

Supporting Information

Electrochemical Debrominative Hydrogenation/Deuteration of 2-Bromo-N-arylamides

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1.1 General Information

The commercially available solvents and reagents were used as received without any further purification. The 2-bromoacetamides were synthesized by the reported procedures.¹ Acetonitrile (MeCN), Methanol, Ethanol, DMF and DMSO were purchased from Merck. All the reactions were monitored by analytical thin layer chromatography (TLC) using Merck pre-coated aluminium sheets and visualized by a UV lamp. Flash column chromatography was performed on silica gel (100–200 mesh). The ^1H and ^{13}C NMR spectra were recorded on JEOL 500 MHz FT-NMR spectrometer. Chemical shifts (δ) for ^1H and $^{13}\text{C}\{^1\text{H}\}$ NMR are given in parts per million (ppm) using the residual solvent peaks as reference relative to tetramethyl silane (TMS). Coupling constant (J) values are reported in Hz. High-resolution mass spectra (HRMS, m/z) were recorded in EI or ESI mode, on SCIEX X500R Q-TOF. The instrument use for the electrolysis is a dual display METRAVI RPS-3005 adjustable 30V/5A DC Power Supply (Made in India). The carbon rod electrode of diameter (Φ 6 mm) and platinum plate of dimensions (10 mm \times 10 mm \times 0.5 mm) were used for electrolysis. Cyclic voltammetry (CV) was performed in an open electrochemical cell with Metrohm AutoLab PGSTAT302N potentiostat using Nova 2 software. The graphs were plotted using Origin Lab software. IUPAC names were obtained using the Chem-Draw Professional 16.0 software.

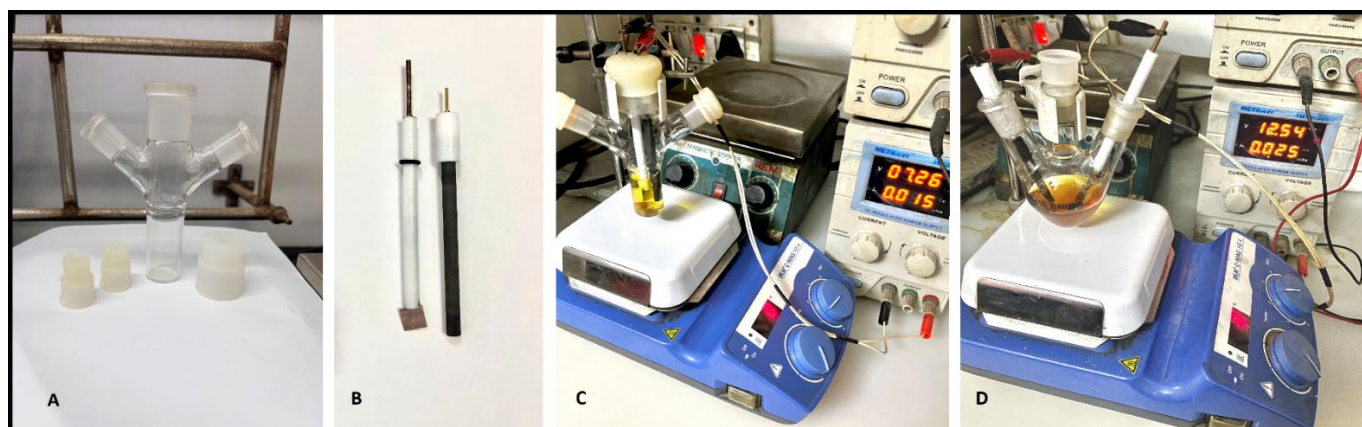
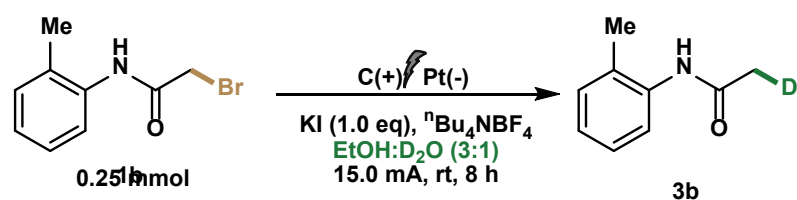


Figure S1. (A) Electrochemical cell; (B) Platinum plate and Carbon rod electrodes; (C) Electrochemical setup; (D) Scale-up reaction setup.

1.2 Optimization of the of Reaction Conditions

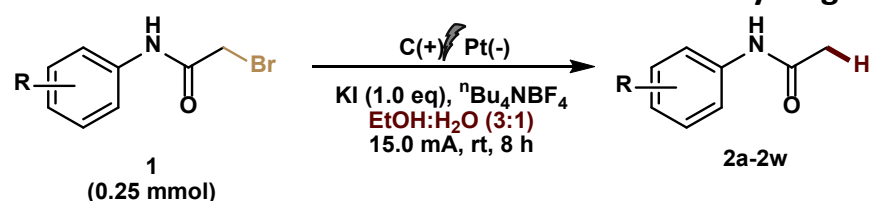
Table S1: Optimization for electrocatalytic deuteration of 2-bromoacetamide^a



S.No.	Solvent	Current (mA)	% yields ^b
1	None	15	45
2	MeOH:D ₂ O	15	48
3	MeCN:D ₂ O	15	59
4	DMF:D ₂ O	15	30
5	DMSO:D ₂ O	15	<10
6	MeCN:D ₂ O ^c	10	50
7	MeCN:D ₂ O	18	65
8	MeCN:D ₂ O	20	72
9	MeCN:D ₂ O ^c	20	74
10	MeCN:D ₂ O	25	68

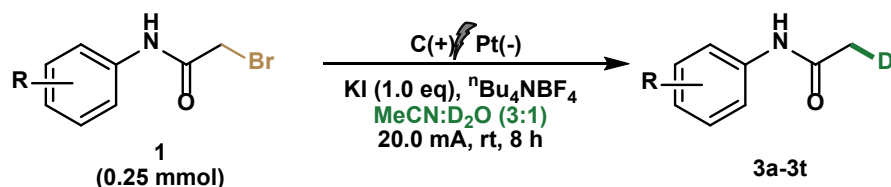
^aReaction conditions: a three-neck electrochemical undivided cell with **1b** (0.25 mmol), solvent (7.0 mL), using carbon rod anode (Φ 6 mm) and platinum plate cathode (10 mm X 10 mm X 0.5 mm), open air, room temperature, 8 h. ^bIsolated yields, ^cReaction time 10h.

1.3 General Procedure for the electrochemical hydrogenation of 2-Bromoacetamides



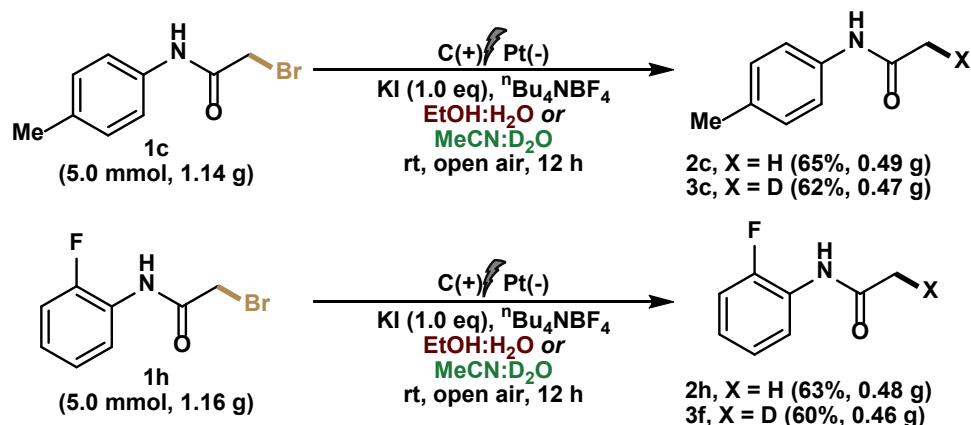
2-Bromoacetamides (**1**, 0.25 mmol, 1.0 equiv.), KI (1.0 equiv.) and TBATFB (20 mol%) were taken in an oven dried undivided three-neck cell. The cell was equipped with Teflon coated magnetic bar, a carbon rod (Φ 6 mm) anode and a Pt plate (10 mm × 10 mm × 0.5 mm) as cathode. EtOH:H₂O (3:1, 7.0 mL) was added. The reaction mixture was stirred and electrolyzed at a constant current of 15.0 mA for 8 h at room temperature. After completion of the reaction, the reaction was quenched with water (10 mL). The reaction mixture was extracted with ethyl acetate (2 x 10 mL) and water (20 mL). The organic layer was dried over anhydrous Na₂SO₄ and evaporated under reduced pressure. The crude residue thus obtained was purified by silica-gel column chromatography using ethyl acetate in hexane. The isolated products **2a-2w** were dried under vacuum and then the analytical studies were performed.

1.4 General Procedure for the electrochemical deuteration of 2-Bromoacetamides



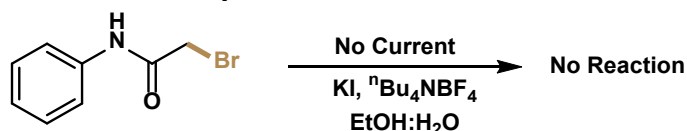
2-Bromoacetamides (**1**, 0.25 mmol, 1.0 equiv.), KI (1.0 equiv.) and TBATFB (20 mol%) were taken in an oven dried undivided three-neck cell. The cell was equipped with Teflon coated magnetic bar, a carbon rod (Φ 6 mm) anode and a Pt plate (10 mm \times 10 mm \times 0.5 mm) as cathode. MeCN:D₂O (3:1, 7.0 mL) was added. The reaction mixture was stirred and electrolyzed at a constant current of 20.0 mA for 8 h at room temperature. After completion of the reaction, the reaction was quenched with water (10 mL). The reaction mixture was extracted with ethyl acetate (2 \times 10 mL) and water (20 mL). The organic layer was dried over anhydrous Na₂SO₄ and evaporated under reduced pressure. The crude residue thus obtained was purified by silica-gel column chromatography using ethyl acetate in hexane. The isolated products **3a-3t** were dried under vacuum and then the analytical studies were performed.

1.5 Procedure for the gram scale synthesis of 2c, 3c, 2h and 3h

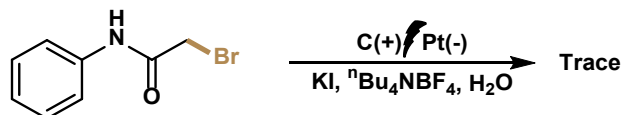


2-Bromoacetamides (5.0 mmol, 1.0 equiv.), KI (1.0 equiv.) and TBATFB (20 mol%) were taken in an oven dried undivided three-neck cell. The cell was equipped with Teflon coated magnetic bar, a carbon rod (Φ 6 mm) anode and a Pt plate (10 mm \times 10 mm \times 0.5 mm) as cathode. EtOH:H₂O (3:1, 25.0 mL) was added. The reaction mixture was stirred and electrolyzed at a constant current of 25.0 mA for 12 h at room temperature. After completion of the reaction, the reaction was quenched with water (30 mL). The reaction mixture was extracted with ethyl acetate (2 \times 20 mL) and water (30 mL). The organic layer was dried over anhydrous Na₂SO₄ and evaporated under reduced pressure. The crude residue thus obtained was purified by silica-gel column chromatography using ethyl acetate in hexane. The isolated products were dried under vacuum and then the analytical studies were performed.

2.1 Control experiments

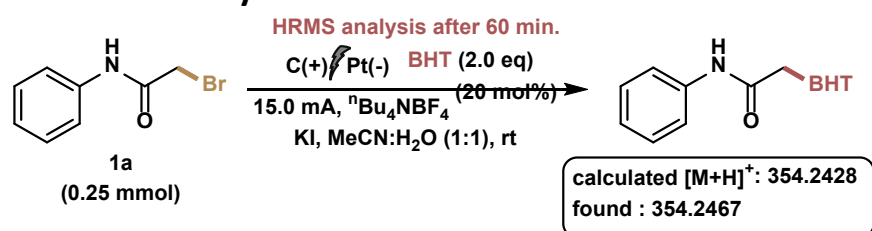


To check the involvement of electricity, the reaction was placed under standard conditions in the absence of electricity. No reaction was observed and substrate **1a** was recovered, suggesting the need of electric current.

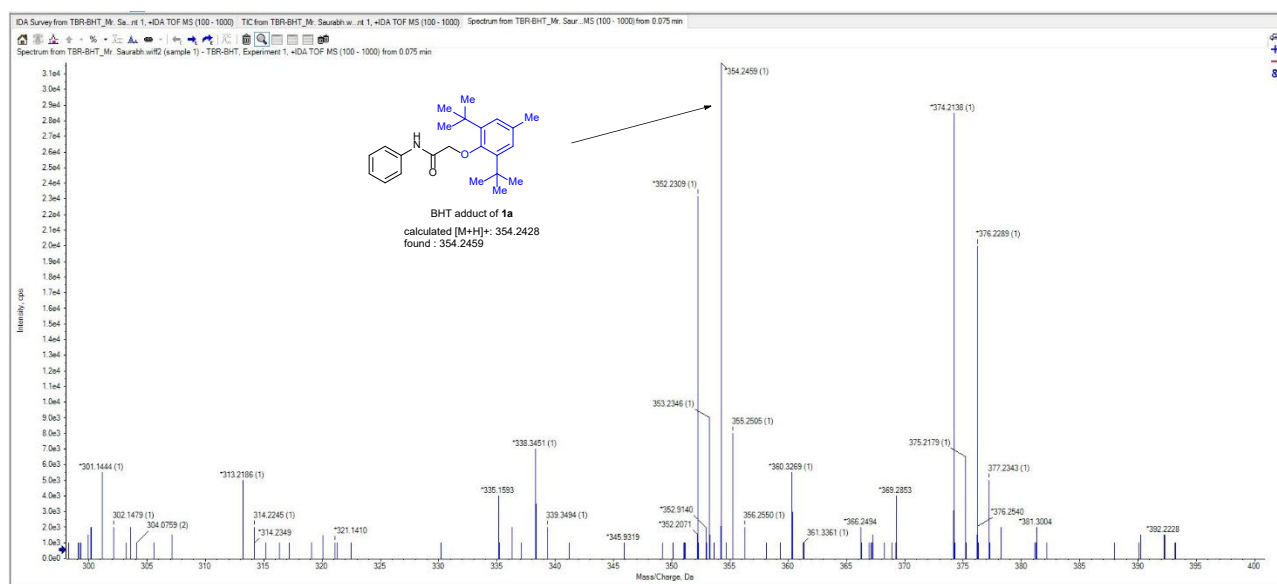


Second, to check the role of co-solvent, we used only water instead of binary mixture. Even after 12 h of electrolysis, only trace amount of the product was detected, suggesting the need of a co-solvent for the reaction.

2.2 HRMS Analysis of BHT adduct



To get a mechanistic insight, we also carried out electrosynthesis with **1a** in the presence of BHT under optimized reaction conditions. At first, a cell equipped with Teflon coated magnetic bar, a carbon rod (Φ 6 mm) anode and a Pt plate (10 mm \times 10 mm \times 0.5 mm) as cathode was charged with **1a** (0.25 mmol, 1.0 equiv), 20 mol% of TBATFB, KI (0.25 mmol, 1.0 equiv) and BHT (0.5 mmol, 2.0 equiv.) was added subsequently. After that 7 mL of MeCN:H₂O was added as solvent and the overall setup was subjected to 15.0 mA of current under an open atmosphere. Then HRMS analysis of the crude reaction mixture was carried out after 60 min and the BHT adduct of **1a** was successfully detected at $\{[\text{M}+\text{H}]^+\}$ 354.2459 (calcd. 354.2428) suggesting the involvement of radical pathway.



2.3 Cyclic voltammetry of 2-bromoacetamides **1a** and **1b**

Cyclic voltammetry (CV) was performed in an open electrochemical cell with Metrohm AutoLab PGSTAT302N potentiostat using Nova 2 software. CV analysis conditions: Working electrode: Pt Plate; counter electrode: Pt wire; reference electrode: Ag/AgCl in saturated aqueous KCl solution; scan rate, $\nu = 100 \text{ mV/s}$; $T = 25^\circ \text{C}$. A 0.10 M solution of n-tetra butyl ammonium tetrafluoroborate (TBATFB) in MeCN was used as electrolytic media. The concentration of KI and 2-bromoacetamides **1a** and **1b** were taken as 10 mM.

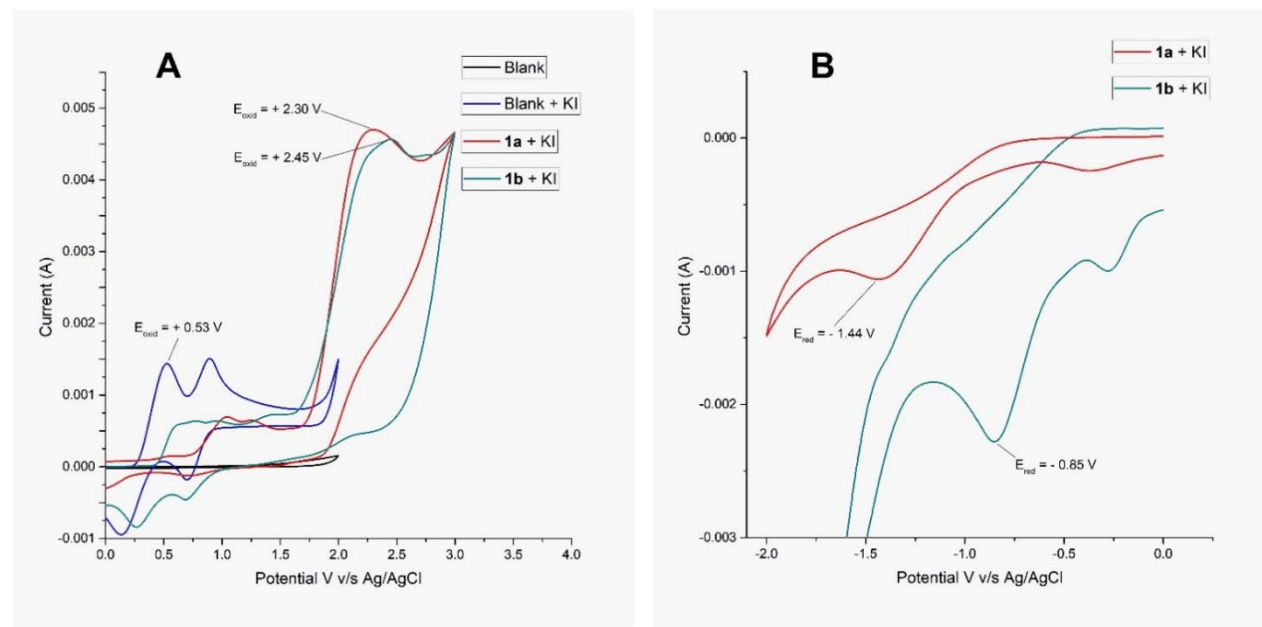
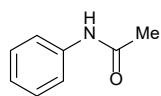


Figure S2. Cyclic voltammograms of **1a** and **1b** were recorded in 0.10 M TBATFB/MeCN electrolyte at 50 mV/s scan rate. Working electrode: platinum wire; Counter electrode: platinum wire; Reference electrode: Ag/AgCl (aq.); (a) Oxidative half of **1a** and **1b** with blank and KI (b) Cyclic voltammetry of reductive half of **1a**, and **1b**.

3.0 References

1) Ang, W.; Lin, Y.-N.; Yang, T.; Yang, J.-Z.; Pi, W.-P.; Yang, Y.-H.; Luo, Y.-F.; Deng, Y.; Wei, Y.-Q. Synthesis and Biological Evaluation of 2-(3-Fluoro-4-nitro phenoxy)-N-phenylacetamide Derivatives as Novel Potential Affordable Antitubercular Agents, *Molecules* **2012**, *17*, 2248-2258.

4.0 Characterisation data of compounds 2 and 3

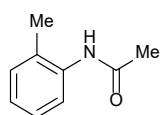


N-Phenyl acetamide (**2a**); Isolated yield (26 mg, 78%); greyish crystalline solid; mp: 111-113 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.79 (s, 1H), 7.50 (d, *J* = 8.0 Hz, 2H), 7.29 (t, *J* = 7.9 Hz, 2H), 7.09 (t, *J* = 7.3 Hz, 1H), 2.15 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.8, 138.1, 129.0, 124.4, 120.2, 24.6.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₈H₉NO 136.0757; found 136.0747

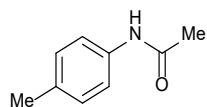


N-(*o*-Tolyl) acetamide (**2b**); Isolated yield (28 mg, 76%); pale yellow crystalline solid; mp: 112-113 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.67 (d, *J* = 8.0 Hz, 1H), 7.22 (s, 1H), 7.17 (d, *J* = 7.7 Hz, 2H), 7.07 (t, *J* = 7.5 Hz, 1H), 2.23 (s, 3H), 2.17 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.7, 135.7, 130.6, 129.9, 126.8, 125.6, 123.9, 24.2, 17.9.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₁NO 150.0913; found 150.0909

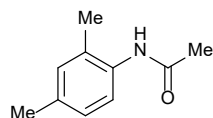


N-(*p*-Tolyl) acetamide (**2c**); Isolated yield (29 mg, 79%); red sticky liquid; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃); δ 7.36 (d, *J* = 8.0 Hz, 2H), 7.29 (s, 1H), 7.11 (d, *J* = 8.0 Hz, 2H), 2.31 (s, 3H), 2.16 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.6, 135.4, 134.2, 129.6, 77.4, 77.2, 76.9, 24.6, 21.0.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₁NO 150.0913; found 150.0901

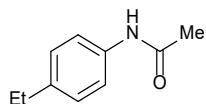


N-(2,4-Dimethylphenyl) acetamide (**2d**); Isolated yield (31 mg, 75%); grey crystalline solid; mp: 125-127 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.47 (d, *J* = 7.7 Hz, 1H), 7.14 (s, 1H), 7.01 – 6.96 (m, 2H), 2.28 (s, 3H), 2.19 (s, 3H), 2.15 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.8, 135.4, 133.1, 131.3, 130.4, 127.3, 124.3, 24.1, 21.0, 17.8.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₁₀H₁₃NO 164.1070; found 164.1055

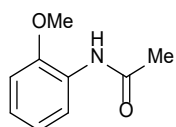


N-(4-Ethylphenyl) acetamide (**2e**); Isolated yield (32 mg, 77%); brown solid; mp: 87-88 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.77 (s, 1H), 7.40 (d, *J* = 8.0 Hz, 2H), 7.11 (d, *J* = 8.0 Hz, 2H), 2.60 (q, *J* = 7.5 Hz, 2H), 2.13 (s, 3H), 1.20 (t, *J* = 7.9 Hz, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.8, 140.5, 135.7, 128.3, 120.4, 28.4, 24.5, 15.7.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₁₀H₁₃NO 164.1070; found 164.1077

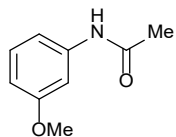


N-(2-Methoxyphenyl) acetamide (**2f**); Isolated yield (31 mg, 75%); dark brown solid; mp: 51-52 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 8.32 (d, *J* = 7.9 Hz, 1H), 7.77 (s, 1H), 7.01 (t, *J* = 7.7 Hz, 1H), 6.93 (t, *J* = 7.7 Hz, 1H), 6.85 (d, *J* = 8.0 Hz, 1H), 3.85 (s, 3H), 2.17 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.3, 147.8, 127.8, 123.7, 121.1, 119.9, 110.0, 55.7, 24.9.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₁NO₂ 166.0863; found 166.0871

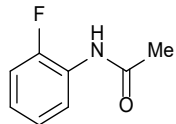


N-(3-Methoxyphenyl) acetamide (**2g**); Isolated yield (32 mg, 78%); reddish brown sticky liquid; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.61 (s, 1H), 7.27 (s, 1H), 7.19 (t, *J* = 8.1 Hz, 1H), 6.98 (d, *J* = 8.1 Hz, 1H), 6.65 (d, *J* = 7.8 Hz, 1H), 3.78 (s, 3H), 2.15 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.7, 160.3, 139.3, 129.7, 112.2, 110.2, 105.9, 55.4, 24.7.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₁NO 166.0863; found 166.0849



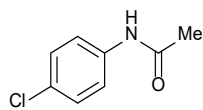
N-(2-Fluorophenyl) acetamide (**2h**); Isolated yield (28 mg, 73%); greenish black crystalline solid; mp: 148-150 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.81 (s, 1H), 7.48 – 7.39 (m, 2H), 6.97 (t, *J* = 8.6 Hz, 2H), 2.13 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.8, 160.5, 158.6, 134.1, 122.1, 122.0, 115.8, 115.6, 24.4.

^{19}F NMR (471 MHz, CDCl_3) δ -117.9.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_8\text{FNO}$ 154.0663; found 154.0661

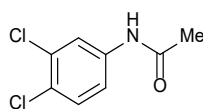


N-(4-Chlorophenyl) acetamide (**2i**); Isolated yield (32 mg, 76%); pale green solid; mp: 185-186 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.56 (s, 1H), 7.45 (d, J = 8.2 Hz, 2H), 7.26 (d, J = 8.3 Hz, 2H), 2.16 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.6, 136.6, 129.5, 129.1, 121.3, 24.6.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_8\text{ClNO}$ 170.0367; found 170.0380

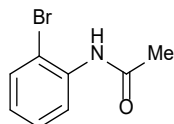


N-(3,4-Dichlorophenyl) acetamide (**2j**); Isolated yield (38 mg, 75%); grey crystalline solid; mp: 129-130 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 8.13 (s, 1H), 7.73 (s, 1H), 7.34 – 7.26 (m, 2H), 2.16 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 169.2, 137.5, 132.8, 130.5, 127.6, 121.9, 119.4, 24.5.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_7\text{Cl}_2\text{NO}$ 203.9977; found 203.9982

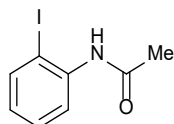


N-(2-Bromophenyl) acetamide (**2k**); Isolated yield (41 mg, 77%); white crystalline solid; mp: 103-104 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 8.30 (d, J = 9.0 Hz, 1H), 7.62 (s, 1H), 7.52 (d, J = 8.1 Hz, 1H), 7.29 (t, J = 7.8 Hz, 1H), 6.96 (t, J = 7.9 Hz, 1H), 2.22 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.4, 135.8, 132.3, 128.5, 125.3, 122.2, 113.4, 24.9.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_8\text{BrNO}$ 213.9862; found 213.9881

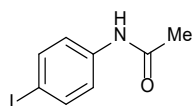


N-(2-Iodophenyl) acetamide (**2l**); Isolated yield (47 mg, 72%); white crystalline solid; mp: 133-135 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 8.16 (d, J = 8.4 Hz, 1H), 7.76 (d, J = 7.9 Hz, 1H), 7.44 (s, 1H), 7.32 (t, J = 7.9 Hz, 1H), 6.83 (t, J = 7.9 Hz, 1H), 2.22 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.4, 138.9, 138.4, 129.3, 126.1, 122.4, 90.2, 24.9.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_8\text{INO}$ 261.9723; found 261.9734

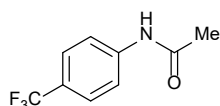


N-(4-Iodophenyl) acetamide (**2m**); Isolated yield (48 mg, 74%); reddish brown solid; mp: 180-182 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.59 (d, J = 8.3 Hz, 2H), 7.46 (s, 1H), 7.28 (d, J = 8.1 Hz, 2H), 2.15 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.5, 138.0, 137.9, 129.1, 121.8, 87.5, 24.7.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_8\text{INO}$ 261.9723; found 261.9723



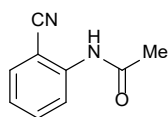
N-(4-(Trifluoromethyl)phenyl)acetamide (**2n**); Isolated yield (38 mg, 75%); light brown crystalline solid; mp: 173-175 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.67 (s, 1H), 7.63 (d, J = 8.4 Hz, 2H), 7.55 (d, J = 8.0 Hz, 2H), 2.20 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.9, 141.1, 126.4, 119.6, 77.4, 77.2, 76.9, 24.7.

^{19}F NMR (471 MHz, CDCl_3) δ -62.0.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_8\text{F}_3\text{NO}$ 204.0631; found 204.0607

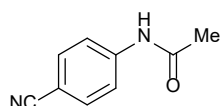


N-(2-Cyanophenyl)acetamide (**2o**); Isolated yield (28 mg, 70%); brown crystalline solid; mp: 164-166 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 8.28 (d, J = 7.6 Hz, 1H), 7.77 (t, J = 7.7 Hz, 1H), 7.69 (d, J = 8.0 Hz, 1H), 7.54 – 7.44 (m, 2H), 2.58 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 163.8, 149.4, 135.1, 127.1, 126.7, 126.5, 122.8, 121.8, 22.3.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_8\text{N}_2\text{O}$ 161.0709; found 161.0721

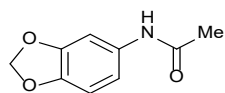


N-(4-Cyanophenyl)acetamide (**2p**); Isolated yield (30 mg, 76%); white crystalline solid; mp: 212-214 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.65 (d, J = 8.2 Hz, 2H), 7.60 (d, J = 8.9 Hz, 2H), 7.45 (s, 1H), 2.22 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.6, 142.1, 133.5, 119.6, 118.9, 107.4, 24.9.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_8\text{N}_2\text{O}$ 161.0709; found 161.0715

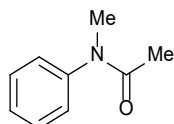


N-(Benzo[d][1,3]dioxol-5-yl)acetamide (**2q**); Isolated yield (35 mg, 78%); Light brown crystalline solid; mp: 134-135 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.63 (s, 1H), 7.17 (s, 1H), 6.77 (d, *J* = 8.3 Hz, 1H), 6.70 (d, *J* = 9.1 Hz, 1H), 5.92 (s, 2H), 2.12 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.7, 147.9, 144.4, 132.3, 113.5, 108.1, 103.2, 101.3, 24.4.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₉NO₃ 180.0655; found 180.0644

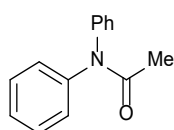


N-Methyl-N-phenyl acetamide (**2r**); Isolated yield (28 mg, 75%); brow solid; mp: 99-101 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.39 (t, *J* = 7.4 Hz, 2H), 7.31 (t, *J* = 7.6 Hz, 1H), 7.16 (d, *J* = 7.4 Hz, 2H), 3.24 (s, 3H), 1.84 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 170.7, 144.7, 129.8, 127.8, 127.2, 37.2, 22.4.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₁NO 150.0913; found 150.0915

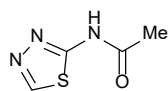


N,N-Diphenyl acetamide (**2s**); Isolated yield (38 mg, 72%); yellowish sticky liquid; Isolation: 10% EtOAc in Hexane

¹H NMR (600 MHz, CDCl₃) δ 7.39 – 7.30 (m, 5H), 7.27 – 7.26 (m, 5H), 2.05 (s, 3H).

¹³C{¹H} NMR (151 MHz, CDCl₃) δ 170.5, 129.7, 129.3, 129.0, 128.5, 127.8, 126.4, 23.9.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₁₄H₁₃NO 212.1070; found 212.1050

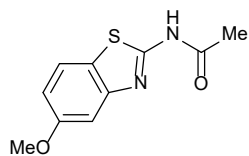


N-(1,3,4-Thiadiazol-2-yl) acetamide (**2t**); Isolated yield (23 mg, 64%); grey crystalline solid; mp: 264-266 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (600 MHz, CDCl₃ + DMSO-*d*₆) δ 12.48 (s, 1H), 8.93 (s, 1H), 2.24 (s, 3H).

¹³C{¹H} NMR (151 MHz, CDCl₃ + DMSO-*d*₆) δ 167.4, 157.5, 146.5, 21.3.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₄H₅N₃OS 144.0266; found 144.0202

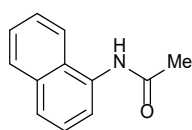


N-(5-Methoxybenzo[d]thiazol-2-yl) acetamide (**2u**); Isolated yield (36 mg, 66%); light grey solid; mp: 214-216 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (600 MHz, CDCl₃ + DMSO-*d*₆) δ 12.08 (s, 1H), 7.59 (d, *J* = 8.8 Hz, 1H), 7.35 (d, *J* = 2.5 Hz, 1H), 6.98 (dd, *J* = 8.8, 2.6 Hz, 1H), 3.84 (s, 3H), 2.21 (s, 3H).

¹³C{¹H} NMR (151 MHz, CDCl₃ + DMSO-*d*₆) δ 167.6, 154.8, 154.7, 141.5, 131.6, 119.8, 119.7, 119.7, 113.3, 113.3, 102.8, 102.8, 54.2, 21.4.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₁₀H₁₀N₂O₂S 223.0536; found 223.0523

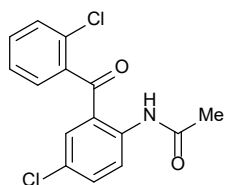


N-(Naphthalen-1-yl) acetamide (**2v**); Isolated yield (35 mg, 76%); grey crystalline solid; mp: 143-145 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.86 (d, *J* = 8.0 Hz, 3H), 7.70 (d, *J* = 8.3 Hz, 1H), 7.58 (s, 1H), 7.51 (t, *J* = 6.7 Hz, 2H), 7.47 (d, *J* = 7.9 Hz, 1H), 2.31 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 169.1, 134.3, 132.5, 128.9, 127.6, 126.4, 126.1, 125.8, 121.6, 120.9, 24.4.

HRMS (ESI-TOF, [M+Na]⁺): Calcd. for C₁₂H₁₁NO 208.0733; found 208.0744

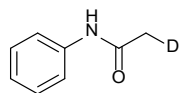


N-(4-Chloro-2-(2-chlorobenzoyl)phenyl)acetamide (**2w**); Isolated yield (56 mg, 73%); yellow sticky solid; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 11.39 (s, 1H), 8.78 (d, *J* = 8.2 Hz, 1H), 7.53 (dd, *J* = 9.2, 2.3 Hz, 1H), 7.50 – 7.46 (m, 2H), 7.42 – 7.38 (m, 1H), 7.32 (d, *J* = 8.0 Hz, 1H), 7.30 – 7.28 (m, 1H), 2.28 (s, 3H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 198.4, 169.6, 140.5, 138.2, 135.7, 133.5, 131.8, 131.2, 130.5, 128.9, 127.4, 127.1, 122.7, 122.4, 25.7.

HRMS (ESI-TOF, [M+Na]⁺): Calcd. for C₁₅H₁₁Cl₂NO₂ 330.0059; found 330.0077

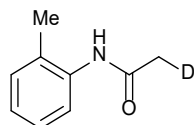


N-Phenyl acetamide-2-d (**3a**); Isolated yield (24 mg, 72%); brownish sticky liquid; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.96 (s, 1H), 7.50 (d, *J* = 8.0 Hz, 2H), 7.28 (t, *J* = 7.6 Hz, 2H), 7.09 (t, *J* = 7.3 Hz, 1H), 2.13 (s, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 169.0, 138.1, 131.9, 129.0, 124.4, 121.6, 120.2, 24.4, 24.3, 24.1.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₈H₈DNO 137.0820; found 137.0820

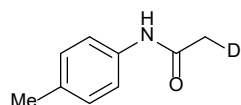


N-(*o*-Tolyl)acetamide-2-d (**3b**); Isolated yield (26 mg, 70%); white crystalline solid; mp: 151-152 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.75 (d, *J* = 8.0 Hz, 1H), 7.22 – 7.17 (m, 2H), 7.08 (t, *J* = 7.4 Hz, 1H), 7.01 (s, 1H), 2.26 (s, 3H), 2.19 (s, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.5, 135.8, 130.6, 129.5, 126.9, 125.5, 123.6, 24.3, 24.3, 24.3, 24.2, 17.9.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₀DNO 151.0976; found 151.0952

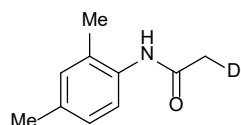


N-(*p*-Tolyl) acetamide-2-d (**3c**); Isolated yield (26 mg, 69%); reddish solid; mp: 141-142 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.79 (s, 1H), 7.37 (d, *J* = 8.0 Hz, 2H), 7.09 (d, *J* = 8.0 Hz, 2H), 2.30 (s, 3H), 2.13 – 2.09 (m, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.8, 135.5, 134.0, 129.5, 120.3, 24.4, 24.2, 24.1, 20.9.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₉H₁₀DNO 151.0976; found 151.0953

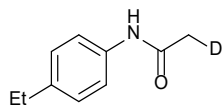


N-(2,4-Dimethylphenyl) acetamide-2-d (**3d**); Isolated yield (31 mg, 75%); pale yellow sticky liquid; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.51 (d, *J* = 8.2 Hz, 1H), 6.99 (d, *J* = 5.5 Hz, 3H), 2.28 (s, 3H), 2.21 (s, 3H), 2.18 – 2.14 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.7, 135.4, 133.1, 131.3, 130.2, 127.4, 124.2, 24.1, 24.0, 23.8, 21.0, 17.8.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_{10}\text{H}_{12}\text{DNO}$ 165.1133; found 165.1108

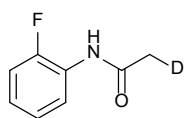


N-(4-Ethylphenyl) acetamide-2-d (**3e**); Isolated yield (27 mg, 67%); grey solid; mp: 82-83 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.39 (d, J = 8.3 Hz, 2H), 7.32 (s, 1H), 7.14 (d, J = 8.0 Hz, 2H), 2.61 (q, J = 7.7 Hz, 2H), 2.17 – 2.11 (m, 2H), 1.21 (t, J = 7.5 Hz, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.5, 140.6, 135.6, 128.4, 120.3, 28.4, 24.5, 24.4, 24.2, 15.8.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_{10}\text{H}_{12}\text{DNO}$ 165.1133; found 165.1129



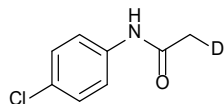
N-(2-Fluorophenyl) acetamide-2-d (**3f**); Isolated yield (26 mg, 67%); grey crystalline solid; mp: 147-149 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.52 (s, 1H), 7.47 – 7.41 (m, 2H), 6.99 (t, J = 8.7 Hz, 2H), 2.16 – 2.11 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.6, 160.5, 158.6, 134.0, 122.0, 122.0, 115.8, 115.6, 24.5, 24.4, 24.2, 24.1.

^{19}F NMR (471 MHz, CDCl_3) δ -117.9.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_7\text{DFNO}$ 155.0725; found 155.0716

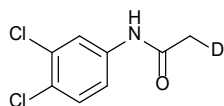


N-(4-Chlorophenyl) acetamide-2-d (**3g**); Isolated yield (29 mg, 69%); grey sticky liquid; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.68 (s, 1H), 7.44 (d, J = 8.2 Hz, 2H), 7.26 (d, J = 9.0 Hz, 2H), 2.17 – 2.12 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.9, 136.5, 129.5, 129.1, 121.4, 24.5, 24.5, 24.3, 24.2.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_8\text{H}_7\text{DCINO}$ 171.0430; found 171.0438

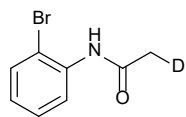


N-(3,4-Dichlorophenyl) acetamide-2-d (**3h**); Isolated yield (38 mg, 75%); greenish solid; mp: 123-124 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 8.21 (s, 1H), 7.74 (s, 1H), 7.34 – 7.28 (m, 2H), 2.18 – 2.14 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 169.2, 137.5, 132.8, 130.5, 127.6, 121.9, 119.4, 24.5, 24.4, 24.3, 24.1.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₈H₆DCl₂NO 205.0040; found 205.0044

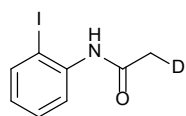


N-(2-Bromophenyl) acetamide-2-d (**3i**); Isolated yield (37 mg, 68%); pale pink solid; mp: 150-152 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 8.30 (d, *J* = 8.4 Hz, 1H), 7.62 (s, 1H), 7.51 (d, *J* = 8.1 Hz, 1H), 7.29 (t, *J* = 7.9 Hz, 1H), 6.96 (t, *J* = 7.9 Hz, 1H), 2.21 (d, *J* = 6.6 Hz, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.4, 135.8, 132.3, 128.4, 125.3, 122.2, 113.4, 24.9, 24.6, 24.5.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₈H₇DBrNO 214.9925; found 214.9934

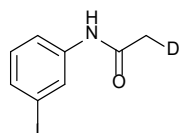


N-(2-Iodophenyl) acetamide-2-d (**3j**); Isolated yield (42 mg, 64%); grey brown crystalline solid; mp: 103-104 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 8.17 (d, *J* = 8.0 Hz, 1H), 7.76 (d, *J* = 6.7 Hz, 1H), 7.43 (s, 1H), 7.33 (d, *J* = 7.9 Hz, 1H), 6.83 (t, *J* = 7.7 Hz, 1H), 2.25 – 2.16 (m, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.4, 138.9, 138.4, 129.4, 126.1, 122.3, 90.2, 24.9, 24.8, 24.6, 24.5.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₈H₇DINO 262.9786; found 262.9799

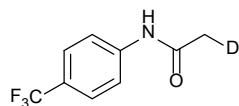


N-(3-Iodophenyl) acetamide-2-d (**3k**); Isolated yield (42 mg, 65%); reddish brown solid; mp: 132-134 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.59 (d, *J* = 8.1 Hz, 1H), 7.48 (d, *J* = 8.3 Hz, 1H), 7.40 (s, 1H), 7.29 (t, *J* = 8.3 Hz, 2H), 2.16 – 2.12 (m, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.7, 138.0, 132.1, 129.0, 129.0, 121.8, 120.2, 87.5, 24.6, 24.5, 24.3.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₈H₇DINO 262.9786; found 262.9772



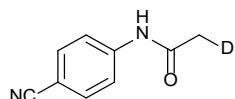
N-(4-(Trifluoromethyl)phenyl)acetamide-2-d (**3l**); Isolated yield (36 mg, 71%); grey crystalline solid; mp: 151-153 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 7.63 (d, *J* = 8.8 Hz, 2H), 7.56 (d, *J* = 8.4 Hz, 3H), 2.19 (d, *J* = 6.8 Hz, 2H).

¹³C{¹H} NMR (126 MHz, CDCl₃) δ 168.8, 141.1, 126.4, 126.4, 125.3, 123.1, 119.5, 77.4, 77.2, 76.9, 24.8, 24.7, 24.5, 24.4.

^{19}F NMR (471 MHz, CDCl_3) δ -62.0.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_7\text{DF}_3\text{NO}$ 205.0694; found 205.0658

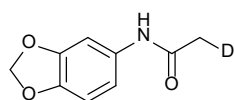


N-(4-Cyanophenyl)acetamide-2-d (**3m**); Isolated yield (26 mg, 65%); grey crystalline solid; mp: 143-145 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.65 (d, J = 8.3 Hz, 2H), 7.60 (d, J = 8.1 Hz, 2H), 7.47 (s, 1H), 2.23 – 2.18 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.7, 142.1, 133.4, 119.6, 118.9, 77.4, 77.2, 76.9, 24.9, 24.8, 24.7, 24.7, 24.7.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_7\text{DN}_2\text{O}$ 162.0772; found 162.0734

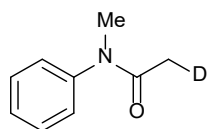


N-(Benzo[d][1,3]dioxol-5-yl)acetamide-2-d (**3n**); Isolated yield (32 mg, 70%); yellowish green crystalline solid; mp: 133-134 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.45 (s, 1H), 7.18 (s, 1H), 6.76 (d, J = 8.3 Hz, 1H), 6.71 (d, J = 8.1 Hz, 1H), 5.93 (s, 2H), 2.14 – 2.09 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.5, 147.9, 144.5, 132.3, 113.5, 108.1, 103.2, 101.4, 24.4, 24.3, 24.2, 24.0.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_8\text{DNO}_3$ 181.0718; found 181.0693

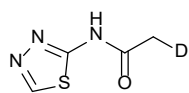


N-Methyl-N-phenylacetamide-2-d (**3o**); Isolated yield (26 mg, 69%); reddish sticky liquid; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.37 (t, J = 7.4 Hz, 2H), 7.28 (t, J = 7.4 Hz, 1H), 7.14 (d, J = 7.9 Hz, 2H), 3.21 (s, 3H), 1.83 – 1.78 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 170.7, 144.6, 129.7, 127.7, 127.0, 37.1, 22.3, 22.2, 22.1, 21.9.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_9\text{H}_{10}\text{DNO}$ 151.0976; found 151.0969

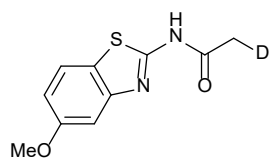


N-(1,3,4-Thiadiazol-2-yl)acetamide-2-d (**3p**); Isolated yield (24 mg, 66%); white crystalline solid; mp: 262-264 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3 + $\text{DMSO}-d_6$) δ 12.38 (s, 1H), 8.80 (t, J = 3.8 Hz, 1H), 2.16 (d, J = 7.9 Hz, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3 + $\text{DMSO}-d_6$) δ 167.8, 157.9, 146.6, 21.5, 21.4, 21.3.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_4\text{H}_4\text{DN}_3\text{OS}$ 145.0289; found 145.0255



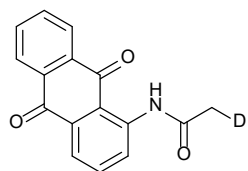
N-(5-Methoxybenzo[d]thiazol-2-yl)acetamide-2-d (**3q**); Isolated yield (35 mg, 63%);

grey crystalline solid; mp: 153-155 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 7.65 (d, J = 9.0 Hz, 1H), 7.31 (d, J = 2.2 Hz, 1H), 7.05 (dd, J = 9.2, 2.3 Hz, 1H), 3.88 (s, 3H), 2.30 – 2.22 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 168.5, 157.1, 142.1, 133.4, 121.3, 115.5, 104.6, 56.0, 23.6, 23.5, 23.4, 23.2.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_{10}\text{H}_9\text{DN}_2\text{O}_2\text{S}$ 224.0599; found 224.0577



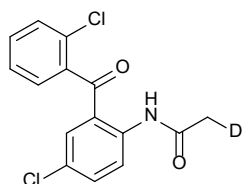
N-(9,10-Dioxo-9,10-dihydroanthracen-1-yl)acetamide-2-d (**3r**); Isolated yield (48 mg,

72%); yellow crystalline solid; mp: 214-216 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 12.31 (s, 1H), 9.11 (d, J = 8.6 Hz, 1H), 8.29 – 8.24 (m, 2H), 8.04 (d, J = 8.0 Hz, 1H), 7.83 – 7.76 (m, 2H), 7.75 (t, J = 8.1 Hz, 1H), 2.35 – 2.31 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 187.5, 182.8, 170.1, 142.3, 135.9, 134.5, 134.4, 134.2, 134.1, 133.0, 127.4, 127.2, 126.2, 122.6, 117.6, 77.4, 77.2, 76.9, 25.9, 25.8, 25.6, 25.5.

HRMS (ESI-TOF, $[\text{M}+\text{H}]^+$): Calcd. for $\text{C}_{16}\text{H}_{10}\text{DNO}_3$ 267.0874; found 267.0868



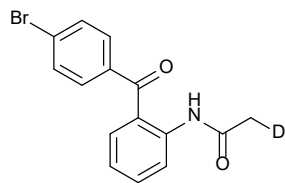
N-(4-Chloro-2-(2-chlorobenzoyl)phenyl)acetamide-2-d (**3s**); Isolated yield (57 mg,

74%); light orange solid; mp: 125-127 °C; Isolation: 10% EtOAc in Hexane

^1H NMR (500 MHz, CDCl_3) δ 11.98 (s, 1H), 8.73 (d, J = 9.3 Hz, 1H), 7.54 (dd, J = 9.2, 2.1 Hz, 1H), 7.47 (d, J = 3.4 Hz, 2H), 7.41 – 7.38 (m, 1H), 7.36 (s, 1H), 7.34 – 7.32 (m, 1H), 4.05 (s, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) δ 198.0, 165.5, 139.3, 137.9, 135.4, 133.5, 131.9, 131.9, 131.2, 130.4, 129.0, 128.5, 127.1, 123.7, 122.4, 29.7, 29.5, 29.3, 29.1.

HRMS (ESI-TOF, [M+Na]⁺): Calcd. for C₁₅H₁₀DCl₂NO₂ 331.0122; found 331.0117



N-(2-(4-Bromobenzoyl)phenyl)acetamide-2-d (**3t**); Isolated yield (53 mg, 67%);

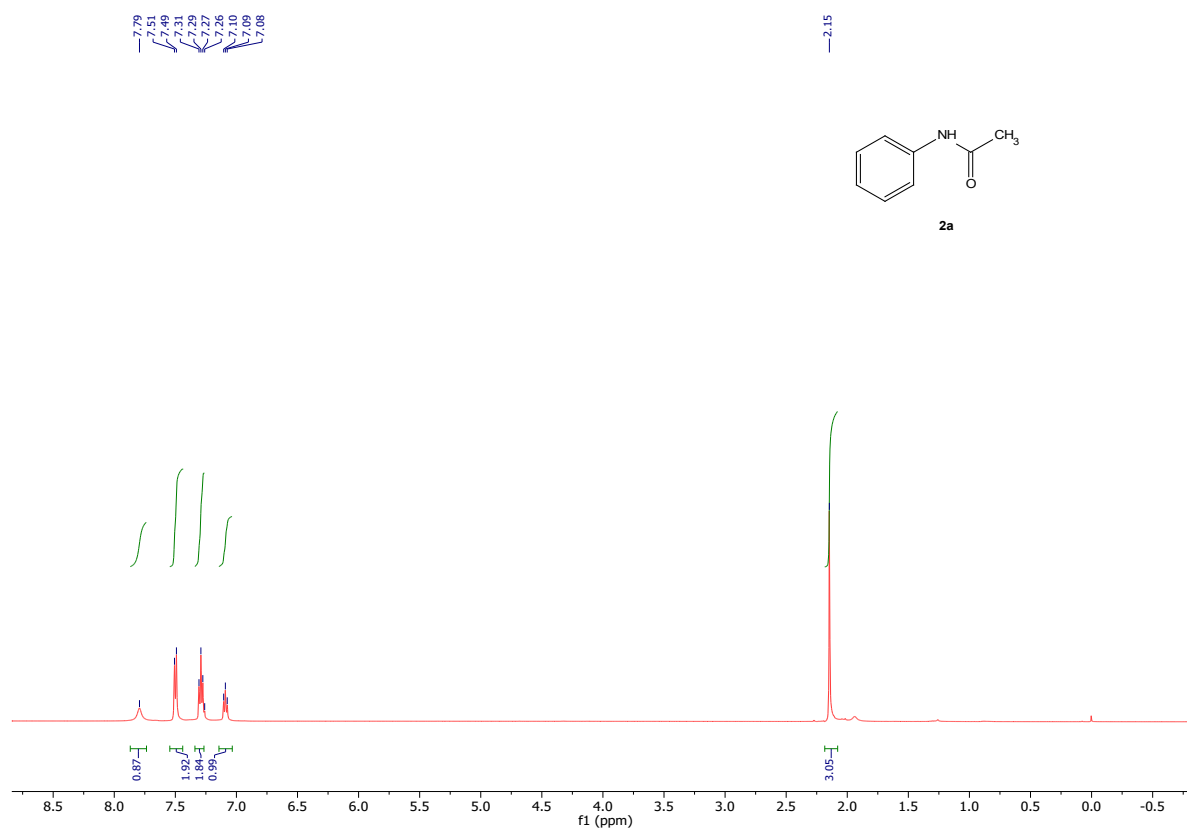
reddish-brown crystalline solid; mp: 148-150 °C; Isolation: 10% EtOAc in Hexane

¹H NMR (500 MHz, CDCl₃) δ 10.69 (s, 1H), 8.60 (d, *J* = 8.6 Hz, 1H), 7.63 (s, 1H), 7.59 – 7.54 (m, 3H), 7.49 (d, *J* = 7.9 Hz, 1H), 7.08 (t, *J* = 7.7 Hz, 1H), 2.23 – 2.15 (m, 2H).

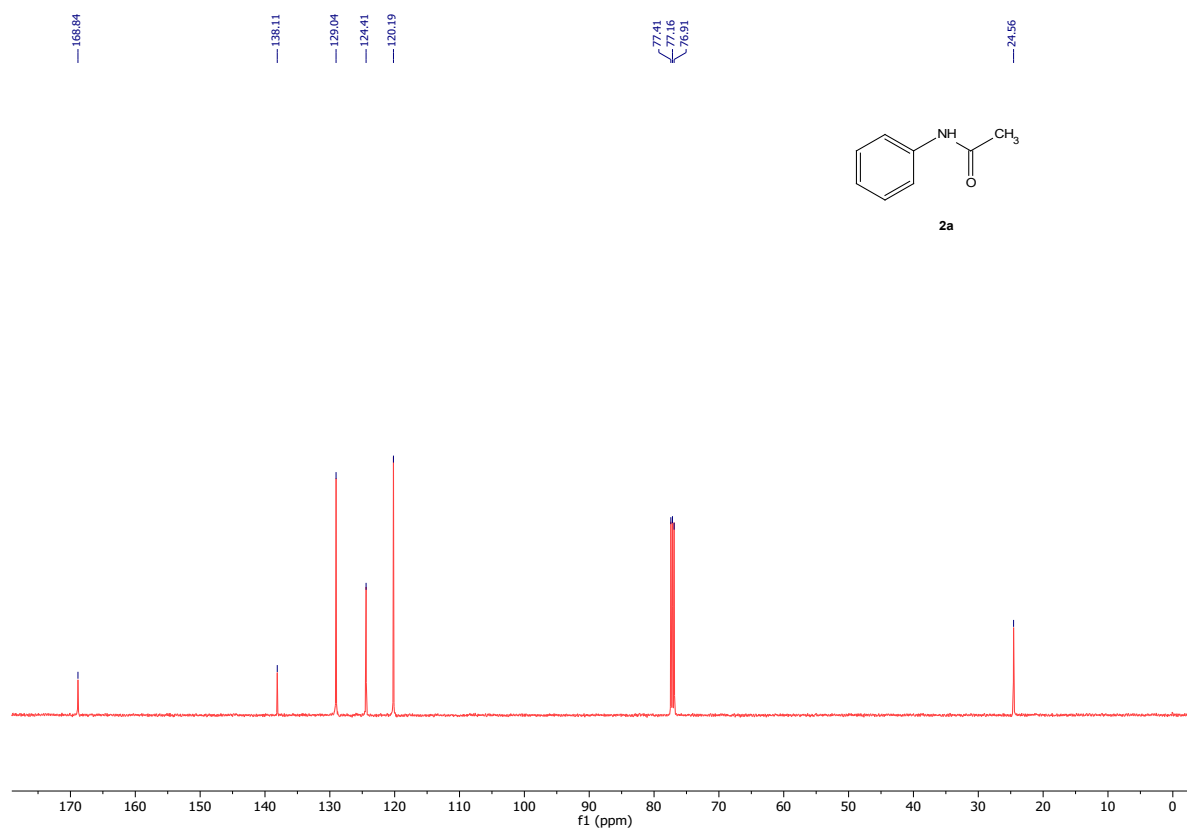
¹³C{¹H} NMR (126 MHz, CDCl₃) δ 198.6, 169.3, 140.6, 137.5, 134.6, 133.3, 131.8, 131.5, 127.7, 123.1, 122.3, 121.8, 25.3, 25.3, 25.1, 25.0.

HRMS (ESI-TOF, [M+H]⁺): Calcd. for C₁₅H₁₁DBrNO₂ 319.0187; found 319.0179

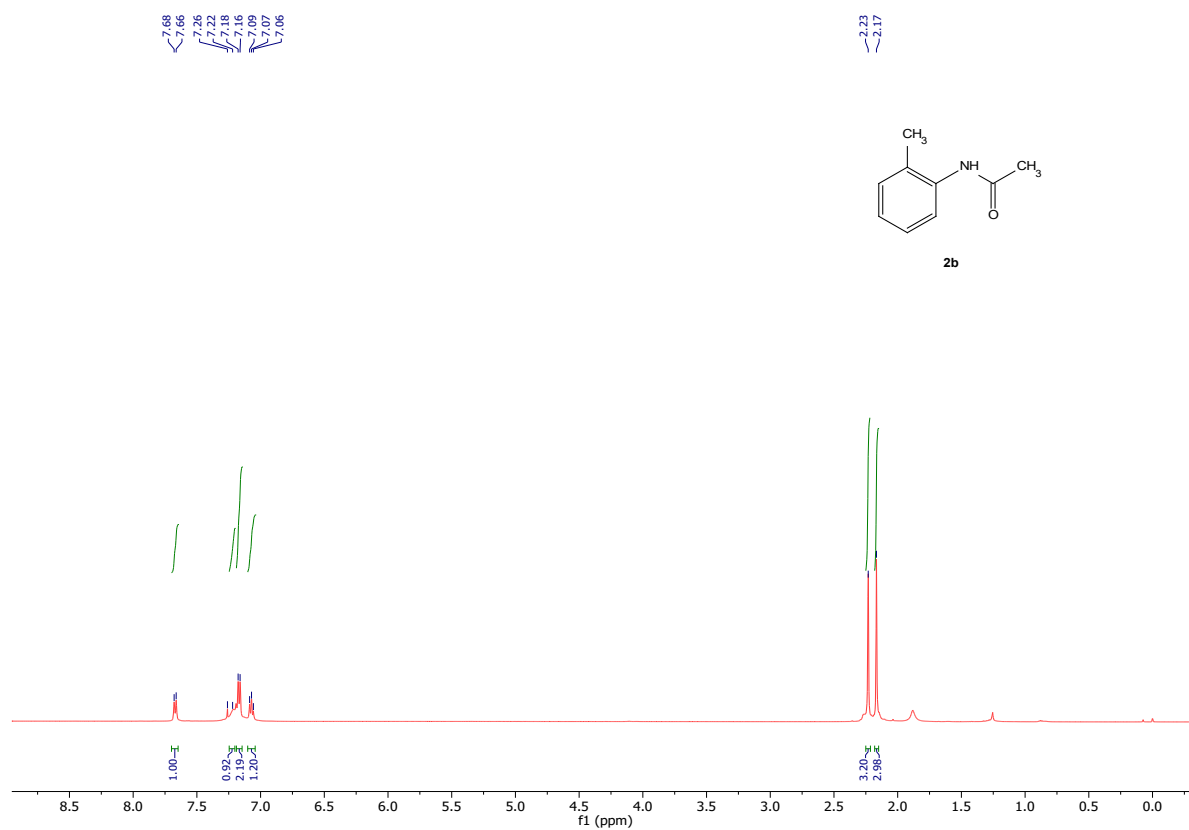
¹H NMR (500 MHz, CDCl₃) of 2a



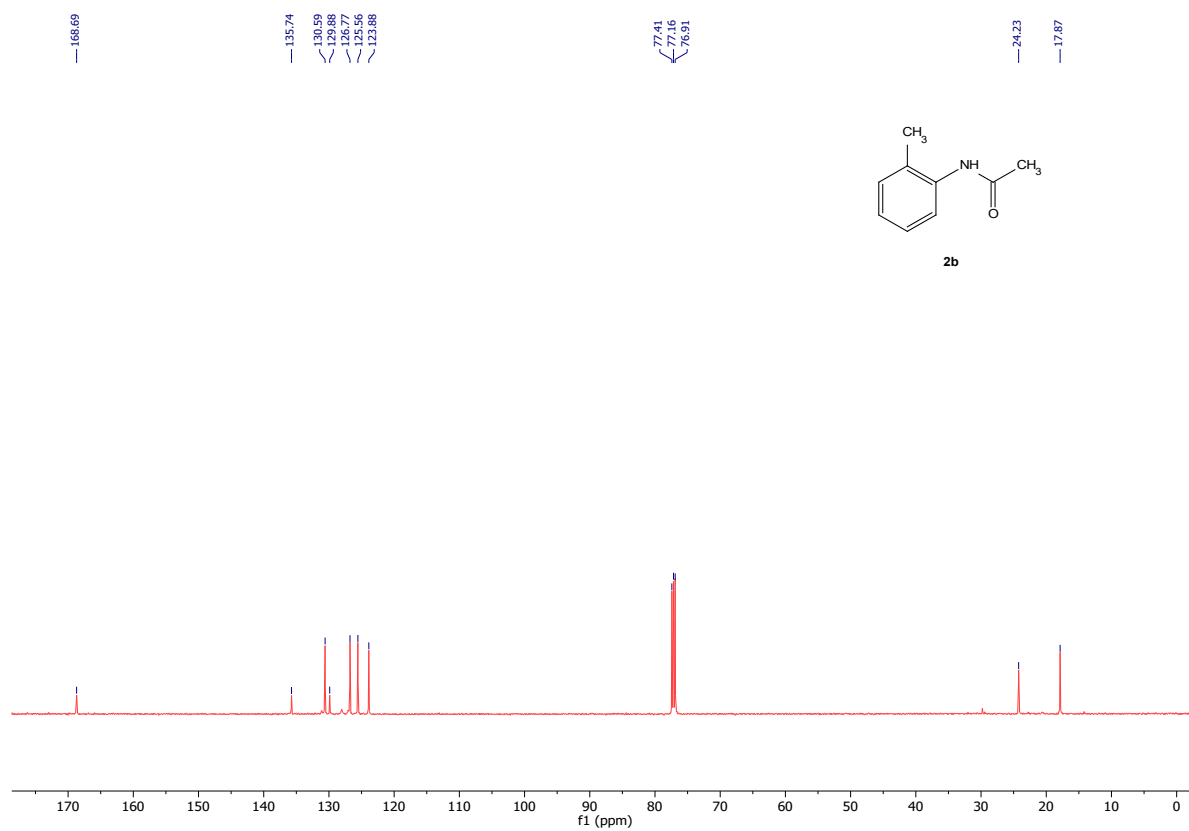
¹³C{¹H} NMR (126 MHz, CDCl₃) 2a



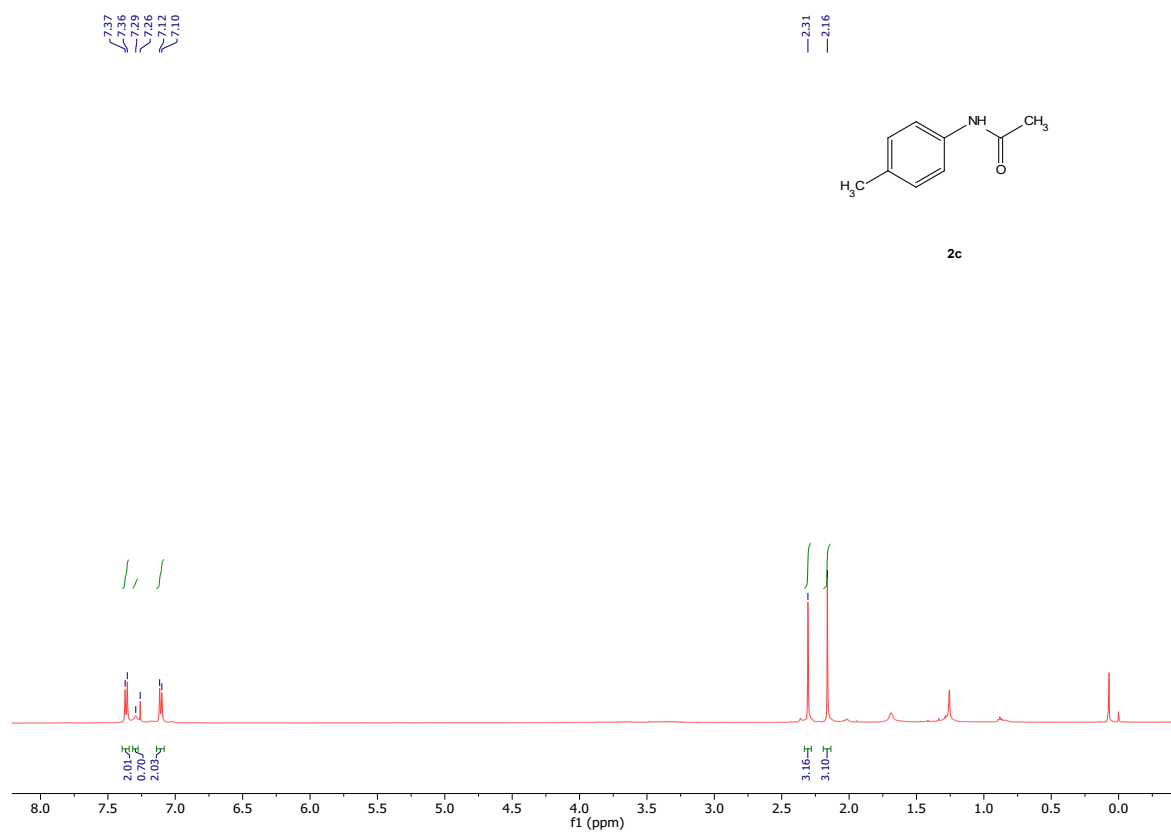
^1H NMR (500 MHz, CDCl_3) of 2b



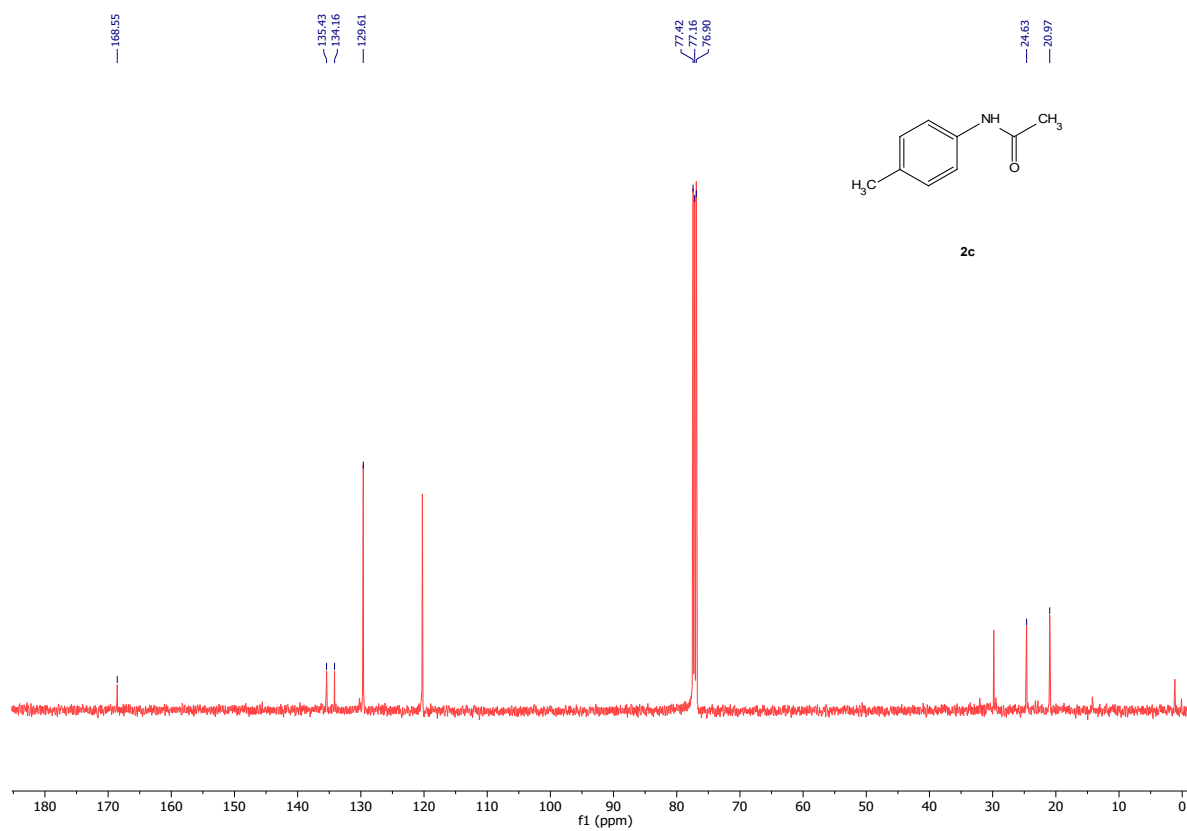
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2b



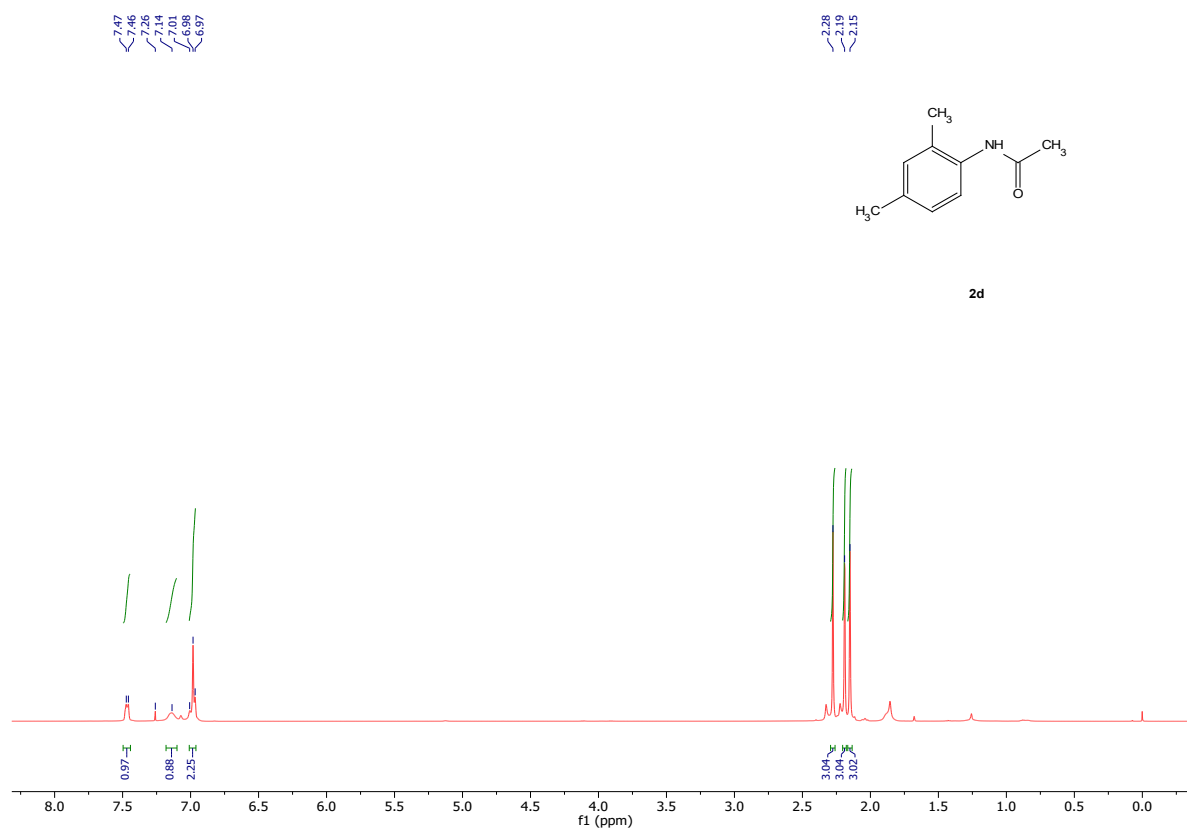
^1H NMR (500 MHz, CDCl_3) of 2c



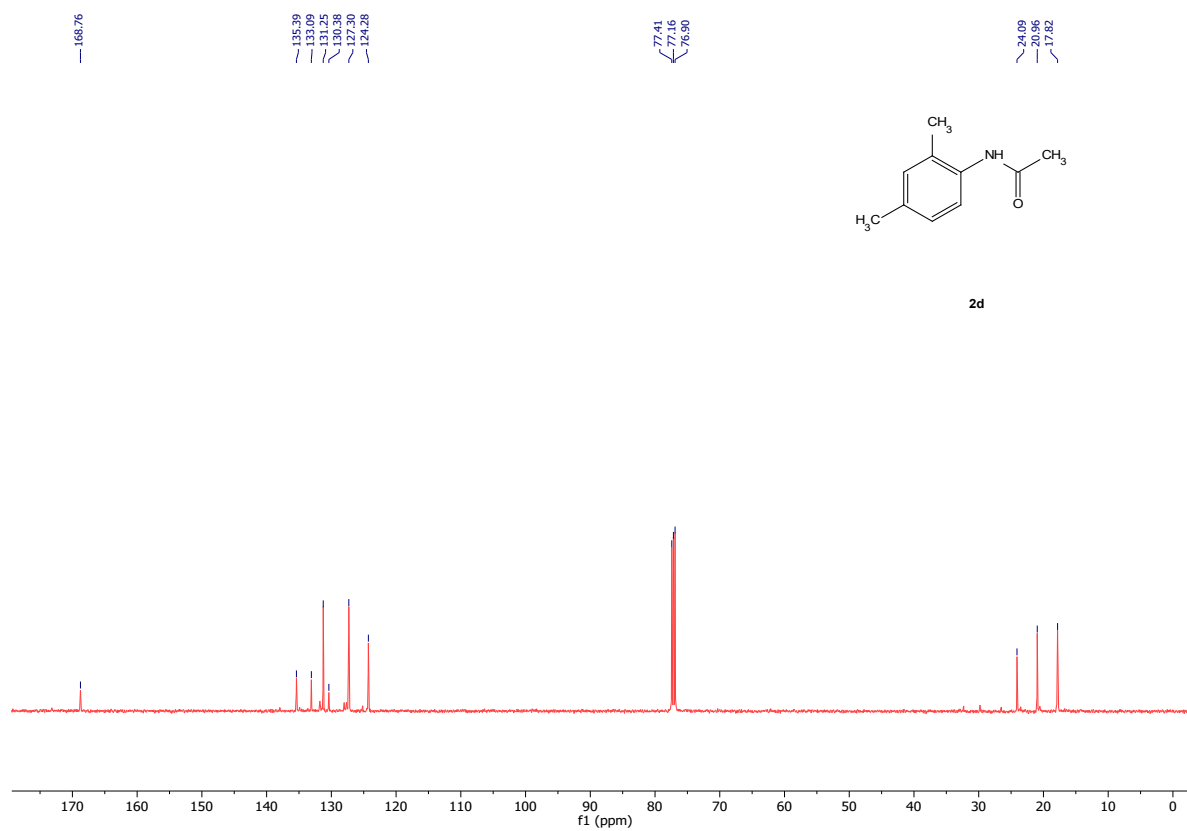
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2c



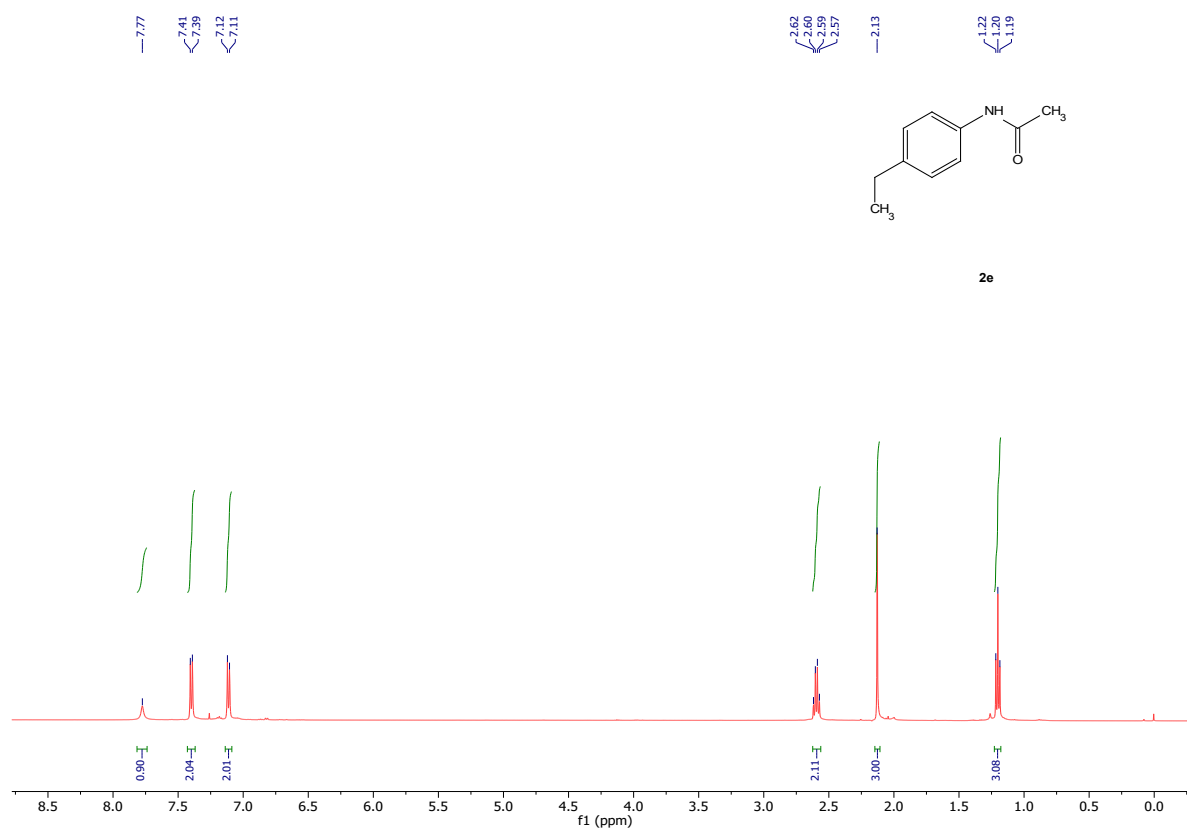
^1H NMR (500 MHz, CDCl_3) of 2d



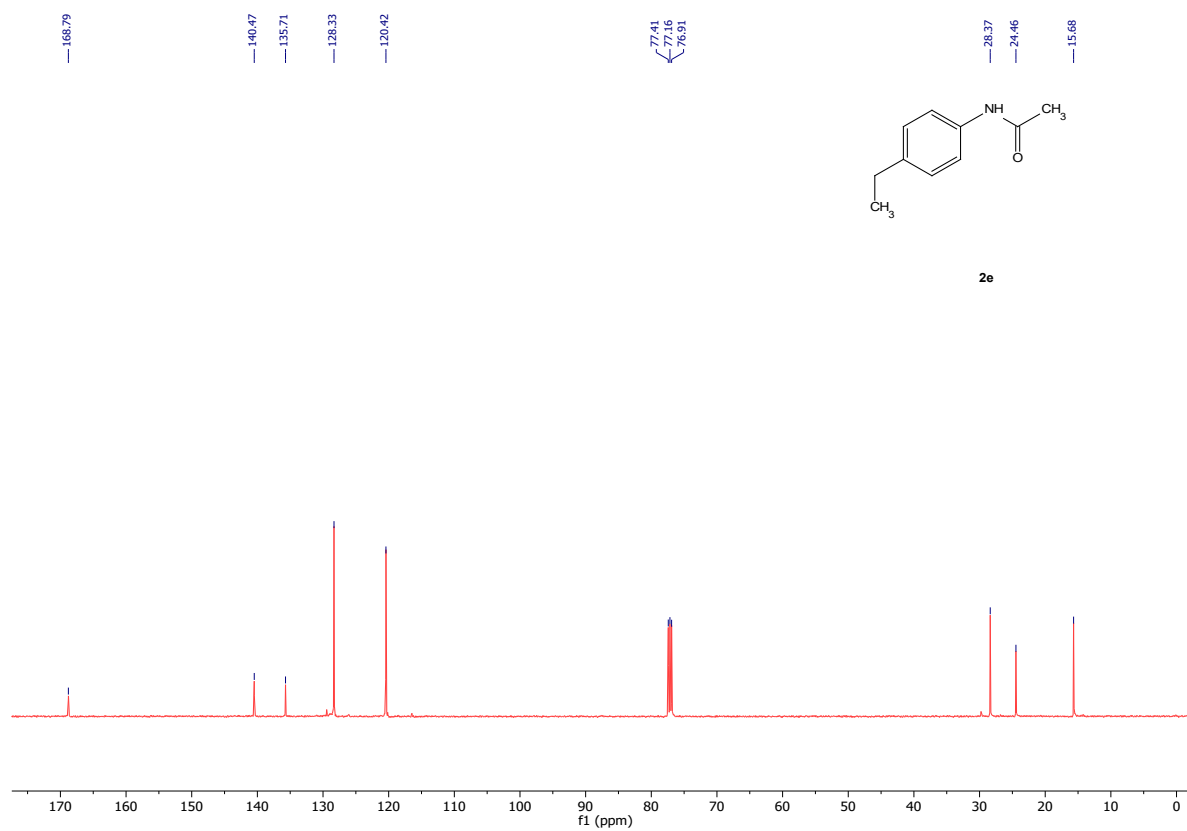
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2d



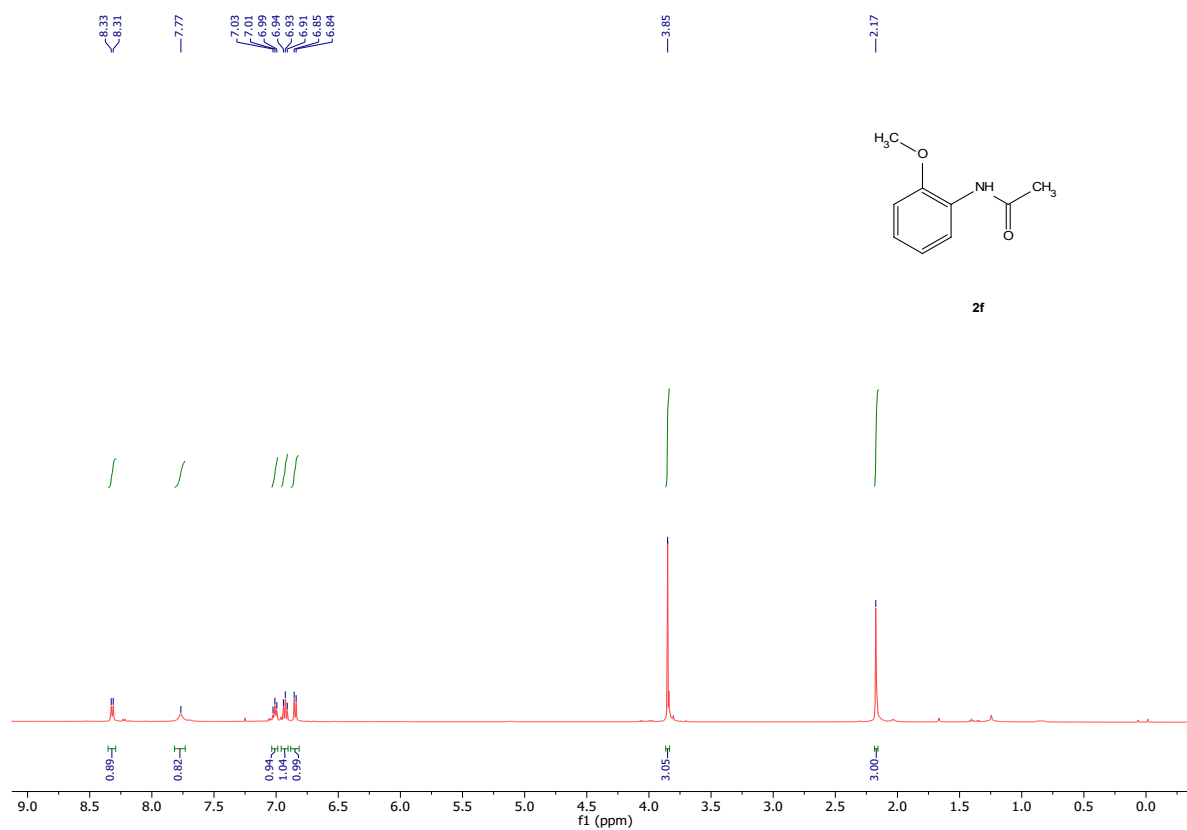
^1H NMR (500 MHz, CDCl_3) of 2e



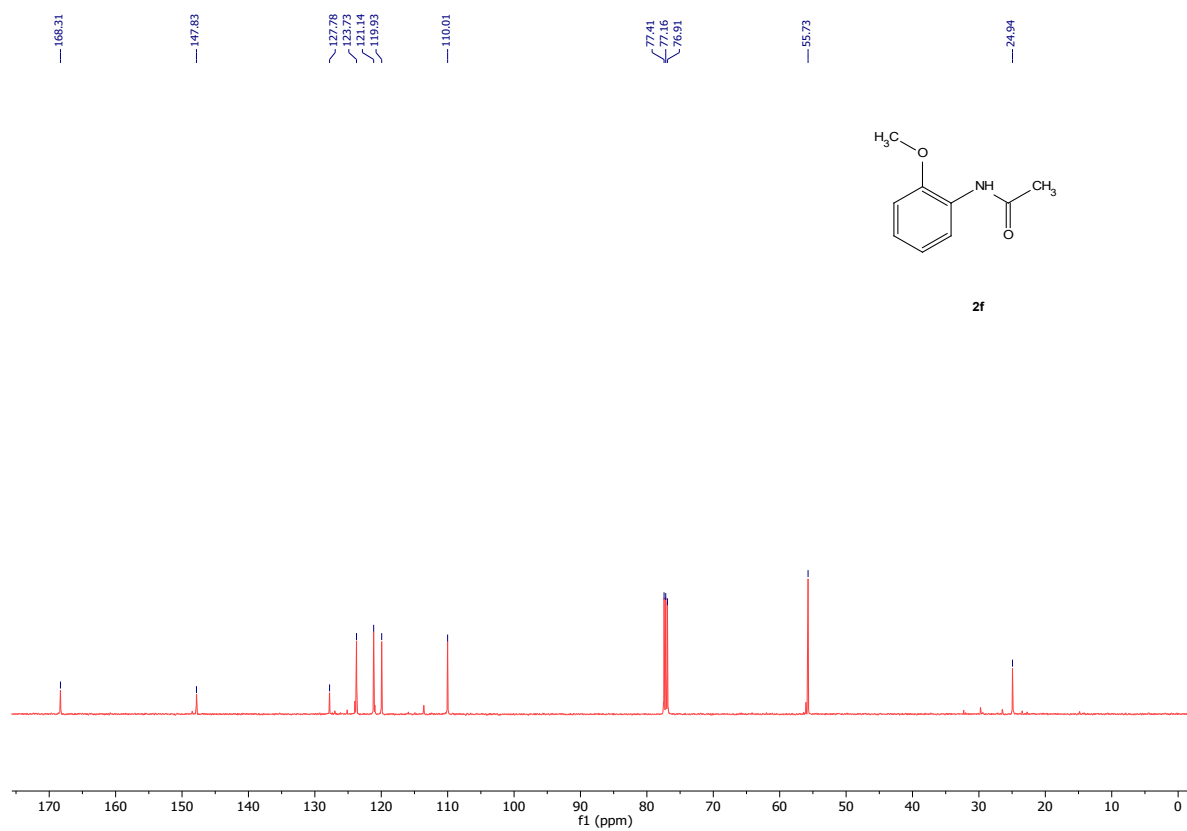
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2e



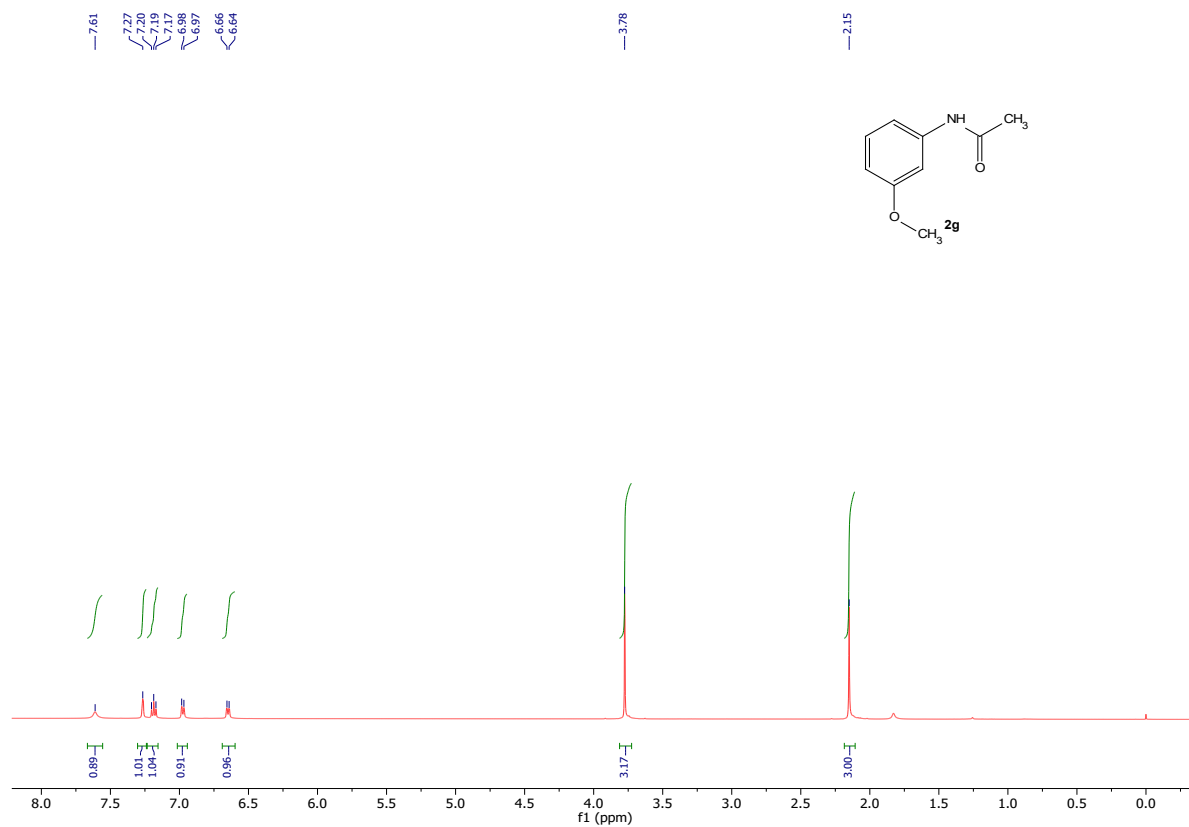
^1H NMR (500 MHz, CDCl_3) of 2f



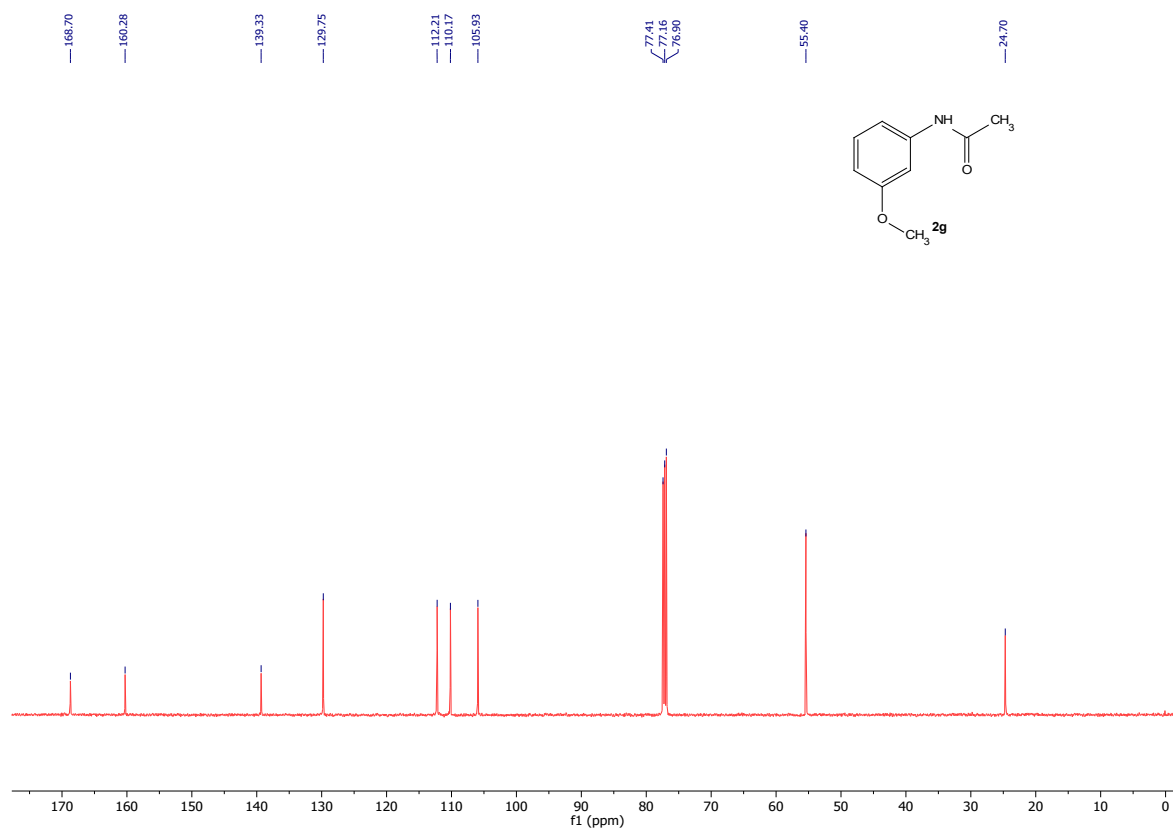
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2f



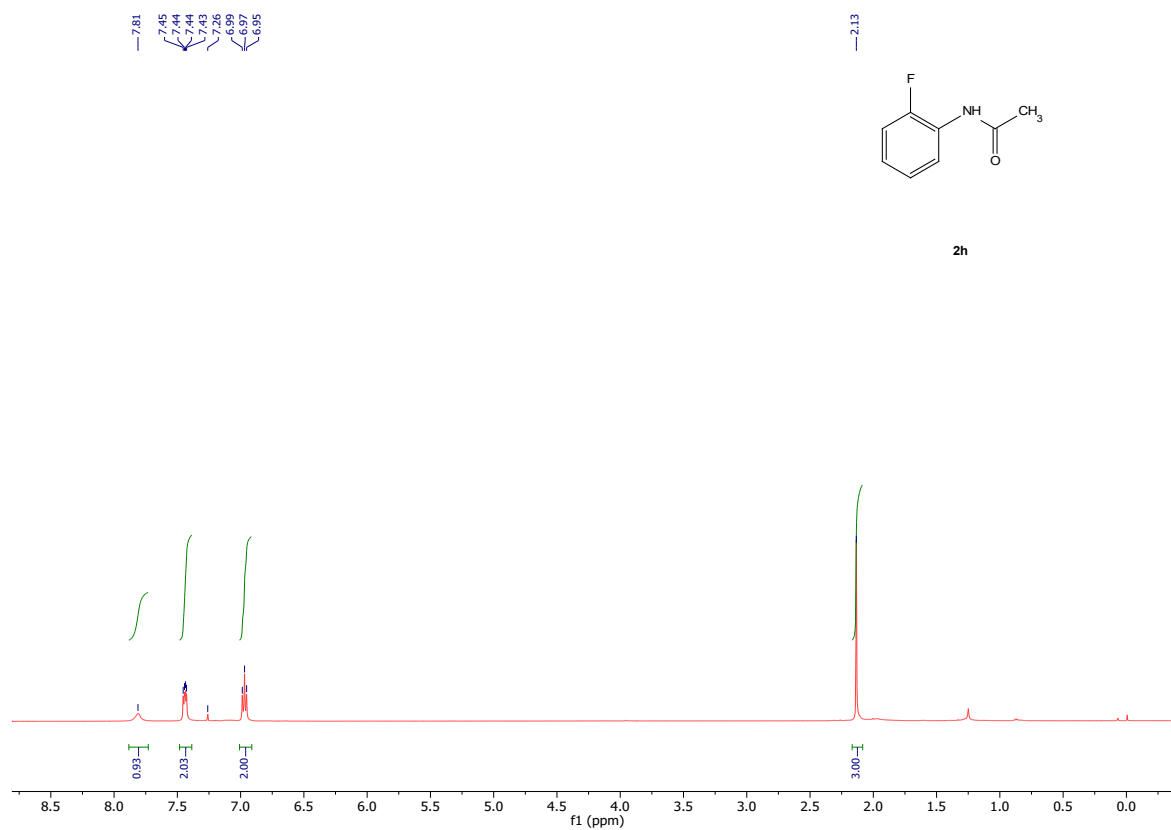
^1H NMR (500 MHz, CDCl_3) of **2g**



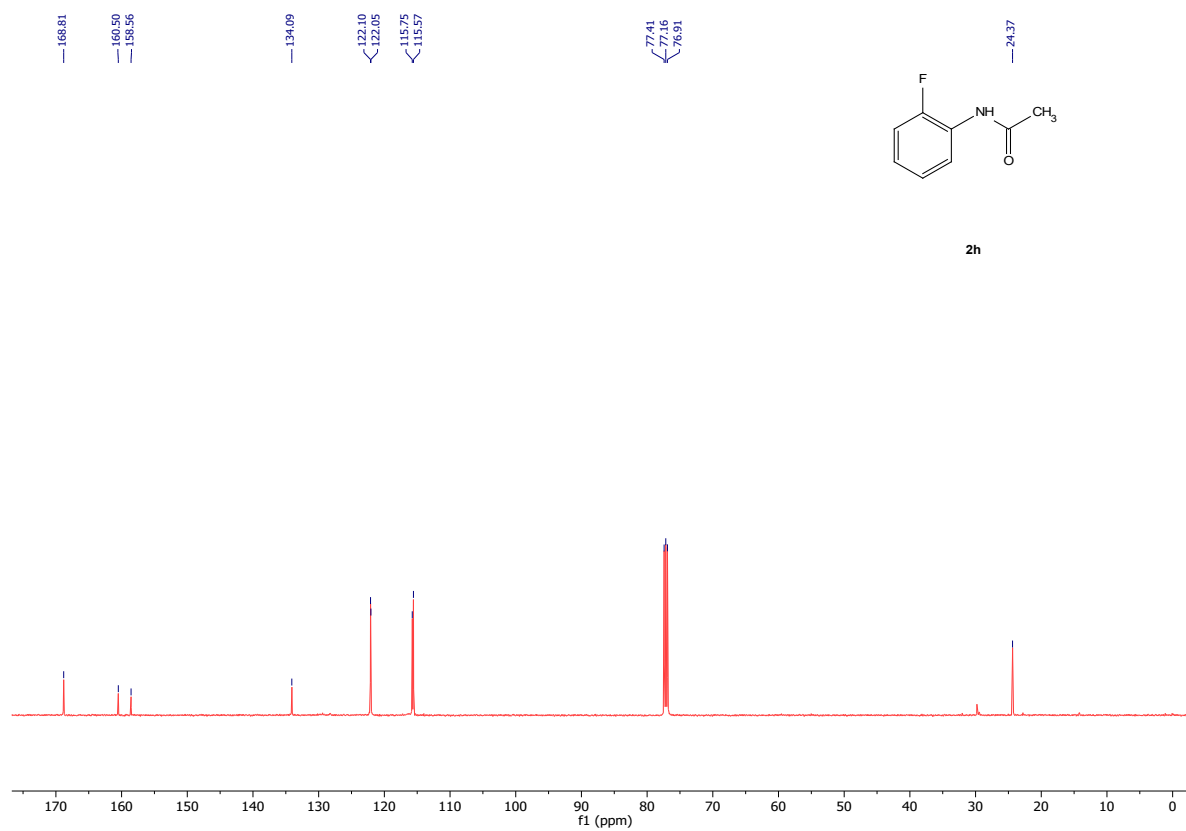
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) **2g**



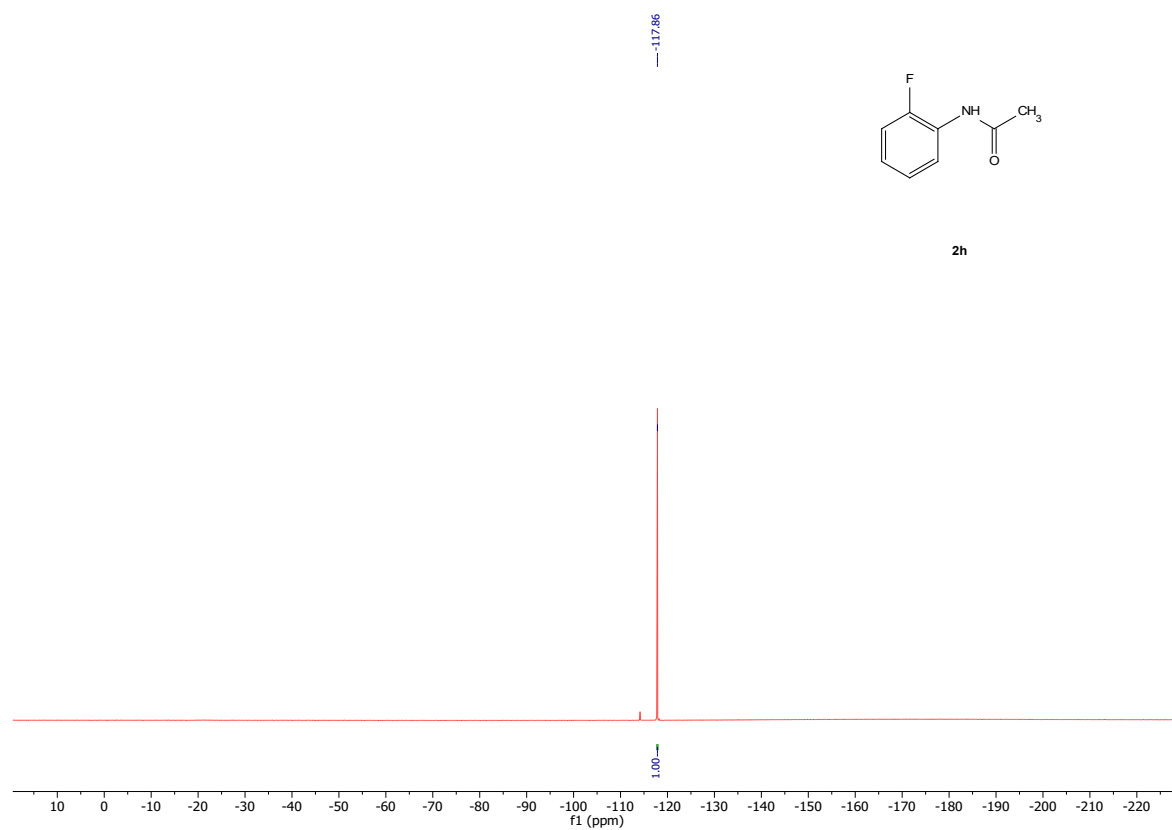
^1H NMR (500 MHz, CDCl_3) of 2h



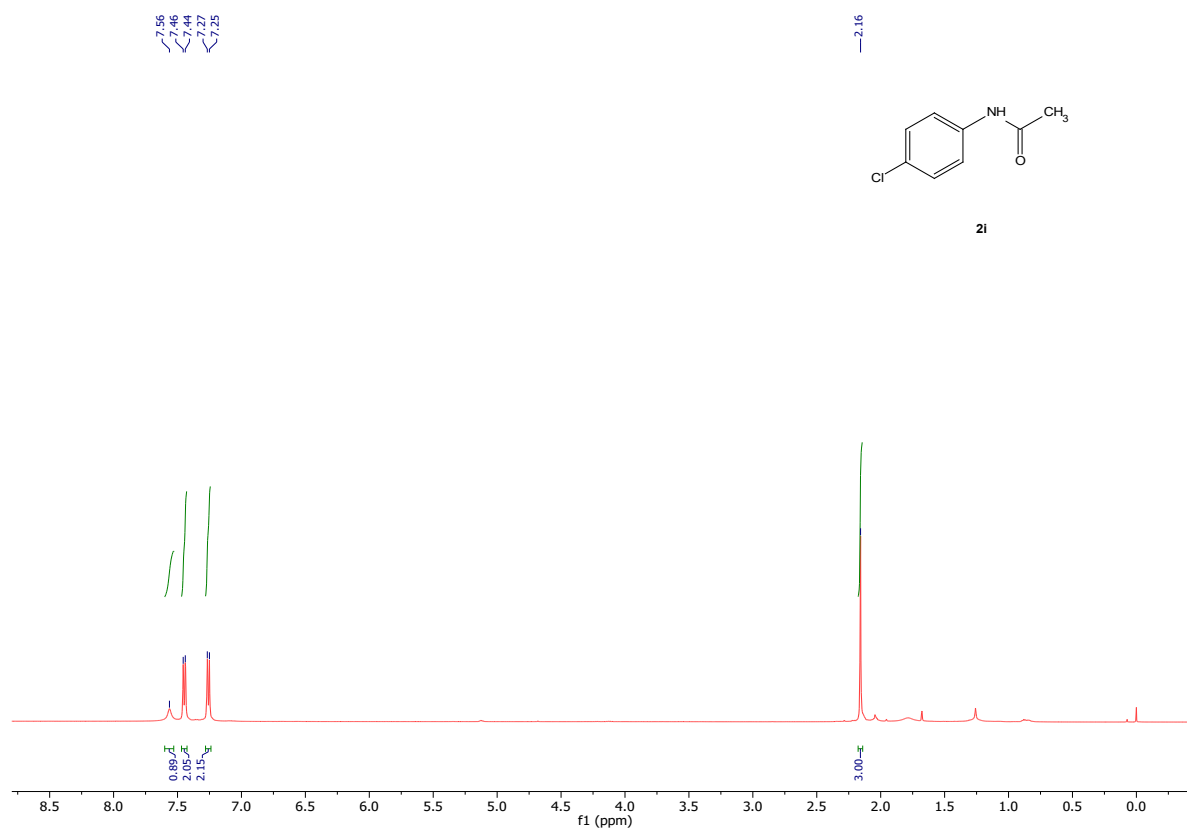
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2h



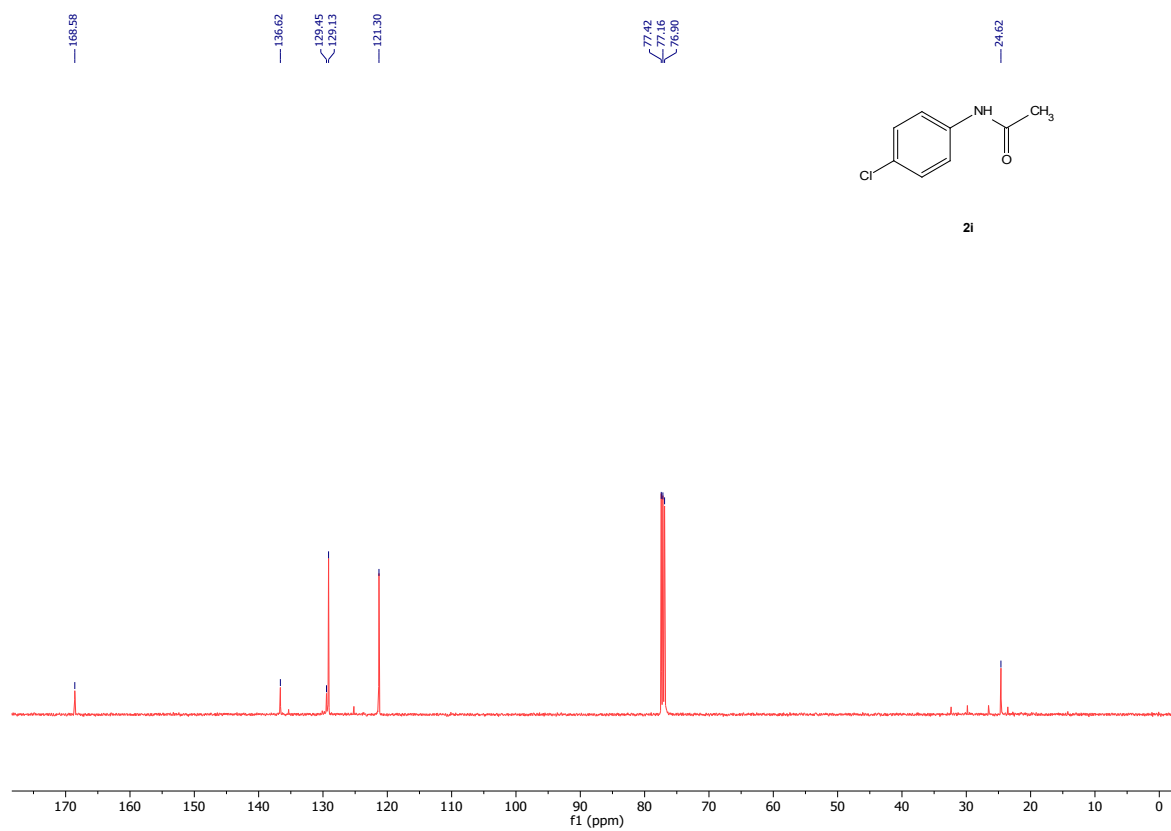
^{19}F NMR (471 MHz, CDCl_3) of 2h



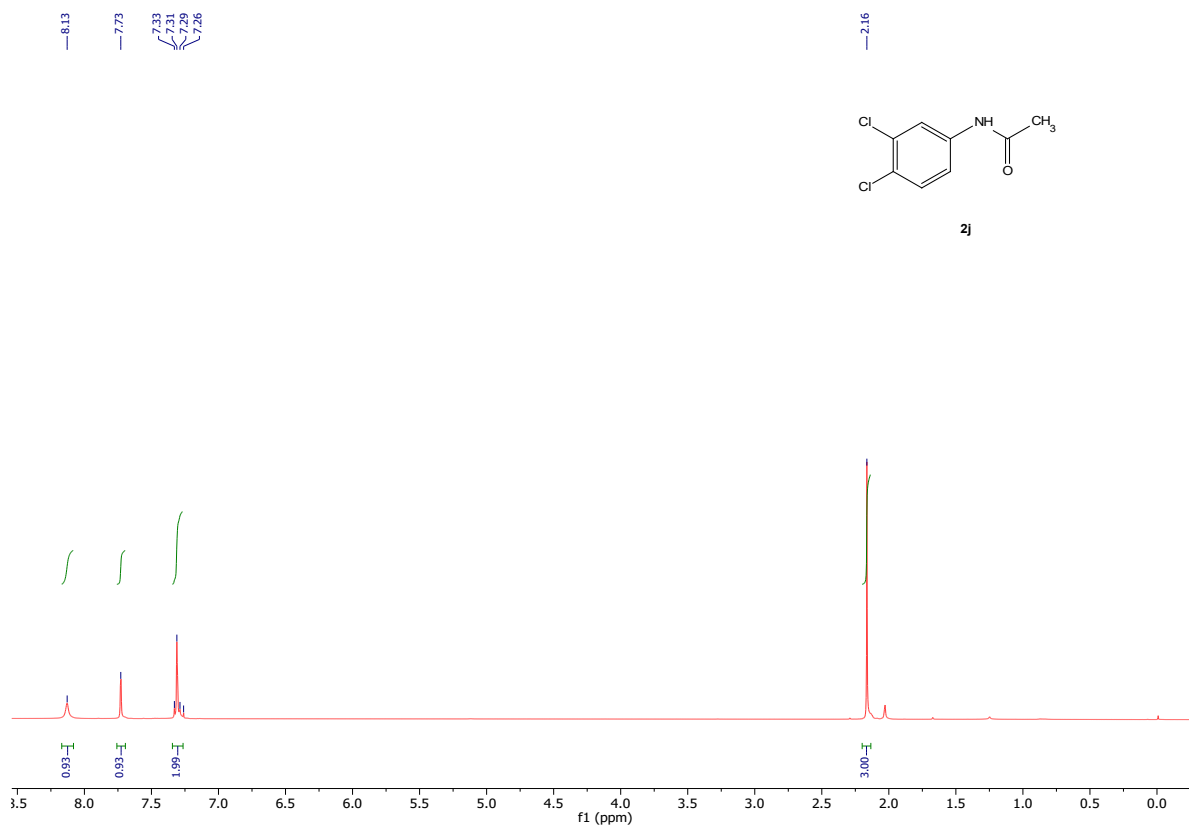
^1H NMR (500 MHz, CDCl_3) of 2i



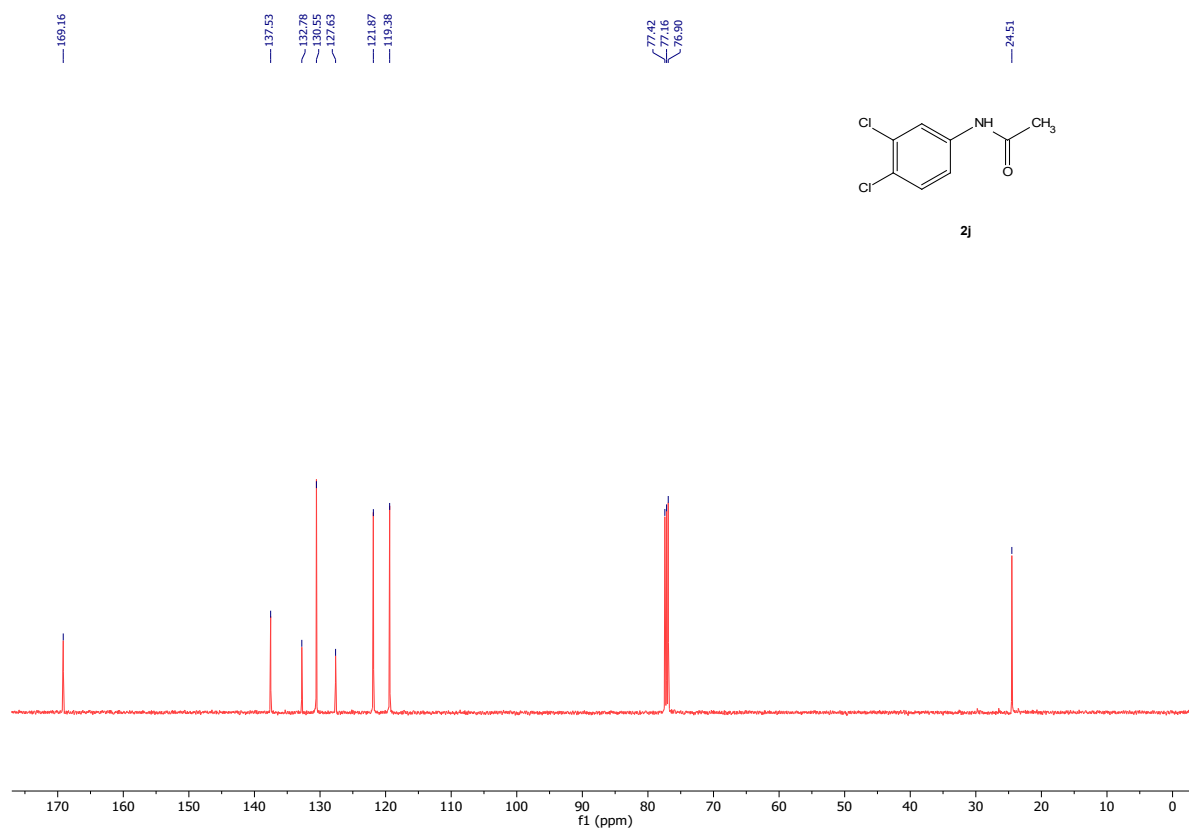
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2i



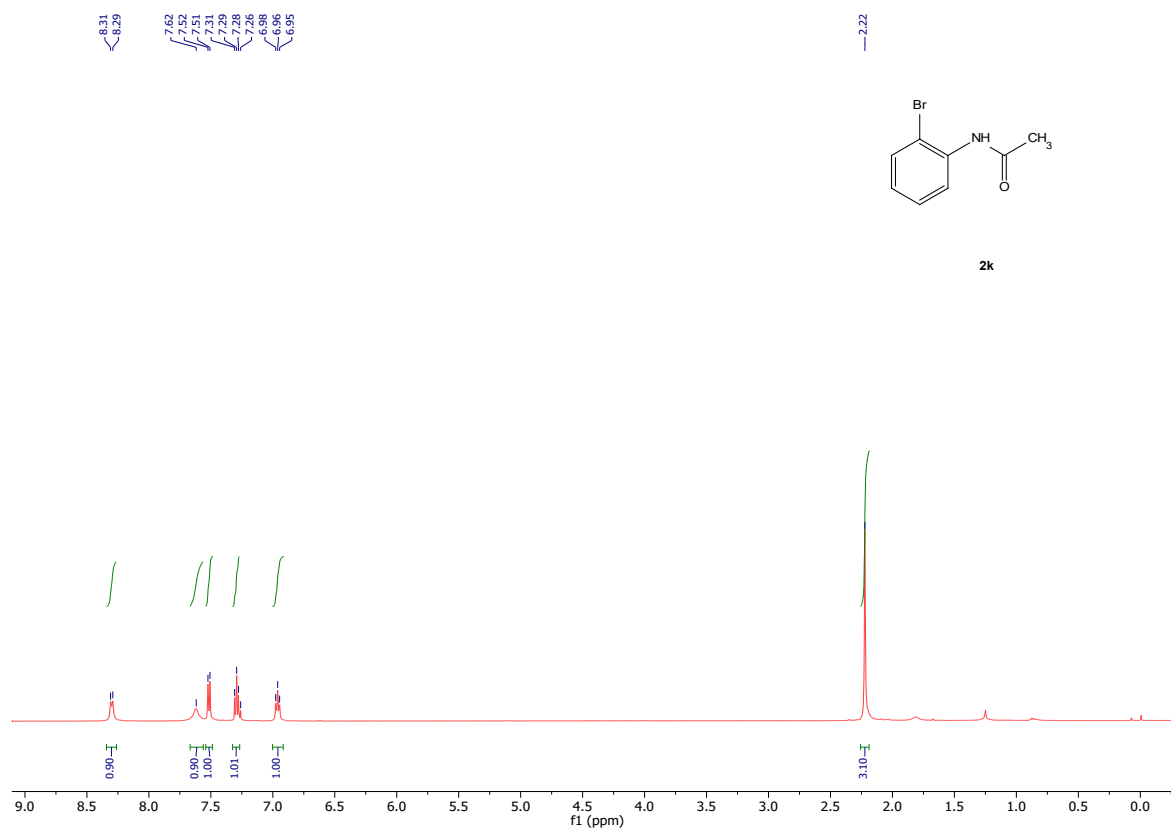
^1H NMR (500 MHz, CDCl_3) of 2j



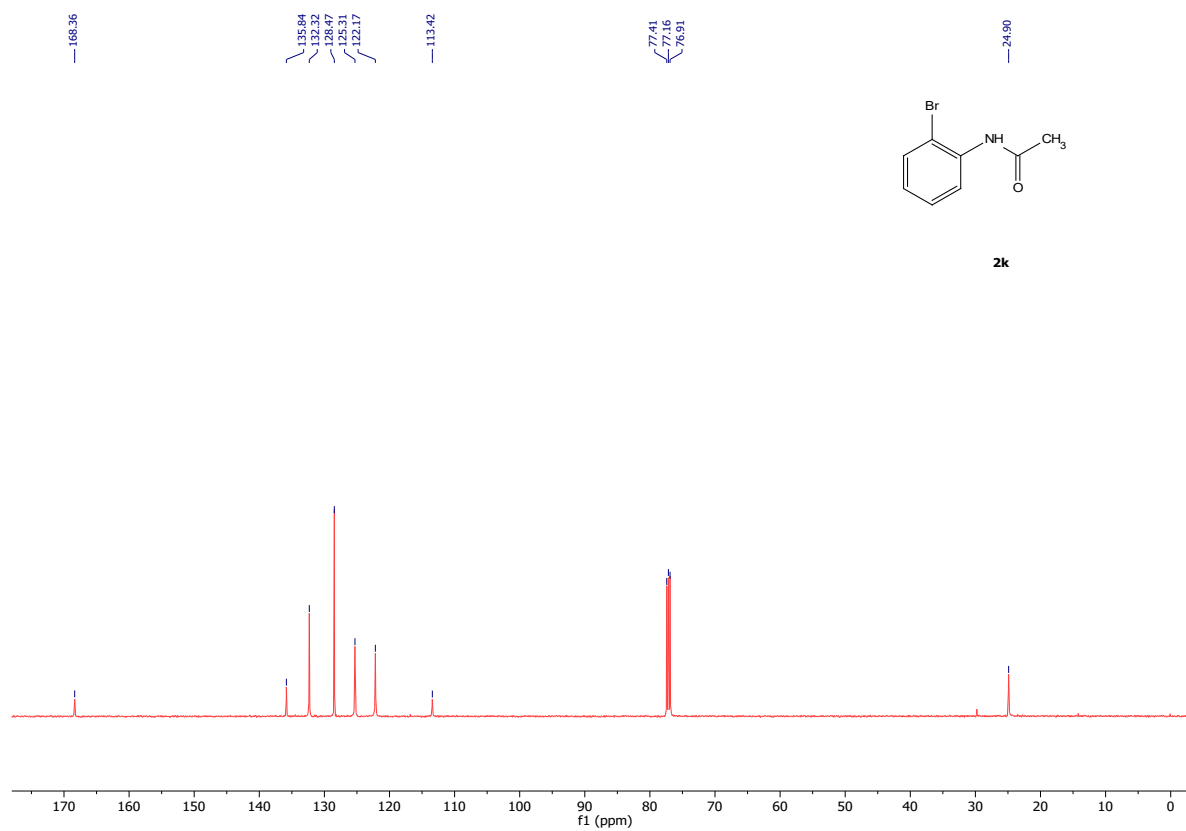
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2j



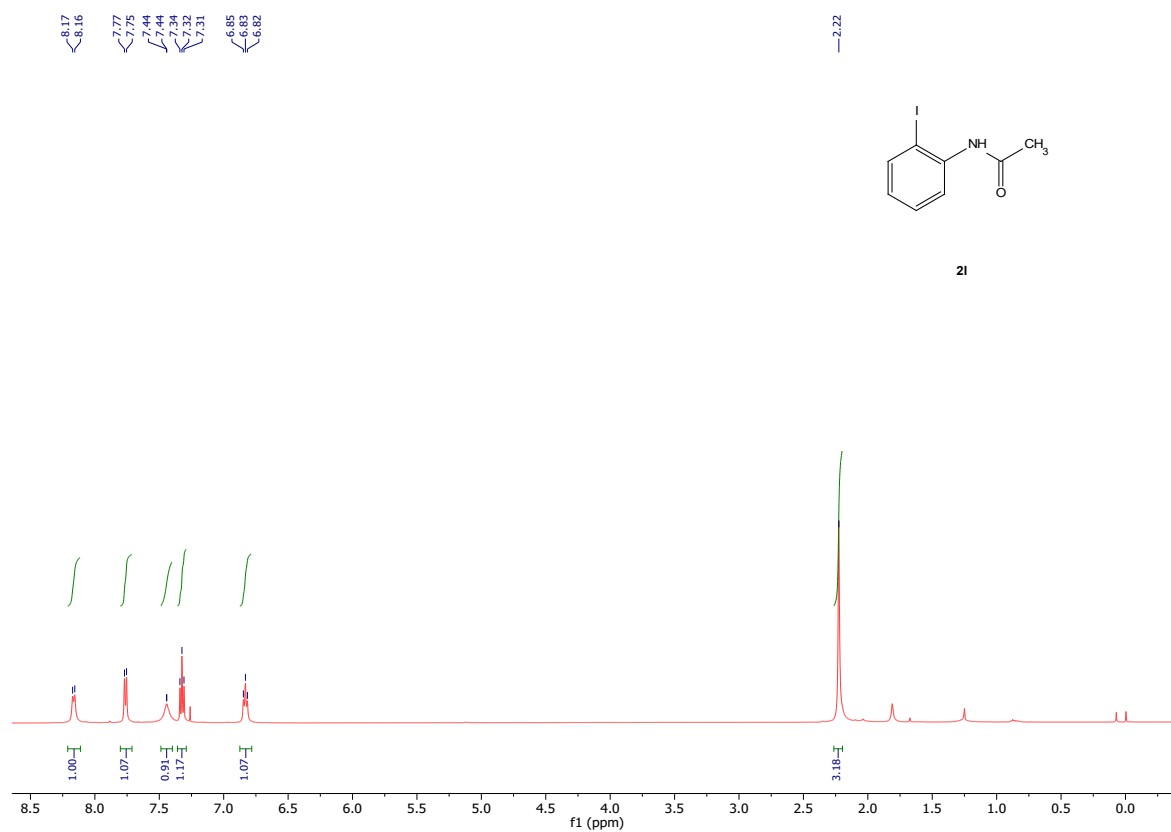
^1H NMR (500 MHz, CDCl_3) of 2k



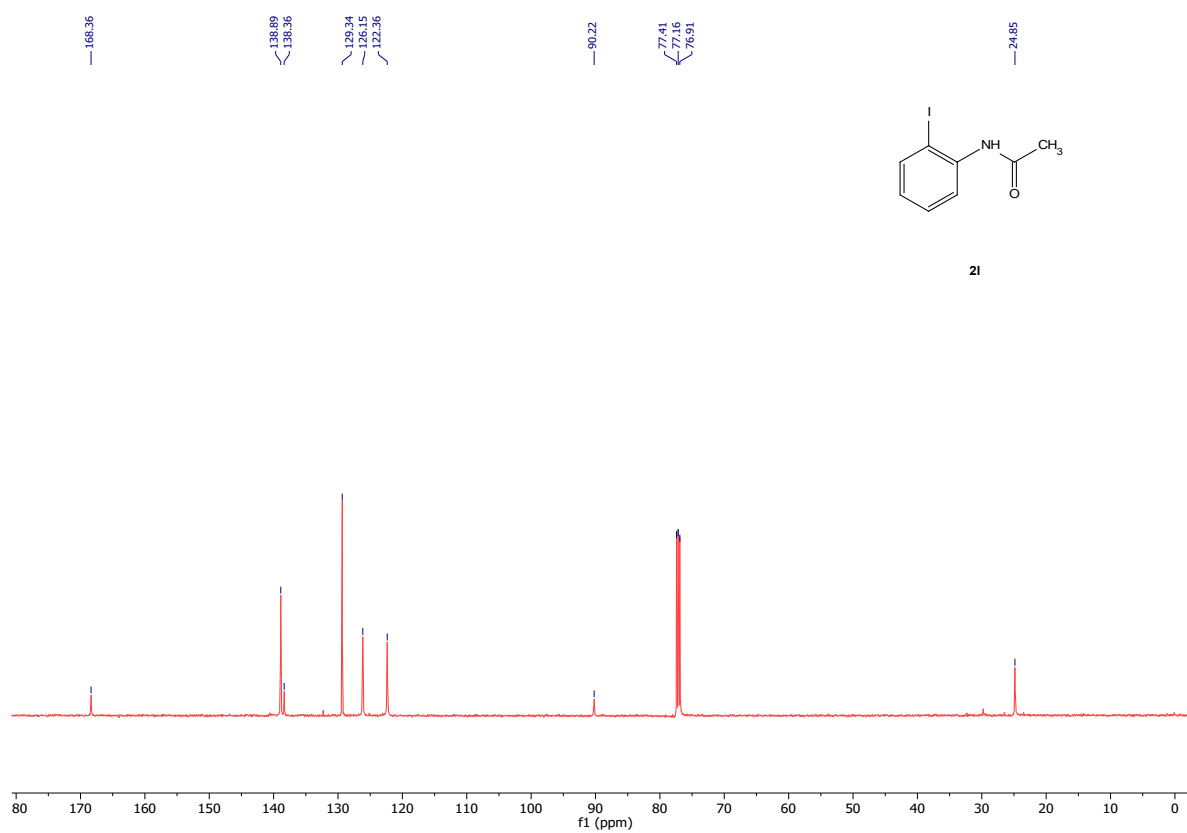
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2k



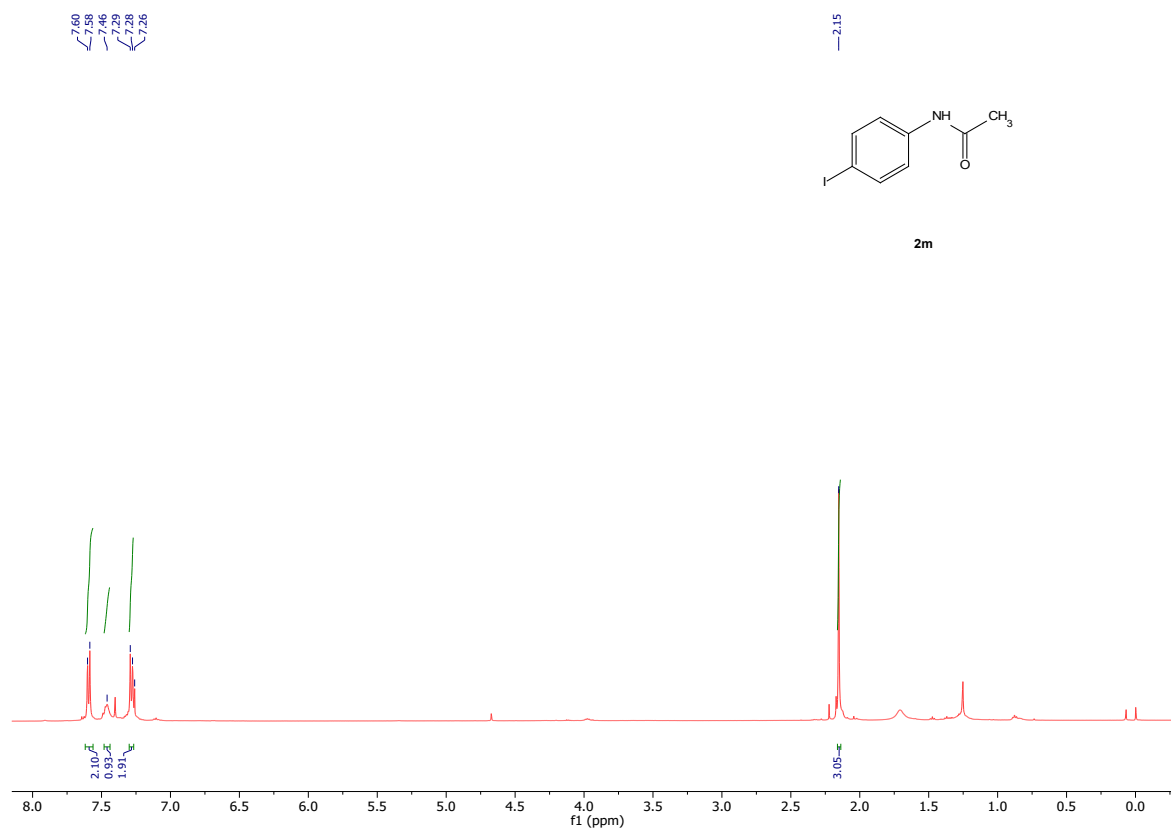
^1H NMR (500 MHz, CDCl_3) of 2I



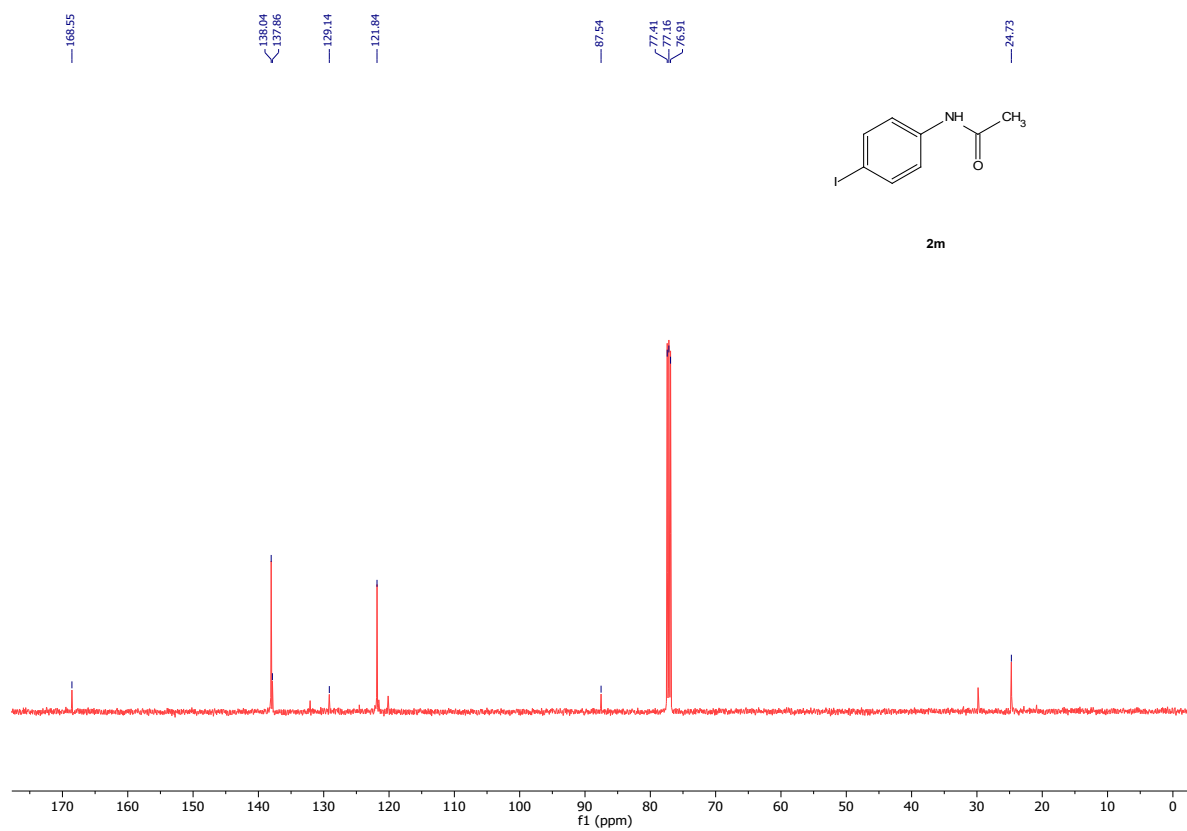
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2I



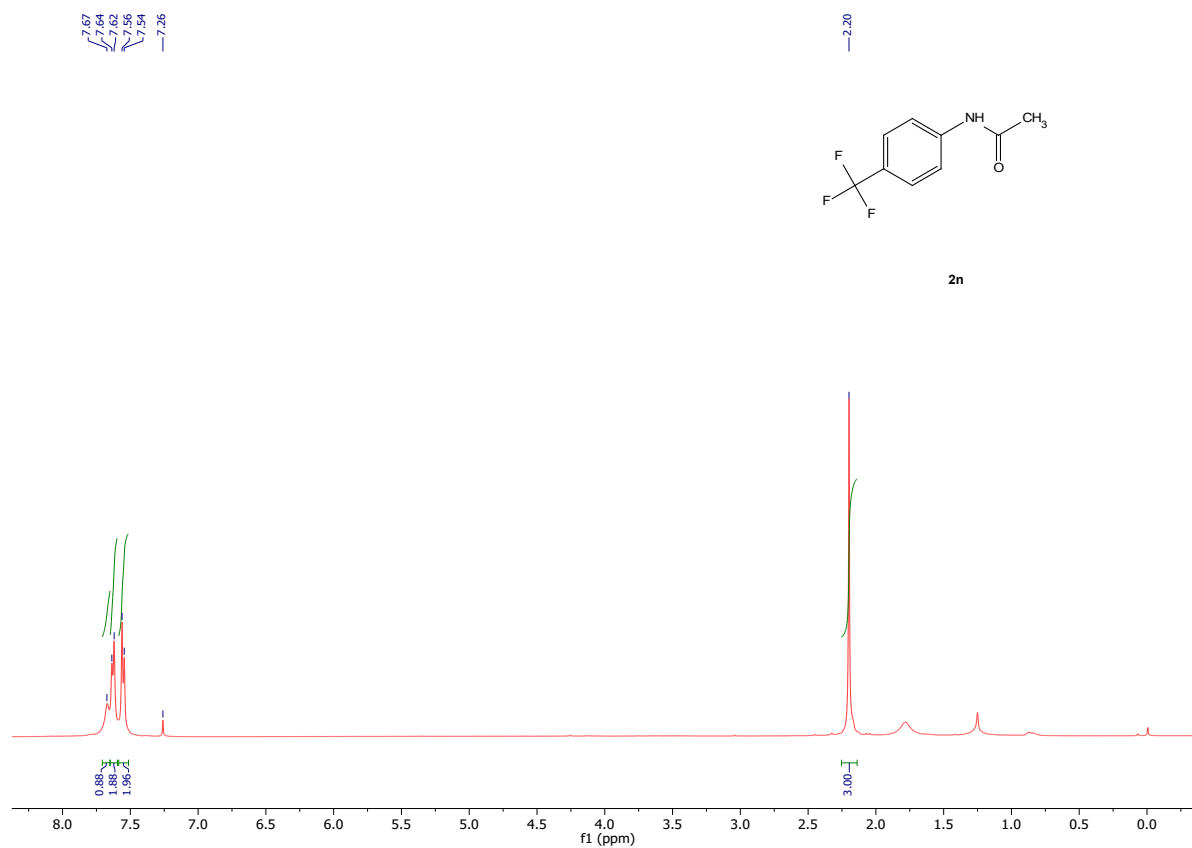
^1H NMR (500 MHz, CDCl_3) of 2m



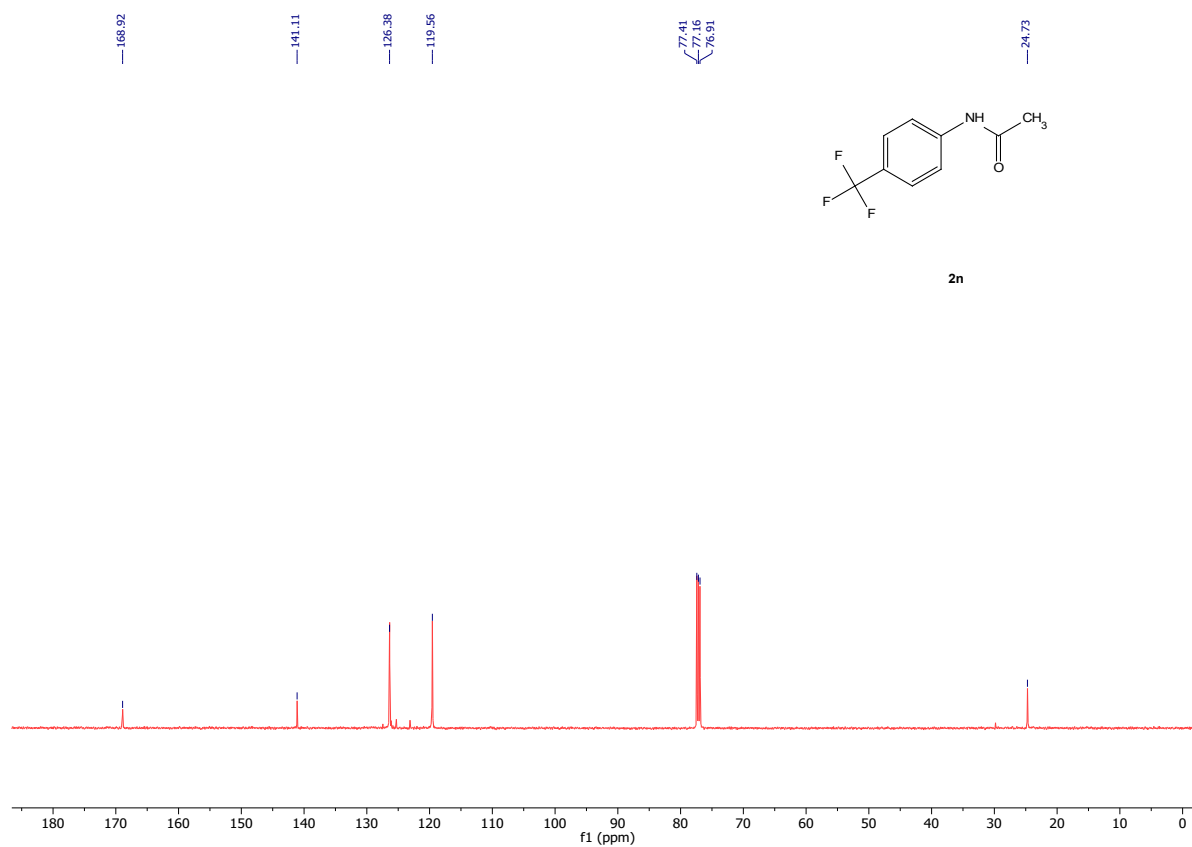
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2m



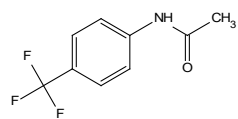
^1H NMR (500 MHz, CDCl_3) of 2n



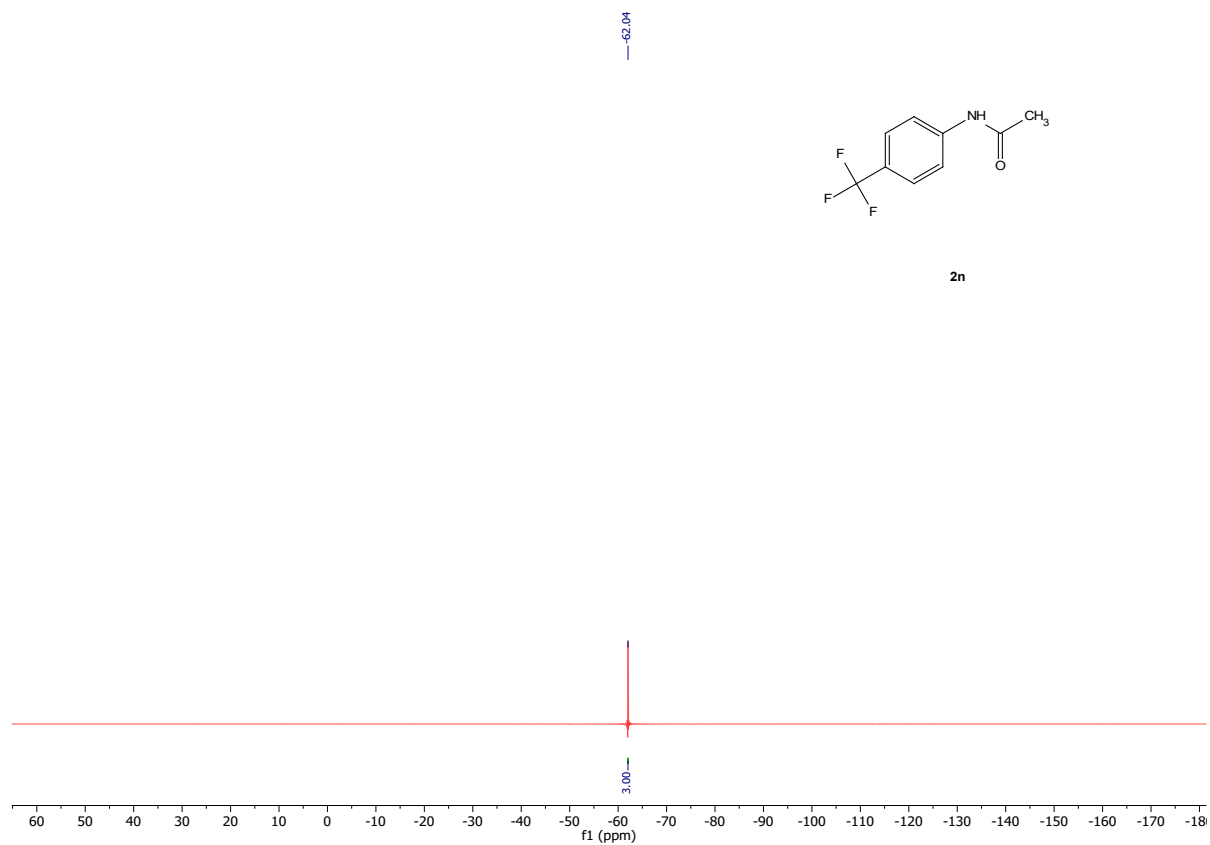
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2n



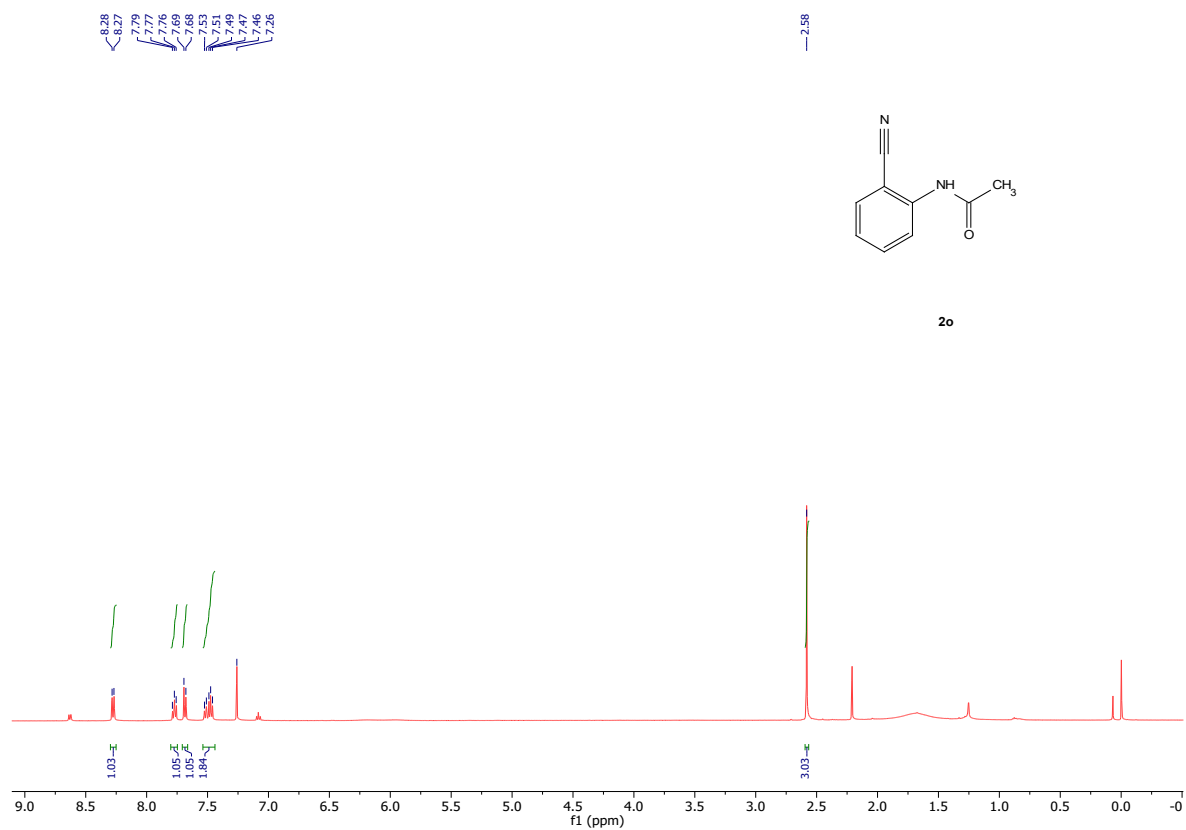
^{19}F NMR (471 MHz, CDCl_3) of 2n



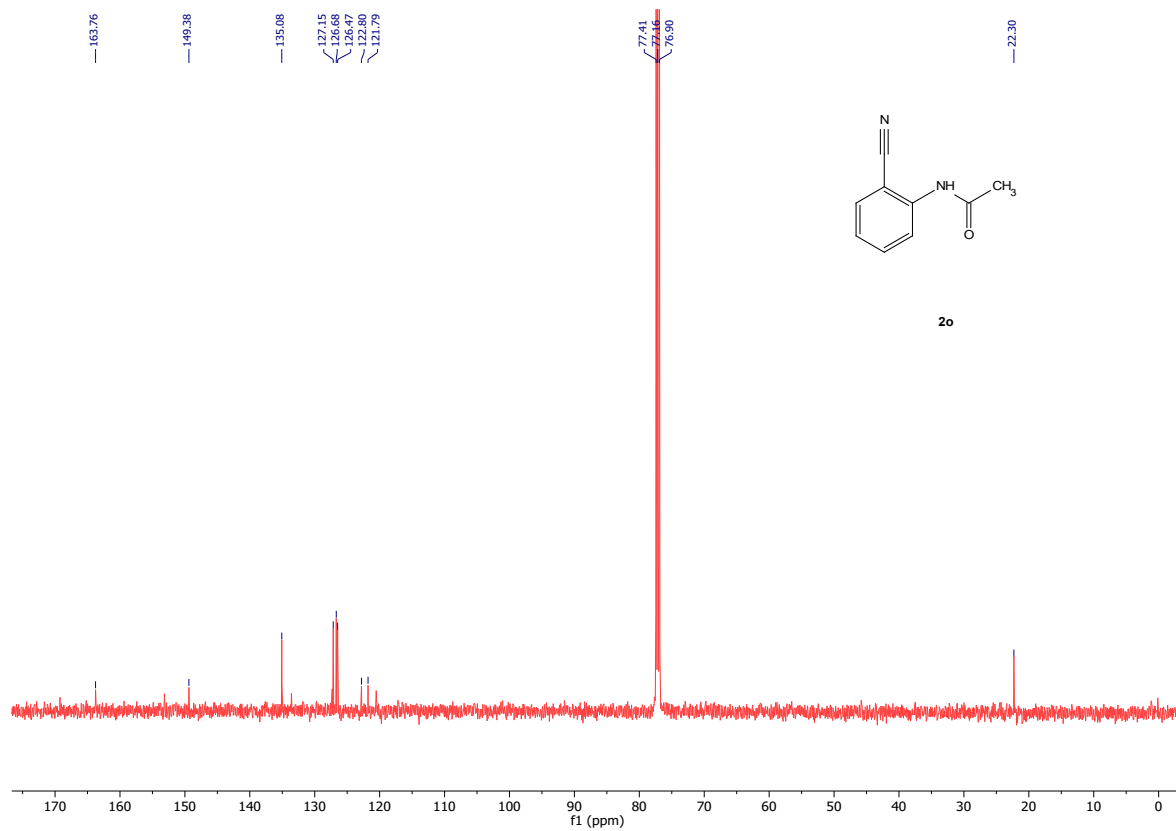
2n



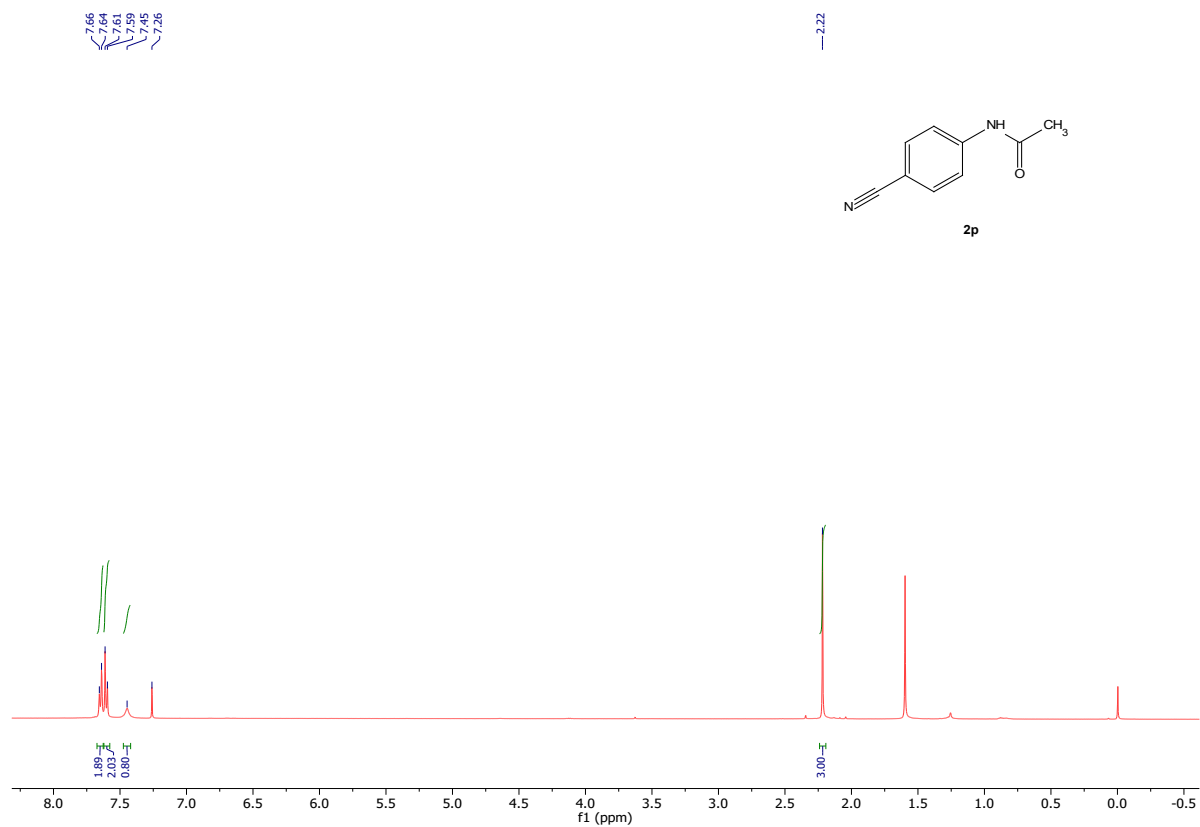
¹H NMR (500 MHz, CDCl₃) of 2o



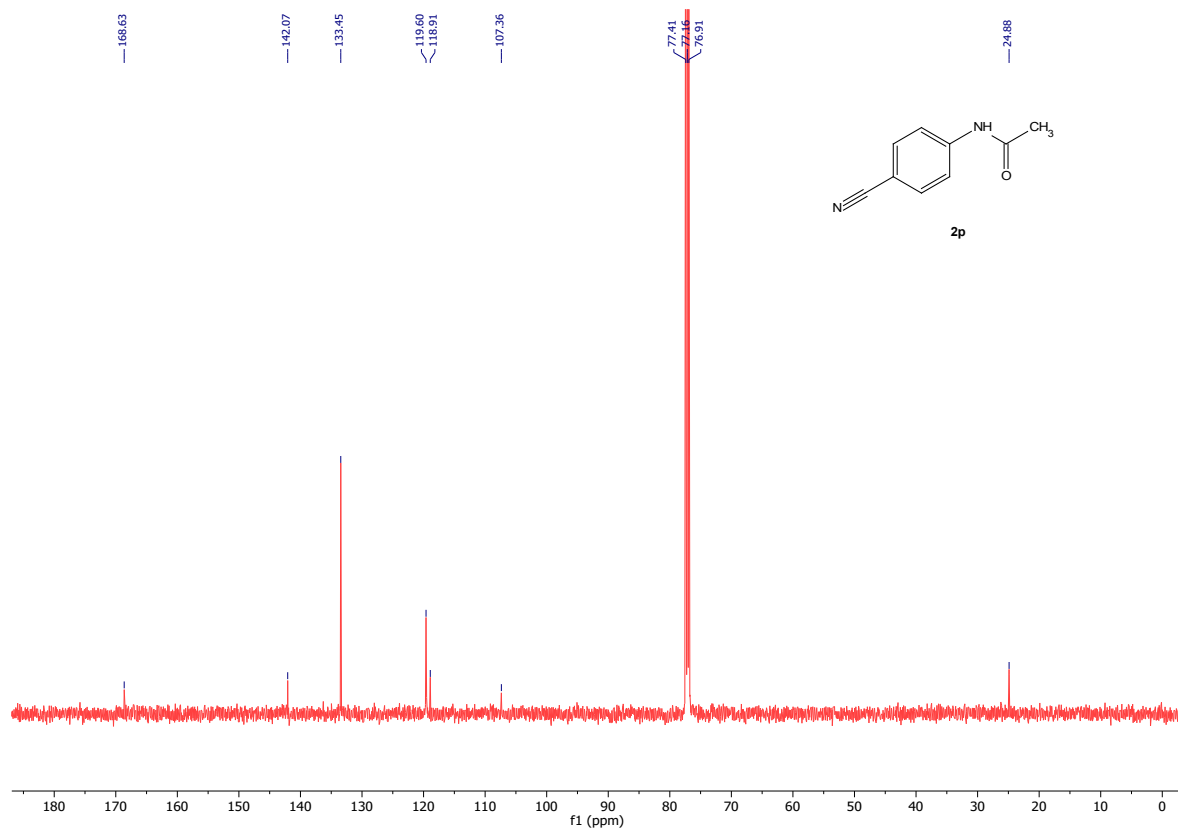
¹³C{¹H} NMR (126 MHz, CDCl₃) 2o



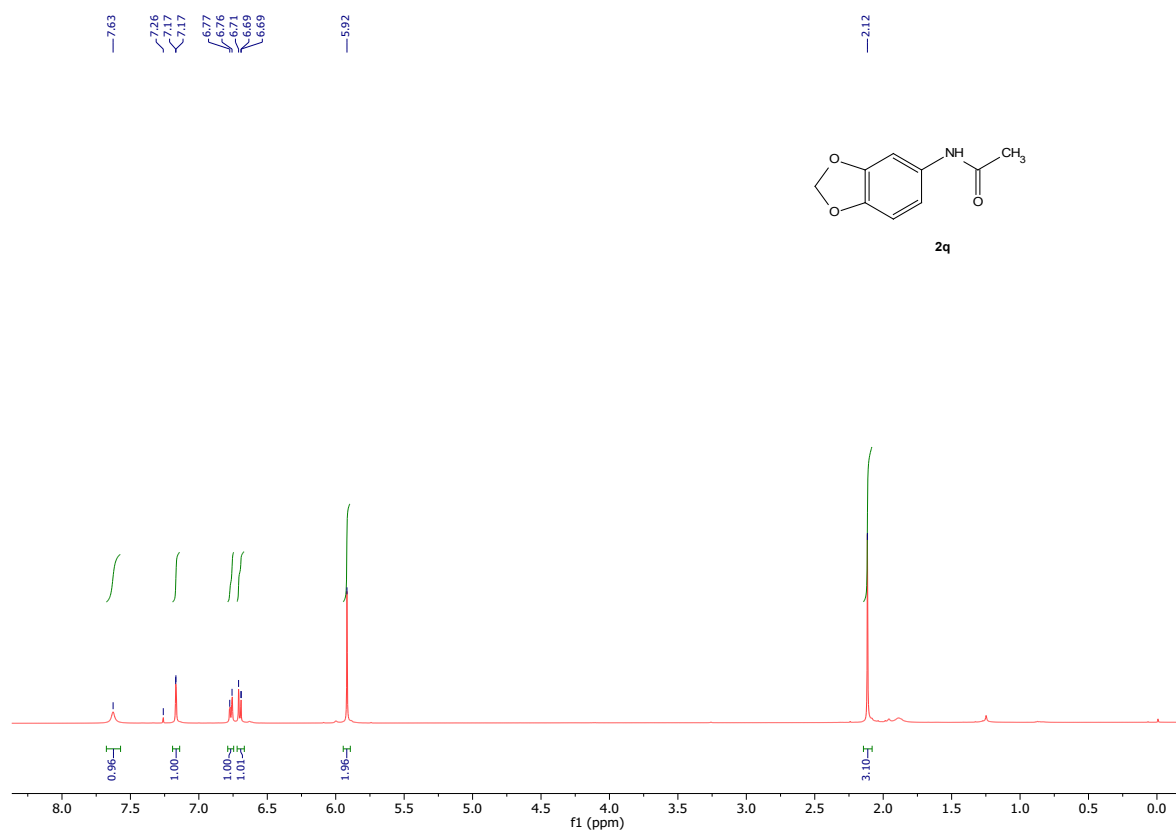
^1H NMR (500 MHz, CDCl_3) of 2p



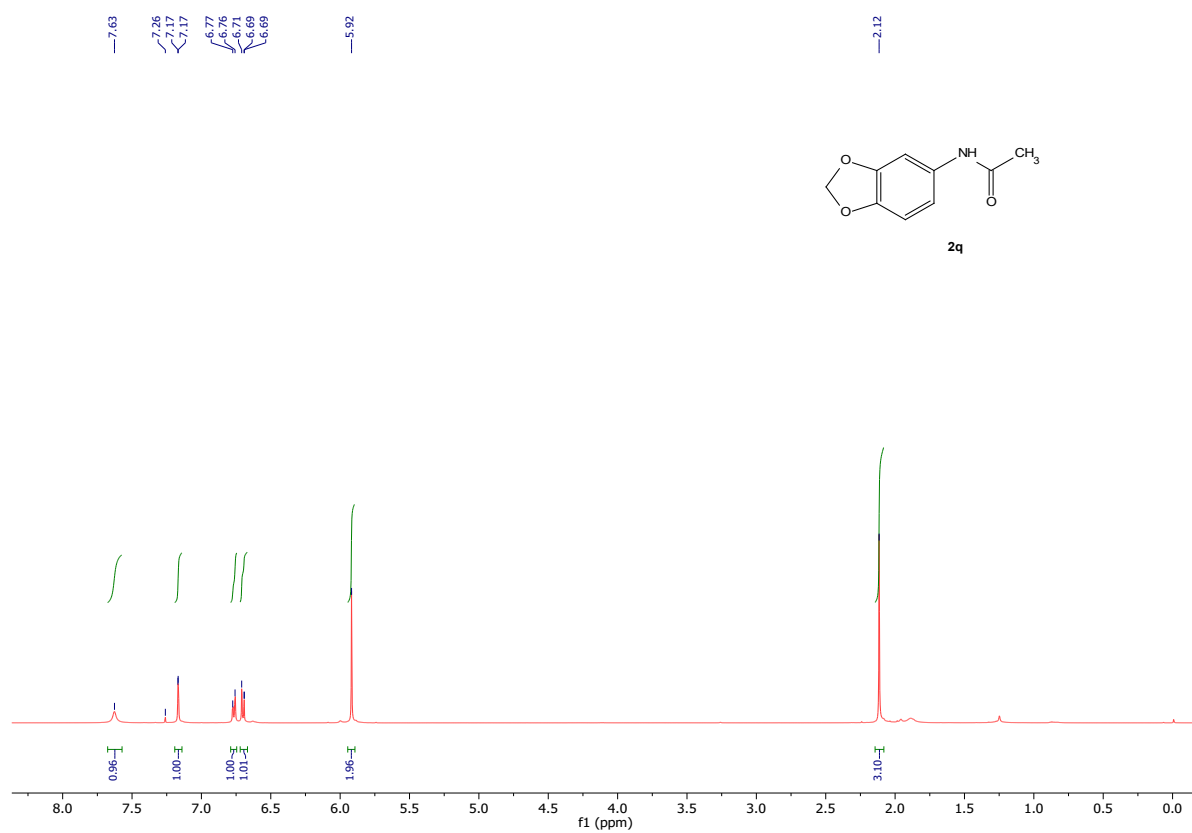
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2p



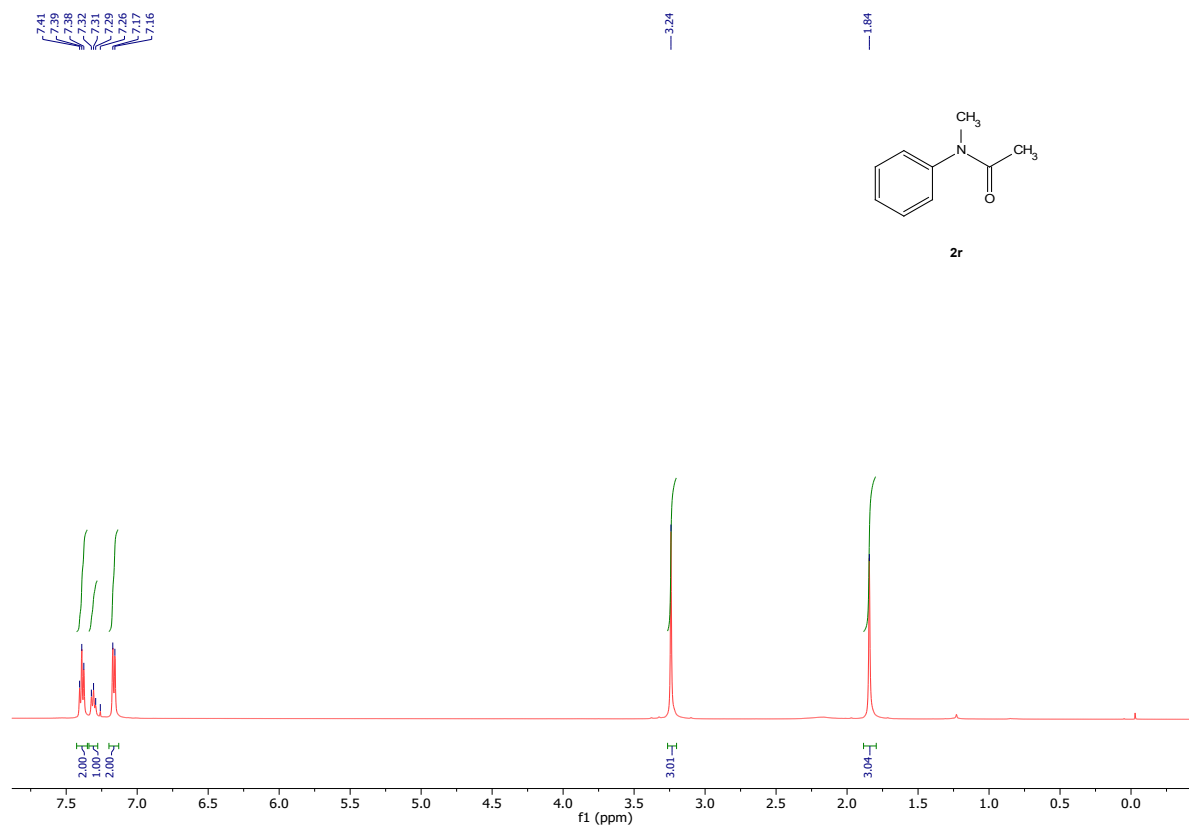
^1H NMR (500 MHz, CDCl_3) of 2q



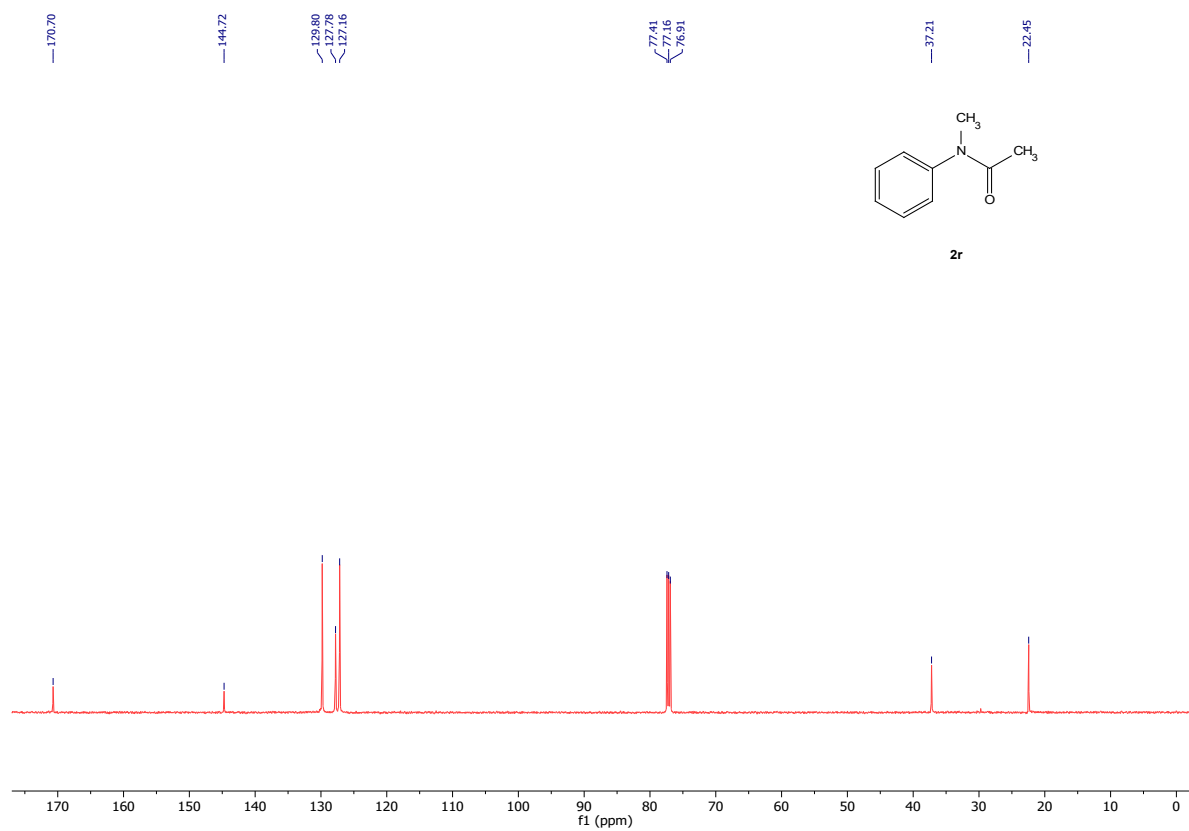
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2q



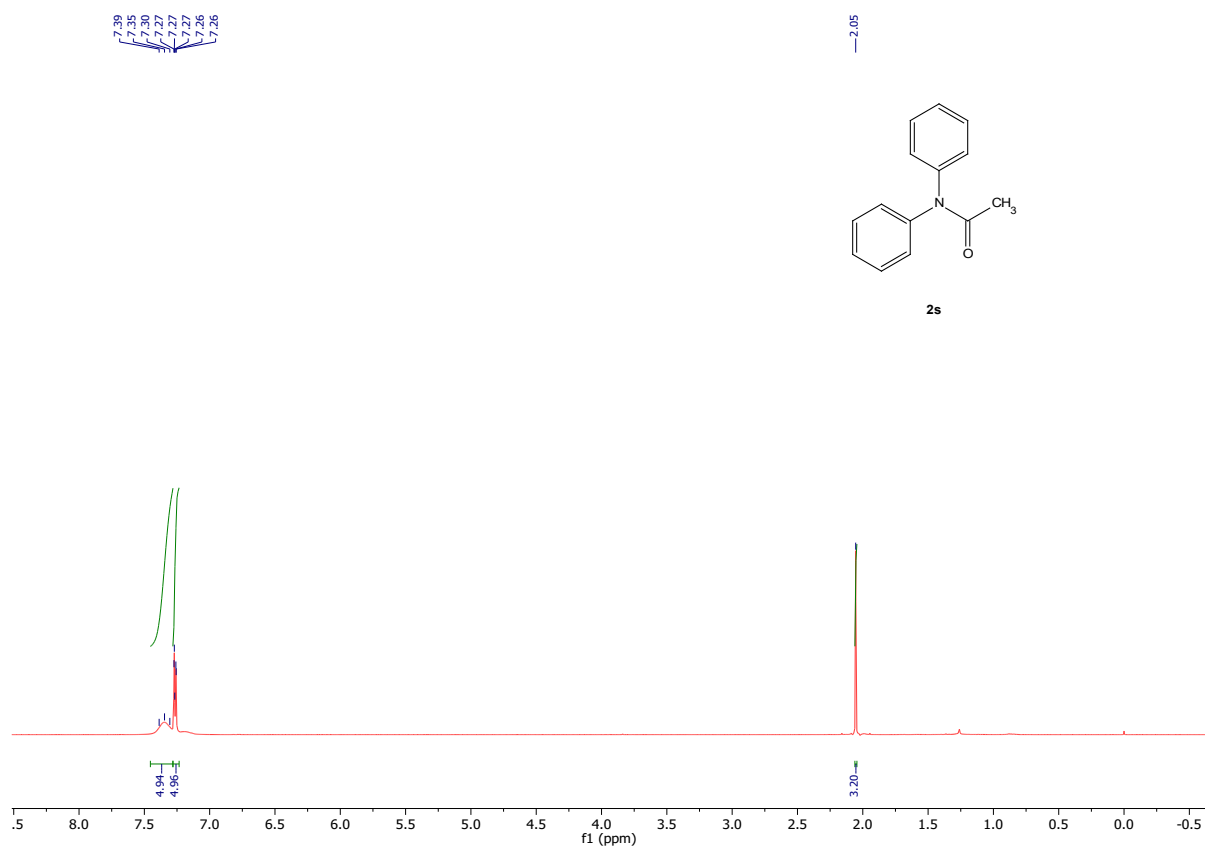
^1H NMR (500 MHz, CDCl_3) of 2r



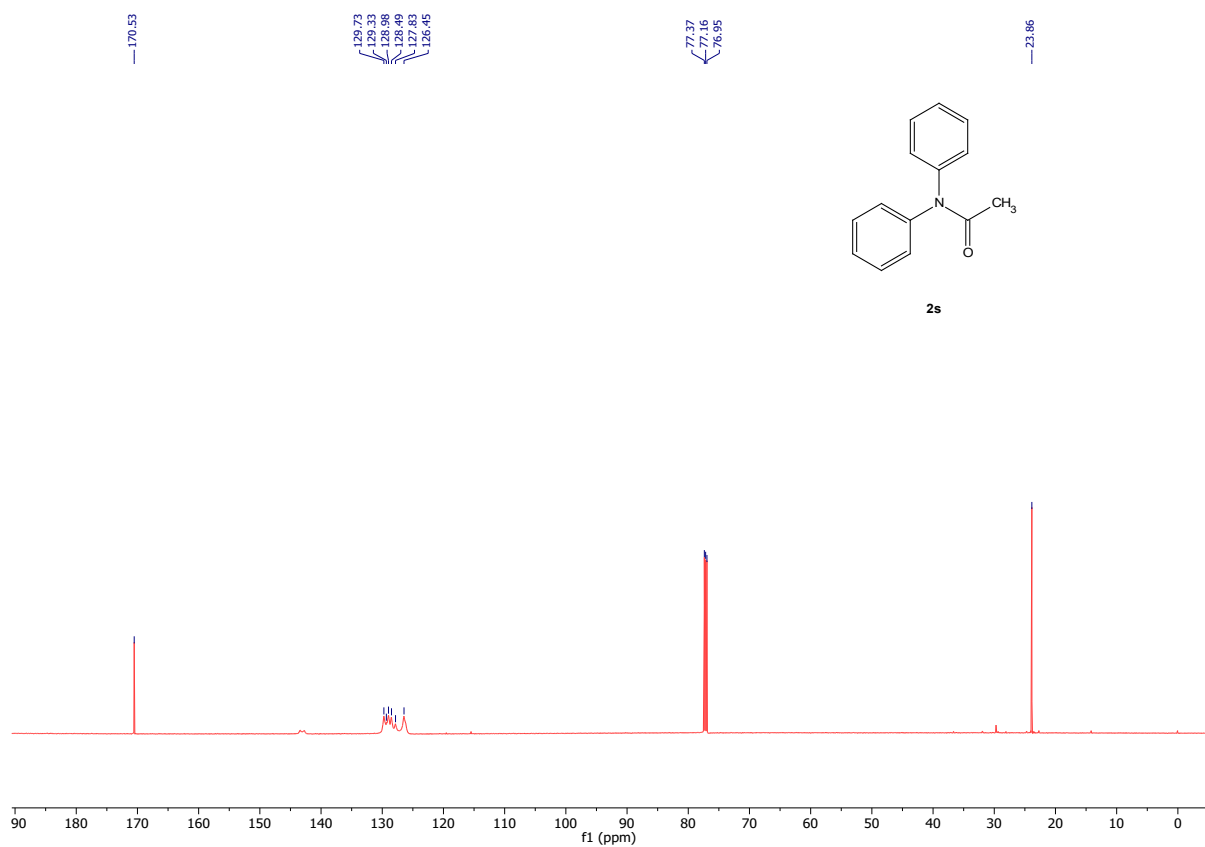
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2r



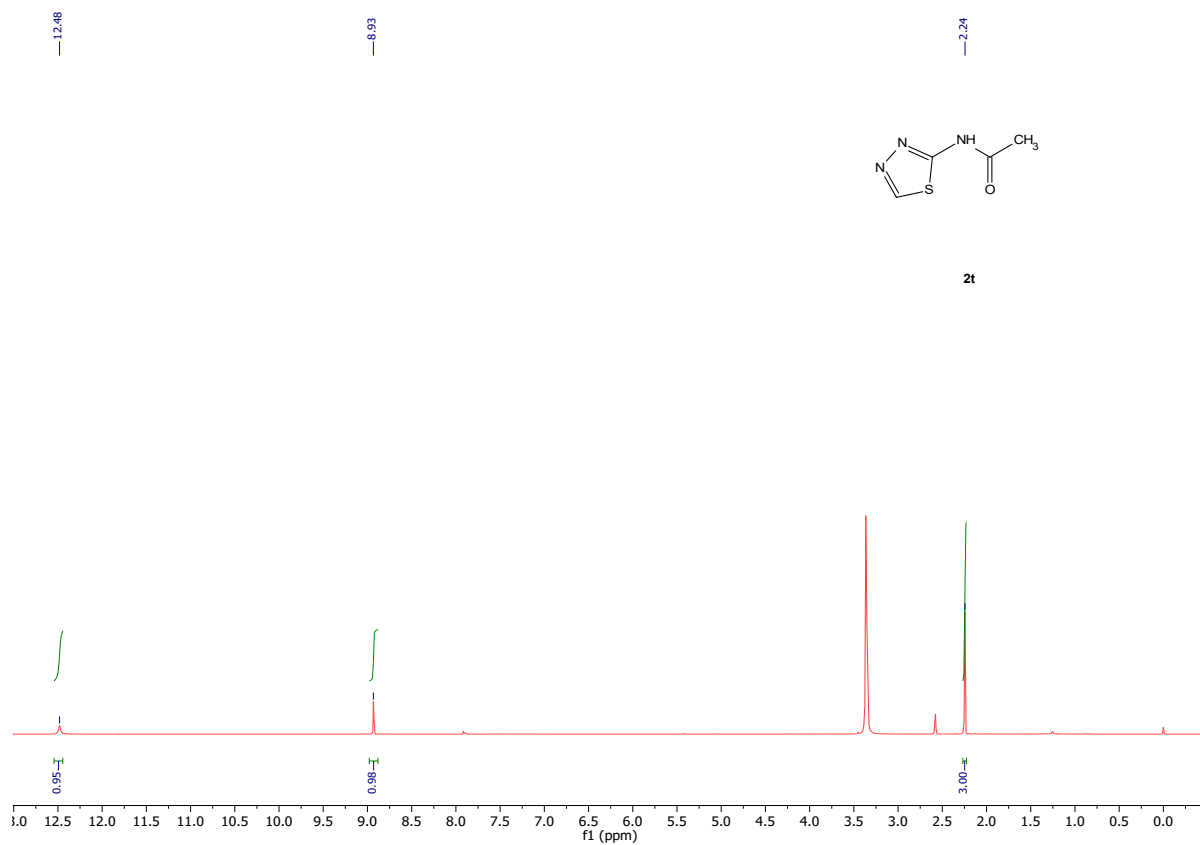
^1H NMR (600 MHz, CDCl_3) of 2s



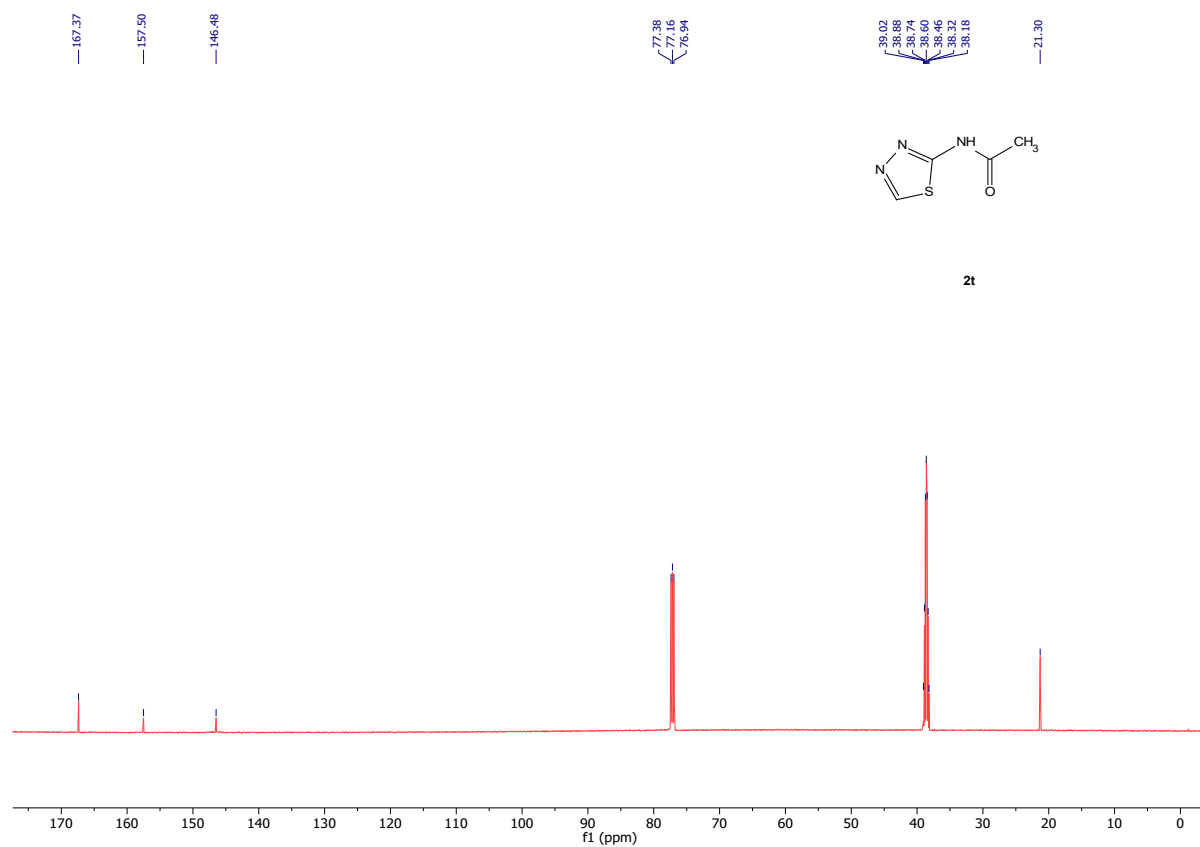
$^{13}\text{C}\{^1\text{H}\}$ NMR (151 MHz, CDCl_3) 2s



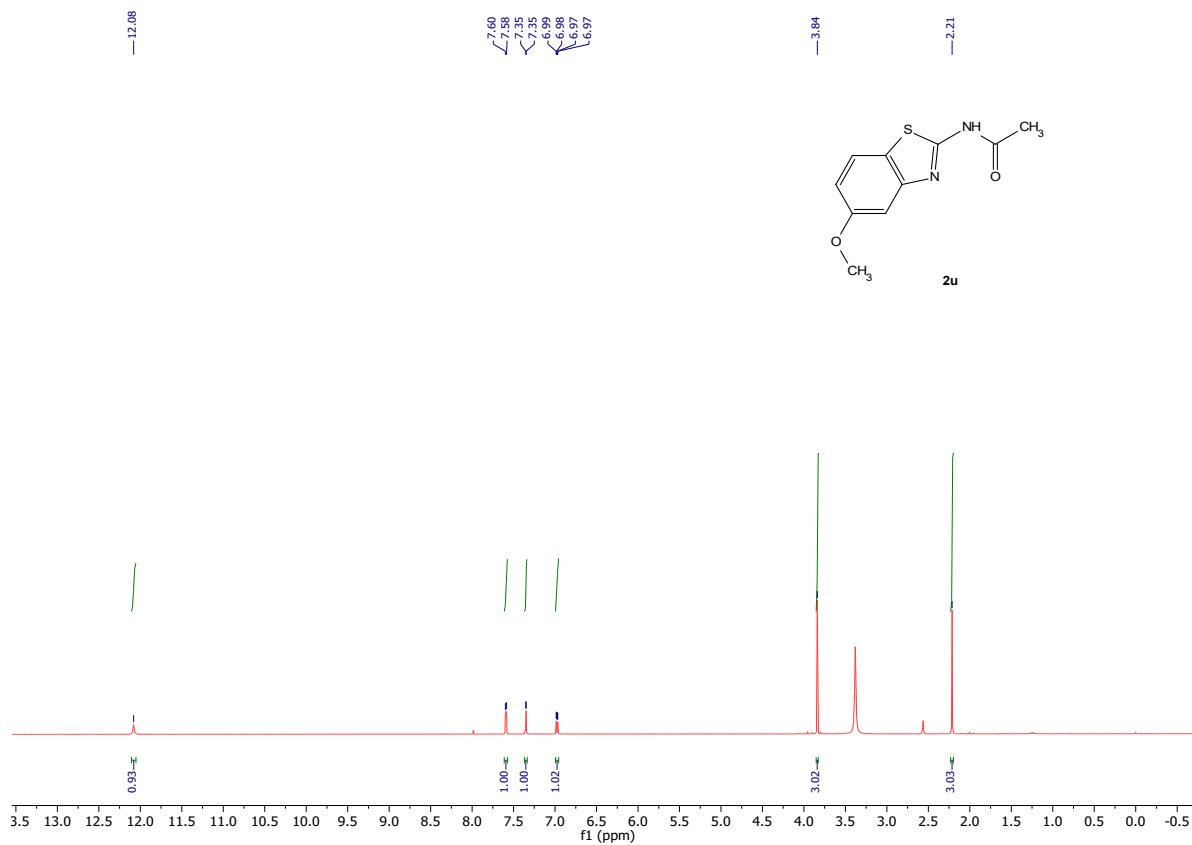
^1H NMR (600 MHz, $\text{CDCl}_3 + \text{DMSO}-d_6$) of 2t



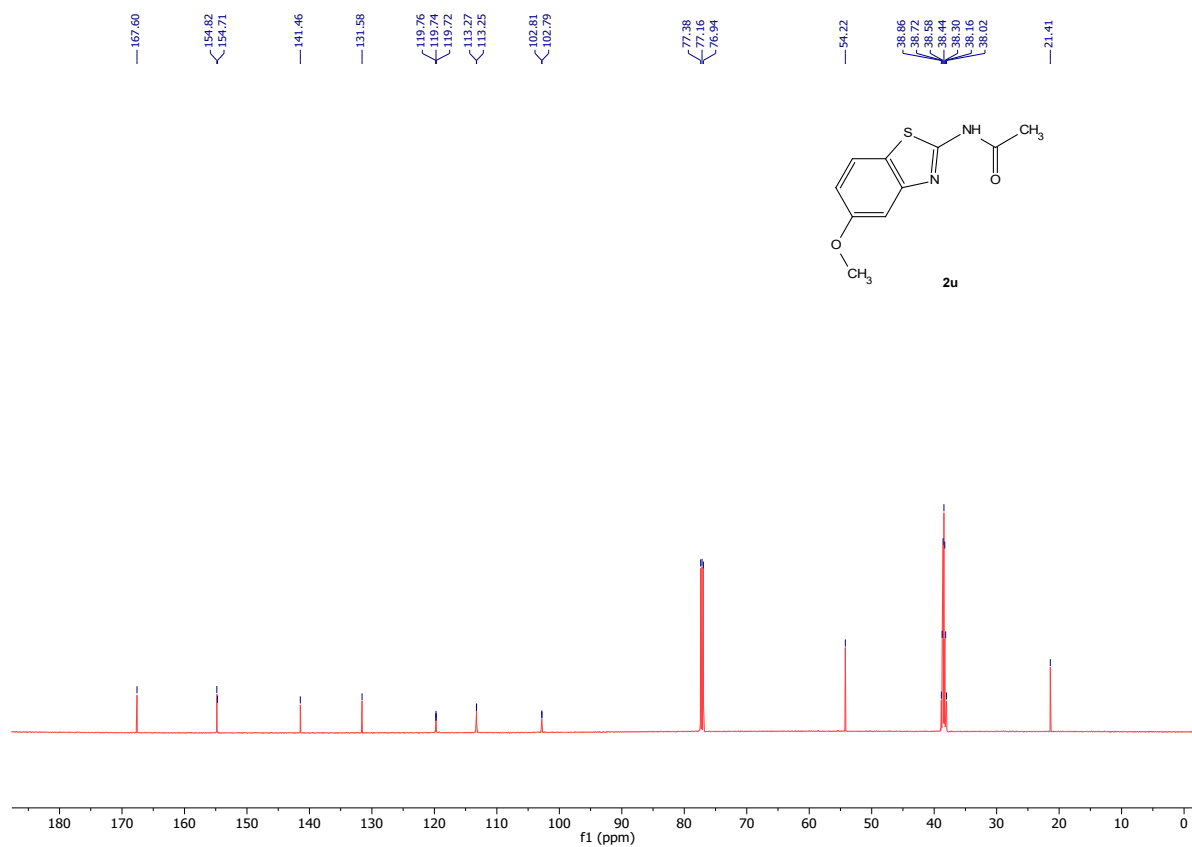
$^{13}\text{C}\{^1\text{H}\}$ NMR (151 MHz, $\text{CDCl}_3 + \text{DMSO}-d_6$) 2t



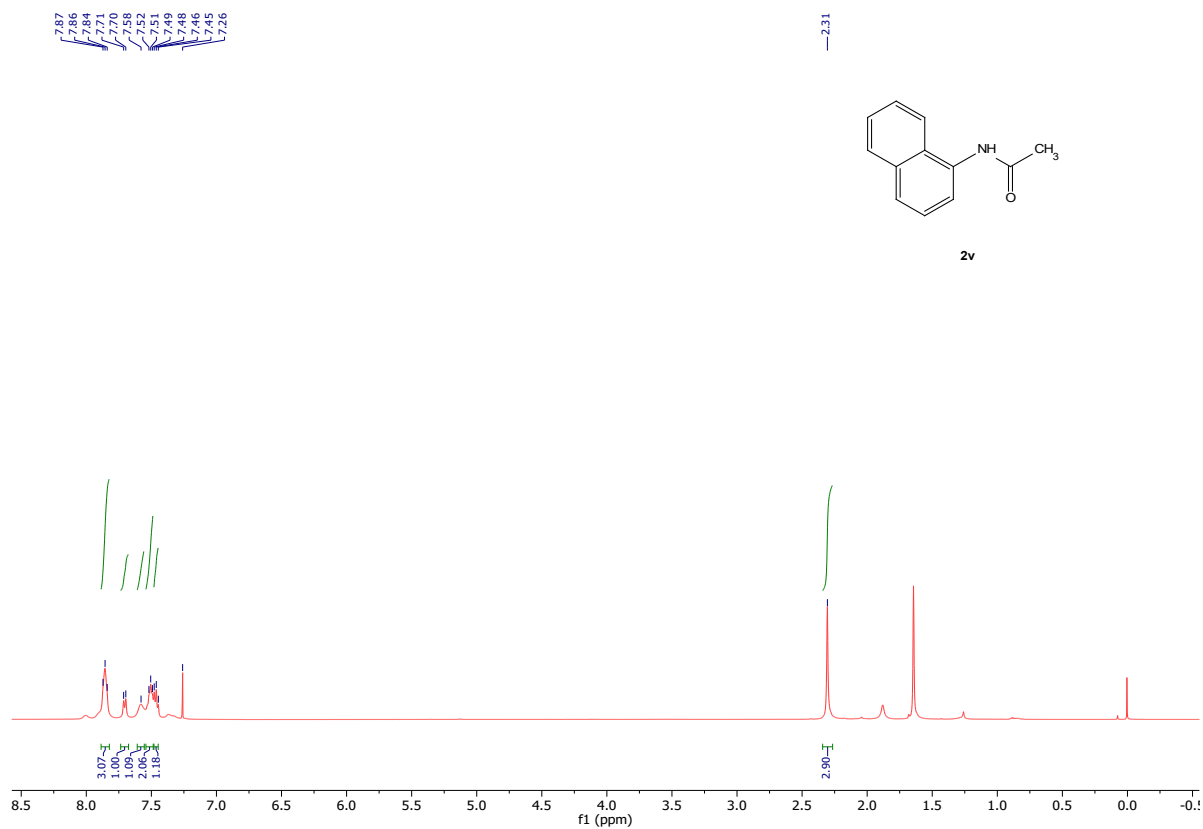
^1H NMR (600 MHz, $\text{CDCl}_3 + \text{DMSO}-d_6$) of **2u**



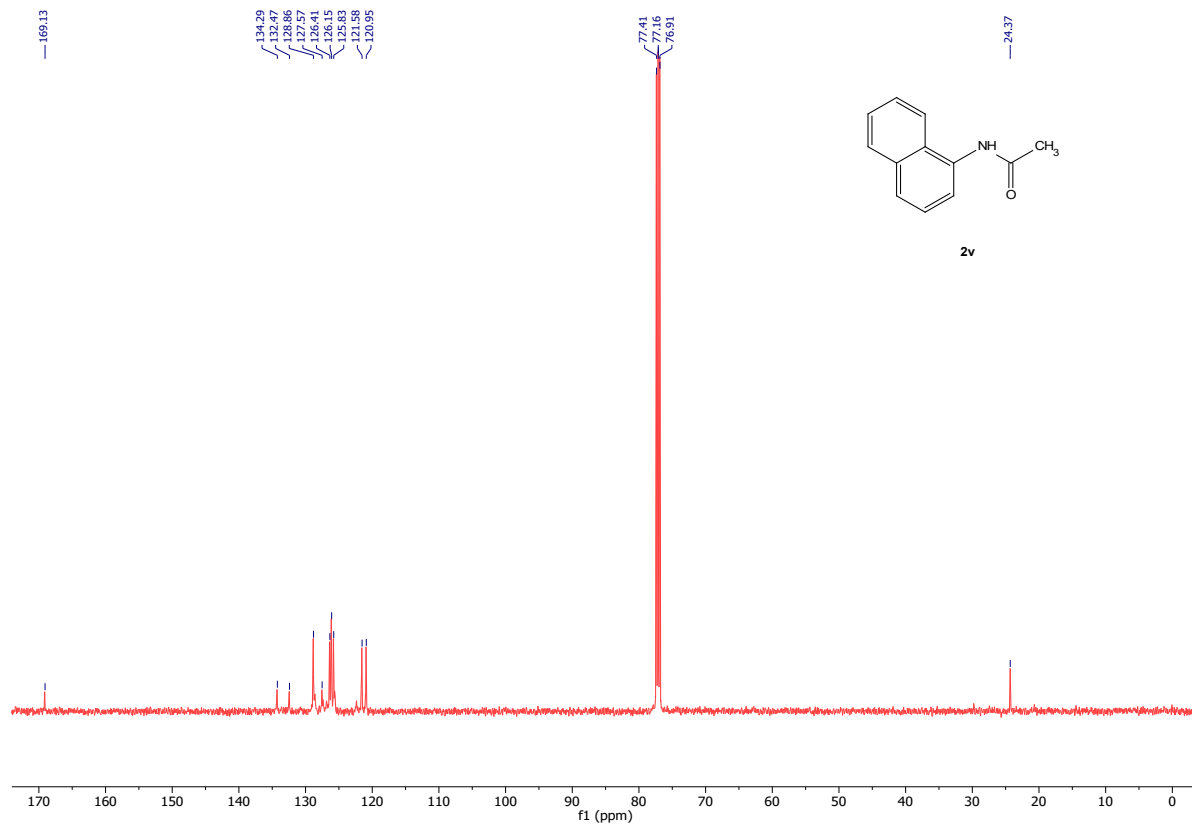
$^{13}\text{C}\{^1\text{H}\}$ NMR (151 MHz, $\text{CDCl}_3 + \text{DMSO}-d_6$) **2u**



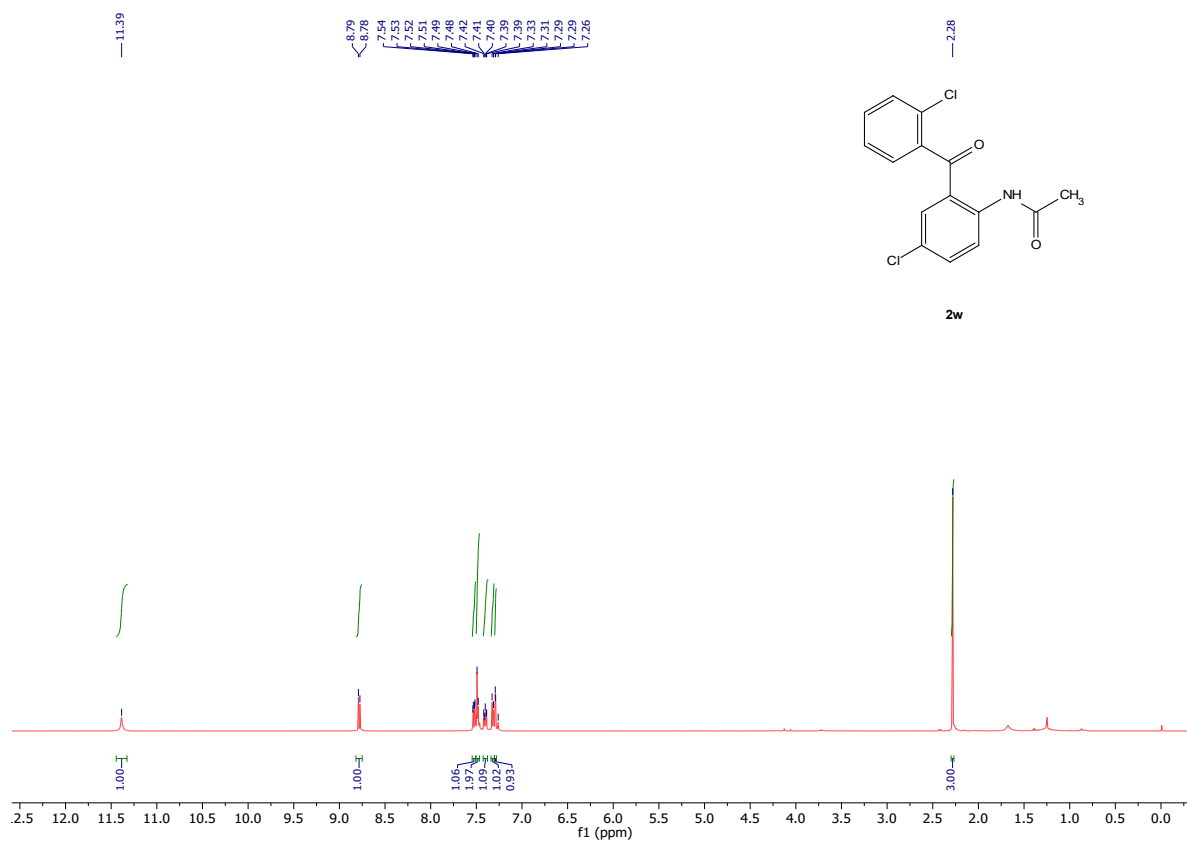
^1H NMR (500 MHz, CDCl_3) of 2v



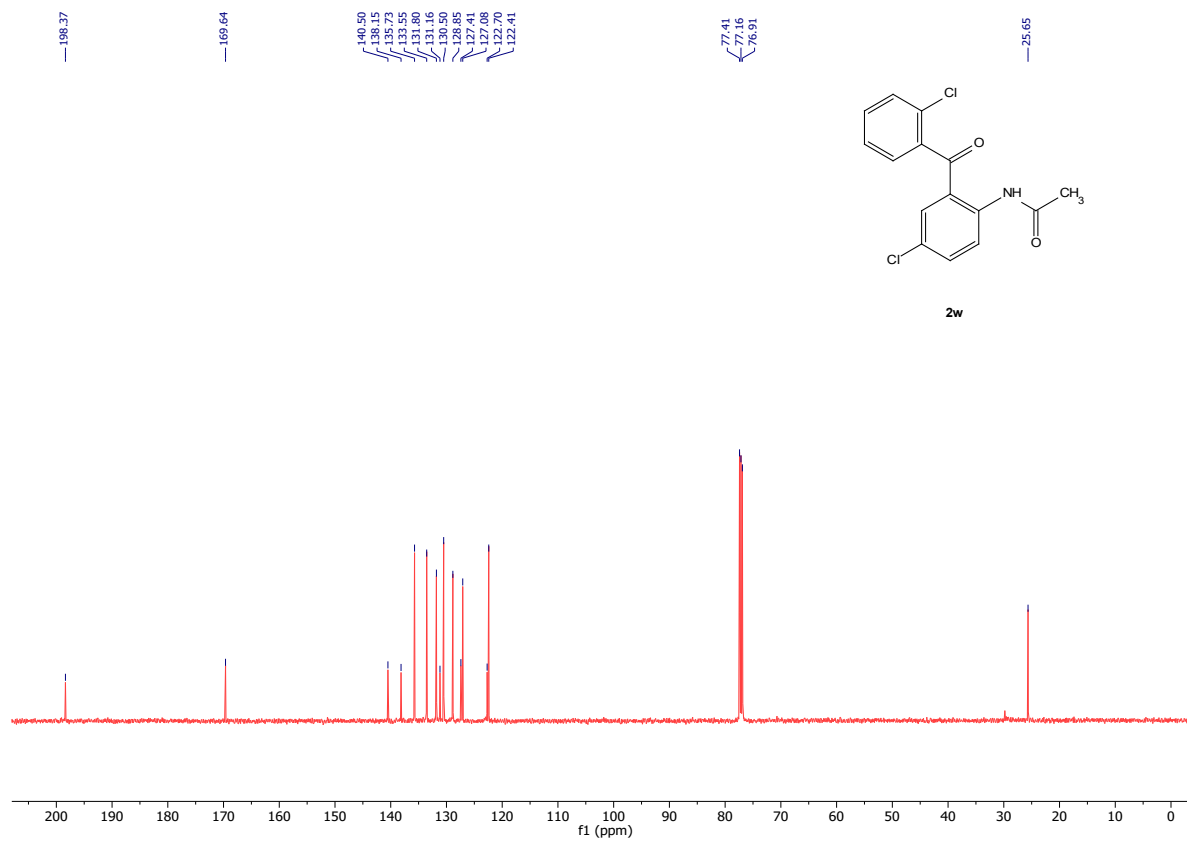
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2v



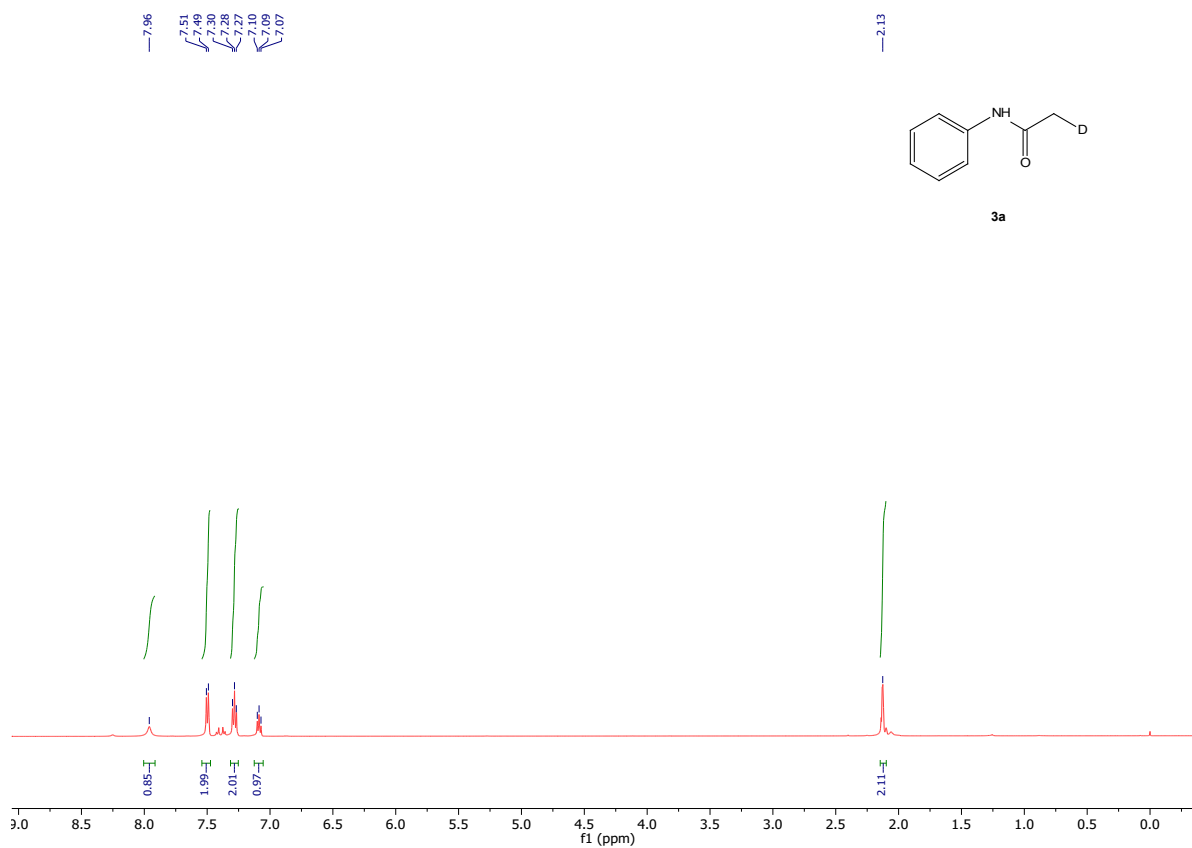
^1H NMR (500 MHz, CDCl_3) of 2w



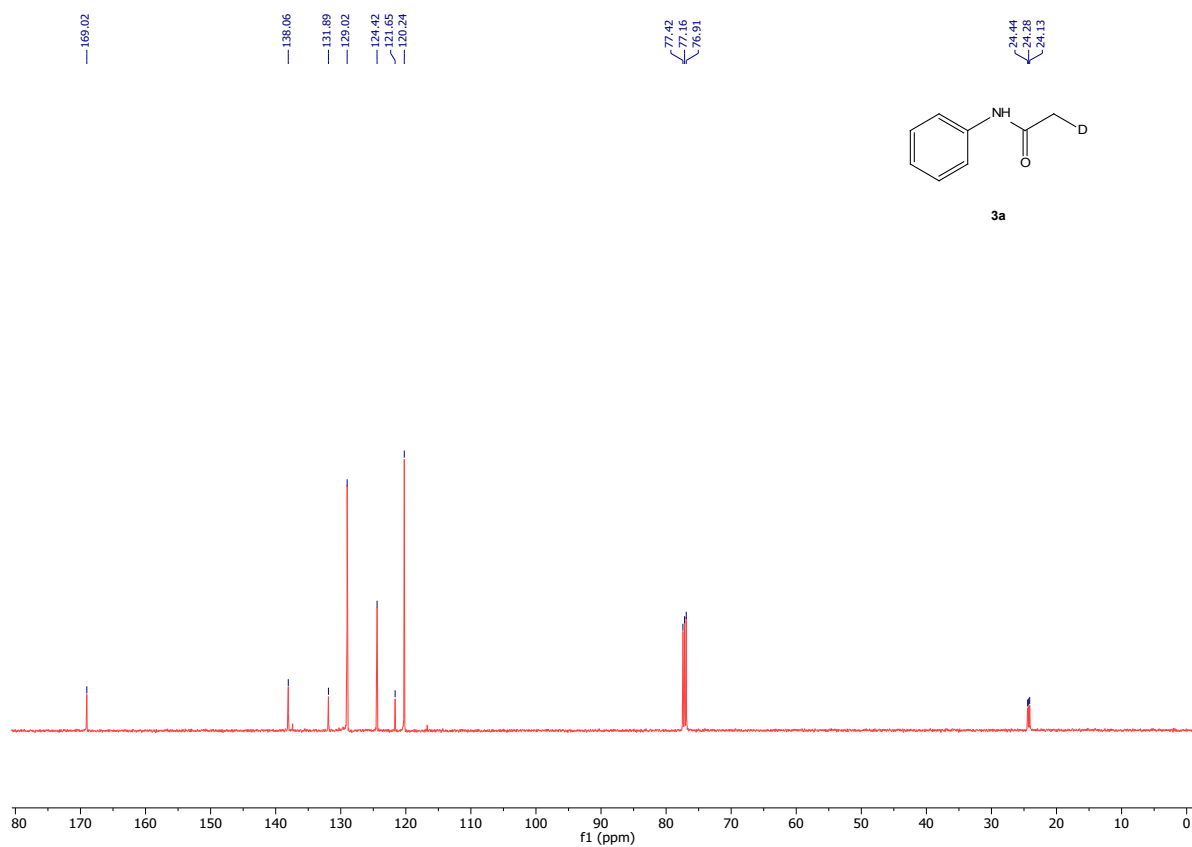
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 2w



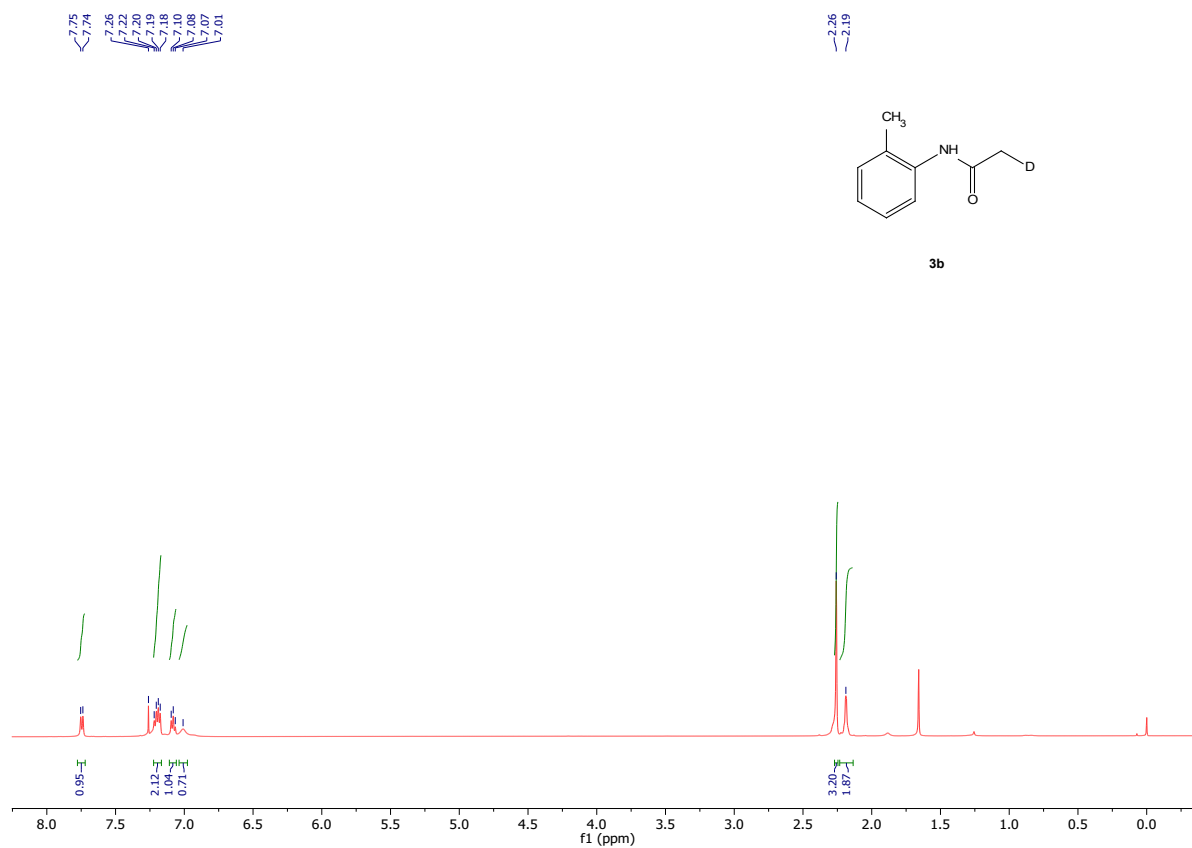
^1H NMR (500 MHz, CDCl_3) of 3a



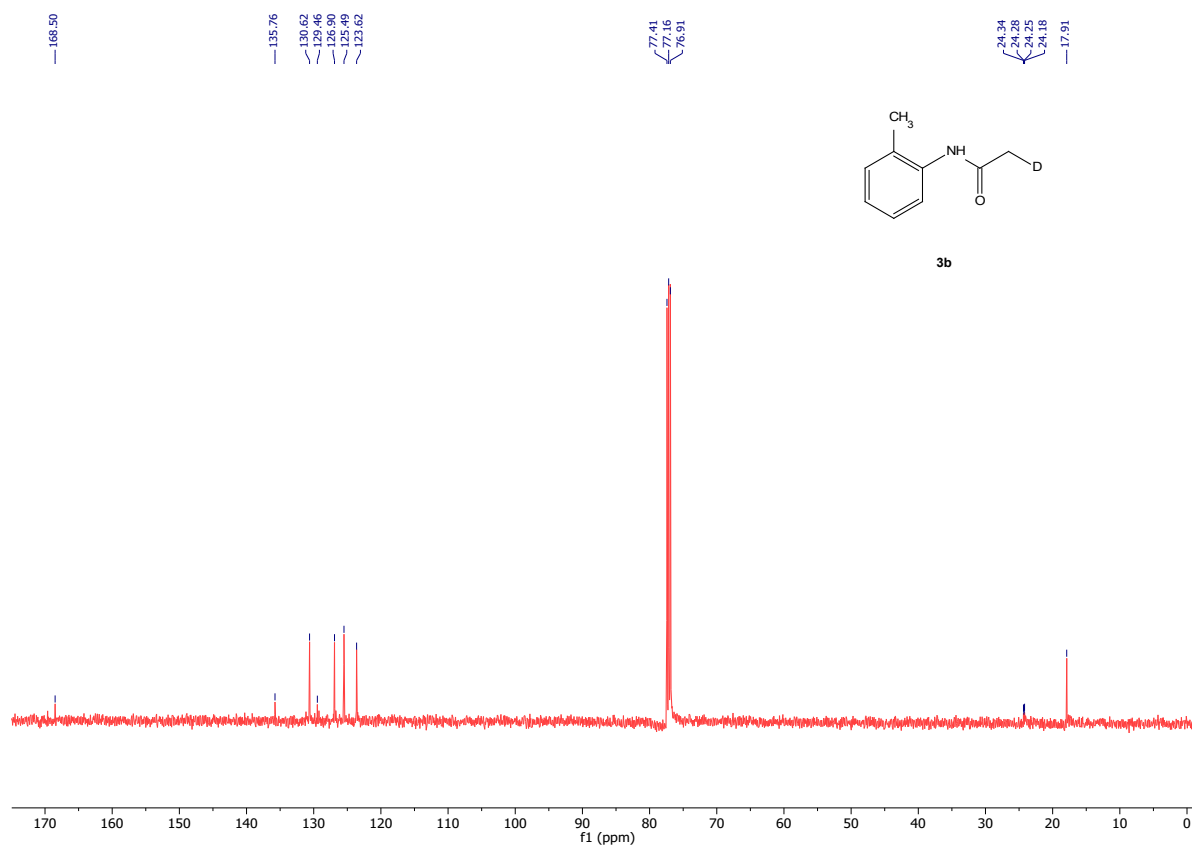
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3a



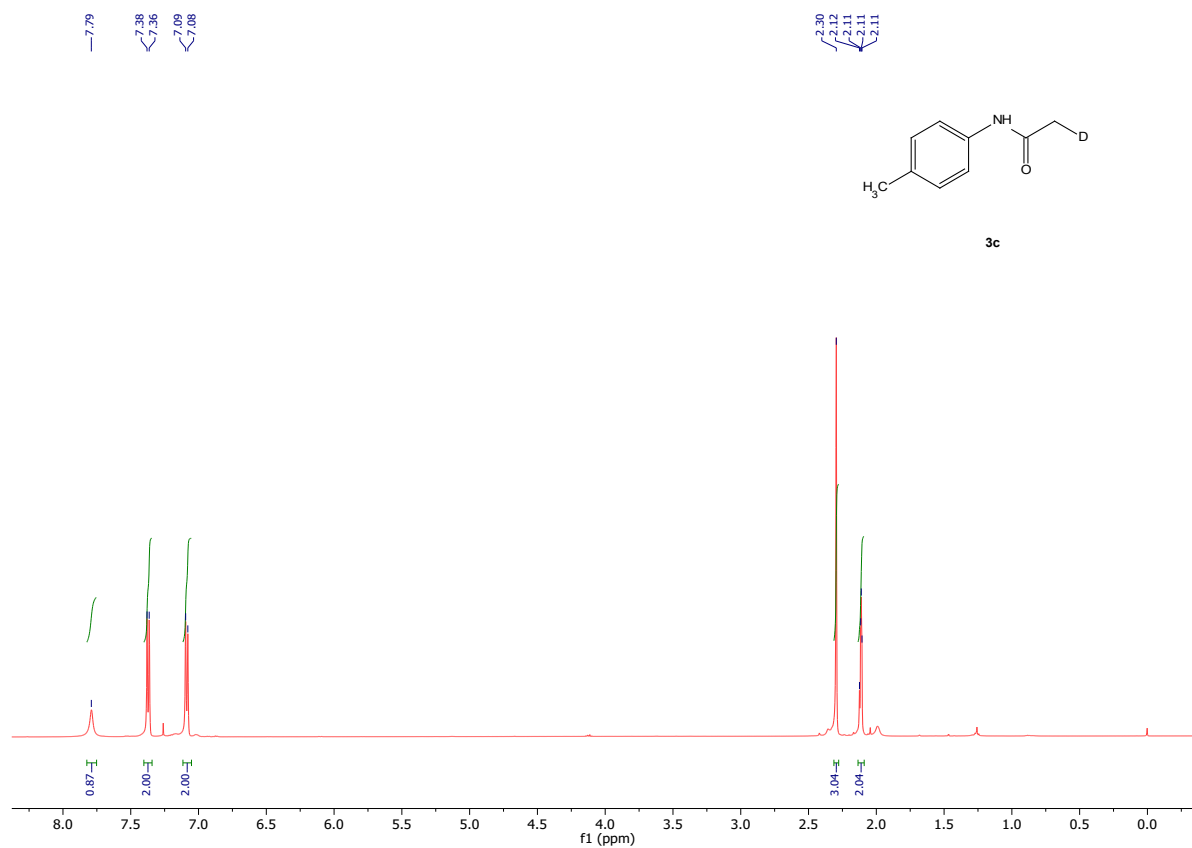
^1H NMR (500 MHz, CDCl_3) of 3b



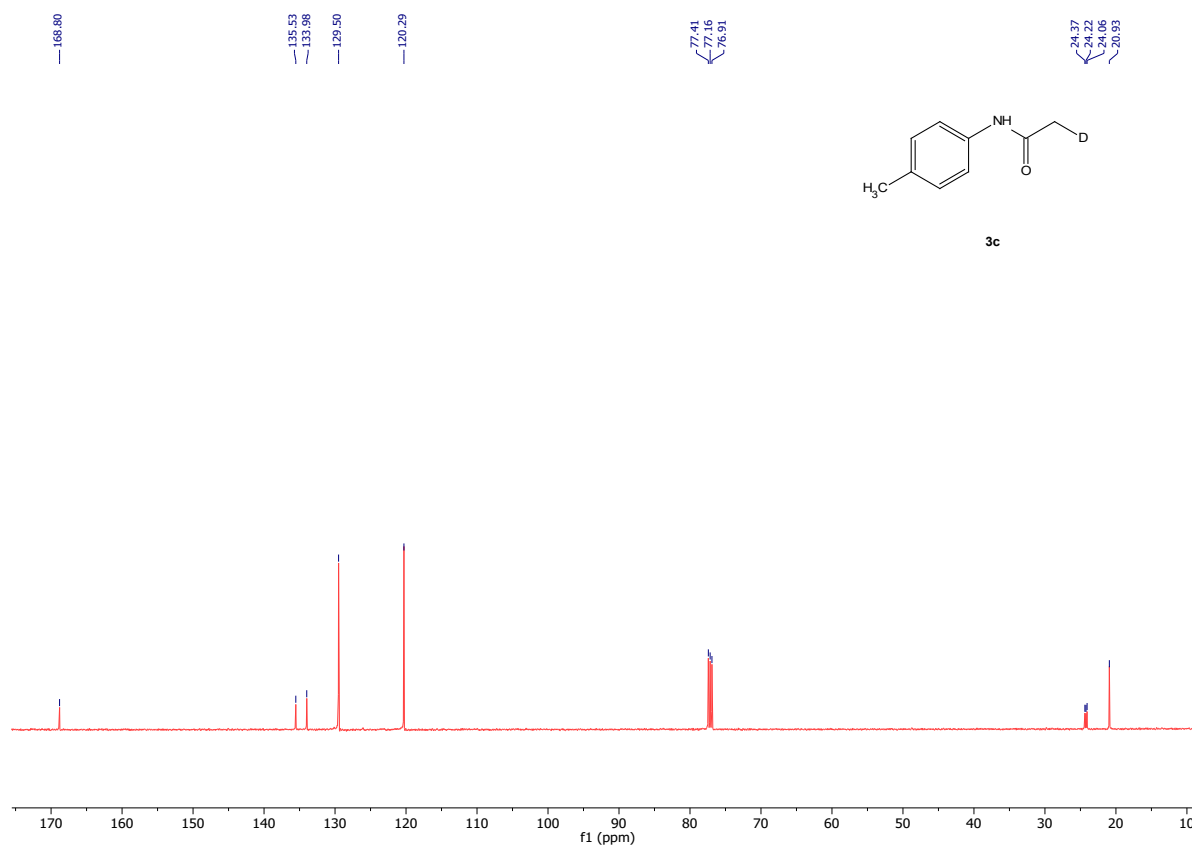
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3b



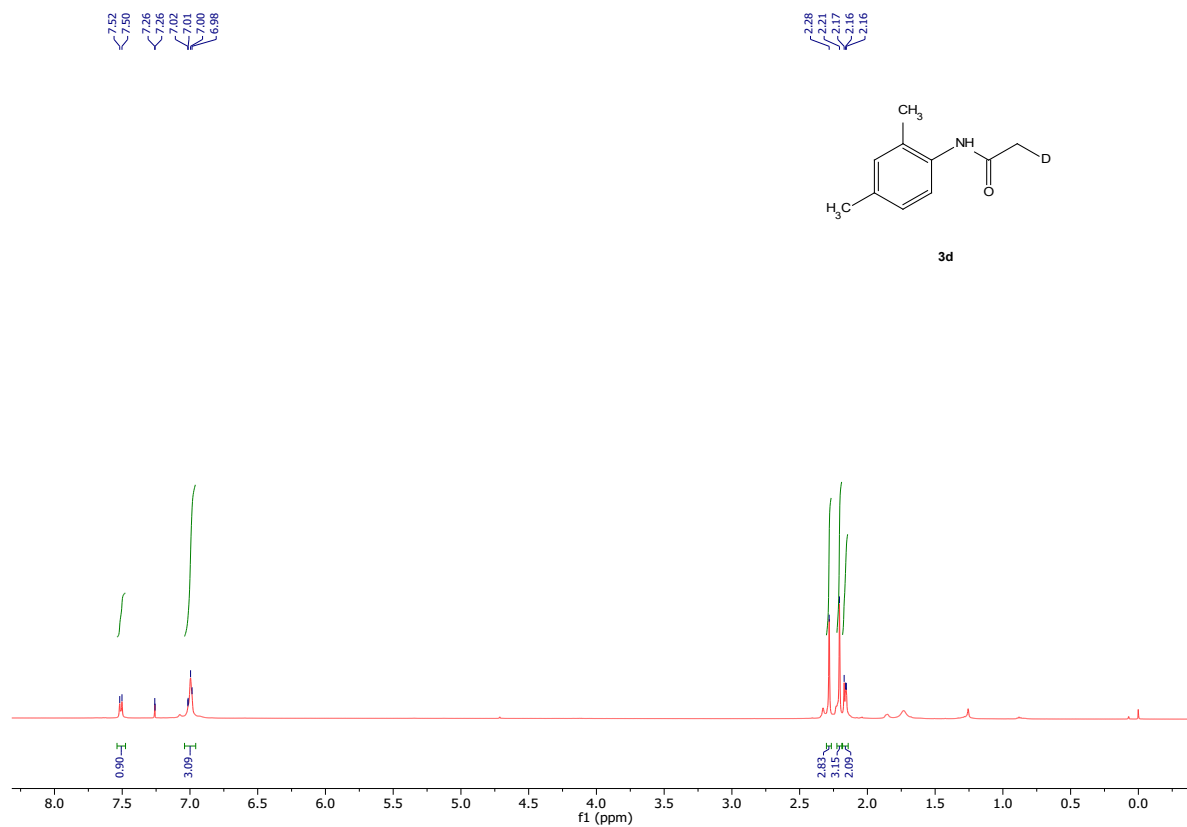
¹H NMR (500 MHz, CDCl₃) of 3c



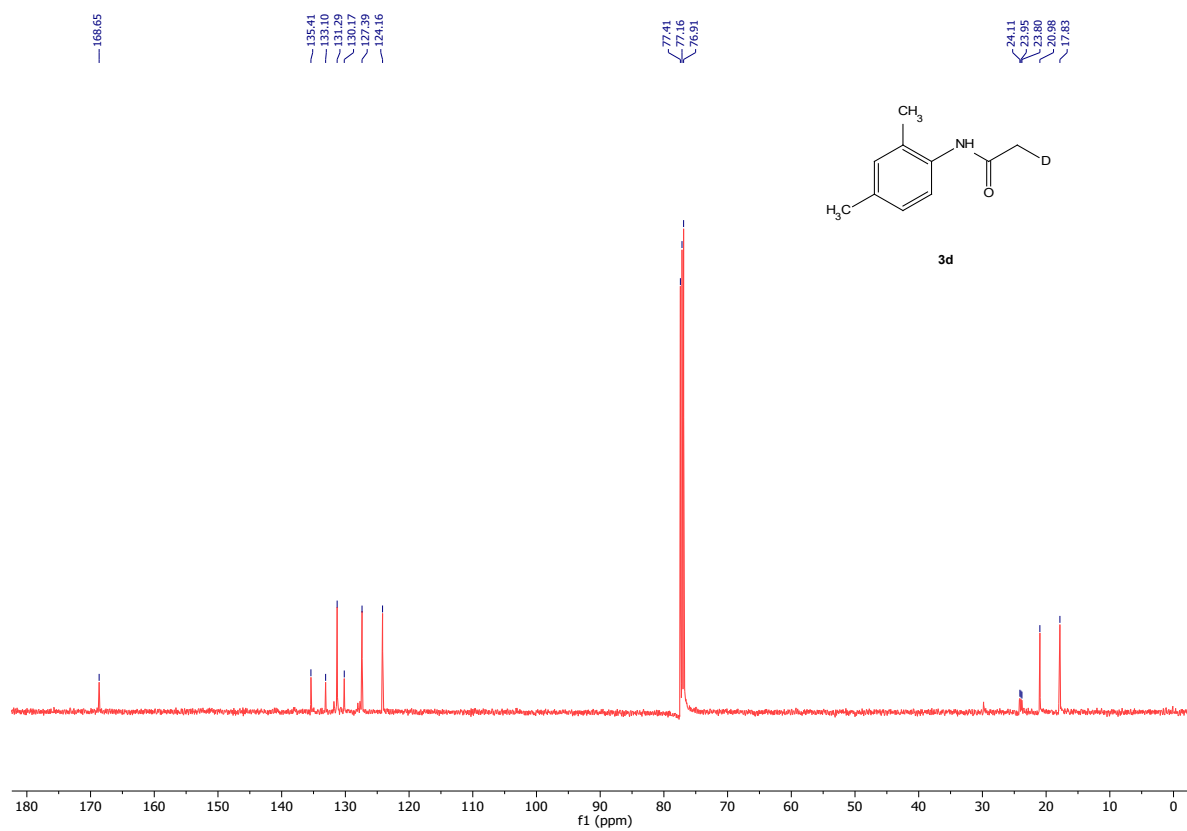
¹³C{¹H} NMR (126 MHz, CDCl₃) 3c



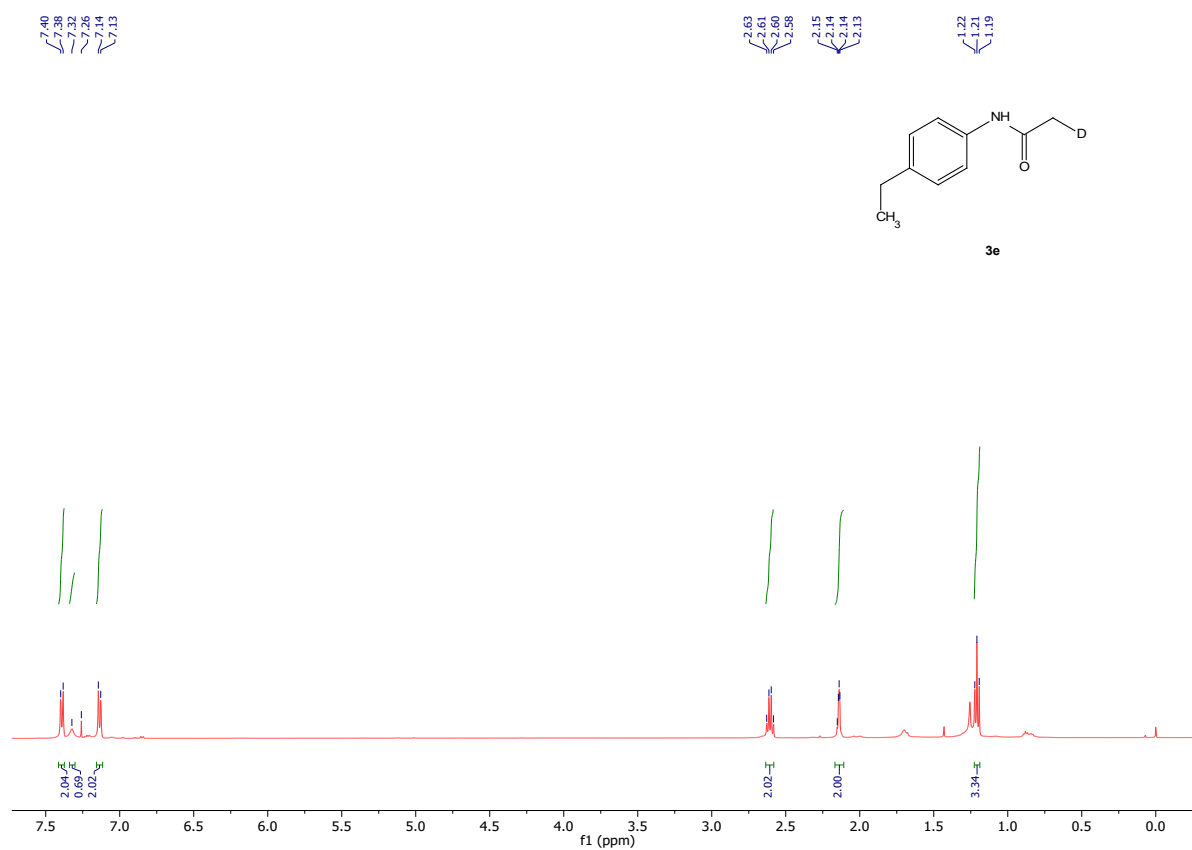
¹H NMR (500 MHz, CDCl₃) of 3d



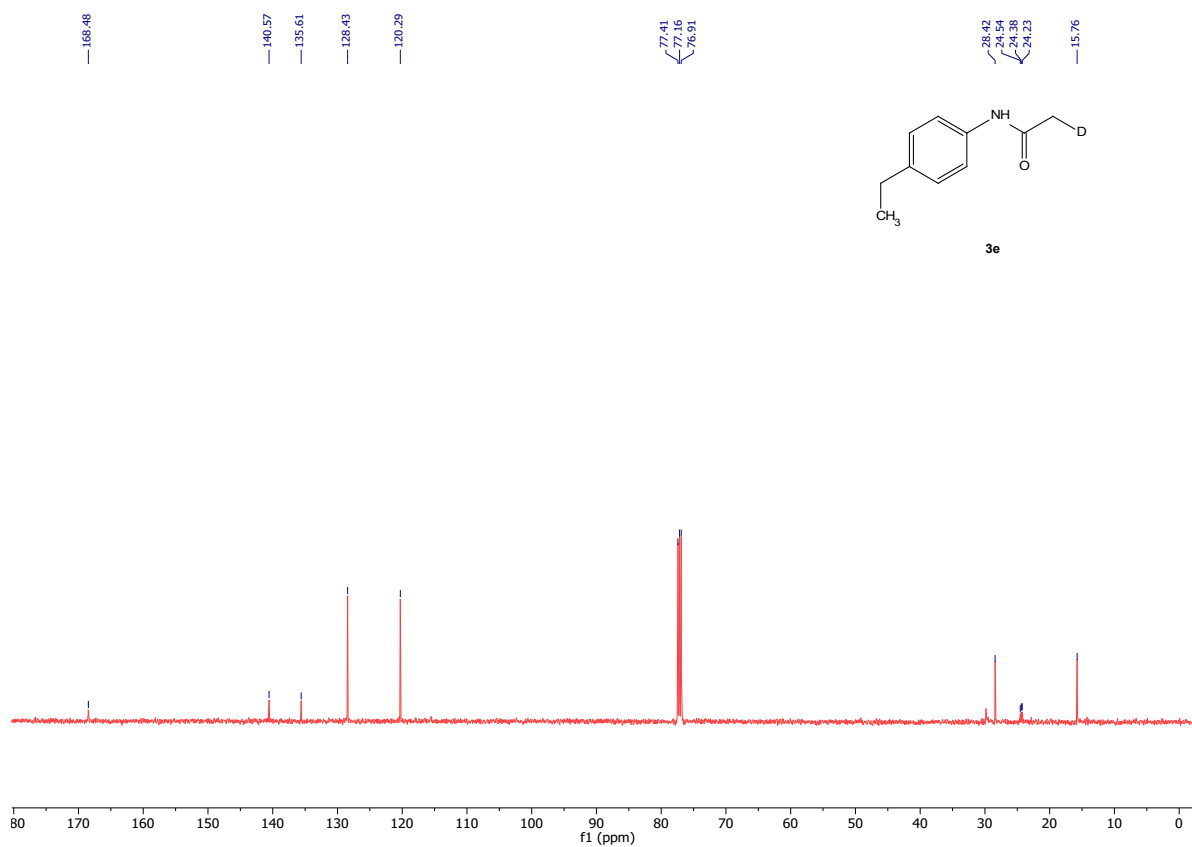
¹³C{¹H} NMR (126 MHz, CDCl₃) 3d



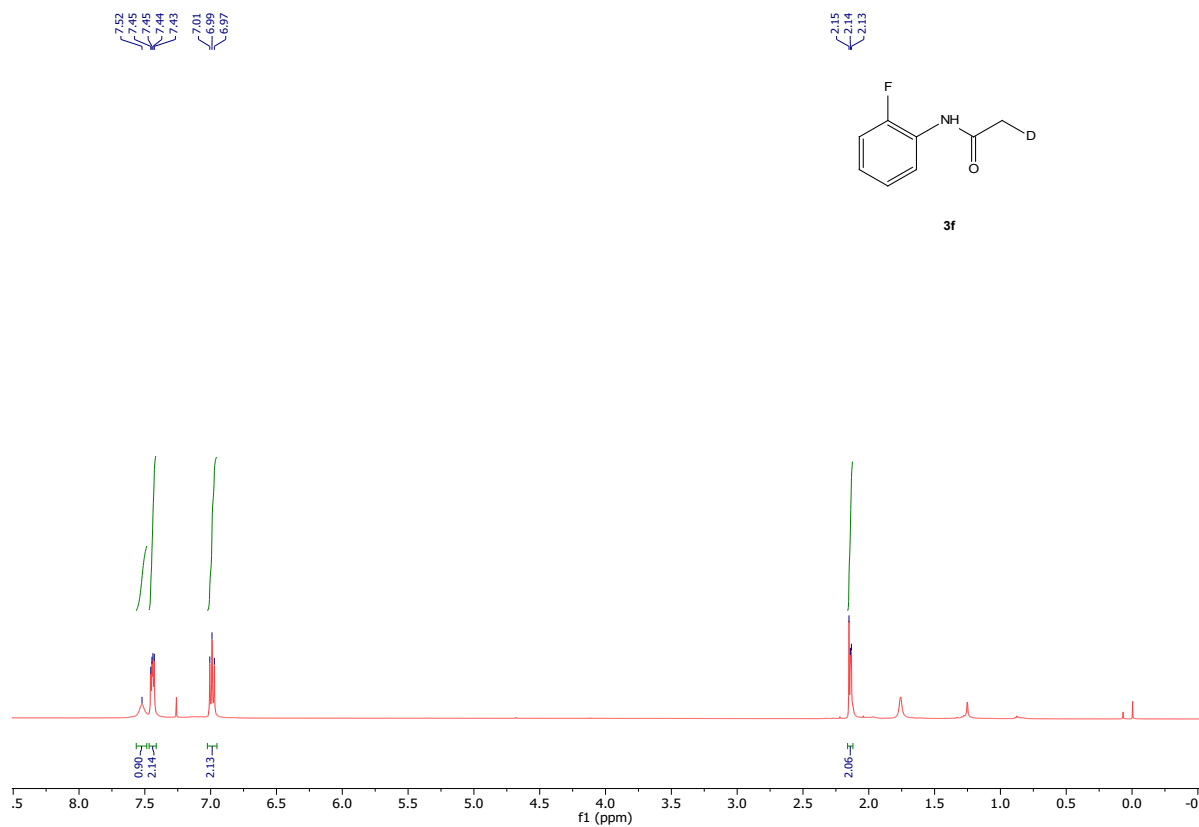
¹H NMR (500 MHz, CDCl₃) of 3e



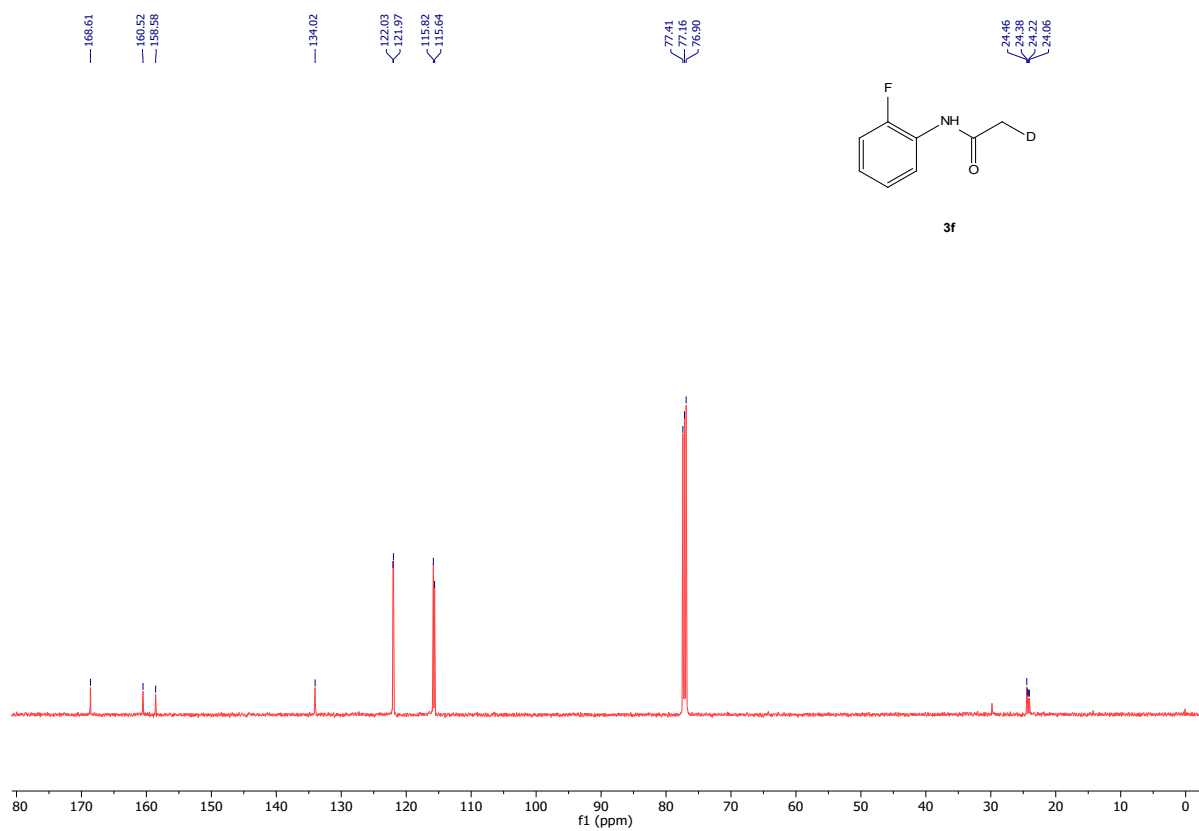
¹³C{¹H} NMR (126 MHz, CDCl₃) 3e



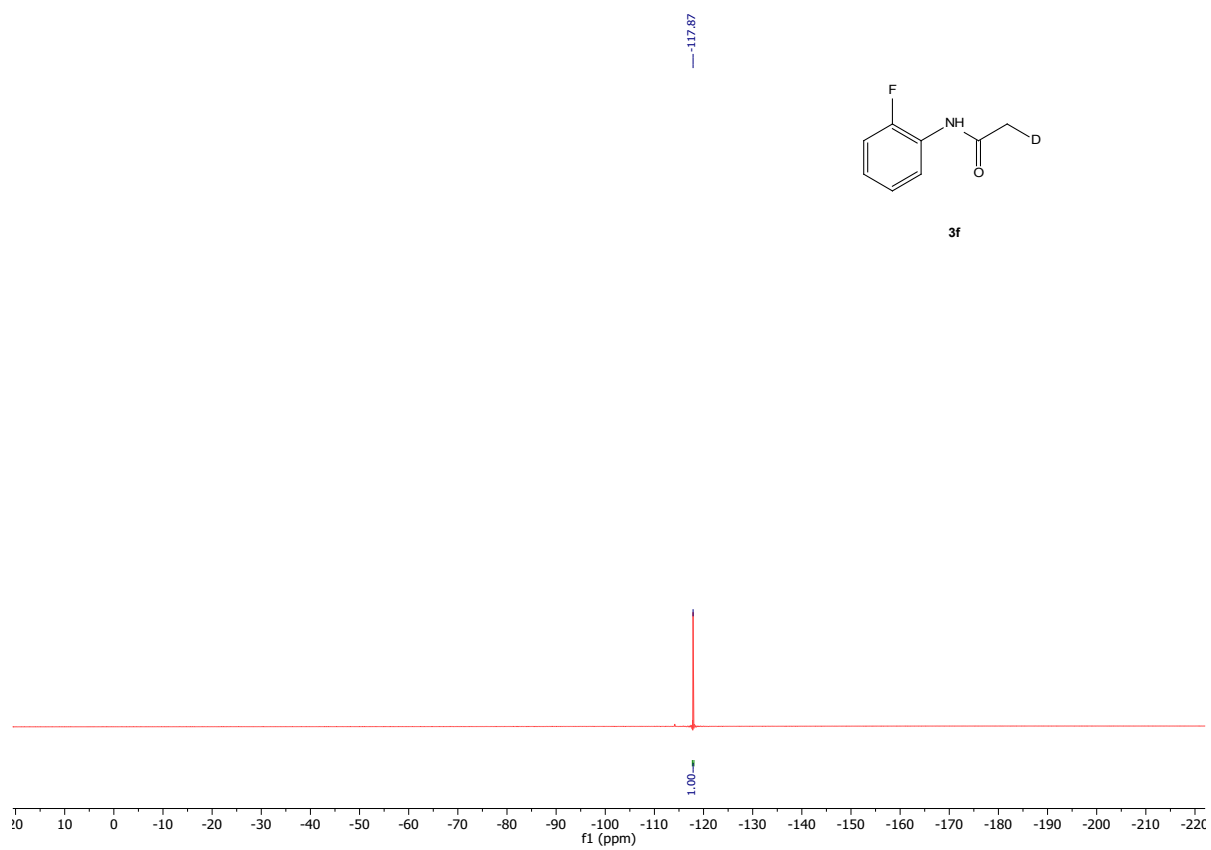
^1H NMR (500 MHz, CDCl_3) of 3f



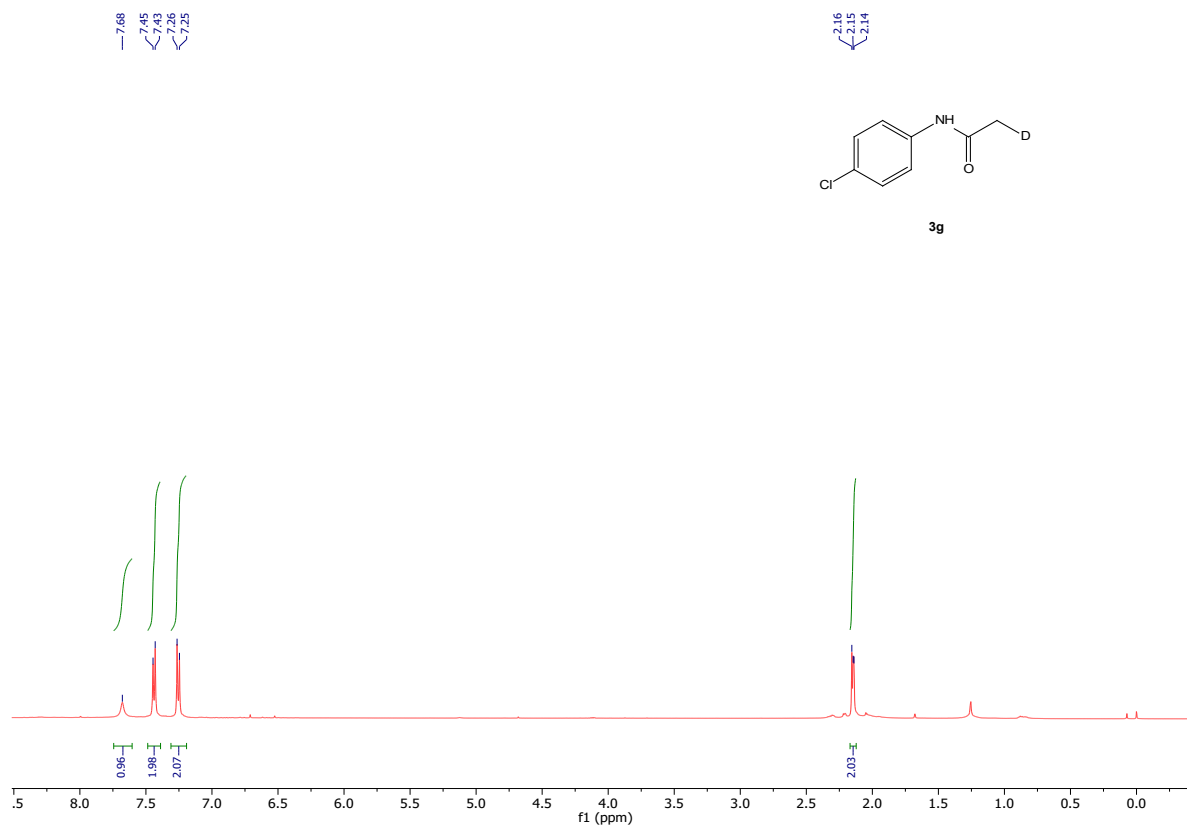
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3f



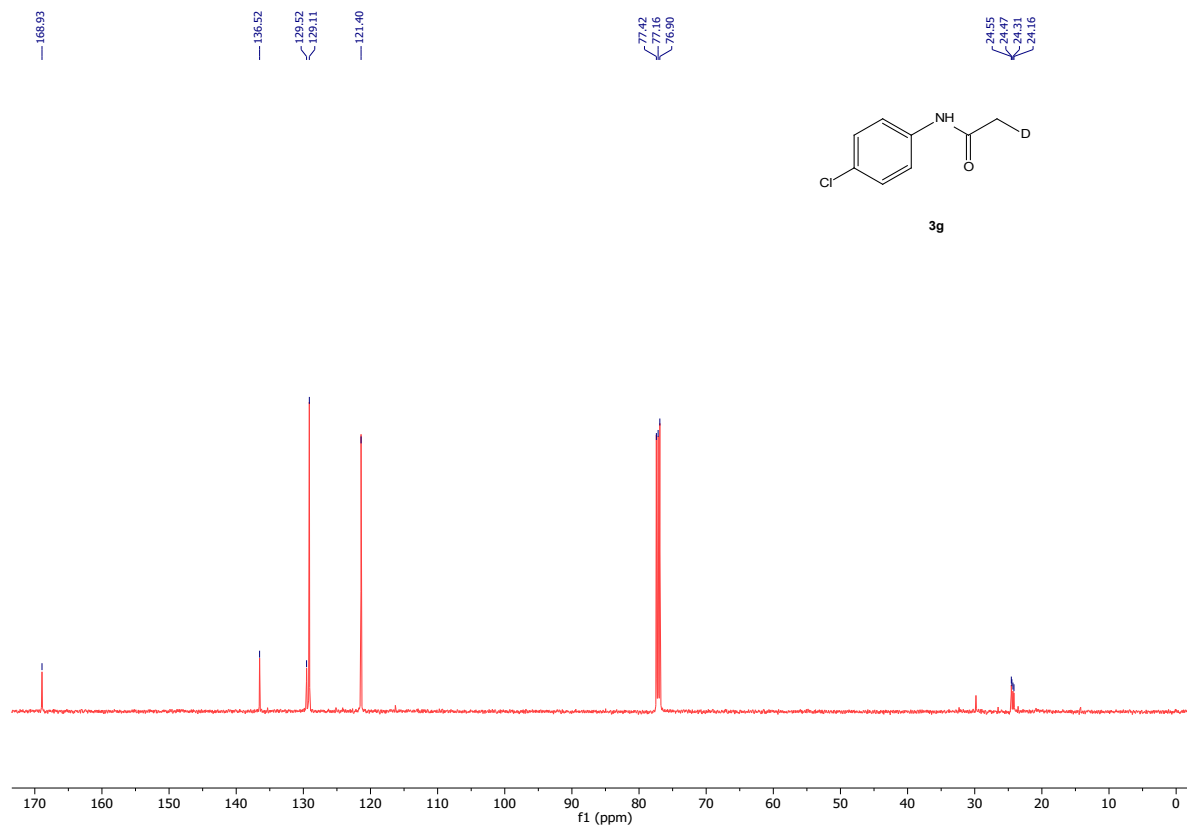
^{19}F NMR (471 MHz, CDCl_3) of 3f



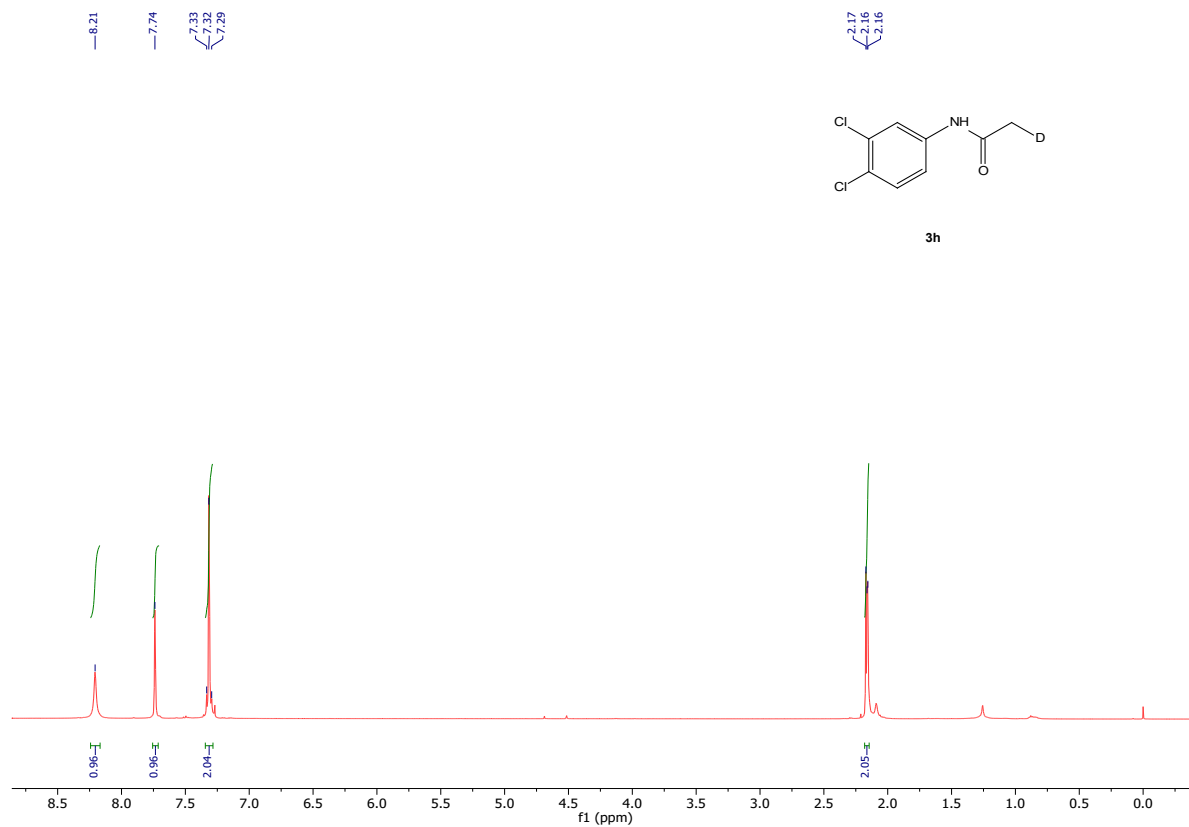
^1H NMR (500 MHz, CDCl_3) of 3g



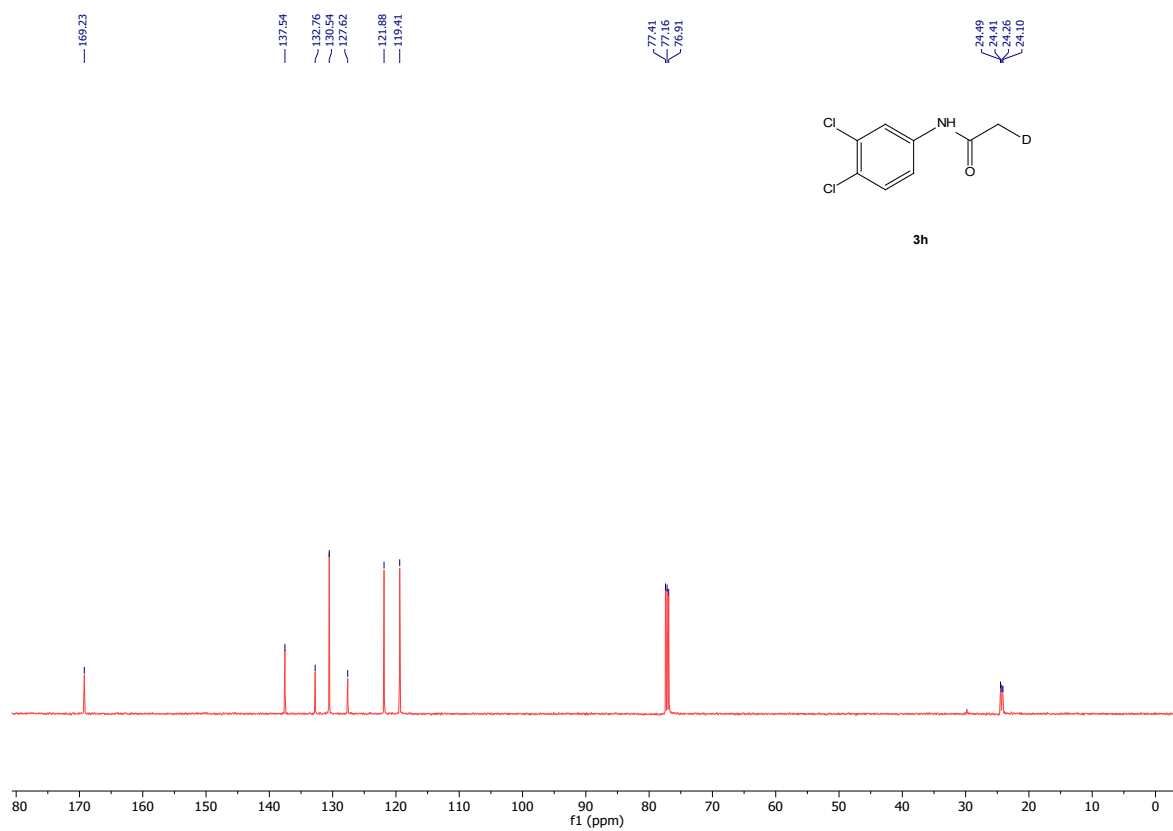
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3g



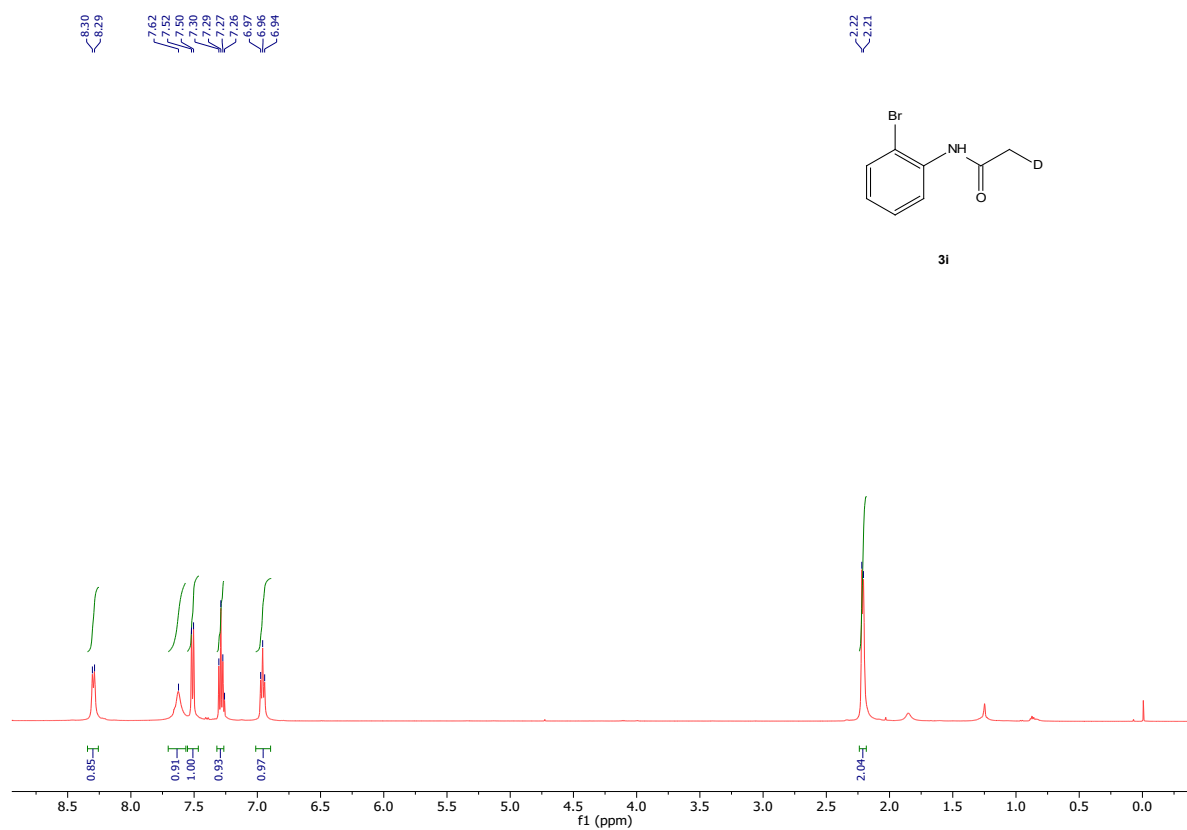
^1H NMR (500 MHz, CDCl_3) of 3h



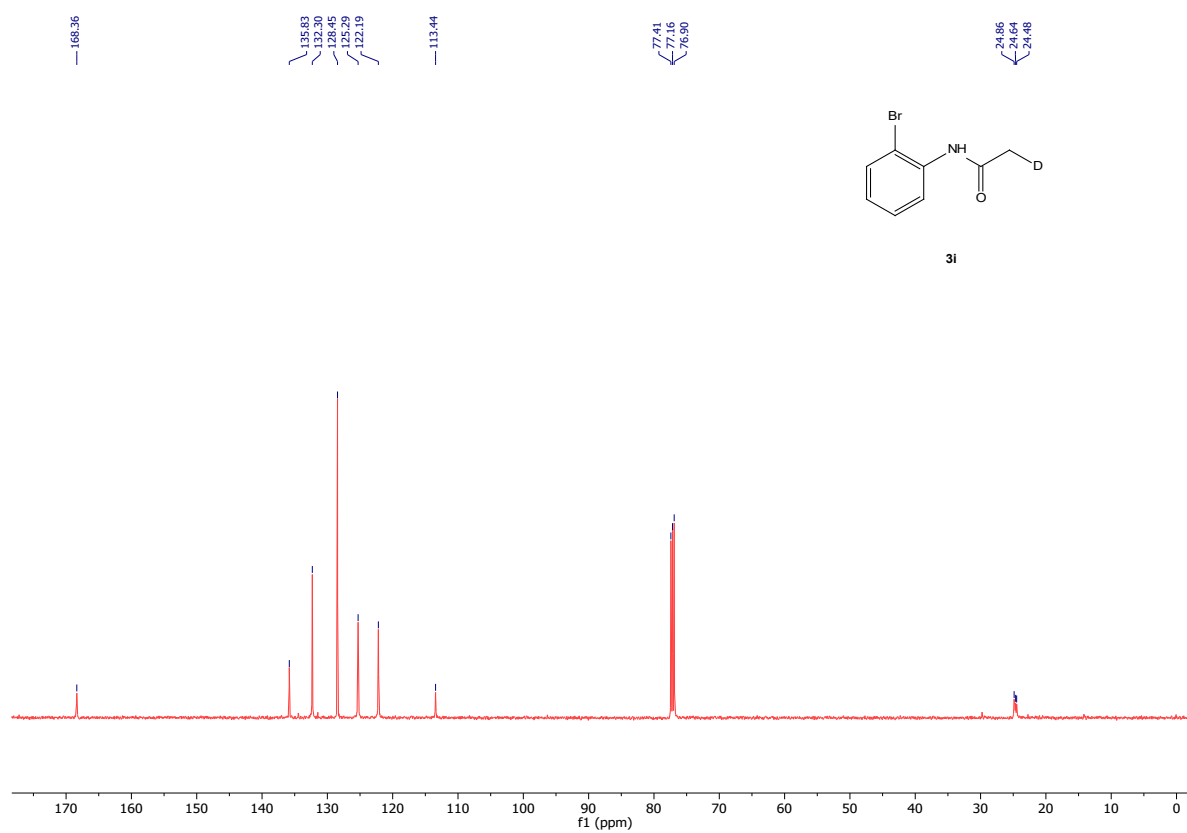
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3h



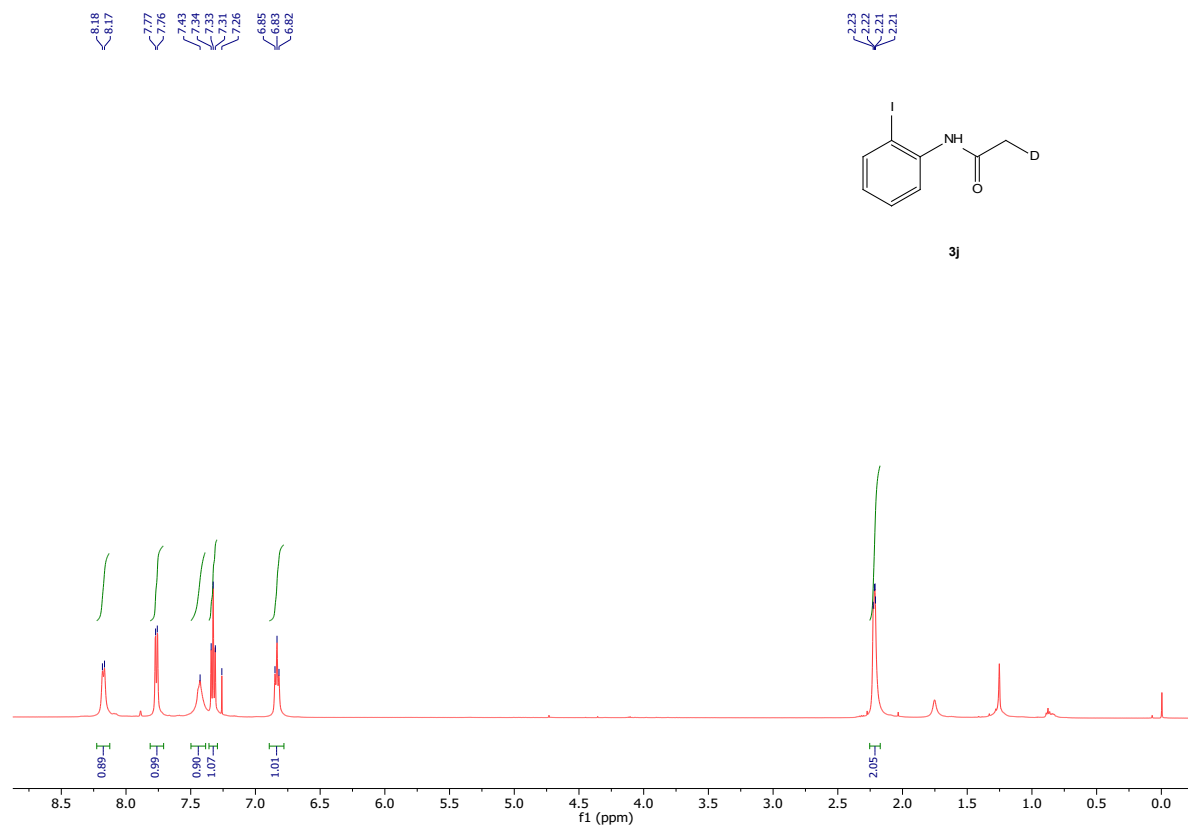
^1H NMR (500 MHz, CDCl_3) of 3i



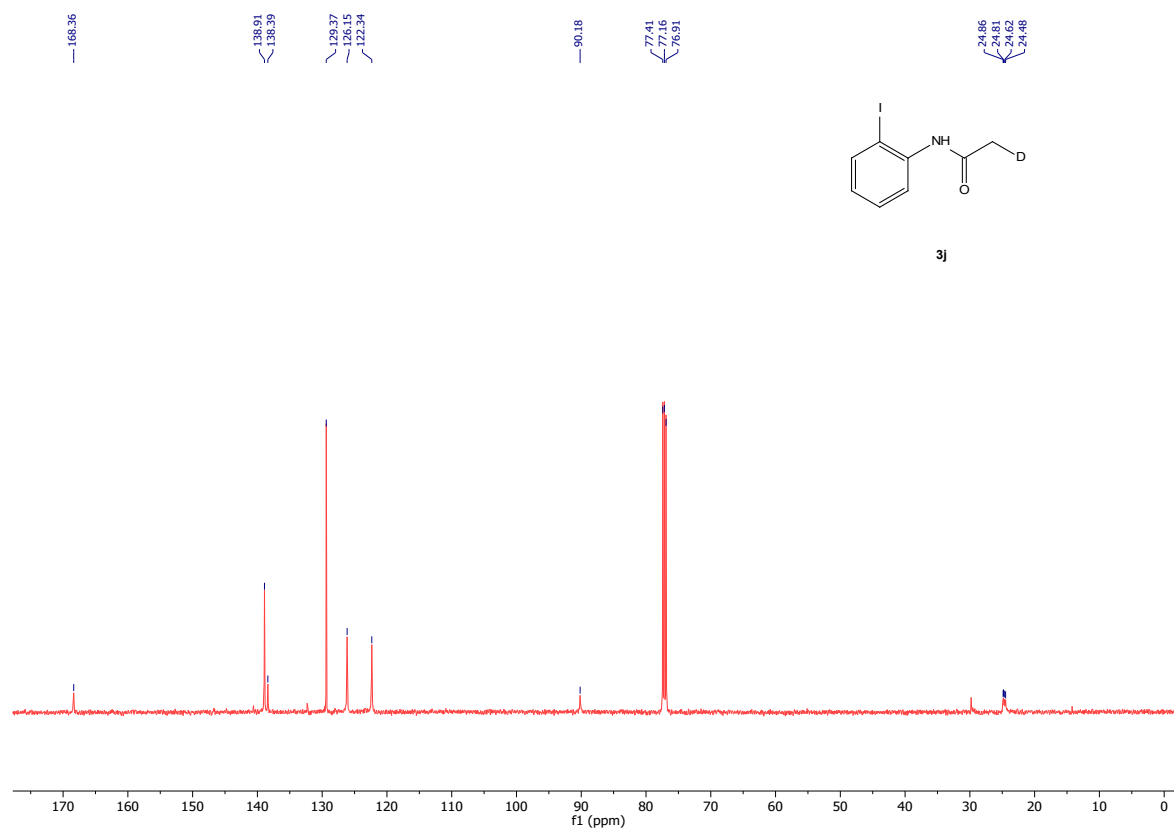
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3i



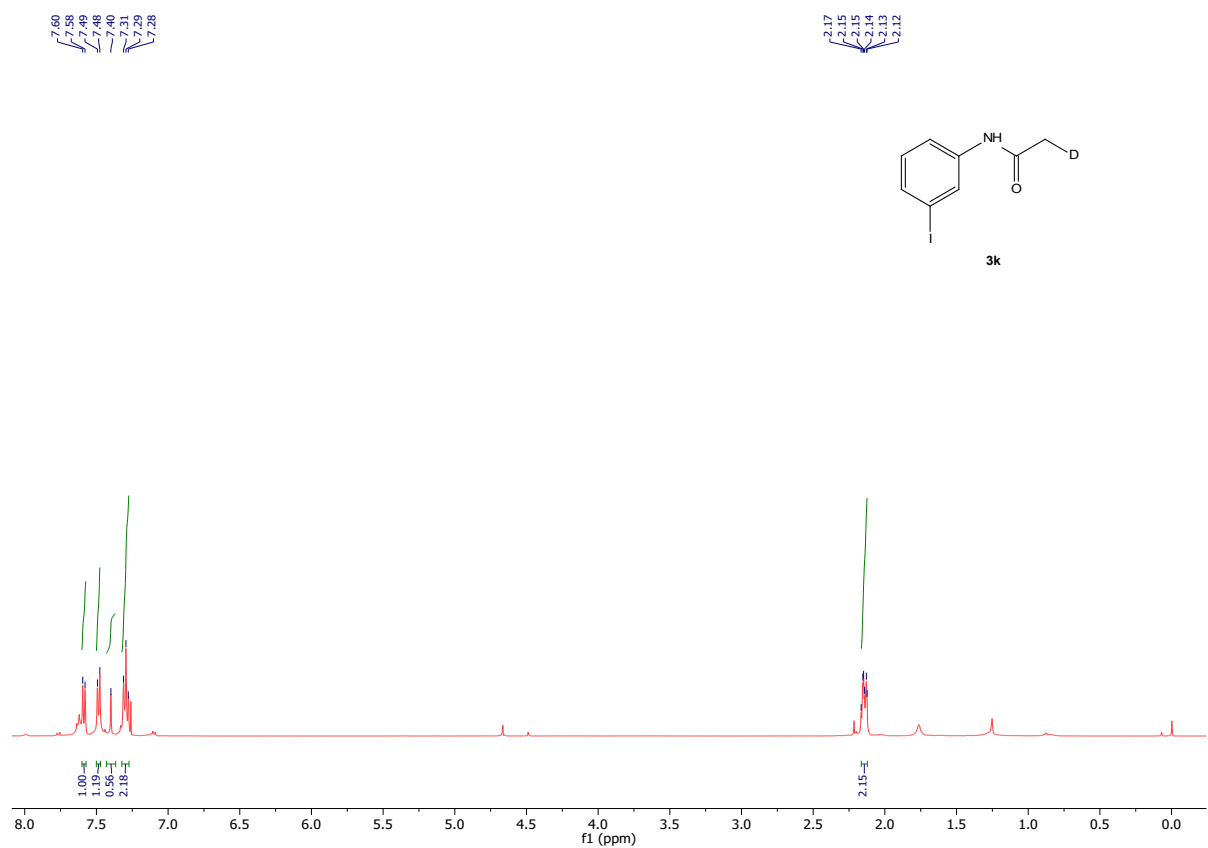
^1H NMR (500 MHz, CDCl_3) of 3j



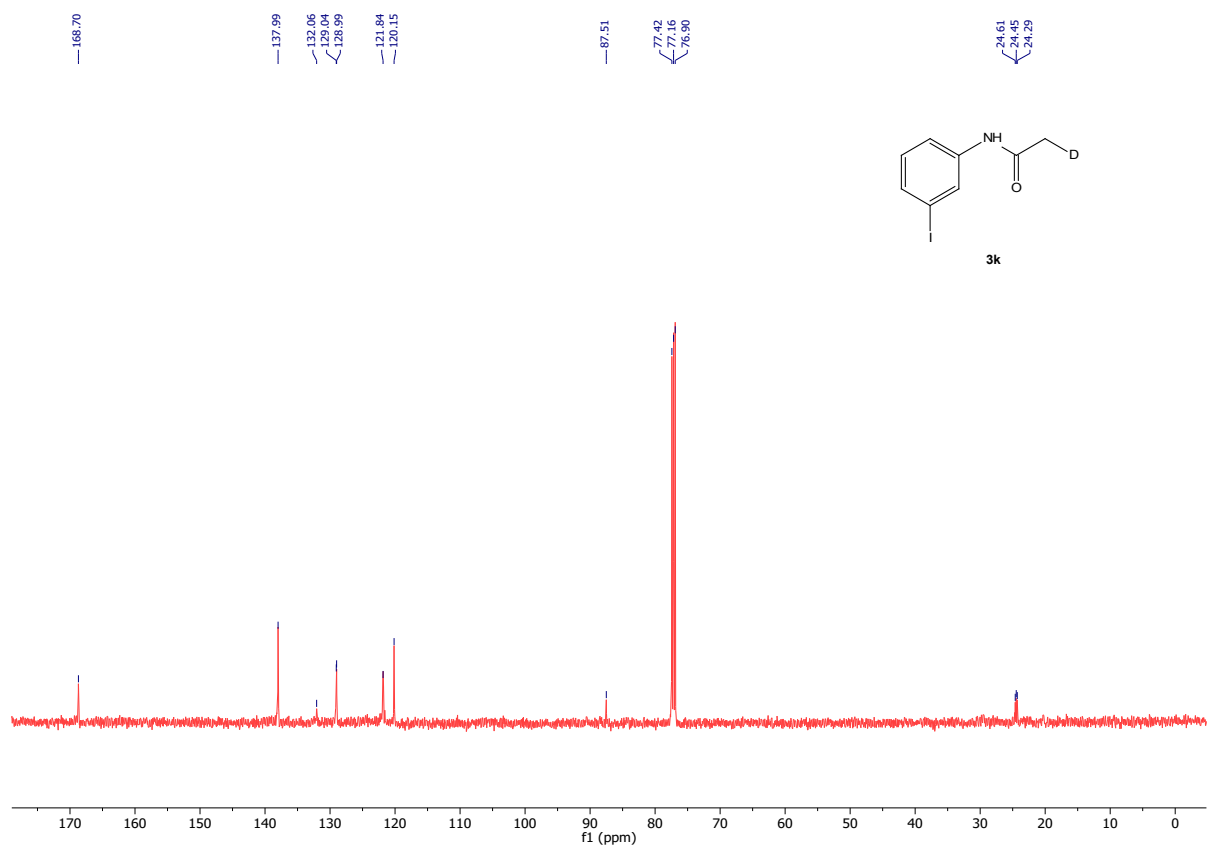
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3j



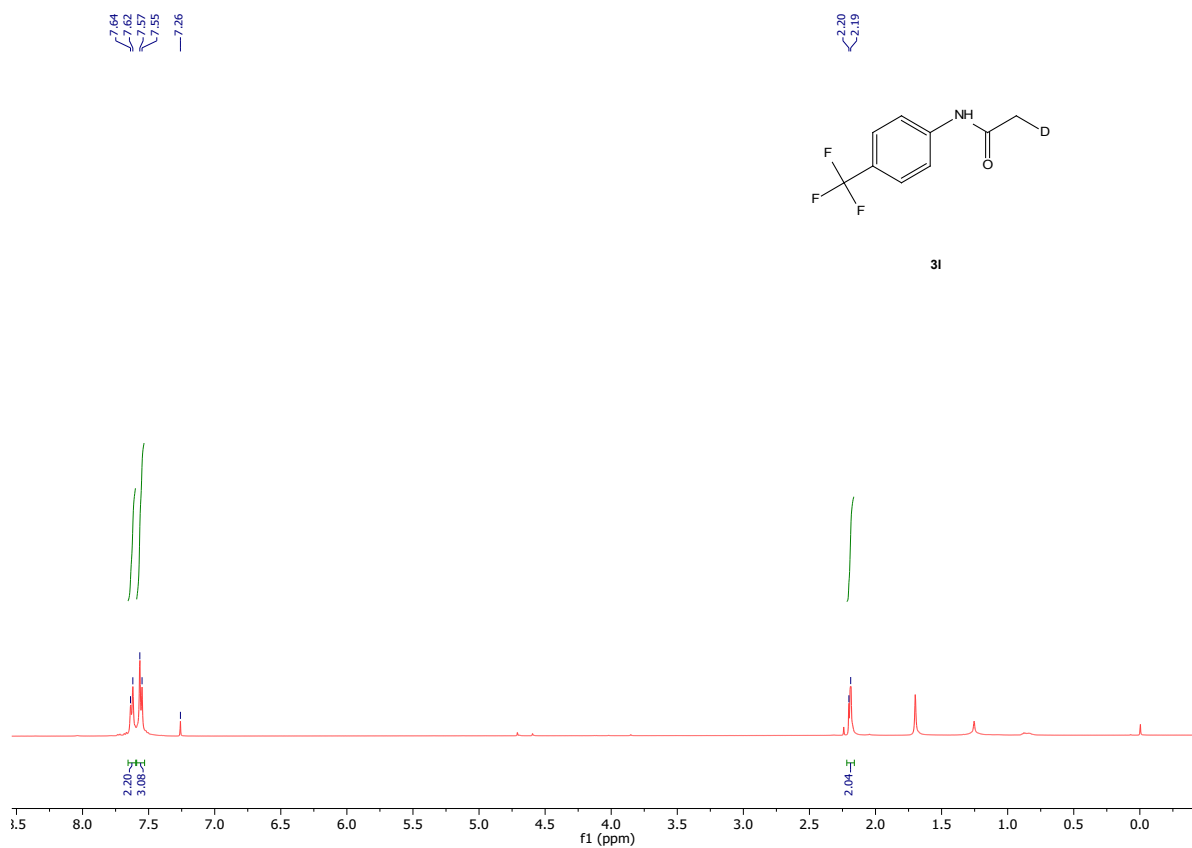
^1H NMR (500 MHz, CDCl_3) of 3k



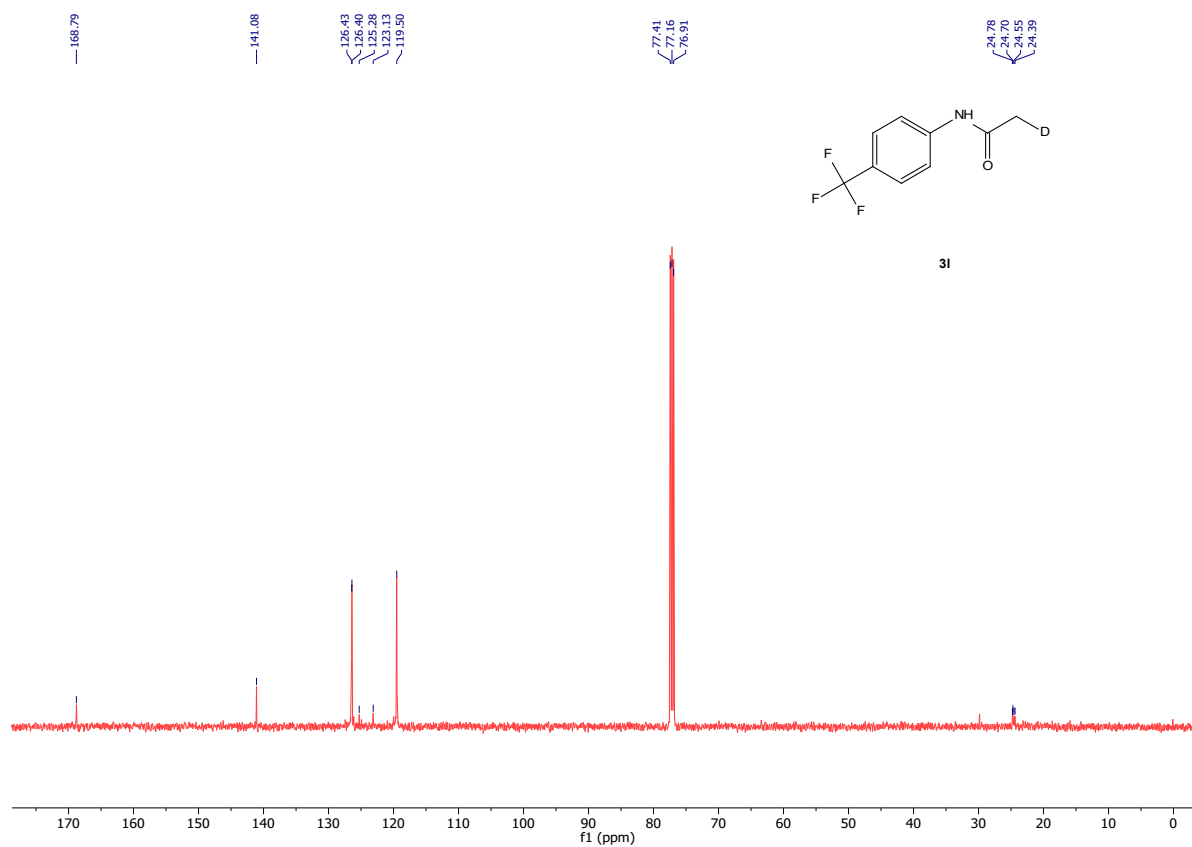
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3k



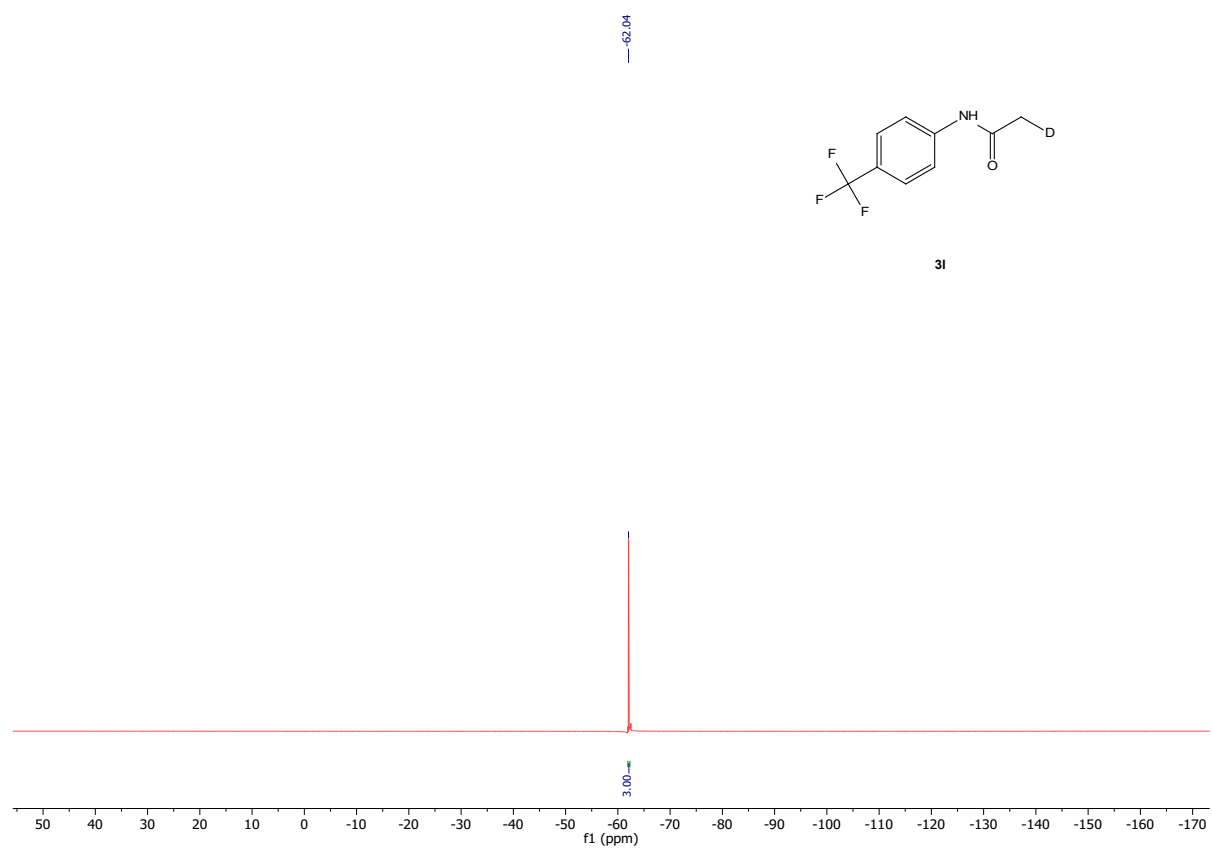
^1H NMR (500 MHz, CDCl_3) of 3I



$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3I



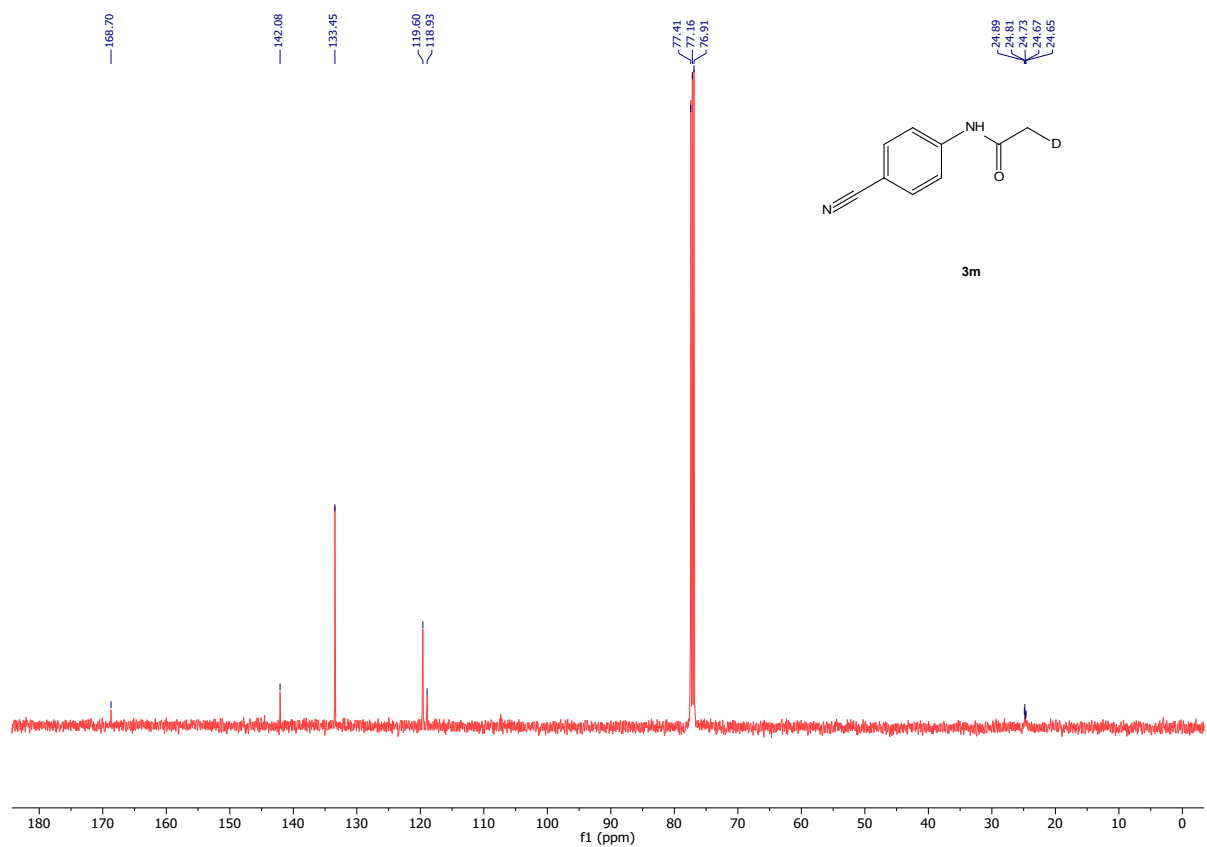
^{19}F NMR (471 MHz, CDCl_3) of 3I



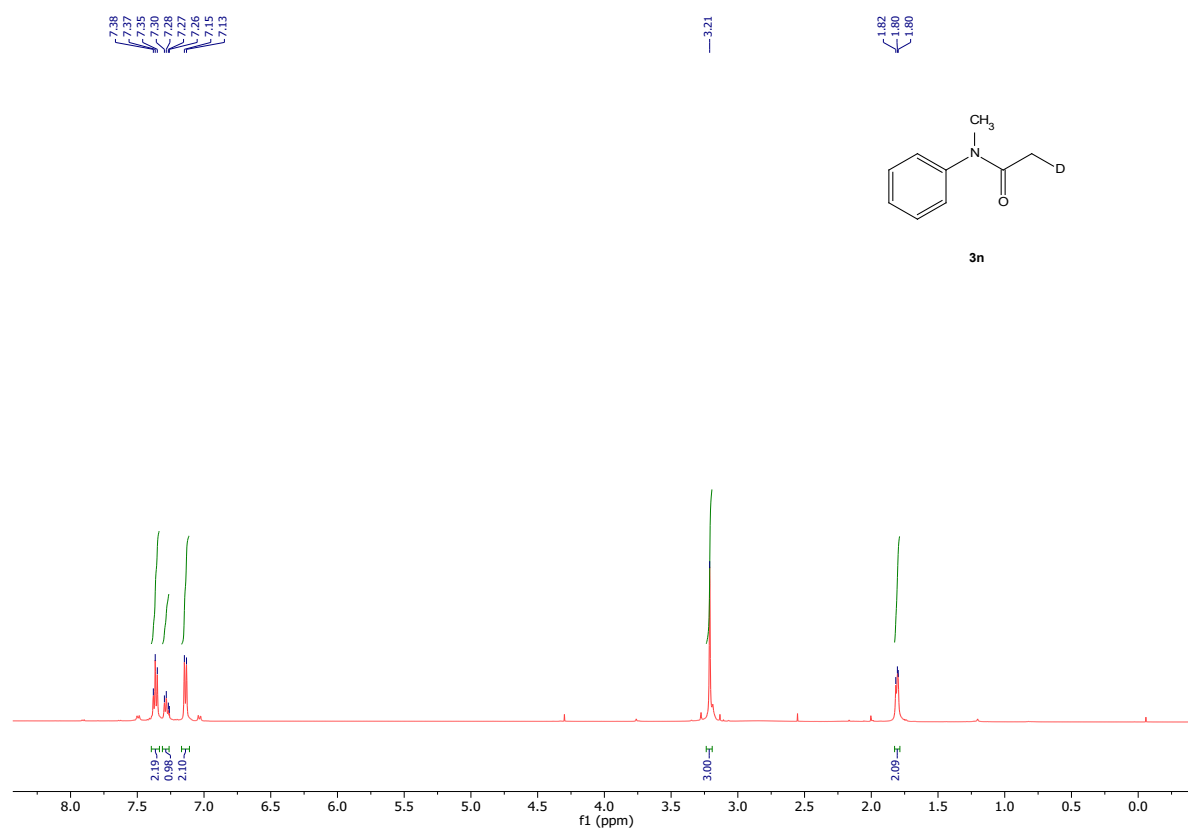
^1H NMR (500 MHz, CDCl_3) of 3m



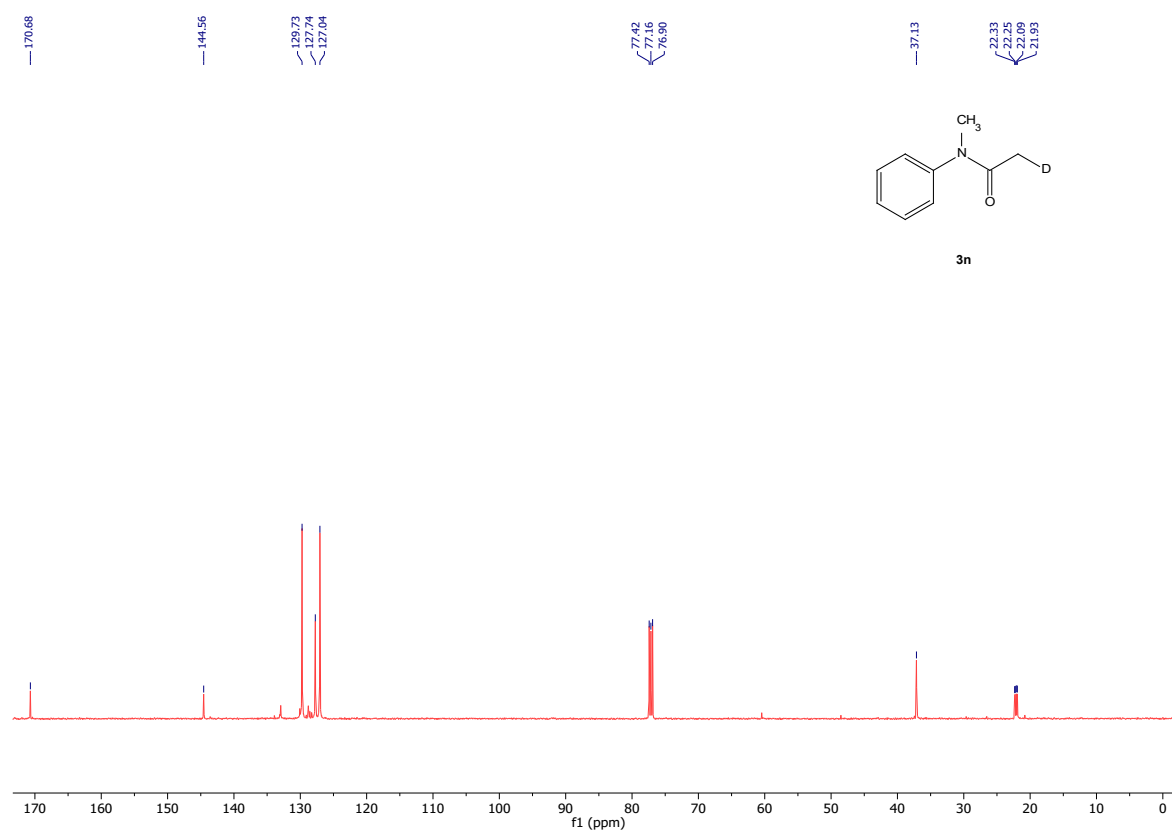
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3m



^1H NMR (500 MHz, CDCl_3) of 3n



$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3n

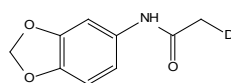


¹H NMR (500 MHz, CDCl₃) of 3o

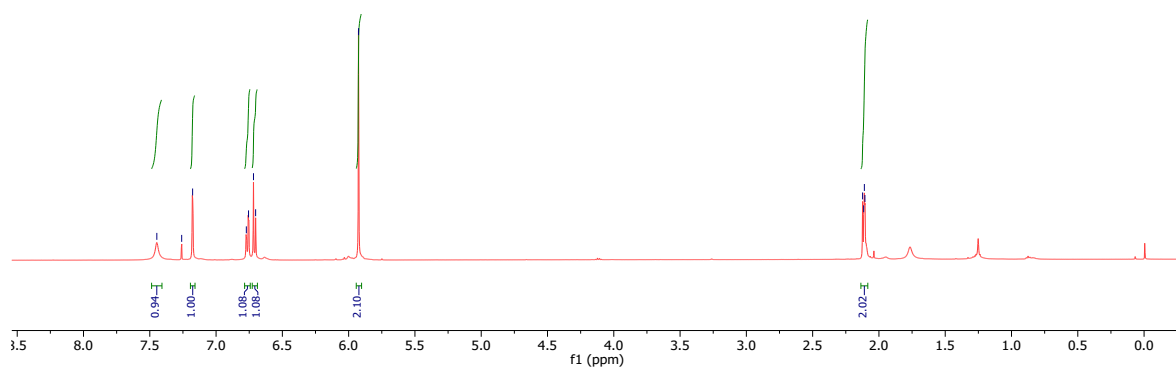
7.45
7.26
7.18
6.77
6.76
6.72
6.70

5.93

2.12
2.12
2.11
2.11



3o



¹³C{¹H} NMR (126 MHz, CDCl₃) 3o

166.55

147.92

144.47

132.26

113.47

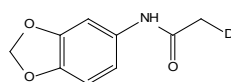
108.13

103.22

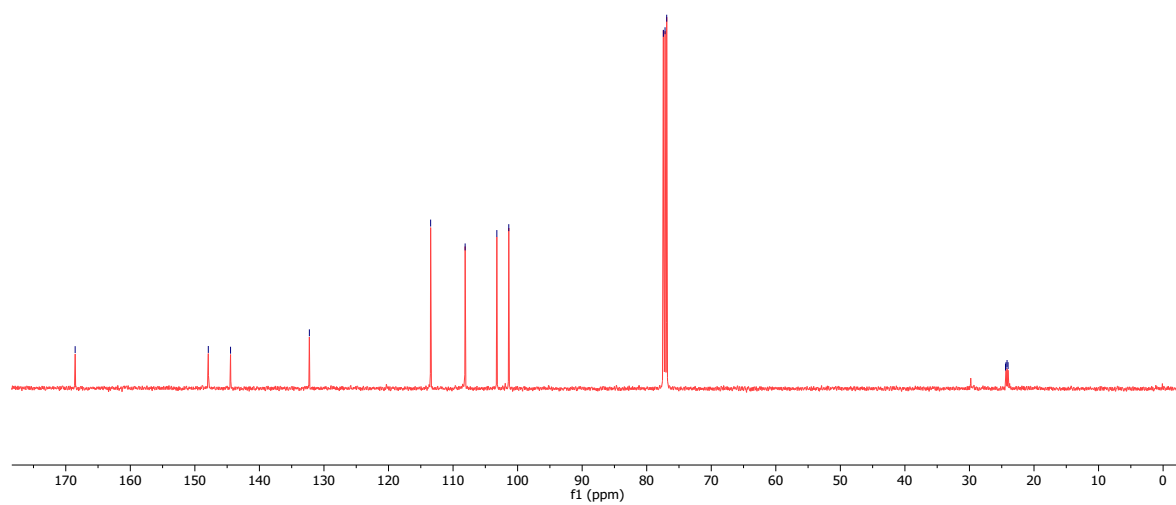
101.37

77.42
77.16
76.90

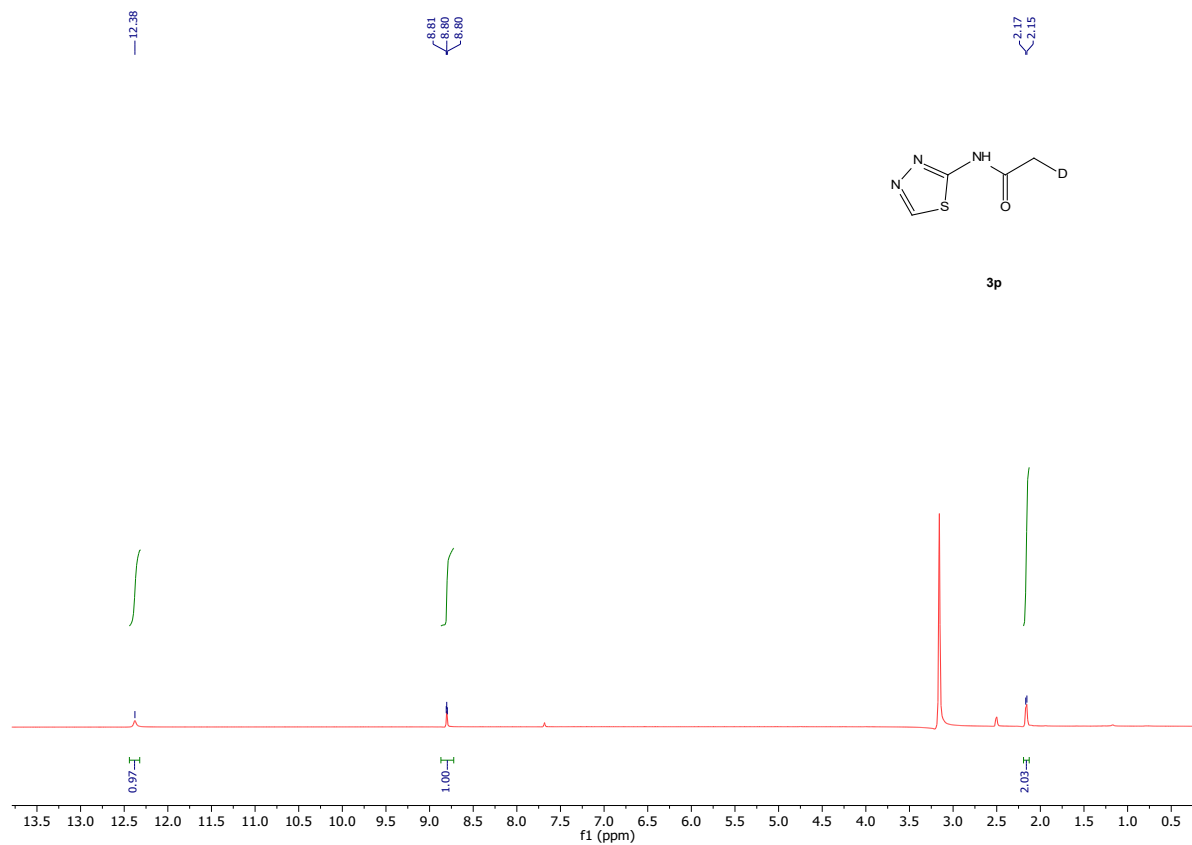
24.42
24.33
24.18
24.02



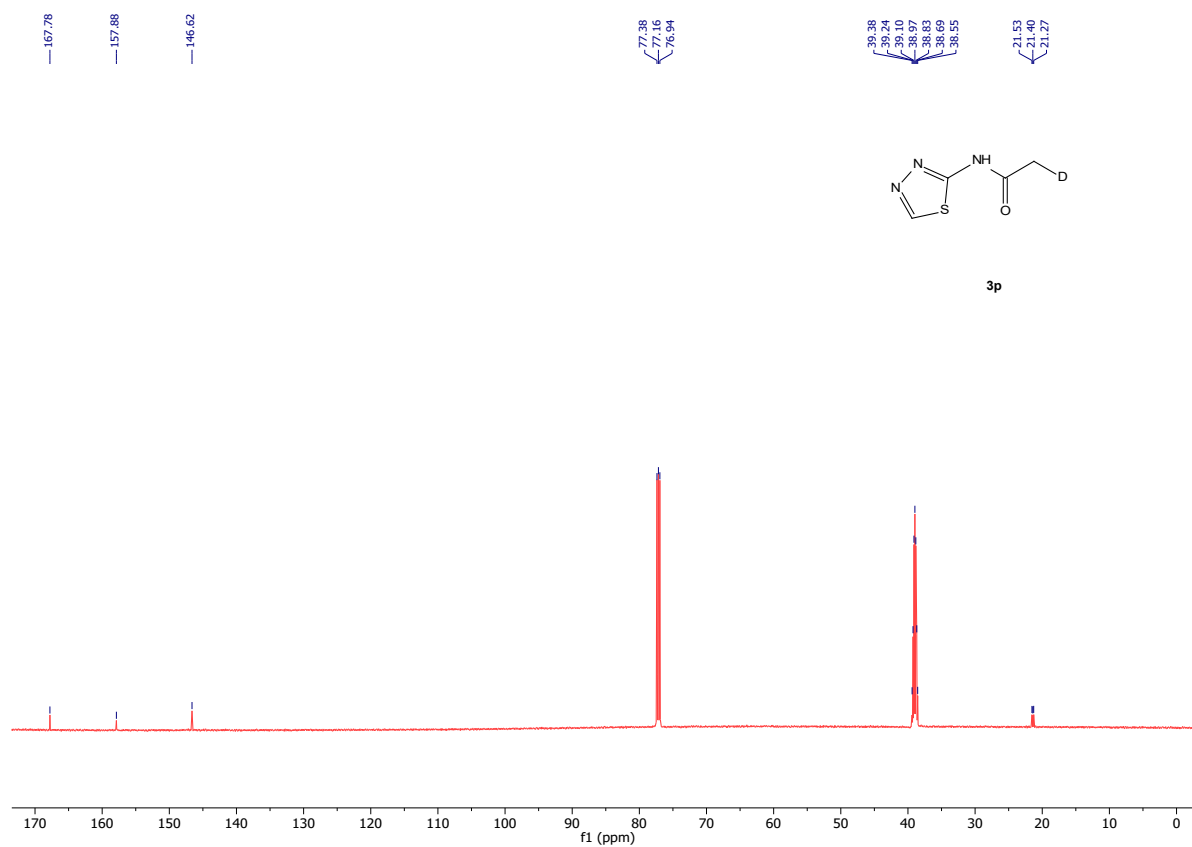
3o



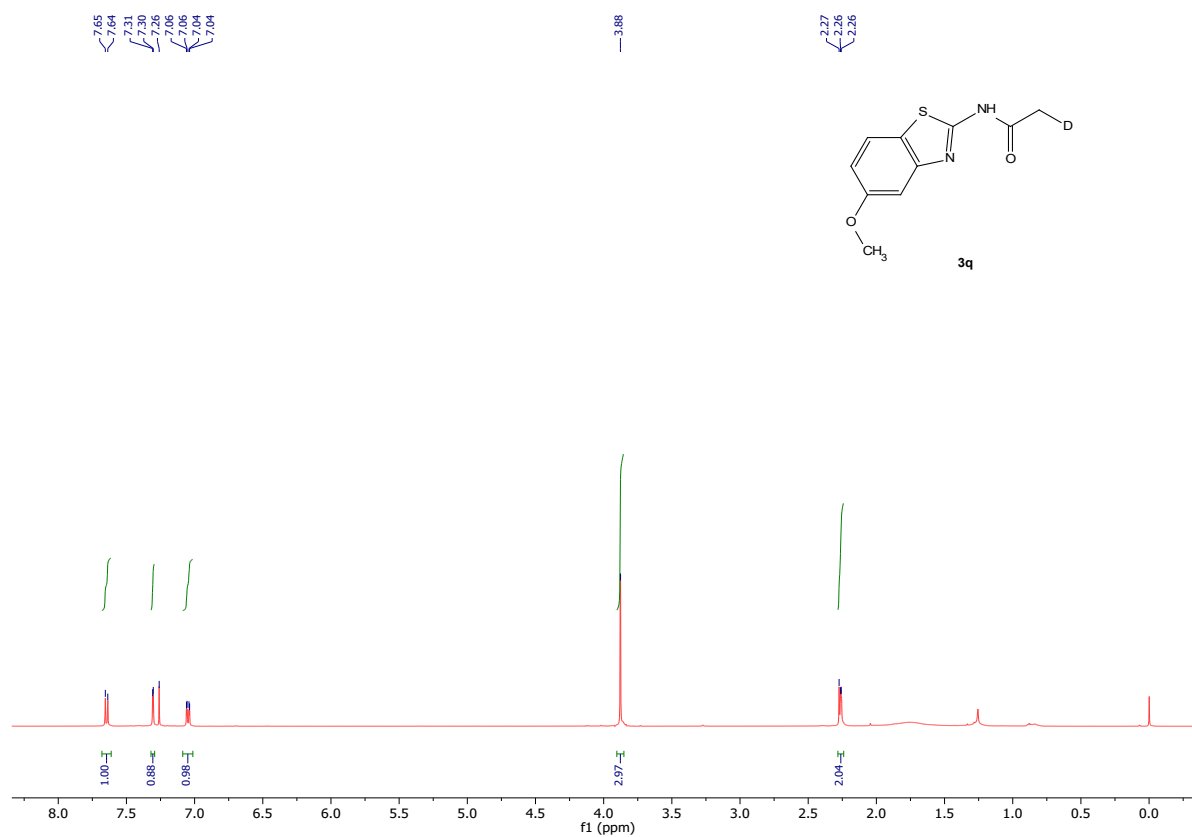
^1H NMR (500 MHz, $\text{CDCl}_3+\text{DMSO}-d_6$) of 3p



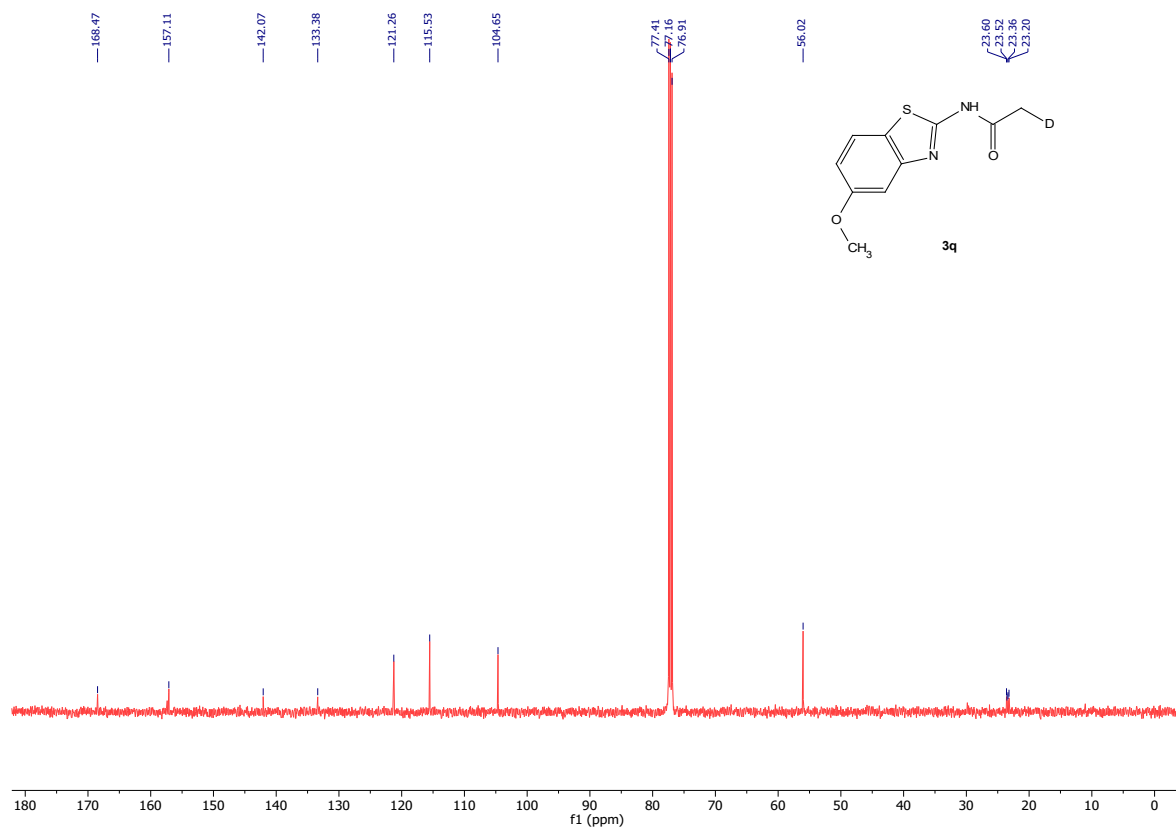
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, $\text{CDCl}_3+\text{DMSO}-d_6$) 3p



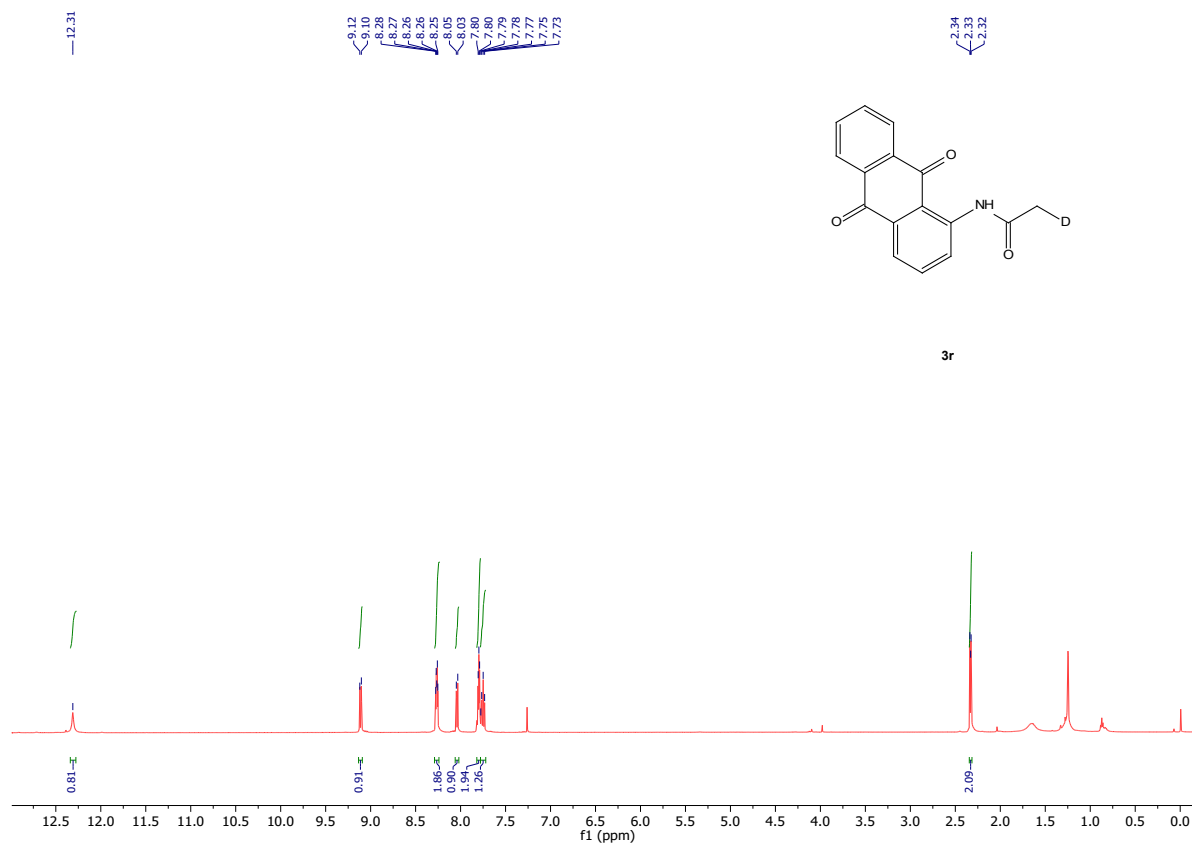
^1H NMR (500 MHz, CDCl_3) of 3q



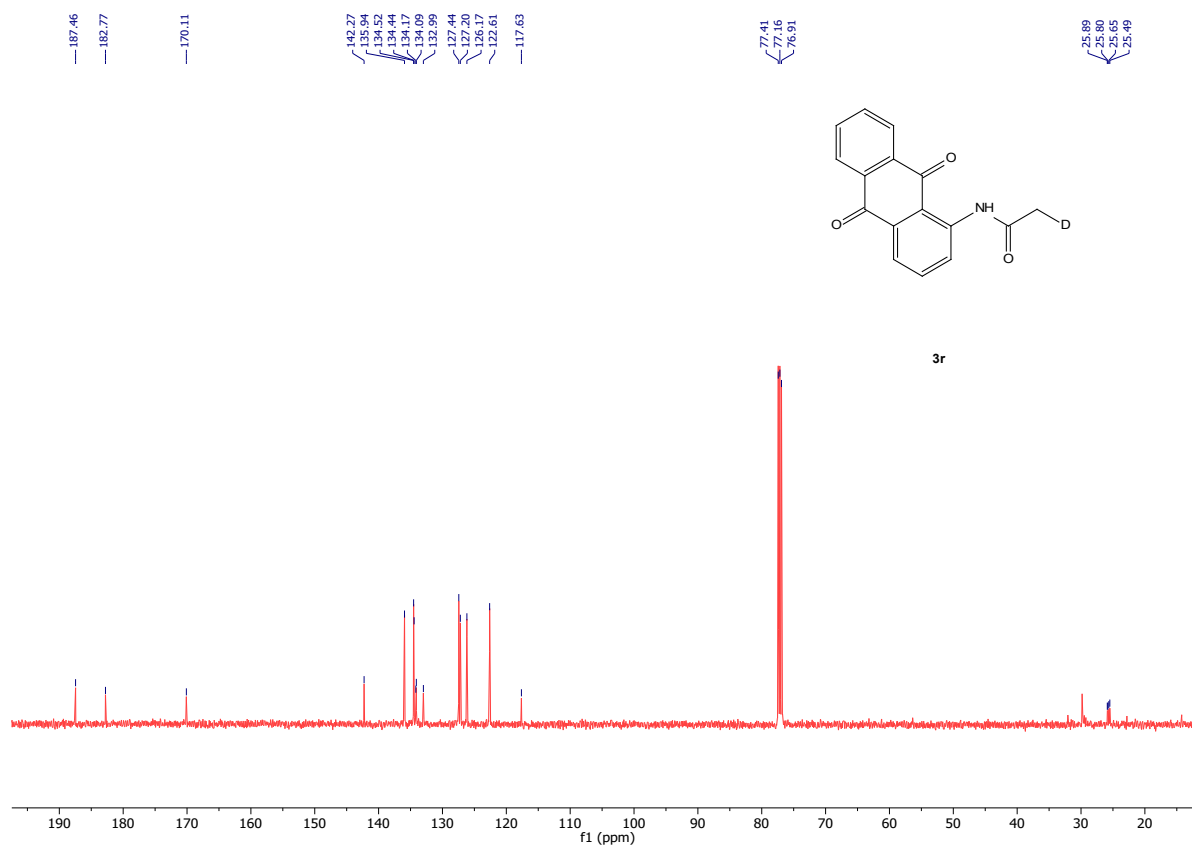
$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3q



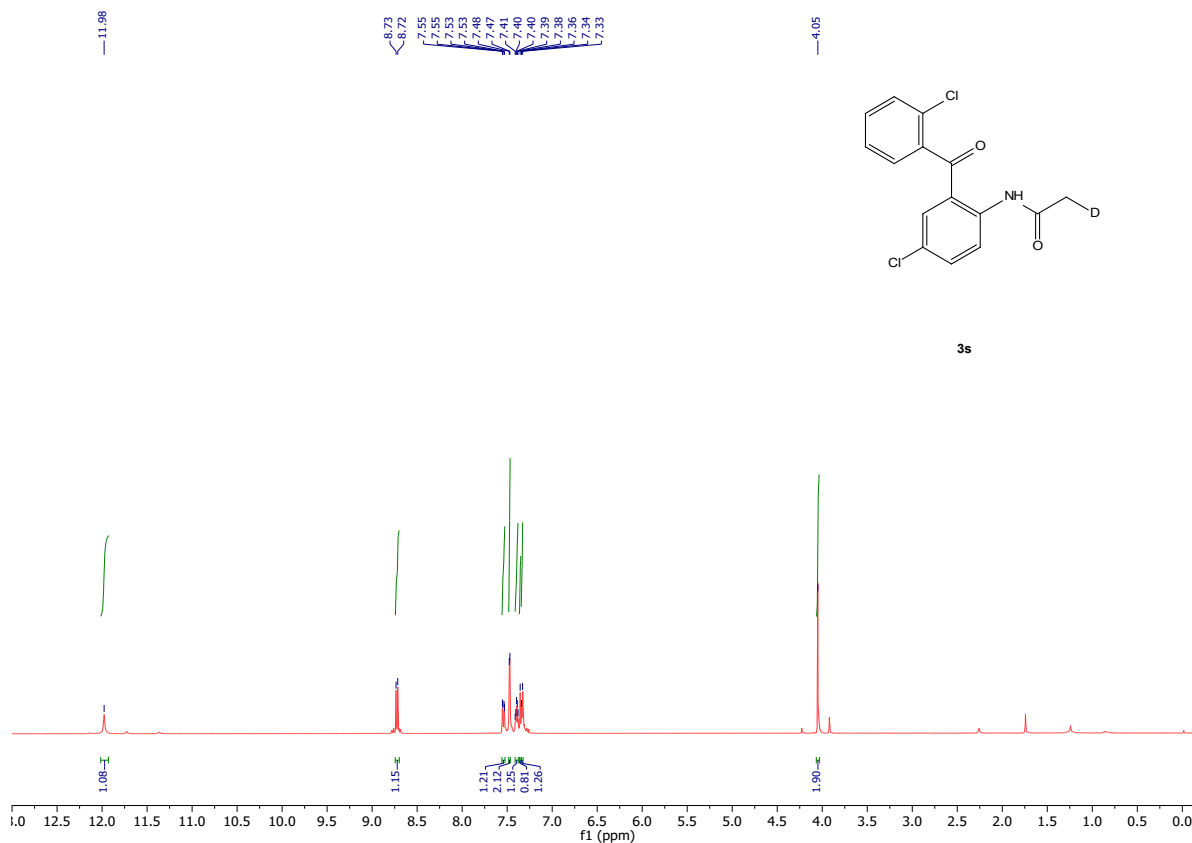
¹H NMR (500 MHz, CDCl₃) of 3r



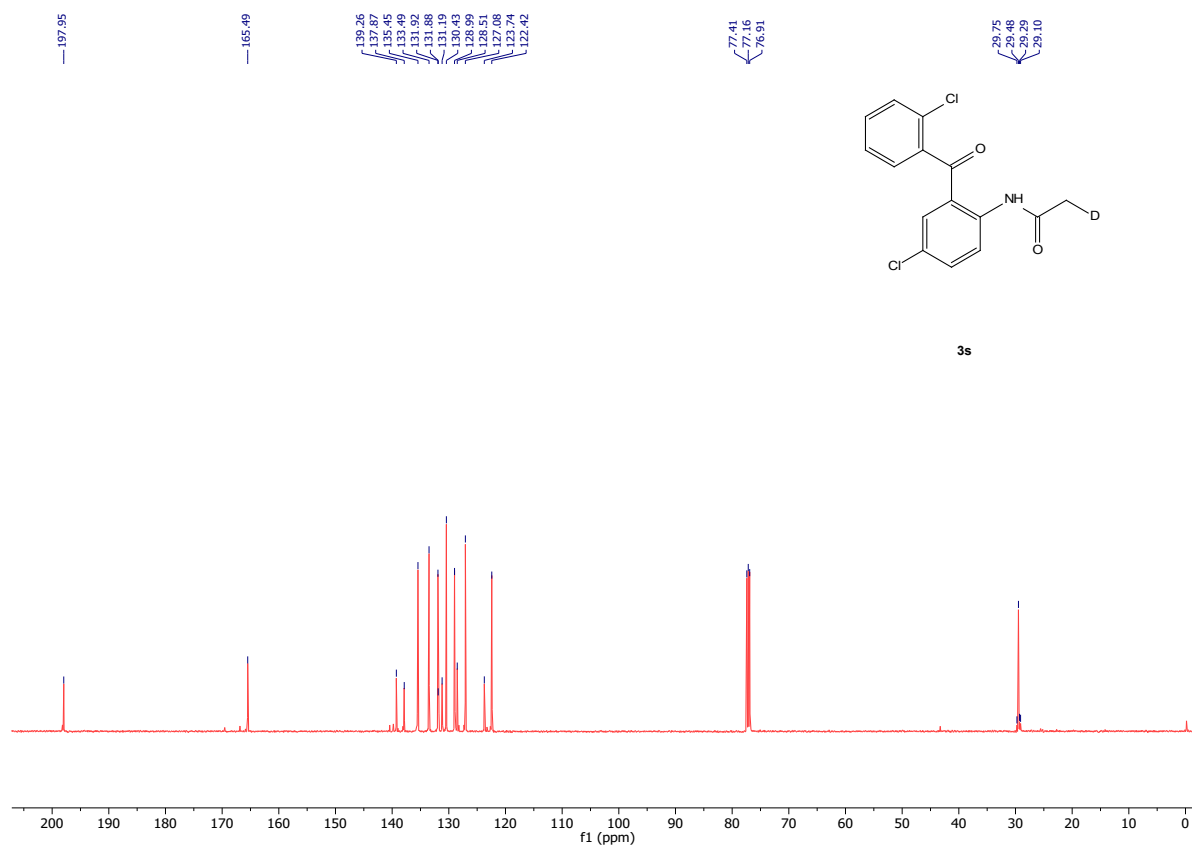
¹³C{¹H} NMR (126 MHz, CDCl₃) 3r



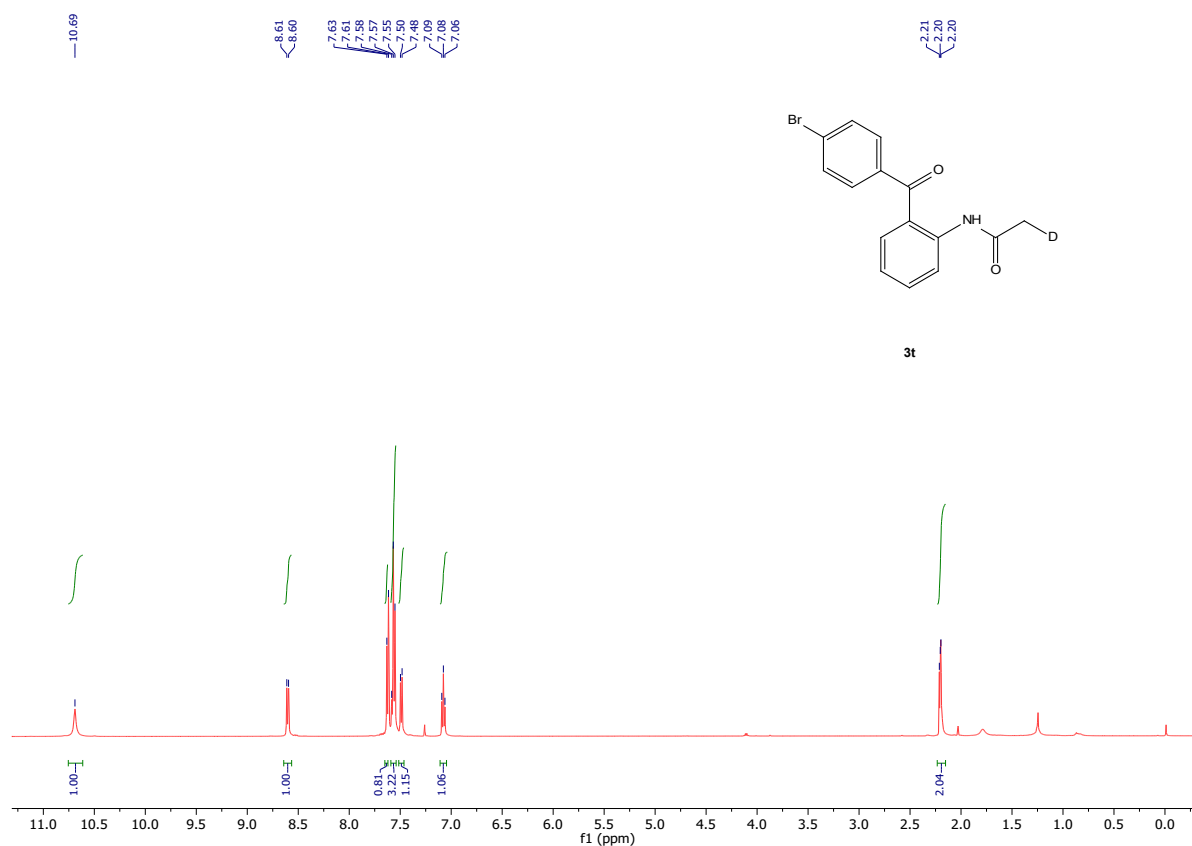
^1H NMR (500 MHz, CDCl_3) of 3s



$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3s



^1H NMR (500 MHz, CDCl_3) of 3t



$^{13}\text{C}\{^1\text{H}\}$ NMR (126 MHz, CDCl_3) 3t

