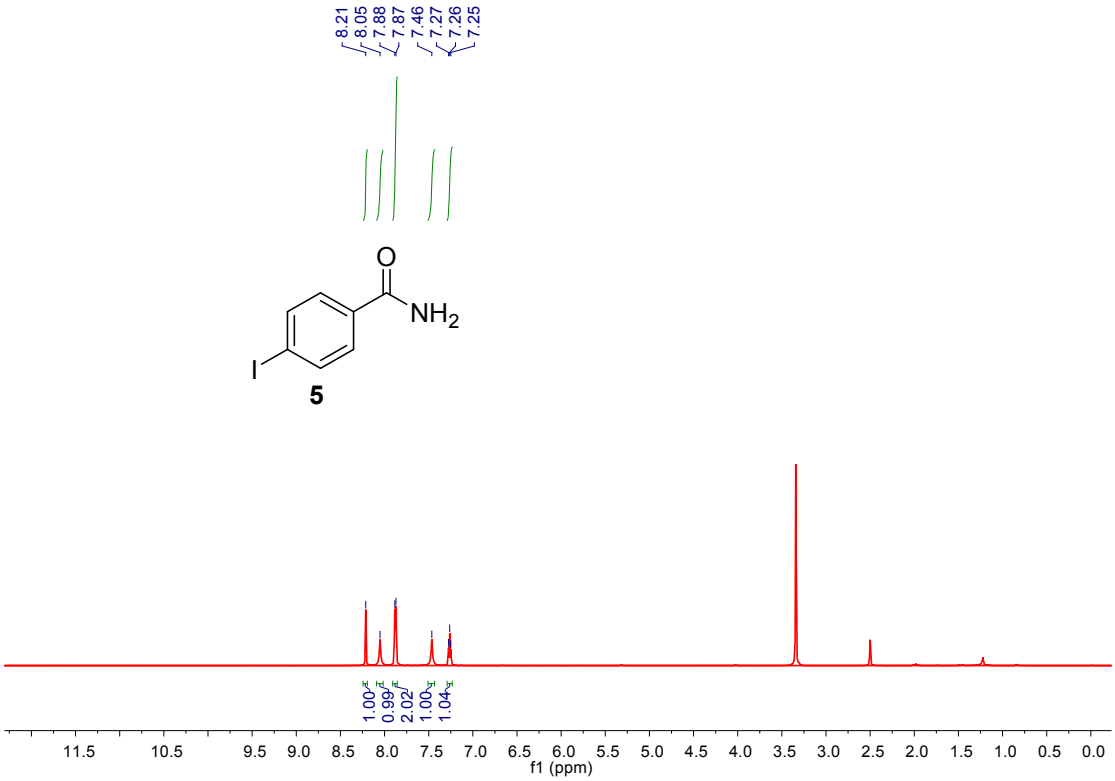

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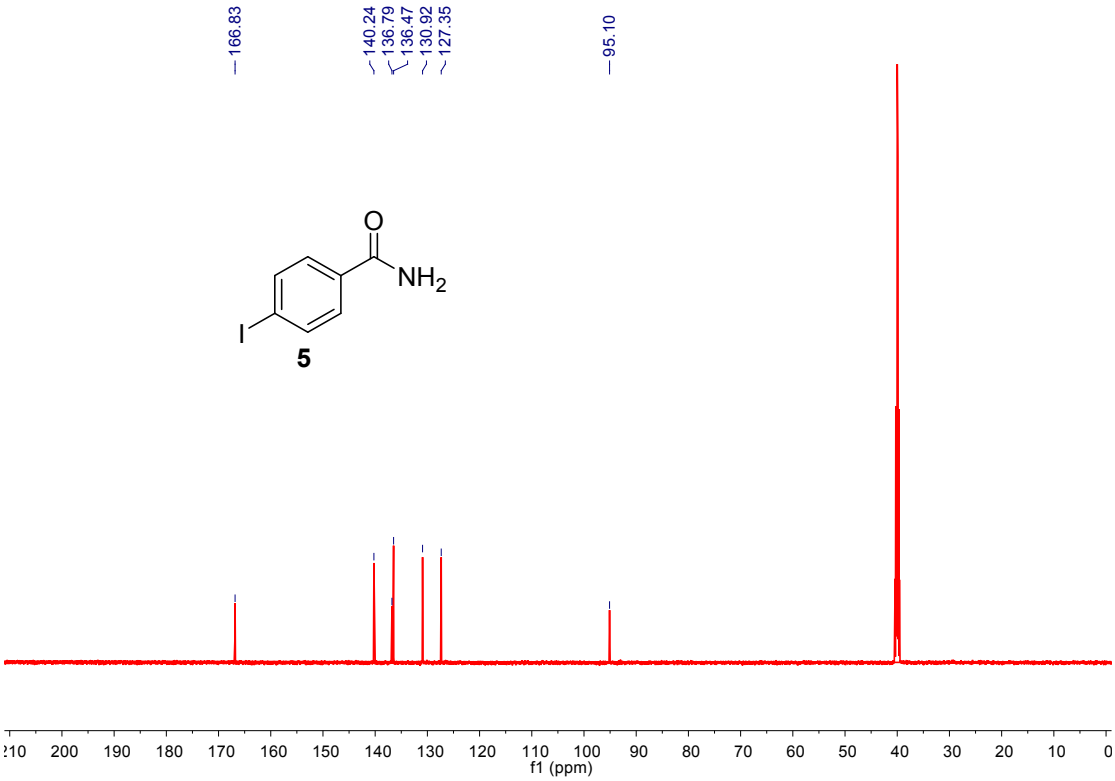

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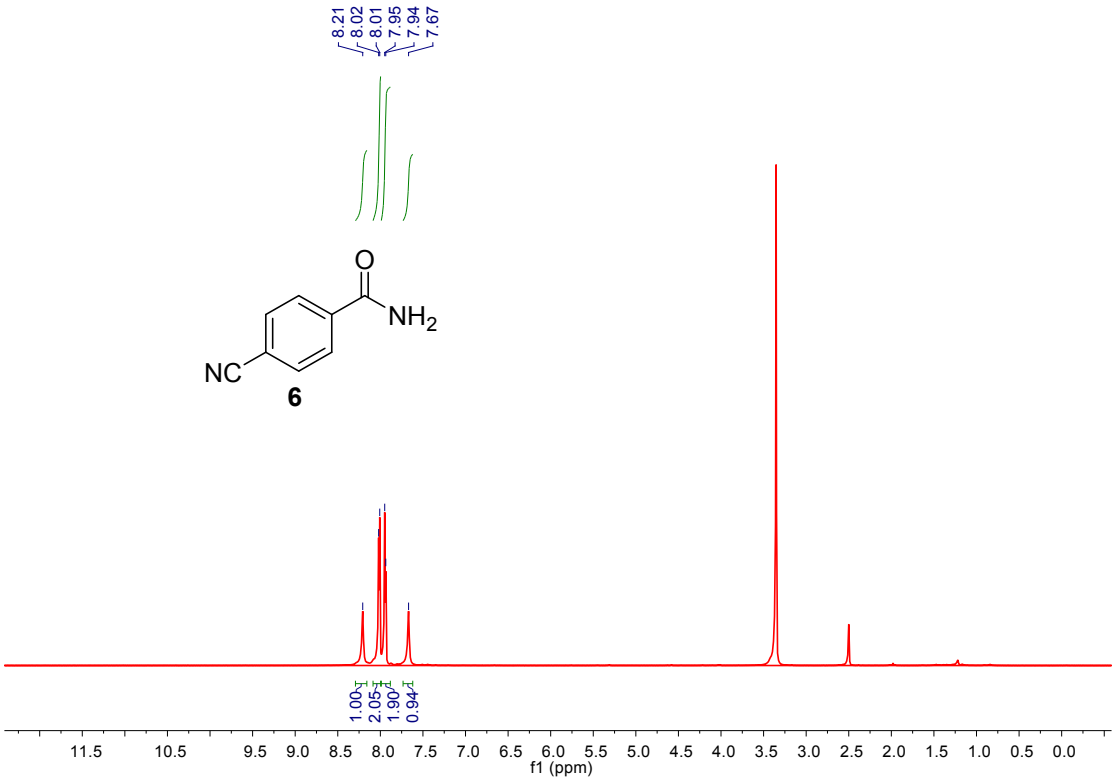

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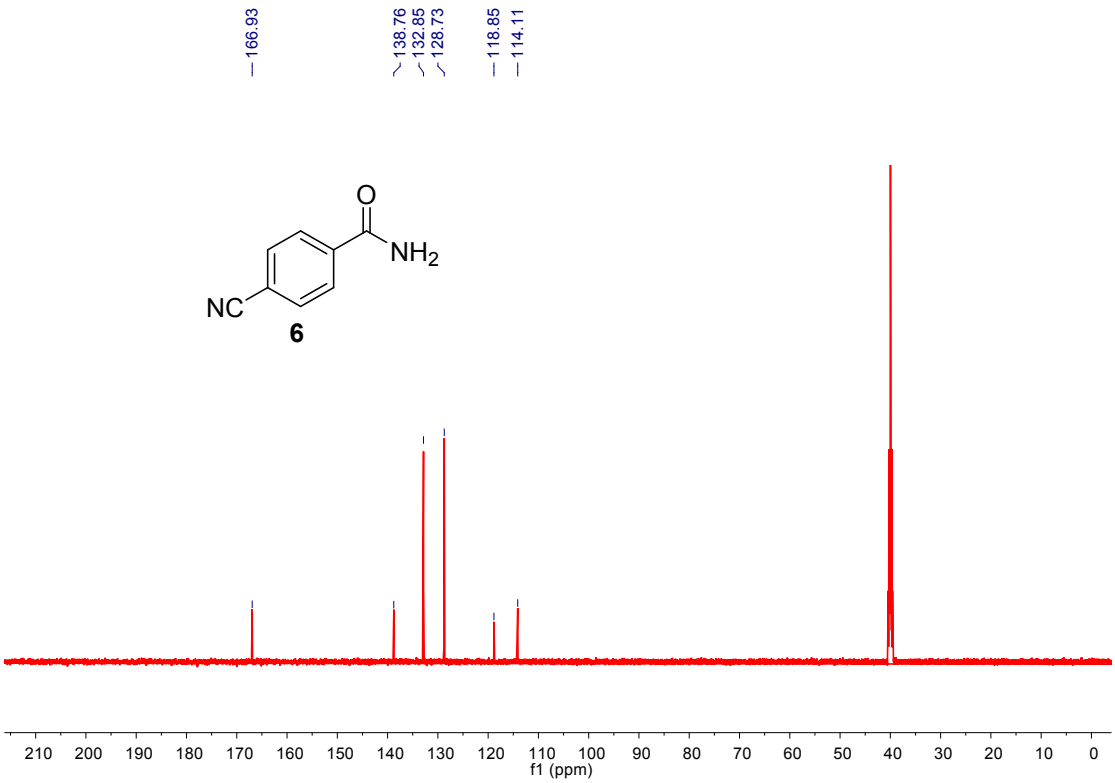

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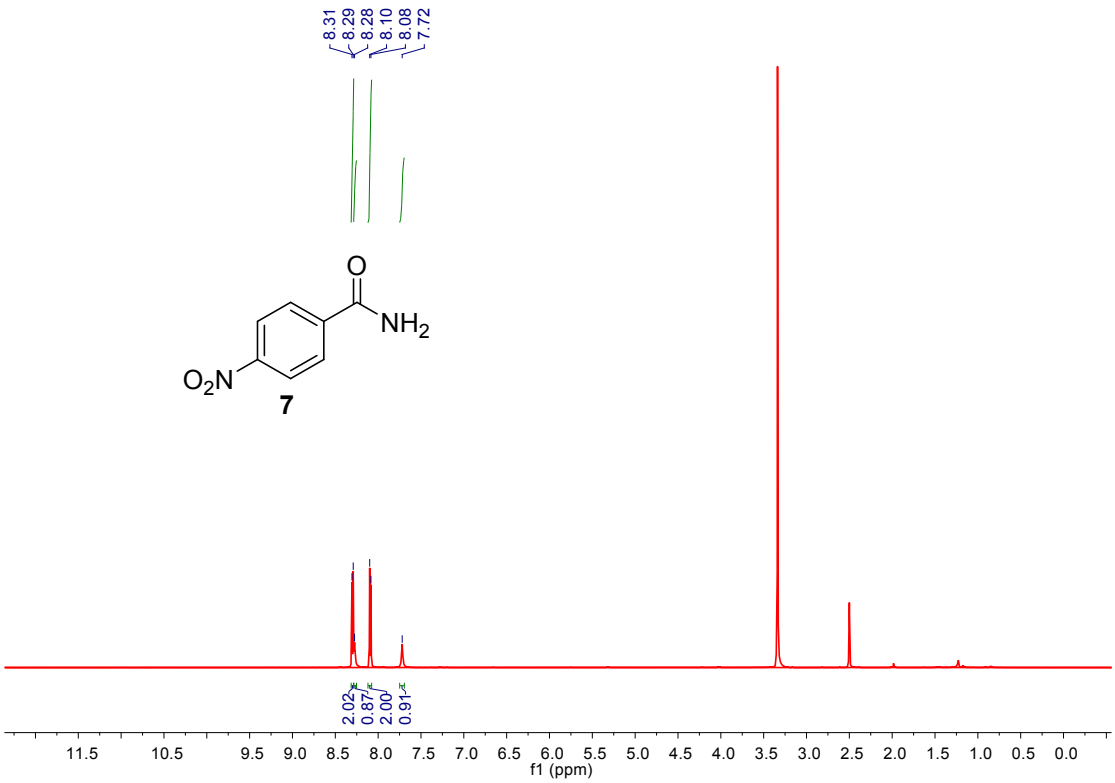

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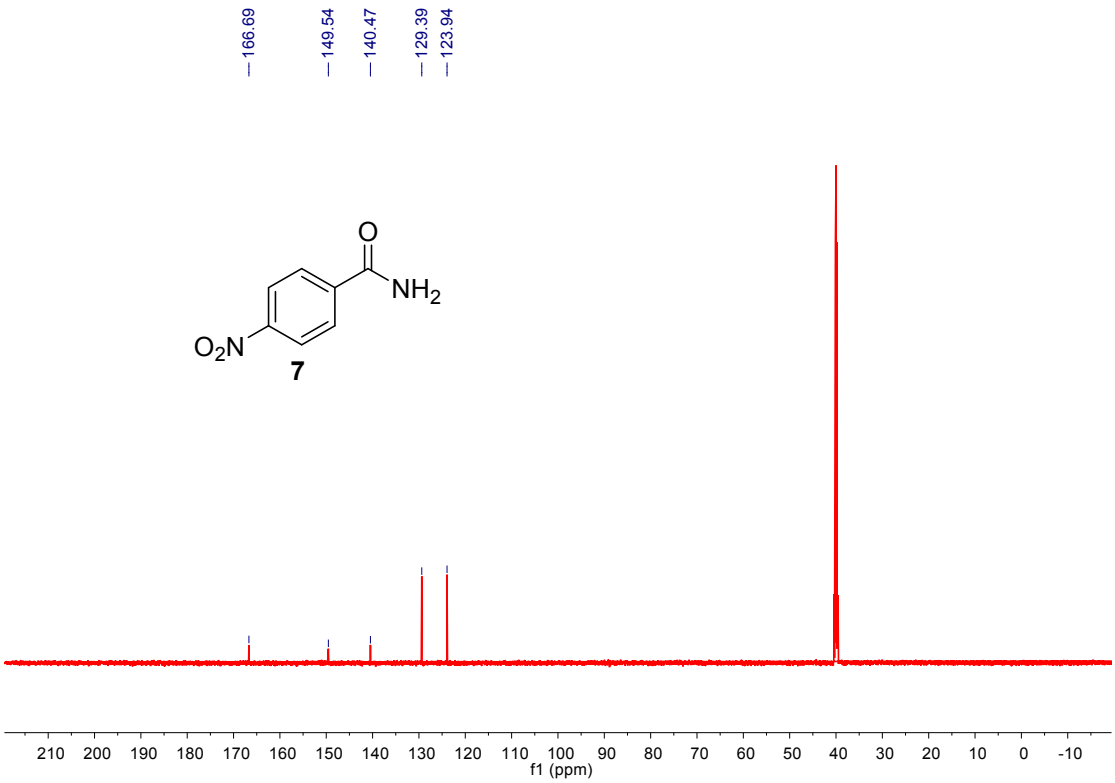

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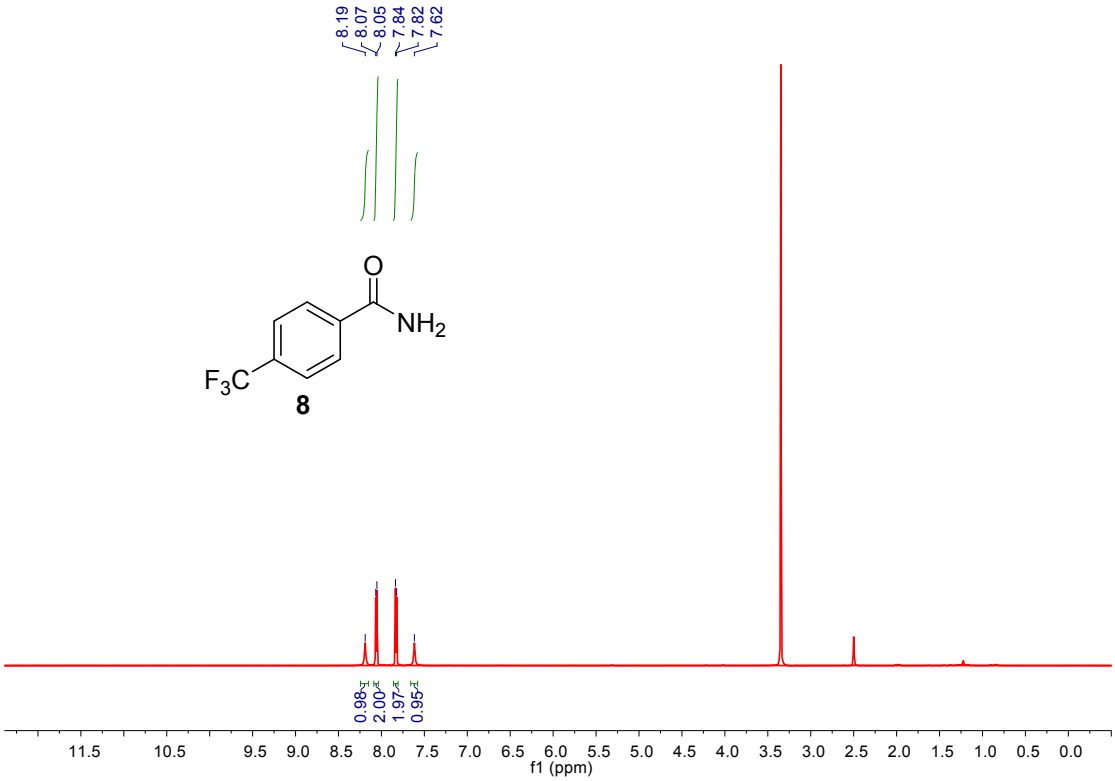

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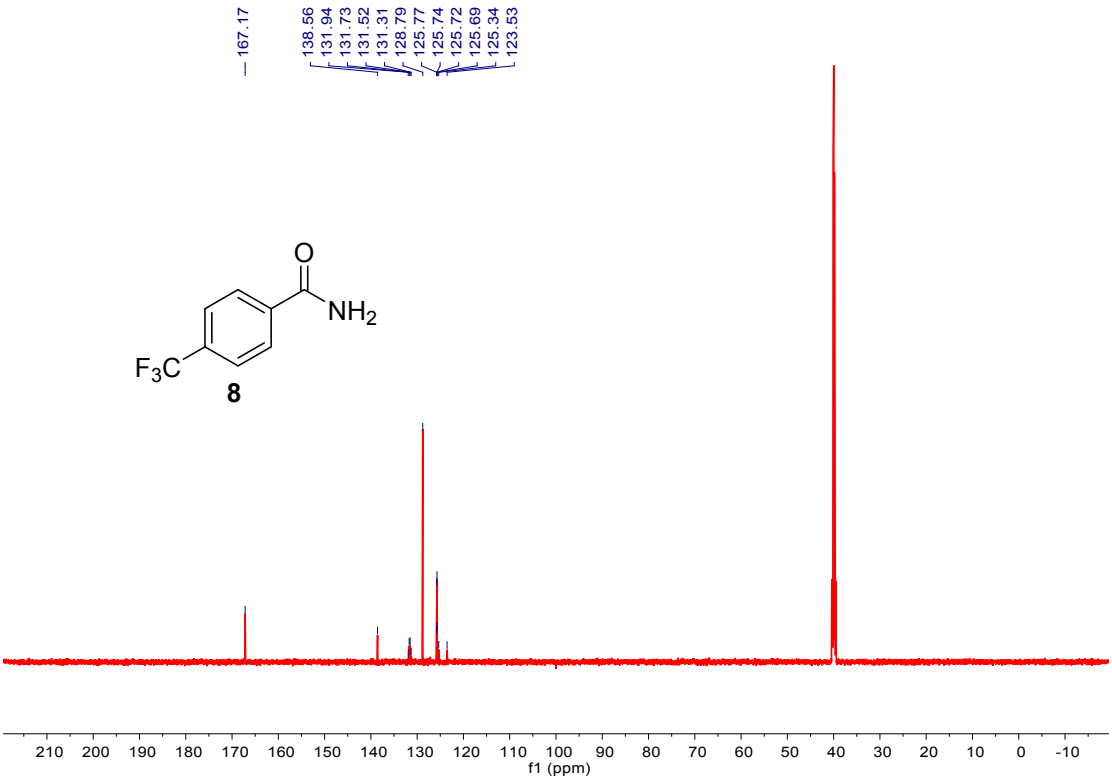
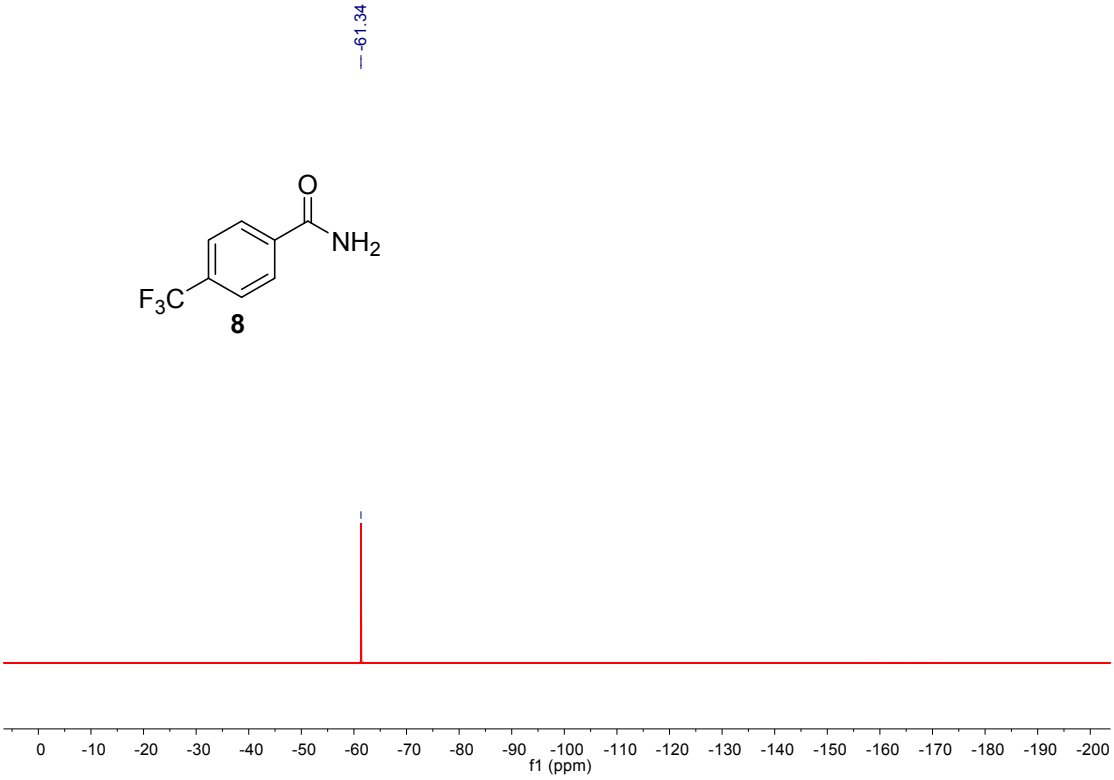
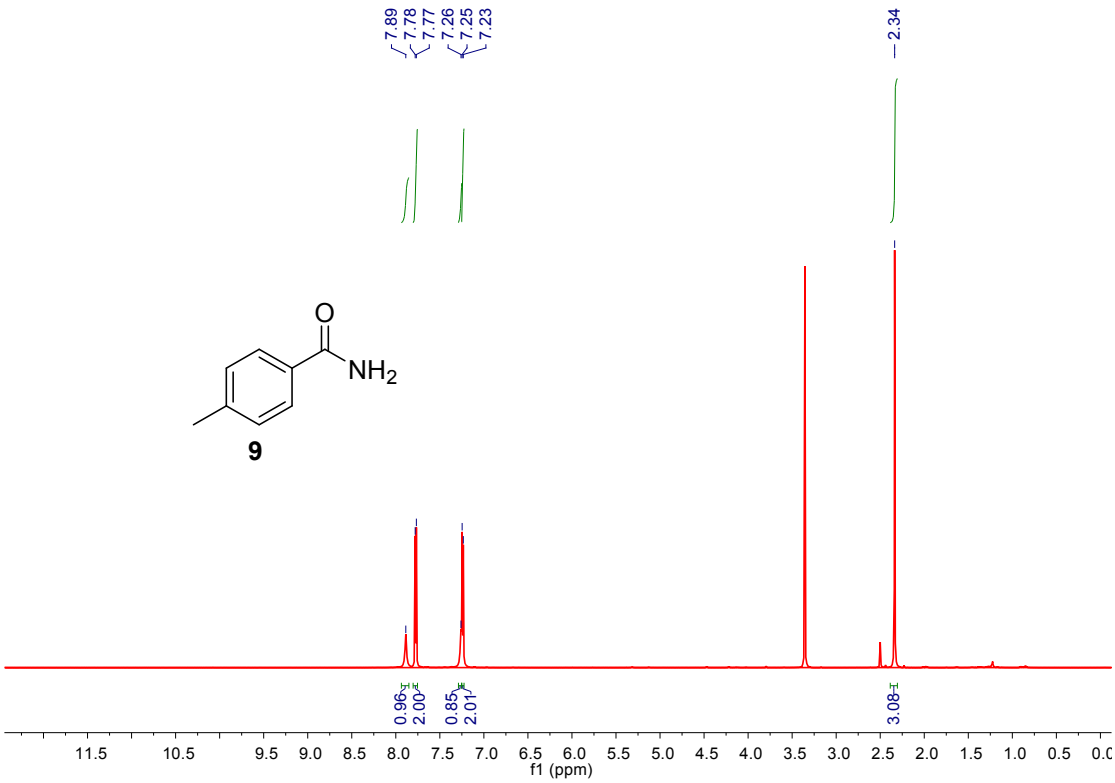


^{13}C NMR (151 MHz, DMSO-d_6)



^{19}F NMR (565 MHz, DMSO-d_6)



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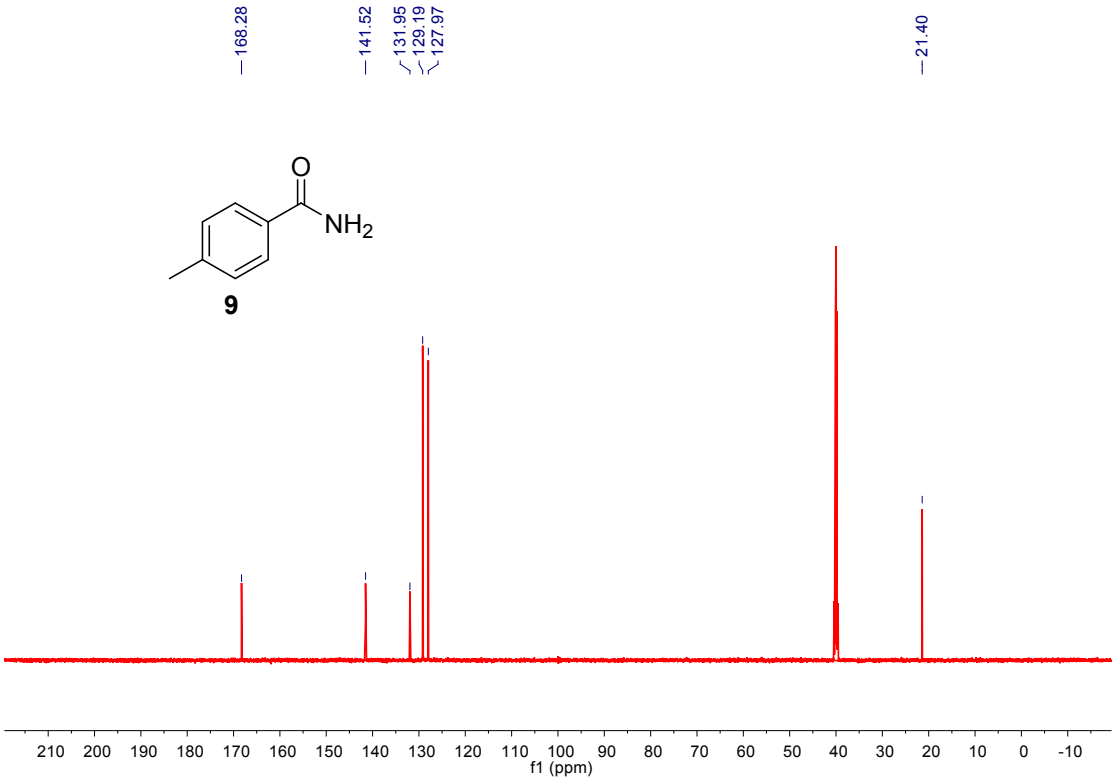

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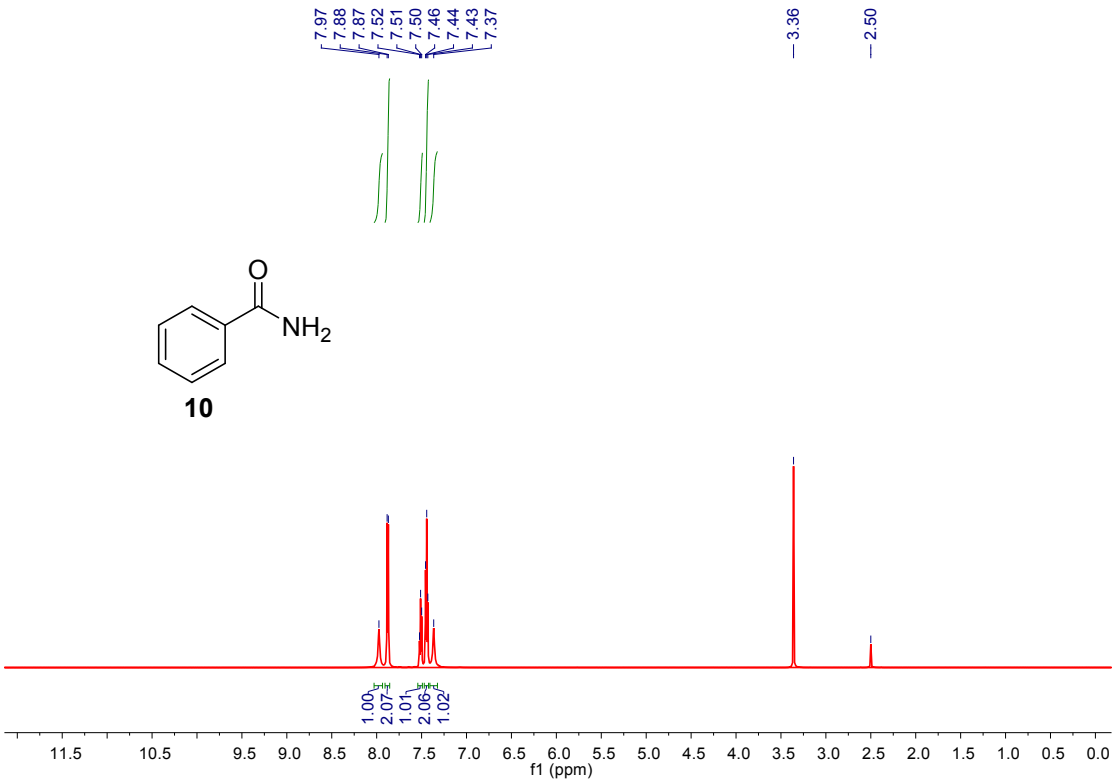

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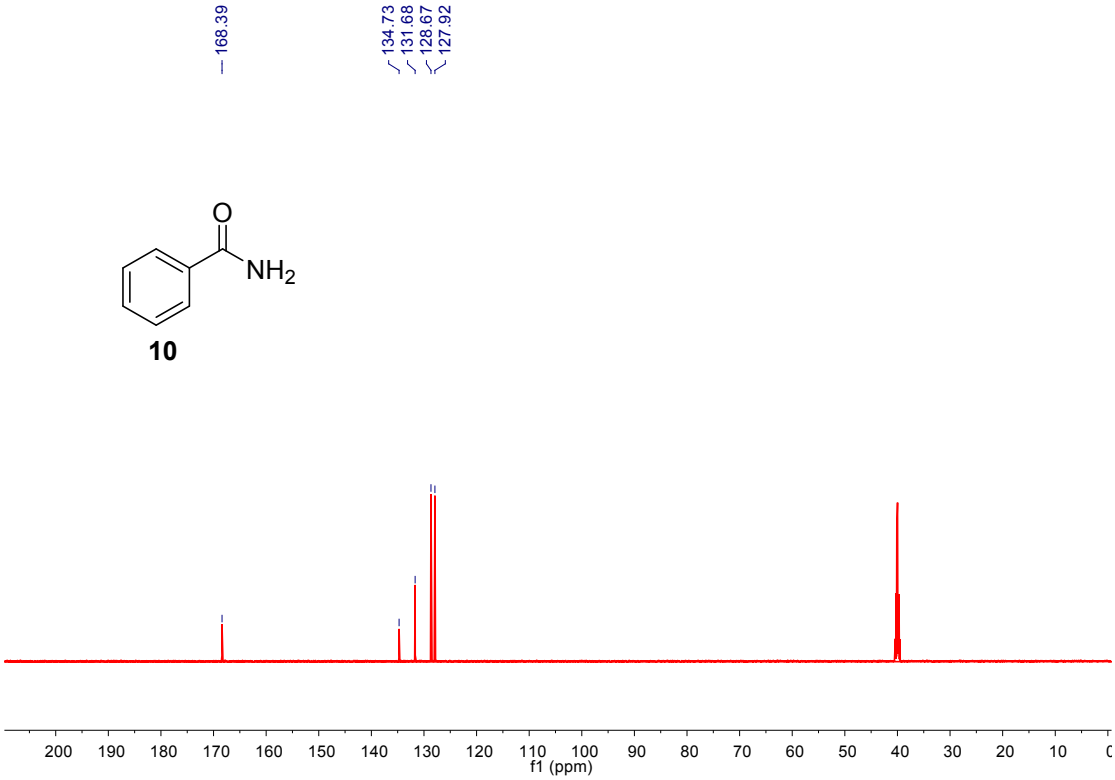

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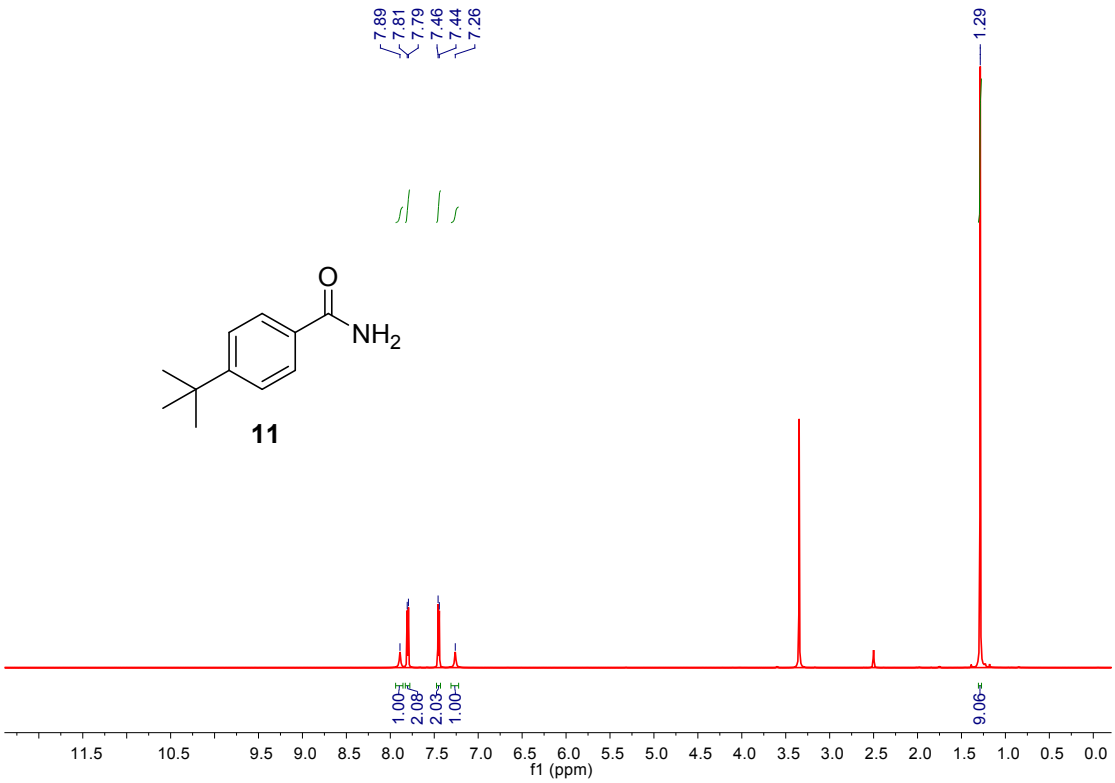

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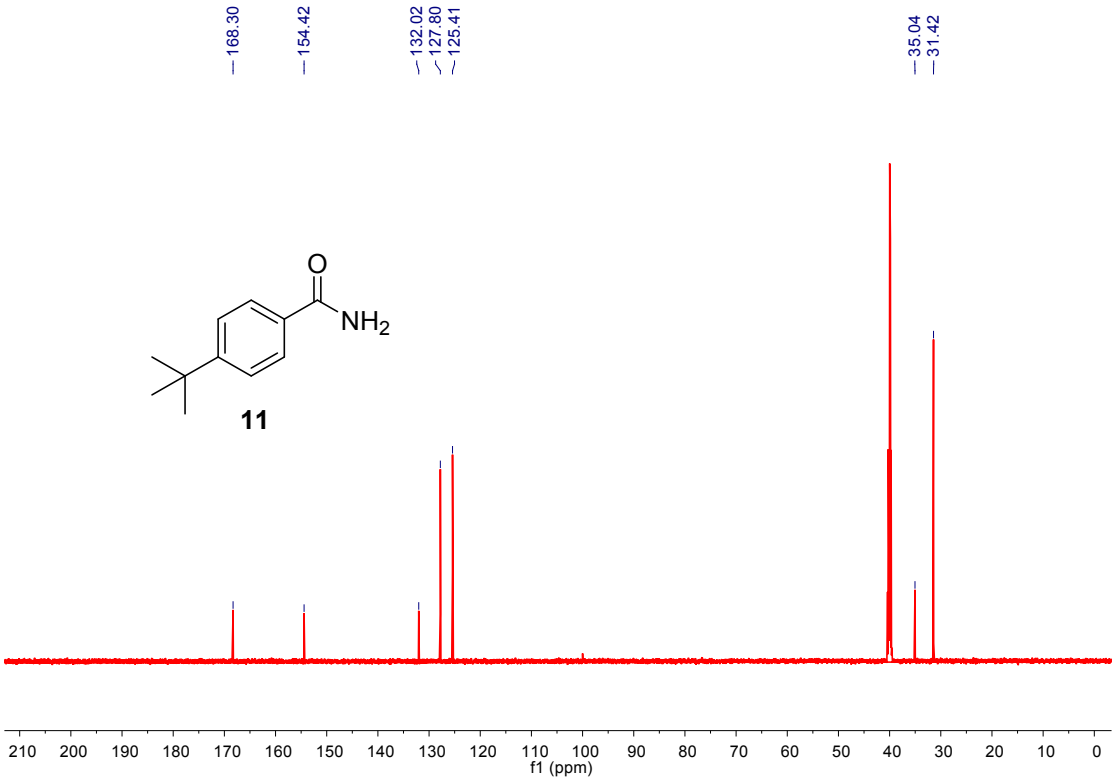

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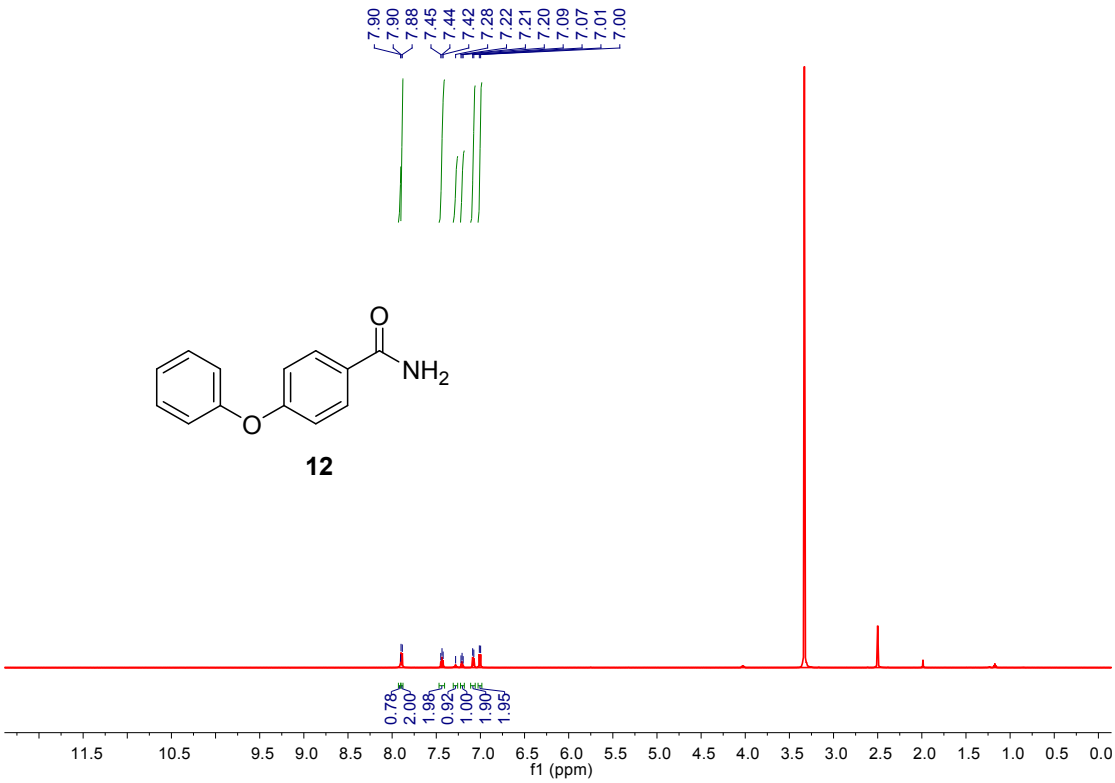

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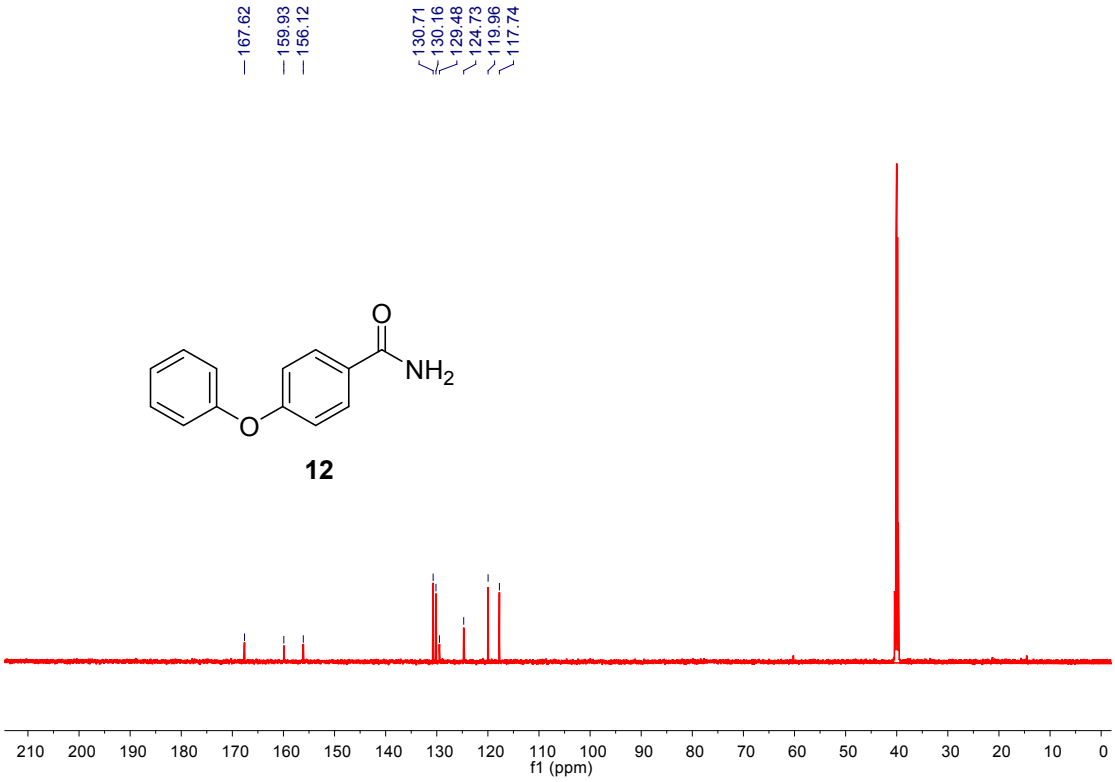

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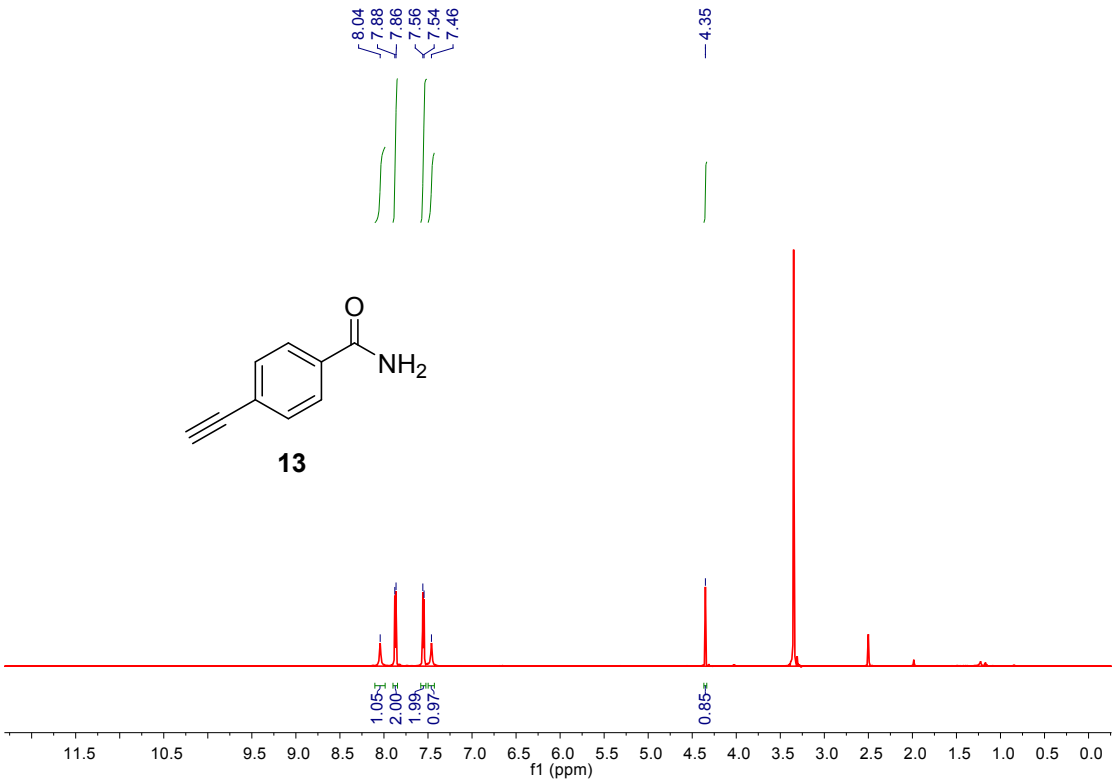

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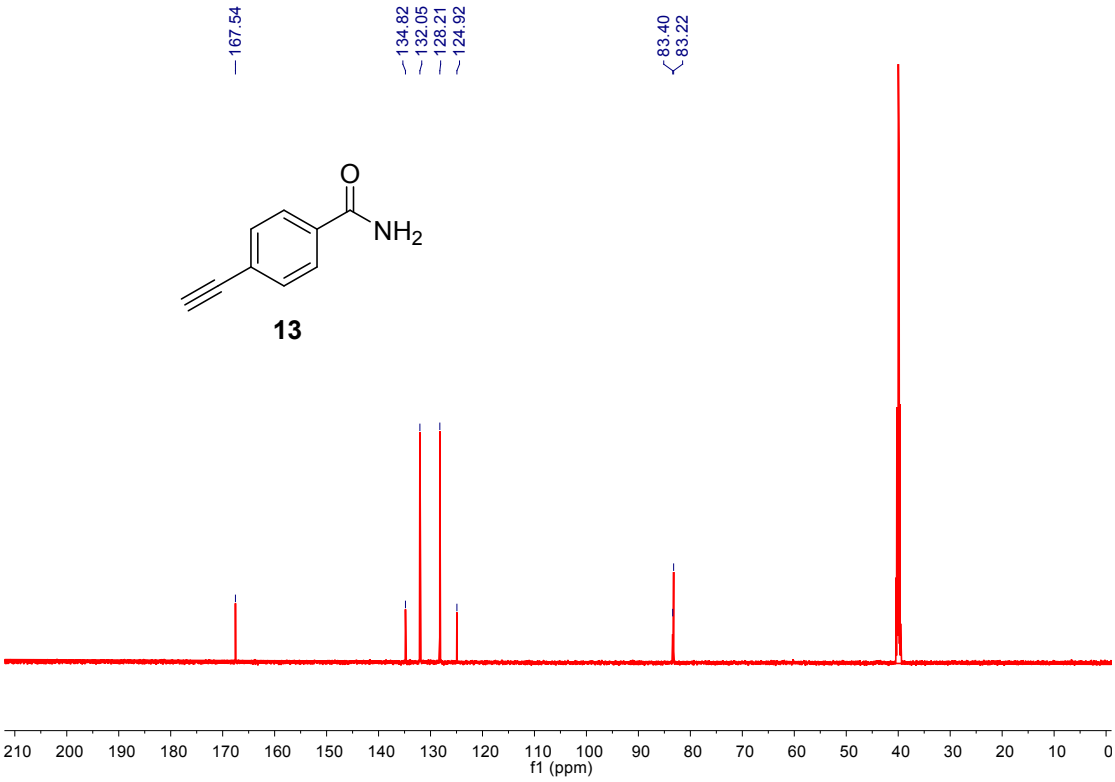

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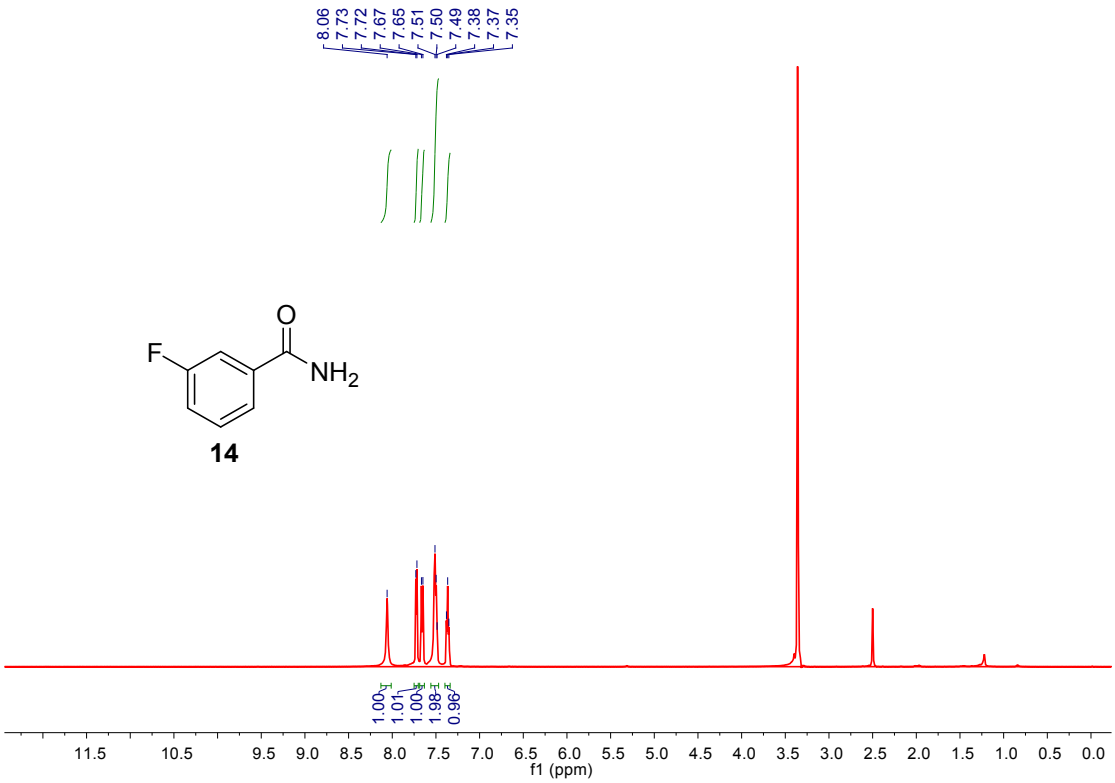

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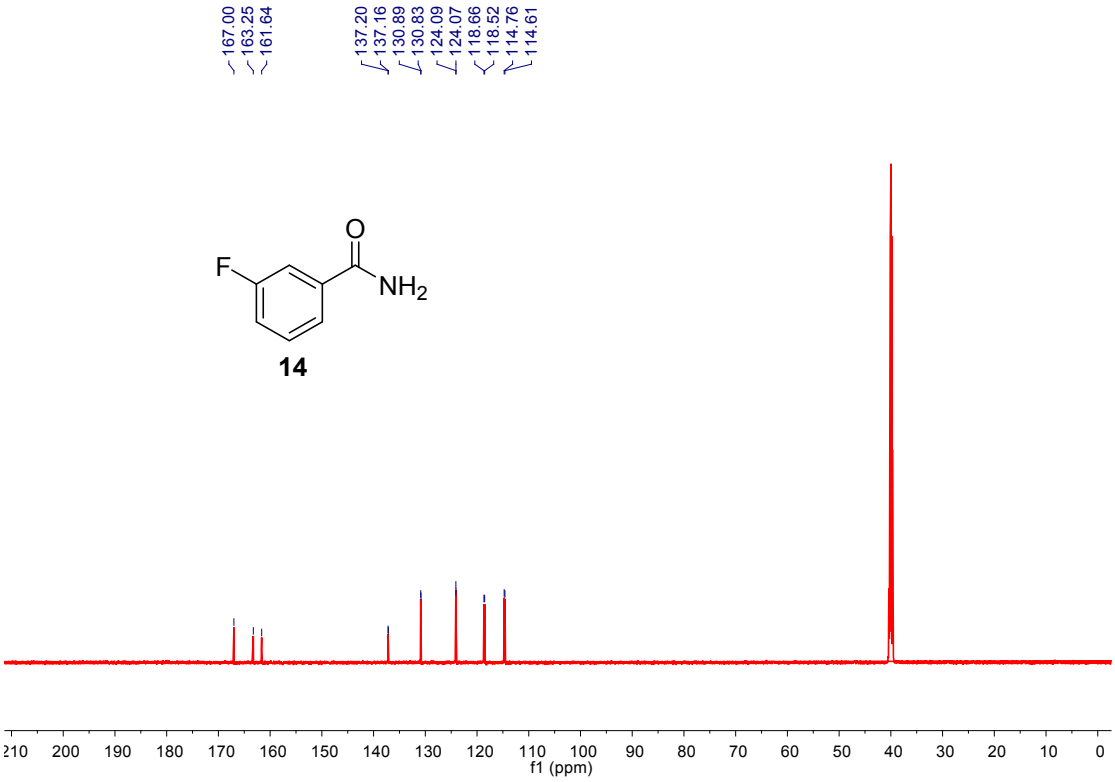

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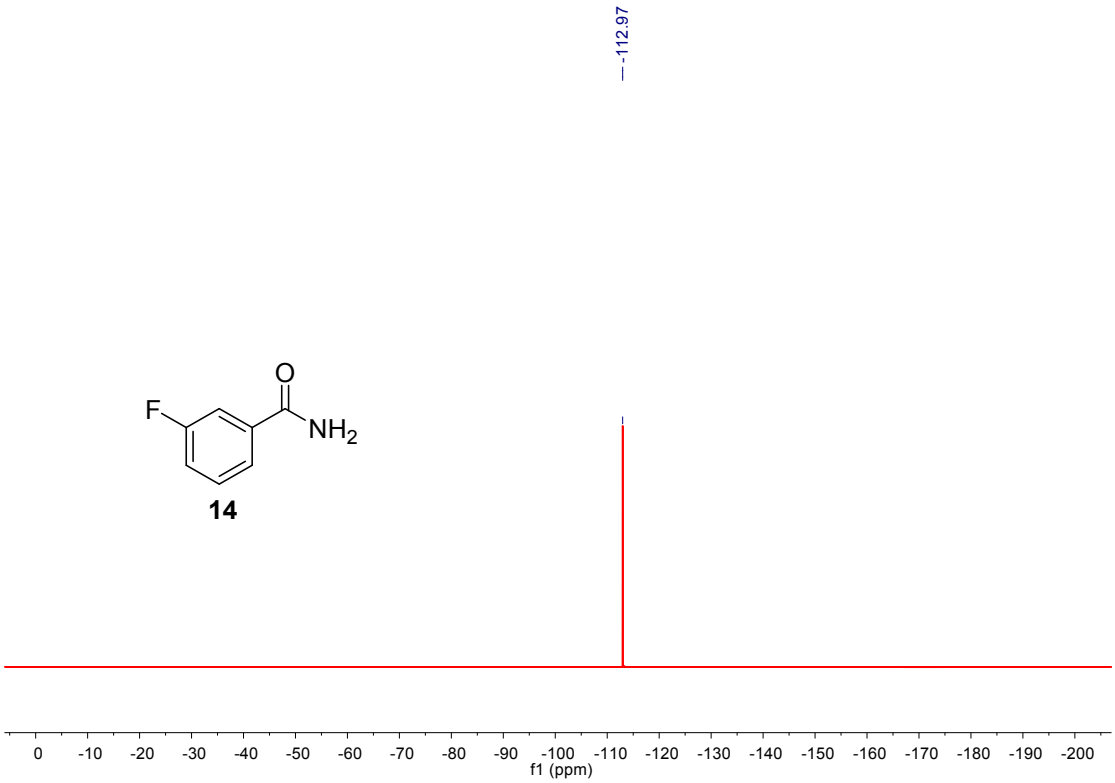
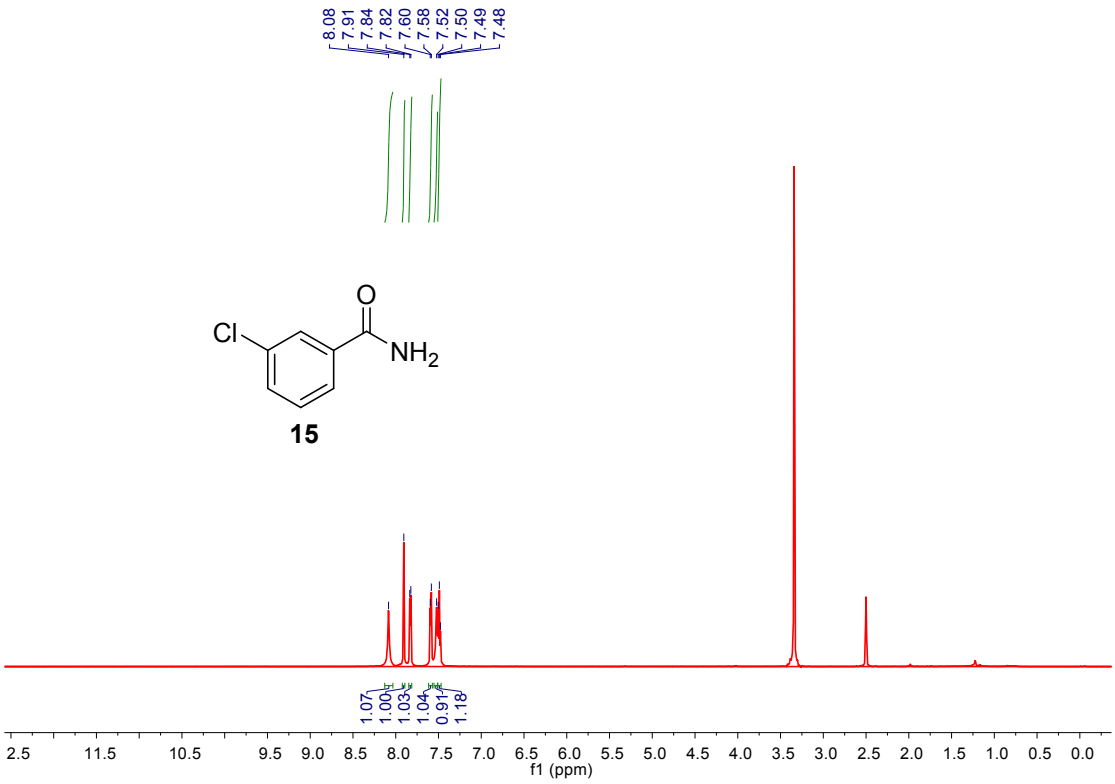


^{19}F NMR (565 MHz, DMSO-d_6)



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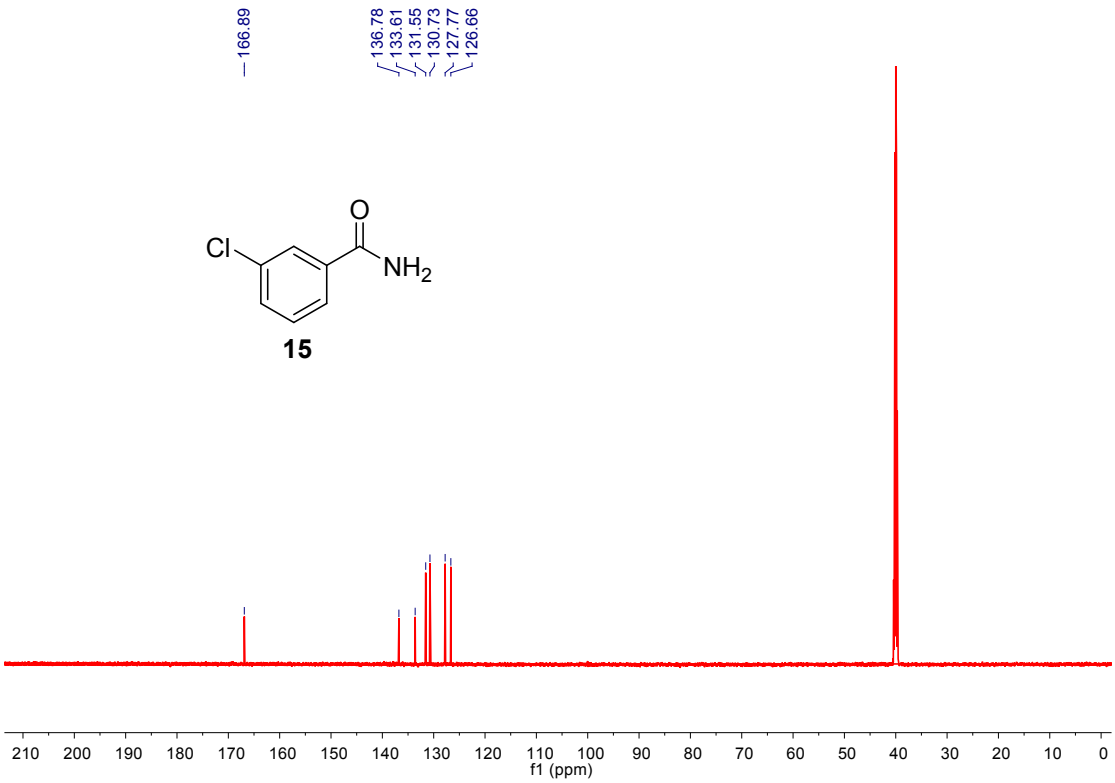

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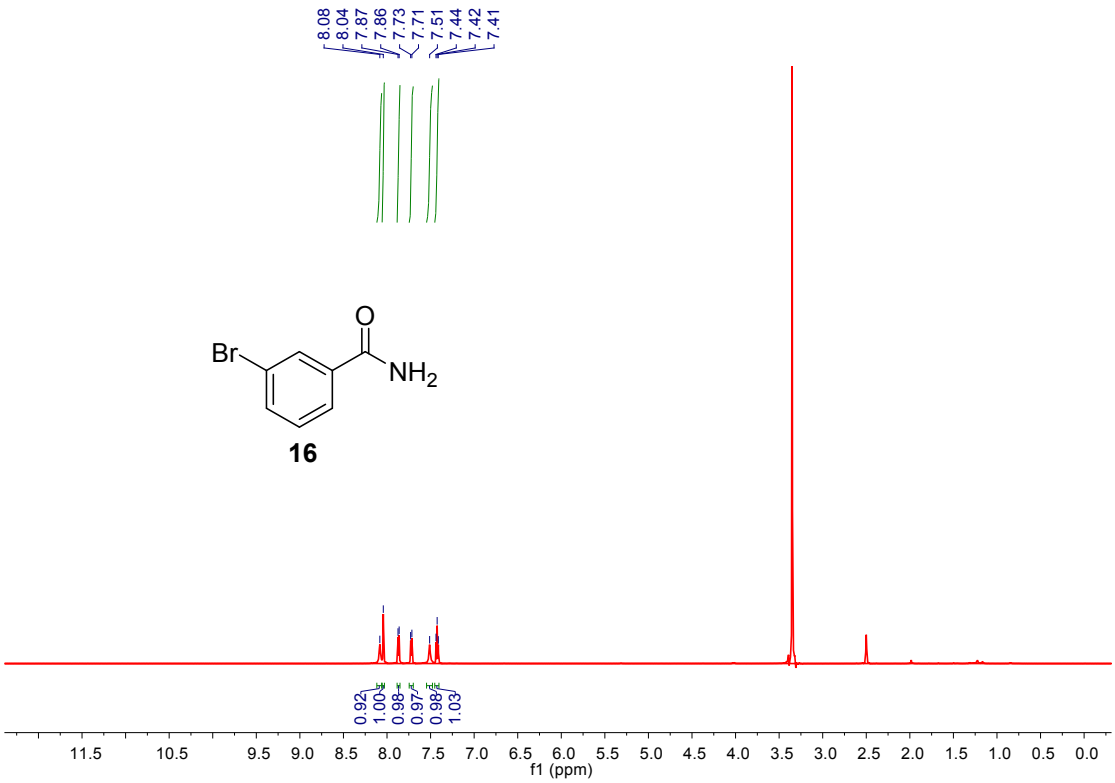

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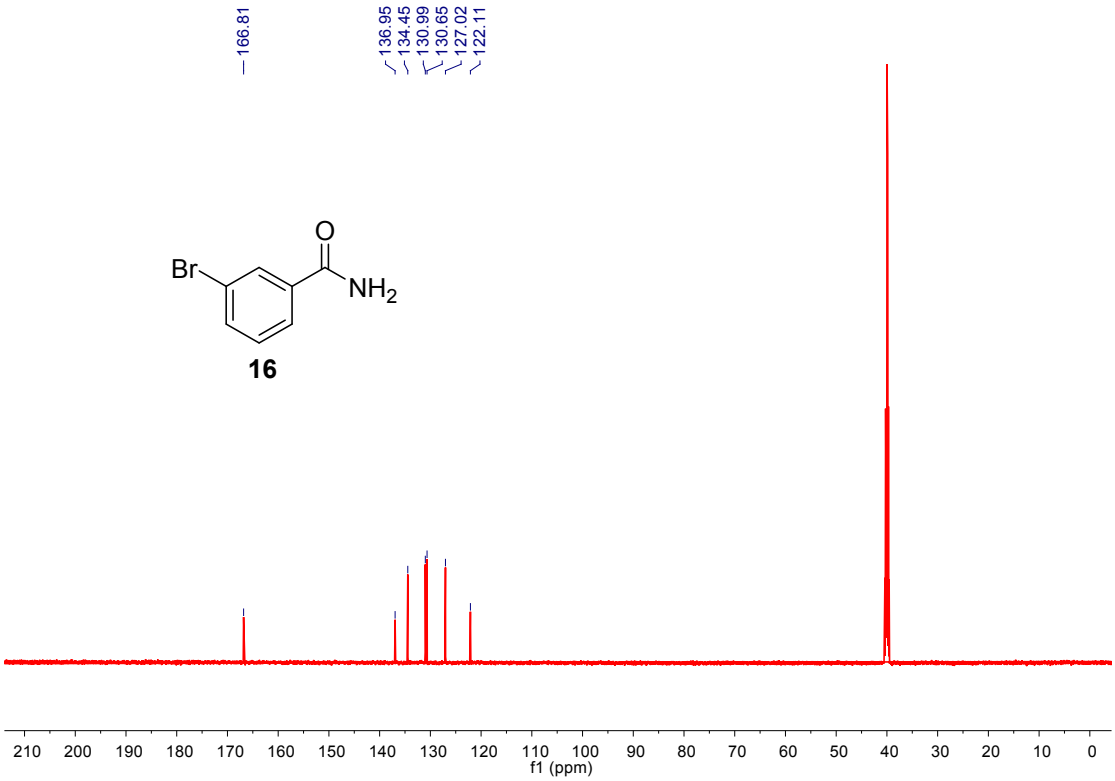

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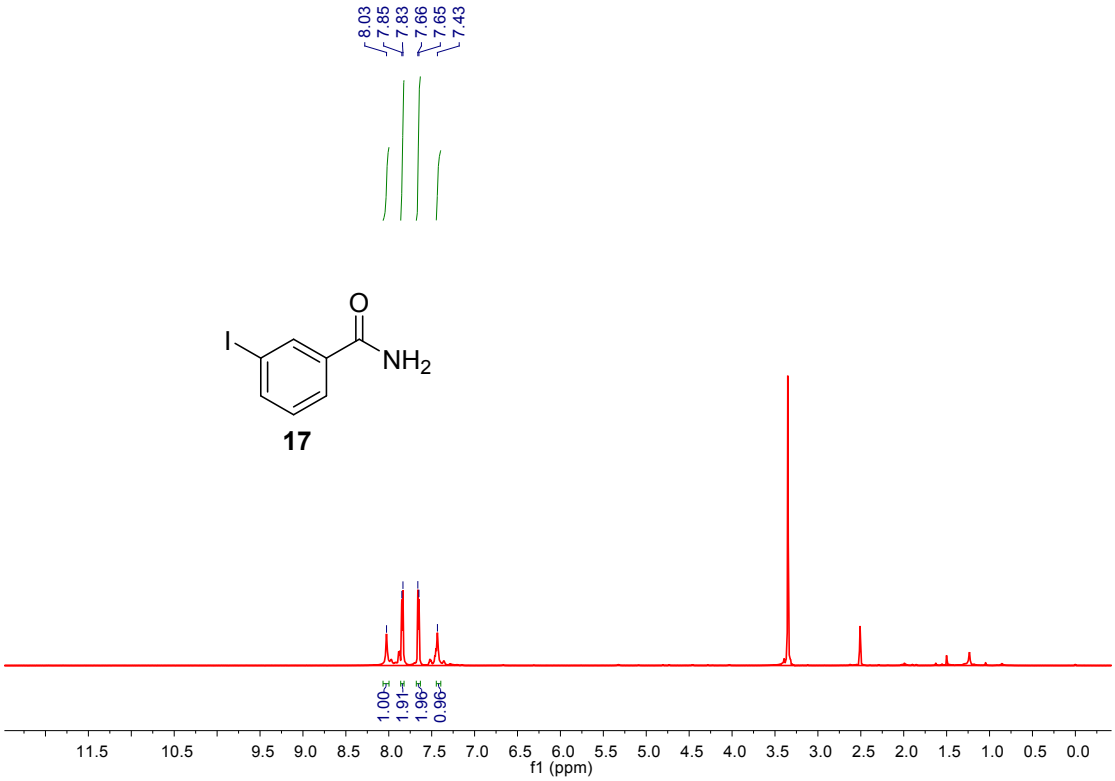

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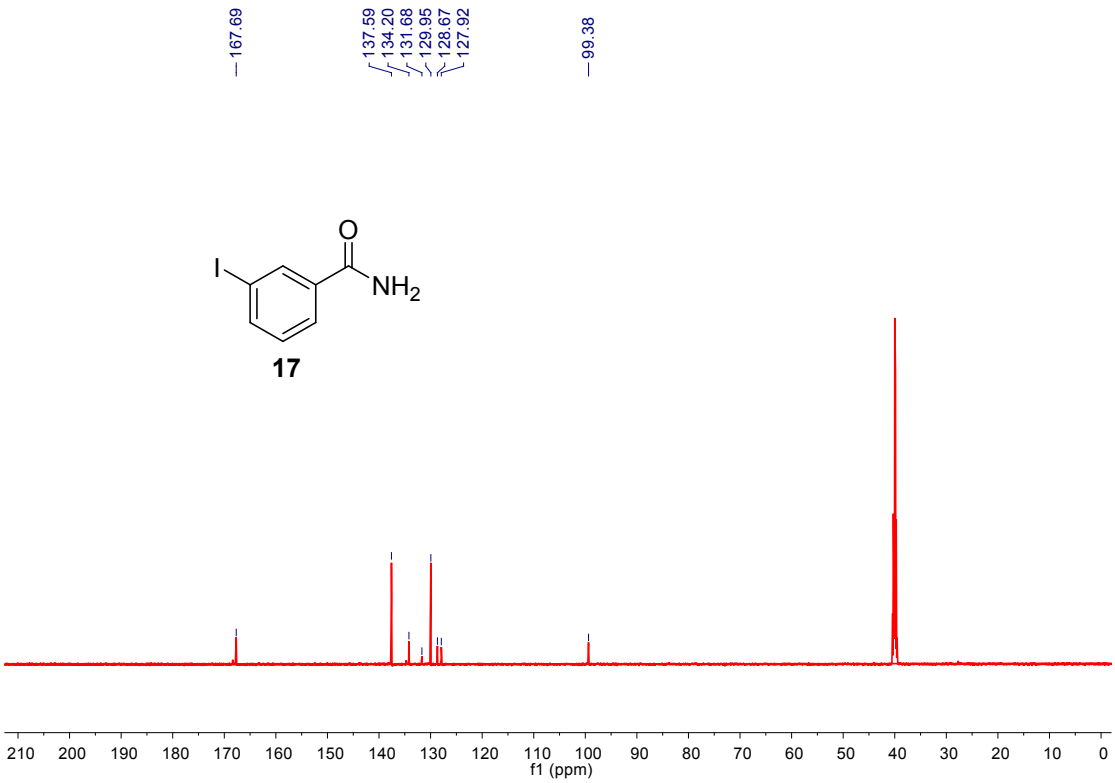

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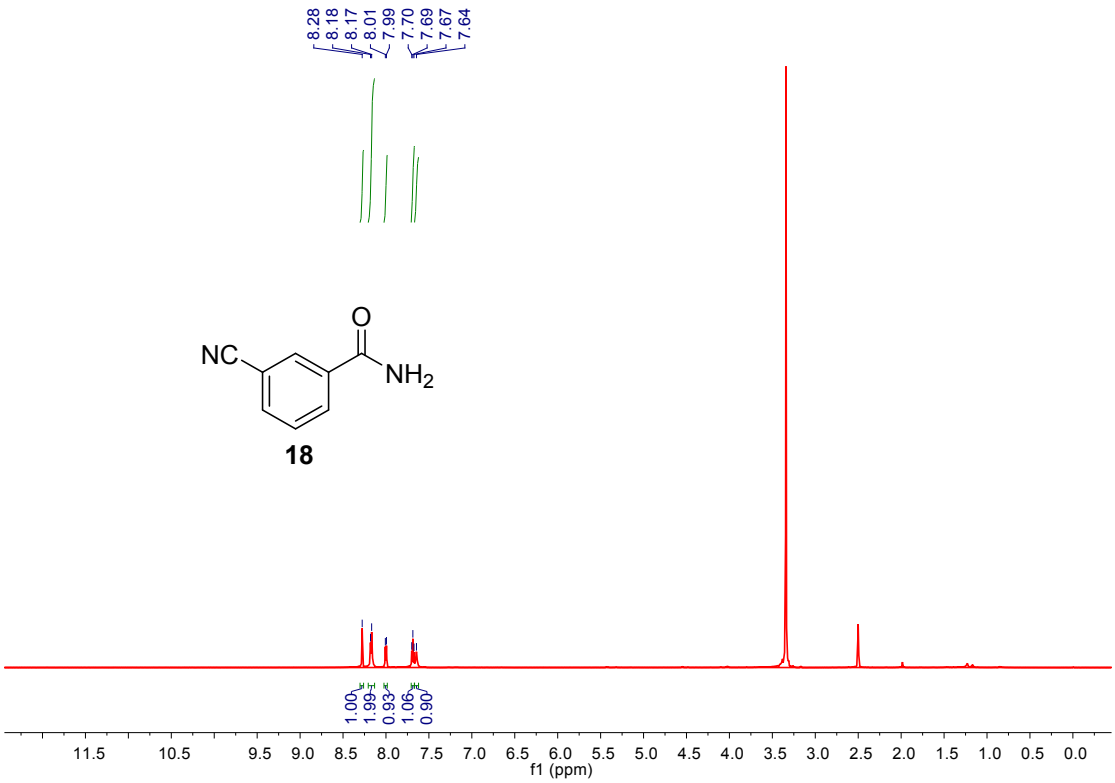

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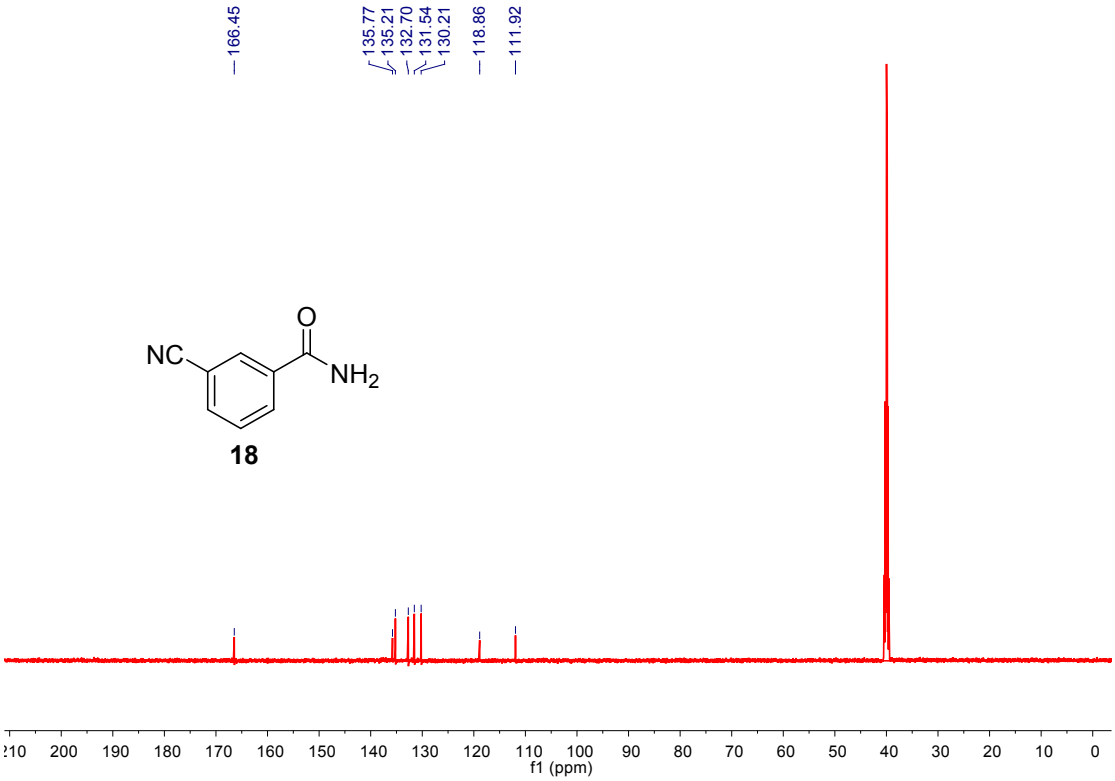

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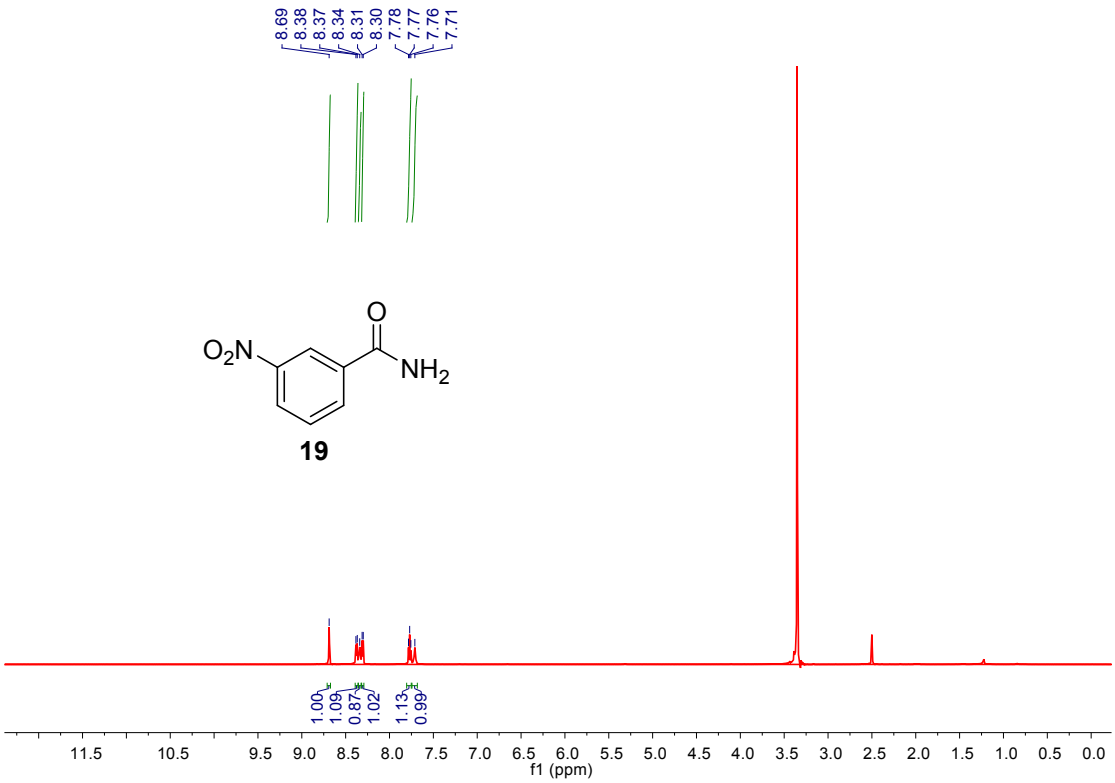
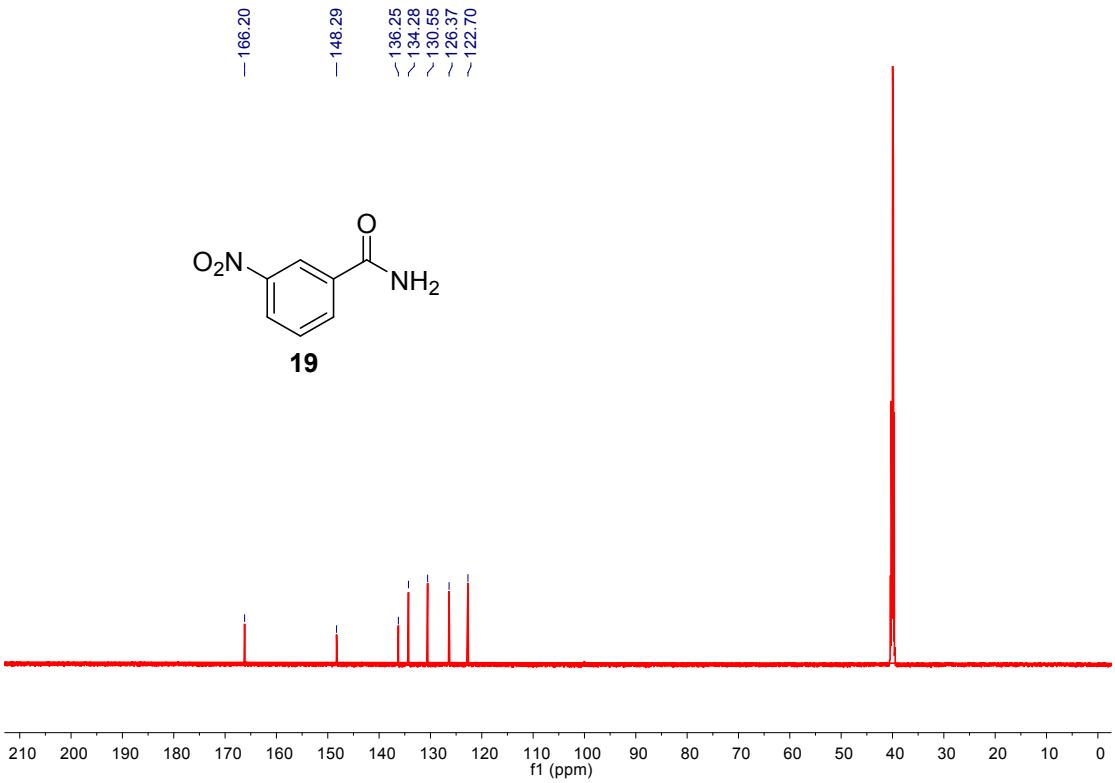
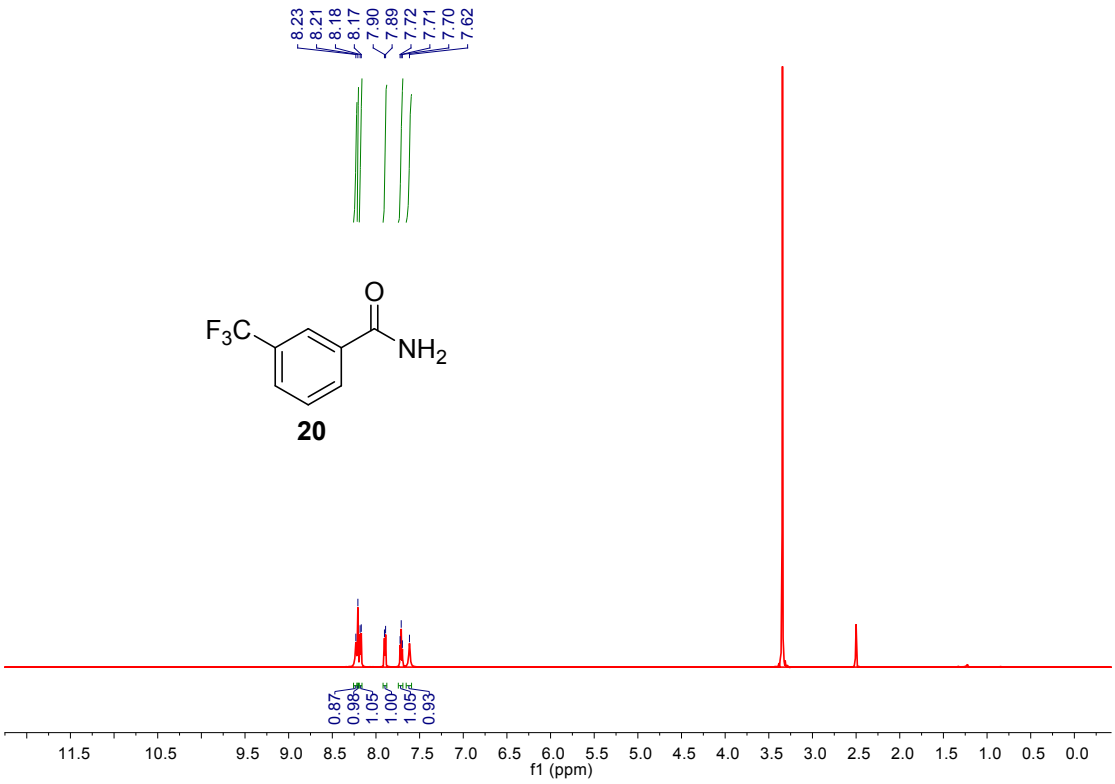


^{1}H NMR (600 MHz, DMSO-d$_6$)



^{13}C NMR (151 MHz, DMSO-d_6)



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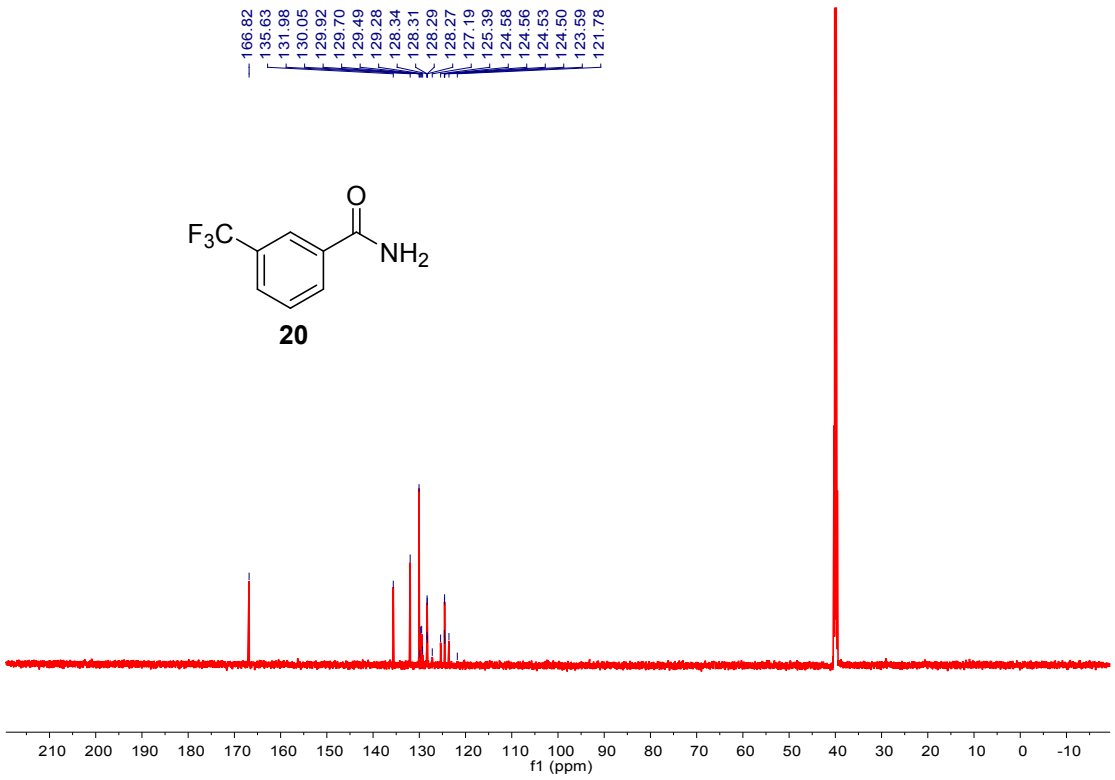
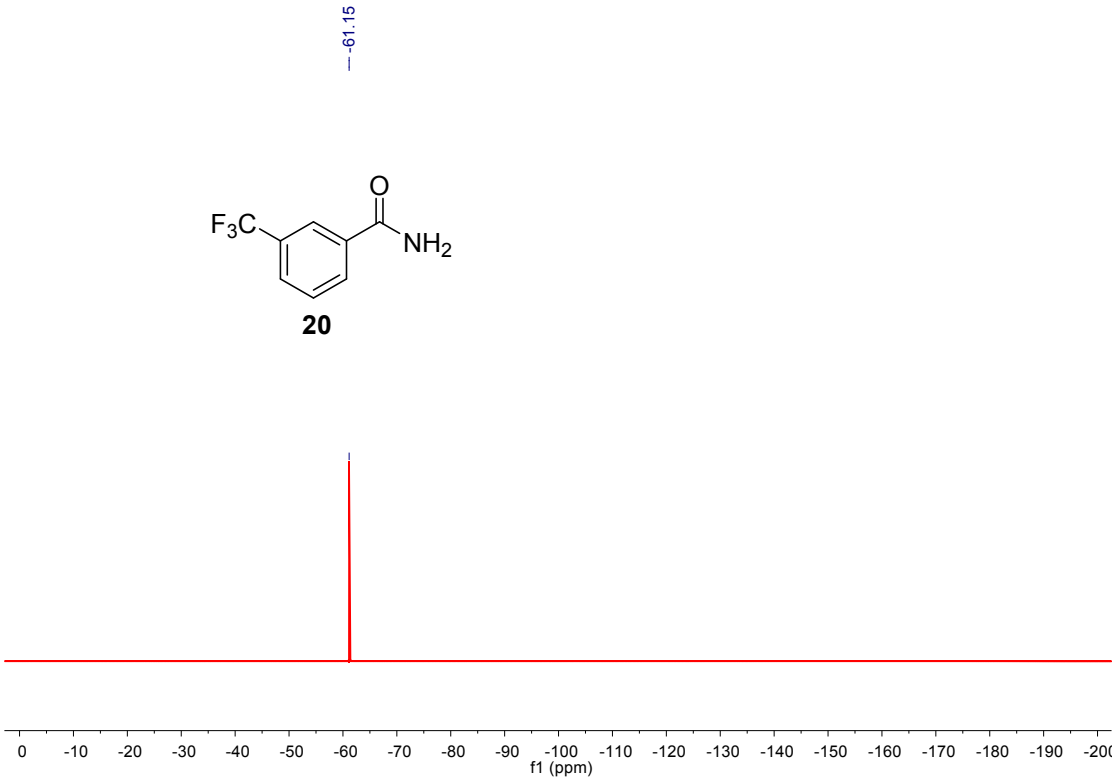
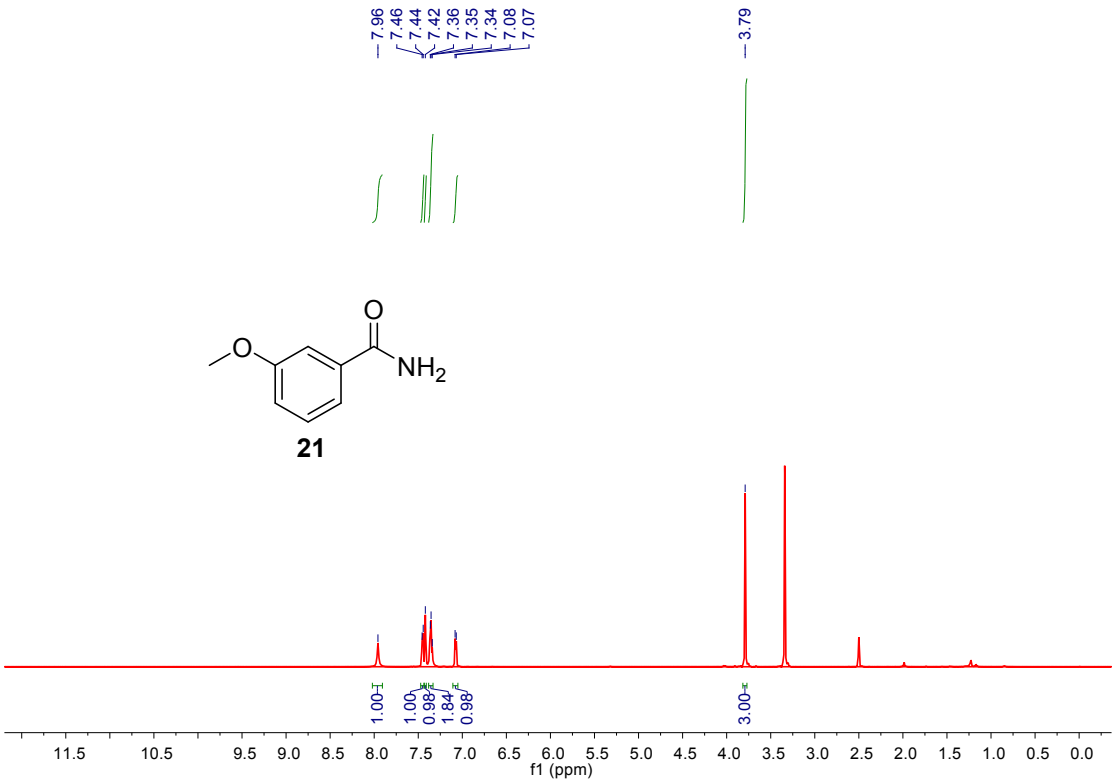


^{13}C NMR (151 MHz, DMSO-d_6)



^{19}F NMR (565 MHz, DMSO-d_6)



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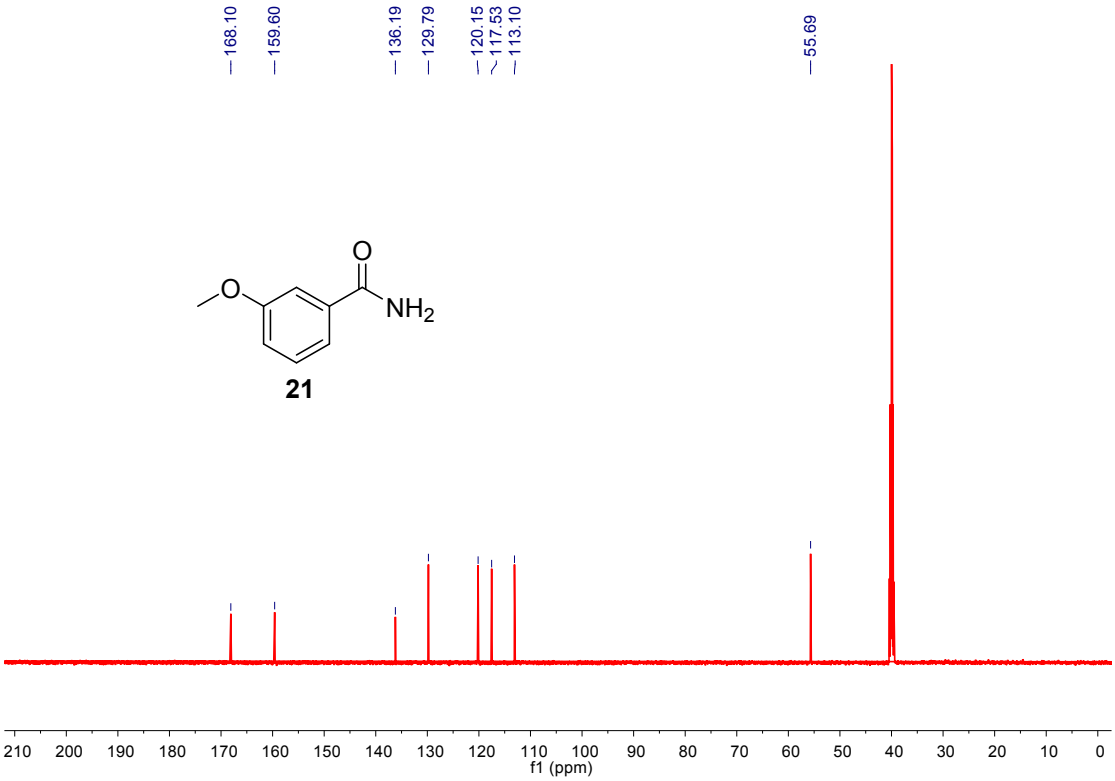
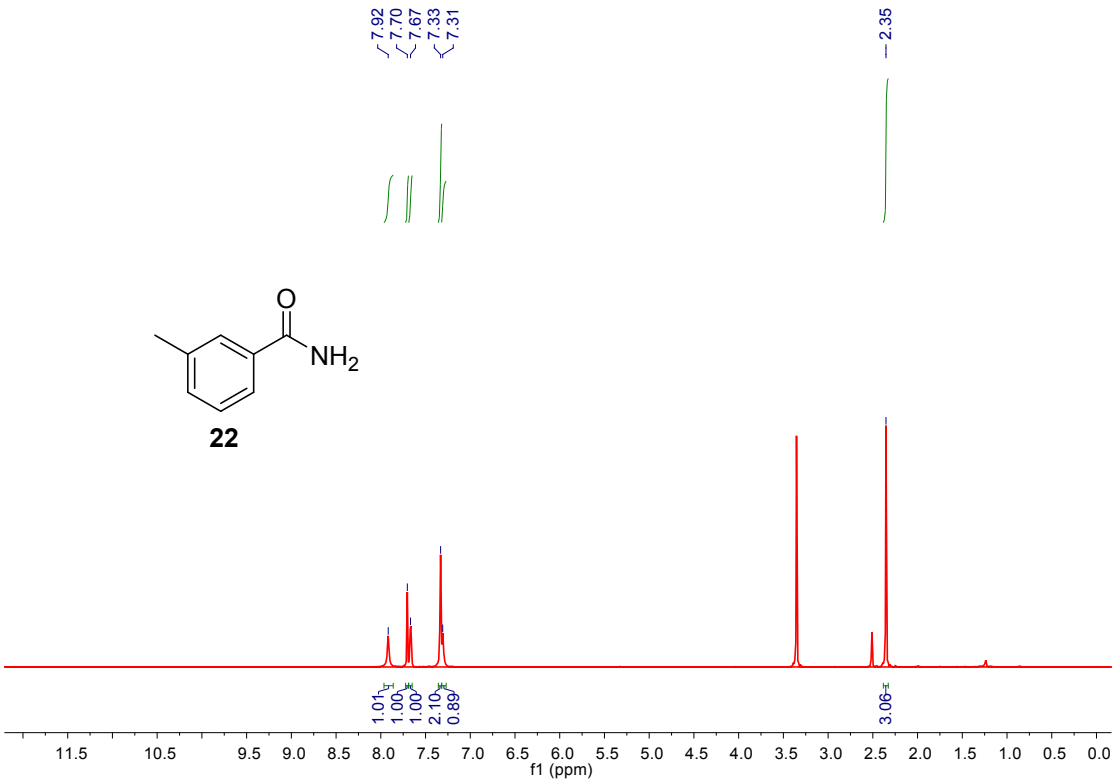


^{13}C NMR (151 MHz, DMSO-d_6)



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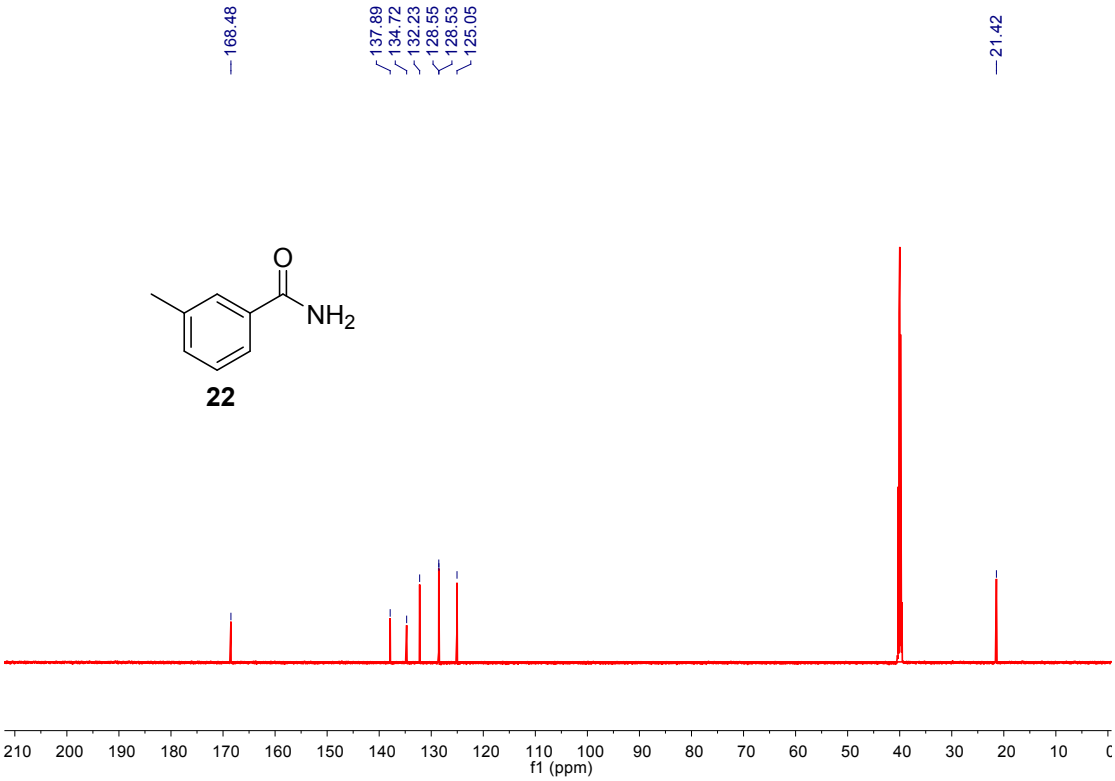

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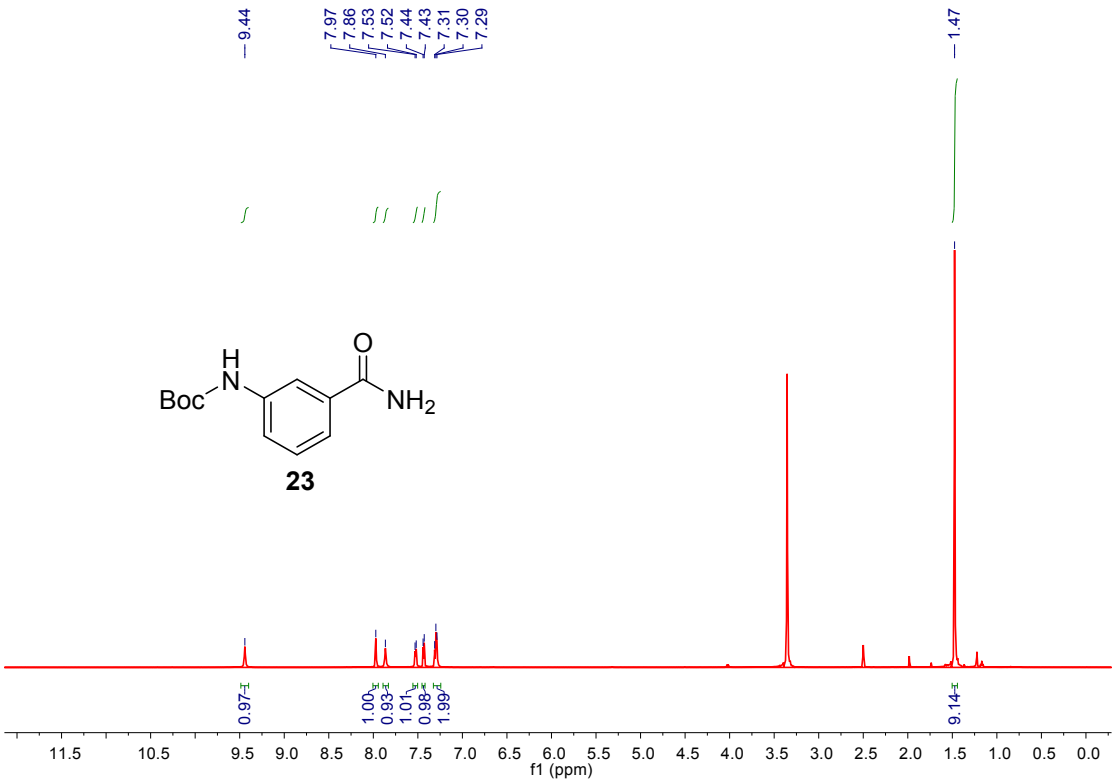
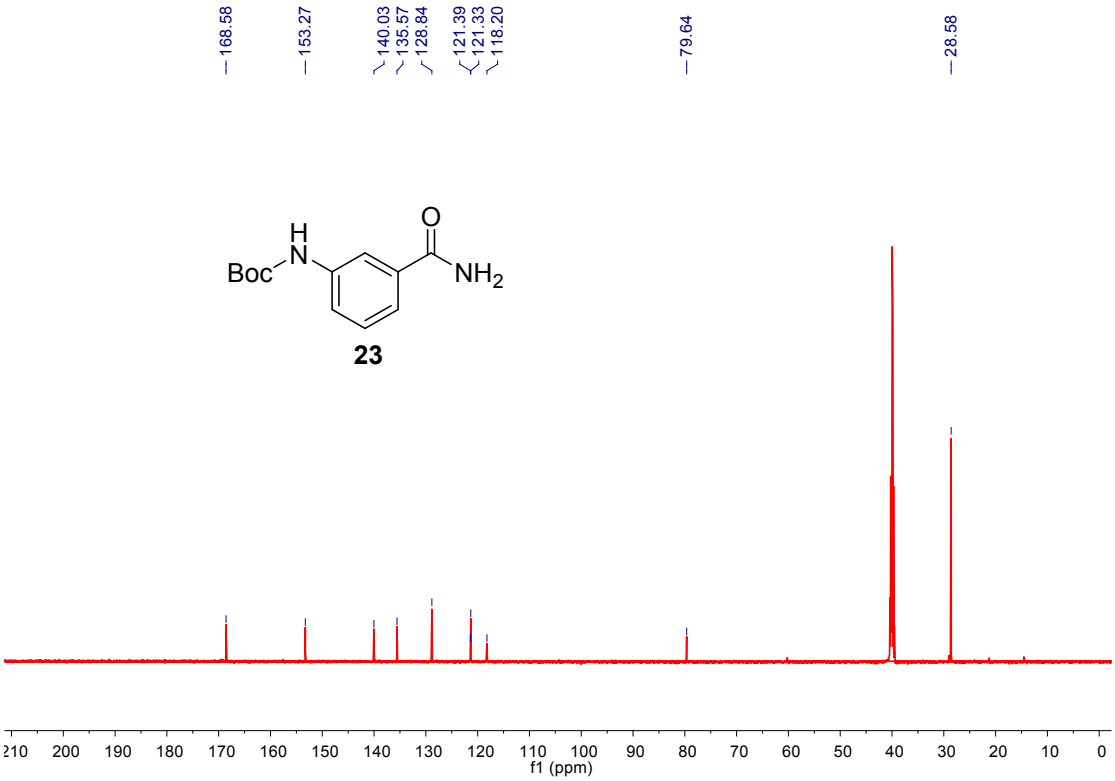
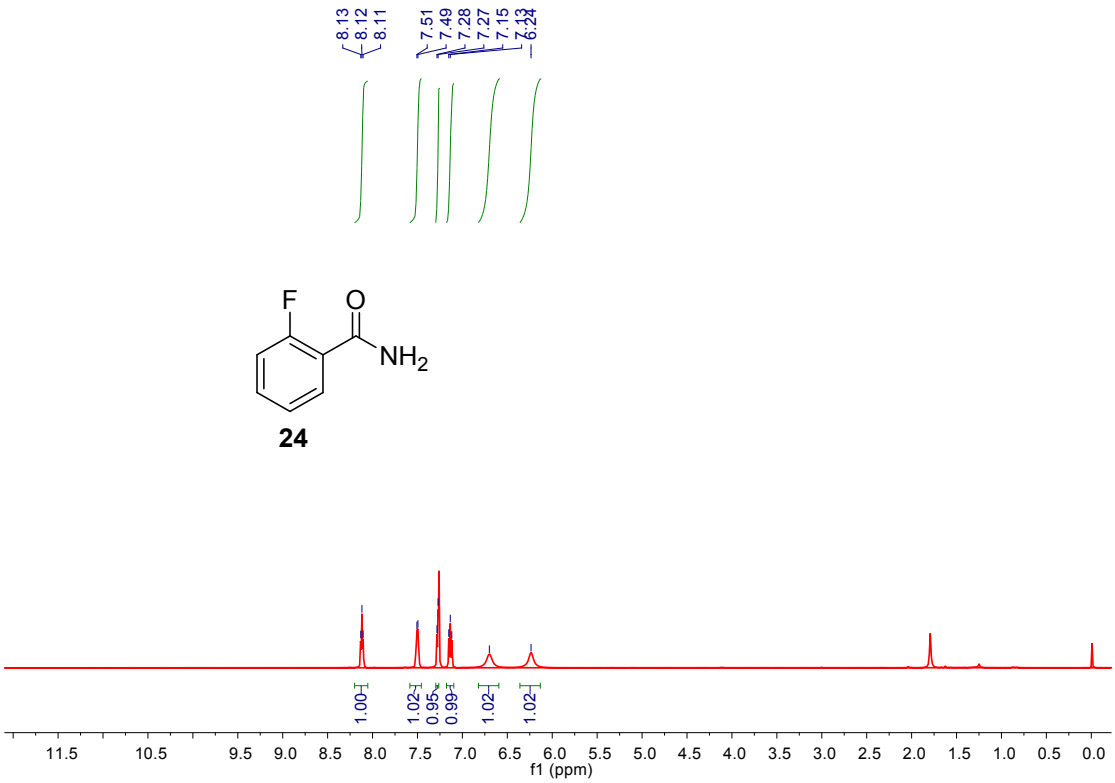


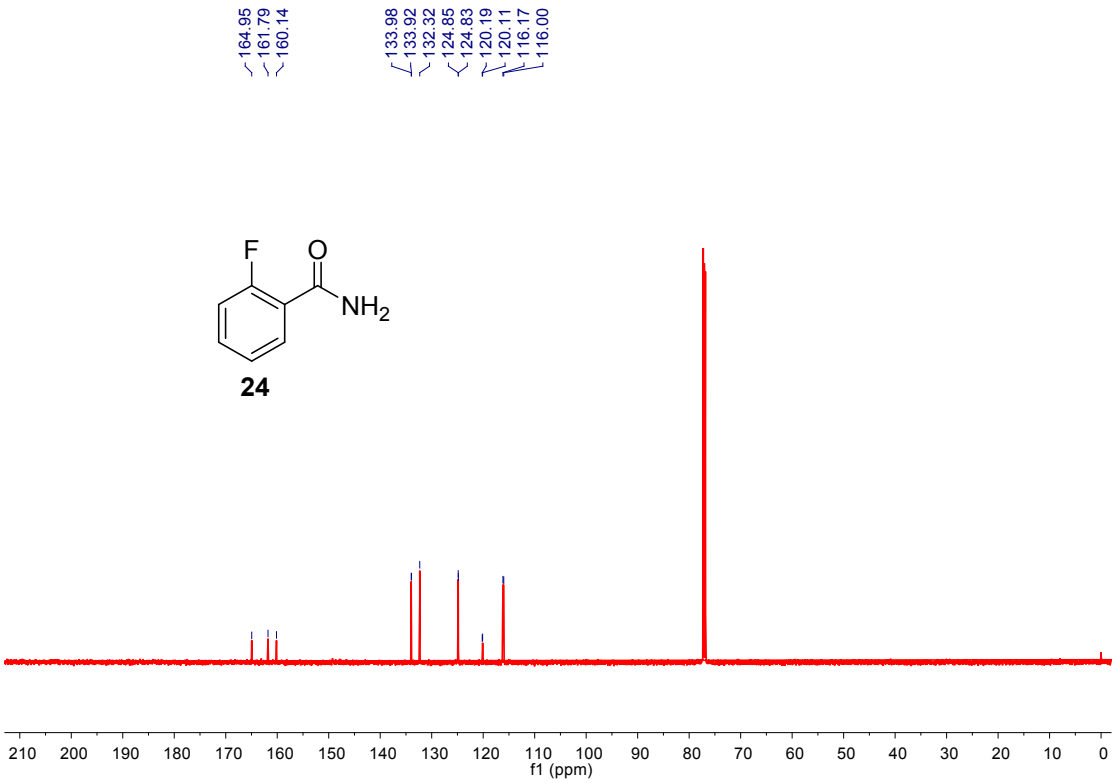
^{1}H NMR (600 MHz, DMSO-d_6)



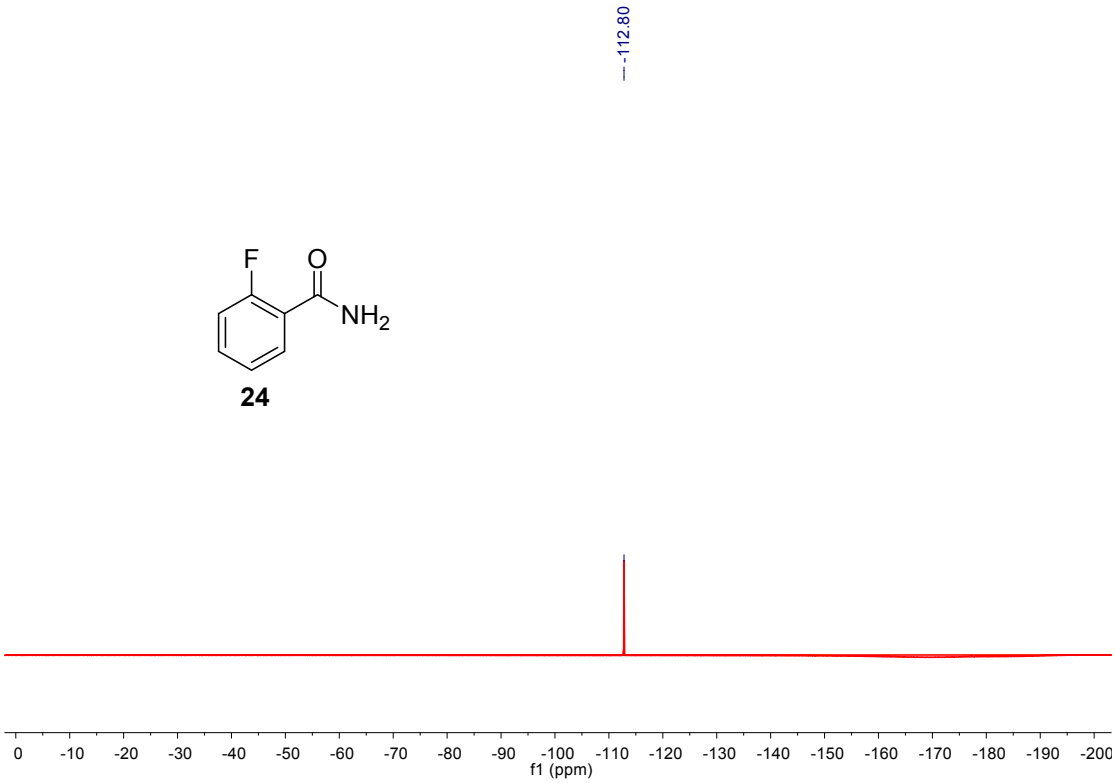
^{13}C NMR (151 MHz, DMSO-d_6)



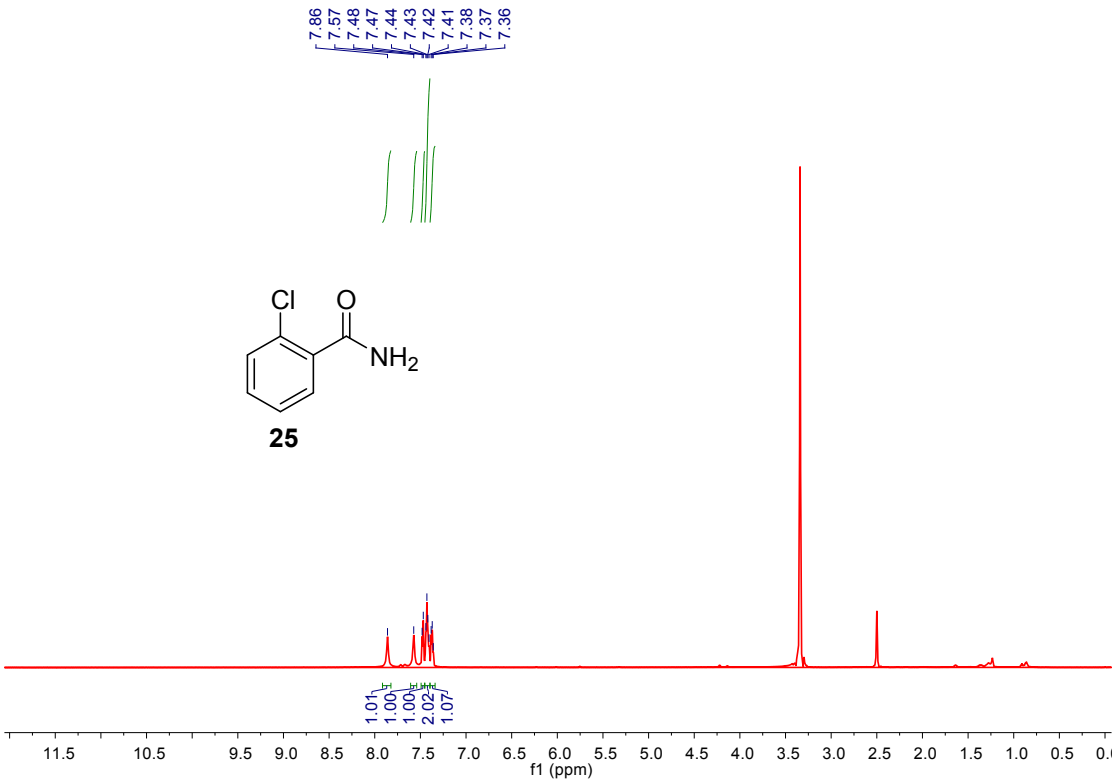
^{1}H NMR (600 MHz, $CDCl_3$)



^{13}C NMR (151 MHz, $CDCl_3$)



^{19}F NMR (565 MHz, DMSO-d$_6$)



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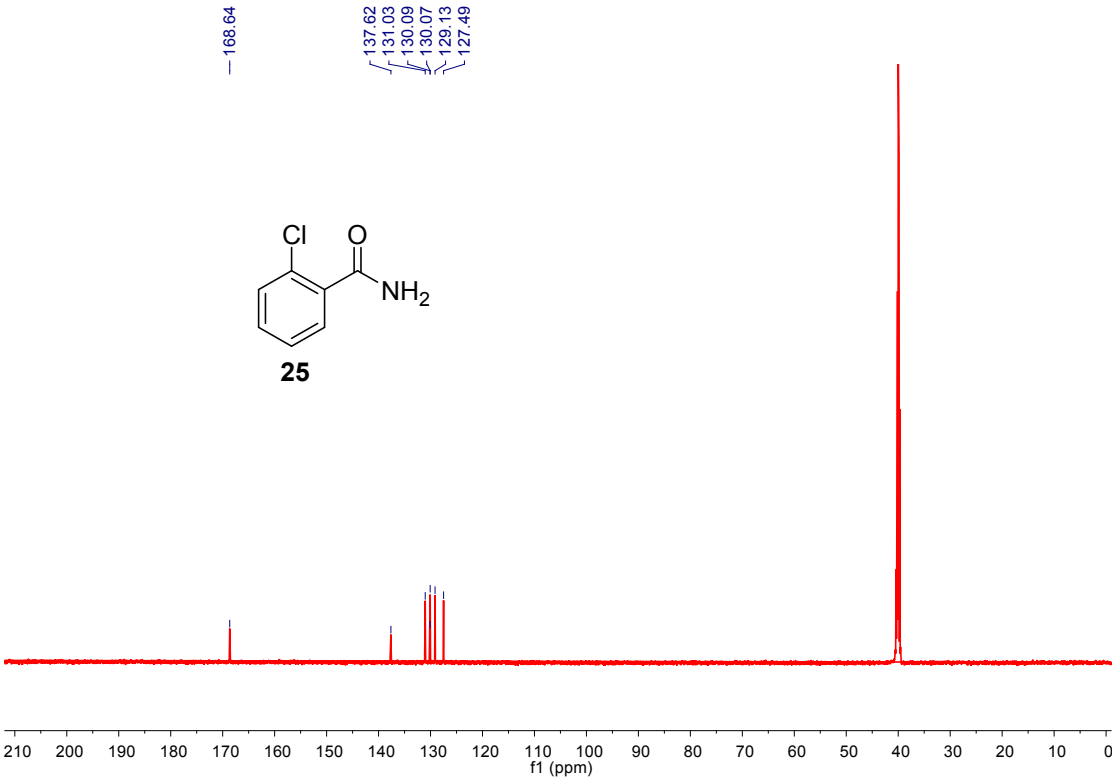

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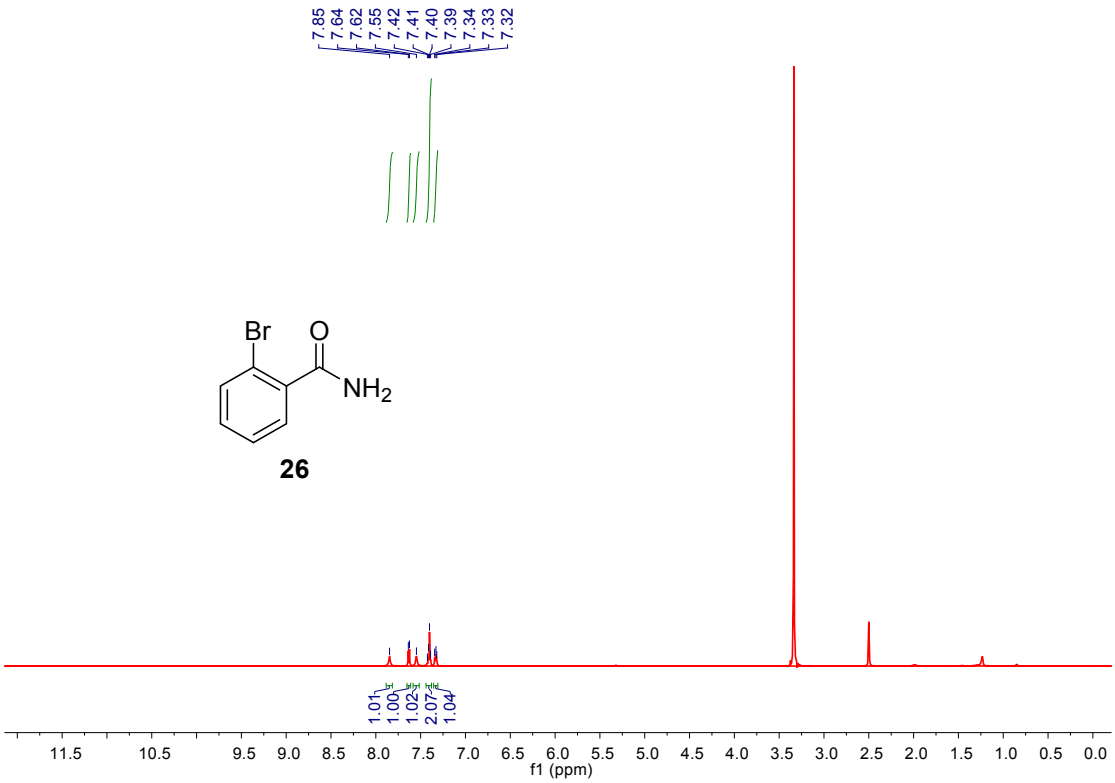
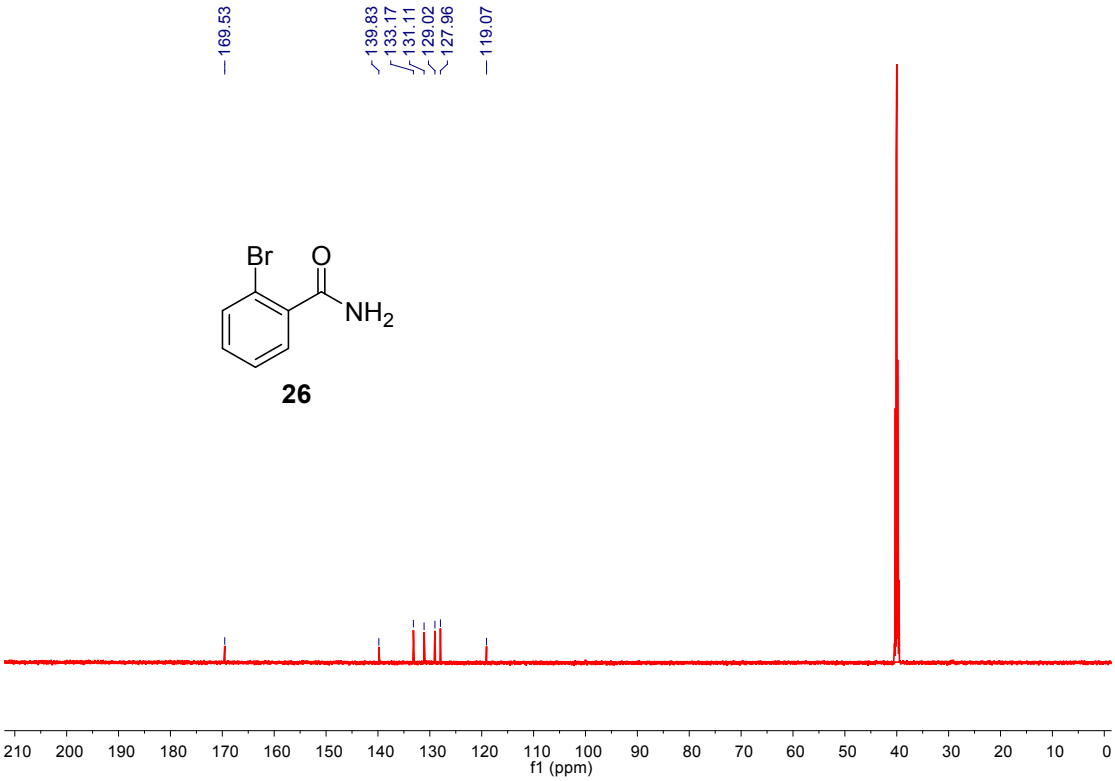
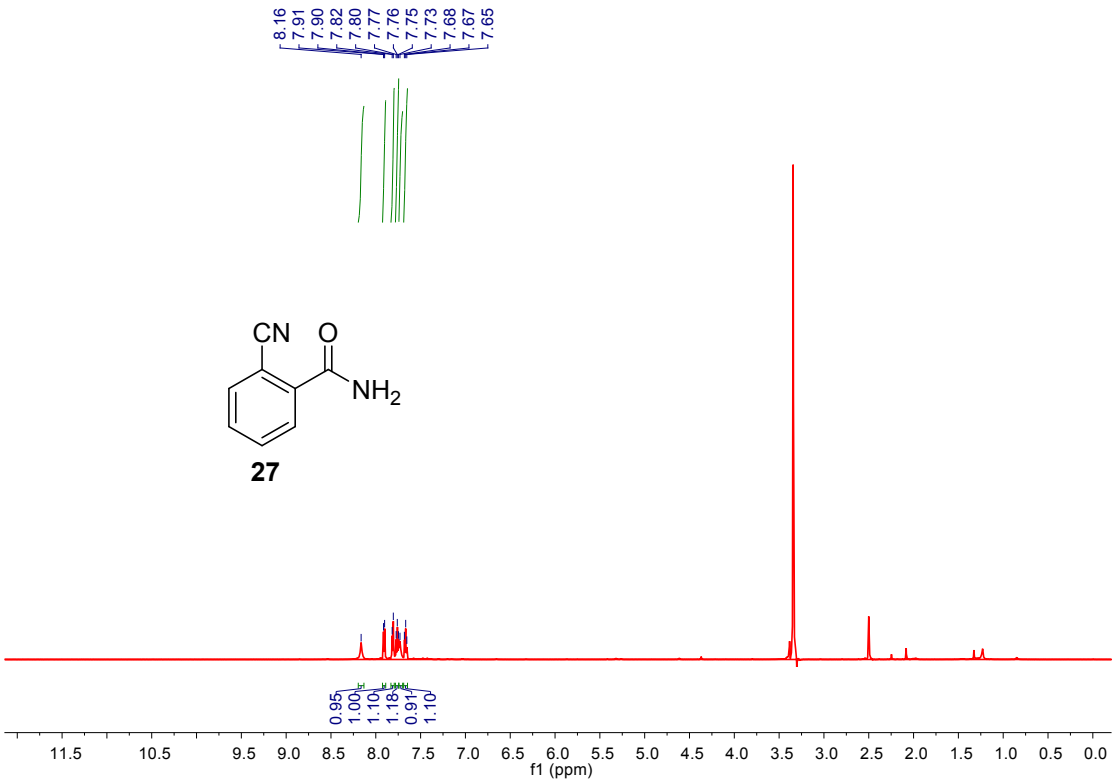


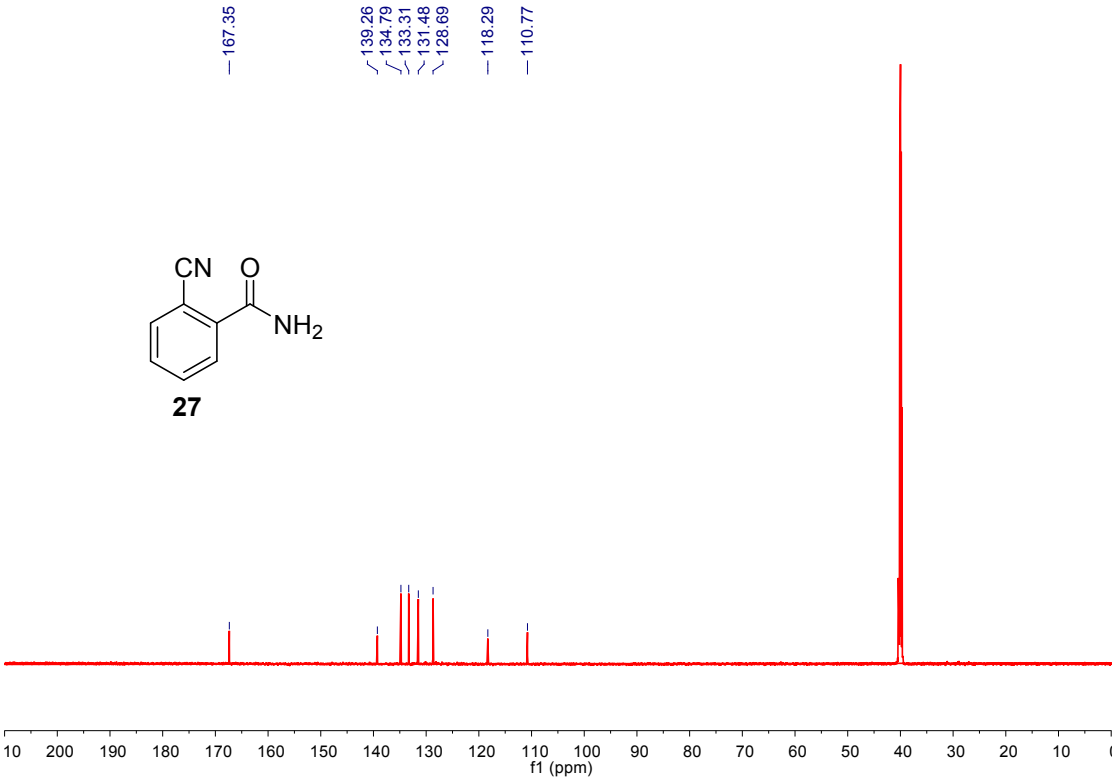
^{1}H NMR (600 MHz, DMSO-d$_6$)



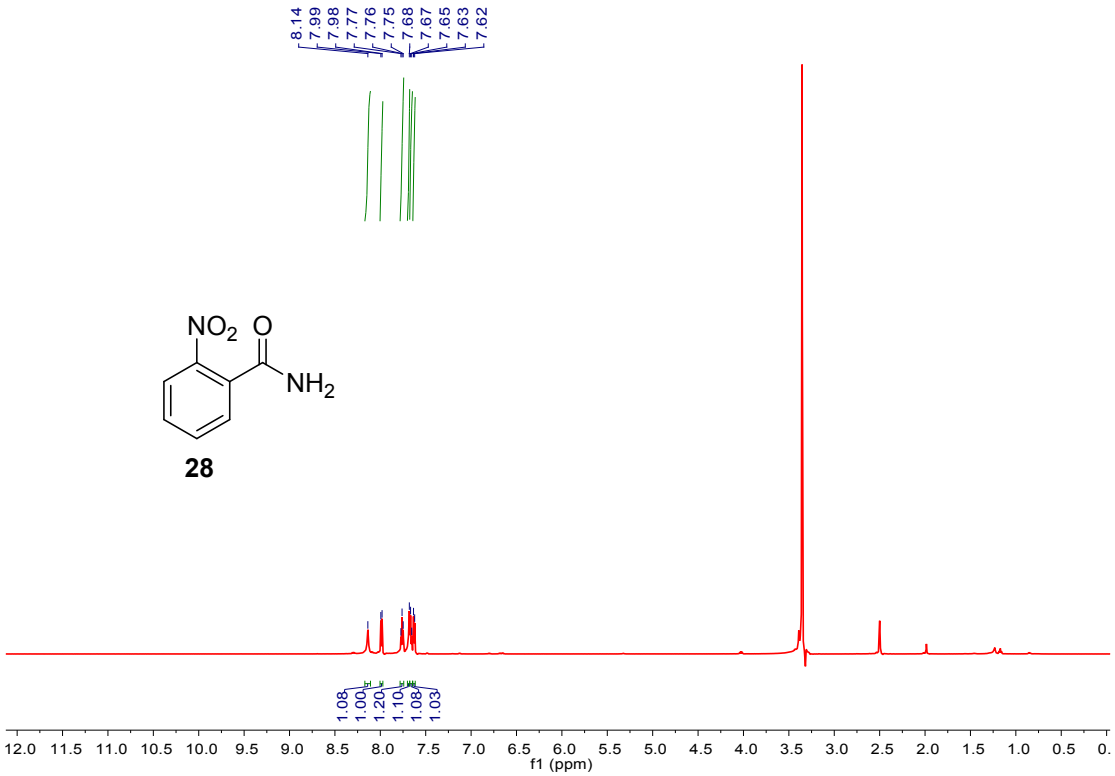
^{13}C NMR (151 MHz, DMSO-d_6)



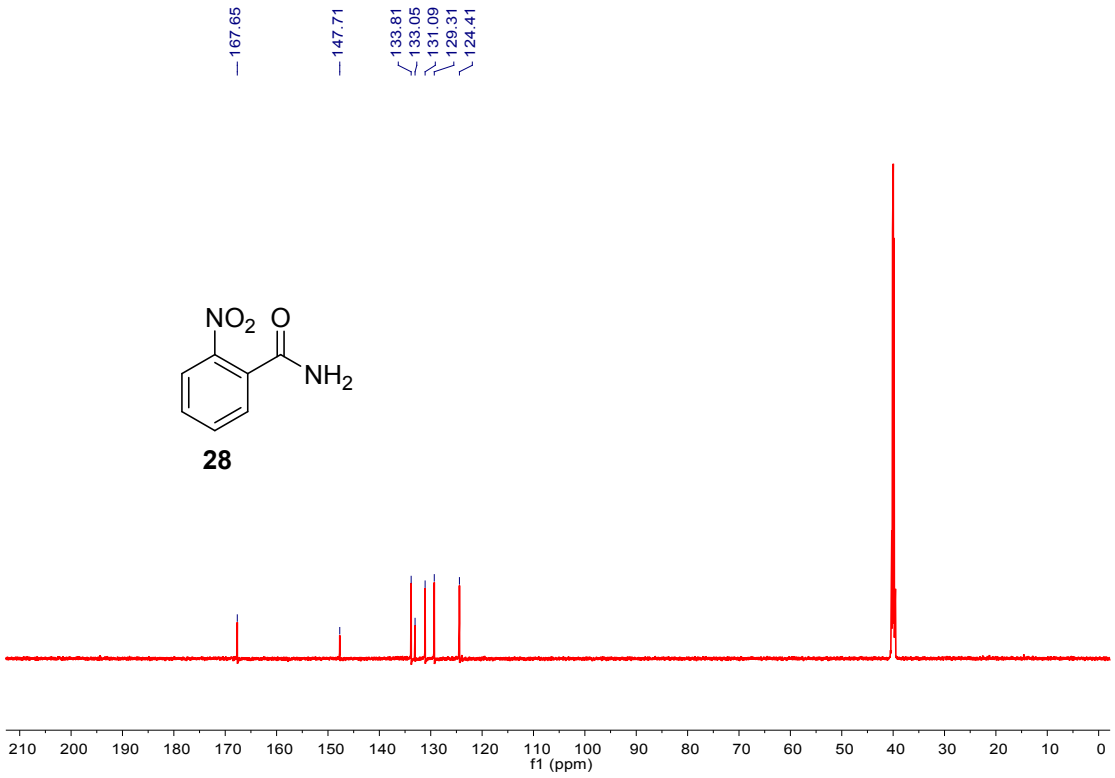
^{1}H NMR (600 MHz, DMSO-d_6)



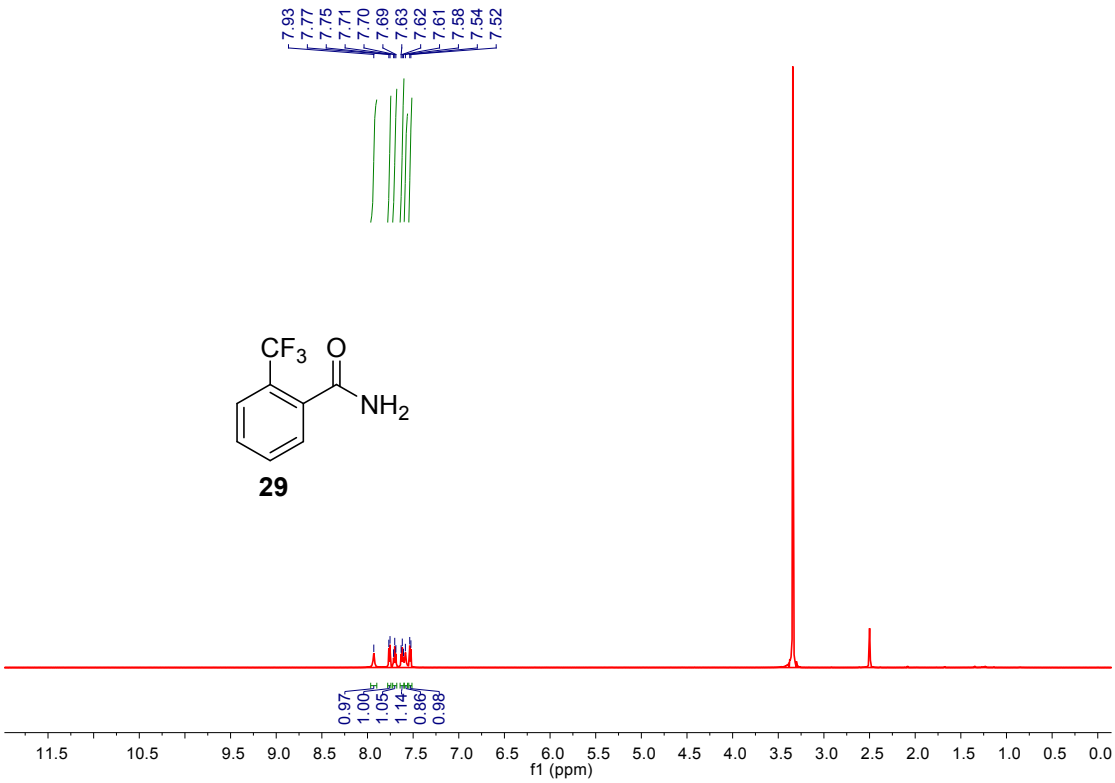
^{13}C NMR (151 MHz, DMSO-d_6)



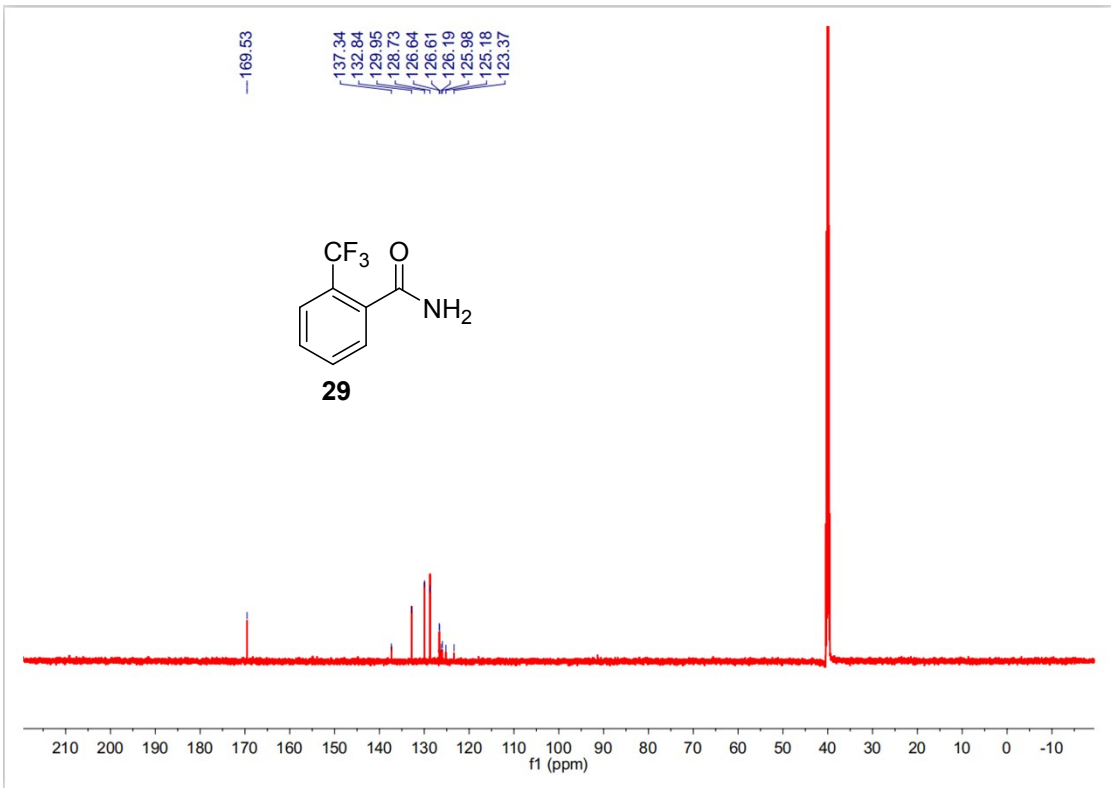
^{1}H NMR (600 MHz, DMSO-d_6)



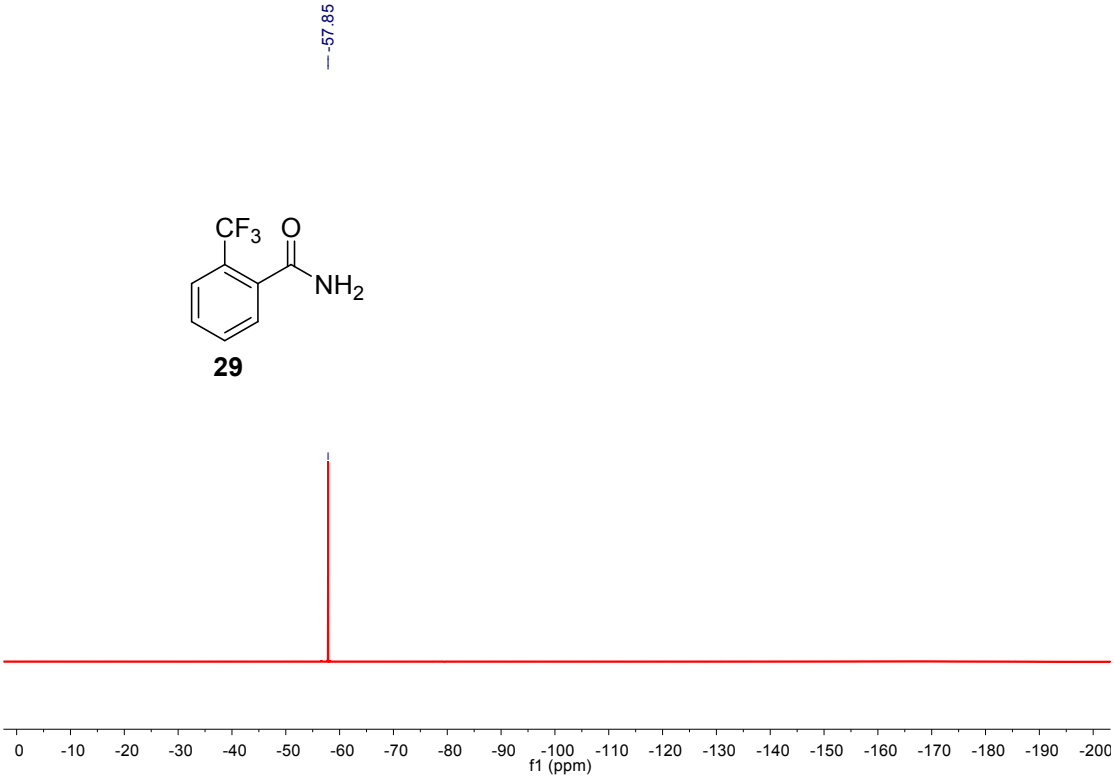
^{13}C NMR (151 MHz, DMSO-d_6)



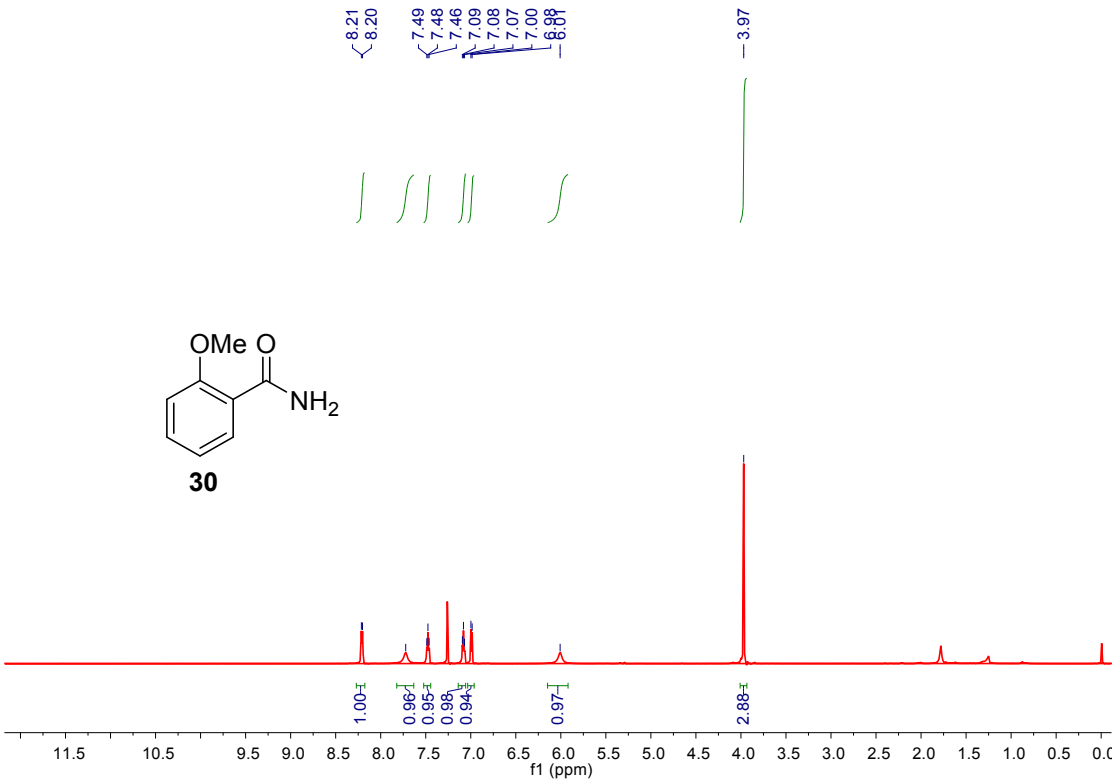
^{1}H NMR (600 MHz, DMSO-d_6)



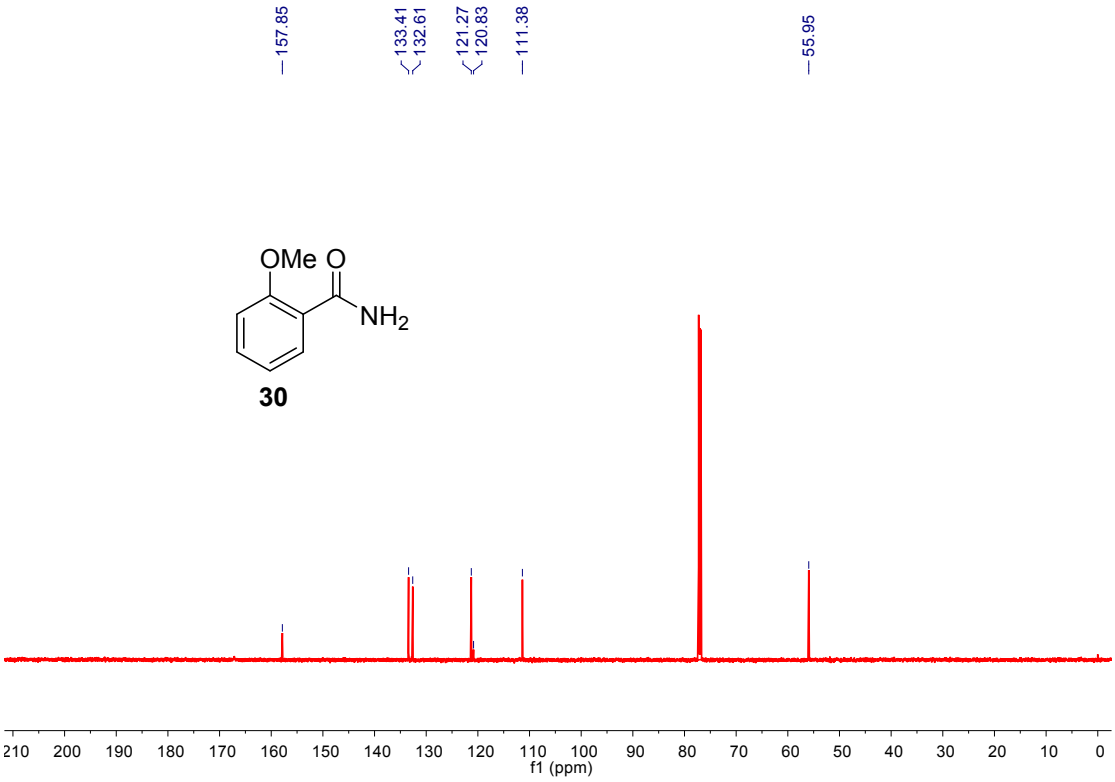
^{13}C NMR (151 MHz, DMSO-d_6)



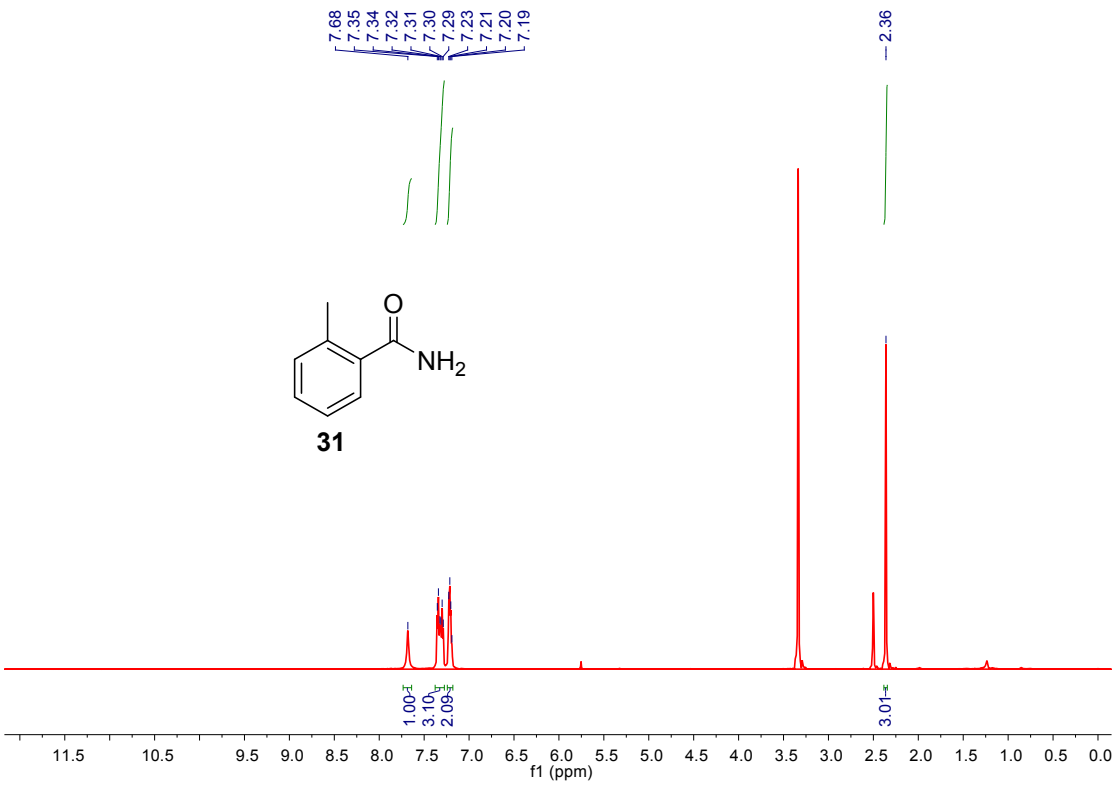
^{19}F NMR (565 MHz, DMSO-d_6)



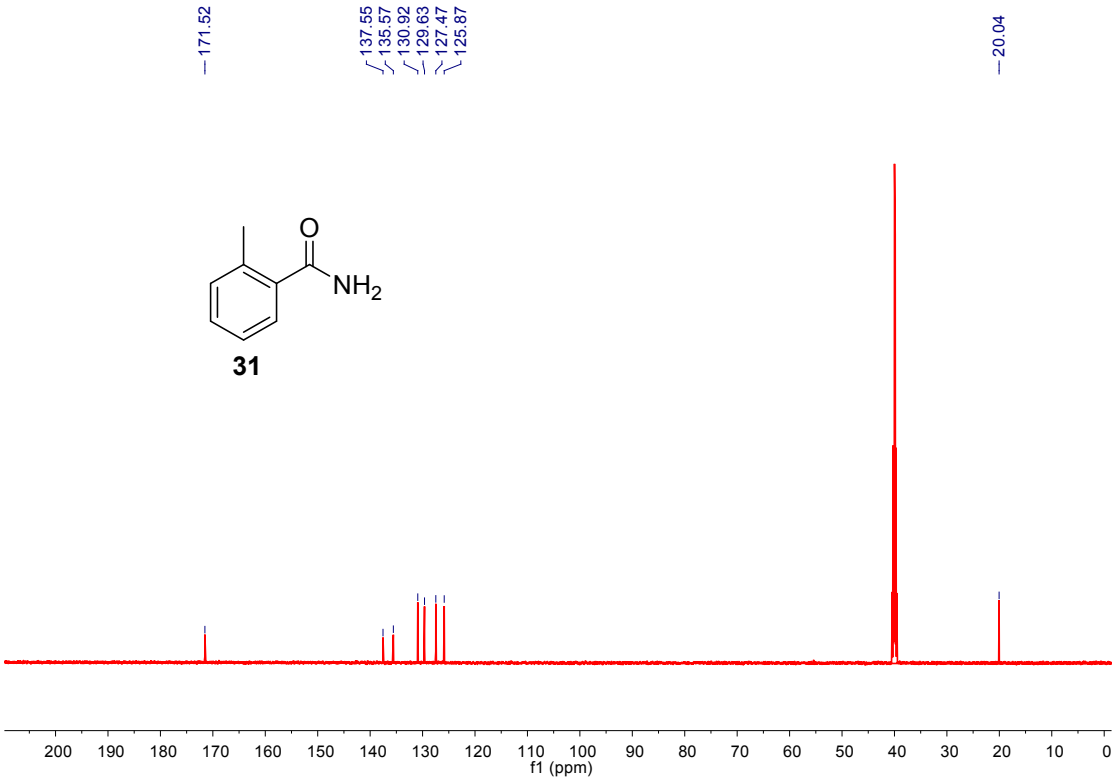
^{1}H NMR (600 MHz, $CDCl_3$)



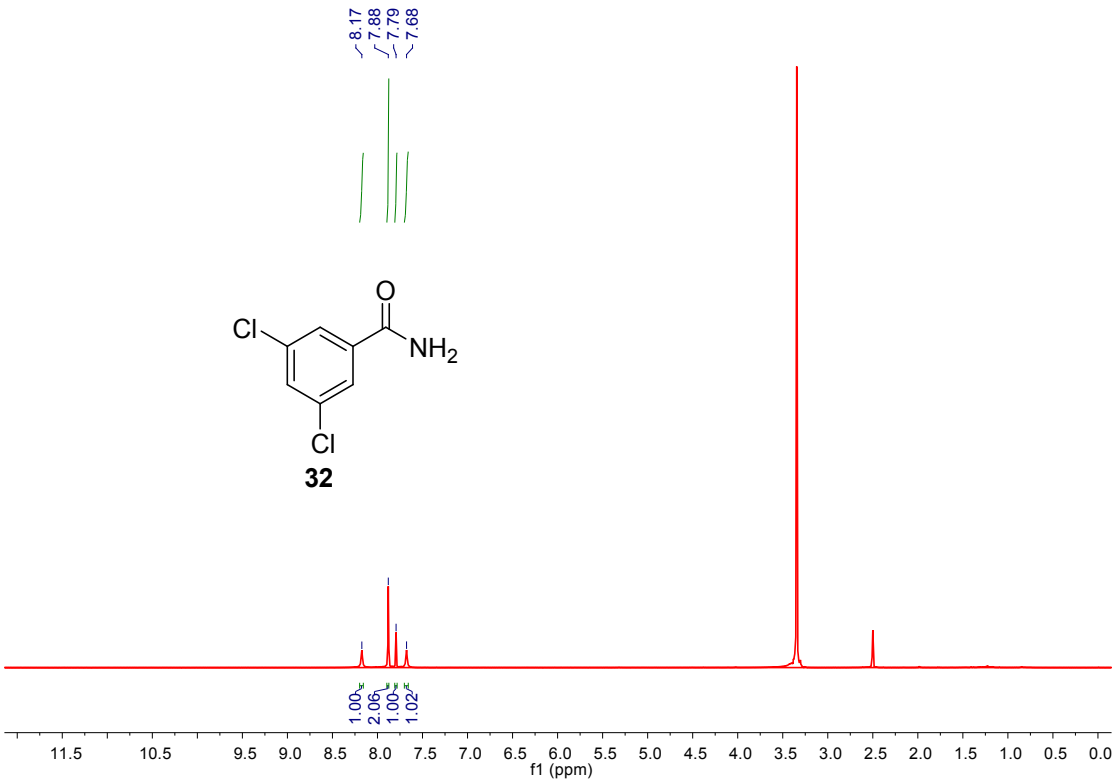
^{13}C NMR (151 MHz, $CDCl_3$)



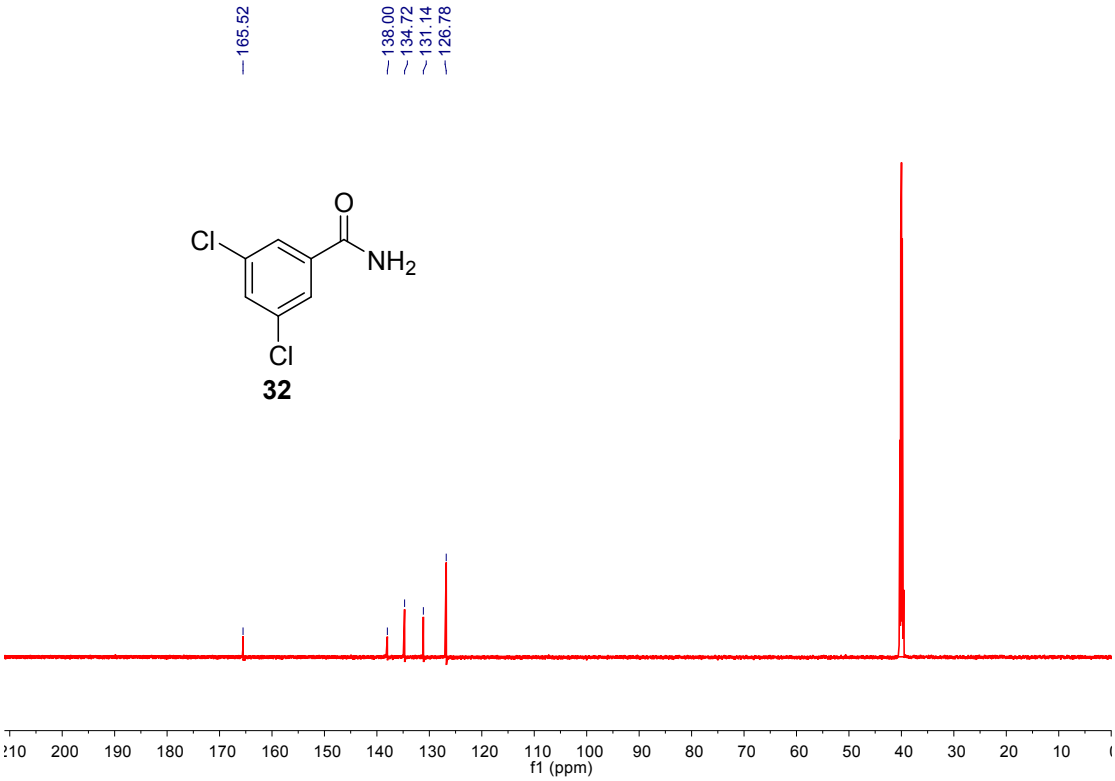
^{1}H NMR (600 MHz, DMSO-d_6)



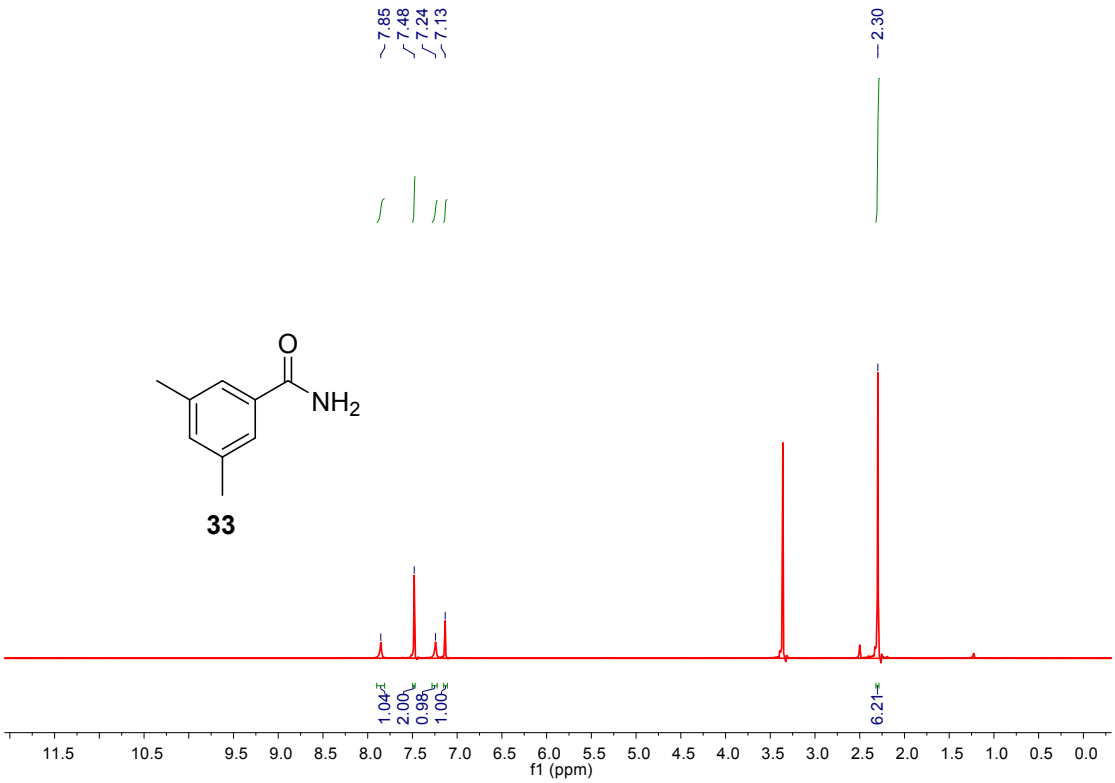
^{13}C NMR (151 MHz, DMSO-d_6)



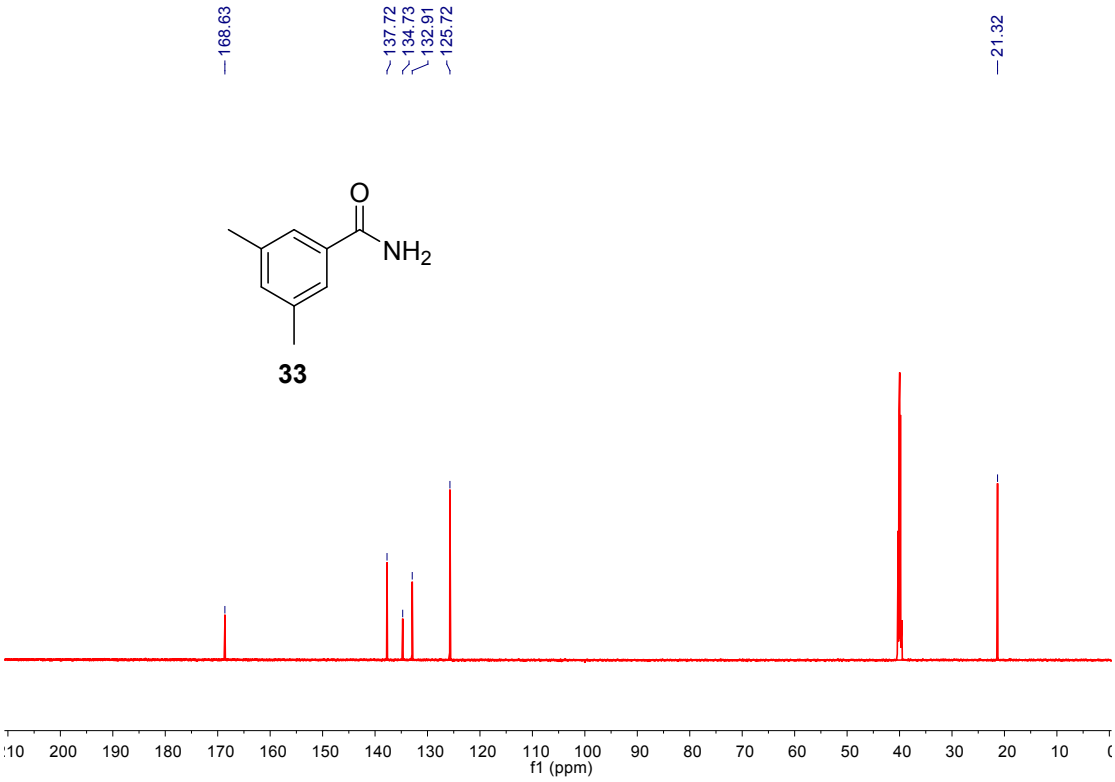
^{1}H NMR (600 MHz, DMSO-d_6)



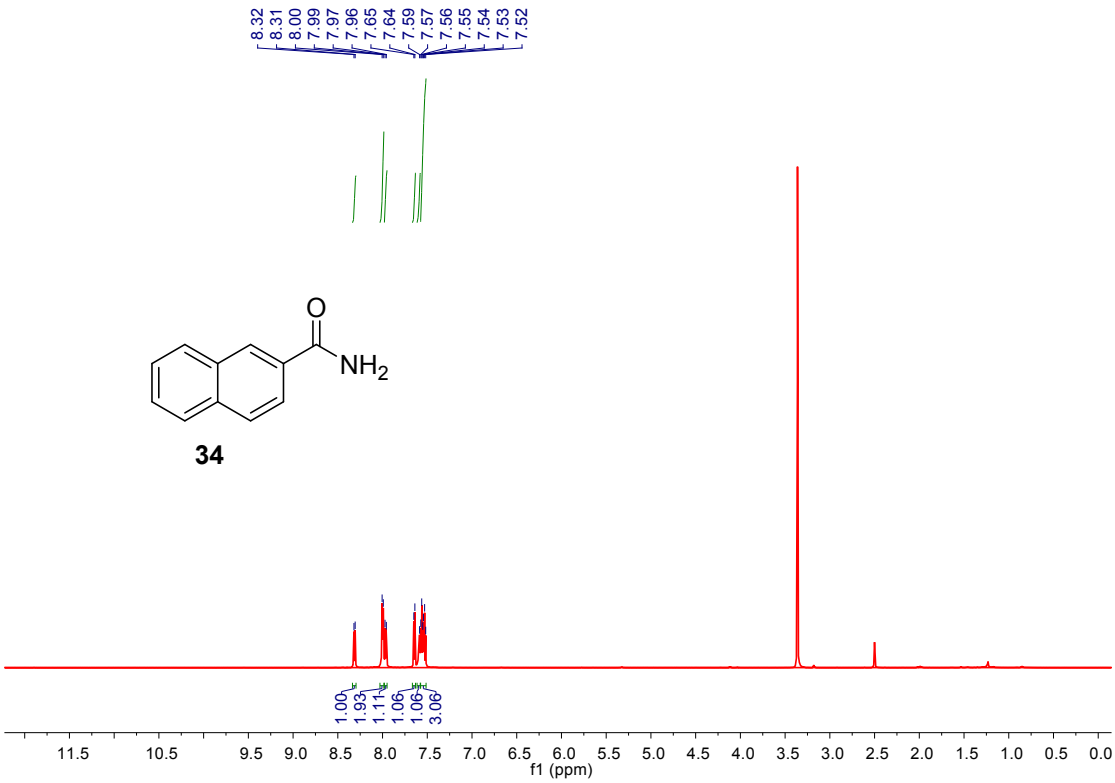
^{13}C NMR (151 MHz, DMSO-d_6)



^{1}H NMR (600 MHz, DMSO-d_6)



^{13}C NMR (151 MHz, DMSO-d_6)



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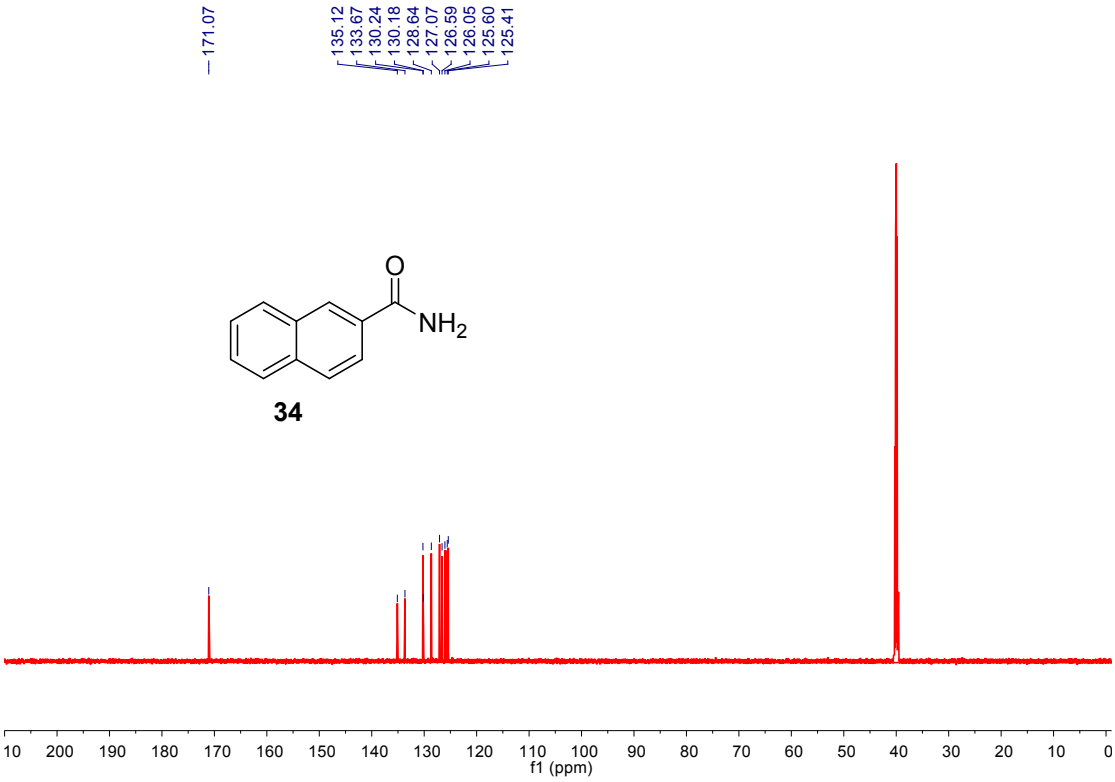
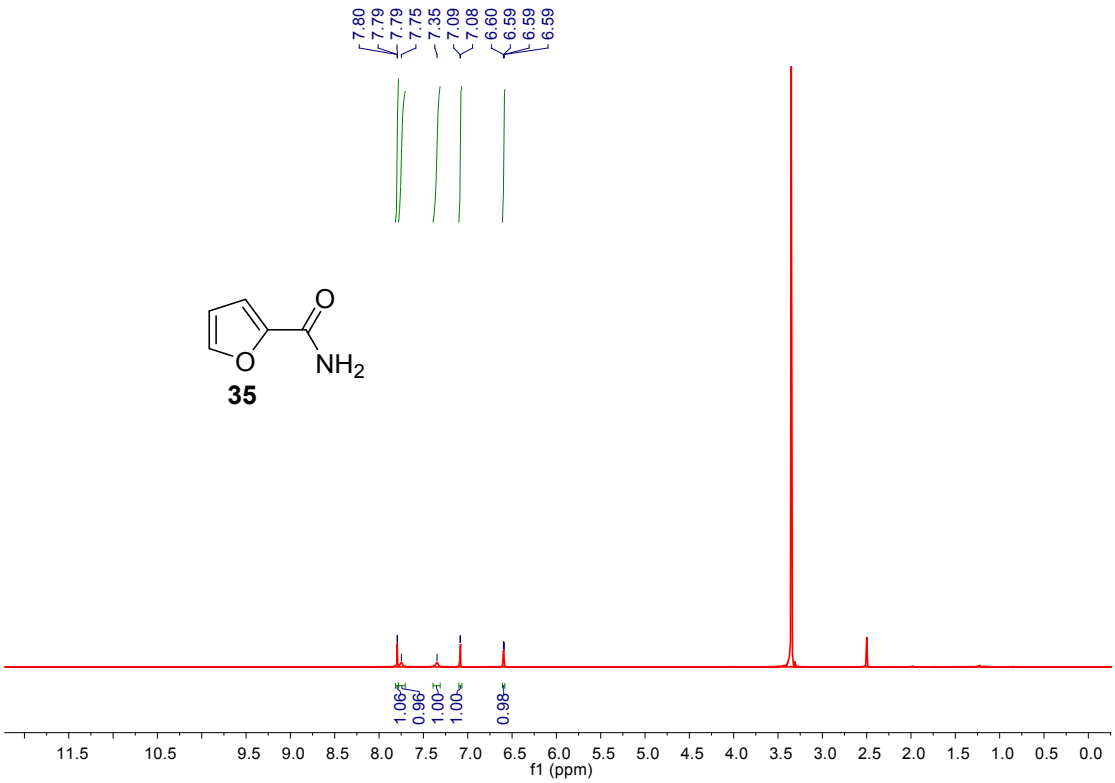
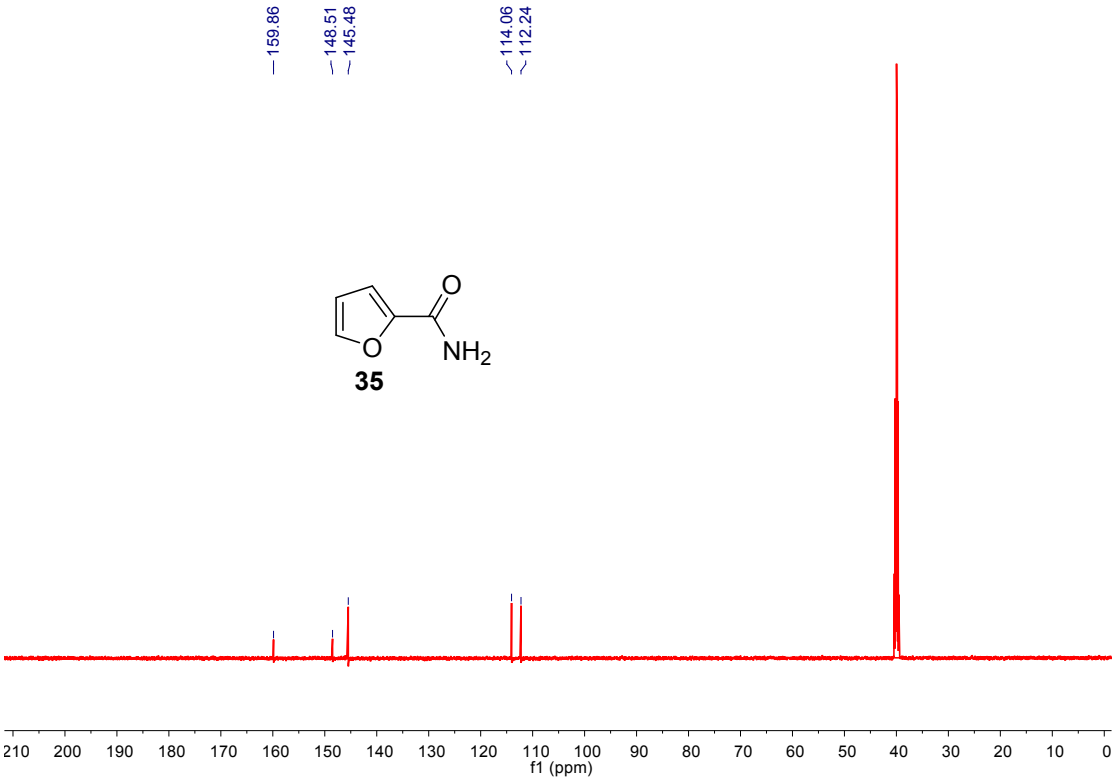


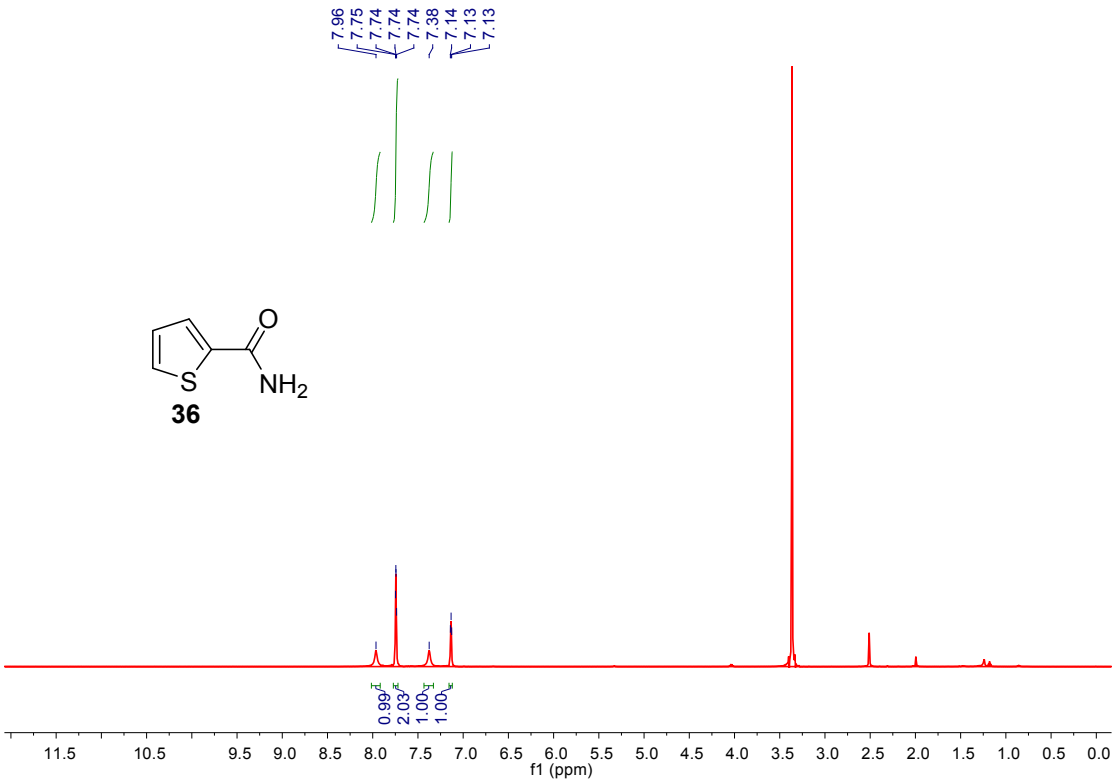
^{13}C NMR (151 MHz, DMSO-d_6)



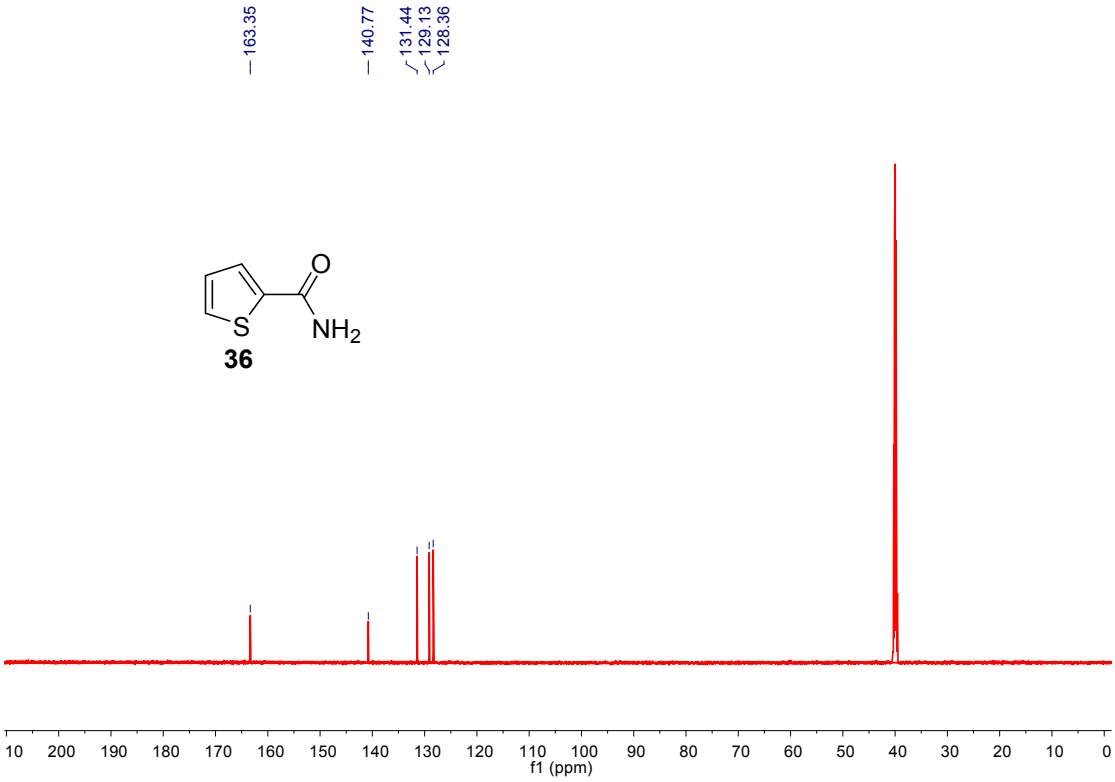
^{1}H NMR (600 MHz, DMSO-d_6)



^{13}C NMR (151 MHz, DMSO-d_6)



^{1}H NMR (600 MHz, DMSO-d_6)



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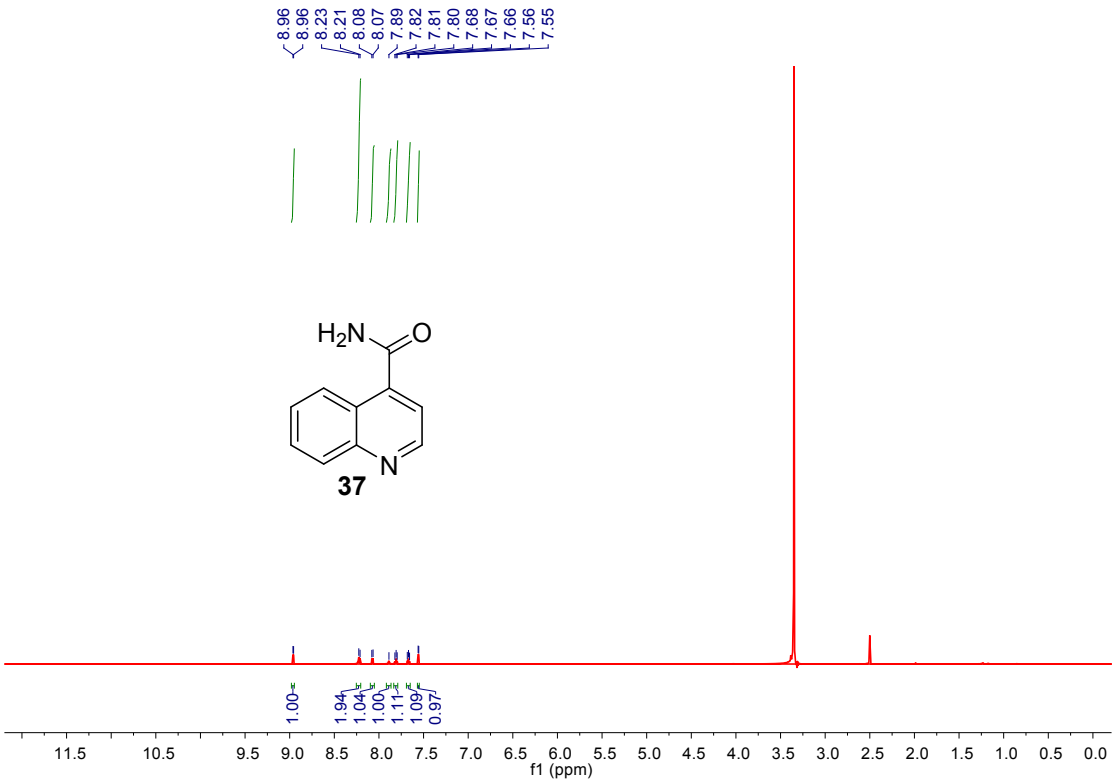

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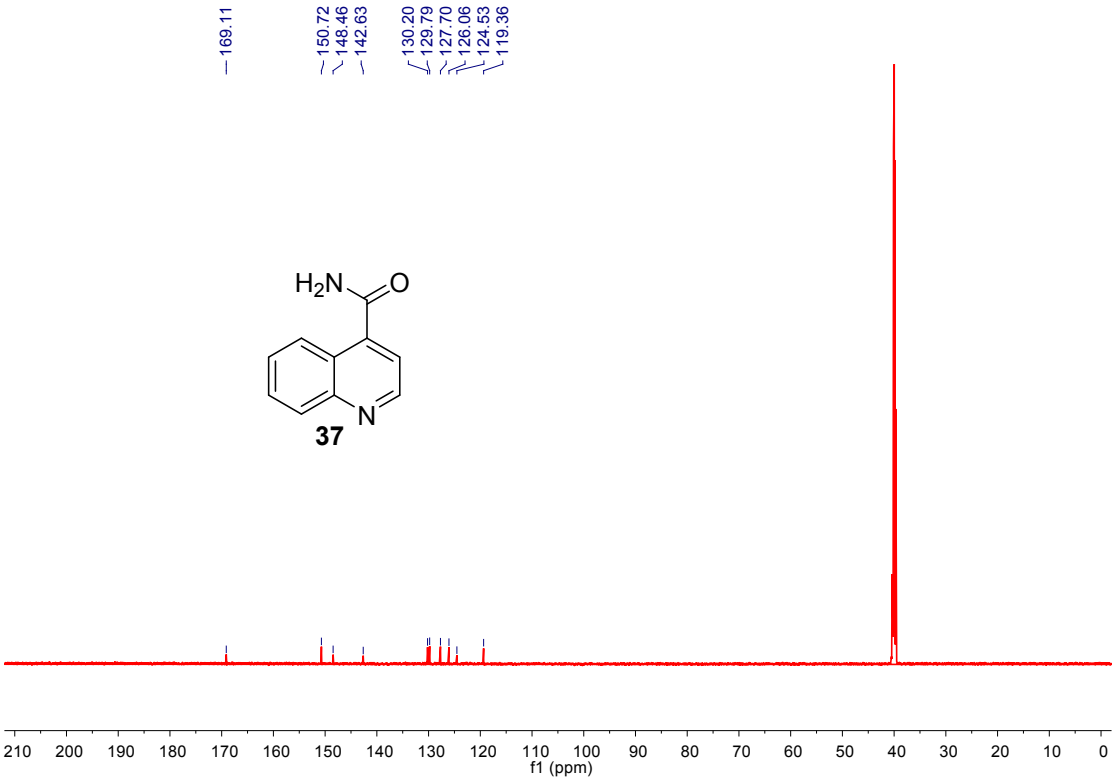
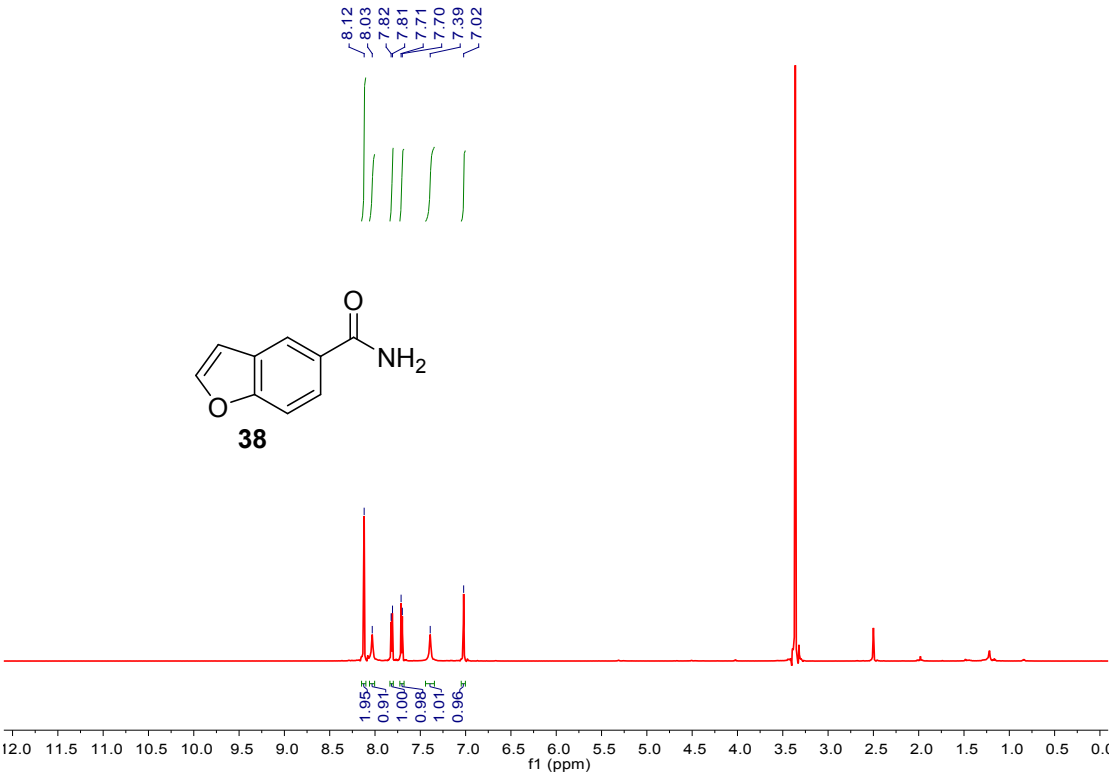
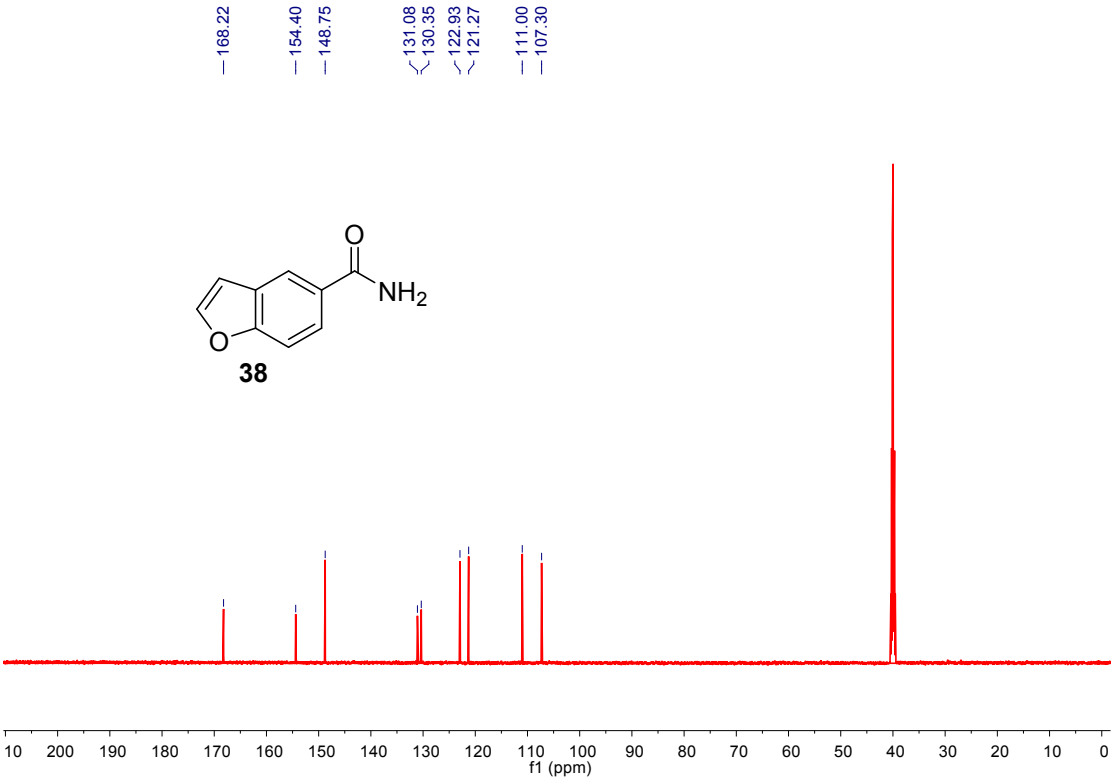


^{13}C NMR (151 MHz, DMSO-d_6)



^{1}H NMR (600 MHz, DMSO-d_6)



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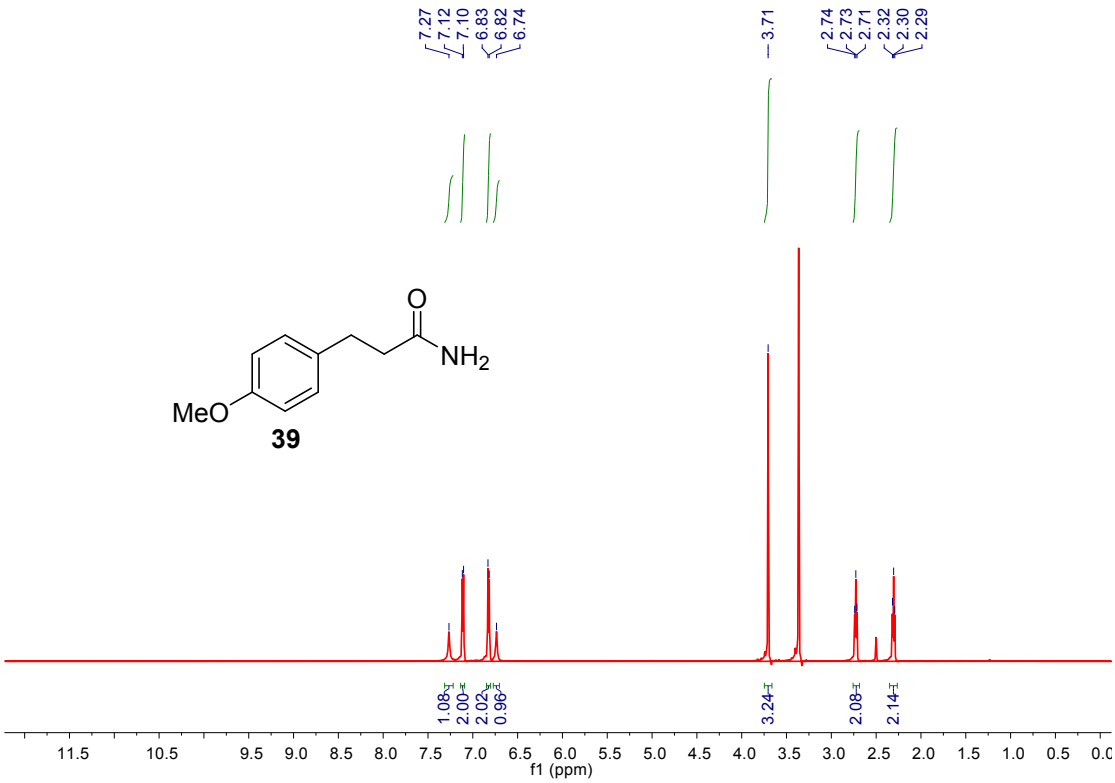

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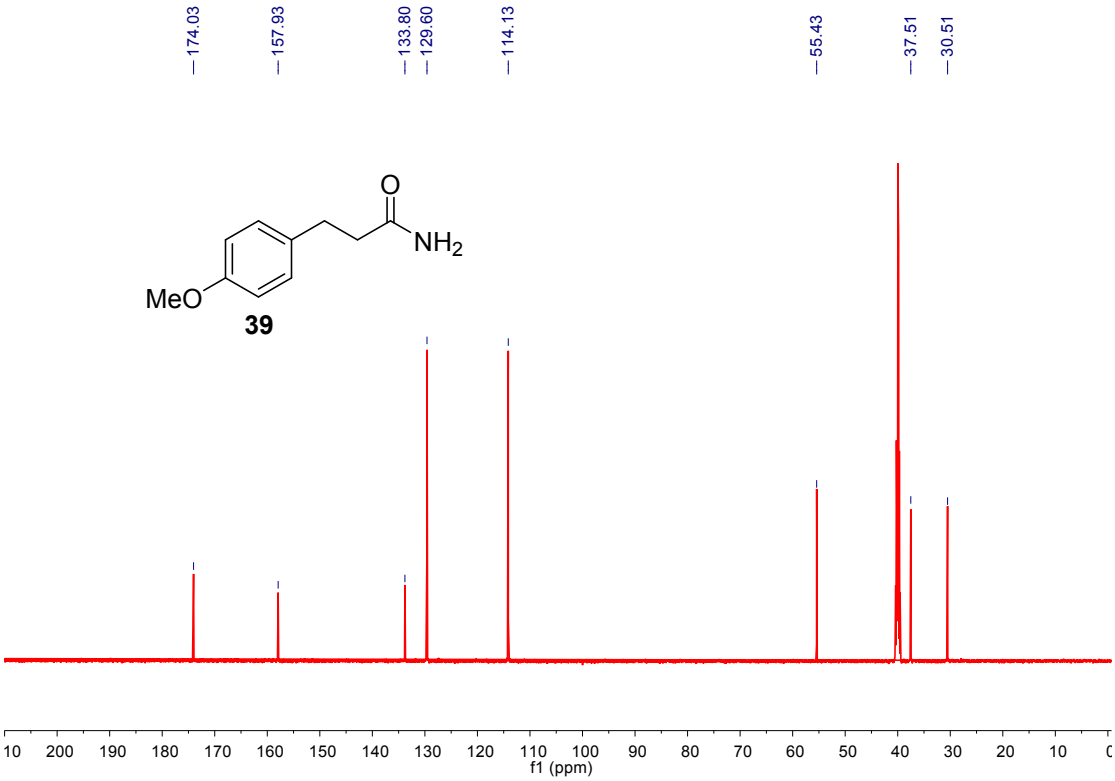
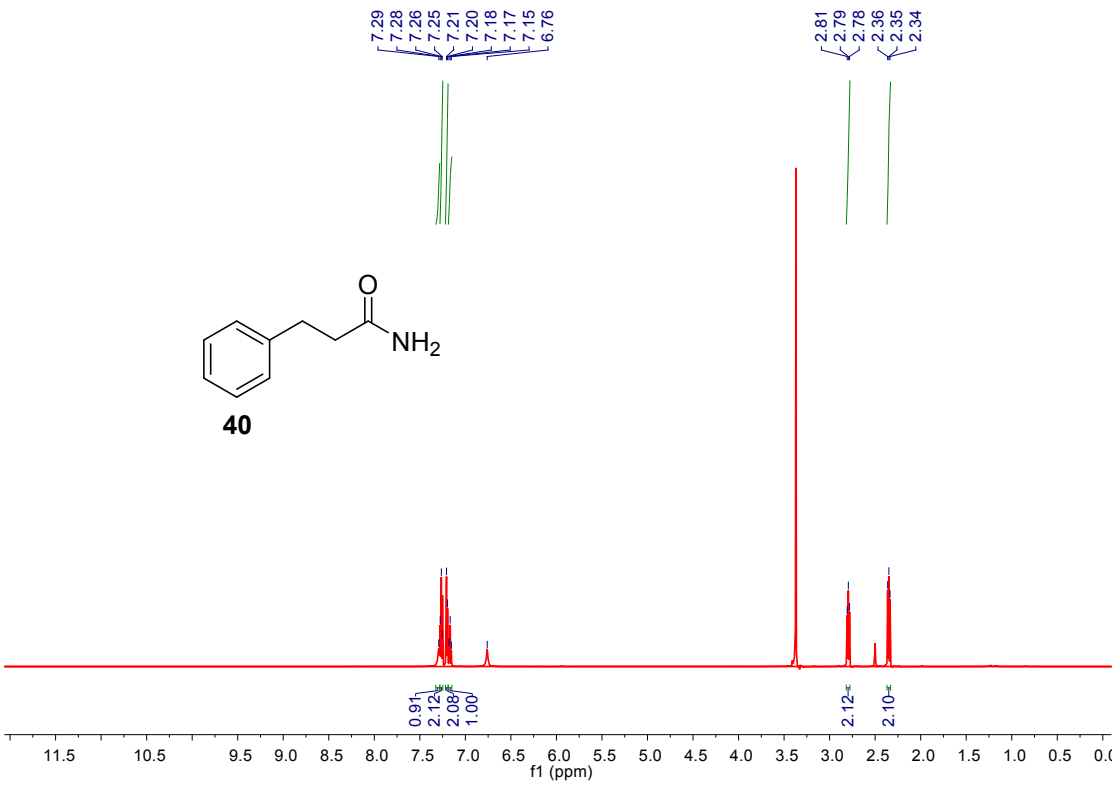


^{13}C NMR (151 MHz, DMSO-d_6)



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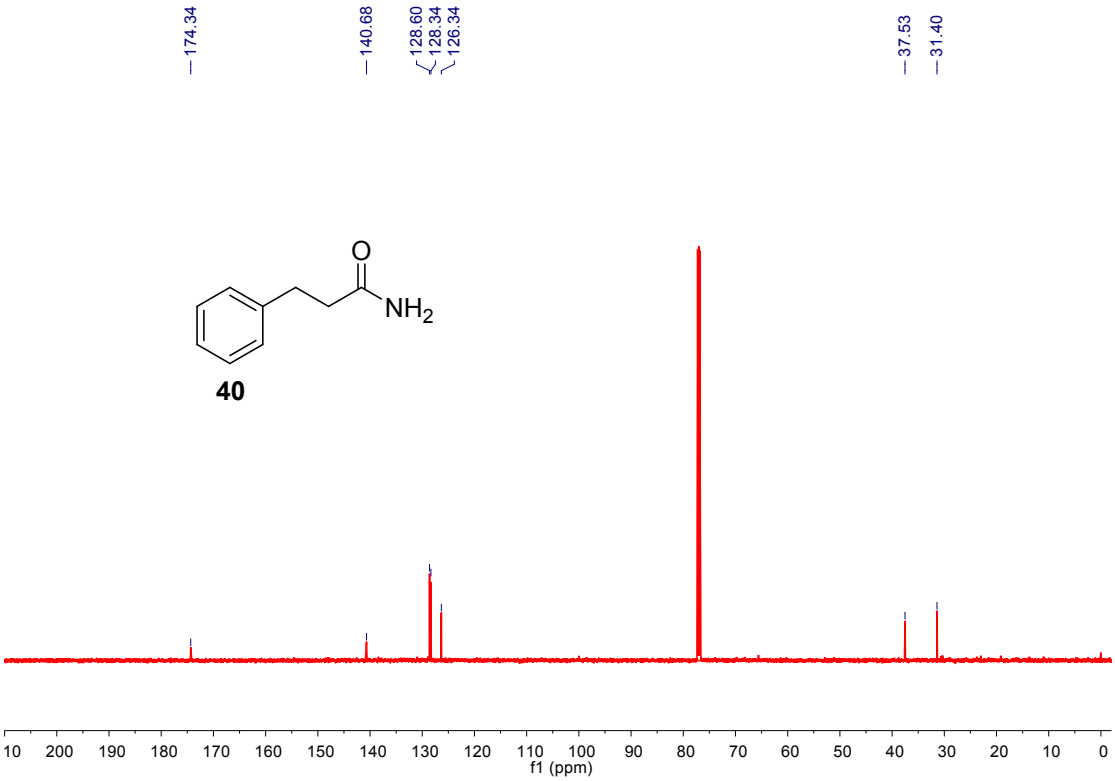
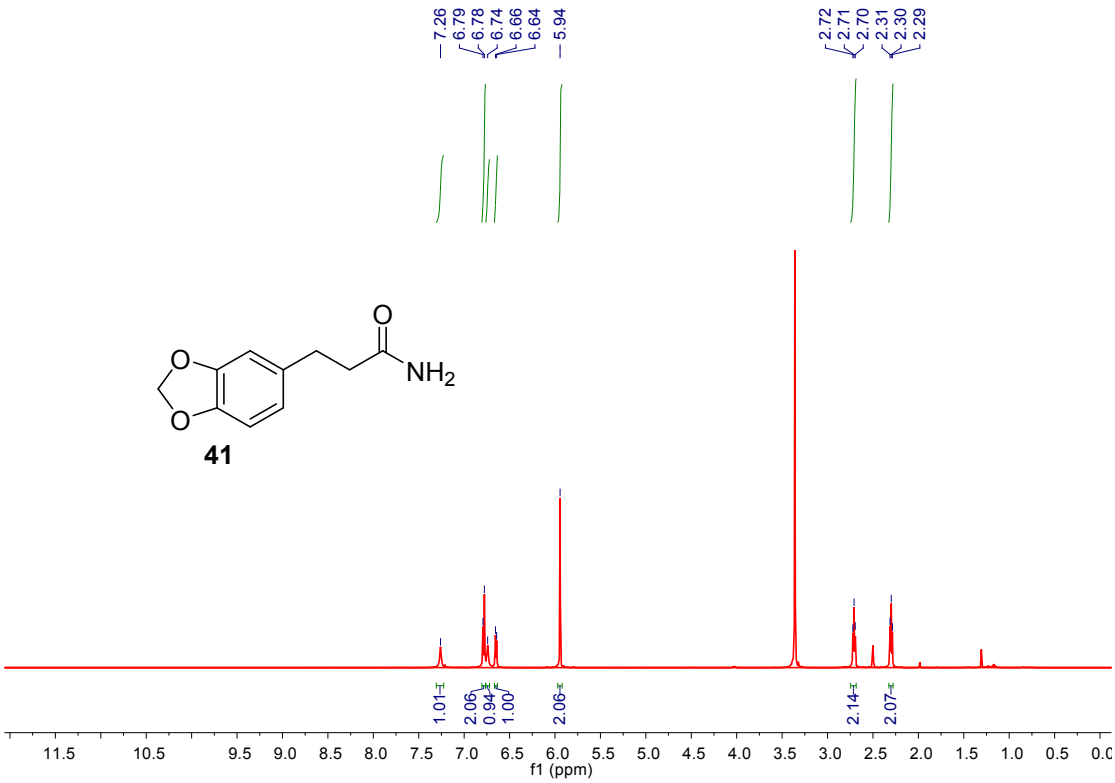
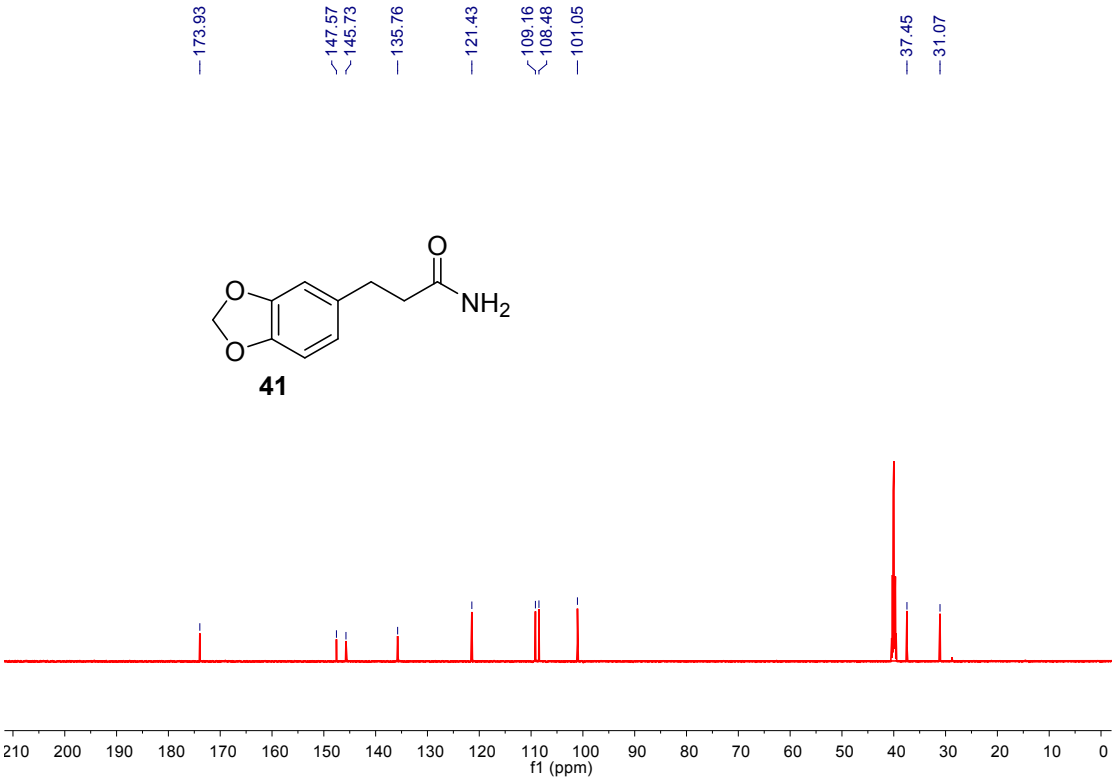


^{13}C NMR (151 MHz, $CDCl_3$)



^{1}H NMR (600 MHz, DMSO-d_6)



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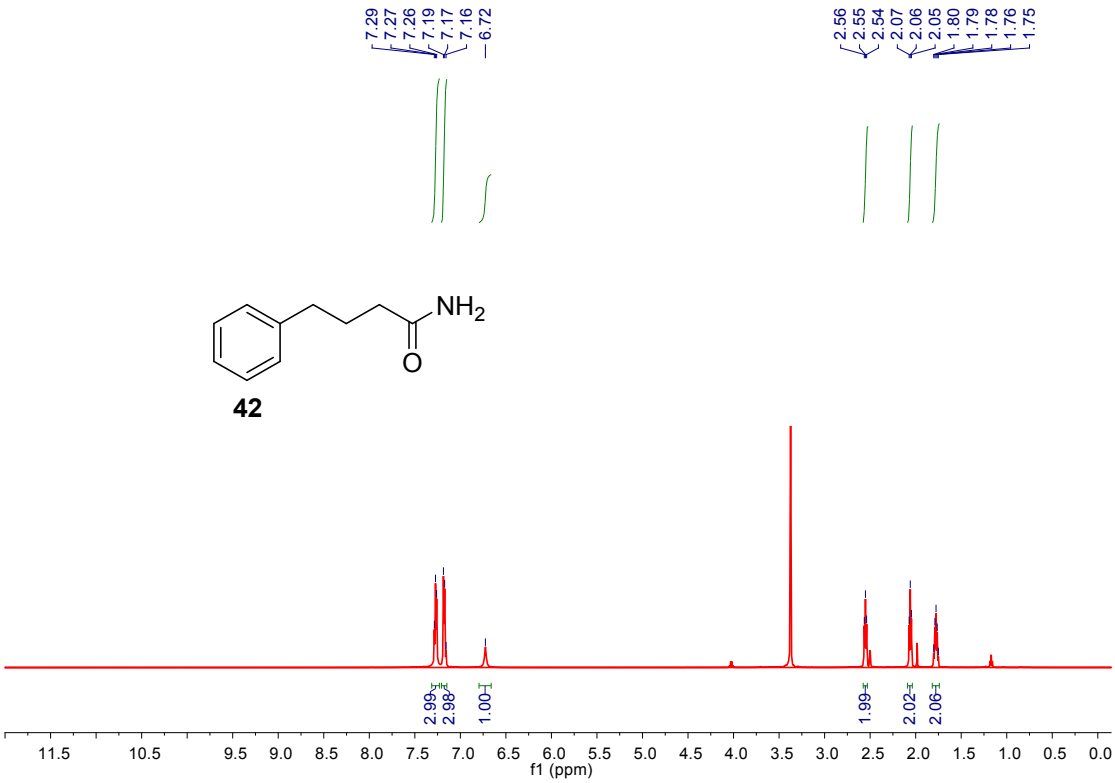

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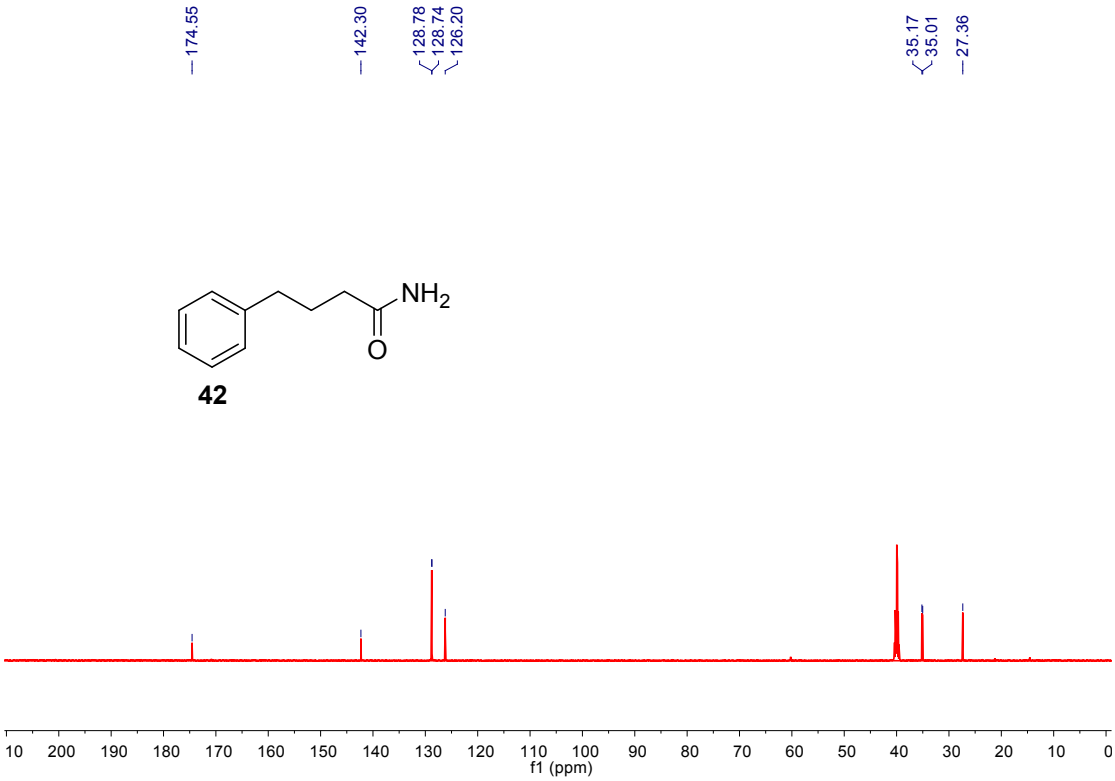

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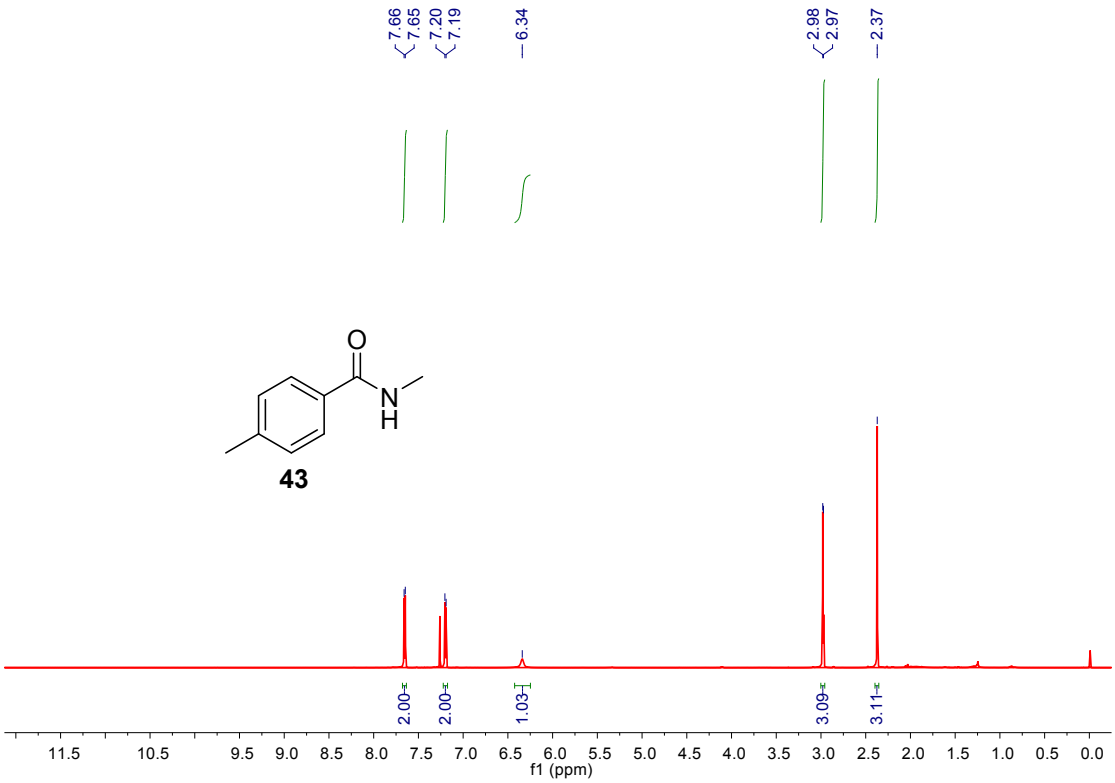
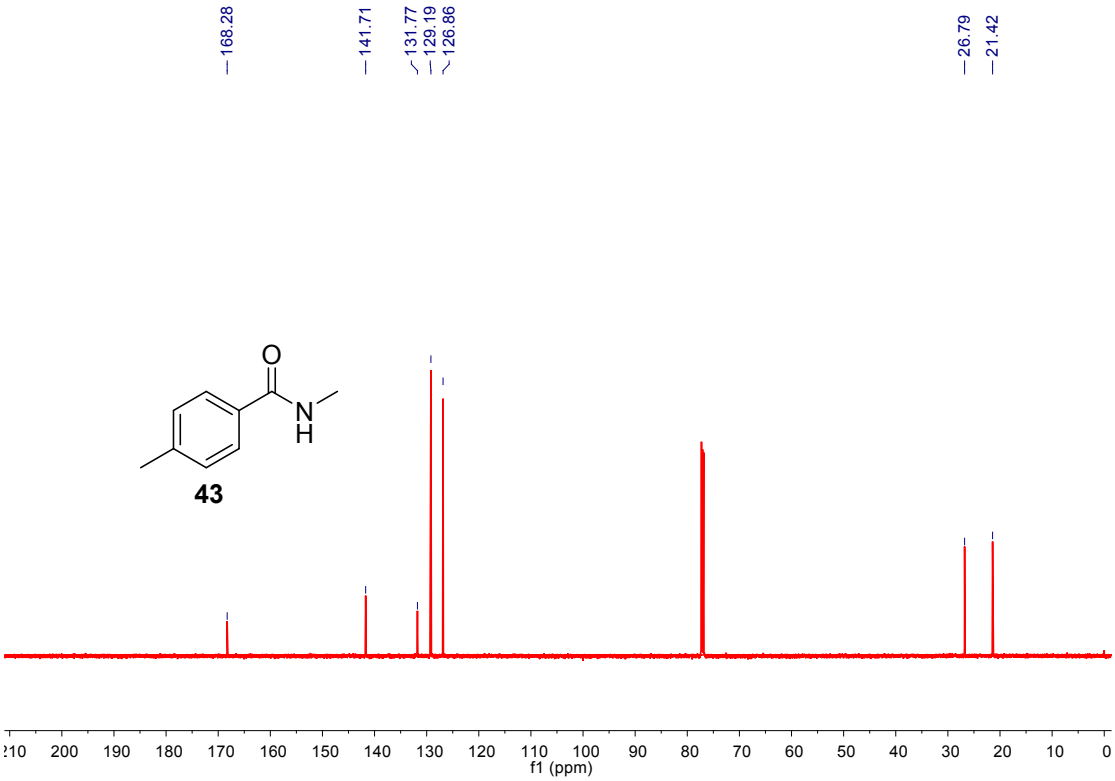
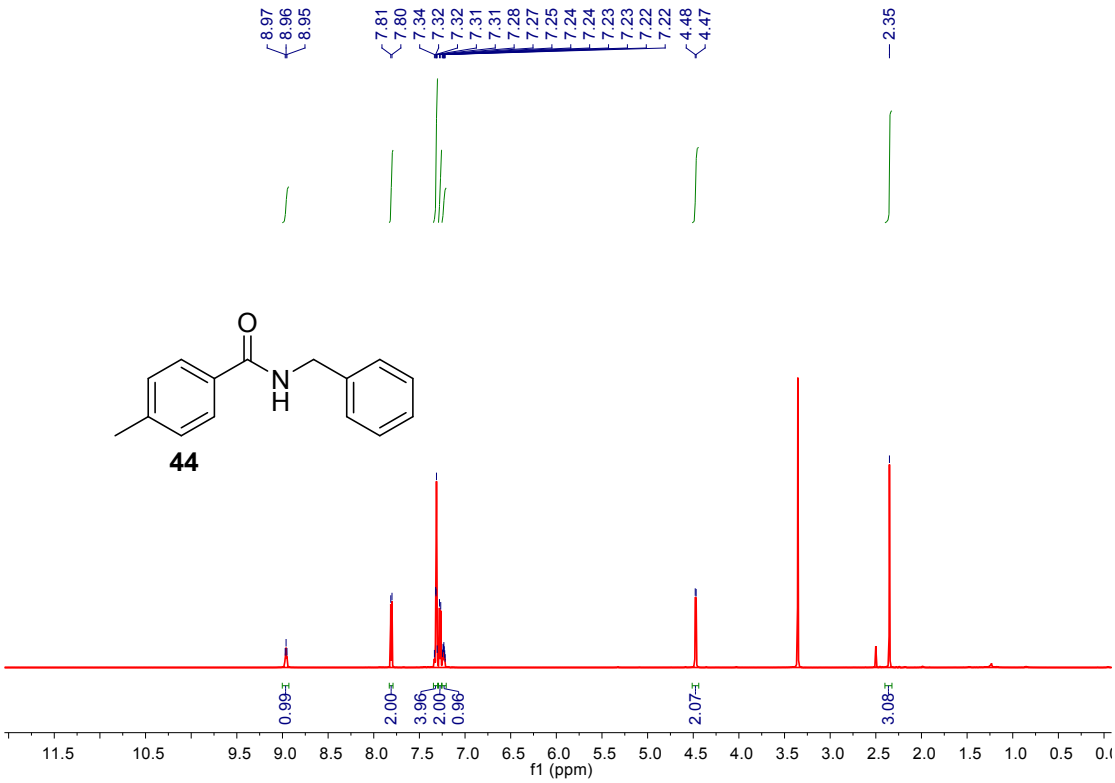


^{1}H NMR (600 MHz, $CDCl_3$)



^{13}C NMR (151 MHz, $CDCl_3$)



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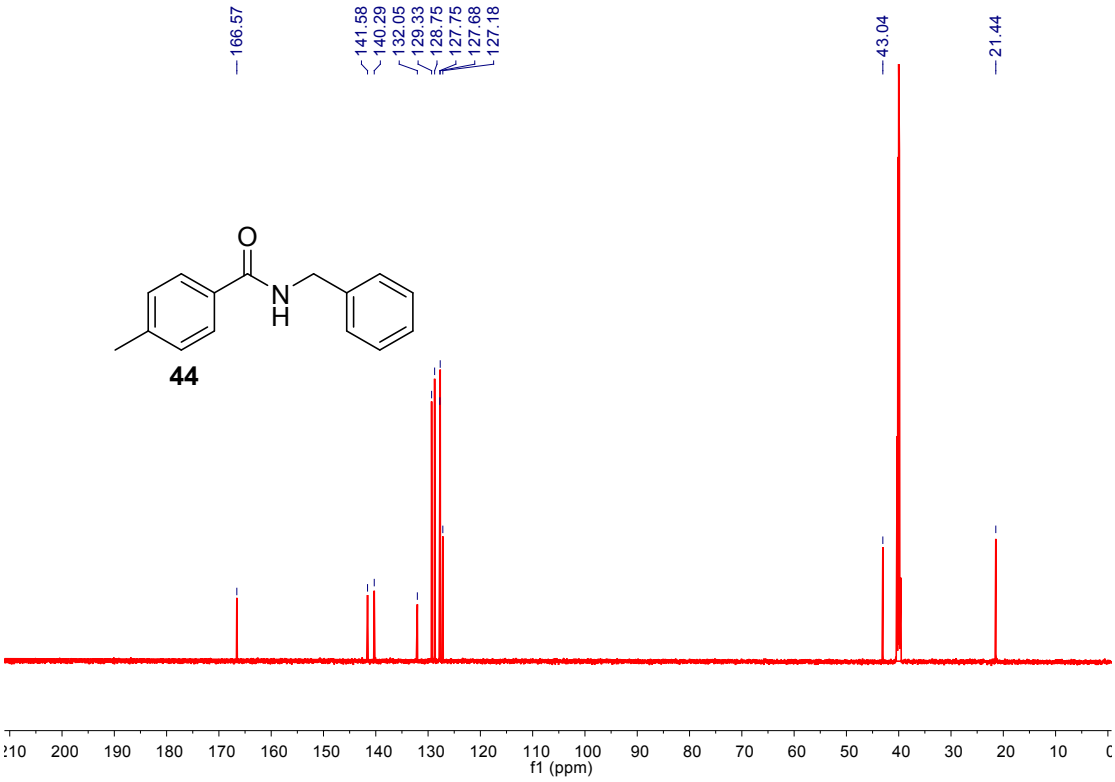

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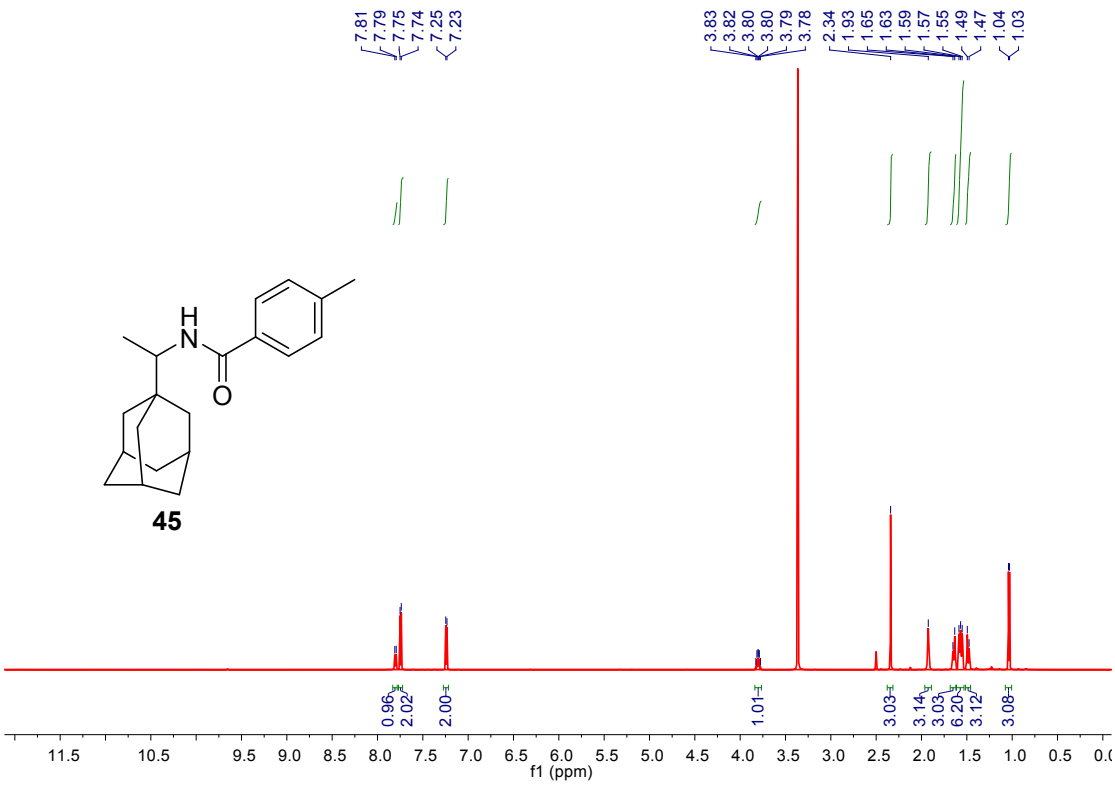
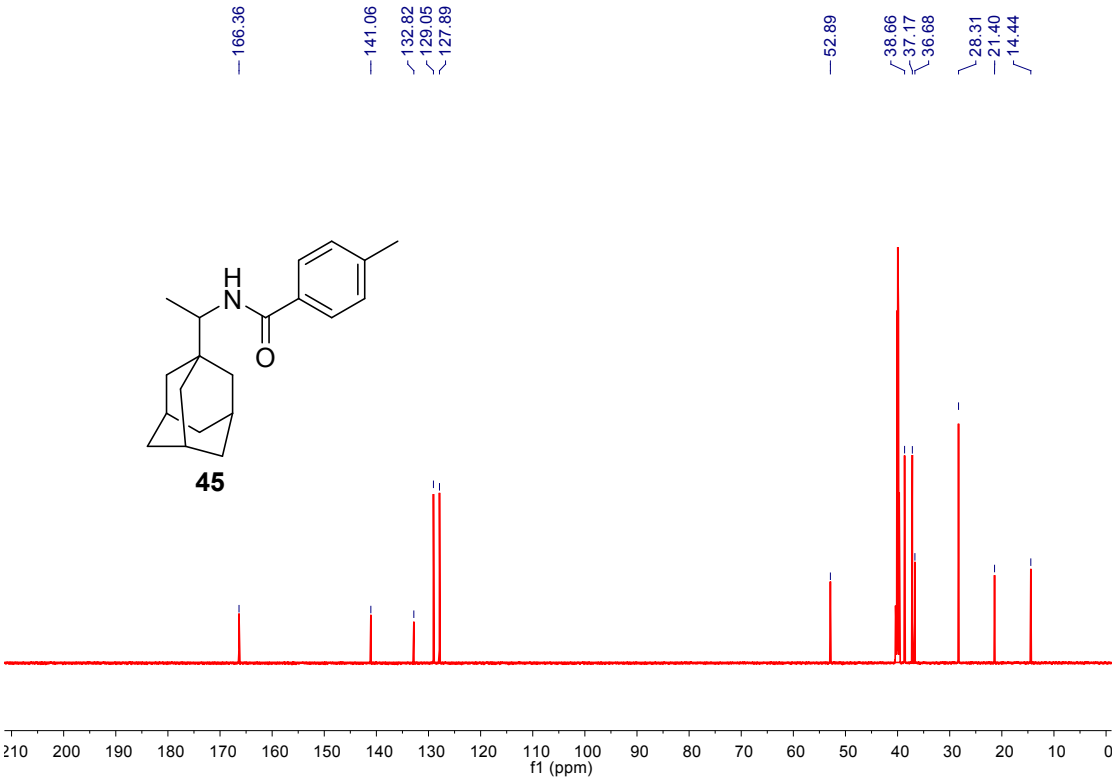


^{1}H NMR (600 MHz, DMSO-d_6)



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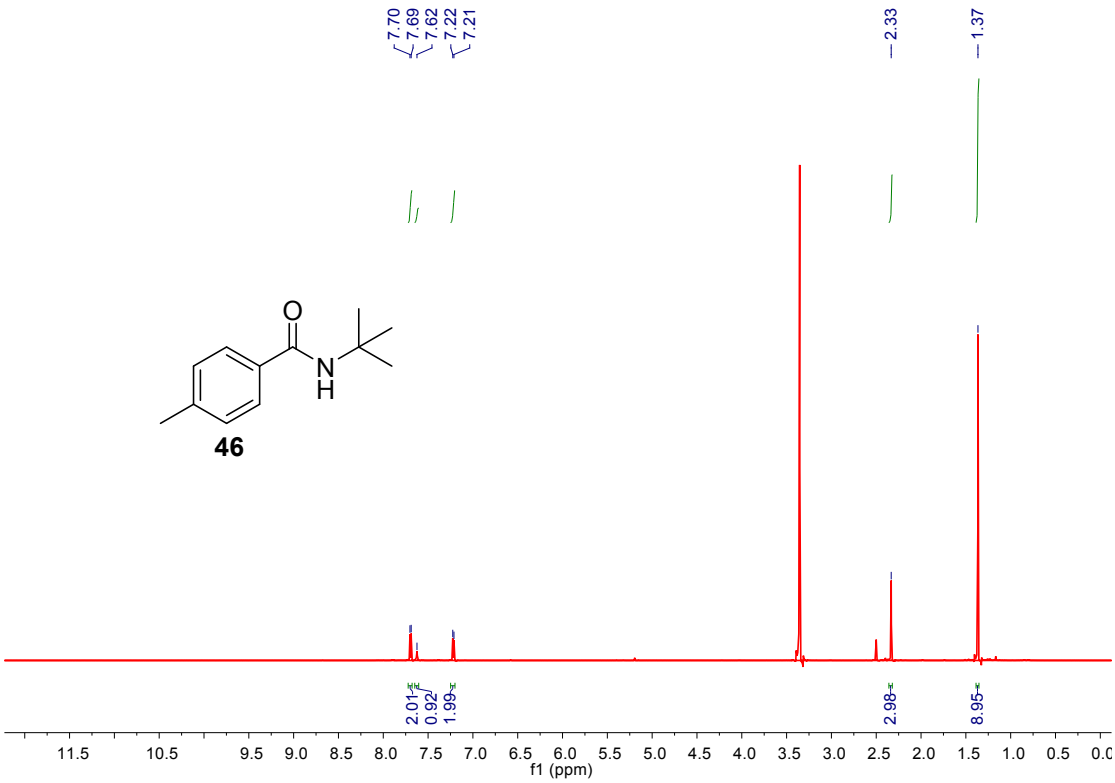

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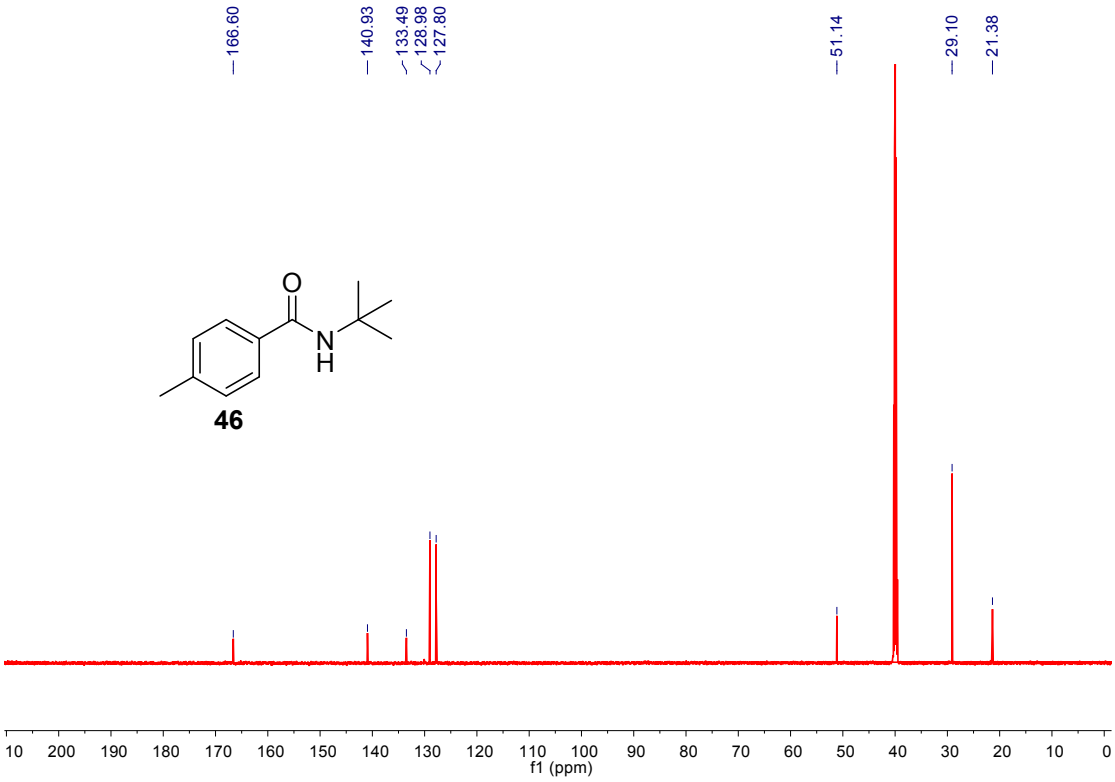

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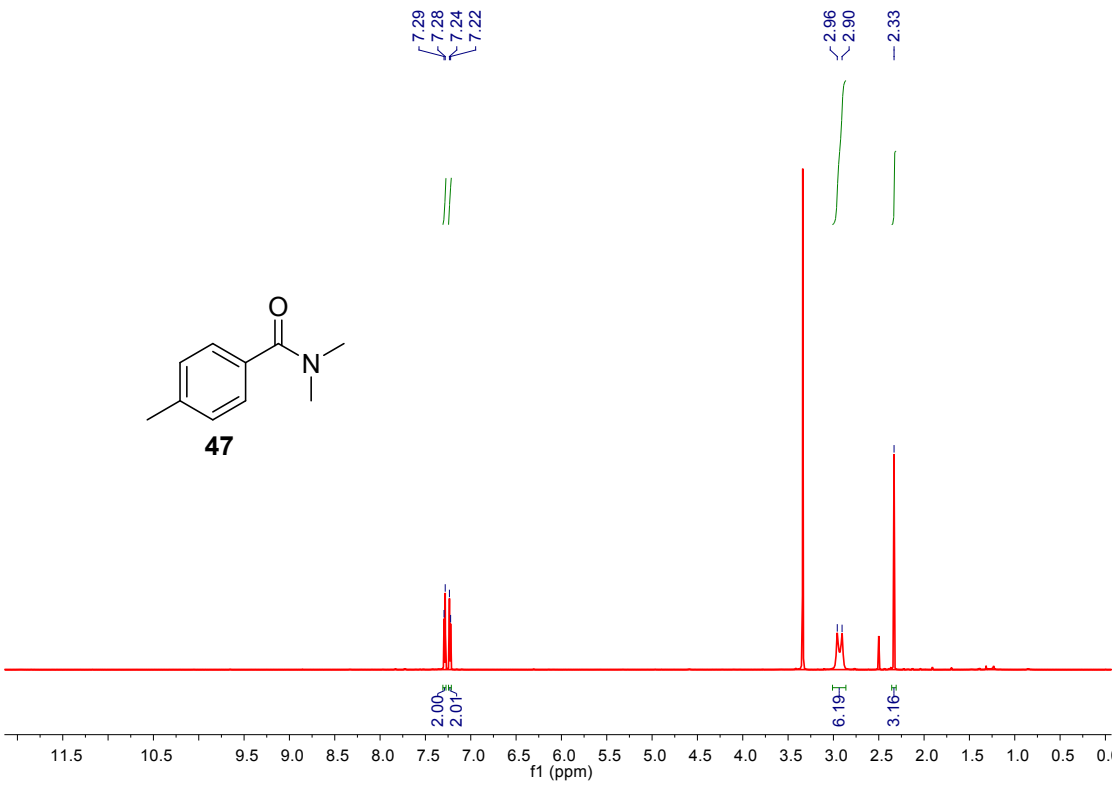
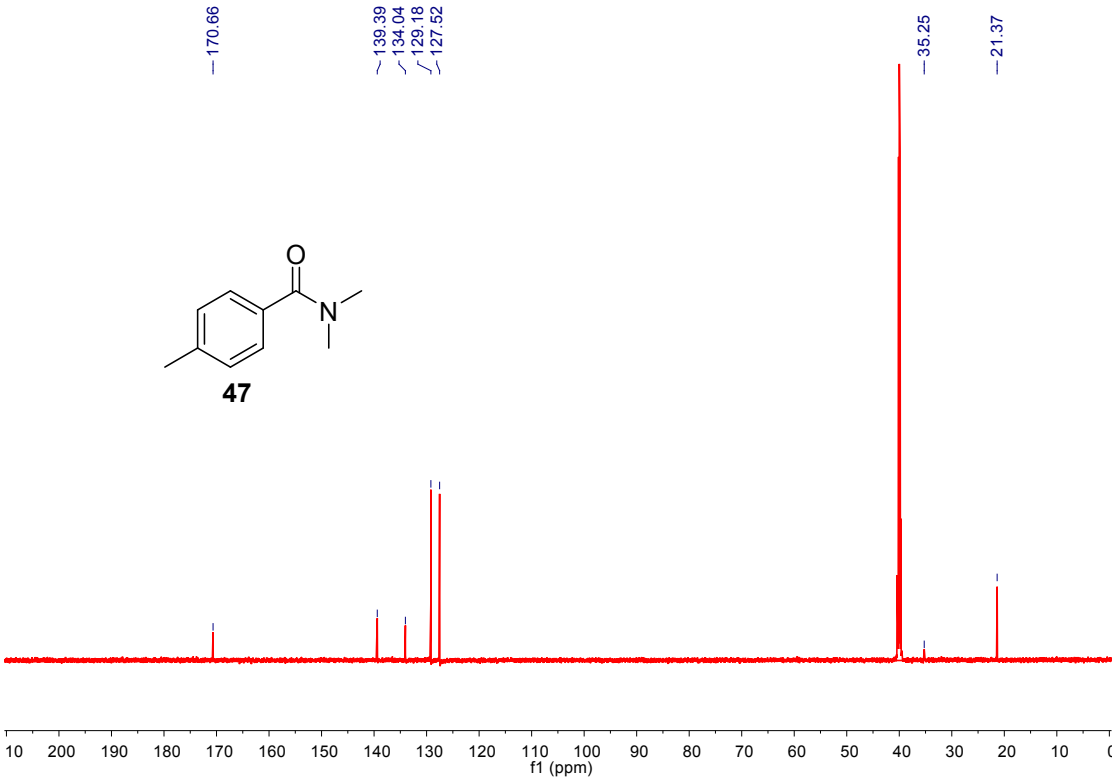
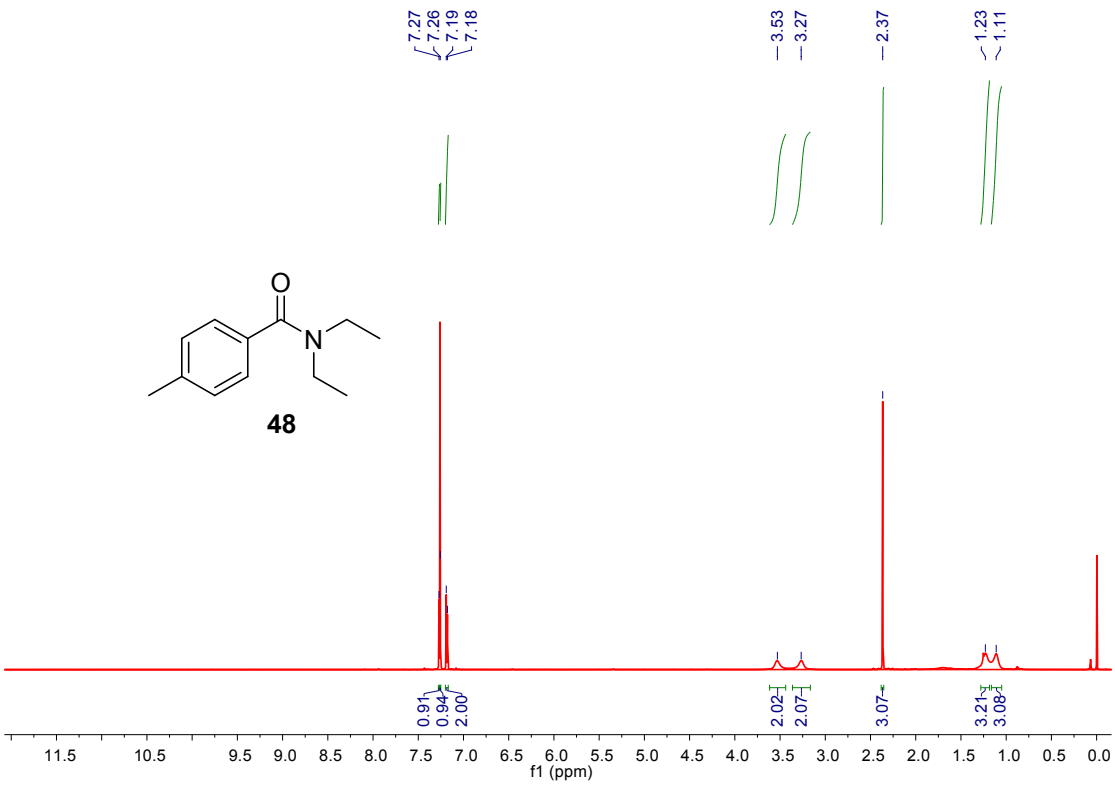


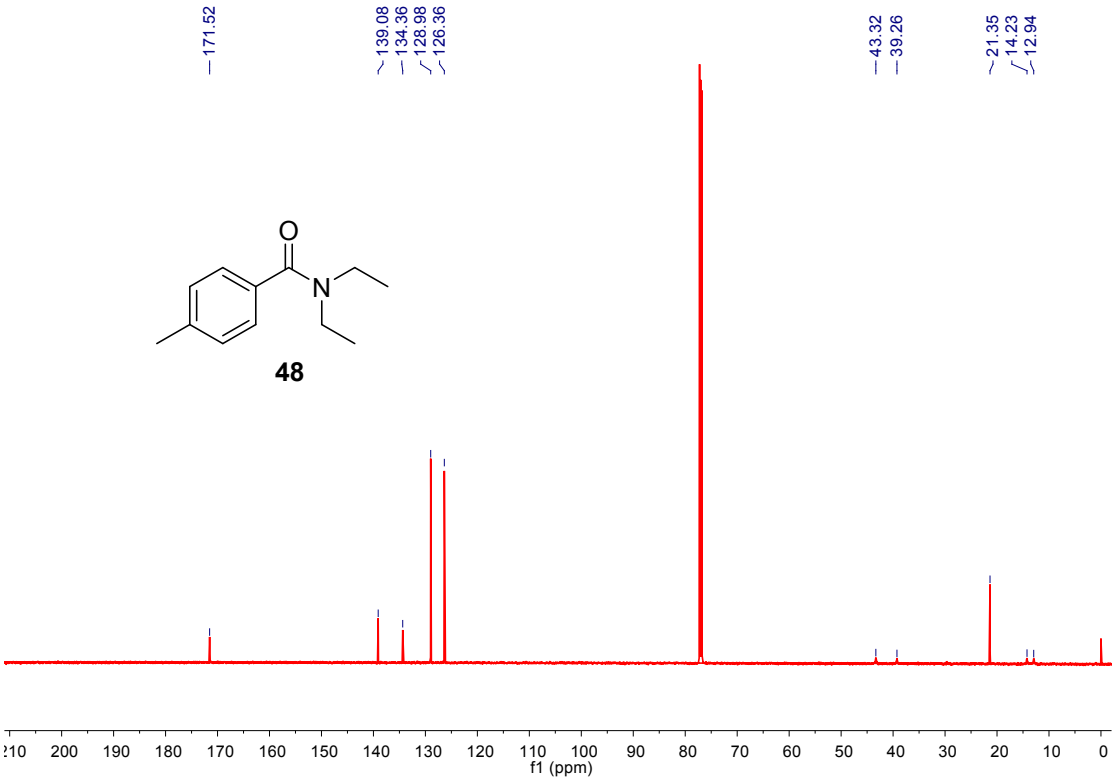
^{1}H NMR (600 MHz, DMSO-d_6)



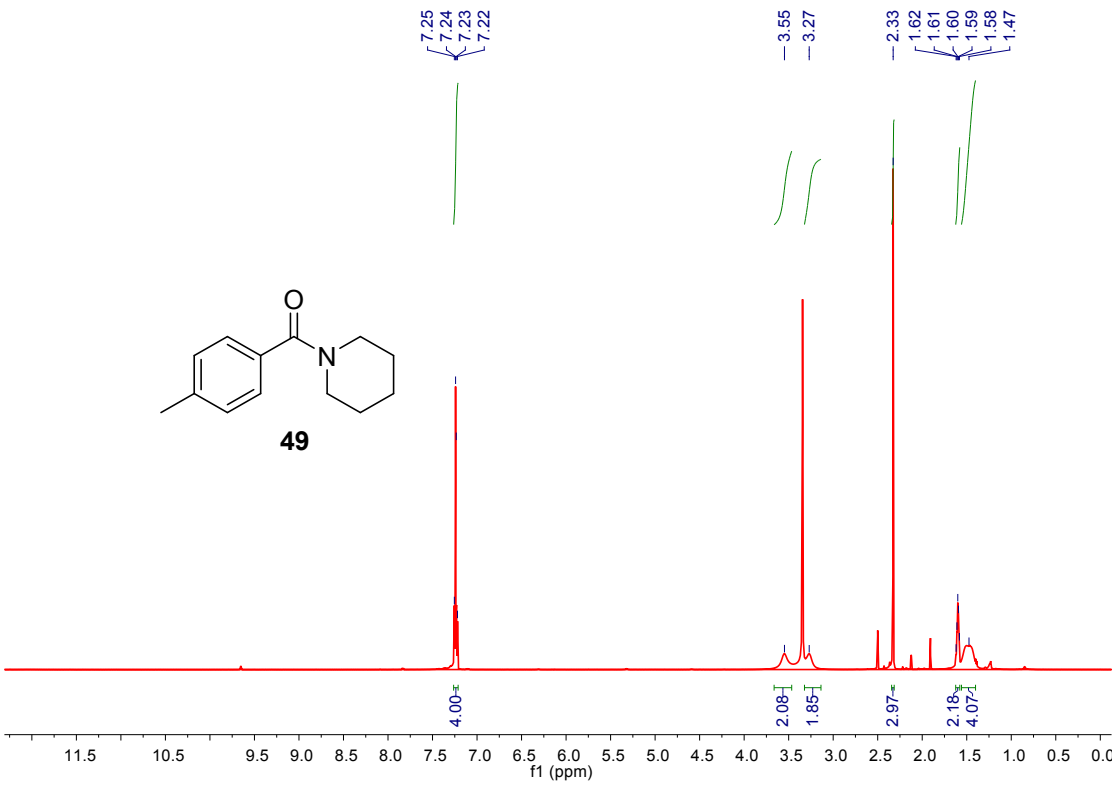
^{13}C NMR (151 MHz, DMSO-d_6)



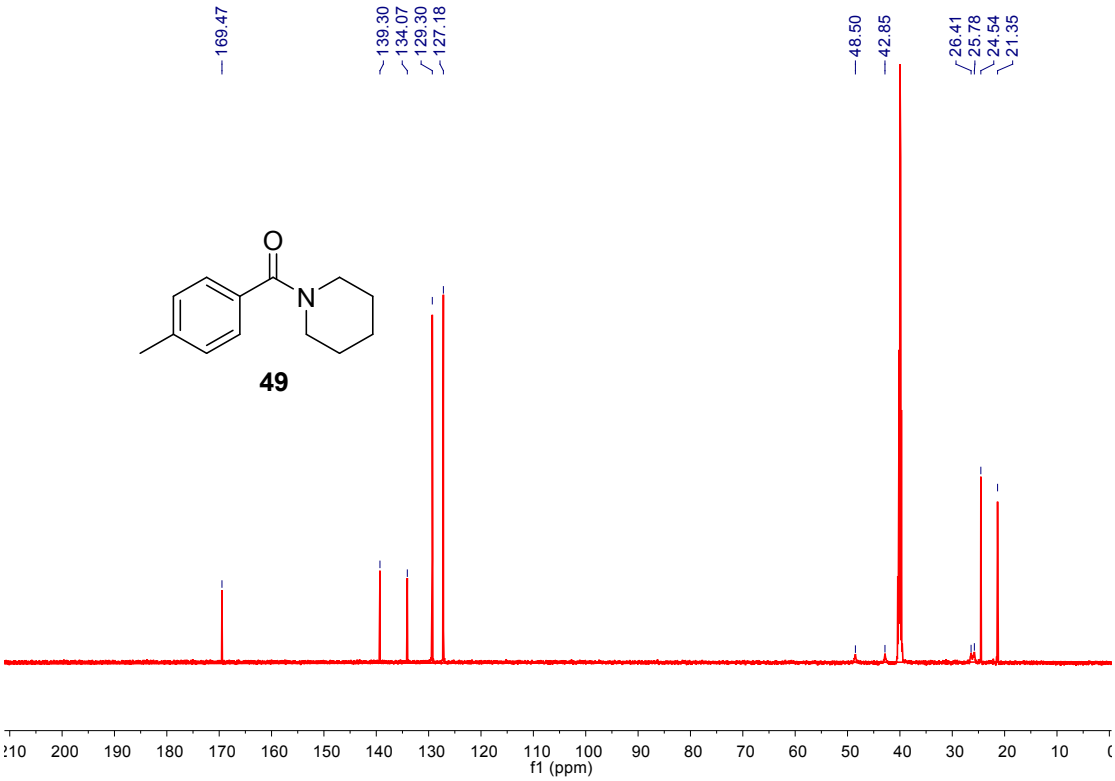
^{1}H NMR (600 MHz, $CDCl_3$)



^{13}C NMR (151 MHz, $CDCl_3$)



^{1}H NMR (600 MHz, DMSO-d_6)



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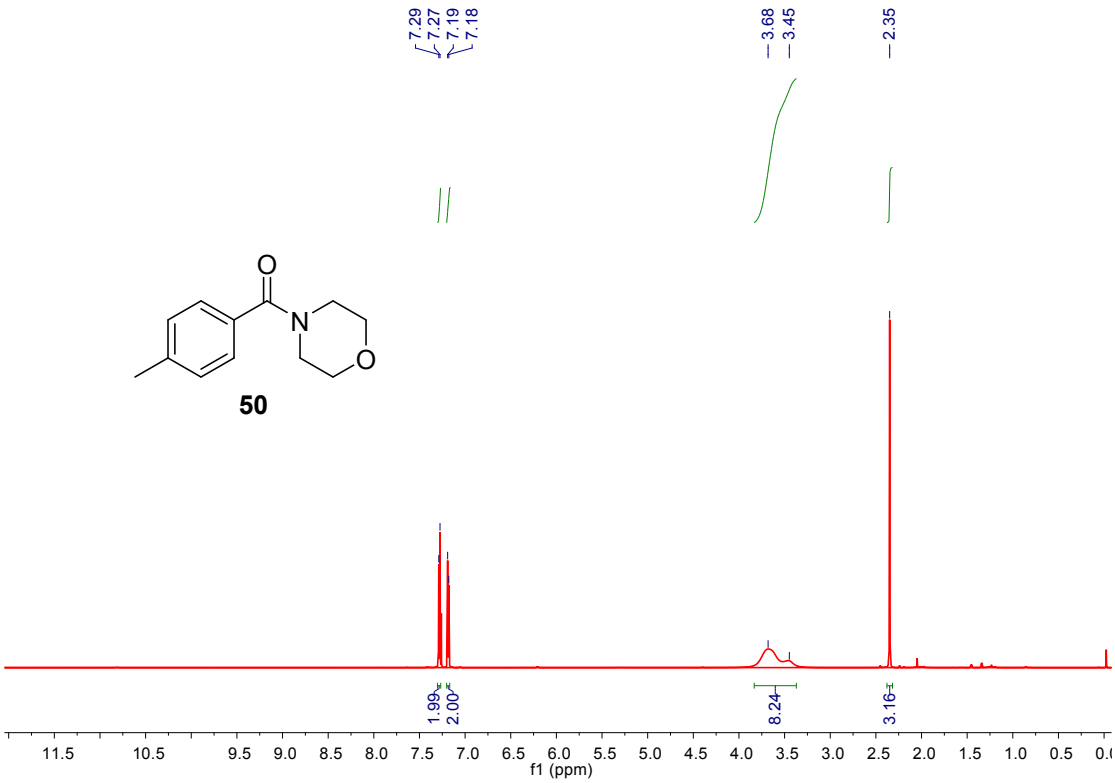

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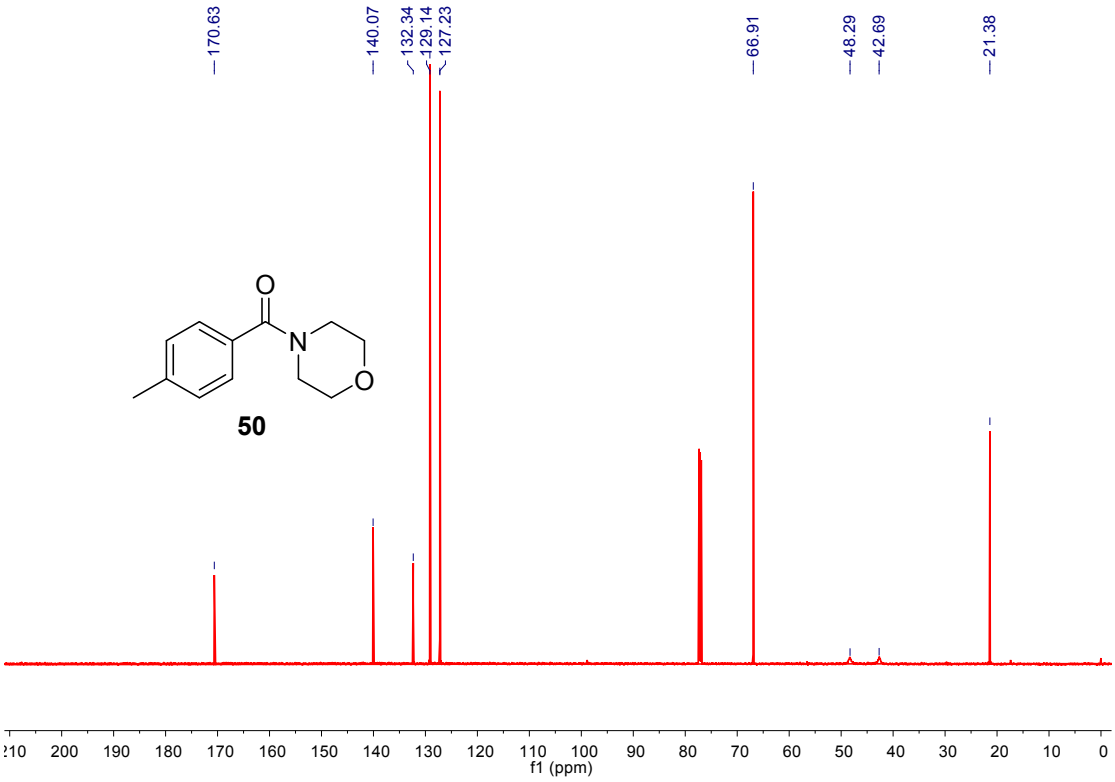
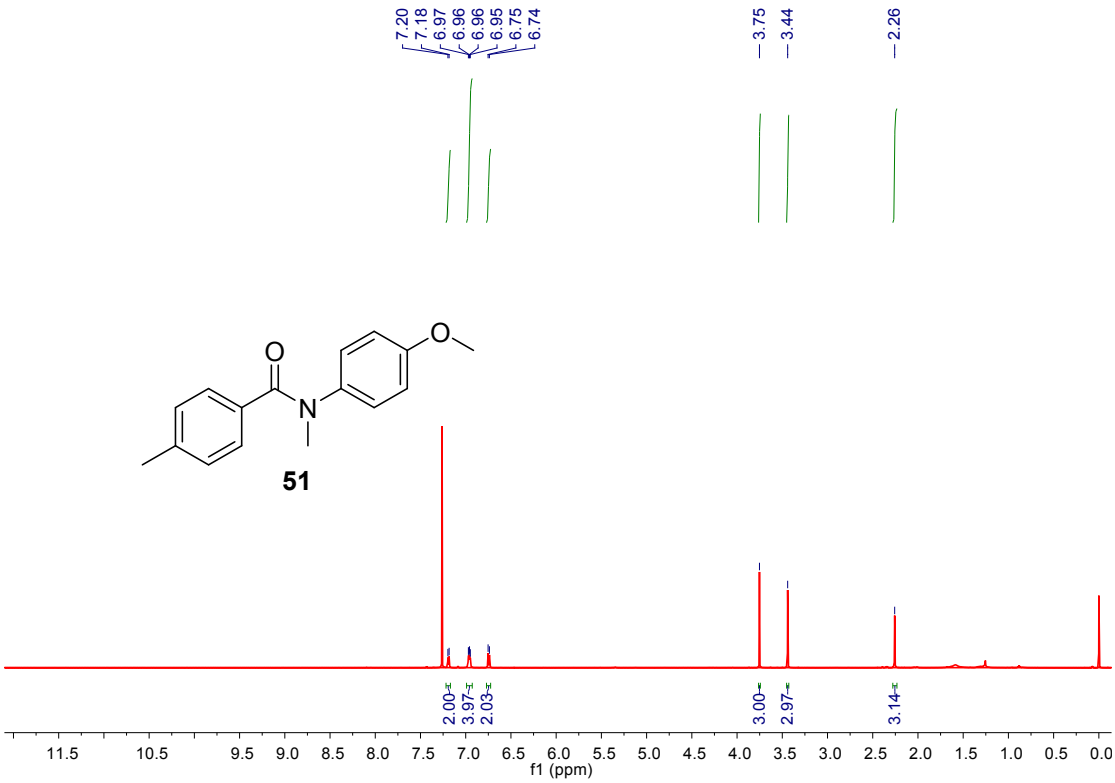
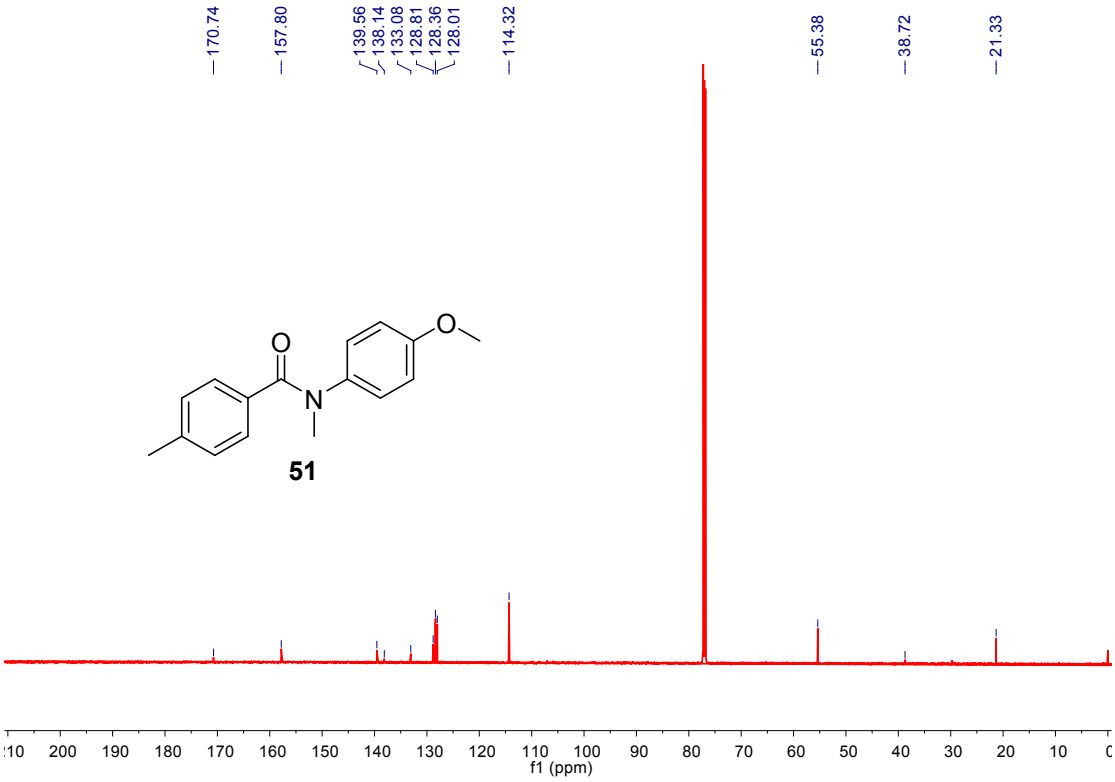


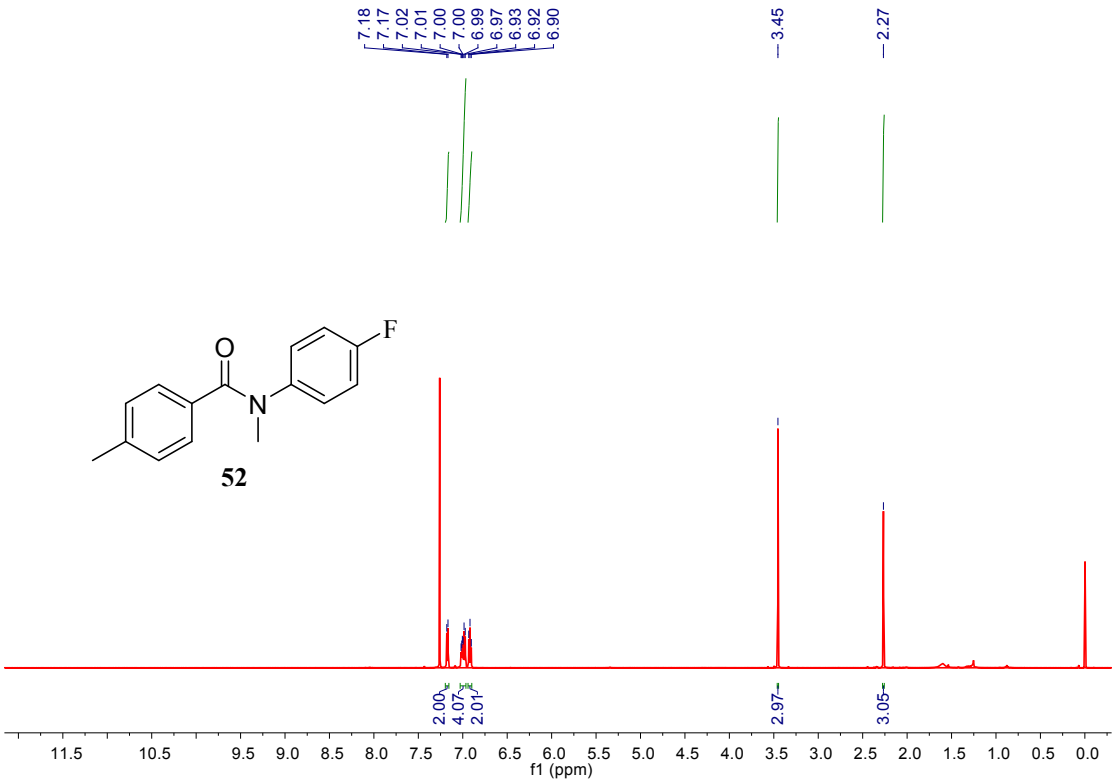
^{13}C NMR (151 MHz, $CDCl_3$)



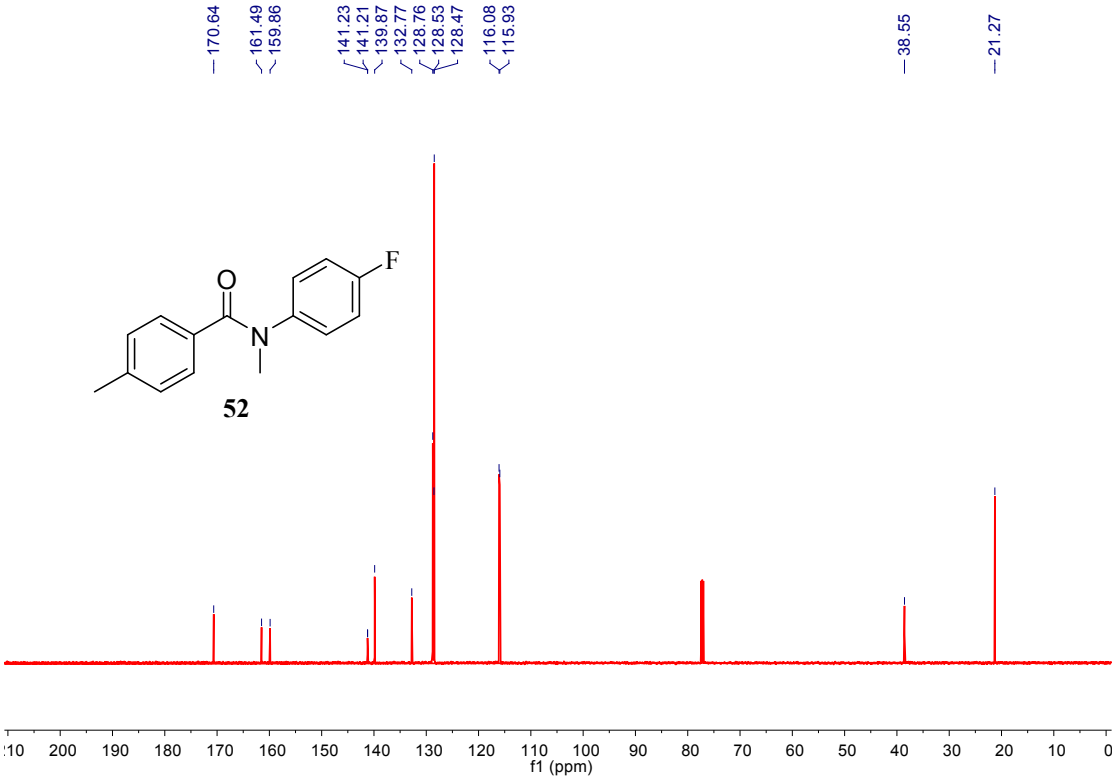
^{1}H NMR (600 MHz, $CDCl_3$)



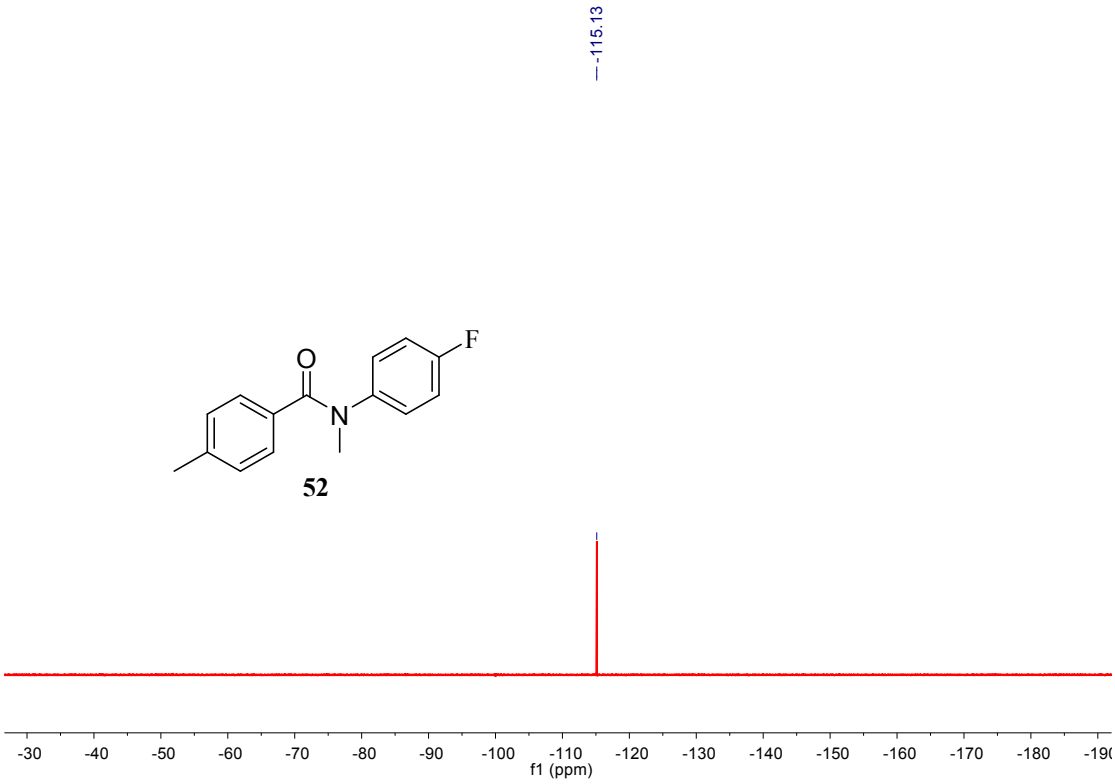
^{13}C NMR (151 MHz, $CDCl_3$)



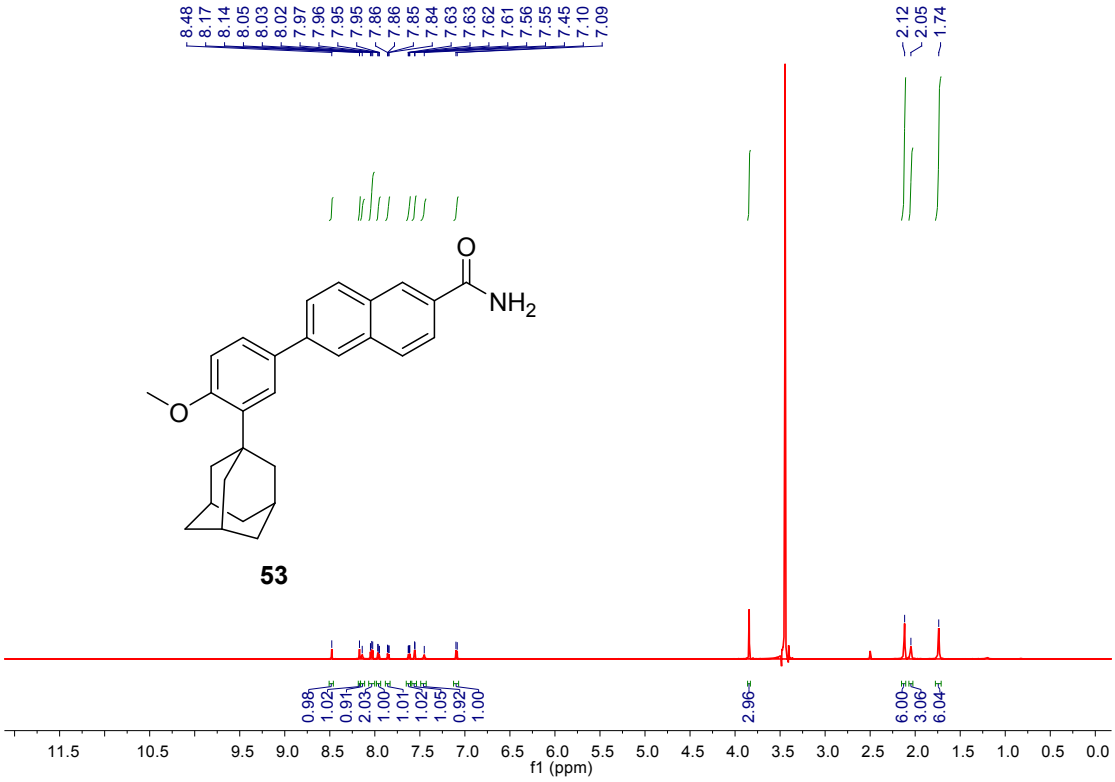
^{1}H NMR (600 MHz, $CDCl_3$)



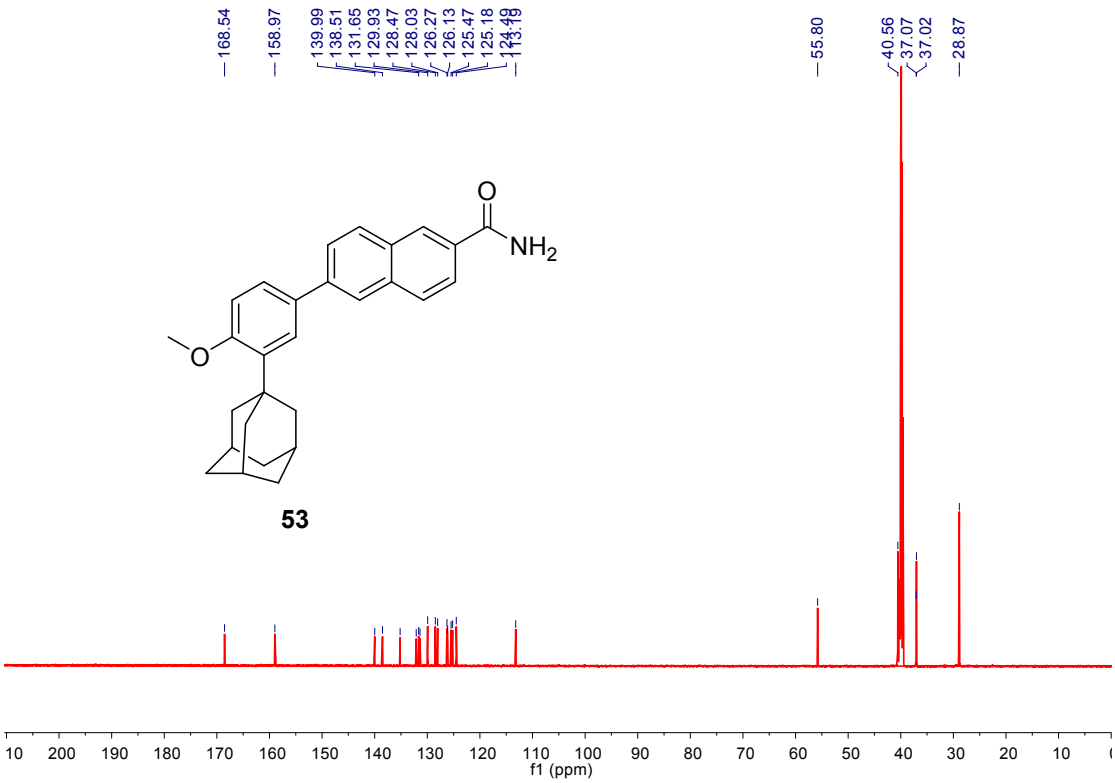
^{13}C NMR (151 MHz, $CDCl_3$)



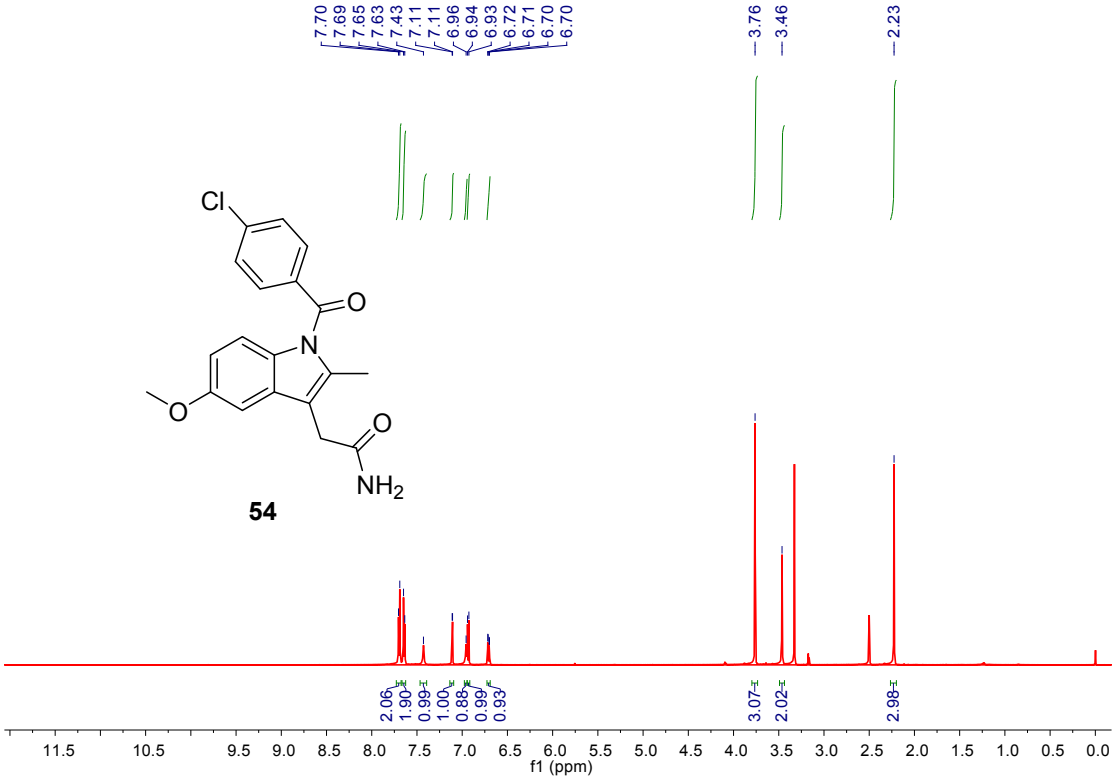
^{19}F NMR (565 MHz, $CDCl_3$)



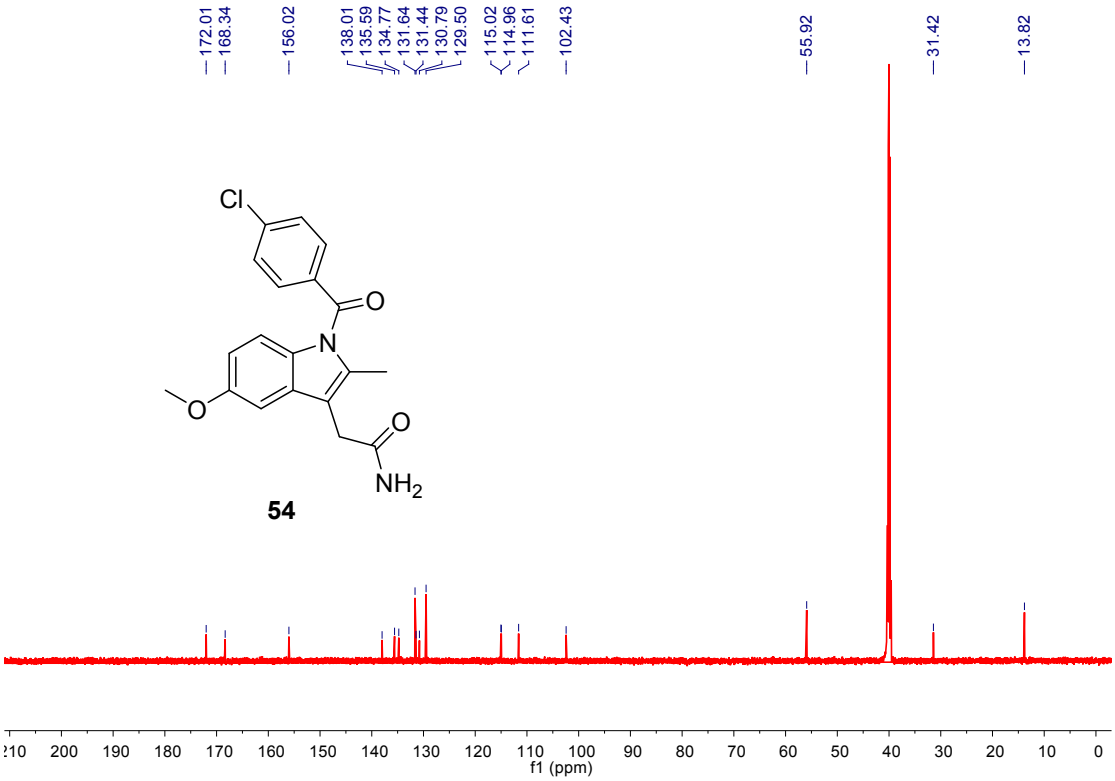
^{1}H NMR (600 MHz, DMSO-d_6)



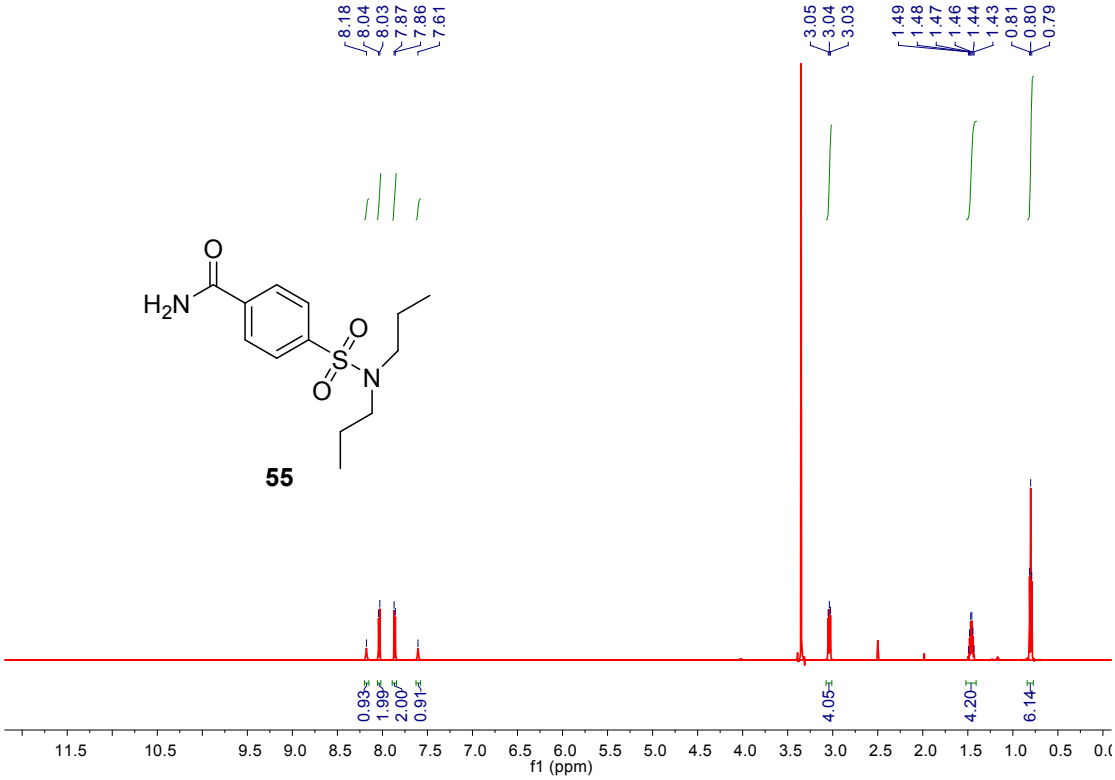
^{13}C NMR (151 MHz, DMSO-d$_6$)



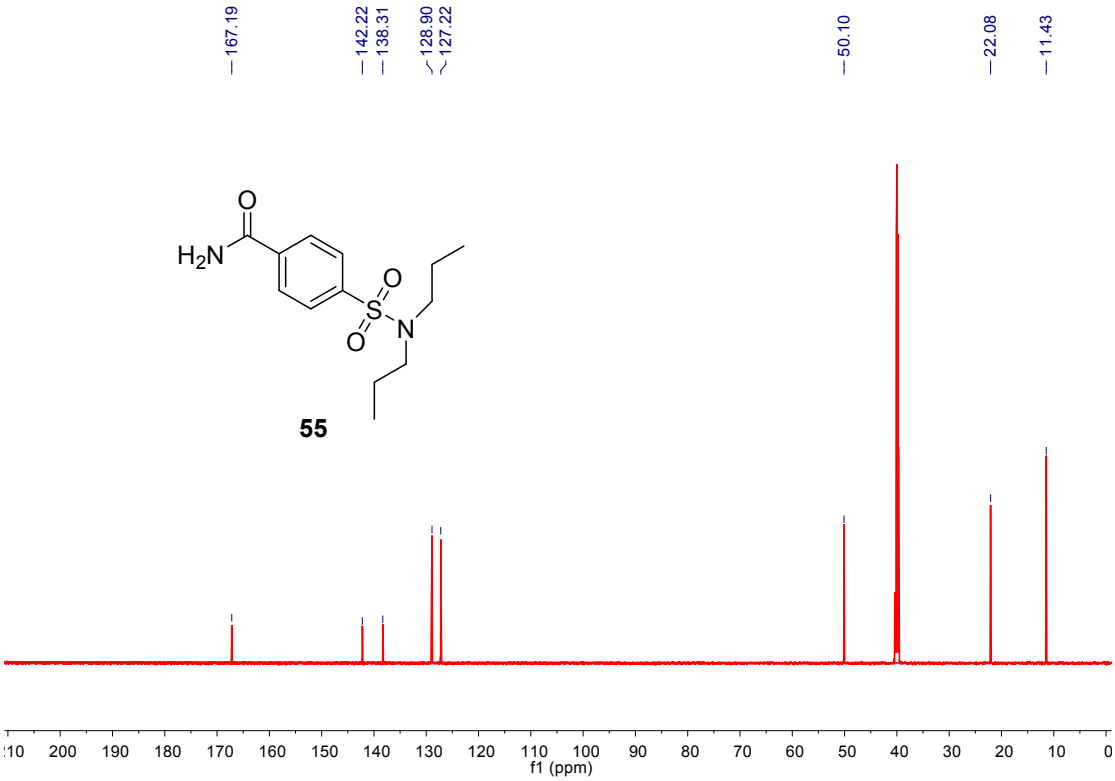
^{1}H NMR (600 MHz, DMSO-d$_6$)



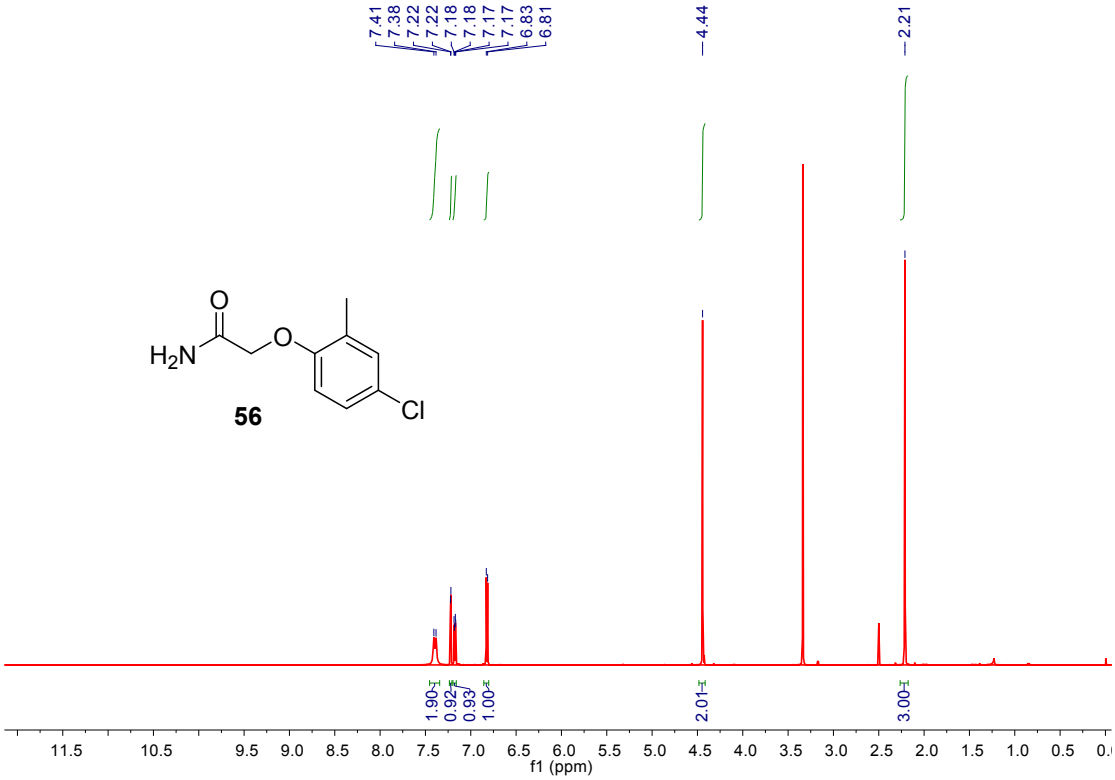
^{13}C NMR (151 MHz, DMSO-d$_6$)



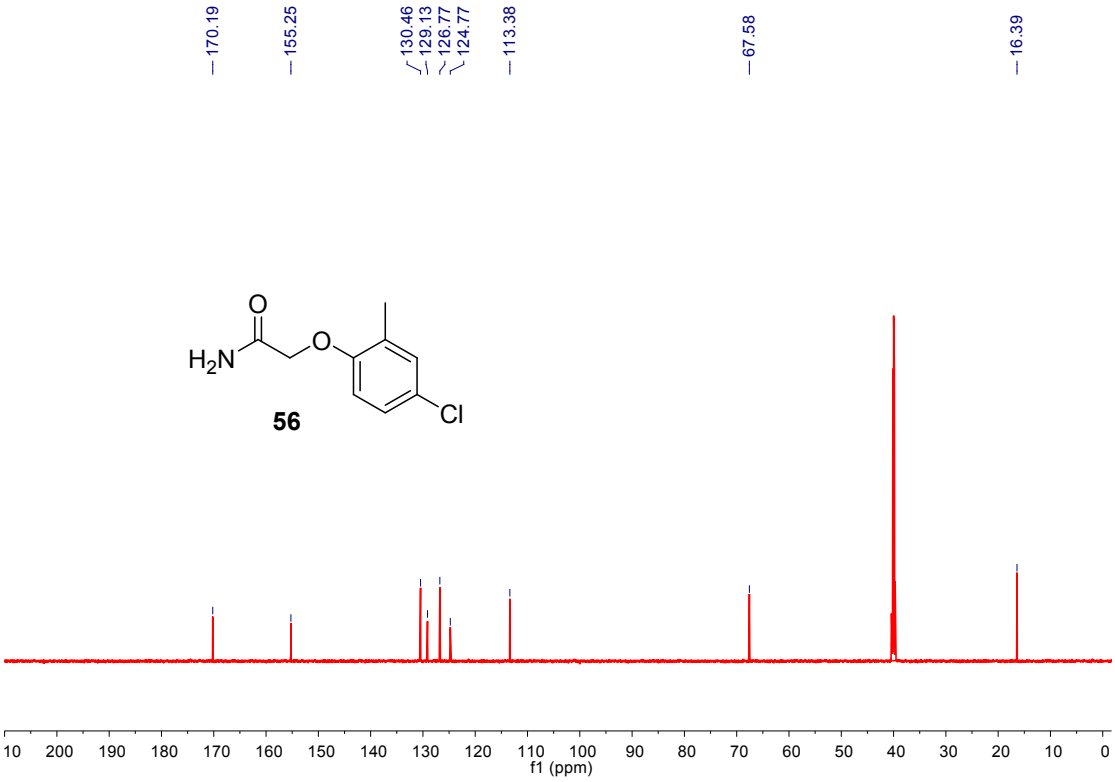
^{1}H NMR (600 MHz, DMSO-d$_6$)



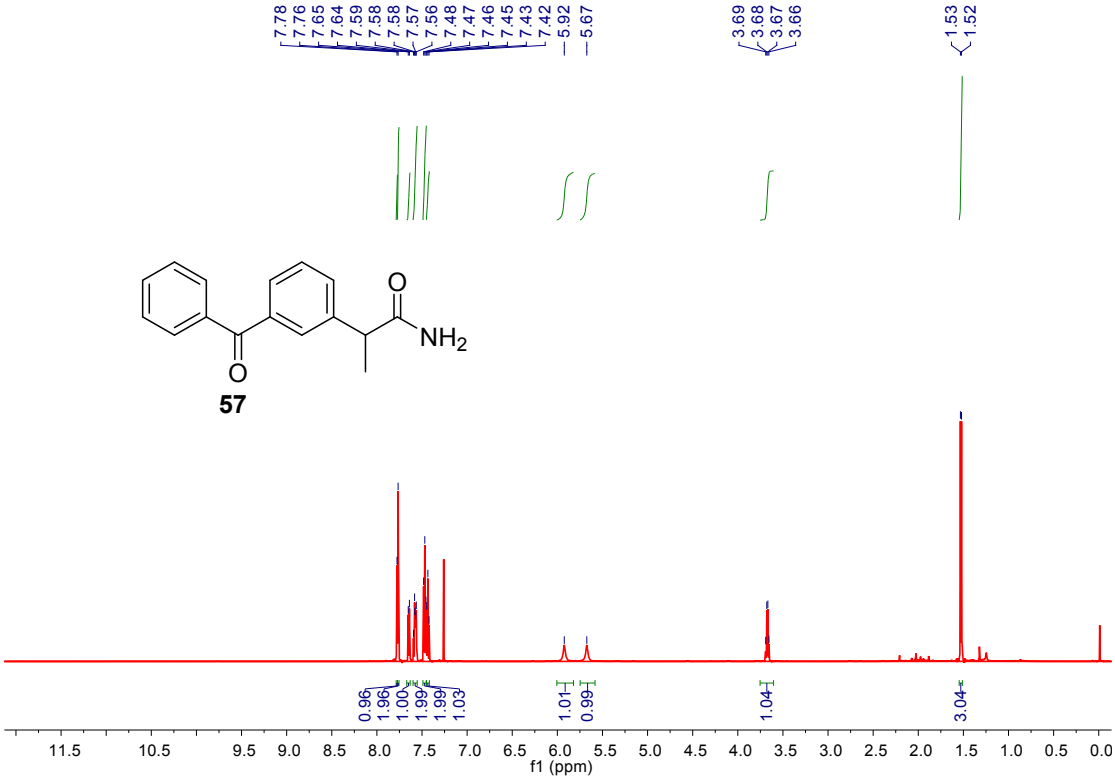
^{13}C NMR (151 MHz, DMSO-d_6)



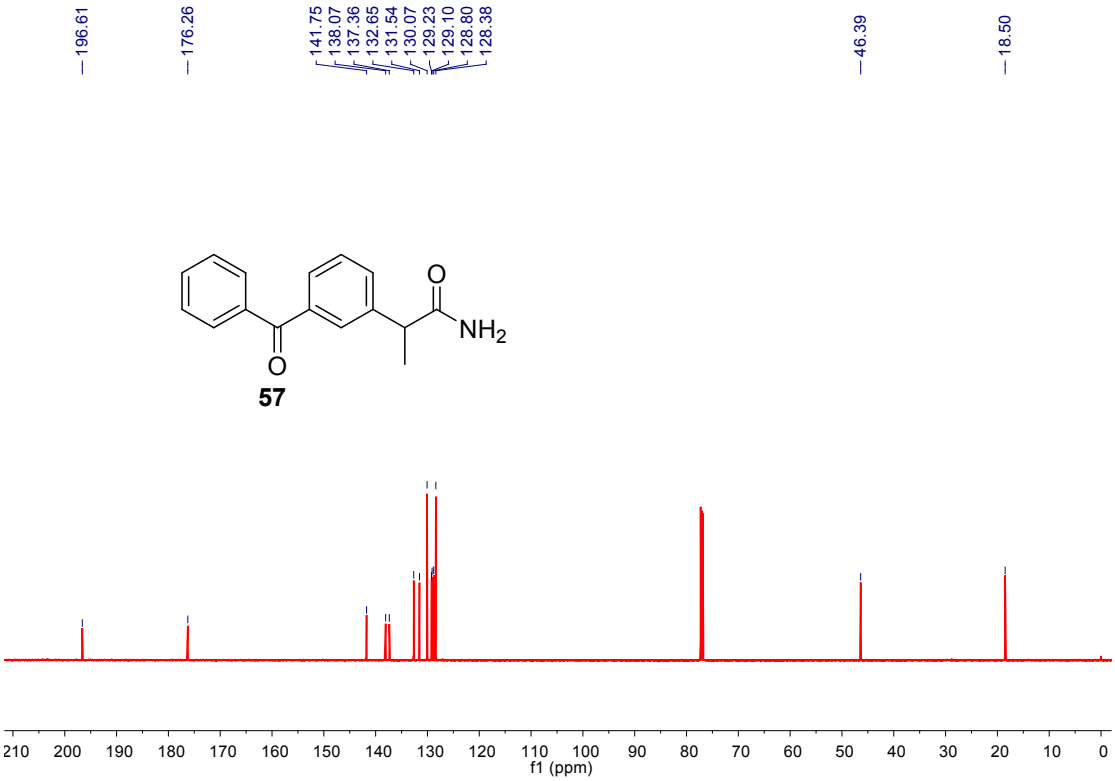
^{1}H NMR (600 MHz, DMSO-d_6)



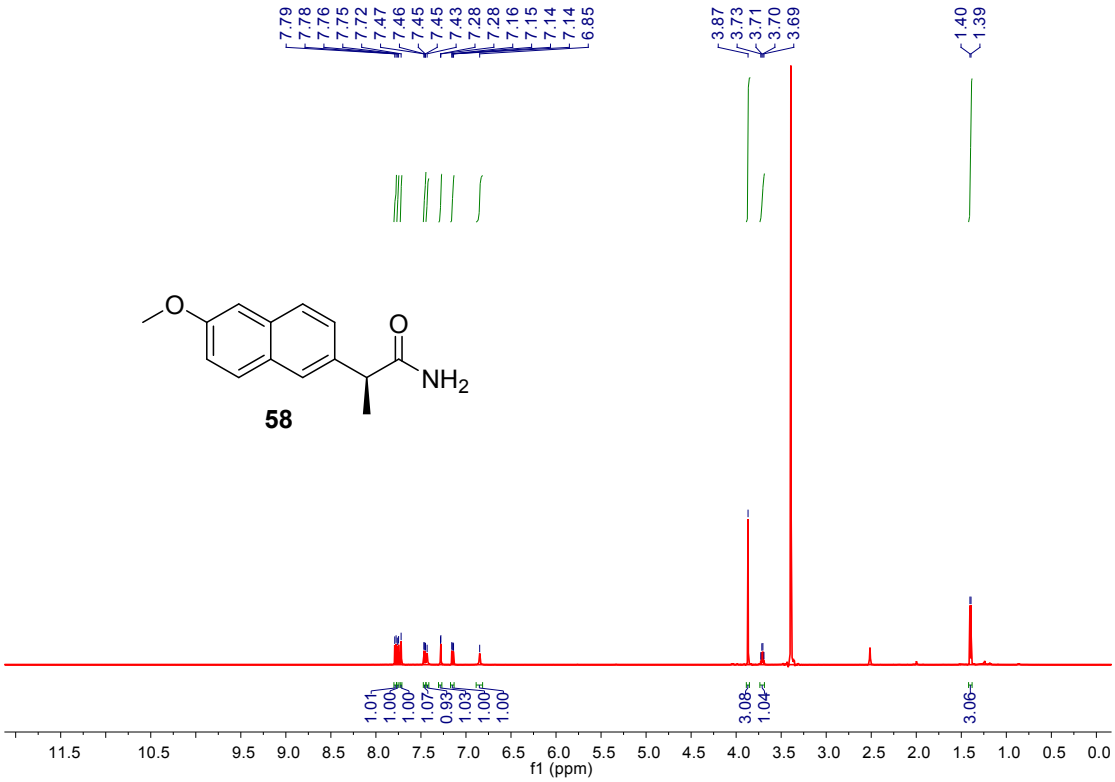
^{13}C NMR (151 MHz, DMSO-d_6)



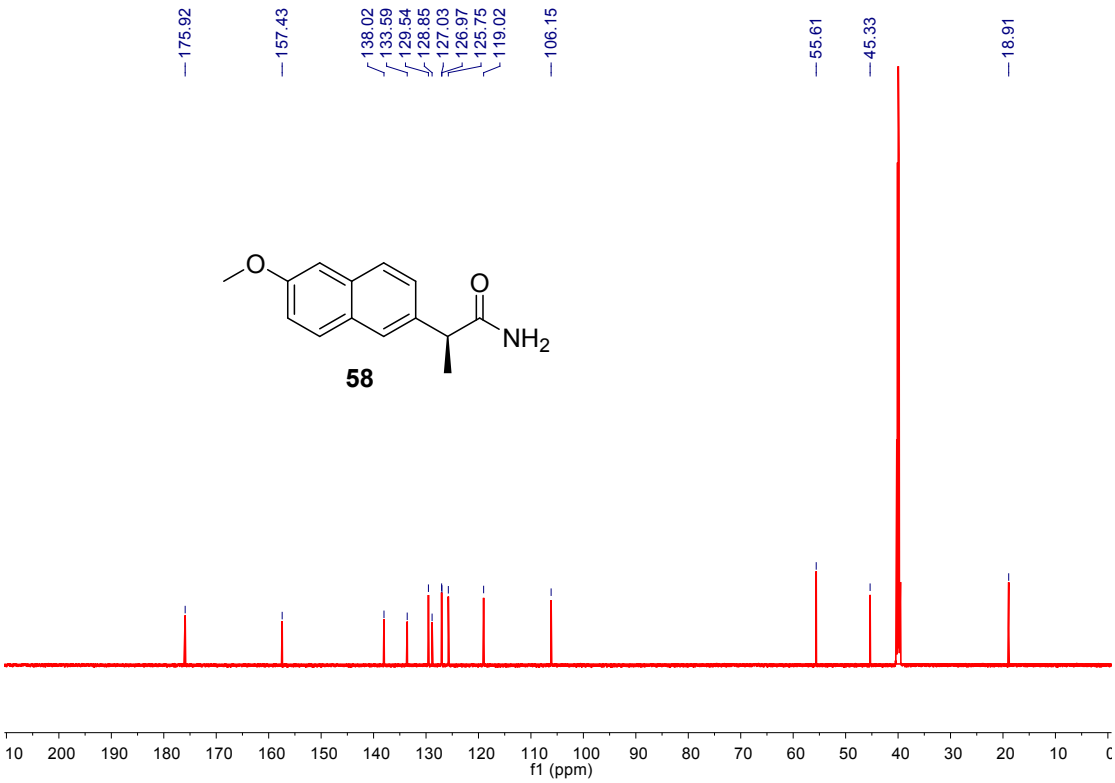
^{1}H NMR (600 MHz, $CDCl_3$)



^{13}C NMR (151 MHz, $CDCl_3$)

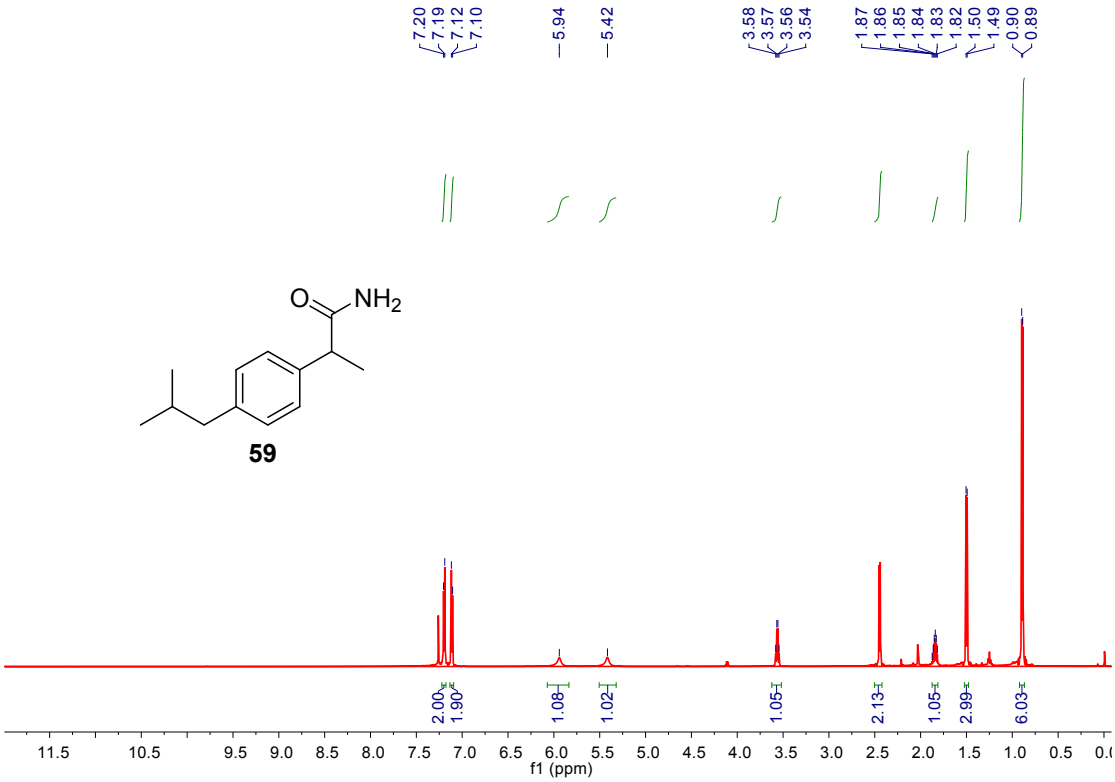


^{1}H NMR (600 MHz, DMSO-d_6)



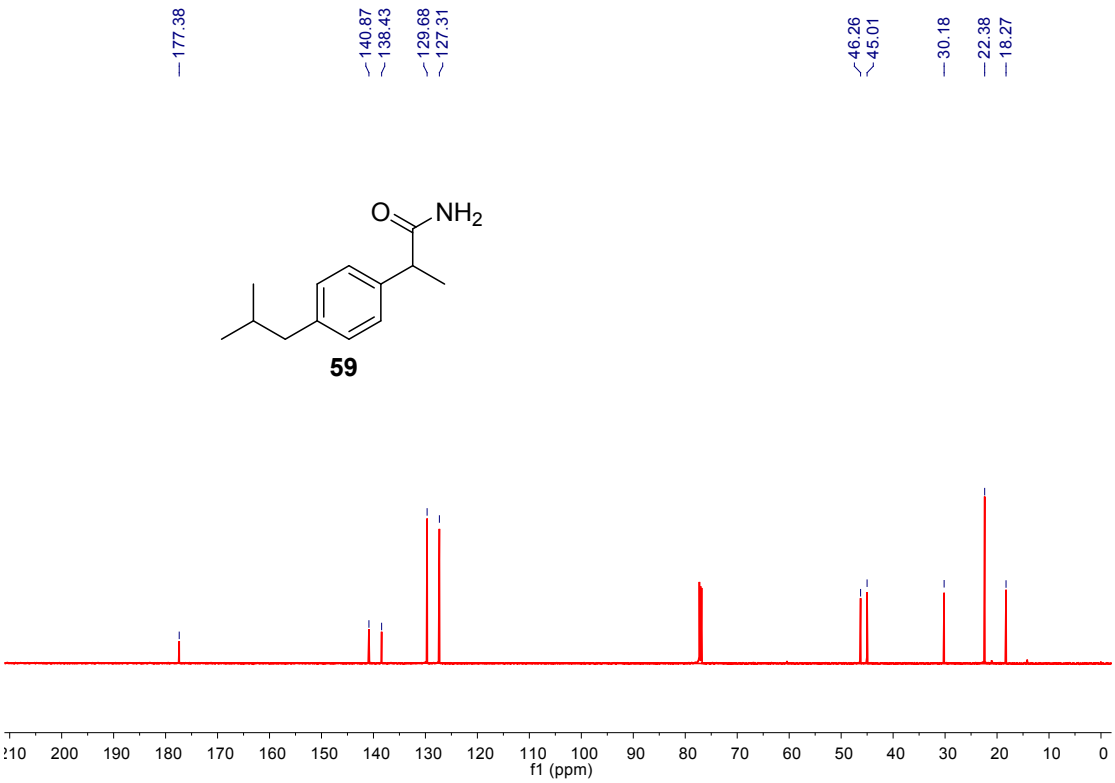
58

^{13}C NMR (151 MHz, DMSO-d_6)

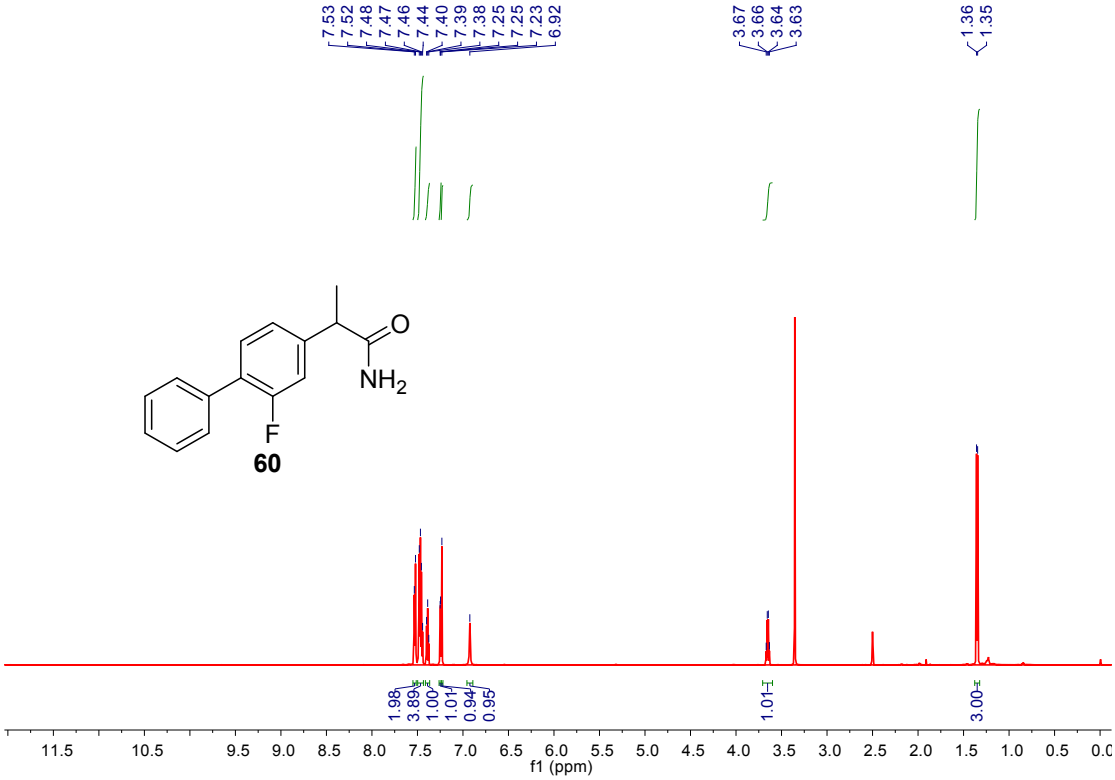


59

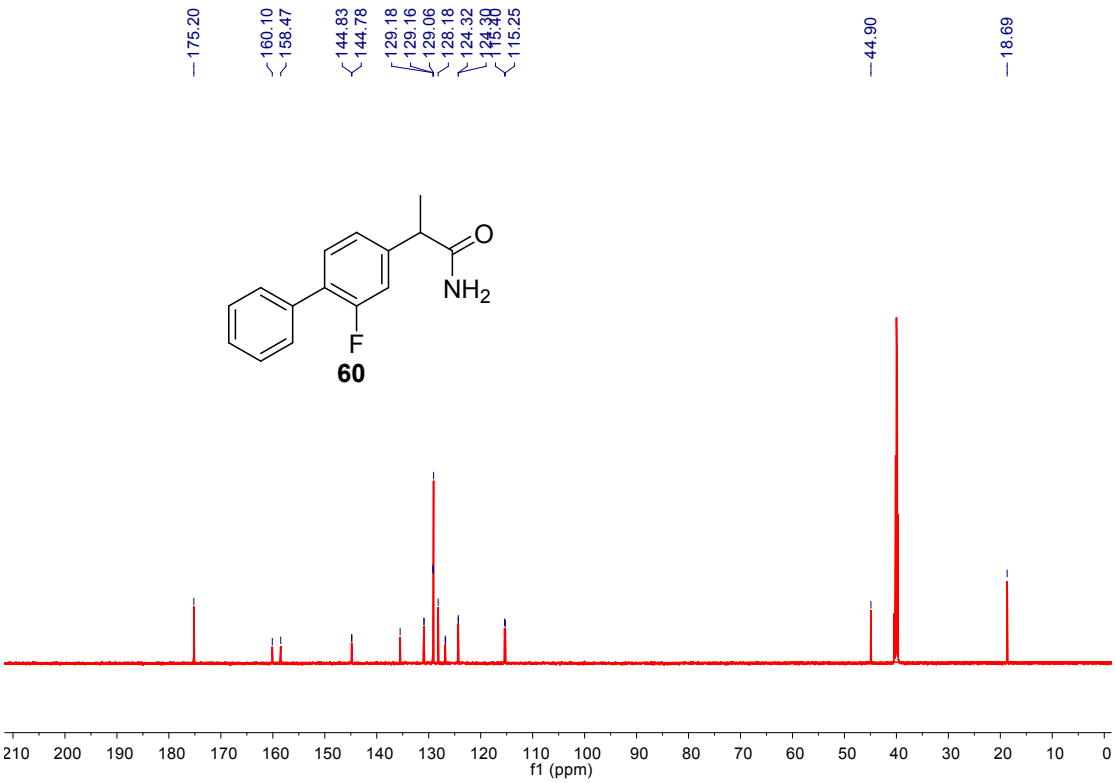
^{1}H NMR (600 MHz, DMSO-d_6)



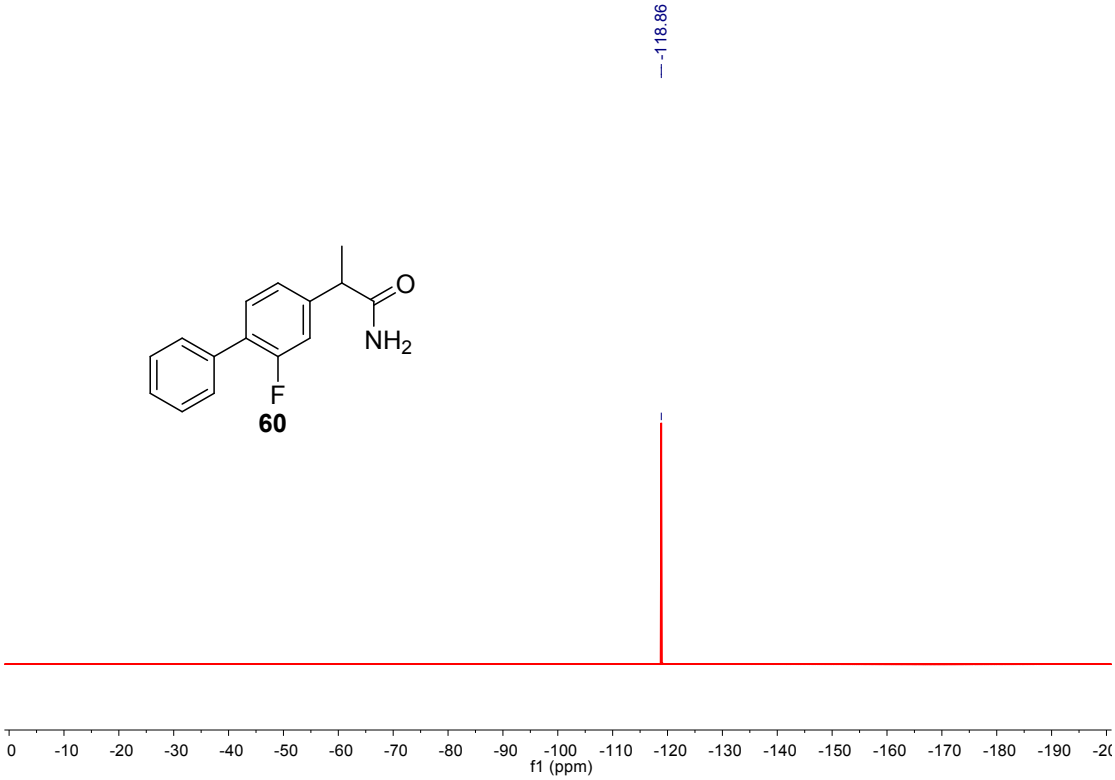
^{13}C NMR (151 MHz, DMSO-d$_6$)



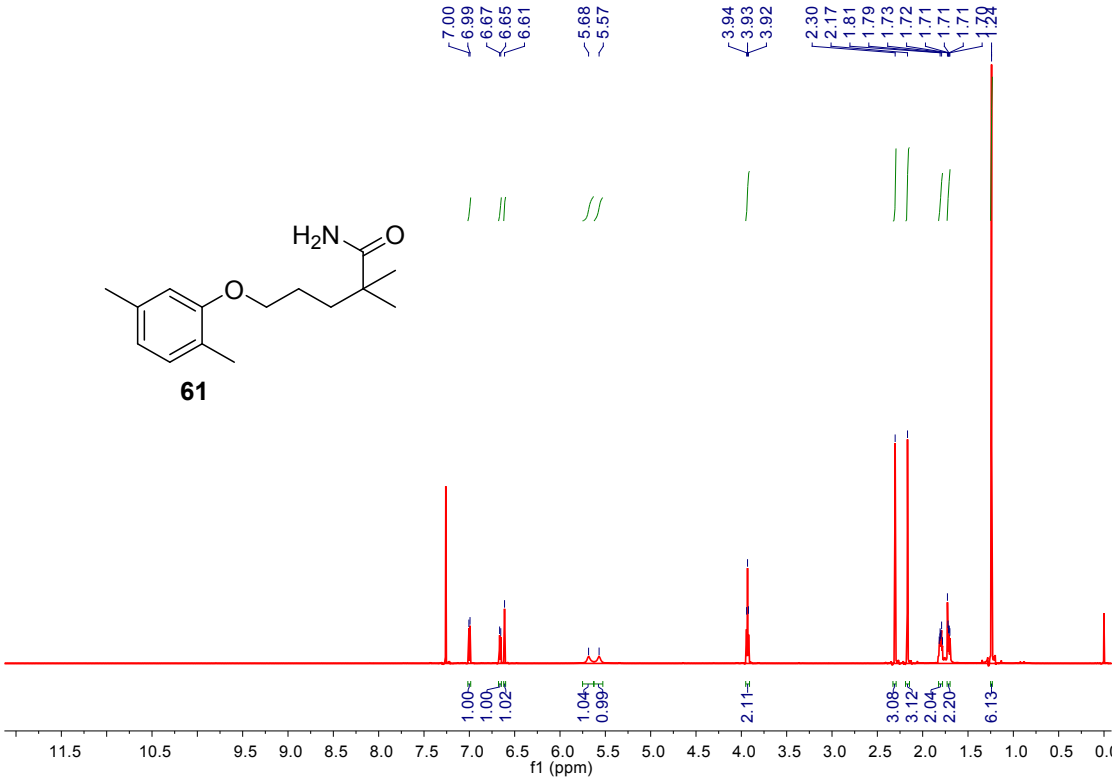
^{1}H NMR (600 MHz, DMSO-d$_6$)



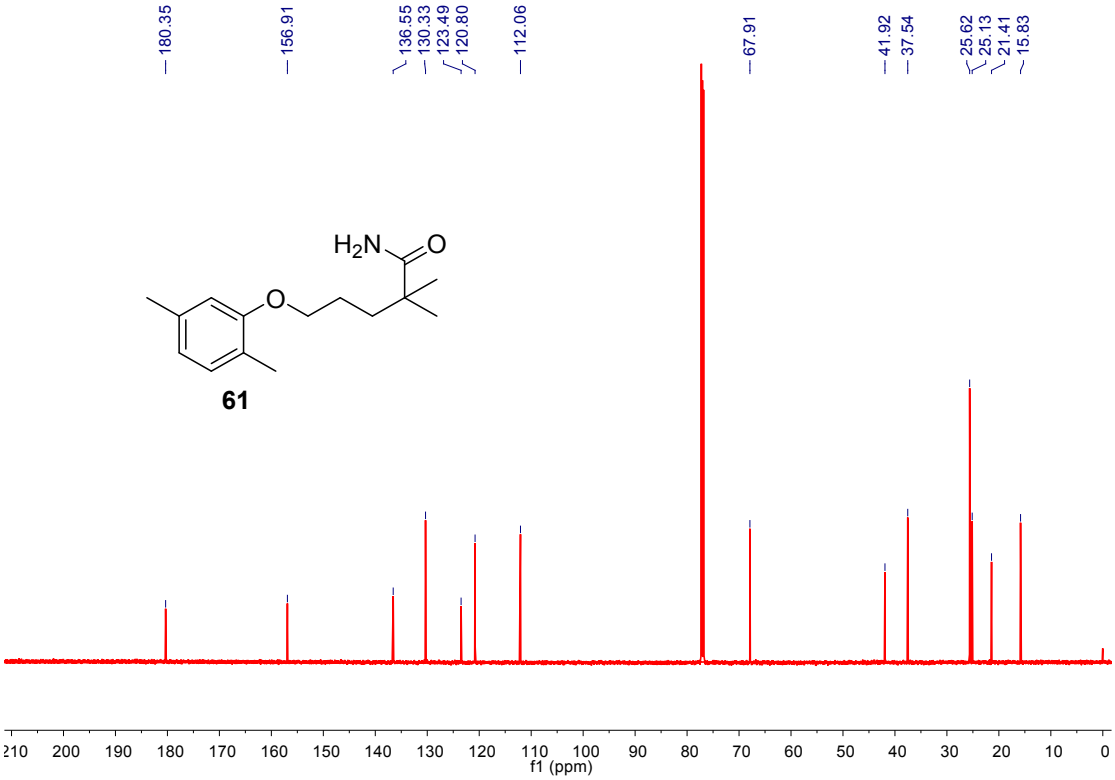
^{13}C NMR (151 MHz, DMSO-d$_6$)



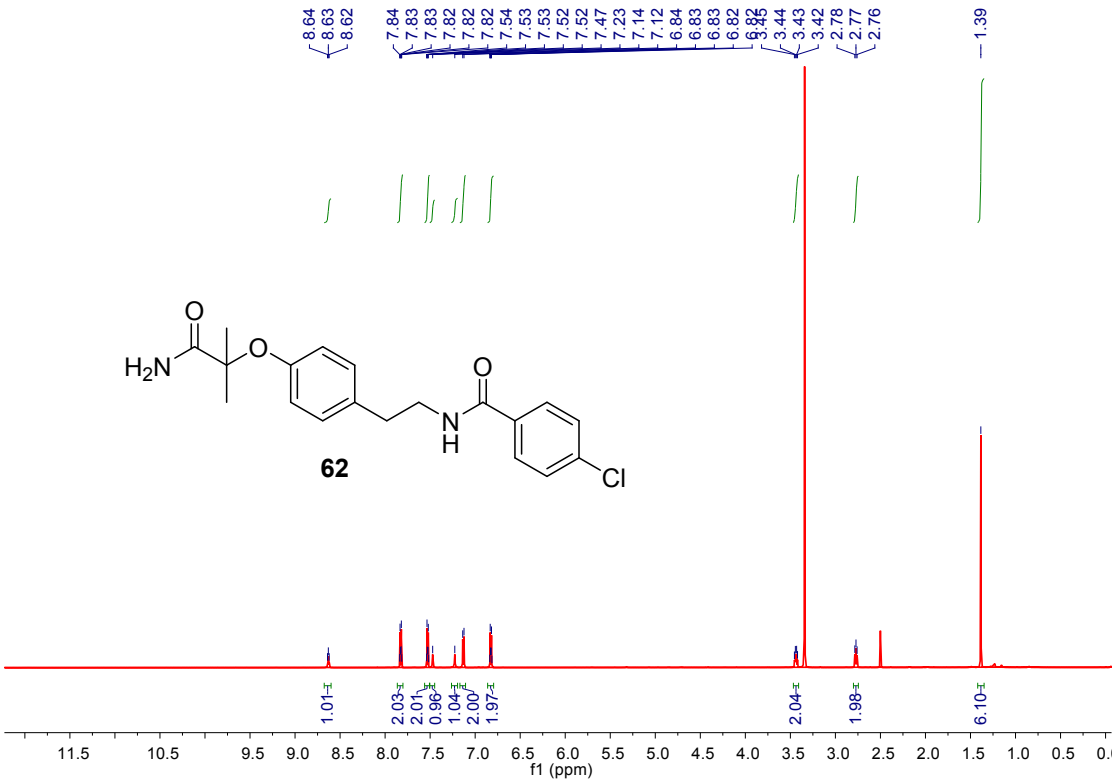
^{19}F NMR (565 MHz, DMSO-d$_6$)



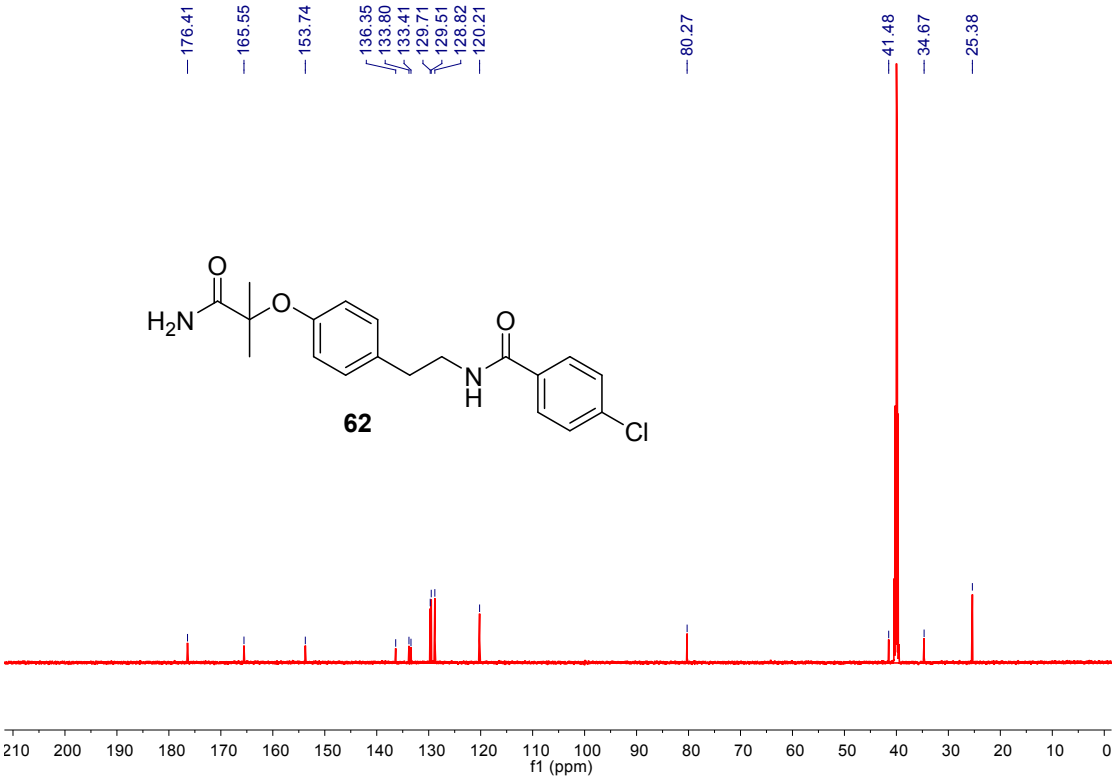
^{1}H NMR (600 MHz, $CDCl_3$)



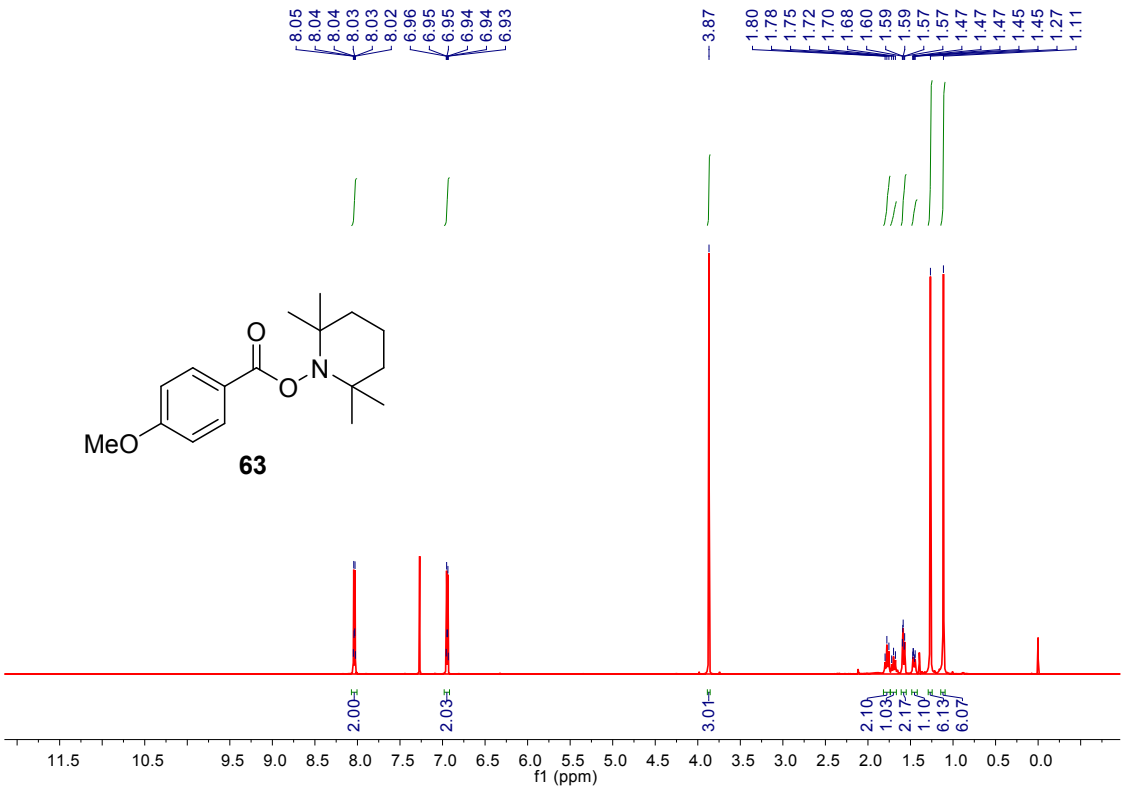
^{13}C NMR (151 MHz, $CDCl_3$)



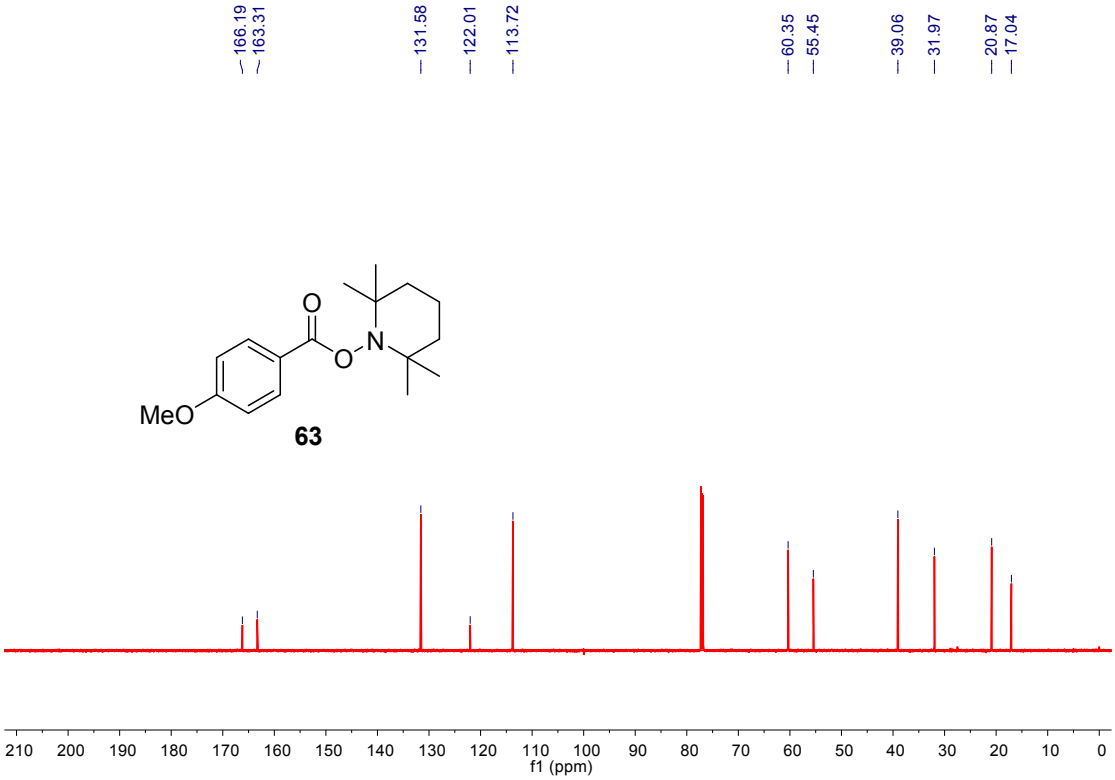
^{1}H NMR (600 MHz, DMSO-d$_6$)



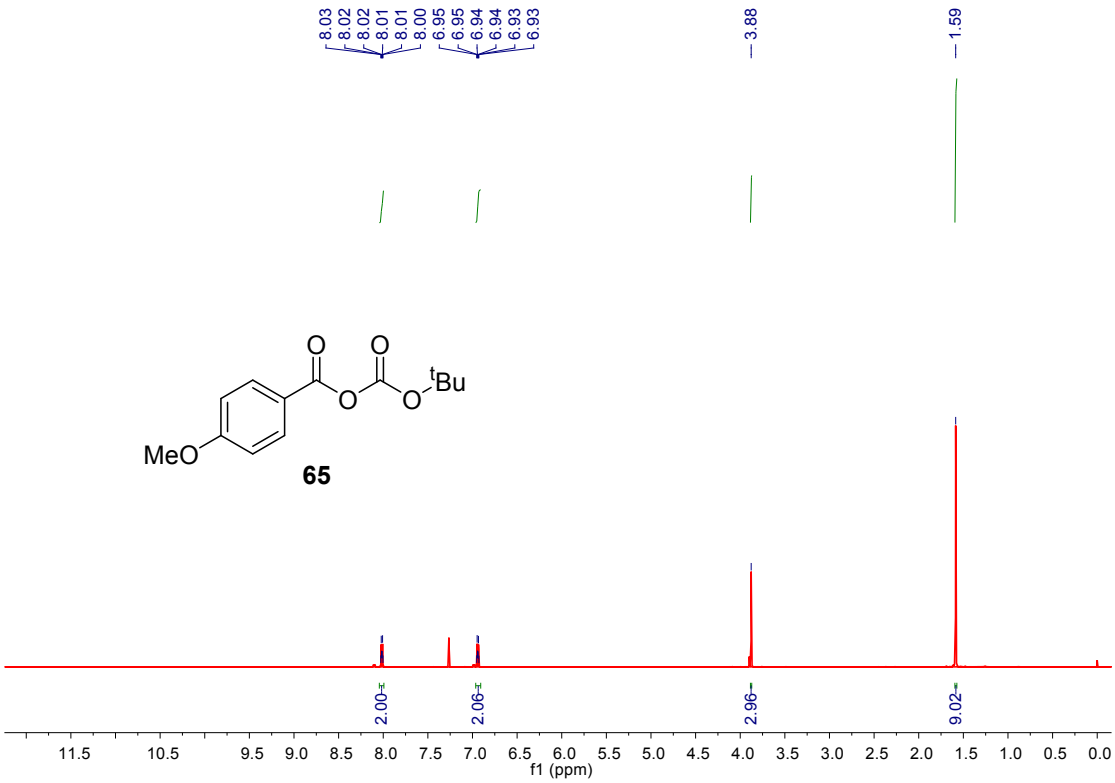
^{13}C NMR (151 MHz, DMSO-d$_6$)



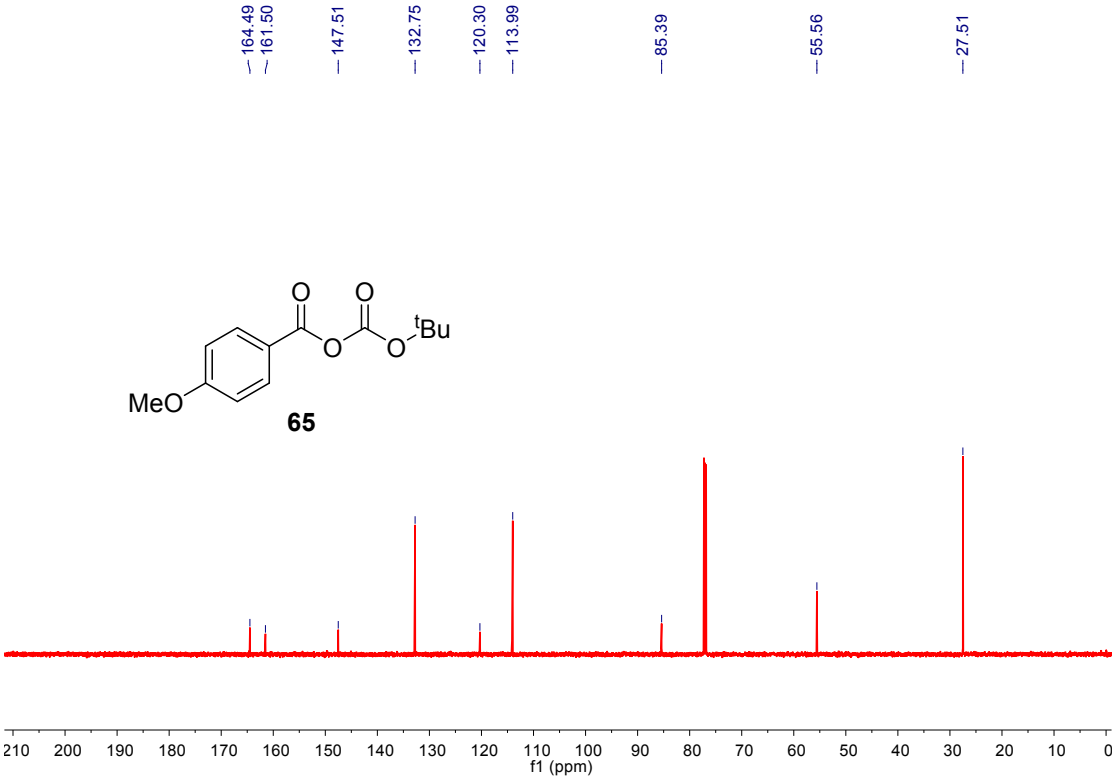
^{1}H NMR (600 MHz, $CDCl_3$)



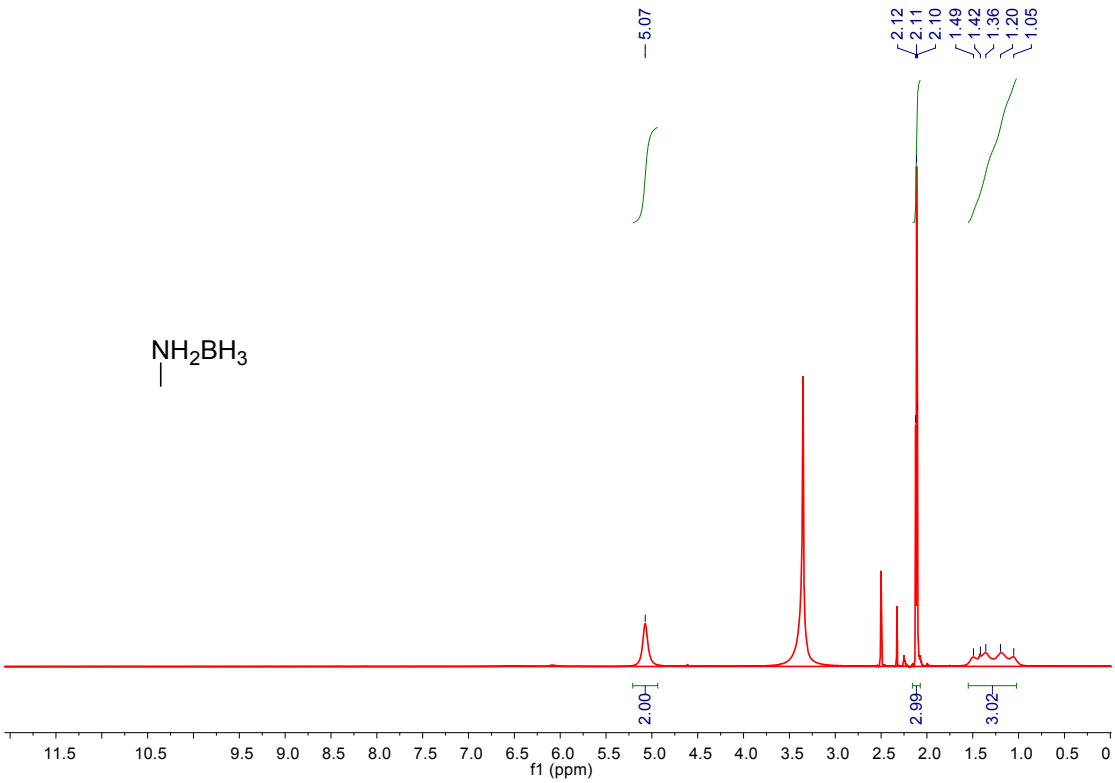
^{13}C NMR (151 MHz, $CDCl_3$)



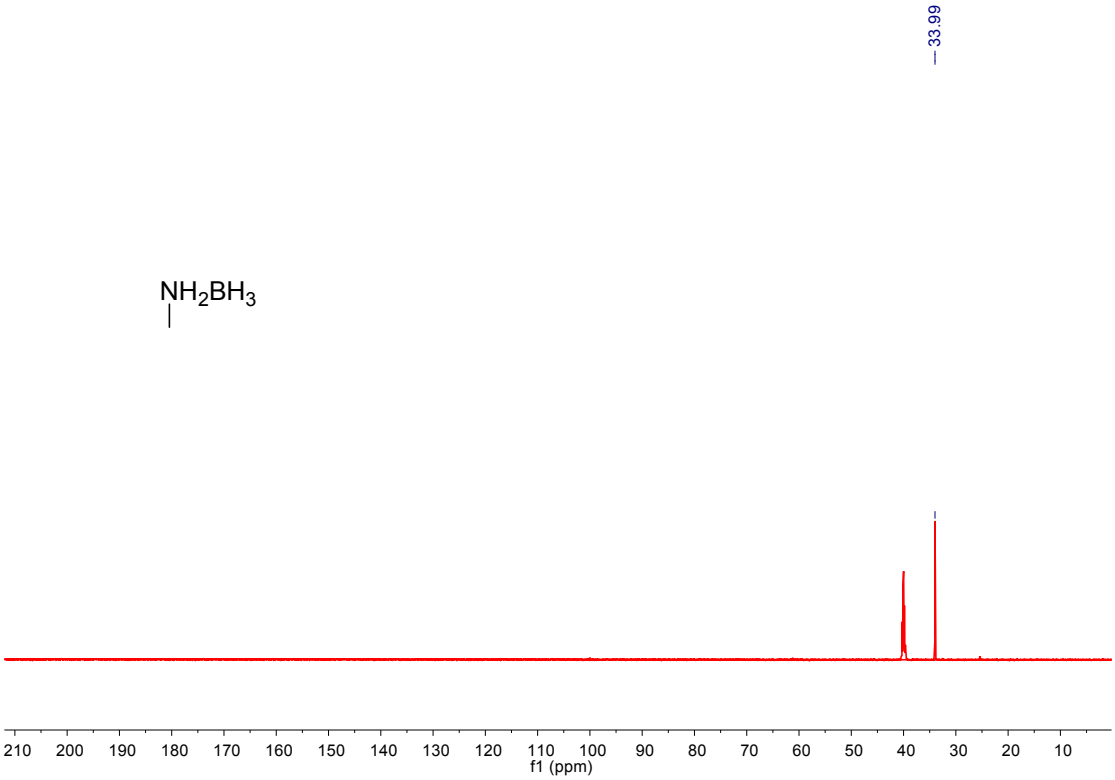
^{1}H NMR (600 MHz, $CDCl_3$)



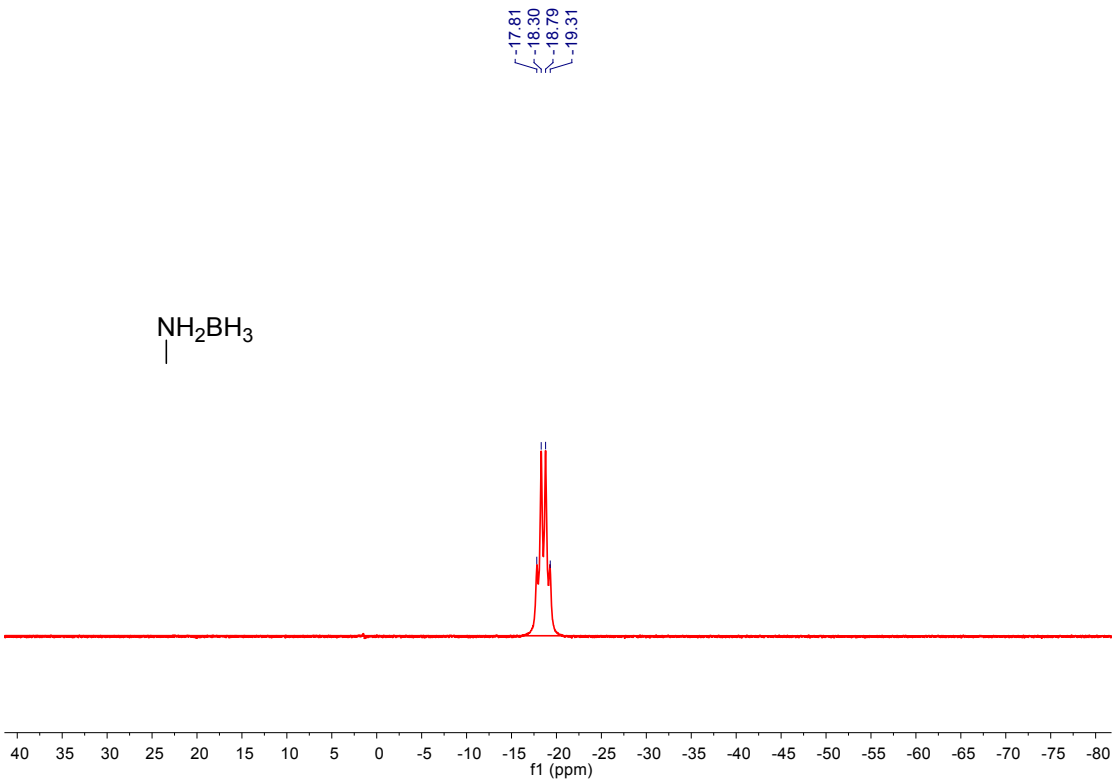
^{13}C NMR (151 MHz, $CDCl_3$)



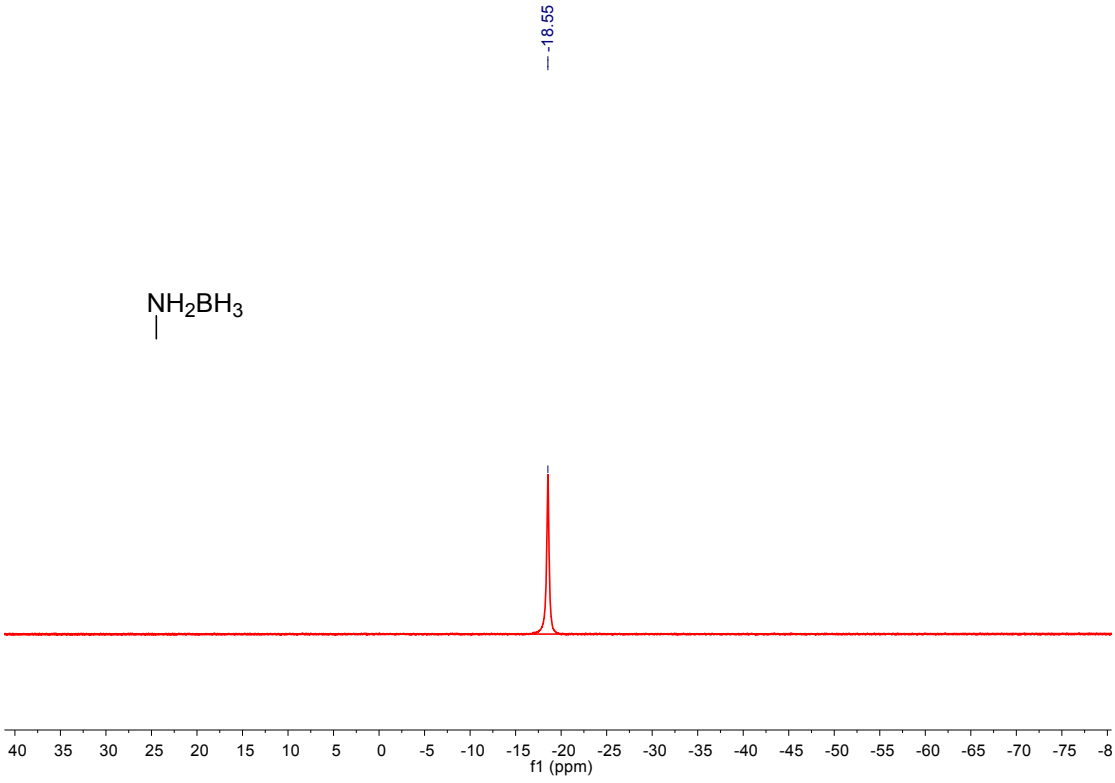
^{1}H NMR (600 MHz, DMSO-d_6)



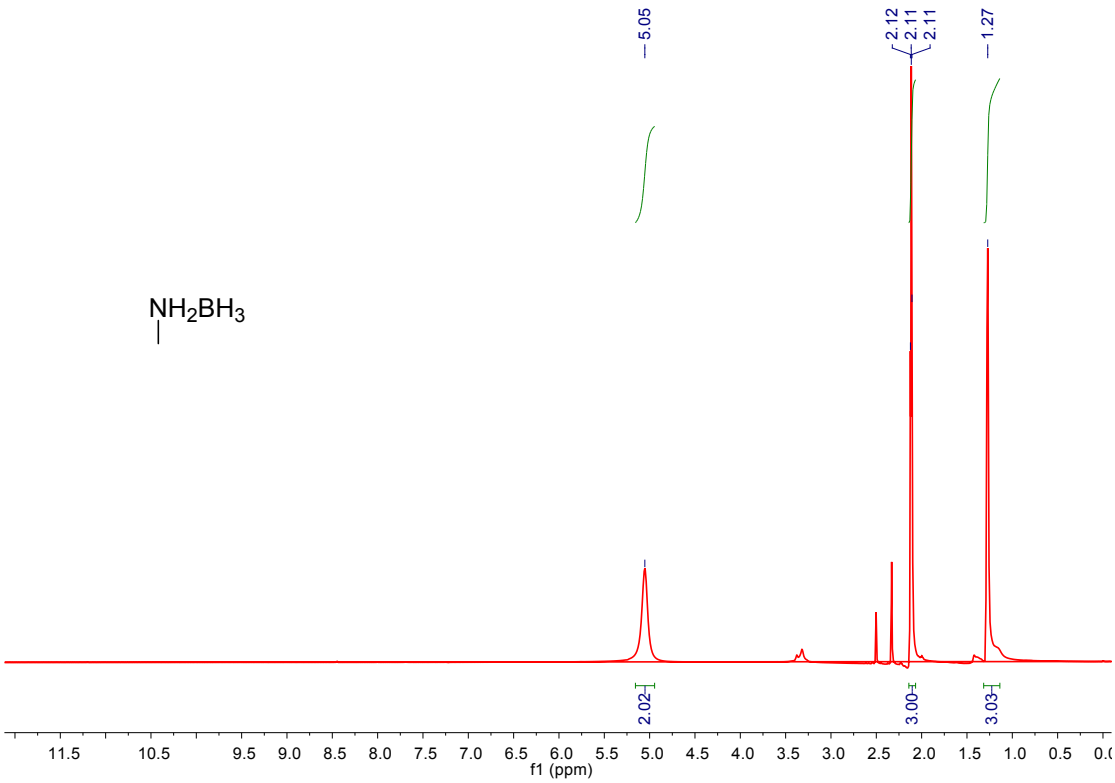
^{13}C NMR (151 MHz, DMSO-d_6)



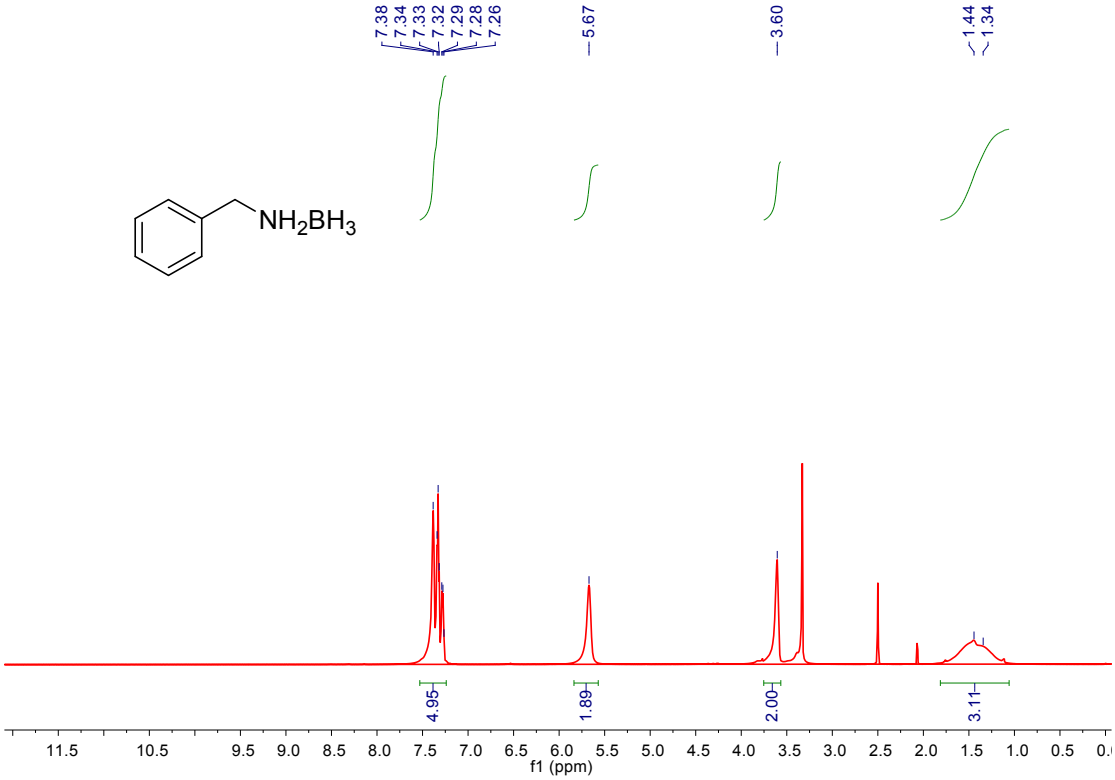
^{11}B NMR (193 MHz, DMSO-d_6)



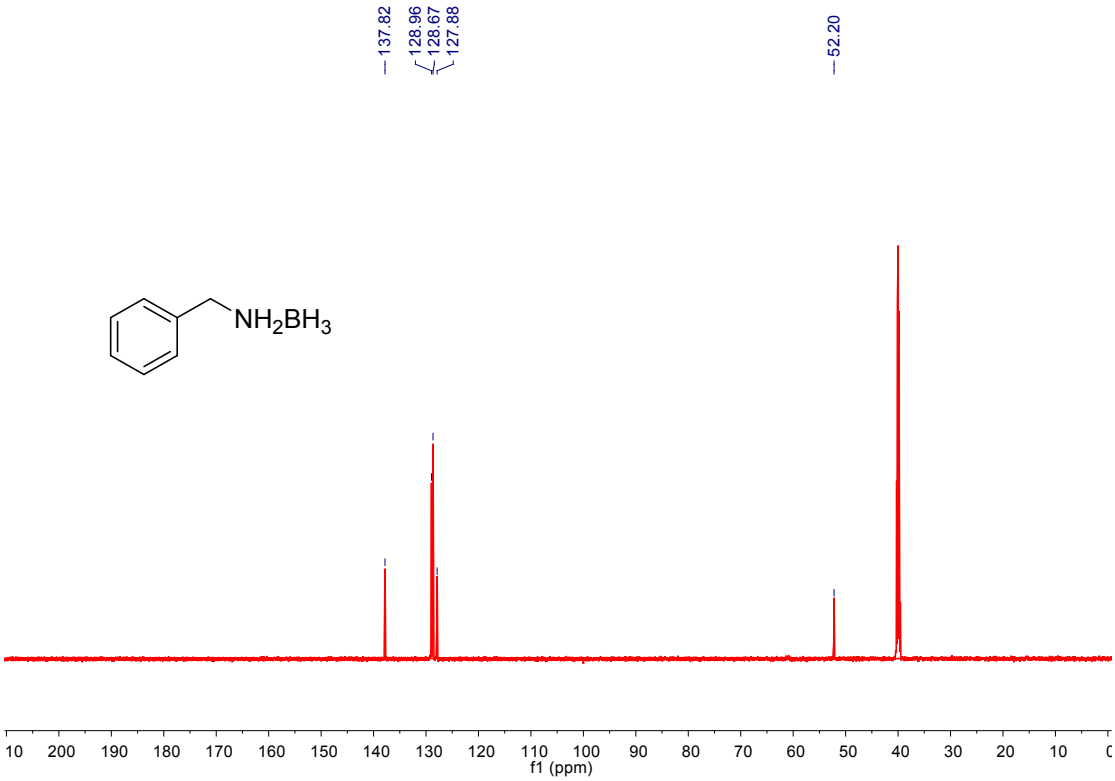
^{11}B{^{1}H} NMR (193 MHz, DMSO-d_6)



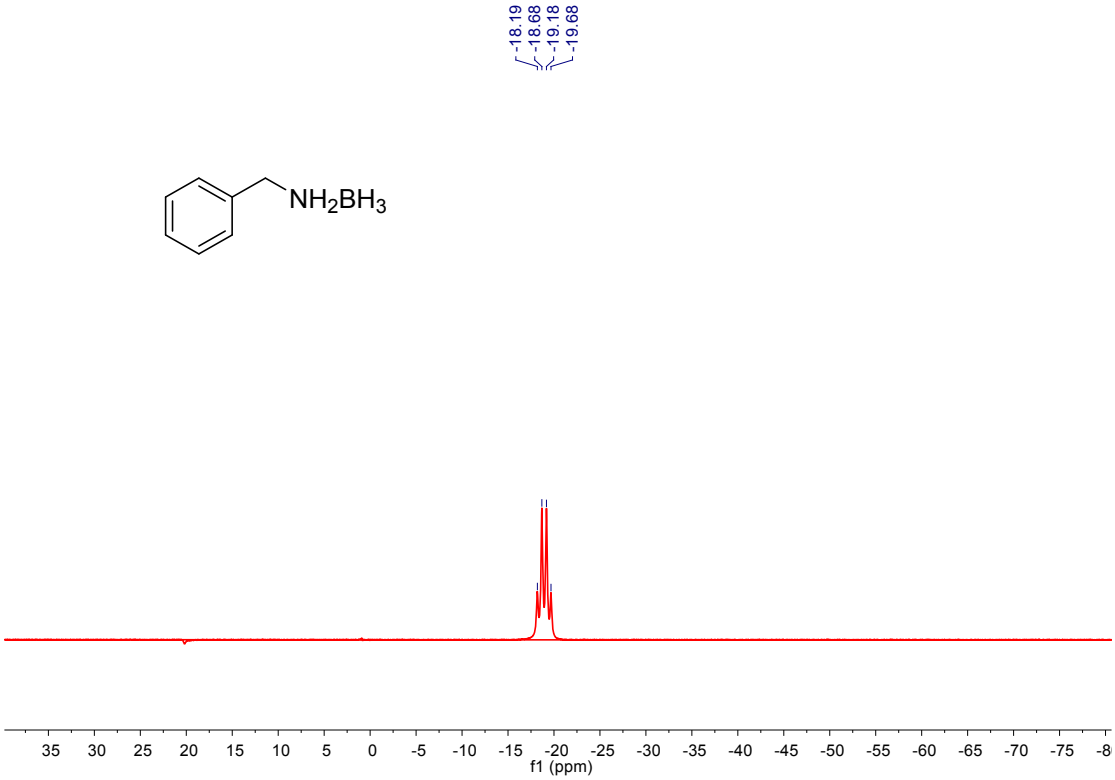
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



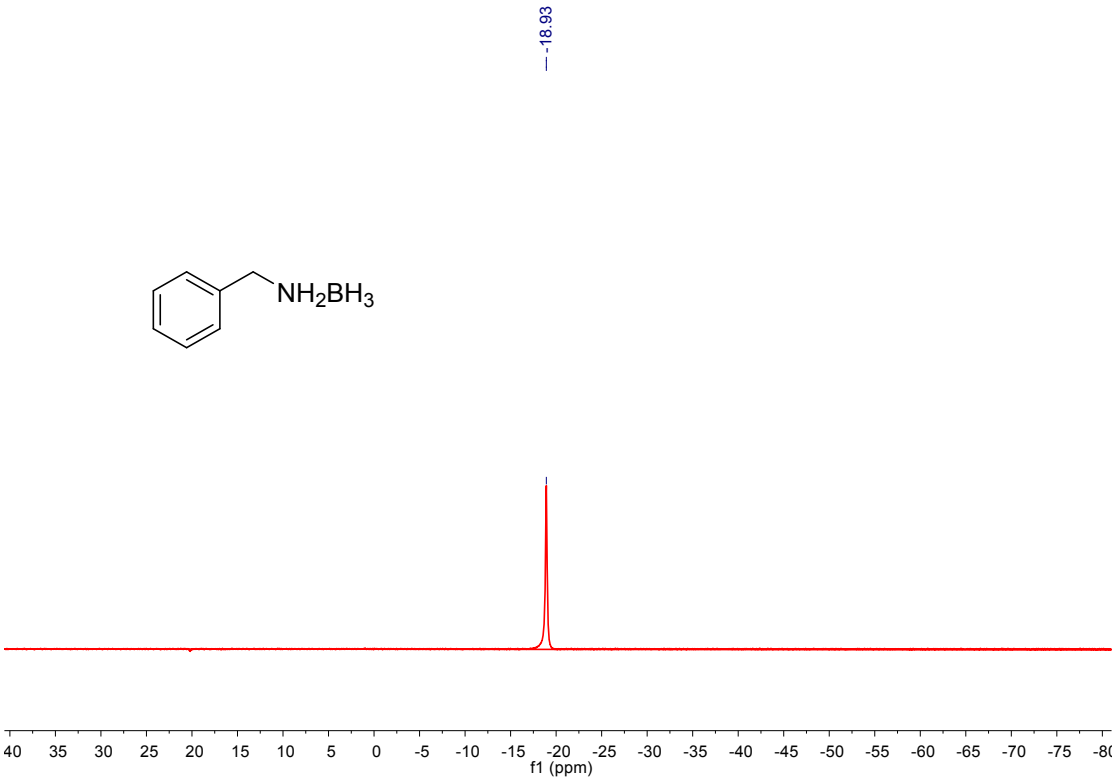
^{1}H NMR (600 MHz, DMSO-d_6)



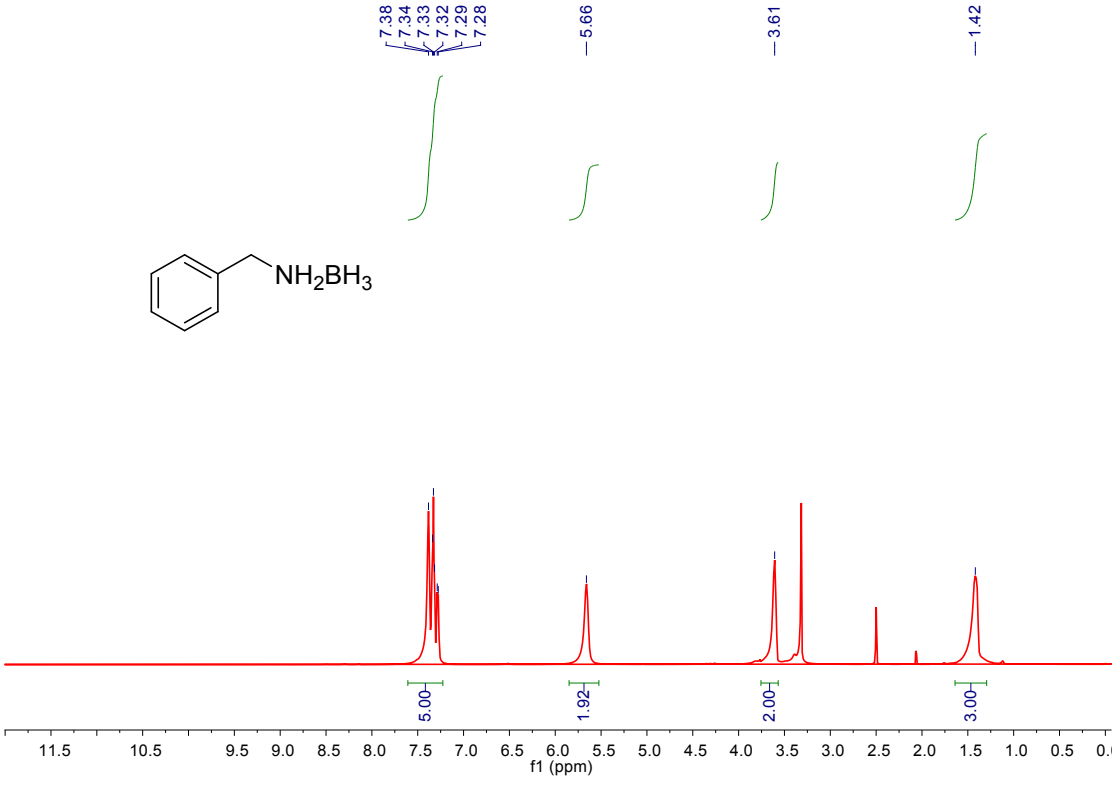
^{13}C NMR (151 MHz, DMSO-d_6)



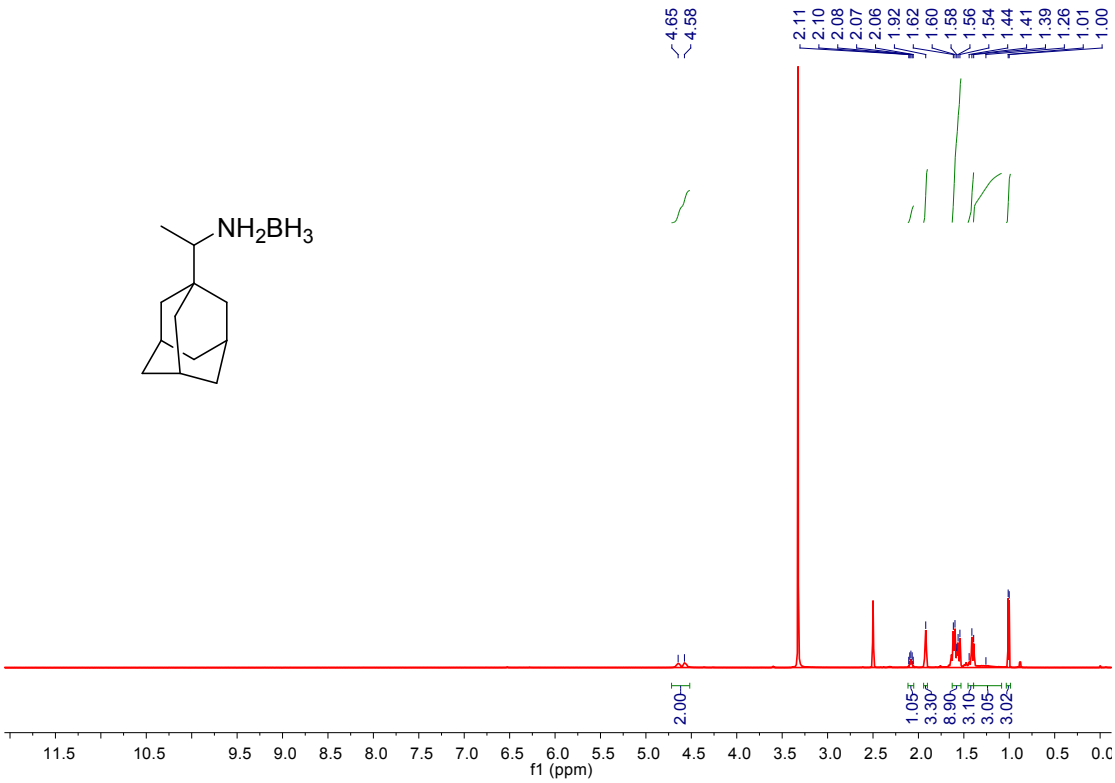
^{11}B NMR (193 MHz, DMSO-d_6)



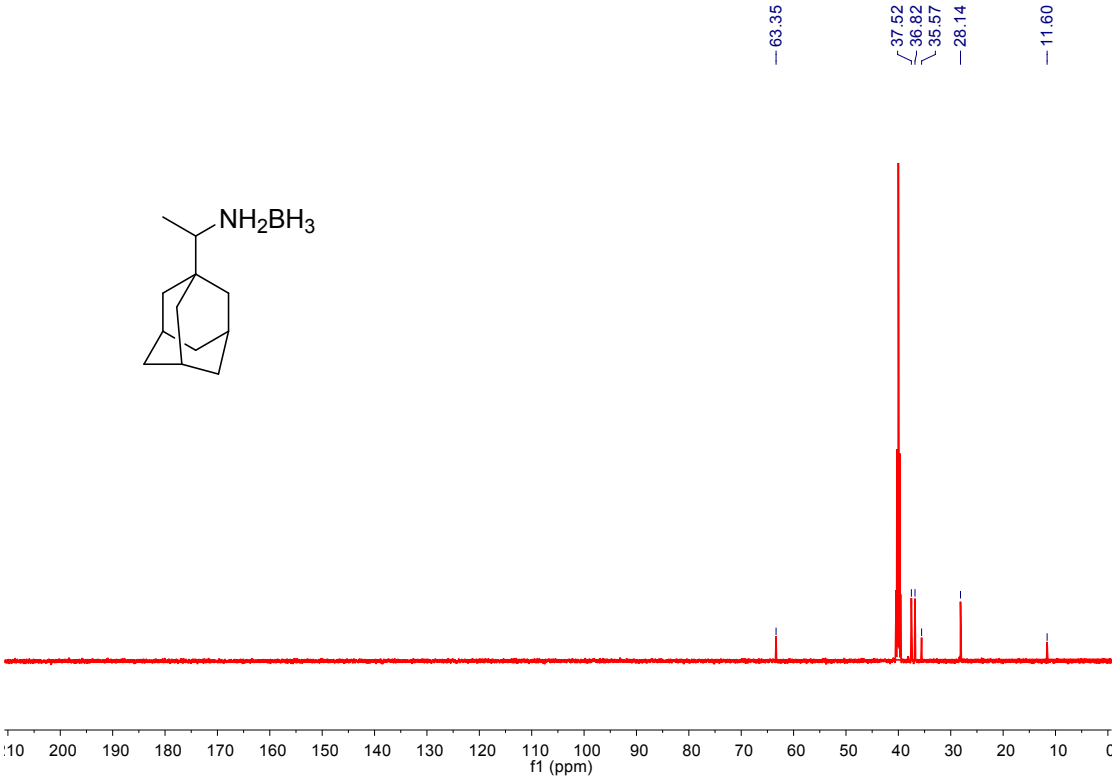
$^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6)



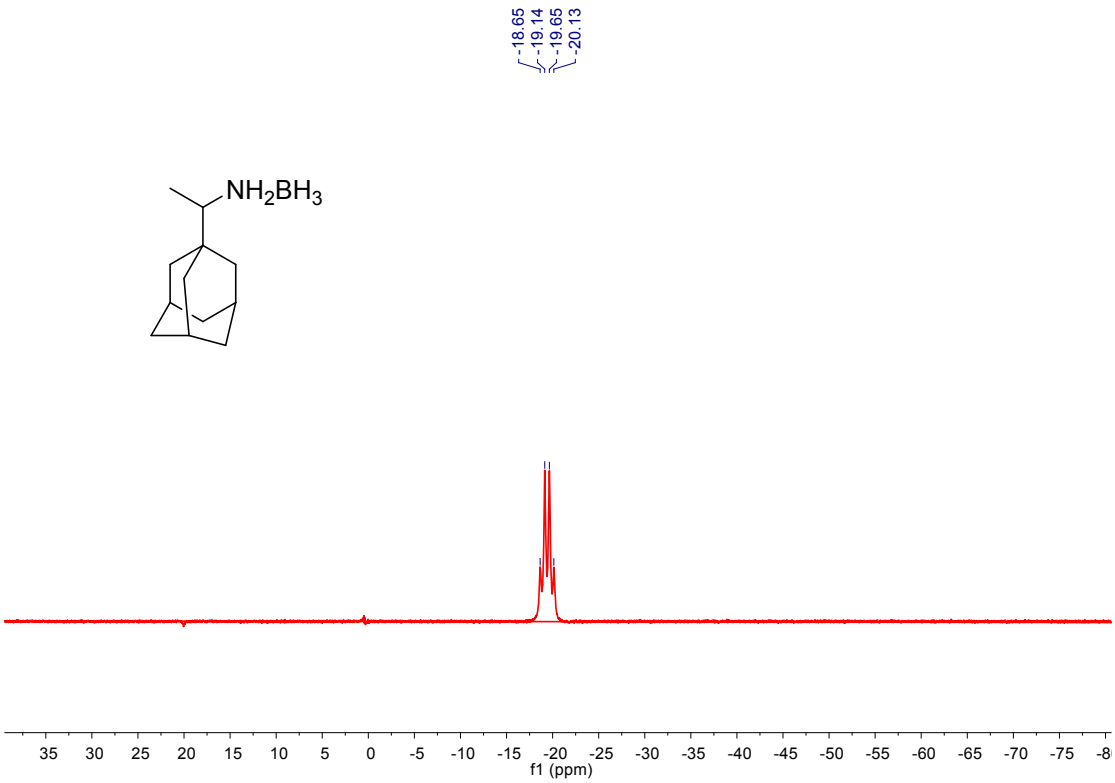
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



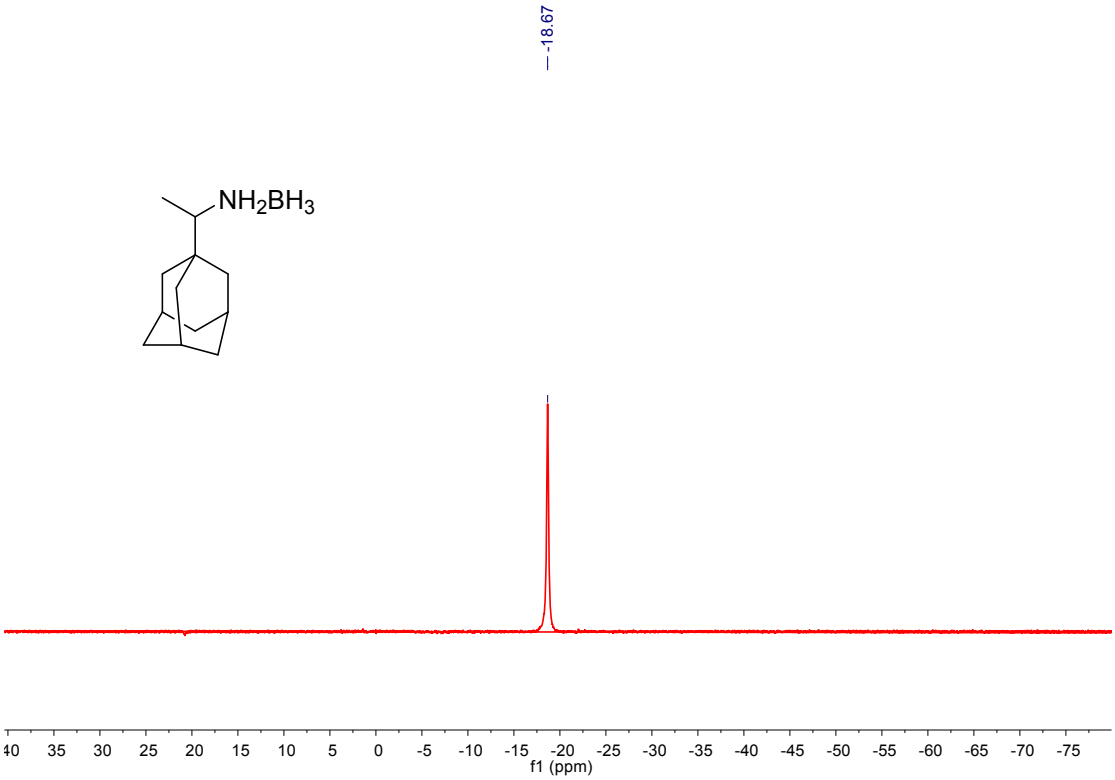
^{1}H NMR (600 MHz, DMSO-d_6)



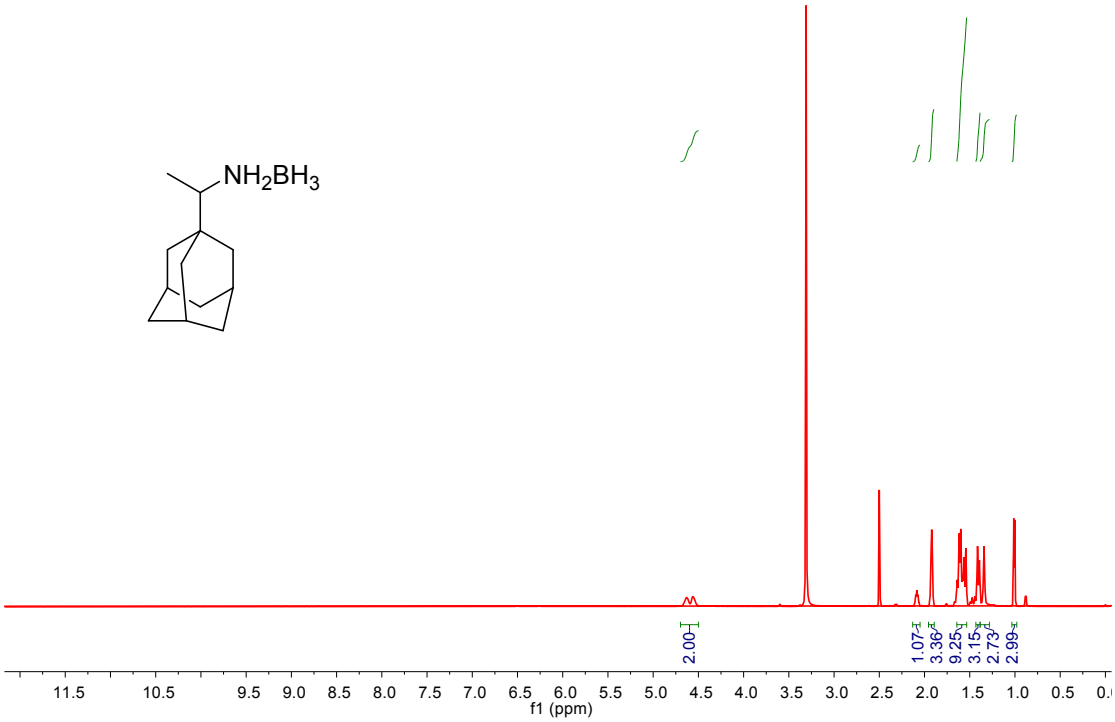
^{13}C NMR (151 MHz, DMSO-d_6)



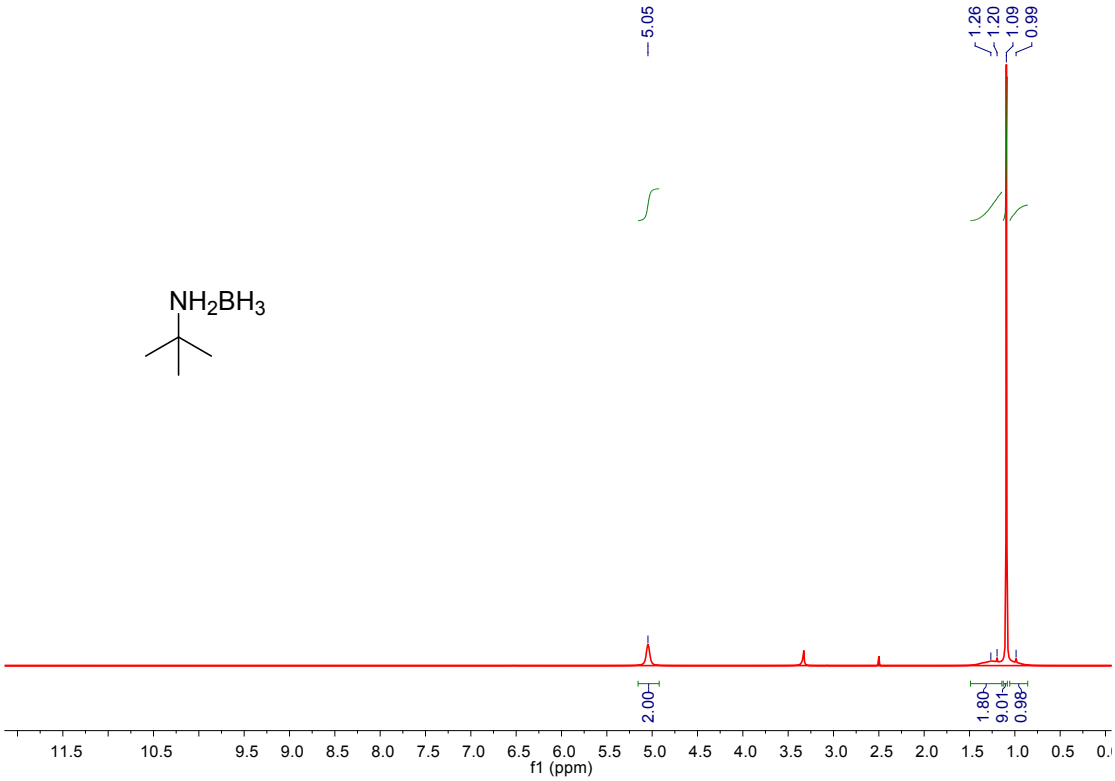
^{11}B NMR (193 MHz, DMSO-d$_6$)



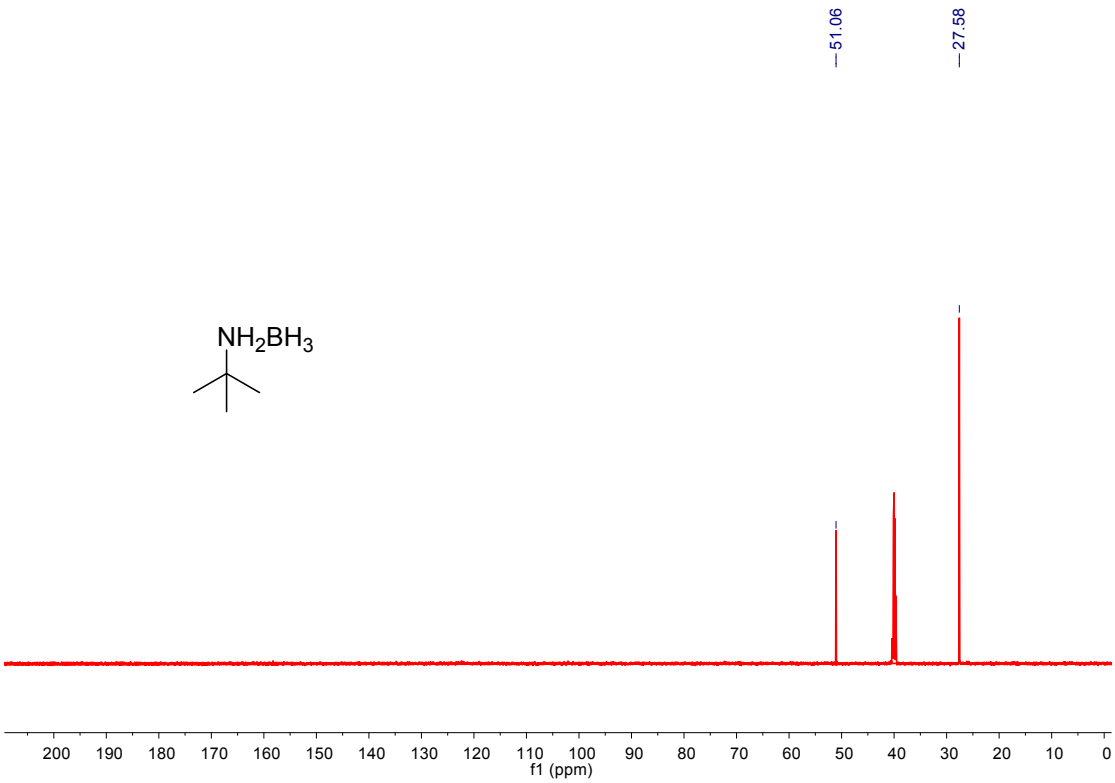
^{11}B{^{1}H} NMR (193 MHz, DMSO-d$_6$)



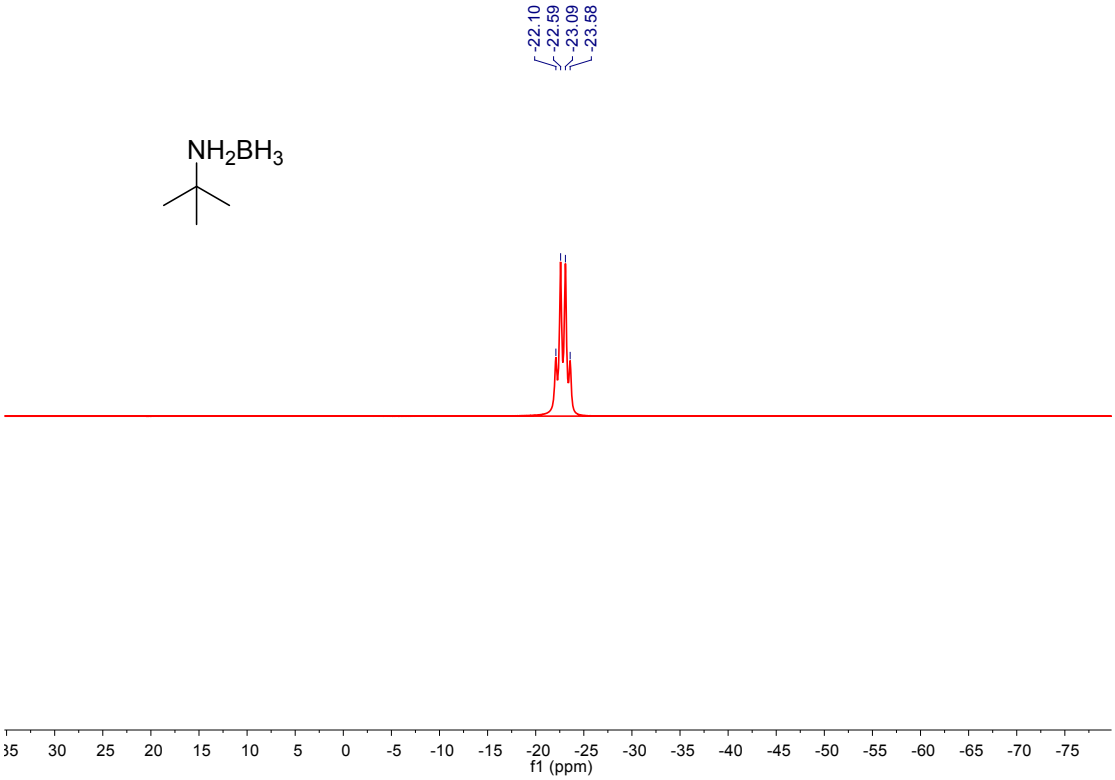
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



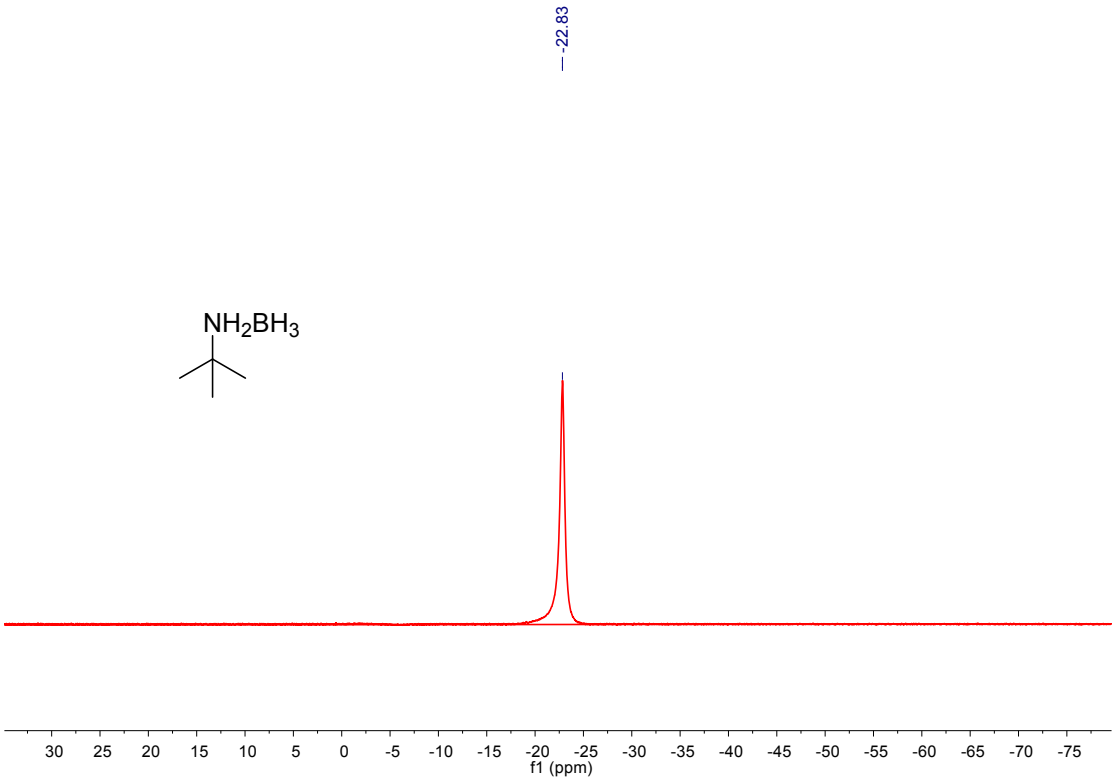
^{1}H NMR (600 MHz, DMSO-d_6)



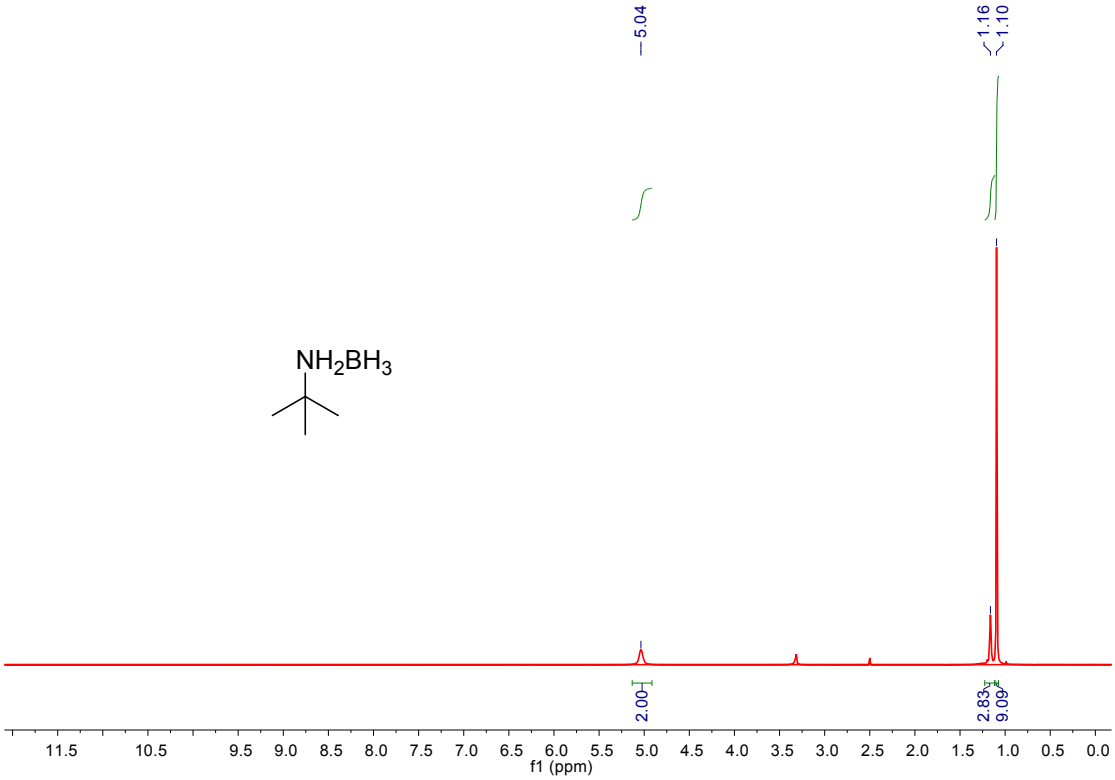
^{13}C NMR (151 MHz, DMSO-d$_6$)



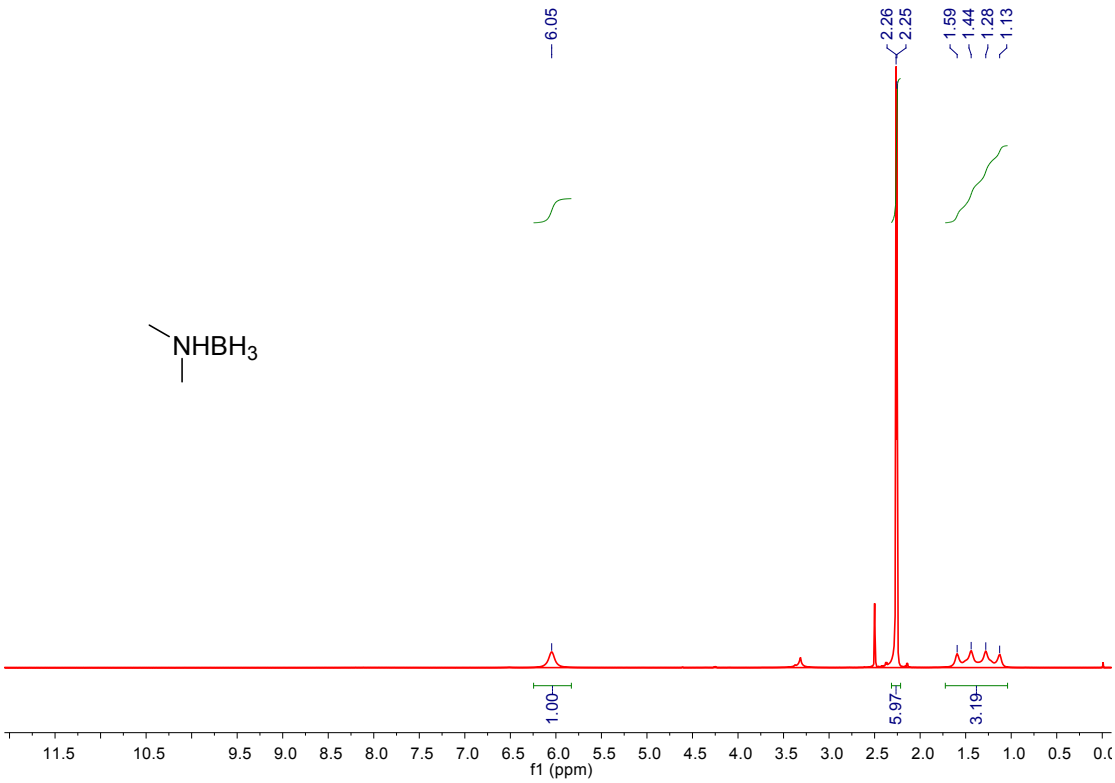
^{11}B NMR (193 MHz, DMSO-d$_6$)



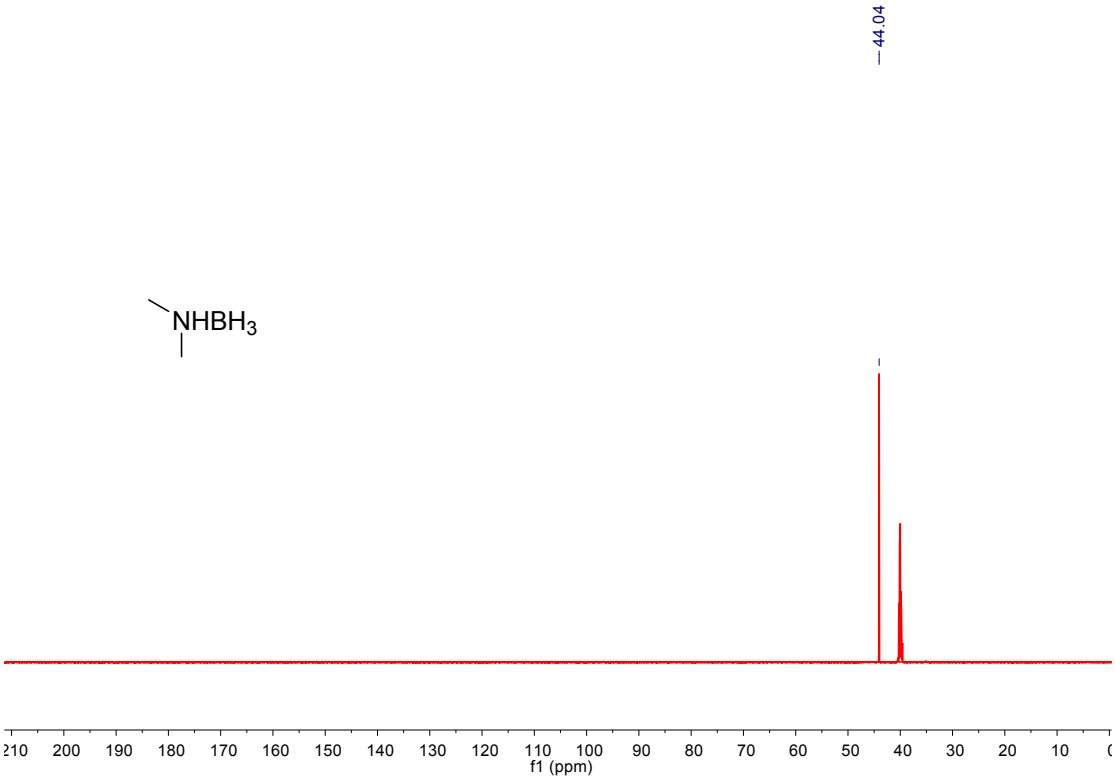
$^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6)



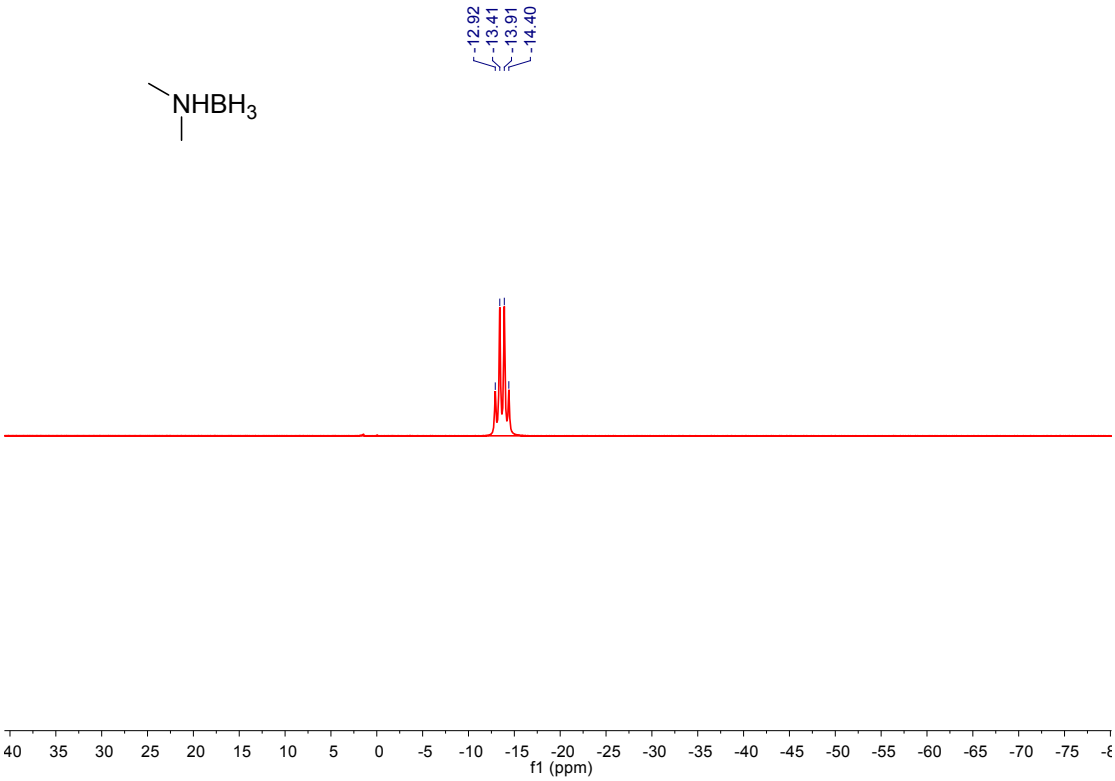
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



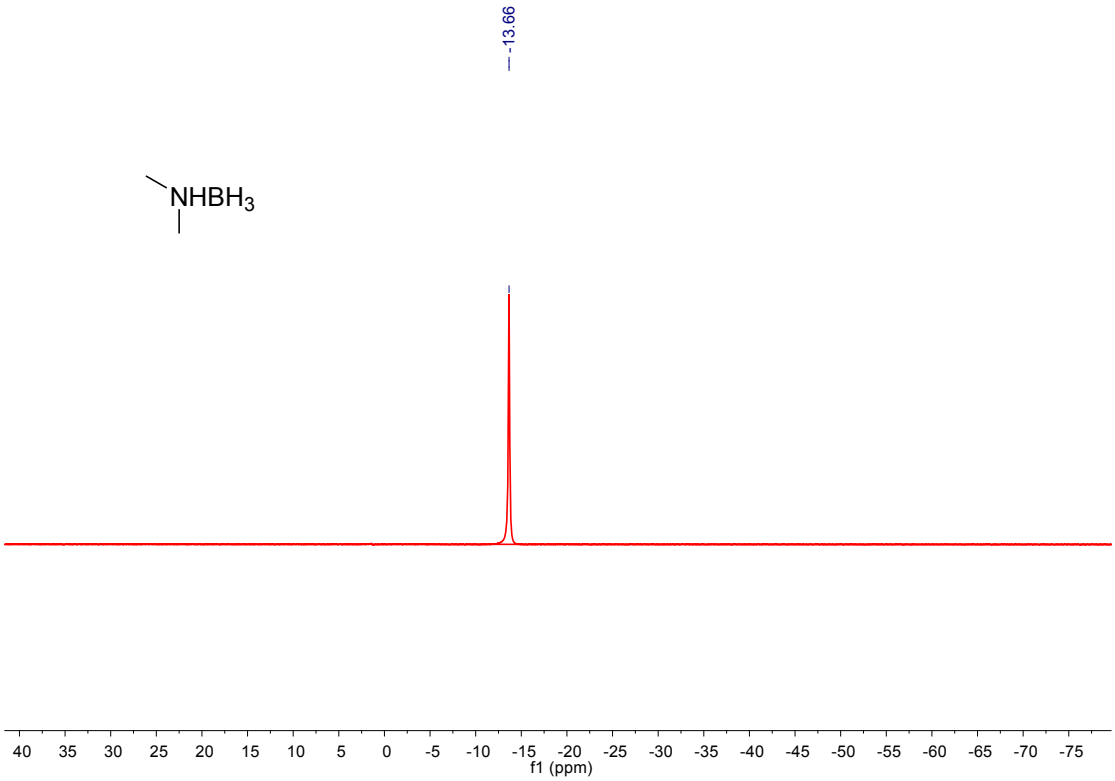
^{1}H NMR (600 MHz, DMSO-d_6)



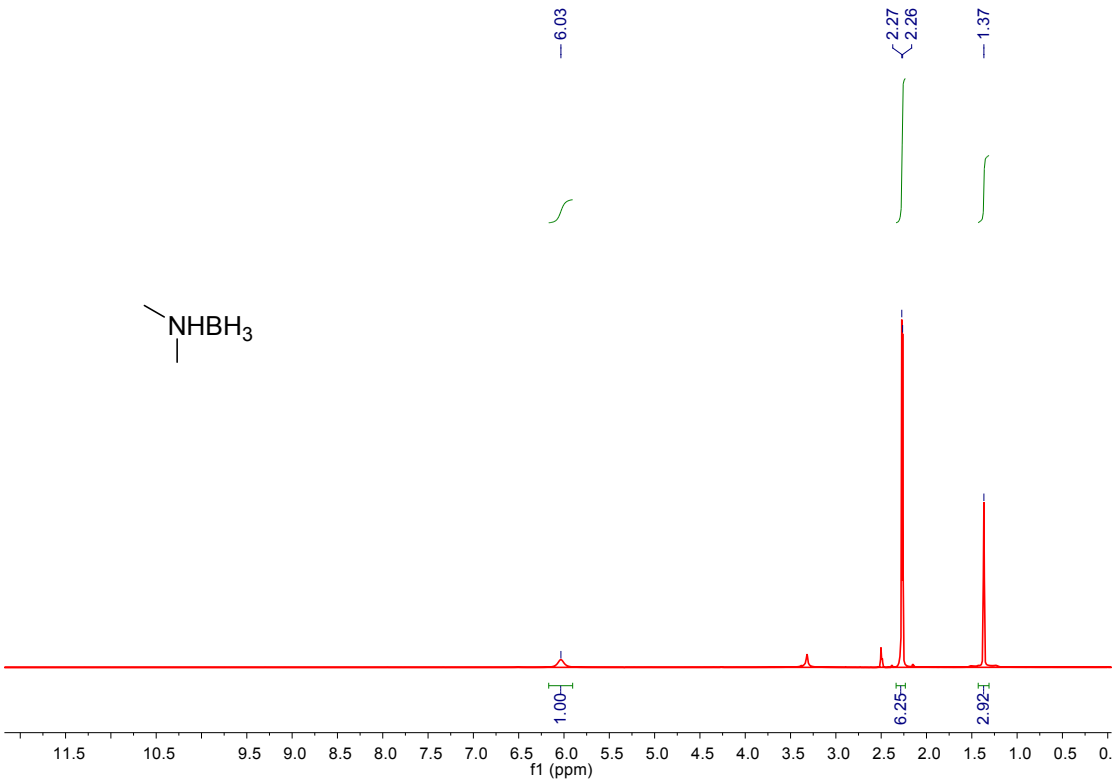
^{13}C NMR (151 MHz, DMSO-d_6)



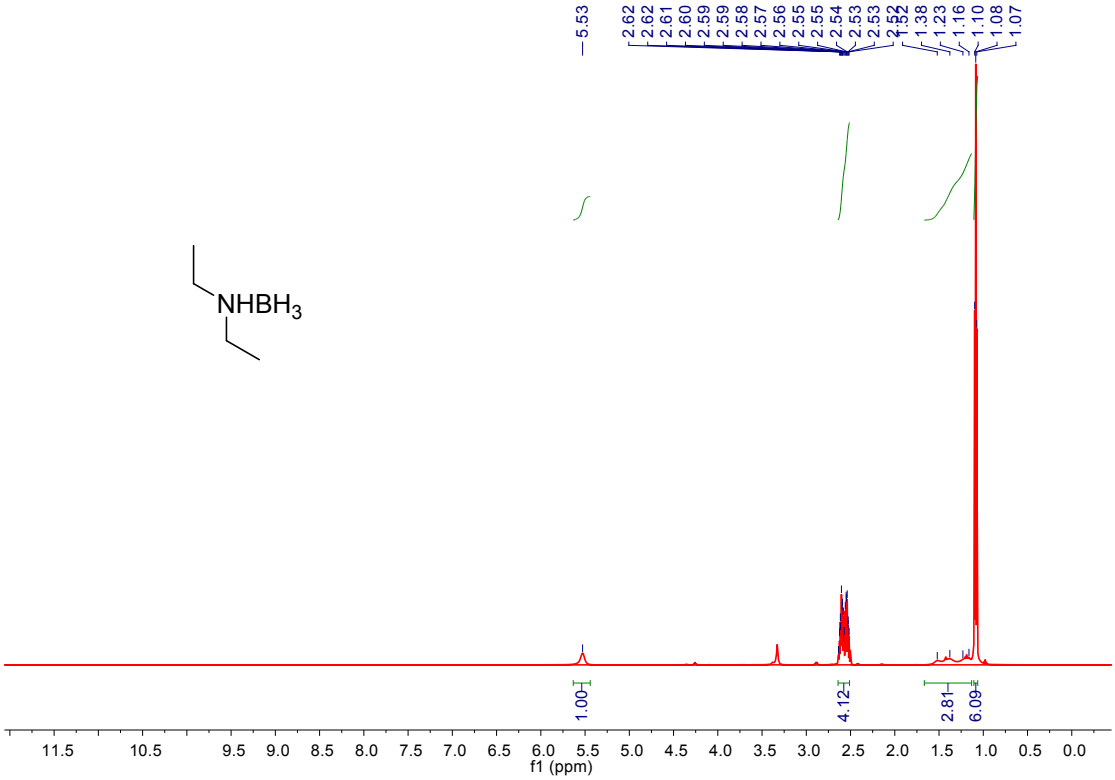
^{11}B NMR (193 MHz, DMSO-d_6)



^{11}B{^{1}H} NMR (193 MHz, DMSO-d_6)



$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



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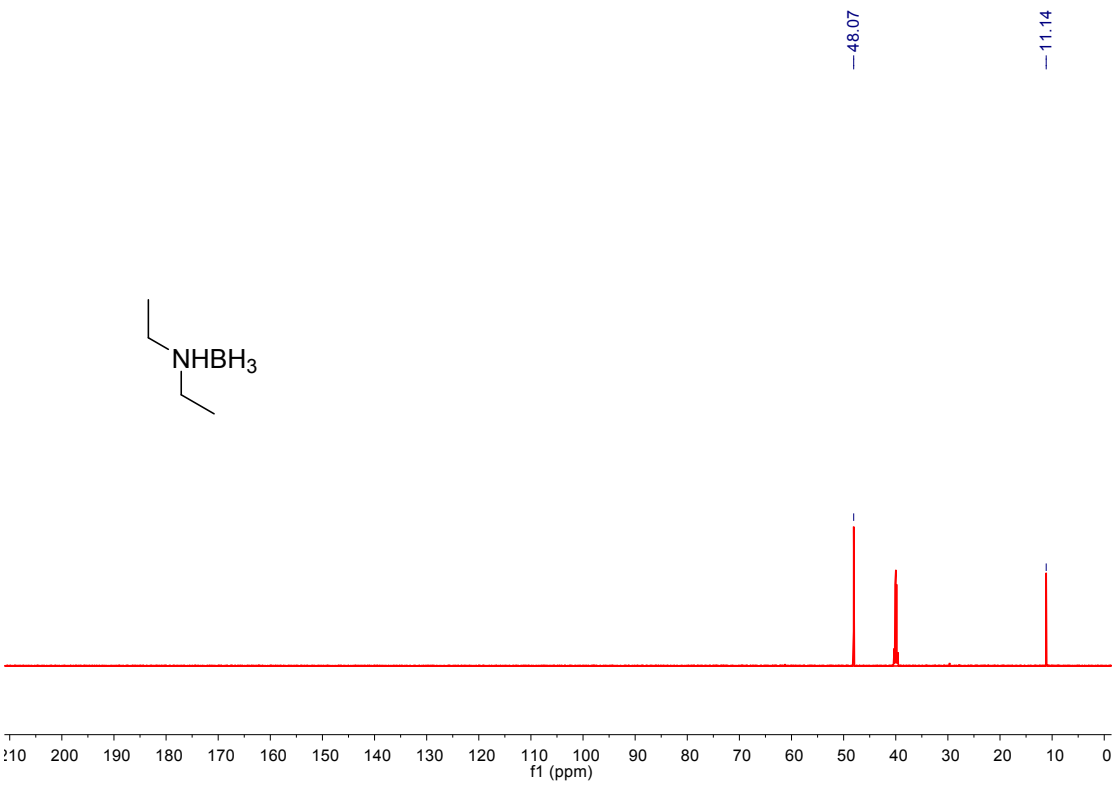
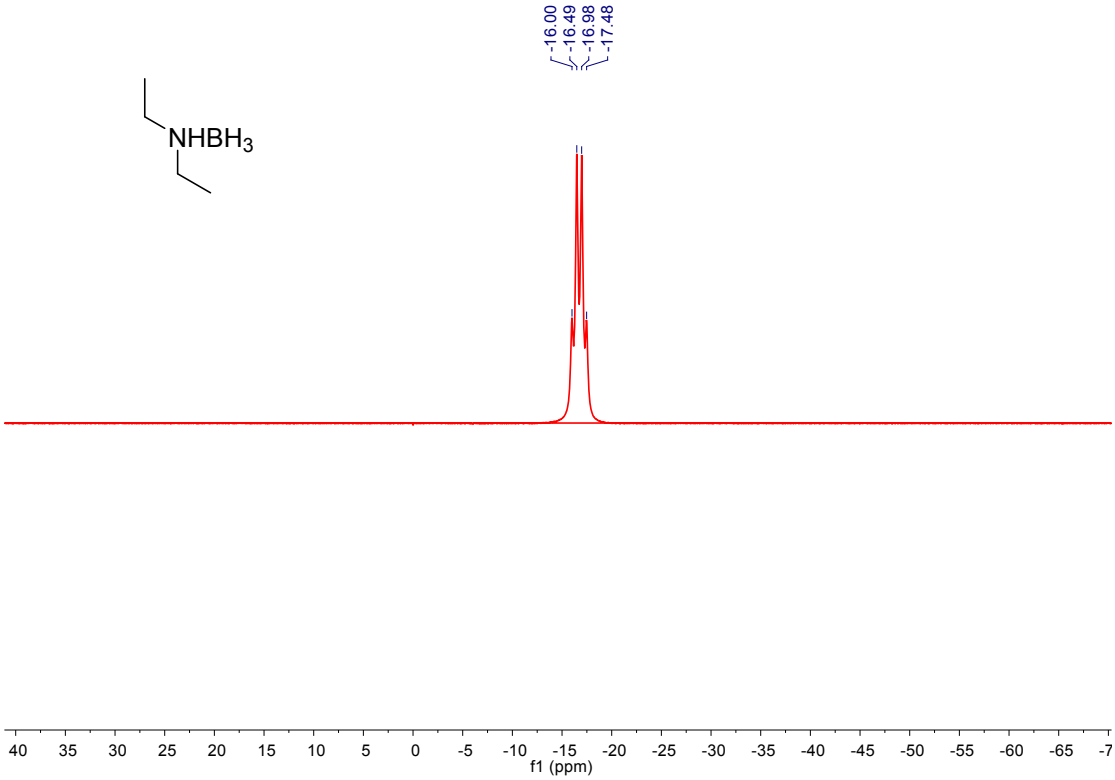


^{13}C NMR (151 MHz, DMSO-d_6)



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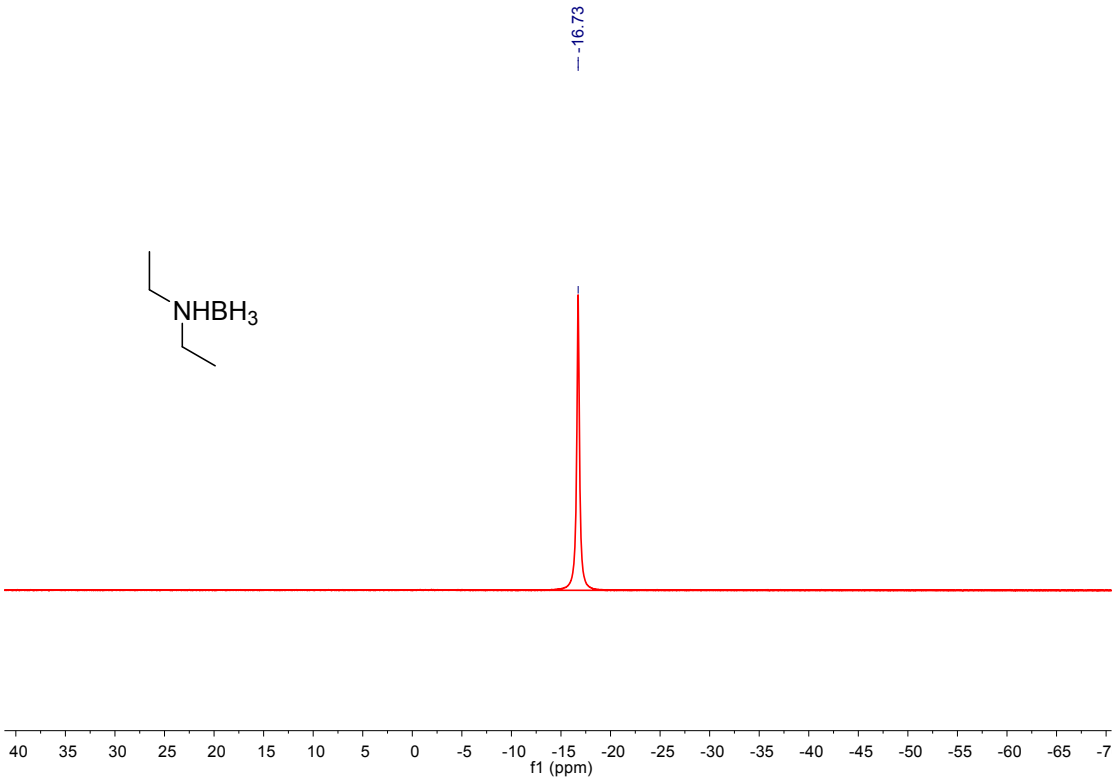

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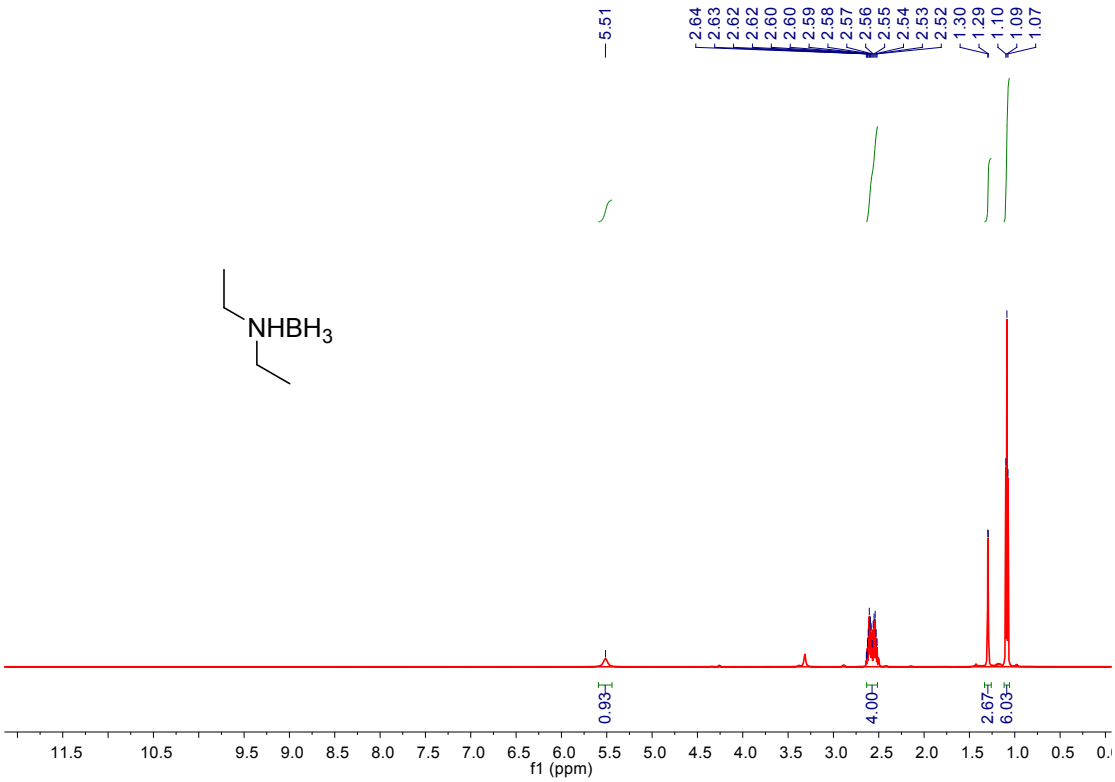
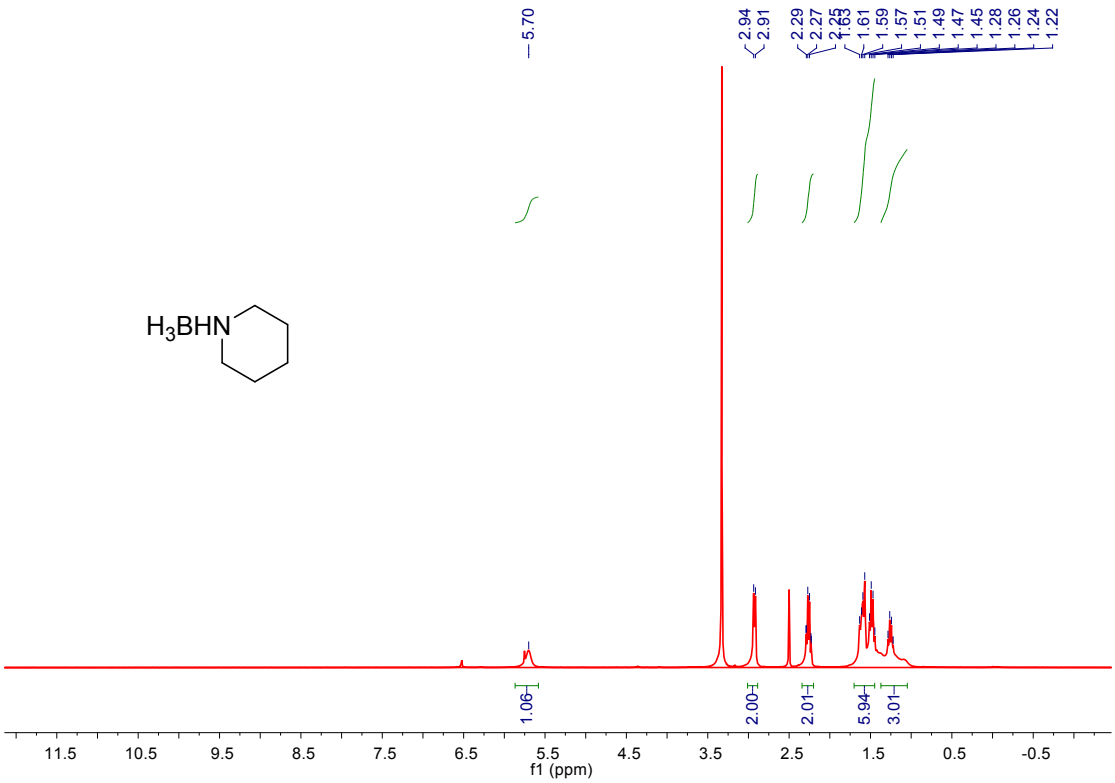
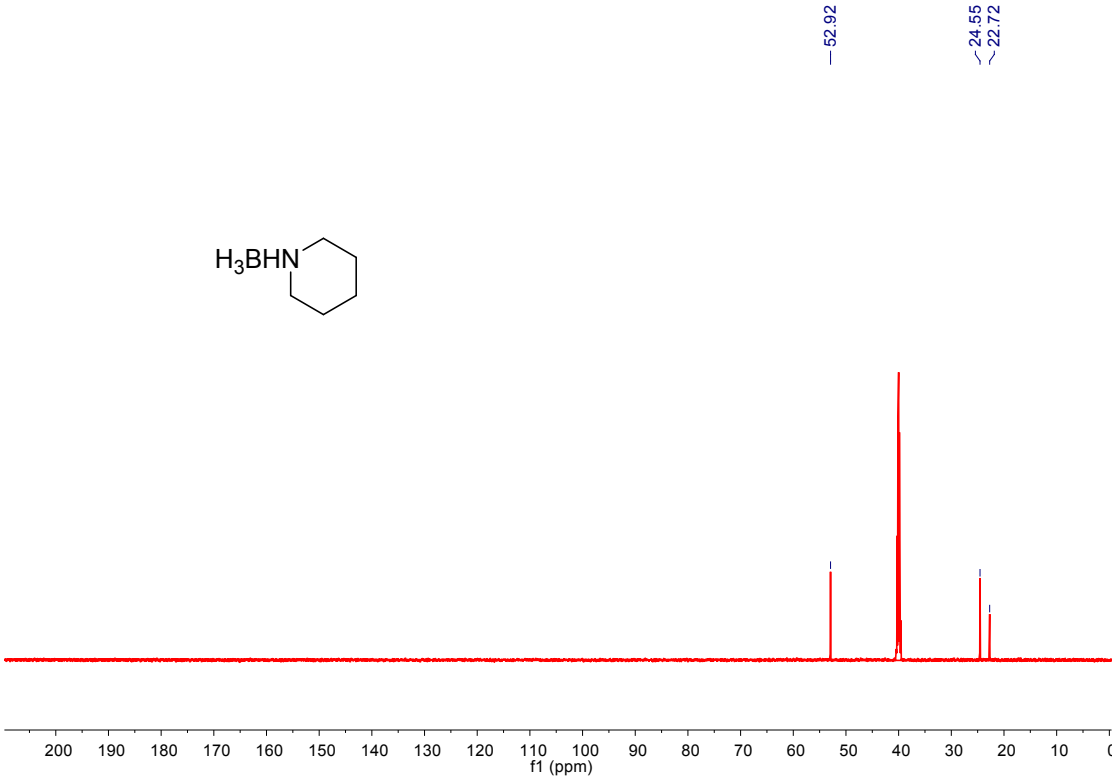


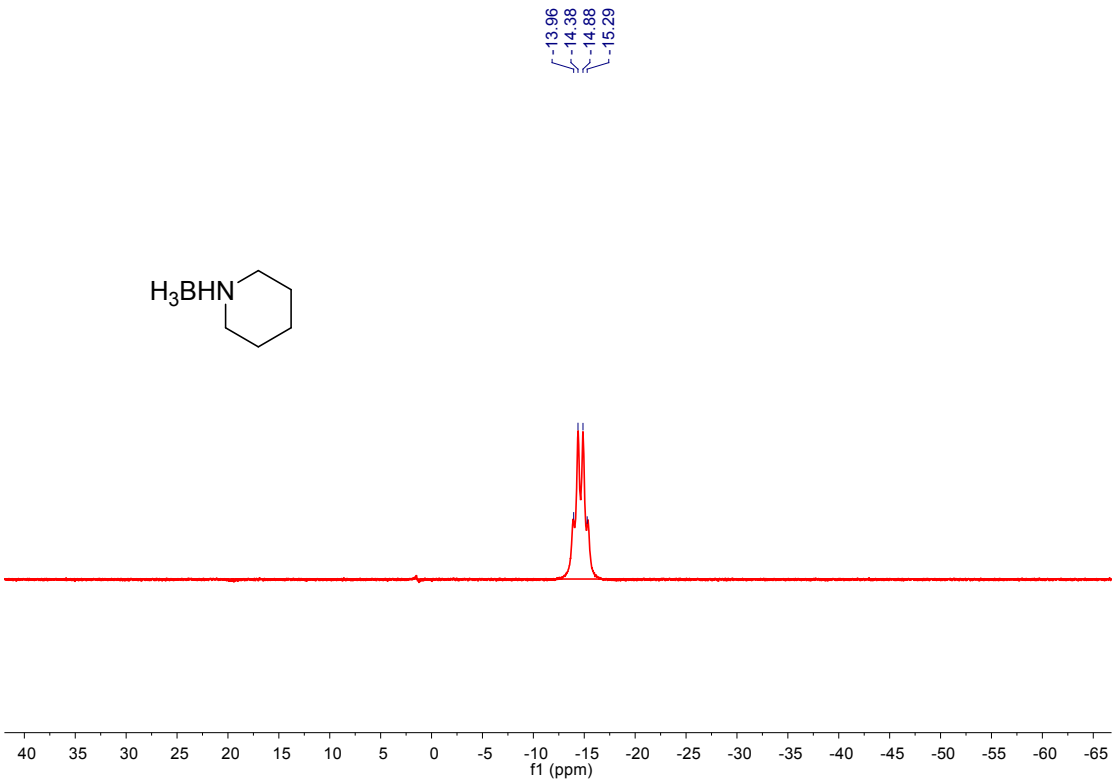
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



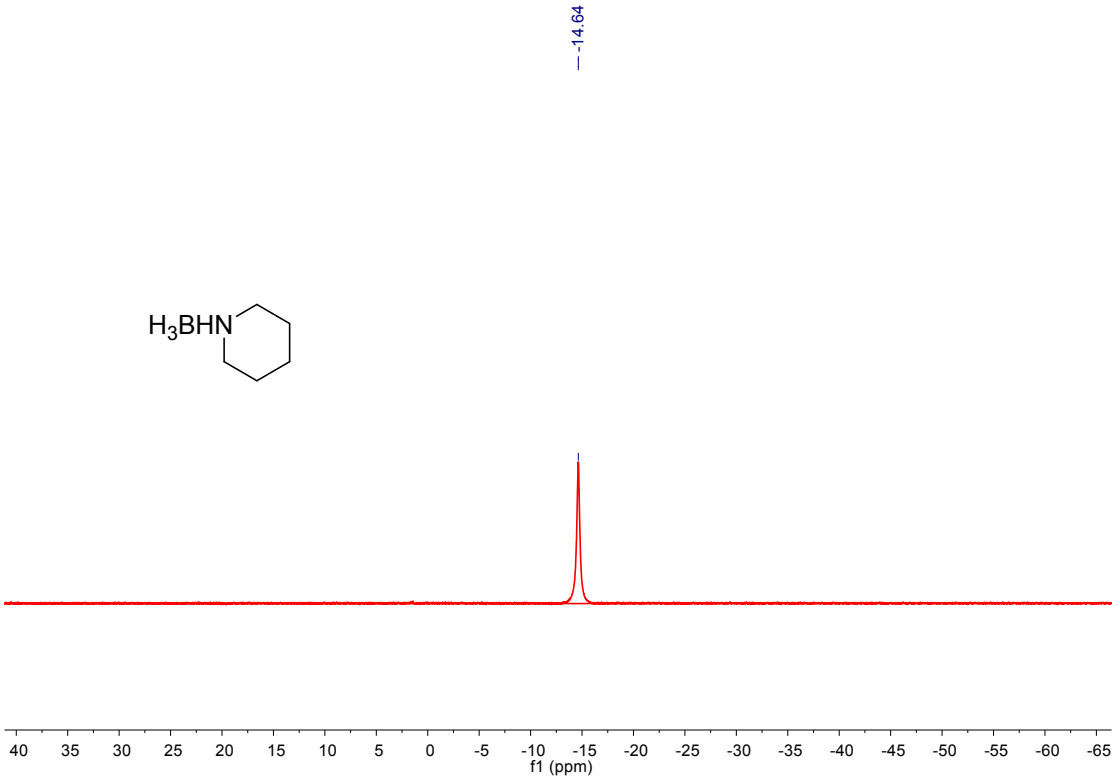
^{1}H NMR (600 MHz, DMSO-d_6)



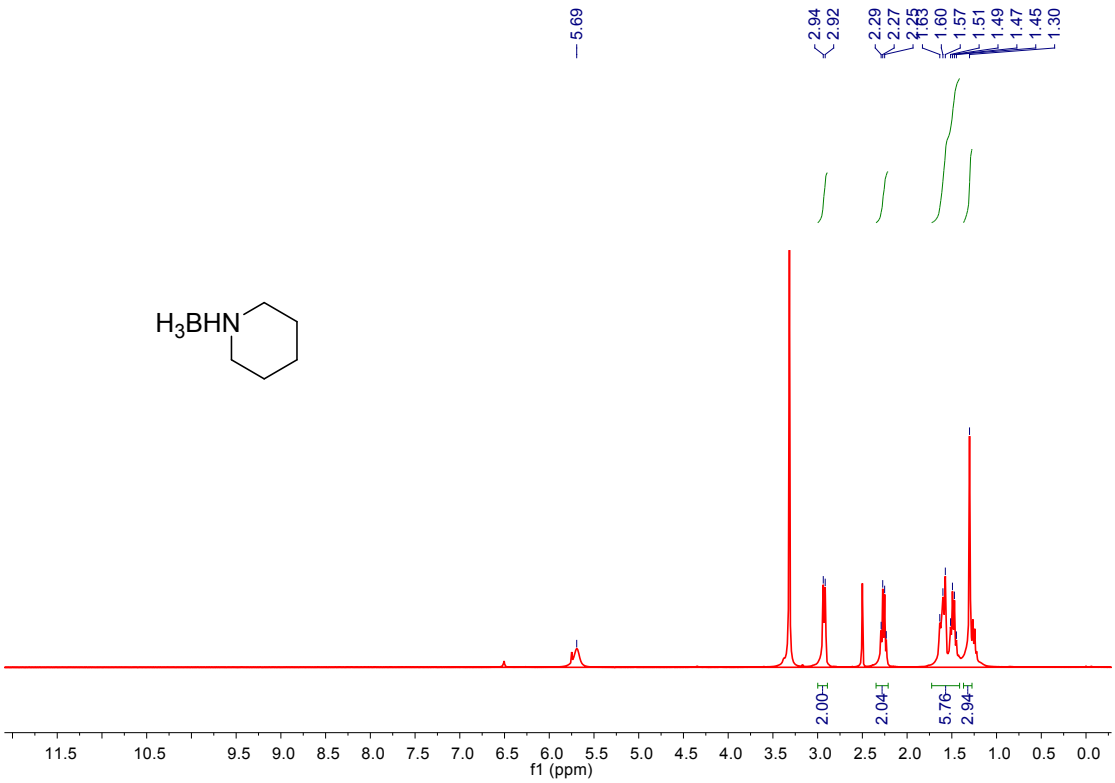
^{13}C NMR (151 MHz, DMSO-d_6)



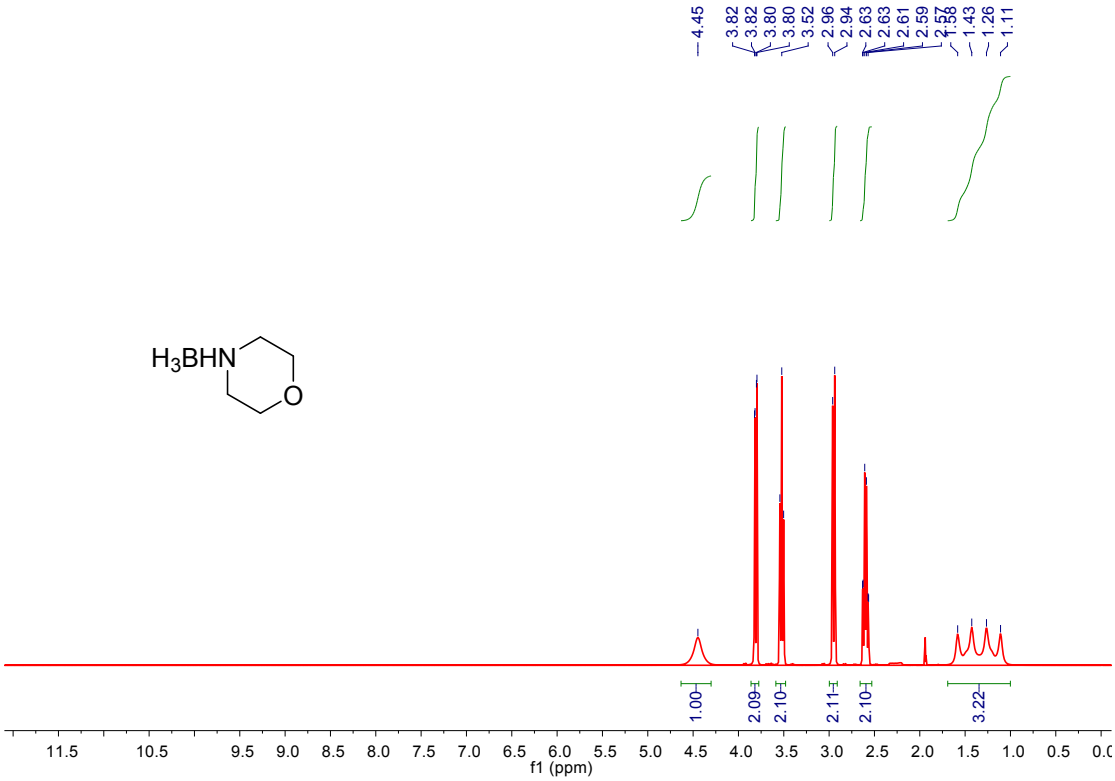
^{11}B NMR (193 MHz, DMSO-d_6)



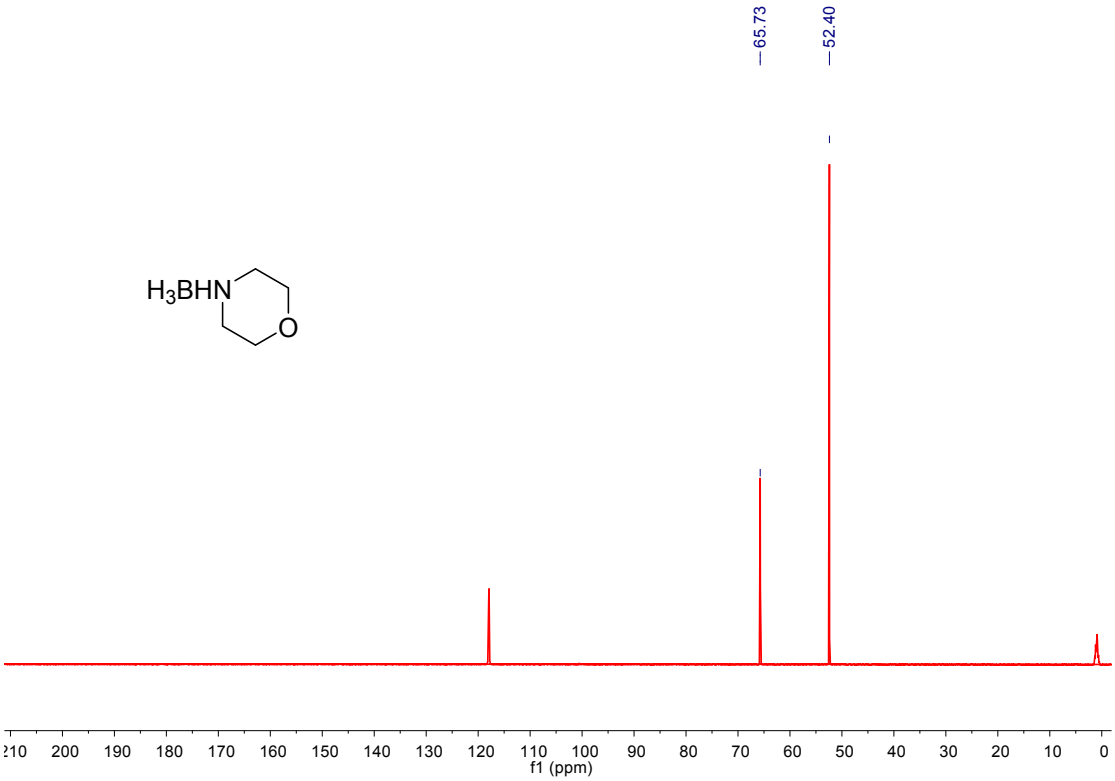
$^{11}B\{^1H\}$ NMR (193 MHz, DMSO-d_6)



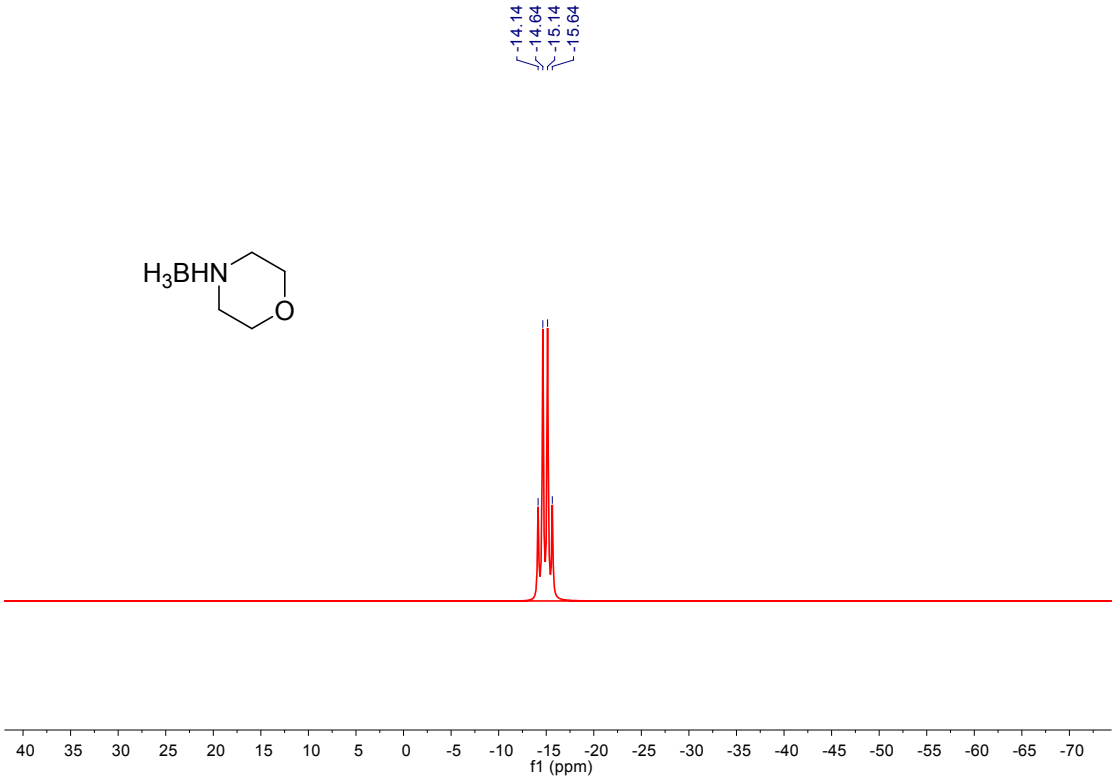
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



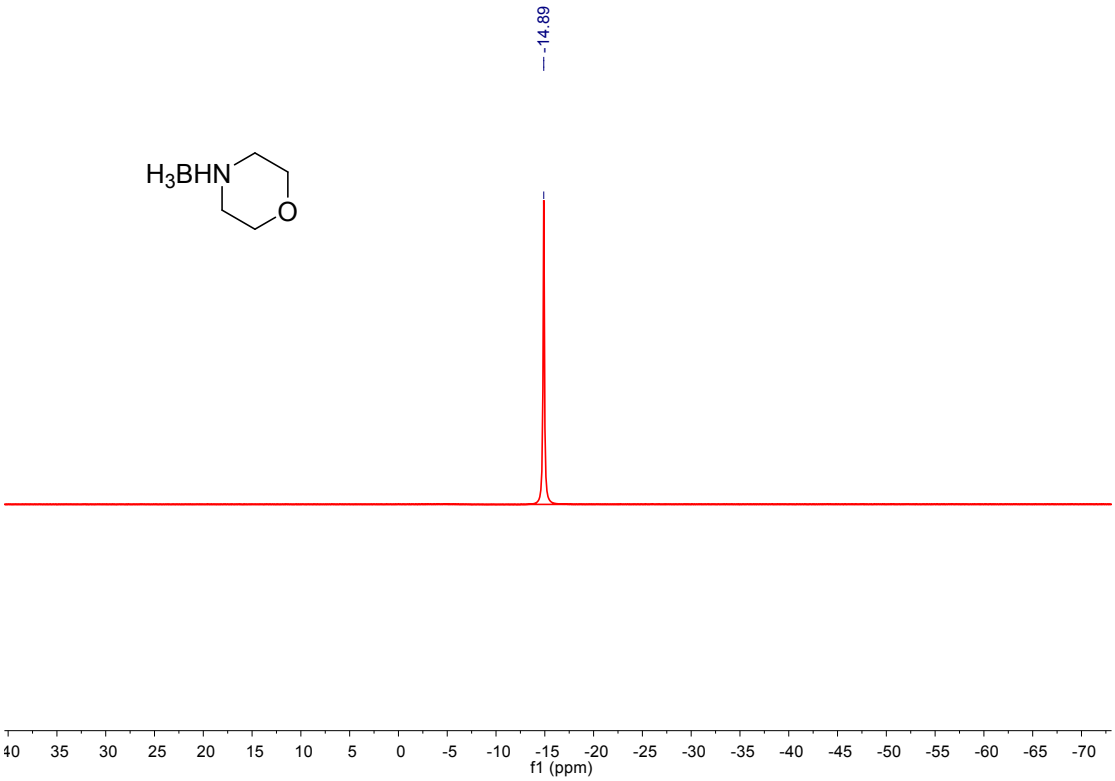
^{1}H NMR (600 MHz, DMSO-d_6)



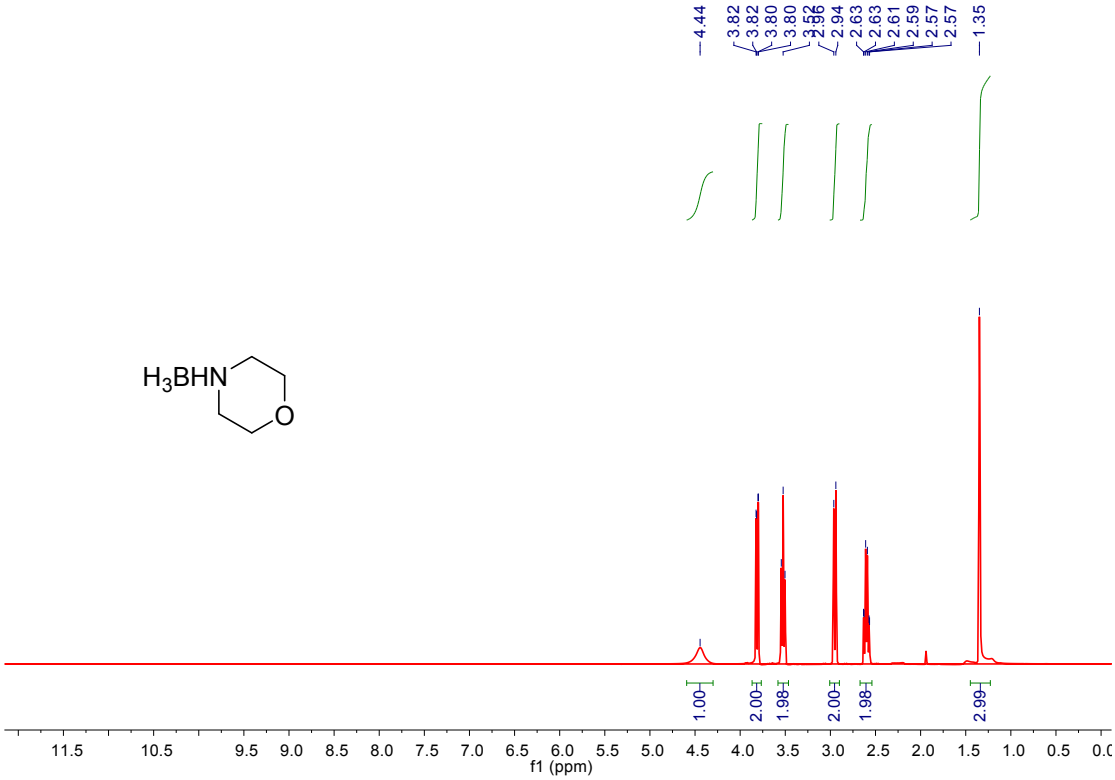
^{13}C NMR (151 MHz, DMSO-d_6)



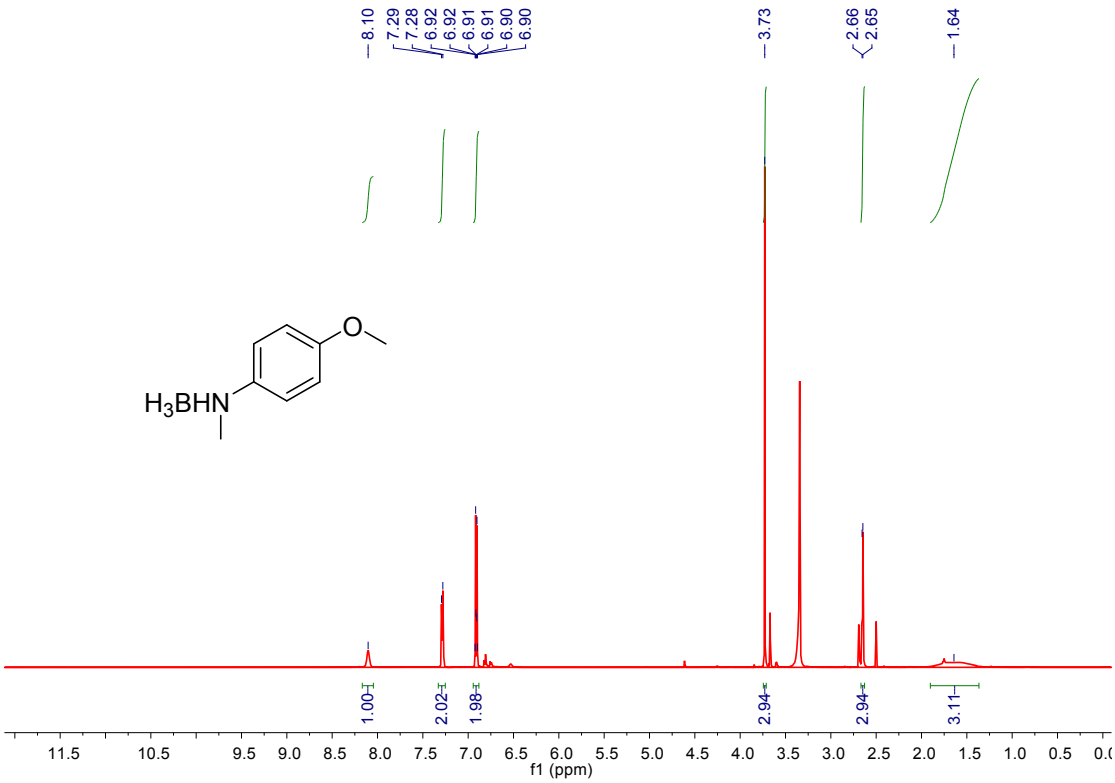
^{11}B NMR (193 MHz, DMSO-d_6)



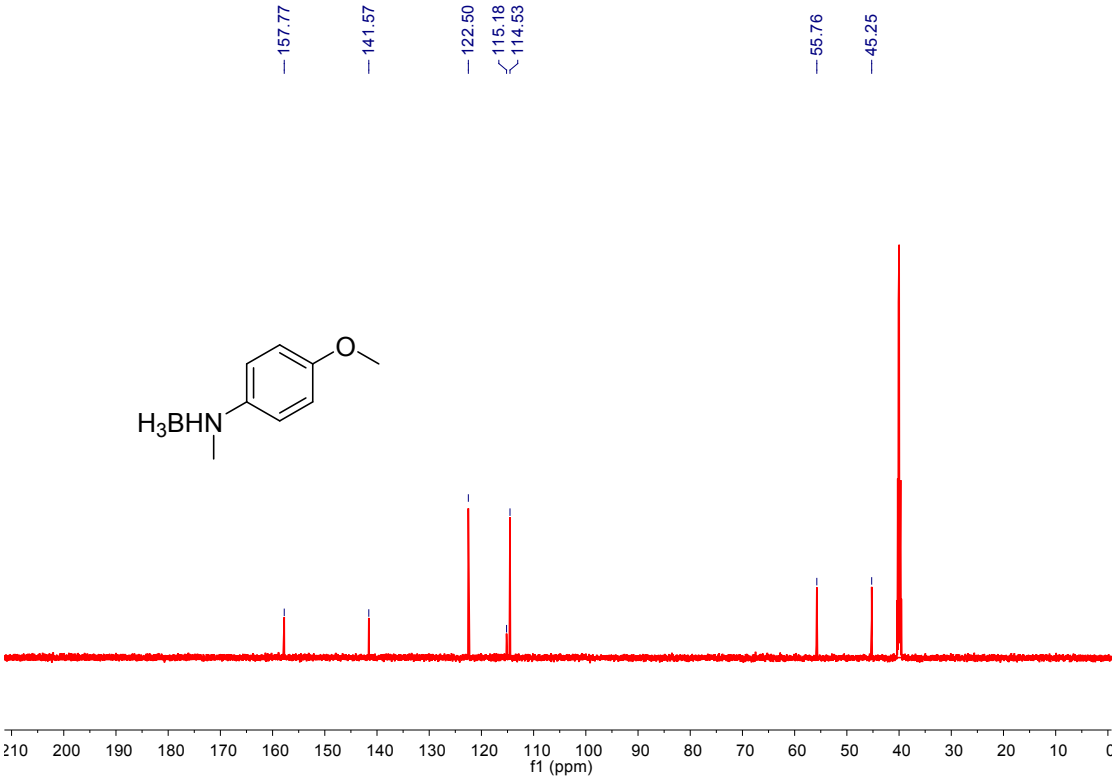
$^{11}B\{^{1}H\}$ NMR (193 MHz, DMSO-d_6)



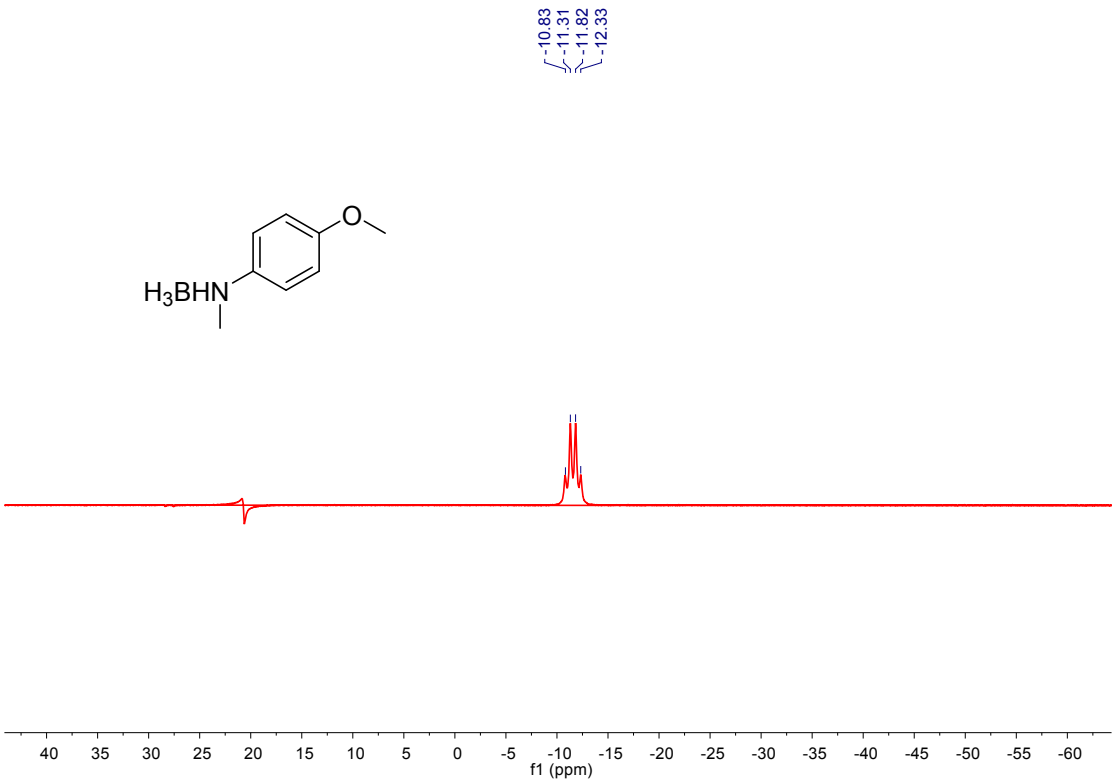
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



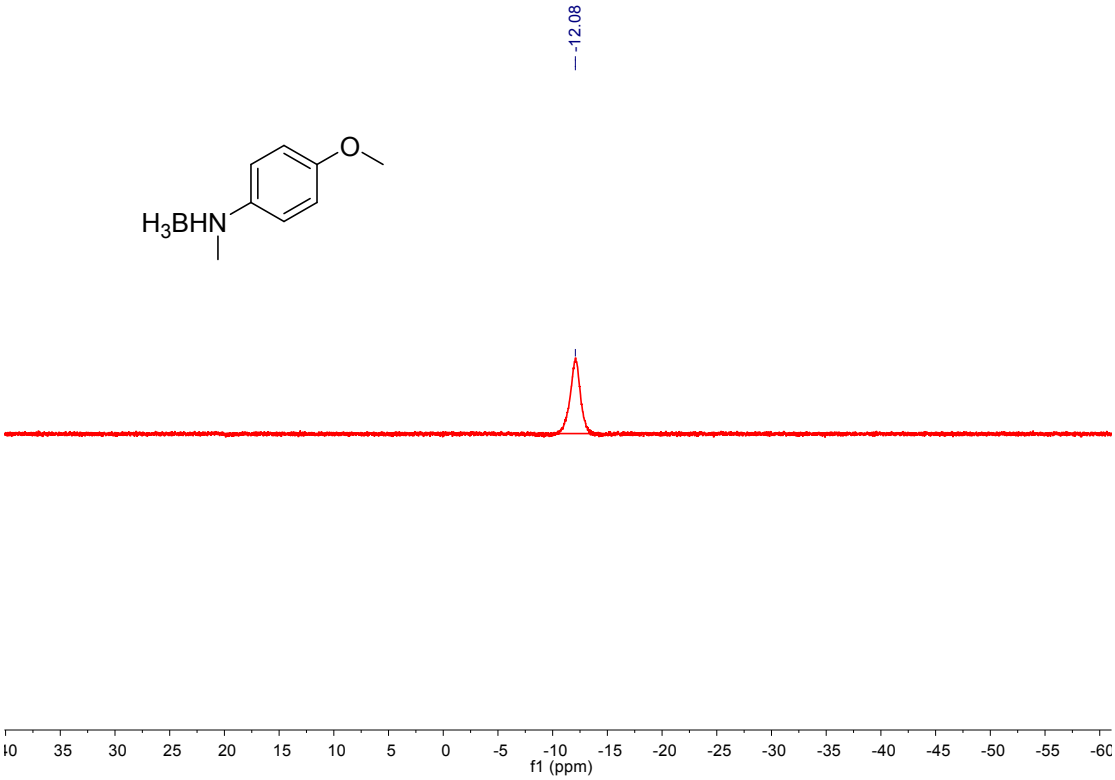
^{1}H NMR (600 MHz, DMSO-d_6)



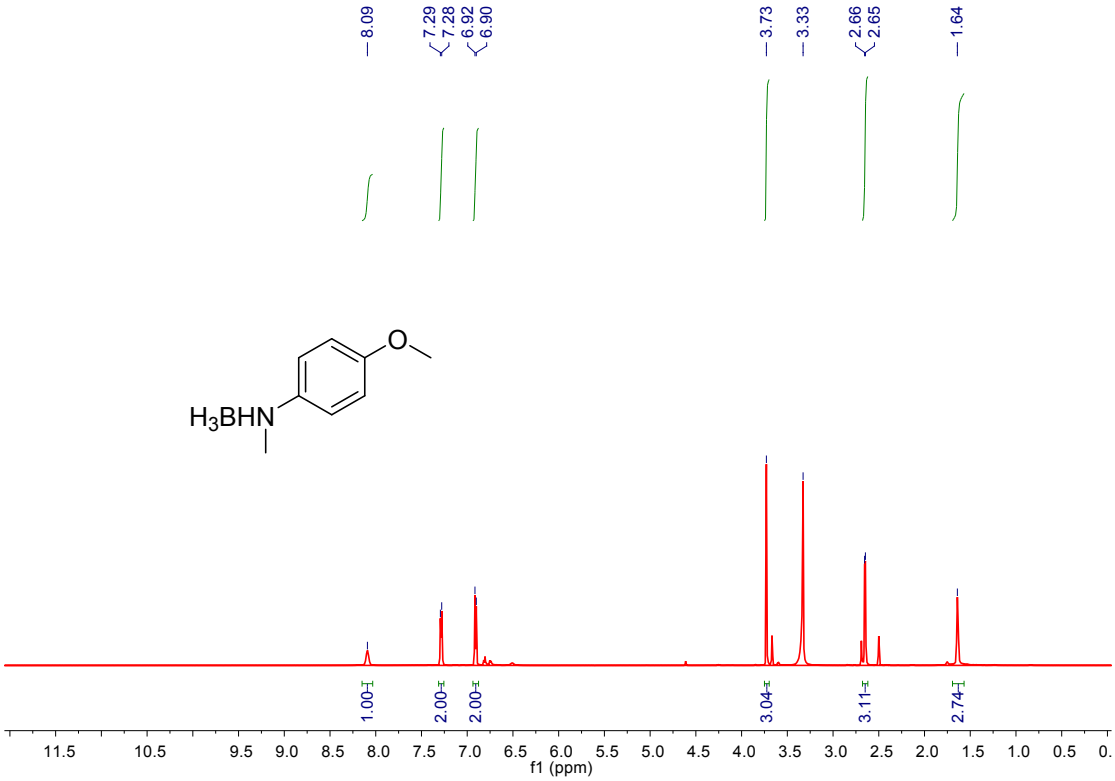
^{13}C NMR (151 MHz, DMSO-d_6)



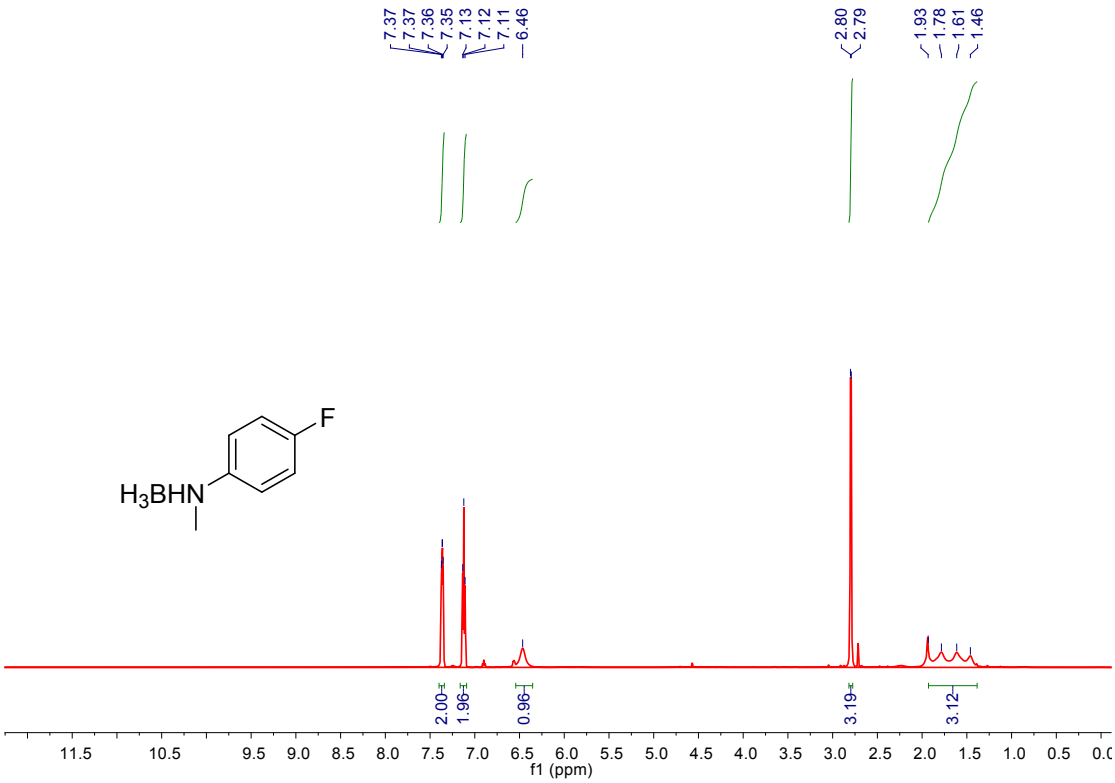
^{11}B NMR (193 MHz, DMSO-d_6)



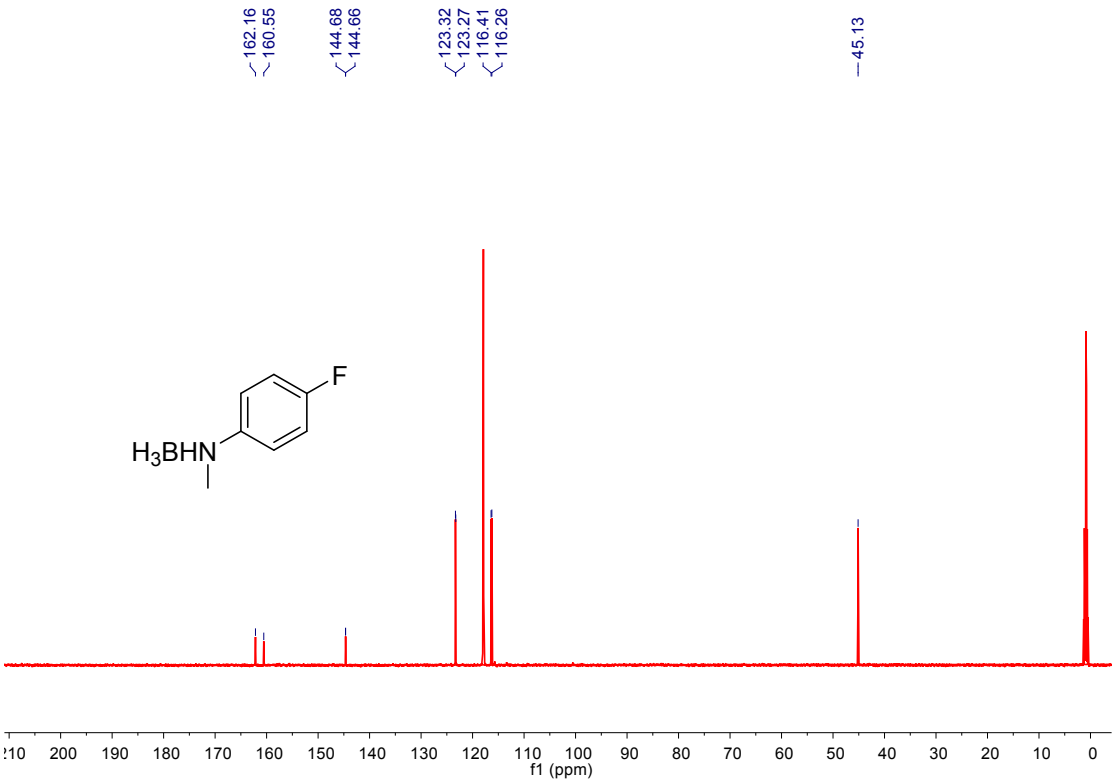
^{11}B{^{1}H} NMR (193 MHz, DMSO-d_6)



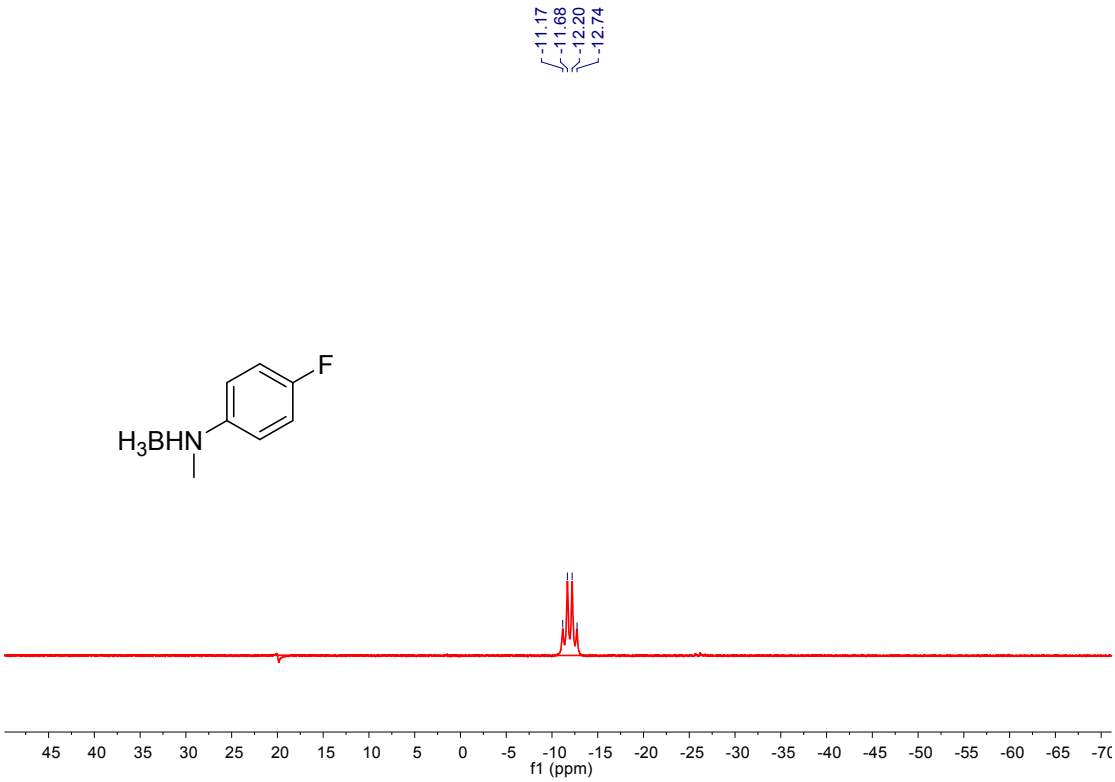
$^{1}H\{^{11}B\}$ NMR (600 MHz, DMSO-d_6)



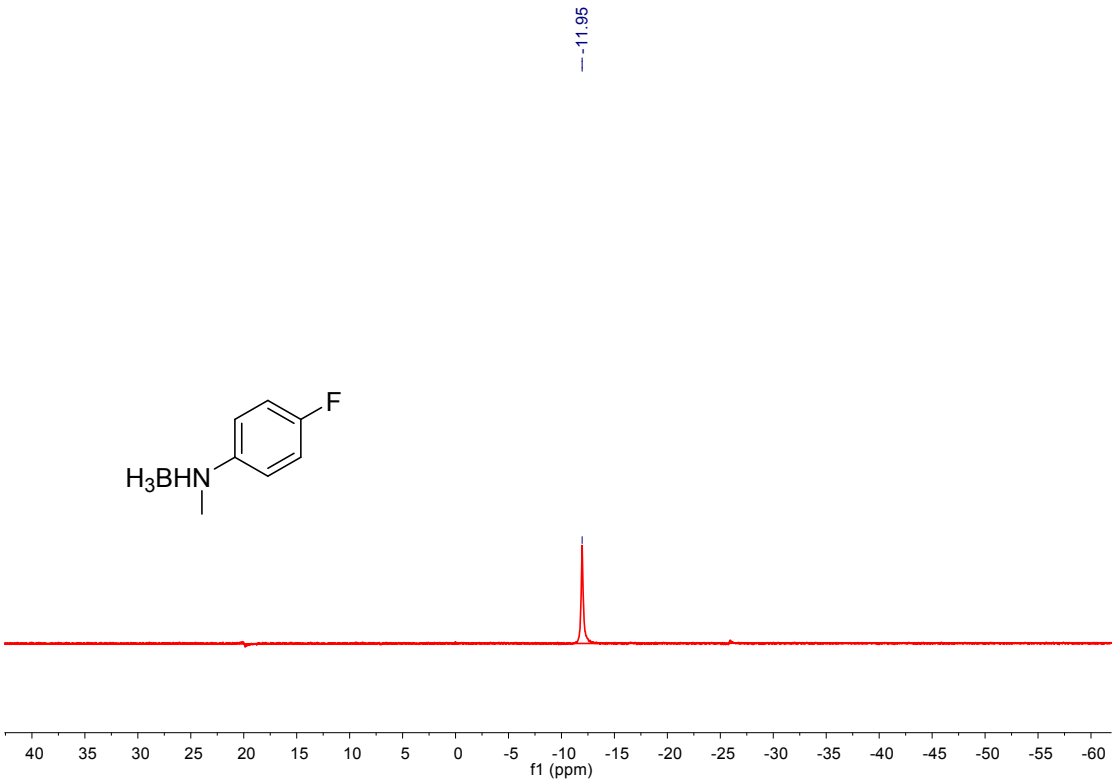
^{1}H NMR (600 MHz, CD_3CN-d_3)



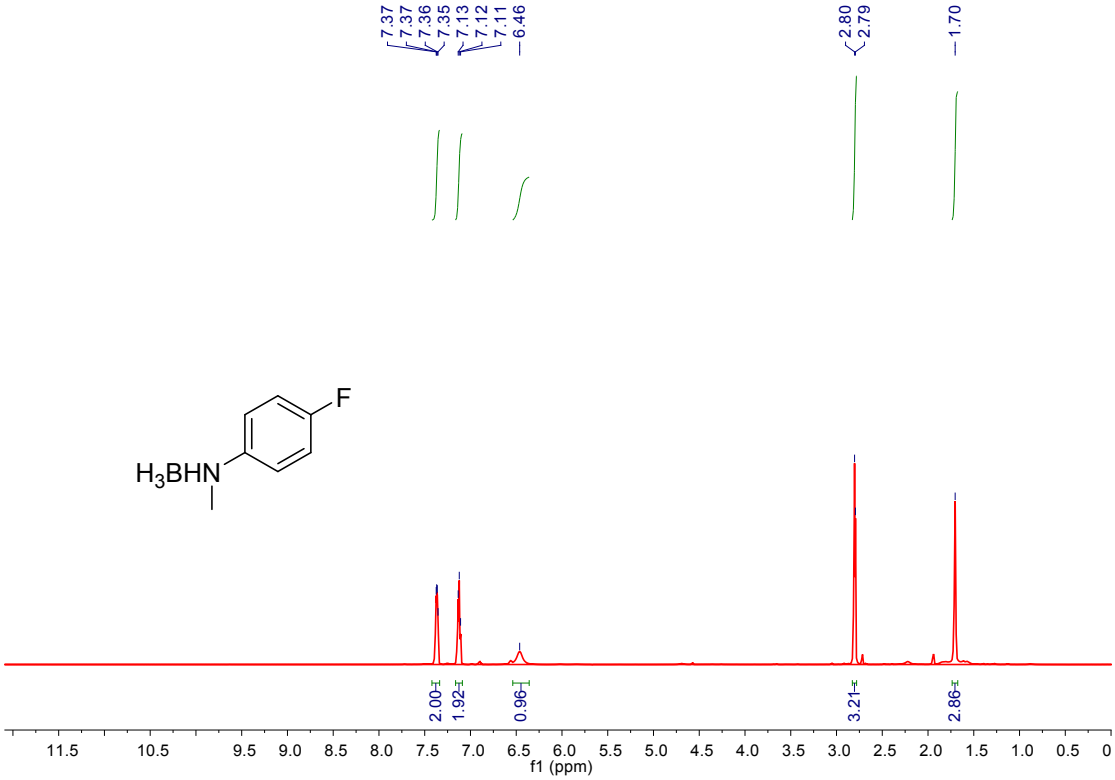
^{13}C NMR (151 MHz, CD_3CN-d_3)



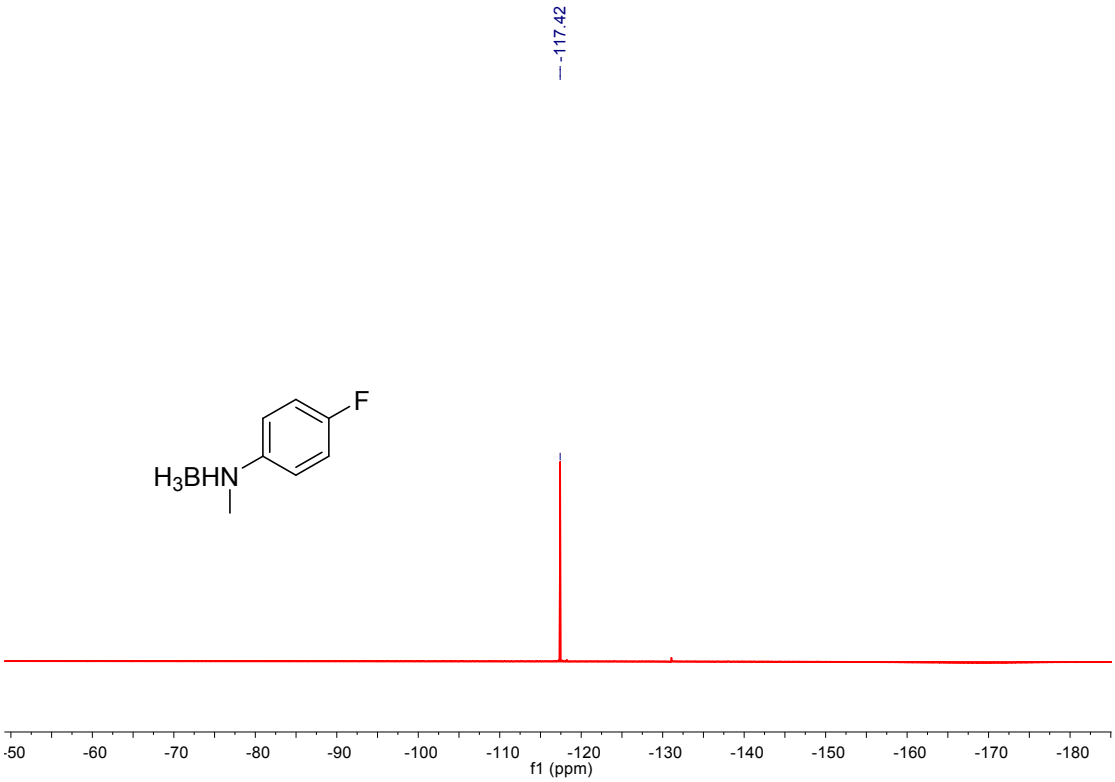
^{11}B NMR (193 MHz, CD_3CN-d_3)



$^{11}B\{^{1}H\}$ NMR (193 MHz, CD_3CN-d_3)



$^{1}H\{^{11}B\}$ NMR (600 MHz, CD_3CN-d_3)



^{19}F NMR (565 MHz, CD_3CN-d_3)