Electronic Supporting information for

Palladium-catalyzed directed synthesis of ortho-deuterated phenylacetic acid and analogues

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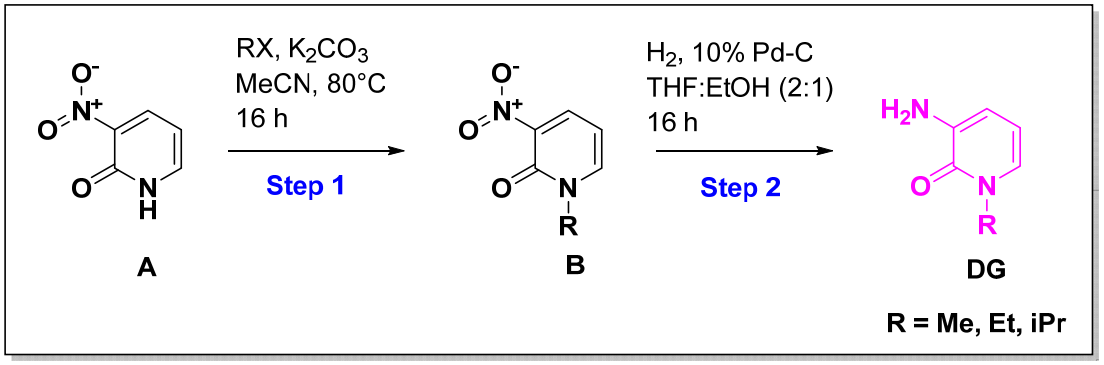
1. General Information

Remarks: Unless otherwise noted, all reagents were obtained from commercial suppliers and used without further purification. All solvents were purified and dried according to standard methods prior to use. All reactions were carried out in screw cap reaction tubes. Palladium (II) acetate was purchased from Alfa-Aesar. Deuterated solvent D_2O (99.8 atom % D) was purchased from ARMAR. Thin layer chromatography was performed using Merck aluminium TLC sheets (silica gel 60F254) and visualized by UV irradiation. For column chromatography, products were purified by RediSep® normal-phase silica Flash columns in Teledyne ISCO CombiFlash system. ^{1}H and $^{13}C\{^{1}H\}$ NMR spectra were recorded in $CDCl_3$ or DMSO-d_6 on a Bruker 400 MHz / 100 MHz and ^{19}F NMR at 376 / 470 MHz instrument. Tetramethylsilane (TMS) served as the internal standard (δ = 0) and data were reported as follows: chemical shift, integration, multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet), and coupling constant(s) in Hertz. LC HRMS data were obtained using on QTOF-LC/MS.

2. Experimental procedures:

2.1 General experimental procedure for the synthesis of different DG's (3-amino-1-alkyl-1H-pyridin-2-one):

Directing group (**DG**) was synthesized following the steps as below. It was found to be moderately stable because of the presence of free amine.



Step-1: To a stirred solution of 3-nitropyridin-2(1H)-one **A** (1.0 equiv) in MeCN (1 mL/mmol) was added K_2CO_3 (3.0 equiv), followed by RX (3.0 equiv) (R= Me, Et, iPr; X=I, Br) and the resulting mixture was then heated at 80°C for overnight. Reaction mixture was then cooled to room temperature, diluted with ethyl acetate and water, layers were separated. Organic layer was dried over anhydrous Na_2SO_4, solvent was removed under vacuum and purified by silica gel CombiFlash column chromatography using (Dichloromethane/Methanol = 100/1) as eluent to get pure 1-alkyl-3-nitropyridin-2(1H)-one **B** as yellow solid.

Step-2: A stirred solution of 1-alkyl-3-nitropyridin-2(1H)-one **B** (1.0 equiv) in

THF:EtOH (2:1) (6 mL/mmol) was degassed under Argon for 10 minutes. Then to it, was added 10% Pd-C (50% wet with water, 400 mg/gm) and the reaction mixture was subjected to hydrogenation under 50 psi for 16 h. Reaction mixture was filtered through celite pad and filtrate was concentrated to afford 3-amino-1-alkyl-1H-pyridin-2-one **DG** as dark brown gum.

2.2 Synthesis of amides (1a, 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l, 1m, 1n, 1o, 1p, 1q, 1r, 1s, 1t, 1u, 1v) from corresponding phenylacetic acids:

To a stirred solution of acids (1.0 equiv) in DMF were added HOBT (1.5 equiv) and DIPEA (3.0 equiv) and the mixture was cooled at 0°C. EDC.HCl (1.5 equiv) was added to it and the resulting mixture was allowed to stir for 16 h at room temperature. Upon completion (monitored by TLC), the reaction mixture was quenched with saturated $NaHCO_3$ and the organic parts were extracted with ethyl acetate (3x50 mL). Combined organic layer was washed with water (2x50 mL), dried over anhydrous Na2SO4, solvent was removed under vacuum and purified by silica gel CombiFlash column chromatography using (Dichloromethane/ethyl acetate = 5/1) as eluent to get pure amides.

2.3 General experimental procedure for the synthesis of deuterated amides 2:

In a sealed tube, amides 1 (0.4 mmol, 1.0 equiv), $Pd(OAc)_2$ (0.08 mmol, 0.2 equiv) and D_2O (99.8% D content, 2 mL) were added. The reaction was stirred at 120 °C for 24 hours. Then, the reaction mixture was cooled to room temperature and the organic components were portioned between water and ethyl acetate. Organic phase was separated, washed with brine and dried with Na_2SO_4 and concentrated under reduced pressure. The crude mixture was purified by RediSep® normal-phase silica Flash columns in teledyne ISCO CombiFlash system (Dichloromethane/ethyl acetate = 5/1) to give the deuterated amides.

2.4 Gram-scale synthesis of deuterated biphenyl acetic acid:

2.4.1 Synthesis of deuterated 2-([1,1'-biphenyl]-2-yl)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide:

In a sealed tube, compound 1v (1.3 g, 4.08 mmol, 1.0 equiv), $Pd(OAc)_2$ (184 mg, 0.82 mmol, 0.2 equiv) and D_2O (99.8% D content, 20 mL) were added. The reaction was stirred at 120 °C for 24 hours. Then, the reaction mixture was cooled to room temperature and the organic parts were portioned between water and ethyl acetate. The organic phase was separated, washed with brine and dried over Na_2SO_4 and concentrated under reduced pressure. The crude mixture was purified by RediSep® normal-phase silica Flash columns in teledyne ISCO CombiFlash system (Dichloromethane/ethyl acetate = 5/1) to give the deuterated amide 2v (1.11 g, 3.47

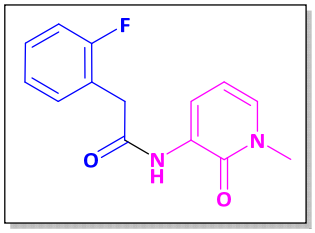
mmol, 85% yield) as off white solid.

2.4.2 Hydrolysis of deuterated biphenylacetic acid:

In an oven–dried screw cap reaction tube containing magnetic bar, deuterated amide 2v (1 mmol) and $LiOH.H_2O$ (5 mmol) were added. Ethanol (2 mL) was added and the reaction was allowed to stir for 24 hours at 100°C. After completion (TLC monitoring) the reaction mixture was cooled to room temperature and volatiles were removed under vacuum. The mixture was then diluted with a mixture of water and ethyl acetate. The aqueous phase was separated, acidified with 2M aqueous HCl to pH=2 and the organic parts were extracted with diethyl ether. The combined ether phase was washed with brine solution and dried over Na_2SO_4 and filtered. The filtrate was concentrated under reduced pressure to afford 3 in 70% and we have recovered 3-amino-1-methyl- 1H-pyridin-2-one (DG) in 80% yield.

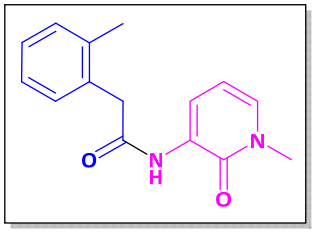
3. Characterization data of amides:

2-(2-fluorophenyl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1a).



Off white solid, 75% yield. Mp 118−120° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.36 (s, 1H), 8.17 (d, J = 7.1 Hz, 1H), 7.40-7.29 (m, 3H), 7.19-7.15 (m, 2H), 6.22 (t, J = 6.9 Hz, 1H), 3.87 (s, 2H), 3.50 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.8, 160.5 (d, $J_{C\text{-}F}$ = 242.9 Hz), 156.8, 132.3, 131.8 (d, $J_{C\text{-}F}$ = 4.3 Hz), 128.8 (d, $J_{C\text{-}F}$ = 8.0 Hz), 128.3, 124.2 (d, $J_{C\text{-}F}$ = 3.3 Hz), 122.7 (d, $J_{C\text{-}F}$ = 15.9 Hz), 122.2, 115.0 (d, $J_{C\text{-}F}$ = 21.3 Hz), 104.8, 37.0, 36.4; ^{19}F NMR (376 MHz, DMSO-d_6) δ -116.99 to -117.06 (m, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{13}FN_2O_2Na$ [M + Na]+ 283.0859, found 283.0852.

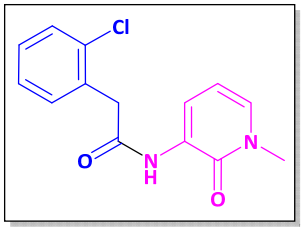
N-(1-methyl-2-oxo-3-pyridyl)-2-(o-tolyl)acetamide (1b).



Off white solid, 73% yield. Mp 128−130° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.15 (s, 1H), 8.19-8.17 (m, 1H), 7.39-7.37 (m, 1H), 7.25-7.23 (m, 1H), 7.17-7.11 (m, 3H), 6.21 (t, J = 7.1 Hz, 1H), 3.82 (s, 2H), 3.47 (s, 3H), 2.25 (s, 3H) ; ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.6, 156.8, 136.6, 134.1, 132.1, 130.0, 129.9, 128.3, 126.8, 125.8,

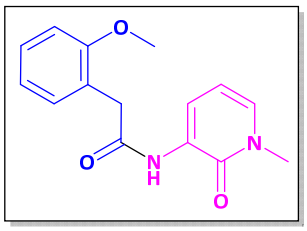
121.8, 104.9, 41.1, 36.9, 19.1; HRMS-ESI (m/z): calcd for $C_{15}H_{16}N_2O_2Na$ [M + Na]+ 279.1109 , found 279.1091.

2-(2-chlorophenyl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1c).



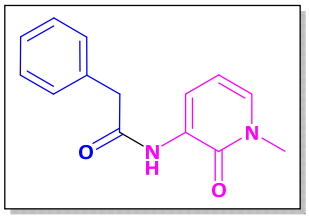
Off white solid, 60% yield. Mp 142-144° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.29 (s, 1H), 8.17-8.16 (m, 1H), 7.47-7.38 (m, 3H), 7.32-7.30 (m, 2H), 6.22 (t, *J* = 7.1 Hz, 1H), 3.96 (s, 2H), 3.49 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.6, 156.8, 133.6, 133.6, 132.3, 132.0, 129.0, 128.6, 128.3, 127.1, 122.0, 104.9, 41.0, 37.0; HRMS-ESI (m/z): calcd for $C_{14}H_{13}ClN_2NaO_2$ [M + Na]+ 299.0563 , found 299.0558.

2-(2-methoxyphenyl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1d).



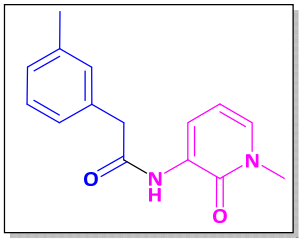
Off white solid, 63% yield. Mp 112-114° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.08 (s, 1H), 8.15 (d, *J* = 7.4 Hz, 1H), 7.36 (d, *J* = 6.6 Hz, 1H), 7.29-7.22 (m, 2H), 7.02 (d, *J* = 8.1 Hz, 1H), 6.92 (t, *J* = 7.2 Hz, 1H), 6.21 (t, *J* = 7.1 Hz, 1H), 3.81 (s, 3H), 3.69 (s, 2H), 3.47 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.5, 156.8, 156.7, 131.9, 130.8, 128.5, 128.4, 123.3, 121.2, 120.4, 110.8, 105.0, 55.4, 40.0, 37.0; HRMS-ESI (m/z): calcd for $C_{15}H_{17}N_2O_3$ [M + H]+ 273.1239 , found 273.1245.

N-(1-methyl-2-oxo-3-pyridyl)-2-phenyl-acetamide (1e).



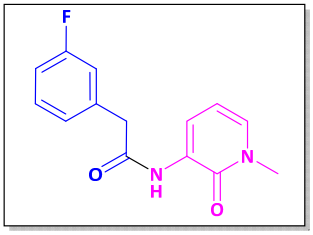
Off white solid, 71% yield. Mp 130-132° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.31 (s, 1H), 8.18 (d, *J* = 7.2 Hz, 1H), 7.38 (d, *J* = 6.6 Hz, 1H), 7.33-7.29 (m, 4H), 7.27-7.24 (m, 1H), 6.21 (t, *J* = 7.0 Hz, 1H), 3.79 (s, 2H), 3.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 156.8, 135.7, 132.3, 129.1, 128.4, 128.2, 126.5, 122.2, 104.8, 43.0, 37.0; HRMS-ESI (m/z): calcd for $C_{14}H_{14}N_2O_2Na$ [M + Na]+ 265.0953 , found 265.0945.

N-(1-methyl-2-oxo-3-pyridyl)-2-(m-tolyl)acetamide (1f).



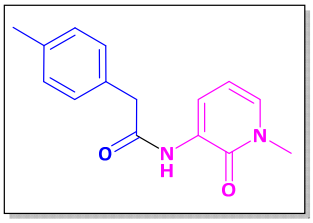
Off white solid, 84% yield. Mp 116-118° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.28 (s, 1H), 8.19-8.17 (m, 1H), 7.39-7.38 (m, 1H), 7.22-7.18 (m, 1H), 7.13-7.10 (m, 2H), 7.06-7.05 (m, 1H), 6.21 (t, J = 7.1 Hz, 1H), 3.74 (s, 2H), 3.48 (s, 3H), 2.28 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 156.8, 137.3, 135.5, 132.3, 129.7, 128.4, 128.2, 127.1, 126.2, 122.1, 104.8, 42.9, 37.0, 20.8; HRMS-ESI (m/z): calcd for $C_{15}H_{17}N_2O_2$ [M + H]+ 257.3077 , found 257.3079.

2-(3-fluorophenyl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1g).



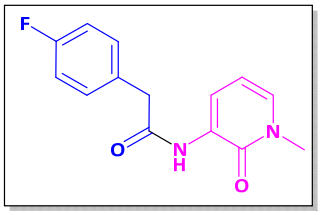
Off white solid, 80% yield. Mp 116-118° C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.43 (s, 1H), 8.19-8.17 (m, 1H), 7.41-7.33 (m, 2H), 7.19-7.15 (m, 2H), 7.10-7.06 (m, 1H), 6.21 (t, J = 7.1 Hz, 1H), 3.83 (s, 2H), 3.49 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.4, 161.9 (d, $J_{C\text{-}F}$ = 241.6 Hz), 156.8, 138.4 (d, $J_{C\text{-}F}$ = 7.8 Hz), 132.4, 130.0 (d, $J_{C\text{-}F}$ = 8.2 Hz), 128.3, 125.3 (d, $J_{C\text{-}F}$ = 2.5 Hz), 122.4, 115.9 (d, $J_{C\text{-}F}$ = 21.2 Hz), 113.3 (d, $J_{C\text{-}F}$ = 20.6 Hz), 104.8, 42.4, 37.0; ^{19}F NMR (470 MHz, DMSO-d_6) δ -113.6 (s, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{13}FN_2NaO_2$ [M + Na]+ 283.0859 , found 283.0619.

N-(1-methyl-2-oxo-3-pyridyl)-2-(p-tolyl)acetamide (1h).



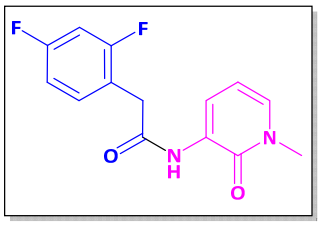
Off white solid, 68% yield. Mp 130-132 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.21 (s, 1H), 8.18-8.16 (m, 1H), 7.38-7.36 (m, 1H), 7.20 (d, J = 7.8 Hz, 2H), 7.12 (d, J = 7.8 Hz, 2H), 6.20 (t, J = 7.1 Hz, 1H), 3.73 (s, 2H), 3.47 (s, 3H), 2.27 (s, 3H) ; ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.1, 156.8, 135.6, 132.6, 132.2, 129.0, 128.9, 128.4, 122.0, 104.9, 42.6, 37.0, 20.5; HRMS-ESI (m/z): calcd for $C_{15}H_{16}N_2NaO_2$ [M + Na]+ 279.1109 , found 279.0916.

2-(4-fluorophenyl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1i).



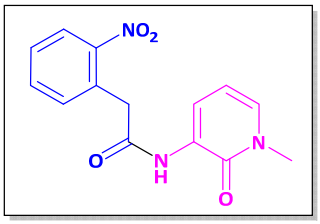
Off white solid, 65% yield. Mp 146-148 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.35 (s, 1H), 8.18-8.17 (m, 1H), 7.40-7.34 (m, 3H), 7.16-7.12 (m, 2H), 6.21 (t, J = 7.0 Hz, 1H), 3.79 (s, 2H), 3.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.2, 161.4 (d, $J_{C\text{-}F}$ = 240.9 Hz), 157.2, 132.7, 132.2 (d, $J_{C\text{-}F}$ = 2.9 Hz), 131.3 (d, $J_{C\text{-}F}$ = 8.0 Hz), 128.7, 122.6, 115.3 (d, $J_{C\text{-}F}$ = 21.0 Hz), 105.2, 42.2, 37.3; ^{19}F NMR (470 MHz, DMSO-d_6) δ -116.4 (s, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{13}FN_2NaO_2$ [M + Na]+ 283.0859 , found 283.0619.

2-(2,4-difluorophenyl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1j).



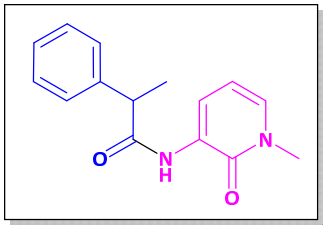
Off white solid, 72% yield. Mp 140-142 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.41 (s, 1H), 8.16 (d, J = 6.0 Hz, 1H), 7.45-7.39 (m, 2H), 7.24-7.18 (m, 1H), 7.08-7.03 (m, 1H), 6.21 (t, J = 7.1 Hz, 1H), 3.86 (s, 2H), 3.50 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.7, 161.2 (dd, $J_{C\text{-}F}$ = 244.8, 13.2 Hz), 160.5 (dd, $J_{C\text{-}F}$ = 245.4, 12.1 Hz), 156.8, 132.8 (dd, $J_{C\text{-}F}$ = 9.5, 6.0 Hz), 132.3, 128.3, 122.3, 119.1 (dd, $J_{C\text{-}F}$ = 16.1, 3.6 Hz), 111.1 (dd, $J_{C\text{-}F}$ = 20.9, 3.5 Hz), 104.8, 103.5 (t, $J_{C\text{-}F}$ = 25.8 Hz), 37.0, 35.8; ^{19}F NMR (376 MHz, DMSO-d_6) δ -112.1 (d, J = 7.3 Hz, 1F), -112.5 (d, J = 7.2 Hz, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{13}F_2N_2O_2$ [M + H]+ 279.0945 , found 279.0962.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(2-nitrophenyl)acetamide (1k)



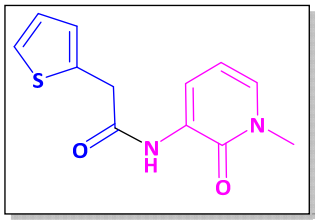
Light yellow solid, 72% yield. Mp 190-192 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.50 (s, 1H), 8.07 (dd, J = 22.16, 7.04 Hz, 2H), 7.71 (t, J = 7.54 Hz, 1H), 7.59-7.54 (m, 2H), 7.40 (d, J = 6.68 Hz, 1H), 6.20 (t, J = 7.02 Hz, 1H), 4.24 (s, 2H), 3.50 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.4, 156.8, 148.9, 133.4, 133.3, 132.3, 130.3, 128.4, 128.3, 124.4, 122.2, 104.8, 40.6, 37.0; LCMS (ESI) calcd for $C_{14}H_{14}N_3O_4$: 288.10 (M + H)+; found: 288.39.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-phenylpropanamide (1l)



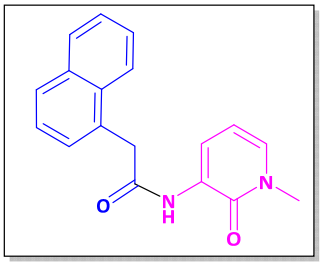
Off white solid, 80% yield. Mp 138-140 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.15 (s, 1H), 8.19 (d, *J* = 7.0 Hz, 1H), 7.40-7.37 (m, 3H), 7.32 (t, *J* = 7.48 Hz, 2H), 7.25-7.21 (m, 1H), 6.20 (t, *J* = 7.1 Hz, 1H), 4.17-4.14 (m, 1H), 3.46 (s, 3H), 1.38 (d, *J* = 7.0 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 172.9, 156.8, 141.6, 132.2, 128.4, 128.3, 127.3, 126.7, 122.0, 104.9, 45.3, 37.0, 18.3; LCMS (ESI) calcd for $C_{15}H_{17}N_2O_2$: 257.13 (M + H)+; found: 257.23.

N-(1-methyl-2-oxo-3-pyridyl)-2-(2-thienyl)acetamide (1m).



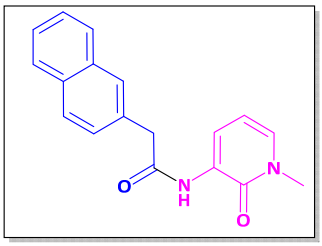
Off white solid, 72% yield. Mp 146-148 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.42 (s, 1H), 8.20 (d, *J* = 6.0 Hz, 1H), 7.41-7.38 (m, 2H), 6.98-6.96 (m, 2H), 6.22 (t, *J* = 7.0 Hz, 1H), 4.04 (s, 2H), 3.49 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.9, 156.8, 136.8, 132.4, 128.3, 126.7, 126.6, 125.1, 122.3, 104.8, 37.1, 37.0; HRMS-ESI (m/z): calcd for $C_{12}H_{12}N_2NaO_2S$ [M + Na]+ 271.0517 , found 271.0312.

N-(1-methyl-2-oxo-3-pyridyl)-2-(1-naphthyl)acetamide (1n).



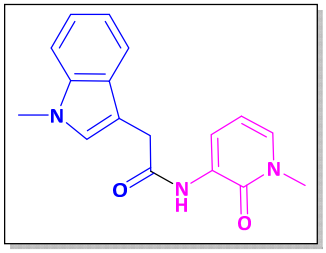
Off white solid, 72% yield. Mp 128-130 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.35 (s, 1H), 8.17-8.15 (m, 1H), 8.09 (d, *J* = 8.3 Hz, 1H), 7.95-7.92 (m, 1H), 7.86 (d, *J* = 7.8 Hz, 1H), 7.56-7.46 (m, 4H), 7.38-7.36 (m, 1H), 6.19 (t, *J* = 7.1 Hz, 1H), 4.30 (s, 2H), 3.46 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.8, 156.7, 133.3, 132.2, 132.1, 131.8, 128.4, 128.3, 128.0, 127.3, 126.1, 125.6, 125.5, 124.0, 121.9, 104.9, 40.6, 37.0; HRMS-ESI (m/z): calcd for $C_{18}H_{16}N_2NaO_2$ [M + Na]+ 315.1109 , found 315.0929.

N-(1-methyl-2-oxo-3-pyridyl)-2-(2-naphthyl)acetamide (1o).



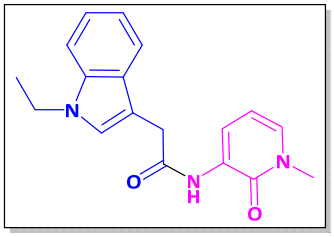
Off white solid, 55% yield. Mp 152-154 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.37 (s, 1H), 8.20 (d, *J* = 7.1 Hz, 1H), 7.90-7.84 (m, 4H), 7.52-7.48 (m, 3H), 7.38 (d, *J* = 6.5 Hz, 1H), 6.21 (t, *J* = 7.1 Hz, 1H), 3.97 (s, 2H), 3.47 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 156.8, 133.3, 132.9, 132.3, 131.8, 128.4, 127.7, 127.6, 127.5, 127.4, 127.3, 126.0, 125.5, 122.2, 104.8, 43.1, 37.0; HRMS-ESI (m/z): calcd for $C_{18}H_{16}N_2NaO_2$ [M + Na]+ 315.1109 , found 315.1111.

2-(1-methylindol-3-yl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1p).



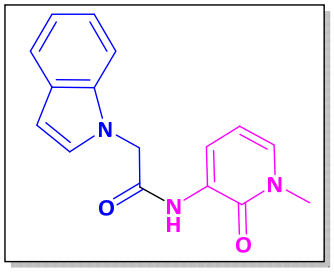
Off white solid, 85% yield. Mp 138-140 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.09 (s, 1H), 8.20 (d, *J* = 7.3 Hz, 1H), 7.57 (d, *J* = 7.8 Hz, 1H), 7.41 (d, *J* = 8.2 Hz, 1H), 7.35 (d, *J* = 6.7 Hz, 1H), 7.30 (s, 1H), 7.15 (t, *J* = 7.5 Hz, 1H), 7.01 (t, *J* = 7.4 Hz, 1H), 6.20 (t, *J* = 7.1 Hz, 1H), 3.85 (s, 2H), 3.77 (s, 3H), 3.44 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.3, 156.7, 136.5, 132.0, 128.5, 128.3, 127.3, 121.4, 121.1, 118.7, 118.6, 109.5, 107.2, 104.9, 36.9, 33.4, 32.2; HRMS-ESI (m/z): calcd for $C_{17}H_{17}N_3O_2Na$ [M + Na]+ 318.1218, found 318.1210.

2-(1-ethylindol-3-yl)-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1q).



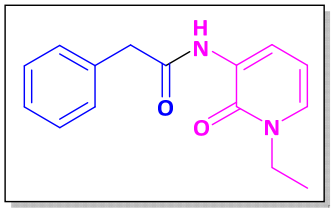
Off white solid, 60% yield. Mp 120-122 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.09 (s, 1H), 8.21-8.19 (m, 1H), 7.56 (d, *J* = 7.8 Hz, 1H), 7.45 (d, *J* = 8.2 Hz, 1H), 7.37-7.34 (m, 2H), 7.13 (t, *J* = 7.4 Hz, 1H), 7.00 (t, *J* = 7.3 Hz, 1H), 6.20 (t, *J* = 7.0 Hz, 1H), 4.19 (q, *J* = 14.2, 7.0 Hz, 2H), 3.85 (s, 2H), 3.44 (s, 3H), 1.35 (t, *J* = 7.1 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.3, 156.7, 135.5, 132.0, 128.3, 127.4, 126.8, 121.4, 121.1, 118.8, 118.5, 109.5, 107.4, 104.9, 40.0, 36.9, 33.5, 15.3; HRMS-ESI (m/z): calcd for $C_{18}H_{19}N_3O_2Na$ [M + Na]+ 332.1375, found 332.1368.

2-indol-1-yl-N-(1-methyl-2-oxo-3-pyridyl)acetamide (1r).



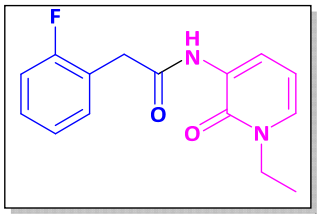
Off white solid, 81% yield. Mp 132-134 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.43 (s, 1H), 8.17 (d, J = 7.2 Hz, 1H), 7.56 (d, J = 7.8 Hz, 1H), 7.43-7.38 (m, 3H), 7.12 (t, J = 7.4 Hz, 1H), 7.03 (t, J = 7.3 Hz, 1H), 6.49-6.48 (m, 1H), 6.21 (t, J = 7.1 Hz, 1H), 5.20 (s, 2H), 3.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 167.4, 156.7, 136.2, 132.6, 129.6, 128.0, 127.9, 122.3, 121.2, 120.3, 119.1, 109.6, 104.8, 101.1, 49.1, 37.0; HRMS-ESI (m/z): calcd for $C_{16}H_{15}N_3NaO_2$ [M + Na]+ 304.1062, found 304.1066.

N-(1-ethyl-2-oxo-3-pyridyl)-2-phenyl-acetamide (1s).



Off white solid, 71% yield. Mp 96-98 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.30 (s, 1H), 8.17 (d, J = 7.2 Hz, 1H), 7.40 (d, J = 6.7 Hz, 1H), 7.33-7.24 (m, 5H), 6.23 (t, J = 7.0 Hz, 1H), 3.95 (q, J = 14.0, 7.0 Hz, 2H), 3.79 (s, 2H), 1.22 (t, J = 6.8 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.8, 156.1, 135.7, 131.1, 129.1, 128.5, 128.2, 126.5, 122.1, 105.2, 44.1, 42.9, 14.2; HRMS-ESI (m/z): calcd for $C_{15}H_{16}N_2NaO_2$ [M + Na]+ 279.1109, found 279.1102.

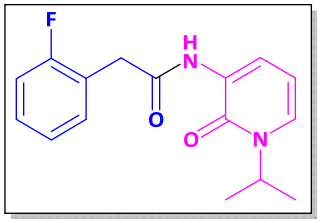
N-(1-ethyl-2-oxo-3-pyridyl)-2-(2-fluorophenyl)acetamide (1t).



Off white solid, 56% yield. Mp 116-118 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.36 (s, 1H), 8.16 (d, J = 7.0 Hz, 1H), 7.41-7.29 (m, 3H), 7.19-7.15 (m, 2H), 6.24 (t, J = 7.04 Hz, 1H), 3.97 (q, J = 14.1, 7.0 Hz, 2H), 3.87 (s, 2H), 1.23 (t, J = 7.0 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.8, 160.6 (d, $J_{C\text{-}F}$ = 242.8 Hz), 156.2, 131.9 (d, $J_{C\text{-}F}$ = 4.3 Hz), 131.1, 128.8 (d, $J_{C\text{-}F}$ = 8.0 Hz), 128.5, 124.2 (d, $J_{C\text{-}F}$ = 3.2 Hz), 122.7 (d, $J_{C\text{-}F}$ = 15.9 Hz), 122.1, 115.0 (d, $J_{C\text{-}F}$ = 21.3 Hz), 105.2, 44.2, 36.4, 14.2; ^{19}F NMR (470 MHz, DMSO-d_6) δ -117.03 (s, 1F); HRMS-ESI (m/z): calcd for $C_{15}H_{16}FN_2O_2$ [M + H]+

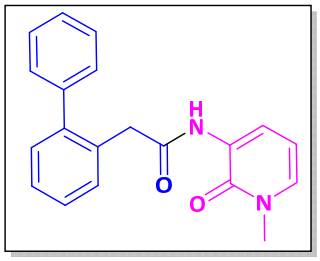
275.1196, found 275.1208.

2-(2-fluorophenyl)-N-(1-isopropyl-2-oxo-3-pyridyl)acetamide (1u).



Off white solid, 60% yield. Mp 86-88 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.35 (s, 1H), 8.15 (d, J = 6.1 Hz, 1H), 7.45 (d, J = 5.6 Hz, 1H), 7.39-7.29 (m, 2H), 7.20-7.15 (m, 2H), 6.28 (t, J = 7.1 Hz, 1H), 5.11-5.08 (m, 1H), 3.87 (s, 2H), 1.30 (d, J = 3.4 Hz, 6H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.7, 160.5 (d, J_{C-F} = 242.9 Hz), 155.9, 131.9 (d, J_{C-F} = 4.2 Hz), 128.8 (d, J_{C-F} = 8.0 Hz), 128.2, 127.0, 124.2 (d, J_{C-F} = 3.2 Hz), 122.6 (d, J_{C-F} = 15.9 Hz), 121.5, 115.0 (d, J_{C-F} = 21.4 Hz), 105.5, 46.9, 36.5, 21.0; ^{19}F NMR (400 MHz, DMSO-d_6) δ -117.0 (s, 1F); HRMS-ESI (m/z): calcd for $C_{16}H_{18}FN_2O_2$ [M + H]+ 289.1352, found 289.1352.

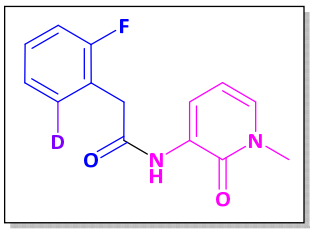
2-([1,1'-biphenyl]-2-yl)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (1v).



Off white solid, 77% yield. Mp 138-140 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.06 (s, 1H), 8.12 (d, J = 7.1 Hz, 1H), 7.41-7.32 (m, 9H), 7.25-7.24 (m, 1H), 6.20 (t, J = 7.0 Hz, 1H), 3.74 (s, 2H), 3.47 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 156.7, 141.9, 140.6, 132.7, 132.2, 130.4, 129.8, 128.8, 128.2, 128.1, 127.4, 126.9, 126.8, 121.9, 104.8, 40.8, 36.9; HRMS-ESI (m/z): calcd for $C_{20}H_{18}N_2O_2Na$ [M + Na]+ 341.1266, found 341.1266.

4. Characterization data of products:

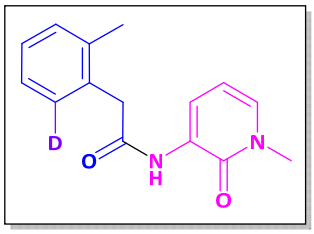
2-(2-fluorophenyl-6-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2a).



Off white solid, 80% yield. Mp 120-122 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.36 (s, 1H), 8.17 (d, J = 8.0 Hz, 1H), 7.41-7.39 (m, 1H), 7.35-7.29 (m, 1H), 7.20-7.15 (m, 1H),

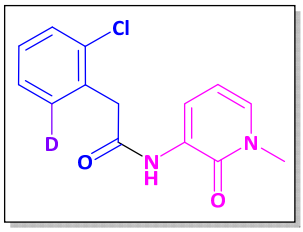
6.22 (t, J = 8.0 Hz, 1H), 3.87 (s, 2H), 3.50 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 168.8, 160.5 (d, J_{C-F} = 242.9 Hz), 156.8, 132.3, 131.6 (t, J_{C-D} = 21.0 Hz), 128.8 (d, J_{C-F} = 8.0 Hz), 128.3, 124.1 (d, J_{C-F} = 3.2 Hz), 122.6 (d, J_{C-F} = 15.9 Hz), 122.2, 115.0 (d, J_{C-F} = 21.0 Hz), 104.8, 37.0, 36.3; ^{19}F NMR (376 MHz, DMSO-d_6) δ -117.06 to -117.10 (m, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{12}DFN_2O_2Na$ [M + Na]+ 284.0922, found 284.0909.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(2-methylphenyl-6-d)acetamide (2b).



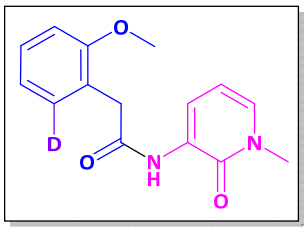
Off white solid, 91% yield. Mp 128-130 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.15 (s, 1H), 8.20-8.18 (m, 1H), 7.39-7.37 (m, 1H), 7.18-7.15 (m, 3H), 6.22 (t, J = 6.0 Hz, 1H), 3.83 (s, 2H), 3.48 (s, 3H), 2.26 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 169.7, 156.7, 136.6, 134.1, 132.2, 129.9, 129.8 (t, J_{C-D} = 24.0 Hz), 128.3, 126.8, 125.7, 121.9, 104.9, 41.0, 37.0, 19.1; HRMS-ESI (m/z): calcd for $C_{15}H_{16}DN_2O_2$ [M + H]+ 258.1353, found 258.1413.

2-(2-chlorophenyl-6-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2c).



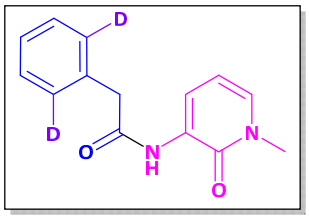
Off white solid, 86% yield. Mp 142-144 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.30 (s, 1H), 8.18-8.16 (m, 1H), 7.46-7.44 (m, 1H), 7.40-7.39 (m, 1H), 7.32-7.29 (m, 2H), 6.22 (t, J = 8.0 Hz, 1H), 3.96 (s, 2H), 3.49 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 168.5, 156.7, 133.6, 133.5, 132.2, 132.0 (t, J_{C-D} = 24.0 Hz), 129.0, 128.6, 128.3, 127.0, 122.0, 104.8, 40.9, 36.9; HRMS-ESI (m/z): calcd for $C_{14}H_{13}DClN_2O_2$ [M + H]+ 278.0807, found 278.0802.

2-(2-methoxyphenyl-6-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide(2d).



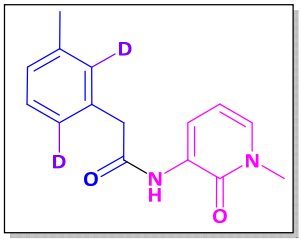
Off white solid, 80% yield. Mp 116-118 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.04 (s, 1H), 8.15 (d, J = 8.0 Hz, 1H), 7.39-7.35 (m, 1H), 7.28 (t, J = 8.0 Hz, 1H), 7.25-7.23 (m, 0.23H), 7.03 (d, J = 8.0 Hz, 1H), 6.93 (d, J = 8.0 Hz, 1H), 6.21 (t, J = 8.0 Hz, 1H), 3.83 (s, 3H), 3.70 (s, 2H), 3.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.5, 156.8, 156.7, 131.9, 130.6 (t, $J_{C\text{-}D}$ = 21.0 Hz), 128.5, 128.4, 123.2, 121.2, 120.3, 110.8, 105.0, 55.4, 40.0, 37.0; HRMS-ESI (m/z): calcd for $C_{15}H_{16}DN_2O_3$ [M + H]+ 274.1302, found 274.1298.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(phenyl-2,6-d$_2$)acetamide (2e).



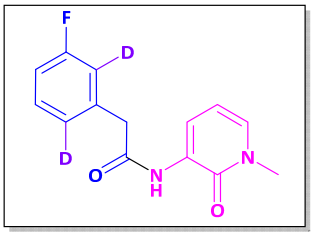
Off white solid, 84% yield. Mp 132-134 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.31 (s, 1H), 8.18 (d, J = 7.0 Hz, 1H), 7.39 (d, J = 6.0 Hz, 1H), 7.33-7.31 (m, 2H), 7.26-7.22 (m, 1H), 6.21 (t, J = 7.0 Hz, 1H), 3.79 (s, 2H), 3.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 156.8, 135.5, 132.3, 128.8 (t, $J_{C\text{-}D}$ = 24 Hz), 128.6, 128.1, 126.5, 122.2, 104.8, 42.8, 37.0; HRMS-ESI (m/z): calcd for $C_{14}H_{13}D_2N_2O_2$ [M + H]+ 245.1259, found 245.1257.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(3-methylphenyl-2,6-d2)acetamide (2f).



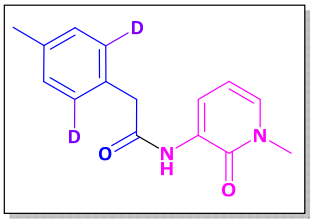
Off white solid, 93% yield. Mp 118-120 °C; ^{1}H NMR (400 MHz, DMSO-d_6, 100^{o}C): δ 8.86 (s, 1H), 8.15-8.14 (m, 1H), 7.29-7.20 (m, 2H), 7.15 (m, 0.12H), 7.08-7.06 (m, 1H), 6.18 (m, 1H), 3.73 (s, 2H), 3.50 (s, 3H), 2.31 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.0, 156.8, 137.2, 135.4, 132.3, 129.5 (t, $J_{C\text{-}D}$ = 21.0 Hz), 128.4, 128.0, 127.1, 125.9 (t, $J_{C\text{-}D}$ = 24.0 Hz), 122.1, 104.8, 42.8, 37.0, 20.8; HRMS-ESI (m/z): calcd for $C_{15}H_{15}D_2N_2O_2$ [M + H]+ 259.1416, found 259.1414.

2-(3-fluorophenyl-2,6-d2)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2g).



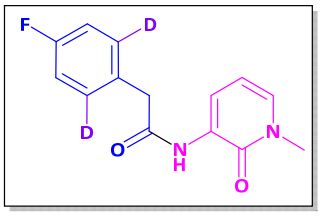
Off white solid, 83% yield. Mp 118-120 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.41 (s, 1H), 8.19-8.17 (m, 1H), 7.40-7.34 (m, 2H), 7.16-7.14 (m, 0.12H), 7.10-7.06 (m, 1H), 6.21 (t, J = 6.0 Hz, 1H), 3.84 (s, 2H), 3.49 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.4, 161.9 (d, $J_{C\text{-}F}$ = 241.7 Hz), 156.8, 138.3 (d, $J_{C\text{-}F}$ = 7.8 Hz), 132.4, 130.0 (d, $J_{C\text{-}F}$ = 8.5 Hz), 128.3, 125.0 (t, $J_{C\text{-}D}$ = 26.0 Hz), 122.5, 115.8 (t, $J_{C\text{-}D}$ = 21.0 Hz), 113.3 (d, $J_{C\text{-}F}$ = 20.6 Hz), 104.8, 42.3, 37.0; ^{19}F NMR (376 MHz, DMSO-d_6) δ -113.91 to -113.95 (m, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{12}D_2FN_2O_2$ [M + H]+ 263.1165, found 263.1192.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(4-methylphenyl-2,6-d2)acetamide (2h).



Off white solid, 78% yield. Mp 132-134 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.22 (s, 1H), 8.18-8.17 (m, 1H), 7.39-7.37 (m, 1H), 7.13 (s, 2H), 6.21 (t, J = 8.0 Hz, 1H), 3.73 (s, 2H), 3.48 (s, 3H), 2.27 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.1, 156.8, 135.5, 132.3, 132.2, 128.7, 128.6 (t, $J_{C\text{-}D}$ = 24.0 Hz), 128.3, 122.0, 104.8, 42.5, 36.9, 20.5; HRMS-ESI (m/z): calcd for $C_{15}H_{15}D_2N_2O_2$ [M + H]+ 259.1416, found 259.1413.

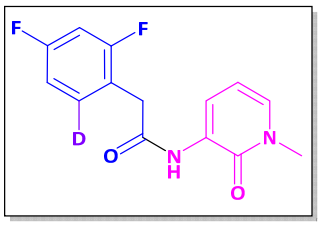
2-(4-fluorophenyl-2,6-d2)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2i).



Off white solid, 76% yield. Mp 148-150 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.35 (s, 1H), 8.19-8.17 (m, 1H), 7.40-7.38 (m, 1.15H), 7.15-7.13 (m, 2H), 6.21 (t, J = 8.0 Hz, 1H), 3.79 (s, 2H), 3.49 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 161.0 (d, $J_{C\text{-}F}$ = 240.5 Hz), 156.8, 132.4, 131.7 (d, $J_{C\text{-}F}$ = 2.9 Hz), 130.7 (td, $J_{C\text{-}D}$ = 30.0, 8.0 Hz), 128.4, 122.3, 114.8 (d, $J_{C\text{-}F}$ = 21.0 Hz), 104.8, 41.8, 37.0; ^{19}F NMR (470 MHz, DMSO-d_6) δ - 116.4 (s, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{12}D_2FN_2O_2$ [M + H]+ 263.1165,

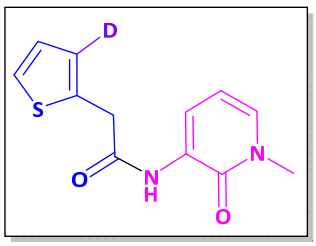
found 263.1157.

2-(2,4-difluorophenyl-6-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2j).



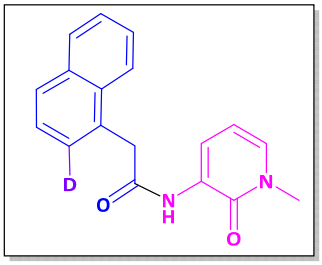
Off white solid, 78% yield. Mp 142-144 °C; ^{1}H NMR (400 MHz, DMSO-d$_6$ at 100°C): δ 9.05 (s, 1H), 8.13 (m, 1H), 7.46-7.44 (m, 0.23H), 7.34-7.32 (m, 1H), 7.12 (t, J = 8.0 Hz, 1H), 7.04-7.02 (m, 1H), 6.20 (t, J = 8.0 Hz, 1H), 3.84 (s, 2H), 3.52 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d$_6$): δ 168.6, 161.2 (dd, $J_{C\text{-}F}$ = 241.9, 10.8 Hz), 160.5 (dd, $J_{C\text{-}F}$ = 245.4, 12.1 Hz), 156.8, 132.6 (t, $J_{C\text{-}D}$ = 22.0 Hz), 132.3, 128.3, 122.3, 118.9 (dd, $J_{C\text{-}F}$ = 16.1, 4.0 Hz), 111.1 (dd, $J_{C\text{-}F}$ = 20.9, 3.5 Hz), 104.8, 103.5 (t, $J_{C\text{-}F}$ = 25.8 Hz), 37.0, 35.7; ^{19}F NMR (376 MHz, DMSO-d$_6$) δ -112.1 (d, J = 7.0 Hz, 1F), -112.5 (d, J = 7.0 Hz, 1F); HRMS-ESI (m/z): calcd for $C_{14}H_{11}DF_2N_2O_2Na$ [M + Na]+ 302.0827, found 302.0835.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(thiophen-2-yl-3-d)acetamide (2m).



Off white solid, 72% yield. Mp 146-148 °C; ^{1}H NMR (400 MHz, DMSO-d$_6$, 100°C): δ 9.06 (s, 1H), 8.16 (d, J = 8.0 Hz, 1H), 7.37-7.36 (m, 0.37H), 7.33-7.31 (d, J = 8.0 Hz, 1H), 7.00 (d, J = 8.0 Hz, 2H), 6.20 (t, J = 6.0 Hz, 1H), 4.02 (s, 2H), 3.51 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d$_6$): δ 168.8, 156.8, 136.8, 132.4, 128.2, 126.6, 126.5, 125.1 (t, $J_{C\text{-}D}$ = 24.0 Hz), 122.3, 104.8, 37.1, 37.0; HRMS-ESI (m/z): calcd for $C_{12}H_{11}DN_2O_2SNa$ [M + Na]+ 272.0580, found 272.0573.

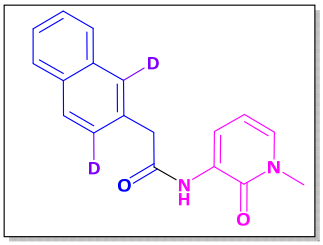
N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(naphthalen-1-yl-2-d)acetamide (2n).



Off white solid, 88% yield. Mp 130-132 °C; ^{1}H NMR (400 MHz, DMSO-d$_6$): δ 9.34 (s,

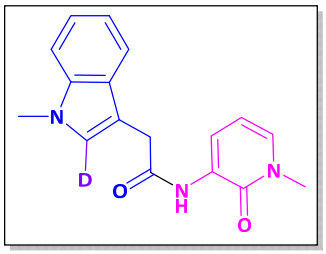
1H), 8.17-8.15 (m, 1H), 8.09 (d, J = 8.0 Hz, 1H), 7.95-7.93 (m, 1H), 7.86 (d, J = 8.0 Hz, 1H), 7.53-7.48 (m, 3H), 7.38-7.36 (m, 1H), 6.19 (t, J = 6.0 Hz, 1H), 4.30 (s, 2H), 3.47 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 169.8, 156.7, 133.3, 132.2, 131.9, 131.8, 128.4, 128.3, 127.9 (t, $J_{C\text{-}D}$ = 24.0 Hz), 127.3, 126.0, 125.6, 125.4, 124.0, 121.9, 104.8, 40.5, 36.9; HRMS-ESI (m/z): calcd for $C_{18}H_{15}DN_2O_2Na$ [M + Na]+ 316.1172, found 316.1196.

N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(naphthalen-2-yl-1,3-d2)acetamide (2o).



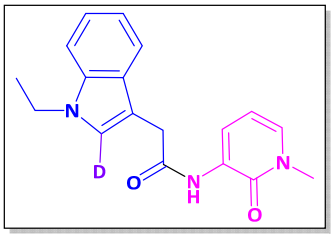
Off white solid, 74% yield. Mp 152-154 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.37 (s, 1H), 8.20 (d, J = 8.0 Hz, 1H), 7.90-7.87 (m, 3H), 7.52-7.46 (m, 2H), 7.39-7.37 (m, 1H), 6.21 (t, J = 8.0 Hz, 1H), 3.98 (s, 2H), 3.48 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 169.9, 156.8, 133.2, 132.8, 132.3, 131.7, 128.4, 127.6 (t, $J_{C\text{-}D}$ = 24.0 Hz), 127.6, 127.4, 127.3, 127.0 (t, $J_{C\text{-}D}$ = 24.0 Hz), 126.0, 125.5, 122.2, 104.8, 43.0, 37.0; HRMS-ESI (m/z): calcd for $C_{18}H_{15}D_2N_2O_2$ [M + H]+ 295.1416, found 295.1411.

2-(1-methyl-1H-indol-3-yl-2-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2p).



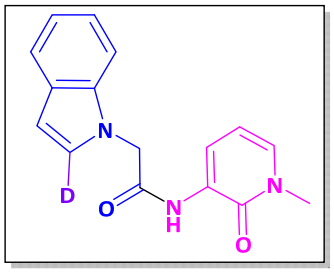
Off white solid, 82% yield. Mp 140-142 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.09 (s, 1H), 8.19 (d, J = 7.4 Hz, 1H), 7.57 (d, J = 7.8 Hz, 1H), 7.41 (d, J = 8.1 Hz, 1H), 7.35 (d, J = 6.7 Hz, 1H), 7.30 (s, 0.09H), 7.15 (t, J = 7.5 Hz, 1H), 7.01 (t, J = 7.4 Hz, 1H), 6.20 (t, J = 7.1 Hz, 1H), 3.85 (s, 2H), 3.77 (s, 3H), 3.44 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 170.3, 156.7, 136.5, 132.0, 128.3 (t, $J_{C\text{-}D}$ = 22.0 Hz), 128.3, 127.3, 121.4, 121.1, 118.7, 118.6, 109.5, 107.0, 104.9, 36.9, 33.4, 32.1; HRMS-ESI (m/z): calcd for $C_{17}H_{17}DN_3O_2$ [M + H]+ 297.1462, found 297.1455.

2-(1-ethyl-1H-indol-3-yl-2-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2q).



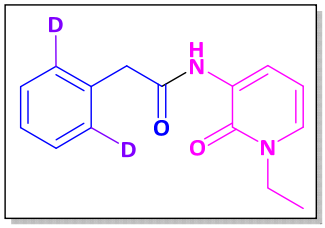
Off white solid, 69% yield. Mp 122-124 °C; ^{1}H NMR (400 MHz, DMSO-d_6 at 100°C): δ 8.85 (s, 1H), 8.19-8.17 (m, 1H), 7.57 (d, J = 7.7 Hz, 1H), 7.43 (d, J = 8.2 Hz, 1H), 7.35 (m, 0.35H), 7.27 (d, J = 6.0 Hz, 1H), 7.15 (t, J = 7.5 Hz, 1H), 7.02 (t, J = 7.2 Hz, 1H), 6.18 (t, J = 6.8 Hz, 1H), 4.19 (q, J = 14.3, 7.1 Hz, 2H), 3.85 (s, 2H), 3.45 (s, 3H), 1.40 (t, J = 6.4 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 170.3, 156.7, 135.5, 132.0, 128.3, 127.4, 126.6 (t, $J_{C\text{-}D}$ = 24.0 Hz), 121.4, 121.1, 118.8, 118.5, 109.5, 107.2, 104.9, 40.0, 36.9, 33.5, 15.3; HRMS-ESI (m/z): calcd for $C_{18}H_{19}DN_3O_2$ [M + H]+ 311.1618, found 311.1614.

2-(1H-indol-1-yl-2-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2r).



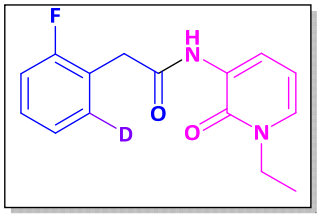
Off white solid, 90% yield. Mp 132-134 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.45 (s, 1H), 8.17 (d, J = 7.3 Hz, 1H), 7.56 (d, J = 7.8 Hz, 1H), 7.43-7.39 (m, 3H), 7.11 (t, J = 7.5 Hz, 1H), 7.03 (t, J = 7.3 Hz, 1H), 6.21 (t, J = 7.0 Hz, 1H), 5.20 (s, 2H), 3.48 (s, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 167.4, 156.7, 136.2, 132.7, 129.5, 128.0, 122.3, 121.2, 120.3, 119.1, 109.6, 104.9, 101.1 (t, $J_{C\text{-}D}$ = 24.0 Hz), 49.1, 37.0; HRMS-ESI (m/z): calcd for $C_{16}H_{15}DN_3O_2$ [M + H]+ 283.1305 , found 283.1304.

N-(1-ethyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(phenyl-2,6-d2)acetamide (2s).



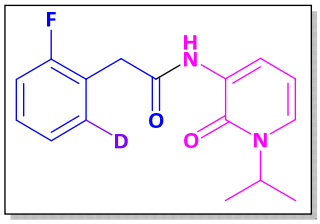
Off white solid, 89% yield. Mp 98-100 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.32 (s, 1H), 8.18-8.17 (m, 1H), 7.40 (d, J = 8.0 Hz, 1H), 7.33-7.31 (m, 2H), 7.26-7.23 (m, 1H), 6.24 (t, J = 6.0 Hz, 1H), 3.96 (q, J = 16.0, 8.0 Hz, 2H), 3.79 (s, 2H), 1.22 (t, J = 8.0 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 169.9, 156.1, 135.5, 131.1, 128.8 (t, $J_{C\text{-}D}$ = 24.0 Hz), 128.5, 128.1, 126.5, 122.1, 105.2, 44.2, 42.8, 14.2; HRMS-ESI (m/z): calcd for $C_{15}H_{15}D_2N_2O_2$ [M + H]+ 259.1416, found 259.1411.

N-(1-ethyl-2-oxo-1,2-dihydropyridin-3-yl)-2-(2-fluorophenyl-6-d)acetamide (2t).



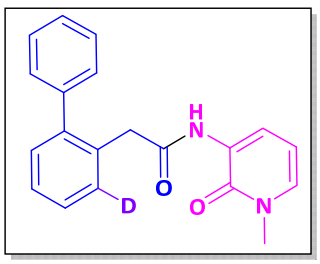
Off white solid, 80% yield. Mp 120-122 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.36 (s, 1H), 8.16 (d, J = 7.0 Hz, 1H), 7.42-7.41 (m, 1H), 7.35-7.30 (m, 1H), 7.20-7.16 (m, 2H), 6.25 (t, J = 6.0. Hz, 1H), 3.97 (q, J = 16.0, 8.0 Hz, 2H), 3.87 (s, 2H), 1.23 (t, J = 8.0 Hz, 3H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.8, 160.5 (d, $J_{C\text{-}F}$ = 242.8 Hz), 156.1, 131.6 (t, $J_{C\text{-}D}$ = 24.2 Hz), 131.1, 128.8 (d, $J_{C\text{-}F}$ = 8.0 Hz), 128.5, 124.1 (d, $J_{C\text{-}F}$ = 3.4 Hz), 122.6 (d, $J_{C\text{-}F}$ = 15.9 Hz), 122.1, 115.0 (d, $J_{C\text{-}F}$ = 21.3 Hz), 105.2, 44.2, 36.4, 14.2; ^{19}F NMR (470 MHz, DMSO-d_6) δ -117.09 (s, 1F); HRMS-ESI (m/z): calcd for $C_{15}H_{15}DFN_2O_2$ [M + H]+ 276.1259, found 276.1258.

2-(2-fluorophenyl-6-d)-N-(1-isopropyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2u).



Off white solid, 83% yield. Mp 90-92 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.34 (s, 1H), 8.16-8.13 (m, 1H), 7.46-7.44 (m,1H), 7.33-7.31 (m, 1H), 7.20-7.16 (m, 2H), 6.29 (t, J = 8.0 Hz, 1H), 5.11-5.08 (m, 1H), 3.87 (s, 2H), 1.31 (d, J = 4.0 Hz, 6H); ^{13}C{^{1}H} NMR (100 MHz, DMSO-d_6): δ 168.7, 160.5 (d, $J_{C\text{-}F}$ = 241.7 Hz), 155.9, 131.6 (t, $J_{C\text{-}D}$ = 23.1 Hz), 128.8 (d, $J_{C\text{-}F}$ = 8.0 Hz), 128.2, 127.0, 124.1 (d, $J_{C\text{-}F}$ = 3.2 Hz), 122.6 (d, $J_{C\text{-}F}$ = 17.1 Hz), 121.5, 115.0 (d, $J_{C\text{-}F}$ = 21.3 Hz), 105.5, 46.9, 36.4, 21.0; ^{19}F NMR (400 MHz, DMSO-d_6) δ -117.0 (s, 1F); HRMS-ESI (m/z): calcd for $C_{16}H_{17}DFN_2O_2$ [M + H]+ 290.1415, found 290.1413.

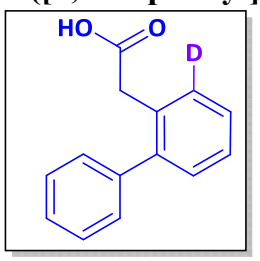
2-([1,1'-biphenyl]-2-yl-3-d)-N-(1-methyl-2-oxo-1,2-dihydropyridin-3-yl)acetamide (2v).



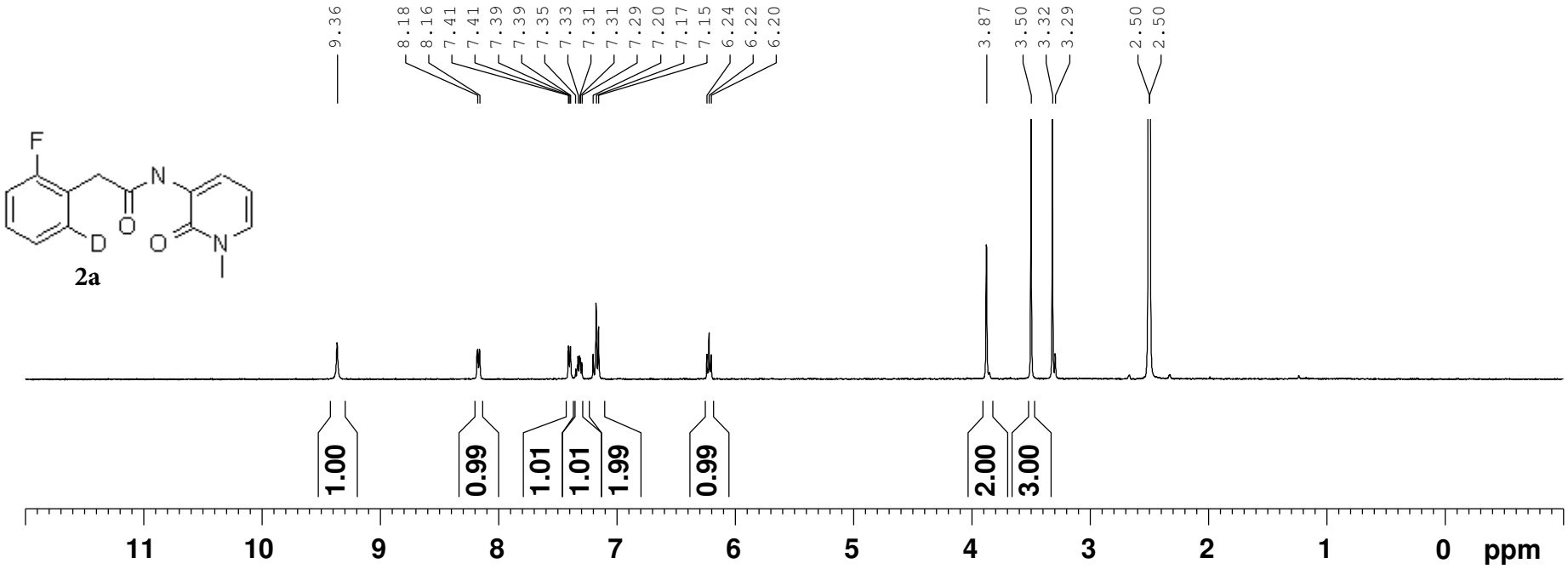
Off white solid, 85% yield. Mp 140-142 °C; ^{1}H NMR (400 MHz, DMSO-d_6): δ 9.04 (s,

1H), 8.12 (d, J = 6.8 Hz, 1H), 7.42-7.31 (m, 8H), 7.25-7.23 (m, 1H), 6.20 (t, J = 6.94 Hz, 1H), 3.74 (s, 2H), 3.47 (s, 3H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 169.9, 156.8, 141.9, 140.6, 132.7, 132.3, 130.3 (t, $J_{C\text{-}D}$ = 24.0 Hz), 129.8, 128.8, 128.3, 128.1, 127.4, 127.0, 126.9, 122.0, 104.9, 40.8, 37.0; HRMS-ESI (m/z): calcd for $C_{20}H_{17}N_2O_2DNa$ [M + Na]+ 342.1329, found 342.1321.

2-([1,1'-biphenyl]-2-yl-3-d)acetic acid (3).

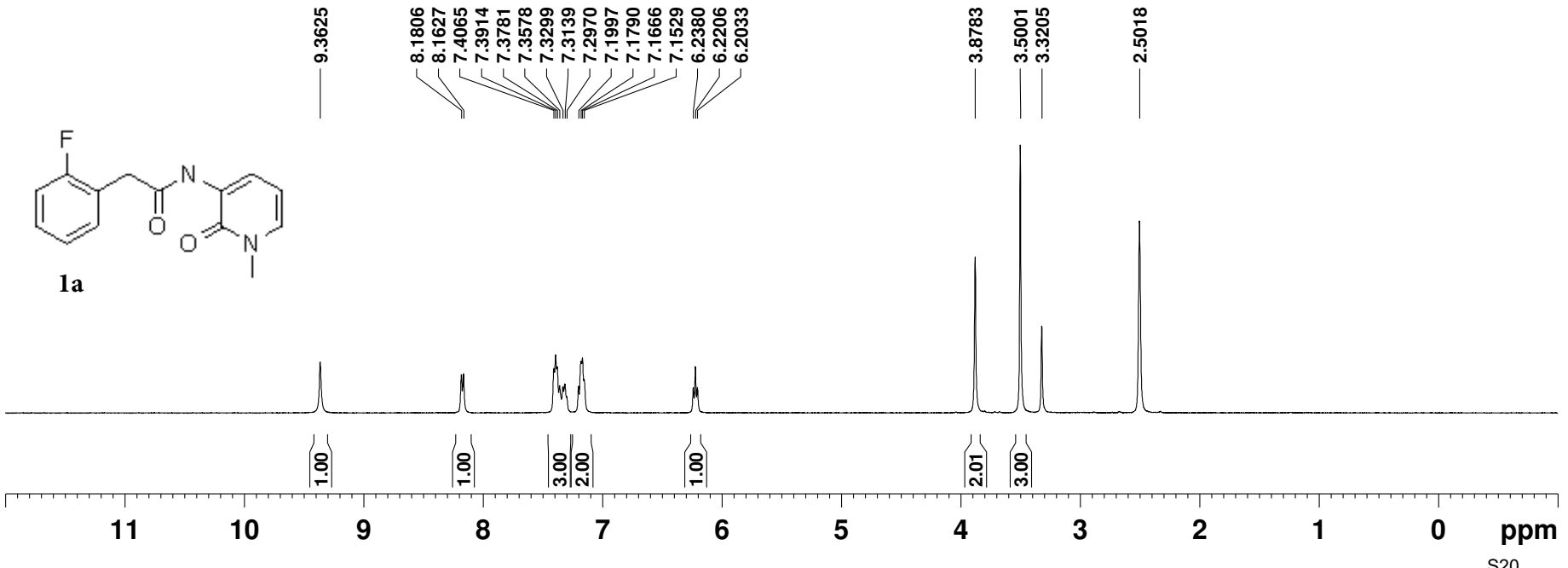


Off white solid, 70% yield. Mp 106-108 °C; 1H NMR (400 MHz, DMSO-d6): δ 12.25 (br, 1H), 7.46-7.41 (m, 2H), 7.39-7.26 (m, 5H), 7.23-7.19 (m, 1H), 3.49 (s, 2H); $^{13}C\{^{1}H\}$ NMR (100 MHz, DMSO-d_6): δ 172.7, 141.7, 140.7, 132.2, 130.4 (t, $J_{C\text{-}D}$ = 25.0 Hz), 129.5, 128.7, 128.1, 127.1, 127.0, 126.7, 38.3; HRMS-ESI (m/z): calcd for C14H11O2D [M + H]+ 214.0978, found 214.0979.



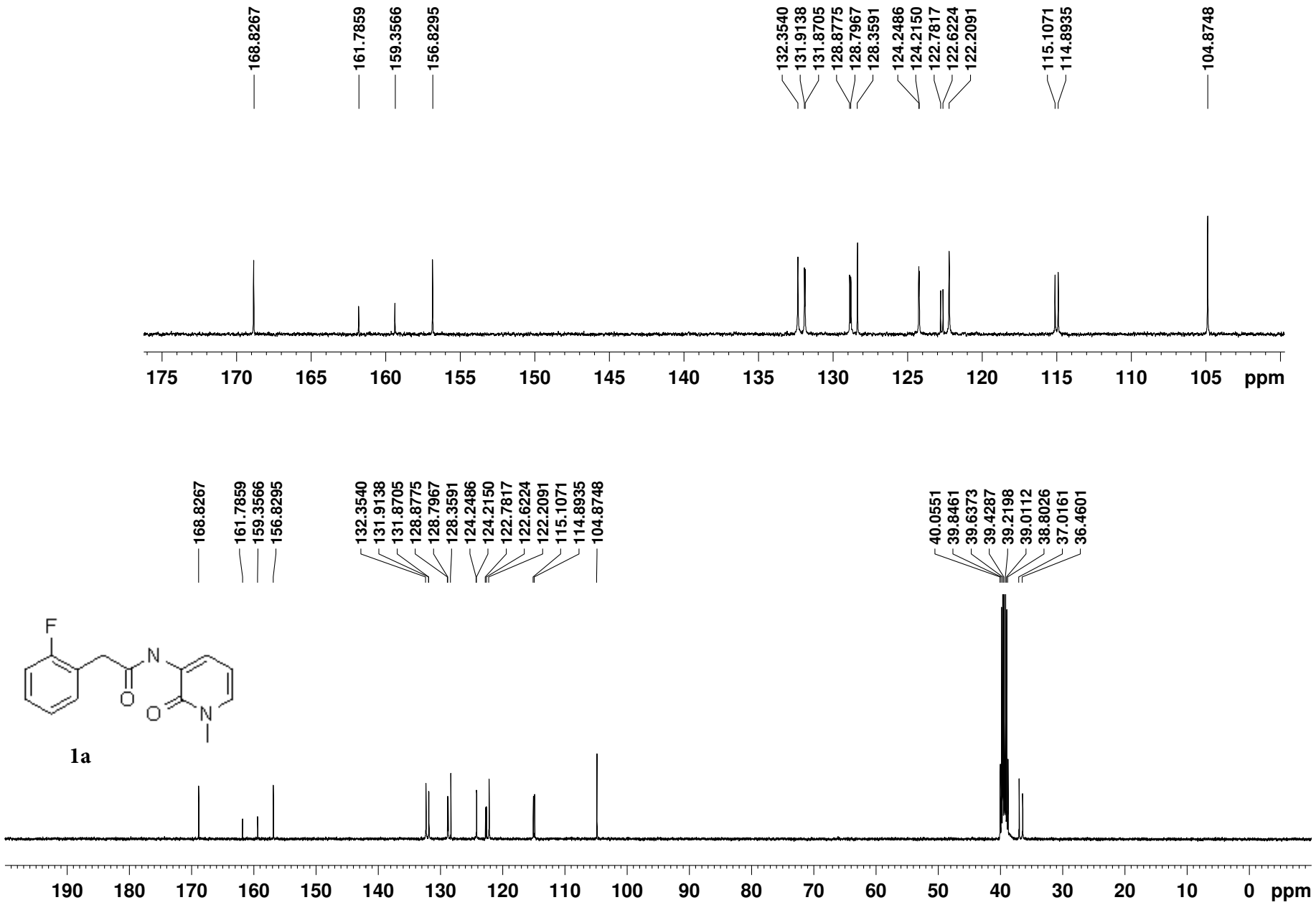
2a

^{1}H NMR of 2a IN DMSO

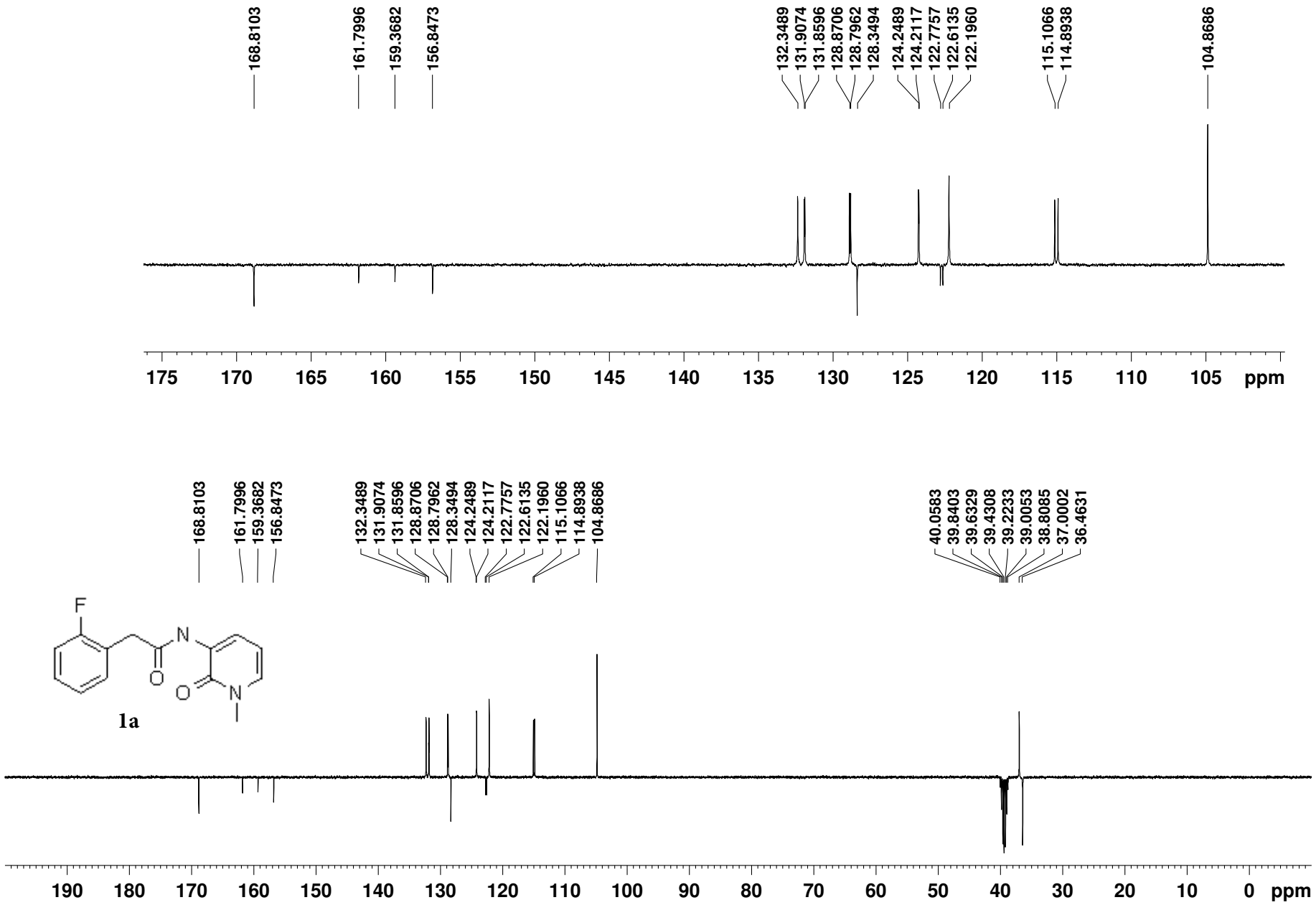


1a

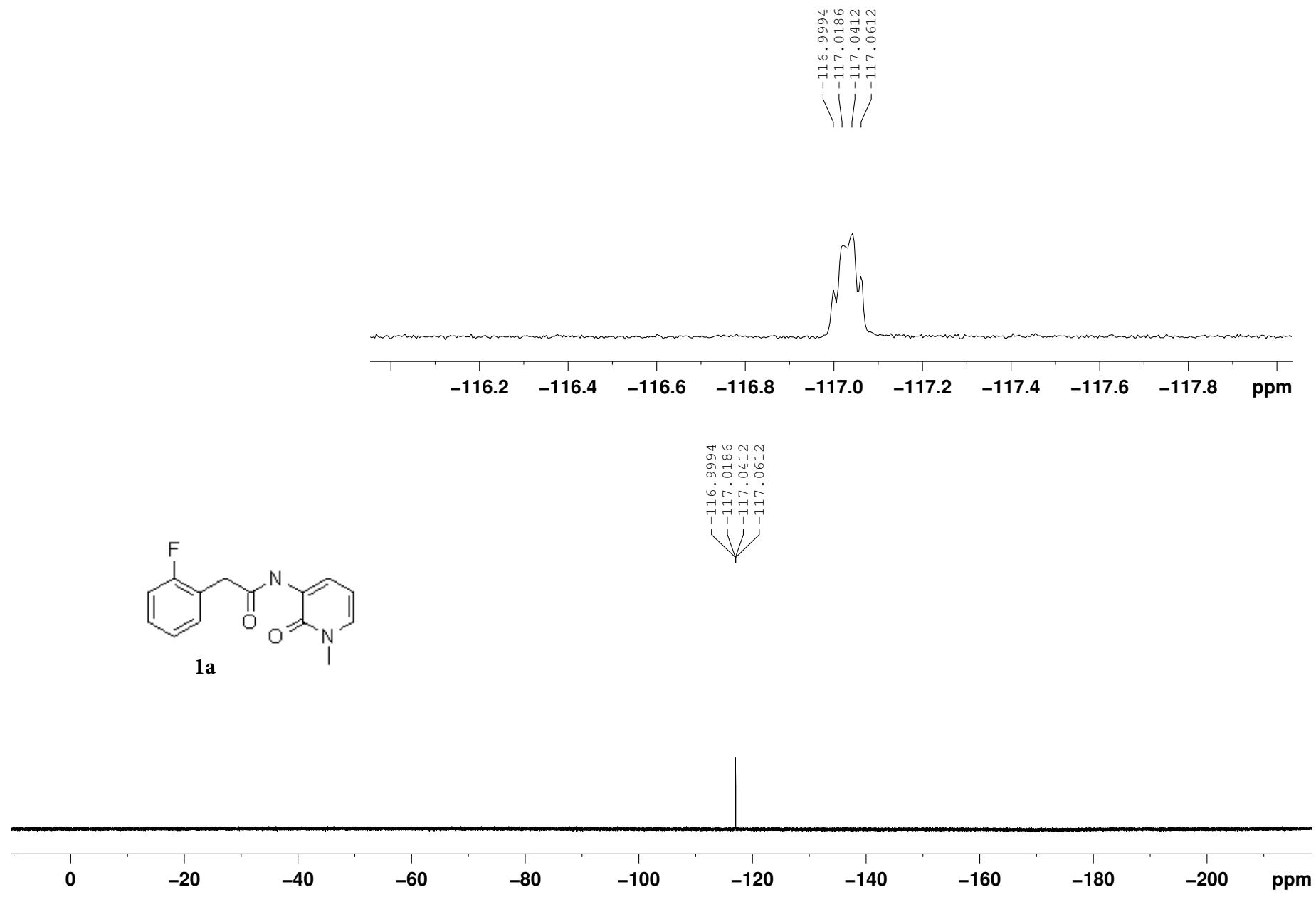
^{1}H NMR of 1a IN DMSO



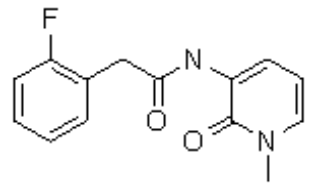
^{13}C NMR of 1a IN DMSO



APT of 1a IN DMSO

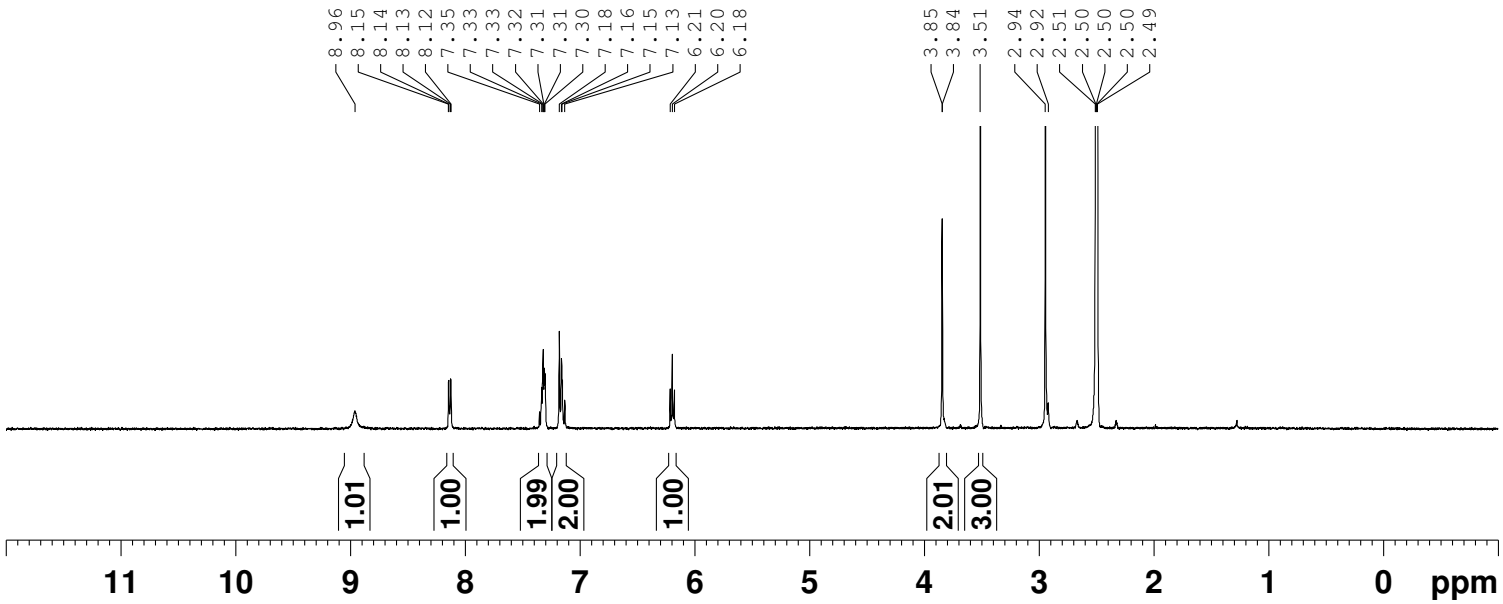


^{19}F NMR of 1a IN DMSO (PC)

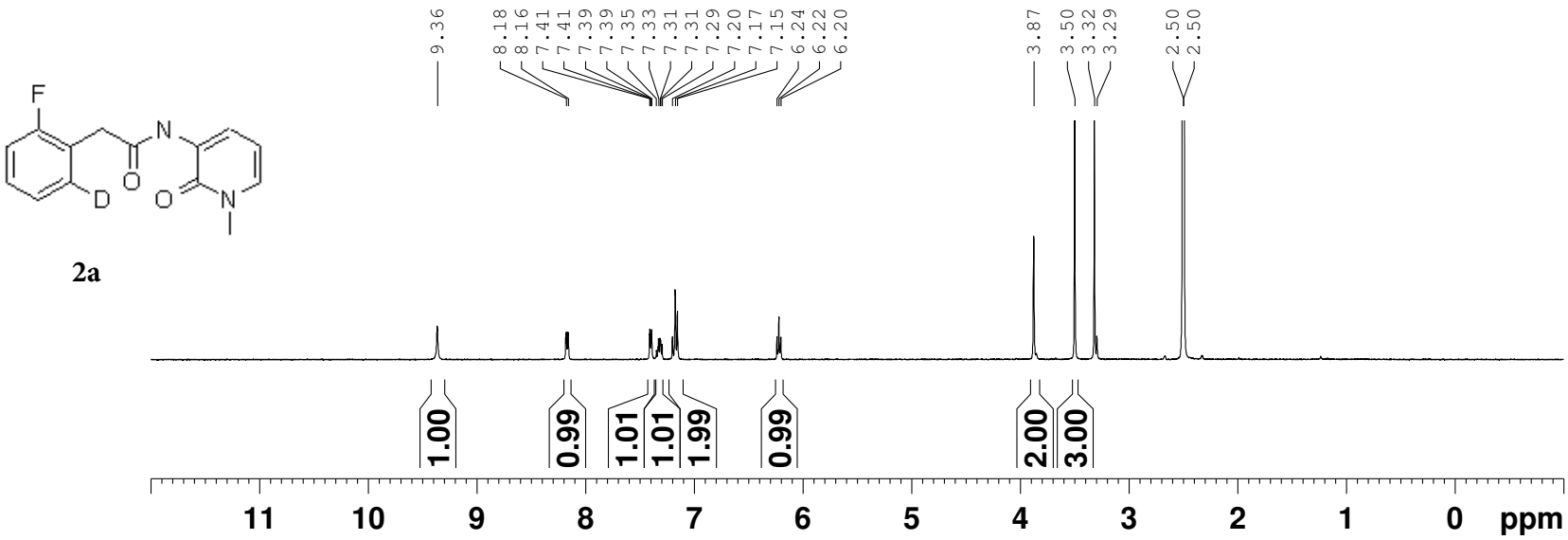


1a

^{19}F NMR of 1a IN DMSO (PDC)

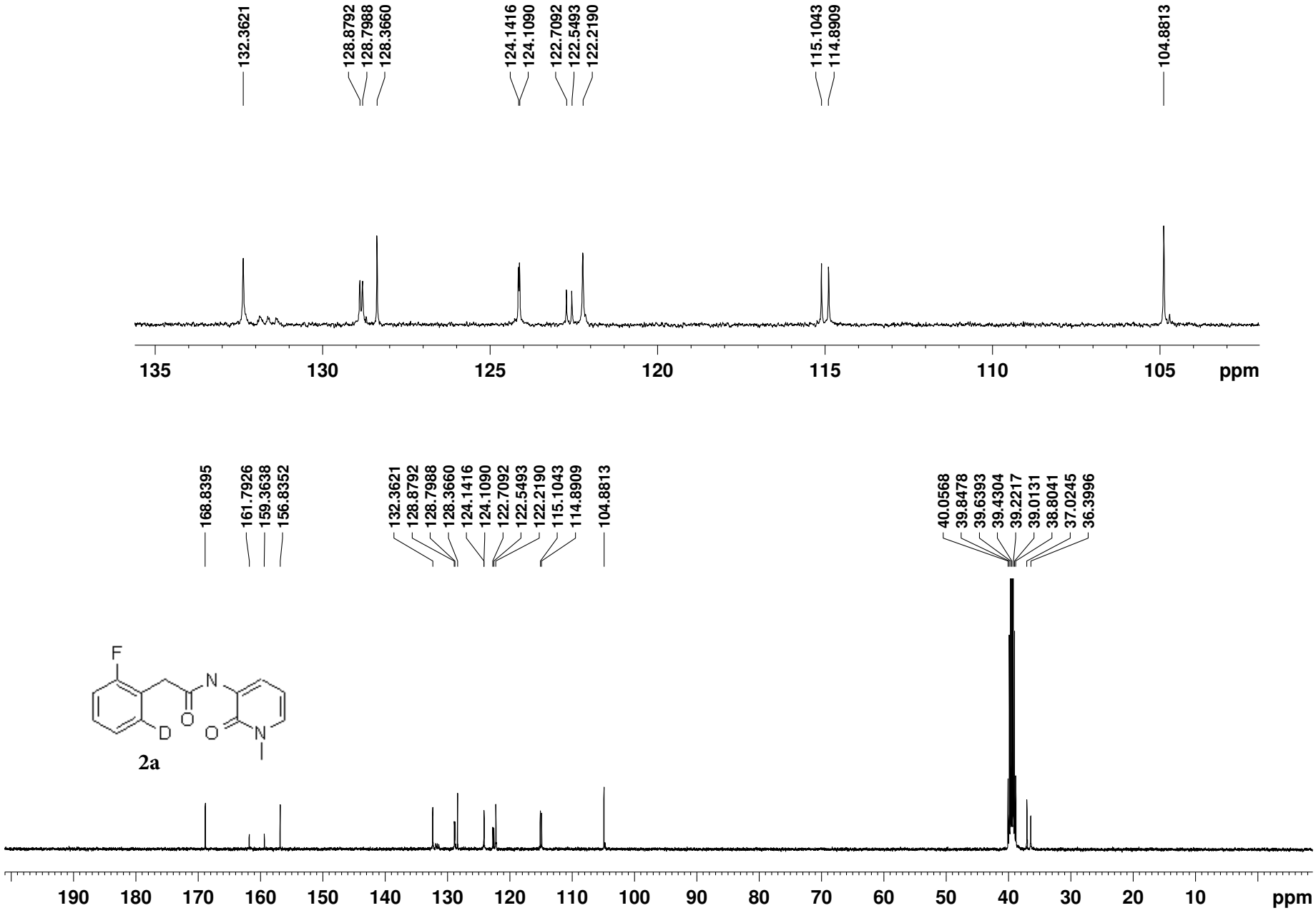


H NMR of 2a IN DMSO AT 100^{O}C

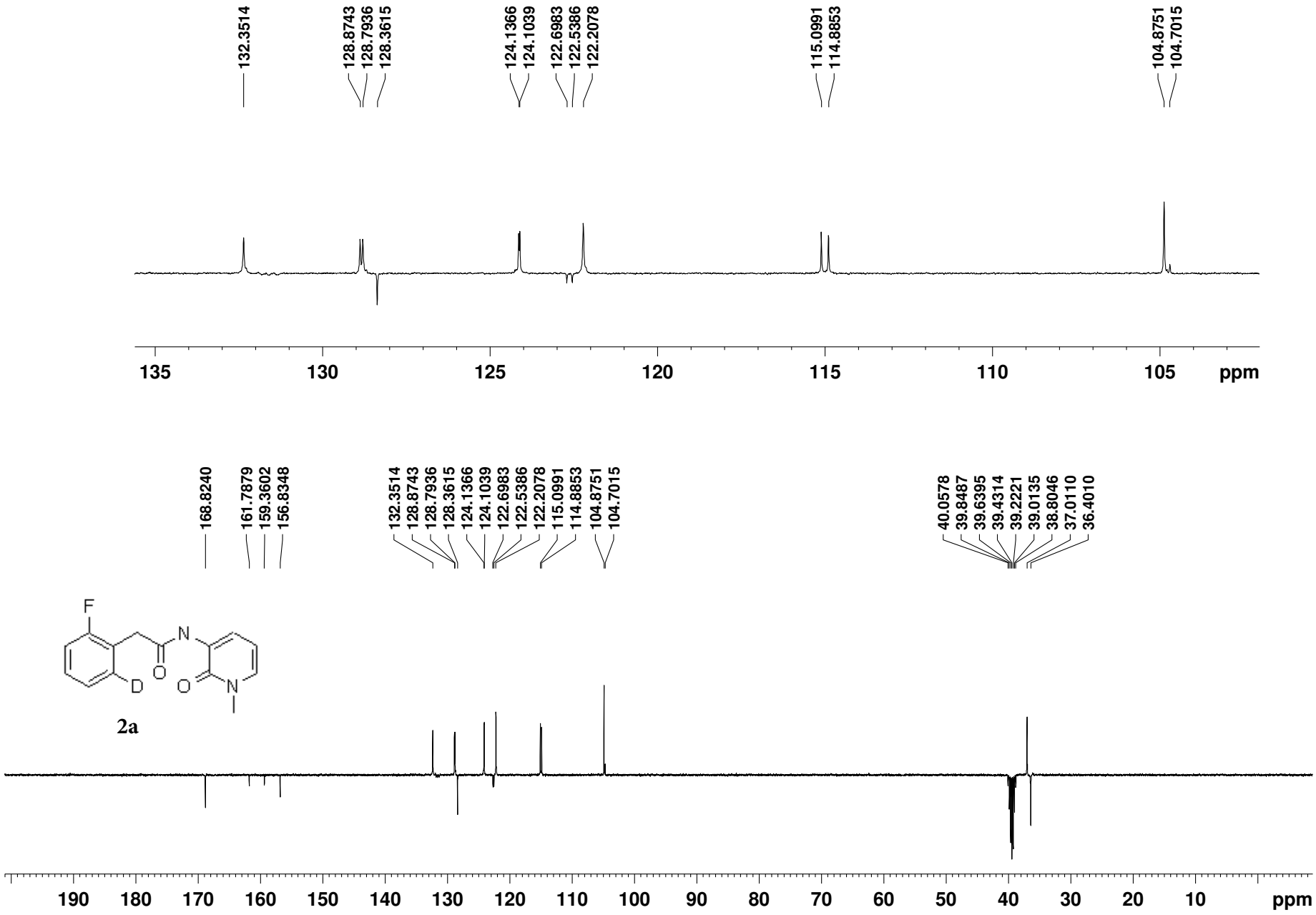


2a

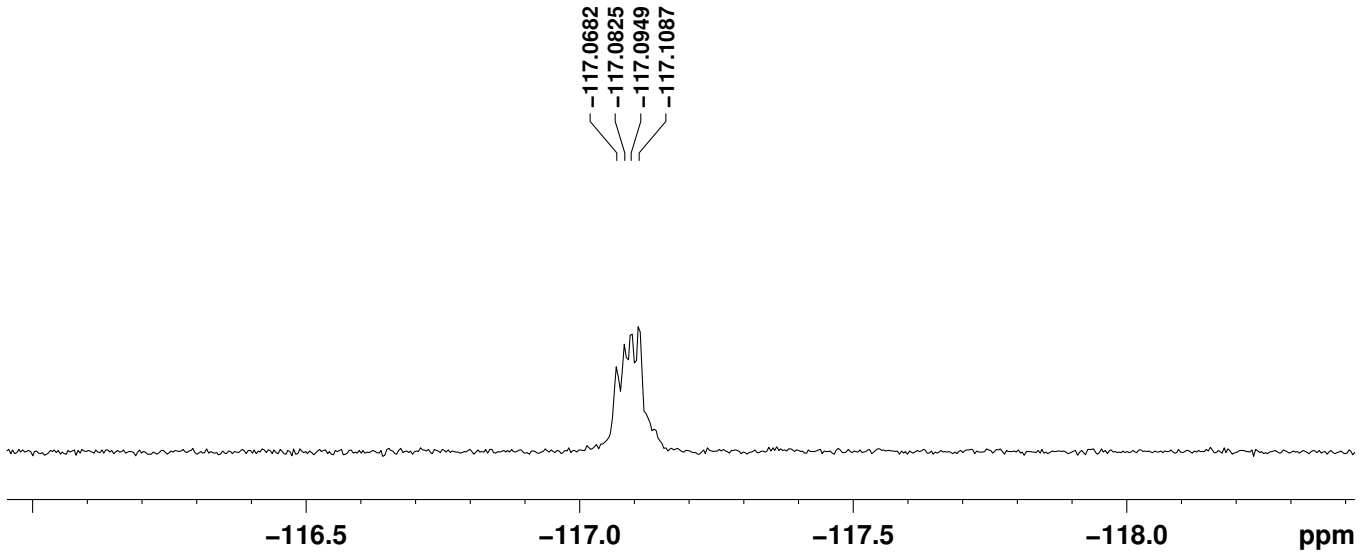
H NMR of 2a IN DMSO AT 20^{O}C

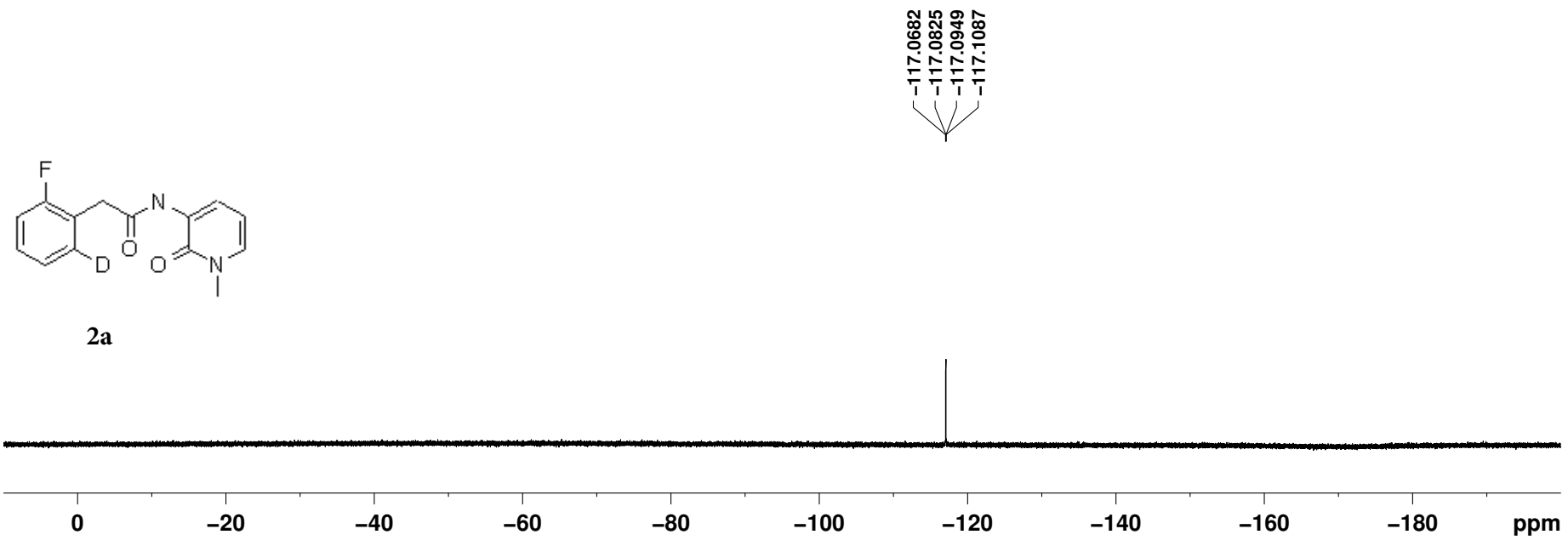


^{13}C NMR of 2a IN DMSO



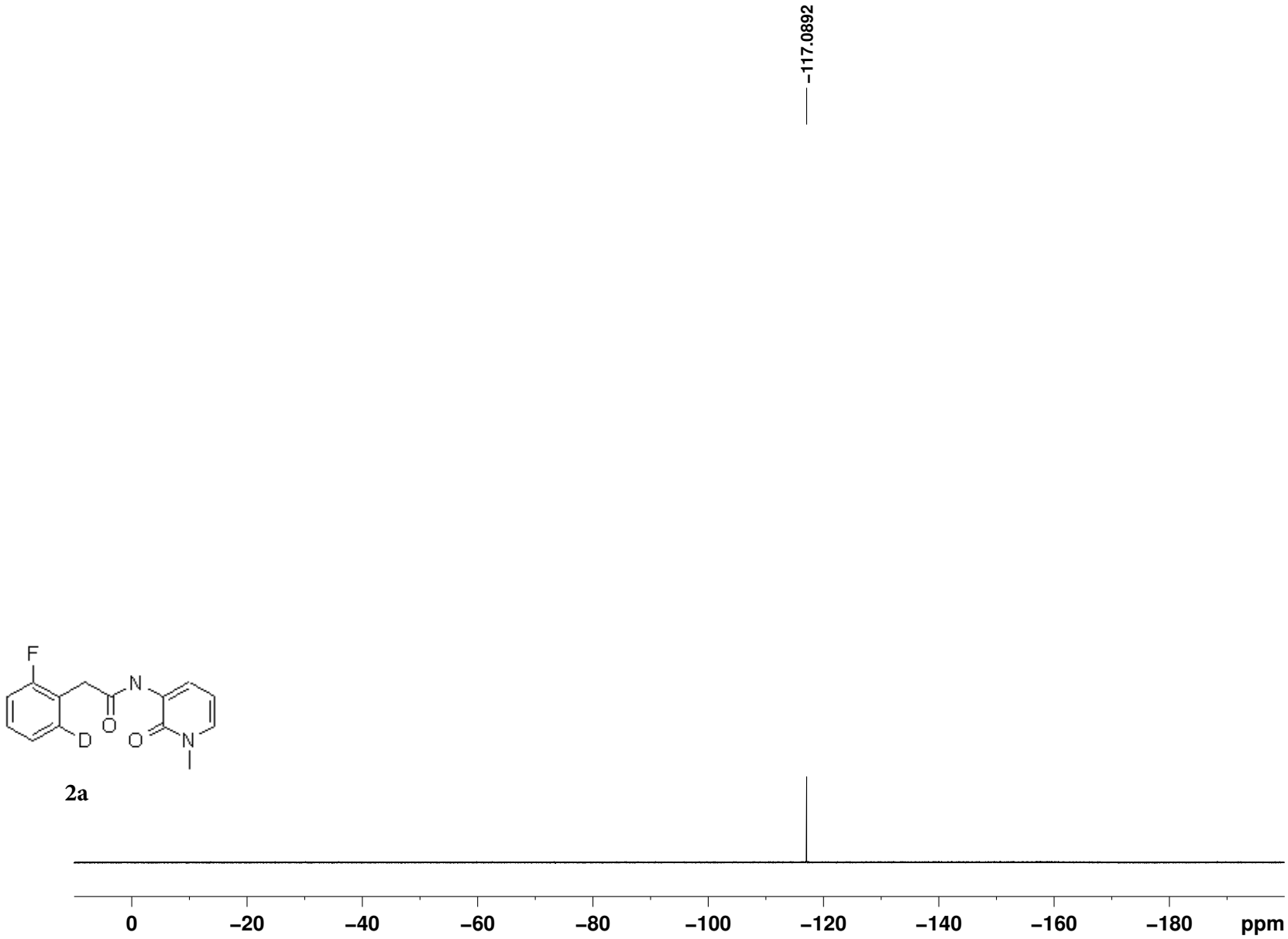
APT of 2a IN DMSO



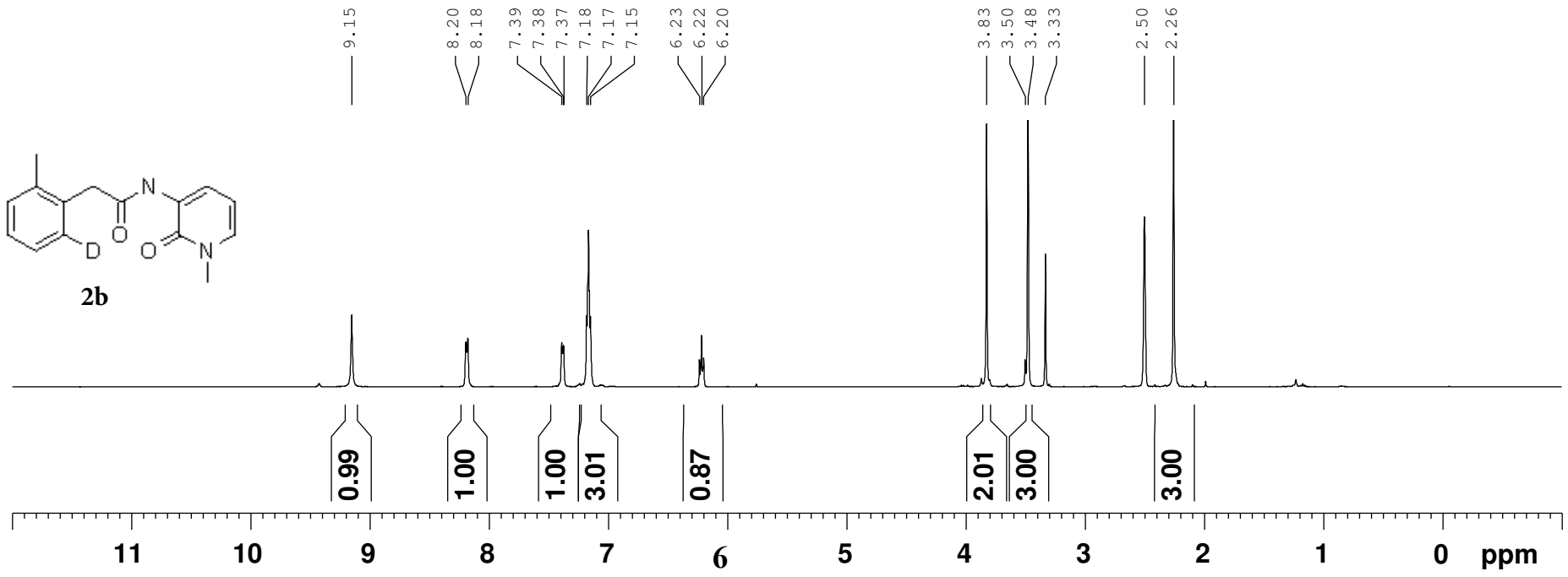


2a

^{19}F NMR of 2a IN DMSO (PC)

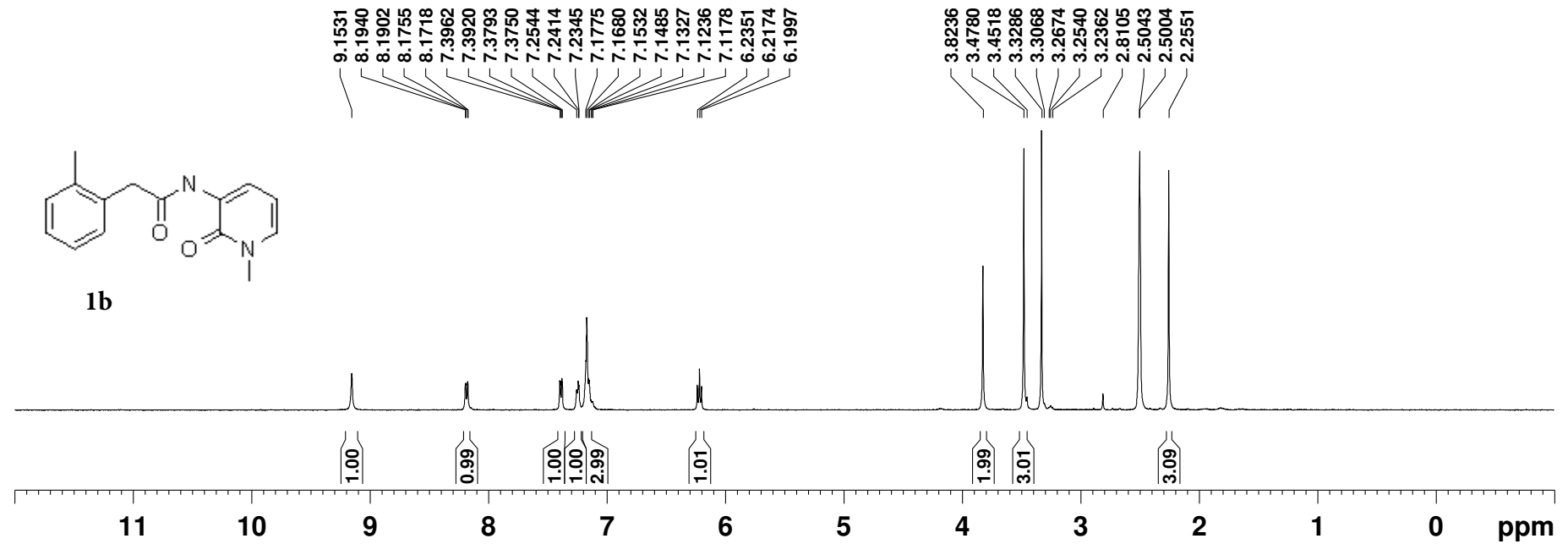


^{19}F NMR of 2a IN DMSO (PDC)



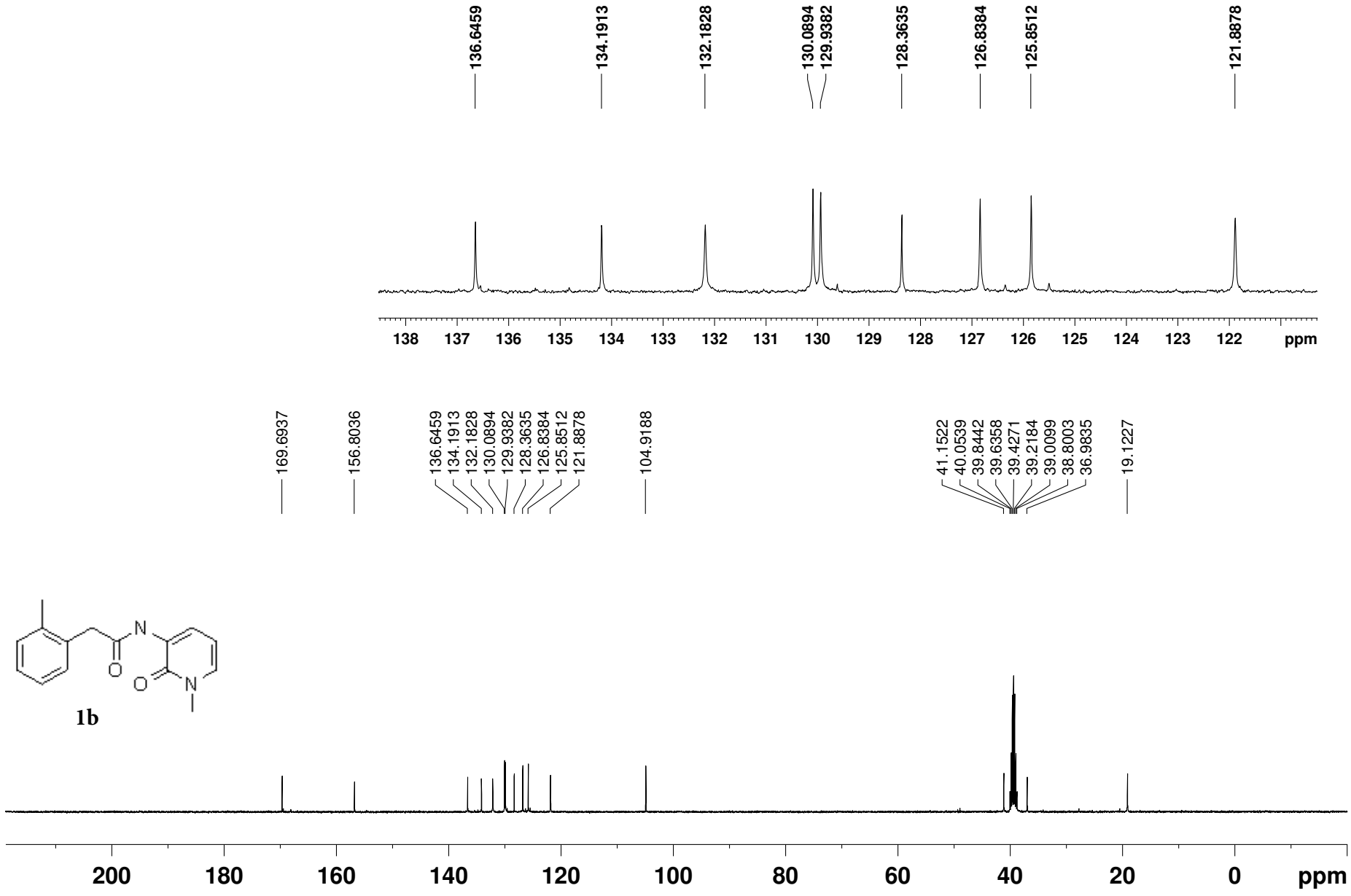
2b

^{1}H NMR of 2b IN DMSO

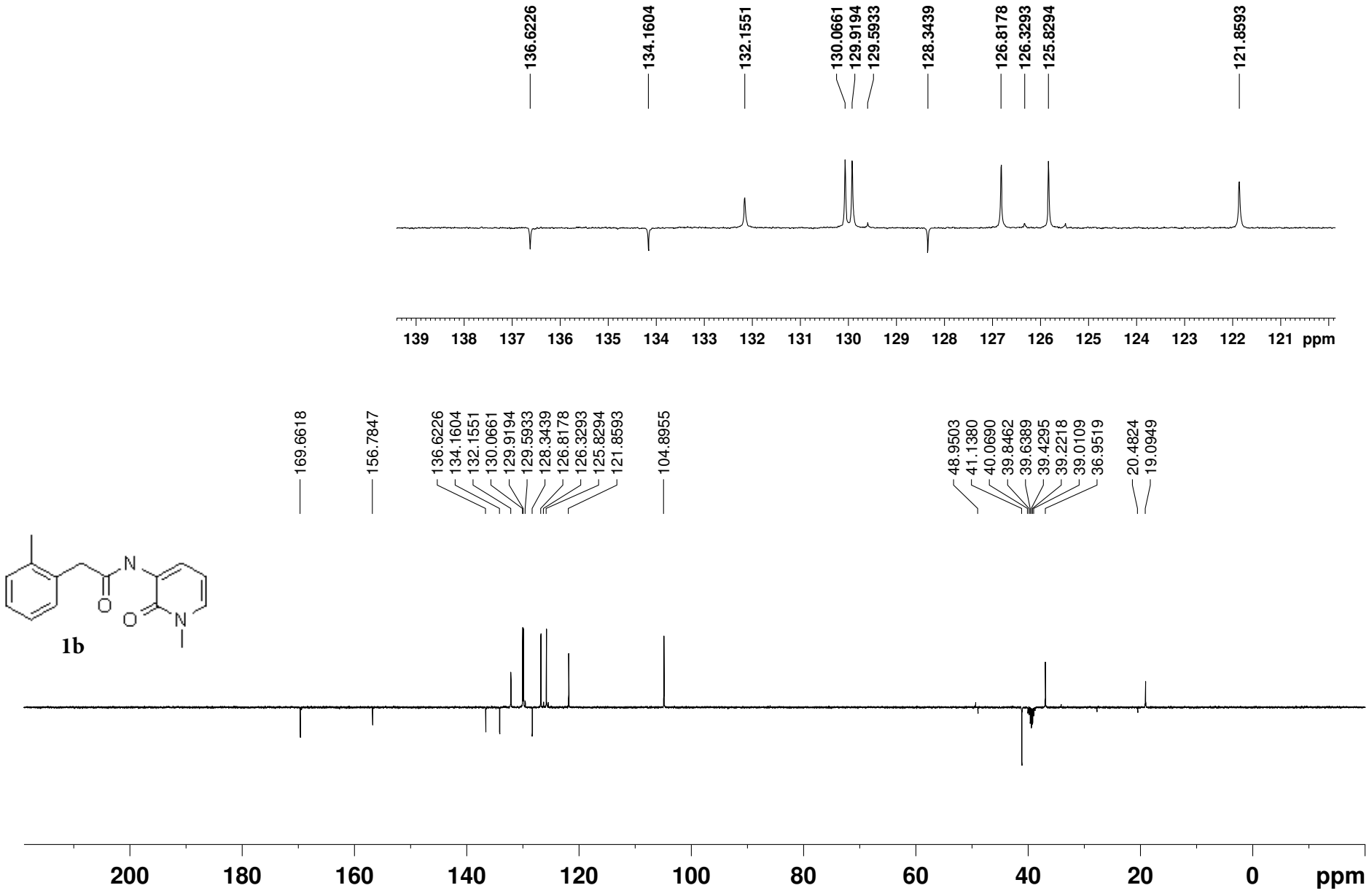


1b

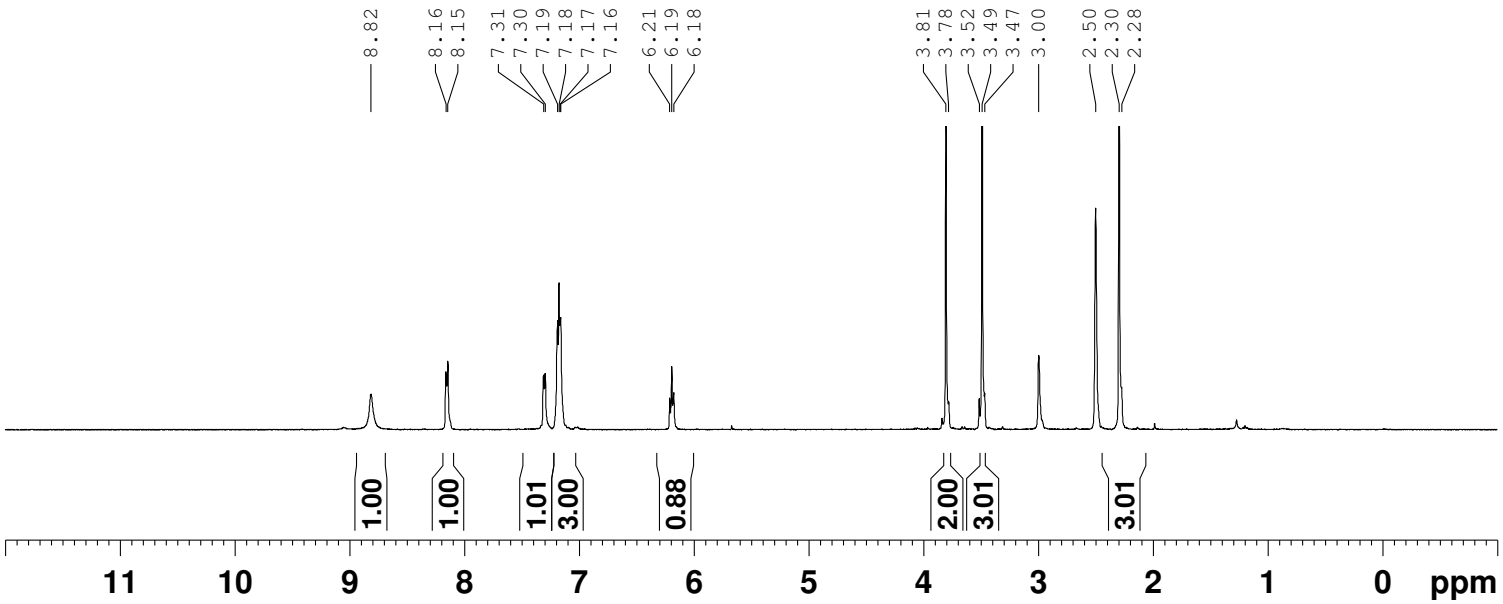
^{1}H NMR of 1b IN DMSO



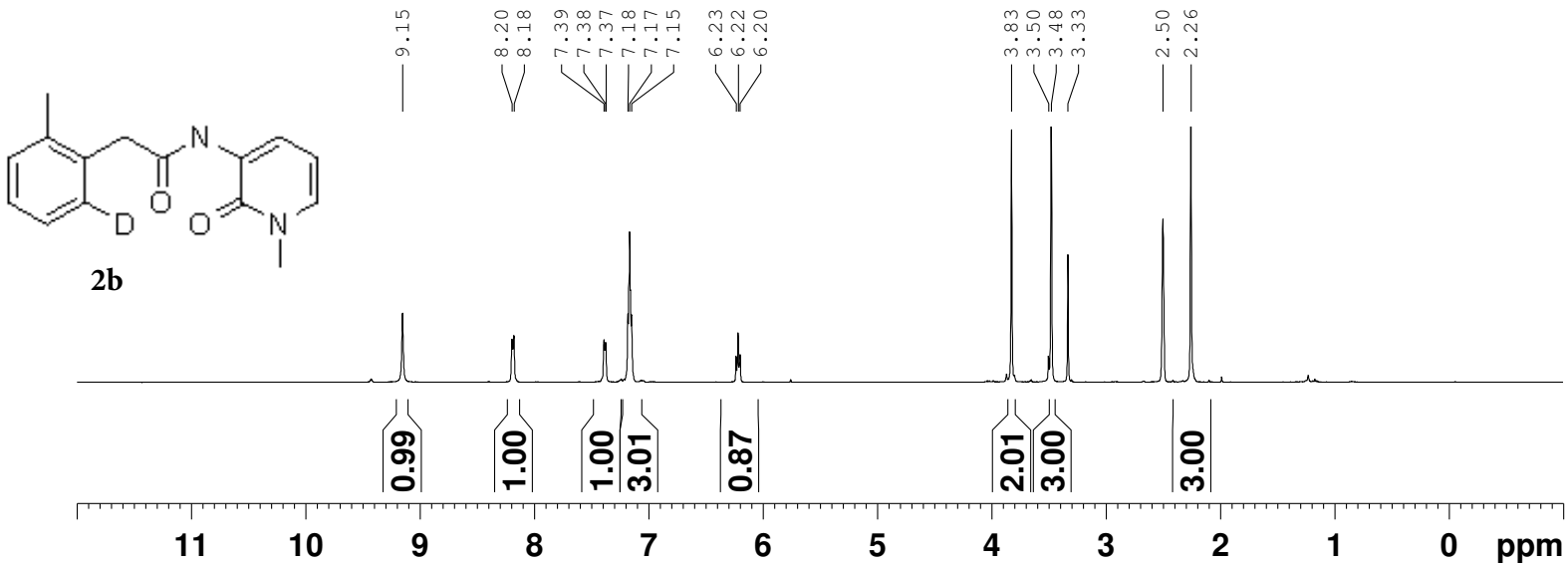
^{13}C NMR of 1b IN DMSO



APT of 1b IN DMSO

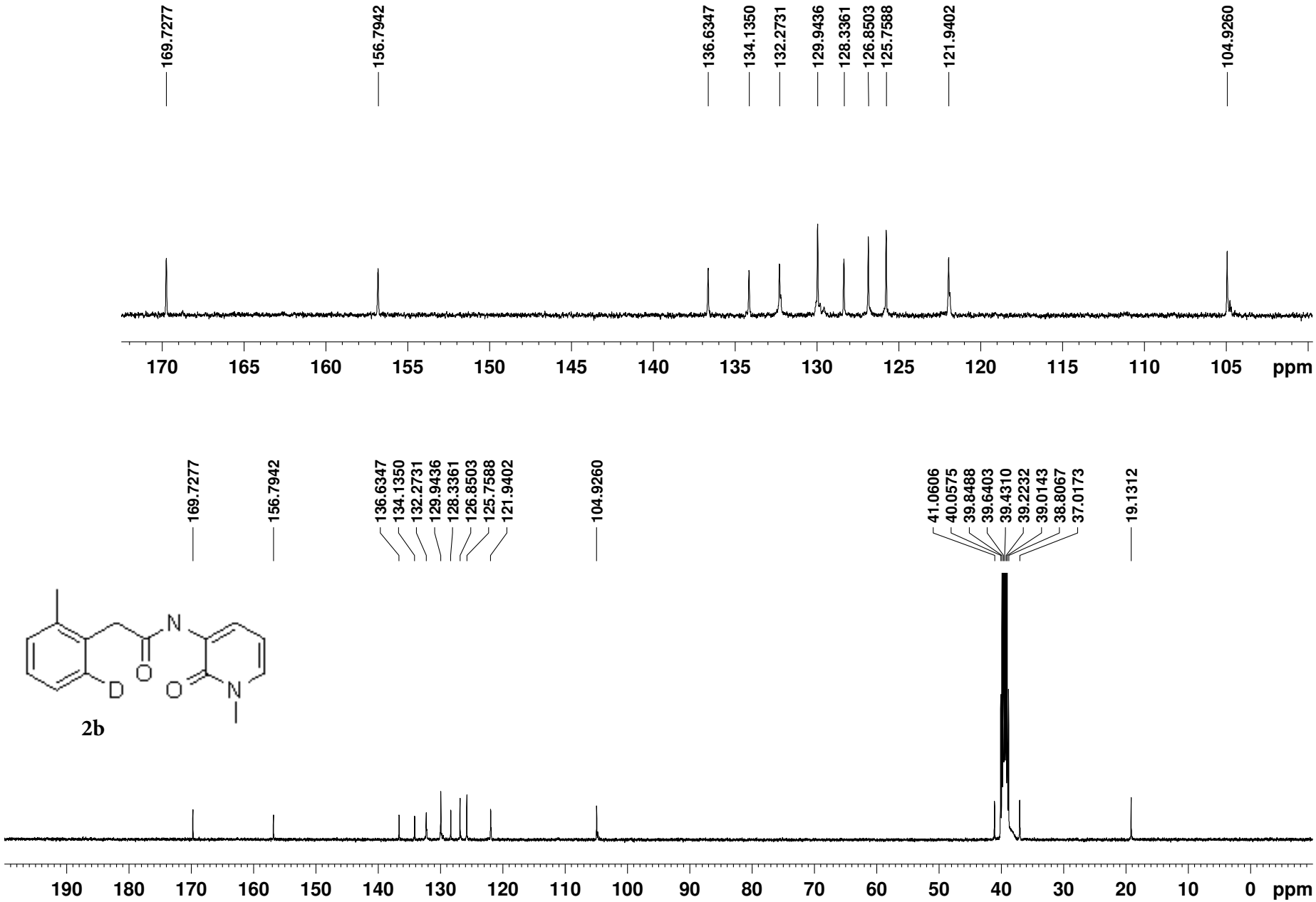


^{1}H NMR of 2b IN DMSO AT 100^{O}C



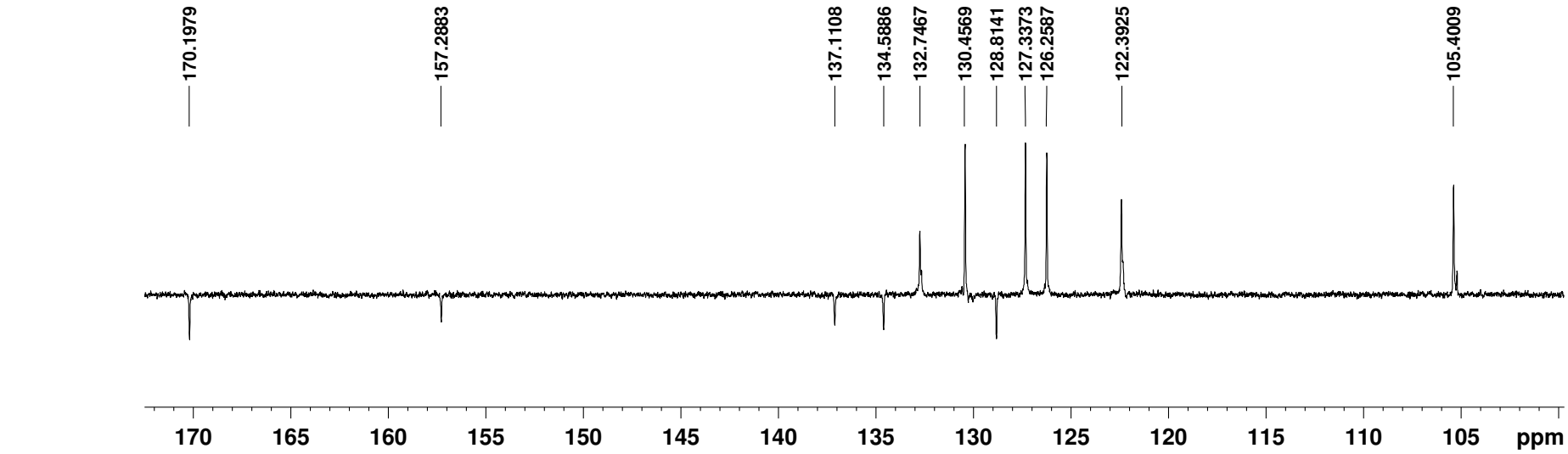
2b

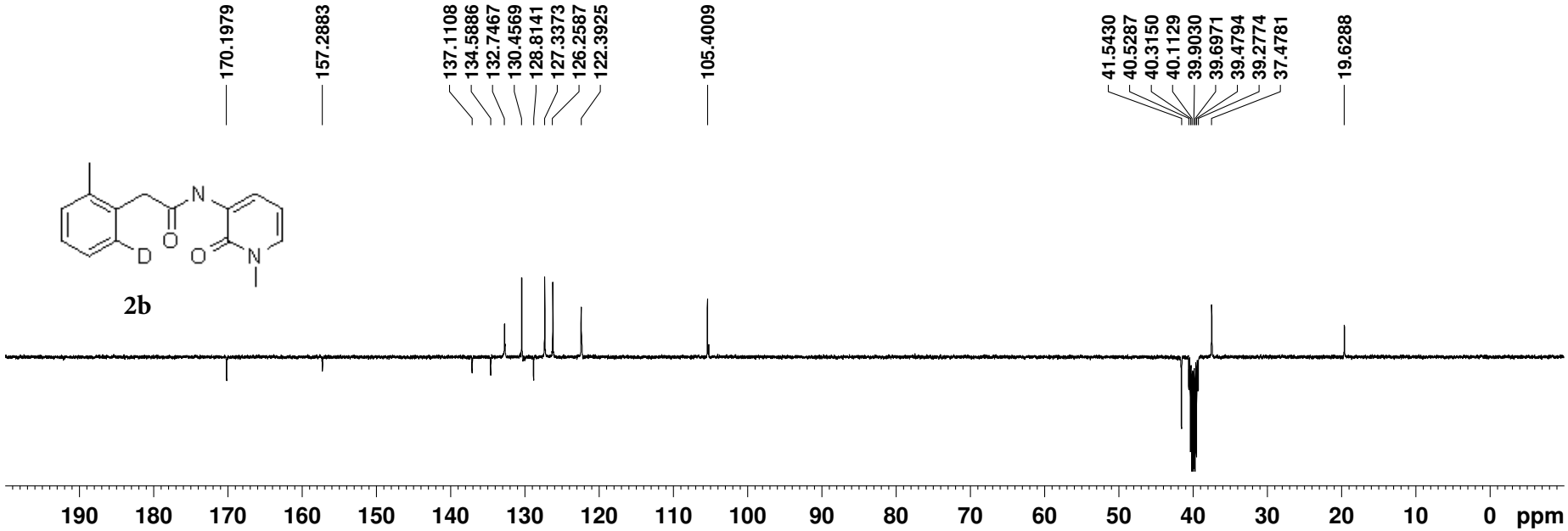
^{1}H NMR of 2b IN DMSO AT 20^{O}C



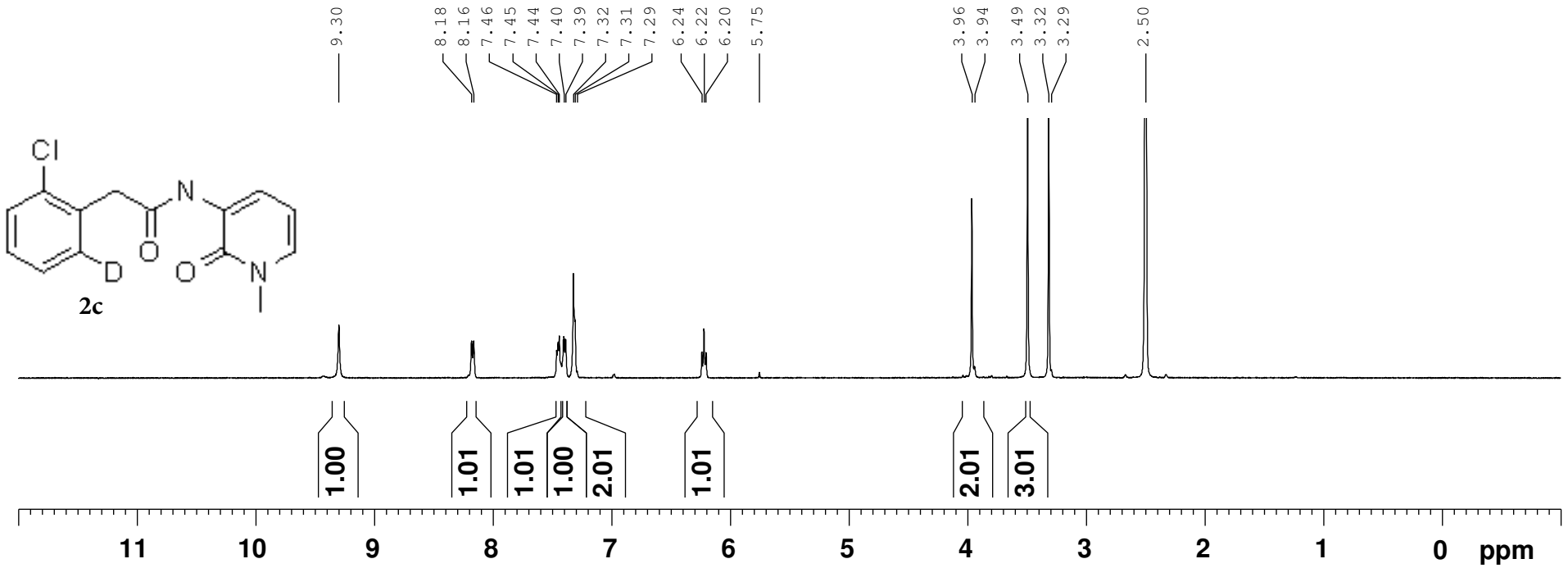
2b

^{13}C NMR of 2b IN DMSO

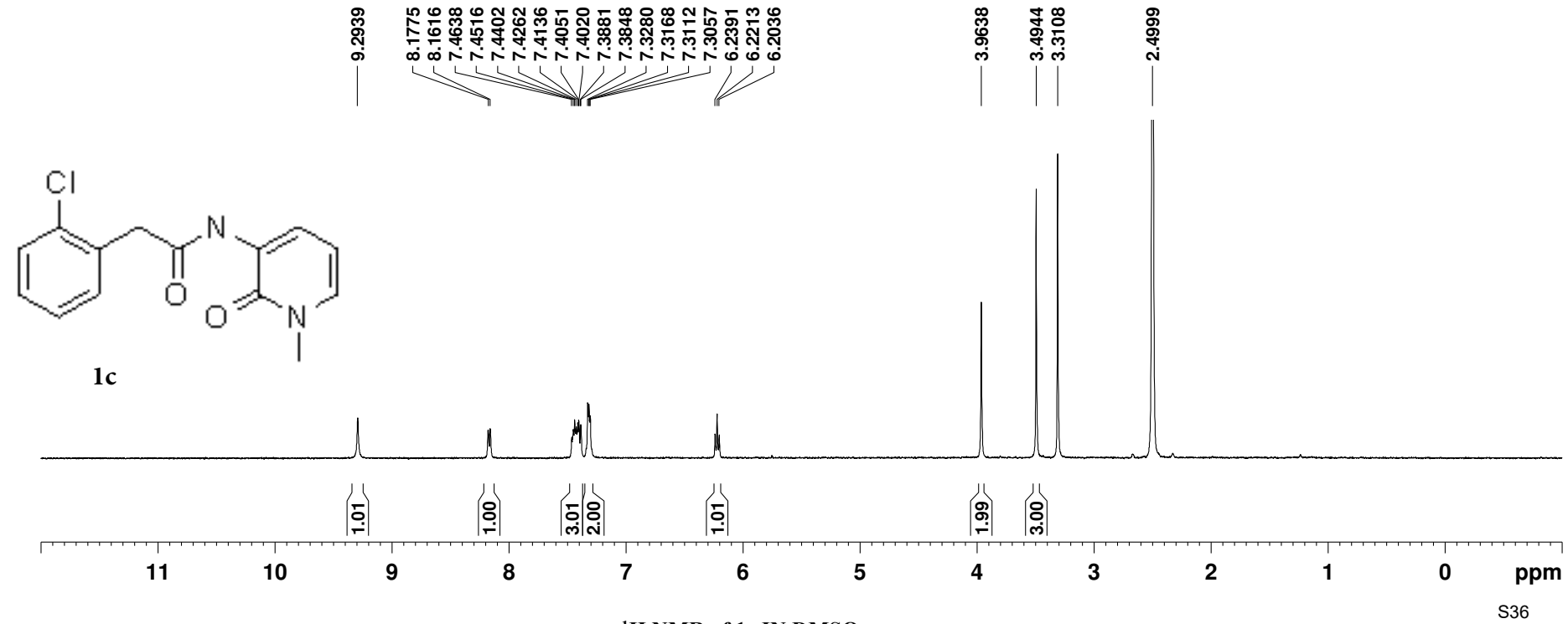




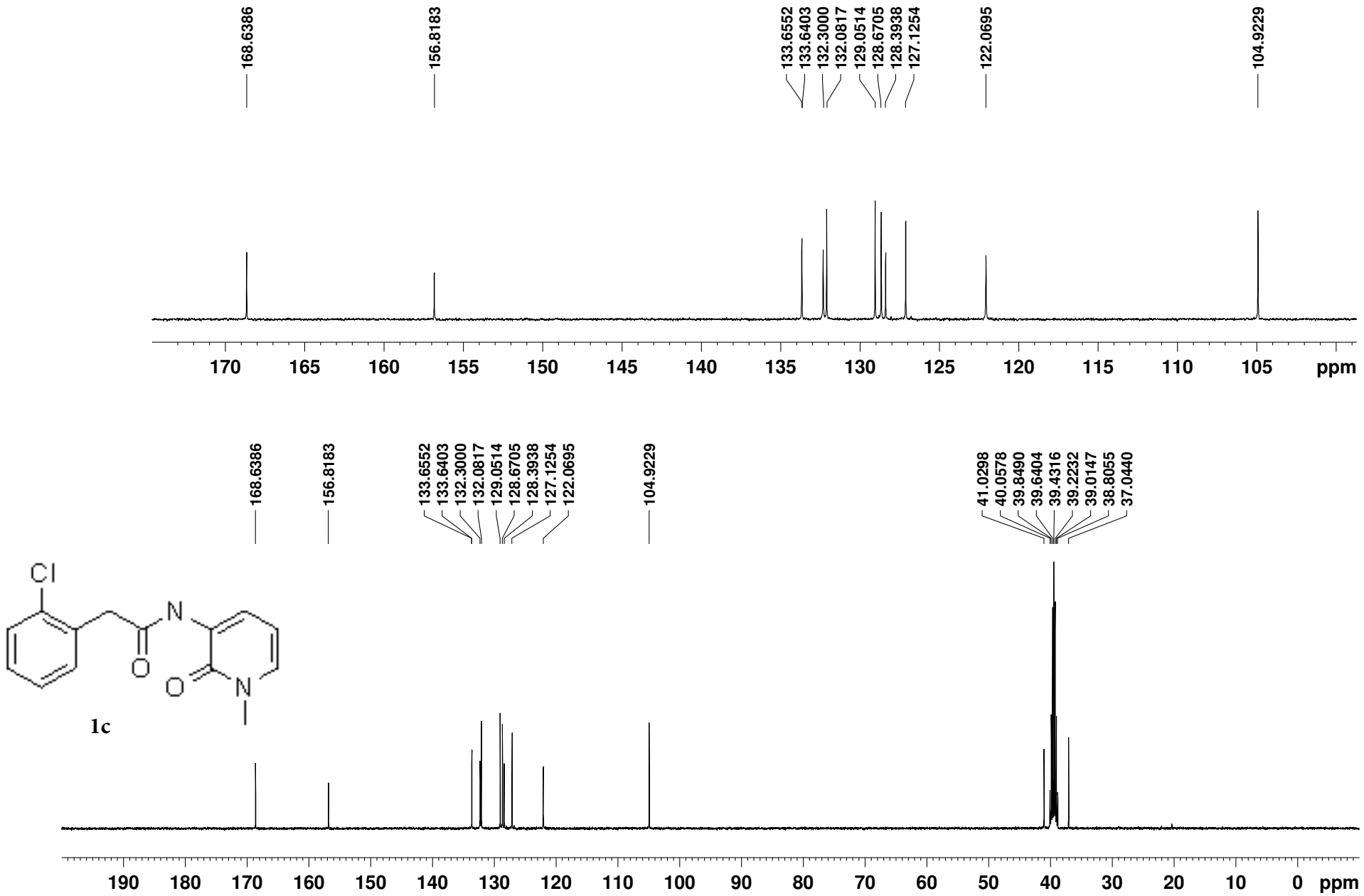
APT of 2b IN DMSO



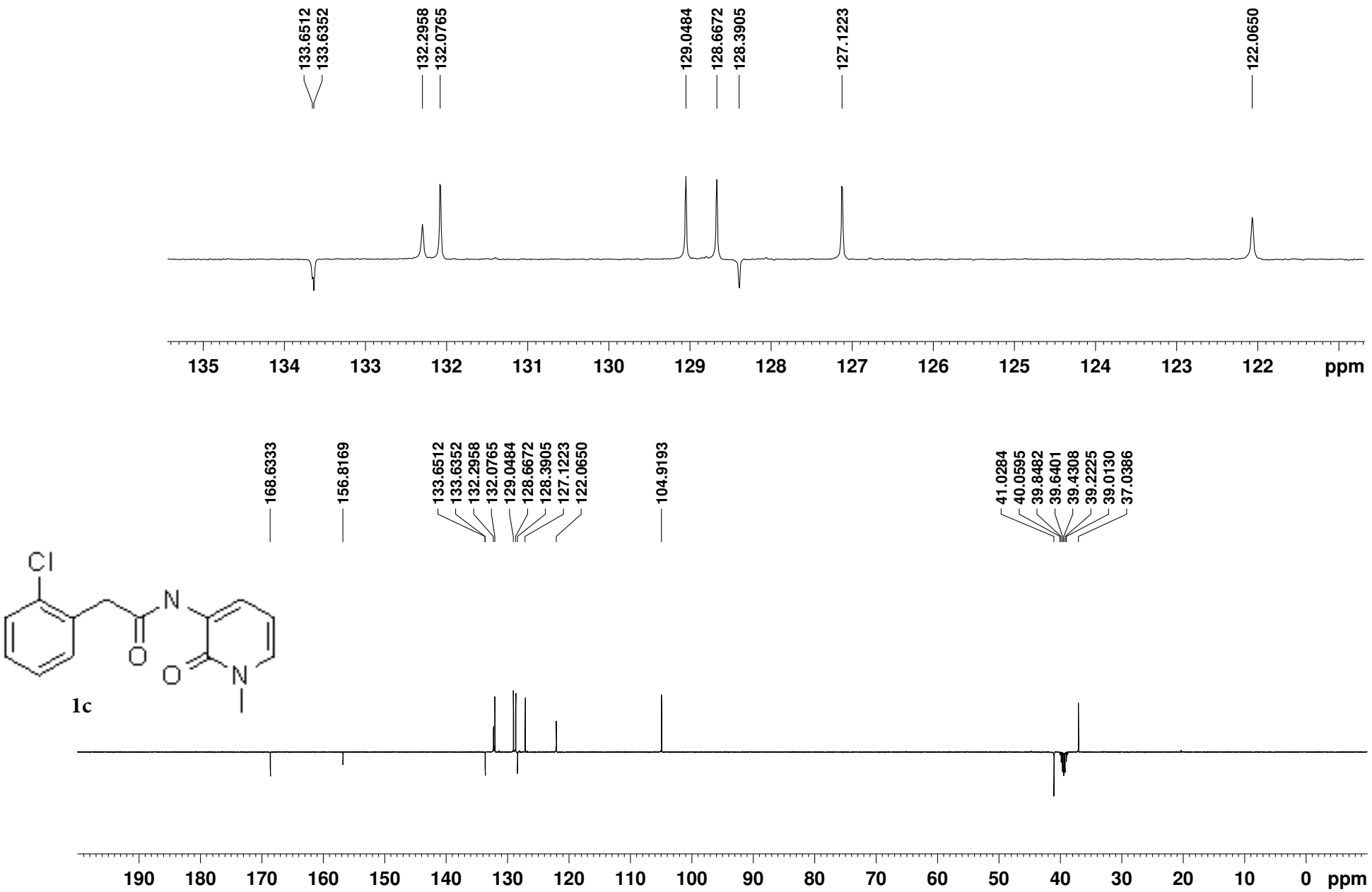
^{1}H NMR of 2c IN DMSO



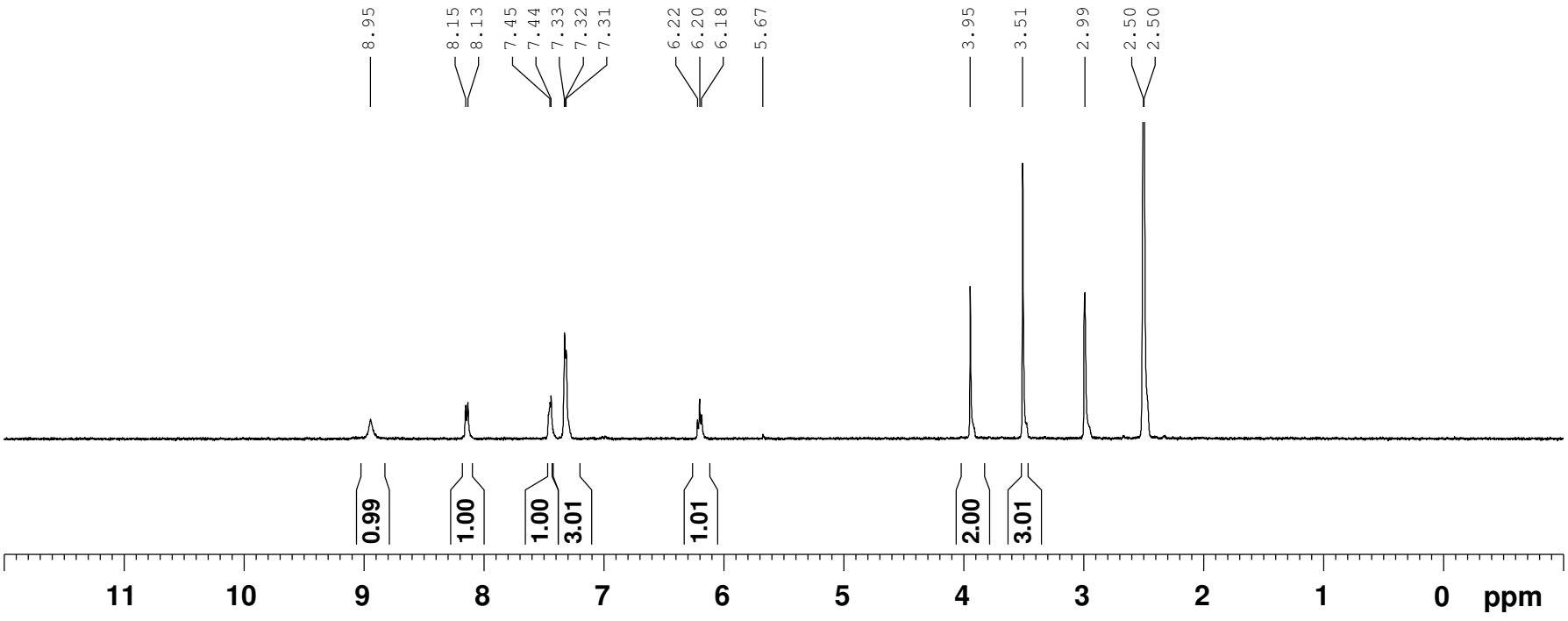
^{1}H NMR of 1c IN DMSO



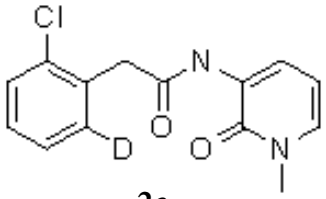
^{13}C NMR of 1c IN DMSO



APT of 1c IN DMSO

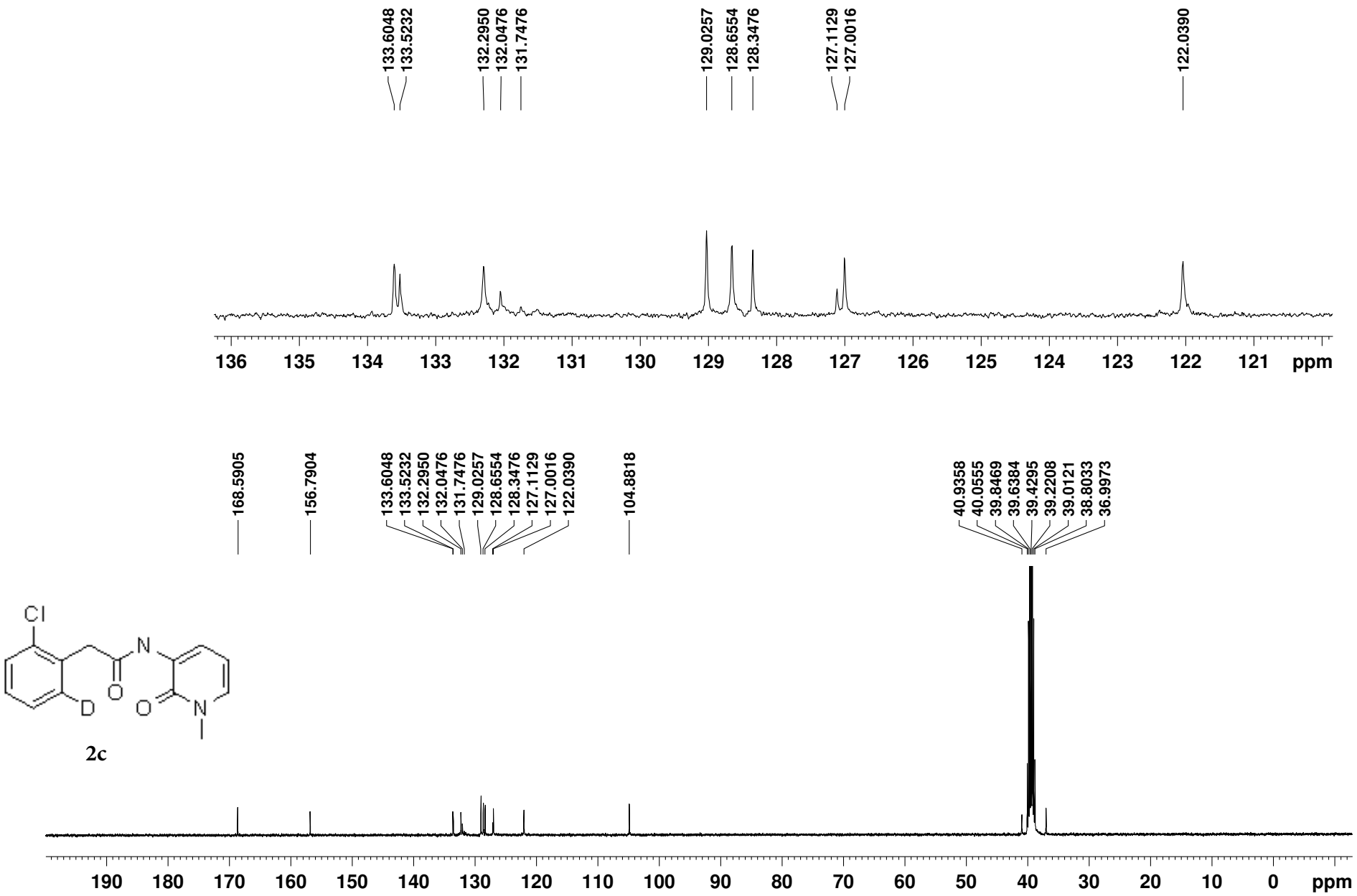


^{1}H NMR of 2c IN DMSO AT 100^{O}C



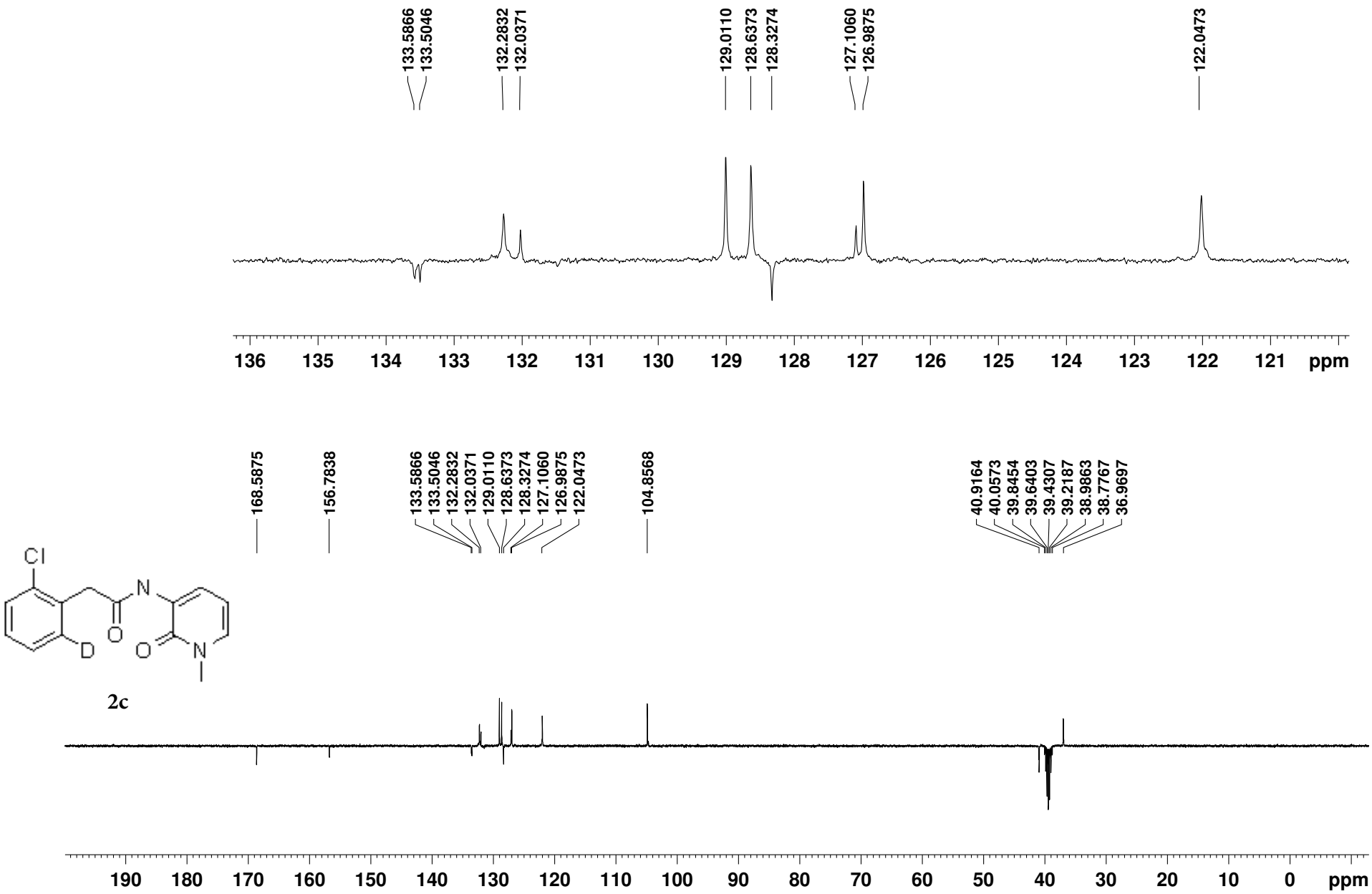
2c

^{1}H NMR of 2c IN DMSO AT 20^{O}C



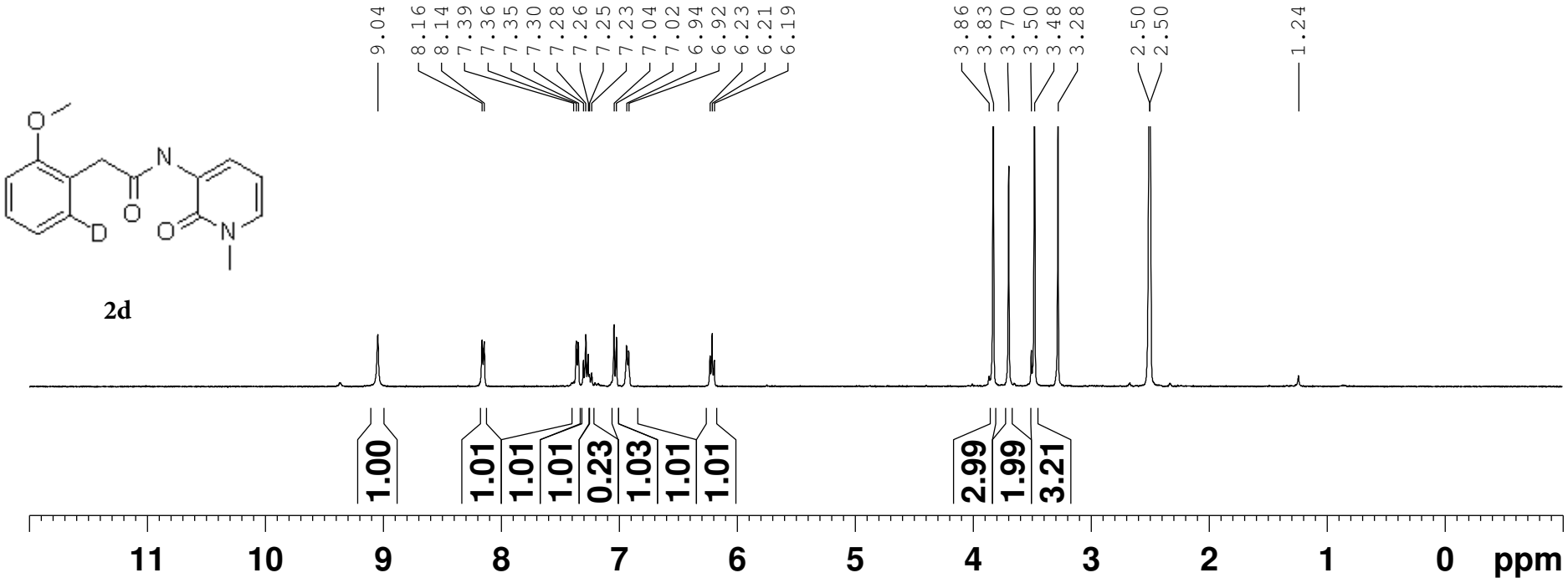
2c

^{13}C NMR of 2c IN DMSO



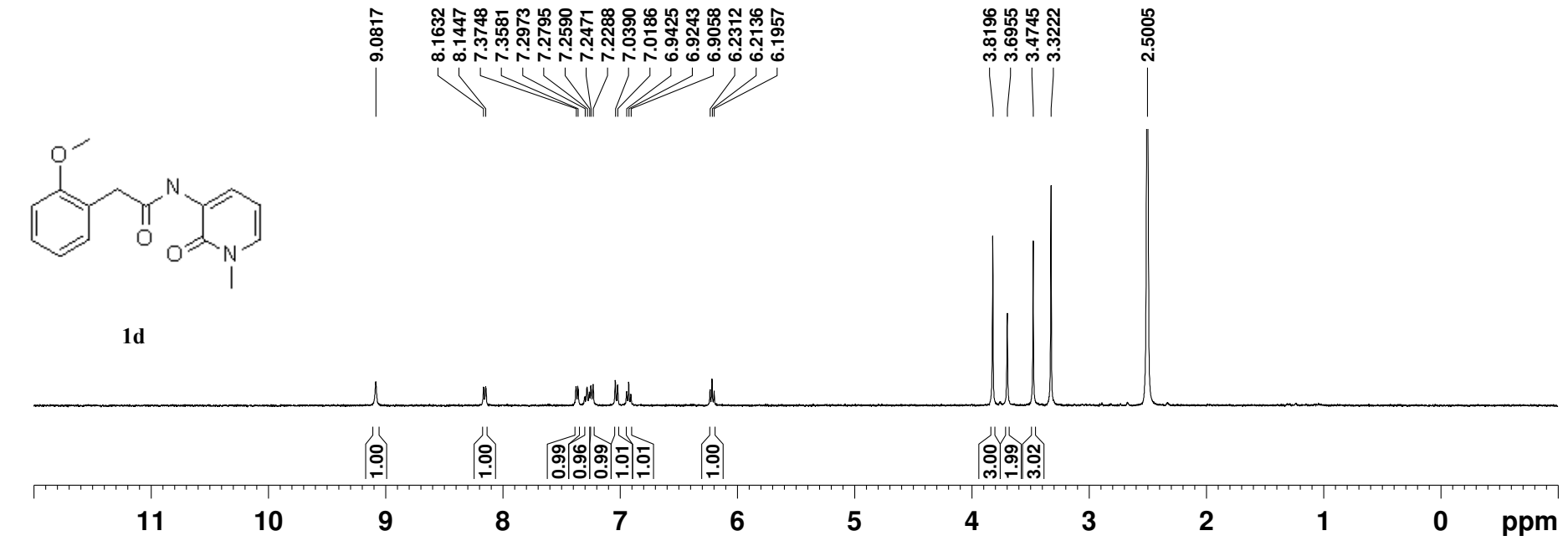
2c

APT of 2c IN DMSO



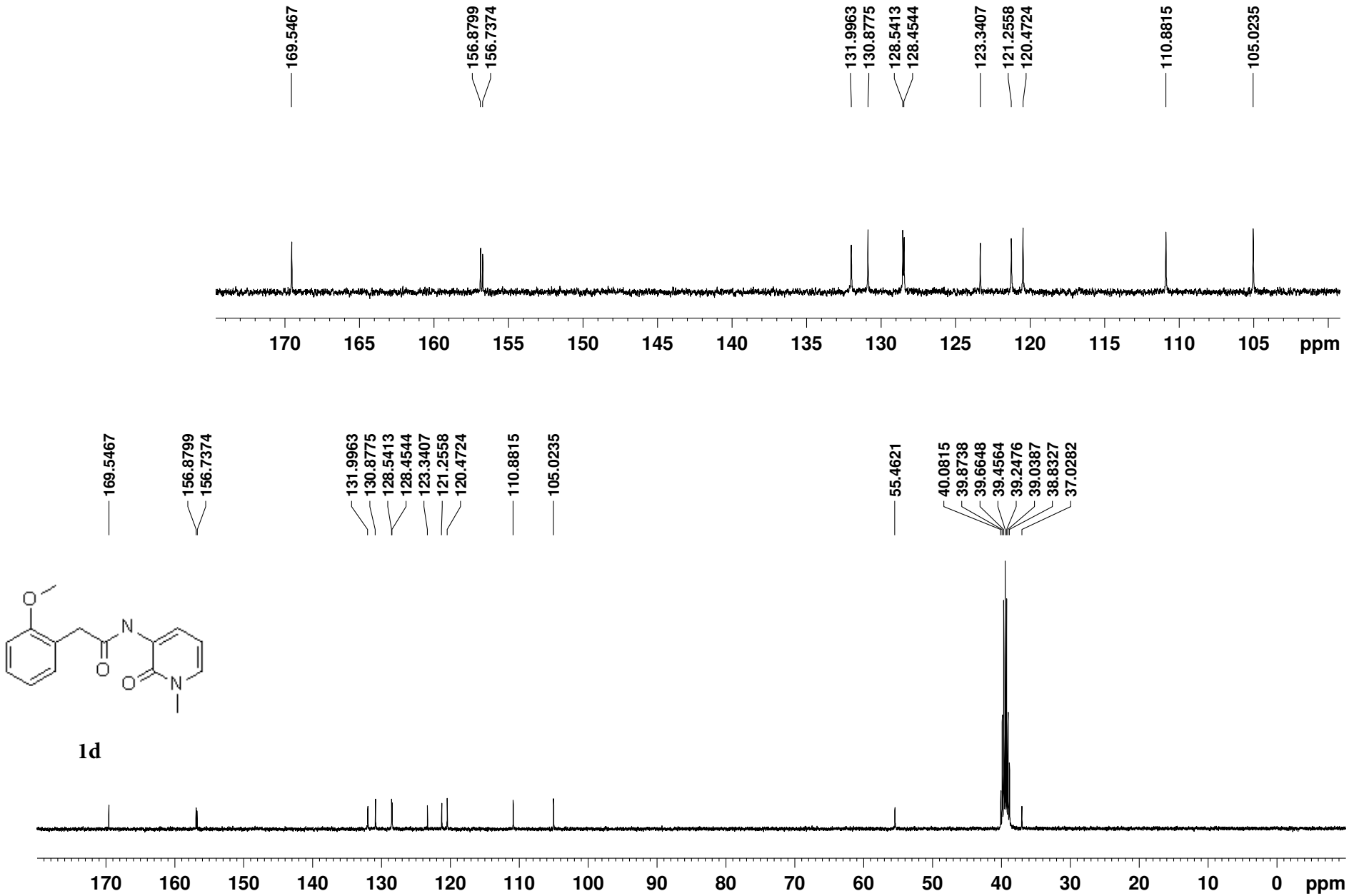
2d

^{1}H NMR of 2d IN DMSO

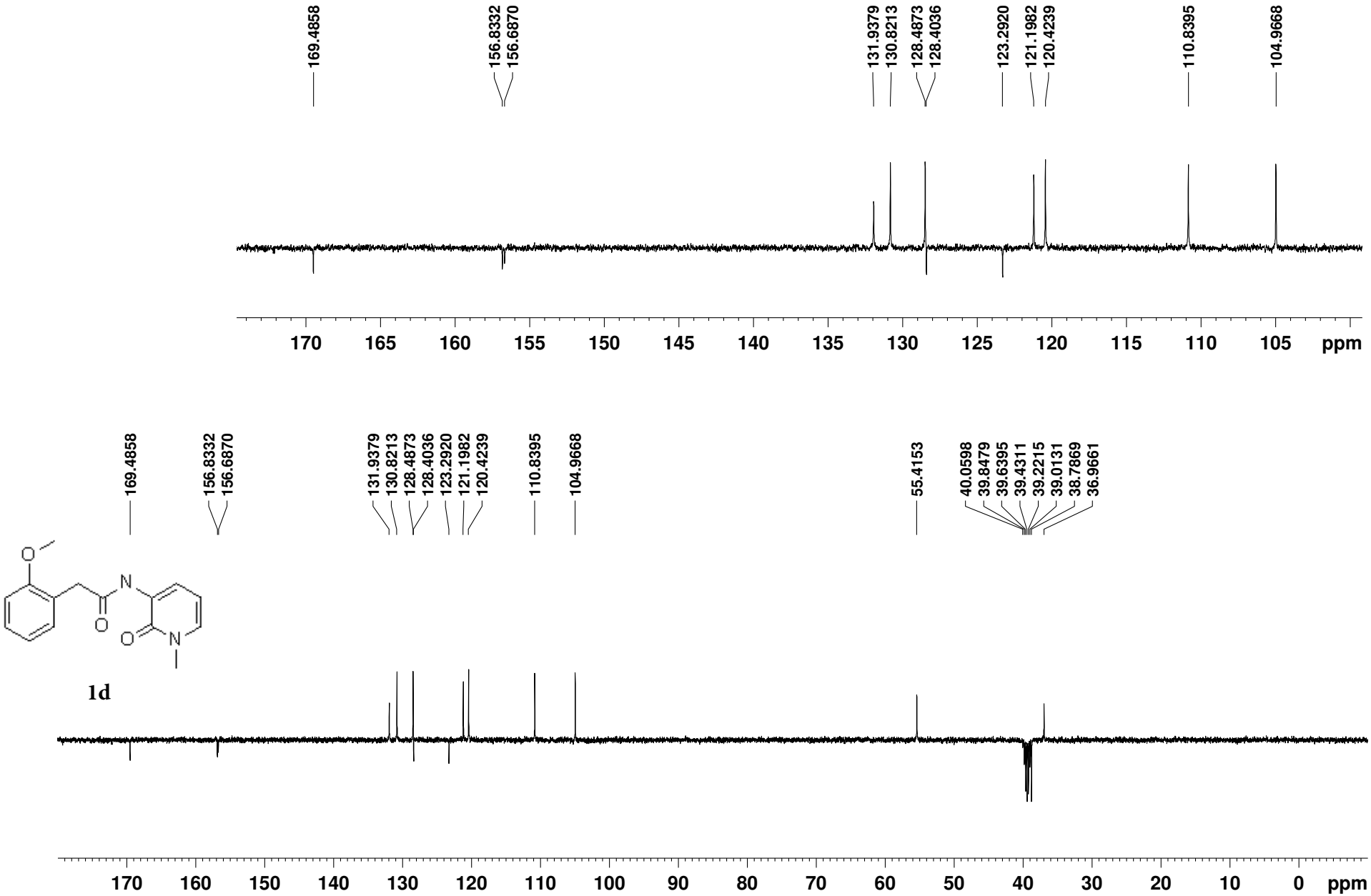


1d

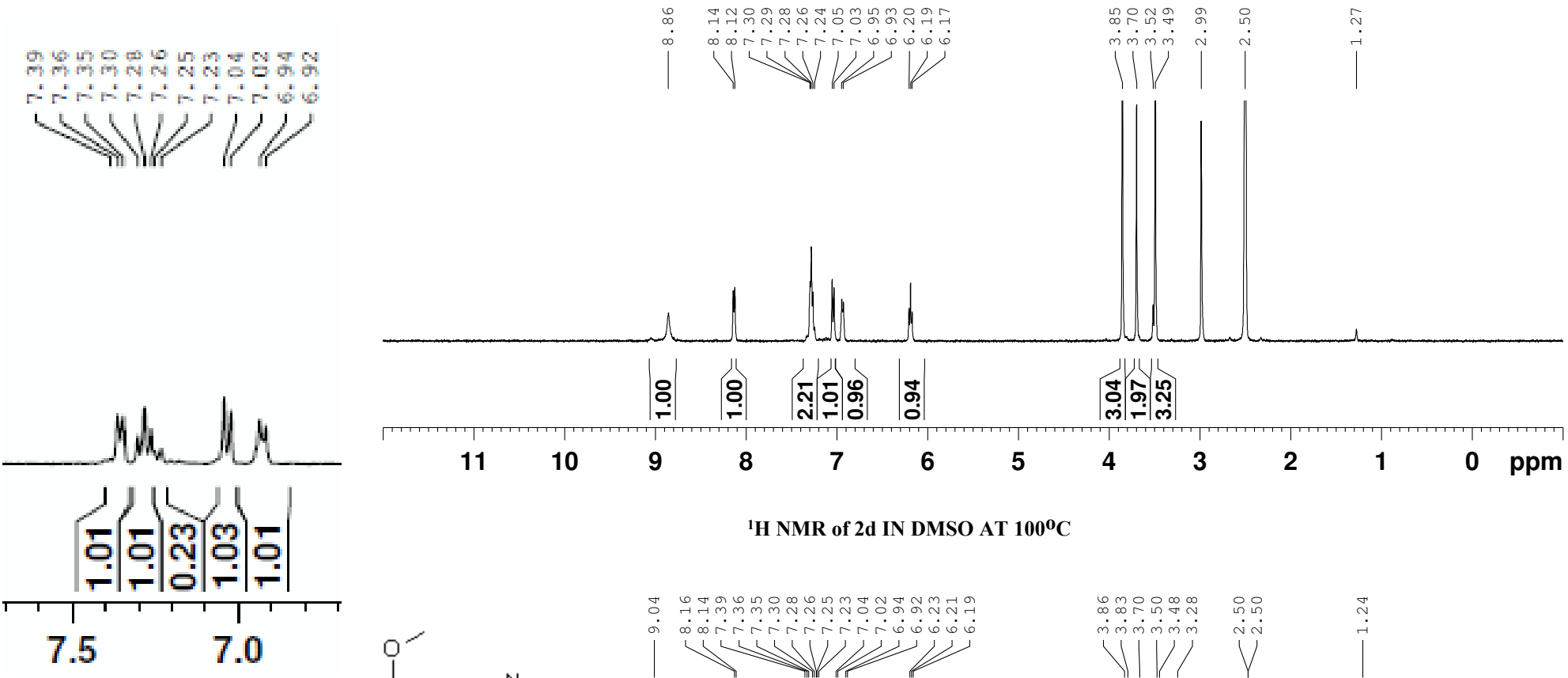
^{1}H NMR of 1d IN DMSO



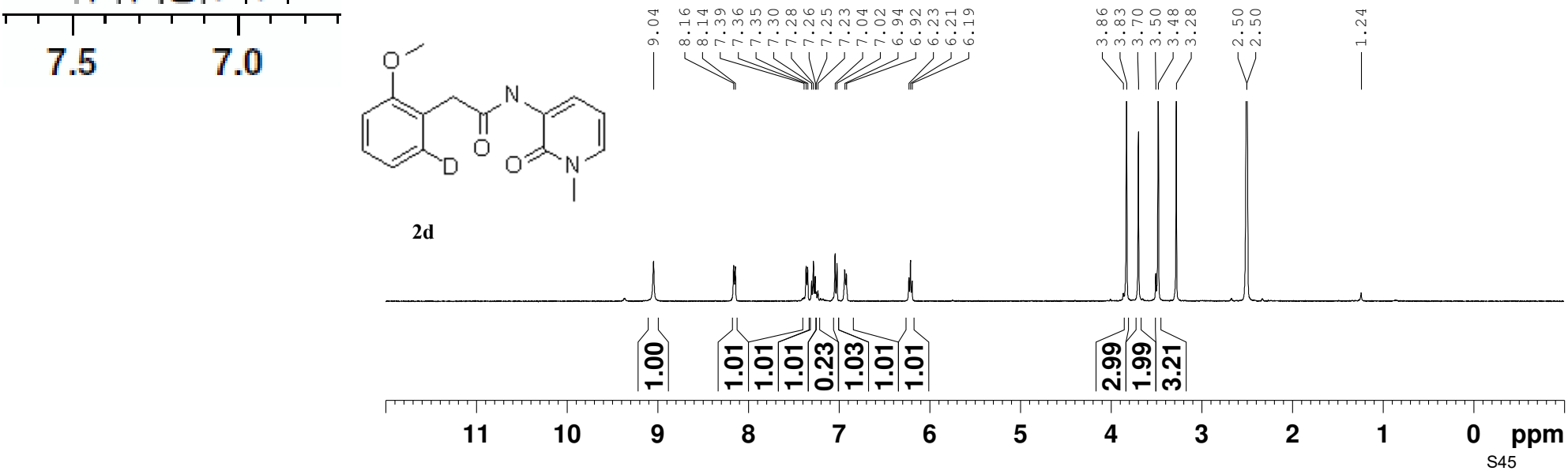
^{13}C NMR of 1d IN DMSO



APT of 1d IN DMSO

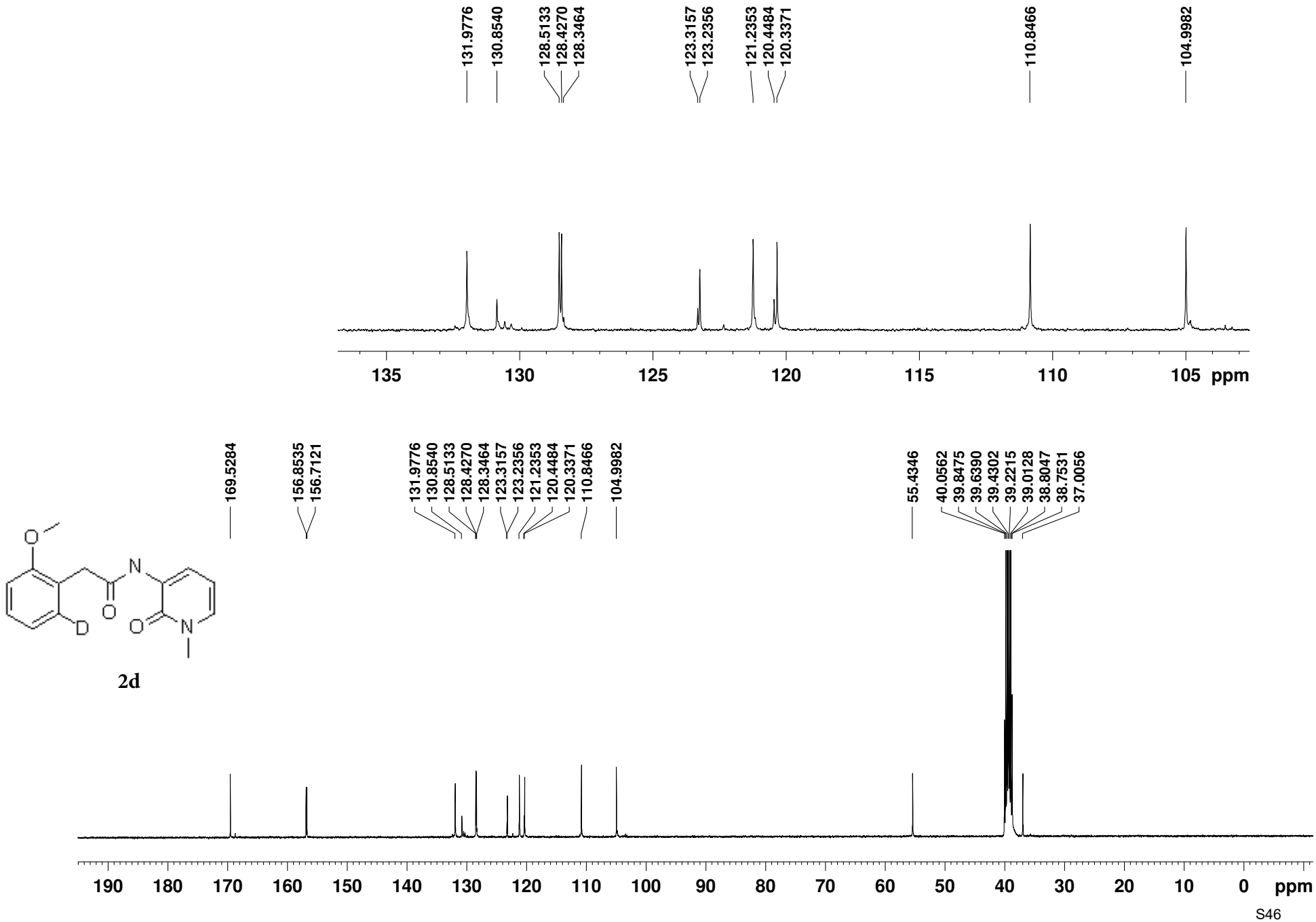


^{1}H NMR of 2d IN DMSO AT 100^{O}C



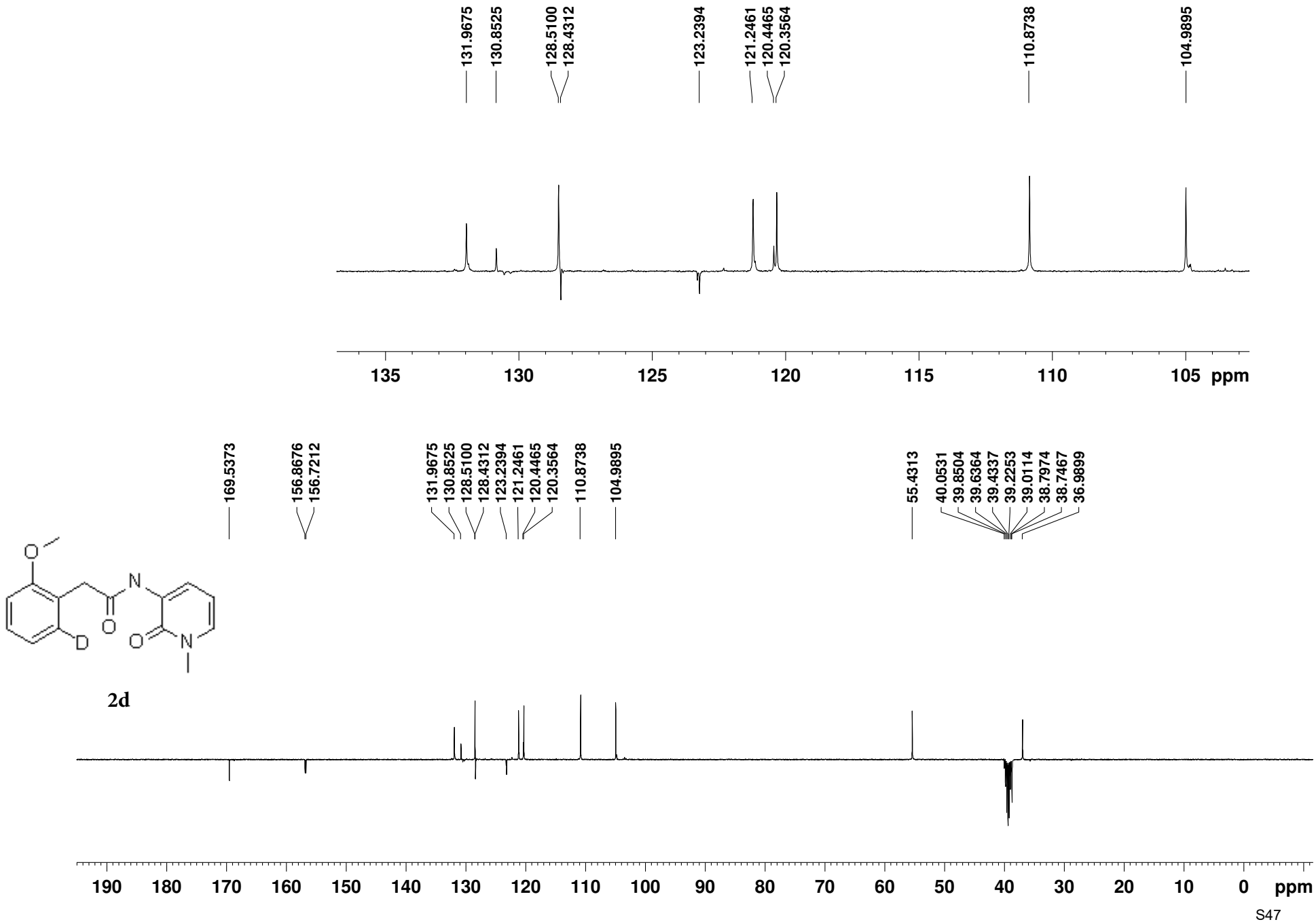
2d

^{1}H NMR of 2d IN DMSO AT 20^{O}C

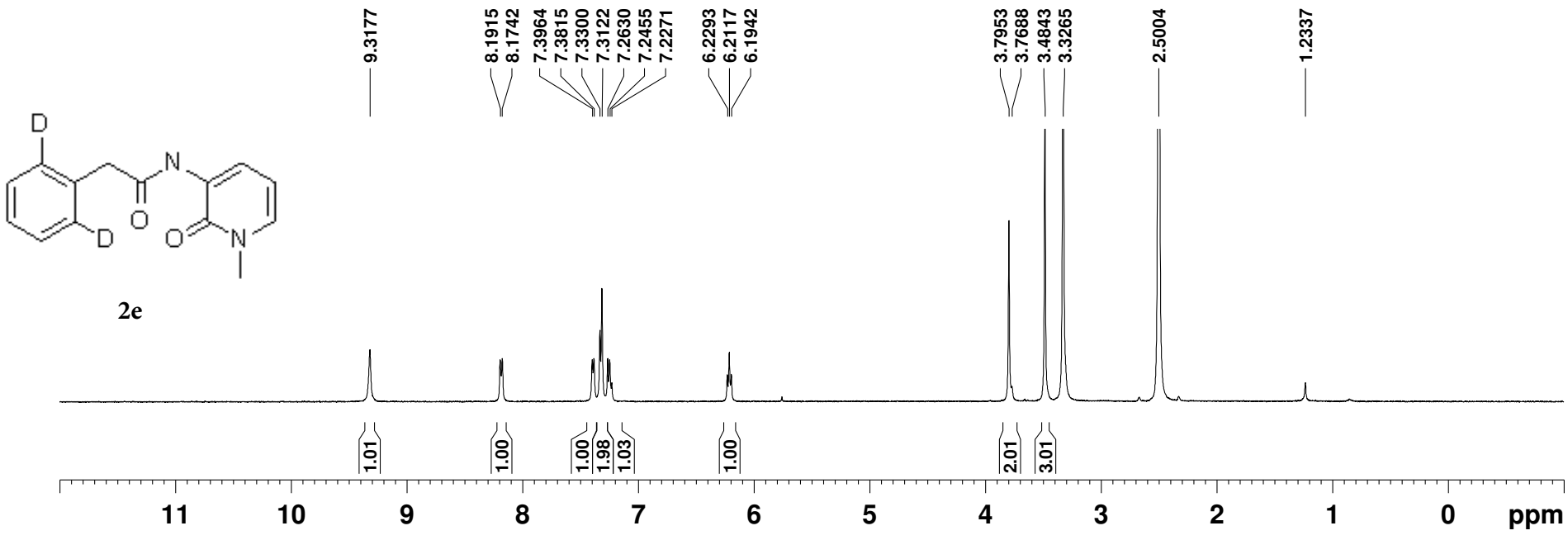


2d

^{13}C NMR of 2d IN DMSO

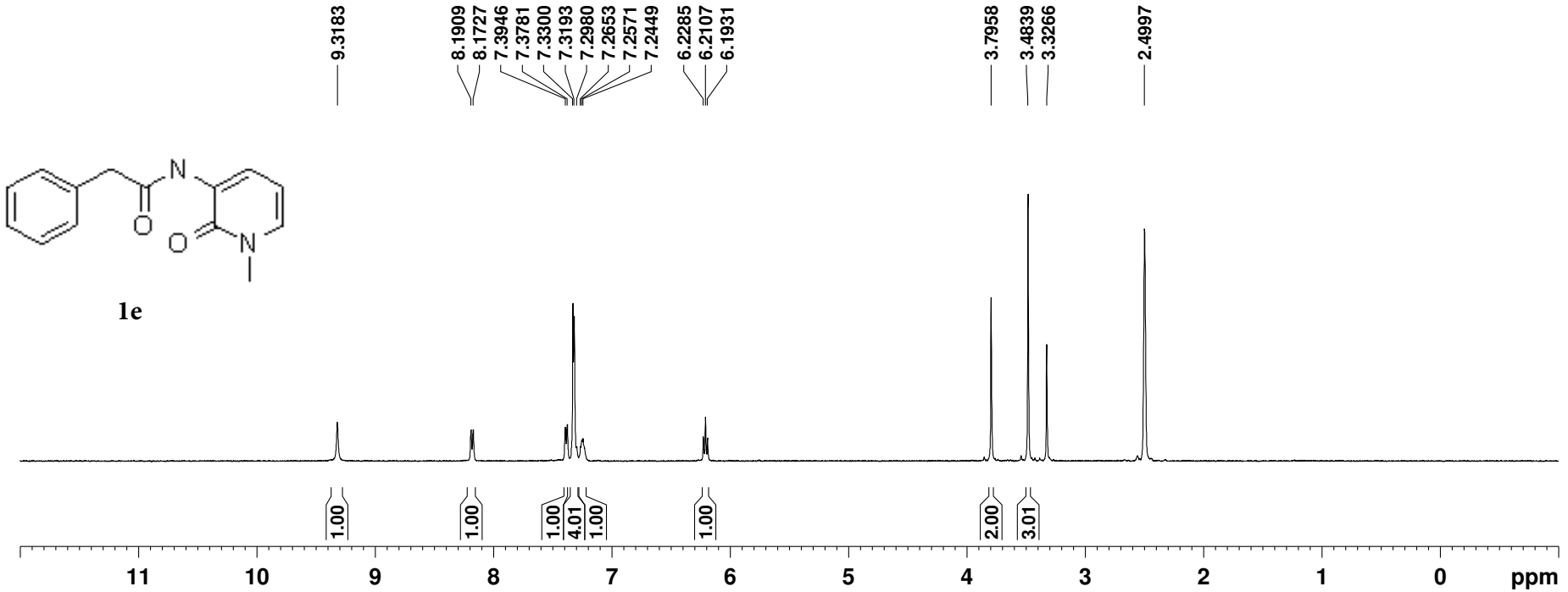


APT of 2d IN DMSO



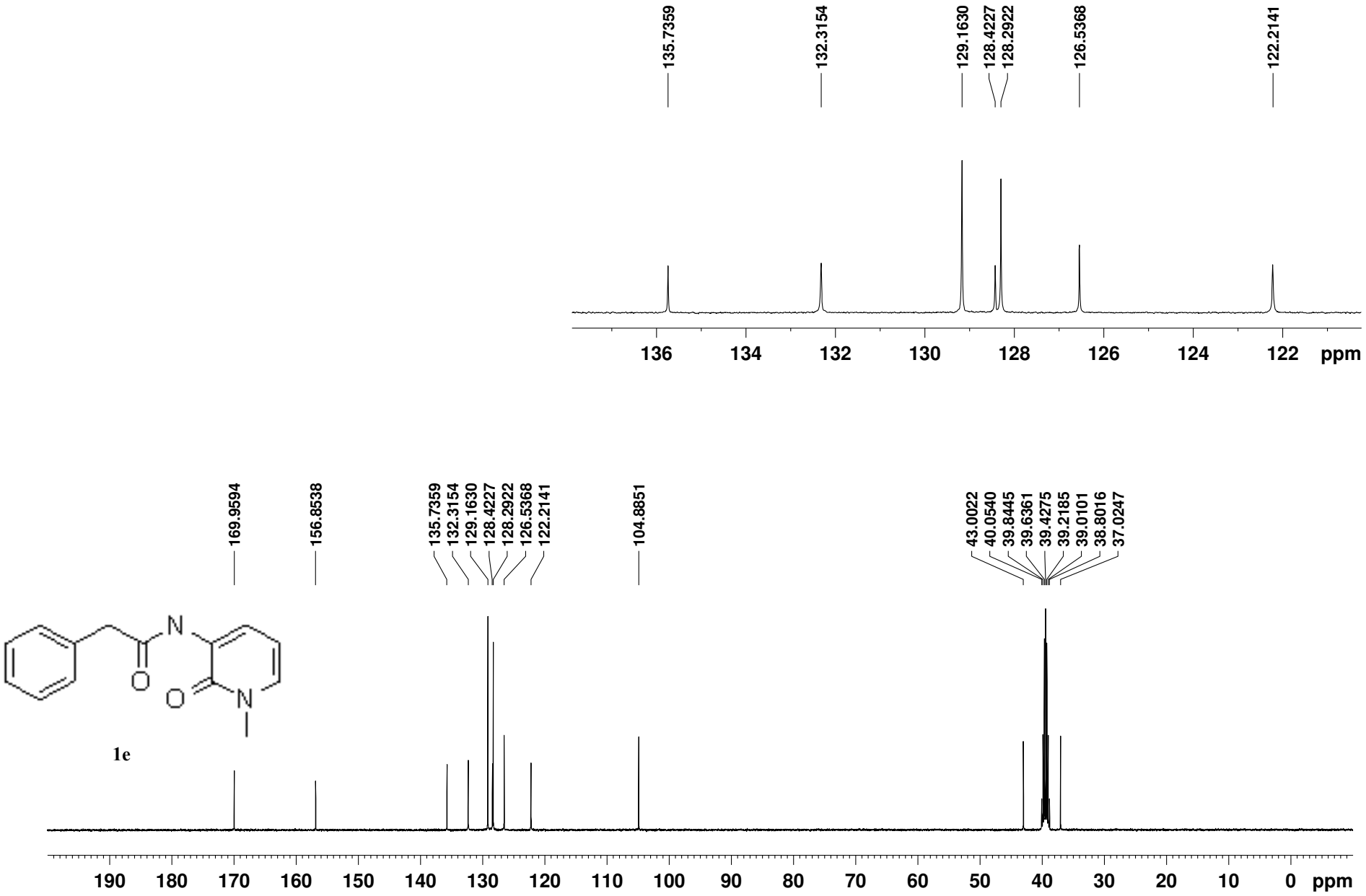
2e

^{1}H NMR of 2e IN DMSO

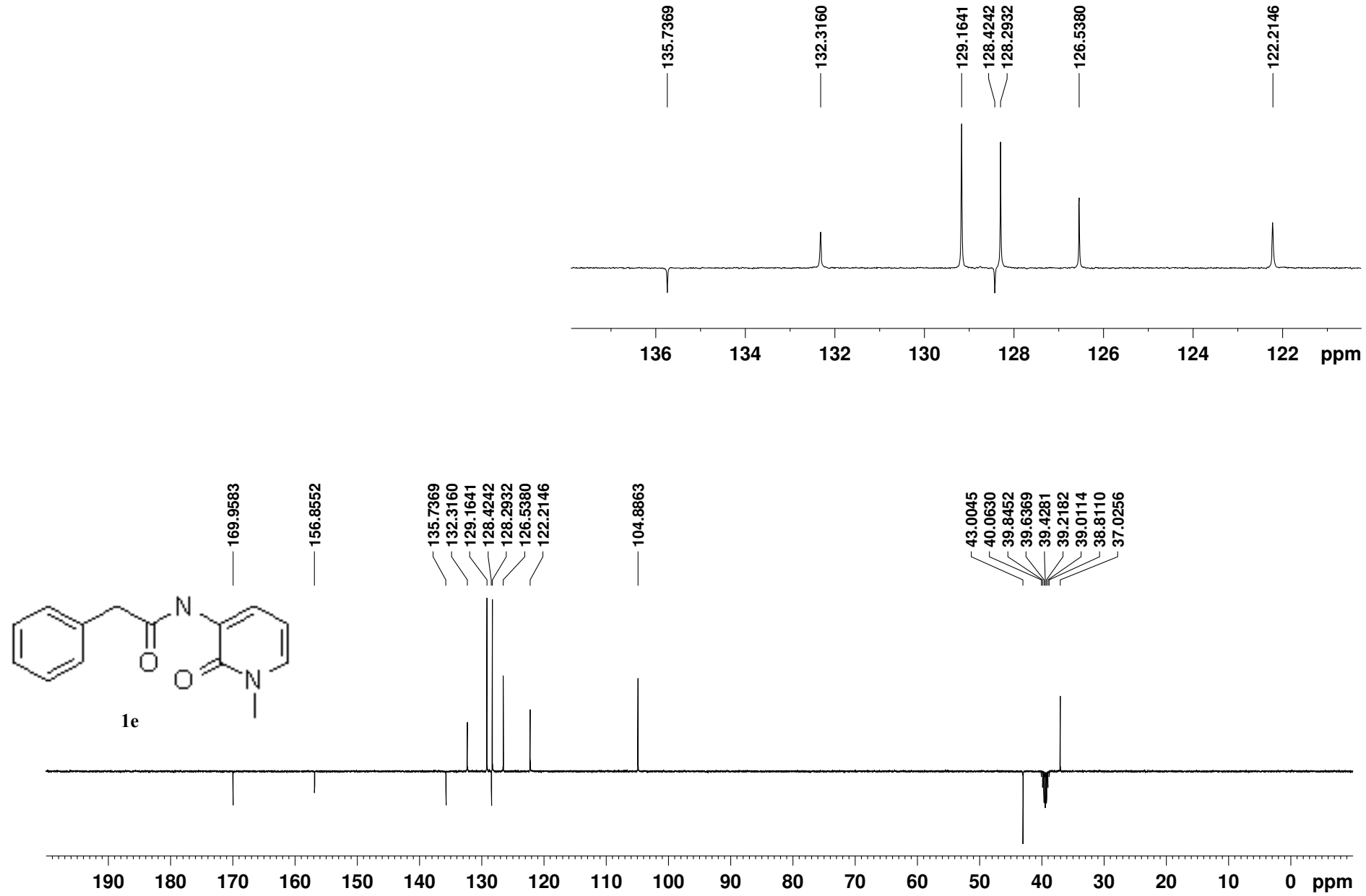


1e

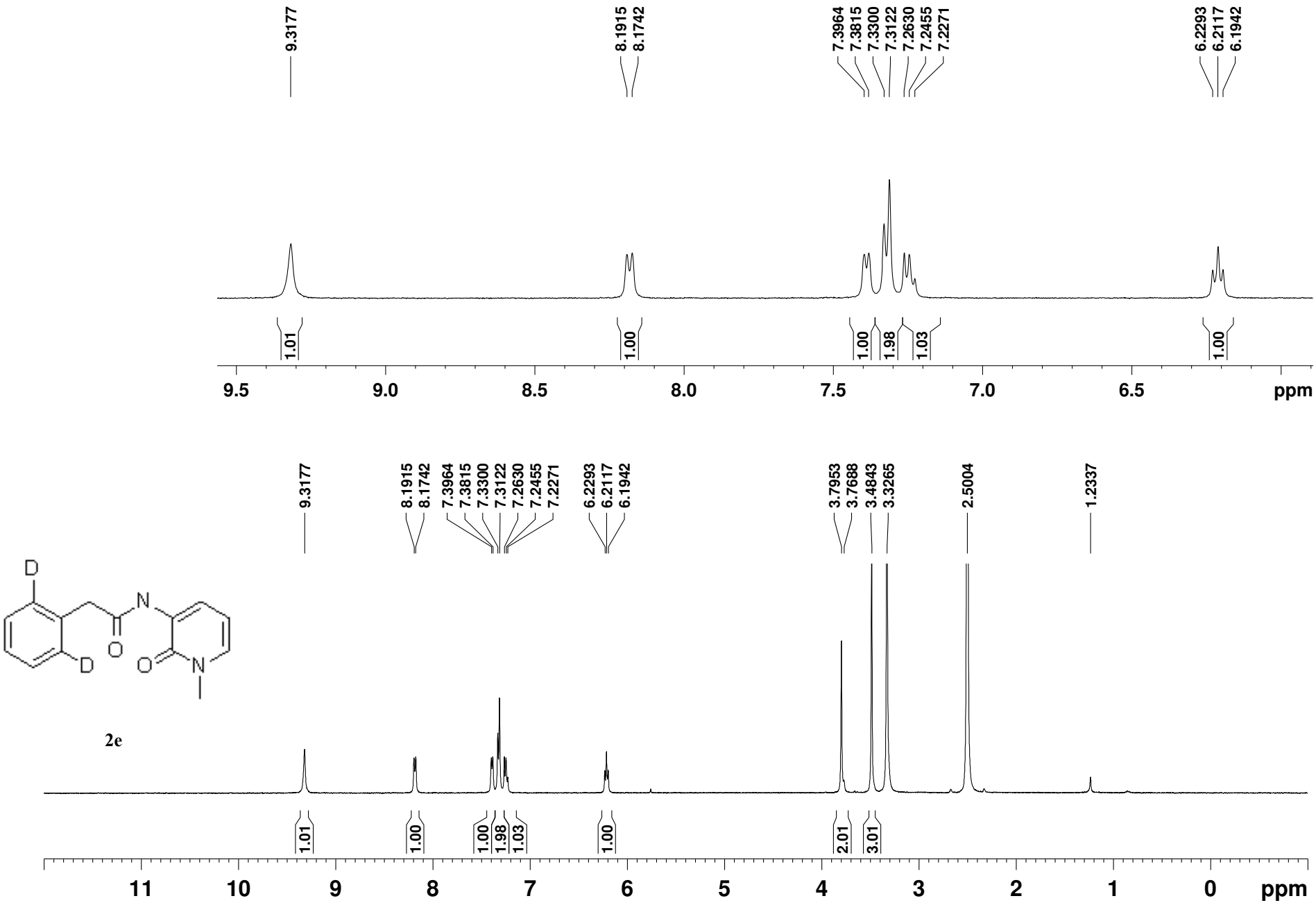
^{1}H NMR of 1e IN DMSO



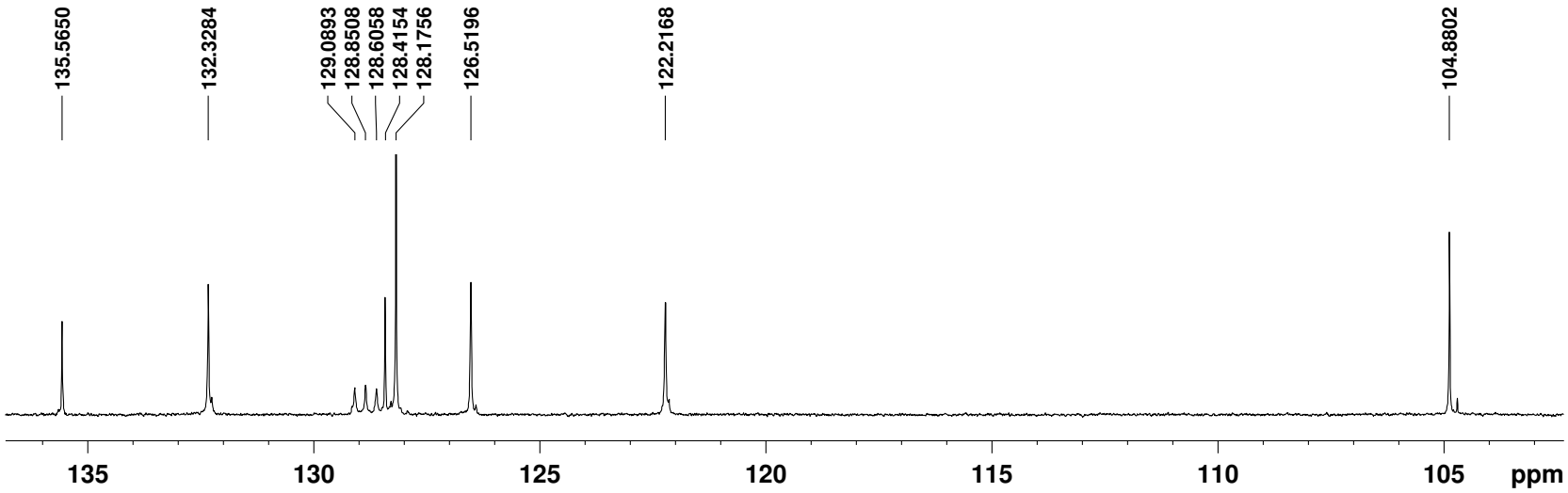
^{13}C NMR of 1e IN DMSO

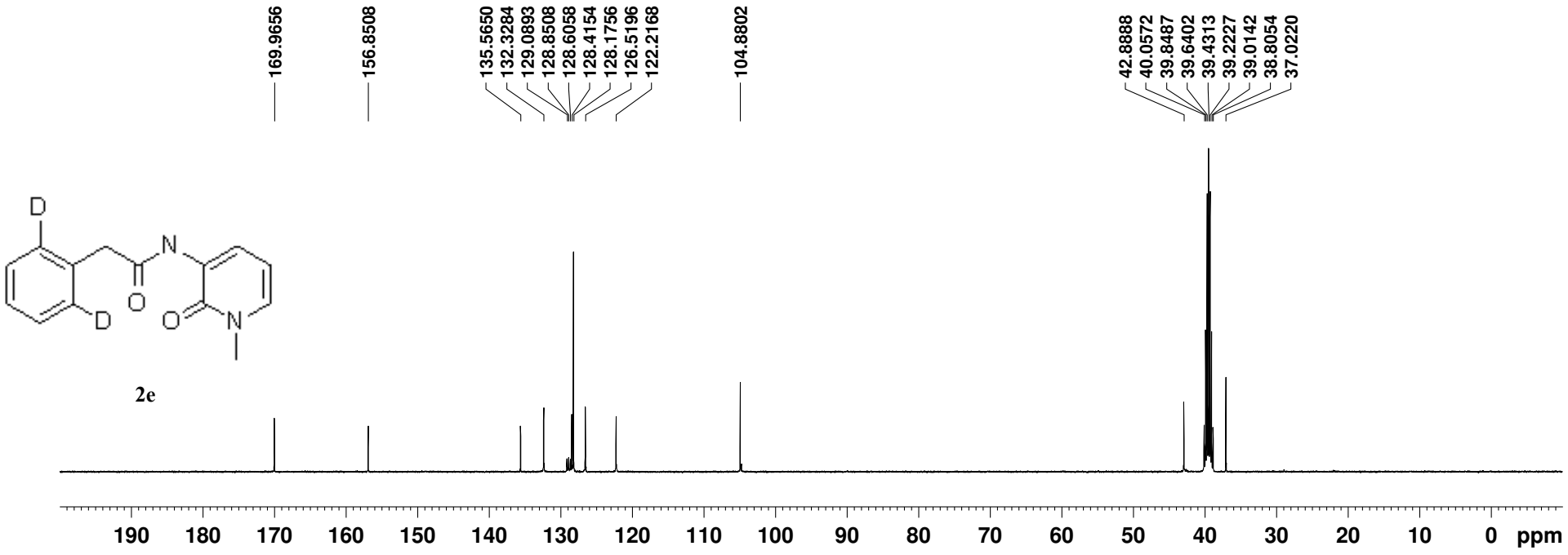


APT of 1e IN DMSO



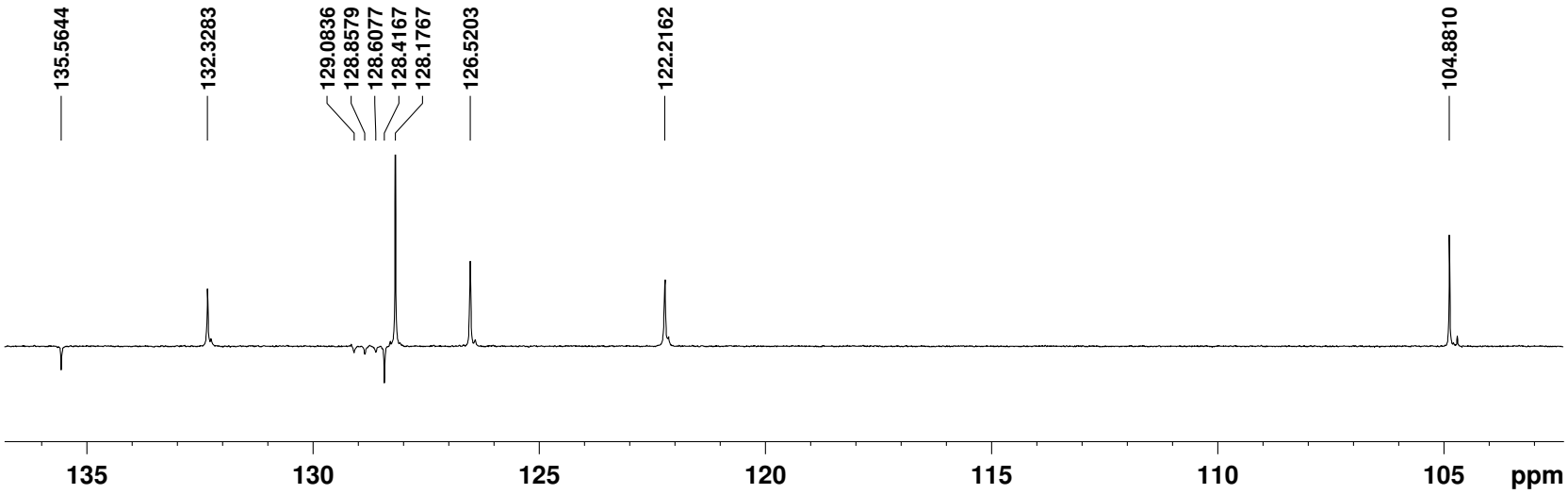
^{1}H NMR of 2e IN DMSO

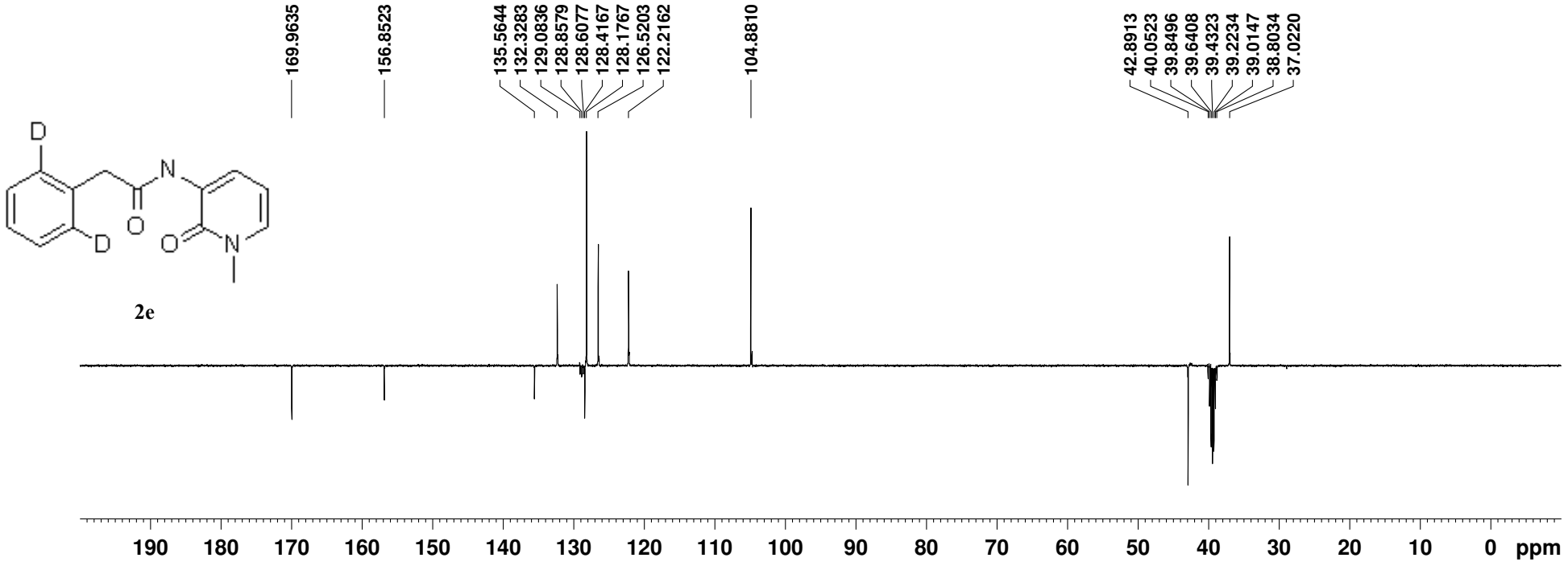




2e

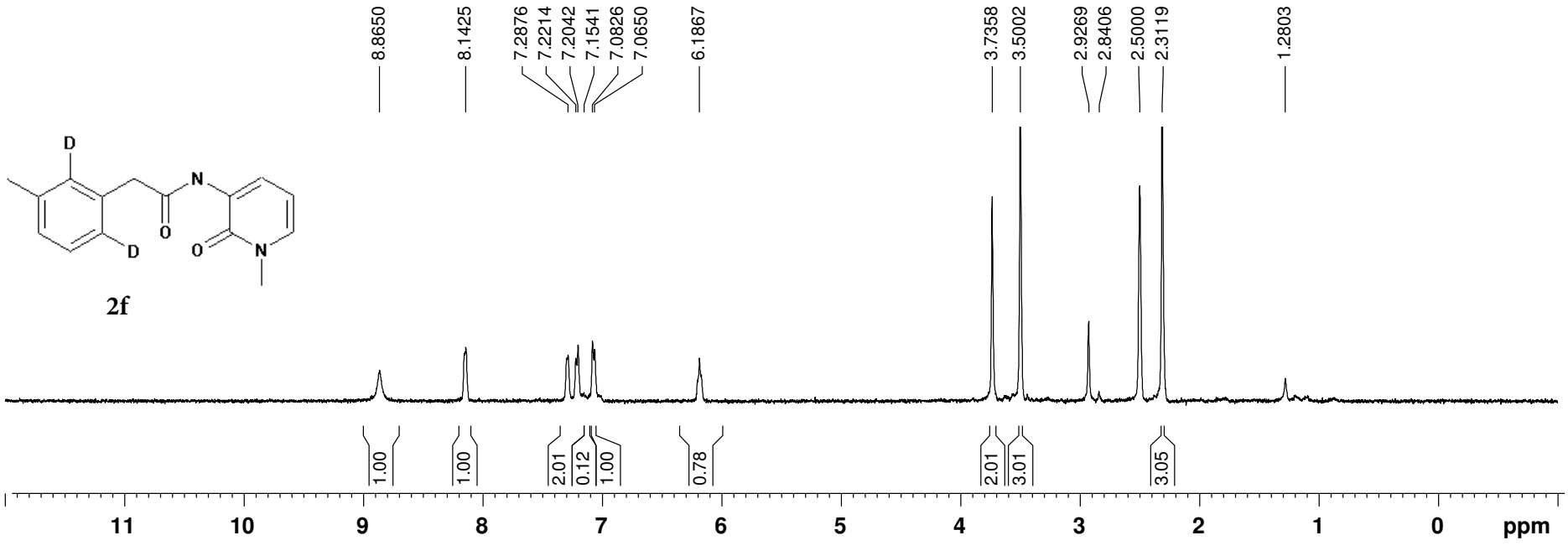
^{13}C NMR of 2e IN DMSO



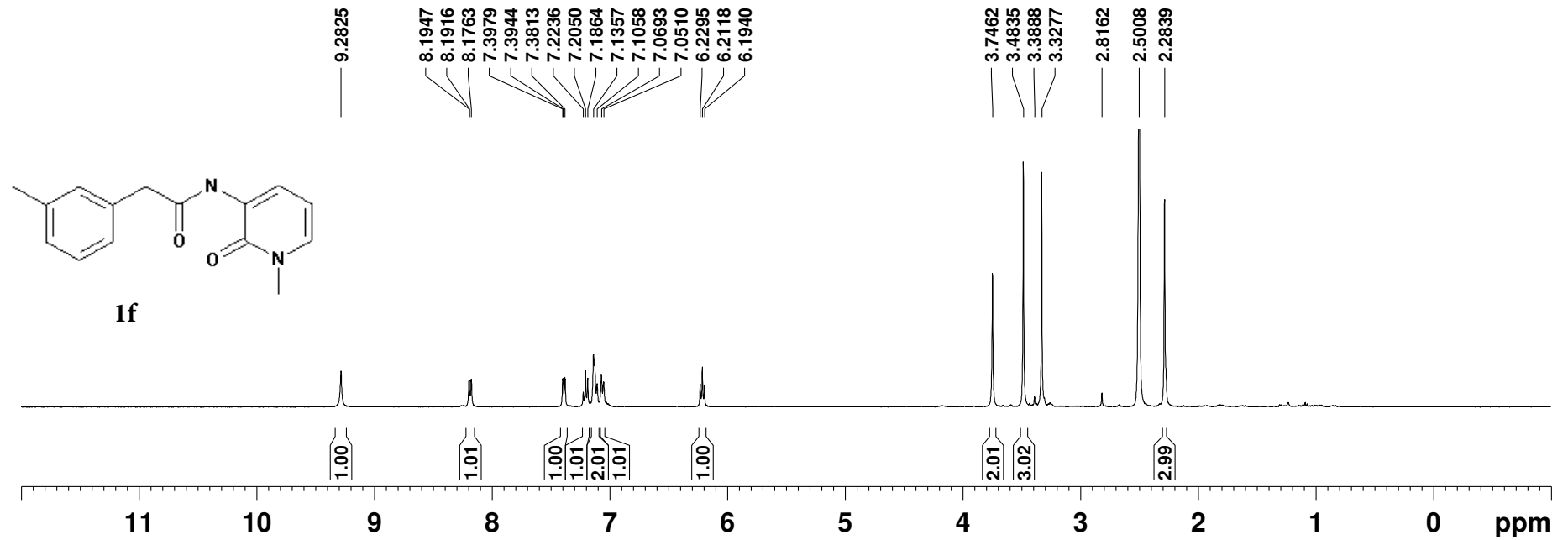


2e

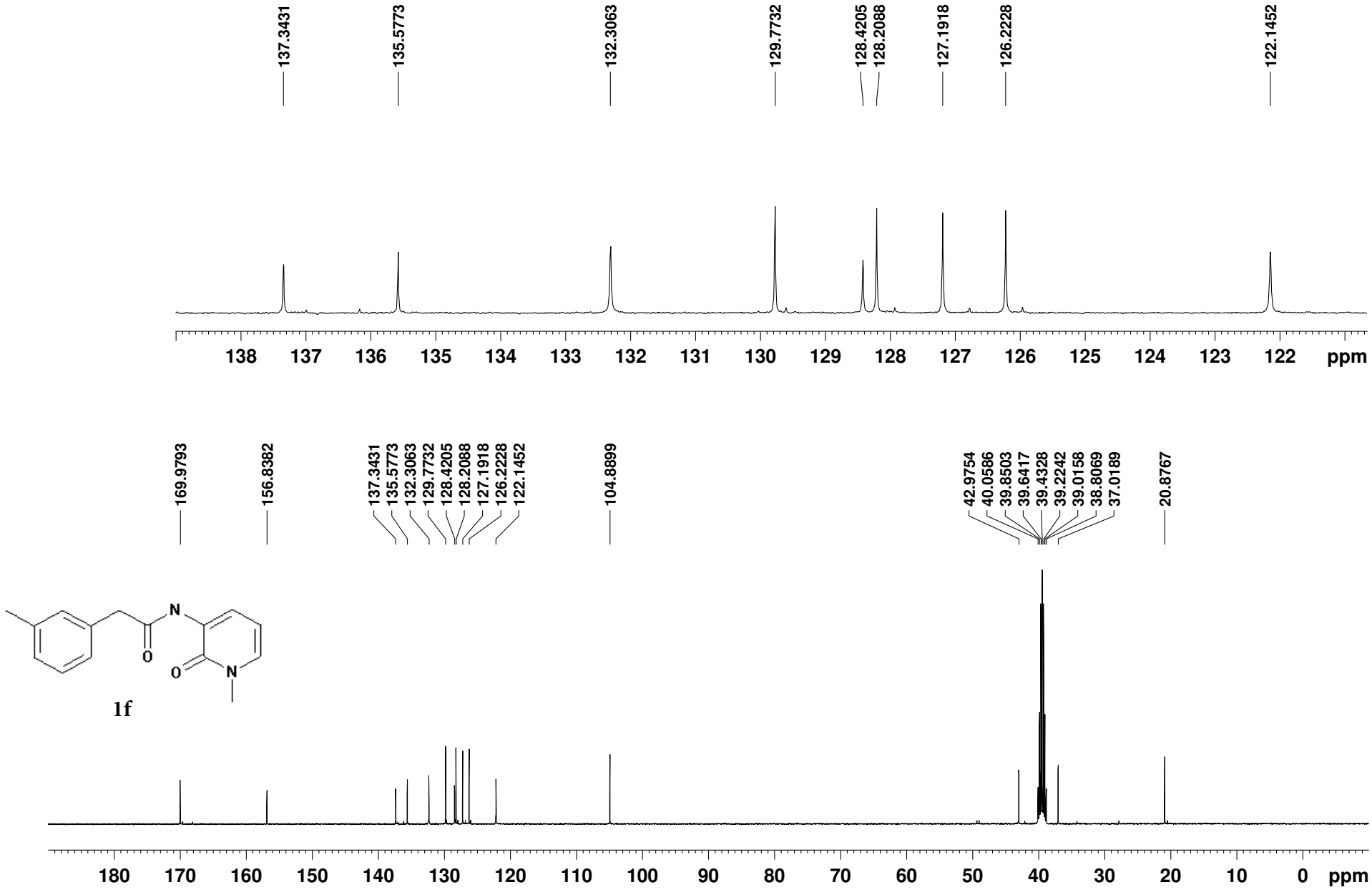
APT of 2e IN DMSO



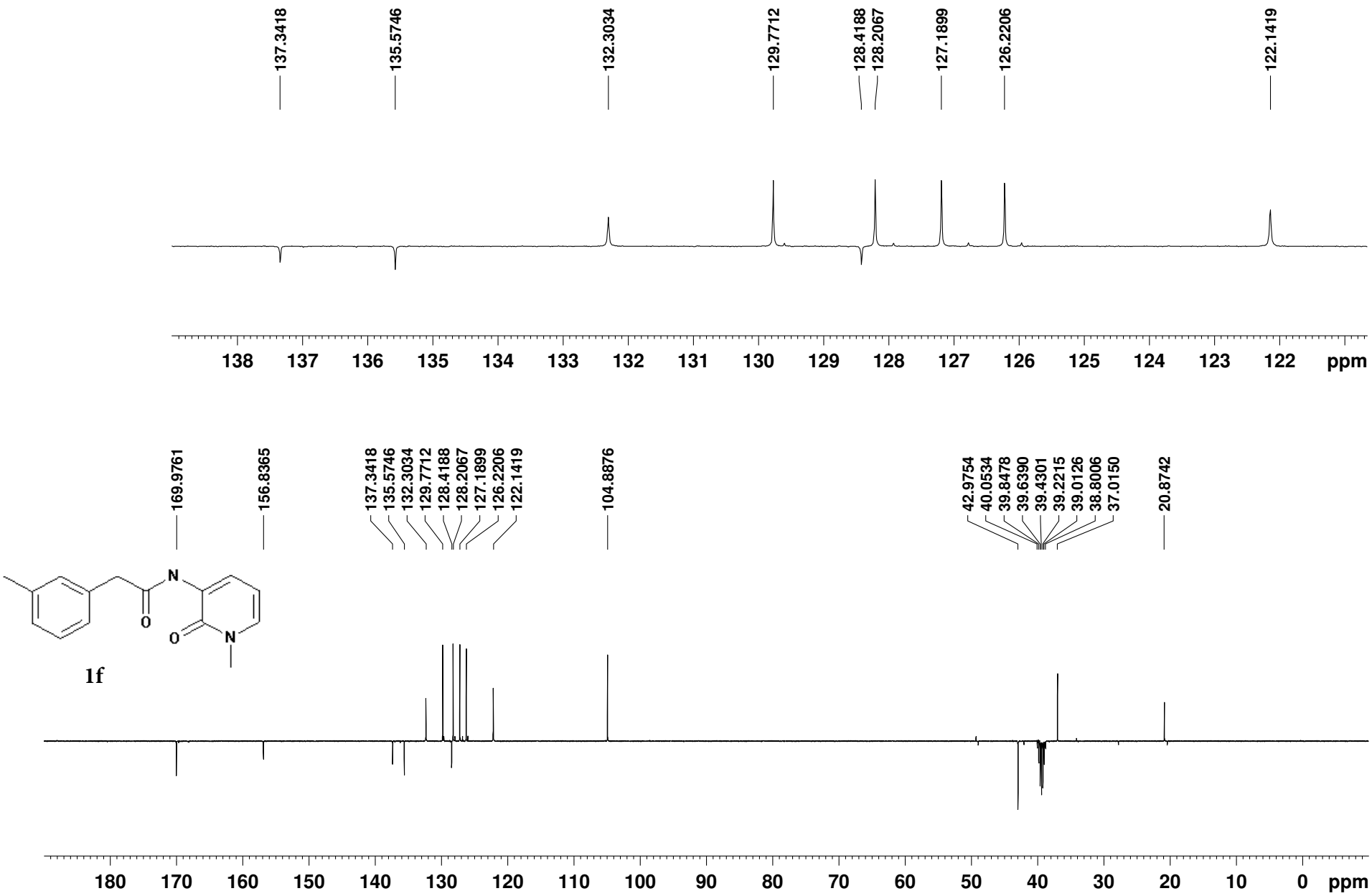
^{1}H NMR of 2f IN DMSO AT 100^{o}C



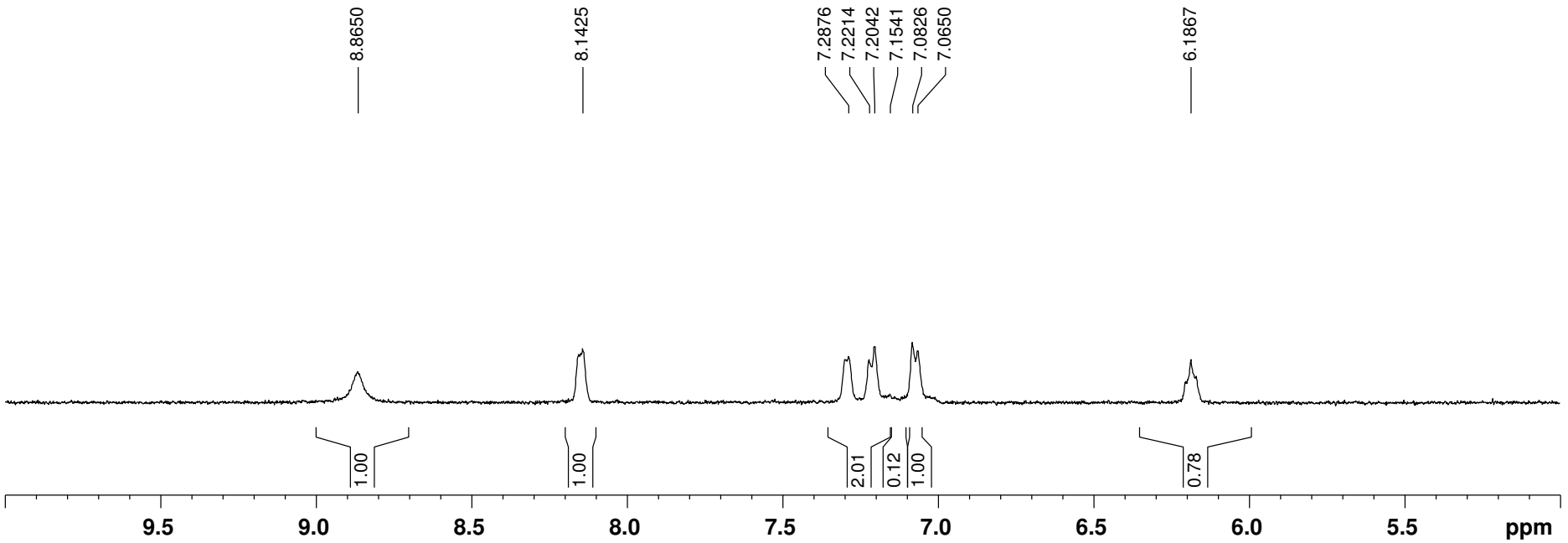
^{1}H NMR of 1f IN DMSO



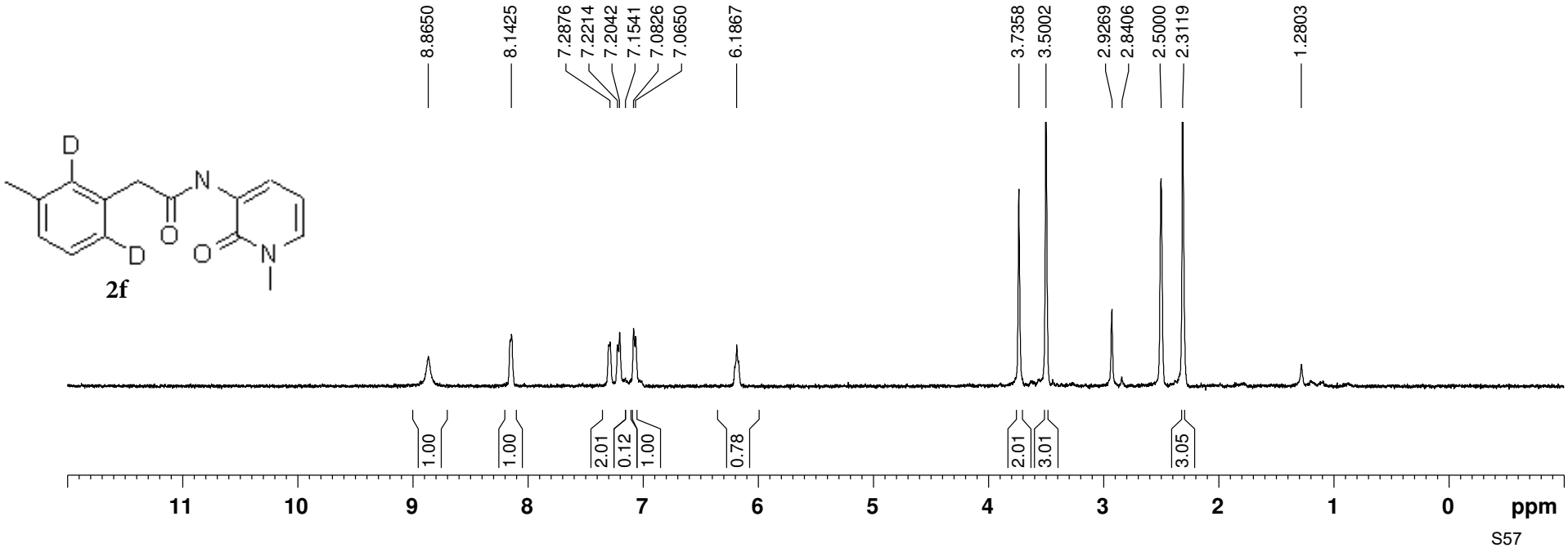
^{13}C NMR of 1f IN DMSO



APT of 1f IN DMSO

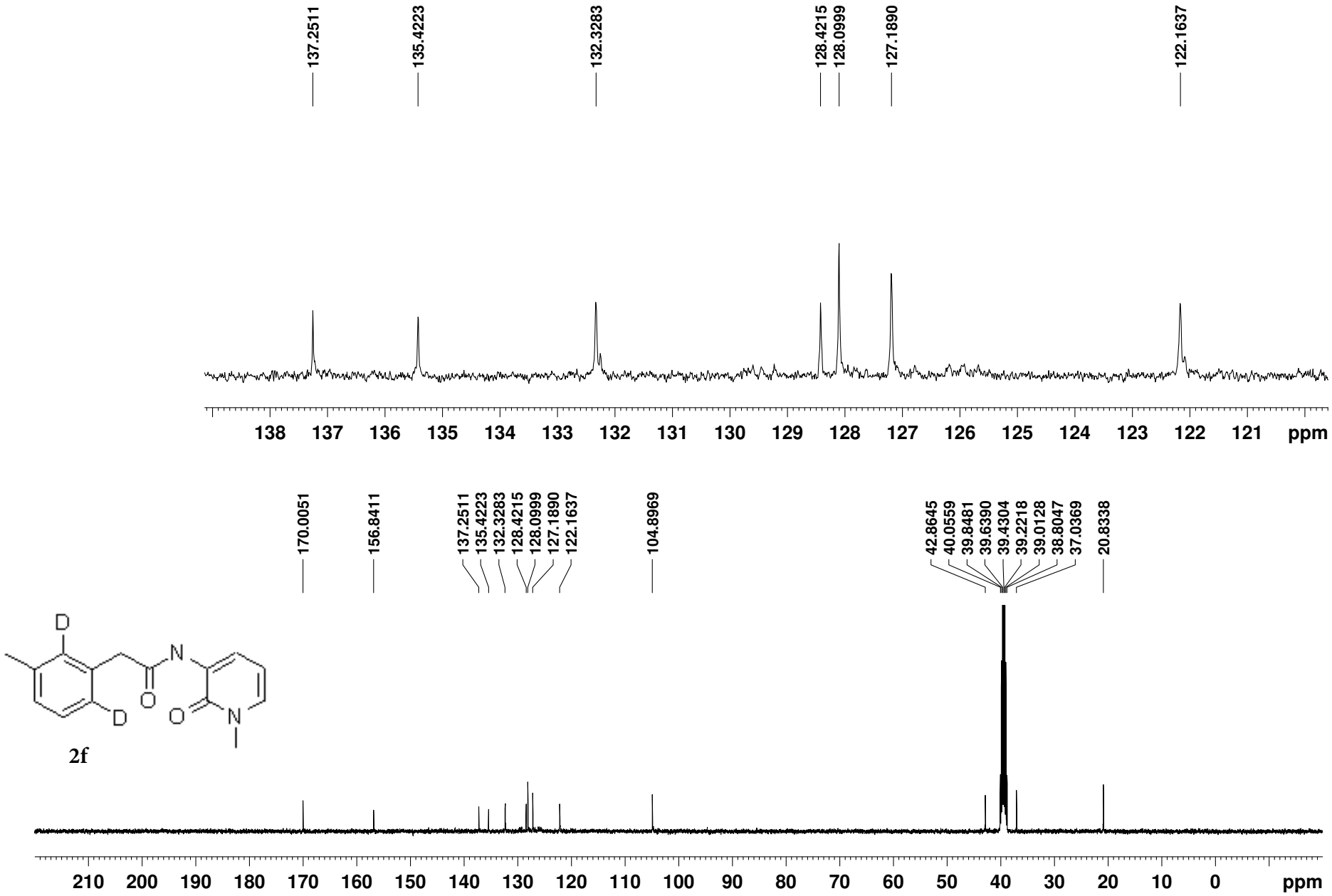


^{1}H NMR of 2f IN DMSO AT 100^{o}C

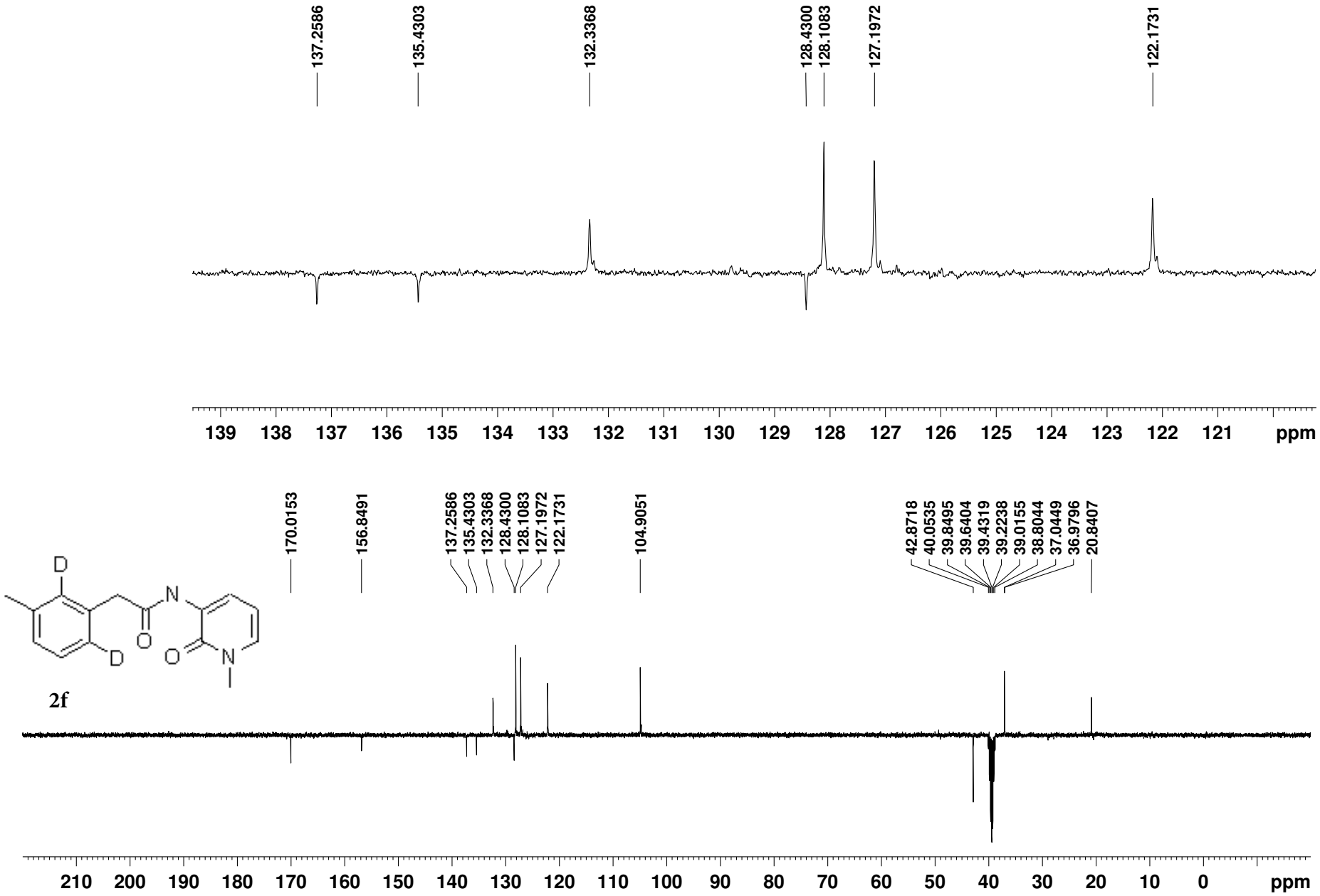


2f

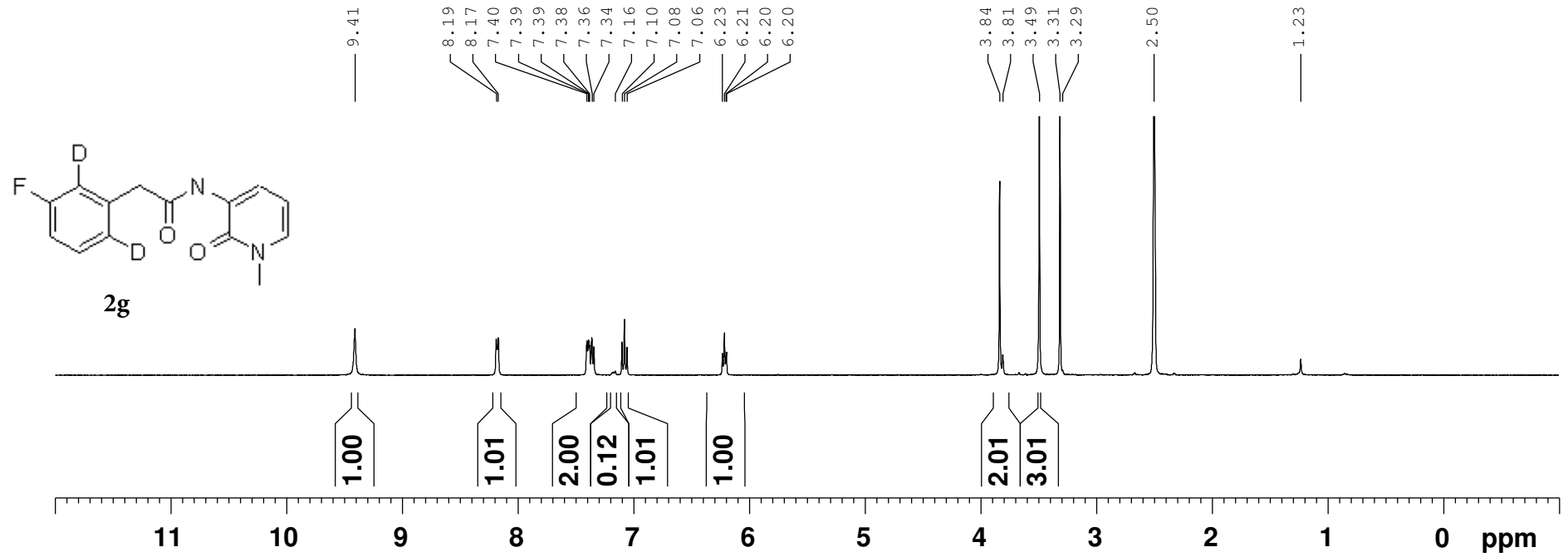
^{1}H NMR of 2f IN DMSO AT 100^{o}C



^{13}C NMR of 2f IN DMSO

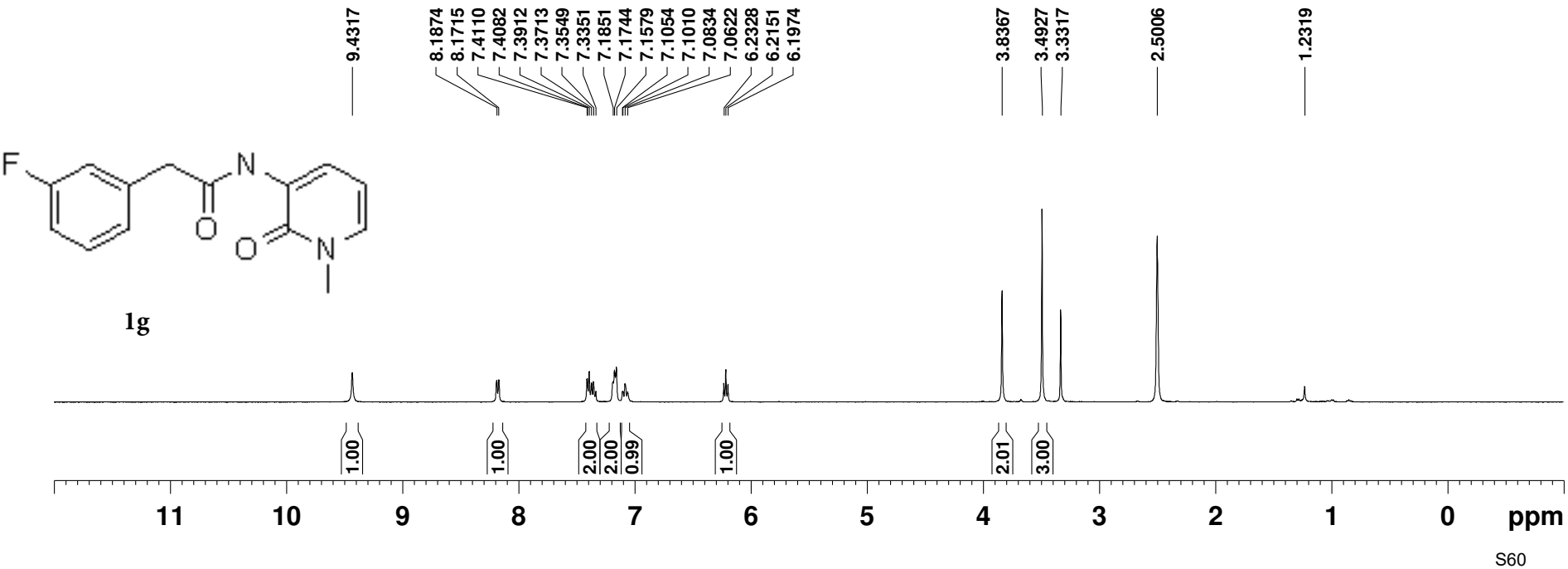


APT of 2f IN DMSO



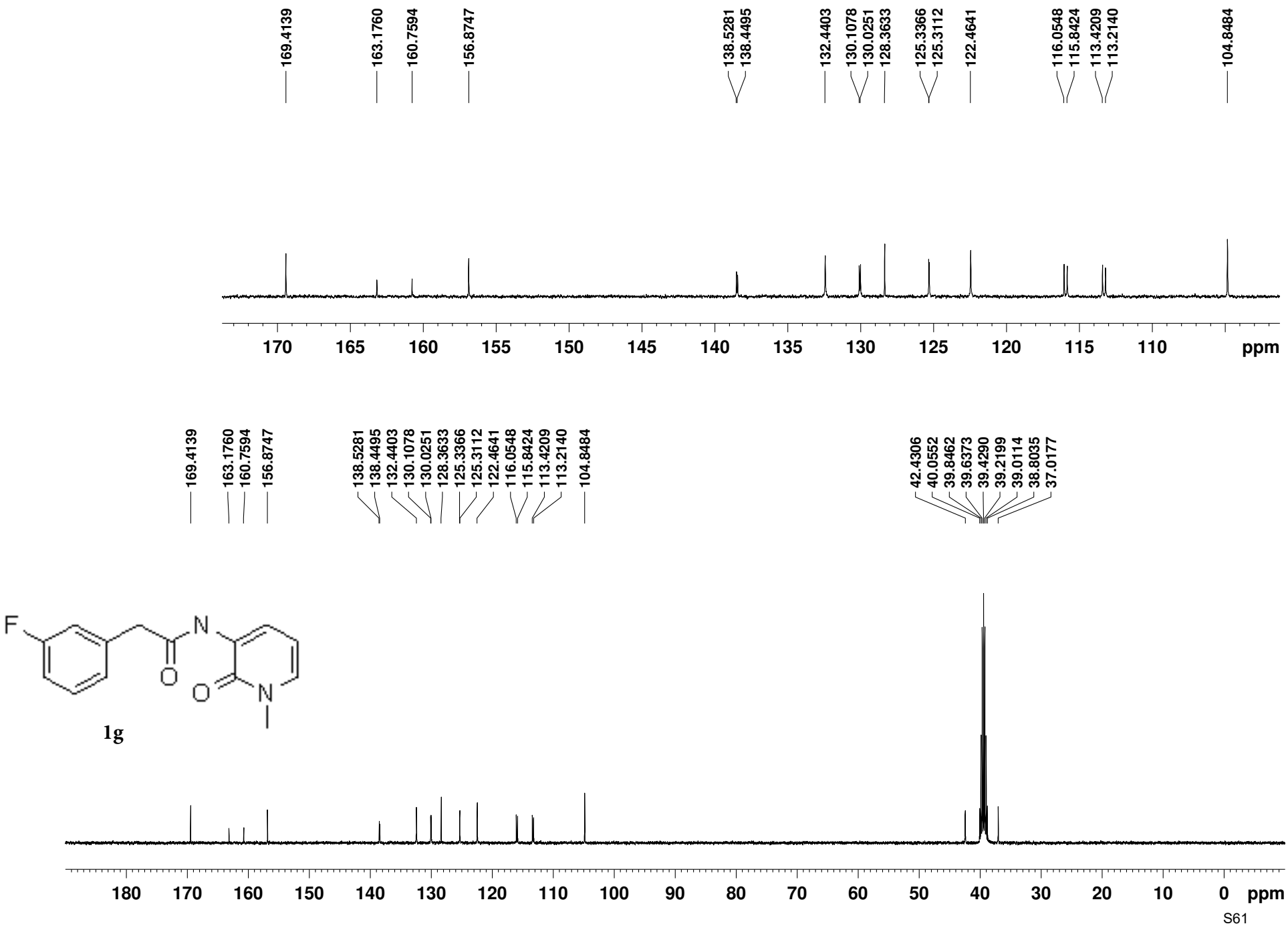
2g

^{1}H NMR of 2g IN DMSO

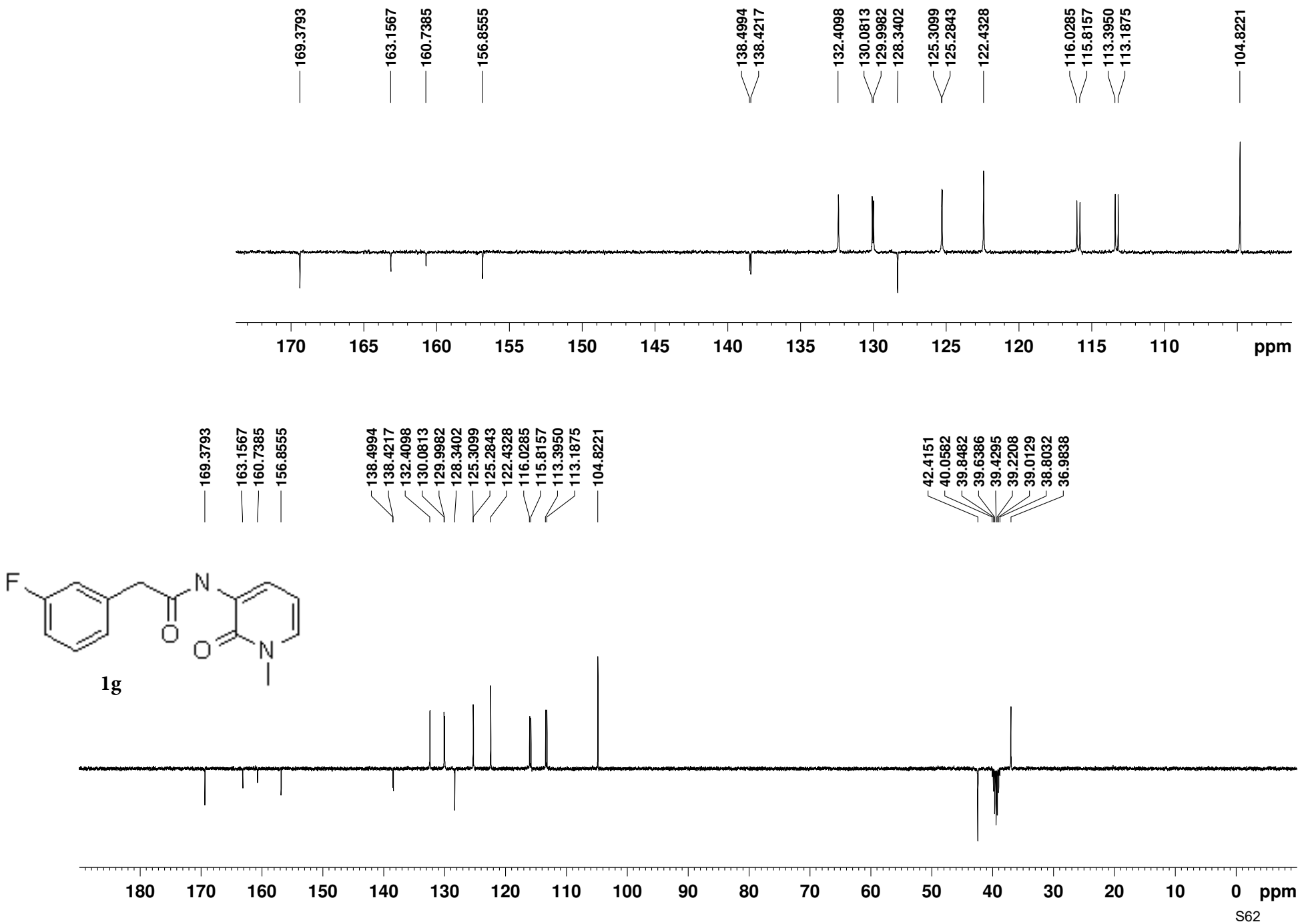


1g

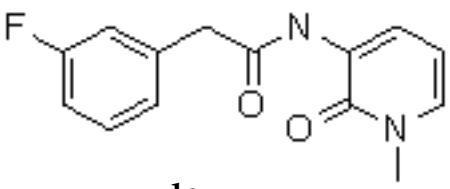
^{1}H NMR of 1g IN DMSO



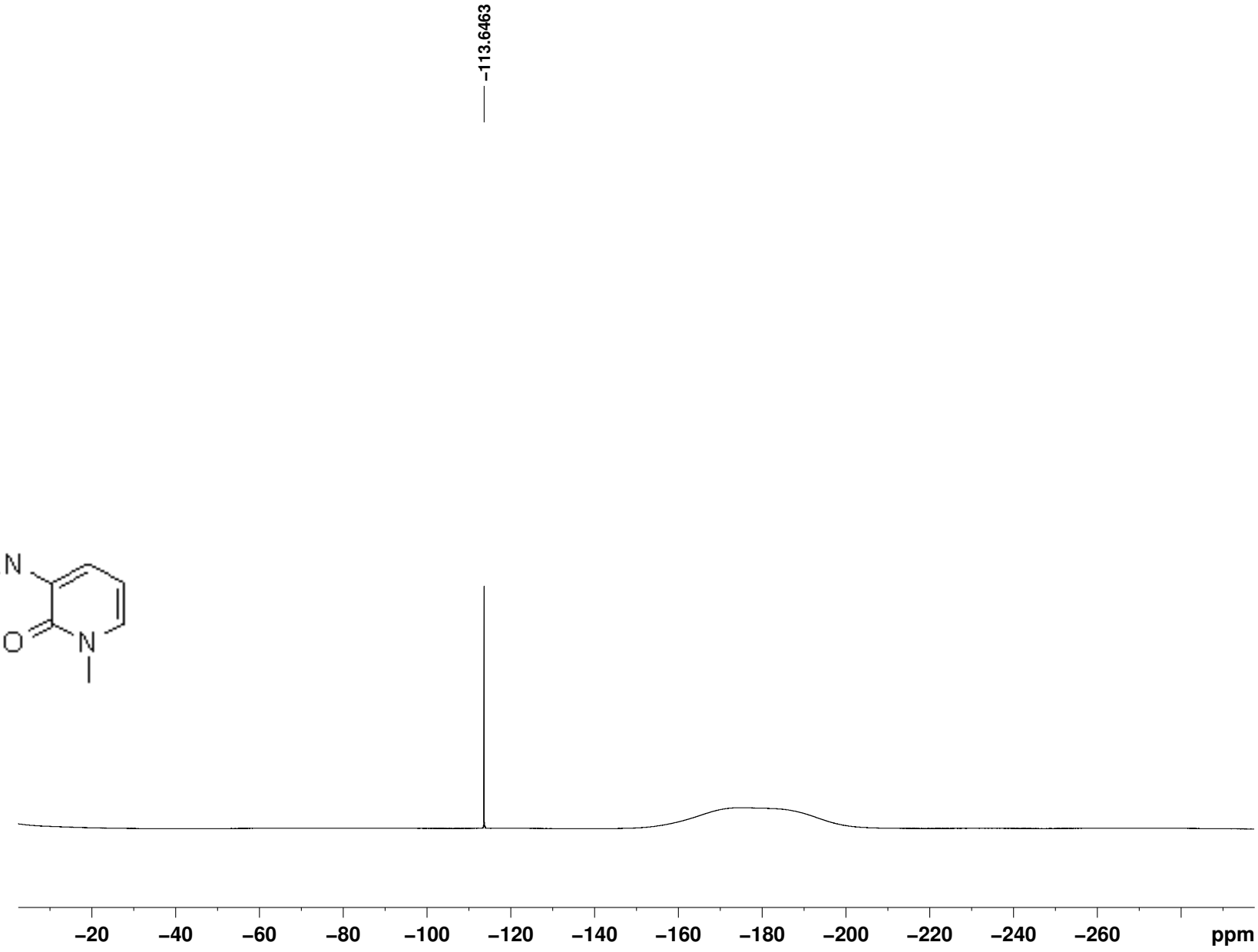
^{13}C NMR of 1g IN DMSO



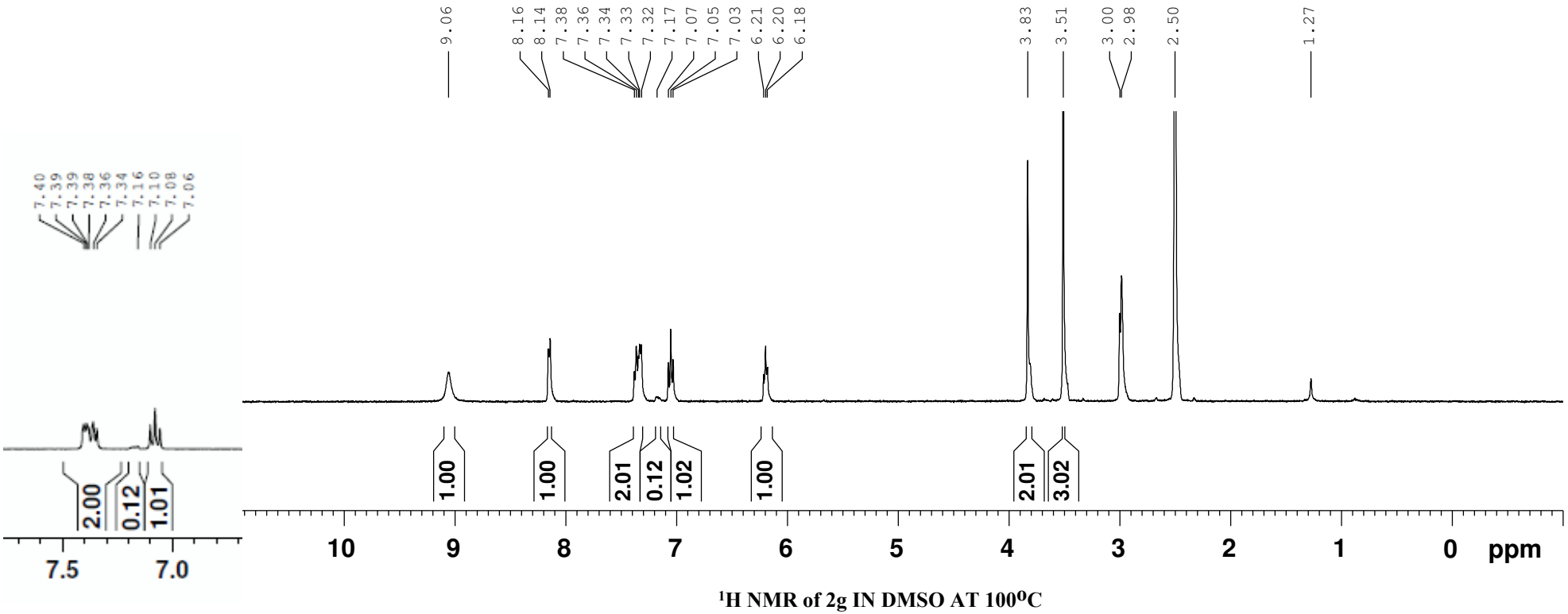
APT of 1g IN DMSO



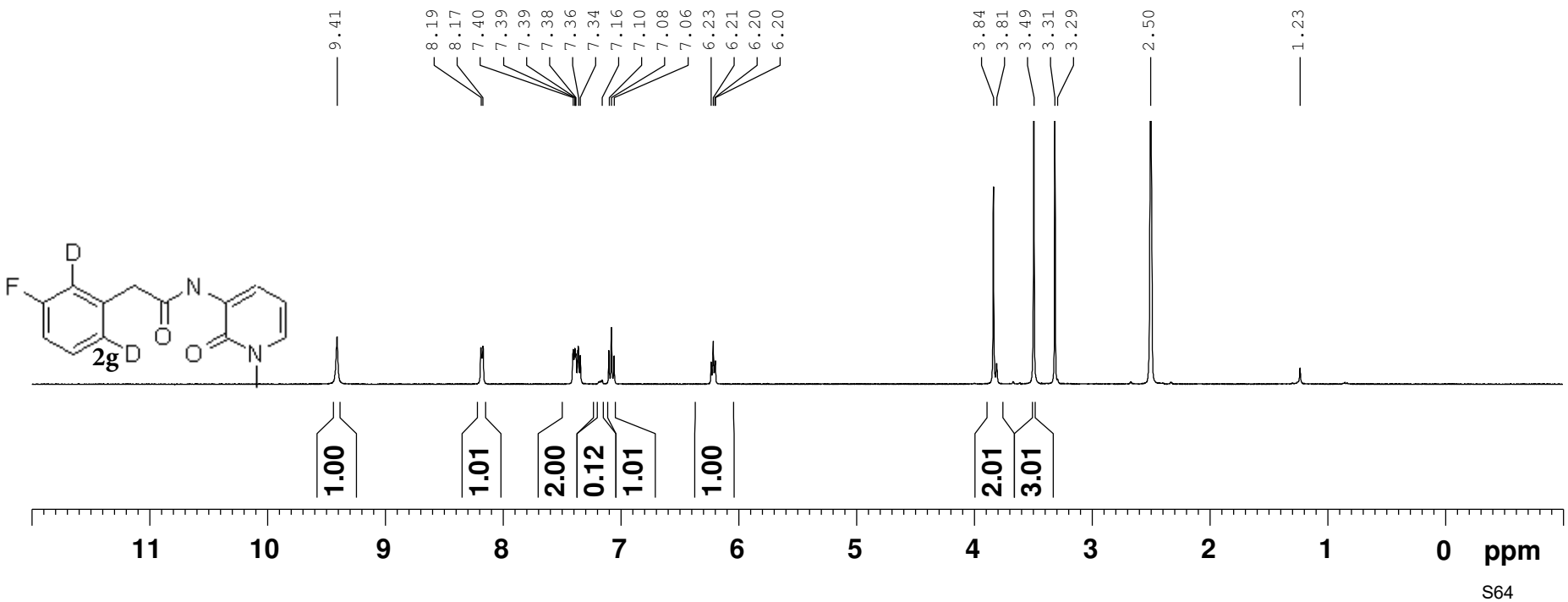
1g



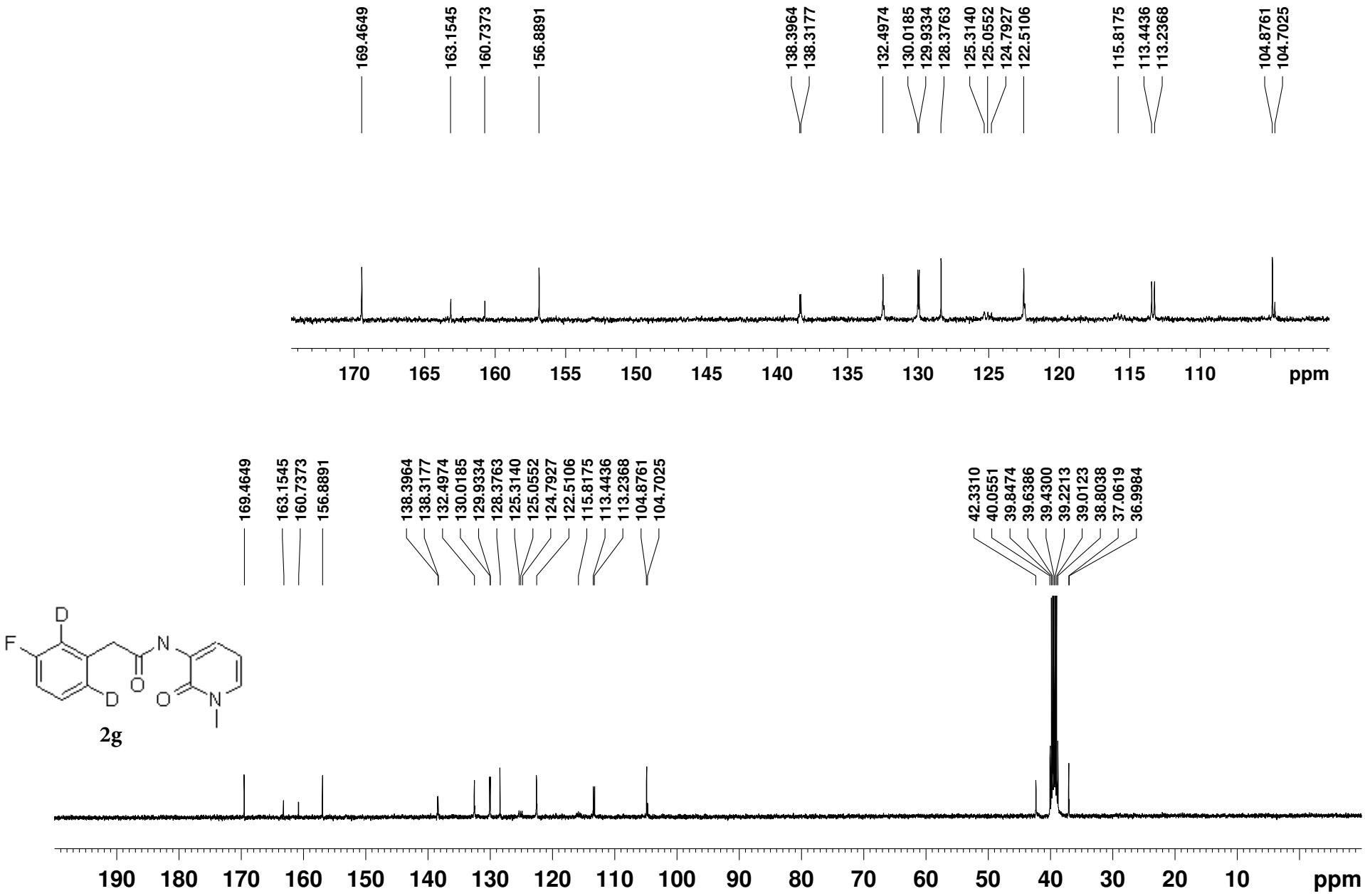
^{19}F NMR of 1g IN DMSO



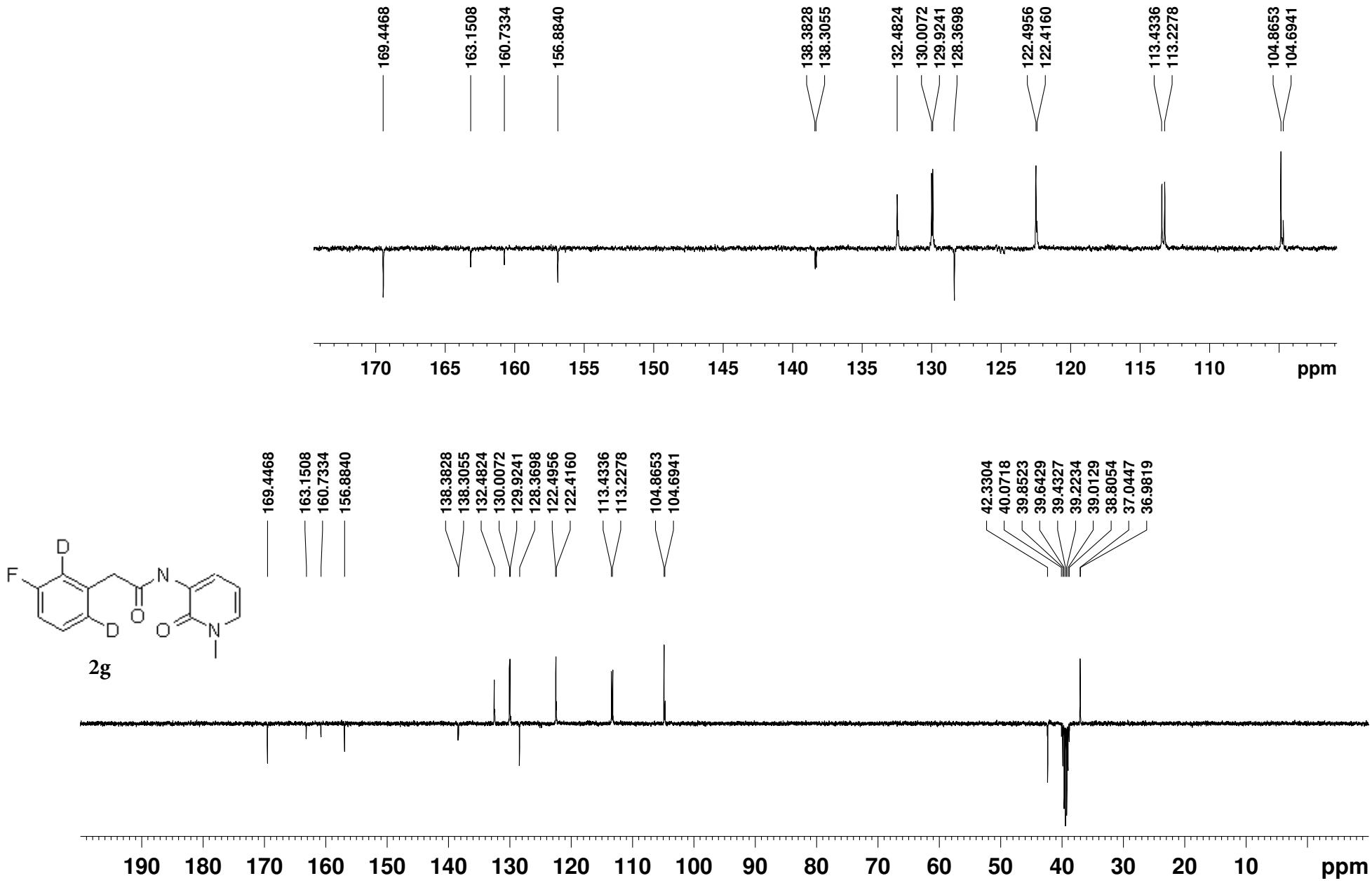
^{1}H NMR of 2g IN DMSO AT 100^{O}C



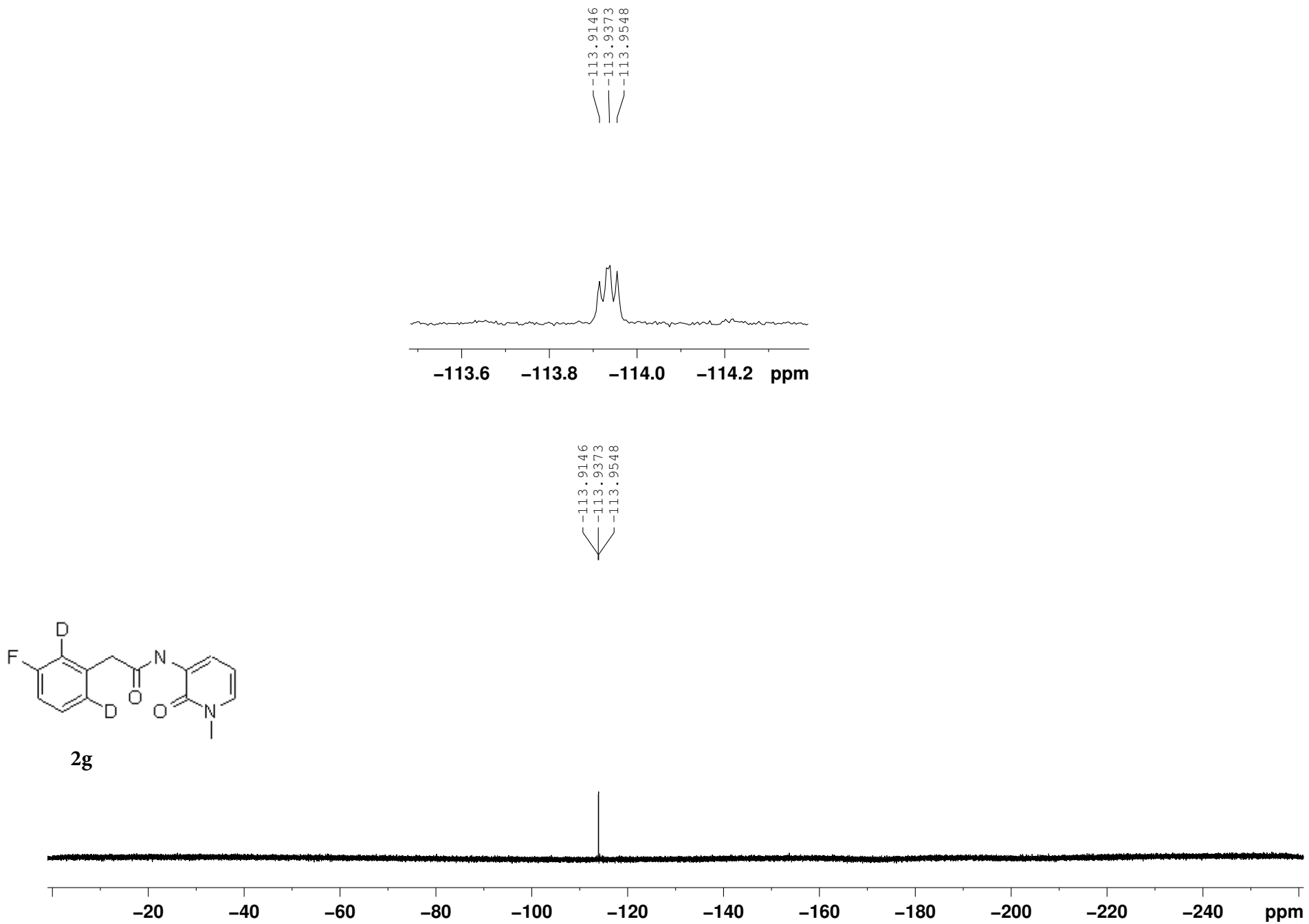
^{1}H NMR of 2g IN DMSO AT 20^{O}C



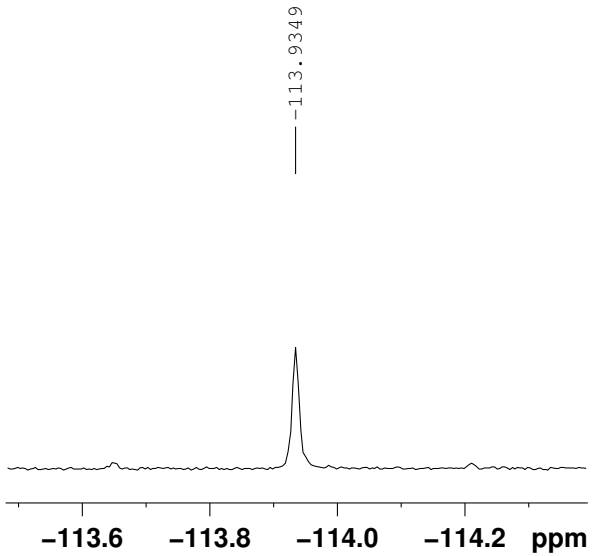
^{13}C NMR of 2g IN DMSO

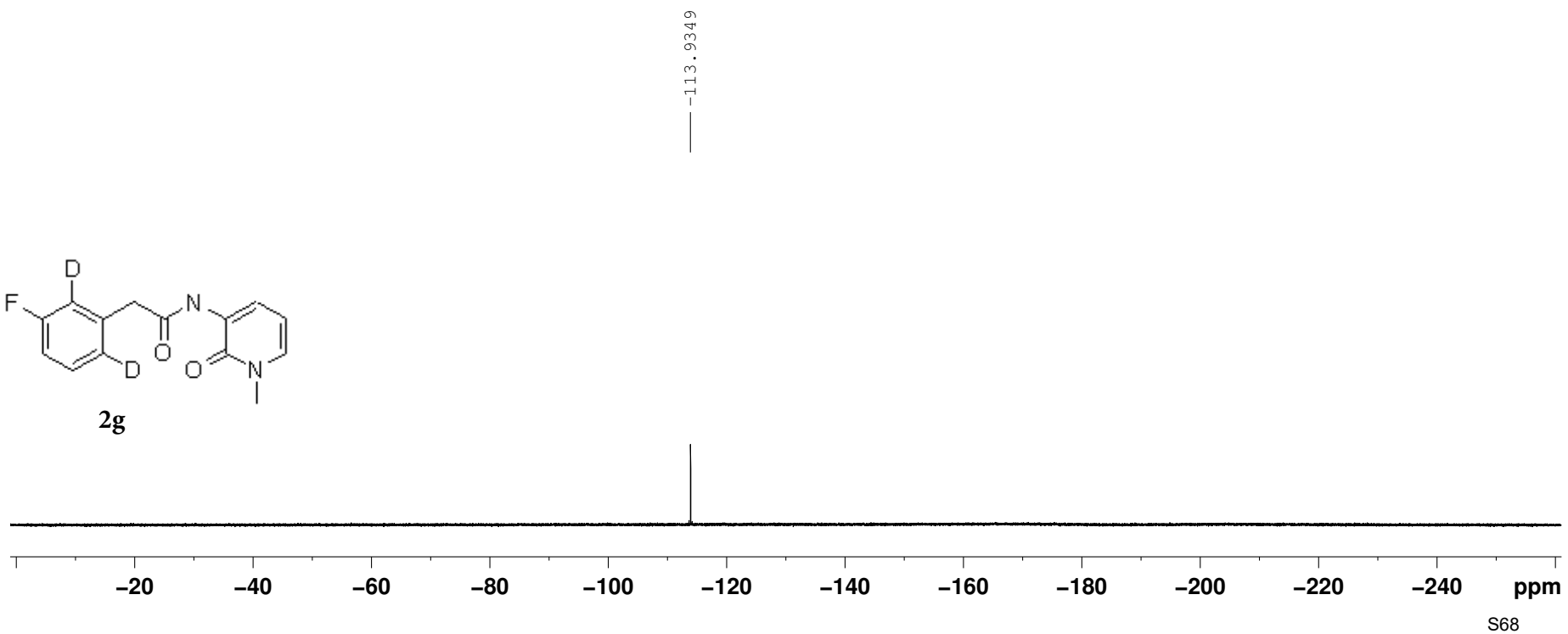


APT of 2a IN DMSO



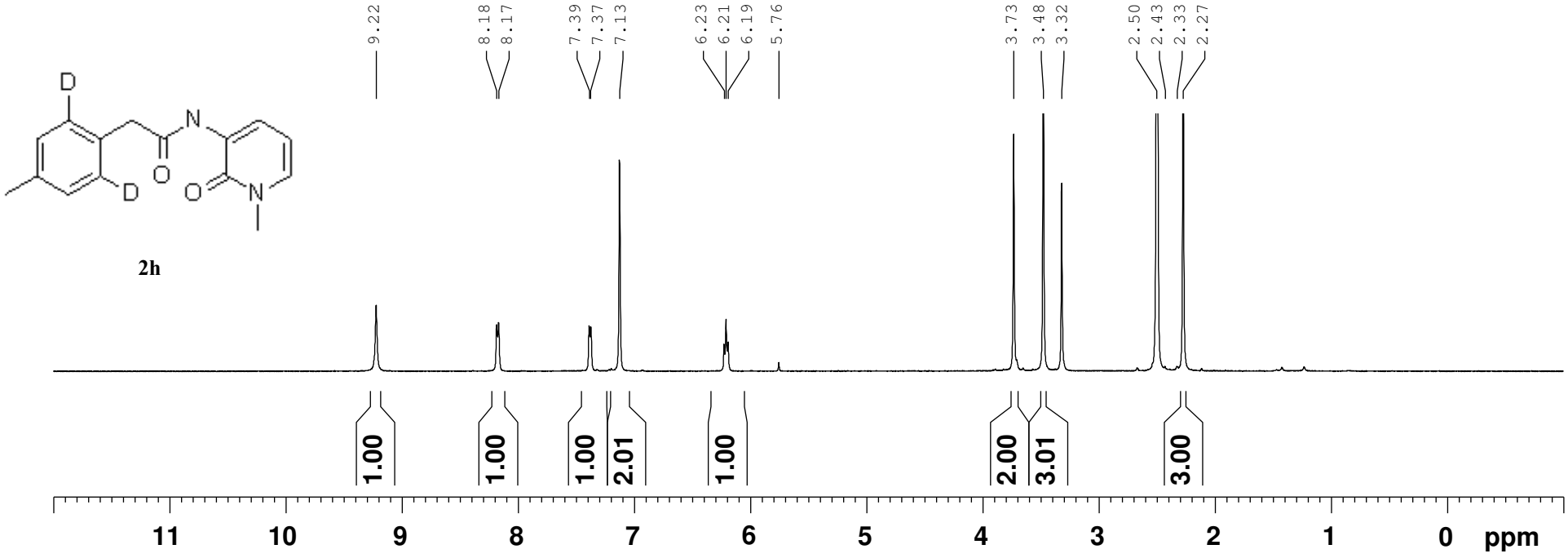
^{19}F NMR of 2g IN DMSO (PC)





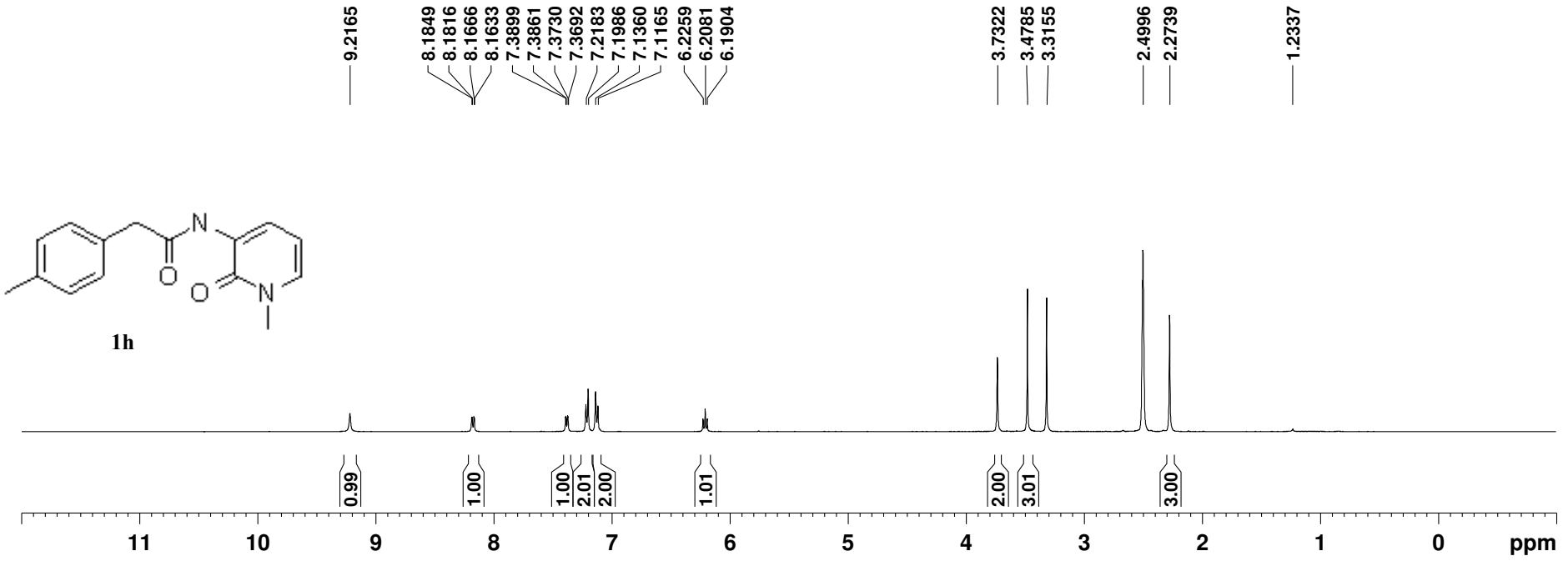
2g

^{19}F NMR of 2g IN DMSO (PDC)



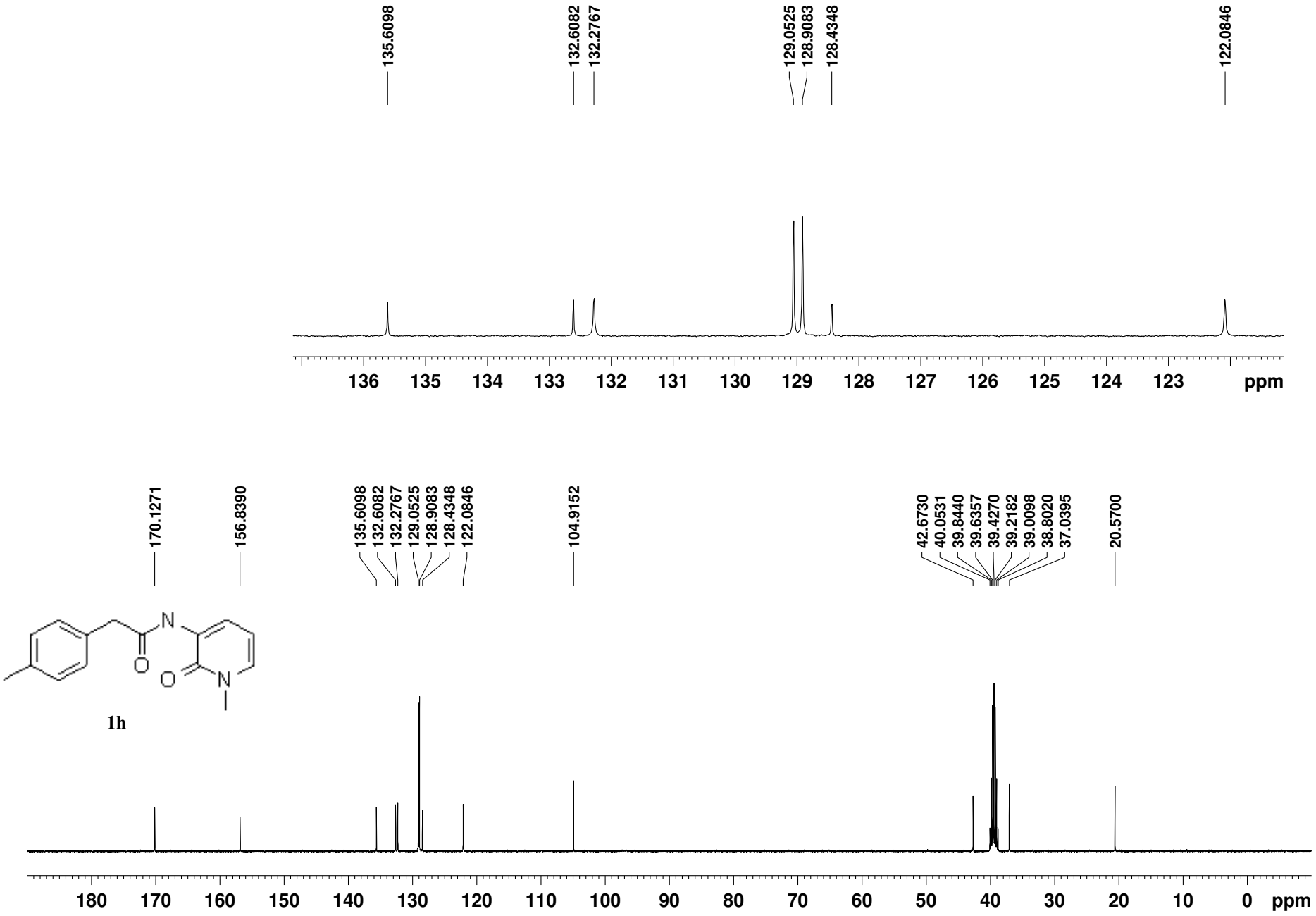
2h

^{1}H NMR of 2h IN DMSO

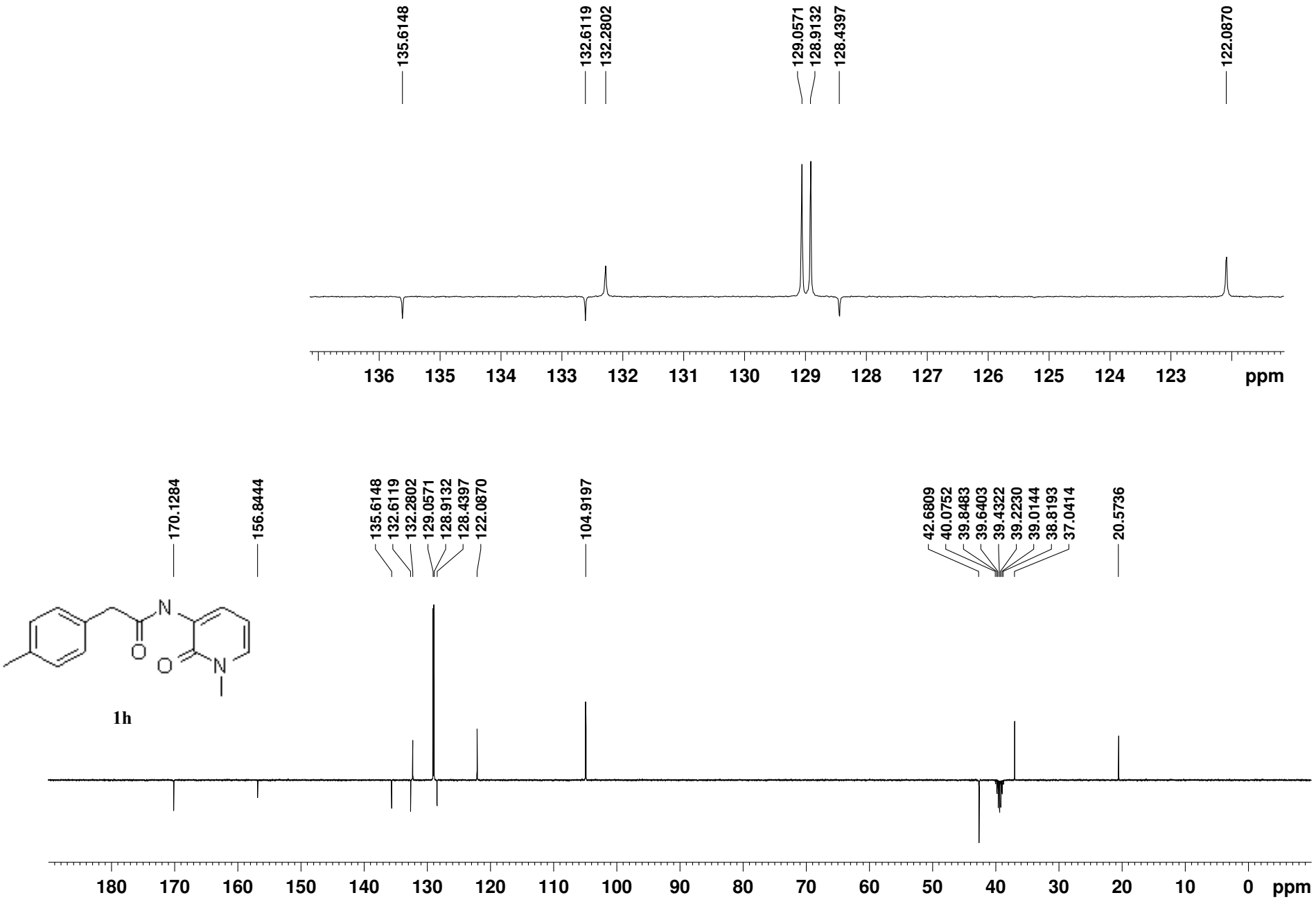


1h

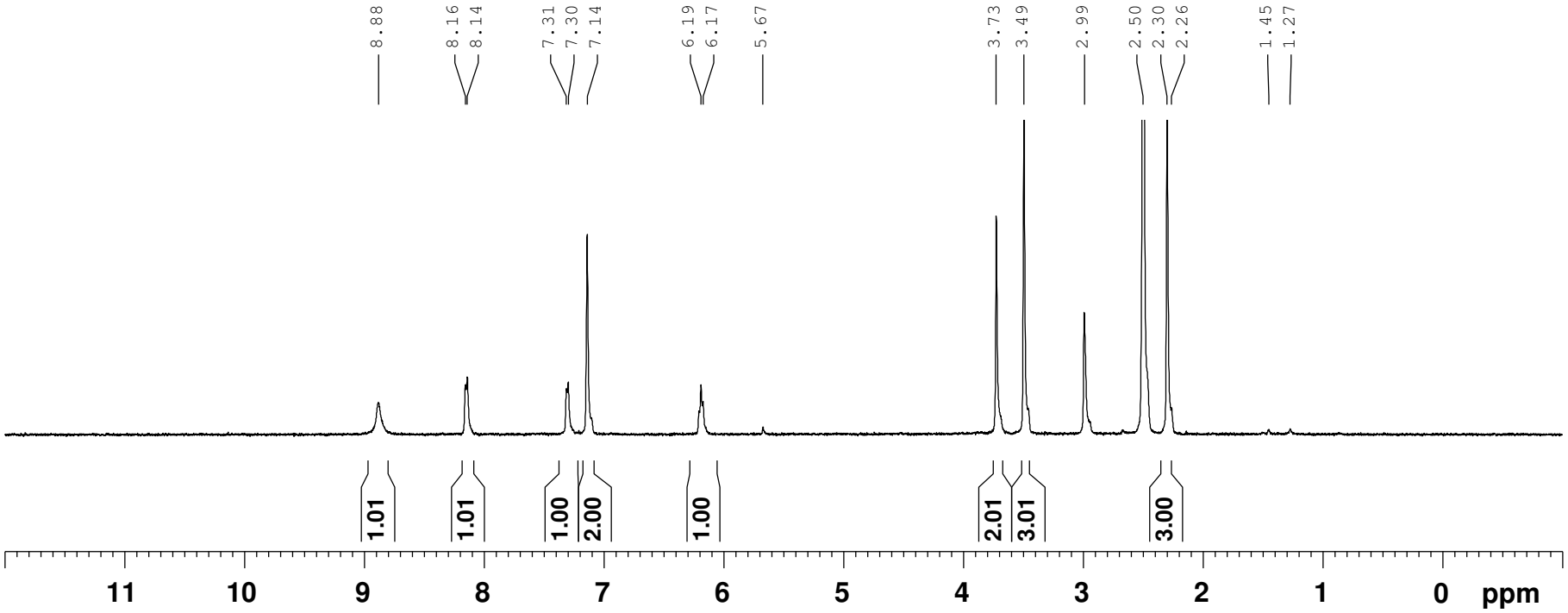
^{1}H NMR of 1h IN DMSO



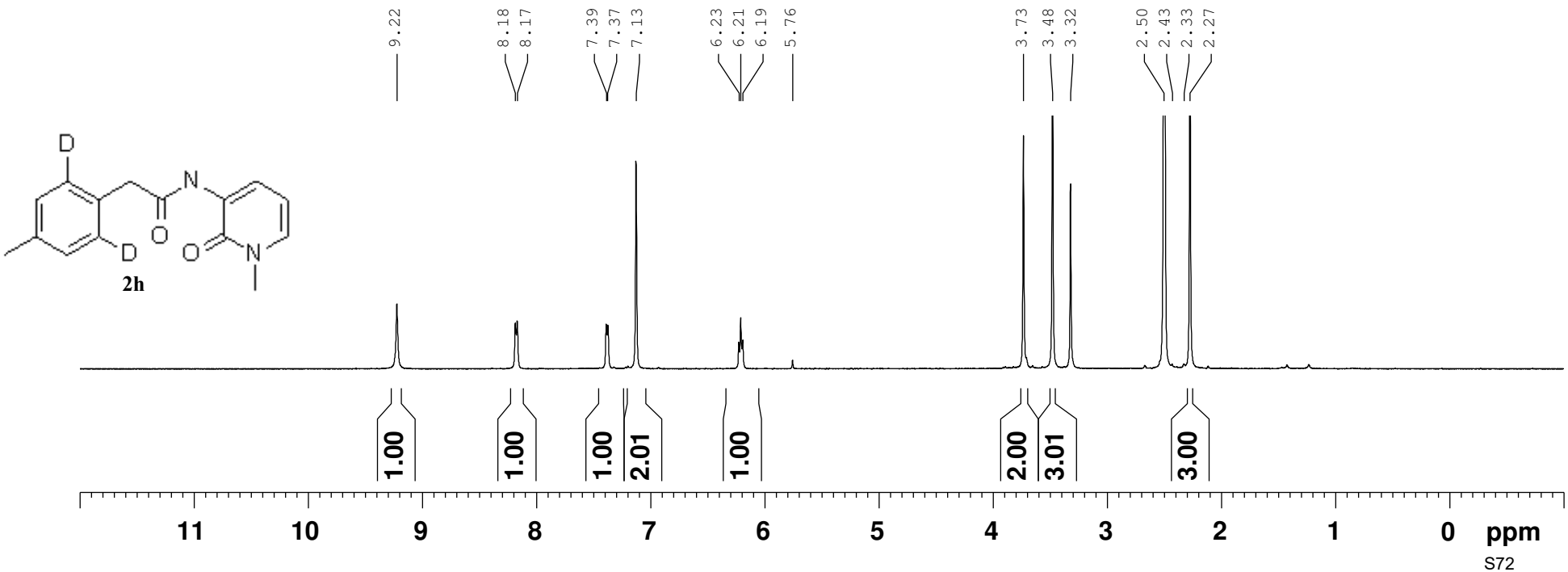
^{13}C NMR of 1h IN DMSO



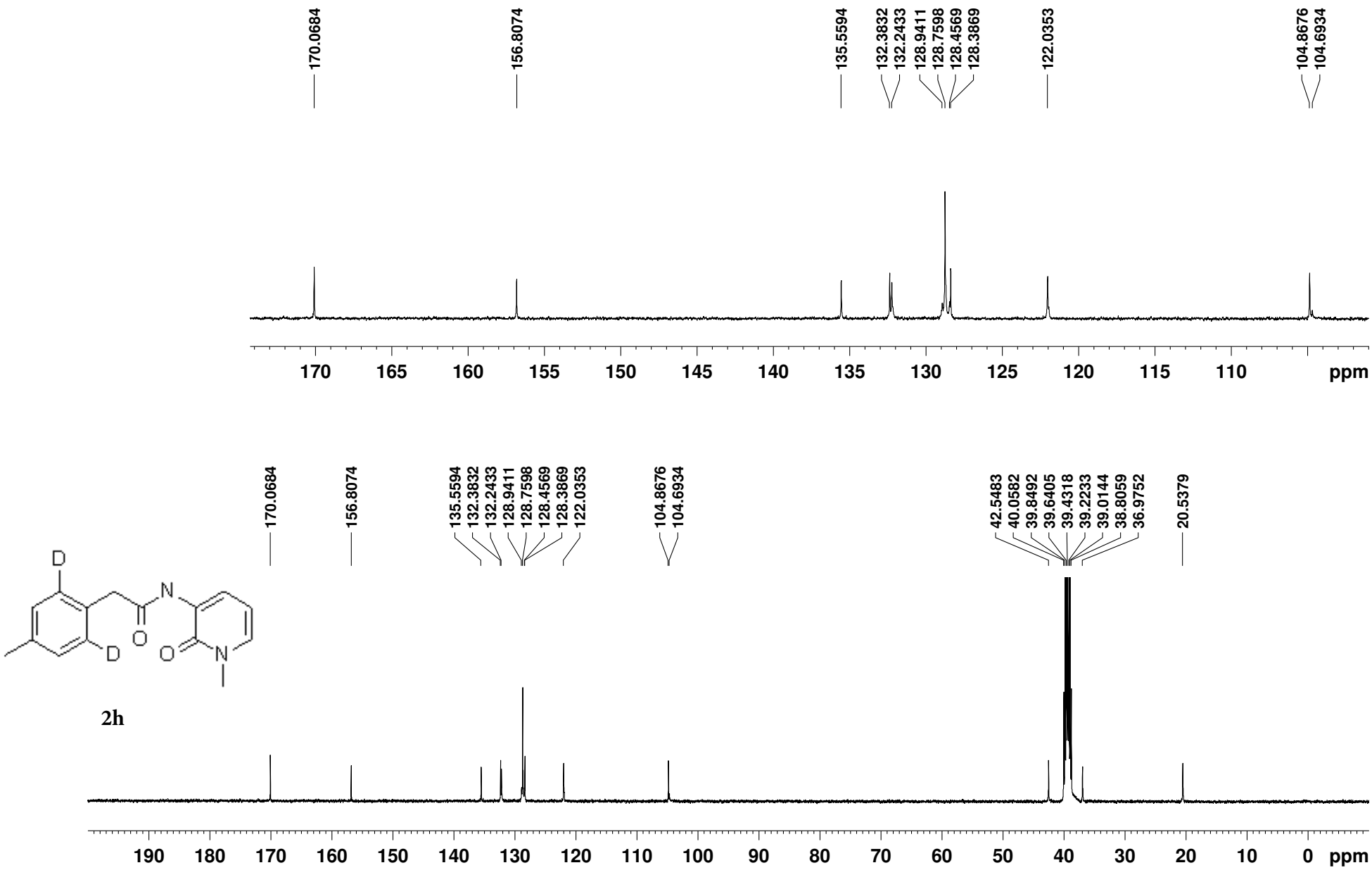
APT of 1h IN DMSO



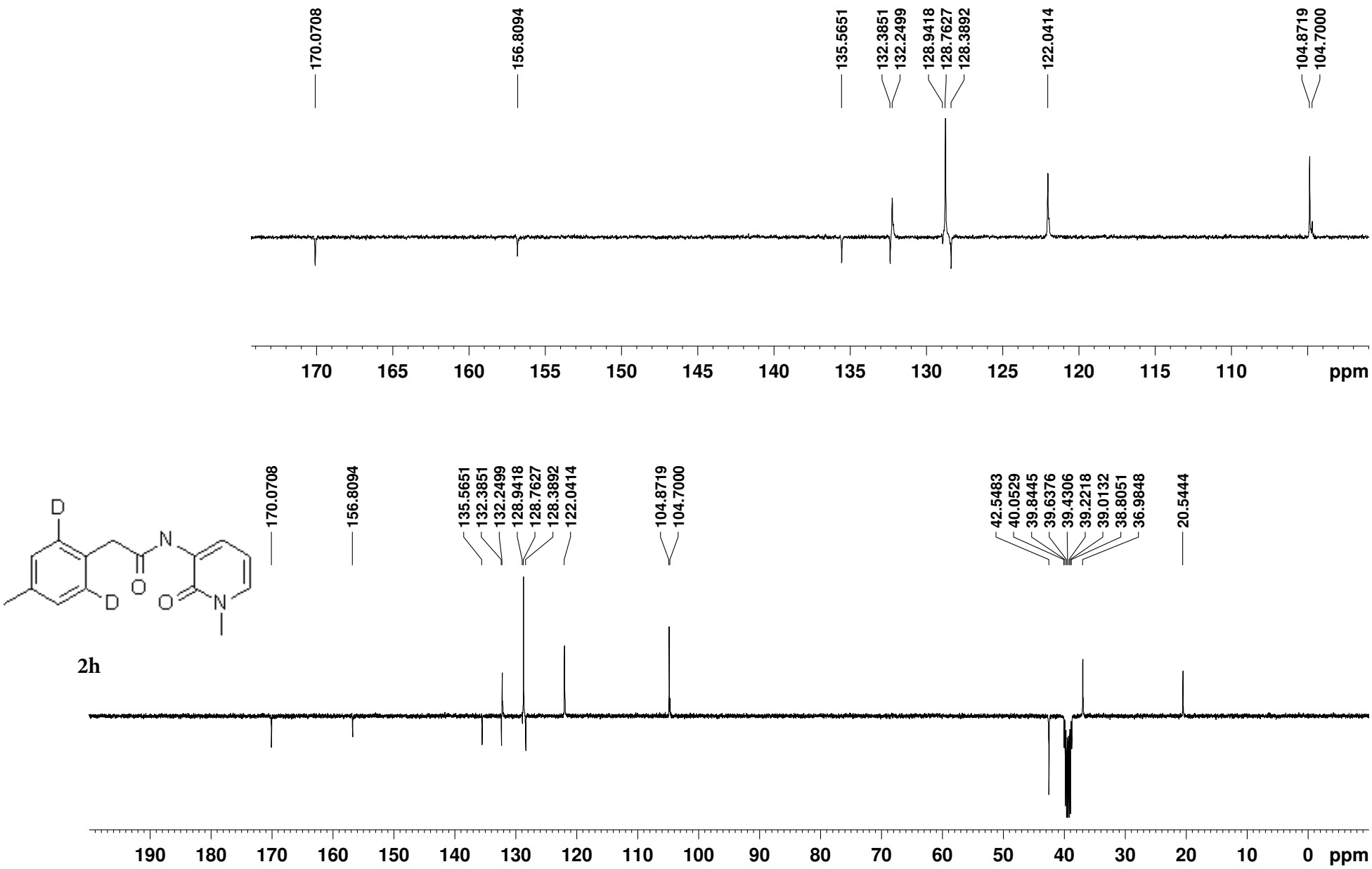
^{1}H NMR of 2h IN DMSO AT 100^{O}C



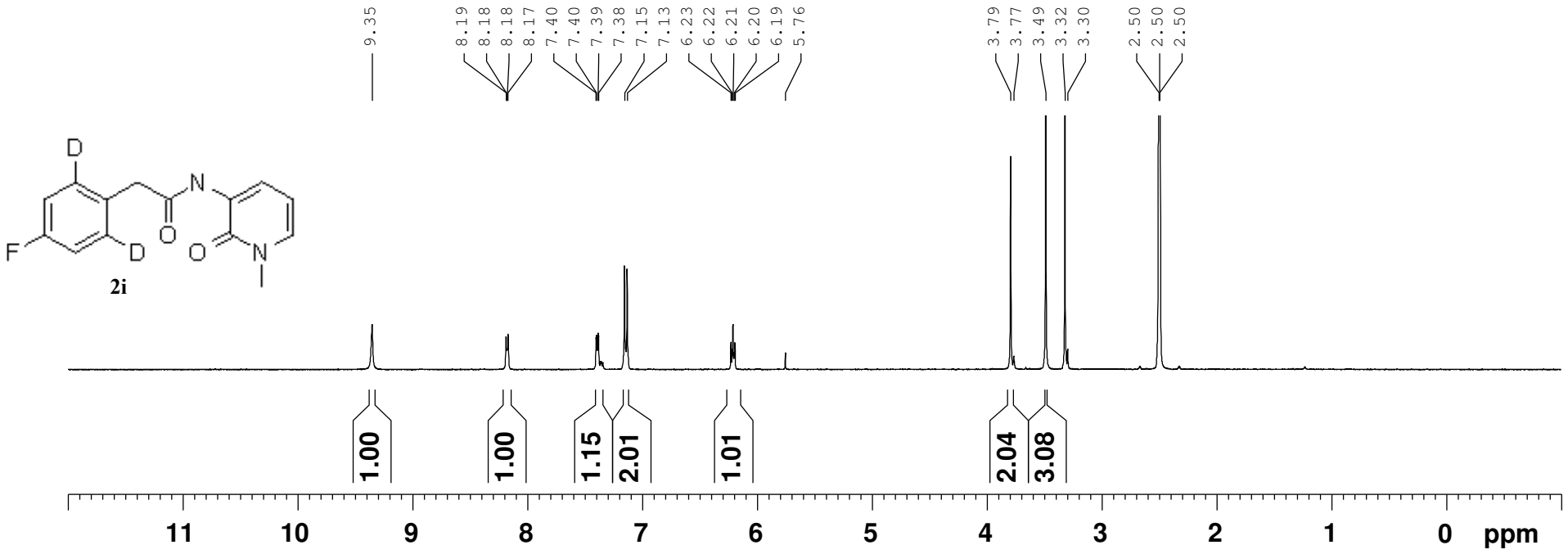
^{1}H NMR of 2h IN DMSO AT 20^{O}C



^{13}C NMR of 2h IN DMSO

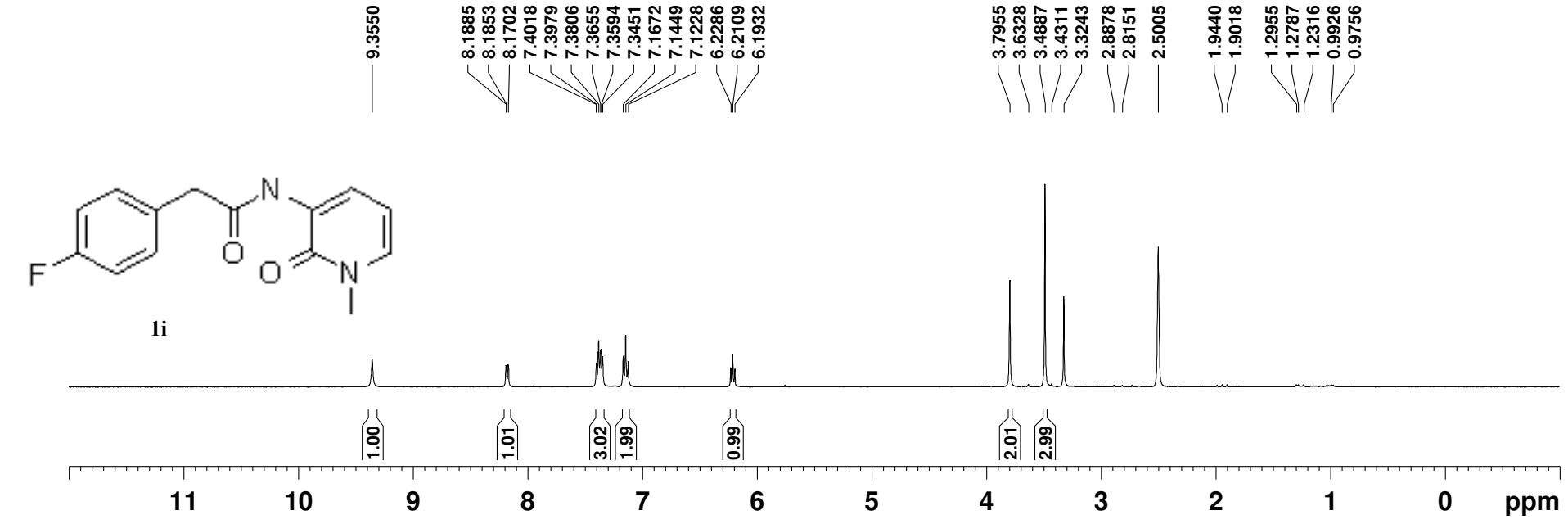


APT of 2h IN DMSO



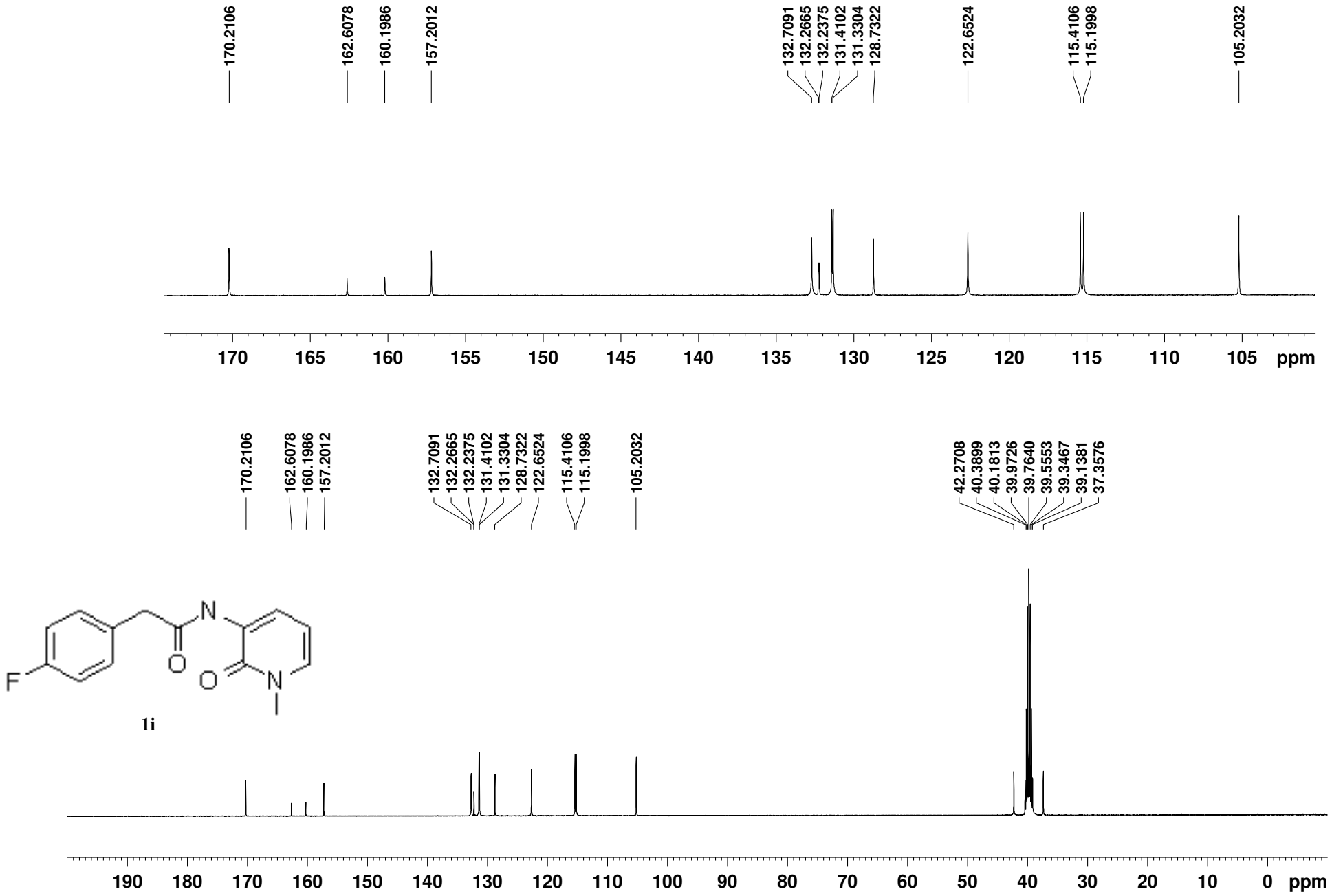
2i

^{1}H NMR of 2i IN DMSO

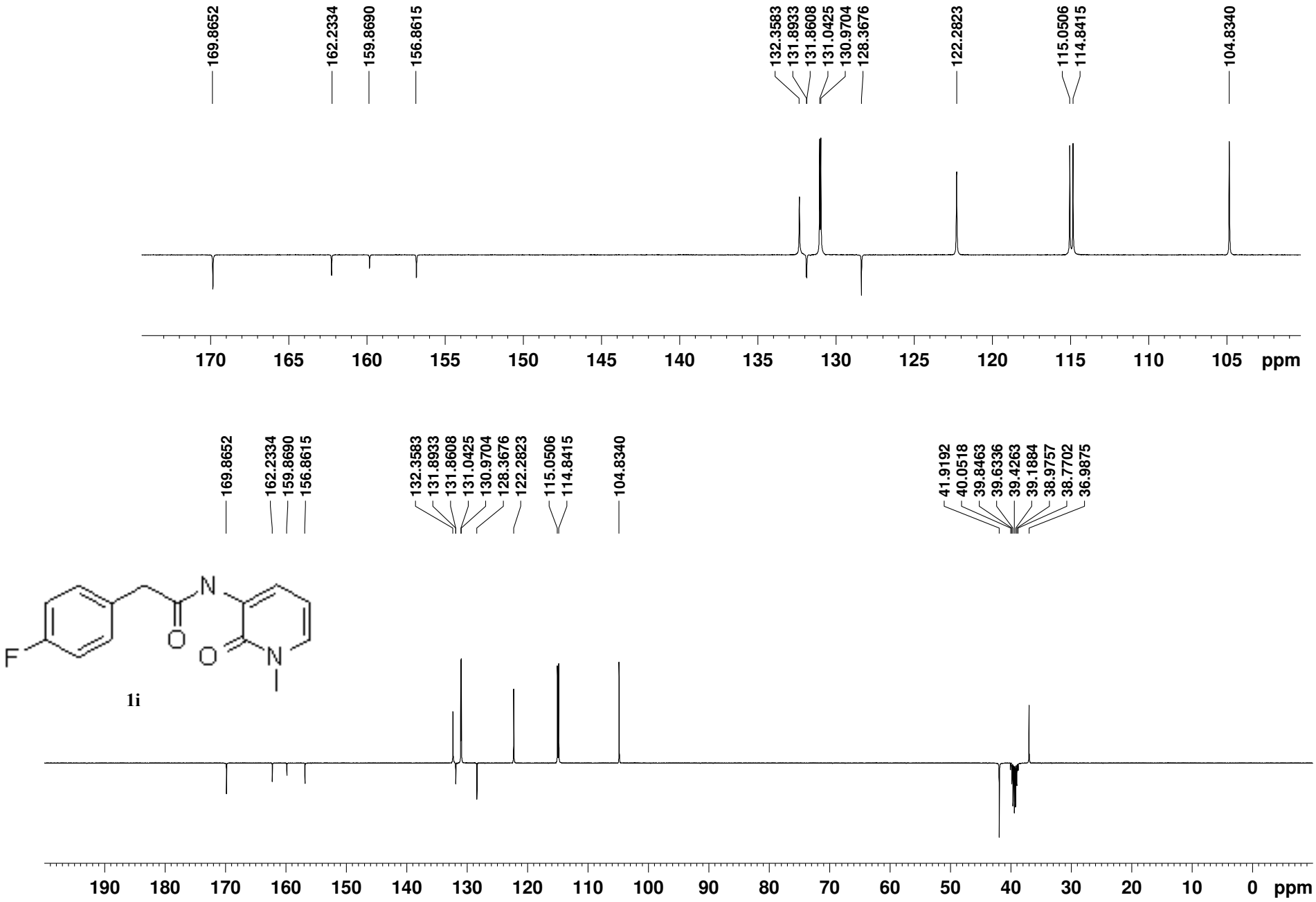


1i

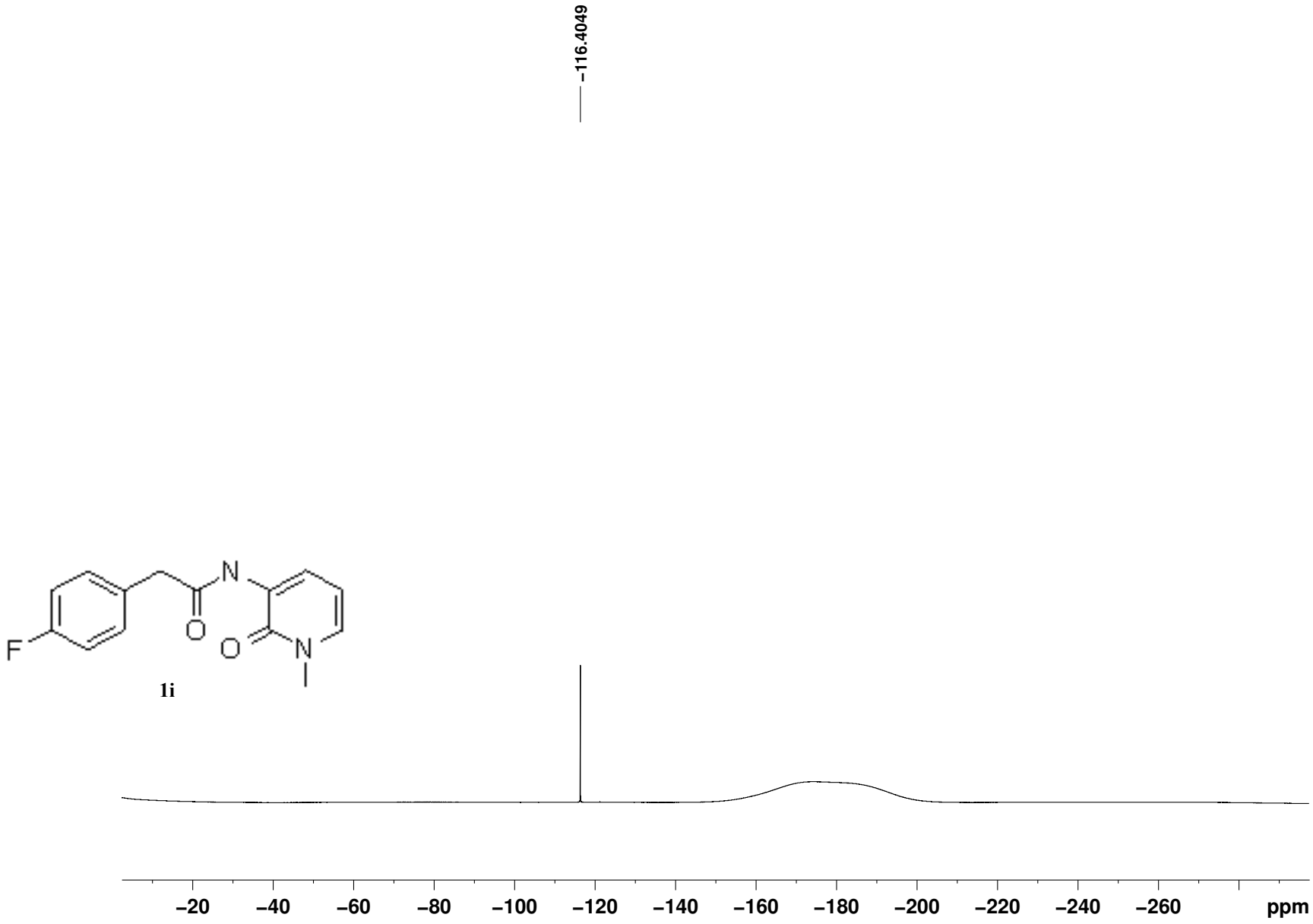
^{1}H NMR of 1i IN DMSO



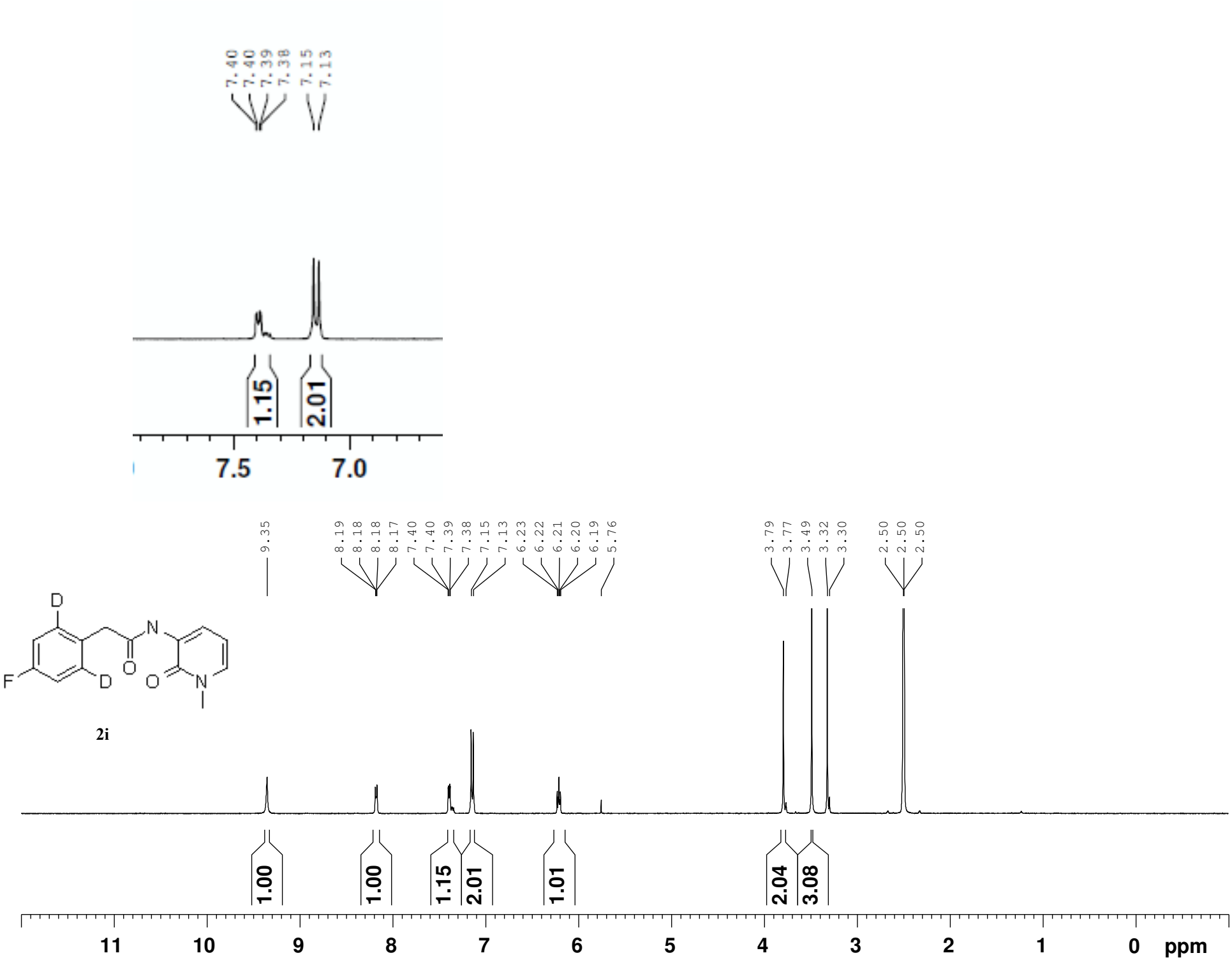
^{13}C NMR of 1i IN DMSO



APT of 1i IN DMSO

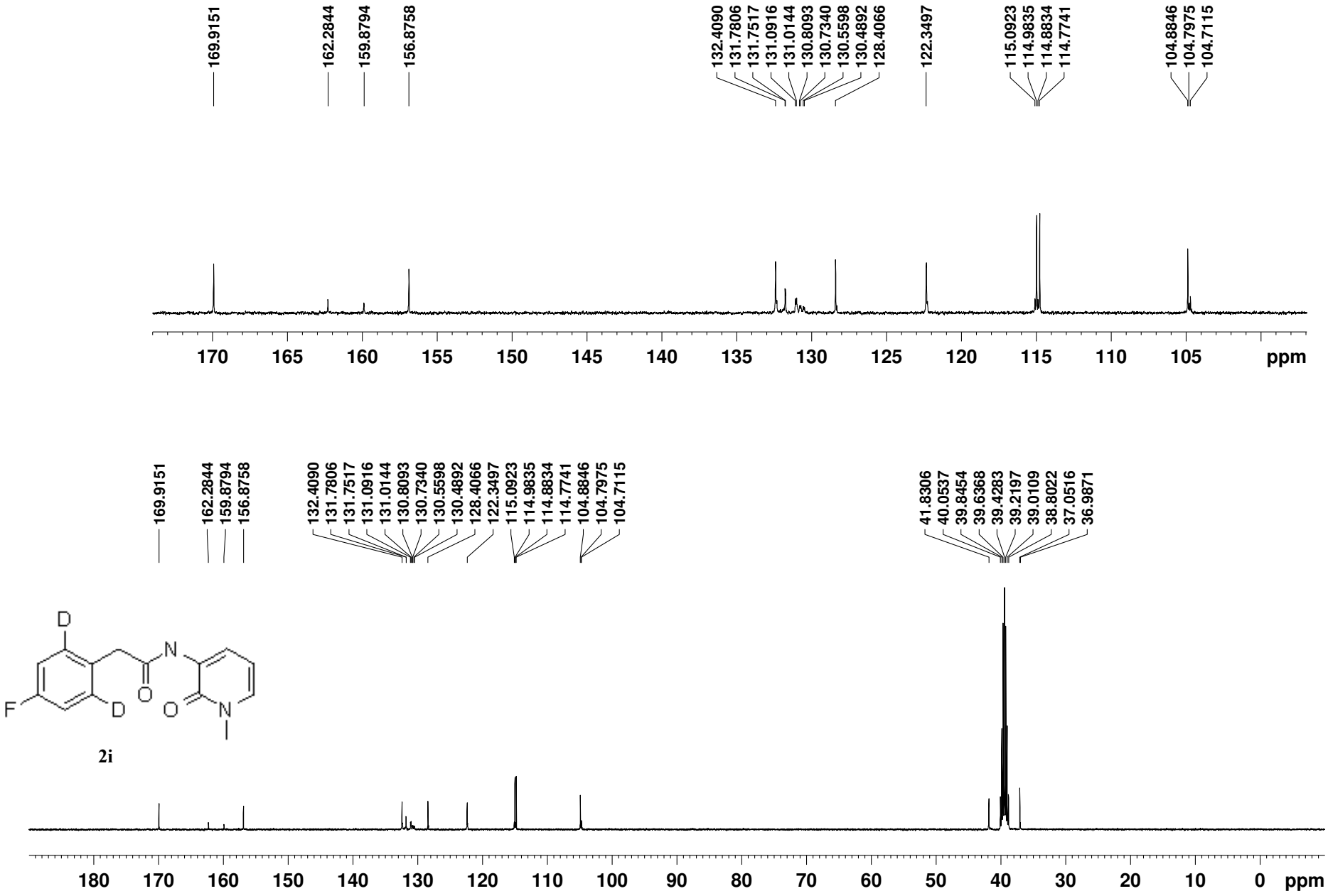


^{19}F NMR of 1i IN DMSO

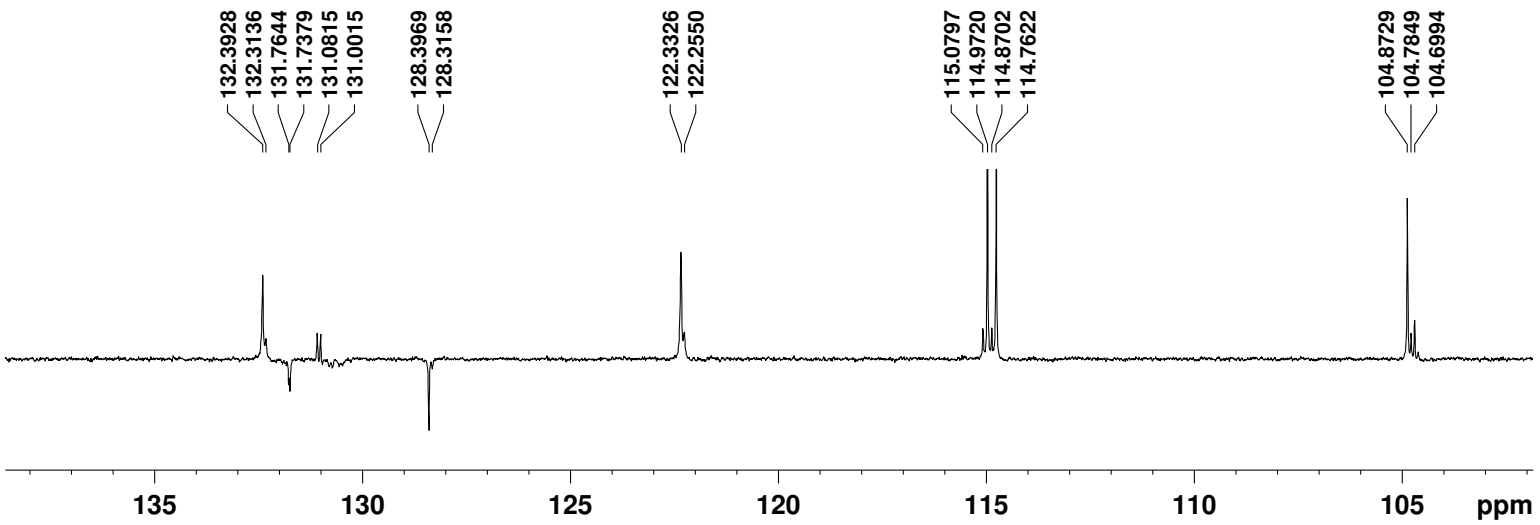


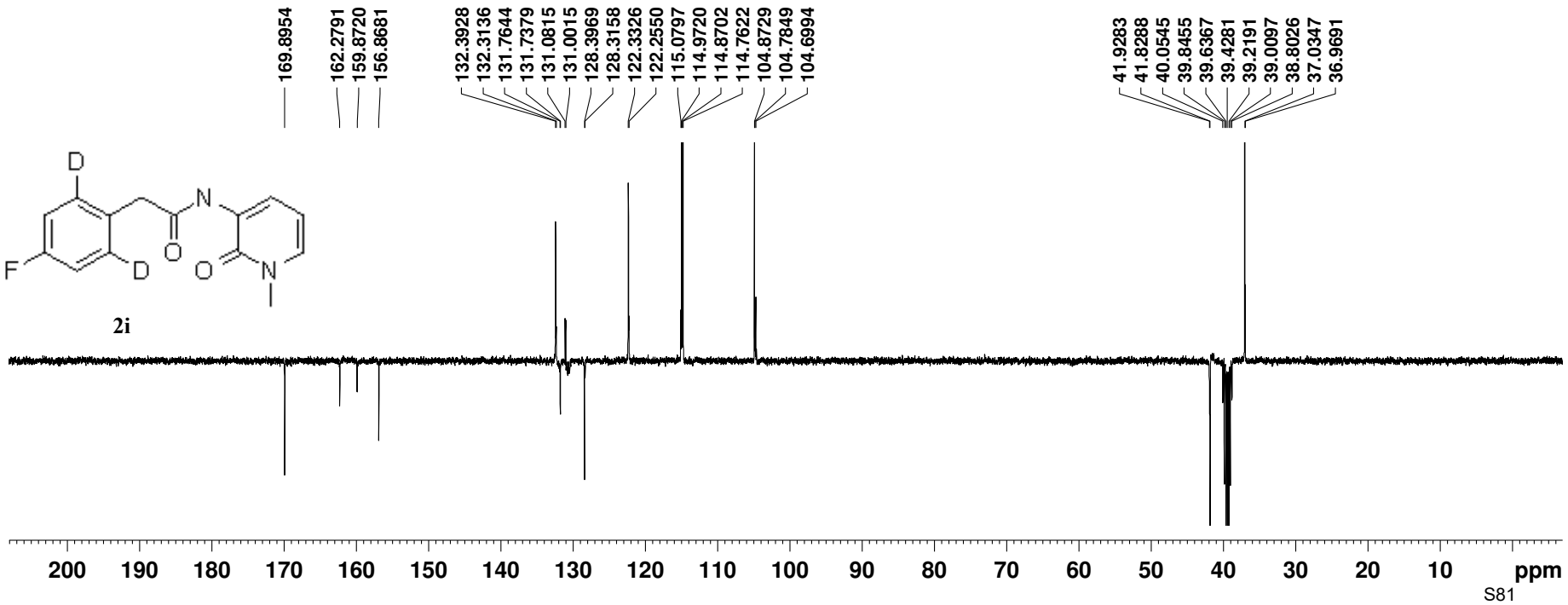
2i

^{1}H NMR of 2i IN DMSO



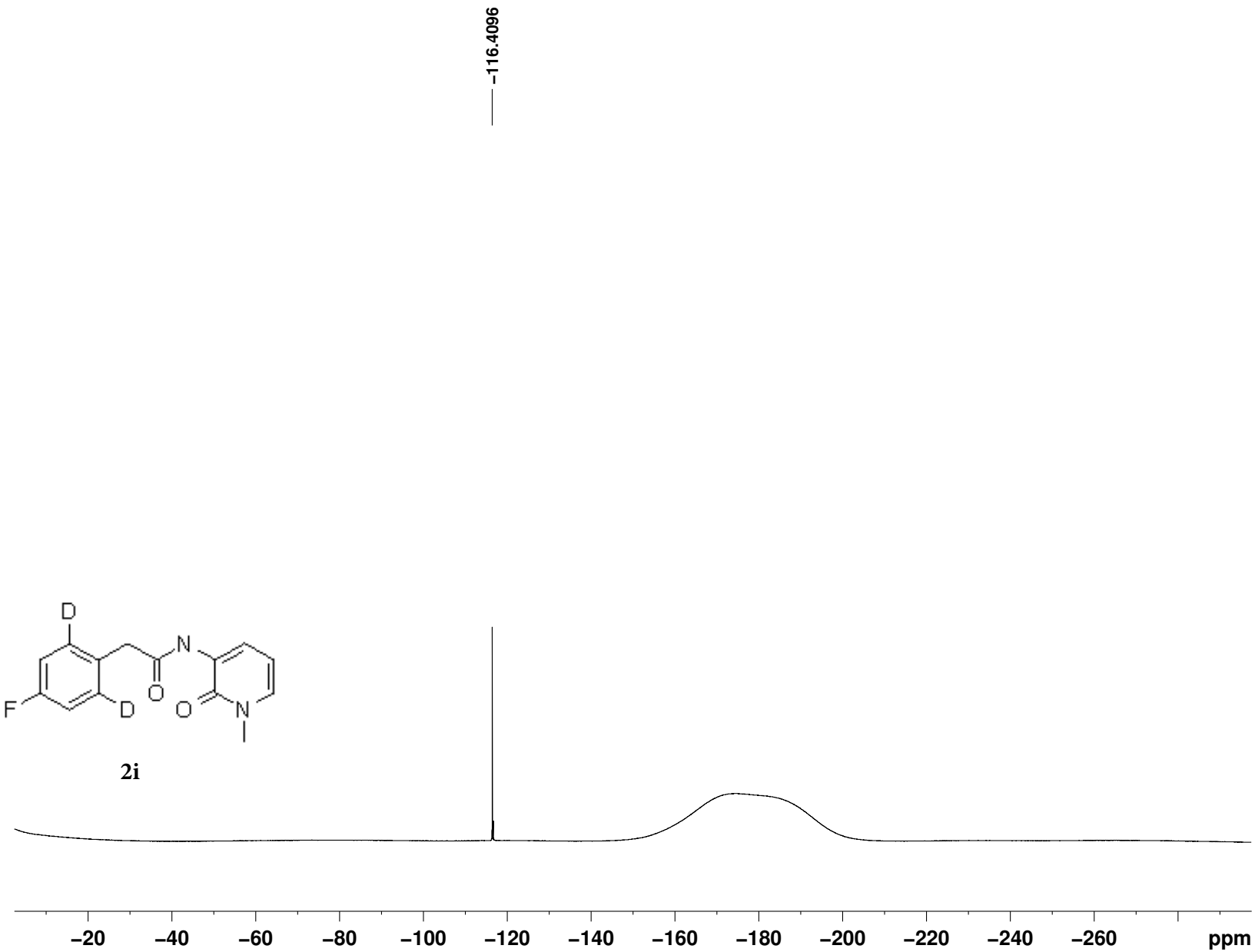
^{13}C NMR of 2i IN DMSO



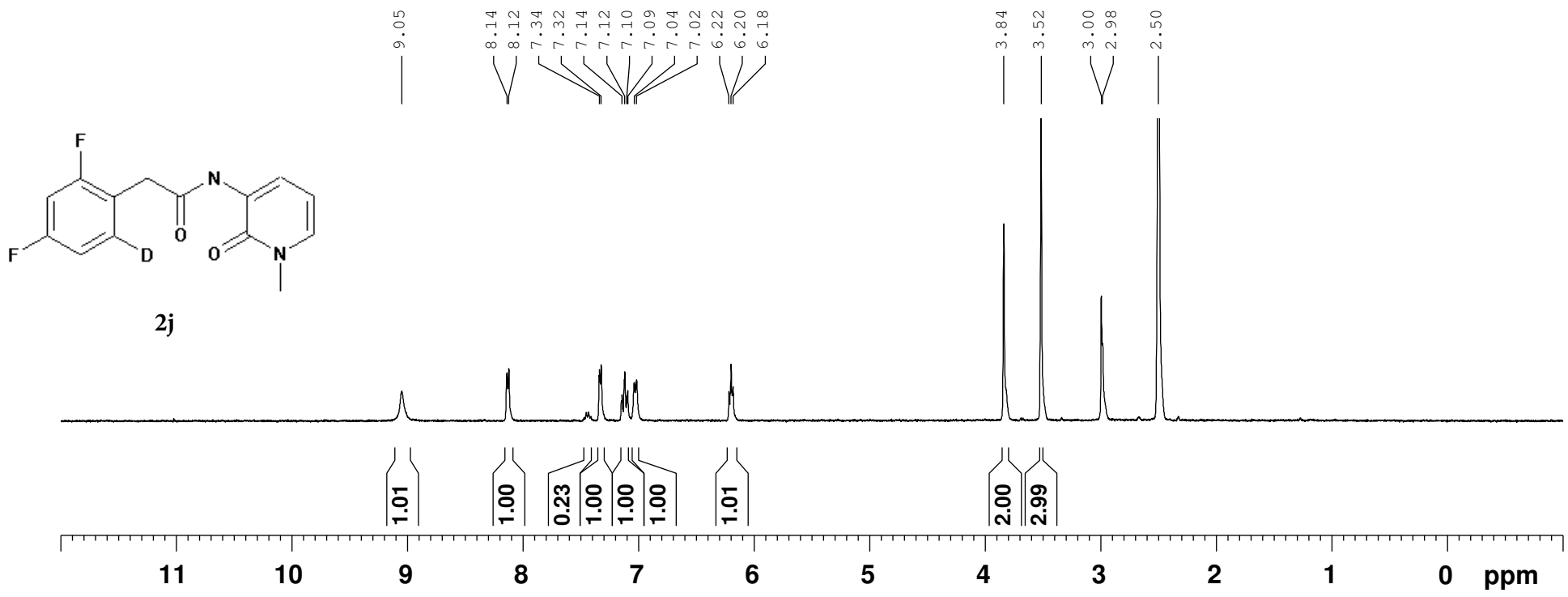


2i

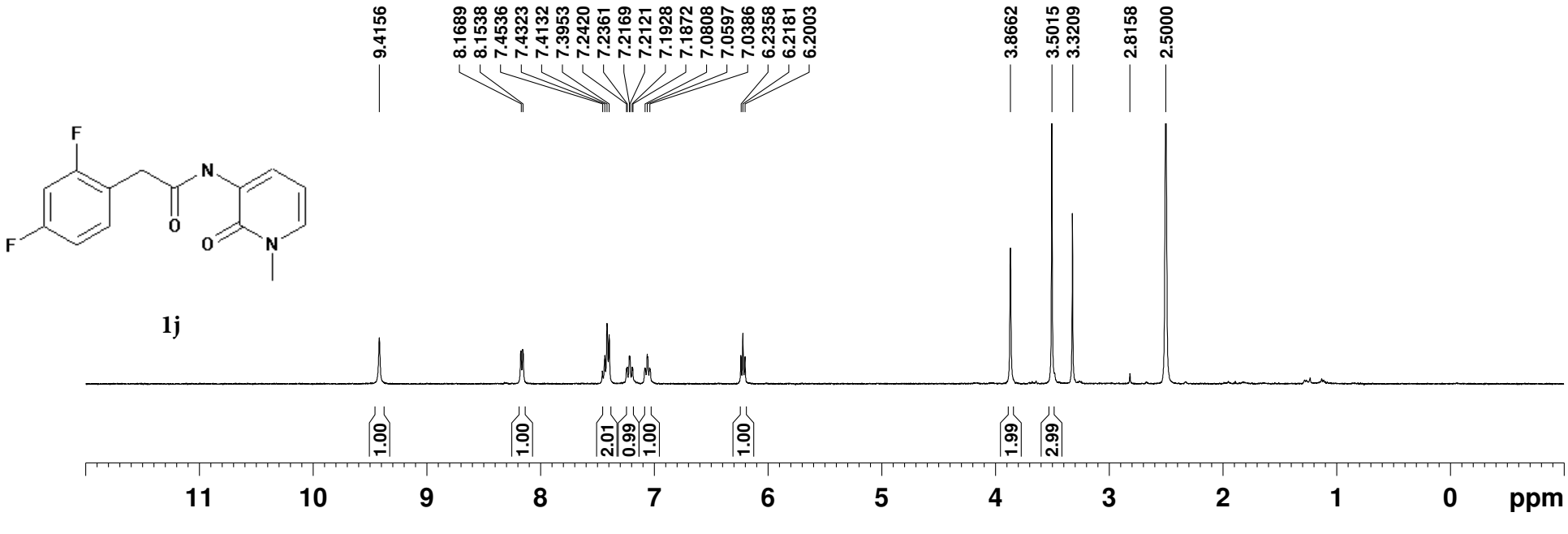
APT of 2i IN DMSO



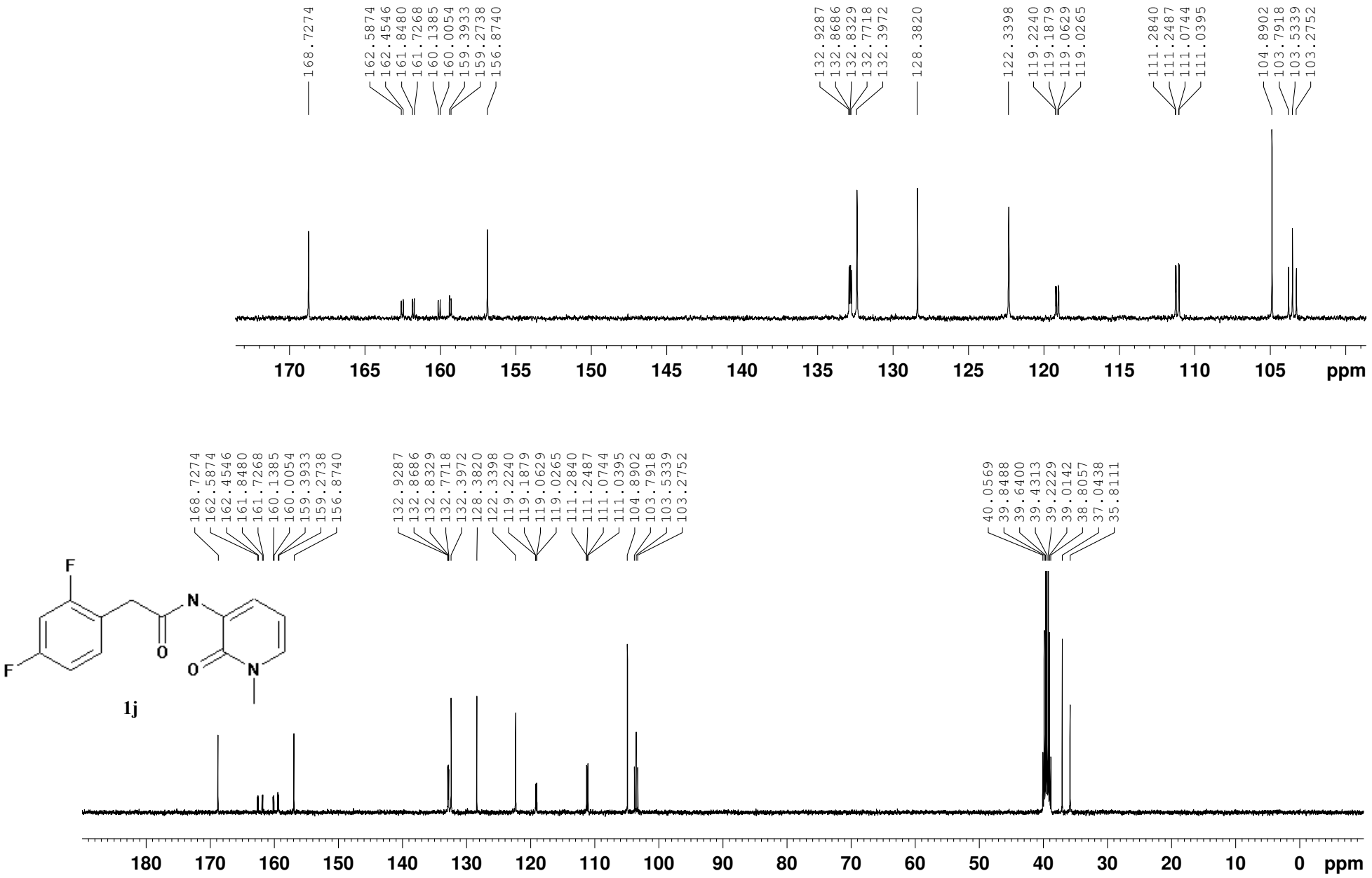
^{19}F NMR of 2i IN DMSO



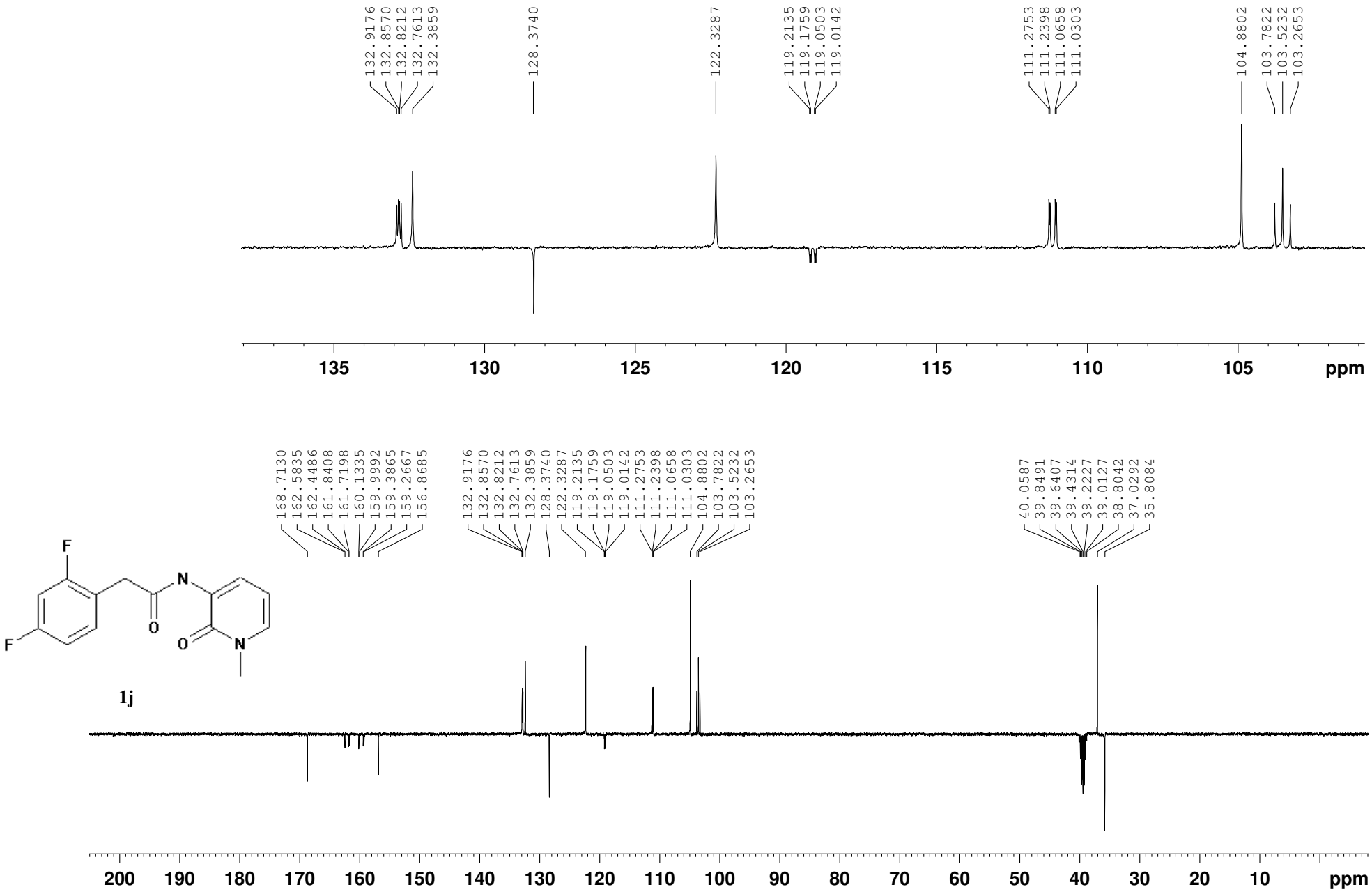
^{1}H NMR of 2j IN DMSO AT 100^{O}C



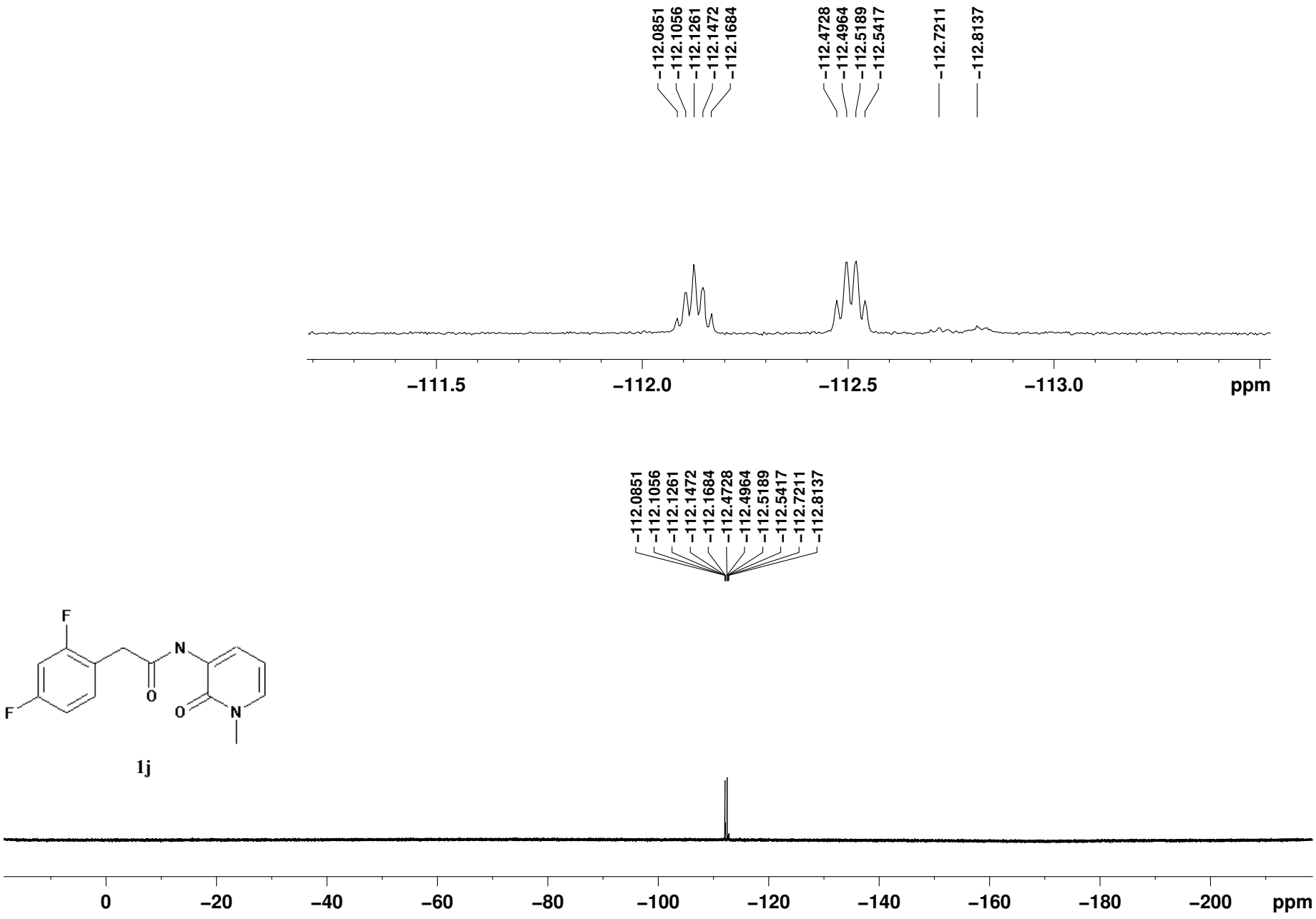
^{1}H NMR of 1j IN DMSO AT 20^{O}C



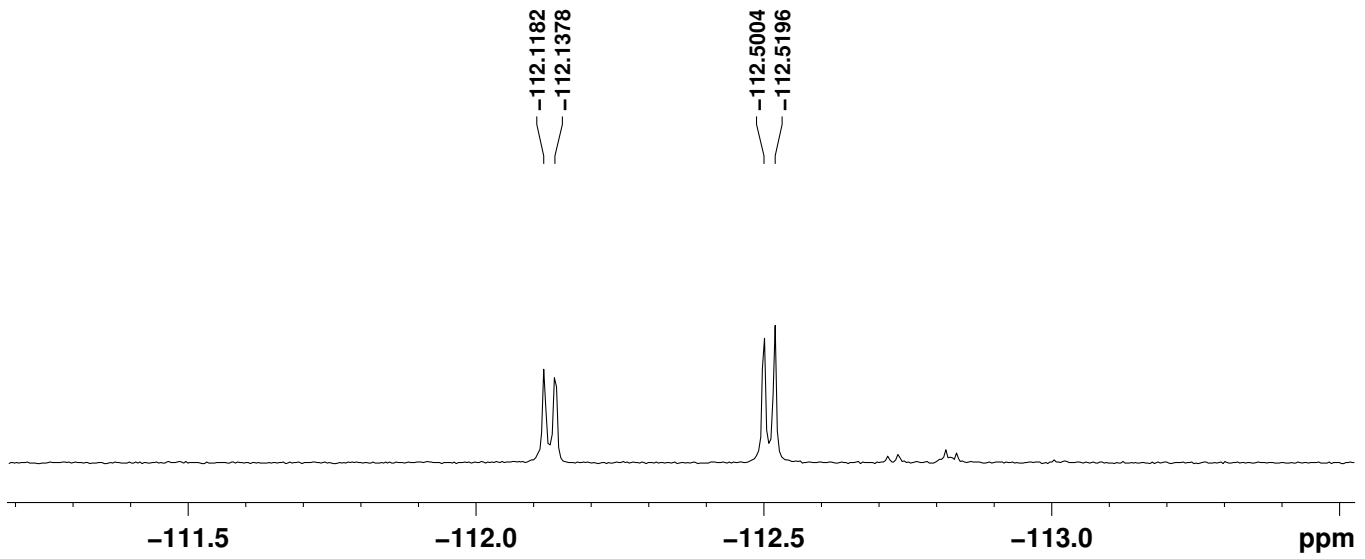
^{13}C NMR of 1j IN DMSO

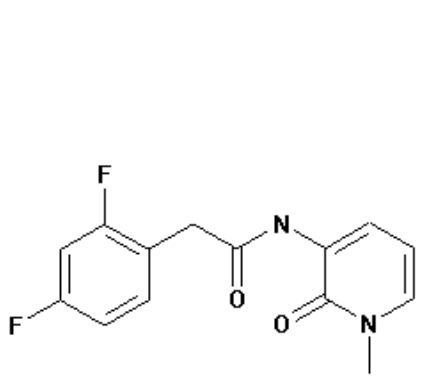


APT of 1j IN DMSO



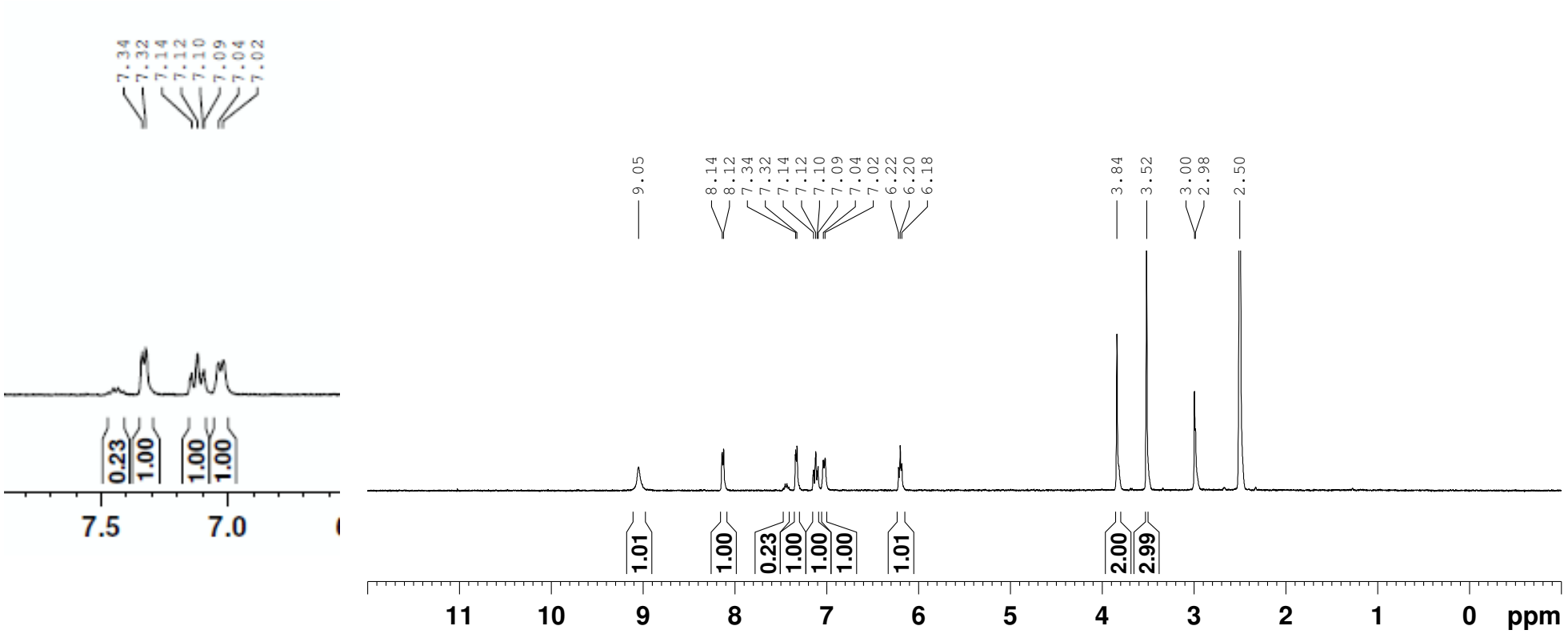
^{19}F NMR of 1j IN DMSO (PC)



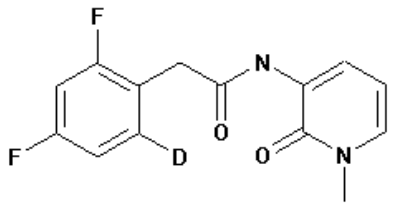


1j

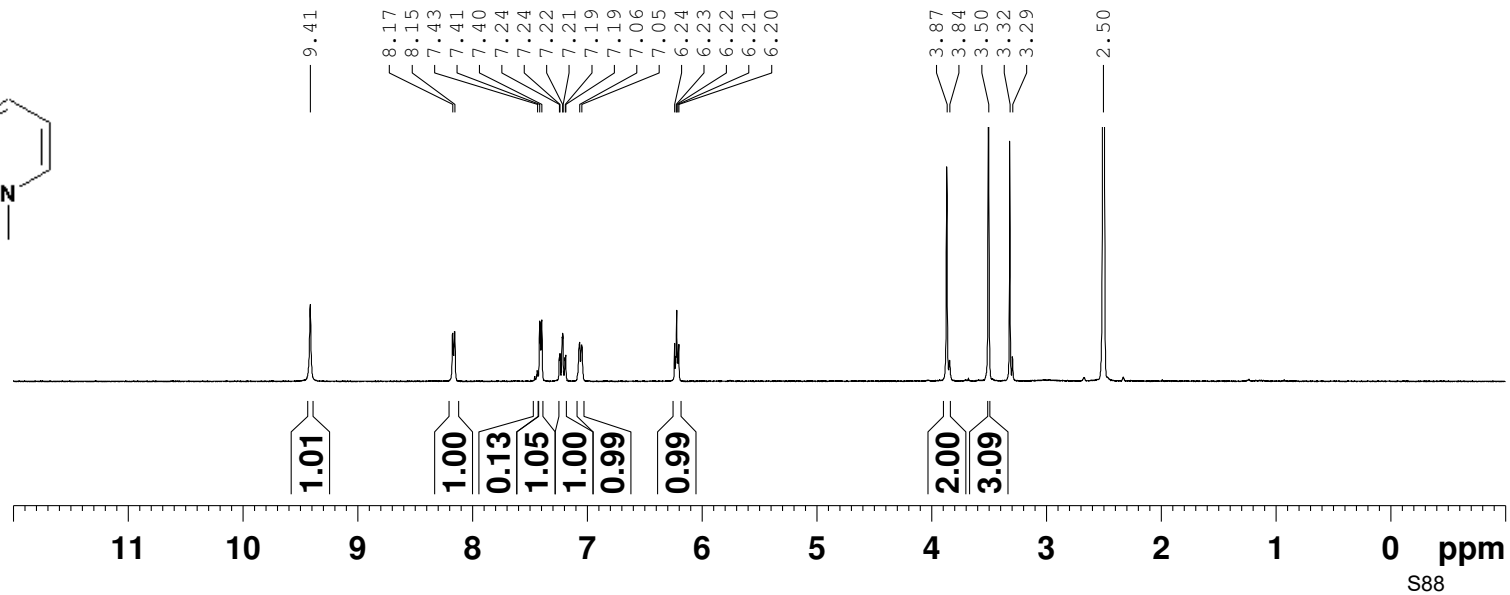
^{19}F NMR of 1j IN DMSO (PDC)



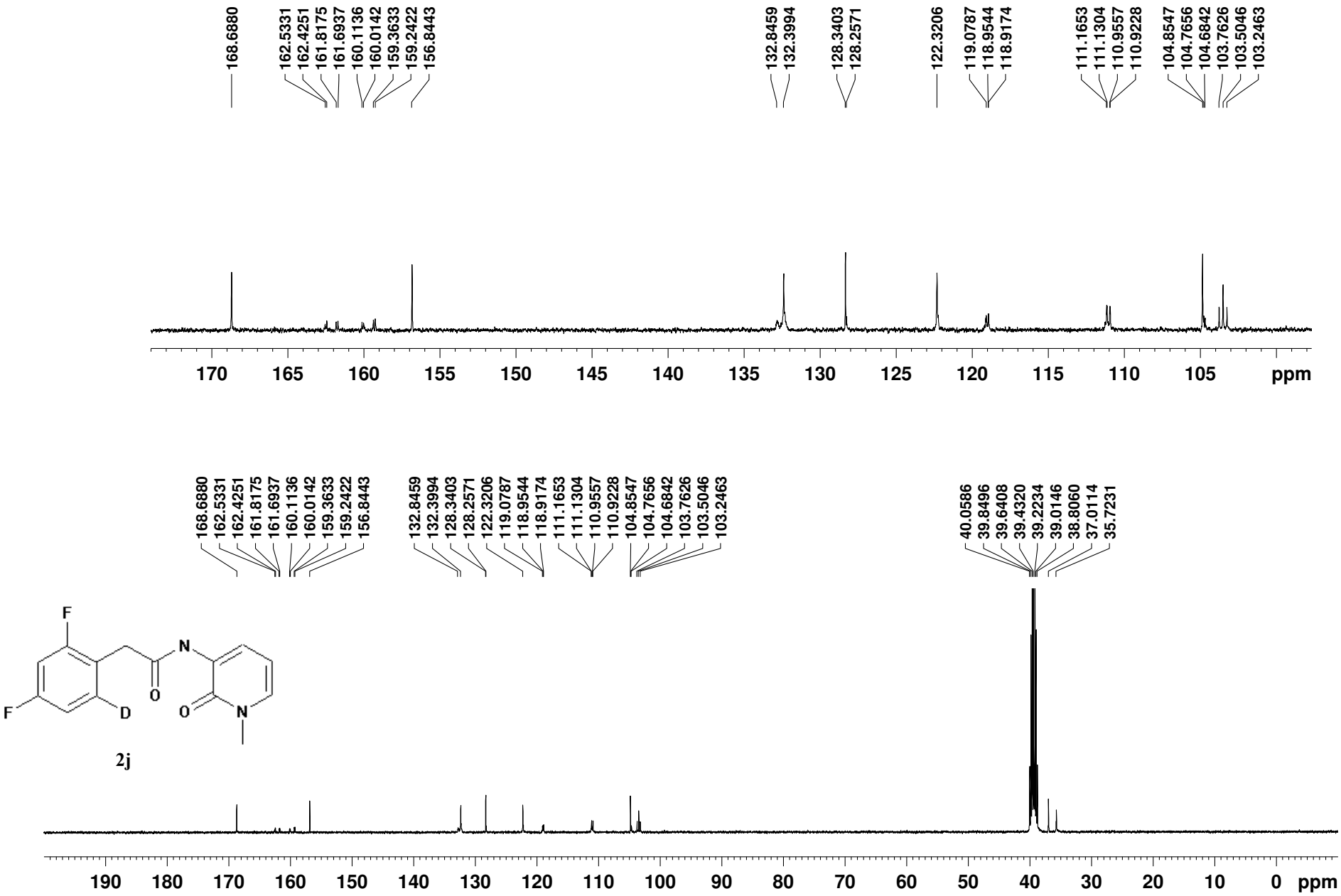
^{1}H NMR of 2j IN DMSO AT 100^{o}C



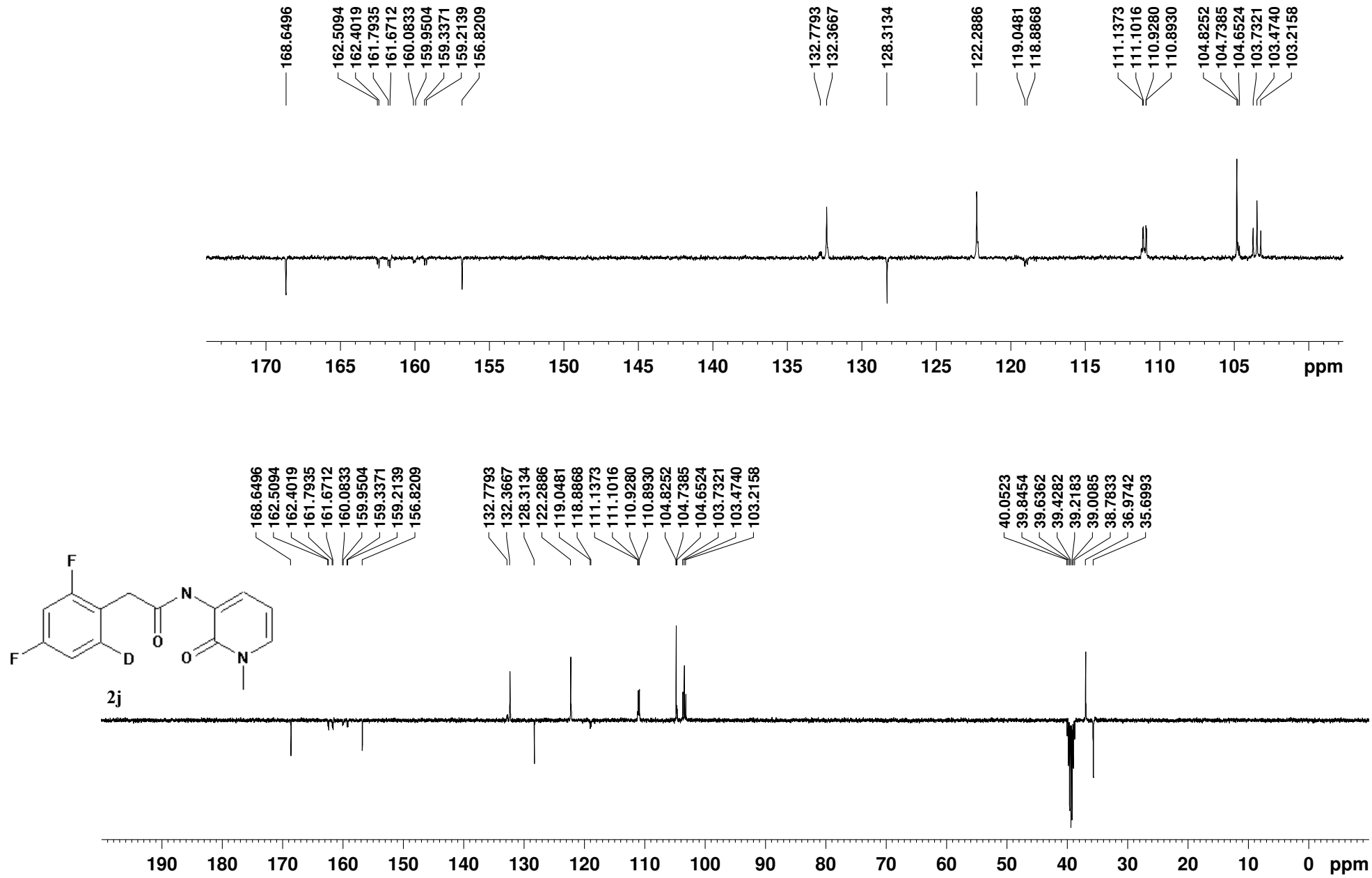
2j



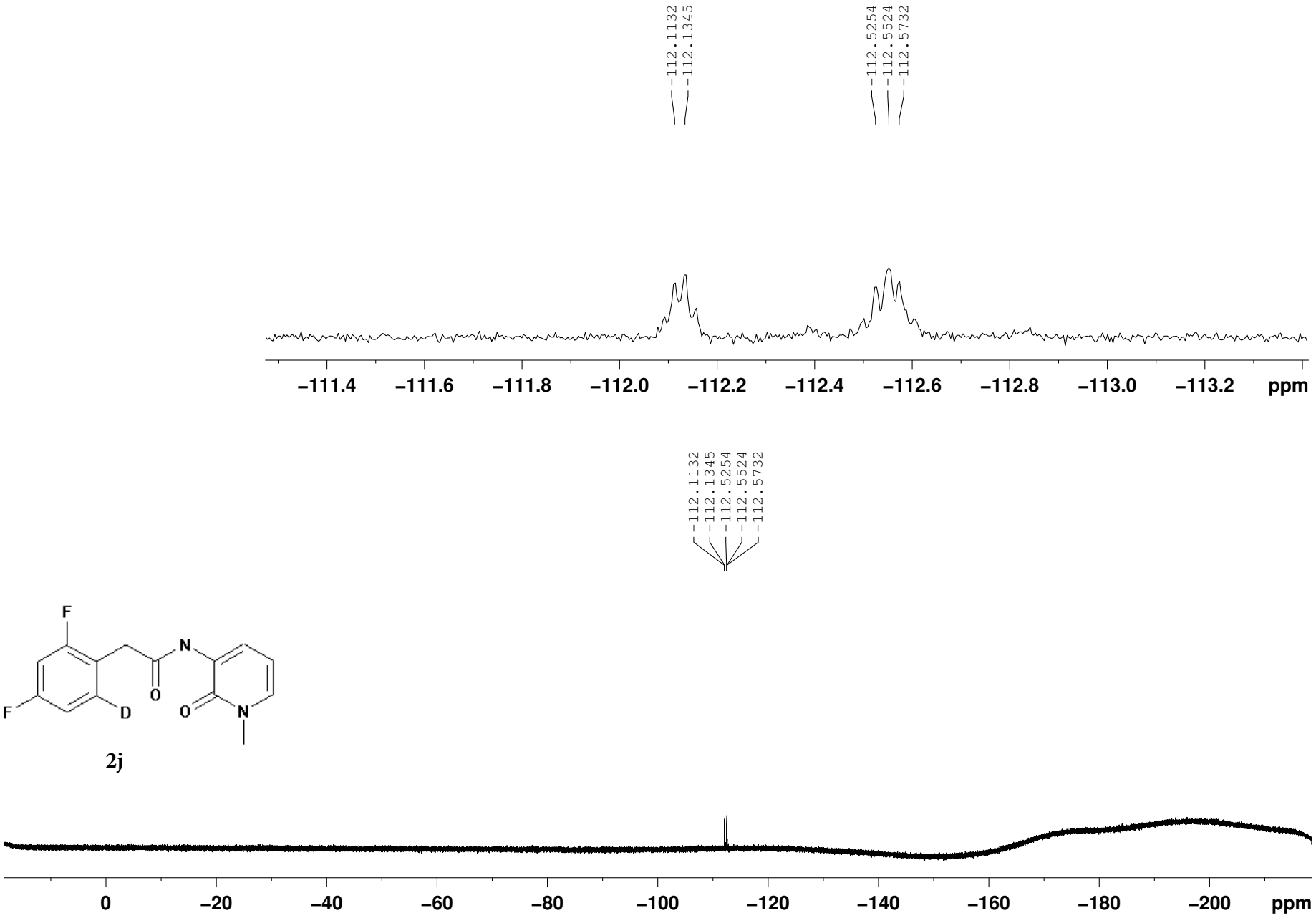
^{1}H NMR of 2j IN DMSO AT 20^{o}C



^{13}C NMR of 2j IN DMSO

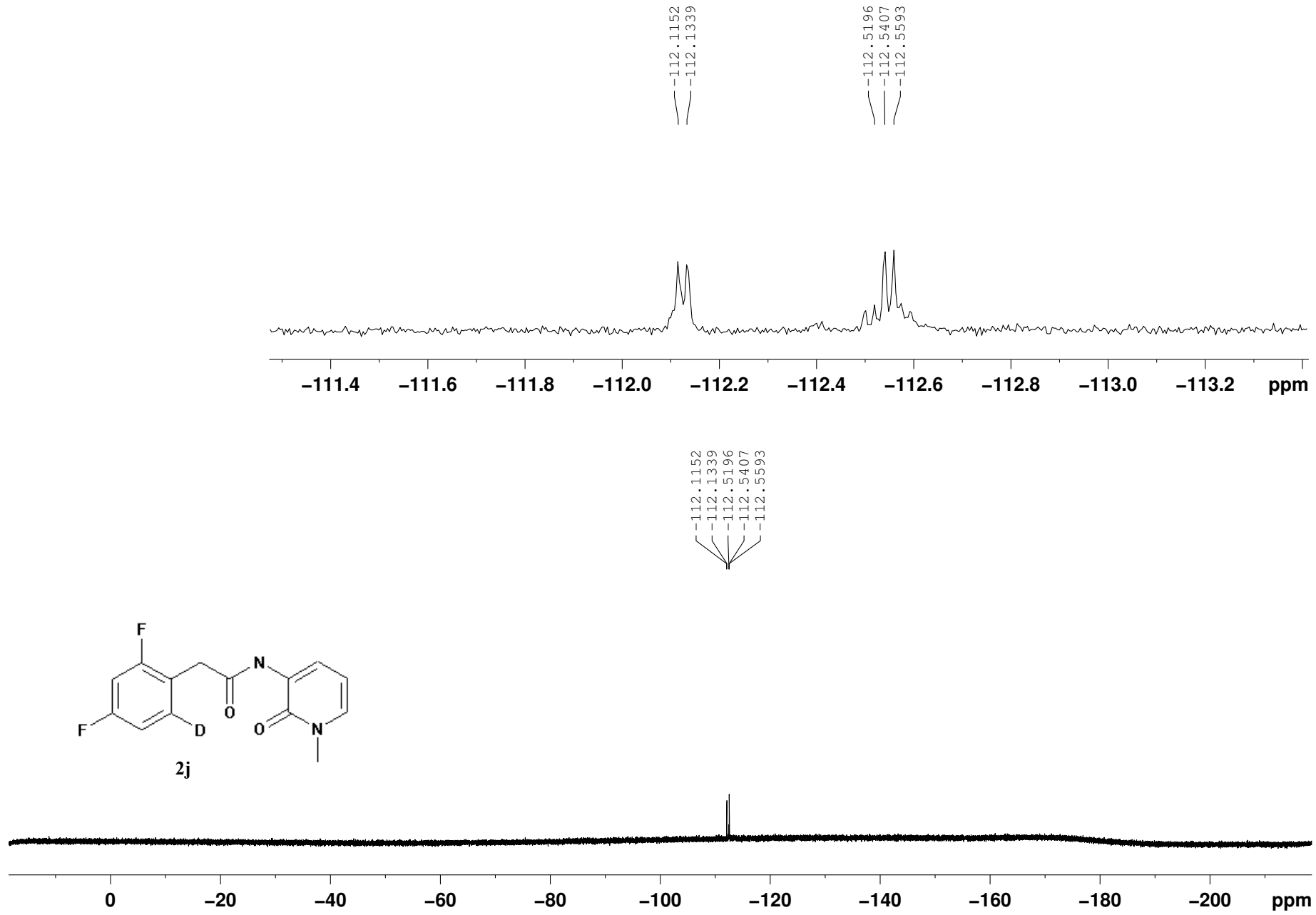


APT of 2j IN DMSO



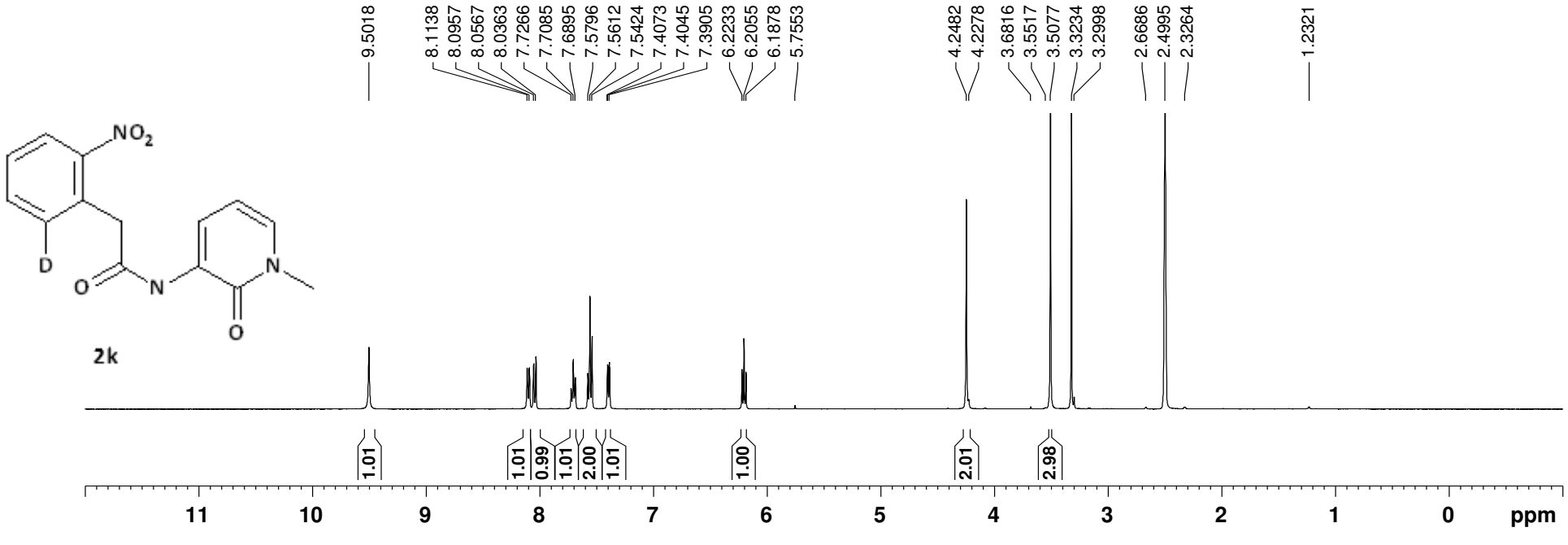
2j

^{19}F NMR of 2j IN DMSO (PC)

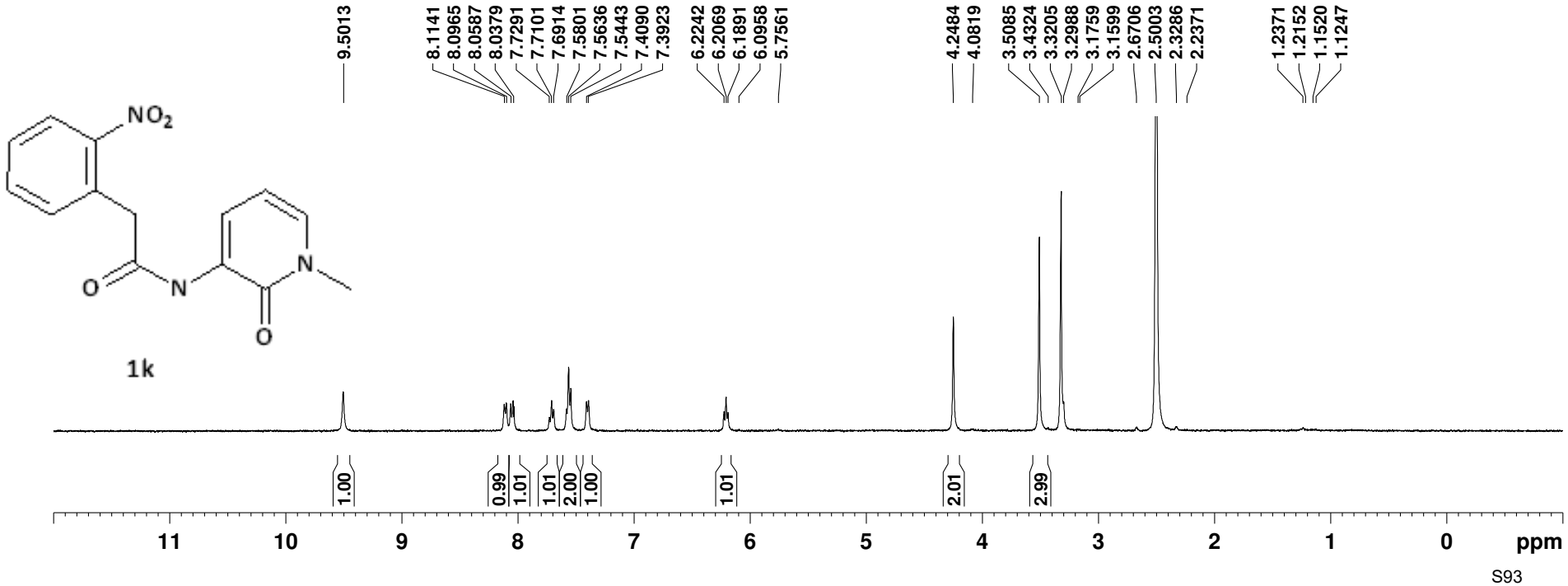


2j

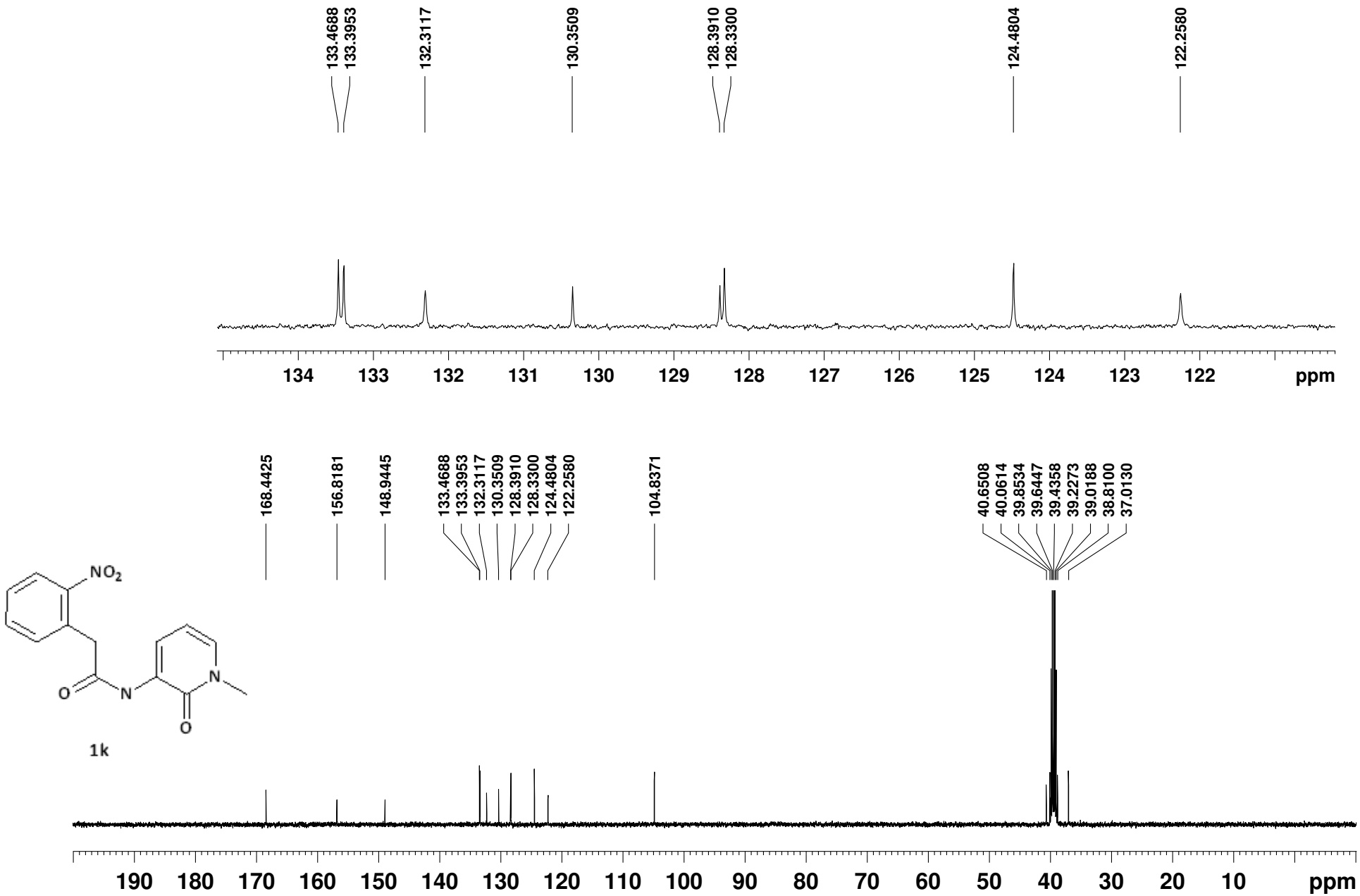
^{19}F NMR of 2j IN DMSO (PDC)



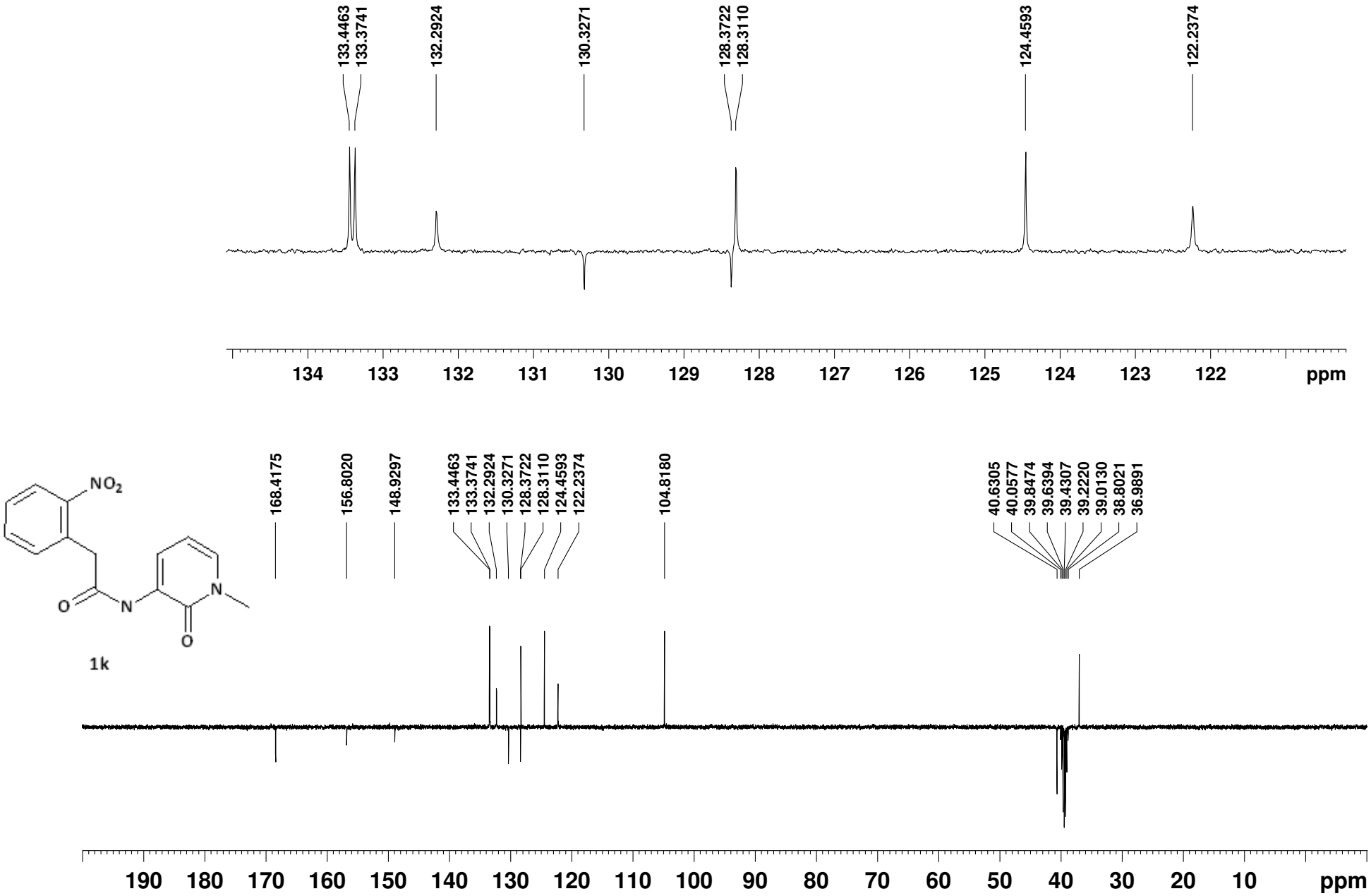
^{1}H NMR of 2k IN DMSO No Deuterium incorporation



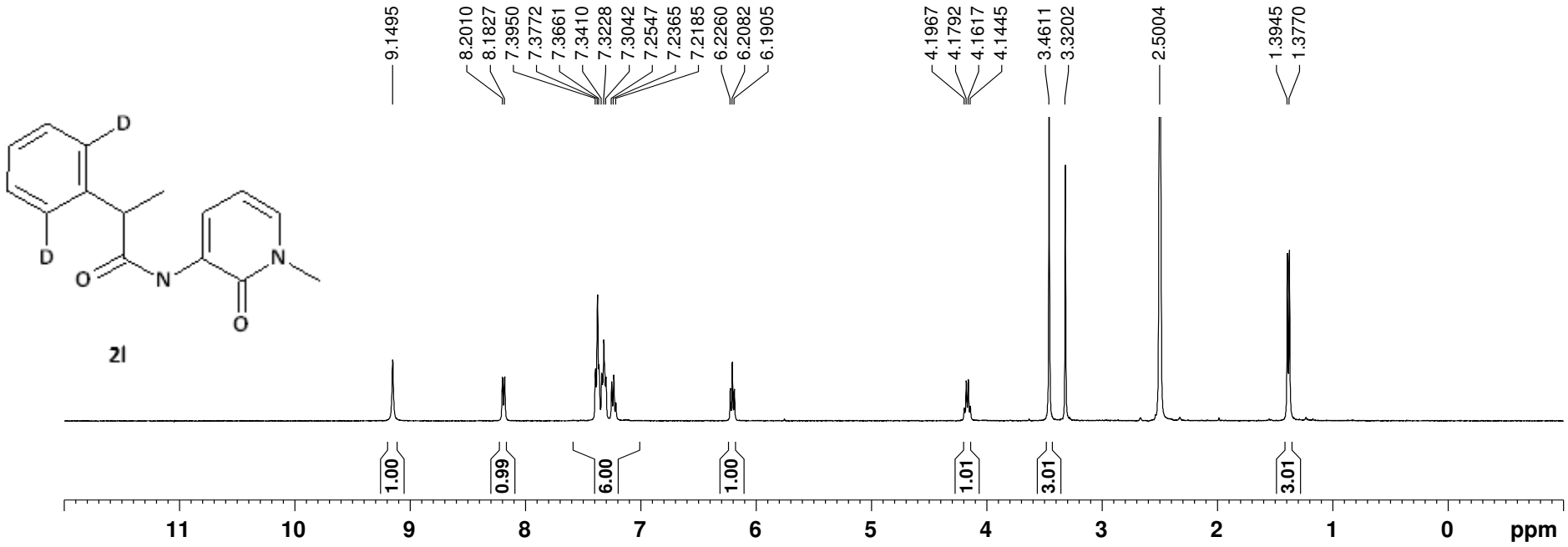
^{1}H NMR of 1k IN DMSO



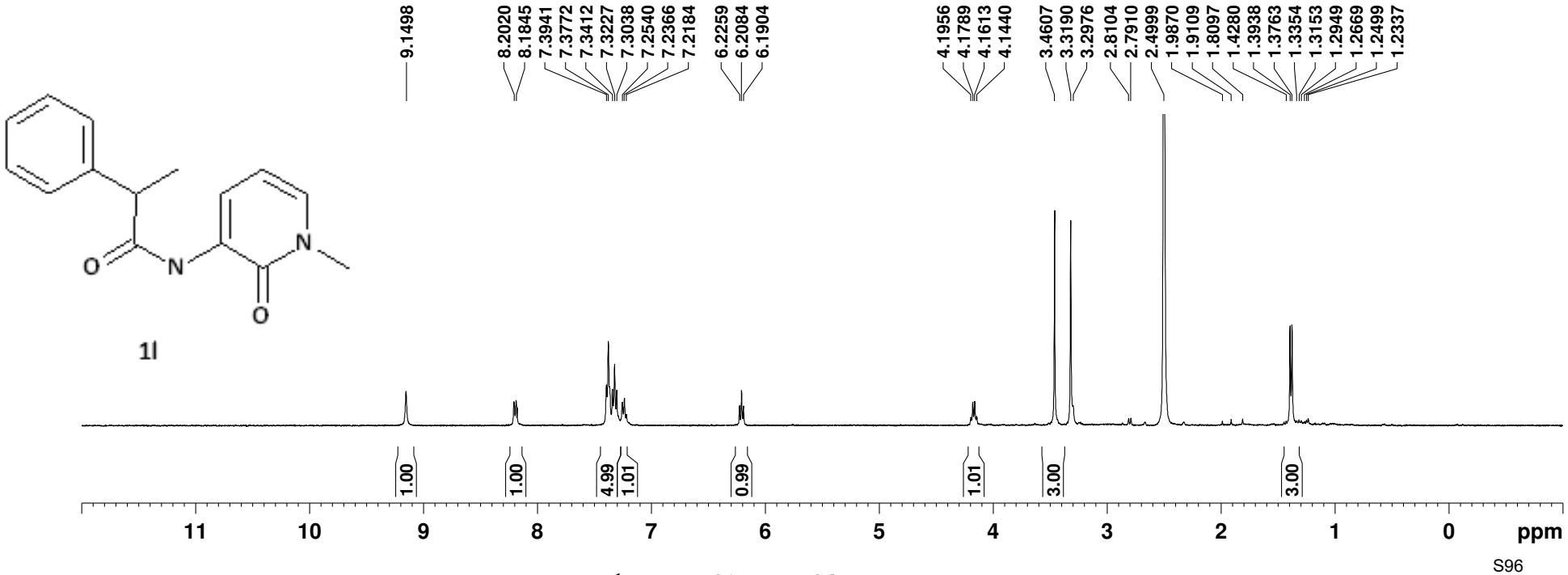
^{13}C NMR of 1k IN DMSO



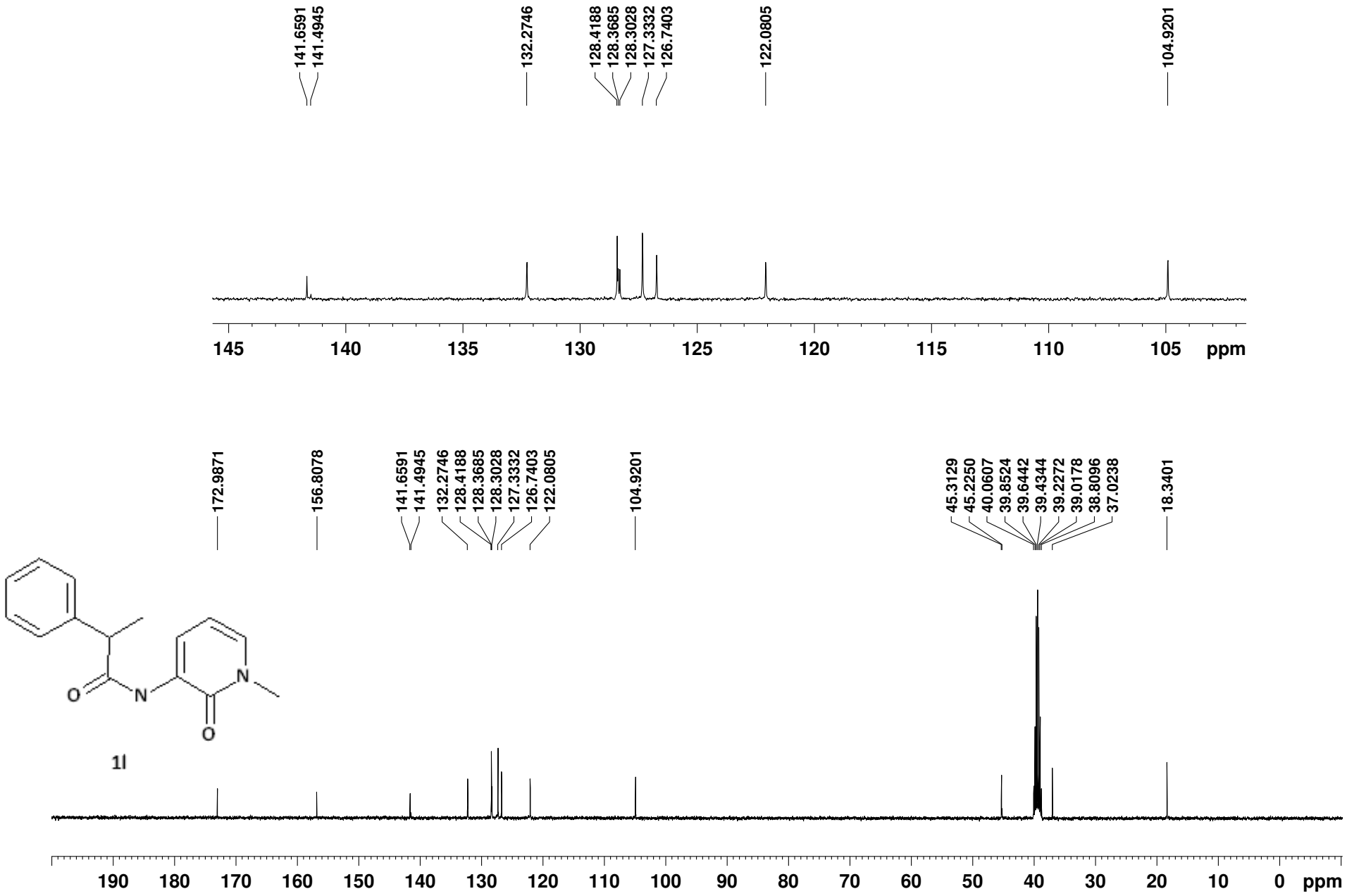
APT of 1k IN DMSO



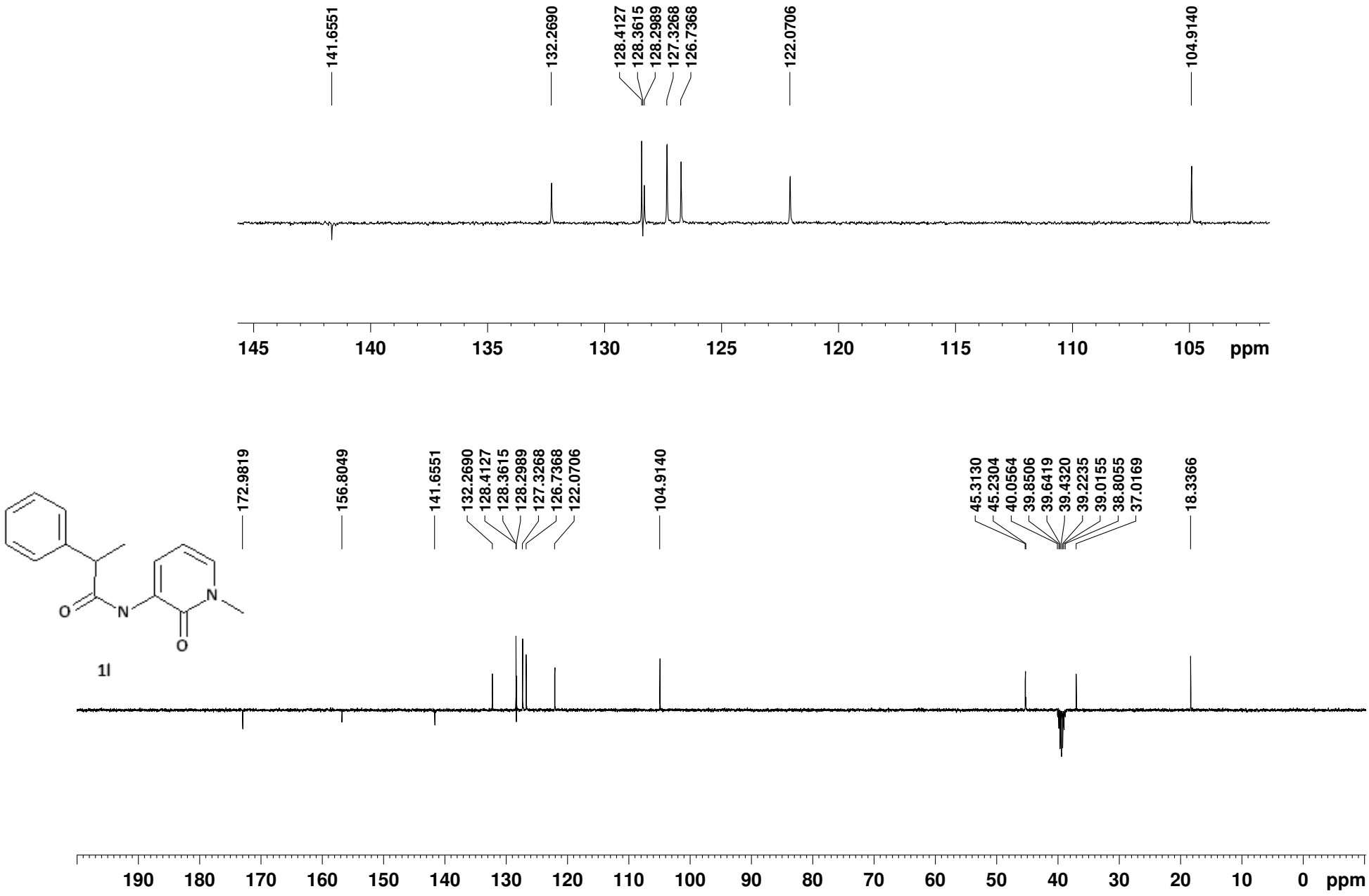
^{1}H NMR of 2l IN DMSO No deuterium incorporation



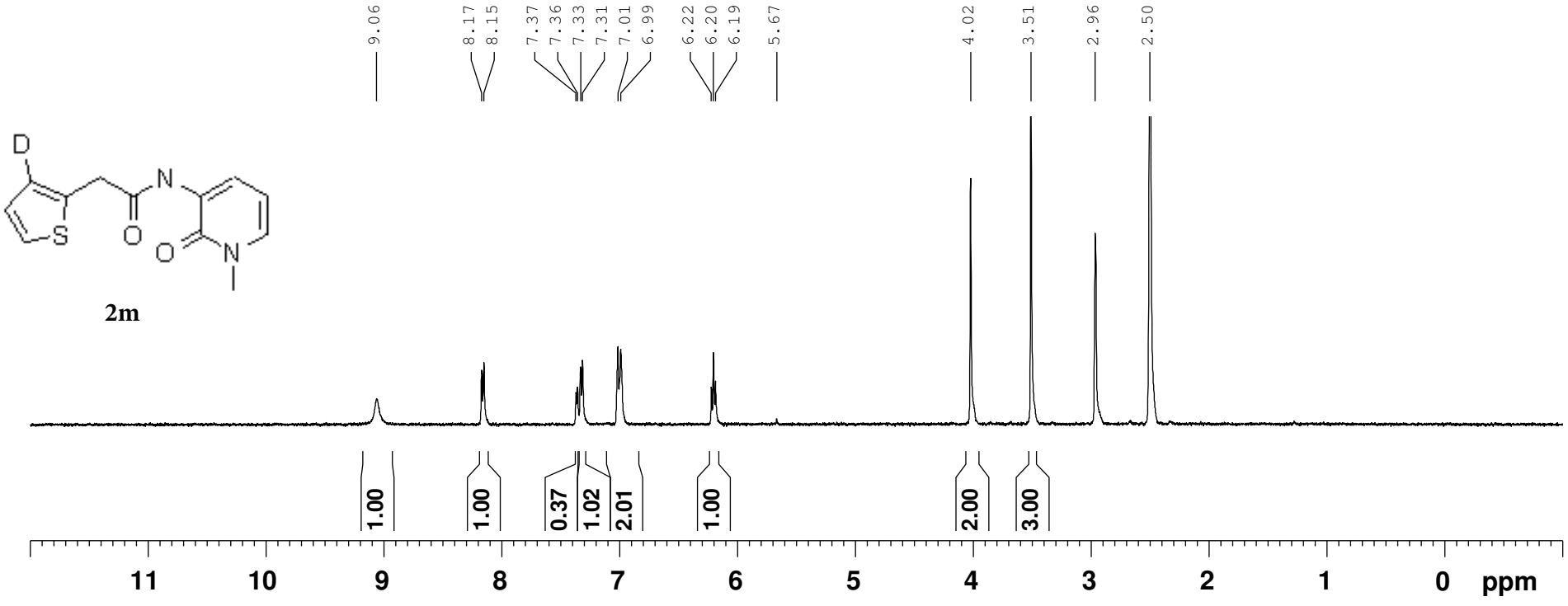
^{1}H NMR of 1l IN DMSO



^{13}C NMR of 1l IN DMSO

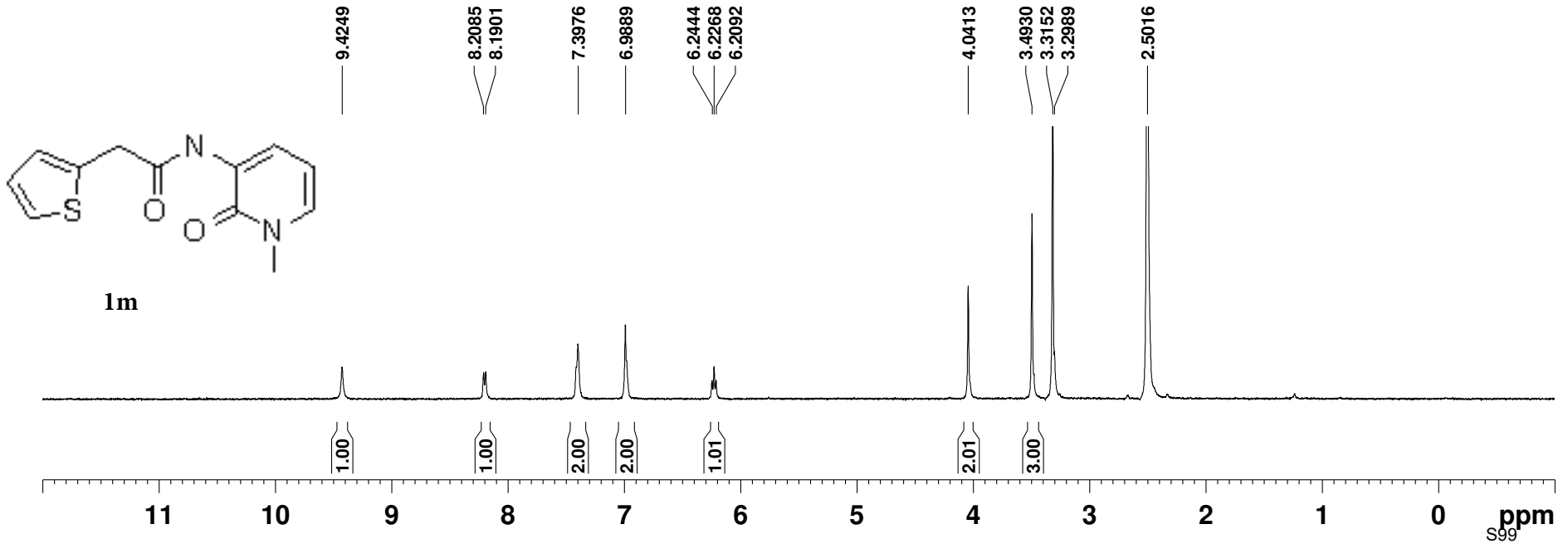


APT of 1l IN DMSO



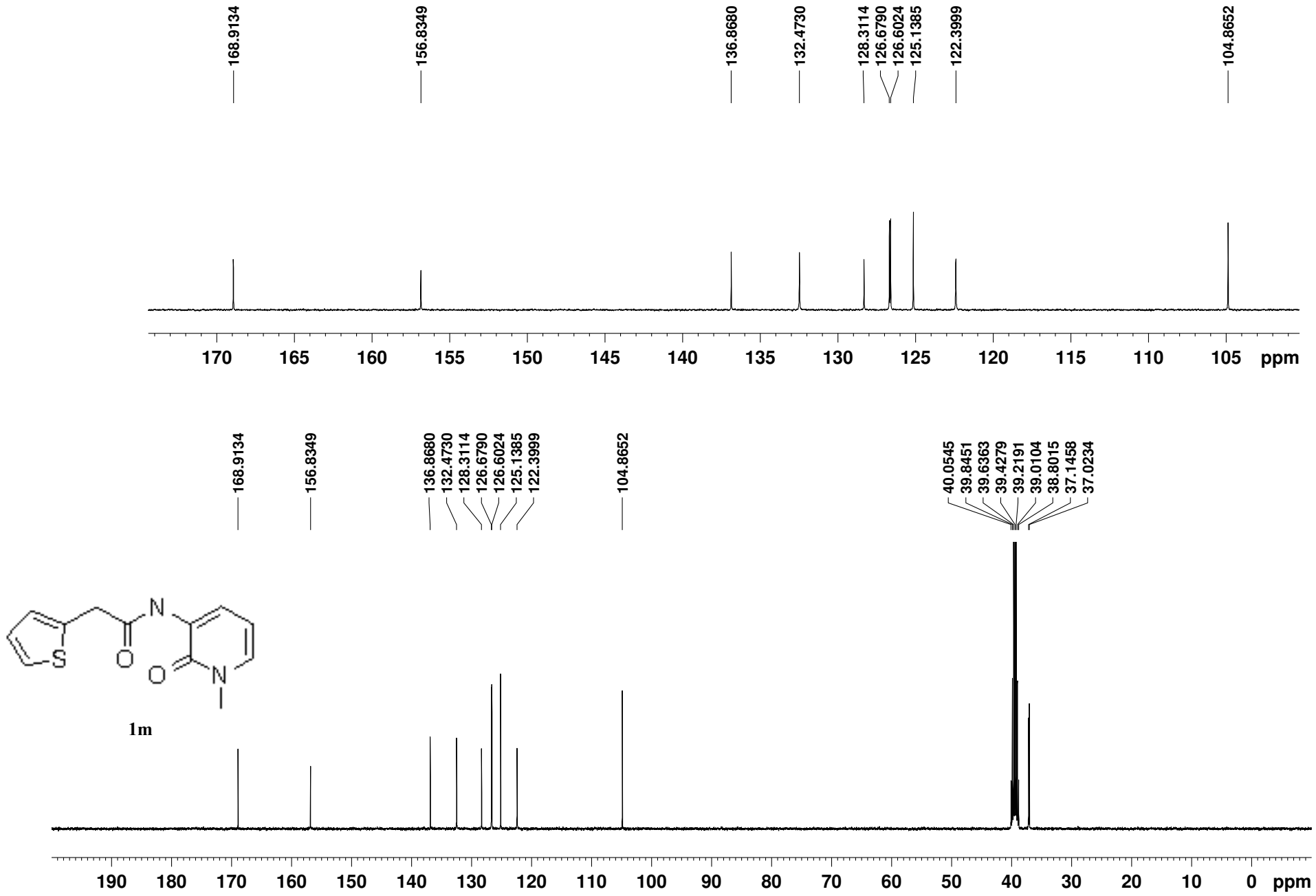
2m

^{1}H NMR of 2m IN DMSO AT 100^{O}C



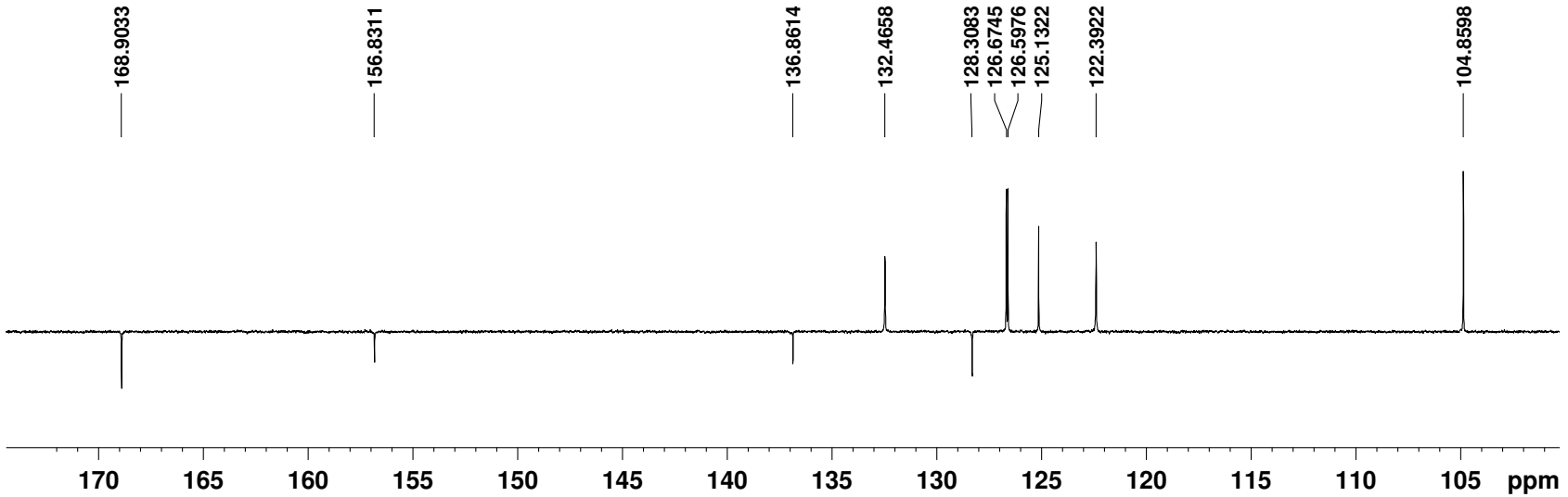
1m

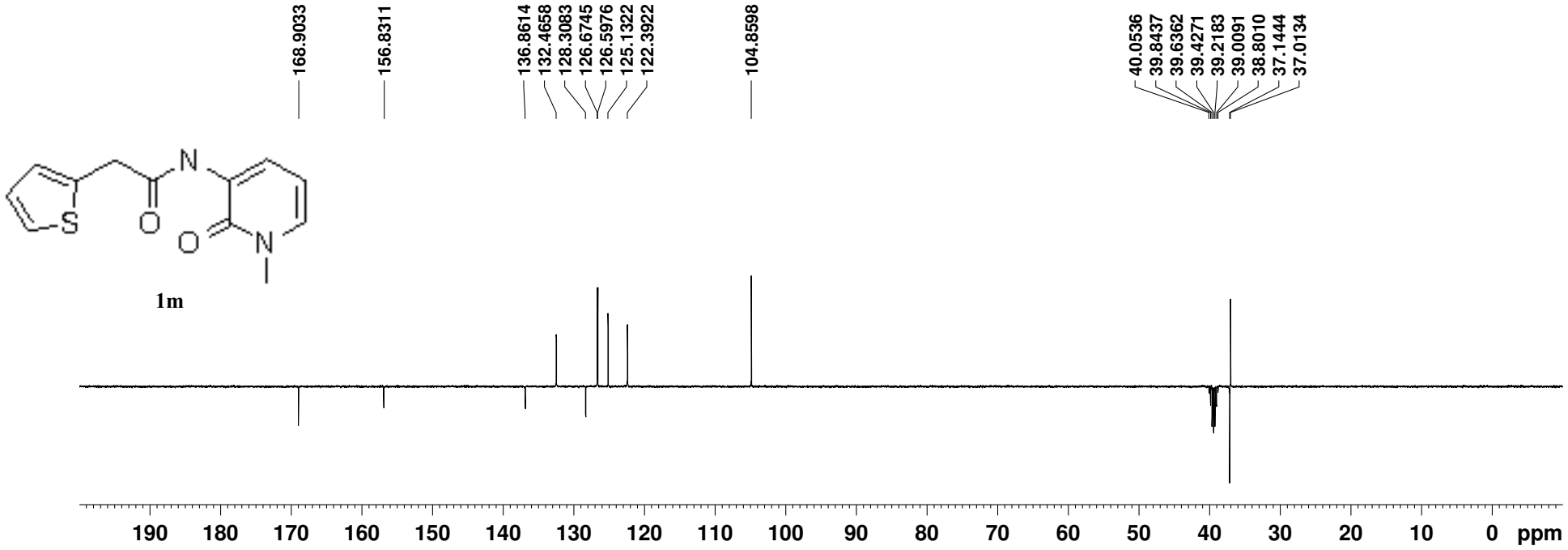
^{1}H NMR of 1m IN DMSO AT 20^{O}C



1m

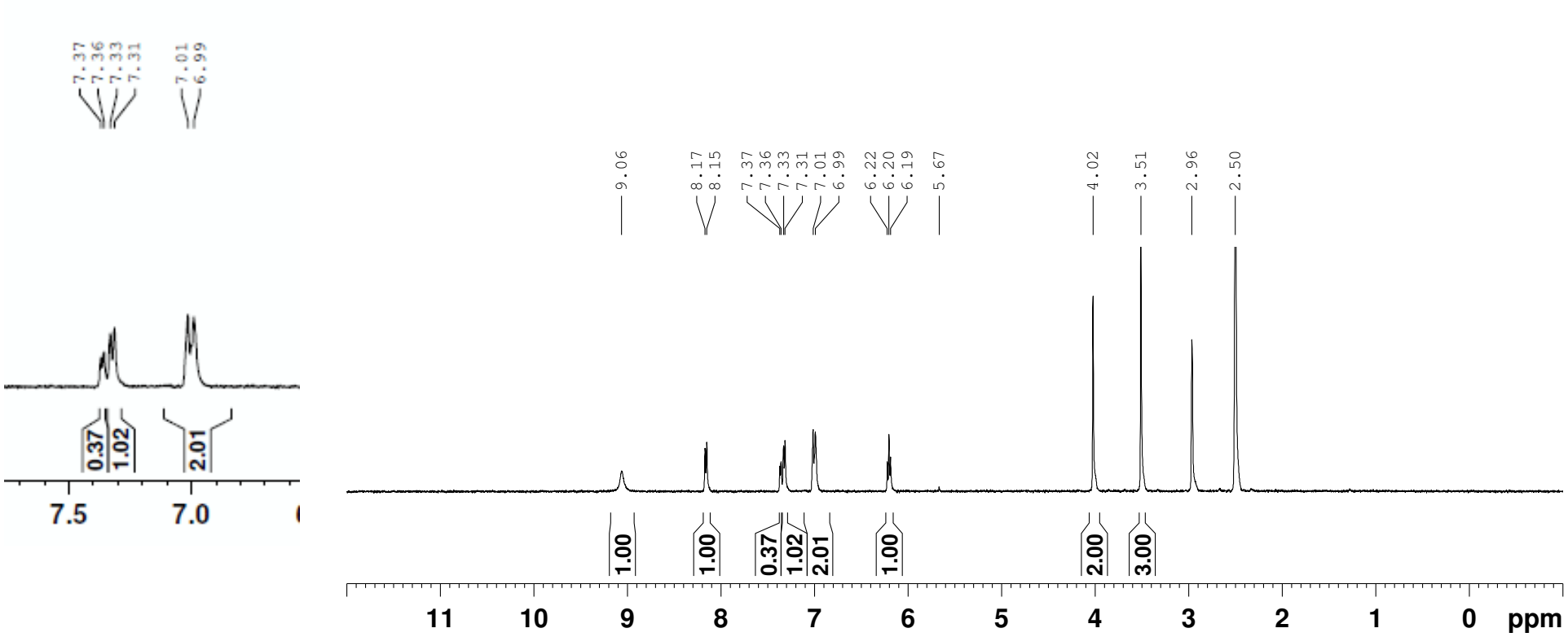
^{13}C NMR of 1m IN DMSO



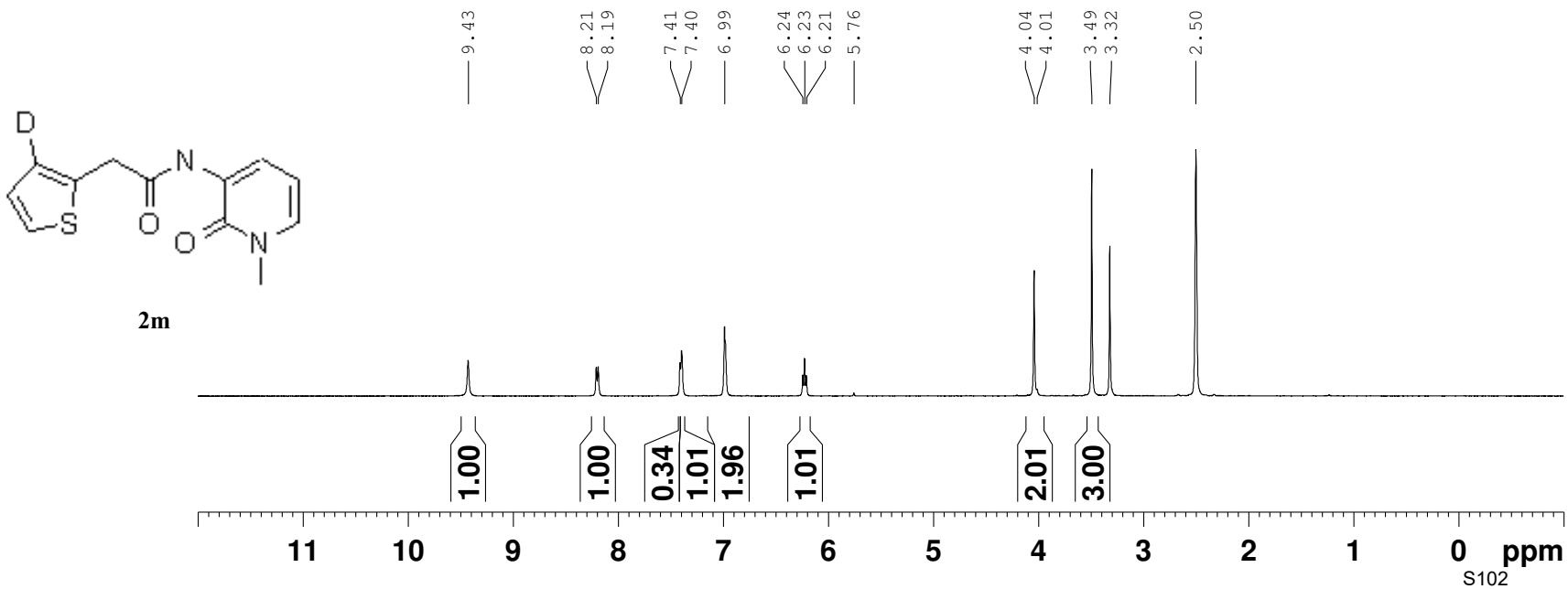


1m

APT of 1m IN DMSO

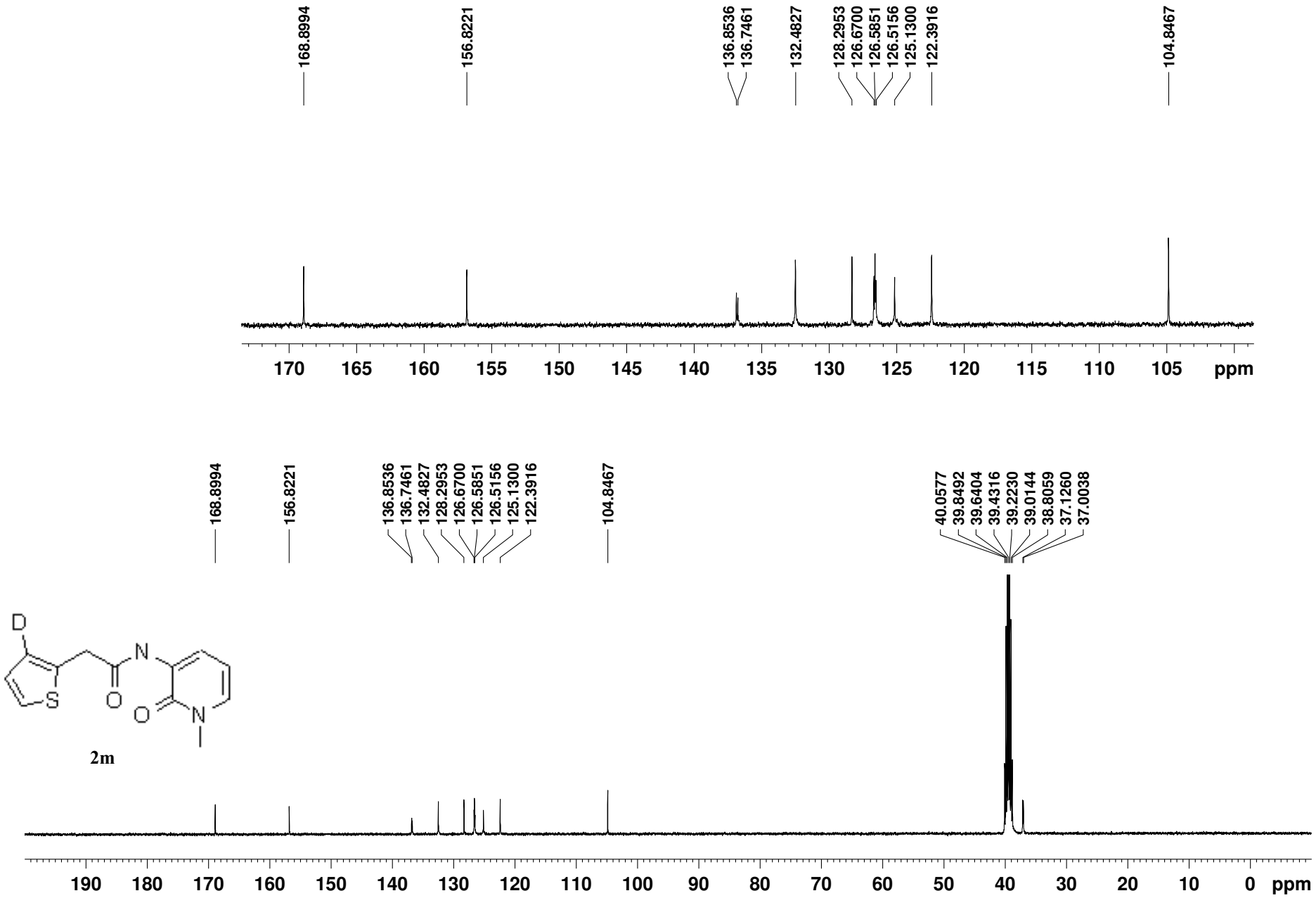


^{1}H NMR of 2m IN DMSO AT 100^{O}C



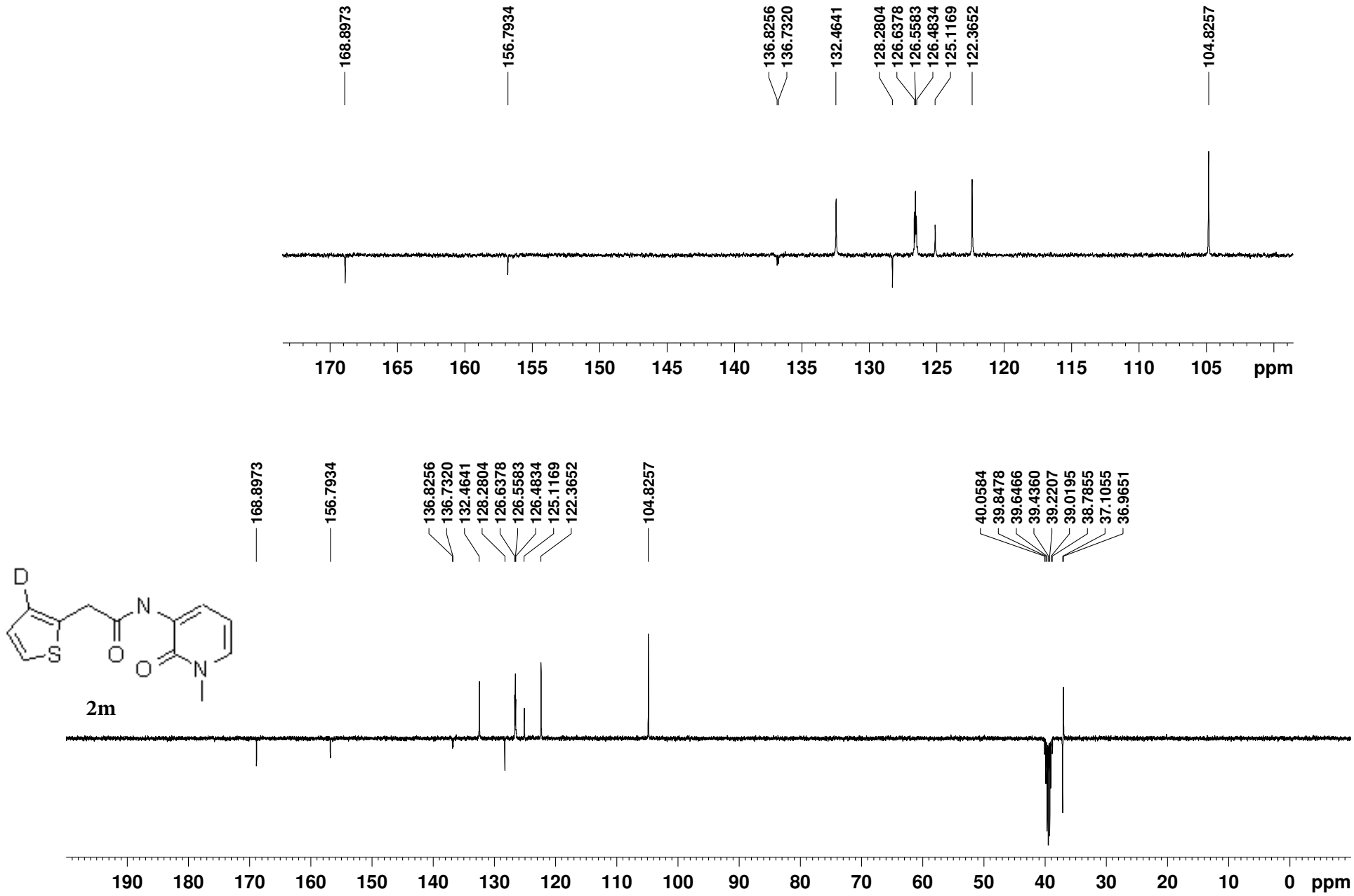
2m

^{1}H NMR of 2m IN DMSO AT 20^{O}C

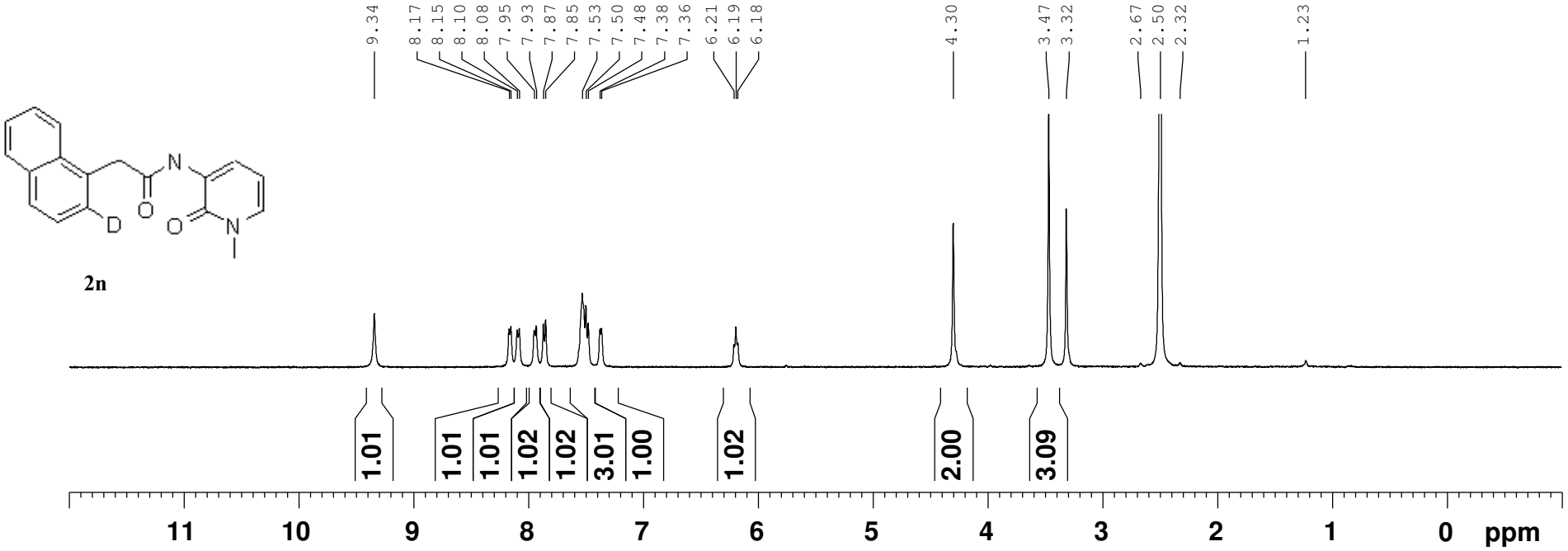


2m

^{13}C NMR of 2m IN DMSO

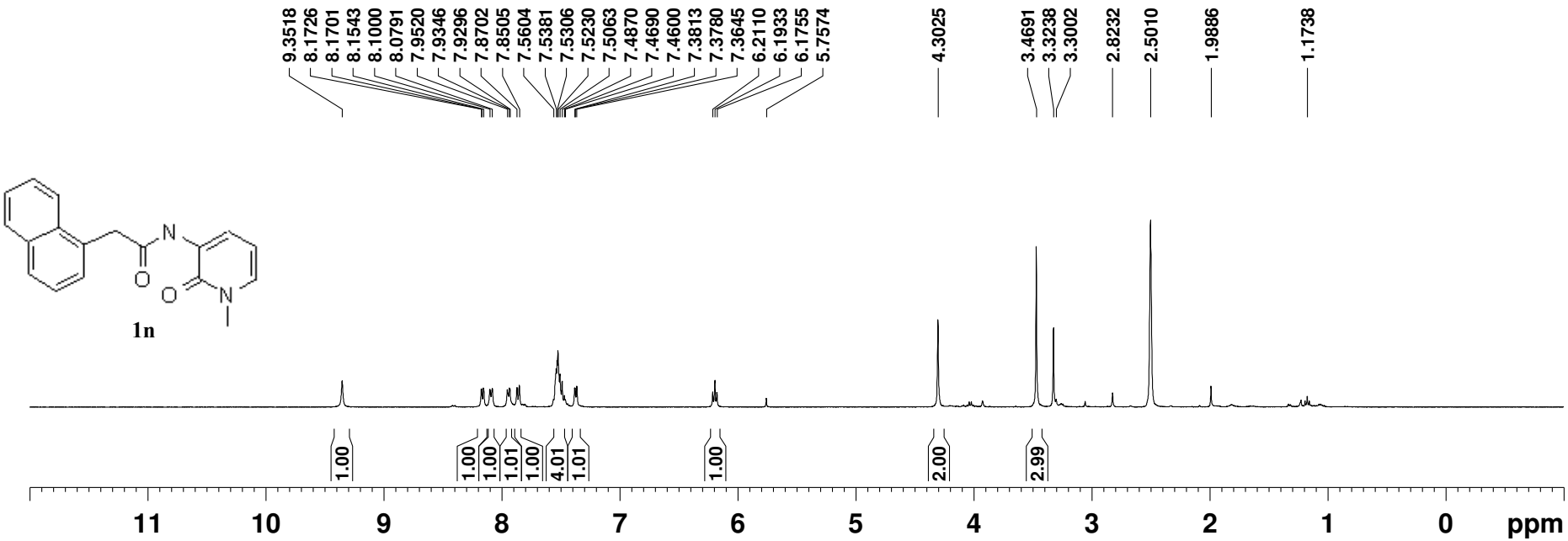


APT of 2m IN DMSO



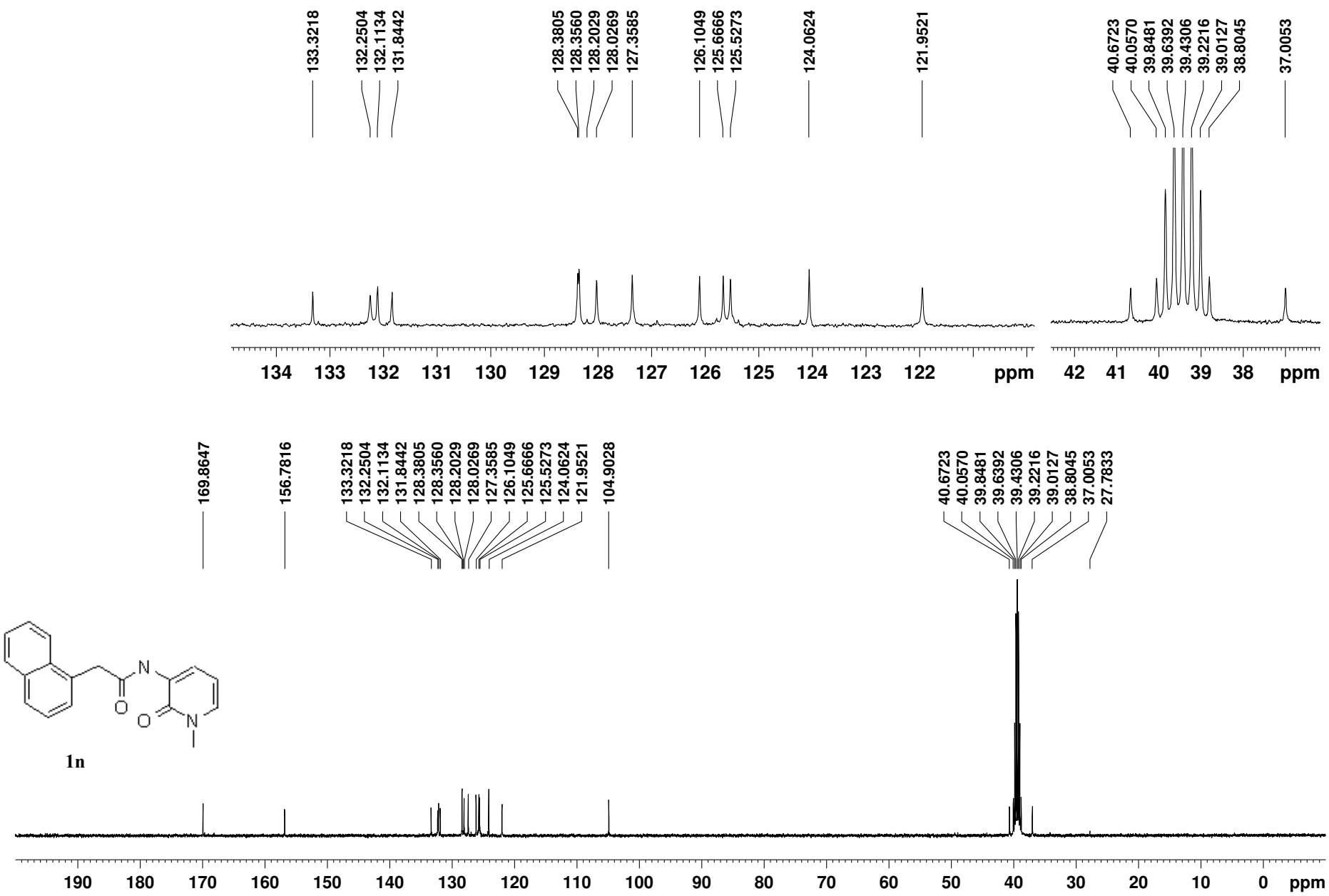
2n

^{1}H NMR of 2n IN DMSO

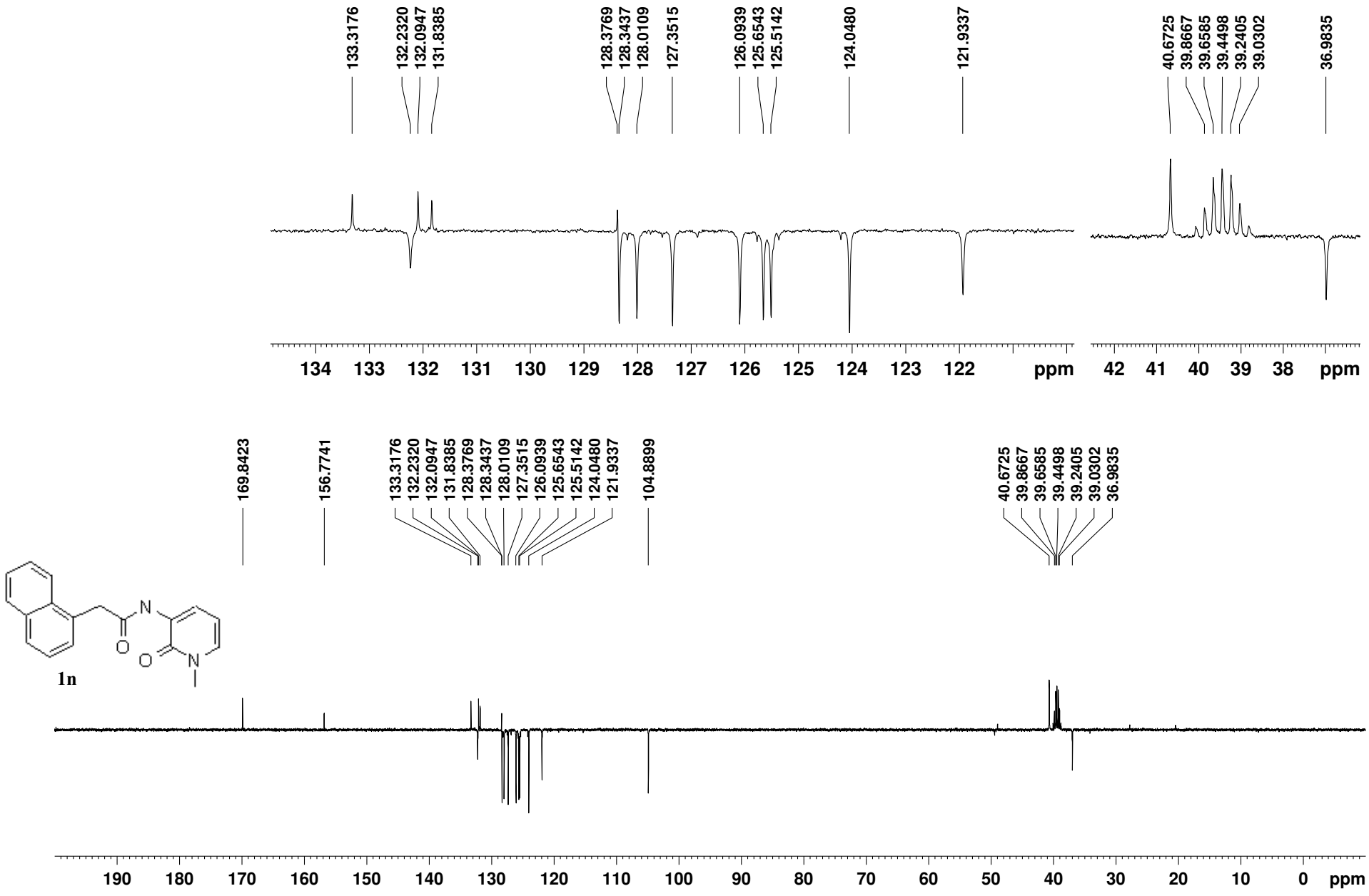


1n

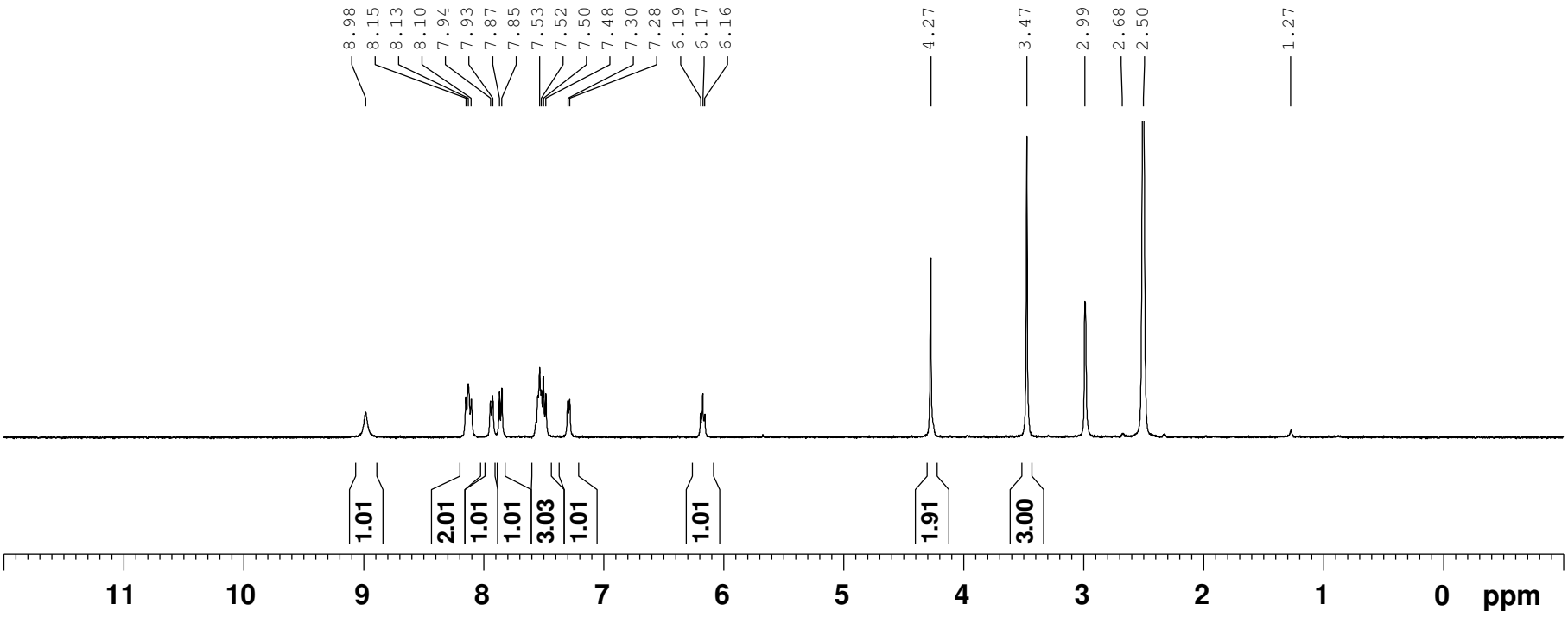
^{1}H NMR of 1n IN DMSO



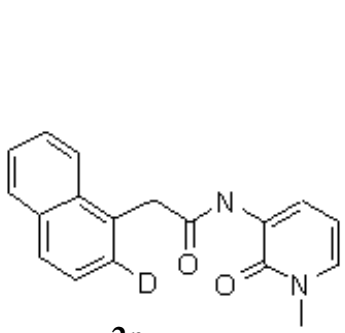
^{13}C NMR of 1n IN DMSO



APT of 1n IN DMSO

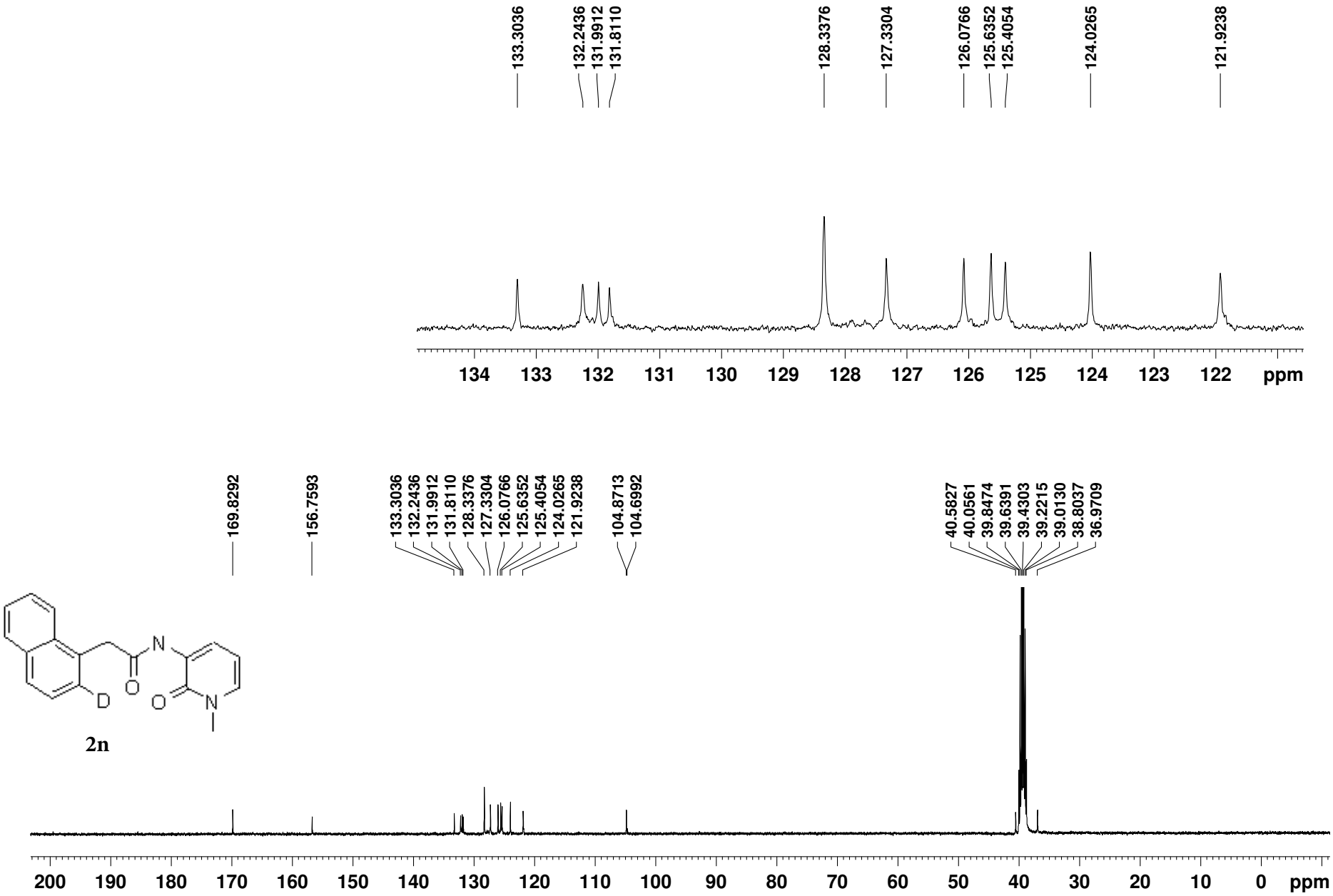


^{1}H NMR of 2n IN DMSO AT 100^{O}C



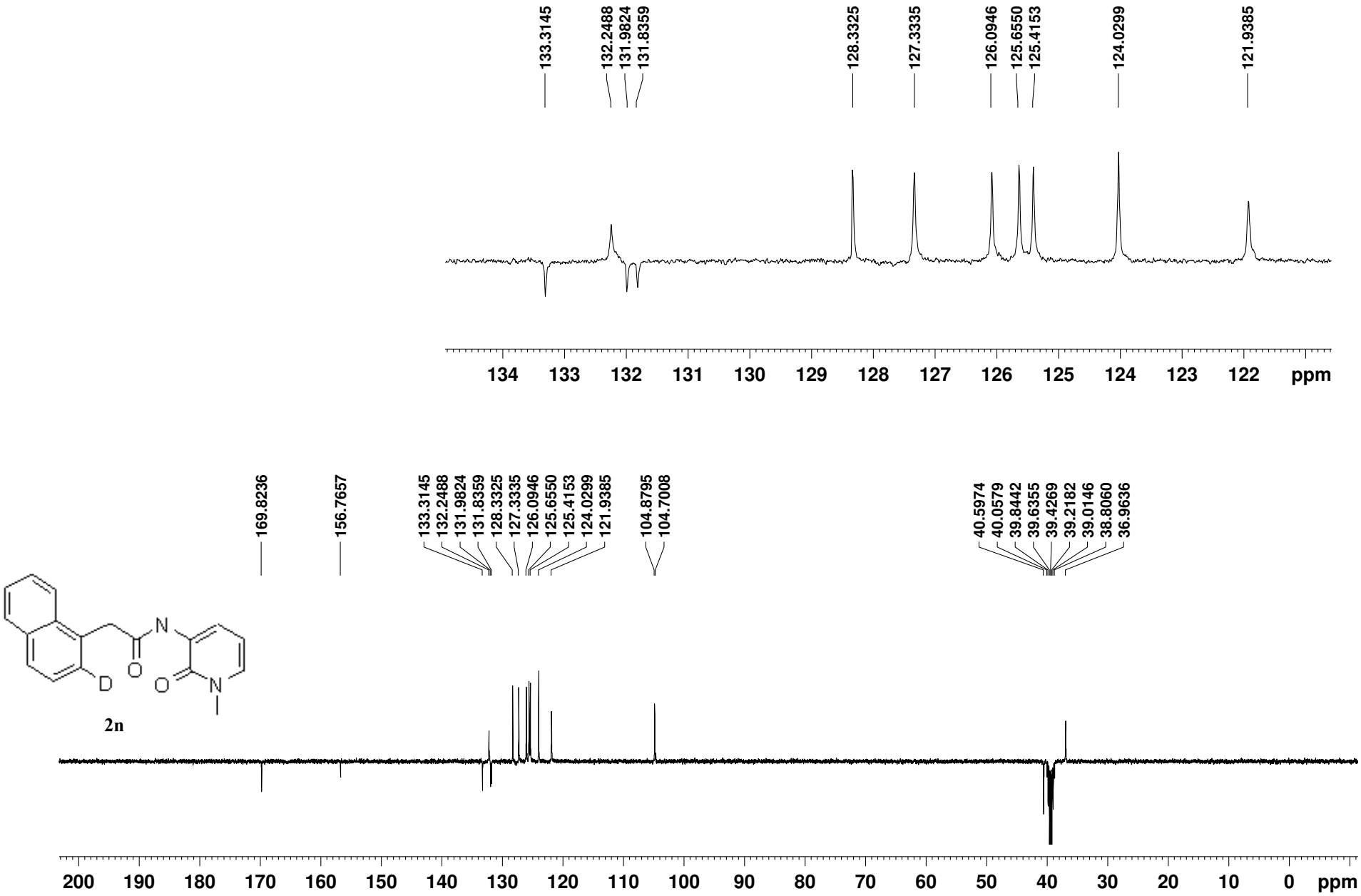
2n

^{1}H NMR of 2n IN DMSO AT 20^{O}C

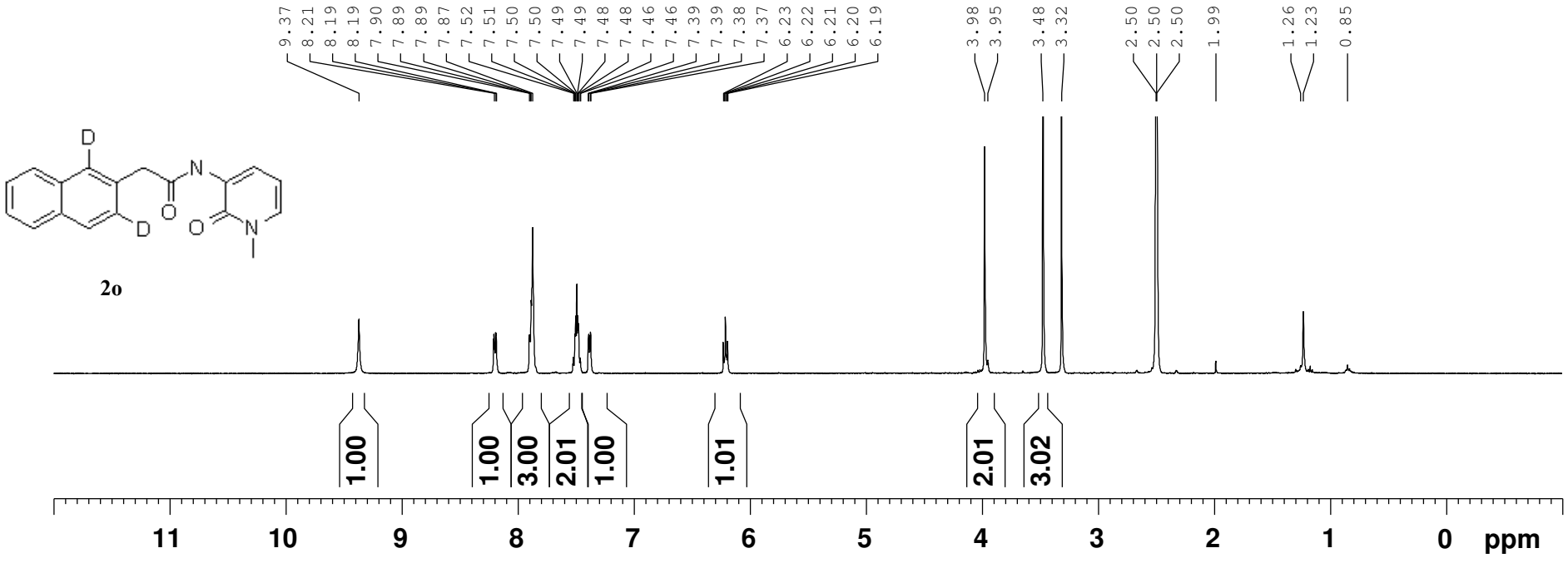


2n

^{13}C NMR of 2n IN DMSO

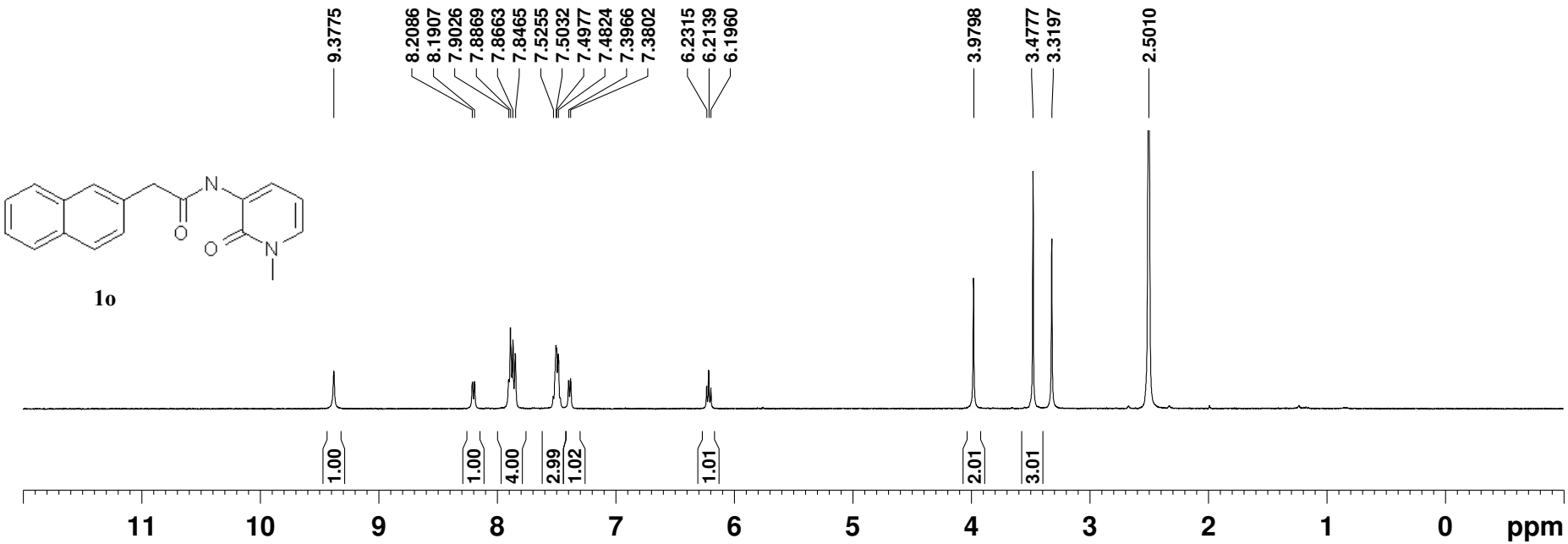


APT of 2n IN DMSO



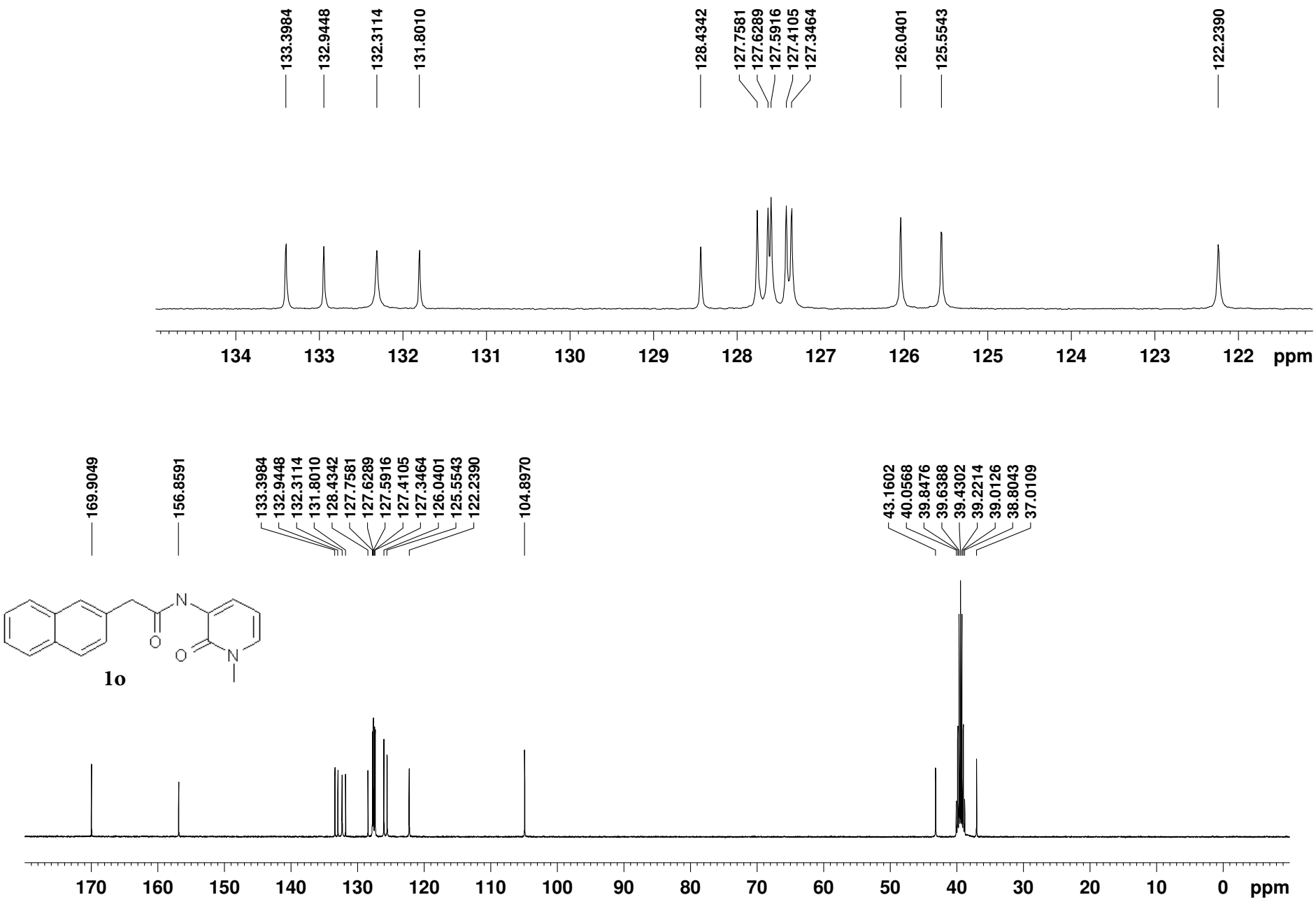
2o

^{1}H NMR of 2o IN DMSO



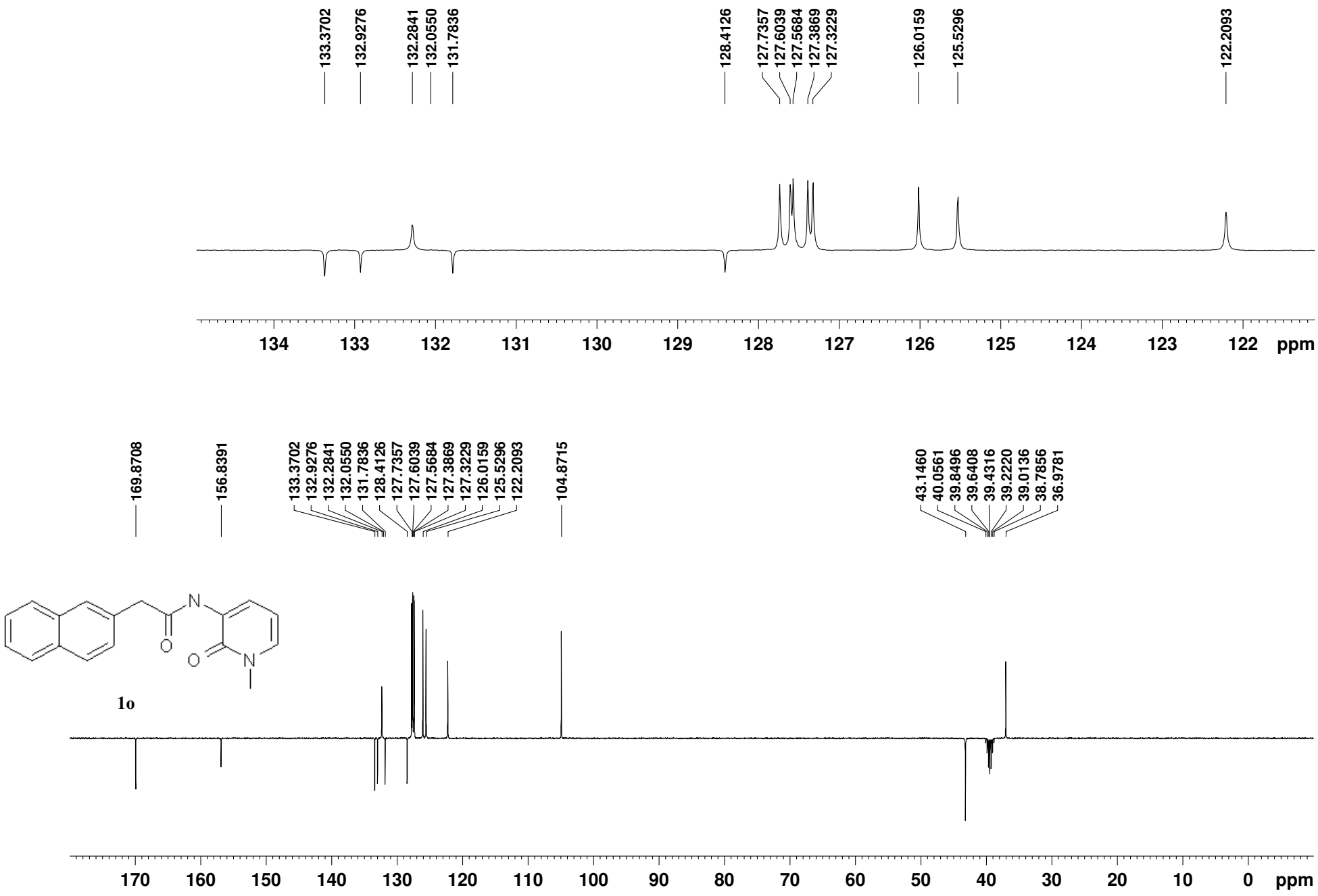
1o

^{1}H NMR of 1o IN DMSO

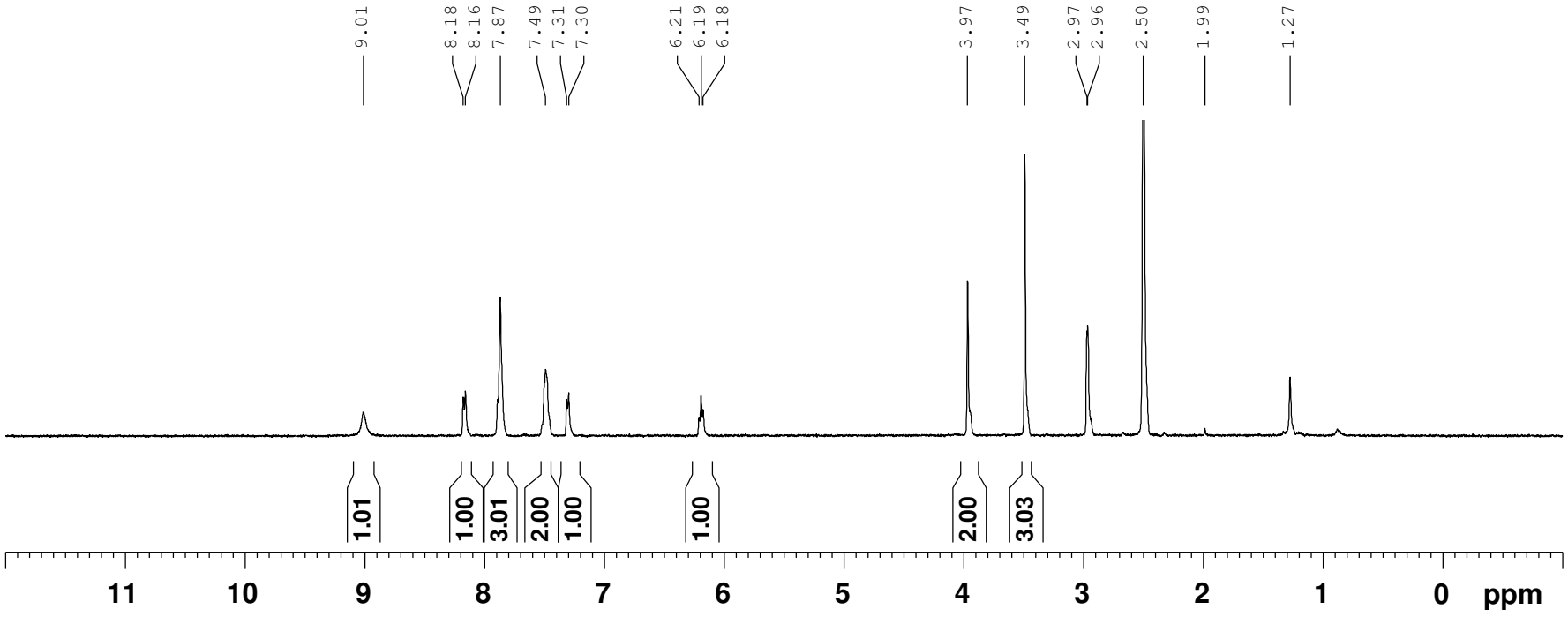


1o

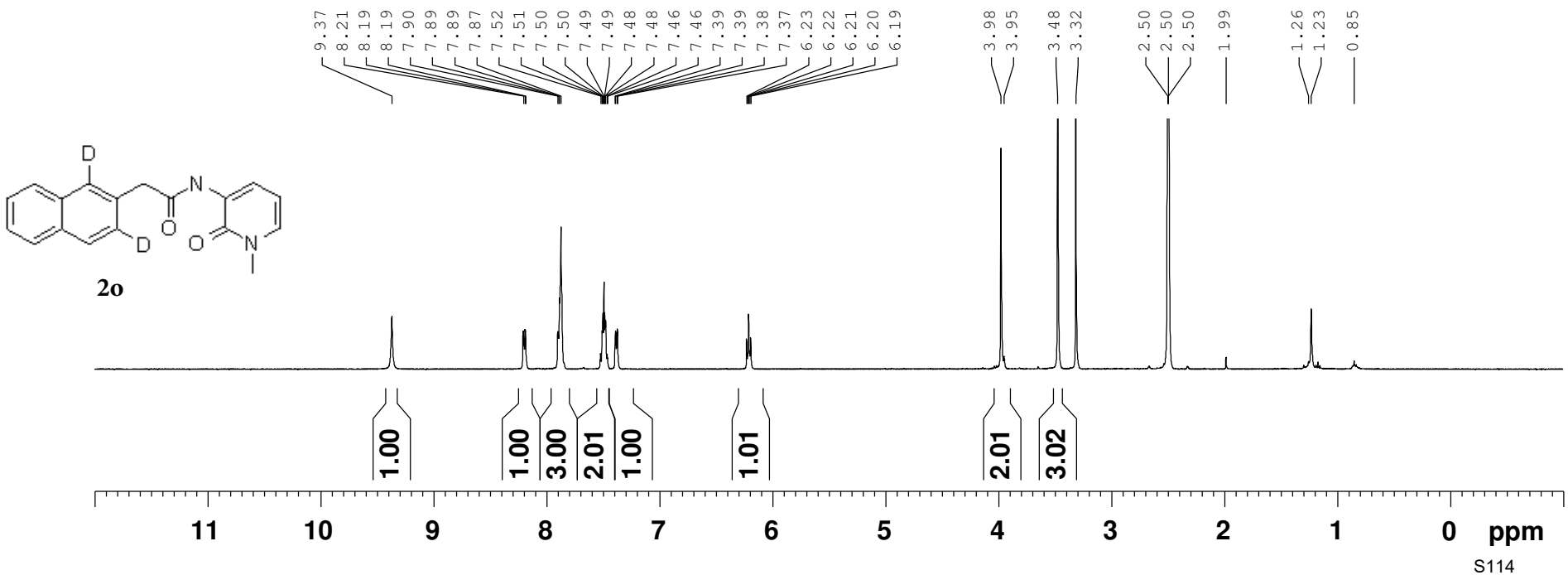
^{13}C NMR of 1o IN DMSO



APT of 1o IN DMSO

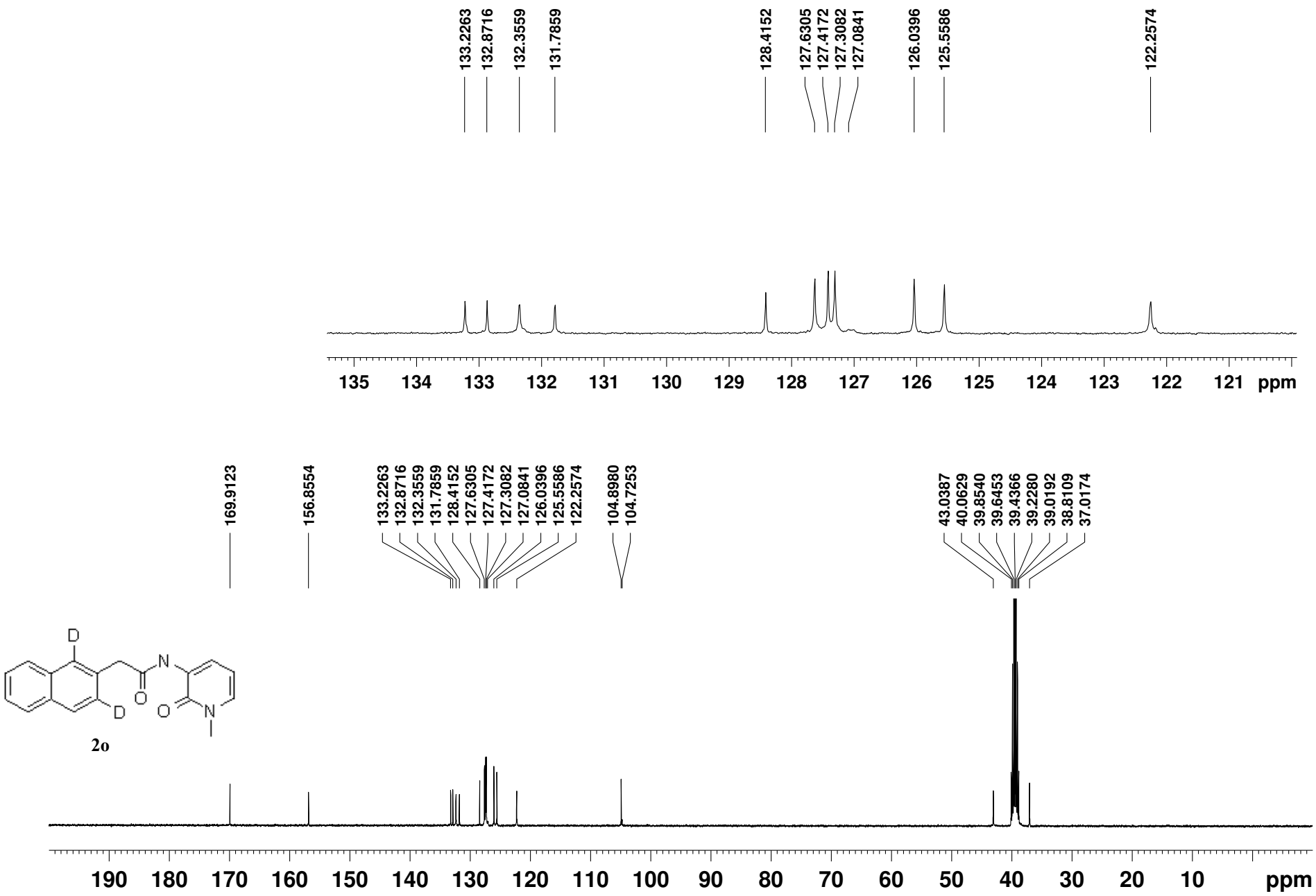


^{1}H NMR of 2o IN DMSO AT 100^{o}C

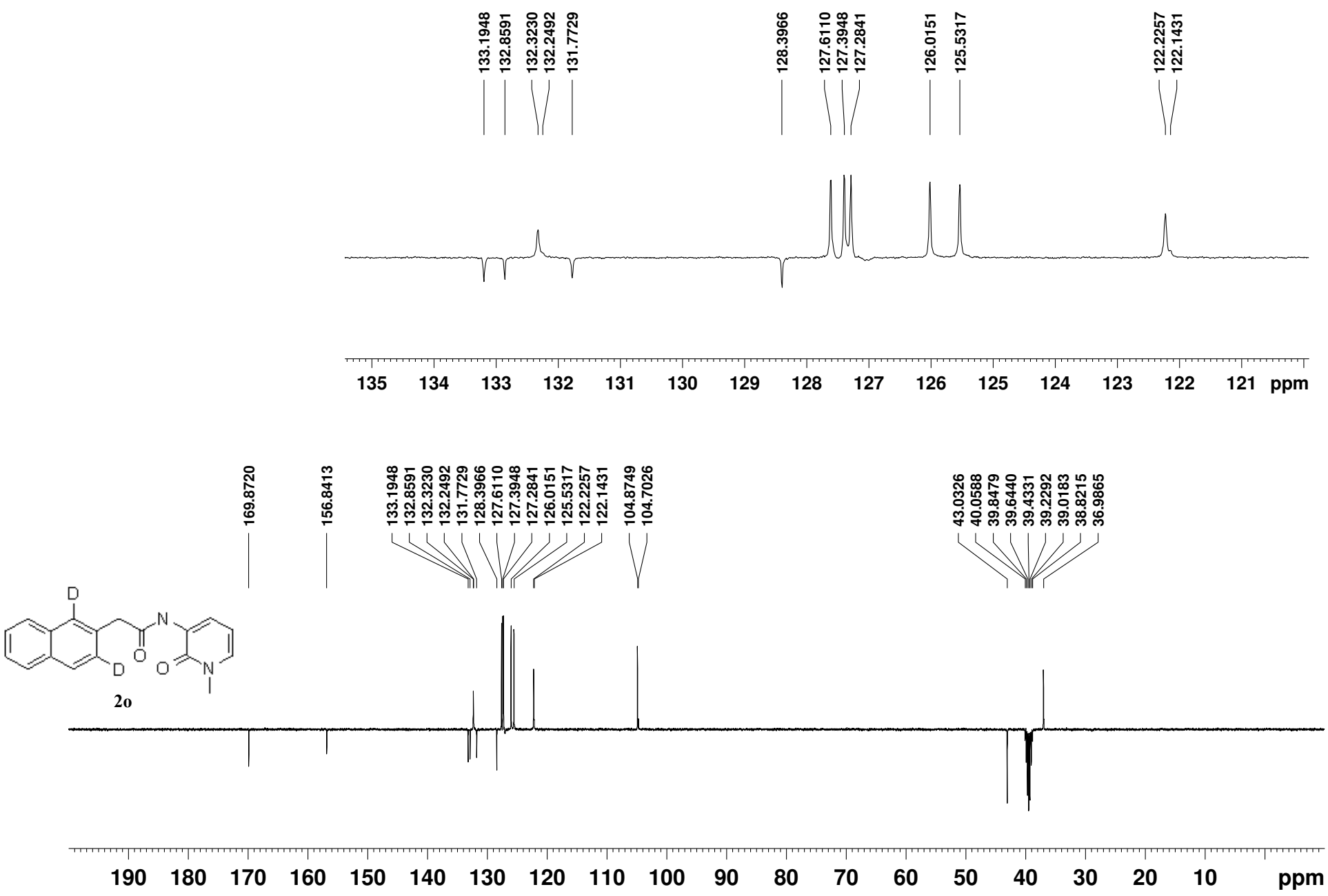


2o

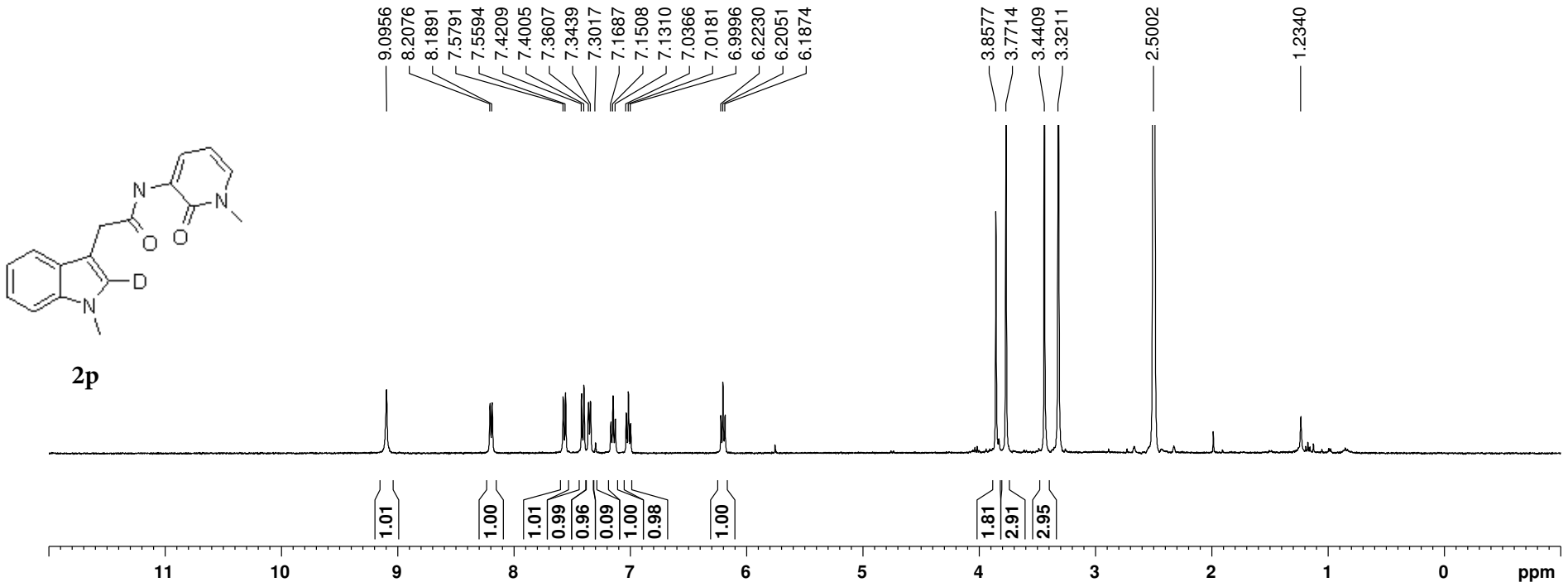
^{1}H NMR of 2o IN DMSO AT 20^{o}C



^{13}C NMR of 2o IN DMSO

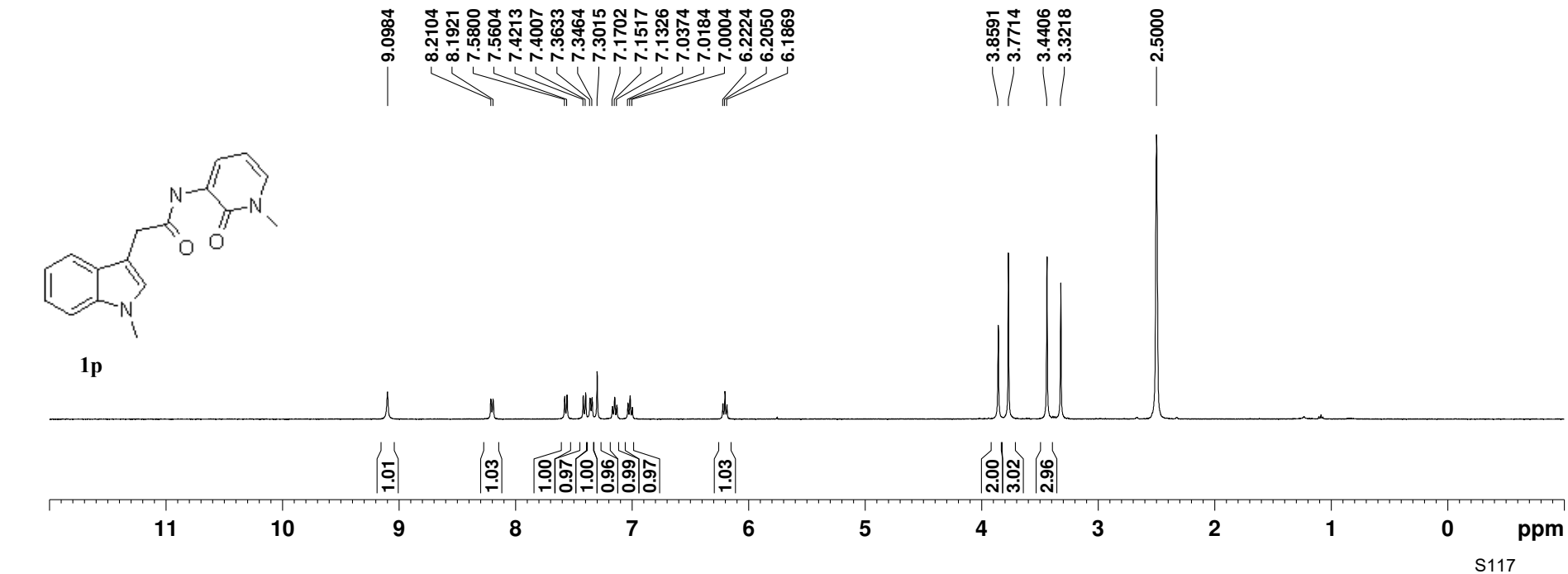


APT of 2o IN DMSO



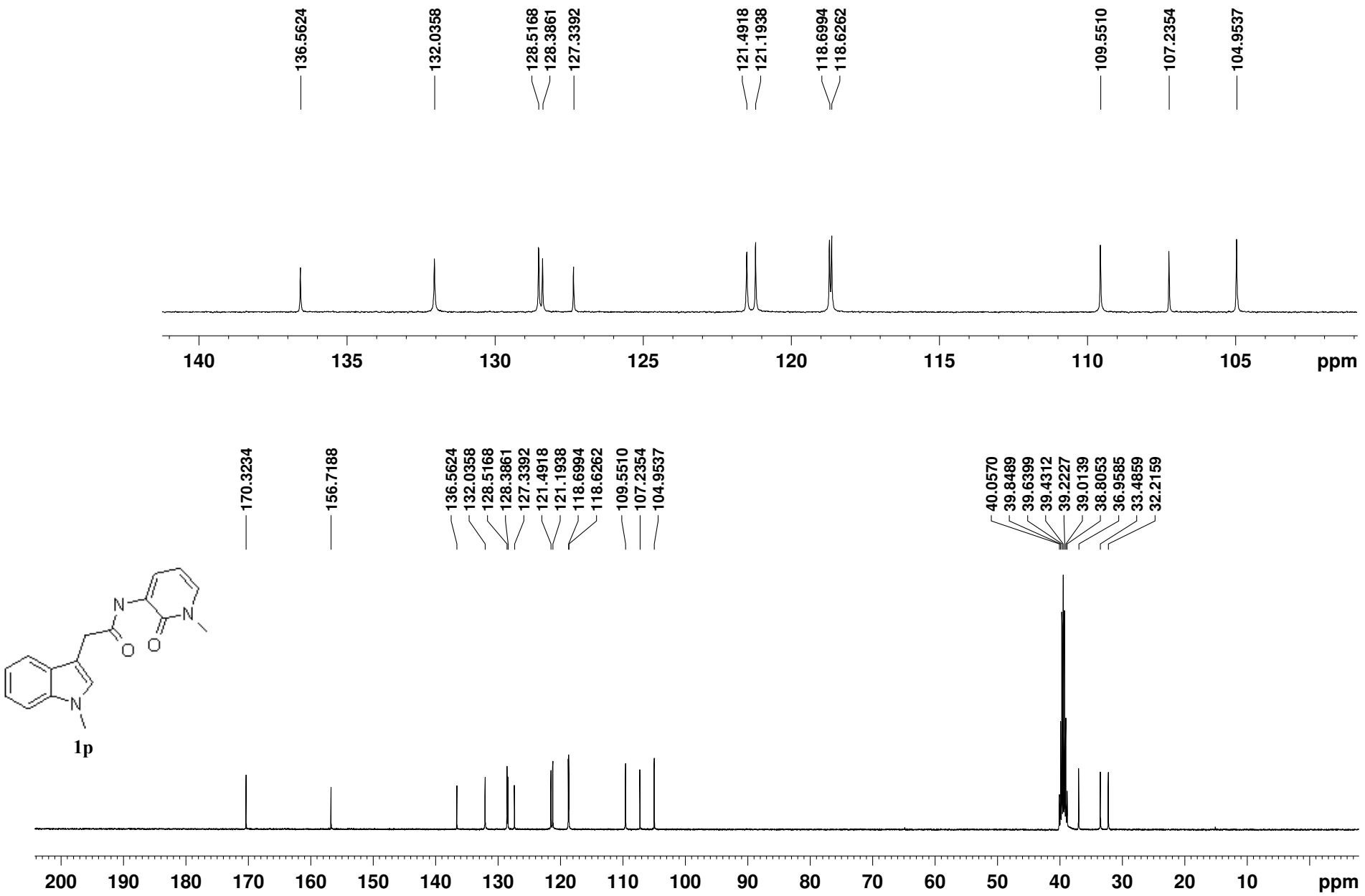
2p

^{1}H NMR of 2p IN DMSO

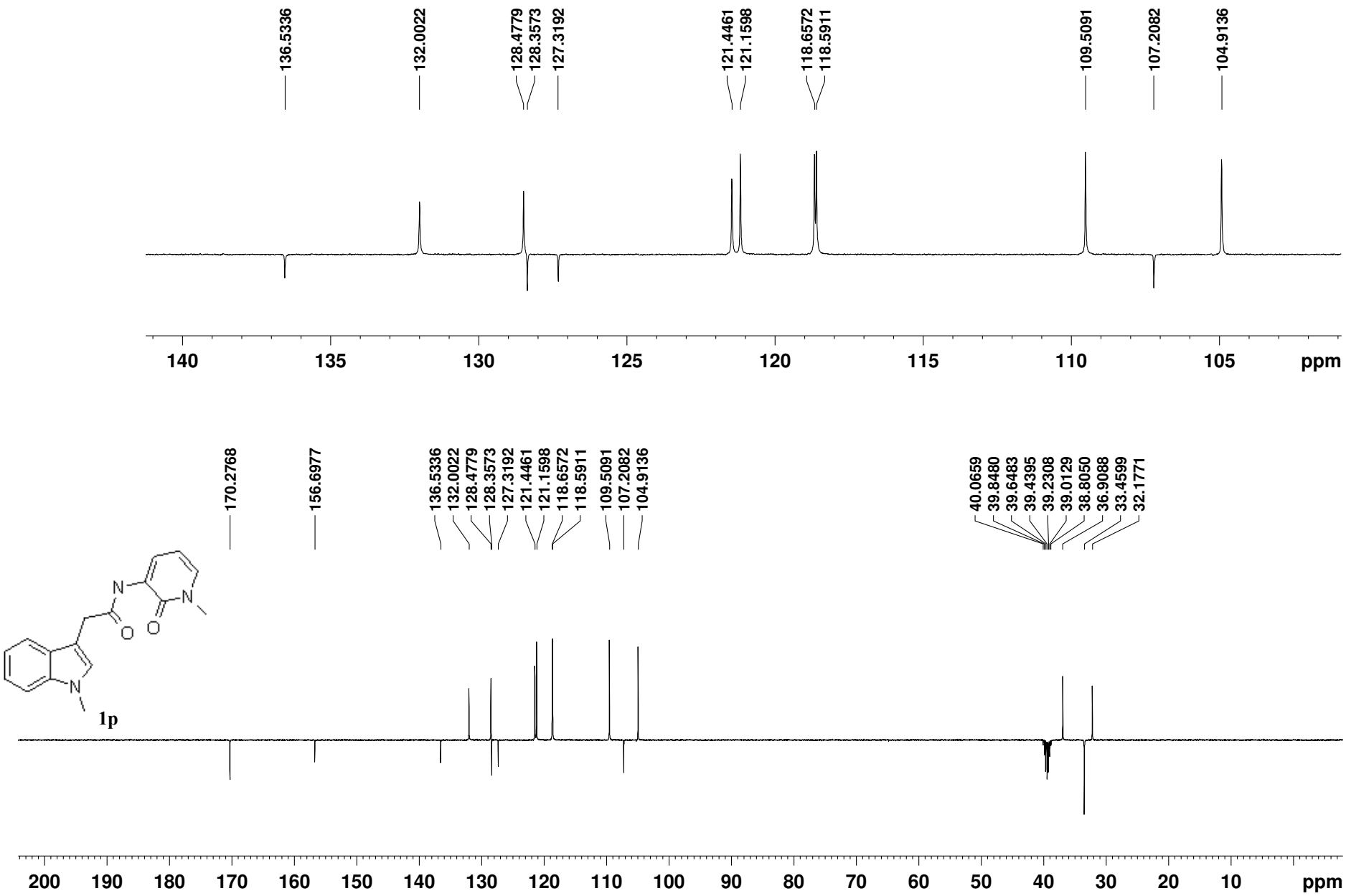


1p

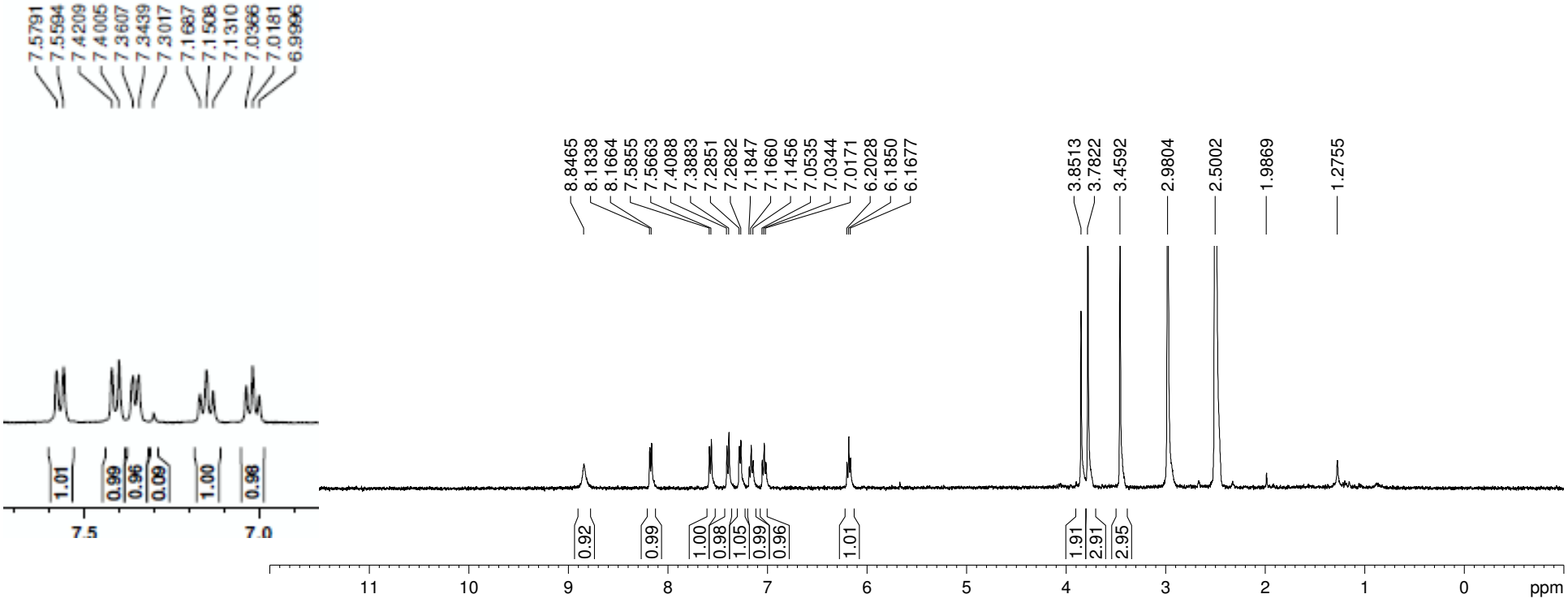
^{1}H NMR of 1p IN DMSO



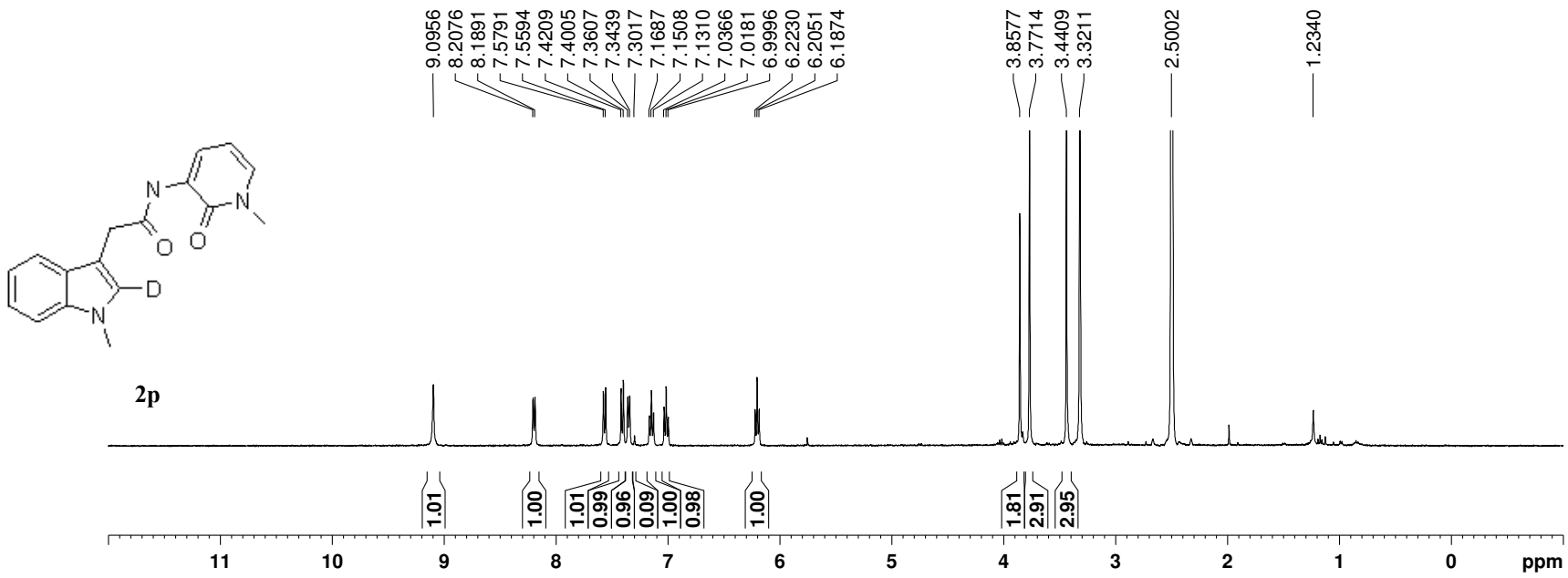
^{13}C NMR of 1p IN DMSO



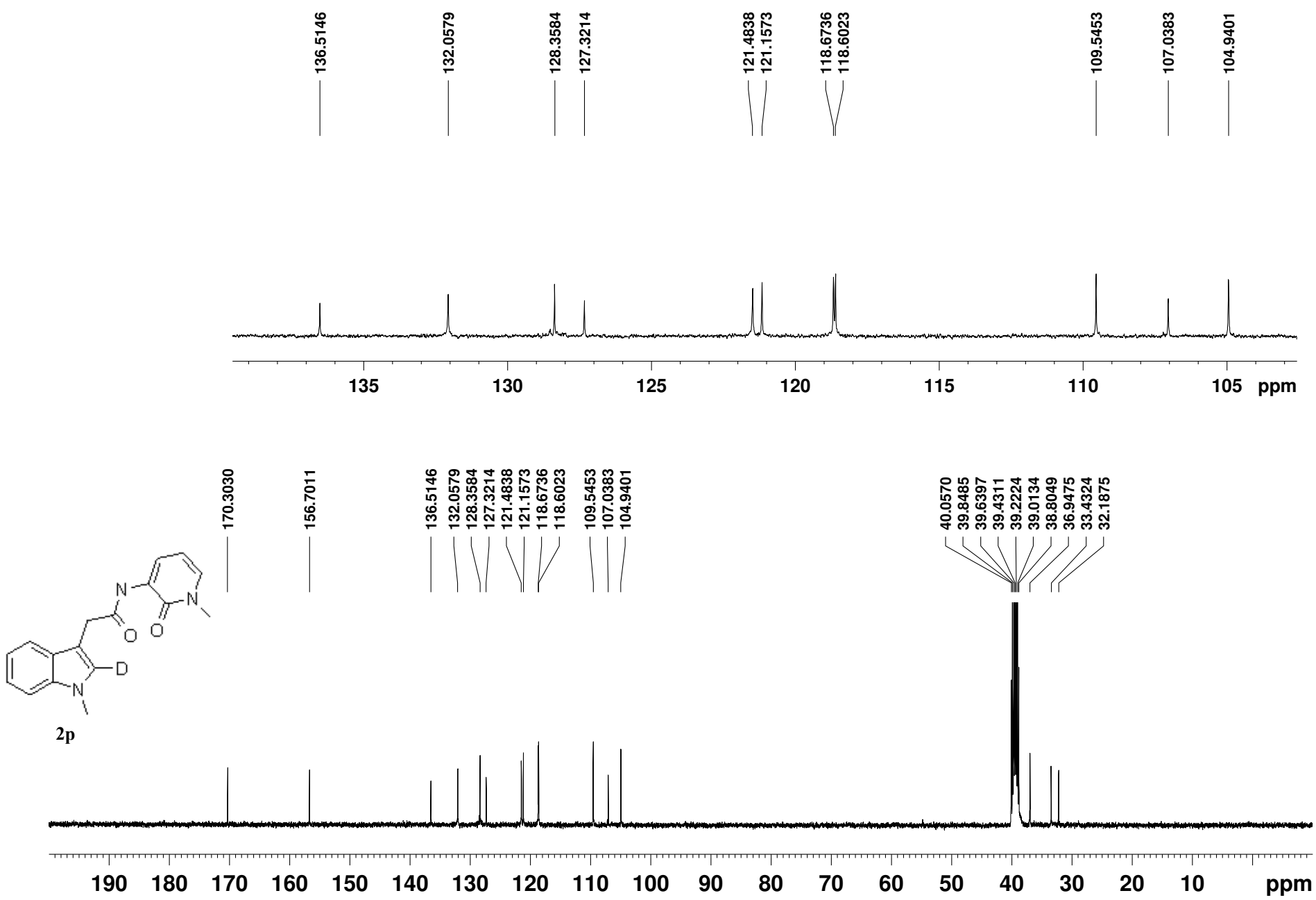
APT of 1p IN DMSO



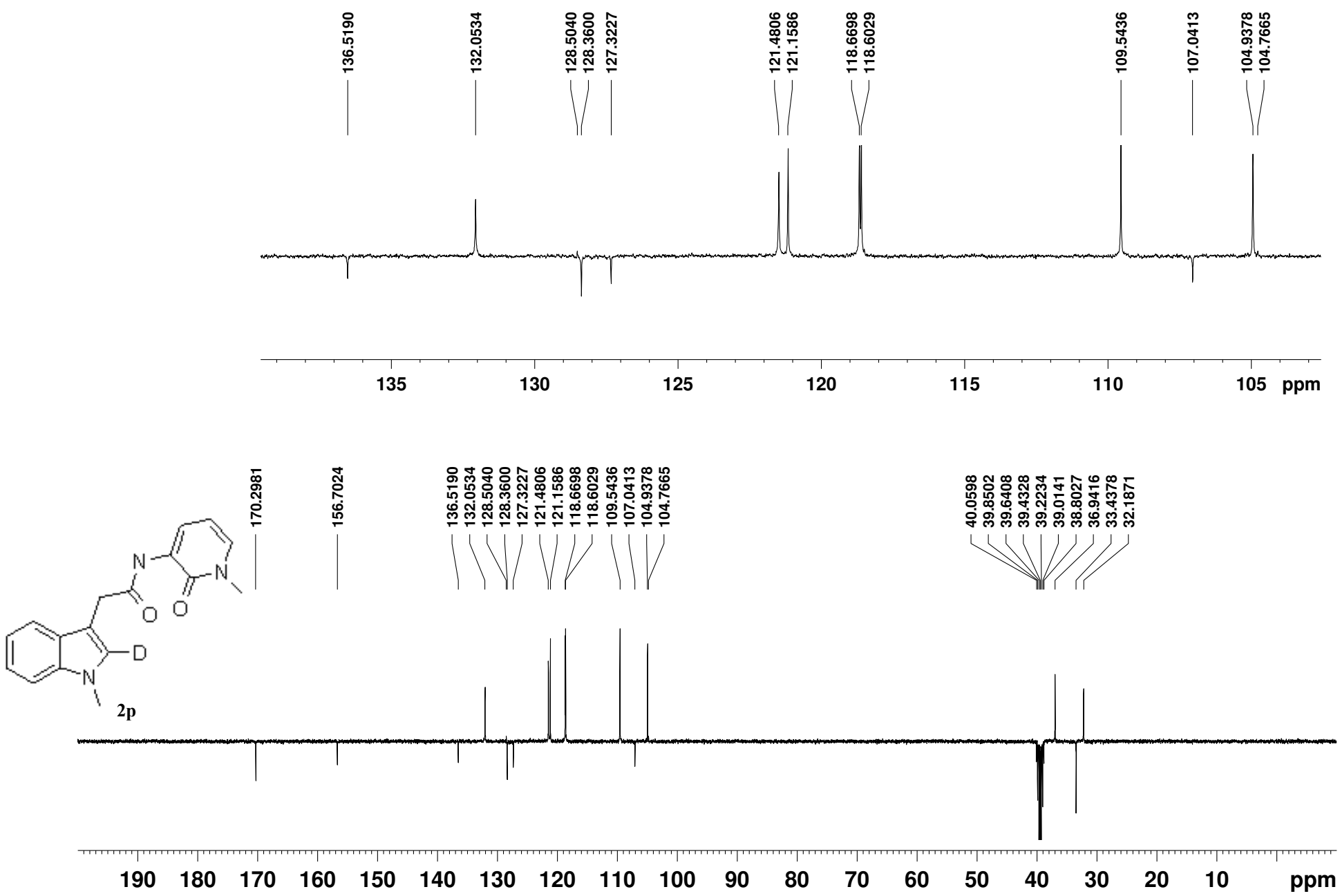
^{1}H NMR of 2p IN DMSO AT 100^{O}C



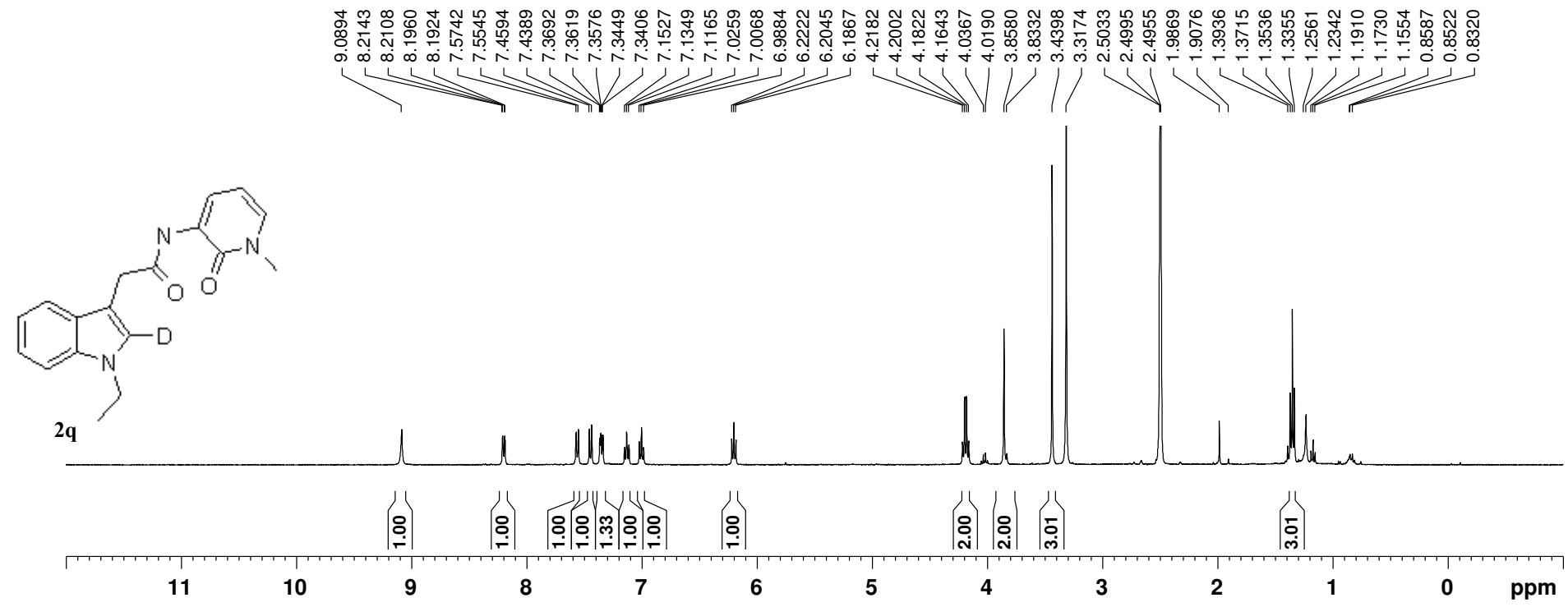
^{1}H NMR of 2p IN DMSO AT 20^{O}C



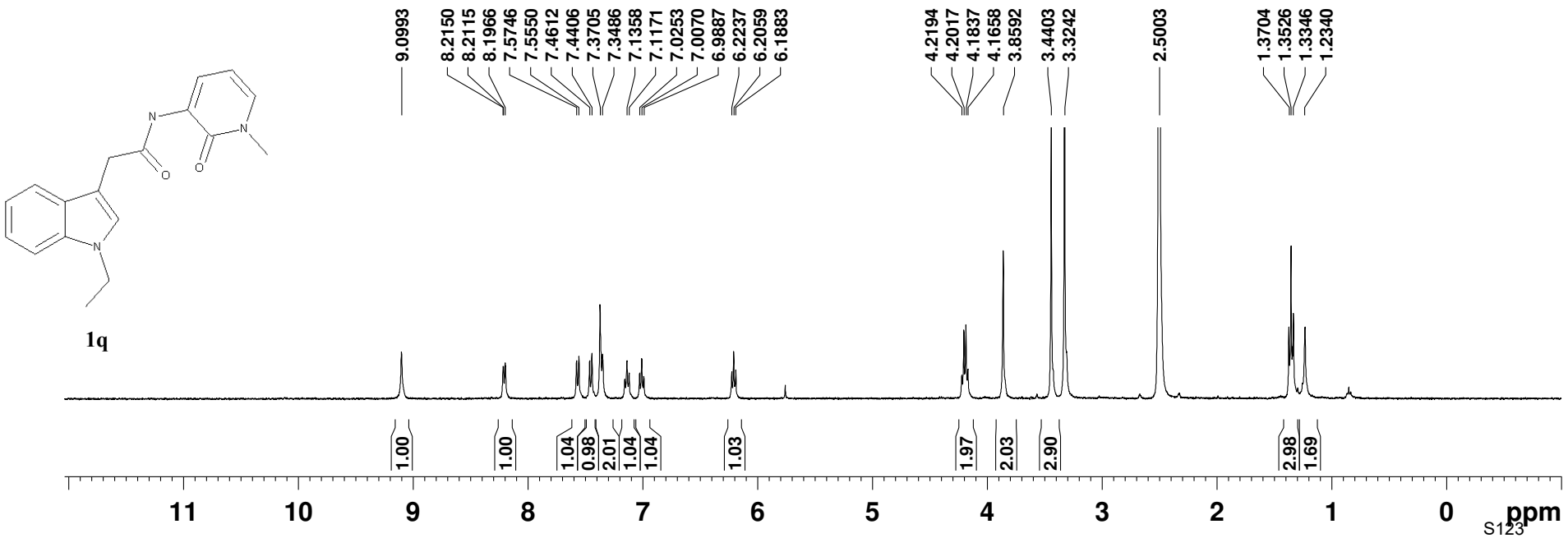
^{13}C NMR of 2p IN DMSO



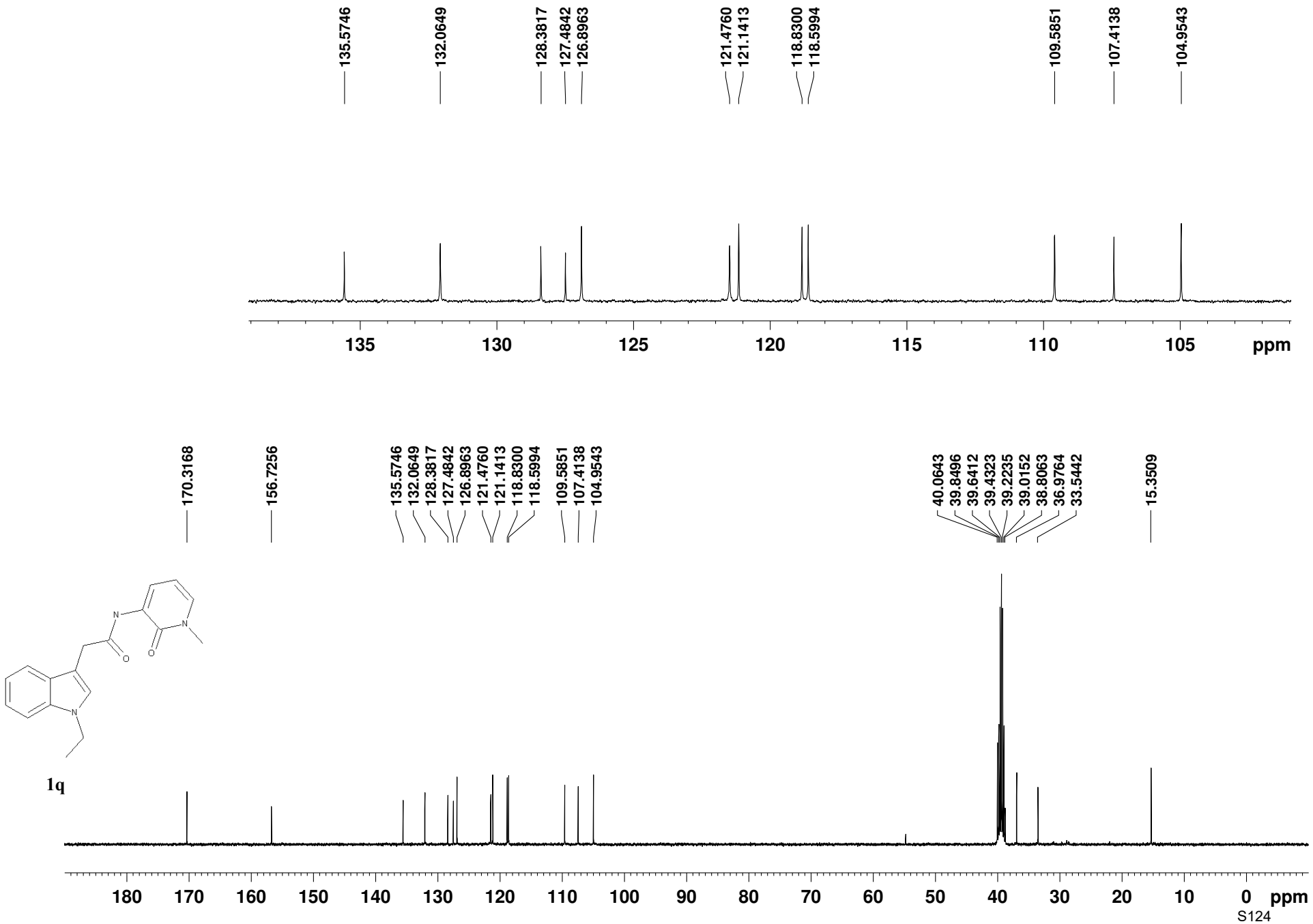
APT of 2p IN DMSO



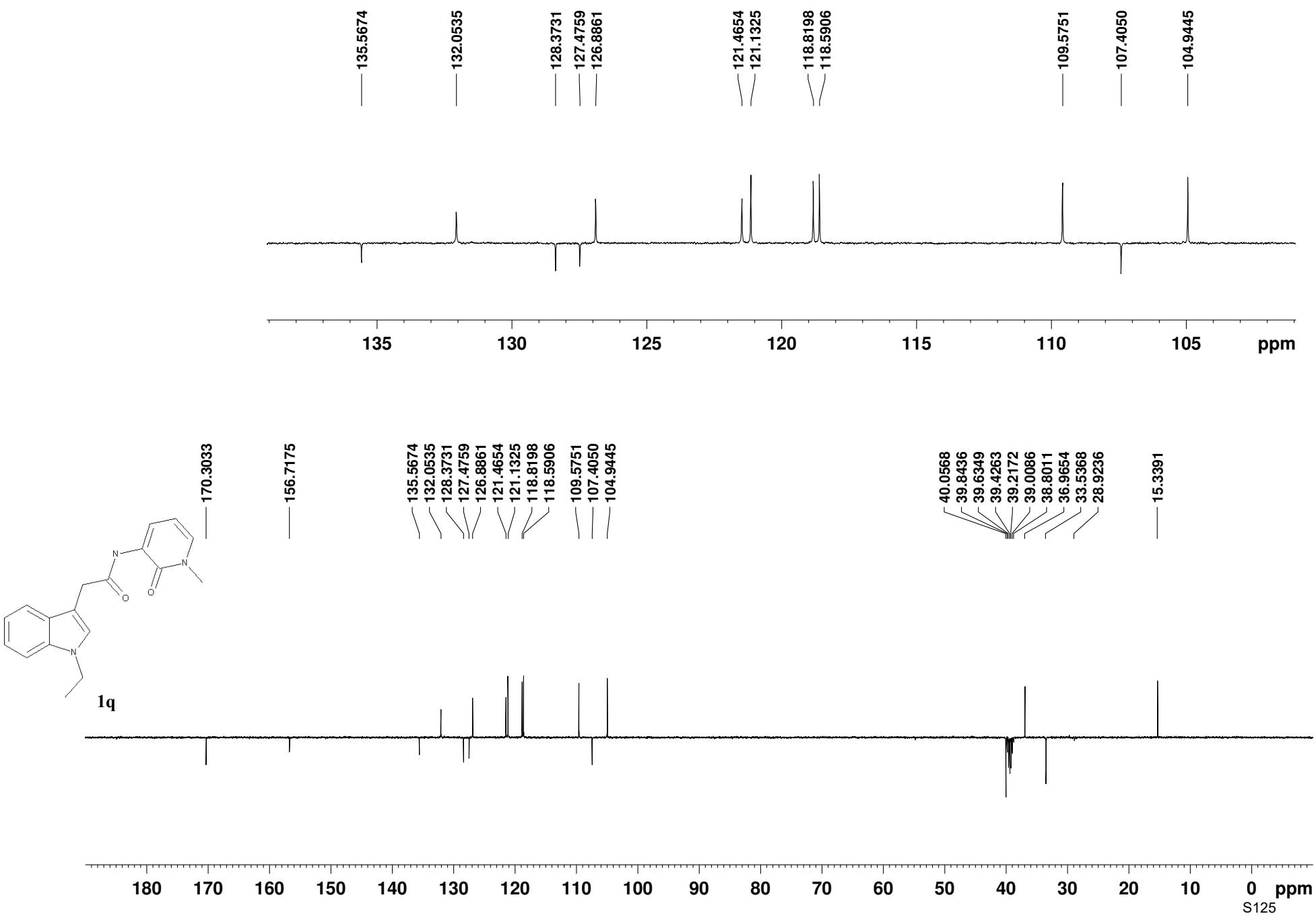
^{1}H NMR of 2q IN DMSO



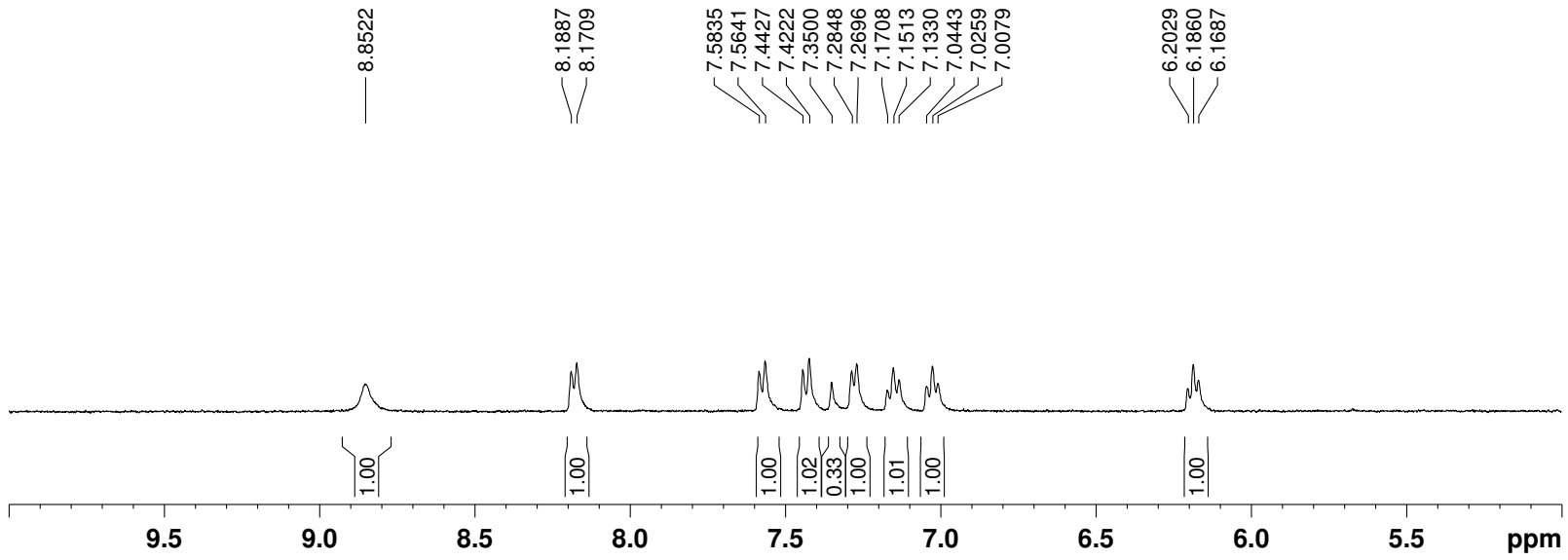
^{1}H NMR of 1q IN DMSO



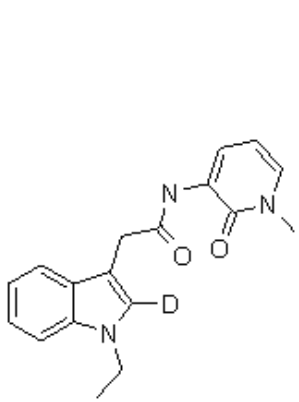
^{13}C NMR of 1q IN DMSO



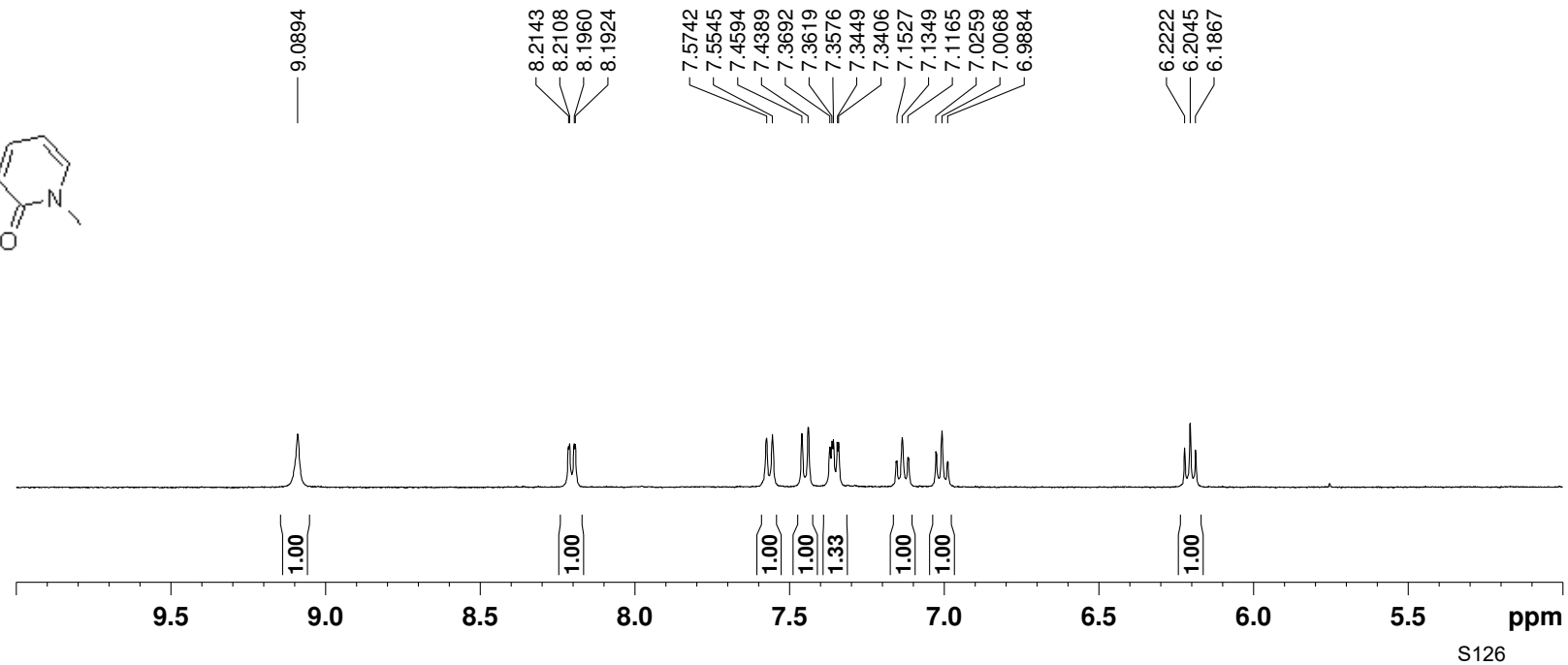
APT of 1q IN DMSO



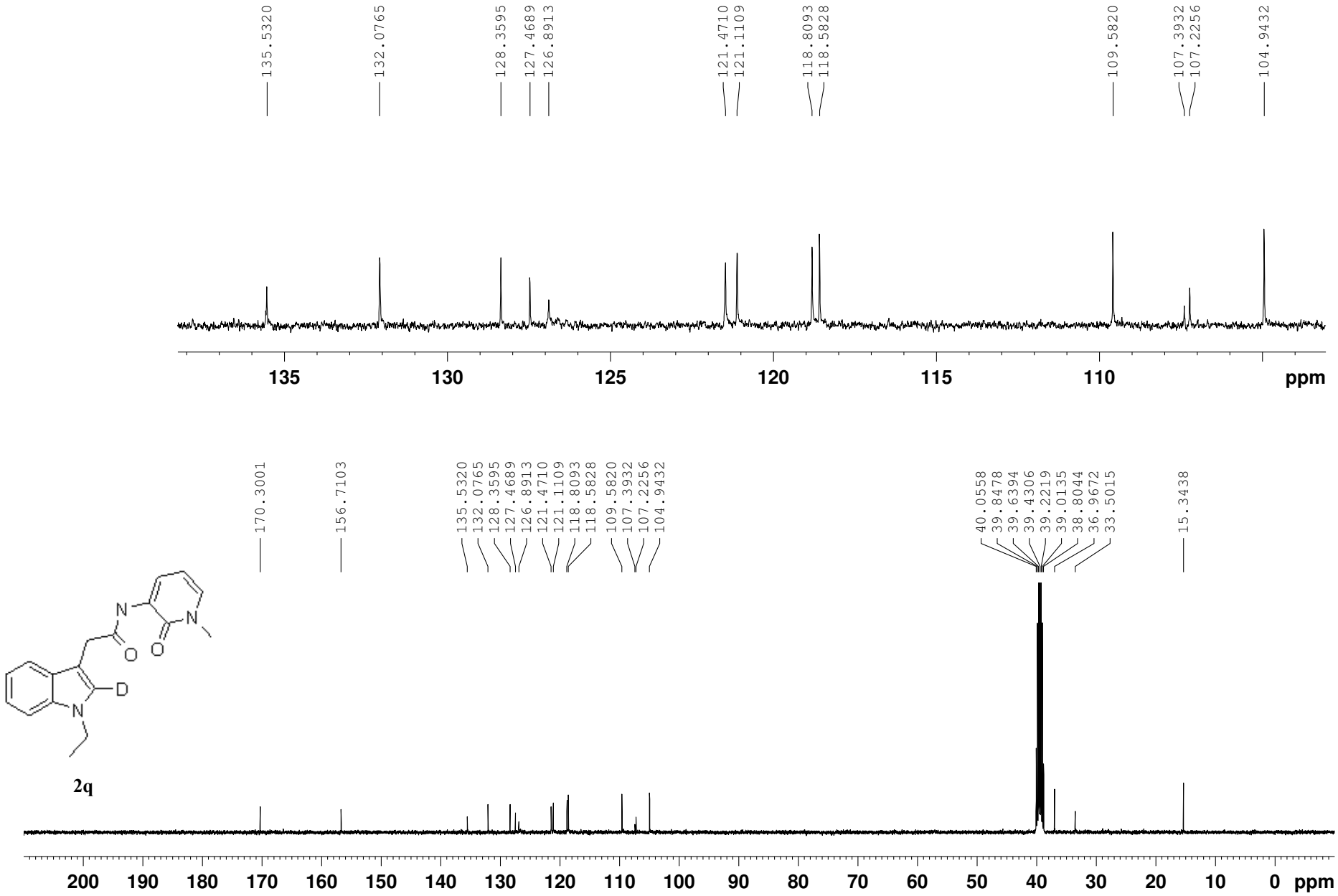
^{1}H NMR of 2q IN DMSO AT 100^{o}C



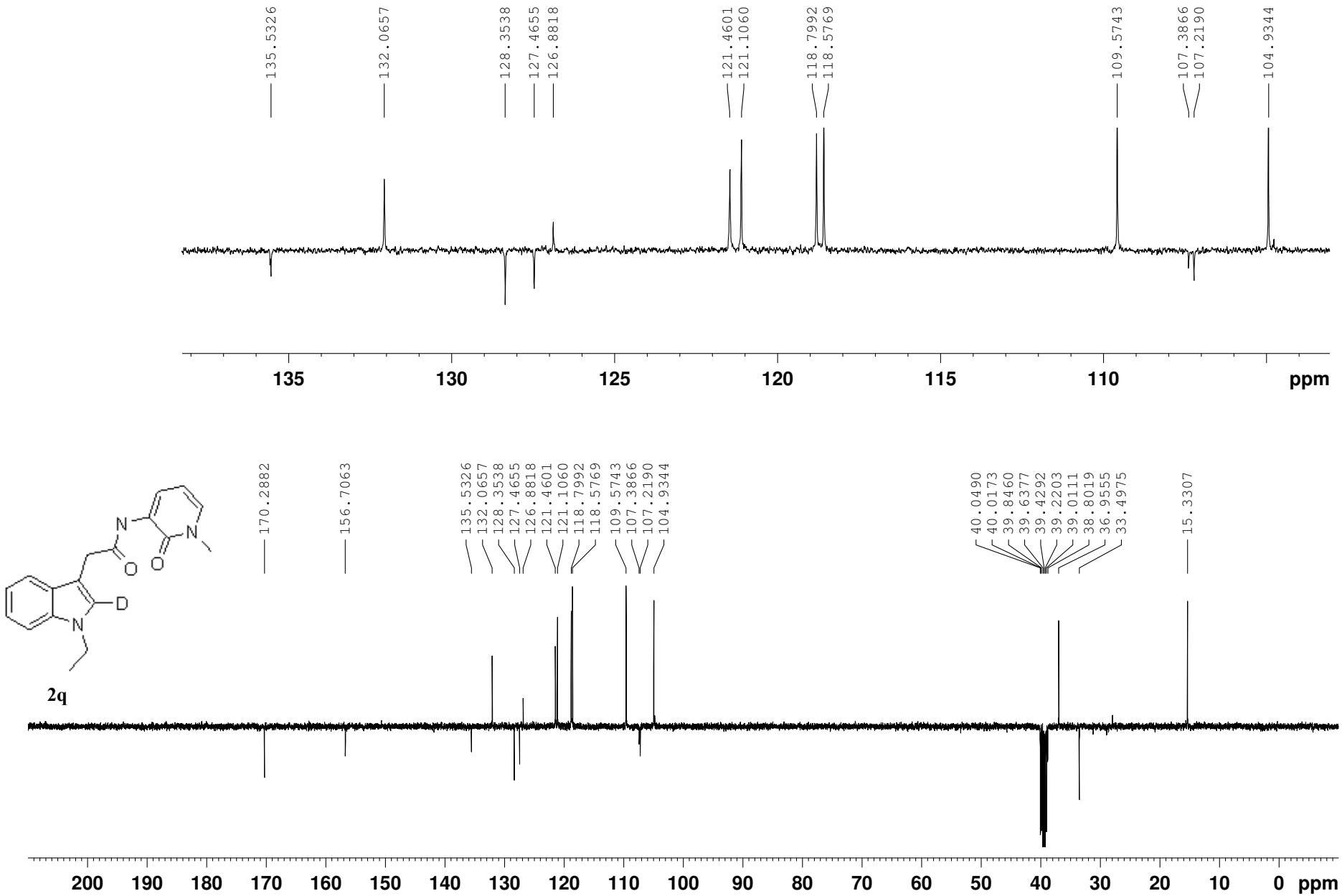
2q



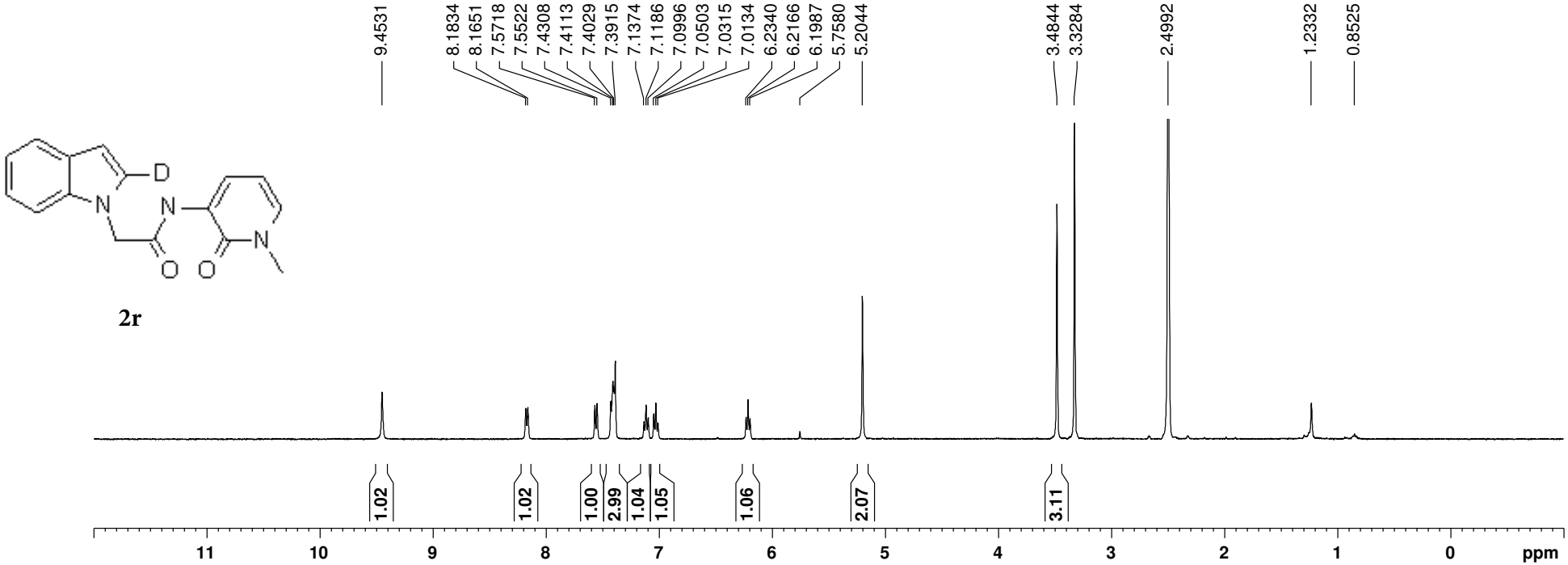
^{1}H NMR of 2q IN DMSO AT 20^{o}C



^{13}C NMR of 2q IN DMSO

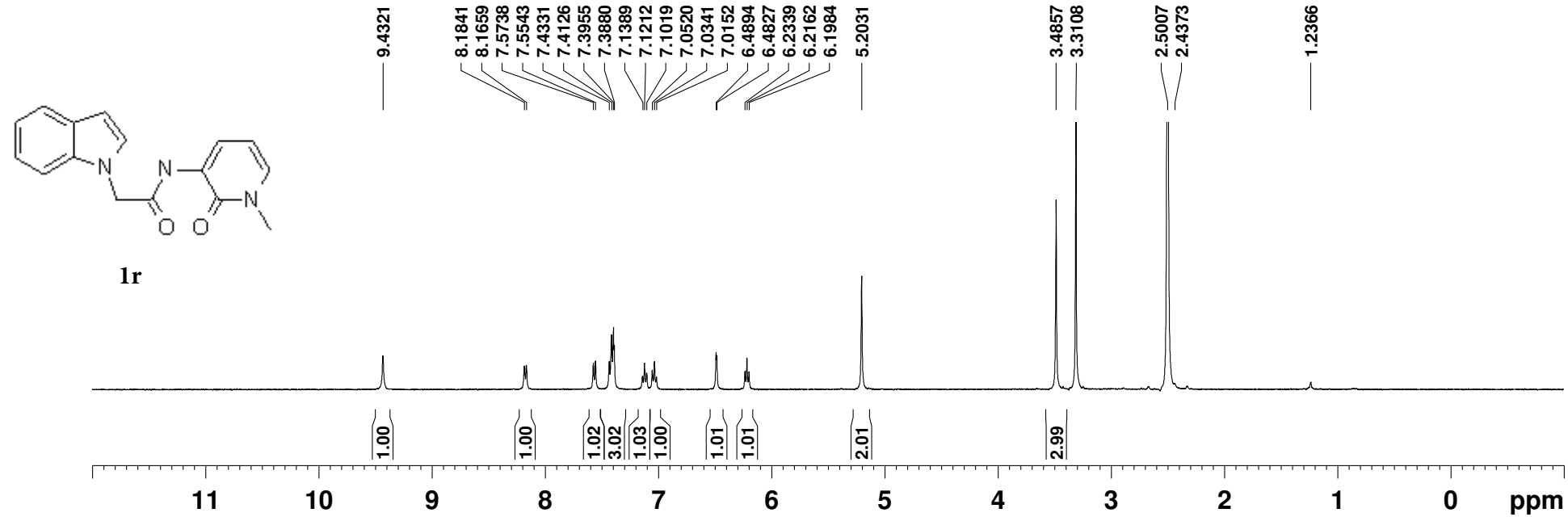


APT of 2q IN DMSO



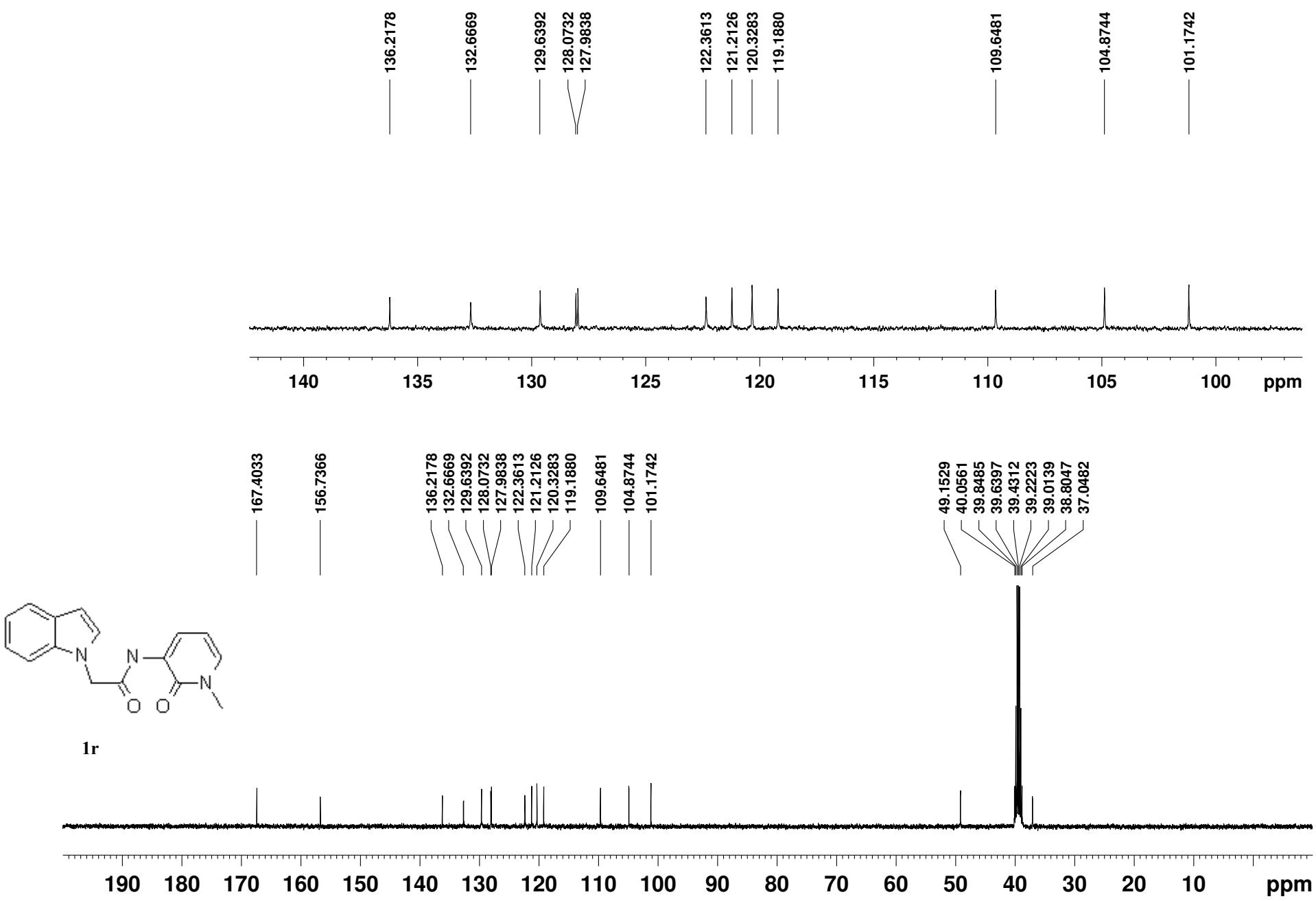
2r

^{1}H NMR of 2r IN DMSO

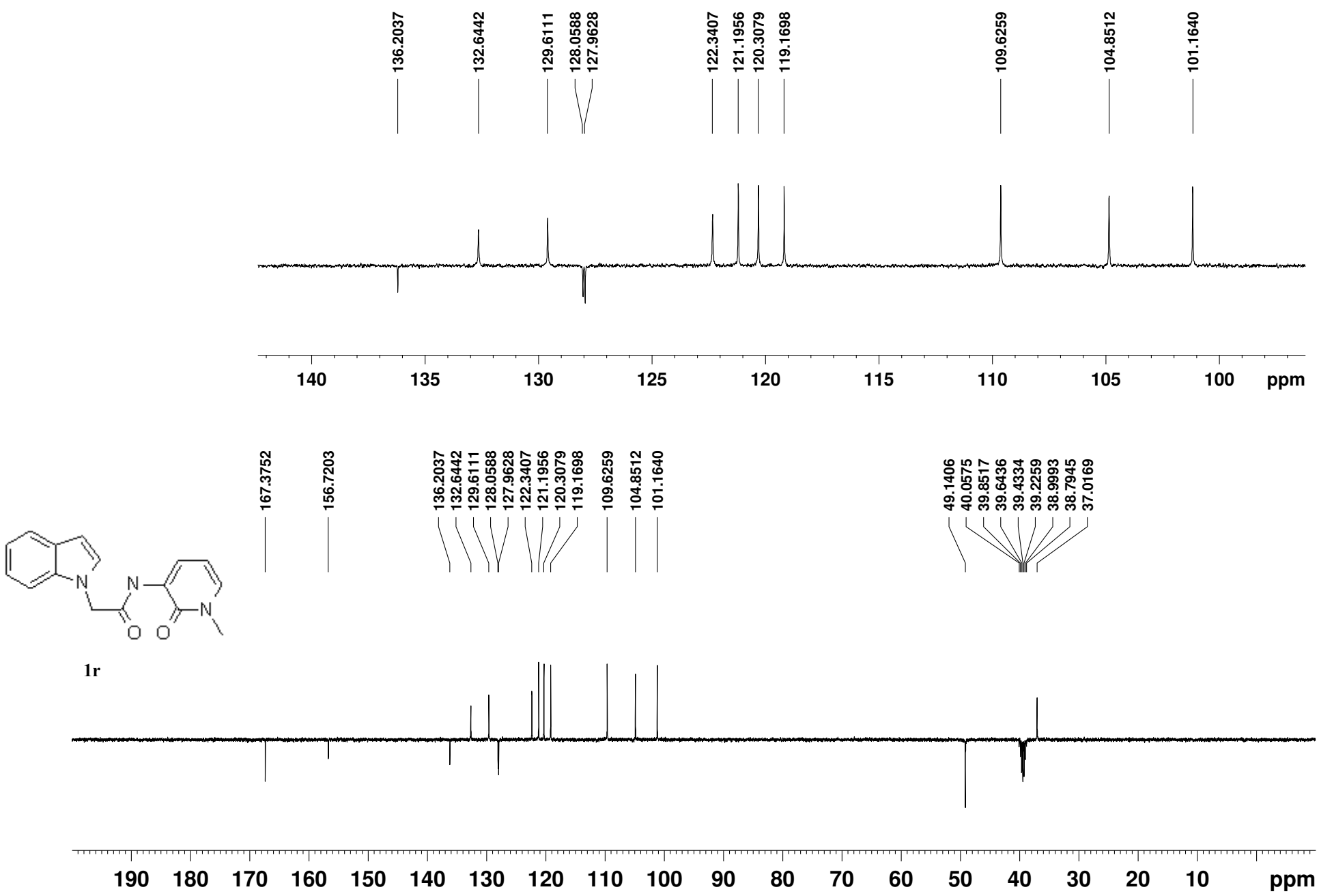


1r

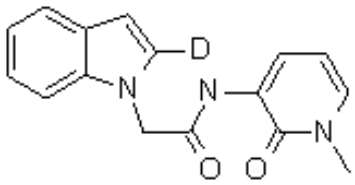
^{1}H NMR of 1r IN DMSO



^{13}C NMR of 1r IN DMSO

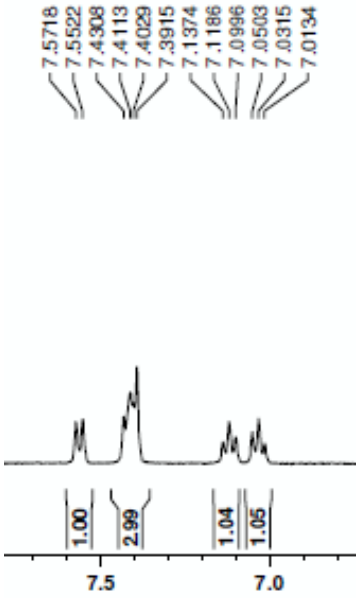


APT of 1r IN DMSO

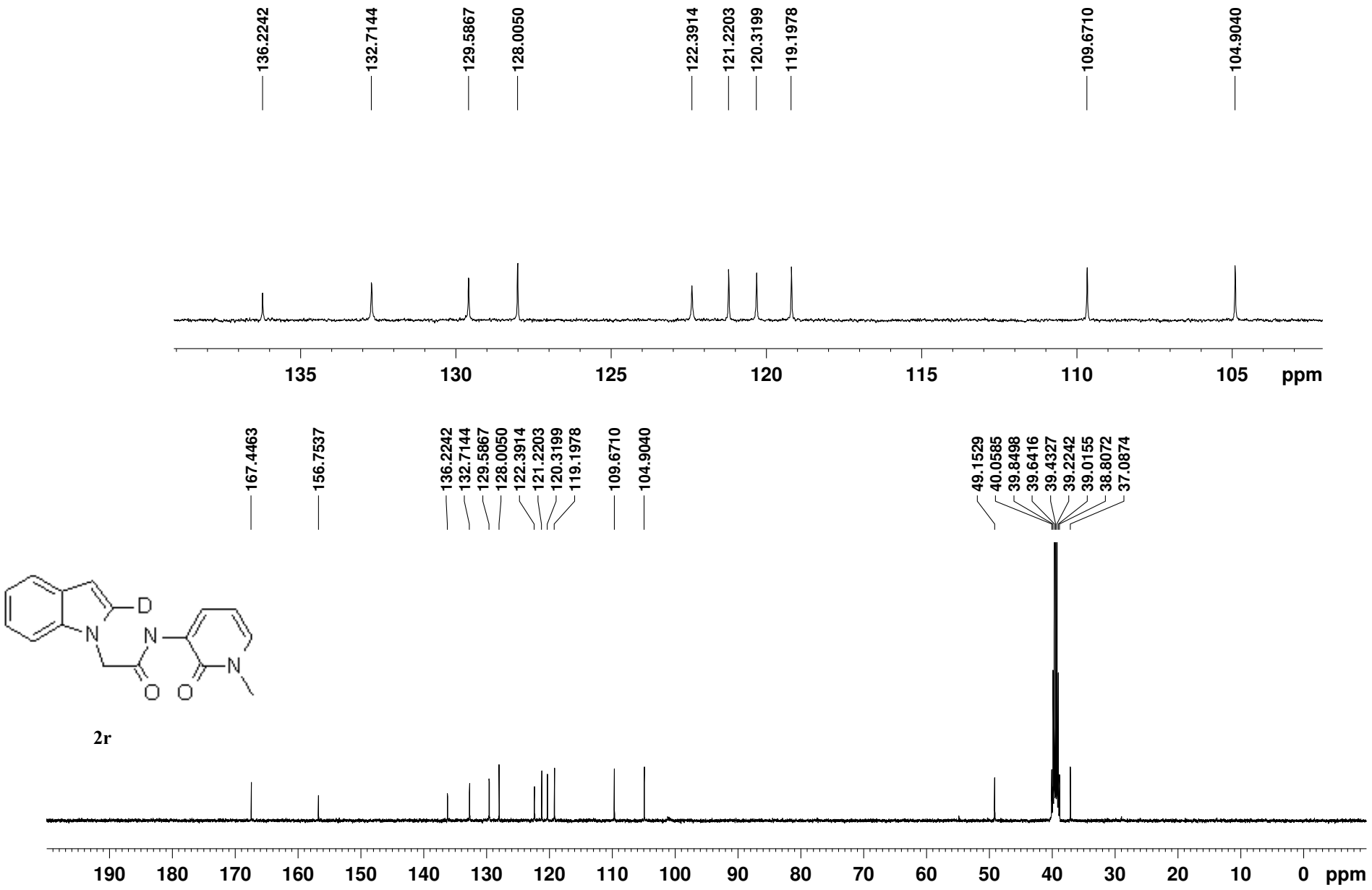


2r

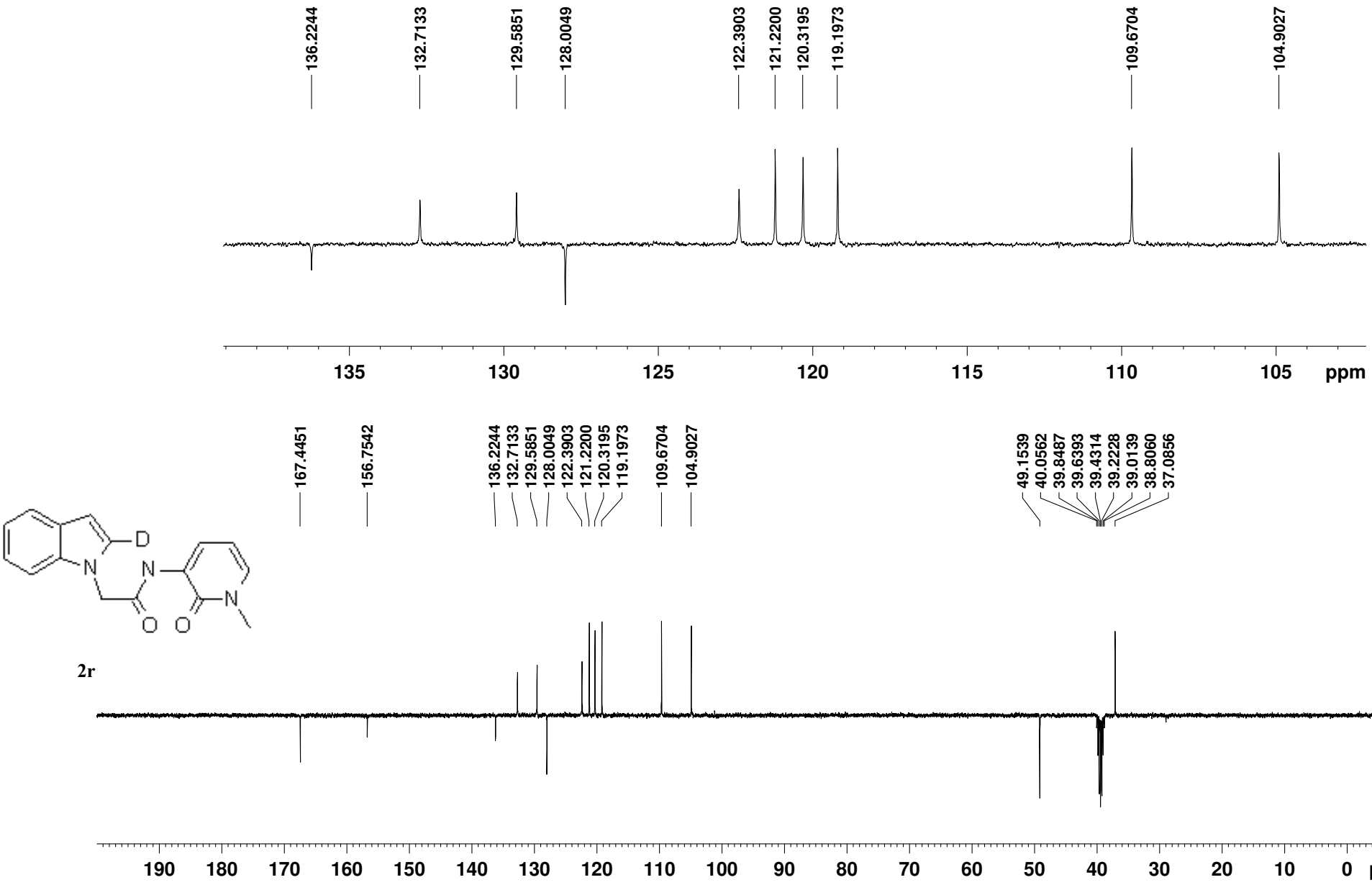
^{1}H NMR of 2r IN DMSO AT 100^{O}C



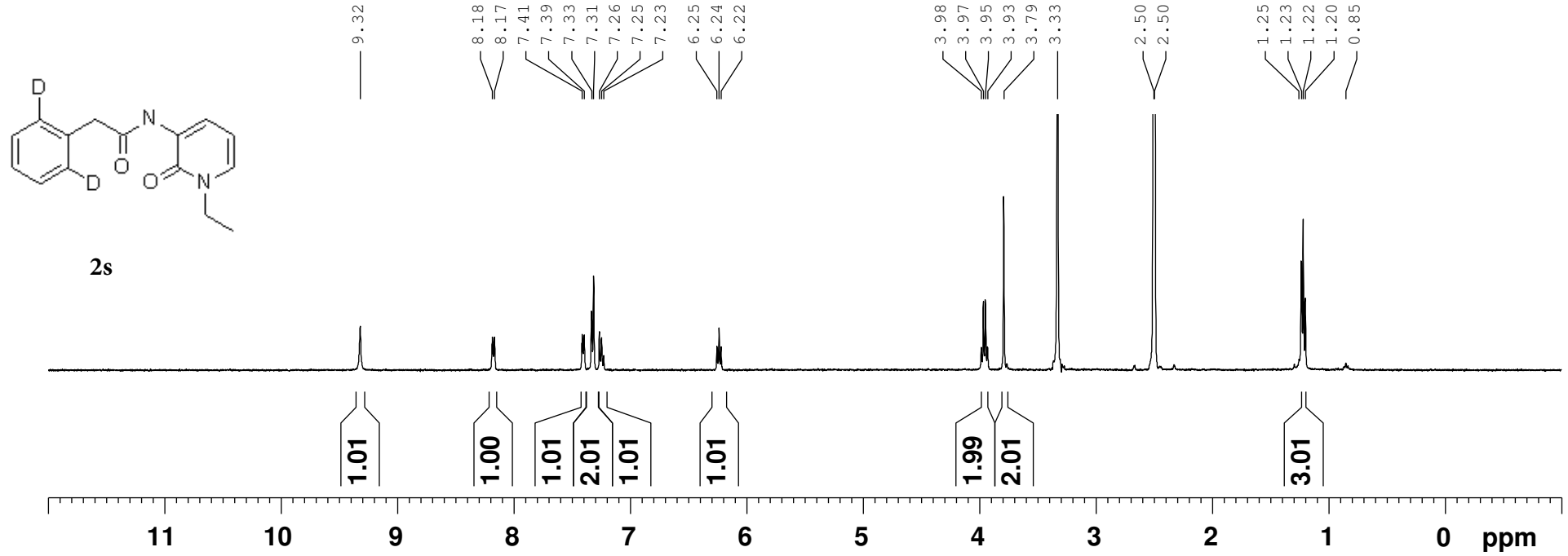
^{1}H NMR of 2r IN DMSO AT 20^{O}C



^{13}C NMR of 2r IN DMSO

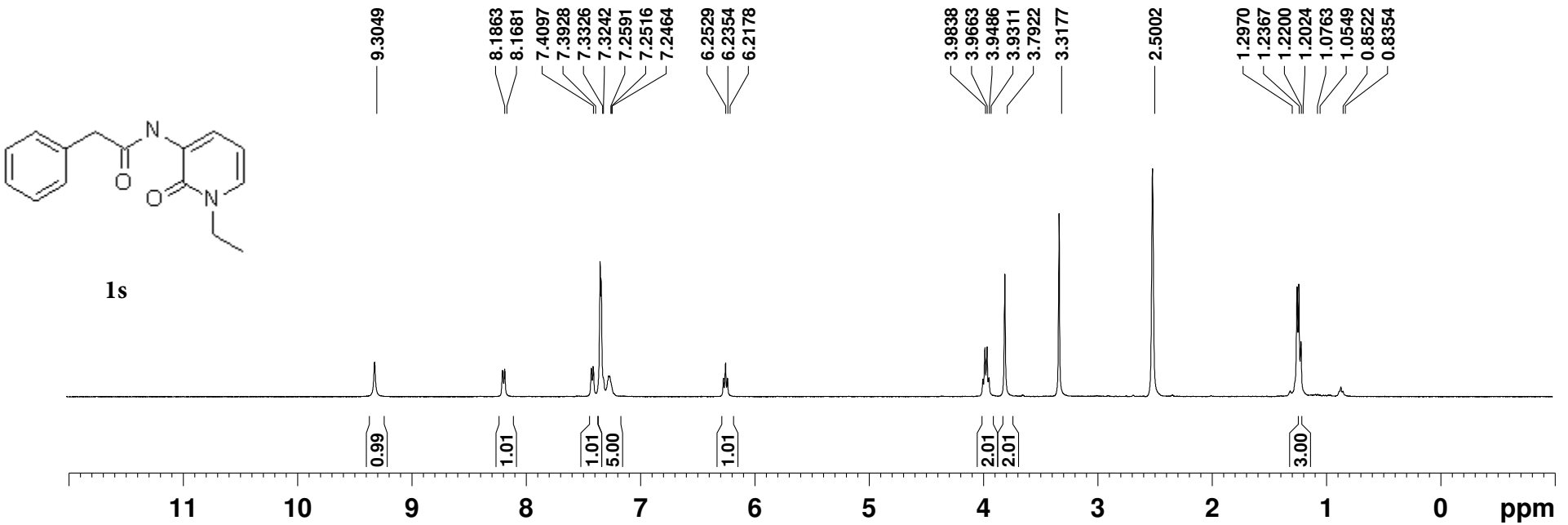


APT of 2r IN DMSO



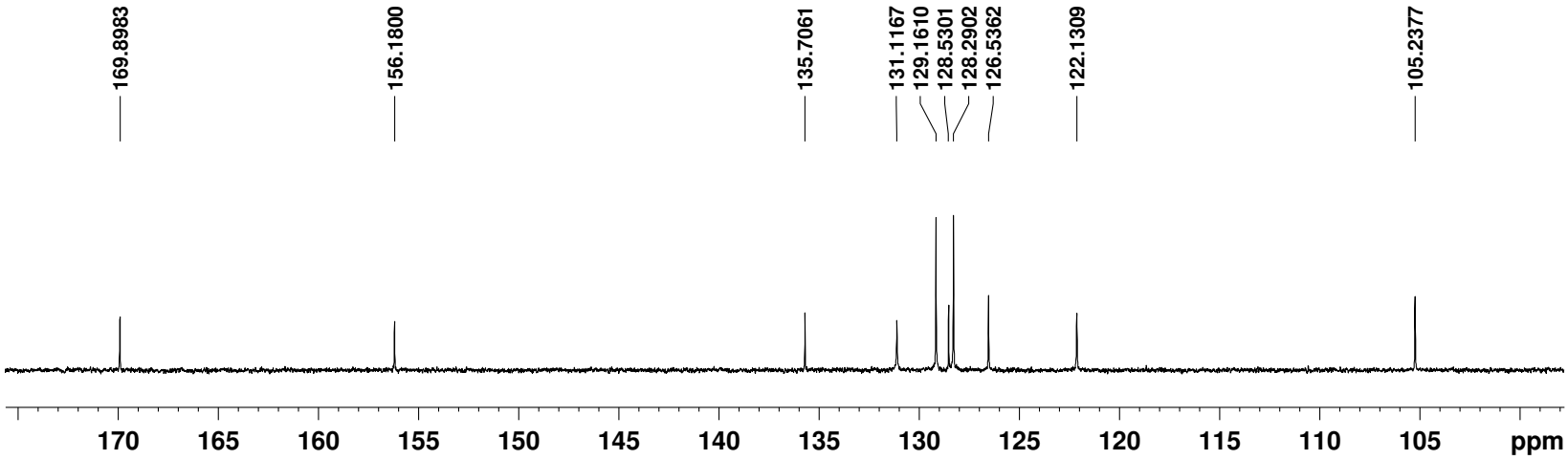
2s

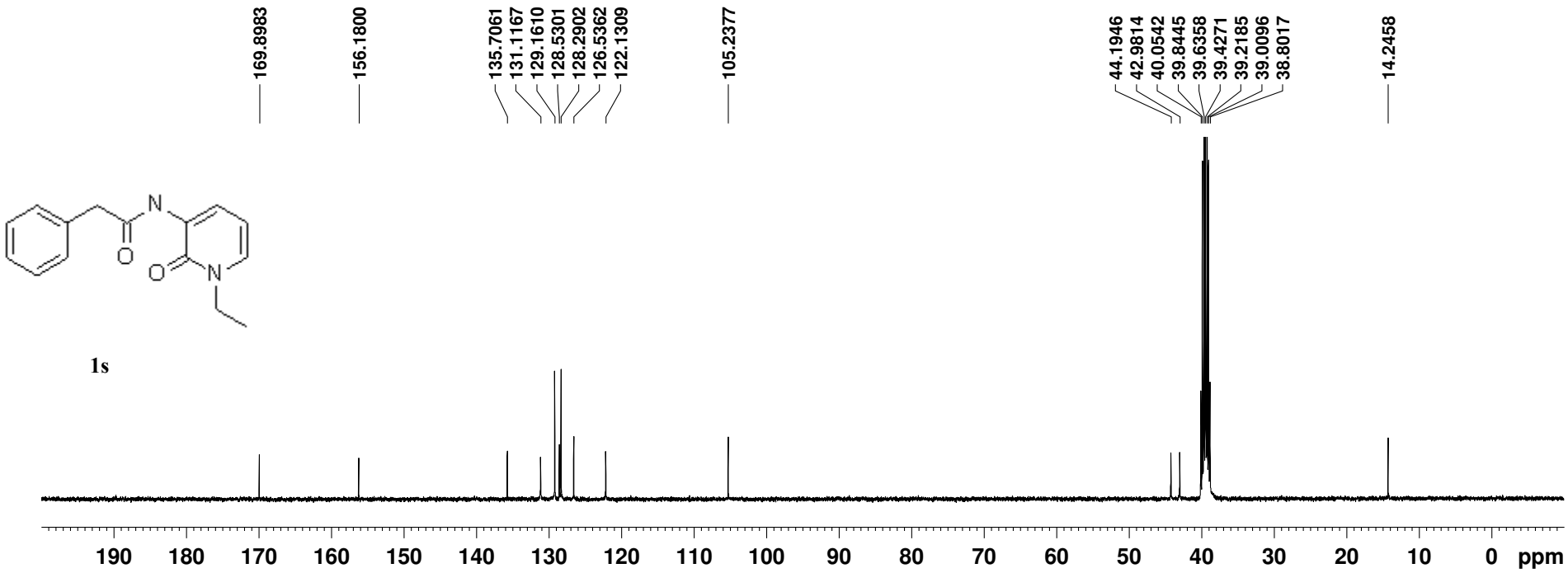
^{1}H NMR of 2s IN DMSO



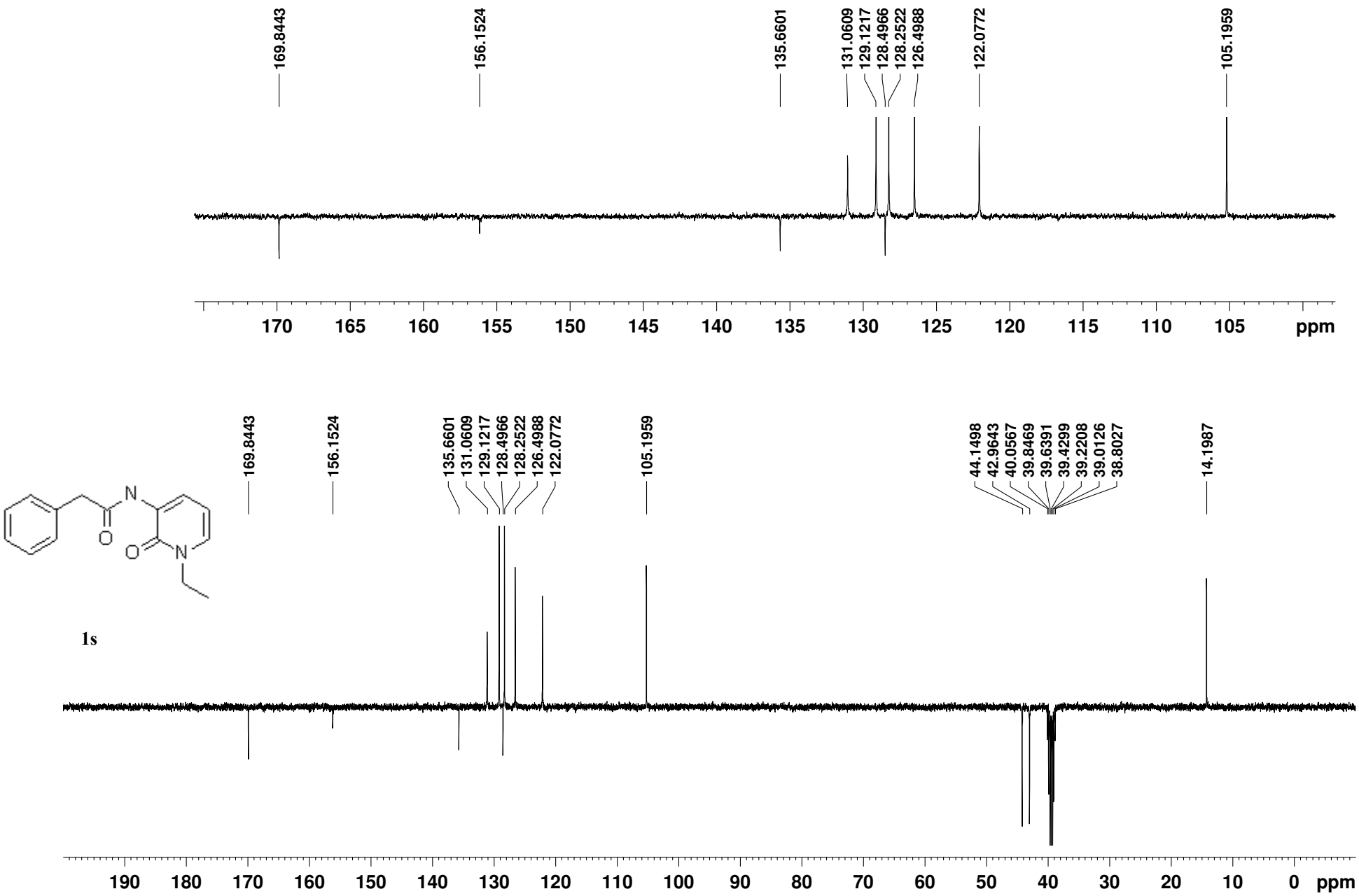
1s

^{1}H NMR of 1s IN DMSO

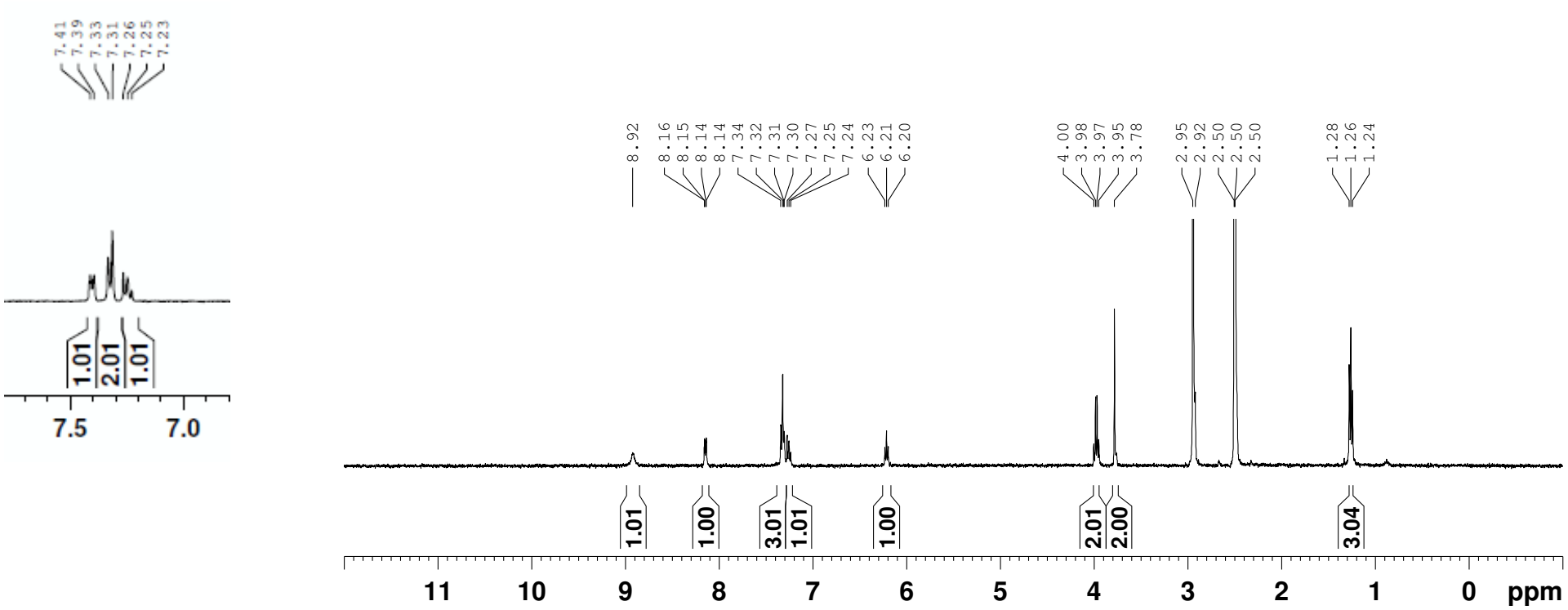




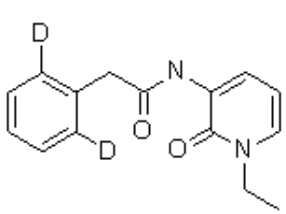
^{13}C NMR of 1s IN DMSO



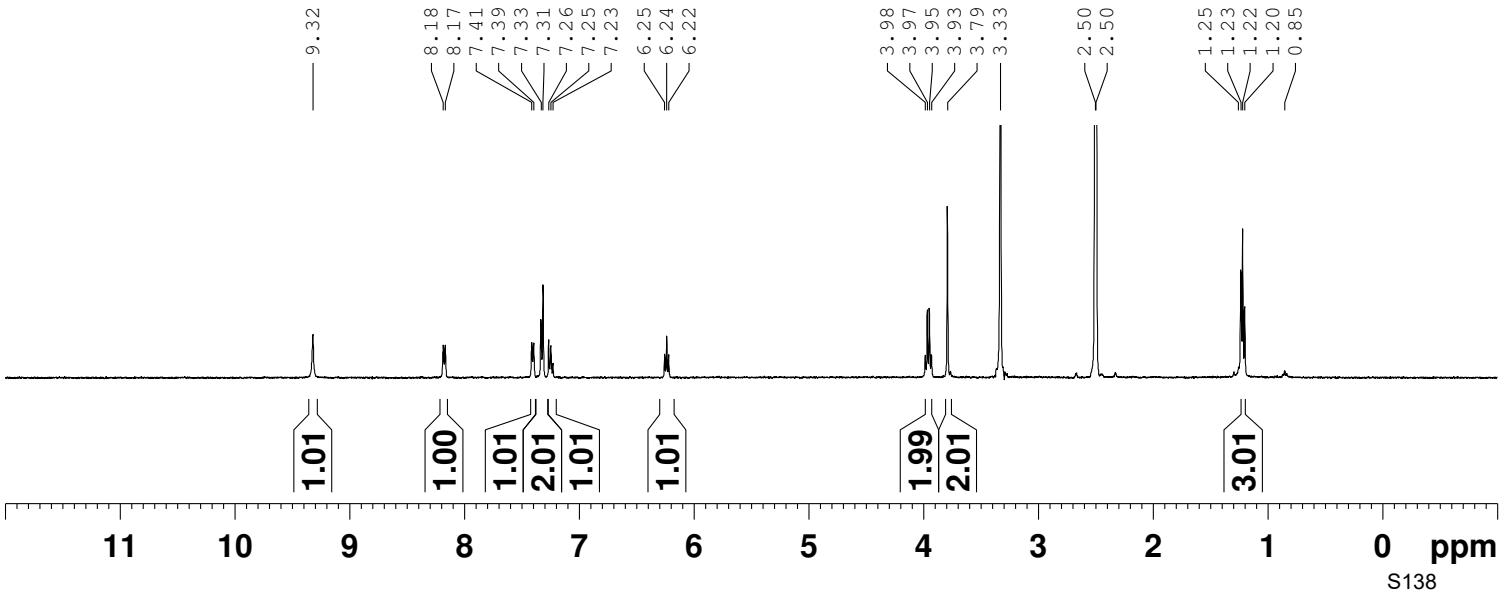
APT of 1s IN DMSO



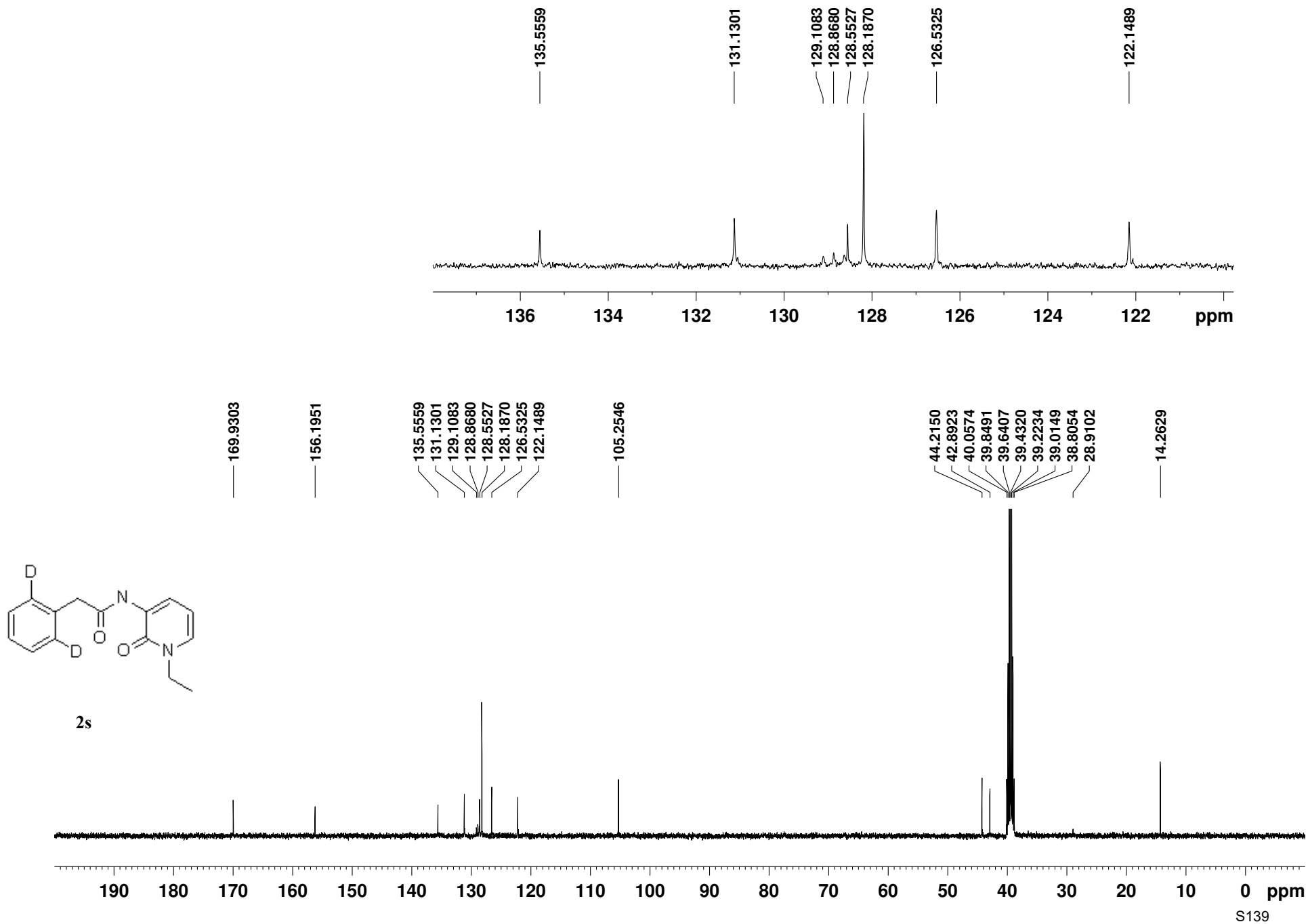
^{1}H NMR of 2s IN DMSO AT 100^{O}C



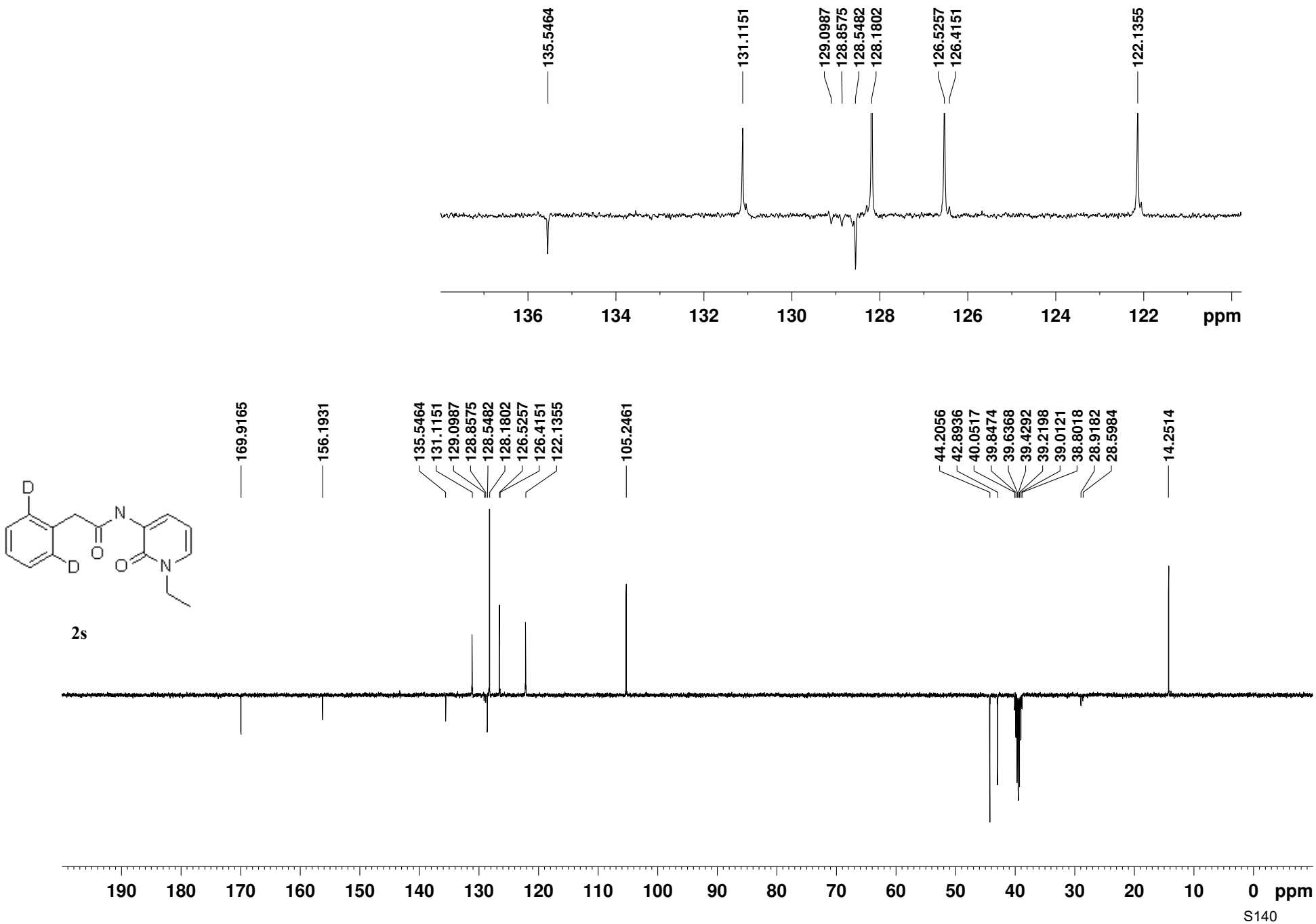
2s



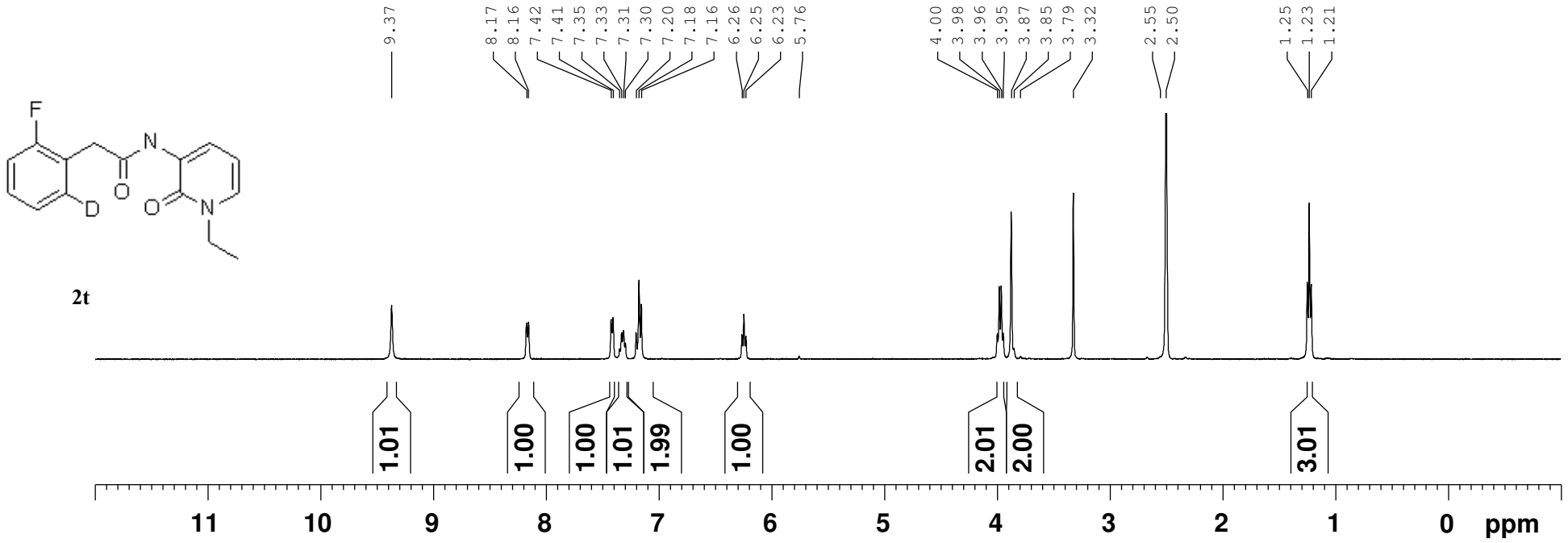
^{1}H NMR of 2s IN DMSO AT 20^{O}C



^{13}C NMR of 2s IN DMSO

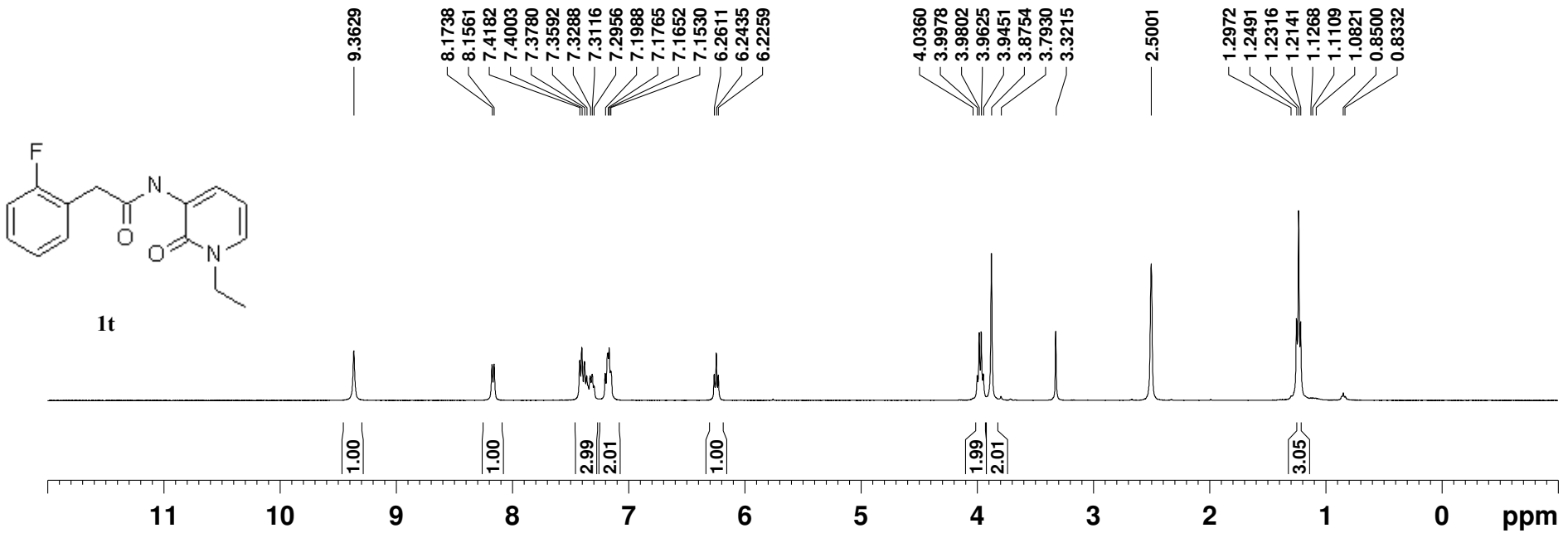


APT of 2s IN DMSO



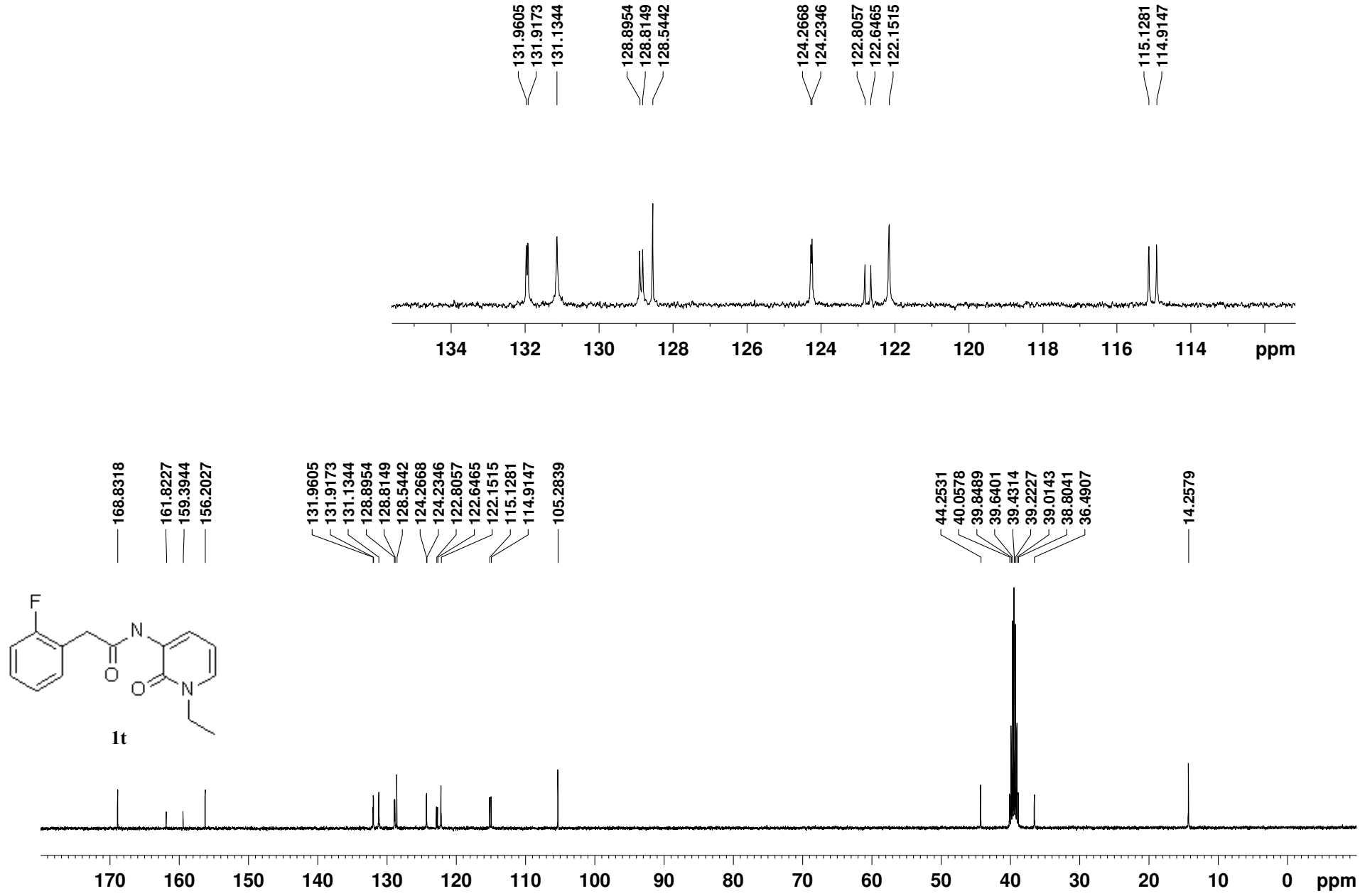
2t

^{1}H NMR of 2t IN DMSO

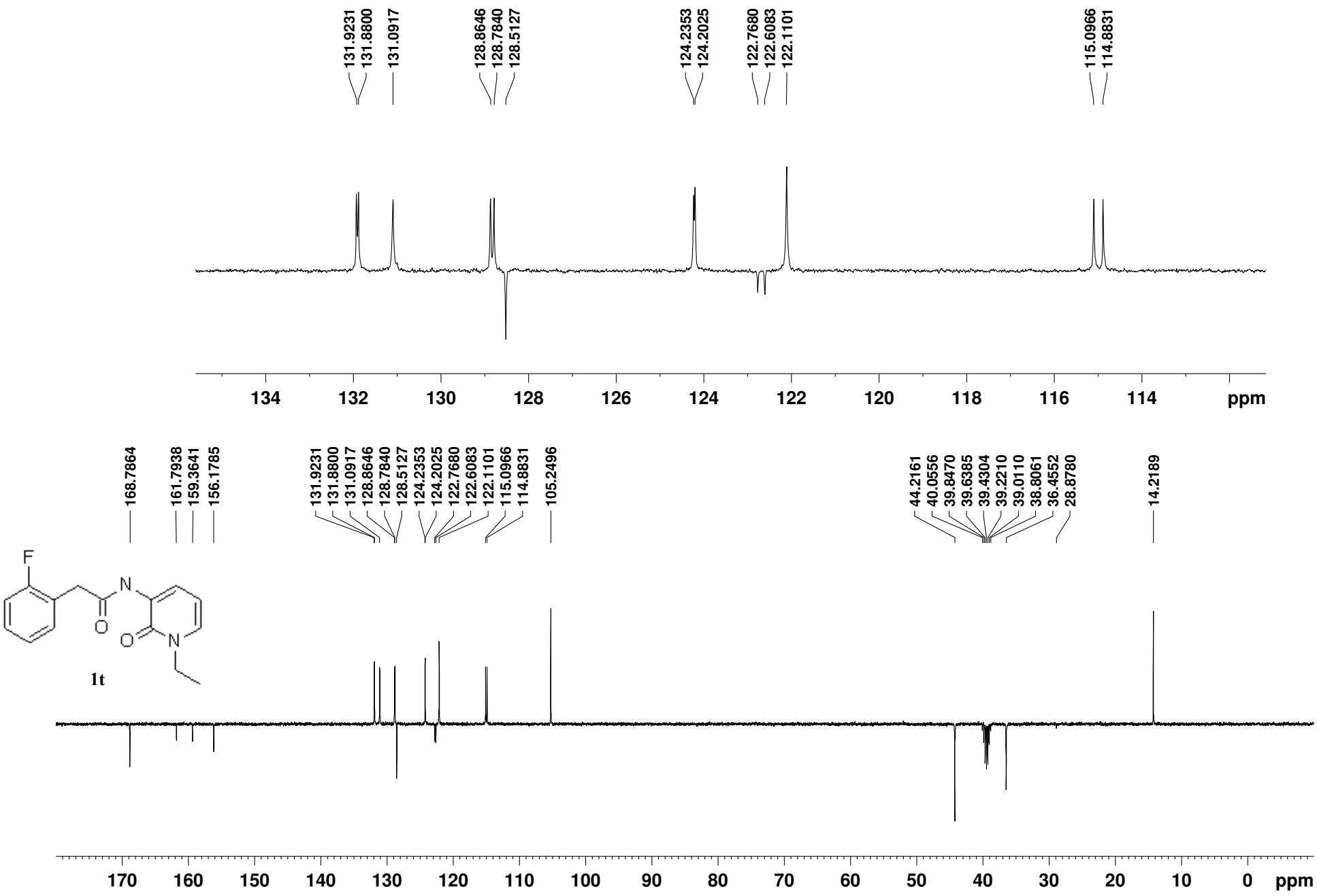


1t

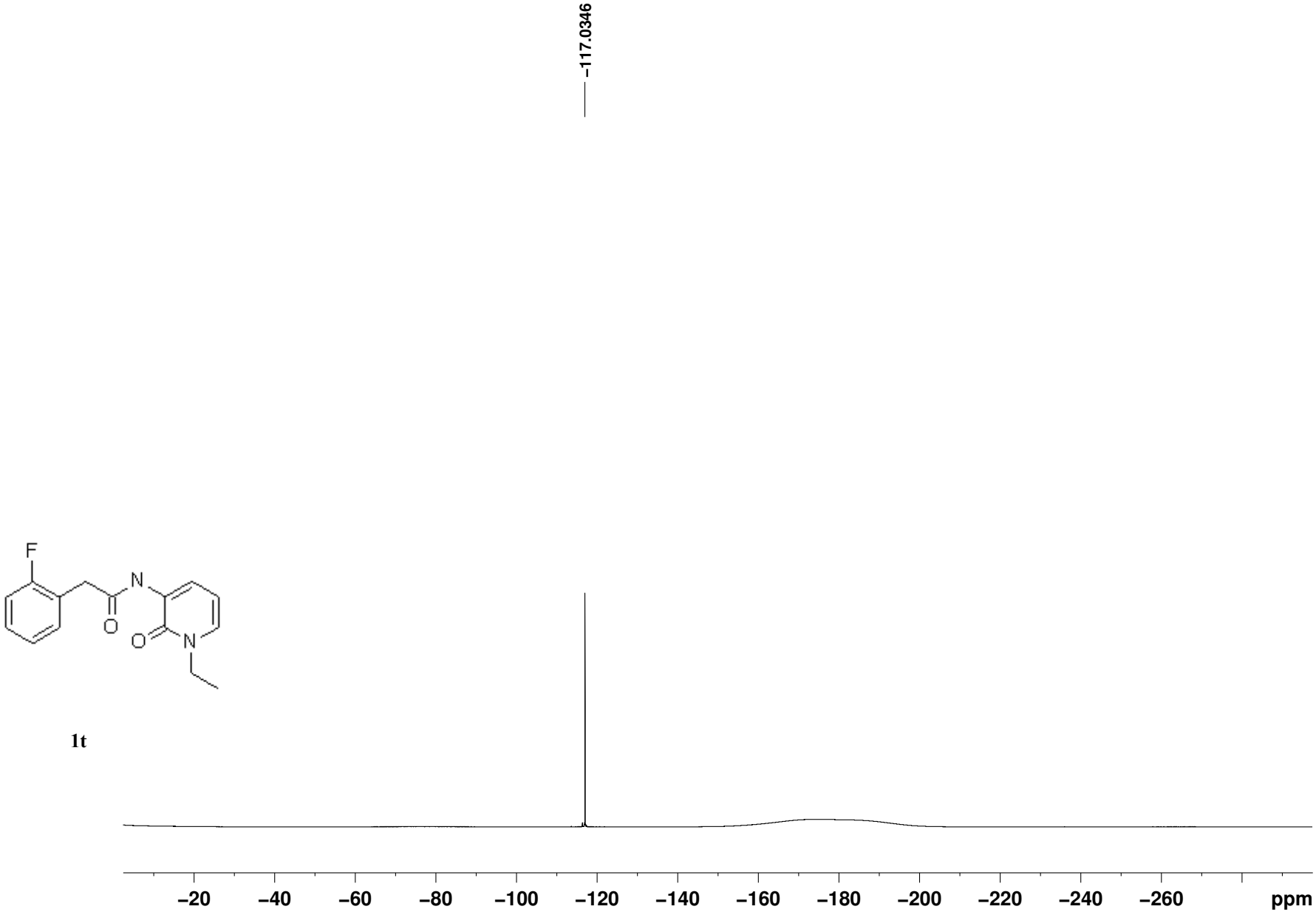
^{1}H NMR of 1t IN DMSO



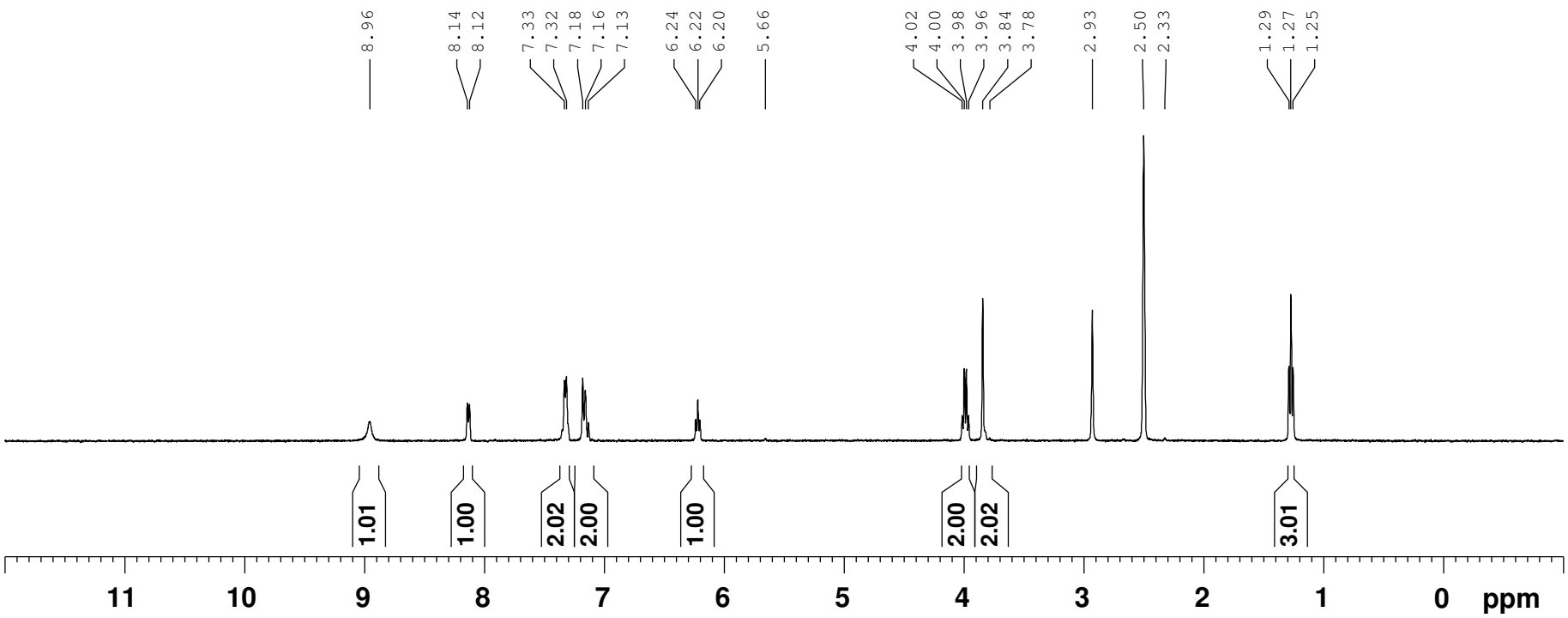
^{13}C NMR of 1t IN DMSO



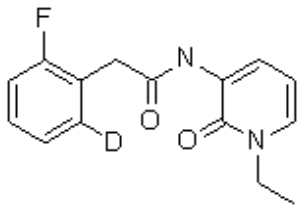
APT of 1t IN DMSO



^{19}F of 1t IN DMSO

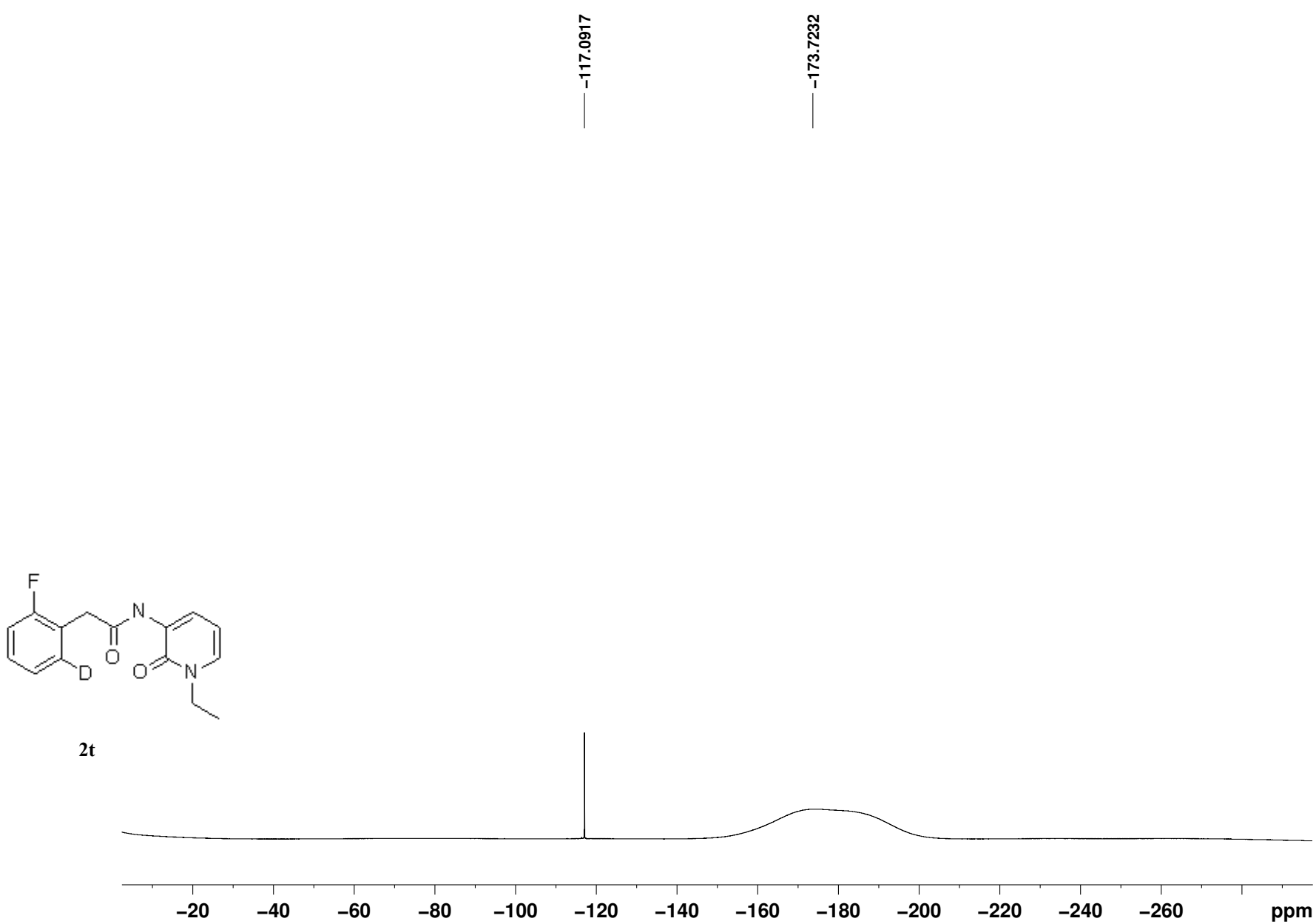


^{1}H NMR of 2t IN DMSO AT 100^{O}C

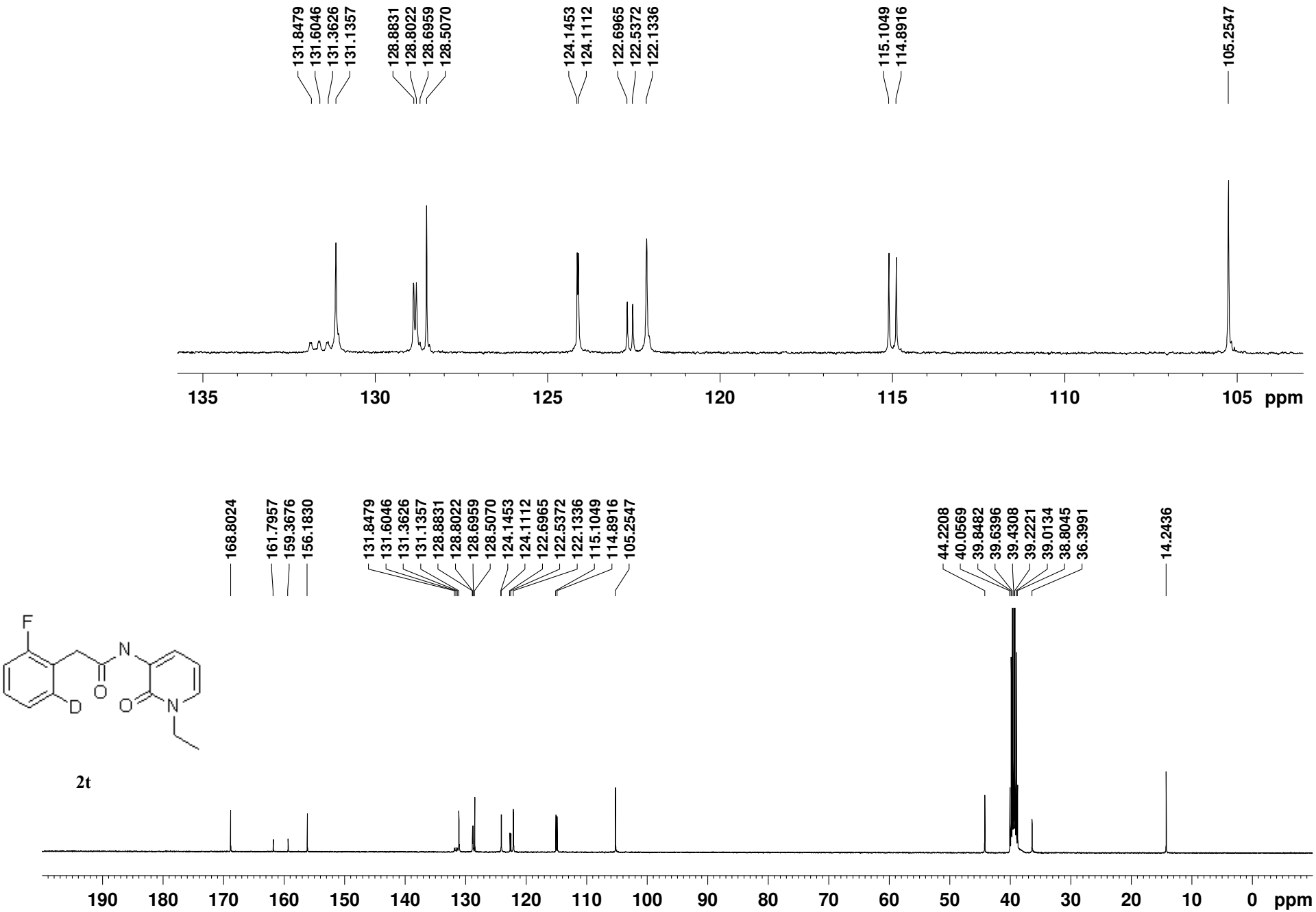


2t

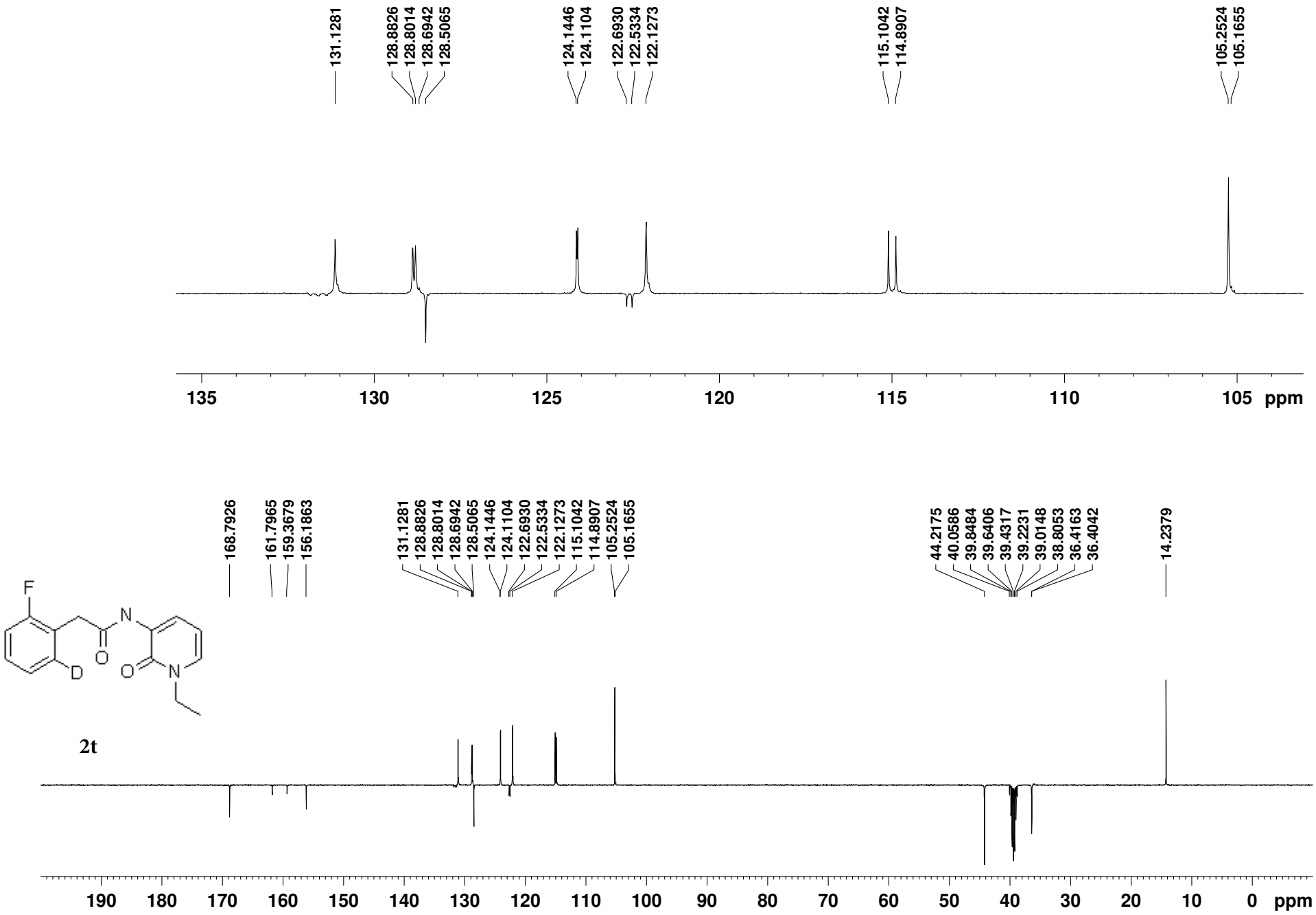
^{1}H NMR of 2t IN DMSO AT 20^{O}C



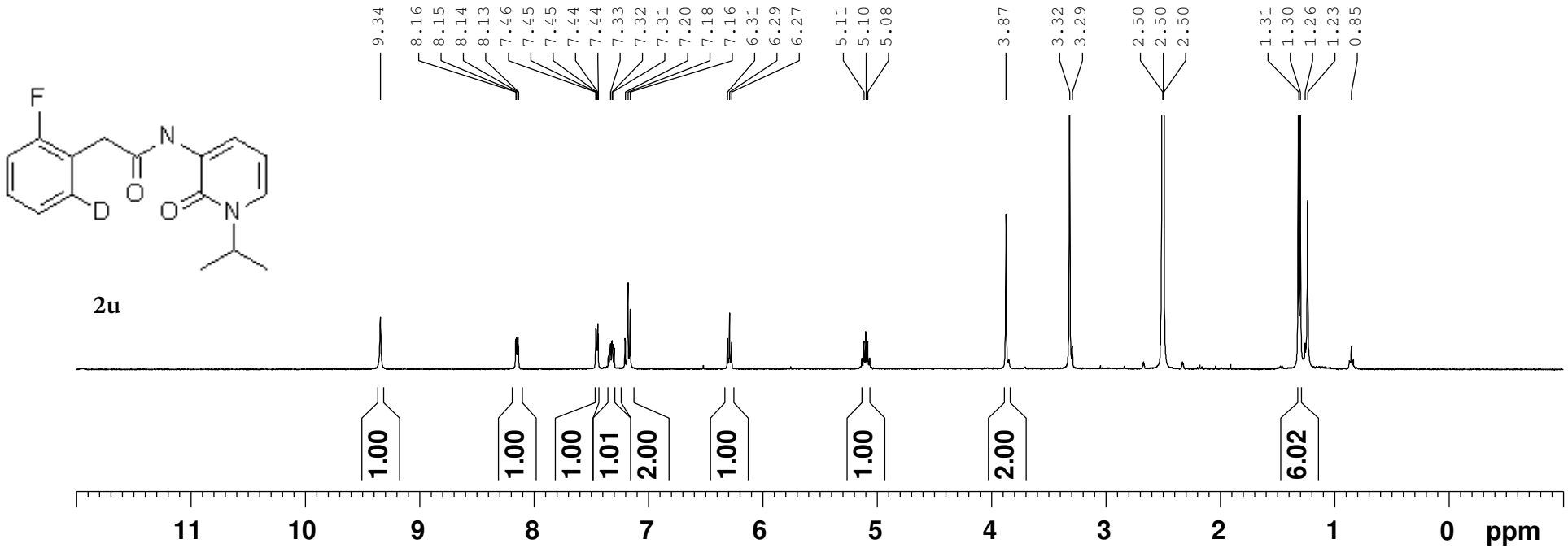
^{19}F NMR of 2t IN DMSO



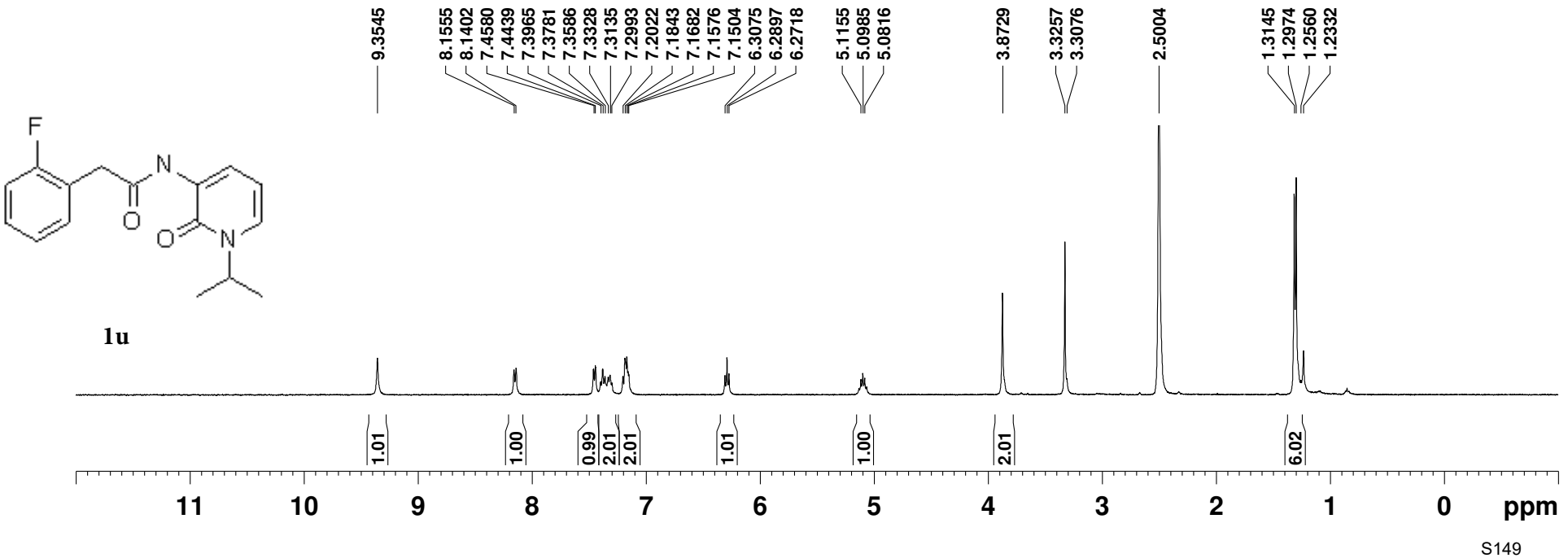
^{13}C NMR of 2t IN DMSO



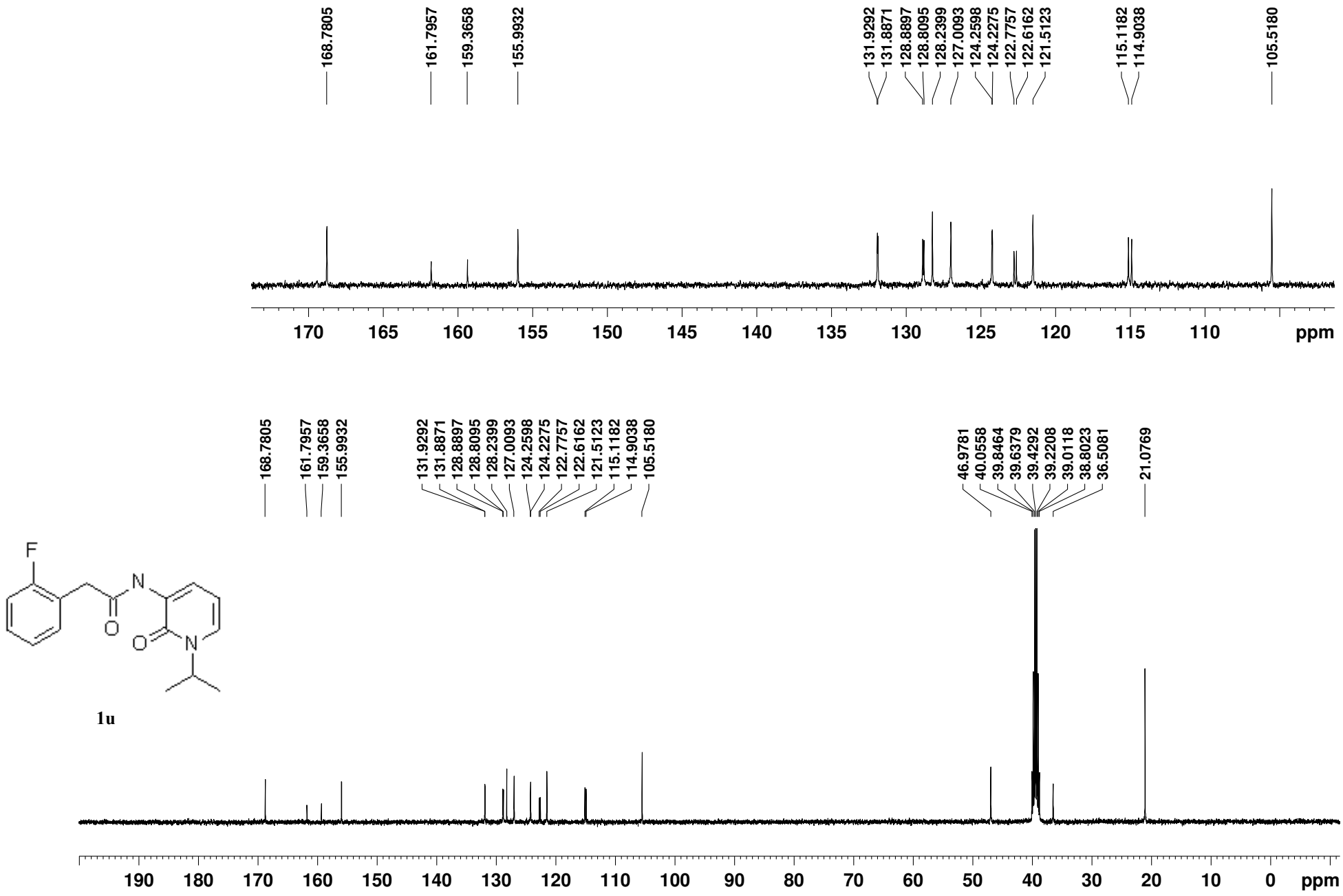
APT of 2t IN DMSO



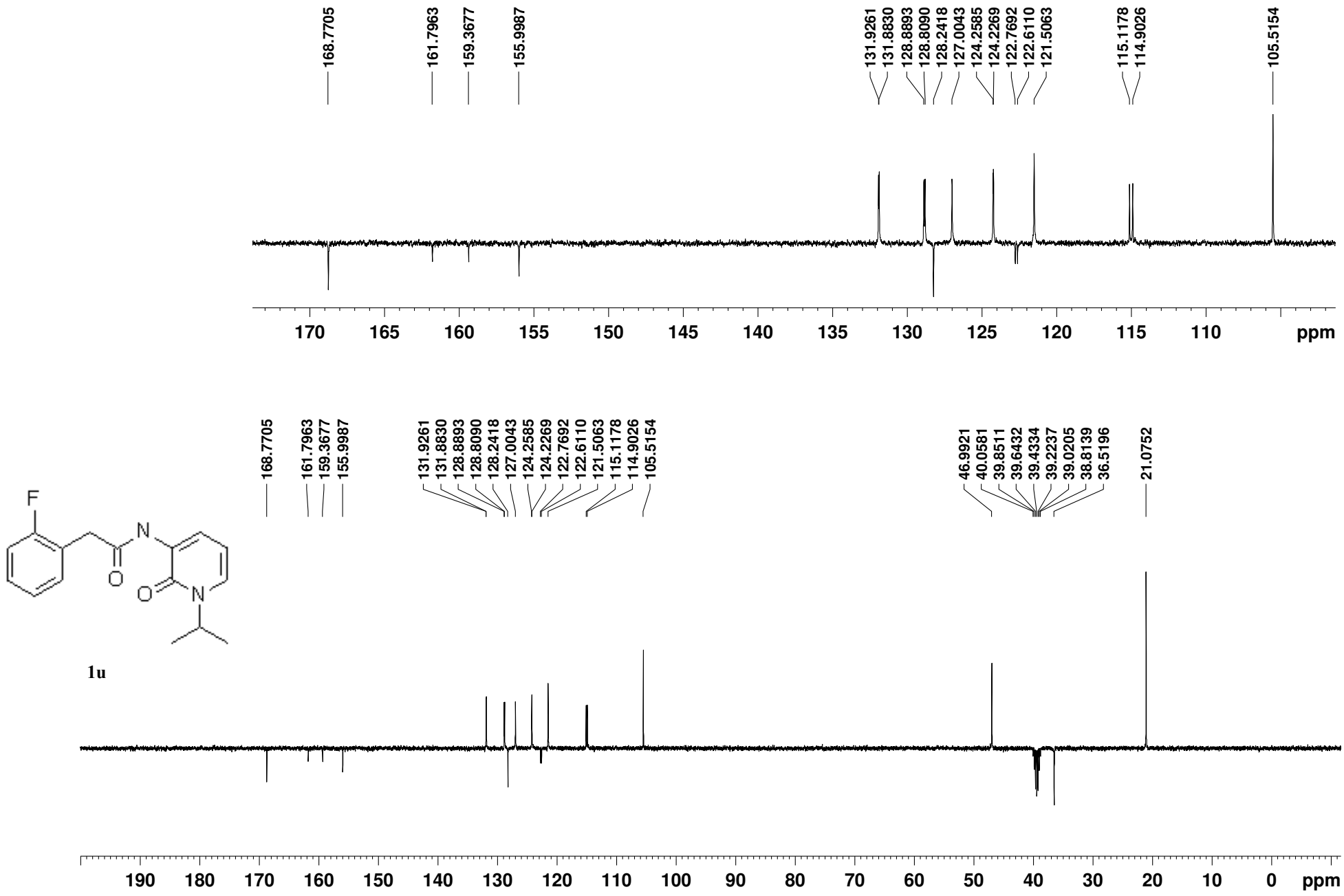
^{1}H NMR of 2u IN DMSO



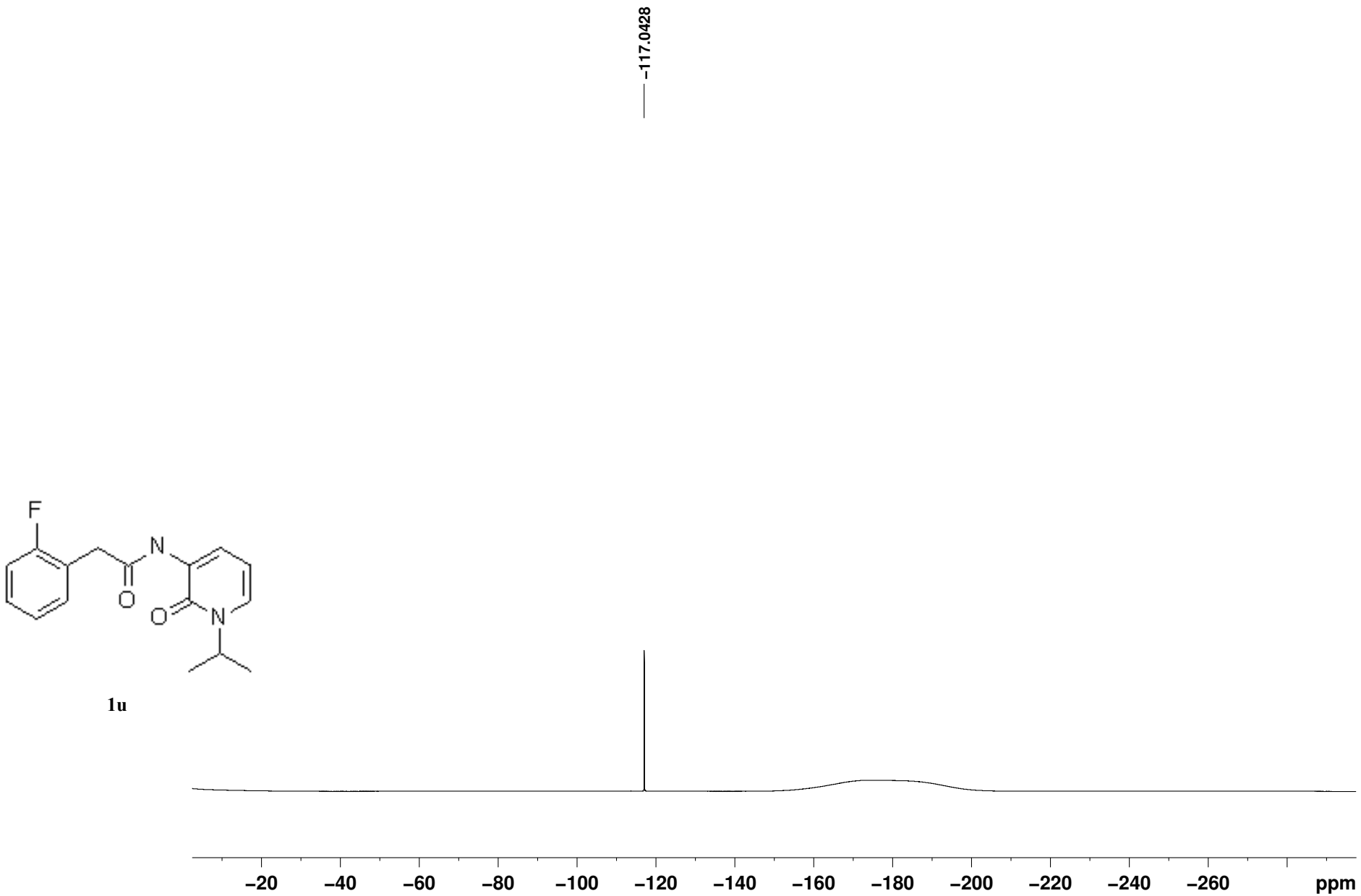
^{1}H NMR of 1u IN DMSO



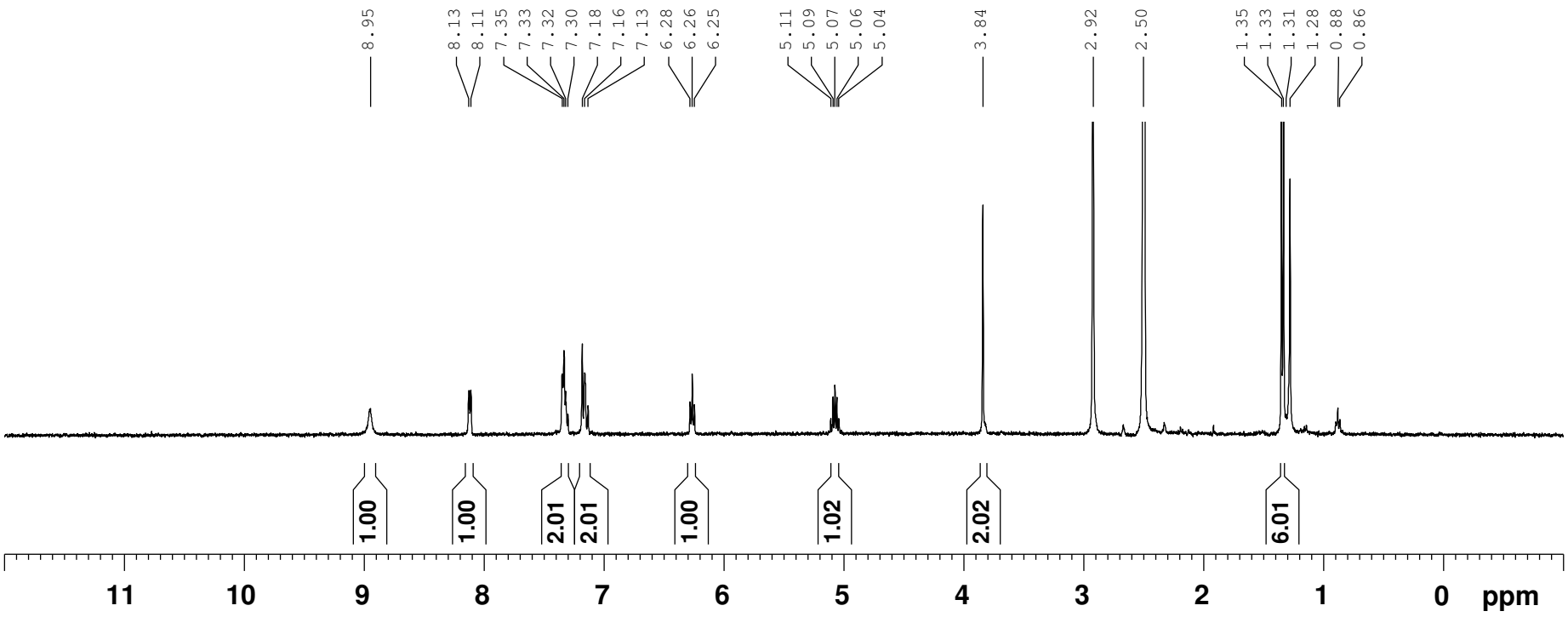
^{13}C NMR of 1u IN DMSO



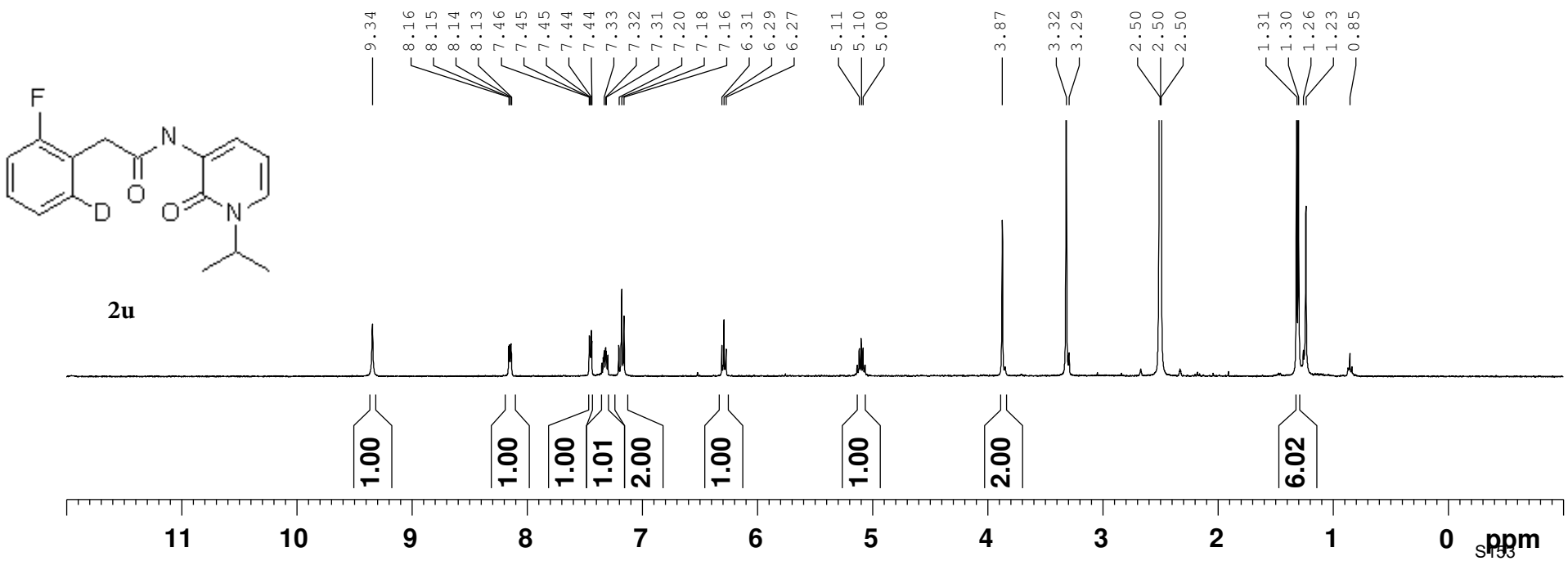
APT of 1u IN DMSO



^{19}F NMR of 1u IN DMSO

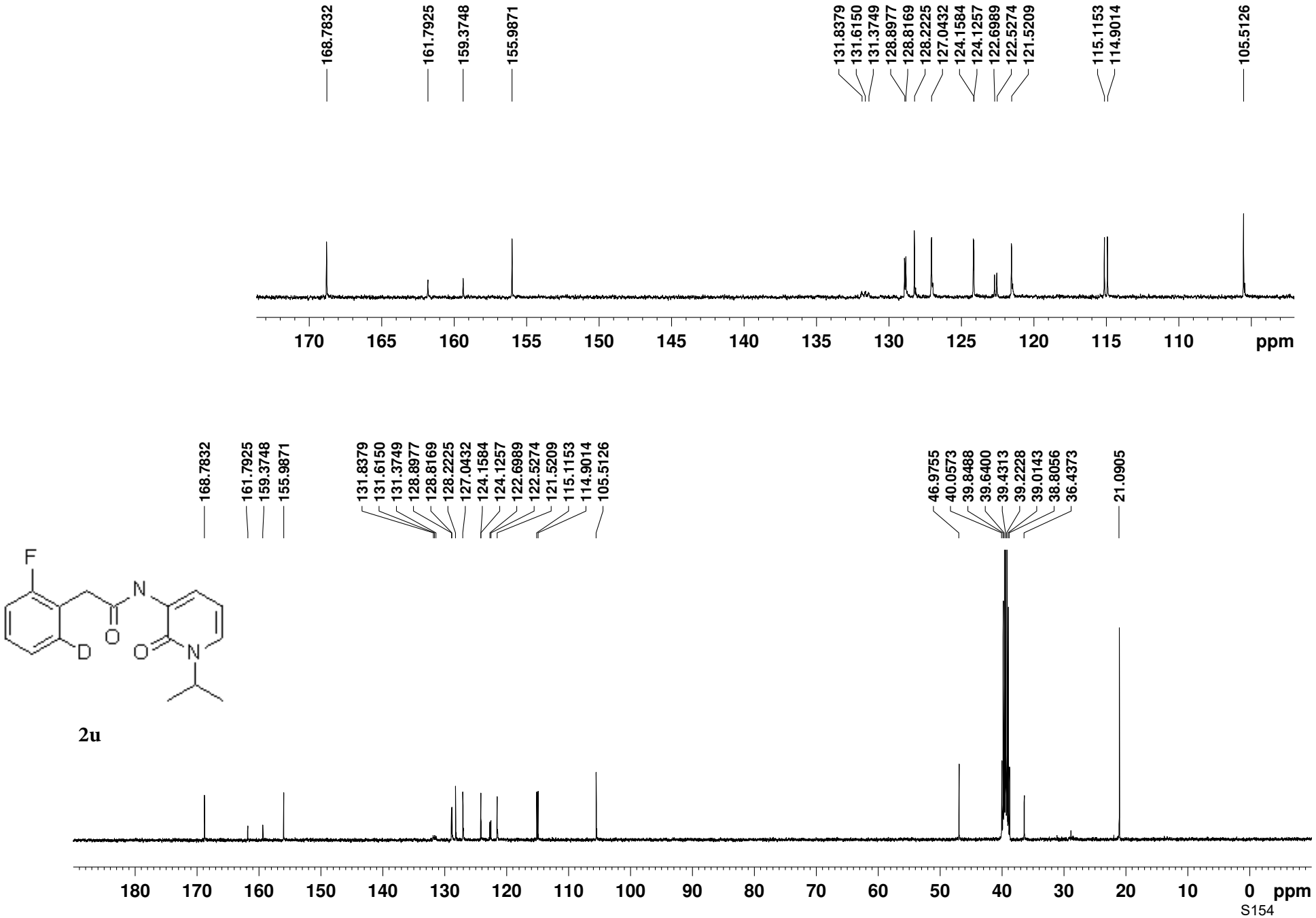


^{1}H NMR of 2u IN DMSO AT 100^{O}C

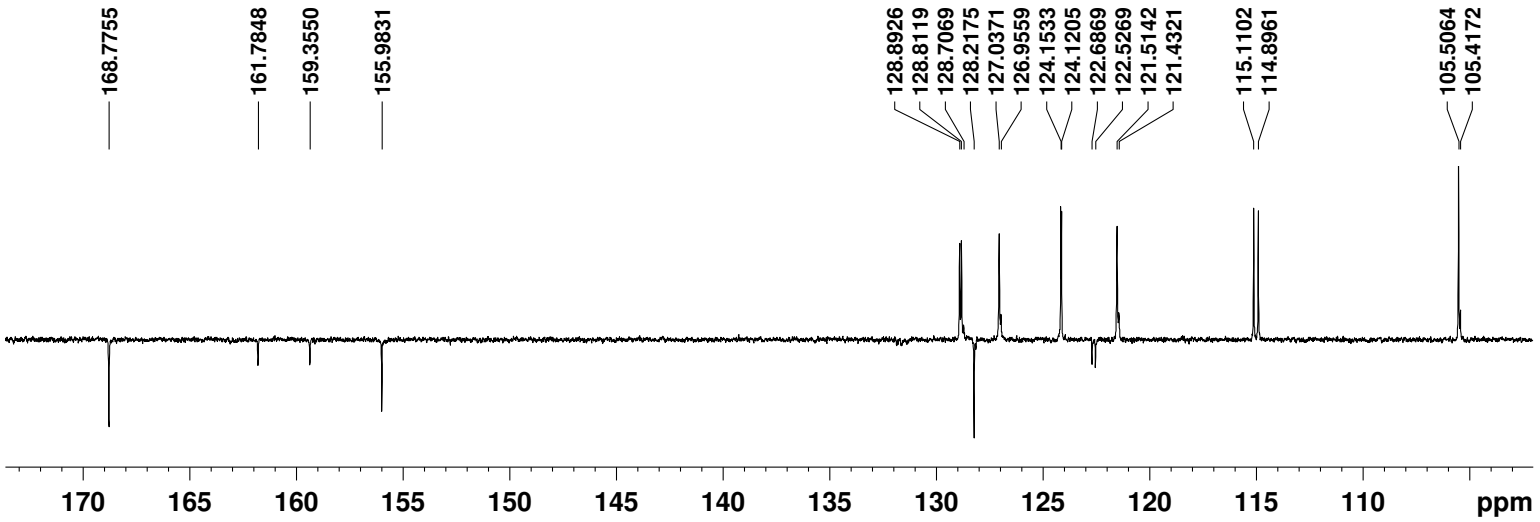


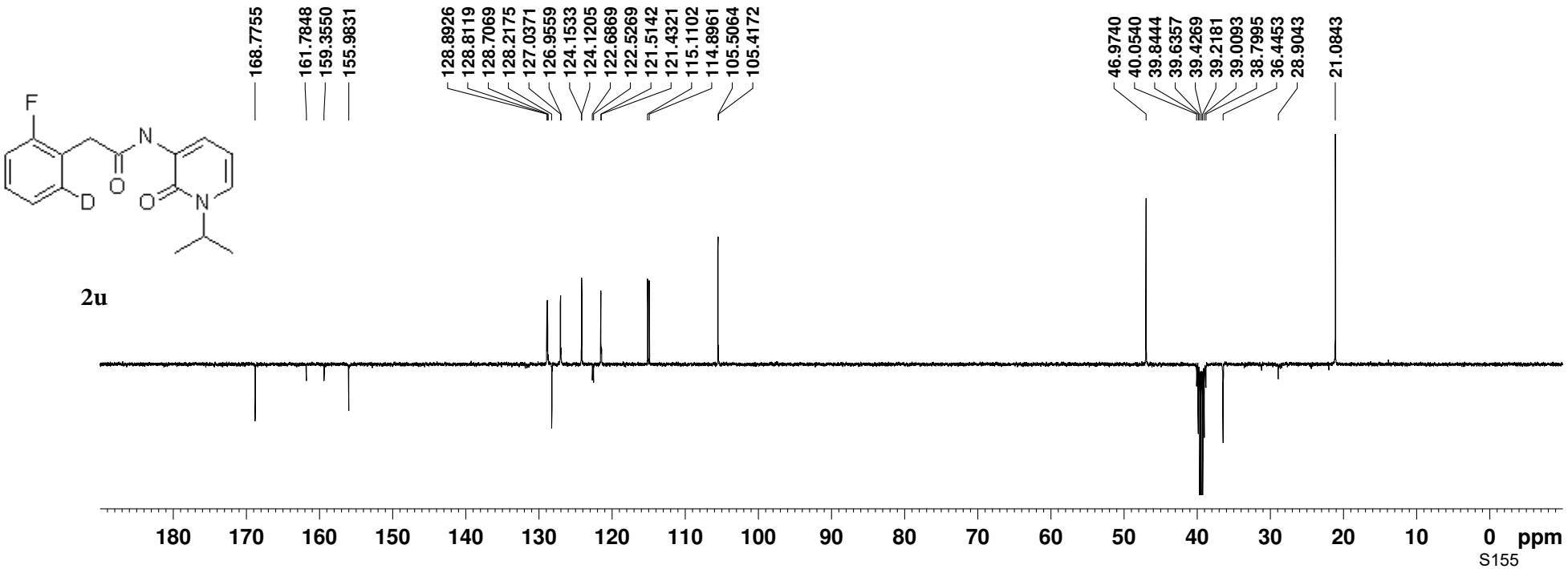
2u

^{1}H NMR of 2u IN DMSO AT 20^{O}C



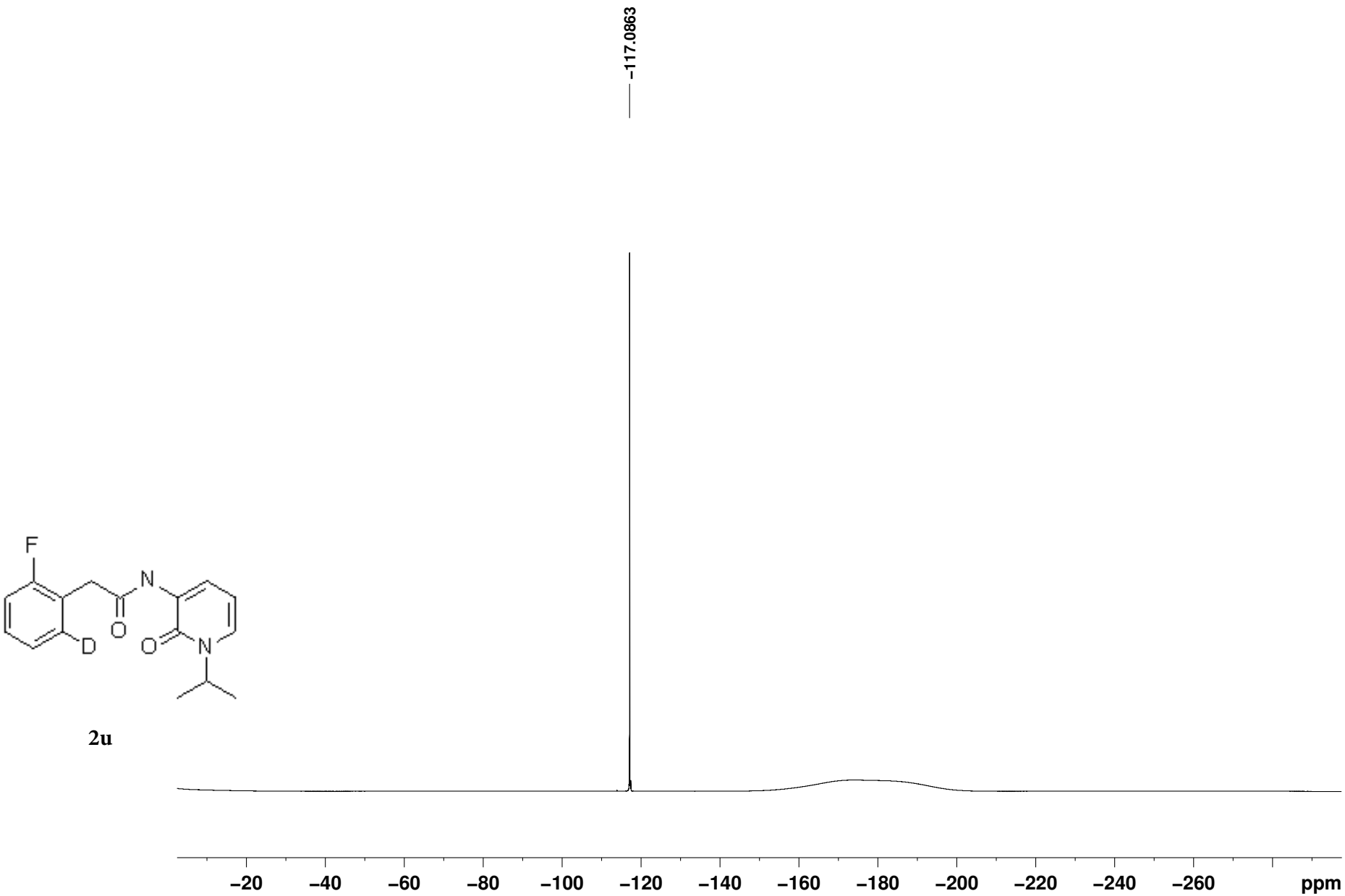
^{13}C NMR of 2u IN DMSO



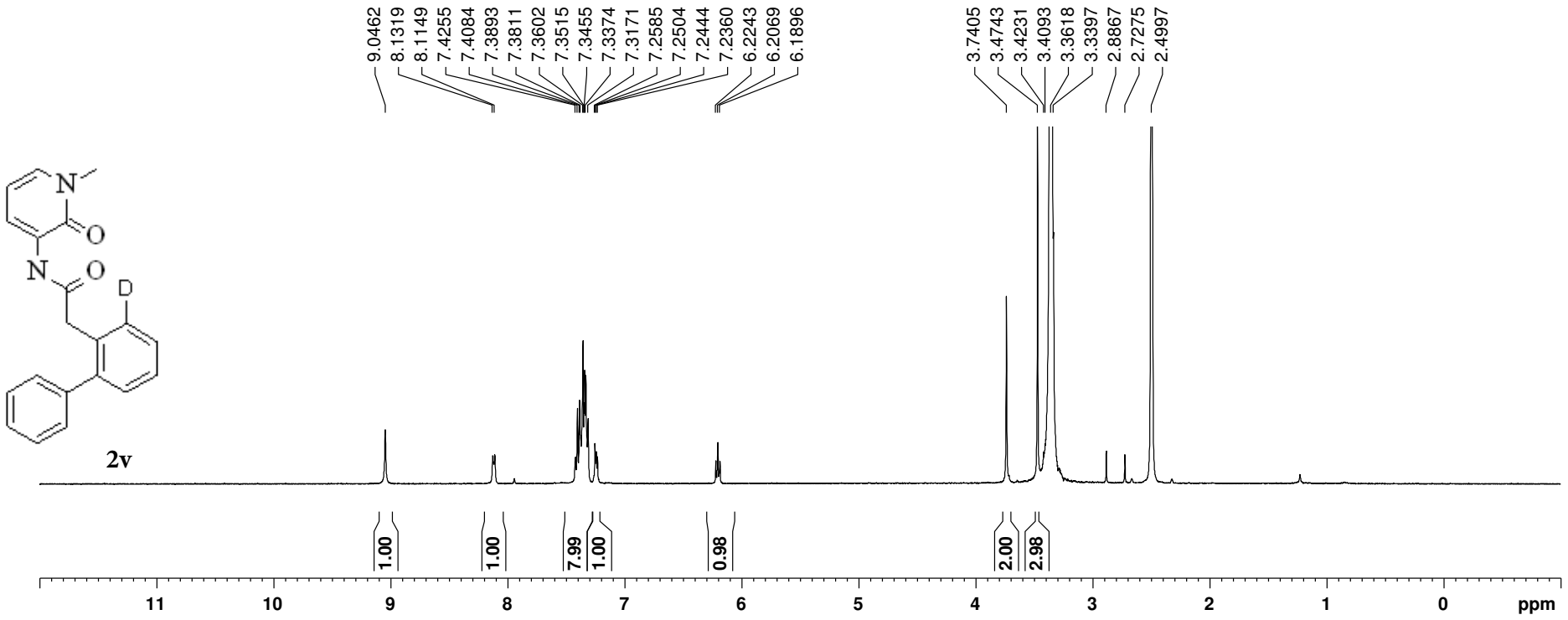


2u

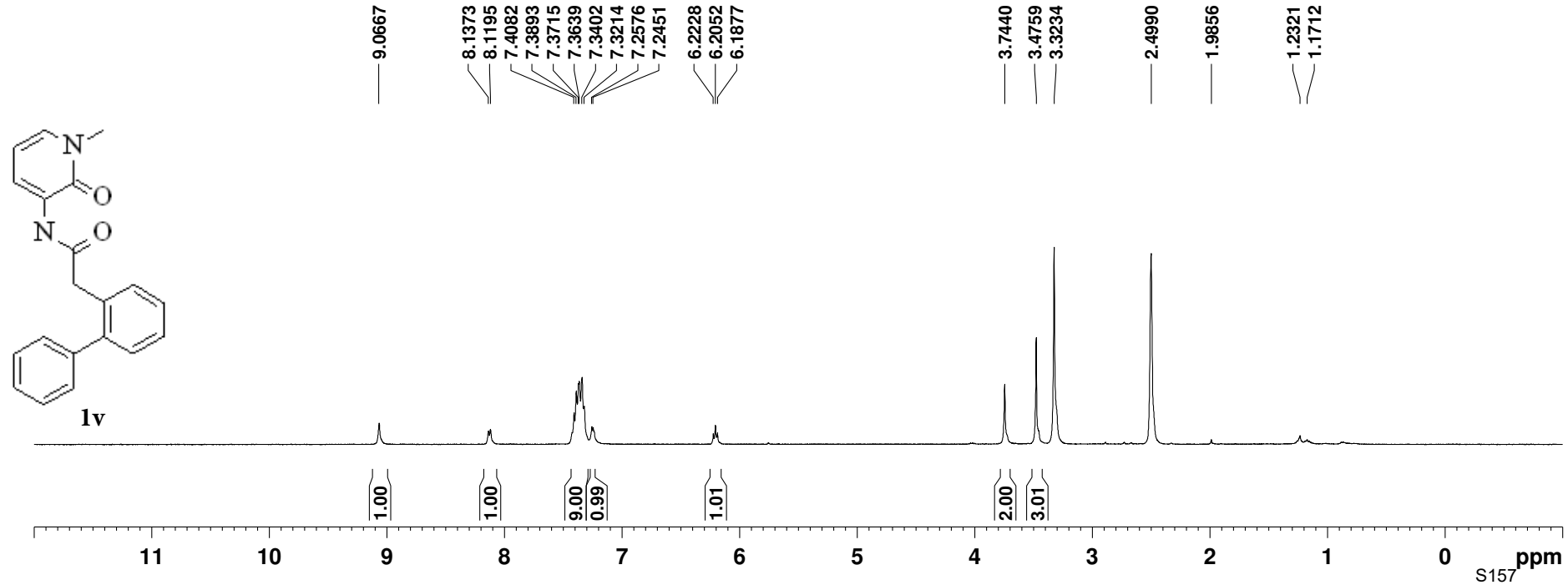
APT of 2u IN DMSO



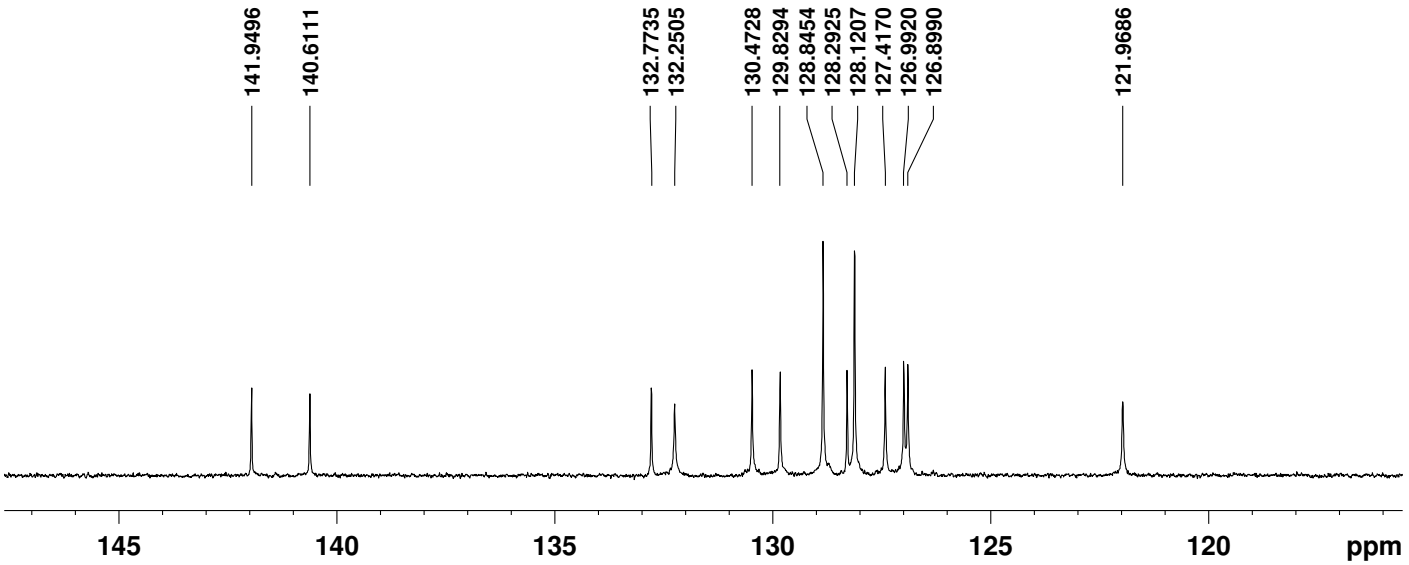
^{19}F NMR of 2u IN DMSO

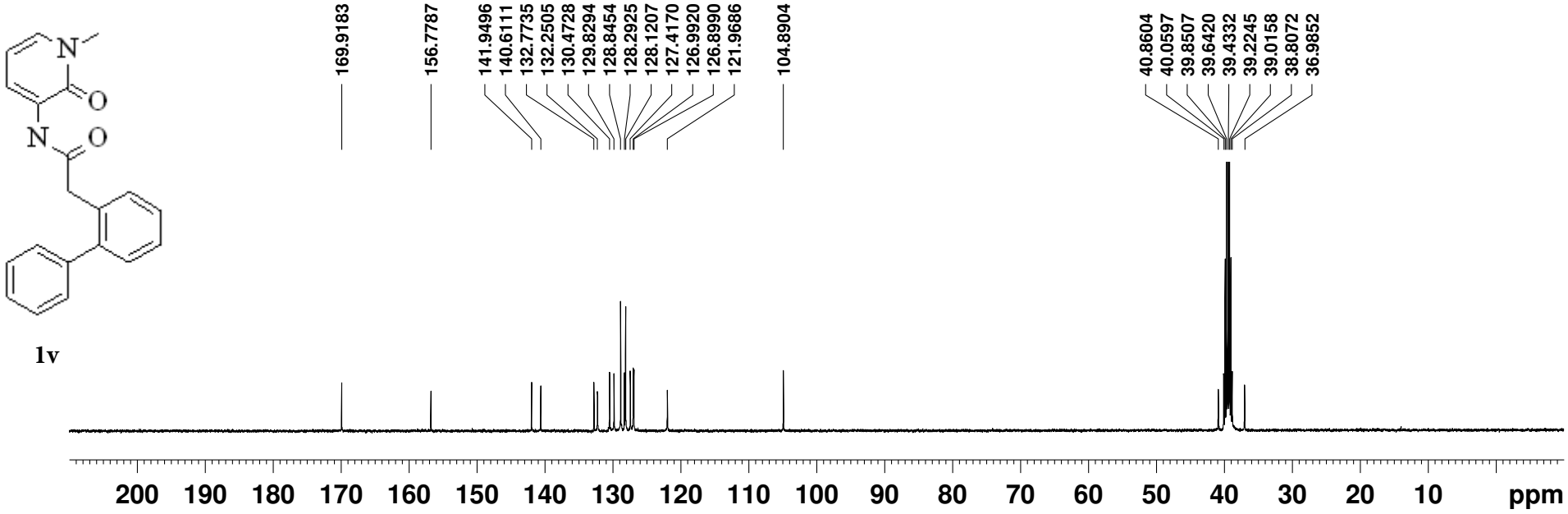


^{1}H NMR of 2v IN DMSO



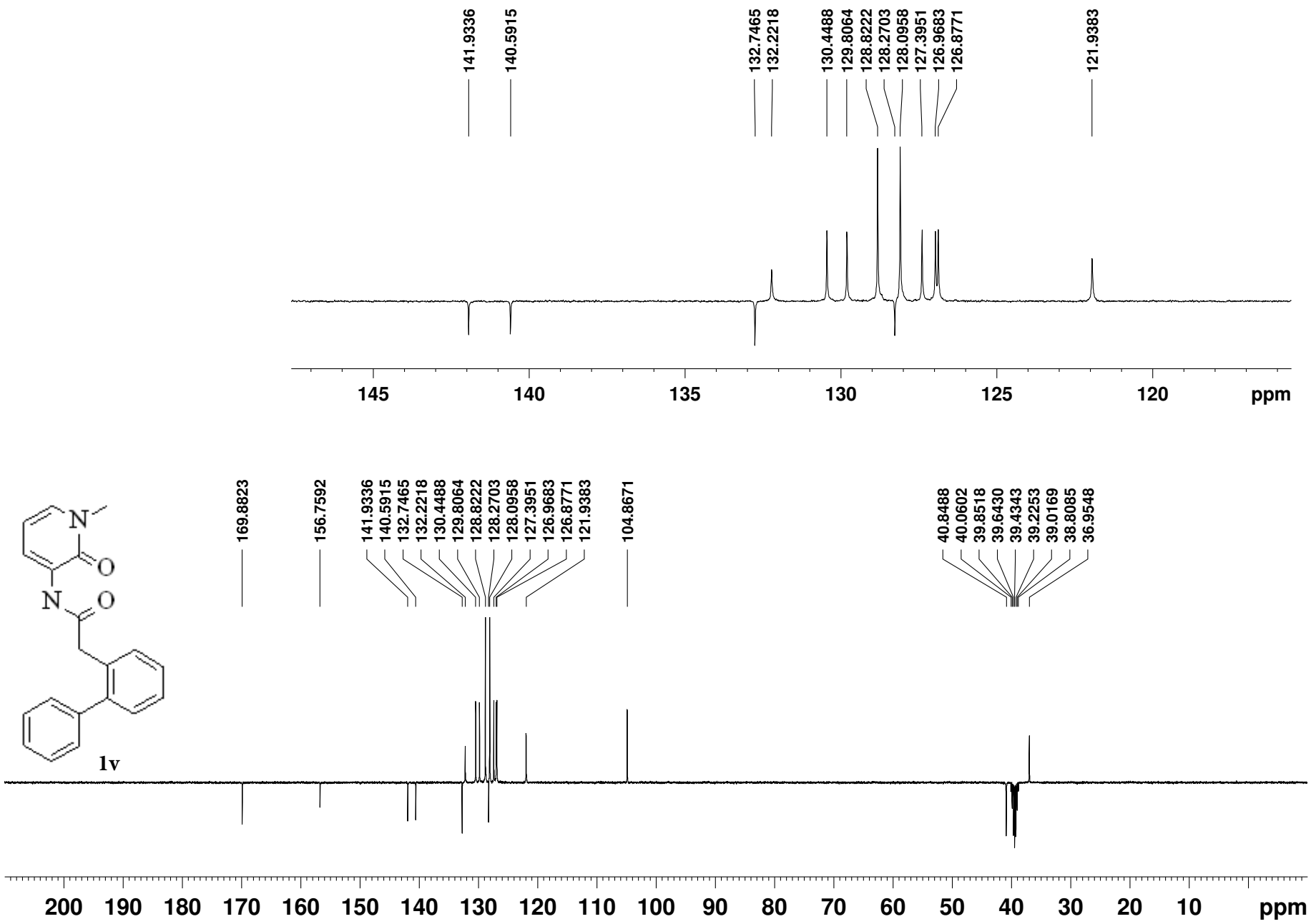
^{1}H NMR of 1v IN DMSO



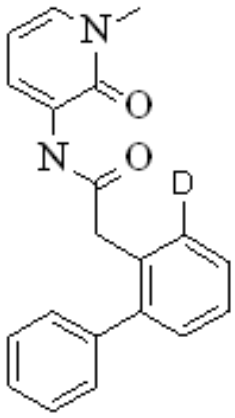


1v

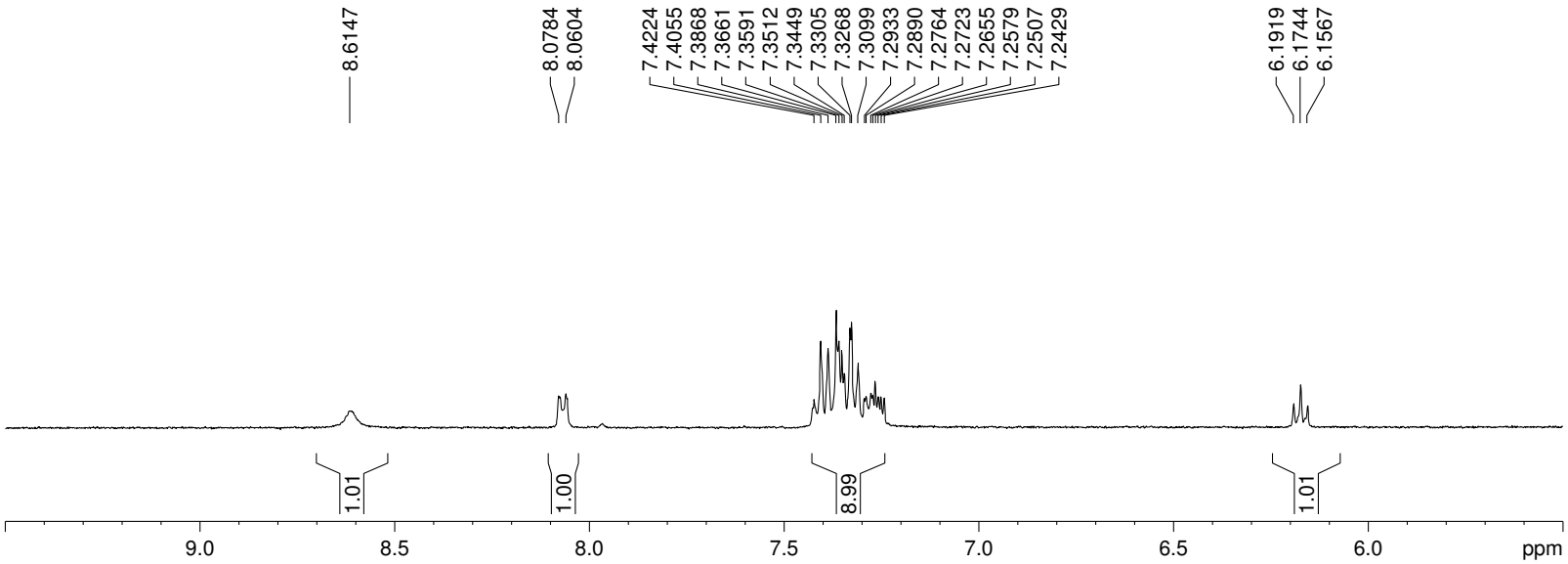
^{13}C NMR of 1v IN DMSO



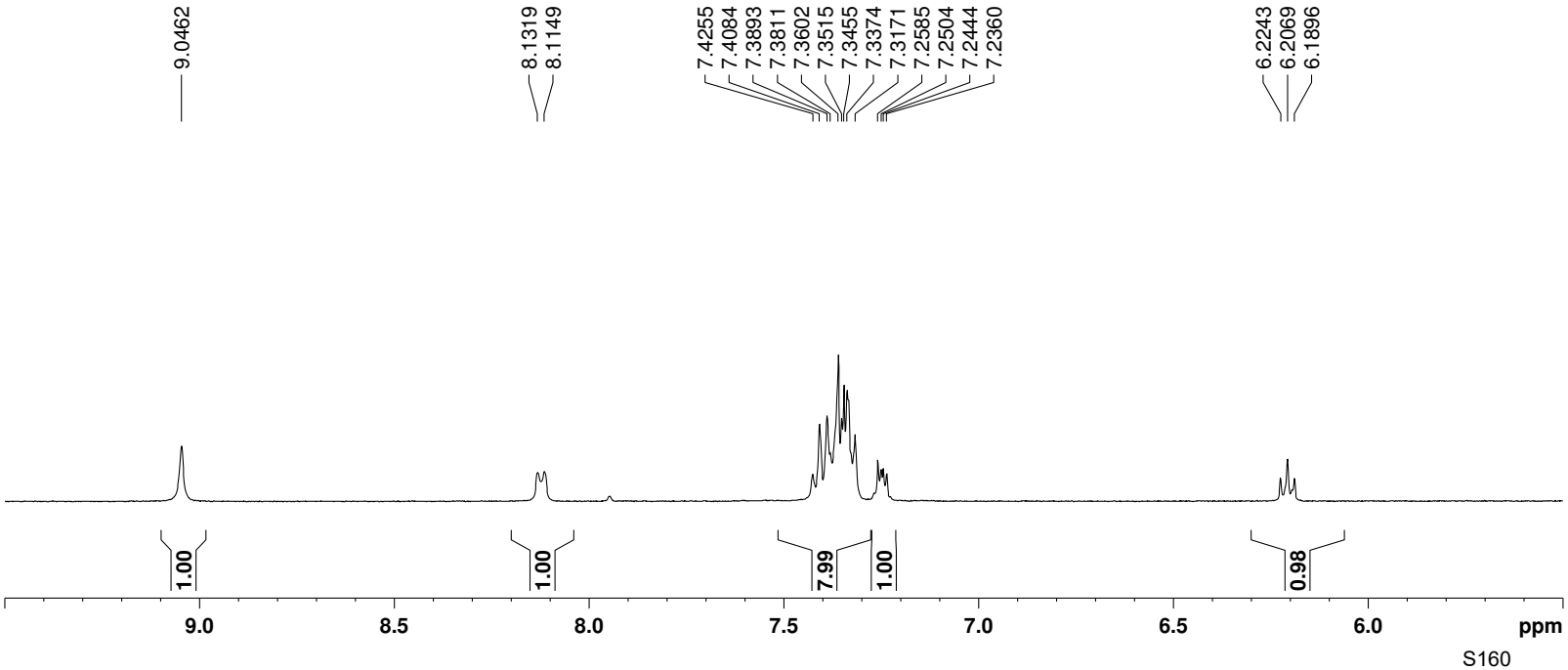
APT of 1v IN DMSO



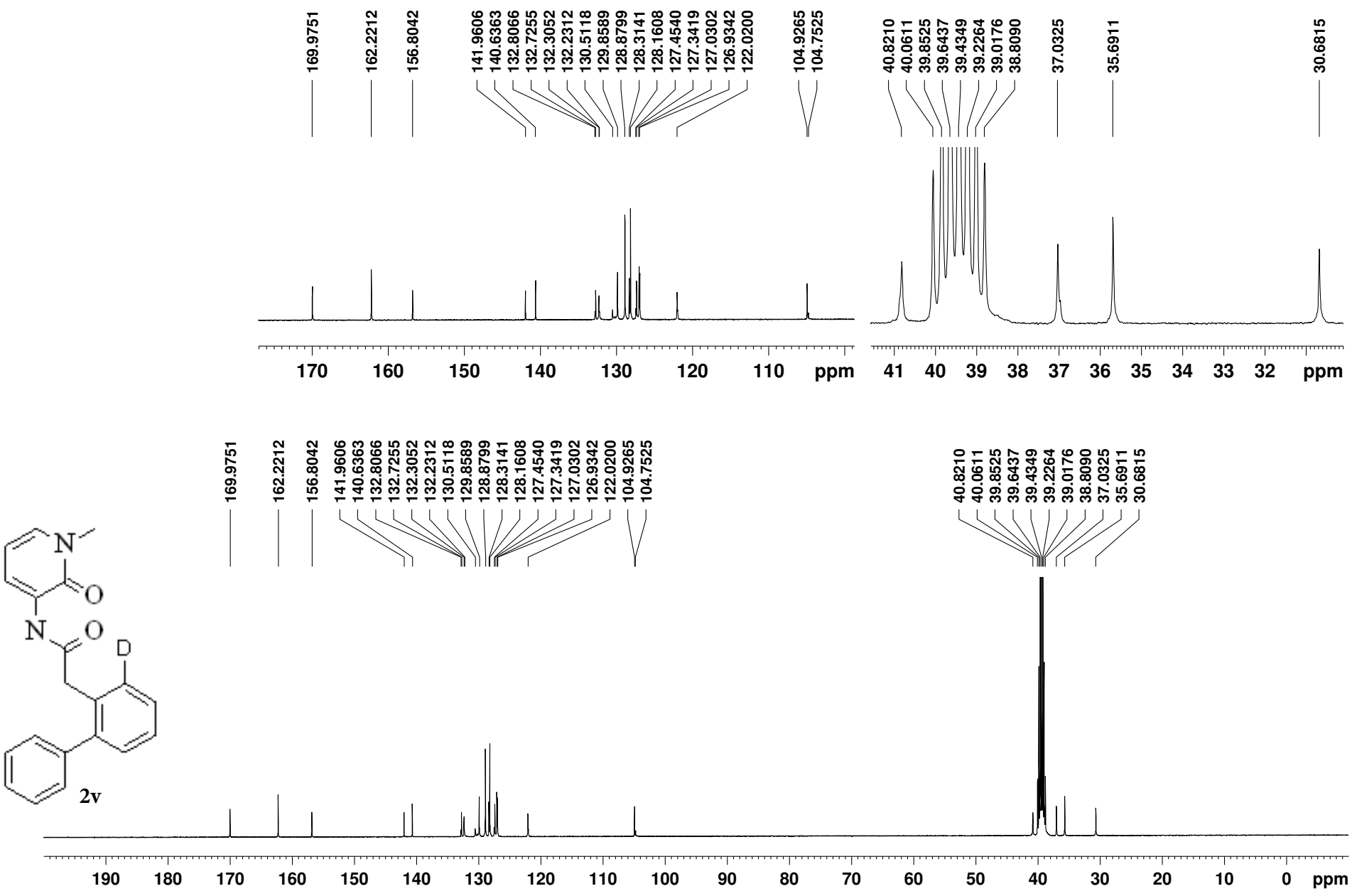
2v



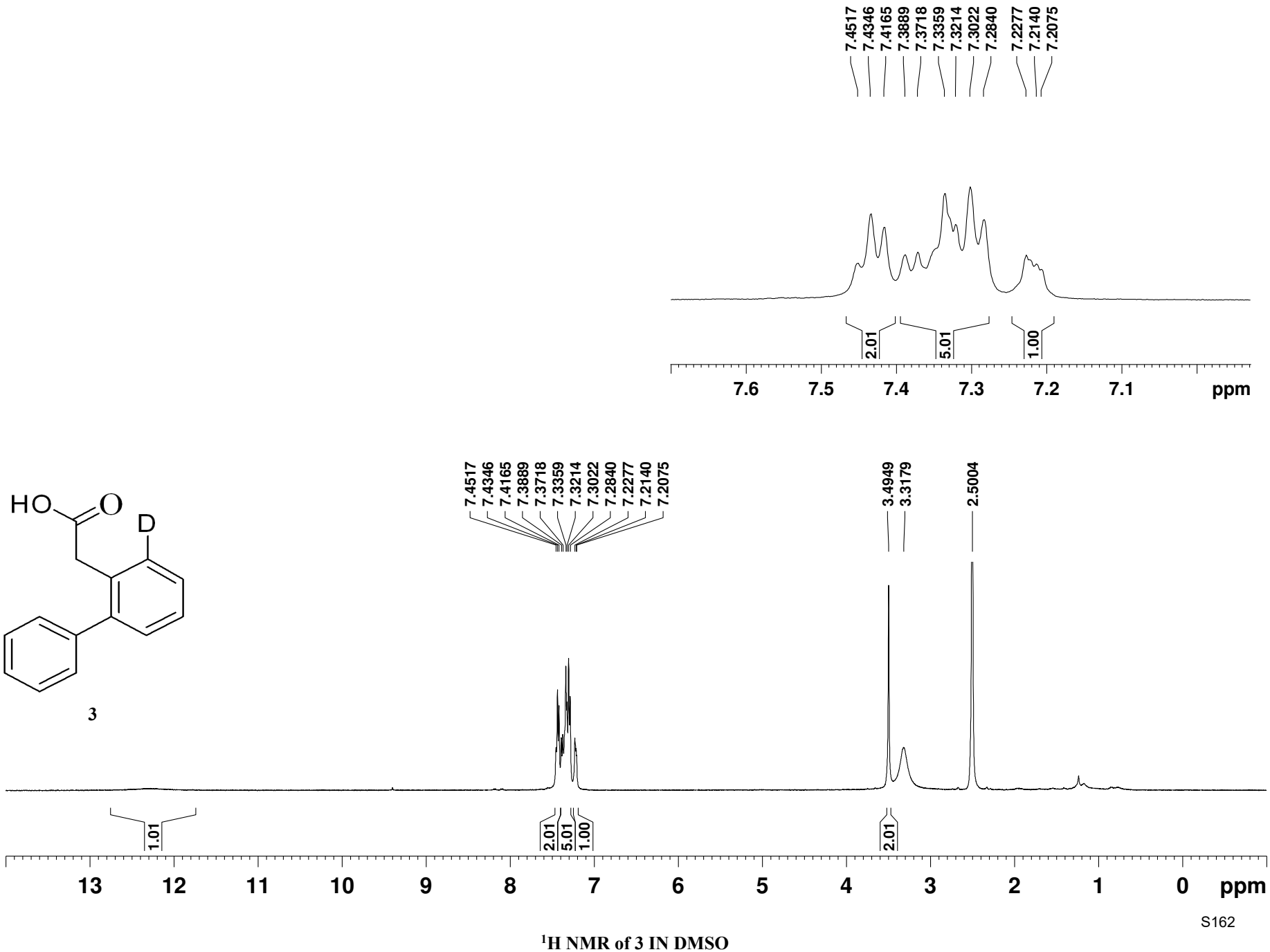
^{1}H NMR of 2v IN DMSO AT 100^{O}C



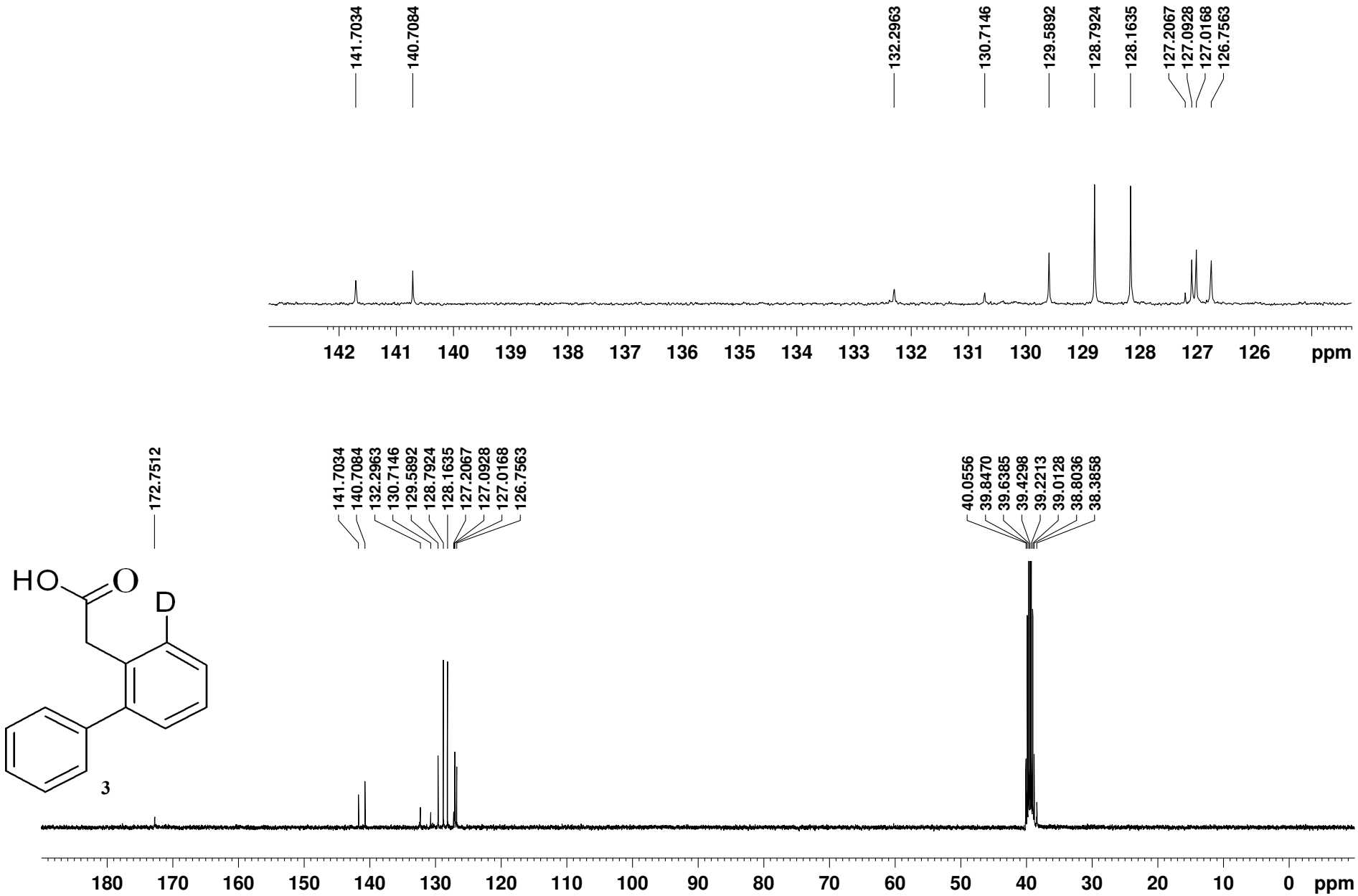
^{1}H NMR of 2v IN DMSO AT 20^{O}C



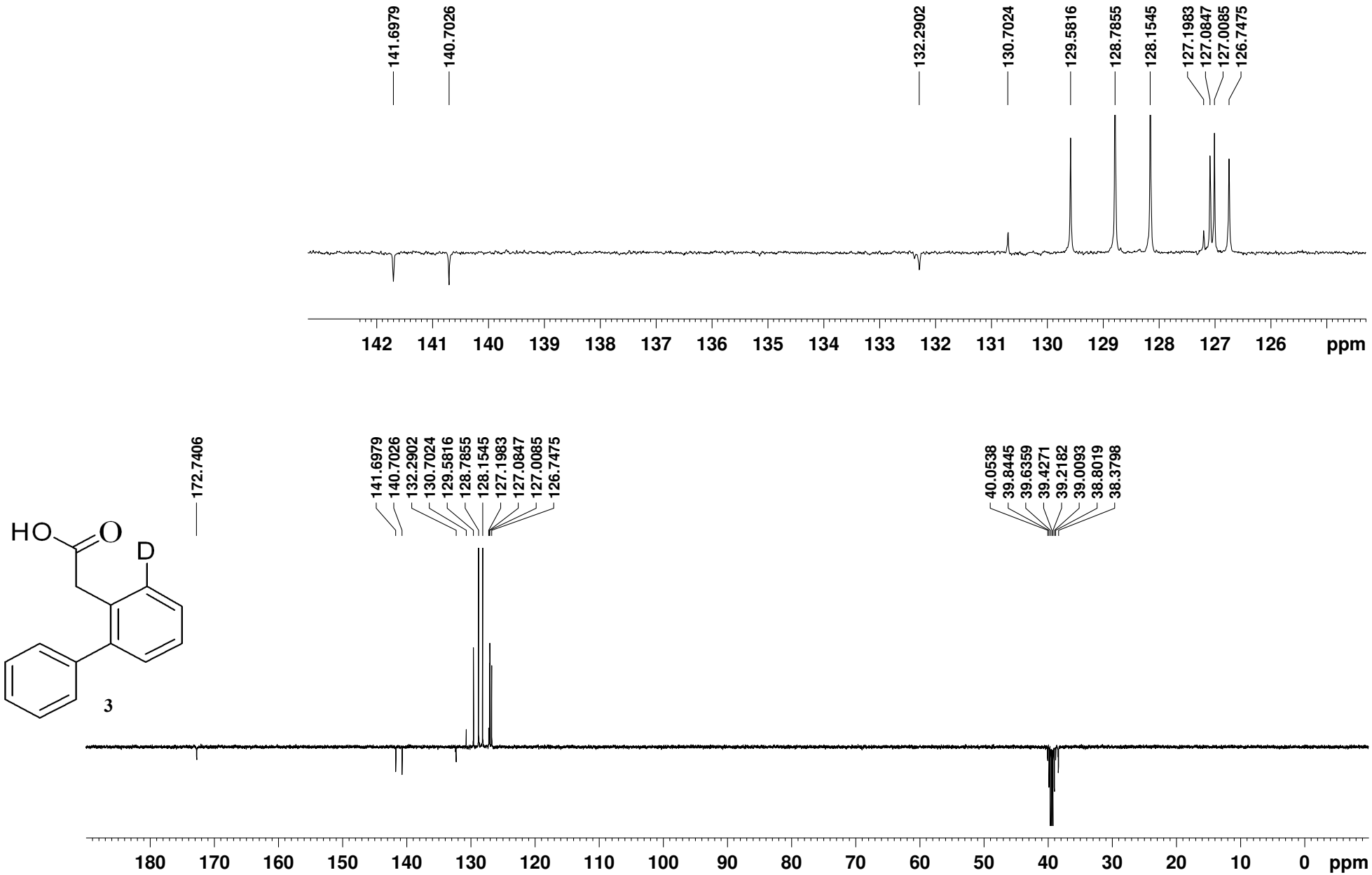
^{13}C NMR of 2v IN DMSO



^{1}H NMR of 3 IN DMSO



^{13}C NMR of 3 IN DMSO



APT of 3 IN DMSO