Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Electrophilic Amidomethylation of Arenes with DMSO/MeCN Reagents

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Supporting Information

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1. General remarks

All commercially available compounds were purchased from Sigma-Aldrich, Alfa-Aesar, Acros, Energy Chemicals, and Beijing Chemical Works, Ltd. Unless otherwise noted, materials obtained from commercial suppliers were used without further purification. Analysis of crude reaction mixture was done on an Agilent 7890 GC System with an Agilent 5975 Mass Selective Detector. Products were purified by flash chromatography on silica gel. ^{1}H-NMR spectra were recorded on Bruker AVANCE III-400 spectrometers. Chemical shifts (in ppm) were referenced TMS in $CDCl_3$ (0 ppm) and TMS in DMSO-d_6 (0 ppm). ^{13}C-NMR spectra were obtained by using the same NMR spectrometers and were calibrated with $CDCl_3$ (δ = 77.0 ppm) and DMSO-d_6 (39.5 ppm). Mass spectra were recorded using a PE SCLEX QSTAR spectrometer. High resolution mass spectra were obtained with a Bruker APEX IV Fourier transform ion cyclotron resonance mass spectrometer.

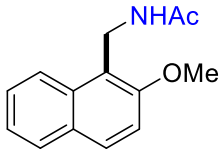
2. Amidomethylation of aromatic substrates

Experimental procedures:

DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CH_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. After the reaction temperature drops to room temperature, the substrate (0.5 mmol) was added, the vessel was tightly closed with a stopper, and the mixture was stirred at 80 ºC for 10 hours. After completion (by TLC), the reaction mixture was quenched with 14.5% sodium hypochlorite solution (1.0 mL) and concentrated under vacuum ,then added to saturated $NaHCO_3$ aqueous solution (3 mL). The aqueous phase was extracted with EtOAc (5 mL × 3). The combined organic extracts were dried over anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified by silica gel (300-400 mesh) chromatography to afford the product (The sample was wet loaded on the silica

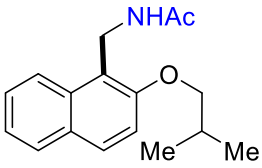
gel column with gradient eluent at a slow flow rate).

***N*-((2-methoxynaphthalen-1-yl)methyl)acetamide (3a)**



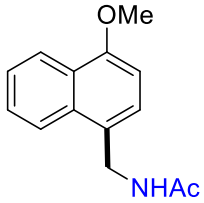
The reaction of 2-methoxynaphthalene **1a** (79.0 mg, 0.5 mmol) at 80 °C for 10 hours afforded 93.8 mg (82 %) of **3a** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.10 (d, *J* = 8.4 Hz, 1H), 7.85 – 7.78 (m, 2H), 7.55 – 7.49 (m, 1H), 7.41 – 7.33 (m, 1H), 7.28 (d, *J* = 9.2 Hz, 1H), 5.69 (s, 1H), 4.93 (d, *J* = 5.2 Hz, 2H), 3.98 (s, 3H), 1.95 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.7, 155.4, 132.8, 129.9, 129.1, 128.4, 127.3, 123.8, 123.3, 118.6, 112.8, 56.5, 34.0, 23.3. **HRMS (ESI)** exact mass calc'd for $C_{14}H_{16}NO_2$ ($[M+H]^+$): 230.1181; found m/z: 230.1184.

***N*-((2-isobutoxynaphthalen-1-yl)methyl)acetamide (3b)**



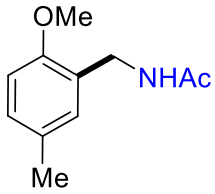
The reaction of 2-isobutoxynaphthalene **1b** (100.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 93.6 mg (69%) of **3b** as a white solid (petroleum ether/ethyl acetate = 12:1 gradient to 1:1).**^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.10 (d, *J* = 8.4 Hz, 1H), 7.81 (t, *J* = 9.2 Hz, 2H), 7.58 – 7.49 (m, 1H), 7.42 – 7.33 (m, 1H), 7.29 – 7.25 (m, 1H), 5.68 (s, 1H), 4.97 (d, *J* = 5.2 Hz, 2H), 3.93 (d, *J* = 6.4 Hz, 2H), 2.26 – 2.12 (m, 1H), 1.97 (s, 3H), 1.10 (d, *J* = 6.8 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.6, 155.1, 132.8, 129.8, 129.0, 128.4, 127.2, 123.7, 123.3, 118.7, 113.9, 75.7, 34.1, 28.6, 23.3, 19.3. **HRMS (ESI)** exact mass calc'd for $C_{17}H_{22}NO_2$ ($[M+H]^+$): 272.1651; found m/z: 272.1646.

***N*-((4-methoxynaphthalen-1-yl)methyl)acetamide (3c)**



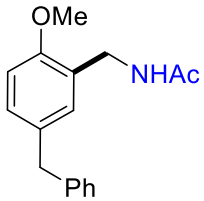
The reaction of 1-methoxynaphthalene **1c** (79.0 mg, 0.5 mmol) at 80 °C for 10 hours afforded 67.5 mg (59 %) of **3c** as a white solid (petroleum ether/ethyl acetate =15:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.32 (d, *J* = 8.4 Hz, 1H), 7.94 (d, *J* = 8.7 Hz, 1H), 7.59 – 7.55 (m, 1H), 7.53 – 7.49 (m, 1H), 7.34 (d, *J* = 7.8 Hz, 1H), 6.74 (d, *J* = 7.8 Hz, 1H), 5.63 (s, 1H), 4.79 (d, *J* = 5.2 Hz, 2H), 4.00 (s, 3H), 1.98 (s, 3H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.7, 155.5, 132.2, 127.2, 127.0, 125.9, 125.4, 125.2, 123.3, 122.6, 102.9, 55.4, 41.0, 23.0. **HRMS (ESI)** exact mass calc'd for $C_{14}H_{16}NO_2$ ($[M+H]^+$): 230.1181 ; found m/z: 230.1185.

***N*-(2-methoxy-5-methylbenzyl)acetamide (3d)**



The reaction of 1-methoxy-4-methylbenzene **1d** (61.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 64.8 mg (67%) of **3d** as a white solid (petroleum ether/ethyl acetate = 15:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.07 (s, 1H), 7.05 (d, *J* = 8.2 Hz, 1H), 6.76 (d, *J* = 8.2 Hz, 1H), 5.99 (s, 1H), 4.38 (d, *J* = 5.8 Hz, 2H), 3.82 (s, 3H), 2.26 (s, 3H), 1.96 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.6, 155.4, 130.6, 129.9, 129.0, 126.0, 110.2, 55.4, 39.4, 23.4, 20.3. **HRMS (ESI)** exact mass calc'd for $C_{11}H_{16}NO_2$ ($[M+H]^+$): 194.1181; found m/z: 194.1183.

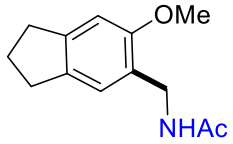
***N*-(5-benzyl-2-methoxybenzyl)acetamide (3e)**



The reaction of 1-benzyl-4-methoxybenzene **1e** (99.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 82.1 mg (61%) of **3e** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.33 – 7.23 (m, 2H), 7.21 – 7.15 (m, 3H), 7.11 (d, *J* = 2.3 Hz, 1H), 7.07 (dd, *J* = 8.3, 2.3 Hz, 1H), 6.79 (d, *J* = 8.3 Hz,

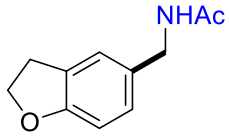
1H), 5.95 (s, 1H), 4.39 (d, *J* = 5.8 Hz, 2H), 3.90 (s, 2H), 3.83 (s, 3H), 1.96 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.6, 156.0, 141.3, 133.4, 130.4, 129.0, 128.8, 128.4, 126.1, 126.0, 110.3, 55.4, 41.0, 39.5, 23.3. **HRMS (ESI)** exact mass calc'd for $C_{17}H_{20}NO_2$ ($[M+H]^+$): 270.1492 ; found m/z: 270.1492.

***N*-((6-methoxy-2,3-dihydro-1H-inden-5-yl)methyl)acetamide (3f)**



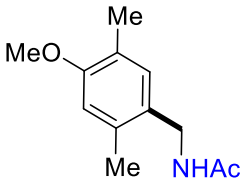
The reaction of 5-methoxy-2,3-dihydro-1H-indene **1f** (74.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 78.8 mg (72%) of **3f** as a white solid (petroleum ether/ethyl acetate = 20:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) 7.13 (s, 1H), 6.78 (s, 1H), 5.91 (s, 1H), 4.38 (d, *J* = 5.8 Hz, 2H), 3.83 (s, 3H), 2.88 (t, *J* = 7.4 Hz, 2H), 2.82 (t, *J* = 7.4 Hz, 2H), 2.12 – 2.00 (m, 2H), 1.96 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.5, 156.4, 145.0, 135.9, 125.7, 124.1, 106.8, 55.5, 39.6, 33.2, 32.0, 25.7, 23.4. **HRMS (ESI)** exact mass calc'd for $C_{13}H_{18}NO_2$ ($[M+H]^+$): 220.1338 ; found m/z: 220.1339.

***N*-((2,3-dihydrobenzofuran-5-yl)methyl)acetamide (3g)**



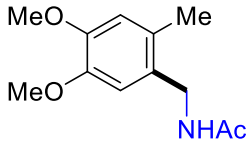
The reaction of 2,3-dihydrobenzofuran **1g** (60.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 63.9 mg (67%) of **3g** as a pale-yellow solid (petroleum ether/ethyl acetate = 20:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.12 (s, 1H), 6.99 (d, *J* = 8.2 Hz, 1H), 6.71 (d, *J* = 8.2 Hz, 1H), 5.86 (s, 1H), 4.54 (t, *J* = 8.6 Hz, 2H), 4.31 (d, *J* = 5.6 Hz, 2H), 3.16 (t, *J* = 8.6 Hz, 2H), 1.98 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.8, 159.5, 130.3, 127.8, 127.5, 124.8, 109.1, 71.3, 43.5, 29.6, 23.2. **HRMS (ESI)** exact mass calc'd for $C_{11}H_{14}NO_2$ ($[M+H]^+$): 192.1025; found m/z: 192.1025.

***N*-(4-methoxy-2,5-dimethylbenzyl)acetamide (3h)**



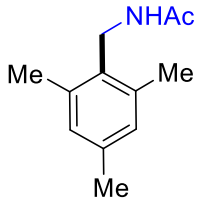
The reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 76.7 mg (74%) of **3h** as a white solid (petroleum ether/ethyl acetate =10:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.97 (s, 1H), 6.64 (s, 1H), 5.59 (s, 1H), 4.32 (d, *J* = 5.2 Hz, 2H), 3.80 (s, 3H), 2.29 (s, 3H), 2.16 (s, 3H), 1.98 (s, 3H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.7, 157.1, 135.0, 131.6, 127.2, 124.1, 112.3, 55.4, 41.4, 23.1, 19.0, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}NO_2$ ($[M+H]^+$): 208.1338 ; found m/z: 208.1337.

***N*-(4,5-dimethoxy-2-methylbenzyl)acetamide (3i)**



The reaction of 1,2-dimethoxy-4-methylbenzene **1i** (76.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 79.1 mg (71%) of **3i** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.72 (s, 1H), 6.64 (s, 1H), 5.87 (s, 1H), 4.29 (d, *J* = 5.2 Hz, 2H), 3.80 (d, *J* = 4.6 Hz, 6H), 2.23 (s, 3H), 1.95 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.7, 148.1, 146.9, 128.6, 127.6, 113.6, 112.7, 55.9, 55.8, 41.6, 23.0, 18.4. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}NO_3$ ($[M+H]^+$): 224.1287 ; found m/z: 224.1290.

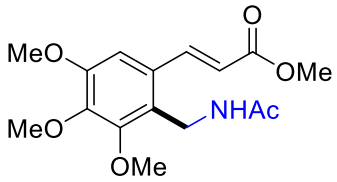
***N*-(2,4,6-trimethylbenzyl)acetamide (3j)**



The reaction of mesitylene **1j** (60.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 63.9 mg (67%) of **3j** as a white solid (petroleum ether/ethyl acetate = 15:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.87 (s, 2H), 5.42 (s, 1H), 4.39 (d, *J* = 4.6 Hz, 2H),

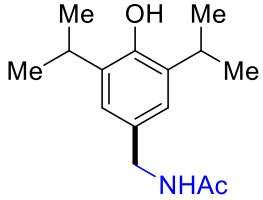
2.31 (s, 6H), 2.26 (s, 3H), 1.94 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.8, 137.5, 137.3, 130.8, 129.1, 38.1, 22.9, 20.8, 19.5. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}NO$ ($[M+H]^+$): 192.1388 ; found m/z: 192.1390.

Methyl-3-(2-(acetamidomethyl)-3,4,5-trimethoxyphenyl)acrylate (3k)



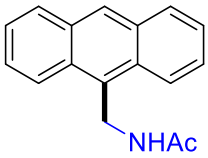
The reaction of methyl-3-(3,4,5-trimethoxyphenyl)acrylate **1k** (126.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 122.7 mg (76%) of **3k** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.08 (d, *J* = 15.6 Hz, 1H), 6.85 (s, 1H), 6.28 (d, *J* = 15.6 Hz, 1H), 5.70 (s, 1H), 4.47 (d, *J* = 5.4 Hz, 2H), 3.90 (s, 3H), 3.89 (s, 3H), 3.87 (s, 3H), 3.80 (s, 3H), 1.94 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.4, 167.0, 153.3, 152.6, 143.7, 141.6, 129.5, 124.1, 120.0, 105.4, 61.3, 60.9, 56.0, 51.8, 35.0, 23.2. **HRMS (ESI)** exact mass calc'd for $C_{16}H_{22}NO_6$ ($[M+H]^+$): 324.1447; found m/z: 324.1443.

***N*-(4-hydroxy-3,5-diisopropylbenzyl)acetamide (3l)**



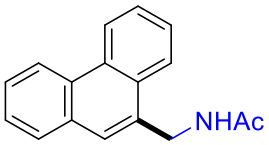
The reaction of 2,6-diisopropylphenol **1l** (89.2 mg, 0.5 mmol) at 80 °C for 10 hours afforded 67.3 mg (54%) of **3l** as a brown oil (petroleum ether/ethyl acetate =10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.96 (s, 2H), 5.86 (s, 1H), 5.47 (s, 1H), 4.32 (d, *J* = 5.4 Hz, 2H), 3.23 – 3.16 (m, 2H), 1.99 (s, 3H), 1.25 (d, *J* = 6.8 Hz, 12H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.8, 149.7, 134.4, 129.6, 123.4, 44.0, 27.1, 23.2, 22.7. **HRMS (ESI)** exact mass calc'd for $C_{15}H_{24}NO_2$ ($[M+H]^+$): 250.1807 ; found m/z: 250.1808.

***N*-(9-anthracenylmethyl)acetamide (3m)** [1]



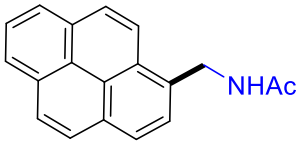
The reaction of anthracene **1m** (89.1 mg, 0.5 mmol) at 80 °C for 10 hours afforded 50.9 mg (41%) of **3m** as an orange-yellow solid (petroleum ether/ethyl acetate =10:1 gradient to 1:2). **^{1}H NMR** (400 MHz, DMSO-d_6) δ 8.61 (s, 1H), 8.38 (d, J = 8.8 Hz, 2H), 8.31 (t, J = 5.2 Hz, 1H), 8.12 (d, J = 8.2 Hz, 2H), 7.61– 7.52 (m, 4H), 5.26 (d, J = 5.2 Hz, 2H), 1.82 (s, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 169.3, 131.5, 130.6, 130.5, 129.3, 127.7, 126.7, 125.7, 125.0, 35.4, 22.9. **MS (70 ev)** : m/z (%): 151.0 (15), 206.1 (80), 249.1 (M^+, 100).

***N*-(phenanthren-9-ylmethyl)acetamide (3n)**



The reaction of phenanthrene **1n** (89.3 mg, 0.5 mmol) at 90 °C for 10 hours afforded 48.4 mg (39 %) of **3n** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:2). **^{1}H NMR** (400 MHz, DMSO-d_6) δ 8.89 – 8.86 (m, 1H), 8.84 – 8.76 (m, 1H), 8.45 (t, J = 5.6 Hz, 1H), 8.19 – 8.11 (m, 1H), 7.98 – 7.96 (m, 1H), 7.78 (s, 1H), 7.75 – 7.59 (m, 4H), 4.79 (d, J = 5.6 Hz, 2H), 1.96 (s, 3H).**^{13}C NMR** (100 MHz, DMSO-d_6) δ 169.6, 133.4, 131.5, 130.6, 130.5, 130.0, 128.7, 127.5, 127.23, 127.18, 126.4, 124.6, 123.9, 123.2, 41.1, 23.1. **HRMS (ESI)** exact mass calc'd for $C_{17}H_{16}NO$ ($[M+H]^+$): 250.1232 ; found m/z: 250.1236.

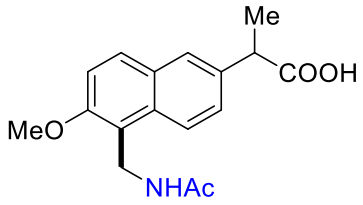
***N*-(pyren-1-ylmethyl)acetamide (3o)**[2]



The reaction of pyrene **1o** (101.0 mg, 0.5 mmol) at 90 °C for 10 hours afforded 42.4 mg (31 %) of **3o** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:2). **^{1}H NMR** (400 MHz, DMSO-d_6) δ 8.56 (t, J = 5.0 Hz, 1H), 8.38 – 8.02 (m, 9H), 5.00 (d, J = 5.6 Hz, 2H), 1.94 (s, 3H).**^{13}C NMR** (100 MHz, DMSO-d_6) δ 169.6, 133.4, 131.3

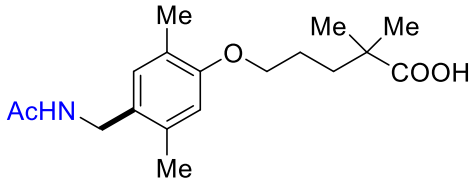
130.8, 130.6, 128.6, 128.0, 127.8, 127.5, 127.2, 126.7, 125.7, 125.6, 125.2, 124.5, 124.4, 123.7, 40.9, 23.1.**HRMS (ESI)** exact mass calc'd for $C_{19}H_{16}NO$ ($[M+H]^+$): 274.1232; found m/z: 274.1232.

2-(5-(acetamidomethyl)-6-methoxynaphthalen-2-yl)propanoic acid (3p)



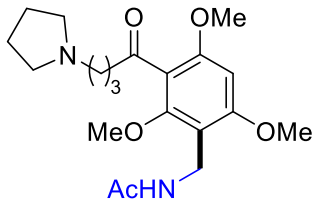
The reaction of Naproxen **1p** (115.0 mg, 0.5 mmol) at 80 °C for 10 hours afforded 108.4 mg (72 %) of **3p** as a brown solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:2). **^{1}H NMR** (400 MHz, DMSO-d_6) δ 7.92 (t, *J* = 8.4 Hz, 3H), 7.75 (s, 1H), 7.45 (d, *J* = 9.0 Hz, 2H), 4.67 (d, *J* = 5.0 Hz, 2H), 3.93 (s, 3H), 3.83 – 3.78 (m, 1H), 1.79 (s, 3H), 1.45 (d, *J* = 7.2 Hz, 3H). **^{13}C NMR** (100 MHz, DMSO-d_6) δ 175.9, 169.4, 155.5, 136.7, 132.1, 129.7, 129.1, 127.3, 126.7, 124.0, 119.0, 114.5, 57.0, 45.0, 33.2, 22.8, 18.8. **HRMS (ESI)** exact mass calc'd for $C_{17}H_{20}NO_4$ ($[M+H]^+$): 302.1392 ; found m/z: 302.1396.

5-(4-(acetamidomethyl)-2,5-dimethylphenoxy)-2,2-dimethylpentanoic acid (3q)



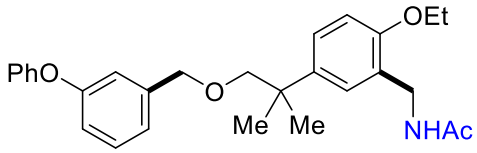
The reaction of Gemfibrozil **1q** (125.2 mg, 0.5 mmol) at 80 °C for 10 hours afforded 117.3 mg (73 %) of **3q** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:2).**^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.96 (s, 1H), 6.60 (s, 1H), 5.63 (s, 1H), 4.30 (d, *J* = 5.2 Hz, 2H), 3.91 (t, *J* = 6.0 Hz, 2H), 2.26 (s, 3H), 2.15 (s, 3H), 1.99 (s, 3H), 1.82 – 1.70 (m, 4H), 1.24 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 183.5, 170.0, 156.6, 135.0, 131.6, 127.1, 124.4, 113.3, 68.2, 41.9, 41.5, 36.9, 25.1, 25.0, 23.1, 19.0, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{18}H_{28}NO_4$ ($[M+H]^+$): 322.2018 ; found m/z: 322.2014.

***N*-(2,4,6-trimethoxy-3-(4-(pyrrolidin-1-yl)butanoyl)benzyl)acetamide (3r)**



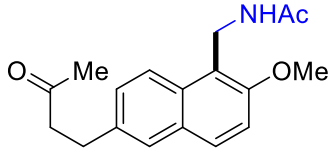
The reaction of Buflomedil hydrochloride **1r** (172.0 mg, 0.5 mmol) at 80 ºC for 10 hours afforded 120.9 mg (64 %) of **3r** as a brown oil (dichloromethane/ethanol = 40:1 gradient to 20:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.18 (s, 1H), 5.94 (t, *J* = 5.4 Hz, 1H), 4.31 (d, *J* = 5.2 Hz, 2H), 3.79 (s, 3H), 3.72 (s, 3H), 3.63 (s, 3H), 2.71 (t, *J* = 7.4 Hz, 2H), 2.48 – 2.33 (m, 6H), 1.85 (s, 3H), 1.82 –1.74 (m, 2H), 1.74 – 1.61 (m, 4H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 204.0, 169.2, 160.0, 157.0, 156.6, 118.3, 111.8, 91.1, 63.4, 55.7, 55.6, 55.5, 53.8, 42.7, 32.4, 23.2, 23.1, 23.0. **HRMS (ESI)** exact mass calc'd for $C_{20}H_{31}N_2O_5$ ($[M+H]^+$): 379.2233 ; found m/z: 379.2229.

_N_-(2-ethoxy-5-(2-methyl-1-((3-phenoxybenzyl)oxy)propan-2-yl)benzyl)acetamide(3s)



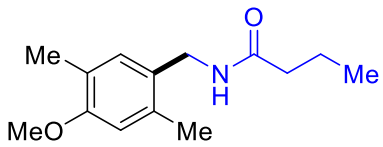
The reaction of Etofenprox **1s** (188.3 mg, 0.5 mmol) at 80 ºC for 10 hours afforded 145.4 mg (65 %) of **3s** as a colorless oil (petroleum ether/ethyl acetate = 10:1 gradient to 1:3). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.43 – 7.23 (m, 5H), 7.13 (t, *J* = 7.5 Hz, 1H), 7.07 – 6.99 (m, 3H), 6.92 (d, *J* = 8.4 Hz, 2H), 6.80 (d, *J* = 8.4 Hz, 1H), 6.18 (t, *J* = 5.6 Hz, 1H), 4.54 – 4.40 (m, 4H), 4.06 (q, *J* = 6.8 Hz, 2H), 3.45 (s, 2H), 1.97 (s, 3H), 1.44 (t, *J* = 7.0 Hz, 3H), 1.34 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.4, 157.1, 157.0, 154.9, 140.8, 139.4, 129.5, 129.4, 127.6, 126.2, 125.4, 123.1, 121.8, 118.7, 117.5, 117.4, 110.7, 80.0, 72.5, 63.4, 39.8, 38.3, 26.0, 23.1, 14.8. **HRMS (ESI)** exact mass calc'd for $C_{28}H_{34}NO_4$ ($[M+H]^+$): 448.2488 ; found m/z: 448.2480.

_N_-((2-methoxy-6-(3-oxobutyl)naphthalen-1-yl)methyl)acetamide (3t)



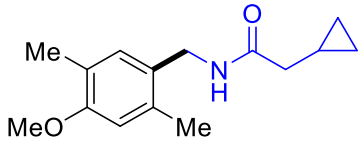
The reaction of Nabumetone **1t** (114.2 mg, 0.5 mmol) at 80 °C for 10 hours afforded 104.7 mg (70 %) of **3t** as a brown solid (petroleum ether/ethyl acetate =10:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 8.8 Hz, 1H), 7.77 (d, *J* = 9.0 Hz, 1H), 7.58 (d, *J* = 1.8 Hz, 1H), 7.37 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.28 (d, *J* = 2.8 Hz, 1H), 5.72 (s, 1H), 4.91 (d, *J* = 5.2 Hz, 2H), 3.98 (s, 3H), 3.03 (t, *J* = 7.6 Hz, 2H), 2.84 (t, *J* = 7.6 Hz, 2H), 2.16 (s, 3H), 1.96 (s, 3H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 207.9, 169.7, 155.1, 136.3, 131.3, 129.4, 129.3, 128.4, 126.9, 123.7, 118.6, 113.0, 56.5, 45.0, 34.0, 30.1, 29.5, 23.3. **HRMS (ESI)** exact mass calc'd for $C_{18}H_{22}NO_3$ ($[M+H]^+$): 300.1600; found m/z: 300.1599.

***N*-(4-methoxy-2,5-dimethylbenzyl)butyramide (4a)**



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and butyronitrile (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 90 °C for 10 hours afforded 59.8 mg (51%) of **4a** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.96 (s, 1H), 6.63 (s, 1H), 5.68 (s, 1H), 4.31 (d, *J* = 5.2 Hz, 2H), 3.79 (s, 3H), 2.28 (s, 3H), 2.17 – 2.10 (m, 5H), 1.69 –1.63 (m, 2H), 0.93 (t, *J* = 7.2 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 172.5, 157.0, 134.9, 131.5, 127.4, 123.9, 112.2, 55.3, 41.1, 38.5, 19.1, 18.9, 15.5, 13.7. **HRMS (ESI)** exact mass calc'd for $C_{14}H_{22}NO_2$ ($[M+H]^+$) : 236.1651; found m/z : 236.1649.

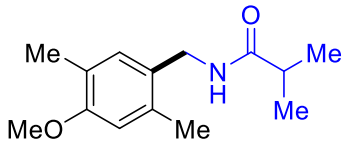
2-cyclopropyl-*N*-(4-methoxy-2,5-dimethylbenzyl)acetamide (4b)



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and cyclopropylacetonitrile (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. Then the

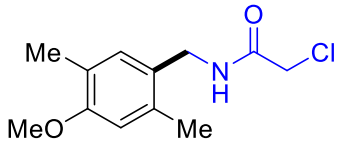
reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 90 ºC for 10 hours afforded 46.7 mg (38%) of **4b** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.99 (s, 1H), 6.65 (s, 1H), 5.88 (s, 1H), 4.37 (d, *J* = 5.2 Hz, 2H), 3.81 (s, 3H), 2.30 (s, 3H), 2.20 – 2.13 (m, 5H), 0.97–0.93 (m, 1H), 0.61 – 0.53 (m, 2H), 0.19 – 0.16 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 172.0, 157.1, 135.0, 131.5, 127.4, 124.1, 112.3, 55.4, 41.5, 41.3, 19.1, 15.7, 7.2, 4.7. **HRMS (ESI)** exact mass calc'd for $C_{15}H_{22}NO_2$ ($[M+H]^+$) : 248.1650 ; found m/z : 248.1650.

***N*-(4-methoxy-2,5-dimethylbenzyl)isobutyramide (4c)**



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and isobutyronitrile (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 90 ºC for 10 hours afforded 41.1 mg (35%) of **4c** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.97 (s, 1H), 6.64 (s, 1H), 5.45 (s, 1H), 4.33 (d, *J* = 5.1 Hz, 2H), 3.81 (s, 3H), 2.39 – 2.30 (m, 1H), 2.28 (s, 3H), 2.16 (s, 3H), 1.16 (d, *J* = 6.9 Hz, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 176.4, 157.2, 135.2, 131.7, 127.5, 124.1, 112.3, 55.4, 41.3, 35.7, 19.7, 19.0, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{14}H_{22}NO_2$ ($[M+H]^+$) : 236.1651 ; found m/z : 236.1648.

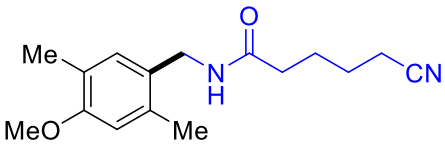
2-chloro-*N*-(4-methoxy-2,5-dimethylbenzyl)acetamide (4d)



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and chloroacetonitrile (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 90 ºC for 10 hours afforded

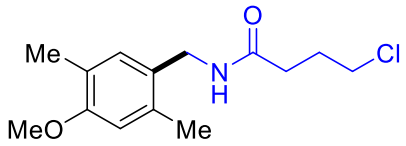
37.3 mg (31%) of **4d** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.00 (s, 1H), 6.66 (s, 1H), 6.57 (s, 1H), 4.40 (d, *J* = 5.3 Hz, 2H), 4.07 (s, 2H), 3.82 (s, 3H), 2.31 (s, 3H), 2.18 (s, 3H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 165.4, 157.4, 135.1, 131.6, 126.3, 124.3, 112.4, 55.4, 42.6, 41.7, 19.1, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{17}NO_2Cl$ ($[M+H]^+$) : 242.0948 ; found m/z : 242.0945, 244.0916 (for ^{37}Cl).

5-cyano-N-(4-methoxy-2,5-dimethylbenzyl)pentanamide (4e)



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and adiponitrile (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 90 °C for 10 hours afforded 56.2 mg (41%) of **4e** as a white solid (petroleum ether/ethyl acetate =10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.95 (s, 1H), 6.63 (s, 1H), 5.68 (s, 1H), 4.31 (d, *J* = 5.1 Hz, 2H), 3.79 (s, 3H), 2.34 (t, *J* = 7.0 Hz, 2H), 2.28 (s, 3H), 2.21 (t, *J* = 7.2 Hz, 2H), 2.15 (s, 3H), 1.83 – 1.72 (m, 2H), 1.75 – 1.64 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 171.3, 157.1, 134.9, 131.5, 127.1, 124.0, 119.4, 112.2, 55.3, 41.2, 35.2, 24.9, 24.5, 19.0, 16.9, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{16}H_{23}N_2O_2$ ($[M+H]^+$): 275.1760; found m/z: 275.1755.

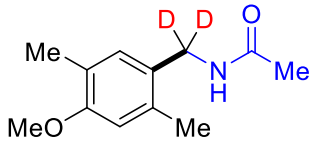
4-chloro-N-(4-methoxy-2,5-dimethylbenzyl)butanamide (4f)



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and 4-chlorobutyronitrile (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 90 °C for 10 hours

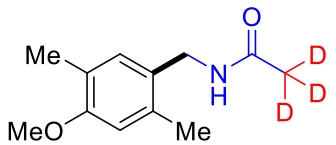
afforded 41.7 mg (31%) of **4f** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.97 (s, 1H), 6.64 (s, 1H), 5.57 (s, 1H), 4.34 (d, *J* = 5.2 Hz, 2H), 3.81 (s, 3H), 3.61 (t, *J* = 6.2 Hz, 2H), 2.36 (t, *J* = 7.2 Hz, 2H), 2.29 (s, 3H), 2.16 (s, 3H), 2.12 (m, 2H). **^{13}C NMR** (100 MHz, CDCl3) δ 171.1, 157.2, 135.0, 131.6, 127.1, 124.1, 112.3, 55.4, 44.5, 41.4, 33.1, 28.1, 19.0, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{14}H_{21}ClNO_2$ ($[M+H]^+$): 270.1261 ; found m/z: 270.1261, 272.1236 (for ^{37}Cl).

***N*-((4-methoxy-2,5-dimethylphenyl)methyl-*d*2)acetamide (*d*$_2$-3h)**



DMSO-d_6 (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CH_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 80 ºC for 10 hours afforded 71.2 mg (68%) of ***d*$_2$-3h** as a white solid (petroleum ether/ethyl acetate =10:1 gradient to 1:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.96 (s, 1H), 6.63 (s, 1H), 5.68 (s, 1H), 3.79 (s, 3H), 2.28 (s, 3H), 2.15 (s, 3H), 1.96 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.7, 157.1, 135.0, 131.5, 127.1, 124.0, 112.2, 55.3, 41.2, 41.0, 40.7, 40.5, 40.3, 23.0, 18.9, 15.5. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{16}D_2NO_2$ ($[M+H]^+$): 210.1463 ; found m/z: 210.1464.

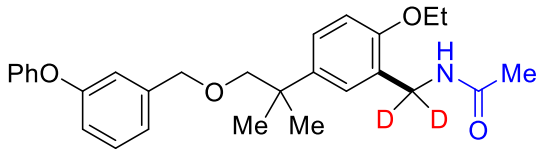
***N*-(4-methoxy-2,5-dimethylbenzyl)acetamide-2,2,2-*d*$_3$ (*d*$_3$-3h)**



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CD_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours . Then the reaction of 2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol) at 80 ºC for 10 hours afforded 71.5 mg (68%) of ***d*$_3$-3h** as a white solid(petroleum ether/ethyl acetate = 10:1 gradient to 1:1).**^{1}H NMR**

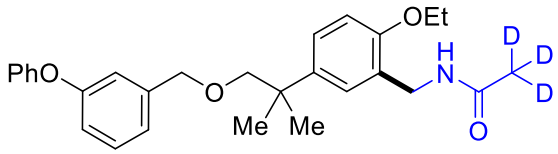
(400 MHz, $CDCl_3$) δ 6.97 (s, 1H), 6.63 (s, 1H), 5.68 (s, 1H), 4.30 (d, *J* = 5.1 Hz, 2H), 3.79 (s, 3H), 2.28 (s, 3H), 2.15 (s, 3H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.7, 157.2, 135.0, 131.6, 127.3, 124.1, 112.3, 55.4, 41.4, 19.0, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{15}D_3NO_2$ ($[M+H]^+$): 211.1526 ; found m/z: 211.1527.

***N*-((2-ethoxy-5-(2-methyl-1-((3-phenoxybenzyl)oxy)propan-2-yl)phenyl)methyl-*d*2)acetamide (*d*$_2$-3s)**



DMSO-d_6 (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CH_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. Then the reaction of Etofenprox **1s** (188.1mg, 0.5 mmol) at 80 ºC for 10 hours afforded 136.9 mg (61%) of ***d*$_2$-3s** as a colorless oil (petroleum ether/ethyl acetate 10:1 gradient to 1:3). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.40 – 7.31 (m, 2H), 7.33 – 7.23 (m, 3H), 7.13 (t, *J* = 7.3 Hz, 1H), 7.04 – 7.01 (m, 3H), 6.92 (d, *J* = 8.4 Hz, 1H), 6.80 (d, *J* = 8.4 Hz, 1H), 6.18 (s, 1H), 4.48 (s, 2H), 4.06 (q, *J* = 7.0 Hz, 2H), 3.45 (s, 2H), 1.97 (s, 3H), 1.44 (t, *J* = 7.0 Hz, 3H), 1.34 (s, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.5, 157.1, 157.0, 155.0, 140.8, 139.4, 129.5, 129.4, 127.6, 126.2, 125.3, 123.1, 121.8, 118.7, 117.5, 117.4, 110.7, 80.0, 72.4, 63.4, 38.3, 26.0, 23.1, 14.8. **HRMS (ESI)** exact mass calc'd for $C_{28}H_{32}D_2NO_4$ ($[M+H]^+$): 450.2613 ; found m/z: 450.2615.

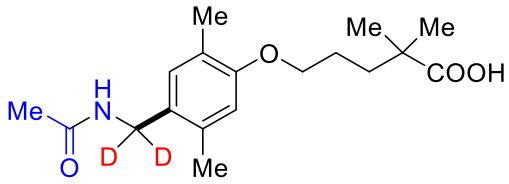
N-(2-ethoxy-5-(2-methyl-1-((3-phenoxybenzyl)oxy)propan-2-yl)benzyl)acetamide-2,2,2-*d*$_3$ （*d*$_3$-3s）



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CD_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. Then the reaction of Etofenprox **1s** (188.1mg, 0.5 mmol) at 80 ºC for 10 hours afforded 132.4 mg (59%) of ***d*$_3$-3s** as a

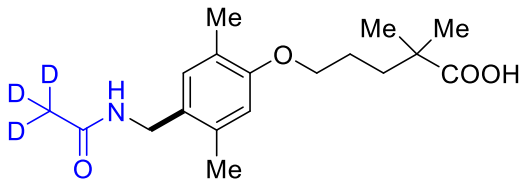
colorless oil (petroleum ether/ethyl acetate = 10:1 gradient to 1:3).**^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.38 – 7.2 (m, 5H), 7.13 (t, *J* = 7.4 Hz, 1H), 7.04 – 7.01 (m, 3H), 6.93 (d, *J* = 8.4 Hz, 2H), 6.80 (d, *J* = 8.4 Hz, 1H), 6.10 (s, 1H), 4.50 – 4.43 (m, 4H), 4.06 (q, *J* = 6.9 Hz, 2H), 3.44 (s, 2H), 1.44 (t, *J* = 7.0 Hz, 3H), 1.33 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 169.5, 157.2, 157.1, 155.0, 140.9, 139.5, 129.6, 129.4, 127.1, 126.3, 125.4, 123.1, 121.9, 118.8, 117.6, 117.5, 110.7, 80.1, 72.5, 63.5, 39.9, 38.4, 26.1, 14.9. **HRMS (ESI)** exact mass calc'd for $C_{28}H_{31}D_3NO_4$ ($[M+H]^+$): 451.2676 ; found m/z: 451.2675.

5-(4-(acetamidomethyl-d2)-2,5-dimethylphenoxy)-2,2-dimethylpentanoic acid (*d*$_2$-3q）



DMSO-d_6 (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CH_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 ºC for 10 hours. Then the reaction of Gemfibrozil **1q** (125.1mg, 0.5 mmol) at 80 ºC for 10 hours afforded 106.7 mg (66 %) of ***d*$_2$-3q** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:2).**^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.95 (s, 1H), 6.59 (s, 1H), 5.72 (s, 1H), 3.90 (t, *J* = 6.0 Hz, 2H), 2.25 (s, 3H), 2.15 (s, 3H), 1.98 (s, 3H), 1.85 – 1.67 (m, 4H), 1.24 (s, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 183.3, 170.1, 156.5, 134.9, 131.5, 126.9, 124.3, 113.2, 68.1, 41.8, 36.8, 25.1, 25.0, 23.0, 18.9, 15.5. **HRMS (ESI)** exact mass calc'd for $C_{18}H_{24}D_2NO_4$ ($[M-H]^+$): 322.1987 ; found m/z: 322.1987.

5-(4-((acetamido-2,2,2-d3)methyl)-2,5-dimethylphenoxy)-2,2-dimethylpentanoic acid(*d*$_3$-3q）

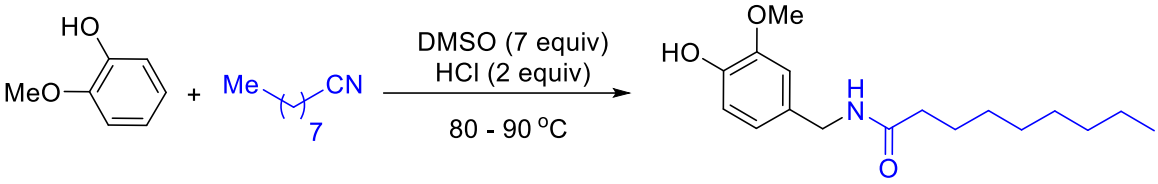


DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and CD_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper

and the mixture was stirred at 60 °C for 10 hours. Then the reaction of Gemfibrozil **1q** (125.1mg, 0.5 mmol) at 80 °C for 10 hours afforded 106.8 mg (66 %) of ***d*$_3$-3q** as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:2).**^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.96 (s, 1H), 6.60 (s, 1H), 5.57 (s, 1H), 4.31 (d, *J* = 5.2 Hz, 2H), 3.91 (t, *J* = 6.0 Hz, 2H), 2.26 (s, 3H), 2.15 (s, 3H), 1.88 – 1.68 (m, 4H), 1.24 (s, 6H).**^{13}C NMR** (100 MHz, $CDCl_3$) δ 188.4, 169.9, 156.6, 135.0, 131.6, 127.1, 124.4, 113.3, 68.2, 41.9, 41.5, 36.9, 25.1, 25.0, 19.0, 15.6. **HRMS (ESI)** exact mass calc'd for $C_{18}H_{23}D_3NO_4$ ([M-H]$^+$): 323.2050 ; found m/z: 323.2049.

3. The application of amidomethylation

General procedures for the synthesis of Nonivamide

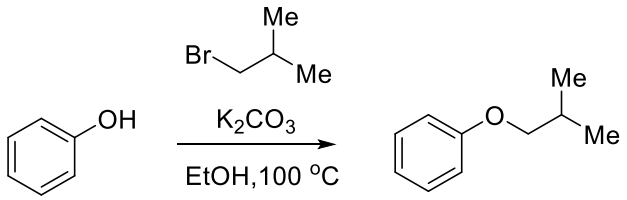


5 *Nonivamide*

DMSO (0.5 mL, 14 mmol), HCl (4 mmol, 1M in AcOH), and nonanonitrile (4.0 mL) were added to a 250 mL reaction flask with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 80 °C for the 10 hours. After the reaction temperature drops to room temperature, then the 2-methoxyphenol (124.0 mg, 1 mmol) was added, and the mixture was stirred at 90 °C for 10 hours. Upon completion of the reaction, the reaction mixture was quenched with 14.5% sodium hypochlorite solution and concentrated under vacuum and concentrated in vacuum, then was quenched with 4 mL saturated $NaHCO_3$ aqueous solution. The aqueous phase was extracted with EtOAc (5 mL × 3). The combined organic extracts were dried over anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified over silica gel chromatography to afford the 64.4 mg (22%) of Nonivamide [5] as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 2:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 6.86 – 6.72 (m, 3H), 5.75 (s, 1H), 4.34 (d, *J* = 5.8 Hz, 2H), 3.86 (s, 3H), 2.19 (t, *J* = 7.6 Hz, 2H), 1.65 – 1.62 (m, 2H), 1.28 – 1.26 (m, 10H), 0.86 (t, *J* = 6.8 Hz, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 173.0, 146.7, 145.2, 130.4, 120.8, 114.4, 110.7,

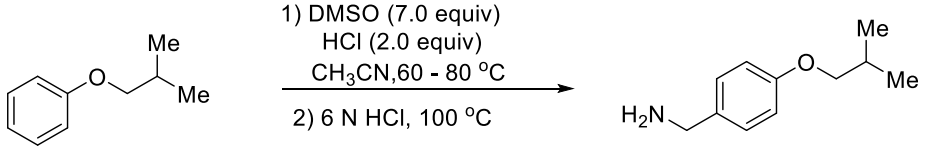
55.9, 43.5, 36.9, 31.8, 29.3, 29.2, 25.8, 22.6, 14.1. **MS (70 ev)**: m/z (%): 122.0 (10),152.1 (12), 137.0 (100), 293.2 (M^+, 20).

General procedures for the synthesis of (4-isobutoxyphenyl)methanamine



7 **11**

To a stirred solution of phenol **7** (3.0 g, 32 mmol) in EtOH (50 mL) was added potassium carbonate (4.4 g, 32 mmol) and 1-bromo-2-methylpropane (4.4 g, 32 mmol), the reaction was stirred at 100 °C for 8 hours. Then potassium carbonate (8.8 g, 64 mmol) and 1-bromo-2-methylpropane (8.8 g, 64 mmol) were added to the mixture in two times in every 8 hours. After that, the reaction mixture was cooled and evaporated to dryness in vacuum. The concentration was extracted with 30 mL ethyl acetate, washed with brine, dried over anhydrous Na_2SO_4 and concentrated in reduced pressure. The crude product was purified by flash column chromatography to afford 3.4 g (71%) of **11**[3] as a colorless oil (petroleum ether/ethyl acetate =10:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.46 – 7.30 (m, 2H), 7.06 – 6.93 (m, 3H), 3.81 (d, *J* = 6.7 Hz, 2H), 2.35 – 2.01 (m, 1H), 1.13 (d, *J* = 6.6 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 159.3, 129.3, 120.4, 114.5, 74.2, 28.3, 19.2. **MS (70 ev)**: m/z (%): 65.0 (8), 77.0 (12), 94.0 (100), 150.1 (M^+, 16).

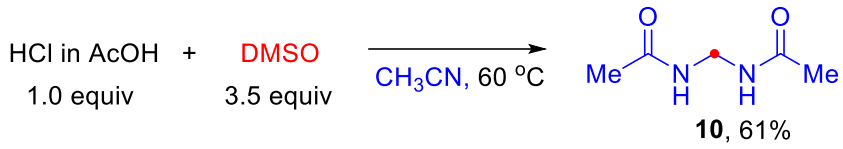


11 **6**

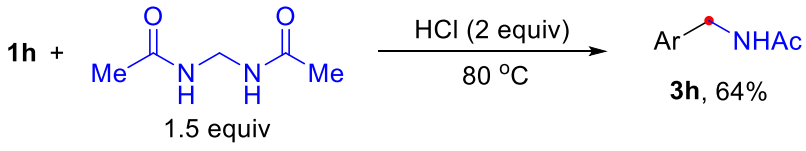
DMSO (3.4 mL, 94.5 mmol), HCl (27 mmol, 1M in AcOH), and CH_3CN (50.0 mL) were added to a 200 mL reaction flask with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for the 10 hours. Then **11** (13.5 mmol) was added, and the mixture was stirred at 80 °C for 10 hours. Upon

completion of the reaction, the reaction mixture was concentrated in reduced pressure. Then the reaction mixture was dissolved in EtOH (3.0 mL) and added to 6 N HCl (40 mL) at 100 °C for 12 hours. Upon completion of the reaction, the mixture was concentrated under vaccum. The residue was purified over silica gel chromatography to afford 747 mg (31%) of **6**[4] as a claybank oil (dichloromethane/ethanol = 50:1 gradient to 20:1). **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.24 – 7.16 (m, 2H), 6.91 – 6.65 (m, 2H), 3.79 (s, 2H), 3.70 (d, *J* = 6.6 Hz, 2H), 2.12– 2.02 (m, 1H), 1.81 (s, 2H), 1.02 (d, *J* = 6.8 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 158.2, 135.0, 128.2, 114.6, 74.5, 45.8, 28.2, 19.2. **MS (70 ev)**: m/z (%): 77.0 (20), 122.0 (100), 179.1 (M^+, 10).

4. Preliminary mechanistic studies



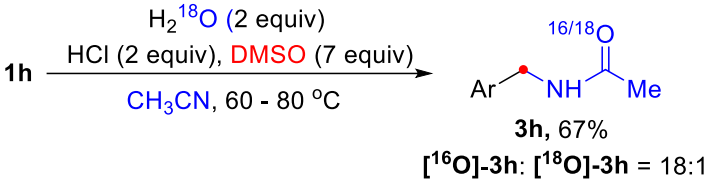
DMSO (2 mL, 28 mmol), HCl (8 mmol, 1M in AcOH), and CH_3CN (16.0 mL) were added to a 100 mL reaction flask with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. After that, the reaction mixture was concentrated under reduced pressure. The residue was purified over silica gel chromatography to afford the 317.0 mg (61%, measured with 4 mmol substrate) of **10**[6] as a white solid (petroleum ether/ethyl acetate = 10:1 gradient to 1:3). **^{1}H NMR** (400 MHz, DMSO-d_6) δ 8.42 (t, *J* = 6.2 Hz, 2H), 4.33 (t, *J* = 6.0 Hz, 2H), 1.79 (s, 6H).**^{13}C NMR** (100 MHz, DMSO-d_6) δ 170.1, 43.6, 22.9. **HRMS (ESI)** exact mass calc'd for $C_5H_{11}N_2O_2$ ($[M+H]^+$): 131.0821; found m/z: 131.0820.



2-methoxy-1,4-dimethylbenzene **1h** (68.1mg, 0.5 mmol), N,N'-methylenediacetamide **10** (98.0 mg, 0.75 mmol), and HCl (1.0 mmol, 1M in AcOH) were added to a reaction tube with a magnetic bar. The mixture was stirred at 80 °C for 10 hours. Upon completion of the reaction (monitored by TLC), the reaction mixture was concentrated

under reduced pressure, then quenched with saturated $NaHCO_3$ aqueous solution (4 mL). The aqueous phase was extracted with EtOAc (5 mL × 3). The combined organic extracts were dried over anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified over silica gel chromatography to afford 66.3 mg (64%) of **3h** (petroleum ether/ethyl acetate = 10:1 gradient to 2:1).

DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), and acetamide (5mmol, 295.0 mg) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. Then 2-methoxy-1,4-dimethylbenzene **1h** (0.5 mmol) was added, and the mixture was stirred at 80 °C for 10 hours. Upon completion of the reaction (monitored by TLC), the reaction mixture was quenched with 14.5% sodium hypochlorite solution (1 mL) and concentrated under vacuum, then quenched with saturated $NaHCO_3$ aqueous solution (4 mL). The aqueous phase was extracted with EtOAc (5 mL × 3). The combined organic extracts were dried over anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified over silica gel chromatography to afford 60.0 mg (58%) of **3h** (petroleum ether/ethyl acetate = 10:1 gradient to 2:1).



DMSO (3.5 mmol), HCl (1.0 mmol, 1M in AcOH), $H_2{}^{18}O$ (1 mmol) and CH_3CN (2.0 mL) were added to a reaction tube with a magnetic bar. Then the vessel was tightly closed with a stopper and the mixture was stirred at 60 °C for 10 hours. Then 2-methoxy-1,4-dimethylbenzene **1h** (0.5 mmol) was added, and the mixture was stirred at 80 °C for 10 hours. Upon completion of the reaction (monitored by TLC), the reaction mixture was concentrated under reduced pressure and then quenched with saturated $NaHCO_3$ aqueous solution (4 mL). The aqueous phase was extracted with EtOAc (5

mL × 3). The combined organic extracts were dried over anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified over silica gel chromatography to afford 69.5mg (67%) of **[^{16}O]-3h** and **[^{18}O]-3h** with the ratio 18: 1 **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}N^{16}O_2$ ([M+H]$^+$): 208.1338 ; found m/z: 208.1338. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}N^{16}O^{18}O$ ([M+H]$^+$): 210.1380 ; found m/z: 210.1382 (Figure S1).

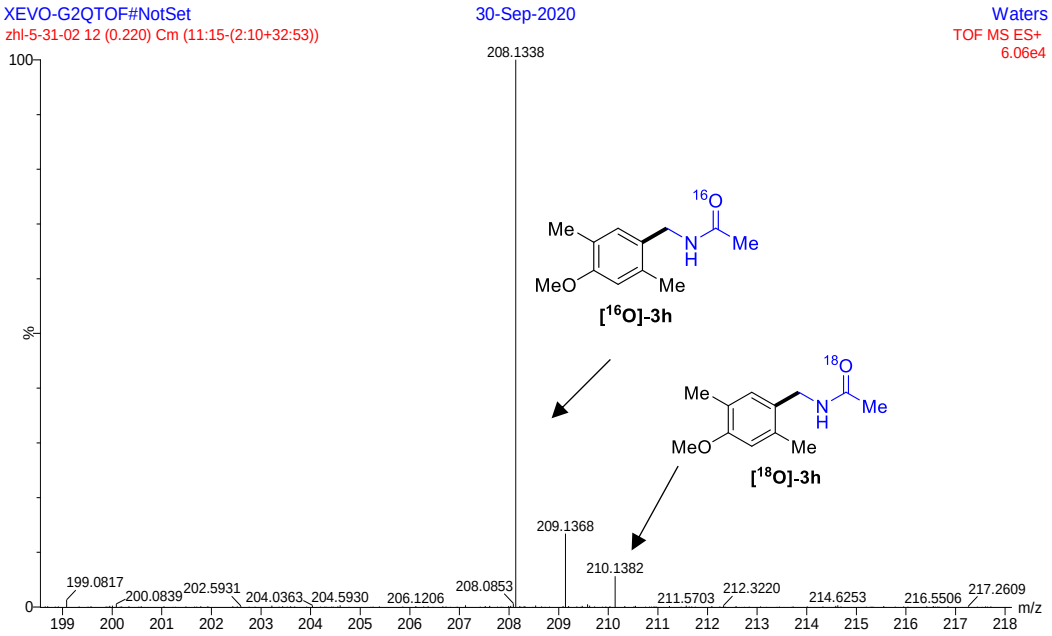
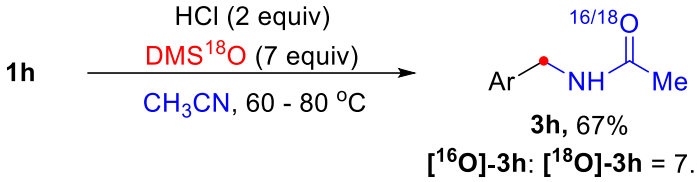


Figure S1. Analysis of **3h** by HRMS ($H_2{}^{18}O$)



$DMS^{18}O$ (1.7 mmol), HCl (0.5 mmol, 1M in AcOH), and CH_3CN (1.0 mL) were added to a reaction tube with a magnetic bar. The mixture was stirred at 60 °C for 10 hours. Then 2-methoxy-1,4-dimethylbenzene **1h** (0.25 mmol) was added, and the mixture was stirred at 80 °C for 10 hours. Upon completion of the reaction (monitored by TLC), the reaction mixture was concentrated under reduced pressure and then quenched with saturated $NaHCO_3$ aqueous solution (2 mL). The aqueous phase was extracted with EtOAc (3 mL × 3). The combined organic extracts were dried over

anhydrous Na_2SO_4, filtered, and concentrated under reduced pressure. The residue was purified over silica gel chromatography to afford 34.7 mg (67%) of **[^{16}O]-3h** and **[^{18}O]-3h** with the ratio 7.6: 1. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}N\,^{16}O_2$ ($[M+H]^+$): 208.1338 ; found m/z: 208.1340. **HRMS (ESI)** exact mass calc'd for $C_{12}H_{18}N^{16}O\,^{18}O$ ($[M+H]^+$): 210.1380 ; found m/z: 210.1383 (Figure S2).

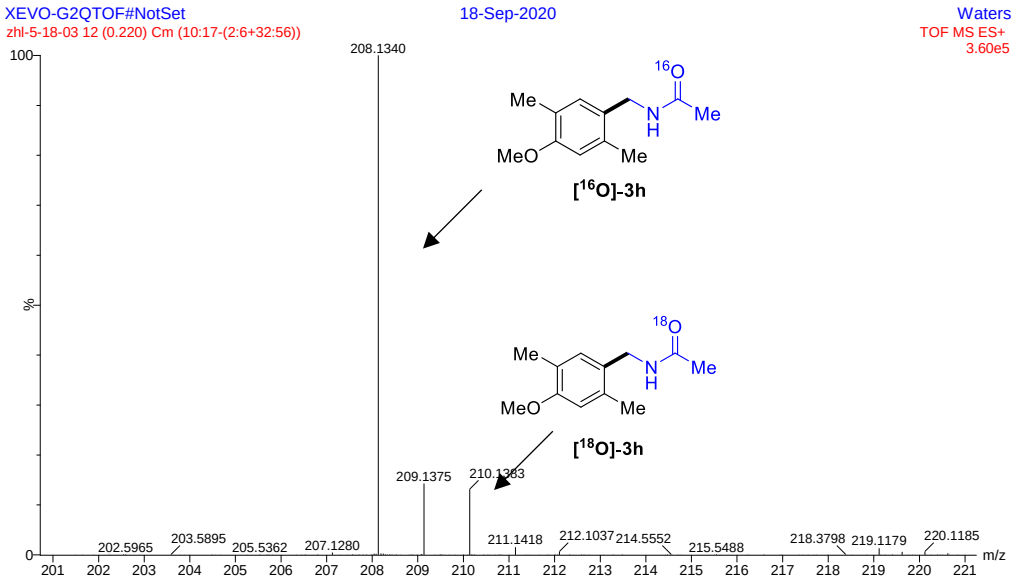


Figure S2. Analysis of **3h** by HRMS (DMS^{18}O)

5. References:

[1] J. Forrester, R. V. H. Jones, L. Newton and P. N. Preston, *Tetrahedron,* 2001**, 57**, 2871-2884.

[2] C. E. Kerr, C. D. Mitchell, Y.-M. Ying, B. E. Eaton and T. L. Netzel, *J. Phys. Chem. B.,* 2000, **104**, 2166-2175.

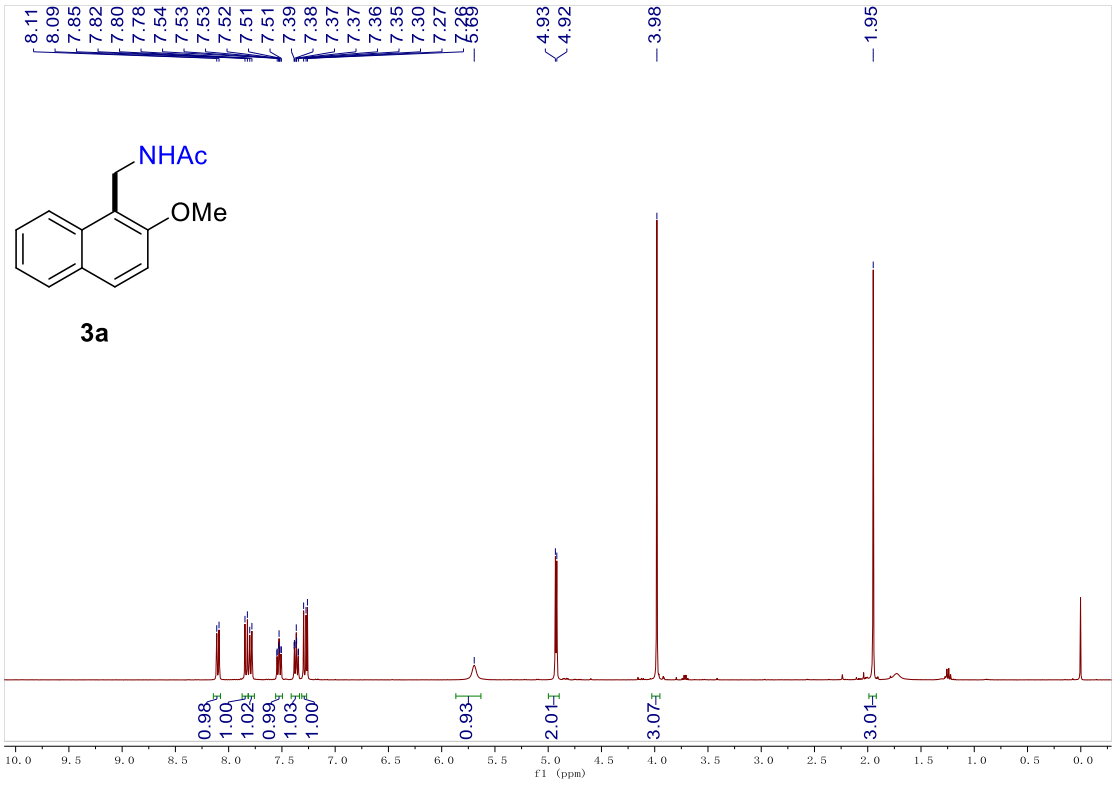
[3] M. Thangaraj, S. S. Bhojgude, M. V. Mane and A. T. Biju, *Chem. Commun.*, 2016, **52,** 1665-1668.

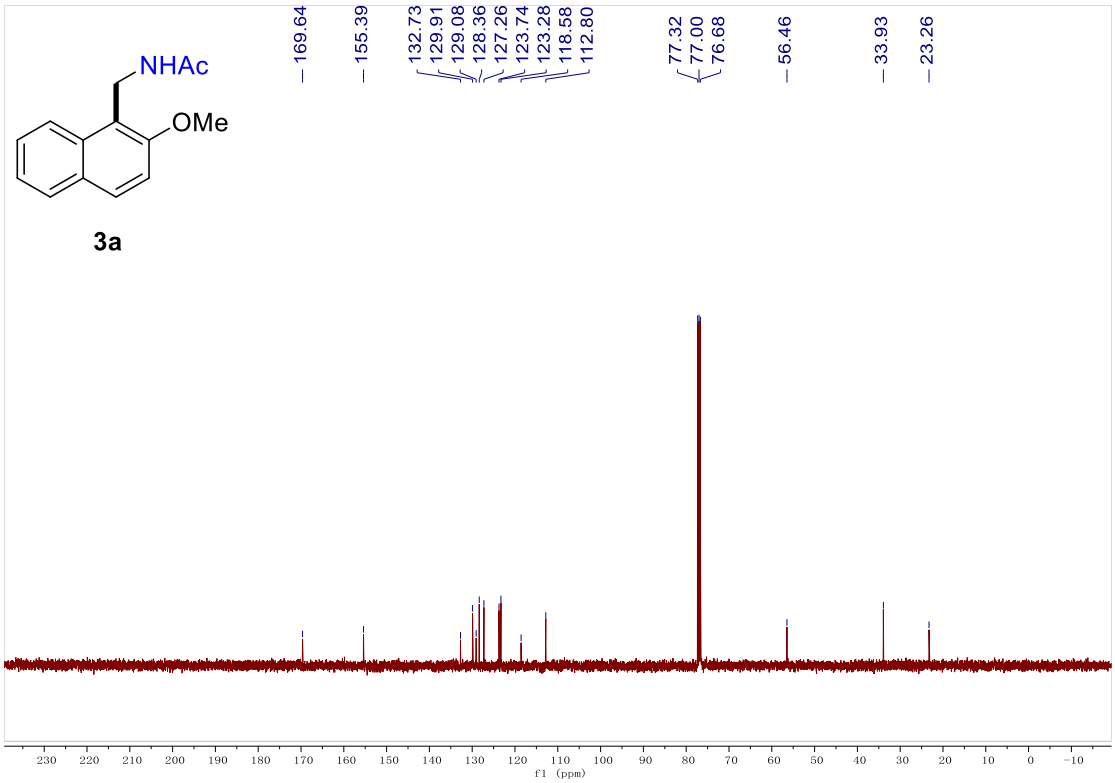
[4] C. Wu, Q. Zhou, D. Song, H. Li, C. Bao, X. Liu, X. Bao and G. Chen. *J. Chem., Res,* 2019, **43**, 480-485.

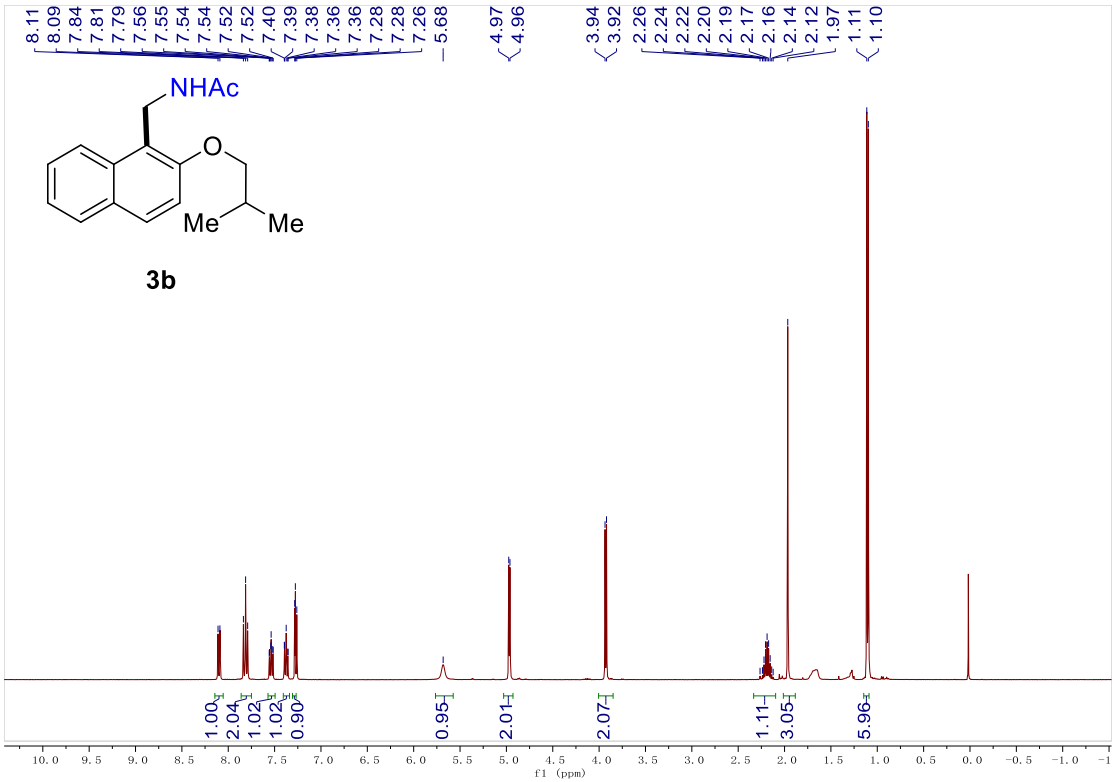
[5] M. Anderson, S. Afewerki, P. Berglund and A. Córdova, *Adv. Synth. Catal*., 2014, **356**, 2113-2118.

[6] A. H. Fernandez, R. M. Alvarez and T. M. Abajo, *Synthesis,* 1996, **11**, 1299-1301.

6.^{1}H and ^{13}C NMR spectra



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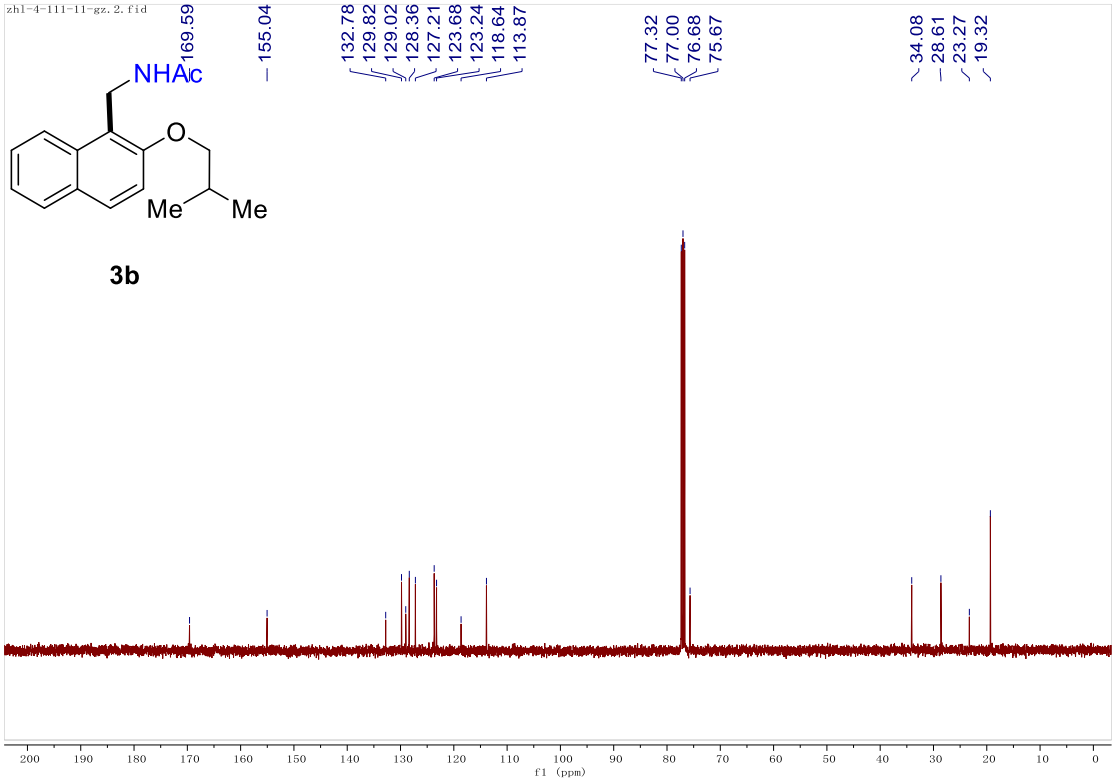
3b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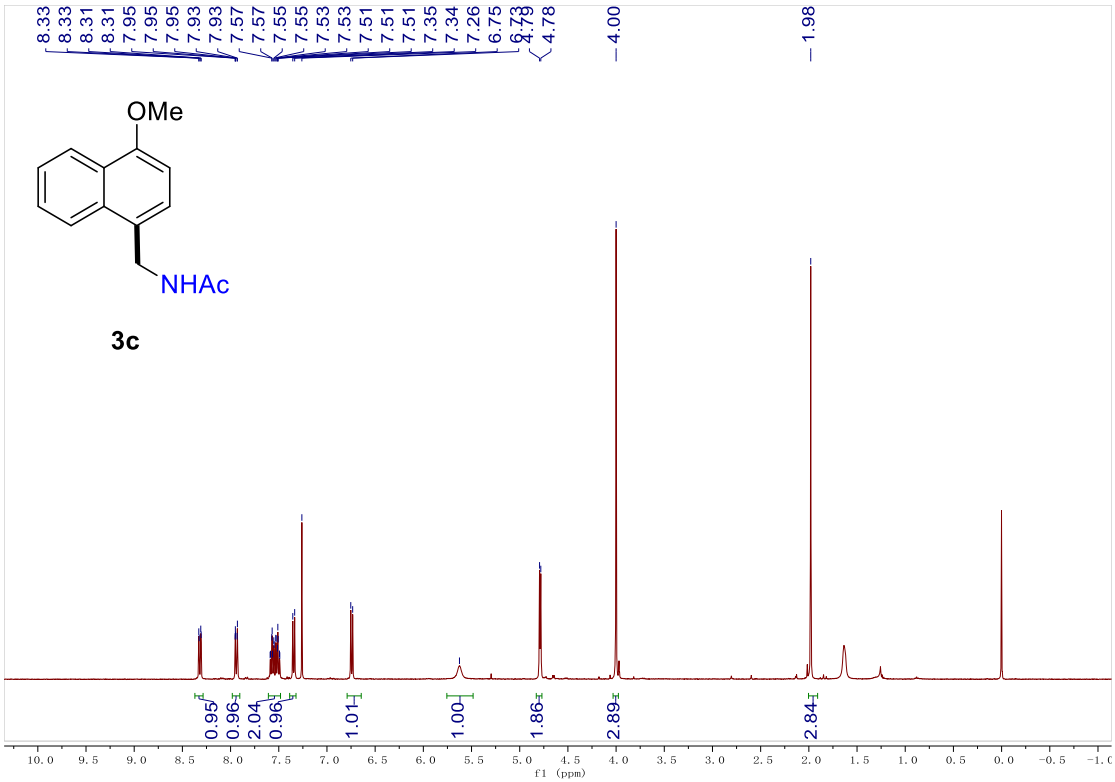
3b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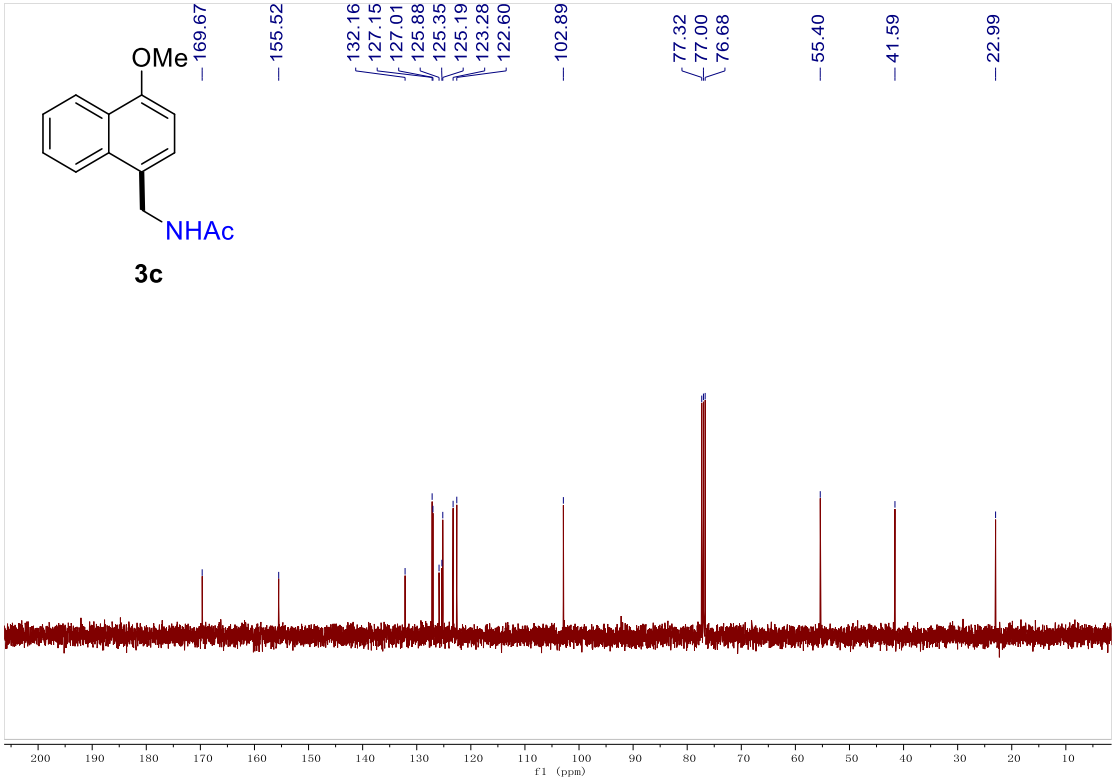
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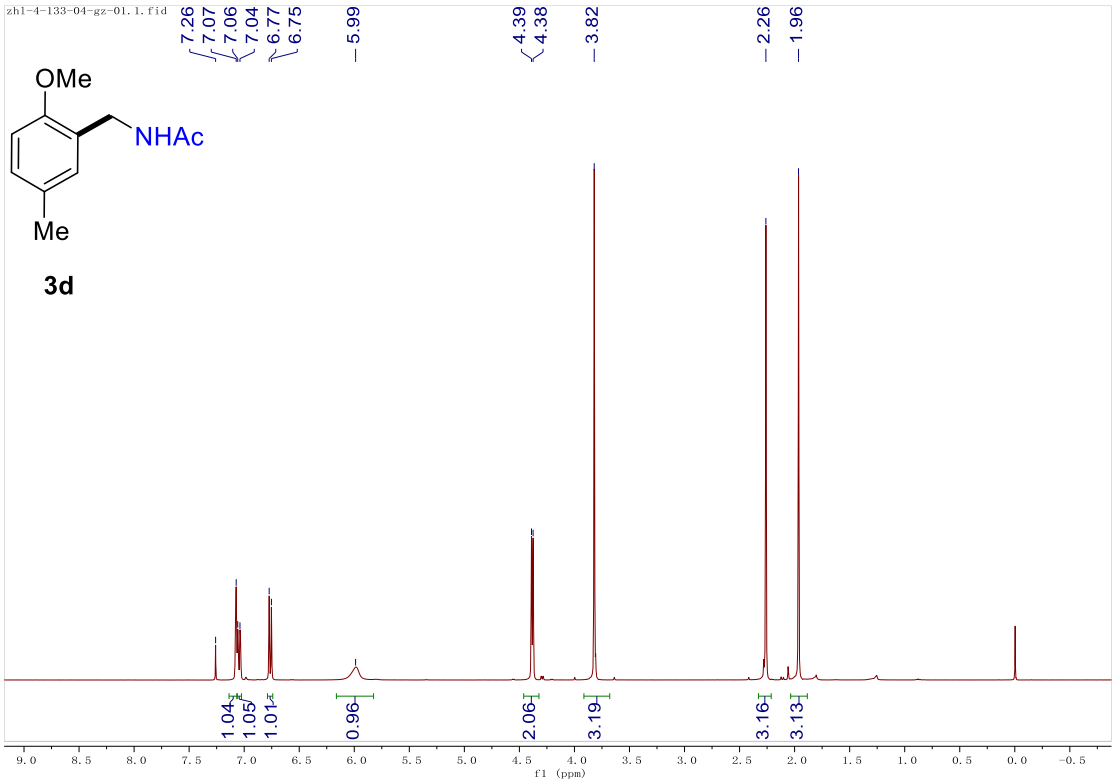
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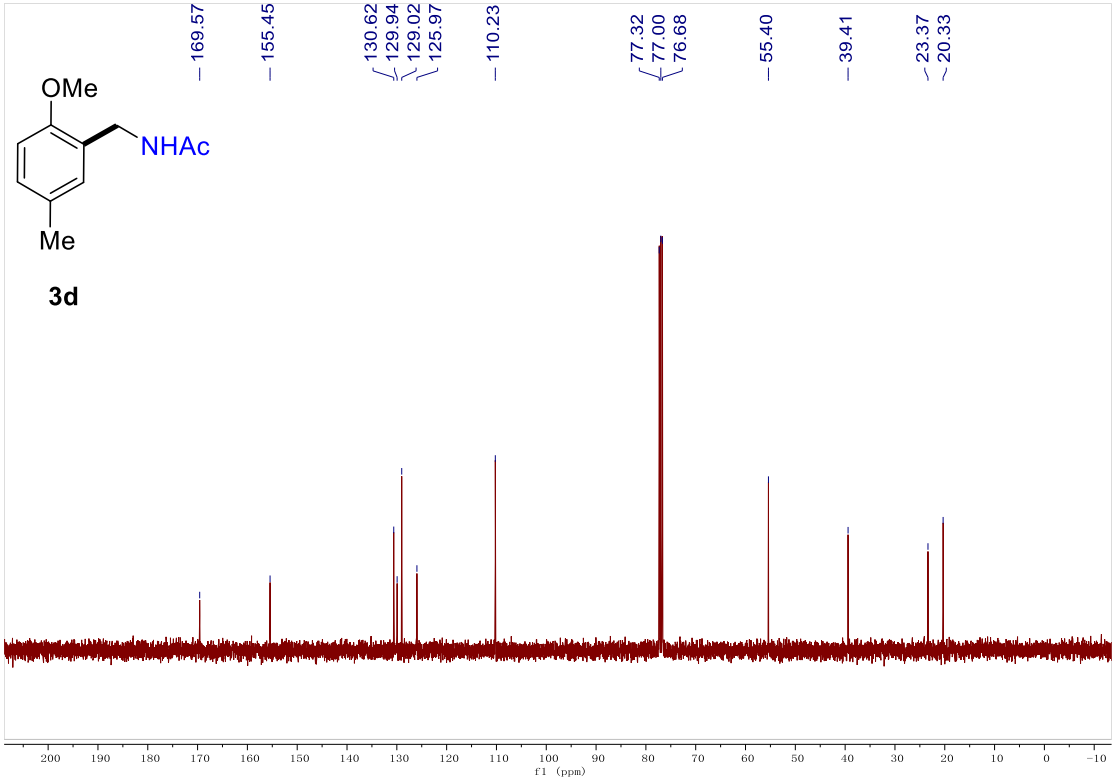
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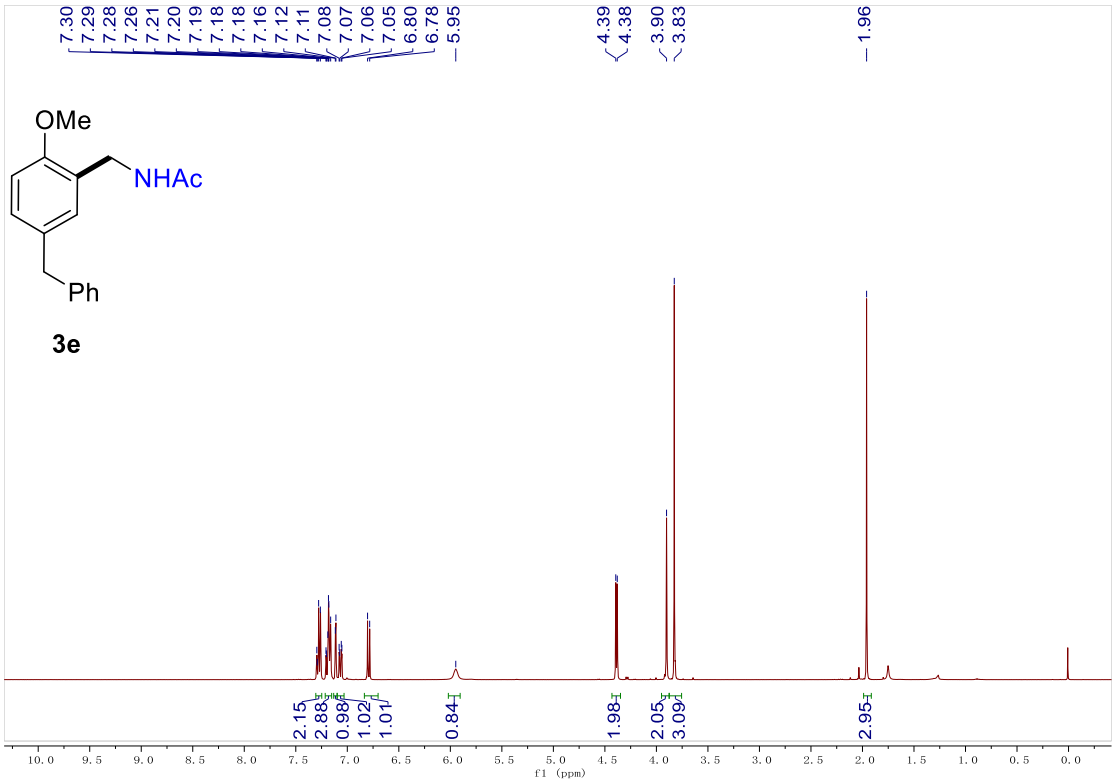
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7.19
7.18
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7.12
7.11
7.08
7.07
7.06
7.05
6.80
6.78
5.95
4.39
4.38
3.90
3.83
1.96
OMe
NHAc
Ph
3e
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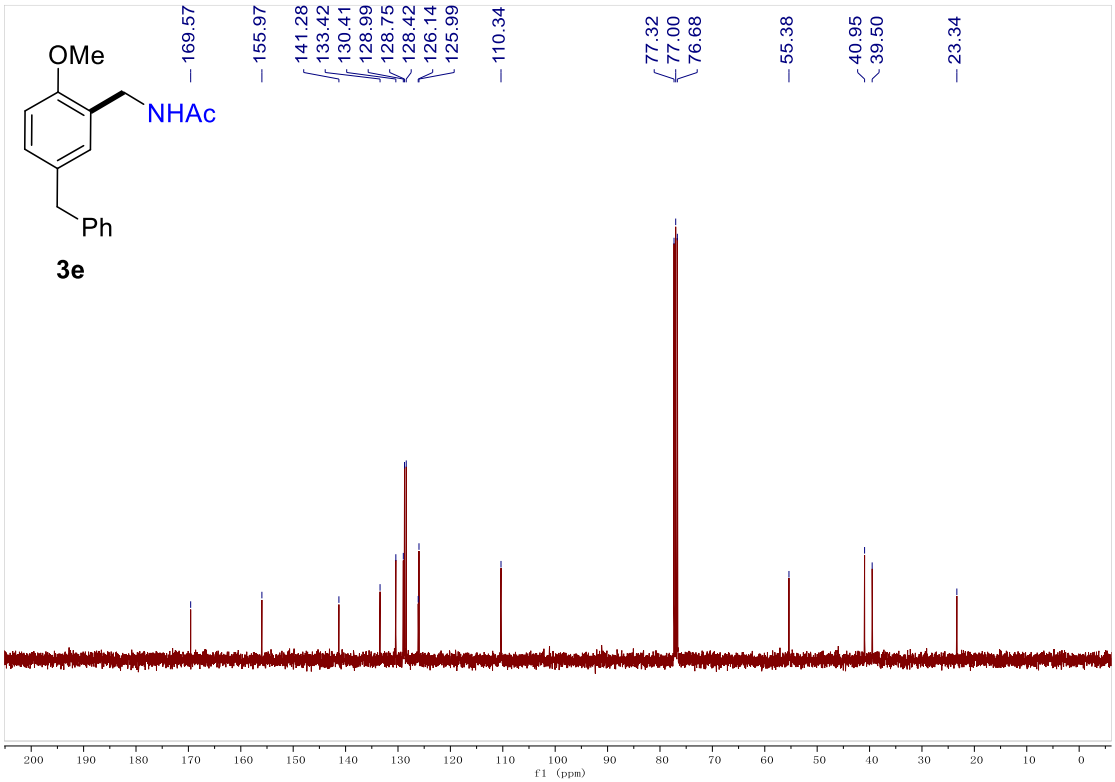
1.02
1.01
0.84
1.98
2.05
3.09
2.95
f1 (ppm)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125.99
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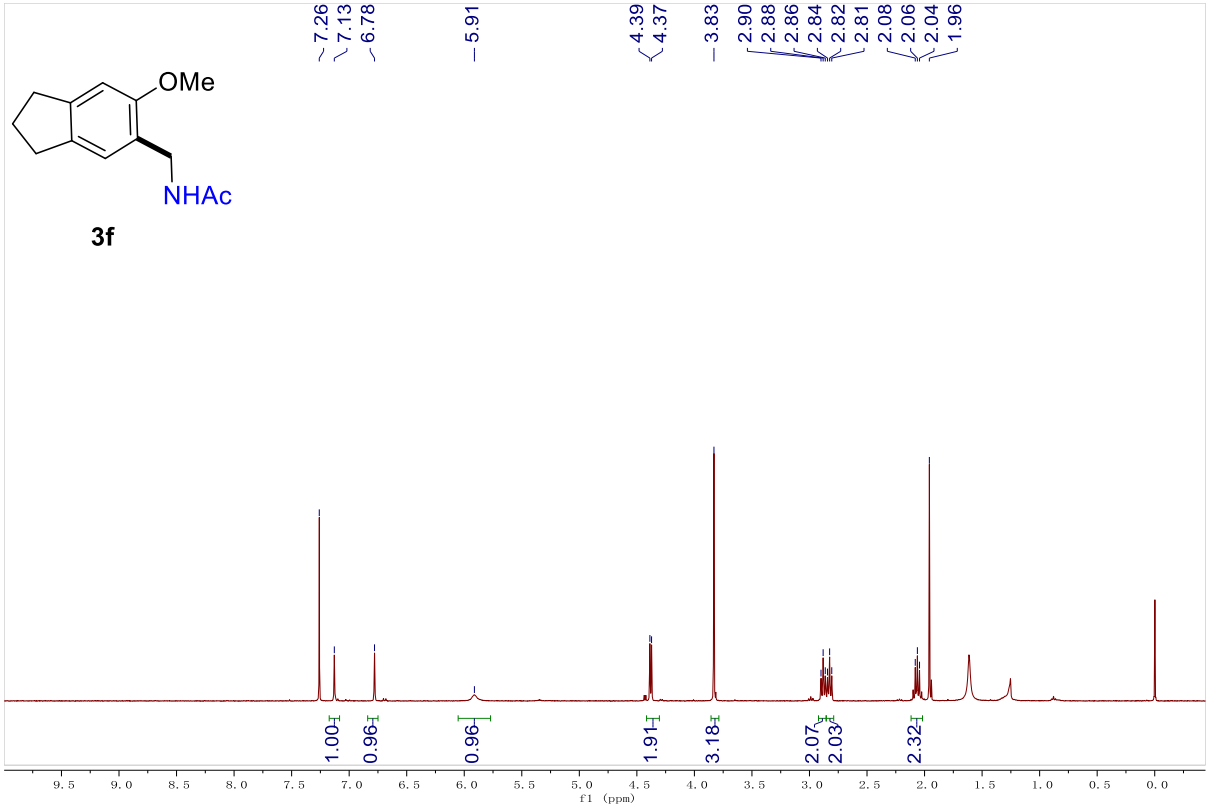
76.68
55.38
40.95
39.50
23.34
OMe
NHAc
Ph
3e
f1 (ppm)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4.37
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2.90
2.88
2.86
2.84
2.82
2.81
2.08
2.06
2.04
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1.00
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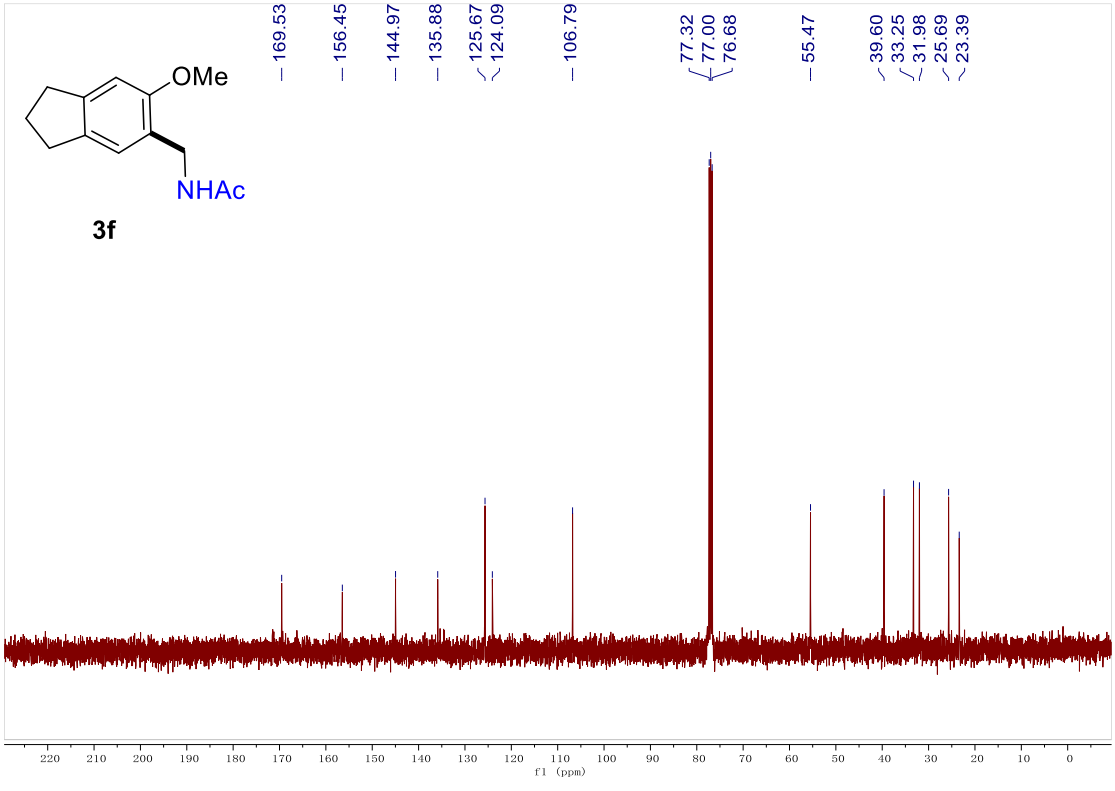
0.96
1.91
3.18
2.07
2.03
2.32
f1 (ppm)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33.25
31.98
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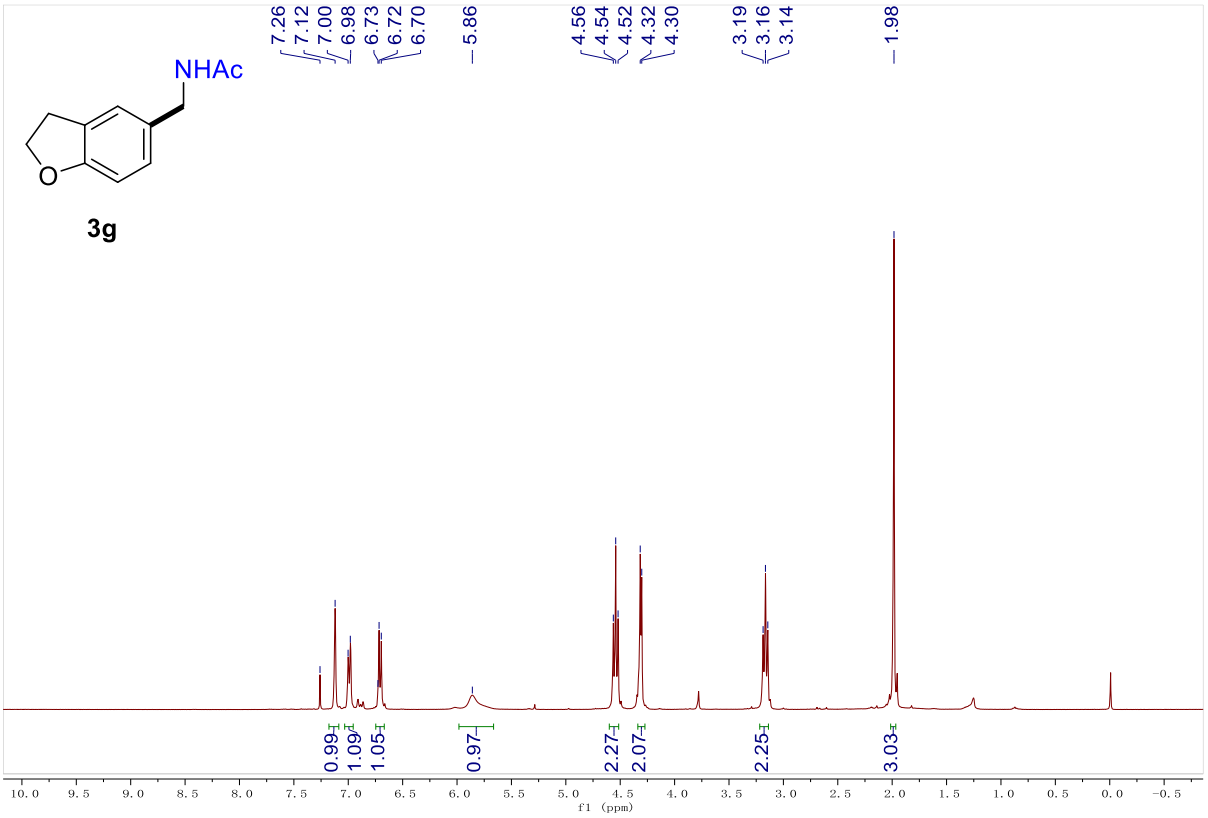
23.39
f1 (ppm)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5.86
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4.54
4.52
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4.30
3.19
3.16
3.14
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1.05
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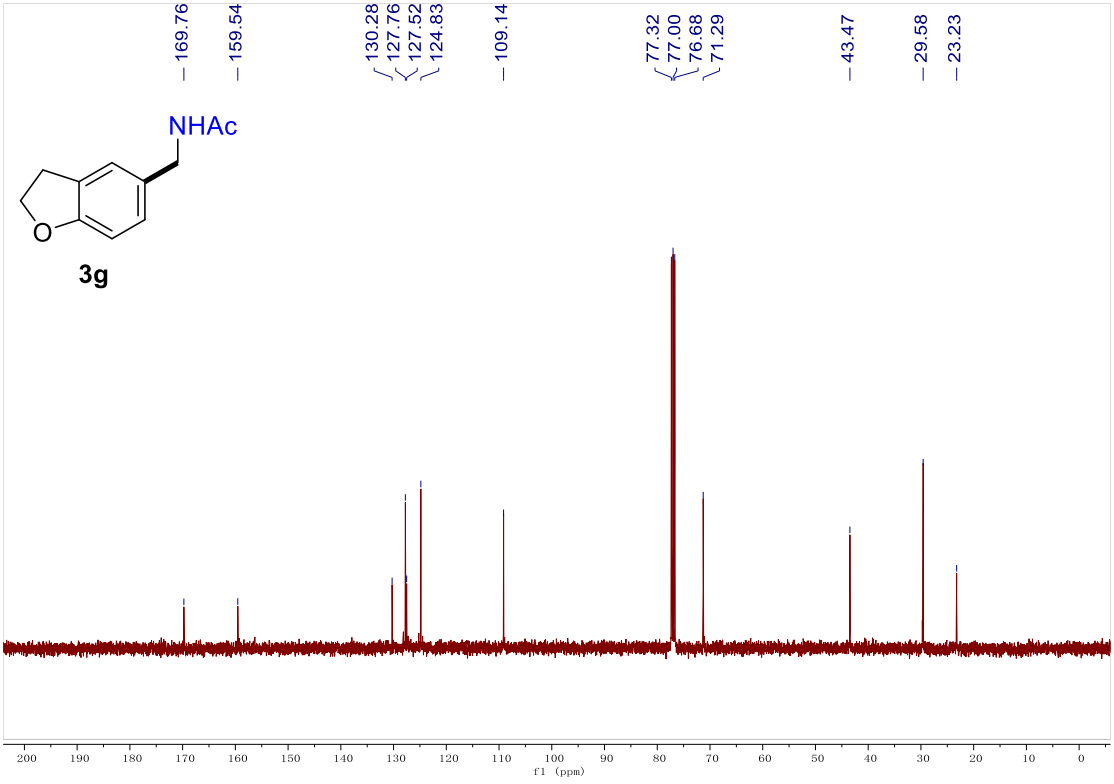
2.25
3.03
f1 (ppm)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29.58
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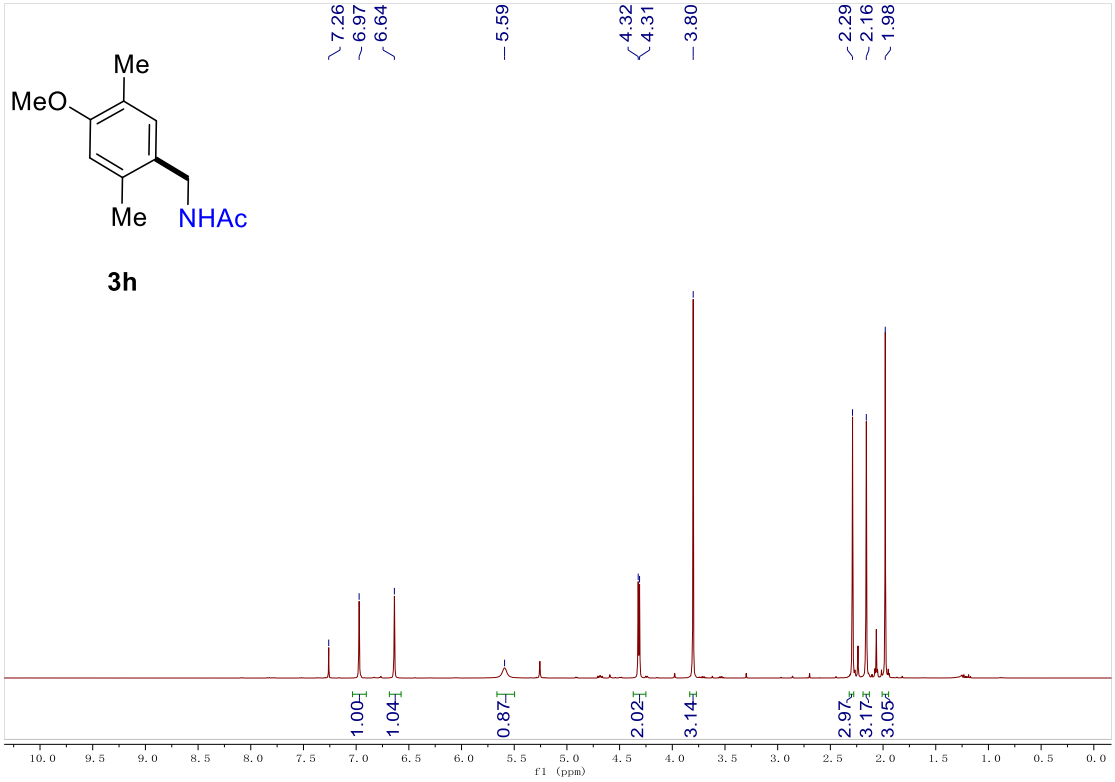
NHAc
3g
f1 (ppm)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4.31
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2.29
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Me
MeO
Me
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2.97
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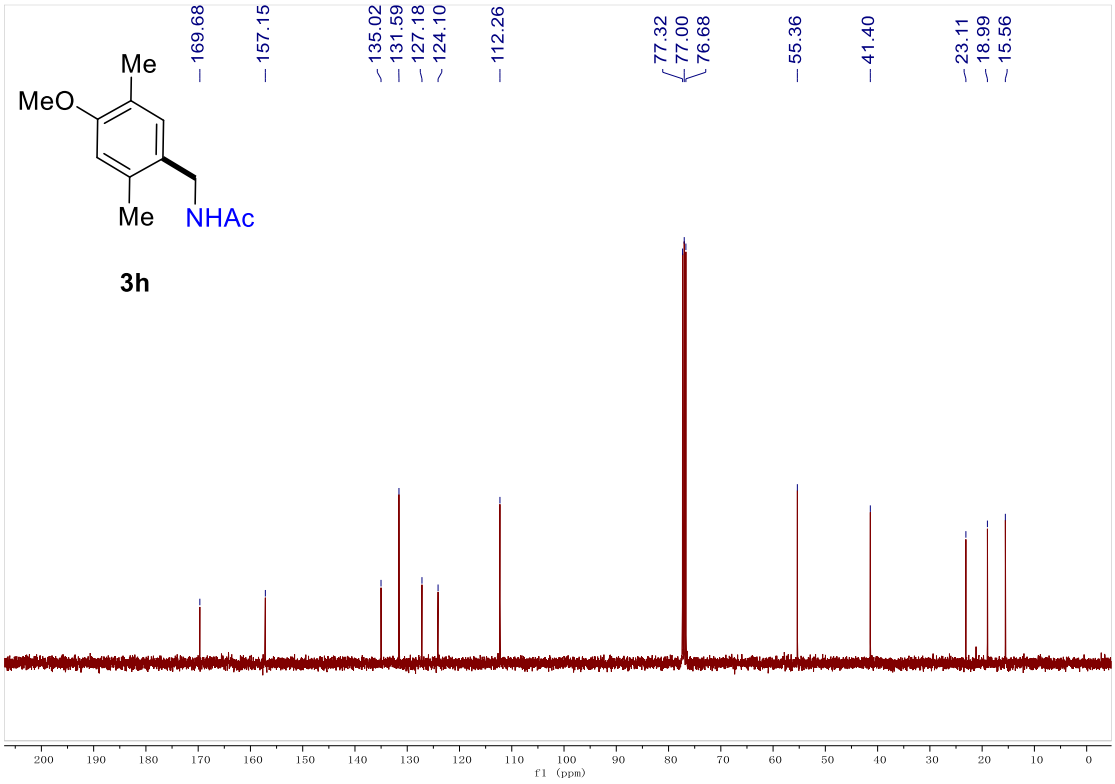
3.05
f1 (ppm)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MeO
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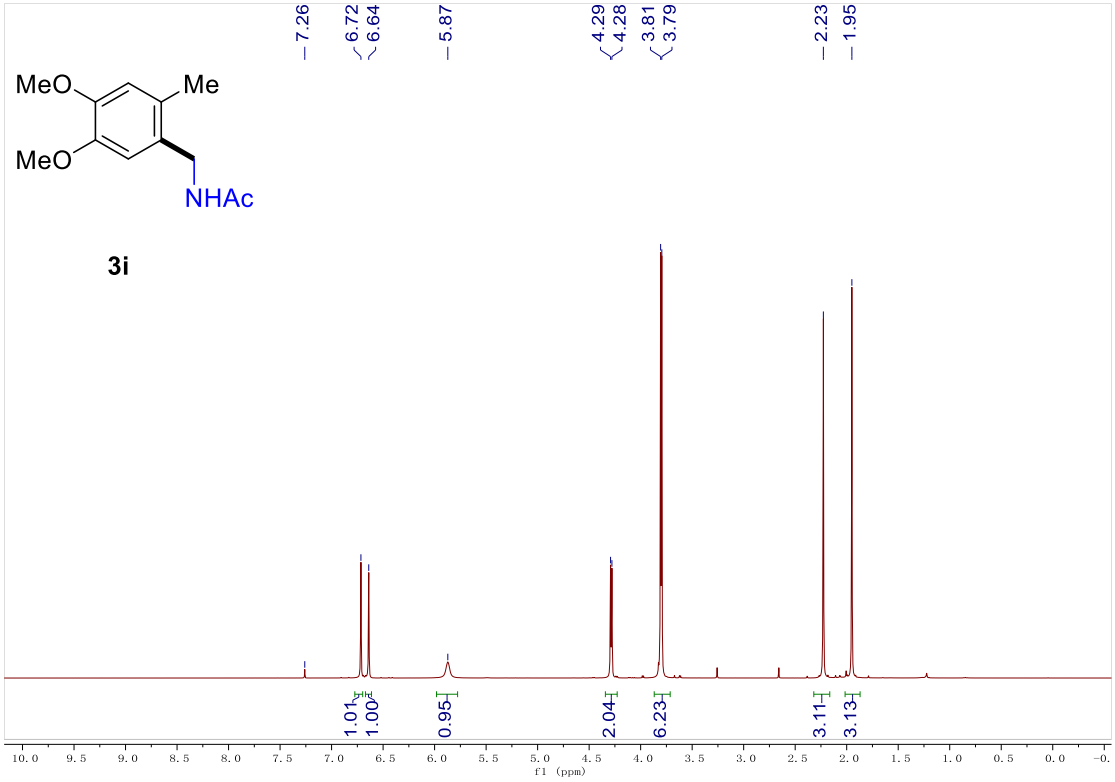
NHAc
3h
f1 (ppm)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4.28
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3.79
2.23
1.95
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Me
MeO
NHAc
3i
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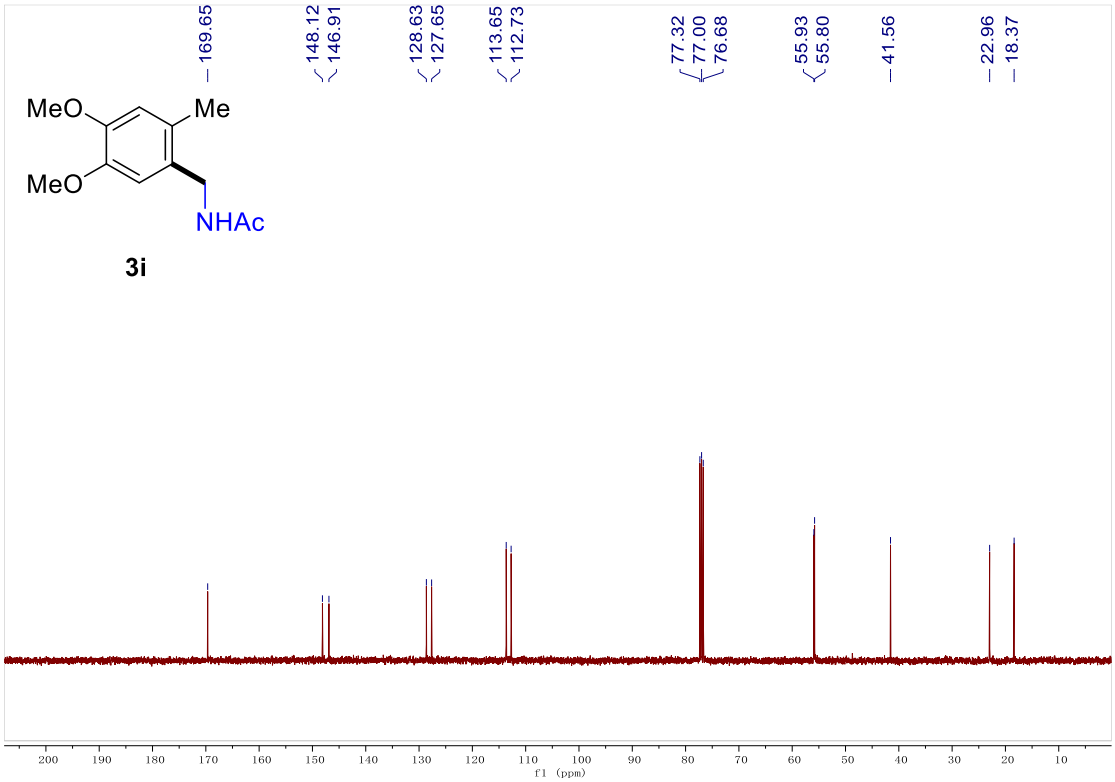
1.00
0.95
2.04
6.23
3.11
3.13
f1 (ppm)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112.73
77.32
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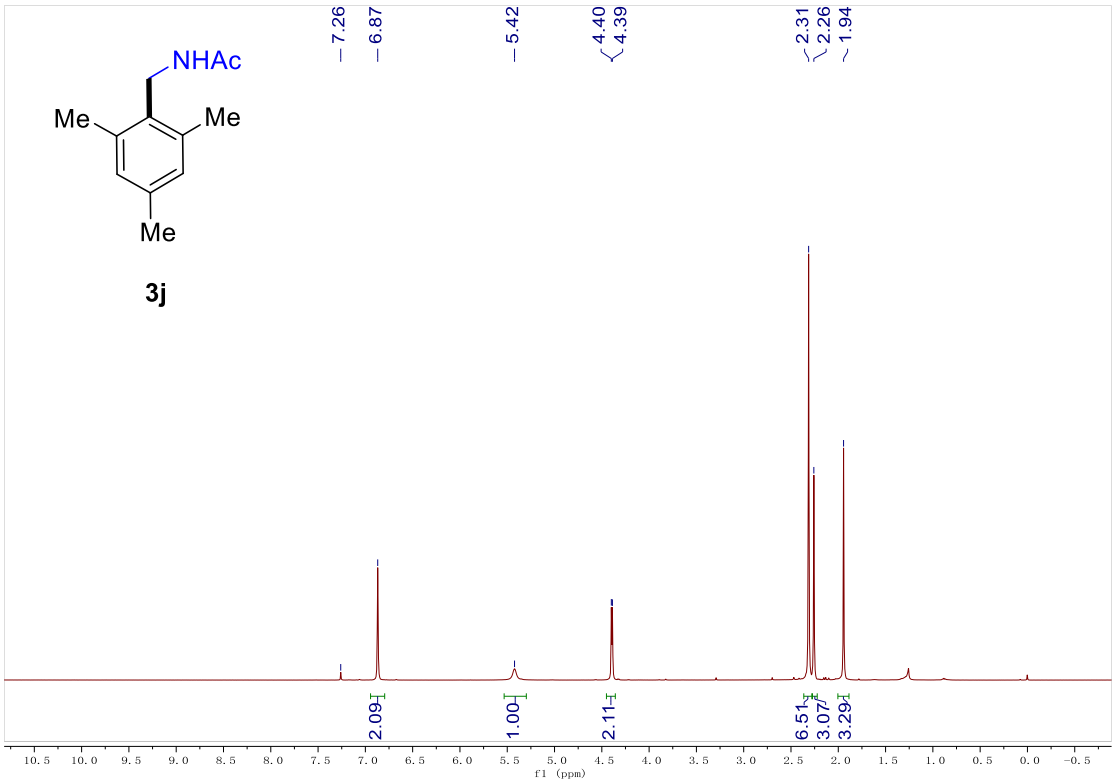
55.80
41.56
22.96
18.37
MeO
Me
MeO
NHAc
3i
f1 (ppm)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Me
Me
Me
3j
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5.42
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4.39
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2.26
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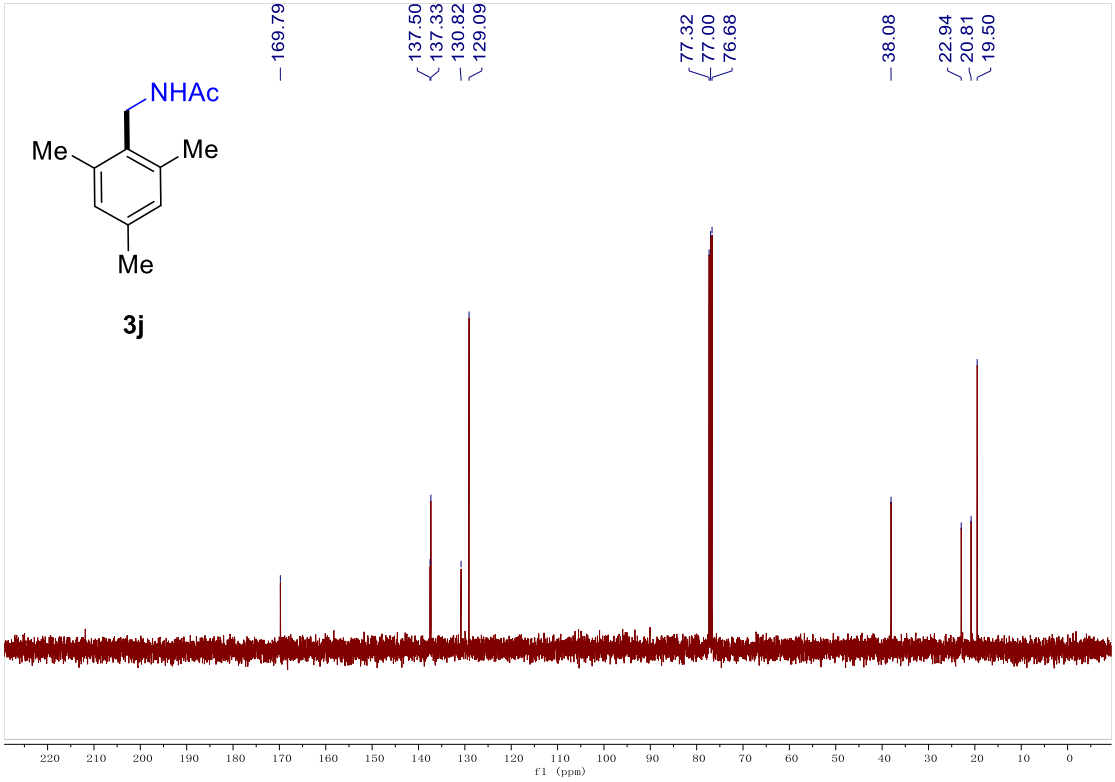
2.09
1.00
2.11
6.51
3.07
3.29
f1 (ppm)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Me
Me
3j
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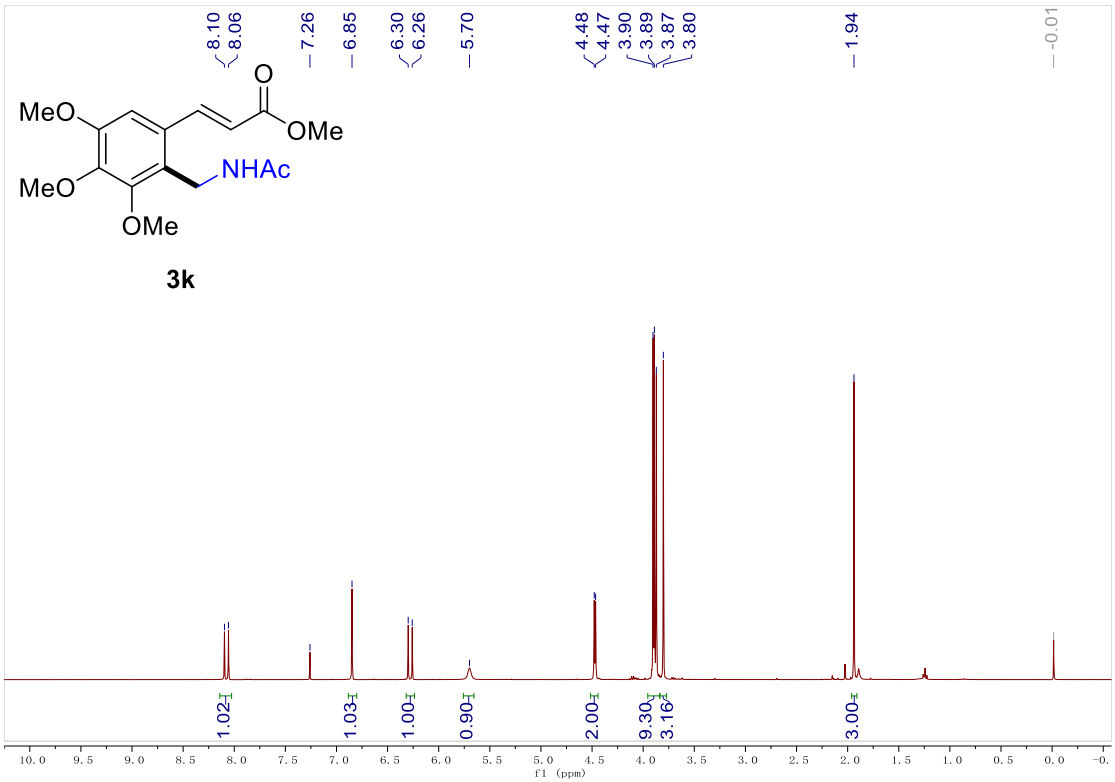
77.00
76.68
38.08
22.94
20.81
19.50
f1 (ppm)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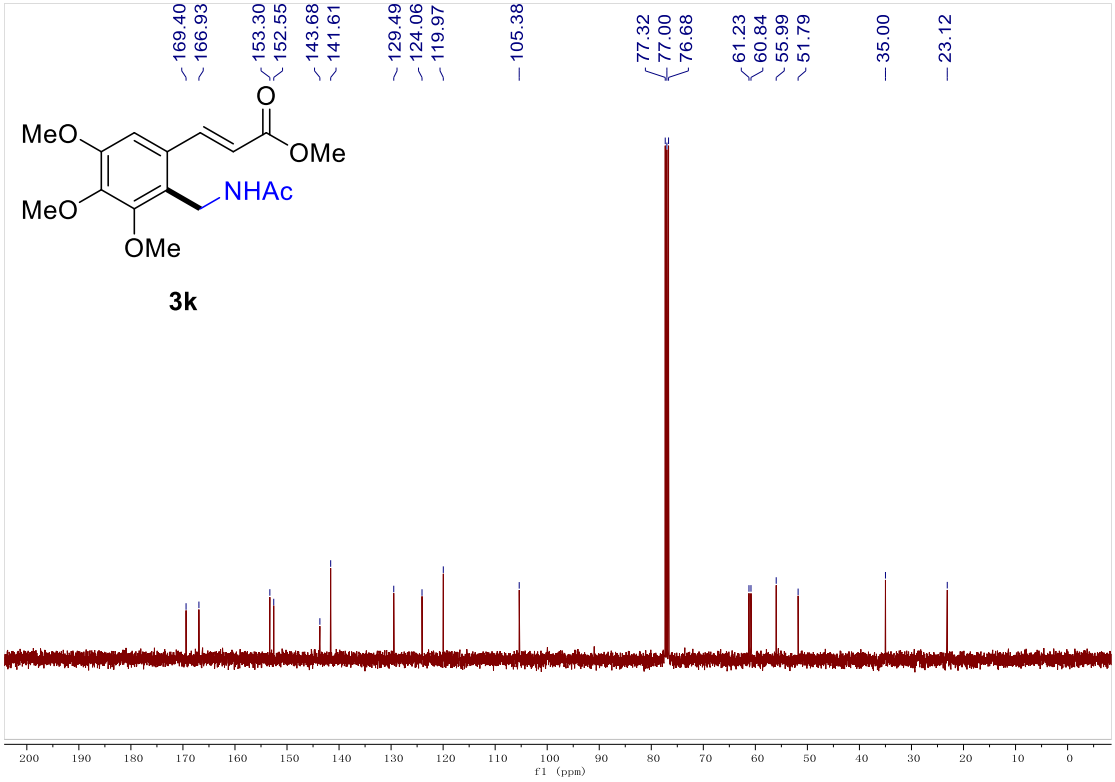
6.30
6.26
5.70
4.48
4.47
3.90
3.89
3.87
3.80
1.94
-0.01
MeO
MeO
OMe
O
OMe
NHAc
3k
1.02
1.03
1.00
0.90
2.00
9.30
3.16
3.00
f1 (ppm)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77.32
77.00
76.68
61.23
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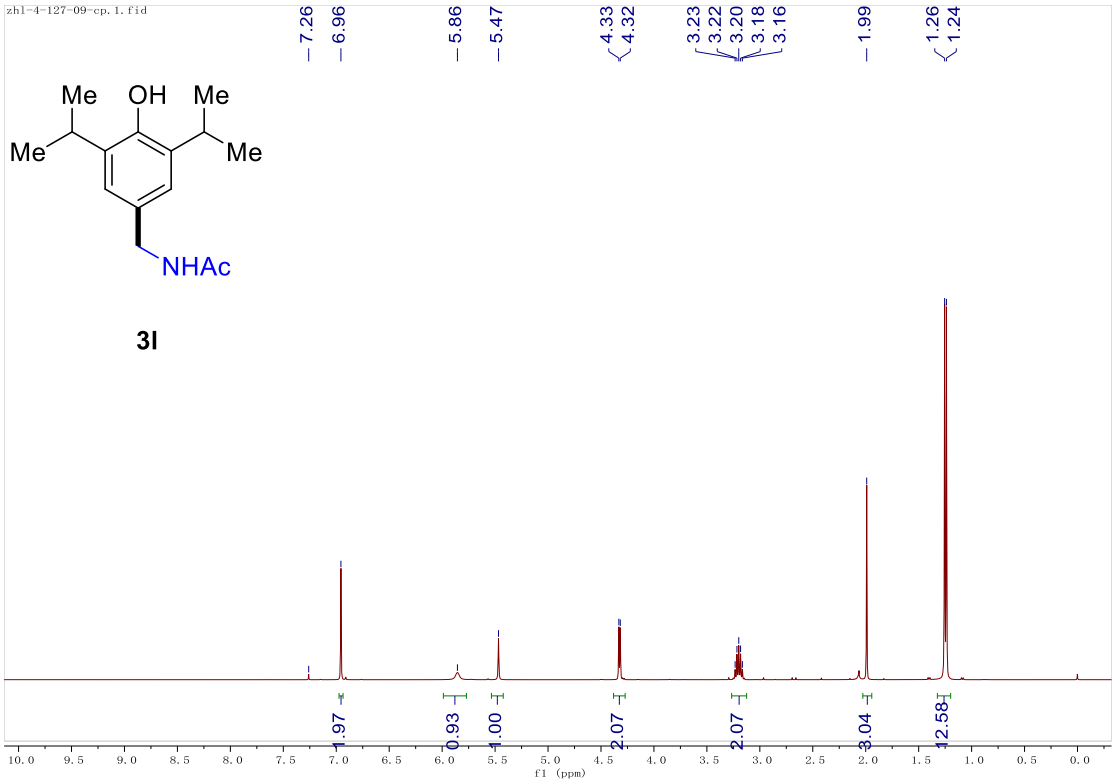
55.99
51.79
35.00
23.12
MeO
MeO
OMe
O
OMe
NHAc
3k
f1 (ppm)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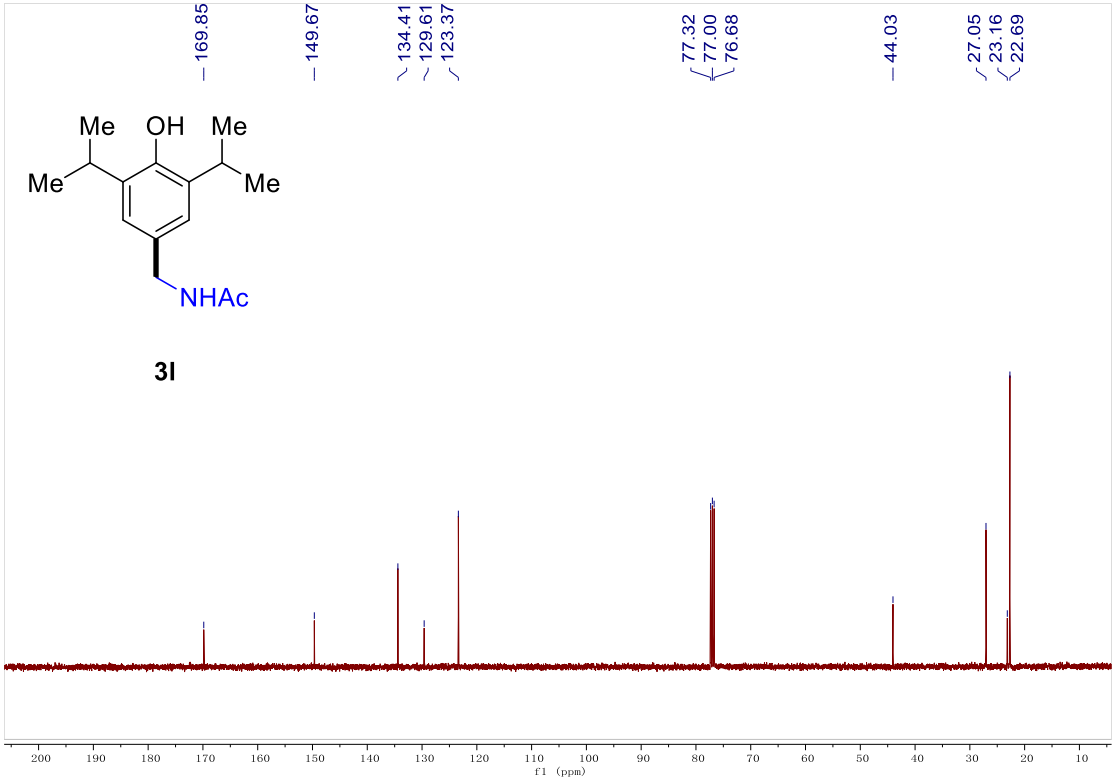
4.33
4.32
3.23
3.22
3.20
3.18
3.16
1.99
1.26
1.24
Me
OH
Me
Me
Me
NHAc
3l
1.97
0.93
1.00
2.07
2.07
3.04
12.58
f1 (ppm)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27.05
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22.69
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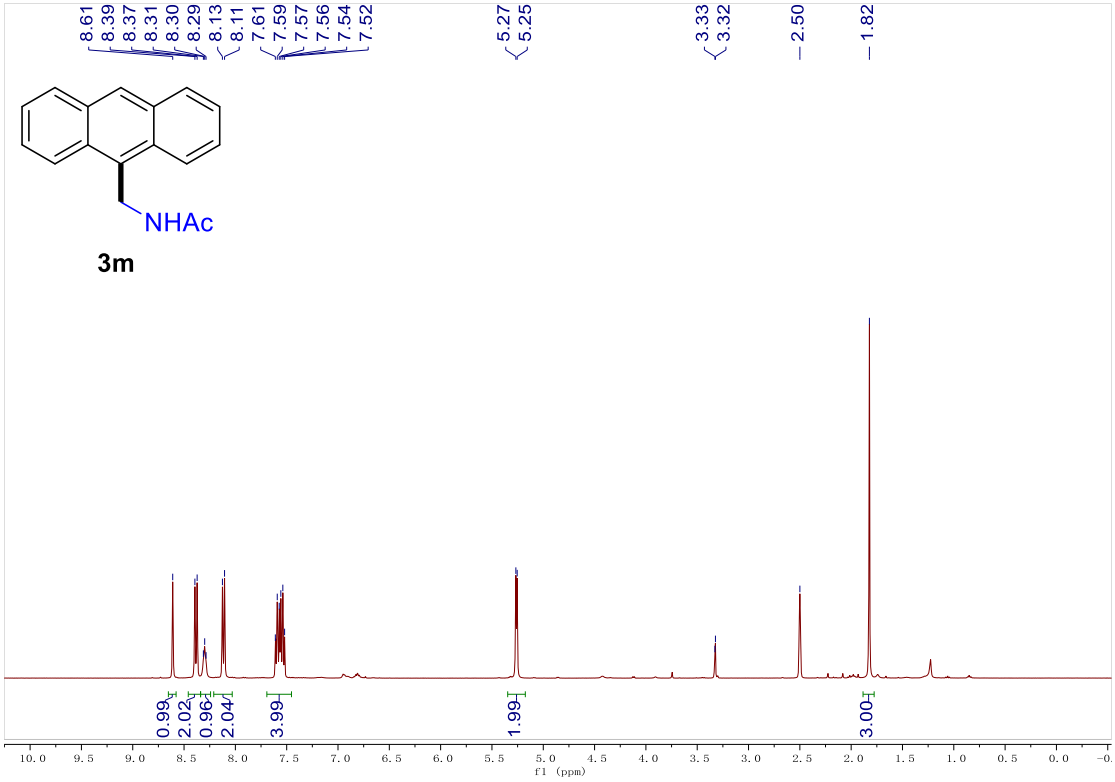
Me
Me
Me
NHAc
3l
f1 (ppm)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7.56
7.54
7.52
5.27
5.25
3.33
3.32
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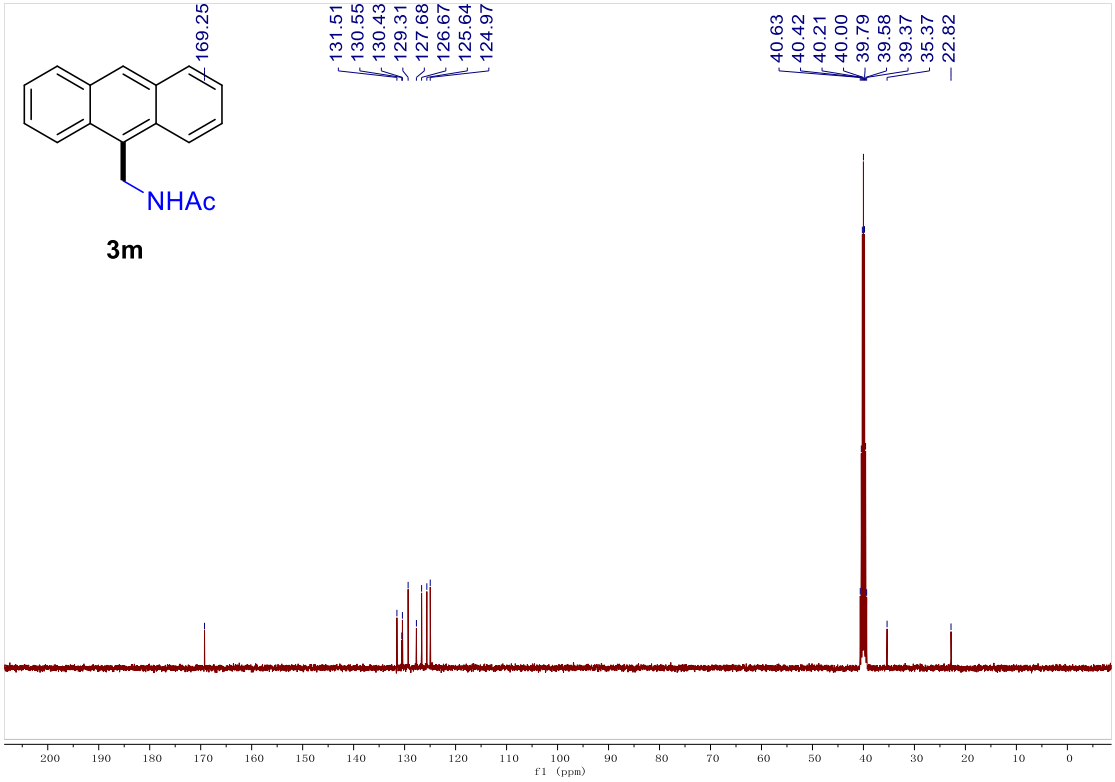
0.96
2.04
3.99
1.99
3.00
f1 (ppm)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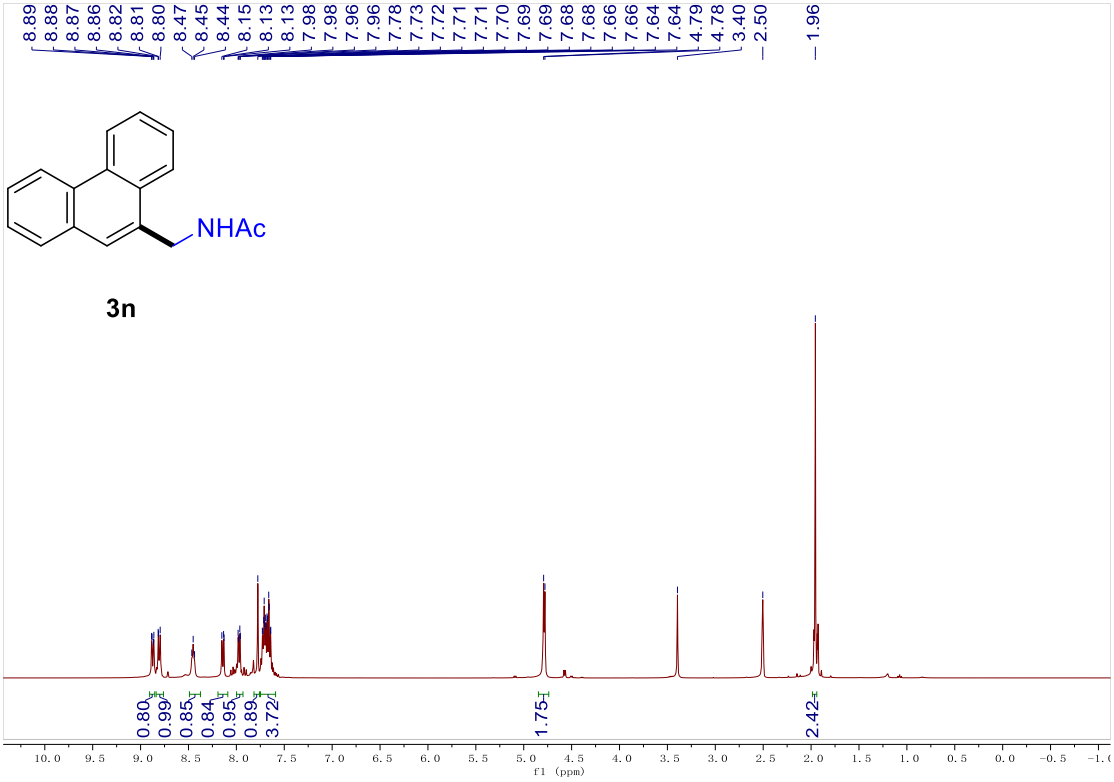
NHAc
3m
f1 (ppm)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8.13
7.98
7.98
7.96
7.96
7.78
7.73
7.72
7.71
7.71
7.70
7.69
7.69
7.68
7.68
7.66
7.66
7.64
7.64
4.79
4.78
3.40
2.50
1.96
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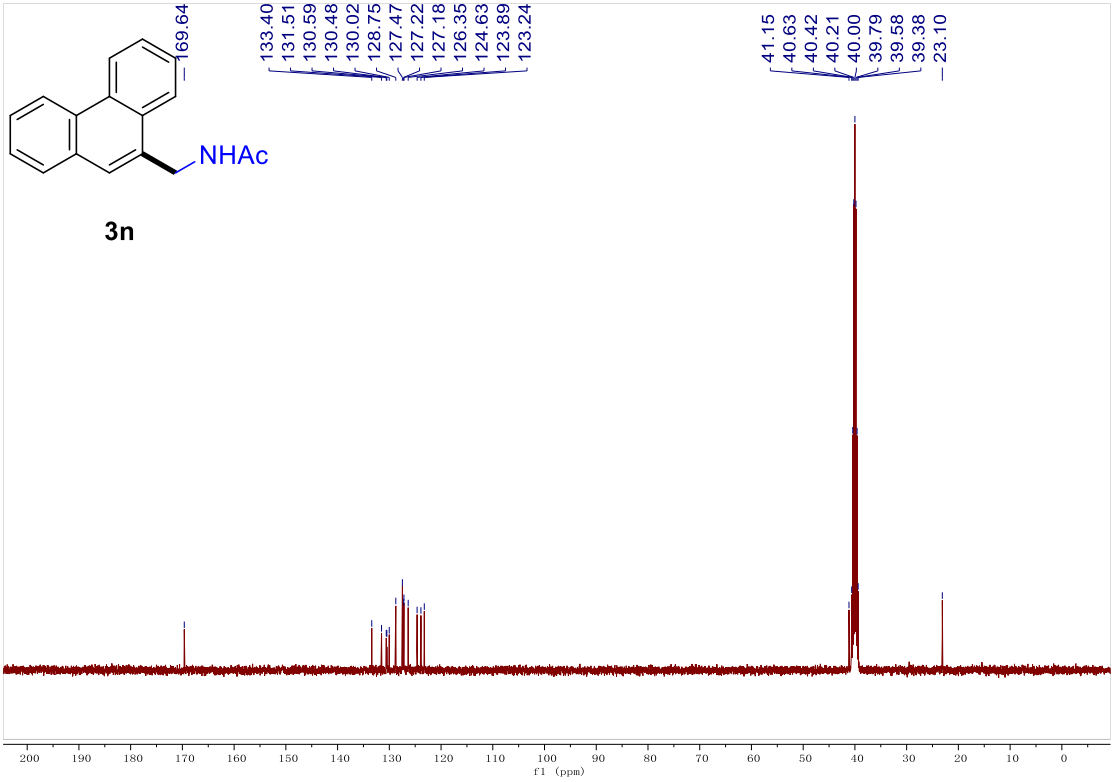
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123.24
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40.21
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39.38
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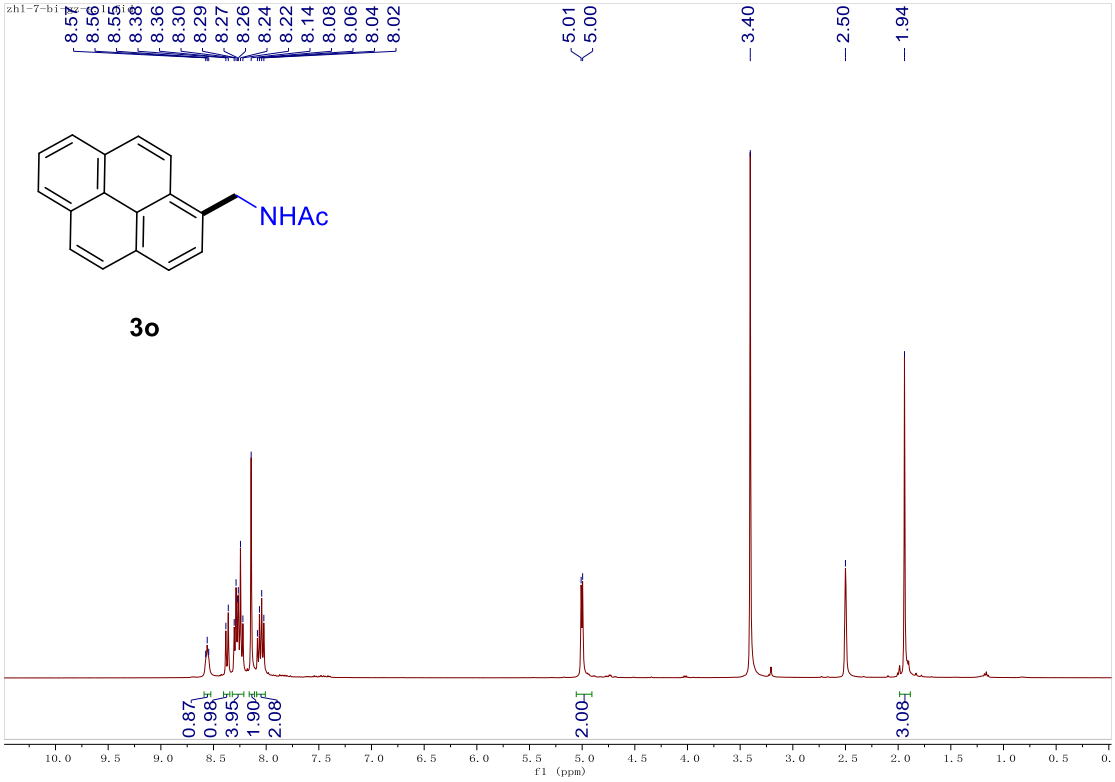
3n
f1 (ppm)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8.22
8.14
8.08
8.06
8.04
8.02
5.01
5.00
3.40
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0.98
3.95
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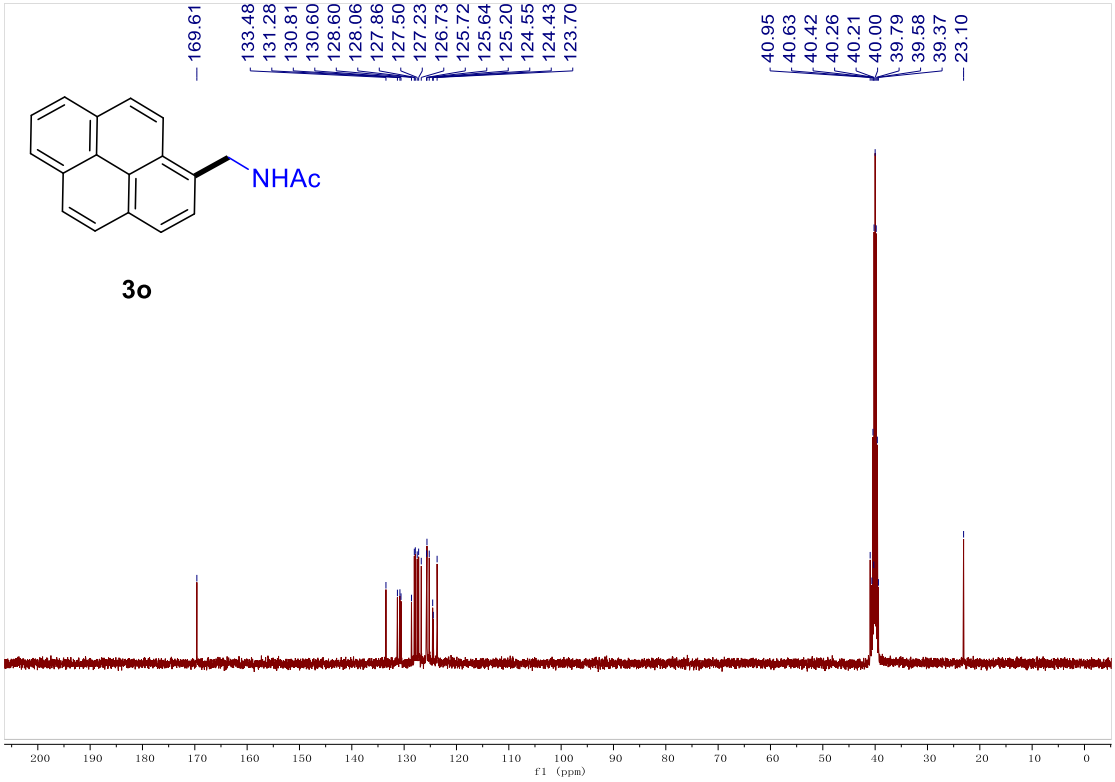
2.08
2.00
3.08
f1 (ppm)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125.64
125.20
124.55
124.43
123.70
40.95
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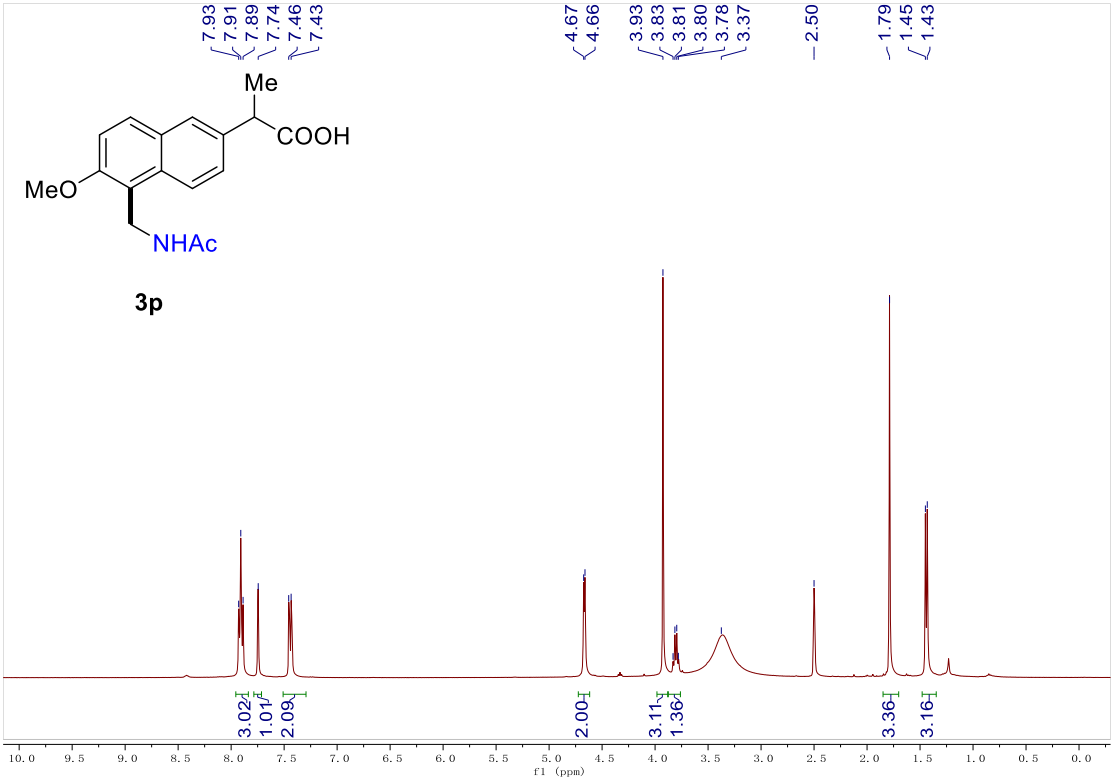
40.26
40.21
40.00
39.79
39.58
39.37
23.10
NHAc
3o
f1 (ppm)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3.78
3.37
2.50
1.79
1.45
1.43
Me
COOH
MeO
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3p
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1.01
2.09
2.00
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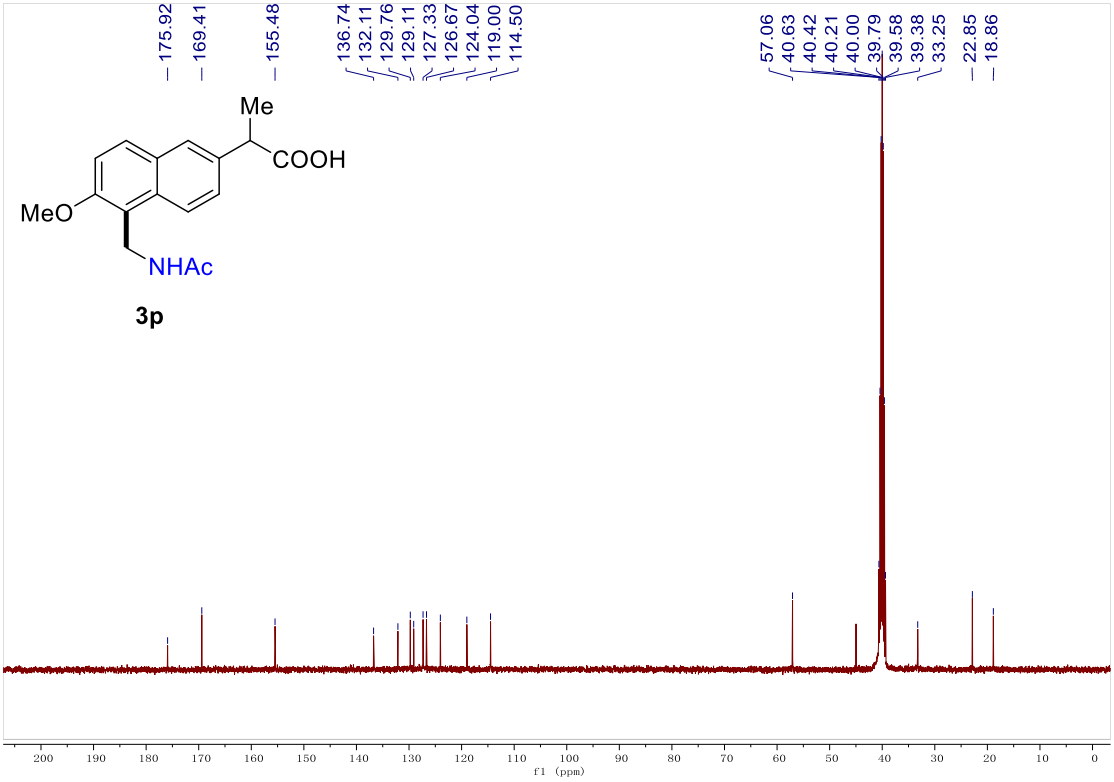
1.36
3.36
3.16
f1 (ppm)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40.21
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22.85
18.86
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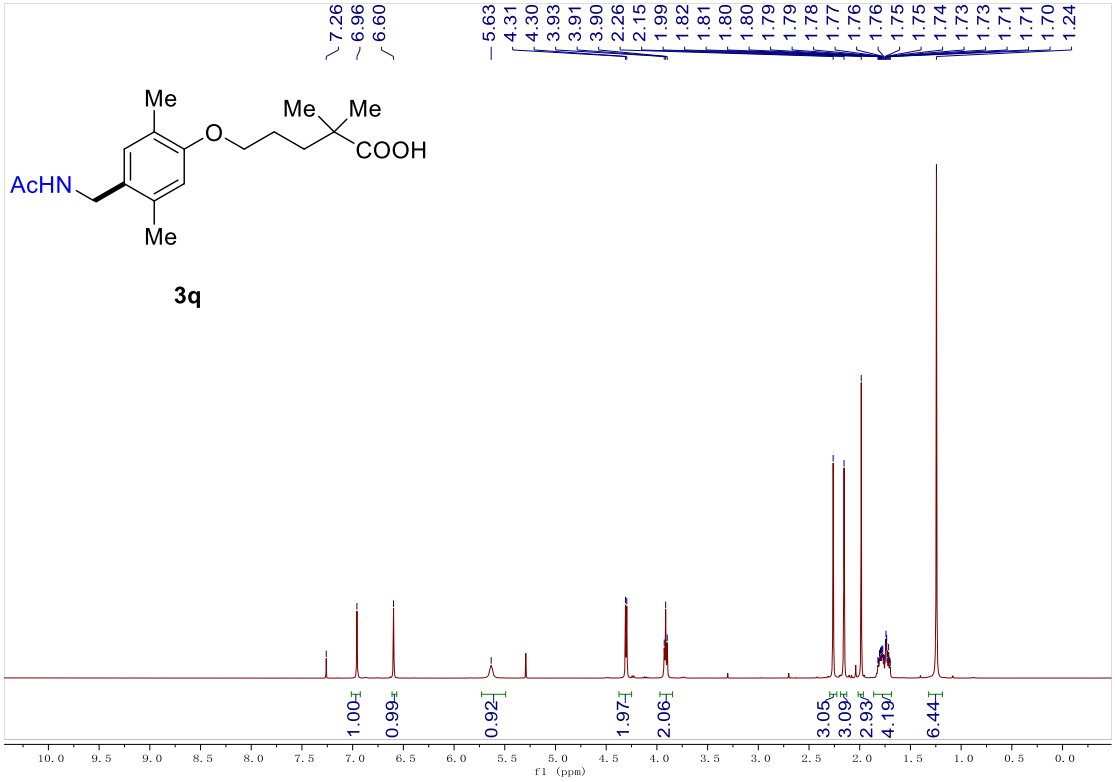
COOH
MeO
NHAc
3p
f1 (ppm)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2.15
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1.82
1.81
1.80
1.80
1.79
1.79
1.78
1.77
1.76
1.76
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1.73
1.71
1.71
1.70
1.24
Me
Me
Me
O
COOH
AcHN
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3.09
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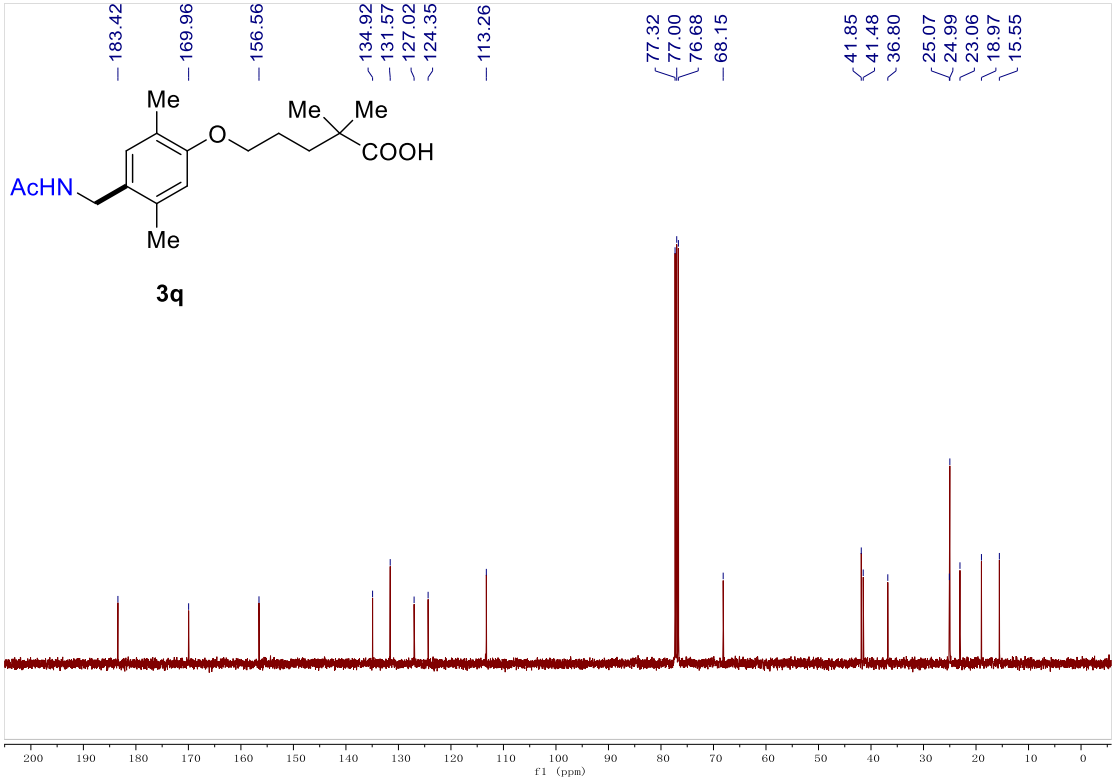
6.44
f1 (ppm)

3q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68.15
41.85
41.48
36.80
25.07
24.99
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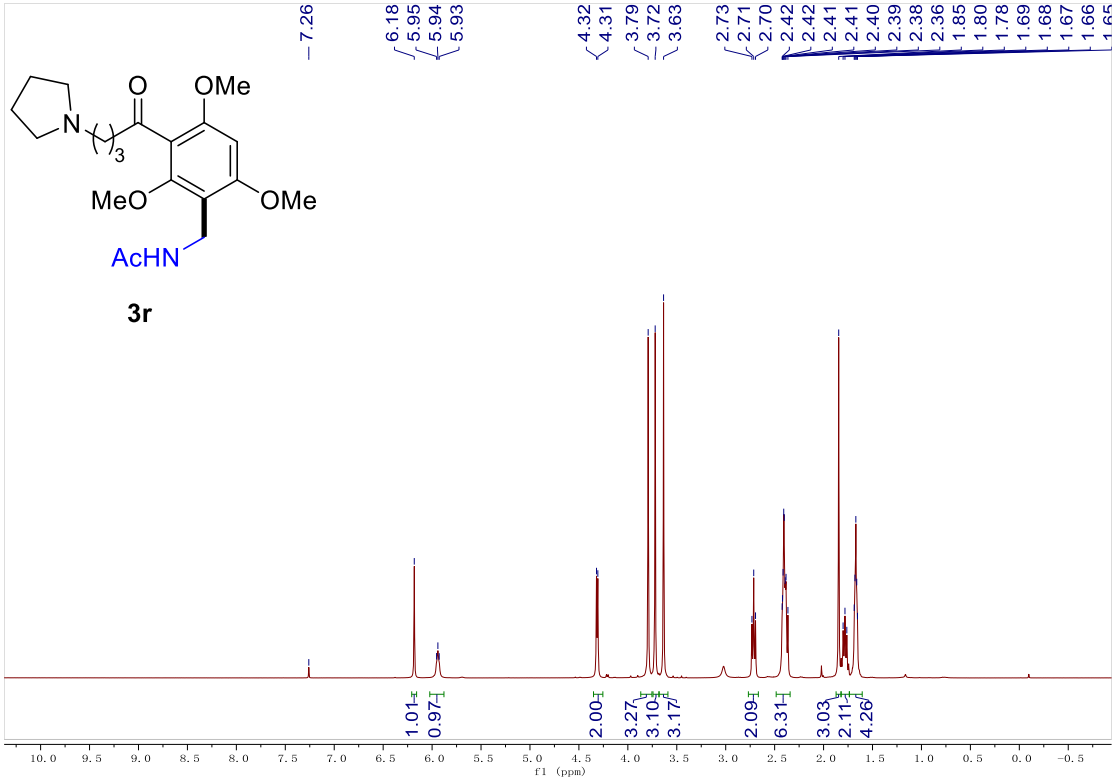
18.97
15.55
Me
Me
Me
O
COOH
AcHN
Me
f1 (ppm)

3q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3.79
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2.73
2.71
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2.42
2.42
2.41
2.41
2.40
2.39
2.38
2.36
1.85
1.80
1.78
1.69
1.68
1.67
1.66
O
OMe
N
3
MeO
OMe
AcHN
3r
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0.97
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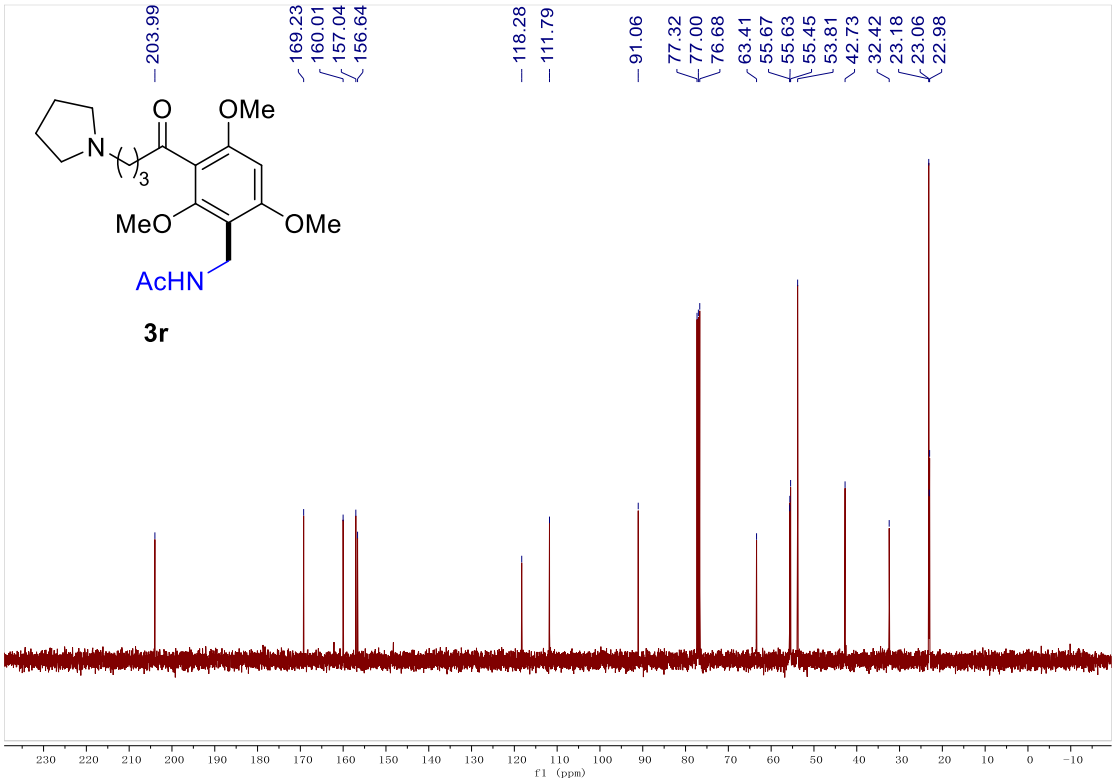
3.27
3.10
3.17
2.09
6.31
3.03
2.11
4.26
f1 (ppm)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63.41
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55.63
55.45
53.81
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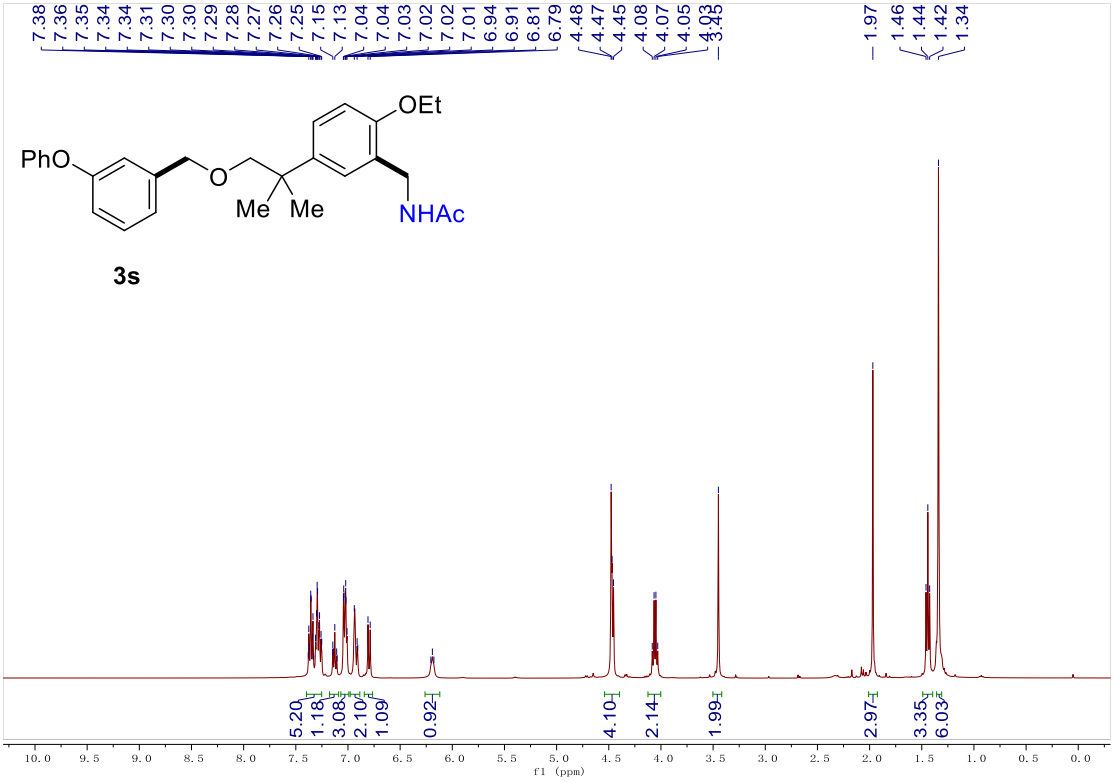
23.06
22.98
O
OMe
N
3
MeO
OMe
AcHN
3r
f1 (ppm)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7.15
7.13
7.04
7.04
7.03
7.02
7.02
7.01
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6.91
6.81
6.79
4.48
4.47
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4.08
4.07
4.05
4.03
3.45
1.97
1.46
1.44
1.42
1.34
OEt
PhO
O
Me
Me
NHAc
3s
5.20
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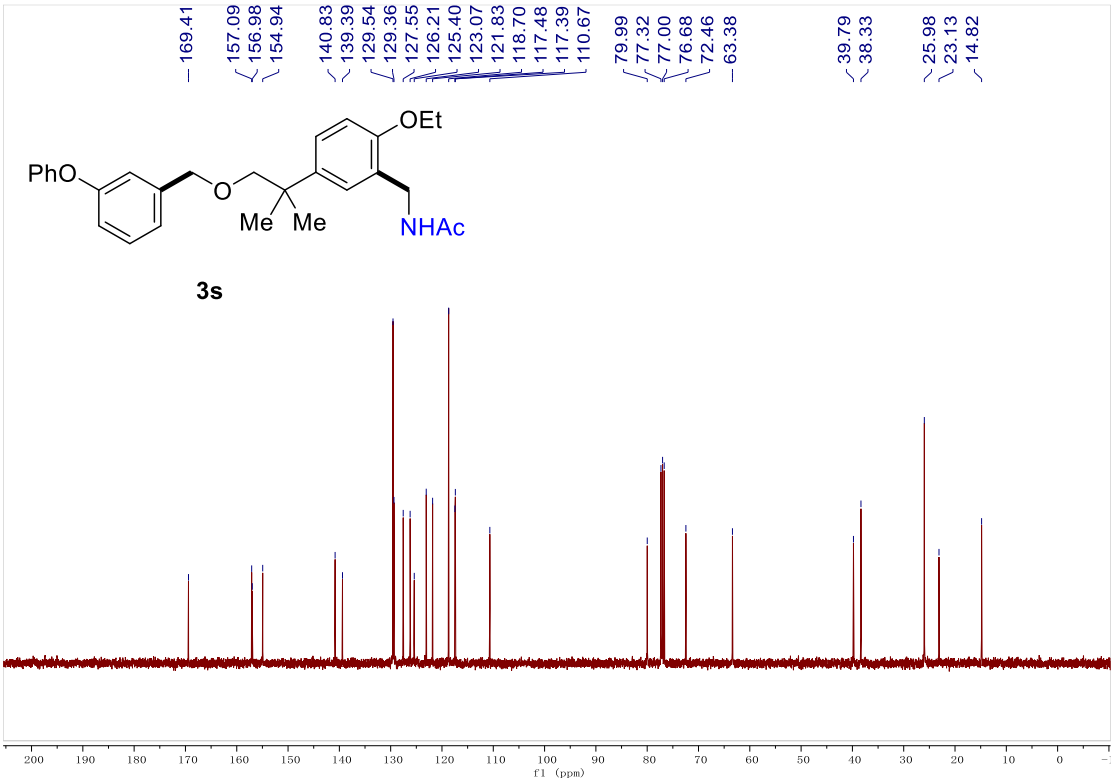
6.03
f1 (ppm)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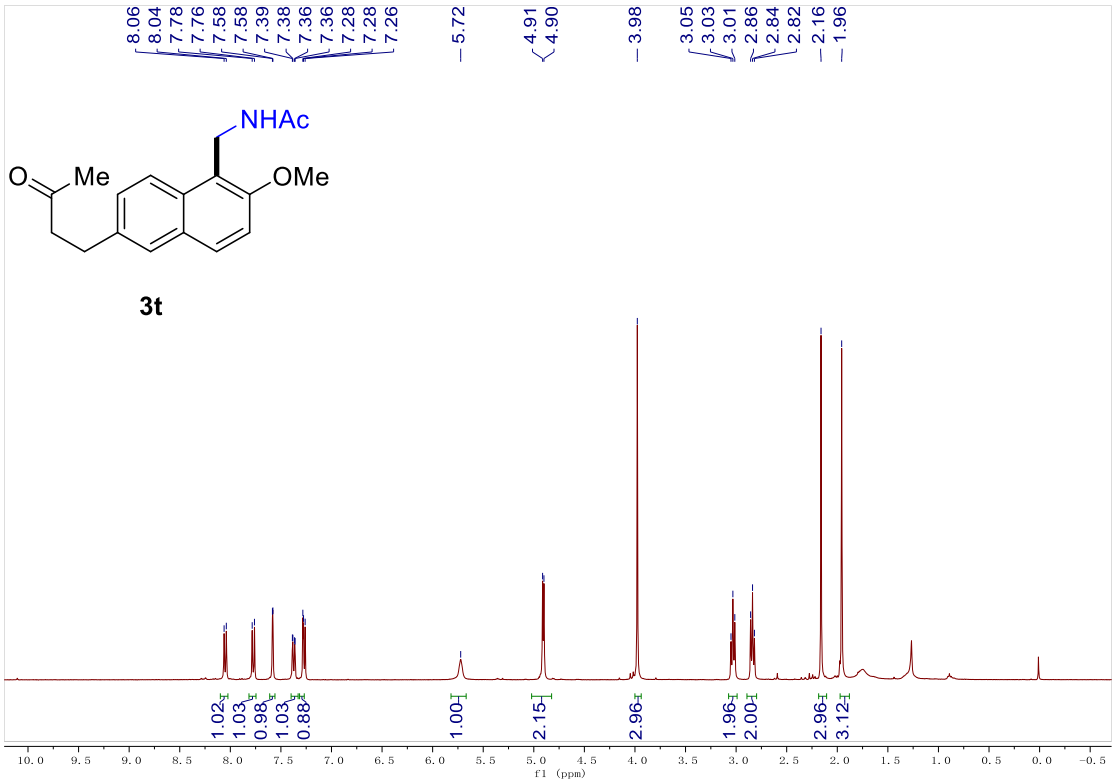
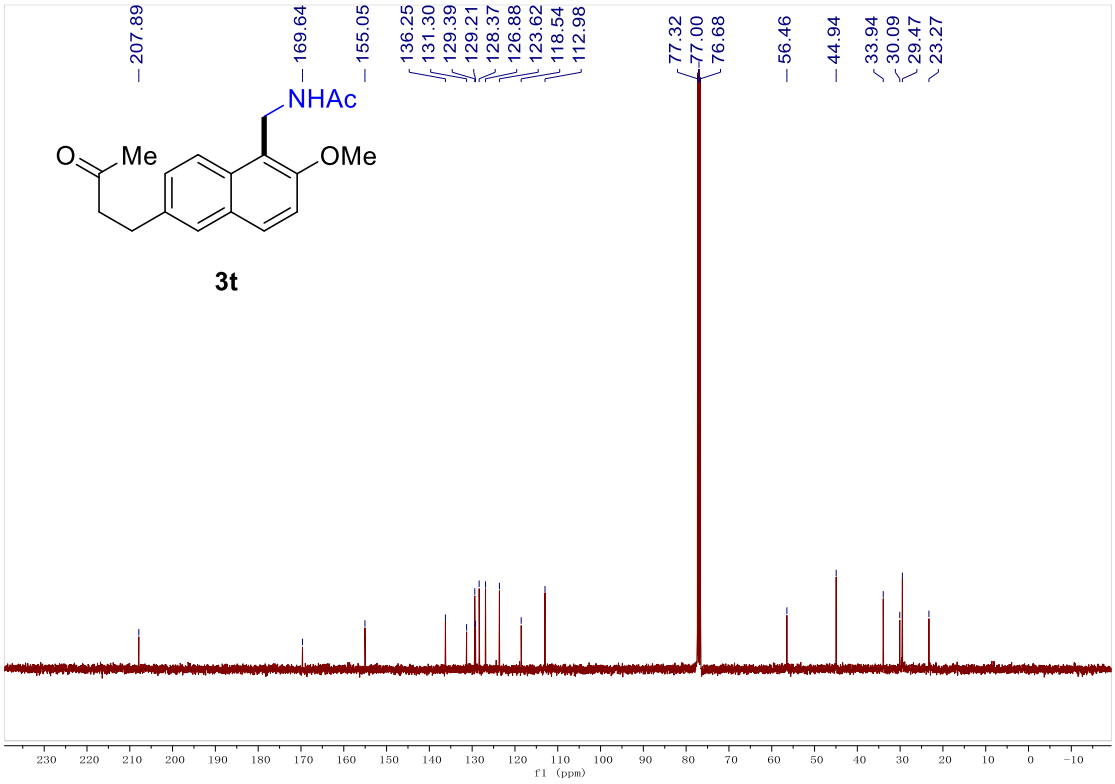
126.21
125.40
123.07
121.83
118.70
117.48
117.39
110.67
79.99
77.32
77.00
76.68
72.46
63.38
39.79
38.33
25.98
23.13
14.82
OEt
PhO
O
Me
Me
NHAc
3s
f1 (ppm)


8.06
8.04
7.78
7.76
7.58
7.58
7.39
7.38
7.36
7.36
7.28
7.28
7.26
5.72
4.91
4.90
3.98
3.05
3.03
3.01
2.86
2.84
2.82
2.16
1.96
NHAc
O
Me
OMe
1.02
1.03
0.98
1.03
0.88
1.00
2.15
2.96
1.96
2.00
2.96
3.12
f1 (ppm)

3t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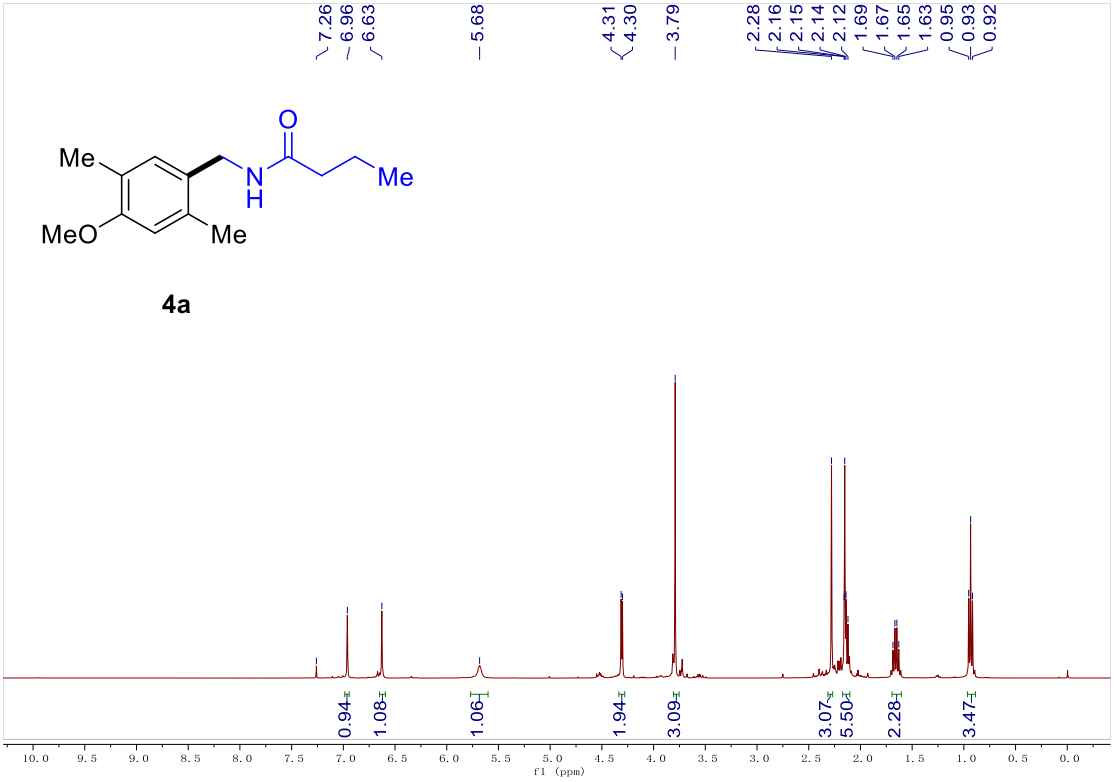
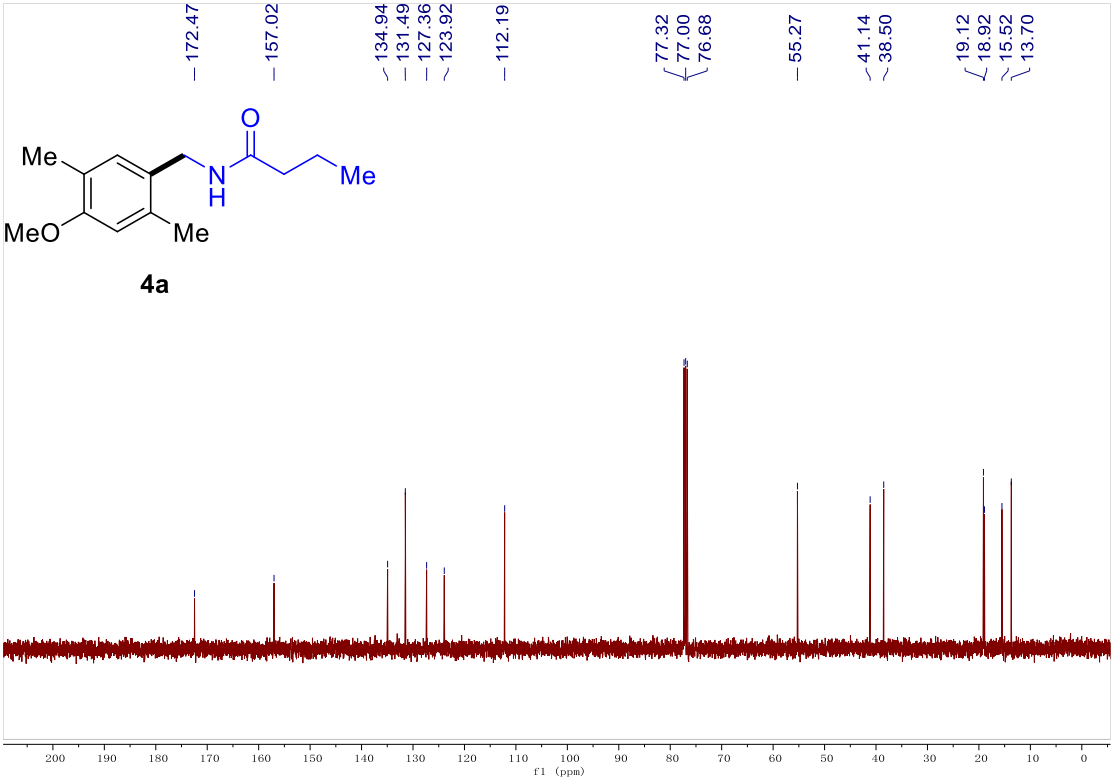
136.25
131.30
129.39
129.21
128.37
126.88
123.62
118.54
112.98
77.32
77.00
76.68
56.46
44.94
33.94
30.09
29.47
23.27
NHAc
O
Me
OMe
f1 (ppm)

3t


7.26
6.96
6.63
5.68
4.31
4.30
3.79
2.28
2.16
2.15
2.14
2.12
1.69
1.67
1.65
1.63
0.95
0.93
0.92
Me
O
N
H
Me
MeO
Me
4a
0.94
1.08
1.06
1.94
3.09
3.07
5.50
2.28
3.47
f1 (ppm)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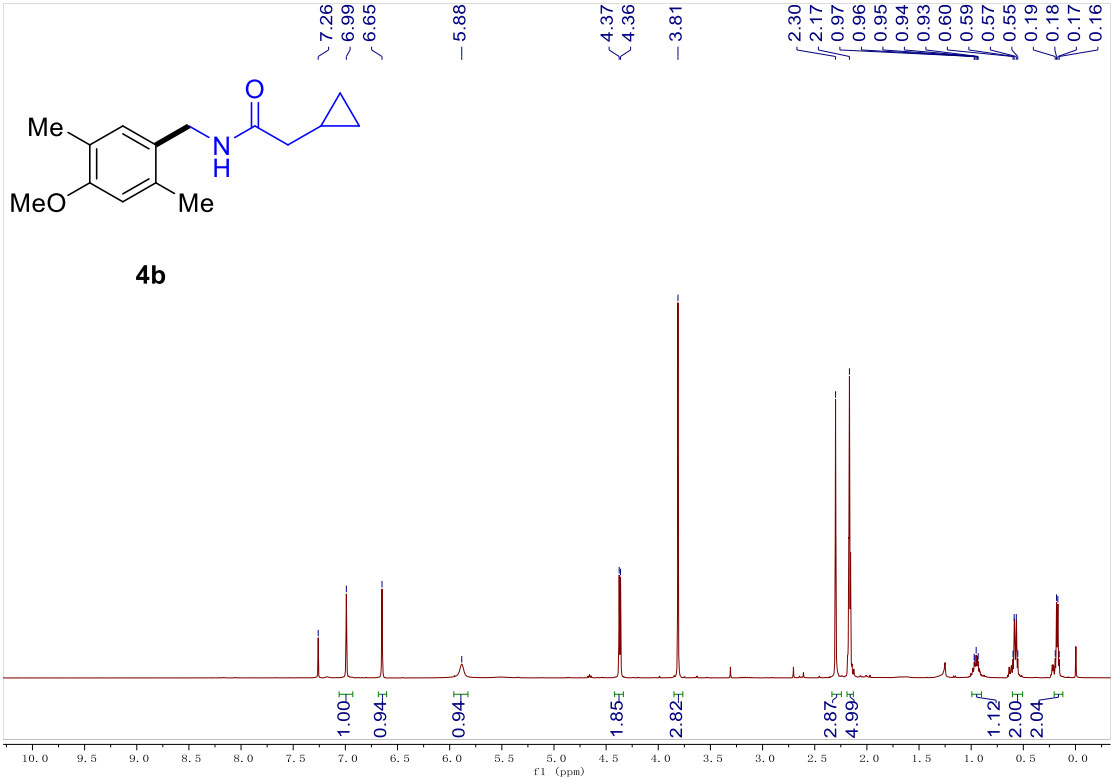
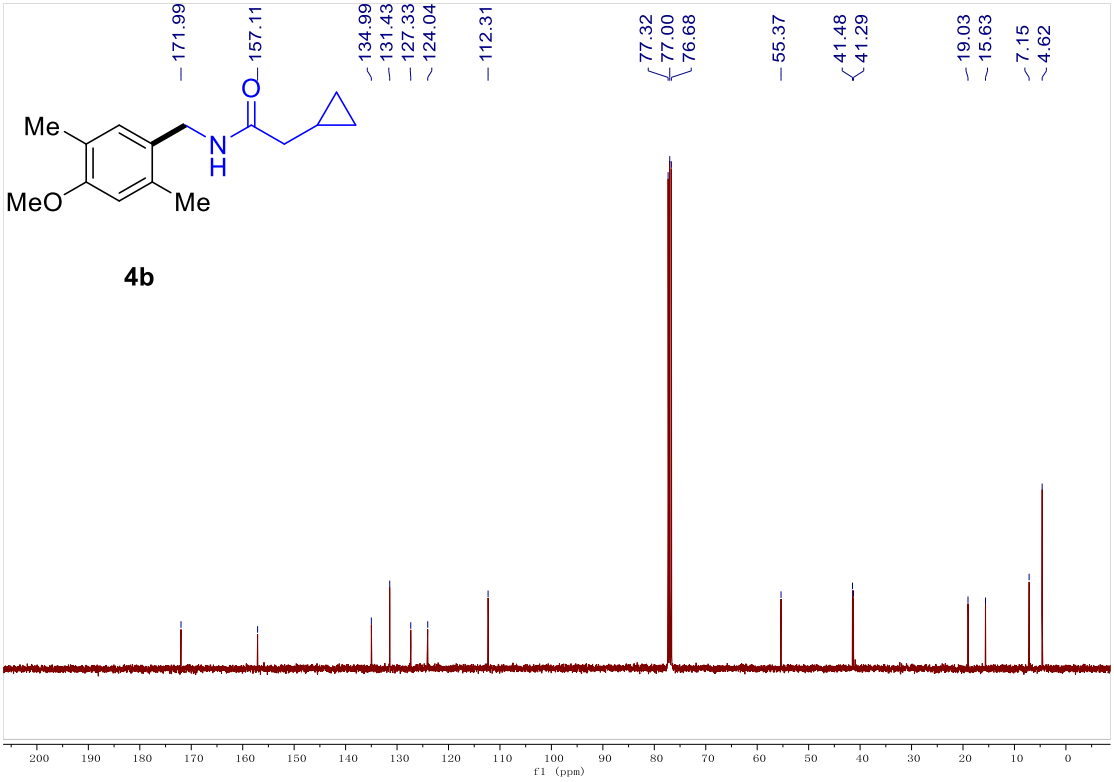
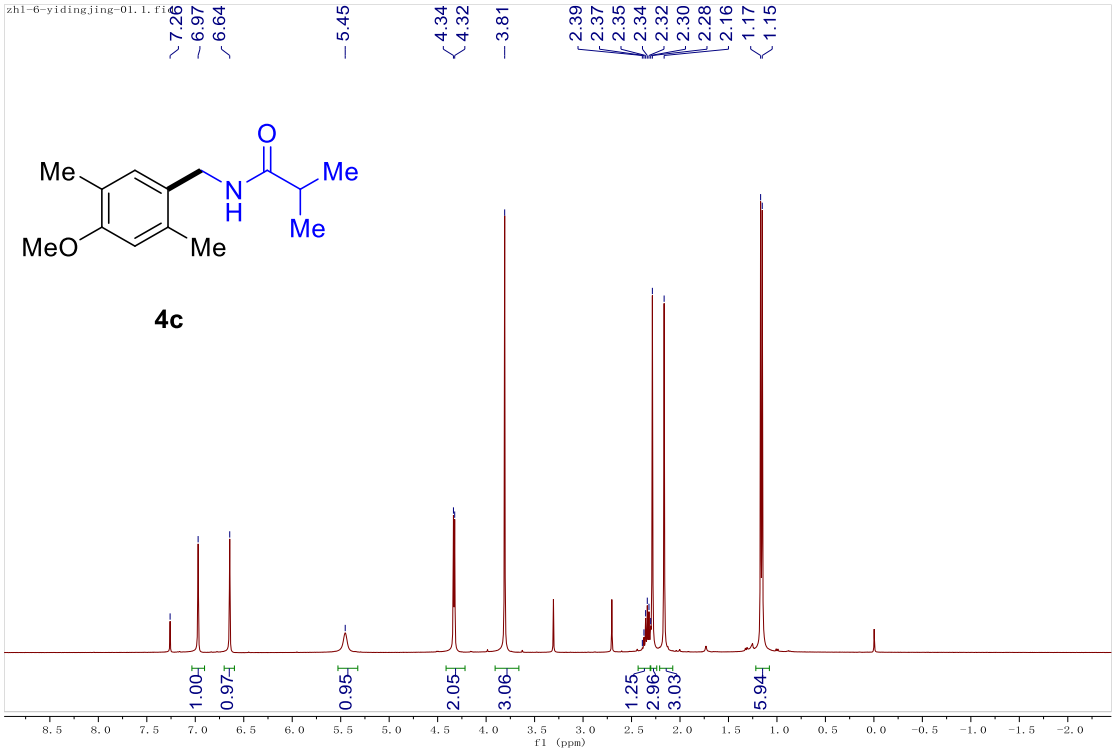
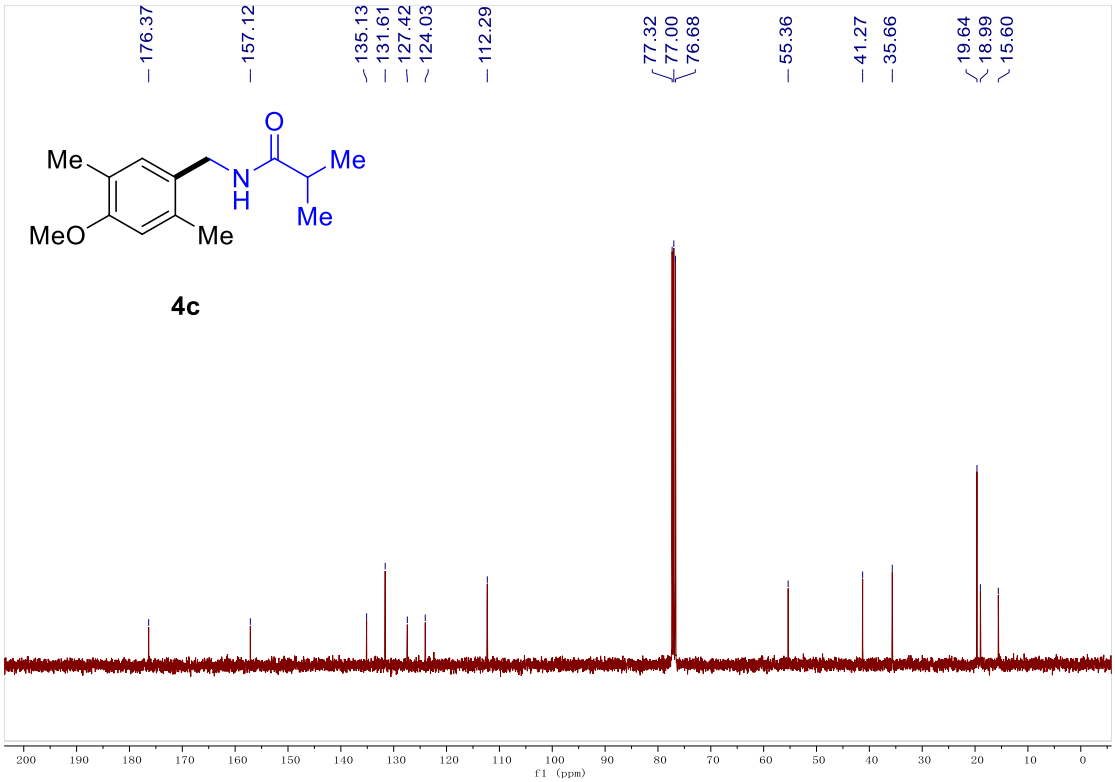
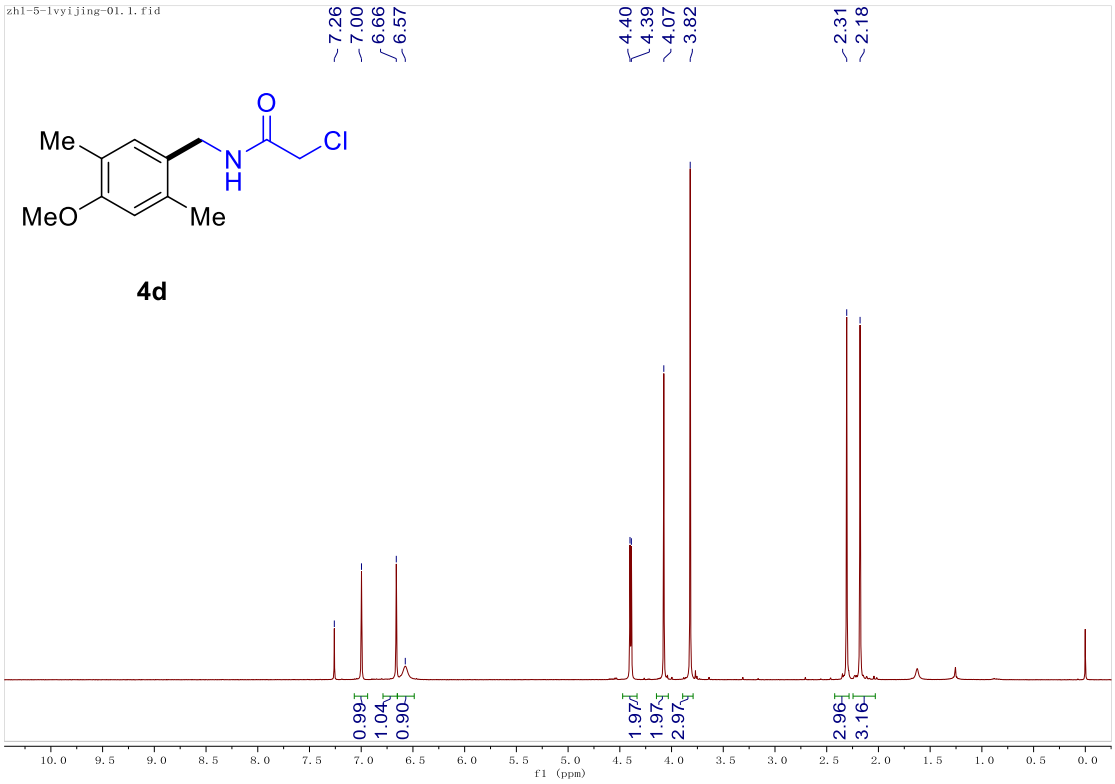
131.49
127.36
123.92
112.19
77.32
77.00
76.68
55.27
41.14
38.50
19.12
18.92
15.52
13.70
Me
O
N
H
Me
MeO
Me
4a
f1 (ppm)

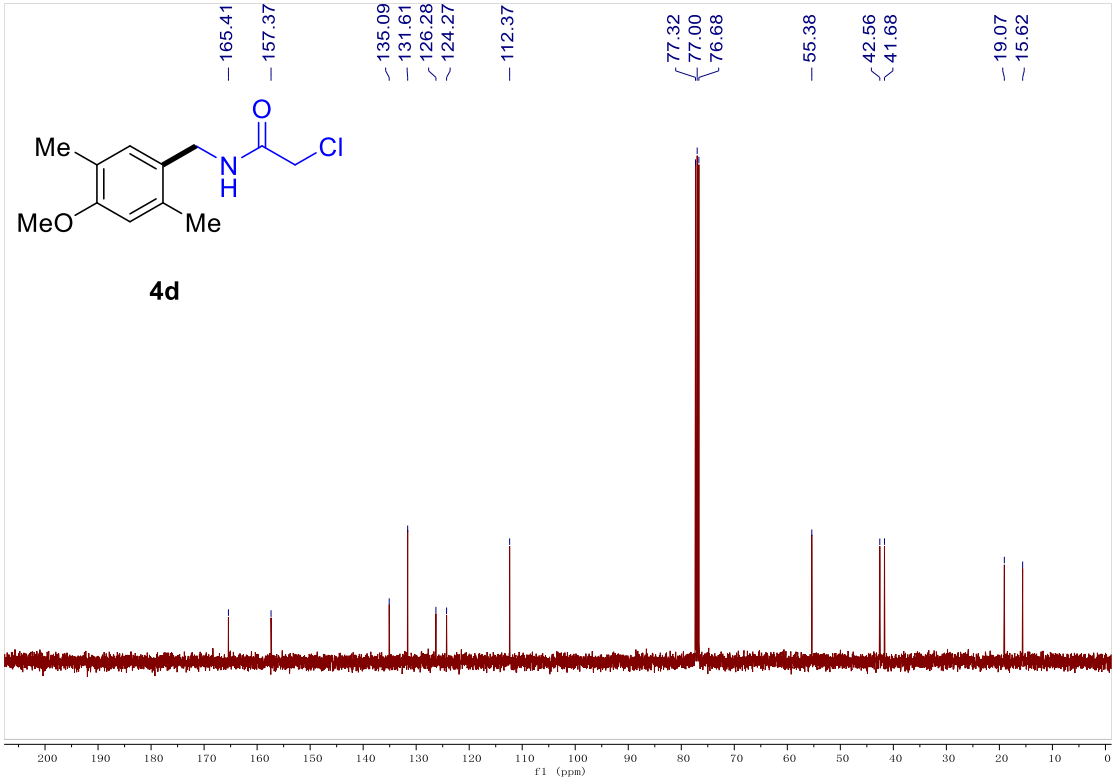

7.26
6.99
6.65
5.88
4.37
4.36
3.81
2.30
2.17
0.97
0.96
0.95
0.94
0.93
0.60
0.59
0.57
0.55
0.19
0.18
0.17
0.16
Me
MeO
Me
O
N
H
4b
1.00
0.94
0.94
1.85
2.82
2.87
4.99
1.12
2.00
2.04
f1 (ppm)


171.99
157.11
134.99
131.43
127.33
124.04
112.31
77.32
77.00
76.68
55.37
41.48
41.29
19.03
15.63
7.15
4.62
Me
MeO
Me
O
N
H
4b
f1 (ppm)


zh1-6-yidingjing-01.1.fi
7.26
6.97
6.64
5.45
4.34
4.32
3.81
2.39
2.37
2.35
2.34
2.32
2.30
2.28
2.16
1.17
1.15
Me
O
N
H
Me
Me
MeO
Me
4c
1.00
0.97
0.95
2.05
3.06
1.25
2.96
3.03
5.94
f1 (ppm)


176.37
157.12
135.13
131.61
127.42
124.03
112.29
77.32
77.00
76.68
55.36
41.27
35.66
19.64
18.99
15.60
Me
O
N
H
Me
Me
MeO
Me
4c
f1 (ppm)


zhl-5-lvyijing-01.1.fid
7.26
7.00
6.66
6.57
4.40
4.39
4.07
3.82
2.31
2.18
Me
MeO
Me
O
N
H
Cl
4d
0.99
1.04
0.90
1.97
1.97
2.97
2.96
3.16
f1 (ppm)


165.41
157.37
135.09
131.61
126.28
124.27
112.37
77.32
77.00
76.68
55.38
42.56
41.68
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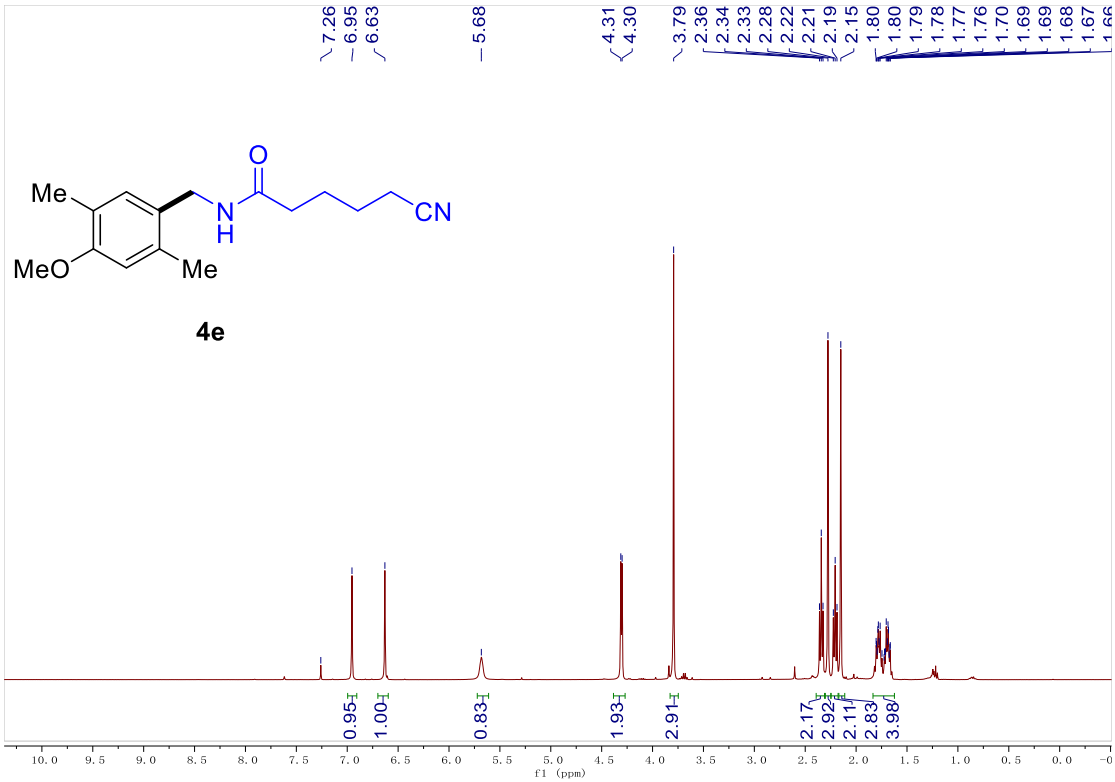
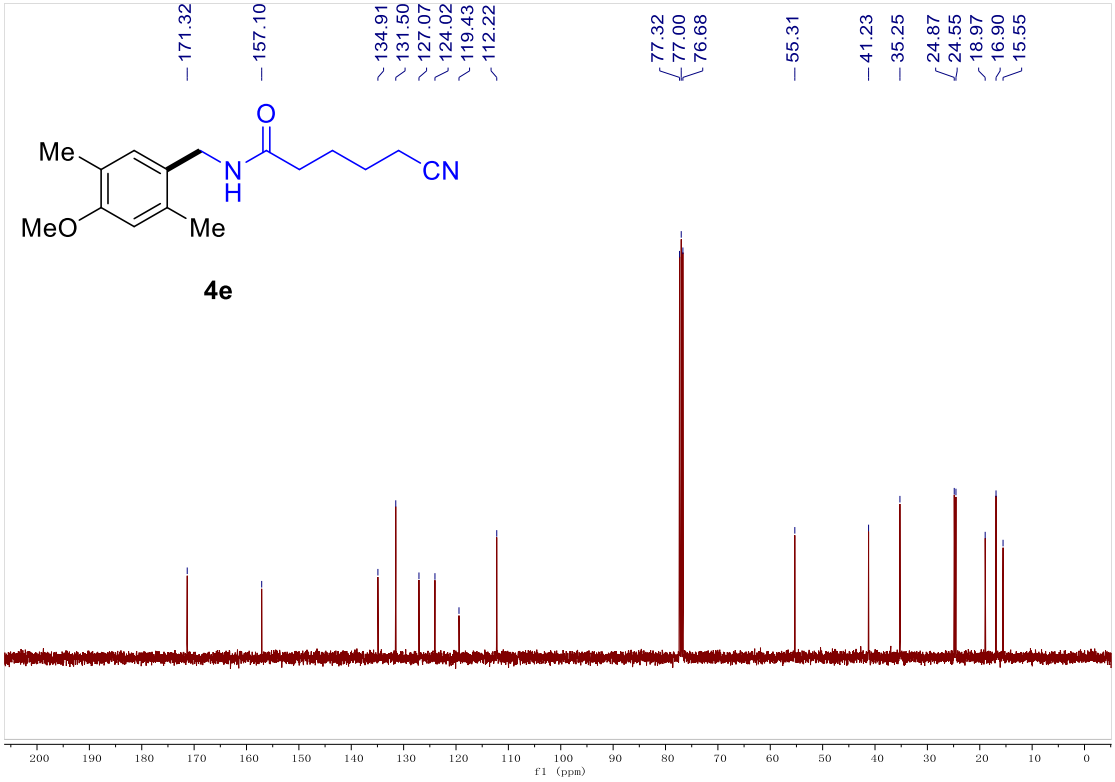
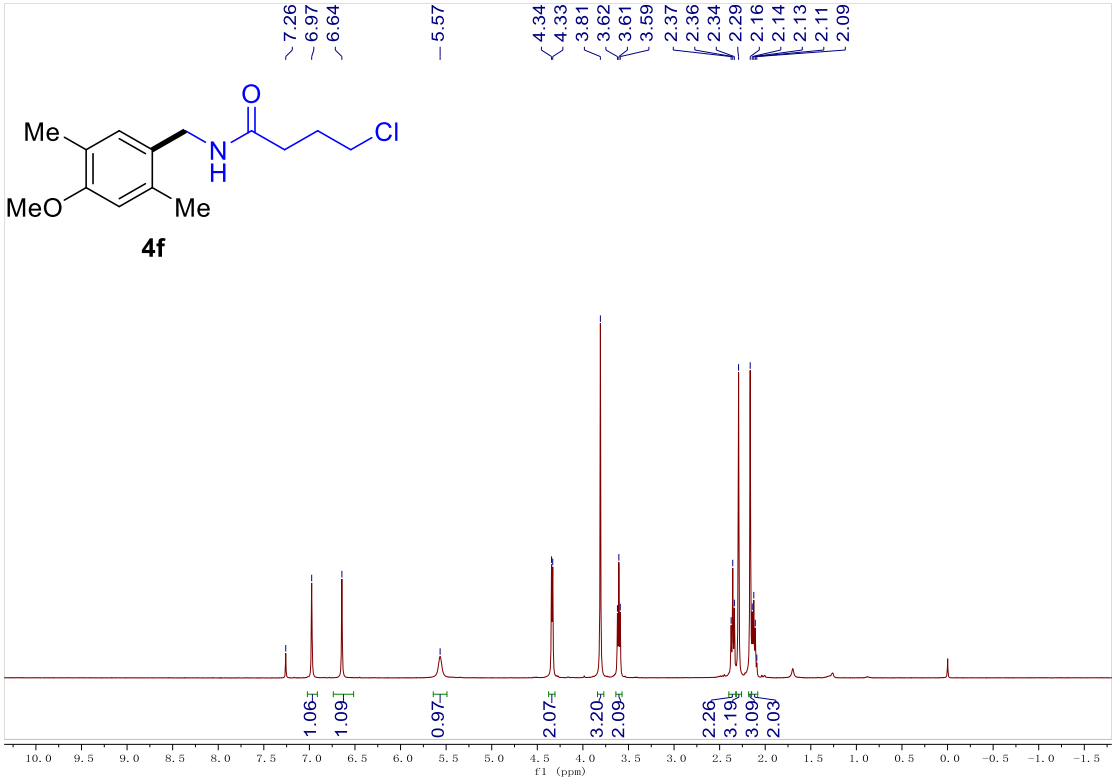
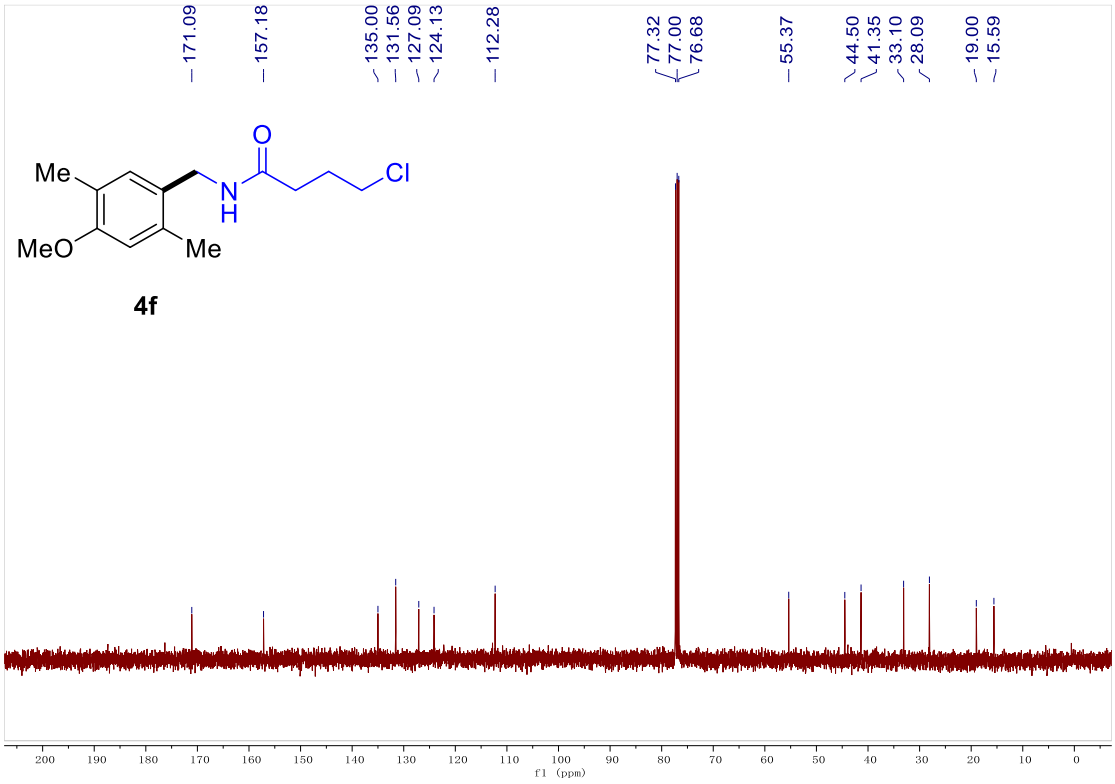
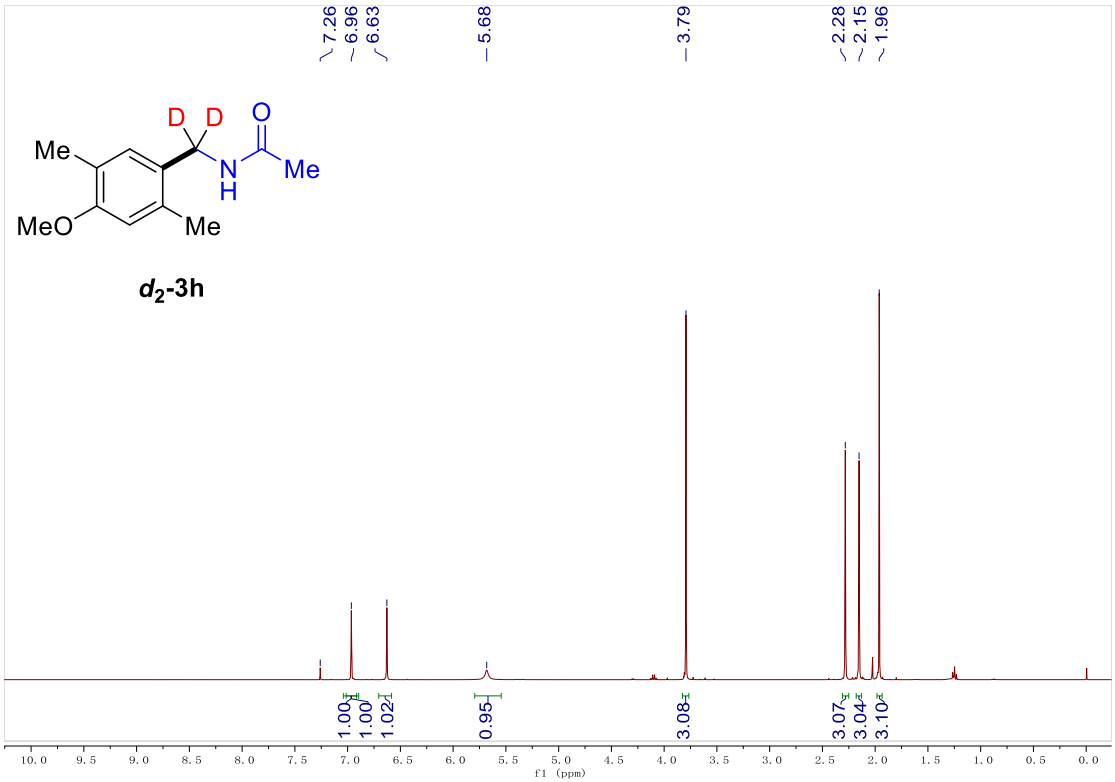
MeO
Me
O
N
H
Cl
4d
f1 (ppm)


7.26
6.95
6.63
5.68
4.31
4.30
3.79
2.36
2.34
2.33
2.28
2.22
2.21
2.19
2.15
1.80
1.80
1.79
1.78
1.77
1.76
1.70
1.69
1.69
1.68
1.67
Me
MeO
Me
N
H
O
CN
4e
0.95
1.00
0.83
1.93
2.91
2.17
2.92
2.11
2.83
3.98
f1 (ppm)

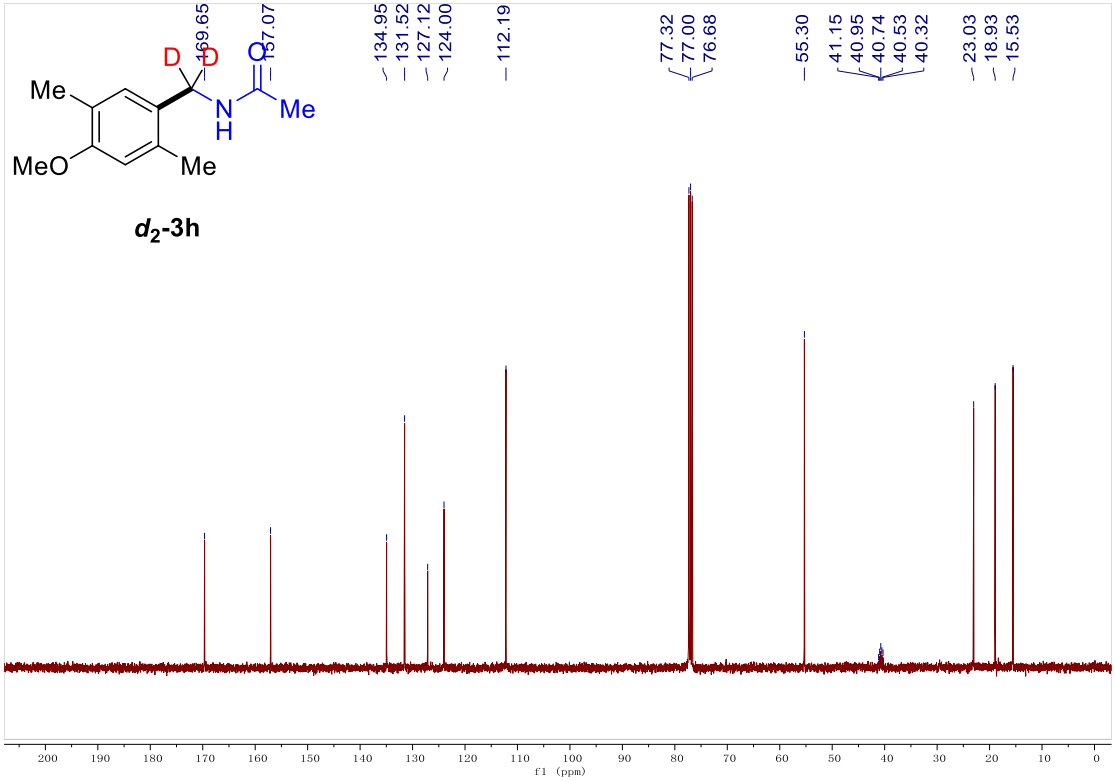

171.32
157.10
134.91
131.50
127.07
124.02
119.43
112.22
77.32
77.00
76.68
55.31
41.23
35.25
24.87
24.55
18.97
16.90
15.55
Me
MeO
Me
N
H
O
CN
4e
f1 (ppm)


7.26
6.97
6.64
5.57
4.34
4.33
3.81
3.62
3.61
3.59
2.37
2.36
2.34
2.29
2.16
2.14
2.13
2.11
2.09
Me
MeO
Me
O
N
H
Cl
4f
1.06
1.09
0.97
2.07
3.20
2.09
2.26
3.19
3.09
2.03
f1 (ppm)

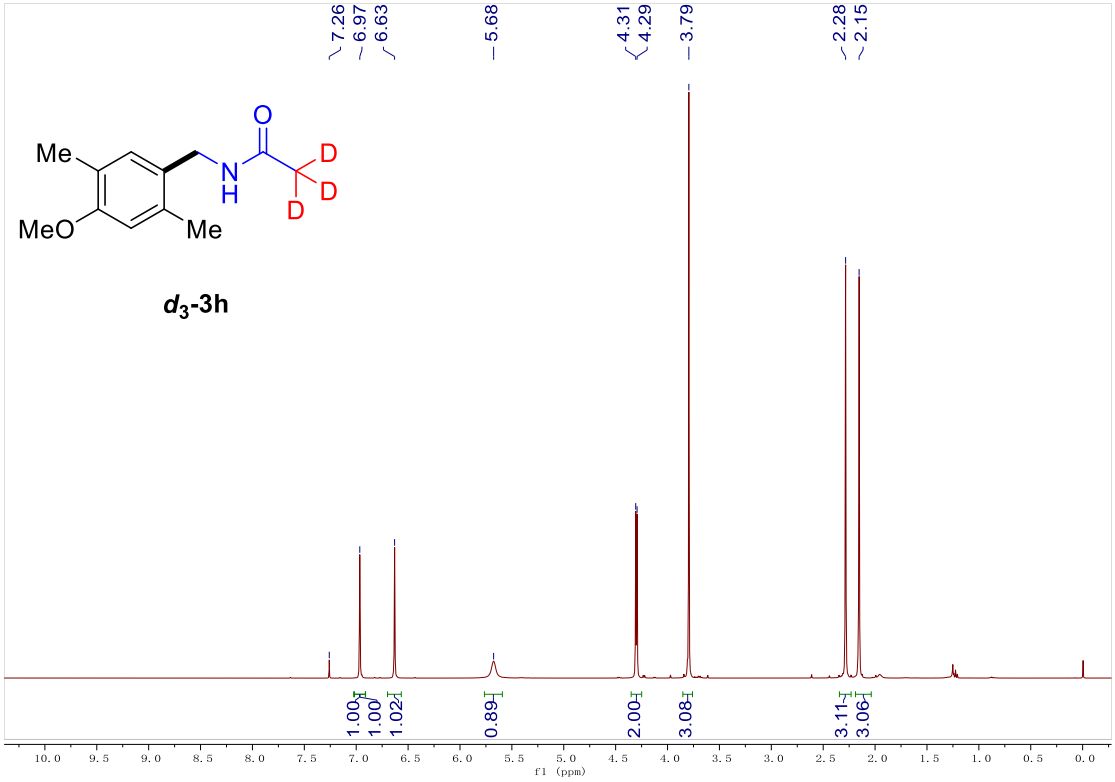

171.09
157.18
135.00
131.56
127.09
124.13
112.28
77.32
77.00
76.68
55.37
44.50
41.35
33.10
28.09
19.00
15.59
Me
MeO
Me
O
N
H
Cl
4f
f1 (ppm)


7.26
6.96
6.63
5.68
3.79
2.28
2.15
1.96
D D O
Me
N
H
Me
MeO
Me
1.00
1.00
1.02
0.95
3.08
3.07
3.04
3.10
f1 (ppm)

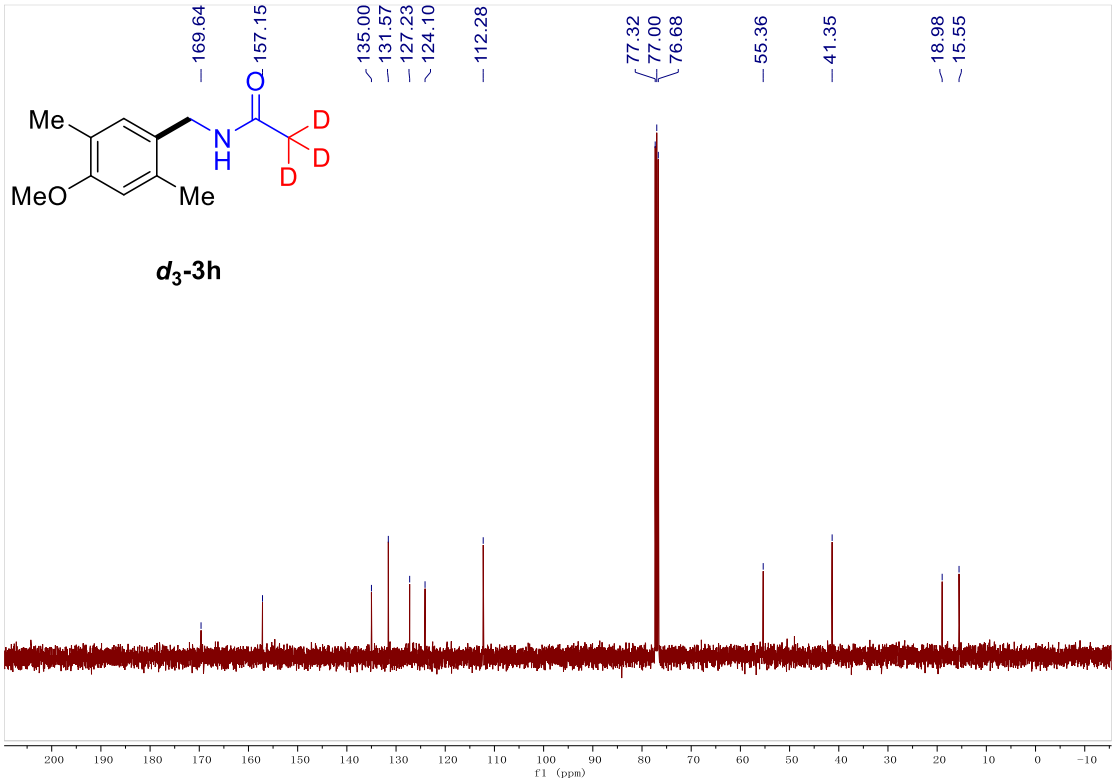
d_2-3h


169.65
137.07
134.95
131.52
127.12
124.00
112.19
77.32
77.00
76.68
55.30
41.15
40.95
40.74
40.53
40.32
23.03
18.93
15.53
D D O
Me
N
H
Me
MeO
Me
f1 (ppm)

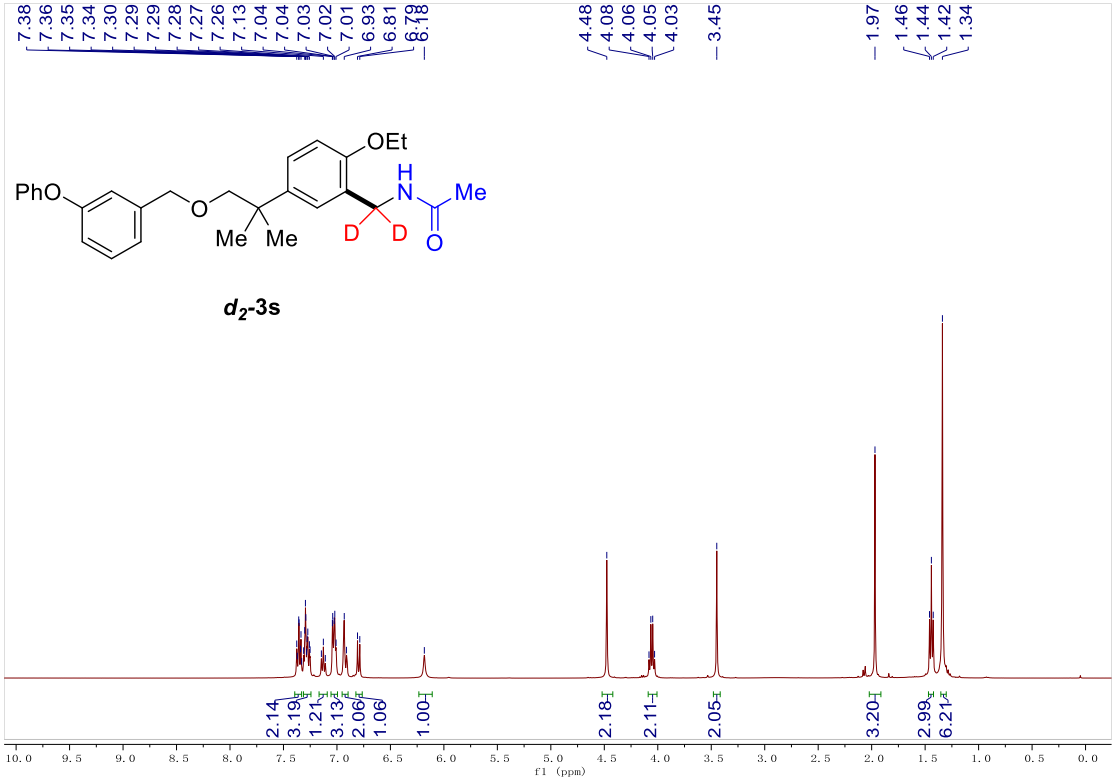
d_2-3h


7.26
6.97
6.63
5.68
4.31
4.29
3.79
2.28
2.15
Me
MeO
Me
O
N
H
D
D
D
1.00
1.00
1.02
0.89
2.00
3.08
3.11
3.06
f1 (ppm)

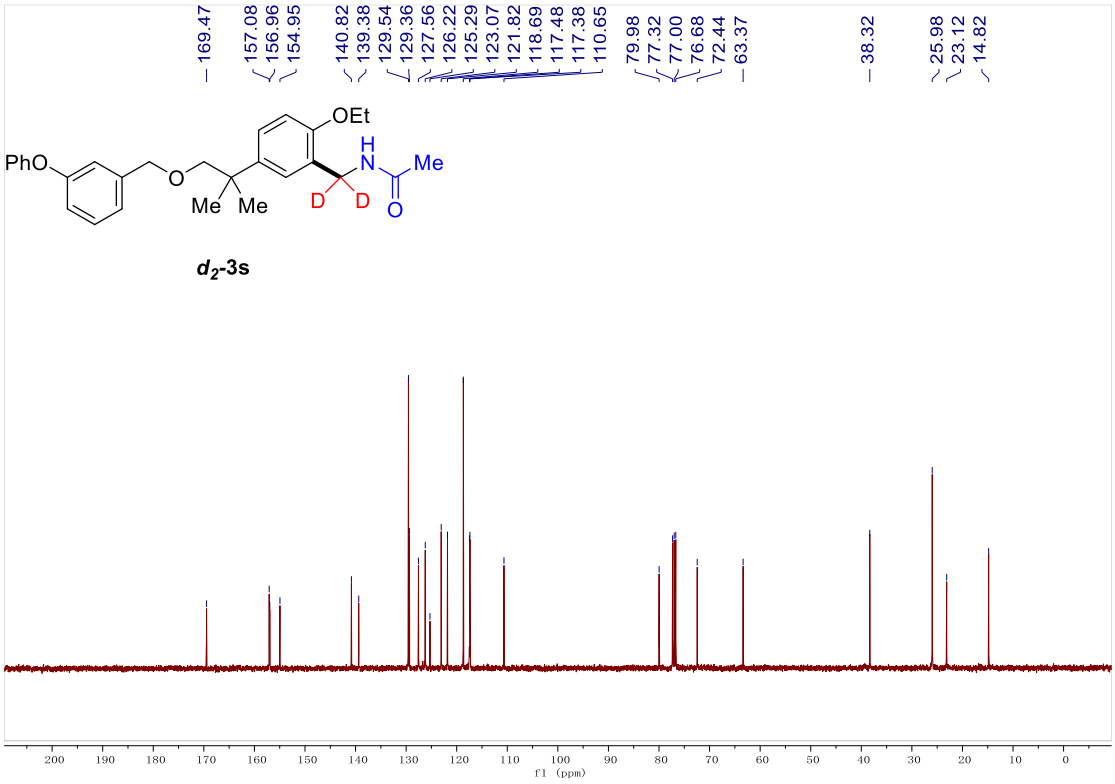
***d*$_3$-3h**


169.64
157.15
135.00
131.57
127.23
124.10
112.28
77.32
77.00
76.68
55.36
41.35
18.98
15.55
Me
MeO
Me
O
N
H
D
D
D
f1 (ppm)

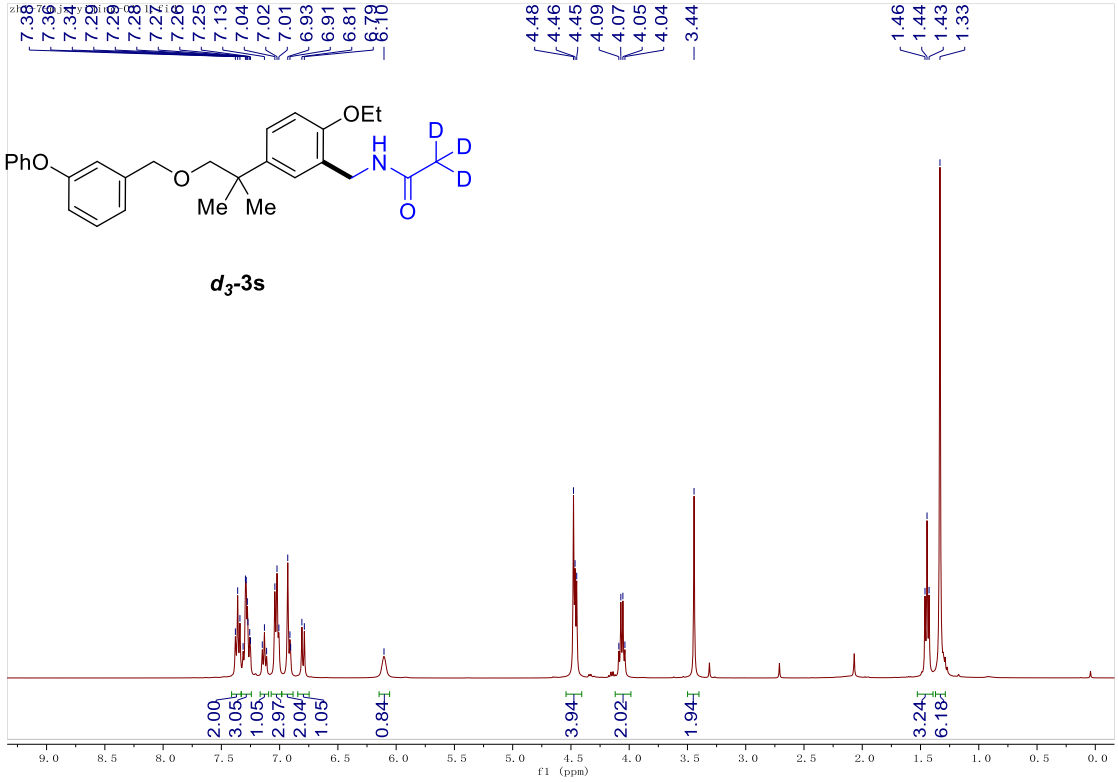
***d*$_3$-3h**


7.38
7.36
7.35
7.34
7.30
7.29
7.29
7.28
7.27
7.26
7.13
7.04
7.04
7.03
7.02
7.01
6.93
6.81
6.78
6.18
4.48
4.08
4.06
4.05
4.03
3.45
1.97
1.46
1.44
1.42
1.34
OEt
PhO
O
H
N
Me
Me
Me
D
D
O
2.14
3.19
1.21
3.13
2.06
1.06
1.00
2.18
2.11
2.05
3.20
2.99
6.21
f1 (ppm)

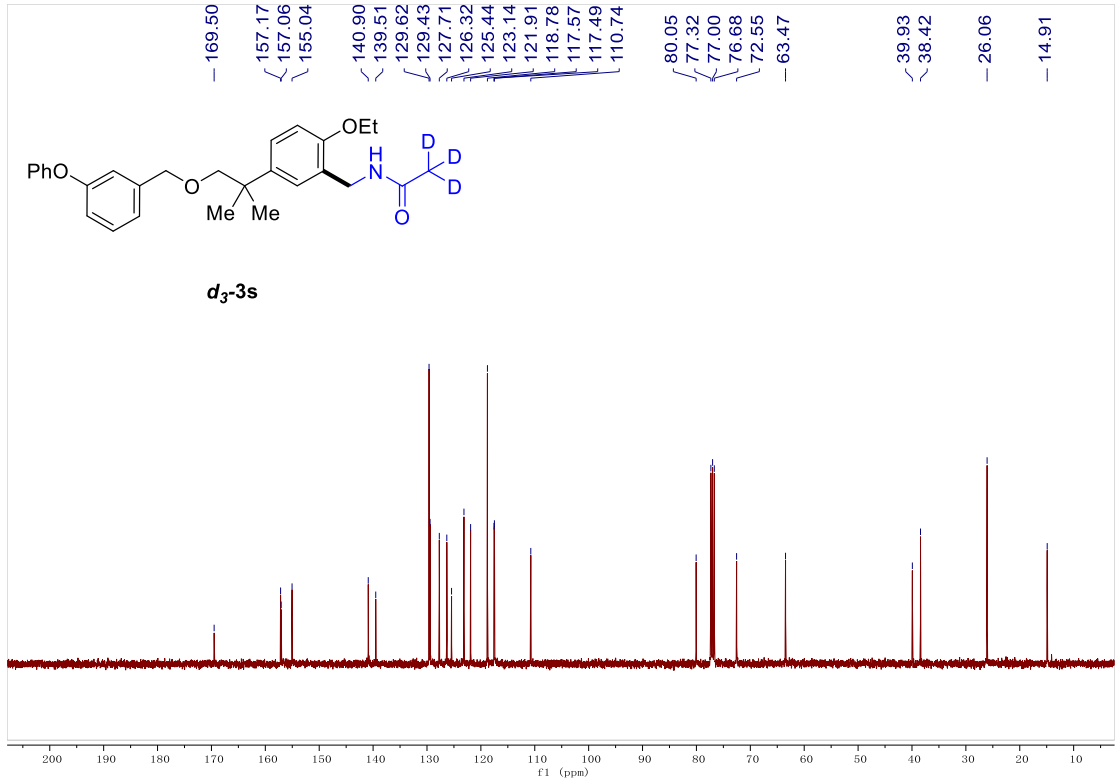
***d*$_2$-3s**


169.47
157.08
156.96
154.95
140.82
139.38
129.54
129.36
127.56
126.22
125.29
123.07
121.82
118.69
117.48
117.38
110.65
79.98
77.32
77.00
76.68
72.44
63.37
38.32
25.98
23.12
14.82
OEt
PhO
O
H
N
Me
Me
Me
D
D
O
f1 (ppm)

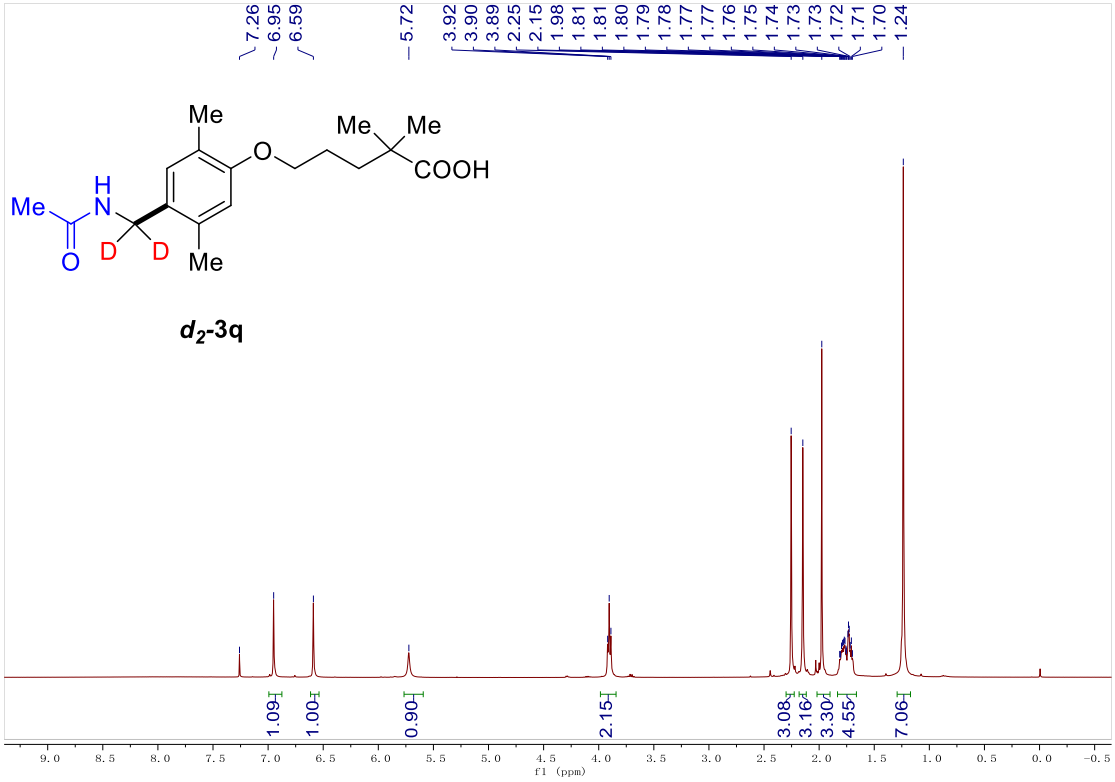
***d*$_2$-3s**


7.38
7.36
7.34
7.29
7.28
7.27
7.26
7.25
7.13
7.04
7.02
7.01
6.93
6.91
6.81
6.79
6.10
4.48
4.46
4.45
4.09
4.07
4.05
4.04
3.44
1.46
1.44
1.43
1.33
OEt
PhO
O
Me Me
H
N
D
D
D
O
2.00
3.05
1.05
2.97
2.04
1.05
0.84
3.94
2.02
1.94
3.24
6.18
f1 (ppm)

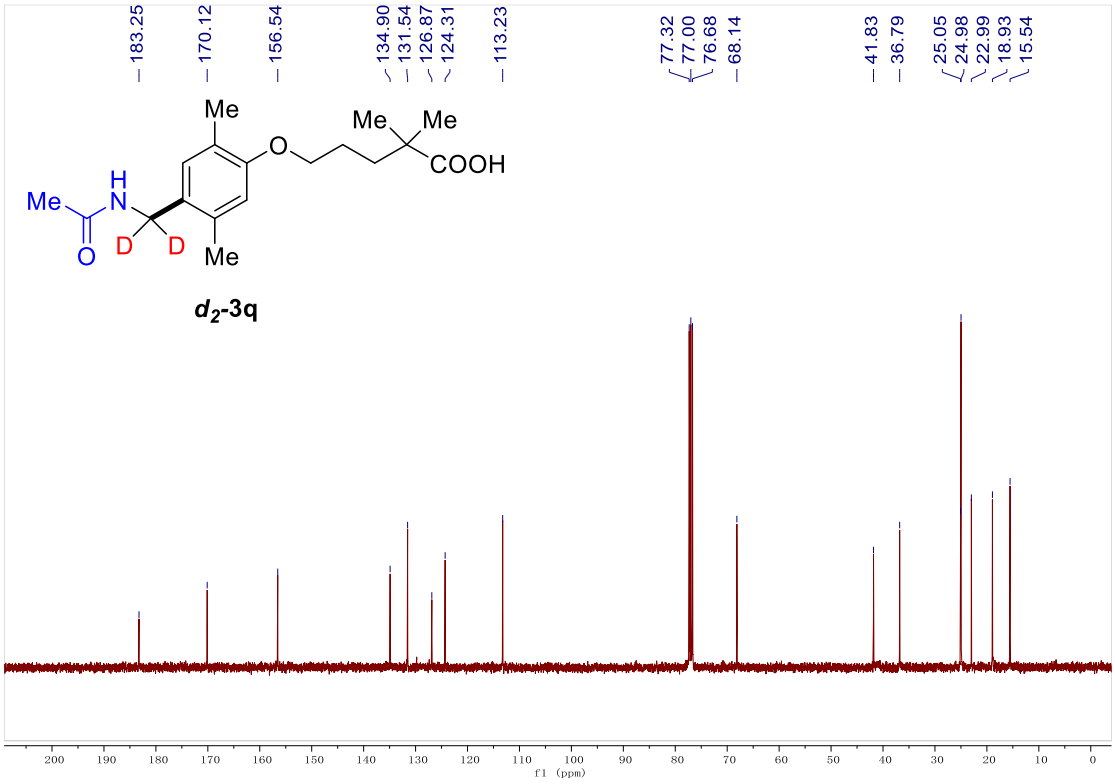
***d*$_3$-3s**


169.50
157.17
157.06
155.04
140.90
139.51
129.62
129.43
127.71
126.32
125.44
123.14
121.91
118.78
117.57
117.49
110.74
80.05
77.32
77.00
76.68
72.55
63.47
39.93
38.42
26.06
14.91
OEt
PhO
O
Me Me
H
N
D
D
D
O
f1 (ppm)

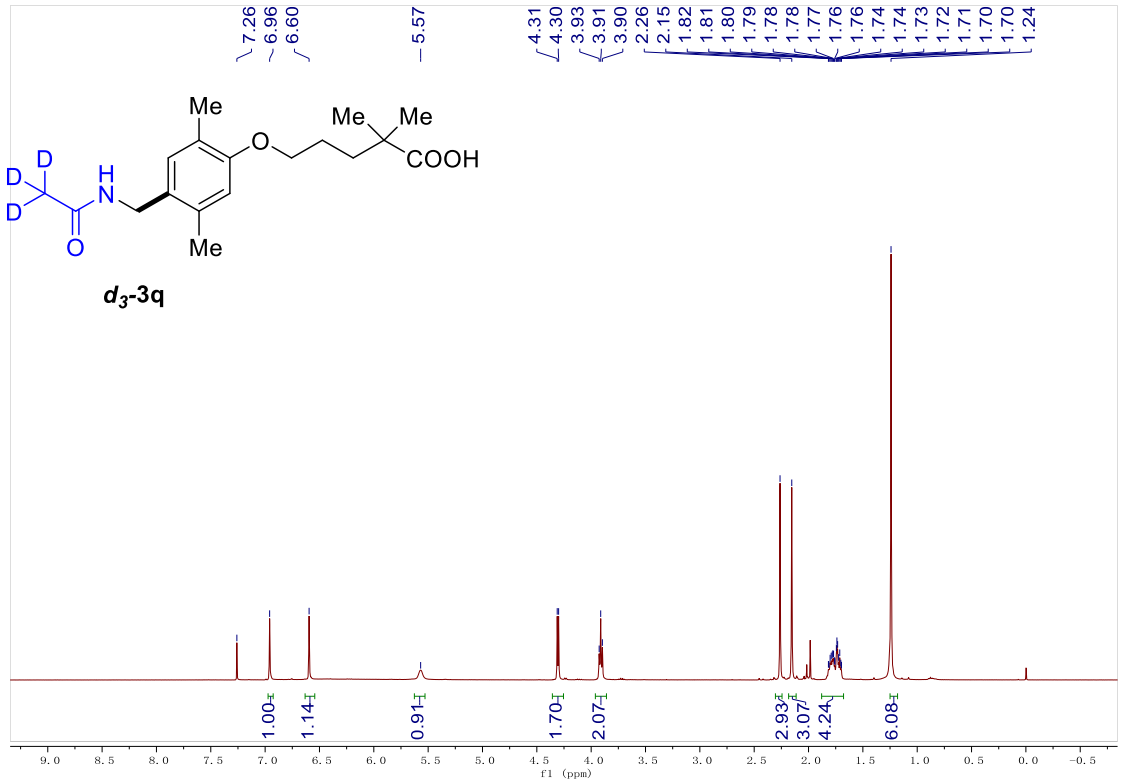
***d*$_3$-3s**


7.26
6.95
6.59
5.72
3.92
3.90
3.89
2.25
2.15
1.98
1.81
1.81
1.80
1.79
1.78
1.77
1.77
1.76
1.75
1.74
1.73
1.73
1.72
1.71
1.70
1.24
Me
Me
Me
O
COOH
H
N
Me
O
D
D
Me
1.09
1.00
0.90
2.15
3.08
3.16
3.30
4.55
7.06
f1 (ppm)

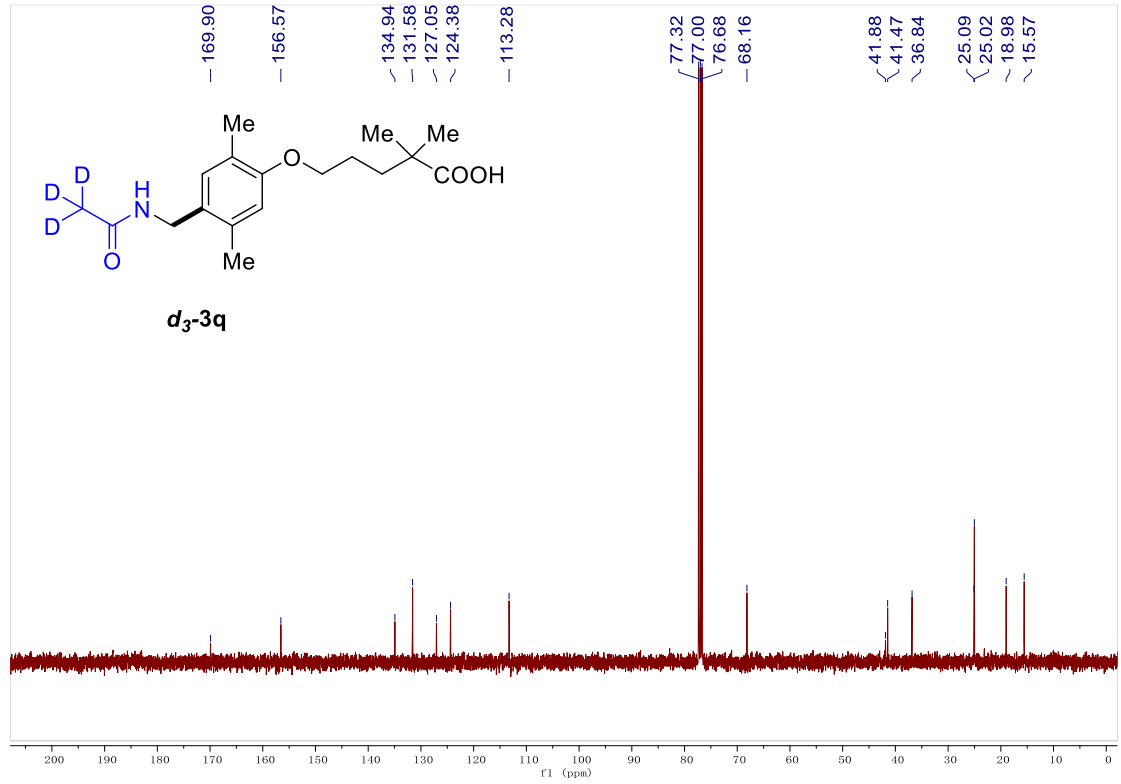
***d*$_2$-3q**


183.25
170.12
156.54
134.90
131.54
126.87
124.31
113.23
77.32
77.00
76.68
68.14
41.83
36.79
25.05
24.98
22.99
18.93
15.54
Me
Me
Me
O
COOH
H
N
Me
O
D
D
Me
f1 (ppm)

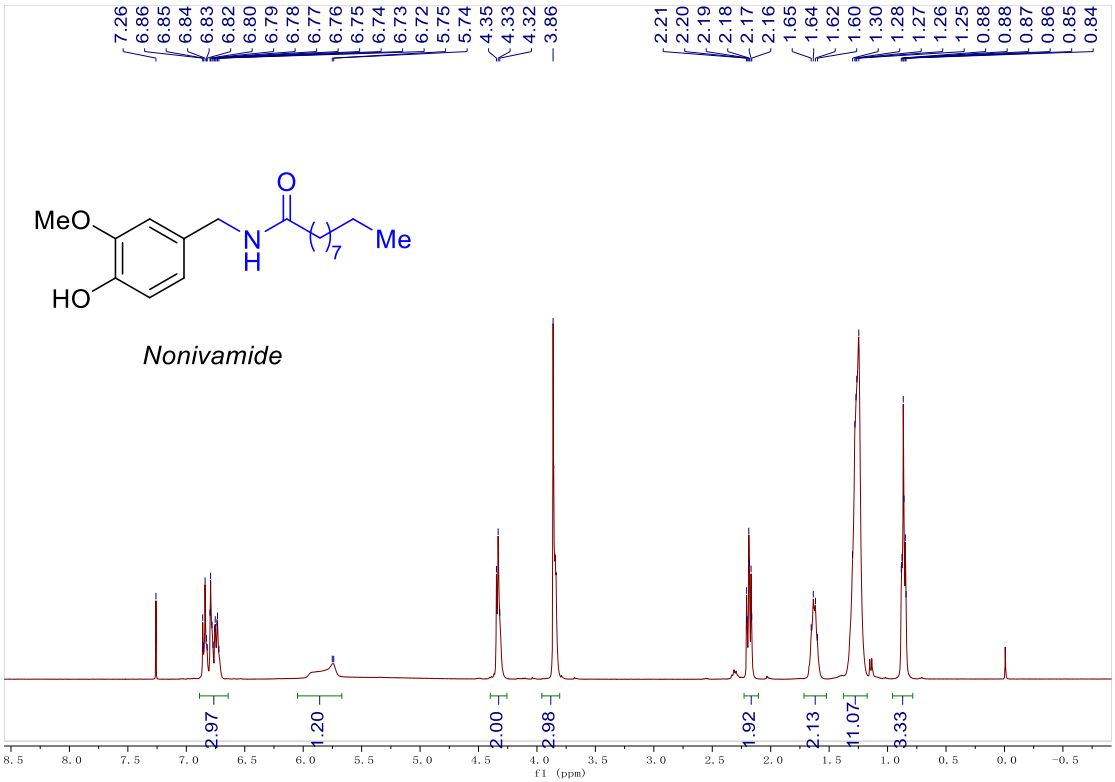
***d*$_2$-3q**

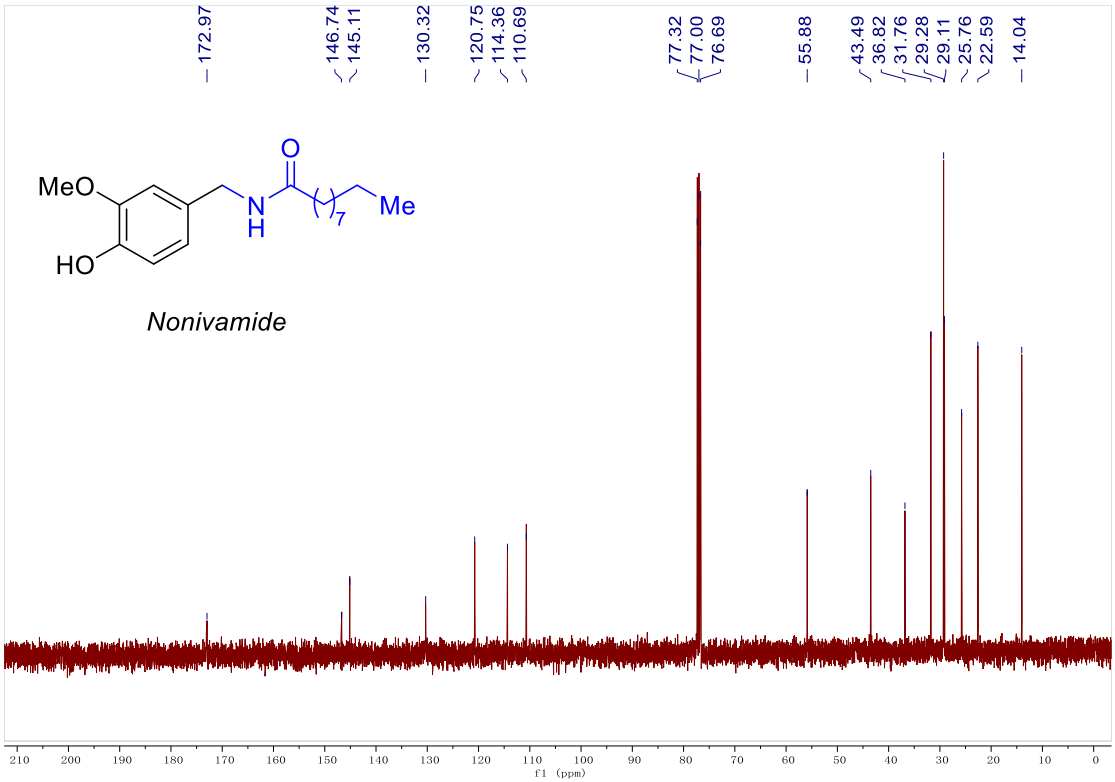

7.26
6.96
6.60
5.57
4.31
4.30
3.93
3.91
3.90
2.26
2.15
1.82
1.81
1.80
1.79
1.78
1.78
1.77
1.76
1.76
1.74
1.74
1.73
1.72
1.71
1.70
1.70
1.24
Me
Me
Me
O
COOH
D
D
D
H
N
O
Me
1.00
1.14
0.91
1.70
2.07
2.93
3.07
4.24
6.08
f1 (ppm)

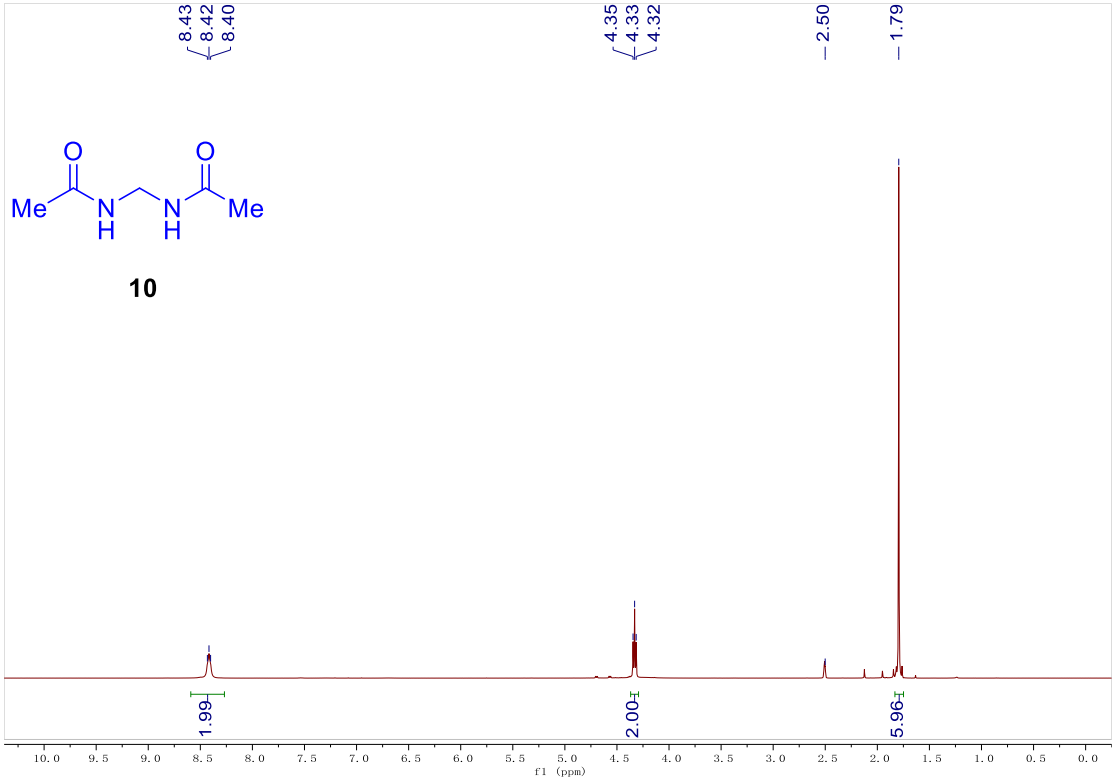
***d*$_3$-3q**

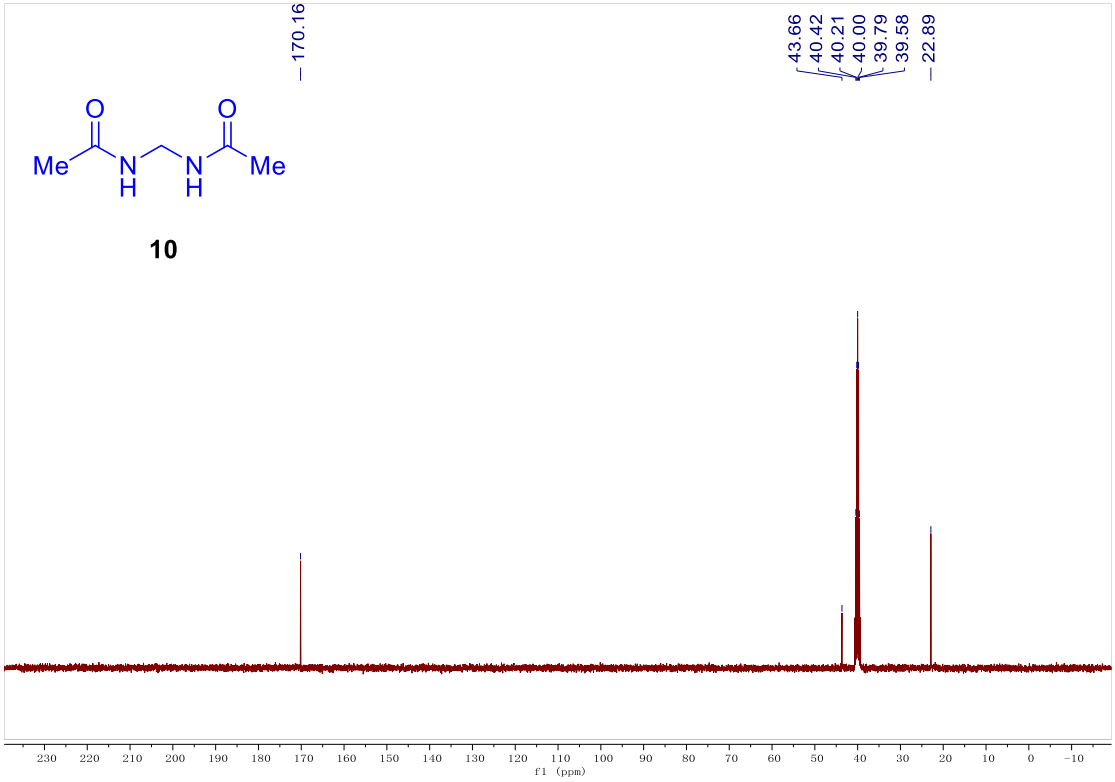

169.90
156.57
134.94
131.58
127.05
124.38
113.28
77.32
77.00
76.68
68.16
41.88
41.47
36.84
25.09
25.02
18.98
15.57
Me
Me
Me
O
COOH
D
D
D
H
N
O
Me
f1 (ppm)

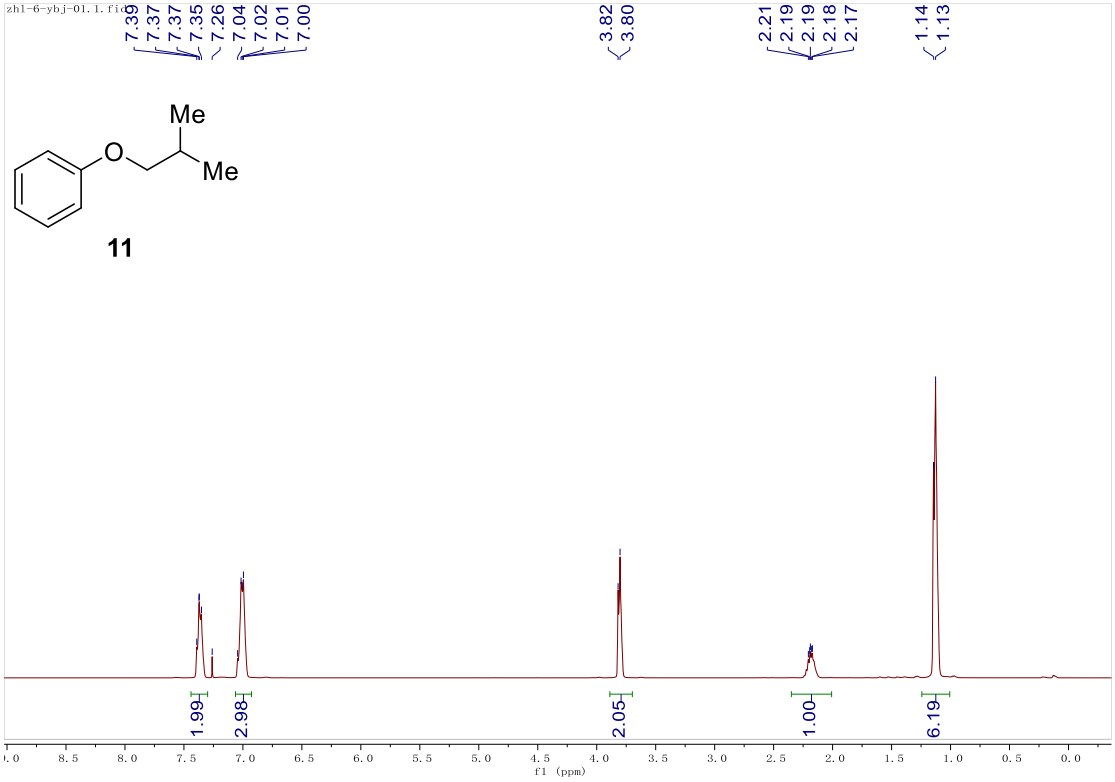
***d*$_3$-3q**


7.26
6.86
6.85
6.84
6.83
6.82
6.80
6.79
6.78
6.77
6.76
6.75
6.74
6.73
6.72
5.75
5.74
4.35
4.33
4.32
3.86
2.21
2.20
2.19
2.18
2.17
2.16
1.65
1.64
1.62
1.60
1.30
1.28
1.27
1.26
1.25
0.88
0.88
0.87
0.86
0.85
0.84
MeO
HO
N
H
O
Me
7
Nonivamide
2.97
1.20
2.00
2.98
1.92
2.13
11.07
3.33
f1 (ppm)


172.97
146.74
145.11
130.32
120.75
114.36
110.69
77.32
77.00
76.69
55.88
43.49
36.82
31.76
29.28
29.11
25.76
22.59
14.04
MeO
HO
N
H
O
Me
7
Nonivamide
f1 (ppm)


8.43
8.42
8.40
4.35
4.33
4.32
2.50
1.79
Me
N
H
N
H
Me
O
O
10
1.99
2.00
5.96
f1 (ppm)


170.16
43.66
40.42
40.21
40.00
39.79
39.58
22.89
Me
N
H
N
H
Me
O
O
10
f1 (ppm)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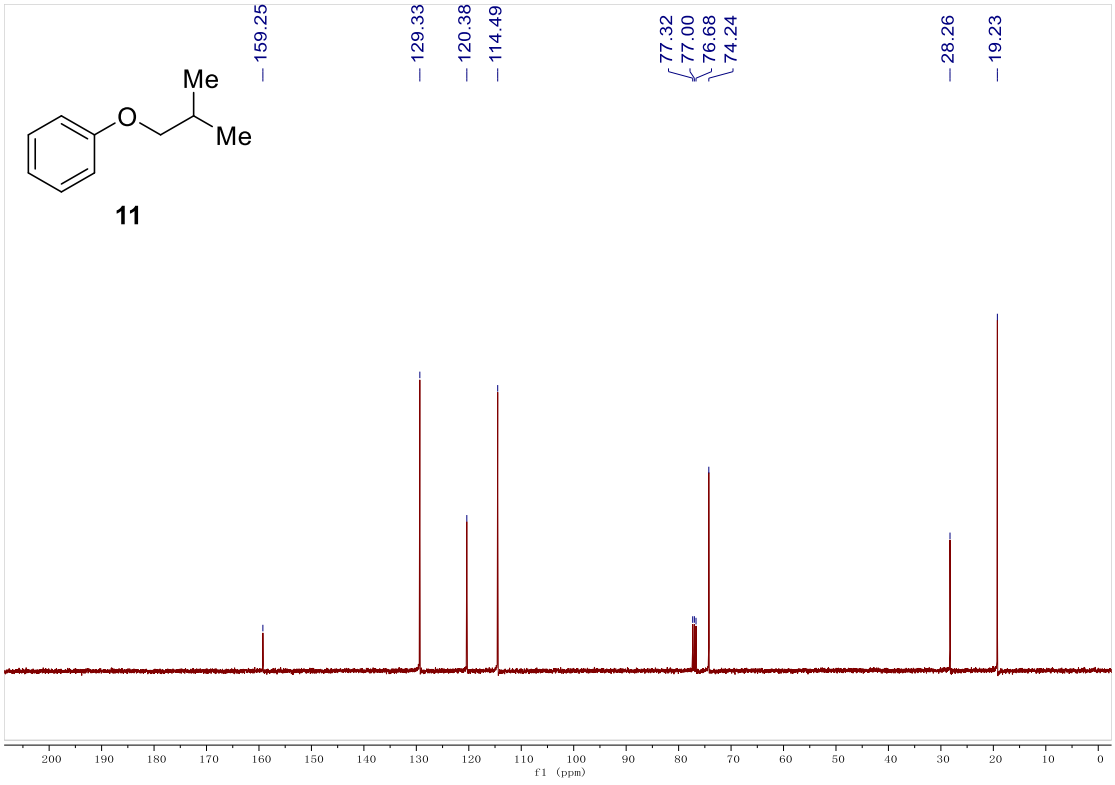
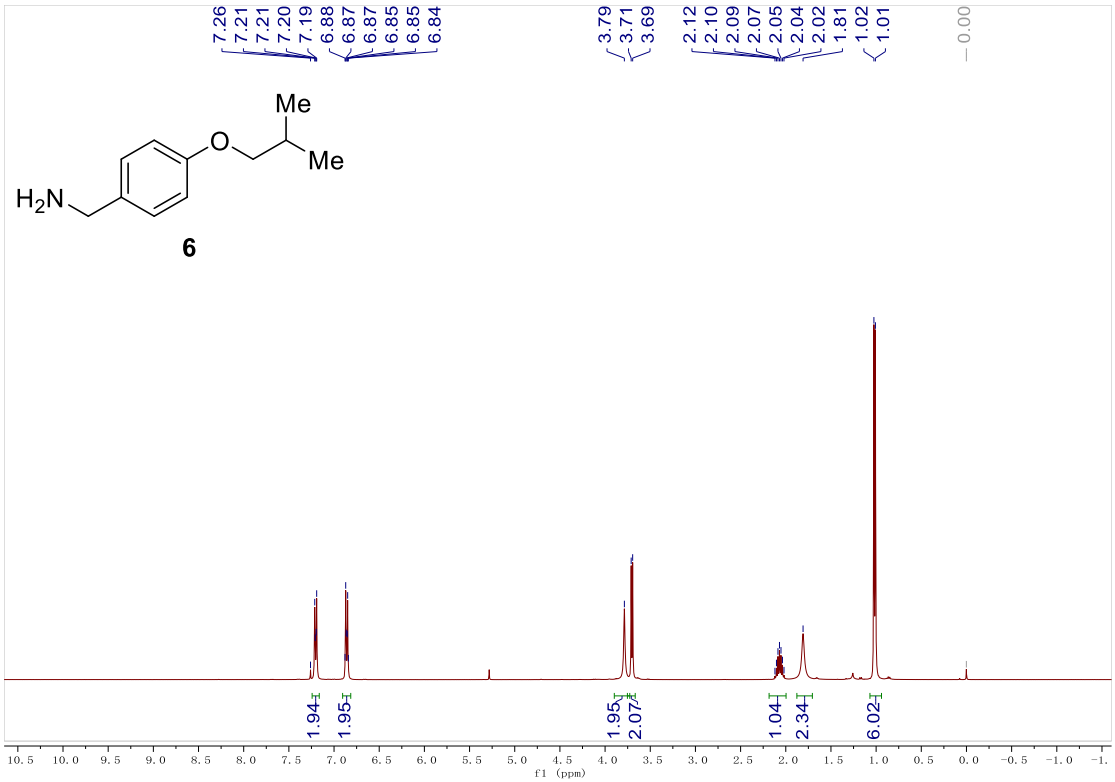
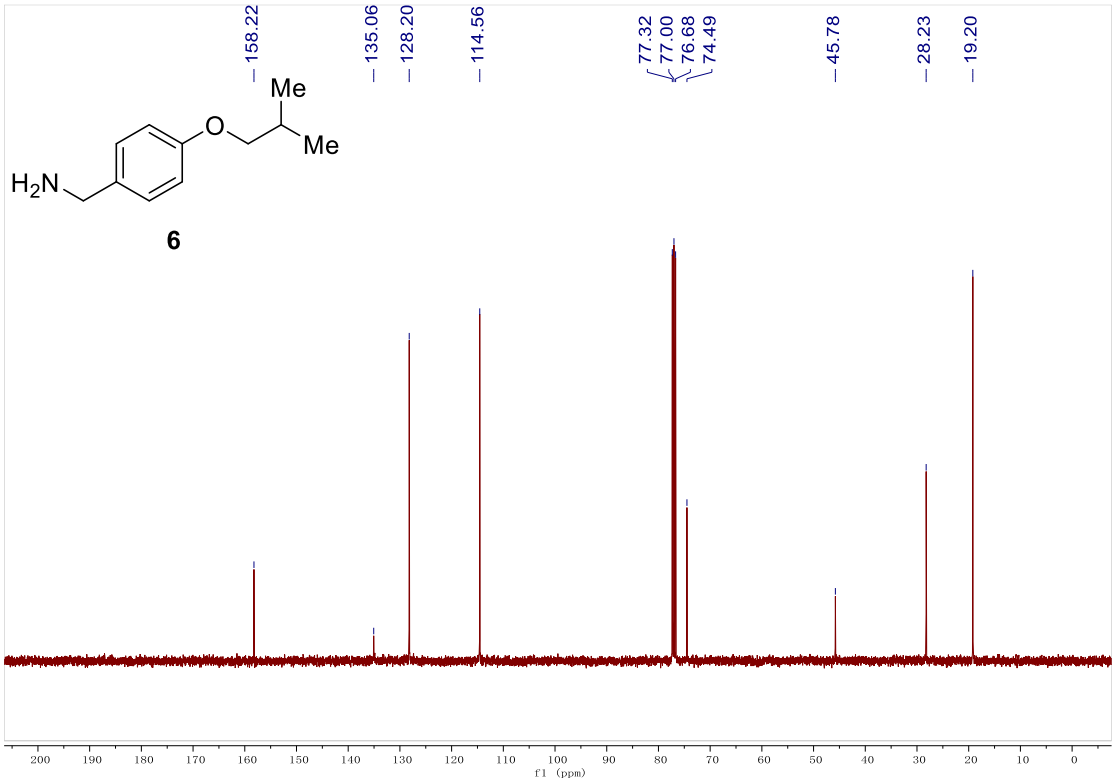
7.39
7.37
7.37
7.35
7.26
7.04
7.02
7.01
7.00
3.82
3.80
2.21
2.19
2.19
2.18
2.17
1.14
1.13
Me
O
Me
11
1.99
2.98
2.05
1.00
6.19
f1 (ppm)


159.25
129.33
120.38
114.49
77.32
77.00
76.68
74.24
28.26
19.23
Me
O
Me
11
f1 (ppm)


7.26
7.21
7.21
7.20
7.19
6.88
6.87
6.87
6.85
6.85
6.84
3.79
3.71
3.69
2.12
2.10
2.09
2.07
2.05
2.04
2.02
1.81
1.02
1.01
0.00
Me
O
Me
H2N
6
1.94
1.95
1.95
2.07
1.04
2.34
6.02
f1 (ppm)


158.22
135.06
128.20
114.56
77.32
77.00
76.68
74.49
45.78
28.23
19.20
Me
O
Me
H2N
6
f1 (ppm)