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*Supporting Information for*

# Expedient access to α-(hetero)aryl-α-keto-1,3-diamines *via* redox-neutral photocatalyzed reactions of *N*-vinylimides with α-aminoalkyl radicals

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# 1. General Information

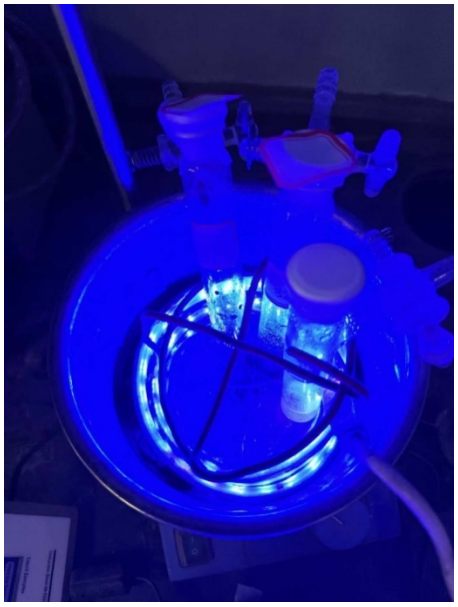
## 1.1 Solvents, Reagents, and Starting Materials

All reactions were carried out in glassware under inert (nitrogen) atmosphere unless otherwise noted. DMF and $CH_2Cl_2$ were dried from CaH. The dehydrated solvents DMSO, DMA and acetonitrile were purchased from Energy Chemical Chemicals. *N*-Vinylimides were prepared according to literature procedures and our previous report.[1] All known tertiary amines and α-silylamines are commercially available or prepared *via* reported procedures.[2] Photocatalysts and all other chemicals were purchased from local vendors and used as supplied unless otherwise stated.

## 1.2 Instruments

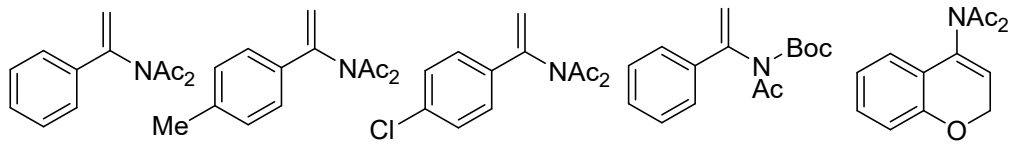
NMR spectra were recorded on a Bruker Avance 500 spectrometer (500 MHz). Chemical shifts were reported in ppm downfield from tetramethylsilane, and calibrated using residue undeuterated solvent ($CHCl_3$ at 7.26 ppm $^1$H NMR, 77.0 ppm $^{13}$C NMR). Spectra were reported as follows: chemical shift (δ ppm), multiplicity (s = singlet, d = doublet, t = triplet, q =quartet, m = multiplet), coupling constants (Hz) and integration. High resolution mass spectra (HRMS) were recorded on an ESI-Q-TOF spectrometer Agilent 6210 ESI/TOF. Single Crystal X-ray Diffraction (SC-XRD) recorded on a Bruker D8 Quest. TLC analyses were performed on precoated $GF_{254}$ silica gel plates and were visualized under UV254 nm light or by $I_2$ staining. Column chromatography was carried out using 300-400 mesh silica gel and eluted with petroleum/ethyl acetate unless otherwise noted.

## 1.3 Picture of a Typical Reaction Setup



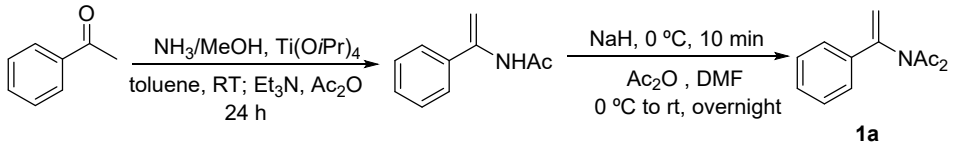
# 2. Preparation of *N*-vinylimides

## 2.1 Know substrates reported in our previous work[1]




**1a** **1d** **1i** **7b** **10**

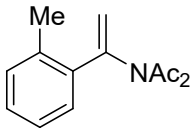
## 2.2 Synthesis of *N*-vinylimide[3,4]




**1a**

(a) To a dry 250 mL Schlenk tube was added acetophenone (3.65 g, 30 mmol, 1.0 equiv) and anhydrous toluene (10 mL under nitrogen. The resultant solution was stirred and cooled in an ice/water bath. To the resultant cold stirring solution was added 7N $NH_3$ in MeOH (6.6 mL, 45 mmol, 1.5 equiv) followed by dropwise addition of Ti(O*i*-Pr)$_4$ (18 mL, 90 mmol, 3.0 equiv). After 10 min, the ice/water cooling bath was removed, and the solution was stirred at room temperature for 24 h. The reaction mixture was then cooled in -5 ºC and added $Et_3N$ (16.7 mL, 120 mmol, 4.0 equiv) followed by $Ac_2O$ (5.7 mL, 60 mmol, 2.0 equiv). The solution was stirred at room temperature for 3 h. The reaction mixture was then added *N,N,N'N'*-tetrakis (2-hydroxyethyl) ethylenedianmine (75% W.t., 18 mL, 63 mmol, 2.1 equiv) at room temperature and the solution was then heated at 55 °C for 20 min. The reaction mixture was cooled to room temperature and diluted with $NH_4OH$ (20 mL), water (20 mL), and EtOAc (30 mL). After separation of the organic phase, the resulting aqueous phase was extracted with additional EtOAc (3 × 10 mL). The combined organic layers were dried over anhydrous $Na_2SO_4$ and evaporated in vacuo. The desired product enamide was obtained after purification by flash chromatography on silica gel with hexane/ethyl acetate as the eluent.

(b) The *N*-(1-phenylvinyl)acetamide (1.61 g, 10 mmol, 1.0 equiv) was dissolved in dry DMF (10 mL) in a dry round-bottom flask. The solution was cooled to 0 ºC and sodium hydride (60% dispersion in mineral oil) (1.0 g, 25 mmol, 2.5 equiv) was added in portions. The resulting suspension was stirred at the same temperature for 10 min. Then $Ac_2O$ (2.81 mL, 30 mmol, 3.0 equiv) was added dropwise and the final solution was continued to stir for overnight at room temperature. The completion of the reaction was confirmed by checking TLC and the excess of sodium hydride was quenched by adding water (20 mL) at 0 ºC. The resulting solution was extracted with ethyl acetate (5 × 10 mL). The combined organic layers were dried over anhydrous sodium sulfate, filtered, and evaporated under reduced pressure to give the crude product, which was purified by column chromatography over silica gel to give the pure product **1a**.

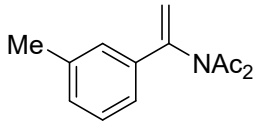



***N*-Acetyl-*N*-(1-(o-tolyl)vinyl)acetamide (1b).** Flash column chromatography to afford product as a yellow oil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.26 – 7.20 (m, 2H), 7.20 – 7.16 (m, 1H), 7.15 – 7.12 (m, 1H), 5.59 (s, 1H), 5.52 (s, 1H), 2.52 (s, 3H), 2.40 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 173.1, 142.7, 136.2, 135.8, 131.7, 128.5, 126.7, 126.1, 119.9, 26.3, 21.1.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{13}H_{15}NO_2Na$: 240.1000, found 240.1003.

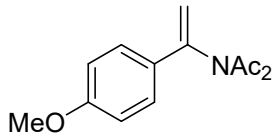



***N*-Acetyl-*N*-(1-(m-tolyl)vinyl)acetamide (1c).** Flash column chromatography to afford product as a yellow oil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.26 – 7.12 (m, 4H), 5.99 (s, 1H), 5.27 (s, 1H), 2.39 (s, 6H), 2.39 (s, 6H), 2.34 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.7, 144.5, 138.5, 135.0, 129.8, 128.7, 125.4, 122.0, 115.4, 26.1, 21.3.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{13}H_{15}NO_2Na$: 240.1000, found 240.1003.

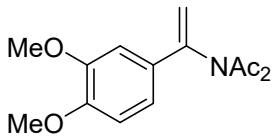



***N*-Acetyl-*N*-(1-(4-methoxyphenyl)vinyl)acetamide (1e).** Flash column chromatography to afford product as a yellow oil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.32 (d, $J$ = 8.9 Hz, 2H), 6.87 (d, $J$ = 8.9 Hz, 2H), 5.87 (s, 1H), 5.18 (s, 1H), 3.79 (s, 3H), 2.39 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.8, 160.2, 144.0, 127.7, 126.3, 114.3, 113.5, 55.3, 26.1.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{13}H_{15}NO_3Na$: 256.0950, found 256.0953.

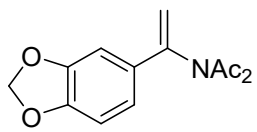



***N*-Acetyl-*N*-(1-(3,4-dimethoxyphenyl)vinyl)acetamide (1f).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 6.97 (d, $J$ = 2.1 Hz, 1H), 6.89 – 6.85 (m, 1H), 6.82 (d, $J$ = 8.4 Hz, 1H), 5.89 (s, 1H), 5.21 (s, 1H), 3.89 (s, 3H), 3.87 (s, 3H), 2.40 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.9, 150.1, 149.3, 144.2, 128.1, 117.7, 113.8, 111.1, 108.1, 55.9, 26.2.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{14}H_{17}NO_4Na$: 286.1055, found 286.1059.

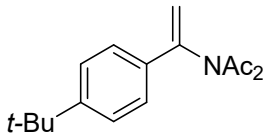



***N*-Acetyl-*N*-(1-(benzo[d][1,3]dioxol-5-yl)vinyl)acetamide (1g).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 6.91 (d, *J* = 1.8 Hz, 1H), 6.85 (dd, *J* = 8.2, 1.9 Hz, 1H), 6.77 (d, *J* = 8.2 Hz, 1H), 5.98 (s, 2H), 5.85 (s, 1H), 5.20 (s, 1H), 2.40 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.8, 148.5, 148.4, 144.1, 129.6, 119.1, 114.2, 108.5, 105.5, 101.5, 26.2.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{13}H_{13}NO_4Na$: 270.0742, found 270.0746.

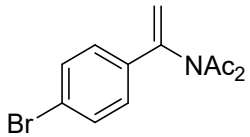



***N*-Acetyl-*N*-(1-(4-(tert-butyl)phenyl)vinyl)acetamide (1h).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ**7.38 (d, *J* = 8.7 Hz, 2H), 7.33 (d, *J* = 8.5 Hz, 2H), 5.98 (s, 1H), 5.25 (s, 1H), 2.41 (s, 6H), 1.30 (s, 9H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.7, 152.3, 144.4, 132.2, 125.9, 124.6, 114.7, 34.6, 31.1, 26.2.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{16}H_{21}Na$: 282.1470, found 282.1471.

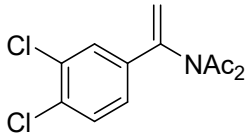



***N*-Acetyl-*N*-(1-(4-bromophenyl)vinyl)acetamide (1j).** Flash column chromatography to afford product as a yellowoil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ**7.52 – 7.47 (m, 2H), 7.28 – 7.25 (m, 2H), 6.01 (d,*J*=1.1 Hz, 1H), 5.33 (d,*J* = 1.1 Hz, 1H), 2.39 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.6, 143.7, 134.2, 132.1, 126.5, 123.3, 116.3, 26.2.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{12}H_{12}NO_2NaBr$: 303.9949, found 303.9953.

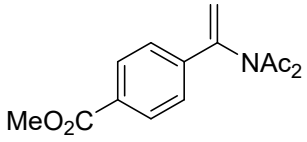



***N*-Acetyl-*N*-(1-(3,4-dichlorophenyl)vinyl)acetamide (1k).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.42 (d, *J* = 2.0 Hz, 1H), 7.31 – 7.22 (m, 2H), 5.94 (s, 1H), 5.55 (s, 1H), 2.41 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 173.0, 140.7, 135.0, 133.3, 132.1, 131.0, 130.6, 127.6, 122.1, 26.4.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{12}H_{11}NO_2NaCl_2$: 294.0065, found294.0068.

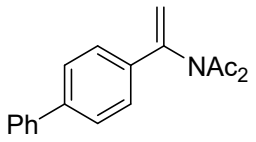



**Methyl 4-(1-(*N*-acetylacetamido)vinyl)benzoate (1l).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.03 (d, *J* = 8.6 Hz, 2H), 7.47 (d, *J* = 8.6 Hz, 2H), 6.12 (s, 1H), 5.43 (s, 1H), 3.92 (s, 3H), 2.40 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.6, 166.4, 143.9, 139.5, 130.6, 130.3, 124.9, 117.9, 52.3, 26.3.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{14}H_{15}NO_4Na$: 284.0899, found284.0902.

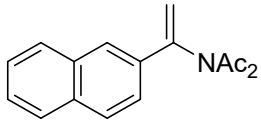



***N*-(1-([1,1'-Biphenyl]-4-yl)vinyl)-*N*-acetylacetamide (1m).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.59 (t, *J* = 9.0 Hz, 4H), 7.50 – 7.42 (m, 4H), 7.37 (t, *J* = 7.4 Hz, 1H), 6.07 (s, 1H), 5.34 (s, 1H), 2.45 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.8, 144.3, 142.0, 140.1, 134.0, 128.9, 127.7, 127.0, 125.4, 115.6, 26.3.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{18}H_{17}NO_2Na$: 302.1157, found302.1160.

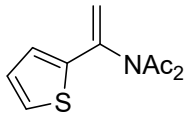



***N*-Acetyl-*N*-(1-(naphthalen-2-yl)vinyl)acetamide (1n).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.50 (d, *J* = 8.0 Hz, 1H), 7.88 (d, *J* = 9.5 Hz, 1H), 7.82 (d, *J* = 8.1 Hz, 1H), 7.59 – 7.55 (m, 1H), 7.54 – 7.49 (m, 1H), 7.43 (t, *J* = 7.7 Hz, 1H), 7.36 (dd, *J* = 7.3, 1.2 Hz, 1H), 5.87 (s, 1H), 5.74 (s, 1H), 2.46 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 173.3, 141.4, 134.3, 134.2, 130.9, 129.4, 128.7, 126.9, 126.0, 124.9, 124.8, 124.2, 121.1, 26.4.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{16}H_{15}NO_2Na$: 276.1000, found 276.1001.

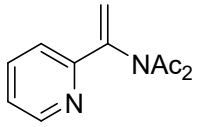



***N*-Acetyl-*N*-(1-(thiophen-2-yl)vinyl)acetamide (1o).** Flash column chromatography to afford product as a yellow oil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.24 (d, *J* = 4.7 Hz, 1H), 7.00 – 6.93 (m, 2H), 5.86 (s, 1H), 5.18 (s, 1H), 2.42 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.3, 140.3, 139.2, 127.8, 126.3, 125.0, 114.6, 26.0.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{10}H_{11}NO_2NaS$: 232.0408, found232.0412.

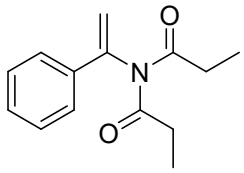



***N*-Acetyl-*N*-(1-(pyridin-2-yl)vinyl)acetamide (1p).** Flash column chromatography to afford product as a brown oil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.56 – 8.52 (m, 1H), 7.70 – 7.64 (m, 1H), 7.45 (d, *J* = 8.0 Hz, 1H), 7.22 – 7.18 (m, 1H), 6.38 (s, 1H), 5.51 (s, 1H), 2.38 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.9, 152.7, 149.5, 144.5, 136.8, 123.3, 119.7, 118.5, 26.1.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{11}H_{12}N_2O_2Na$: 227.0796, found 227.0800.

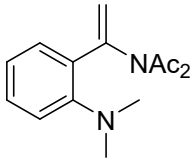


***N*-(1-Phenylvinyl)-*N*-propionylpropionamide (7).** According to the general procedure, propionic anhydride instead of acetic anhydride was used. Flash column chromatography to afford product as a yellow oil.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.47 – 7.21 (m, 5H), 5.98 (s, 1H), 5.25 (s, 1H), 2.73 (q, *J* = 6.9 Hz, 4H), 1.10 (t, *J* = 7.3 Hz, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 176.3, 144.0, 135.4, 128.82, 128.75, 124.7, 115.4, 31.2, 8.9.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{14}H_{17}NO_2Na$: 254.1157, found 254.1160.



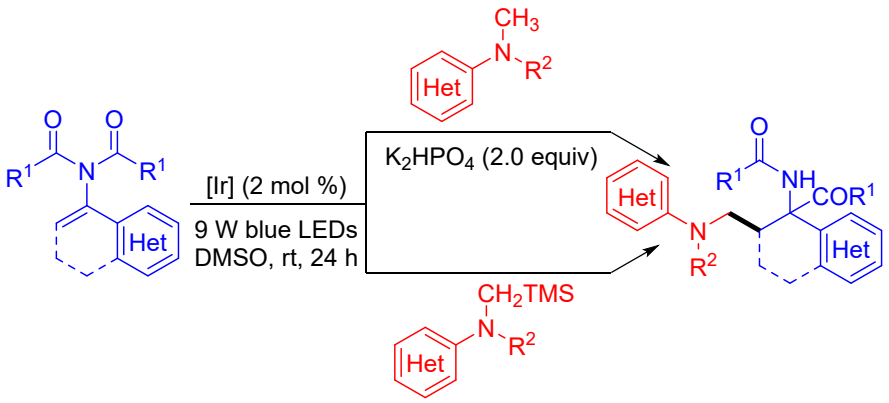
***N*-Acetyl-*N*-(1-(2-(dimethylamino)phenyl)vinyl)acetamide (12).** Flash column chromatography to afford product as a yellow solid.

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.28 – 7.20 (m, 1H), 7.20 – 7.15 (m, 1H), 7.13 (d, *J* = 8.0 Hz, 1H), 6.98 (t, *J* = 7.5 Hz, 1H), 6.43 (s, 1H), 5.42 (s, 1H), 2.70 (s, 6H), 2.39 (d, *J* = 1.2 Hz, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 172.8, 152.4, 143.0, 129.4, 129.0, 127.7, 122.7, 120.0, 118.7, 43.9, 26.1.

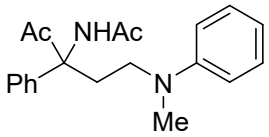
**HRMS (ESI) $[M+H]^+$:** calculated for $C_{14}H_{19}N_2O_2$: 247.1447, found 247.1446.

# 3. General procedure of photoredox-catalyzed acyl migration reactions




To an oven dried transparent 10 mL Schlenk tube equipped with stirring bar, $Ir[dF(CF_3)ppy)]_2(dtbbpy)PF_6$ (4.5 mg, 0.004 mmol, 0.02 equiv), *N*-vinylimide (0.2 mmol, 1.0 equiv), and degassed DMSO (4 mL) were added. The tube was evacuated and filled with nitrogen for 3 times. The tube was then charged under nitrogen with α-silylamine (0.4 mmol, 2.0 equiv) or a mixture of tertiary amine (0.4 mmol, 2.0 equiv) and $K_2HPO_4$ (0.4 mmol, 2.0 equiv). The tube was irradiated with a 9 W blue LEDs strip spiraled within a bowel for 24 h (cooling with a fan). After the reaction was complete, the reaction solution was quenched by the addition of water (5

mL) and extracted with EtOAc (5 x 10 mL). The combined organic layer was washed with brine, dried over $Na_2SO_4$, filtered, and solvent was evaporated to obtain crude product. Flash chromatography over silica gel afforded the product.

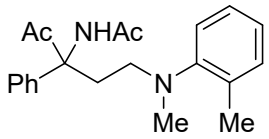



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3a).** Yellow oil (40.8 mg, 78% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.46 (s, 1H), 7.34-7.33 (m, 4H), 7.30 – 7.22 (m, 3H), 6.73 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.1 Hz, 2H), 3.50 – 3.43 (m, 1H), 3.33 – 3.26 (m, 1H), 3.18 – 3.11 (m, 1H), 2.82 (s, 3H), 2.81 – 2.75 (m, 1H), 2.05 (s, 3H), 1.71 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.0, 168.5, 148.9, 139.3, 129.3, 128.9, 128.0, 126.0, 117.0, 112.6, 68.5, 48.5, 40.0, 29.3, 23.8, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{25}N_2O_2$: 325.1911, found 325.1920.

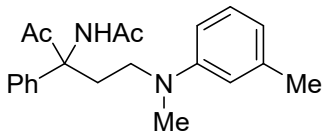



***N*-(1-(Methyl(o-tolyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3b).** Yellow oil (52.8 mg, 78% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ**7.37 – 7.30 (m, 5H), 7.29 – 7.24 (m, 1H), 7.16 (t, *J* = 7.6 Hz, 2H), 7.04 (d, *J* = 7.8 Hz, 1H), 6.98 (t, *J* = 7.4 Hz, 1H), 3.33 – 3.25 (m, 1H), 3.00 – 2.93 (m, 1H), 2.72 – 2.64 (m, 1H), 2.67 (s, 3H), 2.54 – 2.47 (m, 1H), 2.27 (s, 3H), 1.99 (s, 3H), 1.80 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.9, 168.3, 151.5, 139.3, 133.1, 131.3, 128.8, 127.9, 126.5, 126.0, 123.3, 119.8, 68.8, 51.2, 42.5, 29.0, 23.8, 23.3, 18.2.

**HRMS(ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_2$: 339.2073, found 339.2077.

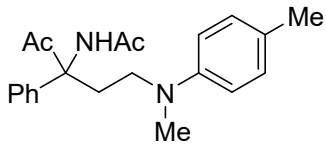



***N*-(1-(Methyl(m-tolyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3c).** Yellow oil (57.5 mg, 85% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.47 (s, 1H), 7.35 (d, *J* = 4.3 Hz, 4H), 7.30 – 7.25 (m, 1H), 7.13 (t, *J* = 7.8 Hz, 1H), 6.57 (d, *J* = 7.4 Hz, 1H), 6.52 – 6.48 (m, 2H), 3.47 – 3.41 (m, 1H), 3.31 – 3.25 (m, 1H), 3.17 – 3.11 (m, 1H), 2.82 (s, 3H), 2.80 – 2.74 (m, 1H), 2.32 (s, 3H), 2.04 (s, 3H), 1.74 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.0, 168.5, 148.9, 139.2, 138.9, 129.1, 128.8, 127.9, 126.0, 117.9, 113.3, 109.8, 68.5, 48.5, 39.9, 29.2, 23.8, 23.2, 21.8.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_2$: 339.2073, found 339.2076.



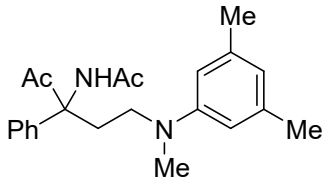

***N*-(1-(Methyl(p-tolyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3d).** Yellow oil (49.4 mg,

73% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.48 (s, 1H), 7.34 (d, *J* = 4.3 Hz, 4H), 7.29 – 7.25 (m, 1H), 7.06 (d, *J* = 8.4 Hz, 2H), 6.62 (d, *J* = 8.5 Hz, 2H), 3.45 – 3.39 (m, 1H), 3.30 – 3.24 (m, 1H), 3.15 – 3.07 (m, 1H), 2.81 – 2.74 (m, 4H), 2.25 (s, 3H), 2.04 (s, 3H), 1.71 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.9, 168.5, 146.9, 139.4, 129.8, 128.8, 127.9, 126.5, 126.0, 113.1, 68.5, 48.9, 40.3, 29.3, 23.8, 23.2, 20.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_2$: 339.2073, found 339.2076.

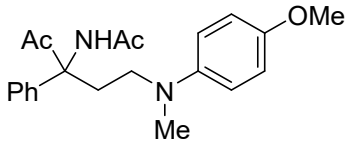



***N*-(1-((3,5-Dimethylphenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3e).** Yellow oil (61.3 mg, 87% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.43 (s, 1H), 7.34 (d, *J* = 4.3 Hz, 4H), 7.30 – 7.25 (m, 1H), 6.41 (s, 1H), 6.30 (s, 2H), 3.44 – 3.37 (m, 1H), 3.30 – 3.24 (m, 1H), 3.16 – 3.09 (m, 1H), 2.81 (s, 3H), 2.78 – 2.72 (m, 1H), 2.27 (s, 6H), 2.04 (s, 3H), 1.76 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.5, 149.1, 139.3, 138.8, 128.8, 128.0, 126.0, 119.1, 110.6, 68.6, 48.6, 40.0, 29.2, 23.8, 23.2, 21.7.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{22}H_{29}N_2O_2$: 353.2229, found 353.2233.

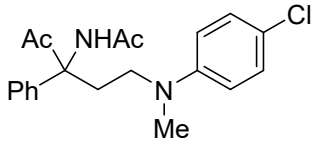



***N*-(1-((4-Methoxyphenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3f).** Yellow oil (50.3 mg, 71% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.48 (s, 1H), 7.34-7.32 (m, 4H), 7.29 – 7.24 (m, 1H), 6.87 – 6.81 (m, 2H), 6.71 – 6.65 (m, 2H), 3.76 (s, 3H), 3.39 – 3.33 (m, 1H), 3.28 – 3.22 (m, 1H), 3.09 – 3.02 (m, 1H), 2.77 – 2.70 (m, 4H), 2.04 (s, 3H), 1.70 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.9, 168.5, 152.2, 143.8, 139.4, 128.8, 128.0, 126.1, 114.9, 114.8, 68.6, 55.7, 49.5, 40.9, 29.3, 23.9, 23.3.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{21}H_{26}N_2O_3Na$: 377.1841, found 377.1845.

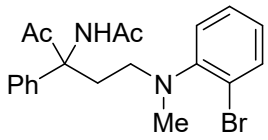



***N*-(1-((4-Chlorophenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide(3g).** Yellow oil (50.2 mg, 70%).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.42 (s, 1H), 7.37 – 7.27 (m, 5H), 7.17 (d, *J* = 9.0 Hz, 2H), 6.58 (d, *J* = 9.0 Hz, 2H), 3.46 – 3.39 (m, 1H), 3.31 – 3.25 (m, 1H), 3.14 – 3.07 (m, 1H), 2.80 (s, 3H), 2.77 – 2.70 (m, 1H), 2.04 (s, 3H), 1.72 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.9, 168.5, 147.5, 139.1, 129.1, 128.9, 128.1, 125.9, 121.9, 113.7, 68.5, 48.7, 40.0, 29.1, 23.8, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2Cl$: 359.1526, found 359.1530.

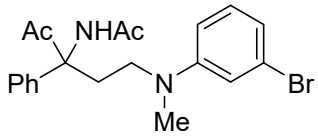



***N*-(1-((2-Bromophenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3h).** Yellow oil (69.3 mg, 86% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.56 – 7.52 (m, 1H), 7.41 (s, 1H), 7.33 (d, *J* = 4.3 Hz, 4H), 7.28 – 7.23 (m, 2H), 7.09 – 7.04 (m, 1H), 6.93 – 6.87 (m, 1H), 3.26 – 3.19 (m, 1H), 2.98 – 2.91 (m, 1H), 2.84 – 2.76 (m, 1H), 2.72 (s, 3H), 2.59 – 2.52 (m, 1H), 1.99 (s, 3H), 1.90 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.6, 168.7, 150.9, 138.7, 133.8, 128.8, 128.2, 127.8, 126.0, 124.6, 121.9, 120.0, 69.0, 51.6, 41.7, 29.0, 23.6(3), 23.6(0).

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2Br$: 403.1021, found 403.1024.

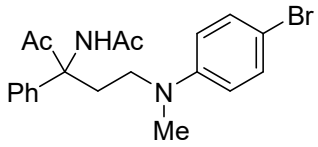



***N*-(1-((3-Bromophenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3i).** Yellow oil (68.5 mg, 85% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.41 (s, 1H), 7.38 – 7.26 (m, 5H), 7.07 (t, *J* = 8.1 Hz, 1H), 6.84 – 6.81 (m, 1H), 6.76-6.75 (m, 1H), 6.57 (dd, *J* = 8.4, 2.3 Hz, 1H), 3.42 – 3.36 (m, 1H), 3.30 – 3.23 (m, 1H), 3.17 – 3.09 (m, 1H), 2.82 (s, 3H), 2.75 – 2.68 (m, 1H), 2.05 (s, 3H), 1.77 (s, 3H).

**$^{13}$C NMR (126 MHz, CDCl3) δ** 204.0, 168.6, 150.0, 139.0, 130.5, 128.9, 128.1, 125.9, 123.5, 119.6, 115.1, 110.9, 68.5, 48.3, 39.6, 28.9, 23.8, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2Br$: 403.1021, found 403.1025.

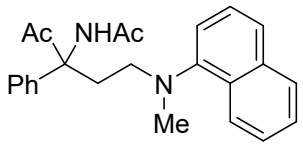



***N*-(1-((4-Bromophenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3j).** Yellow oil (58.8 mg, 73% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.42 (s, 1H), 7.38 – 7.26 (m, 7H), 6.53 (d, *J* = 9.0 Hz, 2H), 3.45 – 3.38 (m, 1H), 3.31 – 3.23 (m, 1H), 3.15 – 3.07 (m, 1H), 2.80 (s, 3H), 2.77 – 2.68 (m, 1H), 2.04 (s, 3H), 1.72 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.9, 168.5, 147.8, 139.1, 132.0, 128.9, 128.1, 125.9, 114.1, 109.0, 68.5, 48.6, 39.9, 29.1, 23.8, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2Br$: 403.1021, found 403.1025.



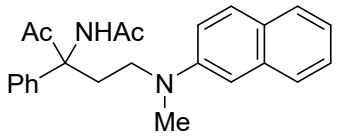

***N*-(1-(Methyl(naphthalen-1-yl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3k).** Yellow oil (61.4 mg, 82% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.14 (d, *J* = 9.0 Hz, 1H), 7.85 – 7.81 (m, 1H), 7.55 (d, *J* = 8.2 Hz, 1H), 7.52 – 7.44 (m, 2H), 7.41 (t, *J* = 7.8 Hz, 1H), 7.37 – 7.30 (m, 5H), 7.29 – 7.24 (m, 1H), 7.12

(d, *J* = 7.4 Hz, 1H), 3.44 – 3.36 (m, 1H), 3.23 – 3.16 (m, 1H), 2.94 – 2.88 (m, 1H), 2.87 (s, 3H), 2.68 – 2.60 (m, 1H), 1.91 (s, 3H), 1.73 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.8, 168.5, 149.3, 139.1, 134.8, 129.2, 128.8, 128.3, 127.9, 126.0, 125.8, 125.6, 125.3, 123.7, 123.5, 115.3, 68.8, 51.6, 43.6, 29.1, 23.6, 23.3.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{24}H_{27}N_2O_2$: 375.2073, found 375.2076.

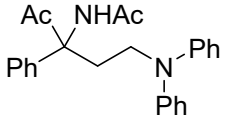



***N*-(1-(Methyl(naphthalen-2-yl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3l).** White solid (64.4 mg, 86% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.72 (d, *J* = 9.1 Hz, 1H), 7.68 (dd, *J* = 16.8, 8.2 Hz, 2H), 7.49 (s, 1H), 7.39 (t, *J* = 8.0 Hz, 1H), 7.35 (d, *J* = 4.3 Hz, 4H), 7.31 – 7.27 (m, 1H), 7.23 (t, *J* = 7.8 Hz, 1H), 7.07 (dd, *J* = 9.0, 2.5 Hz, 1H), 6.92 (d, *J* = 2.2 Hz, 1H), 3.61 – 3.54 (m, 1H), 3.39 – 3.32 (m, 1H), 3.30 – 3.22 (m, 1H), 2.95 (s, 3H), 2.87 – 2.79 (m, 1H), 2.07 (s, 3H), 1.73 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.6, 146.7, 139.2, 134.9, 129.1, 128.9, 128.0, 127.4, 126.9, 126.3, 126.2, 126.0, 122.3, 116.0, 106.9, 68.6, 48.7, 40.2, 29.3, 23.8, 23.3.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{24}H_{27}N_2O_2$: 375.2073, found 375.2077.

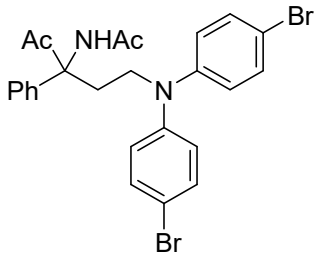



***N*-(1-(Diphenylamino)-4-oxo-3-phenylpentan-3-yl)acetamide (3m).** Yellow oil (58.7 mg, 76% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.37 – 7.30 (m, 5H), 7.30 – 7.25 (m, 5H), 7.02 – 6.94 (m, 6H), 3.82 – 3.75 (m, 1H), 3.55 – 3.44 (m, 2H), 2.72 – 2.66 (m, 1H), 2.00 (s, 3H), 1.75 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.9, 168.5, 148.0, 139.0, 129.4, 128.9, 128.0, 125.9, 121.7, 121.0, 68.7, 48.1, 28.9, 23.7, 23.2.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{25}H_{26}N_2O_2Na$: 409.1892, found 409.1895.

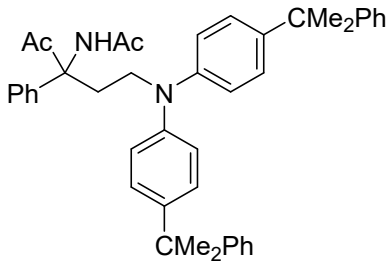



***N*-(1-(Bis(4-bromophenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3n).** Yellow solid (63.1 mg, 58% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.38 – 7.32 (m, 6H), 7.29 (t, *J* = 6.3 Hz, 4H), 6.84 (d, *J* = 8.8 Hz, 4H), 3.73 – 3.64 (m, 1H), 3.50 – 3.37 (m, 2H), 2.65 – 2.56 (m, 1H), 2.01 (s, 3H), 1.79 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.7, 168.7, 146.6, 138.7, 132.4, 129.0, 128.2, 125.8, 122.6, 114.6, 68.6, 48.2, 29.0, 23.7, 23.3.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{25}H_{24}N_2O_2NaBr_2$: 565.0102, found 565.0106.

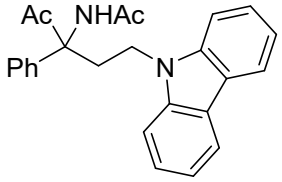



***N*-(1-(Bis(4-(2-phenylpropan-2-yl)phenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3o).** Yellow oil (66.0 mg, 53% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.37 – 7.32 (m, 5H), 7.31 – 7.26 (m, 9H), 7.21 – 7.17 (m, 2H), 7.14 (d, *J* = 8.7 Hz, 4H), 6.91 (d, *J* = 8.7 Hz, 4H), 3.83 – 3.76 (m, 1H), 3.59 – 3.51 (m, 1H), 3.45 – 3.38 (m, 1H), 2.70 – 2.62 (m, 1H), 1.99 (s, 3H), 1.72 (s, 3H), 1.69 (s, 12H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 205.0, 168.5, 150.8, 145.5, 143.8, 139.1, 128.9, 128.0, 127.9, 127.7, 126.7, 126.0, 125.5, 120.4, 68.8, 48.2, 42.3, 30.7, 28.7, 23.7, 23.1.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{43}H_{46}N_2O_2Na$: 645.3457, found 645.3459.

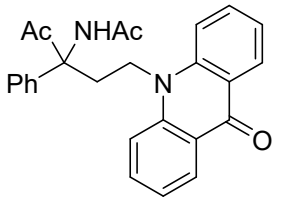



***N*-(1-(9*H*-Carbazol-9-yl)-4-oxo-3-phenylpentan-3-yl)acetamide (3p).** Colorless oil (66.9 mg, 87% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.09 (d, *J* = 8.0 Hz, 2H), 7.45 (t, *J* = 7.7 Hz, 2H), 7.37 – 7.28 (m, 5H), 7.27 – 7.23 (m, 4H), 7.08 (s, 1H), 4.36 – 4.29 (m, 1H), 4.20 – 4.13 (m, 1H), 3.65 – 3.58 (m, 1H), 2.94 – 2.87 (m, 1H), 1.90 (s, 3H), 1.80 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.0, 169.0, 139.9, 138.2, 129.1, 128.3, 125.8(8), 125.8(6), 123.0, 120.4, 119.2, 108.5, 68.7, 38.5, 30.2, 23.4, 23.0.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{25}H_{24}N_2O_2Na$: 407.1735, found 407.1739.

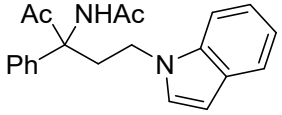



***N*-(4-Oxo-1-(9-oxoacridin-10(9H)-yl)-3-phenylpentan-3-yl)acetamide (3q).** Yellow solid (52.0 mg, 63% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.48 (d, *J* = 8.2 Hz, 2H), 7.59 – 7.53 (m, 2H), 7.49 (s, 1H), 7.40 (d, *J* = 4.2 Hz, 4H), 7.38 – 7.33 (m, 1H), 7.22 – 7.16 (m, 4H), 4.13 – 4.06 (m, 1H), 4.04 – 3.97 (m, 1H), 3.32 – 3.23 (m, 1H), 2.83 – 2.73 (m, 1H), 2.24 (s, 3H), 2.06 (s, 3H), .

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.5, 178.1, 169.9, 141.6, 137.8, 134.1, 129.3, 128.6, 127.8, 125.6, 122.4, 121.3,114.1, 68.7, 42.1, 30.6, 23.9, 23.6.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{26}H_{24}N_2O_3Na$: 435.1685, found 435.1687.

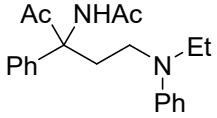


***N*-(1-(1*H*-Indol-1-yl)-4-oxo-3-phenylpentan-3-yl)acetamide (3r).** Yellow oil (21.4 mg, 32% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.62 (d, *J* = 7.9 Hz, 1H), 7.41 – 7.36 (m, 2H), 7.35 – 7.30 (m, 3H), 7.25 – 7.19 (m, 2H), 7.13 – 7.09 (m, 1H), 6.85 (d, *J* = 3.1 Hz, 1H), 6.81 (s, 1H), 6.48 (d, *J* = 3.1 Hz, 1H), 4.28 – 4.22 (m, 1H), 4.01 – 3.94 (m, 1H), 3.56 – 3.49 (m, 1H), 2.97 – 2.89 (m, 1H), 1.77 (s, 3H), 1.70 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.0, 169.1, 137.9, 135.6, 129.1, 128.8, 128.3, 128.0, 125.9, 121.9, 121.2, 119.7, 109.3, 101.6, 68.8, 42.0, 31.4,23.3, 22.9.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{21}H_{22}N_2O_2Na$: 357.1579, found 357.1583.

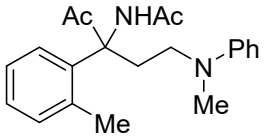



***N*-(1-(Ethyl(phenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (3s).** Brown oil (58.2 mg, 86% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.48 (s, 1H), 7.34 (d, *J* = 4.3 Hz, 4H), 7.30 – 7.21 (m, 3H), 6.75 – 6.68 (m, 3H), 3.46 – 3.34 (m, 2H), 3.33 – 3.24 (m, 1H), 3.11 – 3.01 (m, 2H), 2.83 – 2.74 (m, 1H), 2.04 (s, 3H), 1.72 (s, 3H), 1.08 (t, *J* = 7.0 Hz, 3H), .

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.5, 147.2, 139.4, 129.4, 128.8, 127.9, 126.0, 116.8, 113.2, 68.6, 46.2, 45.5, 29.5, 23.8, 23.3, 11.4.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_2$: 339.2073, found 339.2075.

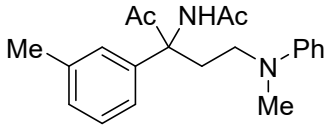



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-(o-tolyl)pentan-3-yl)acetamide (4a).** Yellow oil (52.8 mg, 78%).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.63 (d, *J* = 7.4 Hz, 1H), 7.28 – 7.19 (m, 5H), 7.09 (d, *J* = 7.3 Hz, 1H), 6.73 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.0 Hz, 2H), 3.50 – 3.43 (m, 1H), 3.38 – 3.31 (m, 1H), 3.21 – 3.14 (m, 1H), 2.88 (s, 3H), 2.55 – 2.47 (m, 1H), 2.13 (s, 3H), 2.03 (s, 3H), 1.83 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 205.3, 167.7, 148.9, 136.7, 135.6, 132.5, 129.3, 128.2, 127.6, 126.5, 116.9, 112.6, 68.6, 47.9, 39.2, 29.3, 23.8, 23.5, 20.5.

**HRMS (ESI) $[M+H]^+$:** calculated for: $C_{21}H_{27}N_2O_2$339.2073, found 339.2078.

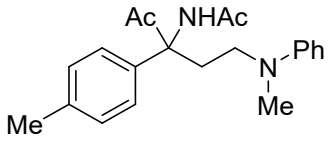



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-(m-tolyl)pentan-3-yl)acetamide (4b).** Yellow oil (52.1 mg, 77% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.44 (s, 1H), 7.29 – 7.22 (m, 3H), 7.17 – 7.08 (m, 3H), 6.75 (t, *J* = 7.3 Hz, 1H), 6.71 (d, *J* = 8.1 Hz, 2H), 3.50 – 3.44 (m, 1H), 3.34 – 3.27 (m, 1H), 3.19 – 3.12 (m, 1H), 2.85 (s, 3H), 2.82 – 2.74 (m, 1H), 2.35 (s, 3H), 2.07 (s, 3H), 1.75 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.5, 148.9, 139.2, 138.5, 129.3, 128.8, 128.7, 126.6, 123.1, 117.0, 112.6, 68.5, 48.5, 39.9, 29.2, 23.9, 23.2, 21.6.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_2$: 339.2073, found 339.2077.

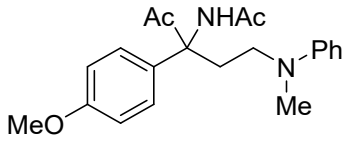



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-(p-tolyl)pentan-3-yl)acetamide (4c).** Yellow oil (58.2 mg, 86% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.45 (s, 1H), 7.27 – 7.21 (m, 4H), 7.15 (d, *J* = 8.1 Hz, 2H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.1 Hz, 2H), 3.49 – 3.42 (m, 1H), 3.30 – 3.24 (m, 1H), 3.18 – 3.11 (m, 1H), 2.83 (s, 3H), 2.80 – 2.73 (m, 1H), 2.32 (s, 3H), 2.04 (s, 3H), 1.73 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.5, 148.9, 137.7, 136.3, 129.6, 129.3, 125.9, 116.9, 112.6, 68.3, 48.5, 39.9, 29.3, 23.8, 23.1, 20.9.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_2$: 339.2073, found 339.2077.

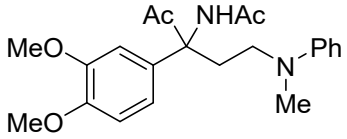



***N*-(3-(4-Methoxyphenyl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4d).** Yellow solid (51.7 mg, 73% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.43 (s, 1H), 7.27 – 7.22 (m, 4H), 6.86 (d, *J* = 8.8 Hz, 2H), 6.73 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.2 Hz, 2H), 3.78 (s, 3H), 3.49 – 3.42 (m, 1H), 3.31 – 3.24 (m, 1H), 3.17 – 3.10 (m, 1H), 2.82 (s, 3H), 2.78 – 2.71 (m, 1H), 2.04 (s, 3H), 1.72 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.2, 168.5, 159.2, 148.9, 131.2, 129.3, 127.2, 117.0, 114.2, 112.6, 68.0, 55.2, 48.6, 40.0, 29.3, 23.9, 23.1.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{27}N_2O_3$: 355.2022, found 355.2022.

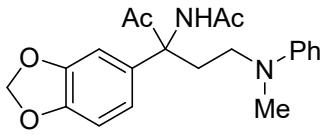



***N*-(3-(3,4-Dimethoxyphenyl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4e).** Yellow oil (65.3 mg, 85% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.40 (s, 1H), 7.27 – 7.21 (m, 2H), 6.93 (dd, *J* = 8.4, 2.3 Hz, 1H), 6.82 (d, *J* = 8.5 Hz, 1H), 6.75 – 6.71 (m, 2H), 6.68 (d, *J* = 8.0 Hz, 2H), 3.84 (s, 3H), 3.83 (s, 3H), 3.47 – 3.41 (m, 1H), 3.30 – 3.24 (m, 1H), 3.16 – 3.09 (m, 1H), 2.82 (s, 3H), 2.75 – 2.68 (m, 1H), 2.04 (s, 3H), 1.74 (s, 3H) .

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.5, 149.2, 148.9, 148.8, 131.7, 129.3, 118.7, 117.0, 112.5, 111.2, 109.2, 68.1, 56.0, 55.8, 48.6, 39.9, 29.2, 23.8, 23.0.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{22}H_{29}N_2O_4$: 385.2127, found 385.2131.



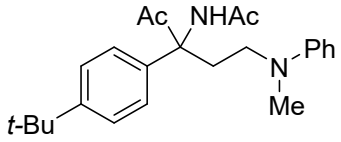

***N*-(3-(Benzo[d][1,3]dioxol-5-yl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4f).** White solid (53.0 mg, 72% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.44 (s, 1H), 7.27 – 7.22 (t, *J* = 7.7 Hz,2H), 6.83 (dd, *J* = 8.2, 1.8

Hz, 1H), 6.79 – 6.71 (m, 3H), 6.68 (d, *J* = 8.2 Hz, 2H), 5.94 (s, 2H), 3.49 – 3.42 (m, 1H), 3.27 – 3.21 (m, 1H), 3.16 – 3.08 (m, 1H), 2.82 (s, 3H), 2.74 – 2.67 (m, 1H), 2.05 (s, 3H), 1.73 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.8, 168.5, 148.8, 148.2, 147.3, 133.3, 129.3, 119.7, 117.1, 112.6, 108.4, 106.6, 101.3, 68.1, 48.6, 40.0, 29.4, 23.8, 23.0.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{25}N_2O_4$: 369.1814, found 369.1818.

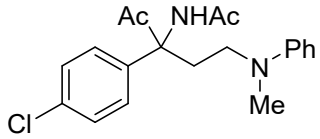



***N*-(3-(4-(*tert*-Butyl)phenyl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4g).** Yellow oil (67.8 mg, 89% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.46 (s, 1H), 7.34 (d, *J* = 8.5 Hz, 2H), 7.27 – 7.22 (m, 4H), 6.73 (t, *J* = 7.3 Hz, 1H), 6.68 (d, *J* = 8.2 Hz, 2H), 3.49 – 3.42 (m, 1H), 3.32 – 3.25 (m, 1H), 3.18 – 3.10 (m, 1H), 2.82 (s, 3H), 2.80 – 2.74 (m, 1H), 2.05 (s, 3H), 1.73 (s, 3H), 1.29 (s, 9H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 168.6, 150.7, 148.9, 135.9, 129.2, 125.7, 125.6, 116.9, 112.5, 68.3, 48.6, 39.9, 34.4, 31.2, 29.3, 23.8, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{24}H_{33}N_2O_2$: 381.2542, found 381.2545.

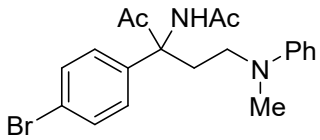



***N*-(3-(4-Chlorophenyl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4h).** Yellow oil (62.4 mg, 87% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.47 (s, 1H), 7.33 – 7.23 (m, 6H), 6.74 (t, *J* = 7.2 Hz, 1H), 6.68 (d, *J* = 8.2 Hz, 2H), 3.50 – 3.43 (m, 1H), 3.29 – 3.23 (m, 1H), 3.16 – 3.09 (m, 1H), 2.81 (s, 3H), 2.79 – 2.72 (m, 1H), 2.04 (s, 3H), 1.70 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.4, 168.5, 148.8, 138.1, 134.0, 129.3, 129.0, 127.5, 117.2, 112.7, 68.1, 48.5, 40.2, 29.3, 23.8, 23.1.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2Cl$: 359.1526, found 359.1528.

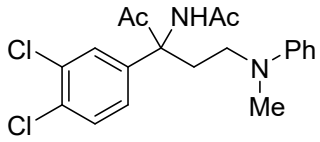



***N*-(3-(4-Bromophenyl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4i).** Yellow oil (64.4 mg, 80% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.51 – 7.43 (m, 3H), 7.27 – 7.20 (m, 4H), 6.75 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.1 Hz, 2H), 3.50 – 3.44 (m, 1H), 3.29 – 3.22 (m, 1H), 3.16 – 3.09 (m, 1H), 2.81 (s, 3H), 2.79 – 2.72 (m, 1H), 2.05 (s, 3H), 1.70 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.3, 168.5, 148.7, 138.6, 132.0, 129.3, 127.8, 122.2, 117.2, 112.7, 68.1, 48.5, 40.2, 29.3, 23.8, 23.1.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2Br$: 403.1021, found 403.1024.

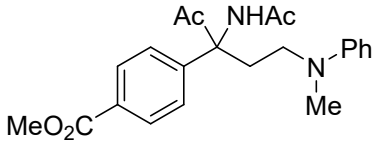



***N*-(3-(3,4-Dichlorophenyl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4j).** Yellow solid (59.8 mg, 76% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.66 (d, *J* = 8.7 Hz, 1H), 7.34 (d, *J* = 2.2 Hz, 1H), 7.31 (dd, *J* = 8.6, 2.2 Hz, 1H), 7.29 – 7.21 (m, 3H), 6.73 (t, *J* = 7.3 Hz, 1H), 6.67 (d, *J* = 8.7 Hz, 2H), 3.49 – 3.41 (m, 1H), 3.35 – 3.27 (m, 1H), 3.22 – 3.14 (m, 1H), 2.88 (s, 3H), 2.32 – 2.24 (m, 1H), 2.02 (s, 3H), 1.92 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.2, 168.5, 148.6, 135.3, 134.9, 133.2, 130.8, 130.6, 129.3, 127.2, 116.9, 112.5, 67.6, 47.4, 39.1, 28.4, 23.9, 23.4.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{23}N_2O_2Cl_2$: 393.1137, found 393.1140.

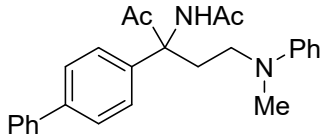



**Methyl 4-(3-acetamido-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)benzoate (4k).** Yellow solid (61.9 mg, 80% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.00 (d, *J* = 8.6 Hz, 2H), 7.50 (s, 1H), 7.42 (d, *J* = 8.6 Hz, 2H), 7.28 – 7.22 (m, 2H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.1 Hz, 2H), 3.89 (s, 3H), 3.52 – 3.45 (m, 1H), 3.32 – 3.26 (m, 1H), 3.17 – 3.09 (m, 1H), 2.86 – 2.78 (m, 4H), 2.05 (s, 3H), 1.68 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.1, 168.5, 166.4, 148.7, 144.5, 130.1, 129.8, 129.4, 126.1, 117.3, 112.7, 68.5, 52.1, 48.5, 40.3, 29.4, 23.7, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{22}H_{27}N_2O_4$: 383.1971, found 383.1974.

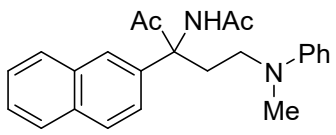



***N*-(3-([1,1'-Biphenyl]-4-yl)-1-(methyl(phenyl)amino)-4-oxopentan-3-yl)acetamide (4l).** White solid (66.4 mg, 83% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.54 – 7.50 (m, 4H), 7.48 (s, 1H), 7.40 – 7.35 (m, 4H), 7.30 (t, *J* = 7.3 Hz, 1H), 7.24 – 7.20 (m, 2H), 6.71 (t, *J* = 7.3 Hz, 1H), 6.67 (d, *J* = 8.2 Hz, 2H), 3.48 – 3.42 (m, 1H), 3.33 – 3.27 (m, 1H), 3.17 – 3.10 (m, 1H), 2.83 – 2.75 (m, 4H), 2.03 (s, 3H), 1.73 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.8, 168.6, 148.9, 140.8, 140.2, 138.2, 129.3, 128.7, 127.5, 127.4, 127.0, 126.4, 117.1, 112.6, 68.4, 48.5, 40.0, 29.4, 23.8, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{26}H_{29}N_2O_2$: 401.2229, found 401.2234.



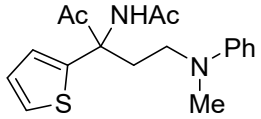

***N*-(1-(Methyl(phenyl)amino)-3-(naphthalen-2-yl)-4-oxopentan-3-yl)acetamide (4m).** White solid (58.5 mg, 78% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.86 – 7.77 (m, 3H), 7.74 (d, *J* = 8.0 Hz, 1H), 7.49 – 7.43 (m, 2H),

7.42 – 7.35 (m, 2H), 7.25 – 7.20 (m, 2H), 6.75 – 6.66 (m, 3H), 3.64 – 3.56 (m, 1H), 3.43 – 3.35 (m, 1H), 3.29 – 3.21 (m, 1H), 2.89 (s, 3H), 2.59 – 2.50 (m, 1H), 1.91 (s, 3H), 1.75 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 207.1, 168.1, 148.9, 134.5, 134.2, 130.6, 129.6, 129.3, 126.41, 126.37, 125.3, 125.1, 123.2, 116.9, 112.6, 68.7, 47.9, 39.2, 29.5, 23.9, 23.6.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{24}H_{26}N_2O_2Na$: 397.1892, found 397.1894.

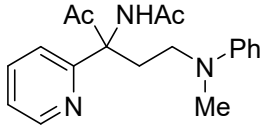



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-(thiophen-2-yl)pentan-3-yl)acetamide (4n).** Yellow oil (60.1 mg, 91% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.45 (s, 1H), 7.28 – 7.22 (m, 3H), 7.03 – 7.00 (m, 1H), 6.98 – 6.95 (m, 1H), 6.74 (t, *J* = 7.3 Hz, 1H), 6.69 (d, *J* = 8.1 Hz, 2H), 3.49 – 3.43 (m, 1H), 3.32 – 3.26 (m, 1H), 3.17 – 3.10 (m, 1H), 2.86-2.79 (m, 4H), 2.06 (s, 3H), 1.83 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 202.4, 168.9, 148.8, 144.3, 129.3, 127.2, 125.5, 125.3, 117.2, 112.7, 66.8, 48.5, 40.1, 31.5, 23.8, 22.6.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{18}H_{23}N_2O_2S$: 331.1480, found 331.1484.

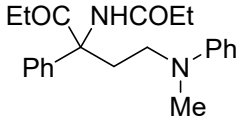



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-(pyridin-2-yl)pentan-3-yl)acetamide (4o).** Brown oil (46.2 mg, 71% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.58 (d, *J* = 4.8 Hz, 1H), 8.43 (s, 1H), 7.75 – 7.68 (m, 1H), 7.34 – 7.27 (m, 2H), 7.15 – 7.09 (m, 2H), 6.63 (t, *J* = 7.2 Hz, 1H), 6.42 (d, *J* = 8.3 Hz, 2H), 3.16 – 3.08 (m, 1H), 2.96 – 2.87 (m, 2H), 2.71 (s, 3H), 2.62 – 2.55 (m, 1H), 2.18 (s, 3H), 1.89 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.8, 169.2, 154.8, 148.8, 148.3, 137.5, 129.0, 123.2, 120.8, 116.2, 112.2, 69.6, 47.7, 38.2, 30.6, 24.0, 23.3.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{19}H_{24}N_3O_2$: 326.1869, found 326.1872.

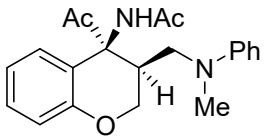



***N*-(1-(Methyl(phenyl)amino)-4-oxo-3-phenylhexan-3-yl)propionamide (8).** Brown oil (52.8 mg, 75% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.52 (s, 1H), 7.36 – 7.30 (m, 4H), 7.28 – 7.21 (m, 3H), 6.73 (t, *J* = 7.3 Hz, 1H), 6.68 (d, *J* = 8.1 Hz, 2H), 3.45 – 3.38 (m, 1H), 3.34 – 3.28 (m, 1H), 3.16 – 3.08 (m, 1H), 2.83 (s, 3H), 2.80 – 2.73 (m, 1H), 2.35 – 2.24 (m, 2H), 2.14 – 2.01 (m, 2H), 1.17 (t, *J* = 7.6 Hz, 3H), 0.75 (t, *J* = 7.3 Hz, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 207.6, 172.0, 148.9, 139.7, 129.2, 128.8, 127.8, 125.9, 116.9, 112.5, 68.1, 48.6, 39.7, 30.1, 29.2, 28.5, 9.7, 8.4.

**HRMS (ESI ) $[M+H]^+$:** calculated for $C_{22}H_{29}N_2O_2$: 353.2229, found 353.2233.

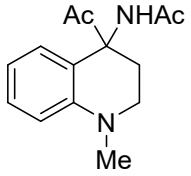


***N*-((3*R**,4*S**)-4-Acetyl-3-((methyl(phenyl)amino)methyl)chroman-4-yl)acetamide ((+/-)-11).** Brown oil (59.9 mg, 85% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.36 (s, 1H), 7.27 – 7.19 (m, 3H), 6.95 – 6.86 (m, 3H), 6.75 (t, *J* = 7.3 Hz, 1H), 6.64 (d, *J* = 8.0 Hz, 2H), 4.69 (t, *J* = 10.2 Hz, 1H), 4.31 (dd, *J* = 10.5, 4.0 Hz, 1H), 3.29 – 3.26 (m, 2H), 3.13 – 3.07 (m, 1H), 2.89 (s, 3H), 2.02 (s, 3H), 1.80 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.1, 169.4, 155.7, 148.6, 129.9, 129.3, 126.6, 121.3, 120.0, 117.8, 117.4, 112.7, 65.5, 64.4, 50.6, 40.4, 38.4, 23.9, 23.7.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{21}H_{25}N_2O_3$: 353.1865, found 353.1870.

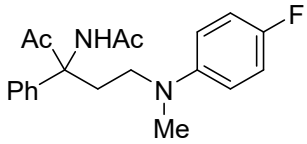



***N*-(4-Acetyl-1-methyl-1,2,3,4-tetrahydroquinolin-4-yl)acetamide (13).** Yellow oil (11.4 mg, 23% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.23 – 7.18 (m, 1H), 6.95 (dd, *J* = 7.8, 1.6 Hz, 1H), 6.68 (d, *J* = 8.3 Hz, 1H), 6.64 (t, *J* = 7.5 Hz, 1H), 6.23 (s, 1H), 3.42 – 3.35 (m, 1H), 3.33 – 3.28 (m, 1H), 2.94 (s, 3H), 2.66 – 2.61 (m, 1H), 2.54 – 2.48 (m, 1H), 2.13 (s, 3H), 2.00 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.8, 169.2, 147.2, 129.9, 126.9, 119.2, 116.7, 112.2, 64.3, 47.4, 39.2, 30.1, 25.7, 23.7.

**HRMS (ESI) $[M+Na]^+$:** calculated for $C_{14}H_{18}N_2O_2Na$: 269.1266, found 269.1269.



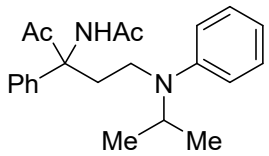

***N*-(1-((4-Fluorophenyl)(methyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (6a).** Yellow oil (56.7 mg, 82% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.46 (s, 1H), 7.37 – 7.31 (m, 4H), 7.31 – 7.26 (m, 1H), 6.95 (t, *J* = 8.7 Hz, 2H), 6.64 – 6.58 (m, 2H), 3.43 – 3.36 (m, 1H), 3.30 – 3.23 (m, 1H), 3.12 – 3.04 (m, 1H), 2.78 (s, 3H), 2.77 – 2.69 (m, 1H), 2.04 (s, 3H), 1.71 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.9, 168.5, 155.7 (d, $J_{C\text{-}F}$ = 236.1 Hz), 145.6, 139.2, 128.9, 128.0, 126.0, 115.7 (d, $J_{C\text{-}F}$ = 21.9 Hz), 114.0 (d, $J_{C\text{-}F}$ = 7.4 Hz), 68.5, 49.2, 40.5, 29.2, 23.8, 23.2.

**$^{19}$F NMR (471 MHz, $CDCl_3$) δ** -128.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{20}H_{24}N_2O_2F$: 343.1816, found 343.1825.

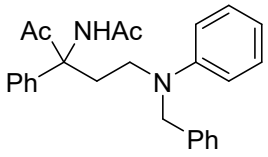



***N*-(1-(*iso*-Propyl(phenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (6b).** Yellow oil (61.4 mg, 87% yield).

$^1$H NMR (**500 MHz, $CDCl_3$**) **δ** 7.51 (s, 1H), 7.34 – 7.29 (m, 4H), 7.28 – 7.21 (m, 3H), 6.82 (d, *J* = 8.2 Hz, 2H), 6.77 (t, *J* = 7.2 Hz, 1H), 3.98 – 3.90 (m, 1H), 3.23 – 3.16 (m, 2H), 2.99 – 2.91 (m, 1H), 2.65 – 2.56 (m, 1H), 2.04 (s, 3H), 1.79 (s, 3H), 1.17 (d, *J* = 6.7 Hz, 3H), 1.05 (d, *J* = 6.6 Hz, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 205.0, 168.3, 148.9, 139.5, 129.2, 128.8, 127.9, 126.0, 118.2, 116.2, 68.8, 51.8, 38.5, 29.8, 23.8, 23.5, 20.5, 18.8.

**HRM (ESI) $[M+H]^+$:** calculated for $C_{22}H_{29}N_2O_2$: 353.2224, found 353.2227.

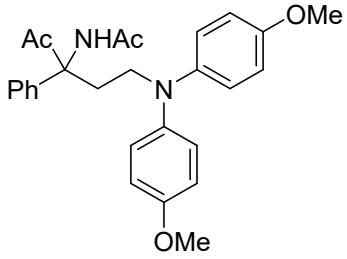



***N*-(1-(benzyl(phenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (6c).** Yellow oil (71.3 mg, 89% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.39 – 7.27 (m, 8H), 7.26 – 7.19 (m, 5H), 6.77 – 6.71 (m, 3H), 4.50 – 4.34 (m, 2H), 3.56 – 3.49 (m, 1H), 3.40 – 3.33 (m, 1H), 3.22 – 3.14 (m, 1H), 2.84 – 2.76 (m, 1H), 1.97 (s, 3H), 1.75 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.5, 168.5, 147.9, 139.2, 138.4, 129.4, 128.9, 128.5, 128.0, 126.9 (d, $J$ = 4.6 Hz), 125.9, 117.2, 113.1, 68.6, 55.2, 46.2, 28.8, 23.7, 23.2.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{26}H_{29}N_2O_2$: 401.2224, found 401.2233.

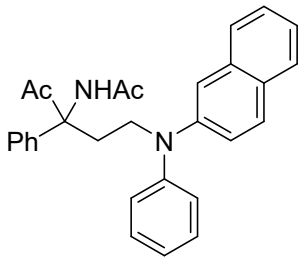



***N*-(1-(Bis(4-methoxyphenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (6d).** Yellow oil (78.6 mg, 88% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.43 (s, 1H), 7.35 – 7.29 (m, 4H), 7.29 – 7.24 (m, 1H), 6.92 – 6.79 (m, 8H), 3.77 (s, 6H), 3.74 – 3.66 (m, 1H), 3.46 – 3.38 (m, 1H), 3.37 – 3.28 (m, 1H), 2.72 – 2.64 (m, 1H), 1.98 (s, 3H), 1.74 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.9, 168.5, 154.6, 142.5, 139.1, 128.8, 127.9, 125.9, 122.3, 114.6, 68.7, 55.5, 48.7, 29.0, 23.6, 23.3.

**HRM (ESI) $[M+Na]^+$:** calculated for $C_{27}H_{30}N_2O_4Na$: 469.2098, found 469.2107.

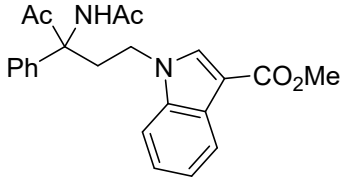



***N*-(1-(Naphthalen-2-yl(phenyl)amino)-4-oxo-3-phenylpentan-3-yl)acetamide (6e).** Yellow oil (73.4 mg, 74% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.75 (d, $J$ = 8.1 Hz, 1H), 7.70 (d, $J$ = 8.9 Hz, 2H), 7.46 – 7.41 (m, 2H), 7.37 – 7.29 (m, 9H), 7.18 (dd, $J$ = 8.9, 2.3 Hz, 1H), 7.09 (d, $J$ = 7.7 Hz, 2H), 7.03 (t, $J$ = 7.4 Hz, 1H), 3.94 – 3.87 (m, 1H), 3.69 – 3.55 (m, 2H), 2.82 – 2.74 (m, 1H), 2.04 (s, 3H), 1.80 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.9, 168.6, 148.1, 145.3, 138.9, 134.5, 129.4, 129.2, 128.9, 128.8, 128.0, 127.4, 126.8, 126.3, 125.9, 123.9, 122.2, 121.7, 115.3, 68.8, 48.4, 29.0, 23.7, 23.3.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{29}H_{28}N_2O_2Na$: 459.2043, found 459.2052.

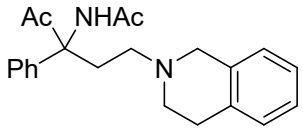



**Methyl 1-(3-acetamido-4-oxo-3-phenylpentyl)-1H-indole-3-carboxylate (6f).** Yellow oil (52.6 mg, 67% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 8.18 – 8.14 (m, 1H), 7.63 (s, 1H), 7.39 – 7.34 (m, 2H), 7.33 – 7.25 (m, 6H), 7.06 (s, 1H), 4.23 – 4.15 (m, 1H), 4.01 – 3.93 (m, 1H), 3.90 (s, 3H), 3.56 – 3.48 (m, 1H), 2.93 – 2.85 (m, 1H), 1.88 (s, 3H), 1.78 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.8, 169.2, 165.2, 137.6, 136.1, 134.2, 129.2, 128.4, 126.7, 125.6, 123.1, 122.1, 121.9, 109.8, 107.3, 68.6, 50.9, 42.7, 31.7, 23.3, 23.1.

**HRMS (ESI) [M+H]$^+$:** calculated for $C_{23}H_{24}N_2O_4Na$: 415.1628, found 415.1637.

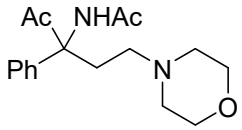



***N*-(1-(3,4-Dihydroisoquinolin-2(1H)-yl)-4-oxo-3-phenylpentan-3-yl)acetamide (6g).** Yellow oil (53.3 mg, 76% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.49 (s, 1H), 7.38 – 7.27 (m, 5H), 7.07 (t, $J$ = 7.8 Hz, 1H), 6.96 (d, $J$ = 7.2 Hz, 1H), 6.64 – 6.57 (m, 2H), 3.38 – 3.26 (m, 2H), 3.23 – 3.17 (m, 1H), 3.12 – 3.04 (m, 2H), 2.87 – 2.65 (m, 3H), 2.04 (s, 3H), 1.98 – 1.83 (m, 2H), 1.81 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.3, 168.5, 145.1, 139.4, 129.3, 128.8, 128.0, 127.1, 126.0, 123.4, 116.5, 110.8, 68.6, 50.3, 47.4, 29.0, 27.7, 23.8, 23.3, 21.7.

**HRMS (ESI) [M+H]$^+$:** calculated for $C_{22}H_{27}N_2O_2$: 351.2067, found 351.2077.

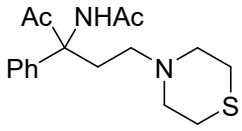



***N*-(1-Morpholino-4-oxo-3-phenylpentan-3-yl)acetamide (6h).** Yellow oil (55.4 mg, 91% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.65 (s, 1H), 7.37 – 7.30 (m, 4H), 7.28 – 7.24 (m, 1H), 3.70 – 3.58 (m, 4H), 3.04 – 2.97 (m, 1H), 2.59 – 2.50 (m, 3H), 2.34 – 2.22 (m, 4H), 1.99 (s, 3H), 1.94 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.5, 168.4, 139.2, 128.7, 127.8, 126.1, 69.0, 66.6, 53.8, 29.0, 24.1, 23.7.

**HRMS (ESI) [M+H]$^+$:** calculated for $C_{17}H_{25}N_2O_3$: 305.1865, found 305.1873.

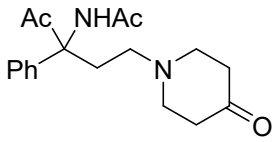



***N*-(4-Oxo-3-phenyl-1-thiomorpholinopentan-3-yl)acetamide (6i).** Yellow oil (44.9 mg, 70% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.63 (s, 1H), 7.37 – 7.30 (m, 4H), 7.29 – 7.24 (m, 1H), 3.04 – 2.98 (m, 1H), 2.82 – 2.75 (m, 2H), 2.66 – 2.50 (m, 7H), 2.39 – 2.32 (m, 1H), 2.27 – 2.20 (m, 1H), 2.00 (s, 3H), 1.93 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.5, 168.4, 139.4, 128.8, 127.8, 126.2, 68.9, 55.2, 54.0, 29.2, 27.6, 24.2, 23.8.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{17}H_{25}N_2O_2S$: 321.1637, found321.1639.

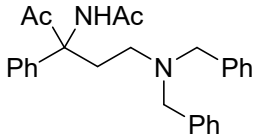



***N*-(4-Oxo-1-(4-oxopiperidin-1-yl)-3-phenylpentan-3-yl)acetamide (6j).** Yellow oil (41.2 mg, 65% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.54 (s, 1H), 7.39 – 7.33 (m, 4H), 7.31 – 7.27 (m, 1H), 3.21 – 3.14 (m, 1H), 2.87 – 2.80 (m, 2H), 2.69 – 2.57 (m, 3H), 2.47 – 2.33 (m, 6H), 2.01 (s, 3H), 1.97 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 208.5, 204.6, 168.5, 139.4, 129.0, 128.1, 126.2, 68.9, 53.5, 52.3, 40.8, 29.8, 24.0, 23.9.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{18}H_{25}N_2O_3$: 317.1865, found 317.1869.

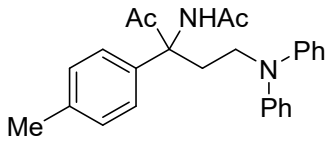



***N*-(1-(Dibenzylamino)-4-oxo-3-phenylpentan-3-yl)acetamide (6k).** Yellow oil (46.5 mg, 56% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.35 – 7.32 (m, 8H), 7.31 – 7.27 (m, 3H), 7.26 – 7.23 (m, 5H), 3.78 (d, $J$ = 13.6 Hz, 2H), 3.39 (d, $J$ = 13.6 Hz, 2H), 3.14 – 3.06 (m, 1H), 2.59 – 2.51 (m, 1H), 2.42 – 2.31 (m, 2H), 1.77 (s, 3H), 1.75 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.8, 168.4, 139.2, 139.0, 128.9, 128.7, 128.3, 127.7, 127.1, 126.1, 68.9, 58.8, 48.3, 28.7, 23.5, 23.4.

**HRMS (ESI) $[M+H]^+$:** calculated for $C_{27}H_{31}N_2O_2$: 415.2386, found 415.2389.

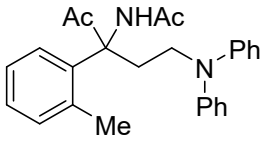



***N*-(1-(Diphenylamino)-4-oxo-3-(p-tolyl)pentan-3-yl)acetamide (6l).** Yellow oil (74.5 mg, 93% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.36 (s, 1H), 7.28 (t, $J$ = 7.9 Hz, 4H), 7.22 – 7.13 (m, 4H), 7.05 – 6.92 (m, 6H), 3.84 – 3.73 (m, 1H), 3.55 – 3.44 (m, 2H), 2.73 – 2.62 (m, 1H), 2.32 (s, 3H), 2.00 (s, 3H), 1.77 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 205.0, 168.5, 147.9, 137.8, 135.9, 129.6, 129.3, 125.8, 121.6, 121.0, 68.5, 48.1, 29.0, 23.6, 23.1, 20.9.

**HRMS (ESI) [ $M+Na]^+$:** calculated for $C_{26}H_{28}N_2O_2Na$: 423.2043, found 423.2052.

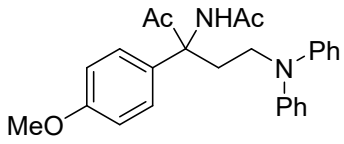



***N*-(1-(Diphenylamino)-4-oxo-3-(o-tolyl)pentan-3-yl)acetamide (6m).** Yellow oil (70.5 mg, 88% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.61 (d, *J* = 7.8 Hz, 1H), 7.30 – 7.23 (m, 5H), 7.22 – 7.15 (m, 2H), 7.09 (d, *J* = 7.3 Hz, 1H), 7.01 (d, *J* = 7.8 Hz, 4H), 6.96 (t, *J* = 7.3 Hz, 2H), 3.79 – 3.66 (m, 2H), 3.53 – 3.45 (m, 1H), 2.53 – 2.45 (m, 1H), 2.11 (s, 3H), 2.00 (s, 3H), 1.77 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 205.9, 167.7, 147.8, 136.6, 135.5, 132.5, 129.4, 128.2, 127.6, 126.5, 121.6, 120.9, 68.8, 47.6, 29.7, 23.6, 23.4, 20.4.

**HRMS (ESI) [ M+Na]$^+$:** calculated for $C_{26}H_{28}N_2O_2Na$: 423.2050, found 423.2043.

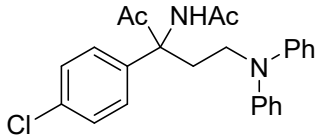



***N*-(1-(Diphenylamino)-3-(4-methoxyphenyl)-4-oxopentan-3-yl)acetamide (6n).** Yellow oil (74.2 mg, 89% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.36 (s, 1H), 7.27 (t, *J* = 7.9 Hz, 4H), 7.22 (d, *J* = 8.8 Hz, 2H), 7.04 – 6.94 (m, 6H), 6.86 (d, *J* = 8.8 Hz, 2H), 3.83 – 3.72 (m, 4H), 3.52 – 3.43 (m, 2H), 2.71 – 2.60 (m, 1H), 1.99 (s, 3H), 1.76 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 205.0, 168.6, 159.2, 147.9, 130.8, 129.3, 127.1, 121.6, 121.0, 114.2, 68.2, 55.1, 48.1, 29.0, 23.6, 23.0.

**HRMS (ESI) [ M+Na]$^+$:**calculated for $C_{26}H_{28}N_2O_3Na$: 439.1992, found 439.2001.

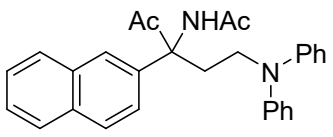



***N*-(3-(4-Chlorophenyl)-1-(diphenylamino)-4-oxopentan-3-yl)acetamide (6o).** Yellow oil (80.0 mg, 95% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.40 (s, 1H), 7.32 – 7.23 (m, 8H), 7.02 – 6.94 (m, 6H), 3.83 – 3.73 (m, 1H), 3.52 – 3.42 (m, 2H), 2.70 – 2.60 (m, 1H), 1.99 (s, 3H), 1.76 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 204.3, 168.5, 147.9, 137.7, 134.0, 129.3, 129.0, 127.4, 121.7, 121.0, 68.3, 48.0, 28.9, 23.6, 23.1.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{25}H_{25}N_2O_2NaCl$: 443.1497, found 443.1503.



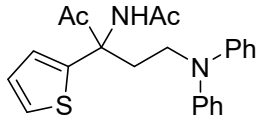

***N*-(1-(Diphenylamino)-3-(naphthalen-2-yl)-4-oxopentan-3-yl)acetamide (6p).** Yellow oil (77.8 mg, 89% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.86 (t, *J* = 7.1 Hz, 2H), 7.82 (d, *J* = 8.2 Hz, 1H), 7.73 (d, *J* = 8.4 Hz, 1H), 7.49 (t, *J* = 7.8 Hz, 1H), 7.46 – 7.38 (m, 3H), 7.32 – 7.26 (m, 4H), 7.06 – 7.01 (m, 4H),

6.97 (t, *J* = 7.3 Hz, 2H), 3.91 – 3.80 (m, 2H), 3.65 – 3.56 (m, 1H), 2.62 – 2.54 (m, 1H), 1.92 (s, 3H), 1.72 (s, 3H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 207.6, 168.1, 147.7, 134.5, 134.0, 130.5, 129.6, 129.4,126.5, 126.4, 125.4, 125.2, 123.1, 121.6, 120.8, 68.8, 47.6, 30.0, 29.6, 23.8, 23.6.

**HRMS (ESI) [M+Na]$^+$:** calculated for $C_{29}H_{28}N_2O_2Na$: 459.2043, found 459.2052.



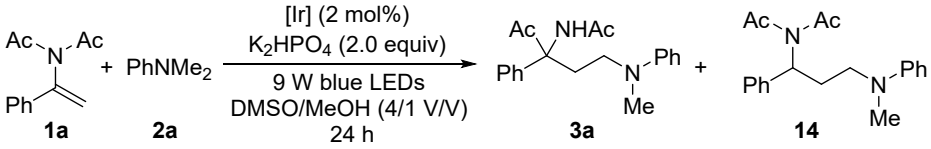

***N*-(1-(Diphenylamino)-4-oxo-3-(thiophen-2-yl)pentan-3-yl)acetamide (6q).** Yellow oil (63.6 mg, 81% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.30 – 7.22 (m, 6H), 7.02 – 6.93 (m, 8H), 3.82 – 3.73 (m, 1H), 3.51 – 3.43 (m, 2H), 2.77 – 2.68 (m, 1H), 2.00 (s, 3H), 1.87 (s, 3H).

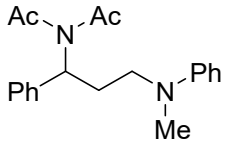
**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 203.5, 169.0, 148.0, 143.9, 129.4, 127.3, 125.6, 125.4, 121.7, 121.1, 67.0, 48.0, 31.0, 23.7, 22.7.

**HRMS (ESI) [M+H]$^+$:** calculated for $C_{23}H_{24}N_2O_2NaS$: 415.1451, found 415.1460.

# 4. Mechanism study




To an oven dried transparent 10 mL Schlenk tube equipped with stirring bar, $Ir[dF(CF_3)ppy)]_2(dtbbpy)PF_6$ (4.5 mg, 0.004 mmol, 0.02 equiv), $K_2HPO_4$ (69.6 mg, 0.4 mmol), *N*-acetyl-*N*-(1-phenylvinyl)acetamide **1a** (40.6 mg, 0.2 mmol), and *N*,*N*-dimethylaniline **2a** (48.4 mg, 0.4 mmol) were added. The tube was evacuated and filled with nitrogen for 3 times. The degassed DMSO (4 mL) and dried methanol (1 mL) were added via syringe. The tube was irradiated with 9 W blue LEDs strip spiraled within a bowel for 24 h (cooling with a fan). After the reaction was completed, the reaction solution was quenched by the addition of water (5 mL) and extracted with EtOAc (5 × 10 mL). The combined organic layer was washed with brine, dried over $Na_2SO_4$, filtered, and solvent was evaporated to obtain crude product. Flash chromatography over silica gel afforded the product **3a** and **14**.

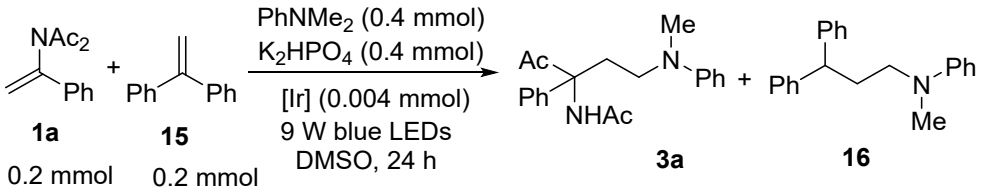



***N*-Acetyl-*N*-(3-(methyl(phenyl)amino)-1-phenylpropyl)acetamide (14).** Yellow oil (9.8 mg, 15% yield).

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.37 – 7.31 (m, 2H), 7.31 – 7.21 (m, 5H), 6.76 – 6.69 (m, 3H), 5.63 – 5.55 (m, 1H), 3.48 – 3.31 (m, 2H), 2.93 (s, 3H), 2.67 – 2.56 (m, 1H), 2.49 – 2.40 (m, 1H), 2.28 (s, 6H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 174.4, 149.2, 139.6, 129.3, 128.7, 127.5, 126.8, 117.1, 112.9, 56.0, 50.2, 38.7, 28.8, 26.8.

**HRMS (ESI) [M+H]$^+$:** calculated for $C_{20}H_{25}N_2O_2$: 325.1916, found 325.1917.




To an oven dried transparent 10 mL Schlenk tube equipped with stirring bar, Ir[dF($CF_3$)ppy)]$_2$(dtbbpy)$PF_6$ (4.5 mg, 0.004 mmol), $K_2HPO_4$ (69.6 mg, 0.4 mmol), *N*-acetyl-*N*-(1-phenylvinyl)acetamide **1a** (40.6 mg, 0.2 mmol), 1,1-diphenylethylene **15** (36 mg, 0.2 mmol), and *N*,*N*-dimethylaniline **2a** (48.4 mg, 0.4 mmol) were added. The tube was evacuated and filled with nitrogen for 3 times. The degassed DMSO (4 mL) was added via syringe. The tube was irradiated with 9 W blue LEDs strip spiraled within a bowel for 24 h (cooling with a fan). After the reaction was completed, the reaction solution was quenched by the addition of water (5 mL) and extracted with EtOAc (5 × 10 mL). The combined organic layer was washed with brine, dried over Na2SO4, filtered, and solvent was evaporated to obtain crude product. Flash chromatography over silica gel afforded the product **3a** (37.5 mg, 58% yield) and **16** (20.5 mg, 34% yield).

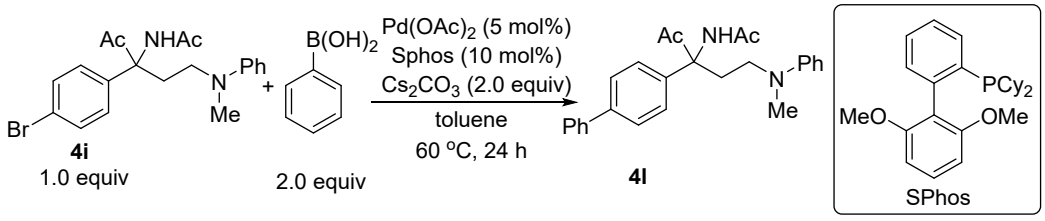
***N*-(3,3-Diphenylpropyl)-*N*-methylaniline 16.**

**$^1$H NMR (500 MHz, $CDCl_3$) δ** 7.32 – 7.26 (m, 8H), 7.22 – 7.17 (m, 4H), 6.67 (t, J = 7.2 Hz, 1H), 6.58 (d, J = 8.2 Hz, 2H), 3.94 (t, J = 7.8 Hz, 1H), 3.30 – 3.25 (m, 2H), 2.88 (s, 3H), 2.33 (q, J = 7.7 Hz, 2H).

**$^{13}$C NMR (126 MHz, $CDCl_3$) δ** 149.1, 144.5, 129.1, 128.5, 127.7, 126.3, 116.0, 112.2, 51.3, 49.0, 38.2, 32.0.

This compound has been reported in the published literature. [4]

# 5. Procedure of Suzuki reaction




To an oven dried transparent 10 mL Schlenk tube equipped with stirring bar, compound **4i** (77 mg, 0.2 mmol), phenylboronic acid (48.8 mg, 0.4 mmol), $Cs_2CO_3$ (130 mg, 0.4 mmol), $Pd(OAc)_2$ (1.7 mg, 5 mol%), and SPhos (8.2 mg, 10 mol%) were added. The tube was evacuated and filled with nitrogen for 3 times. Then anhydrous toluene (2.0 mL) was introduced and the mixture was stirred at 60 °C for 24 h. After completion of the reaction, the mixture was cooled down to room temperature and diluted with EtOAc (15.0 mL). The catalyst and inorganic base were filtered off using a short pad of silica gel. The filtrate was concentrated under reduced pressure. The residue was purified by column chromatography on a silica gel column using petroleum ether/EtOAc as the eluent to give the product **4l** (73.6 mg, 92% yield).

# 6. References

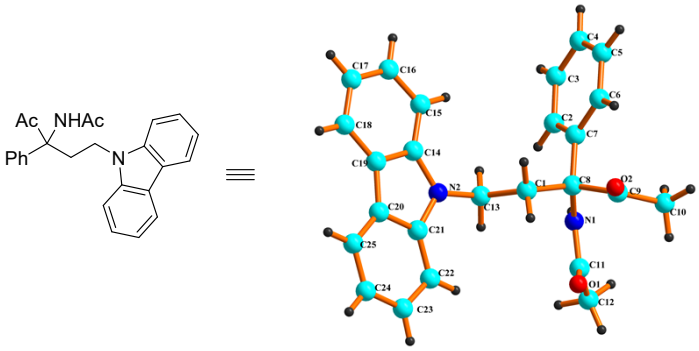

[1] (*a*) L. Huai, L. Zhang, Z. Wang, H. Wu and Y. Fang, *Org. Chem. Front.*, 2023, **10**, 1245; (*b*) L. Huai, L. Zhang, Z. Wang and Y. Fang, *Org. Chem. Front.*, 2024, **11**, 2344.

[2] (*a*) B. Han, Y. Li, Y. Yu and L. Gong, *Nat. Commun.*, 2019, **10**, 3804; (*b*) Y. Jia, K. Zhang, L.-Q. Lu, Y. Cheng and W.-J. Xiao, *ACS Catal.*, 2024, **14**, 13550; (*c*) C. Remeur, C. B. Kelly, N. R. Patel and G. A. Molander, *ACS Catal.*, 2017, **7**, 6065; (*d*) A. Ilic, B. R. Strücker, C. E. Johanson, S. Hainz, R. Lomoth and K. Wärnmark, *Chem. Sci.*, 2024, **15**, 12077; (*e*) Y. Zhao, L. D. Bruce, J. Jin, B. Xia and P. W. H. Chan, *Green Chem.*, 2020, **22**, 5296; (*f*) J. Li, L. Carli, S. H. Kyne and P. W. H. Chan, *Adv. Synth. Catal.*, 2023, **365**, 2422.

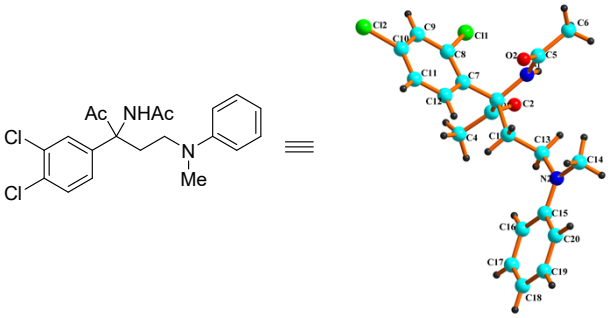
[3] J. T. Reeves, Z. Tan, Z. S. Han, G. Li, Y. Zhang, Y. Xu, D. C. Reeves, N. C. Gonnella, S. Ma, H. Lee, B. Z. Lu and C. H. Senanayake, *Angew. Chem. Int. Ed.*, 2012, **51**, 1400.

[4] N. A. Larionova, J. M. Ondozabal, E. G. Smith and X. C. Cambeiro, A Photocatalytic Regioselective Direct Hydroaminoalkylation of Aryl-Substituted Alkenes with Amines, *Org. Lett.*, 2021, **23**, 5383.

# 7. X-ray crystal data for compounds 3q and 4j

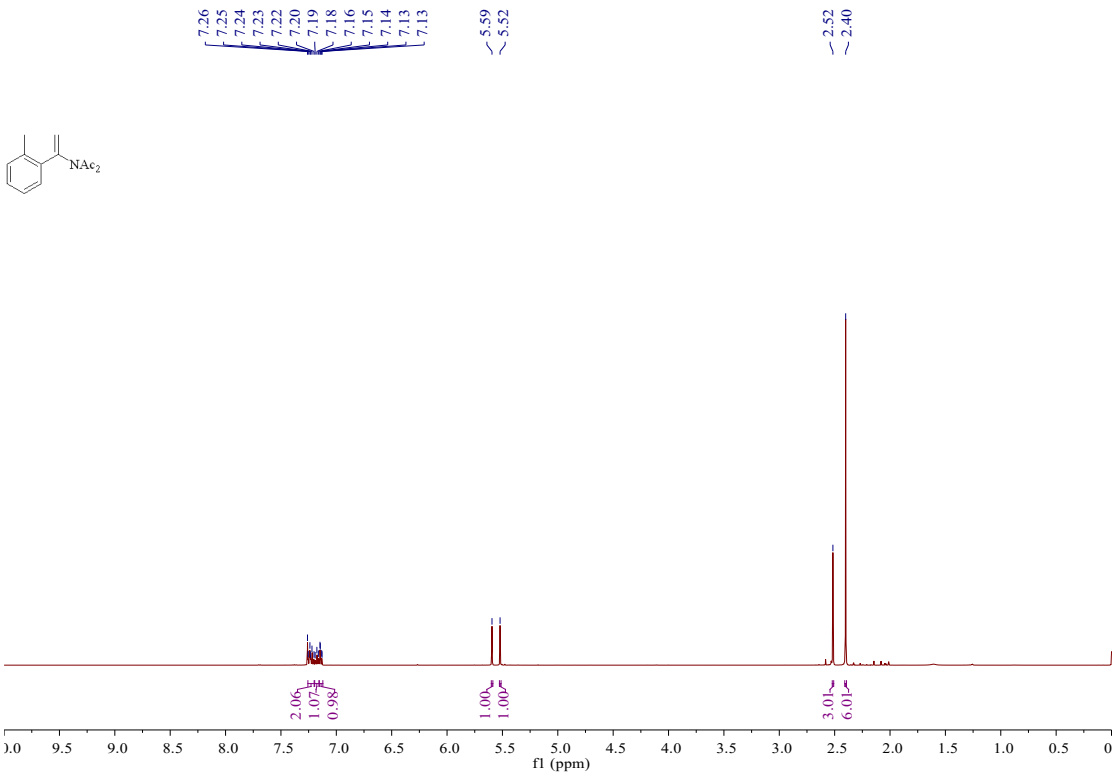


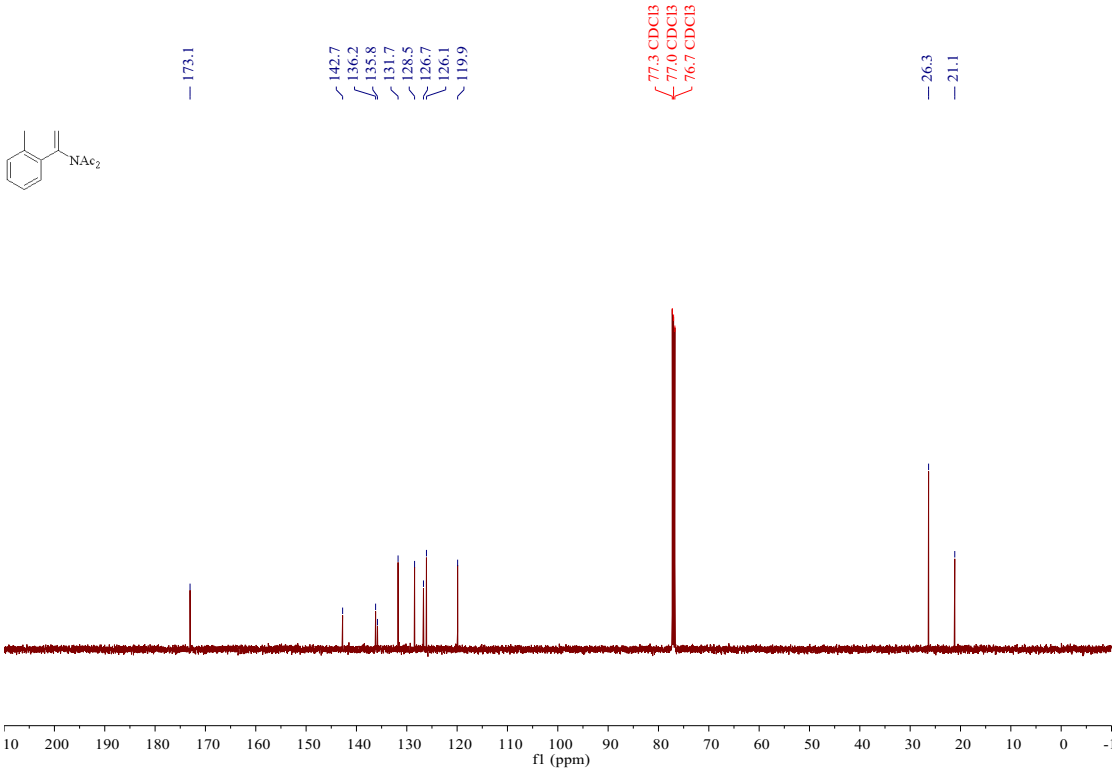

| **Table S1 Crystal data and structure refinement for 3p** | |
|---|---|
| Identification code | CCDC 2415011 (**3p**) |
| Empirical formula | $C_{25}H_{24}N_2O_2$ |
| Formula weight | 384.4790 |
| Temperature/K | 273.15 |
| Crystal system | monoclinic |
| Space group | $P2_1/c$ |
| a/Å | 9.835(3) |
| b/Å | 19.389(6) |
| c/Å | 11.255(4) |
| α/° | 90 |
| β/° | 102.090(9) |
| γ/° | 90 |
| Volume/Å$^3$ | 2098.8(11) |
| Z | 42 |
| $\rho_{calcg}$/cm$^3$ | 1.2167 |
| μ/mm$^{-1}$ | 0.078 |
| F(000) | 816.4 |
| Crystal size/mm$^3$ | 0.34×0.20×0.14 |
| Radiation | MoKα (λ = 0.71073) |
| 2Θ range for data collection/° | 4.2 to 50 |
| Index ranges | -11 ≤ h ≤ 11, -23 ≤ k ≤ 23, -13 ≤ l ≤ 13 |
| Reflections collected | 46194 |
| Independent reflections | 3698 [$R_{int}$ = 0.0801, $R_{sigma}$ = 0.0369] |
| Data/restraints/parameters | 3698/0/264 |
| Goodness-of-fit on F$^2$ | 1.088 |
| Final R indexes [I>=2σ (I)] | $R_1$ = 0.0668, $wR_2$ = 0.1779 |
| Final R indexes [all data] | $R_1$ = 0.1026, $wR_2$ = 0.2156 |
| Largest diff. peak/hole / e Å$^{-3}$ | 0.46/-0.34 |

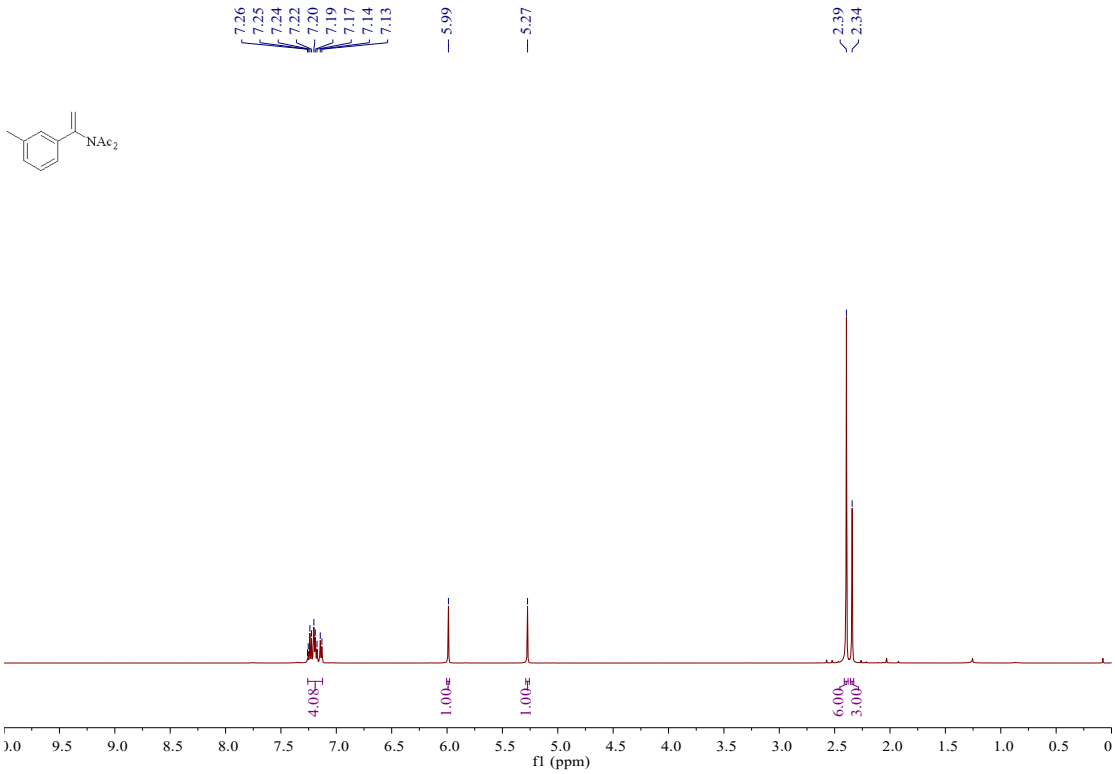


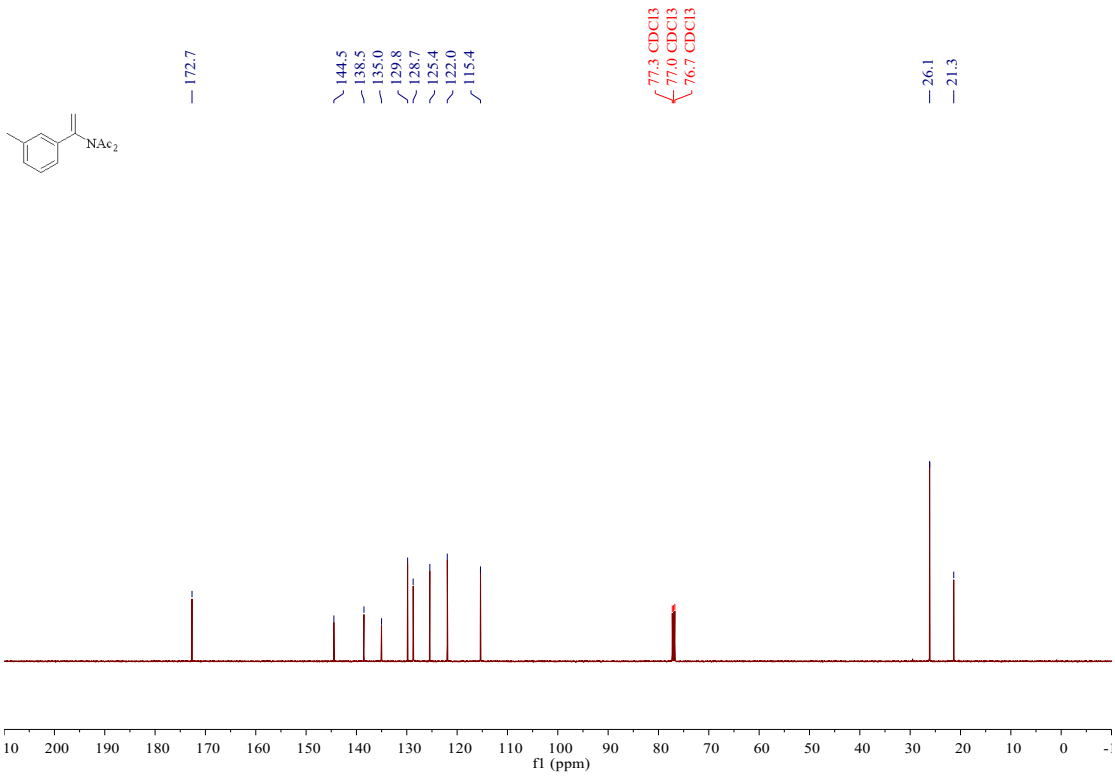

| **Table S2 Crystal data and structure refinement for 4j** | |
|---|---|
| Identification code | CCDC 2415006 (**4j**) |
| Empirical formula | $C_{20}H_{22}Cl_2N_2O_2$ |
| Formula weight | 393.3080 |
| Temperature/K | 273.15 |
| Crystal system | monoclinic |
| Space group | Cc |
| a/Å | 7.1592(8) |
| b/Å | 14.4200(16) |
| c/Å | 19.648(2) |
| α/° | 90 |
| β/° | 93.554(3) |
| γ/° | 90 |
| Volume/Å$^3$ | 2024.5(4) |
| Z | 1 |
| $\rho_{calcg}$/cm$^3$ | 1.2903 |
| μ/mm$^{-1}$ | 0.337 |
| F(000) | 825.5 |
| Crystal size/mm$^3$ | 0.35×0.18×0.14 |
| Radiation | MoKα (λ = 0.71073) |
| 2Θ range for data collection/° | 4.16 to 50.84 |
| Index ranges | -8 ≤ h ≤ 7, -17 ≤ k ≤ 17, -23 ≤ l ≤ 23 |
| Reflections collected | 16708 |
| Independent reflections | 3599 [$R_{int}$ = 0.0497, $R_{sigma}$ = 0.0417] |
| Data/restraints/parameters | 3599/2/238 |
| Goodness-of-fit on F$^2$ | 1.060 |
| Final R indexes [I>=2σ (I)] | $R_1$ = 0.0368, $wR_2$ = 0.0887 |
| Final R indexes [all data] | $R_1$ = 0.0469, $wR_2$ = 0.0971 |
| Largest diff. peak/hole / e Å$^{-3}$ | 0.15/-0.28 |

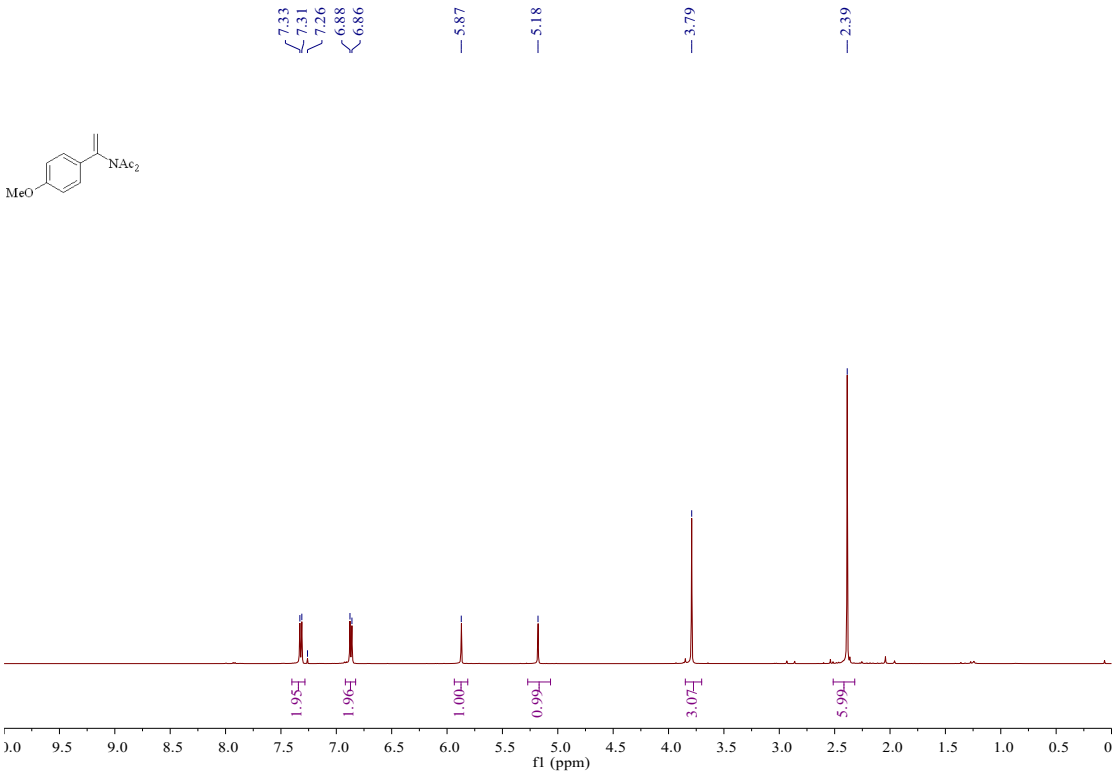
# 8. NMR Spectra of New Compounds

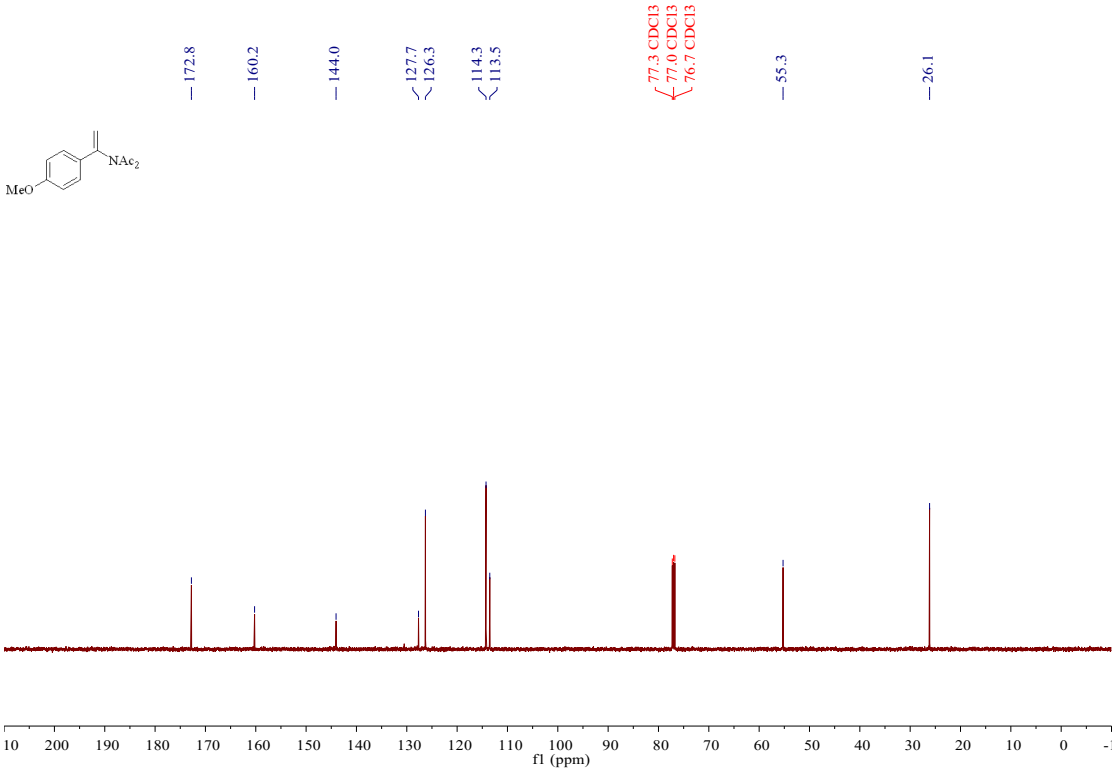

7.26
7.25
7.24
7.23
7.22
7.20
7.19
7.18
7.16
7.15
7.14
7.13
7.13
5.59
5.52
2.52
2.40
NAc2
2.06
1.07
0.98
1.00
1.00
3.01
6.01
f1 (ppm)

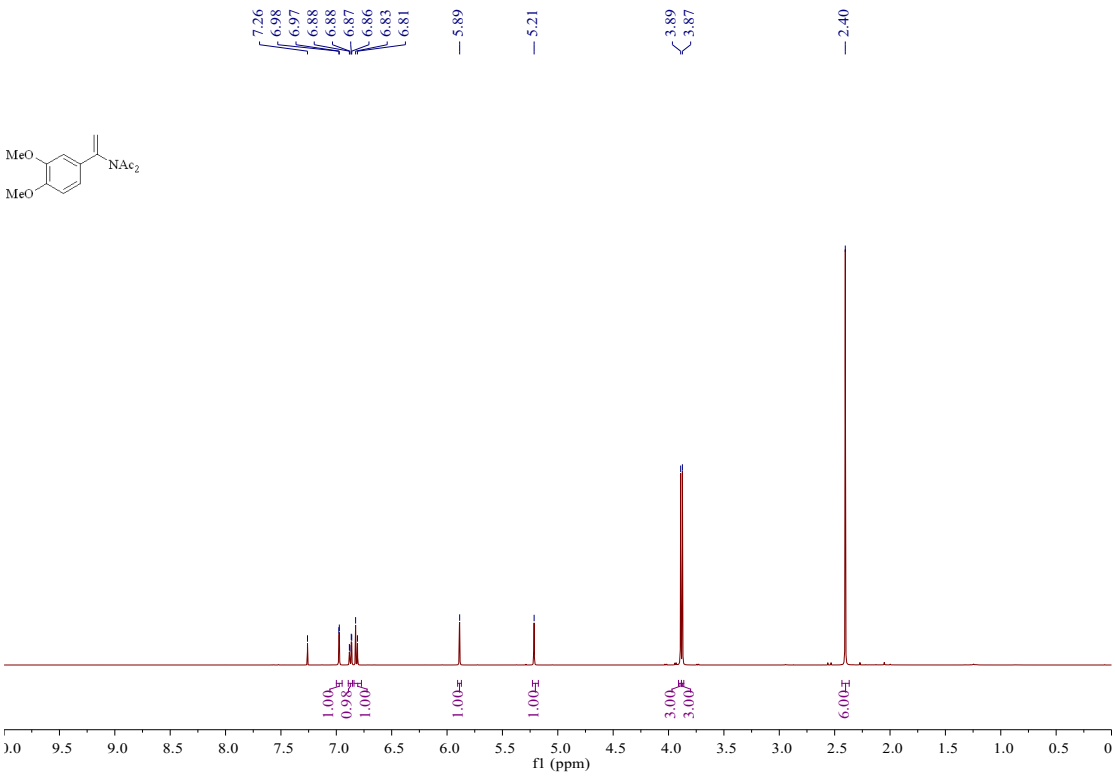

173.1
142.7
136.2
135.8
131.7
128.5
126.7
126.1
119.9
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.3
21.1
NAc2
f1 (ppm)

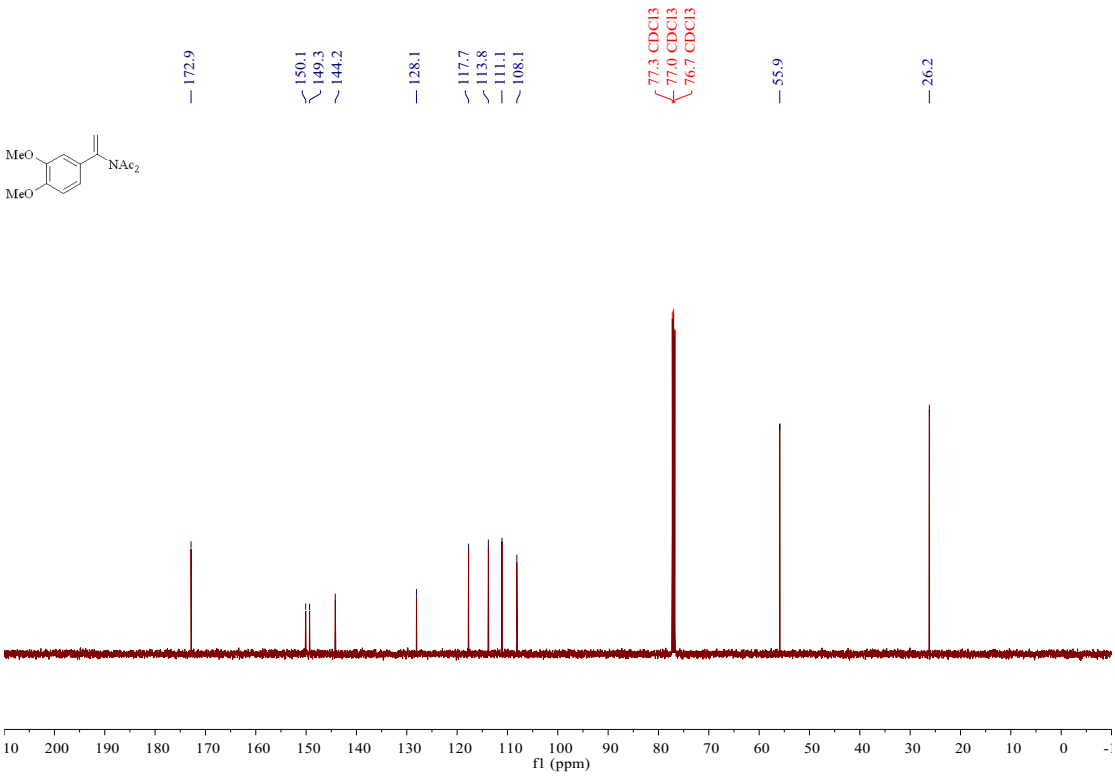

7.26
7.25
7.24
7.22
7.20
7.19
7.17
7.14
7.13
5.99
5.27
2.39
2.34
NAc2
4.08
1.00
1.00
6.00
3.00
f1 (ppm)

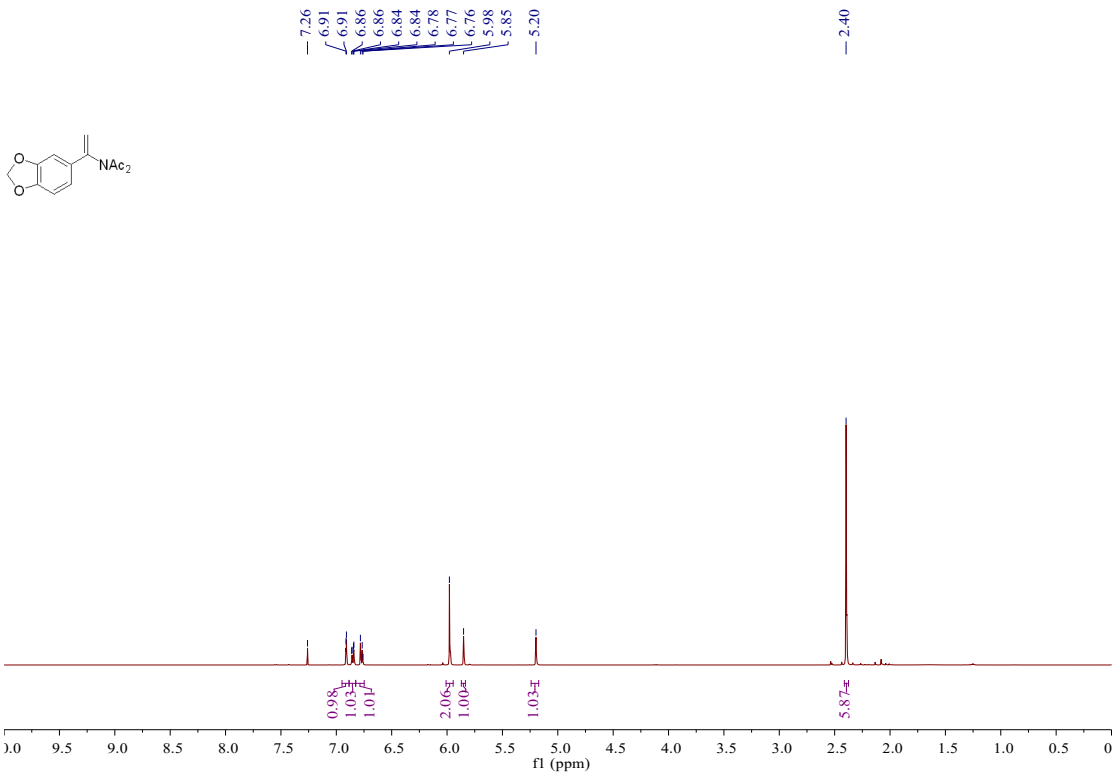

172.7
144.5
138.5
135.0
129.8
128.7
125.4
122.0
115.4
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.1
21.3
NAc2
f1 (ppm)

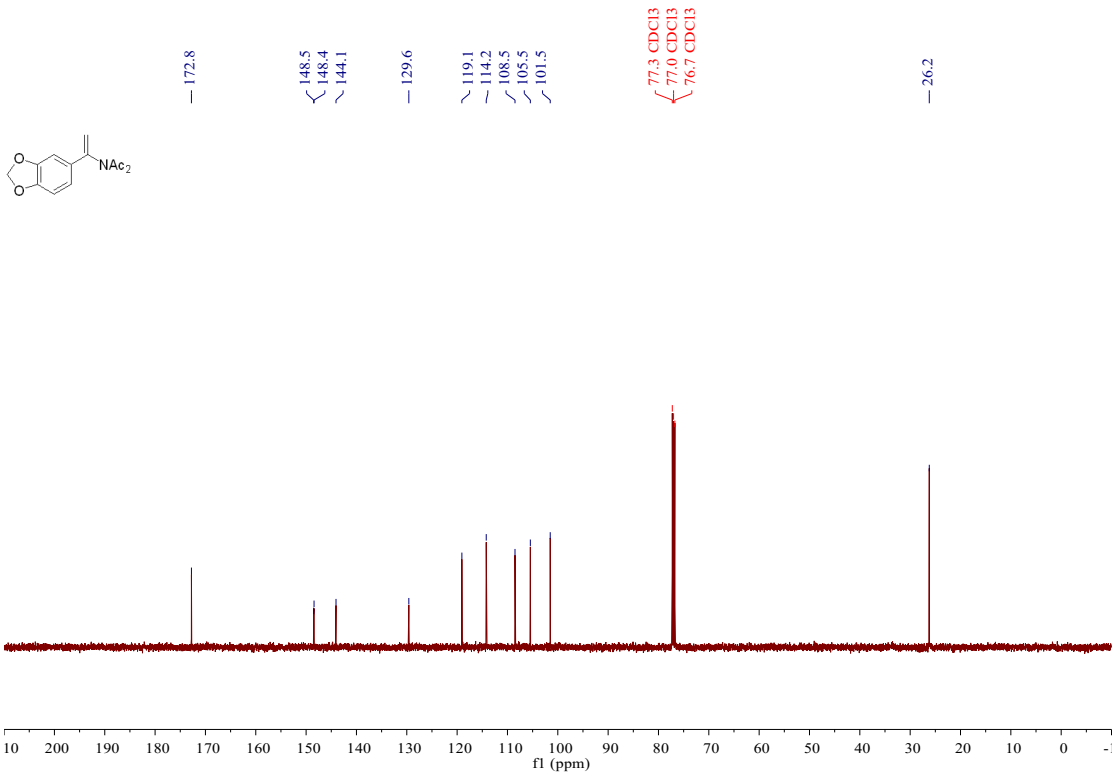

7.33
7.31
7.26
6.88
6.86
5.87
5.18
3.79
2.39
NAc2
MeO
1.95
1.96
1.00
0.99
3.07
5.99
f1 (ppm)

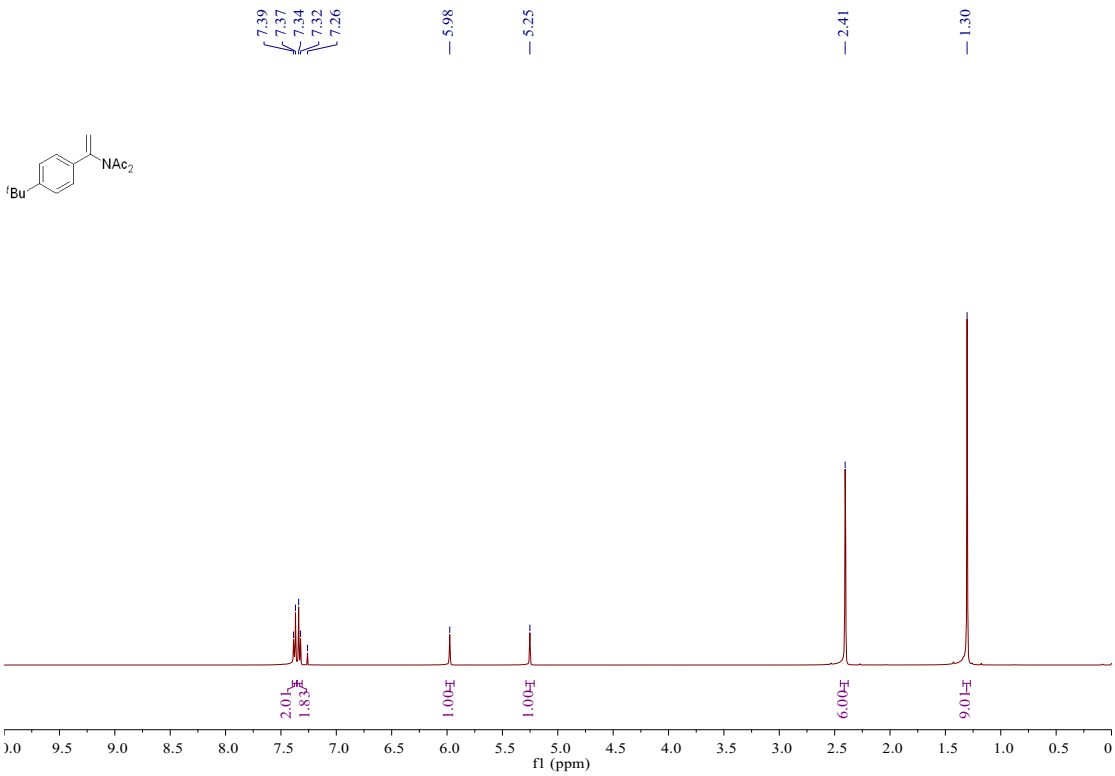

172.8
160.2
144.0
127.7
126.3
114.3
113.5
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
55.3
26.1
NAc2
MeO
f1 (ppm)

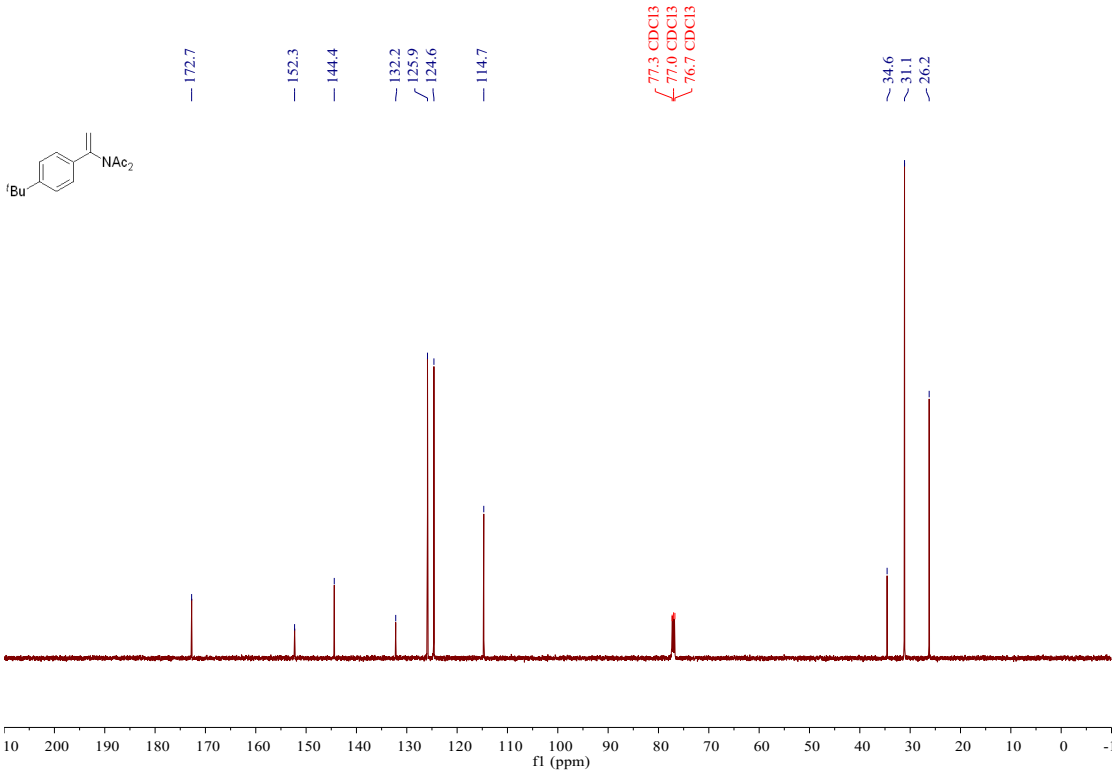

7.26
6.98
6.97
6.88
6.88
6.87
6.86
6.83
6.81
5.89
5.21
3.89
3.87
2.40
MeO
MeO
NAc2
1.00
0.98
1.00
1.00
1.00
3.00
3.00
6.00
f1 (ppm)


172.9
150.1
149.3
144.2
128.1
117.7
113.8
111.1
108.1
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
55.9
26.2
MeO
MeO
NAc2
f1 (ppm)


7.26
6.91
6.91
6.86
6.86
6.84
6.84
6.78
6.77
6.76
5.98
5.85
5.20
2.40
NAc2
0.98
1.03
1.01
2.06
1.00
1.03
5.87
f1 (ppm)


172.8
148.5
148.4
144.1
129.6
119.1
114.2
108.5
105.5
101.5
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.2
NAc2
f1 (ppm)


7.39
7.37
7.34
7.32
7.26
5.98
5.25
2.41
1.30
NAc2
tBu
2.01
1.83
1.00
1.00
6.00
9.01
f1 (ppm)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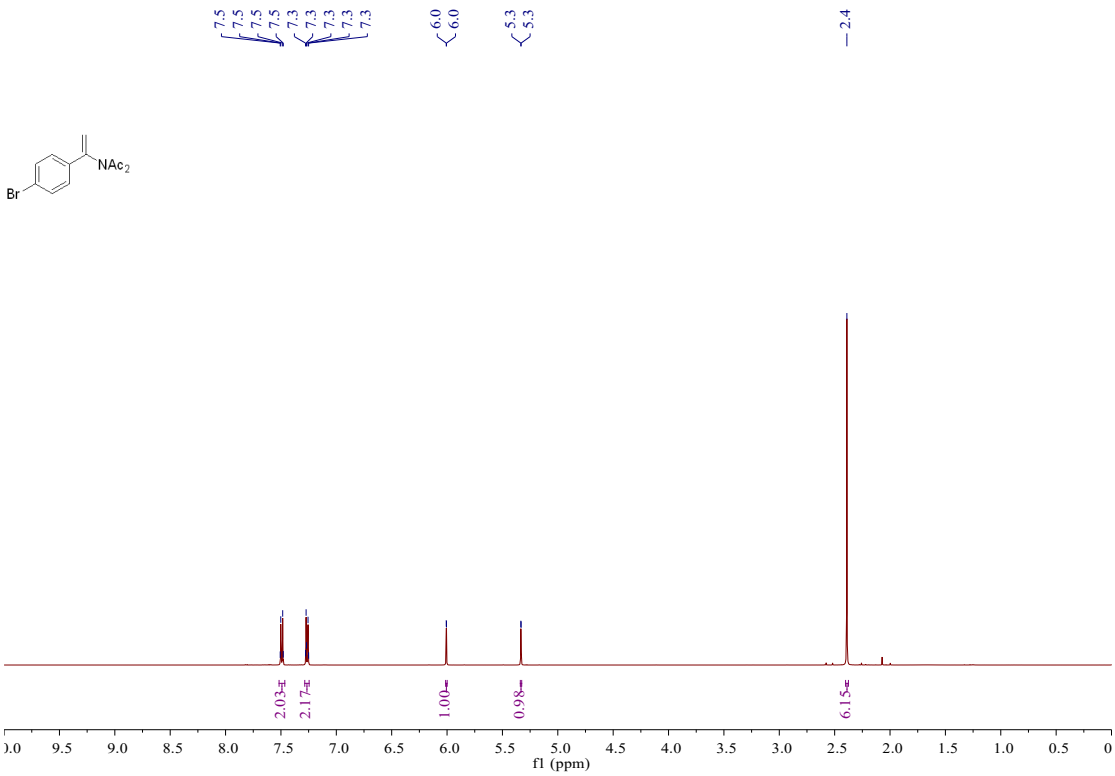
152.3
144.4
132.2
125.9
124.6
114.7
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
34.6
31.1
26.2
NAc2
tBu
f1 (ppm)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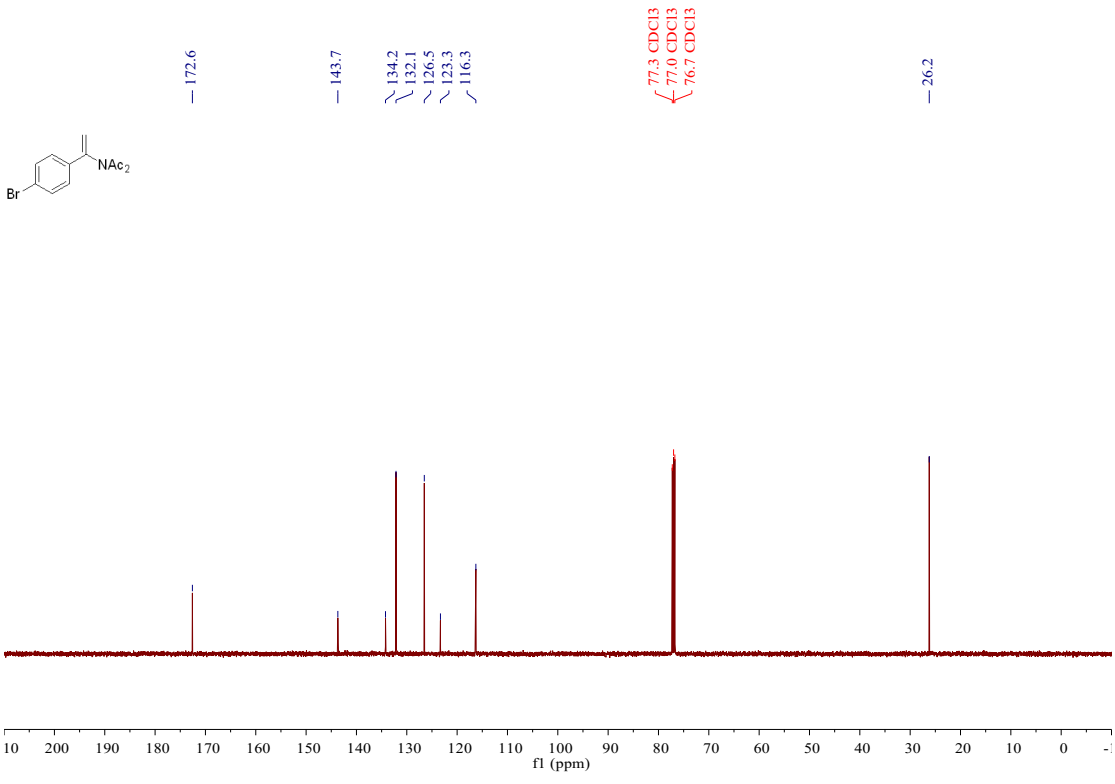
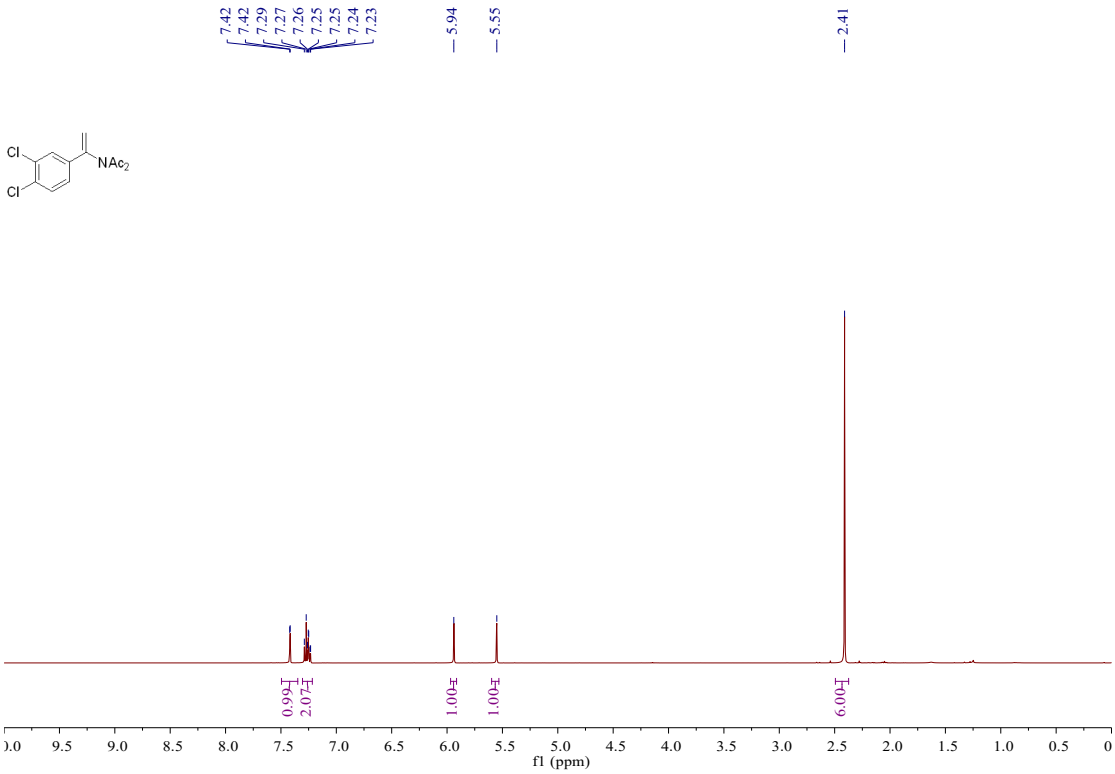
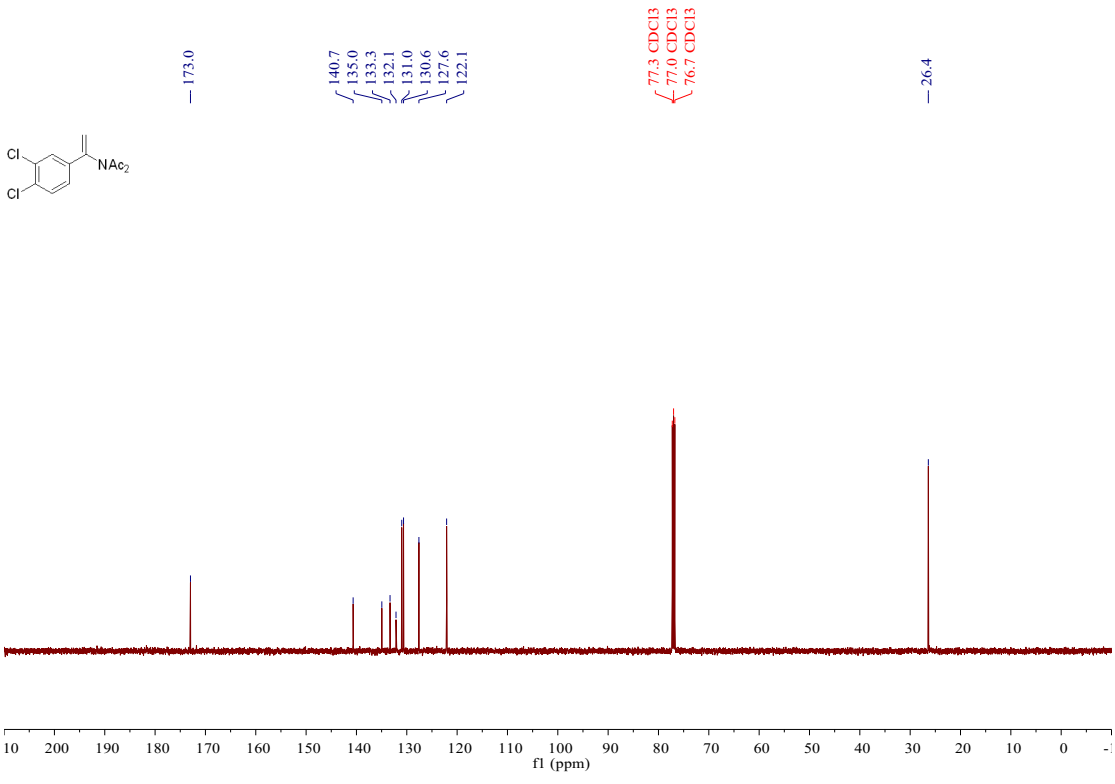
7.5
7.5
7.5
7.3
7.3
7.3
7.3
7.3
6.0
6.0
5.3
5.3
2.4
NAc2
Br
2.03
2.17
1.00
0.98
6.15
f1 (ppm)


172.6
143.7
134.2
132.1
126.5
123.3
116.3
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.2
NAc2
Br
f1 (ppm)


7.42
7.42
7.29
7.27
7.26
7.25
7.25
7.24
7.23
5.94
5.55
2.41
Cl
Cl
NAc2
0.99
2.07
1.00
1.00
6.00
f1 (ppm)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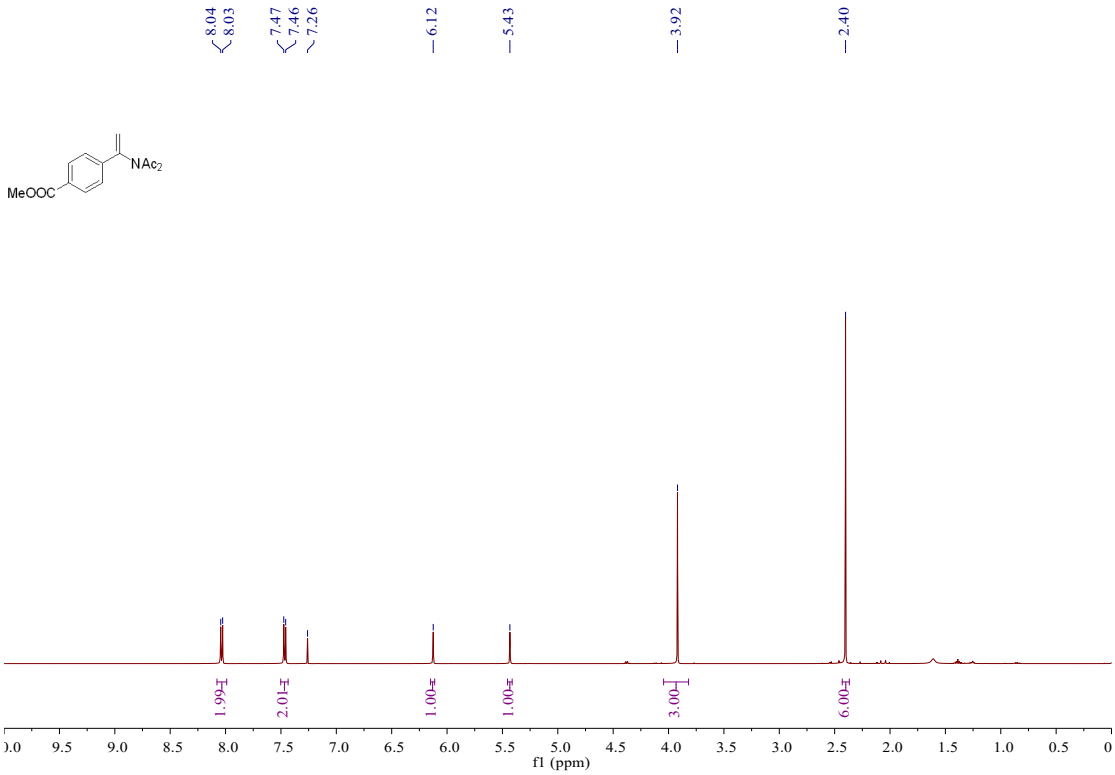
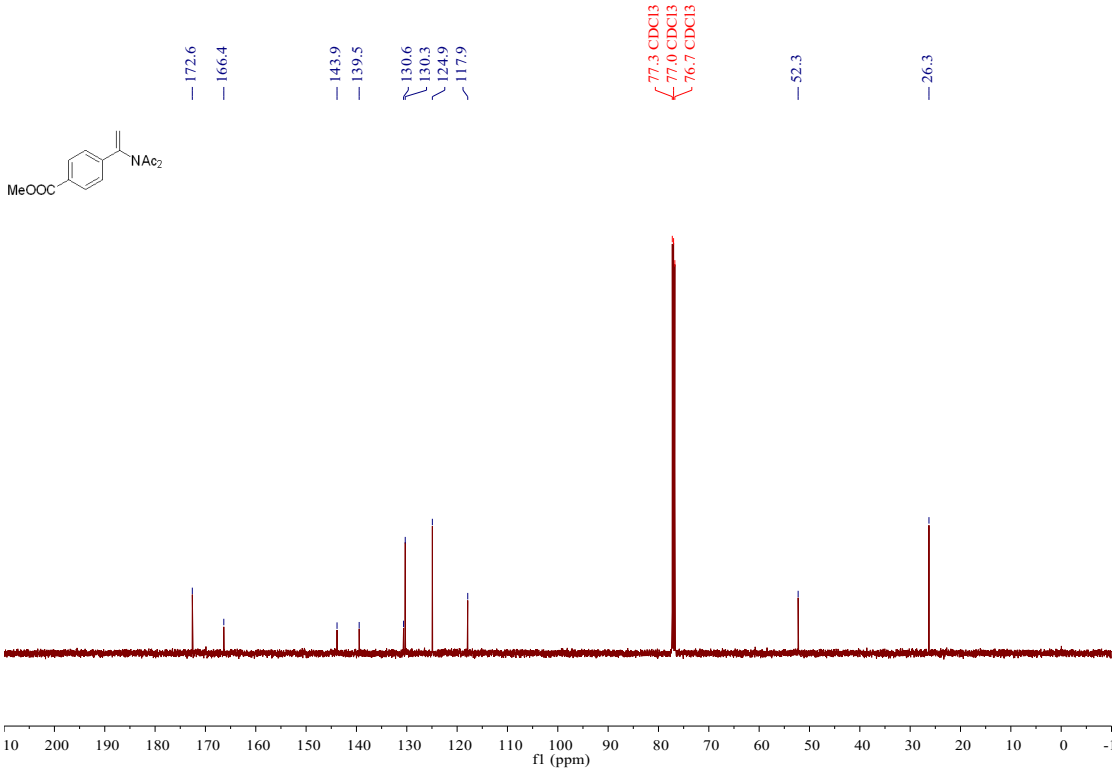
140.7
135.0
133.3
132.1
131.0
130.6
127.6
122.1
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.4
Cl
Cl
NAc2
f1 (ppm)


8.04
8.03
7.47
7.46
7.26
6.12
5.43
3.92
2.40
NAc2
MeOOC
1.99
2.01
1.00
1.00
3.00
6.00
f1 (ppm)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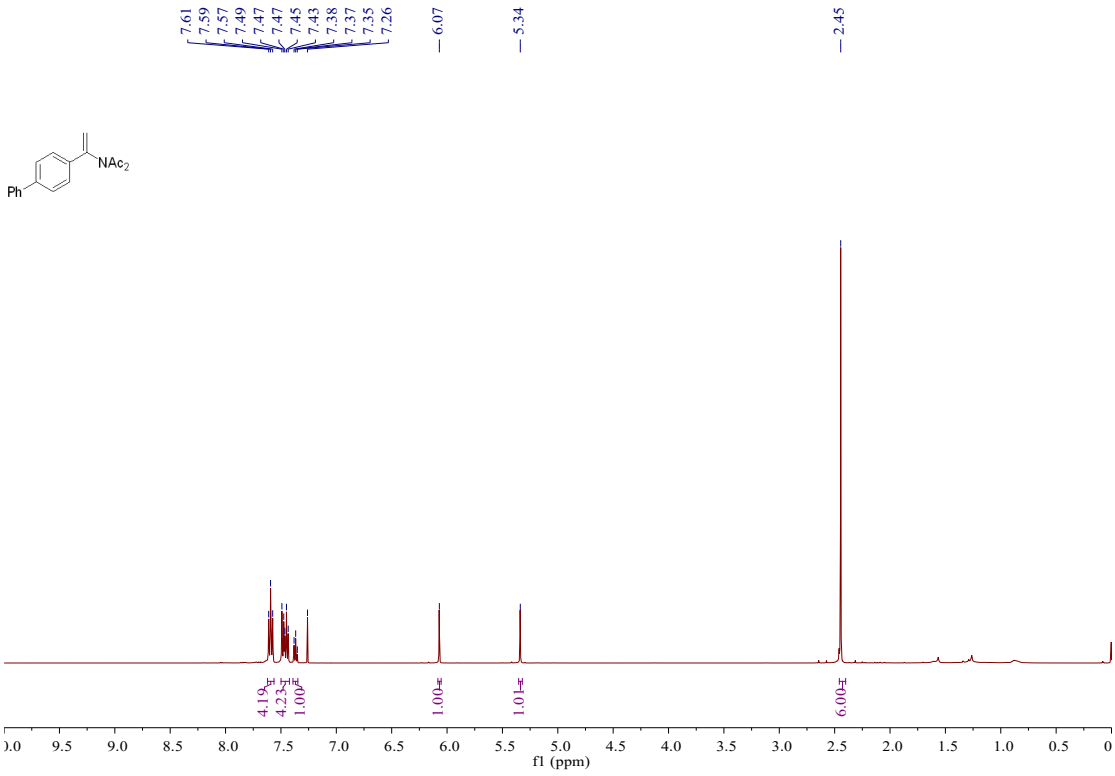
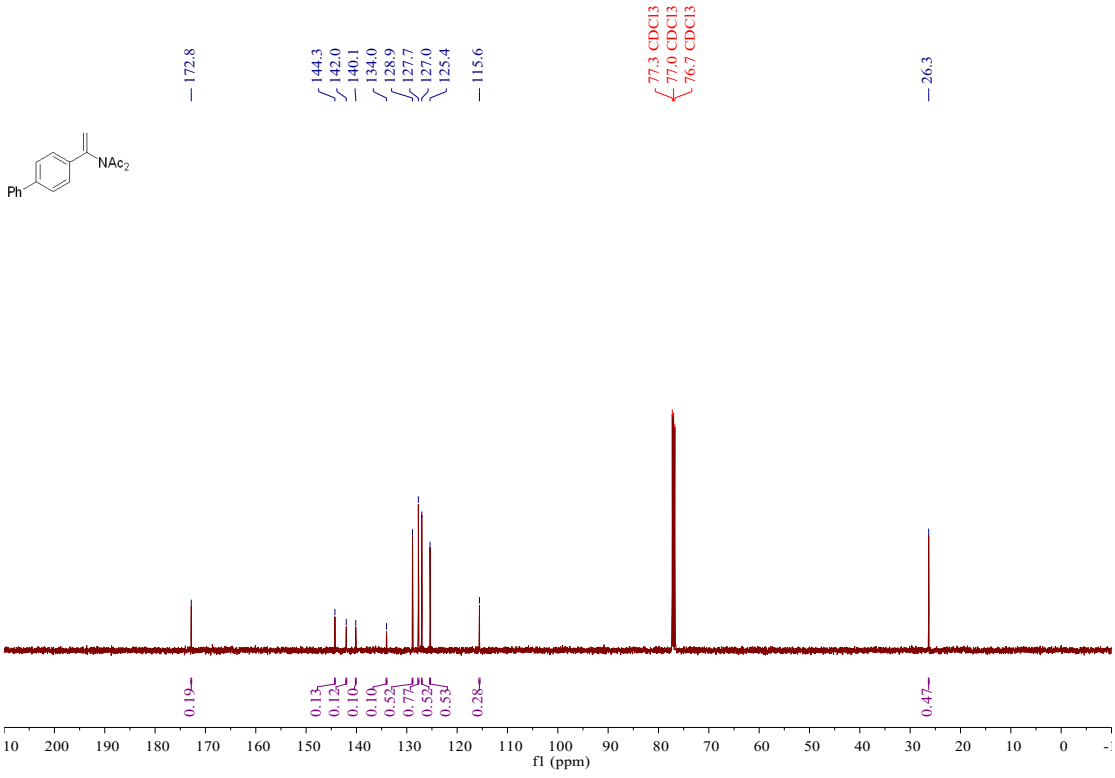
166.4
143.9
139.5
130.6
130.3
124.9
117.9
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
52.3
26.3
NAc2
MeOOC
f1 (ppm)


7.61
7.59
7.57
7.49
7.47
7.47
7.45
7.43
7.38
7.37
7.35
7.26
6.07
5.34
2.45
NAc2
Ph
4.19
4.23
1.00
1.00
1.01
6.00
f1 (ppm)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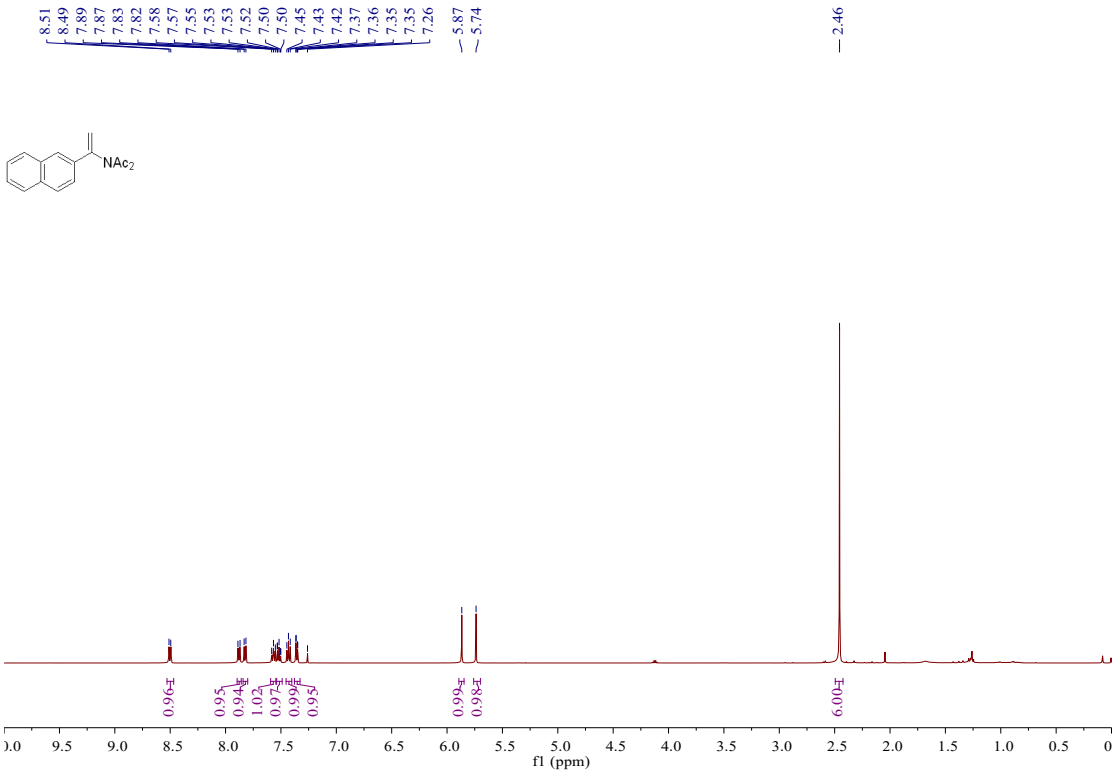
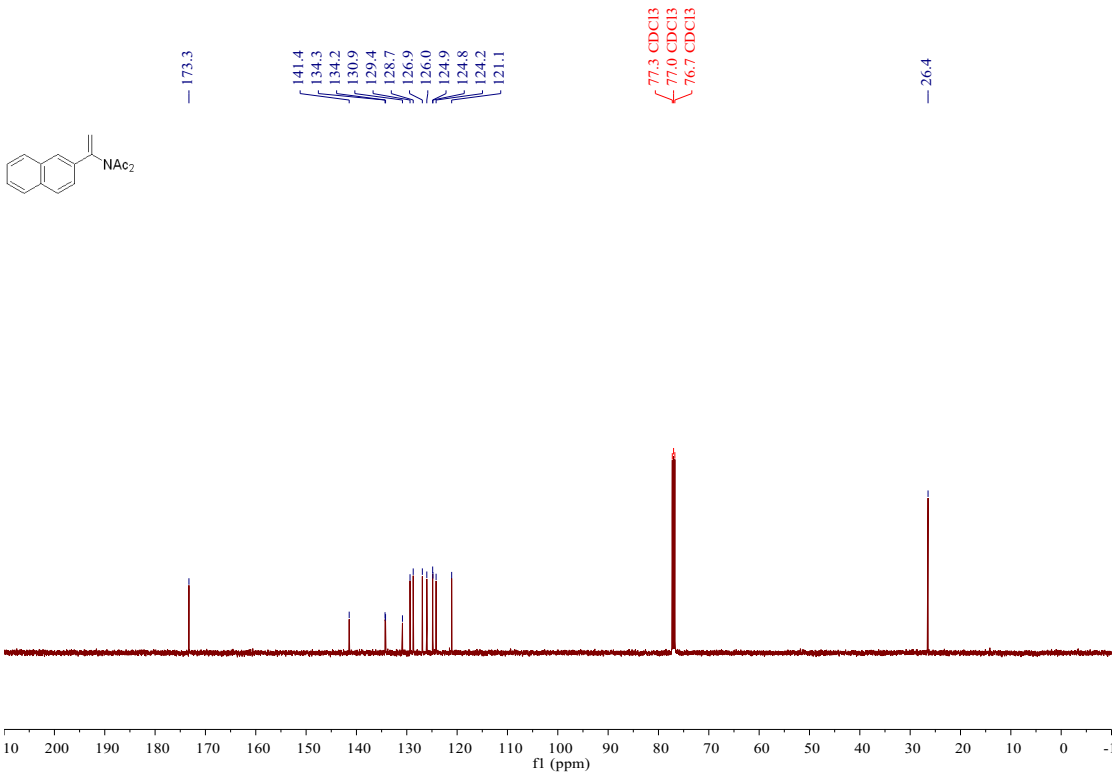
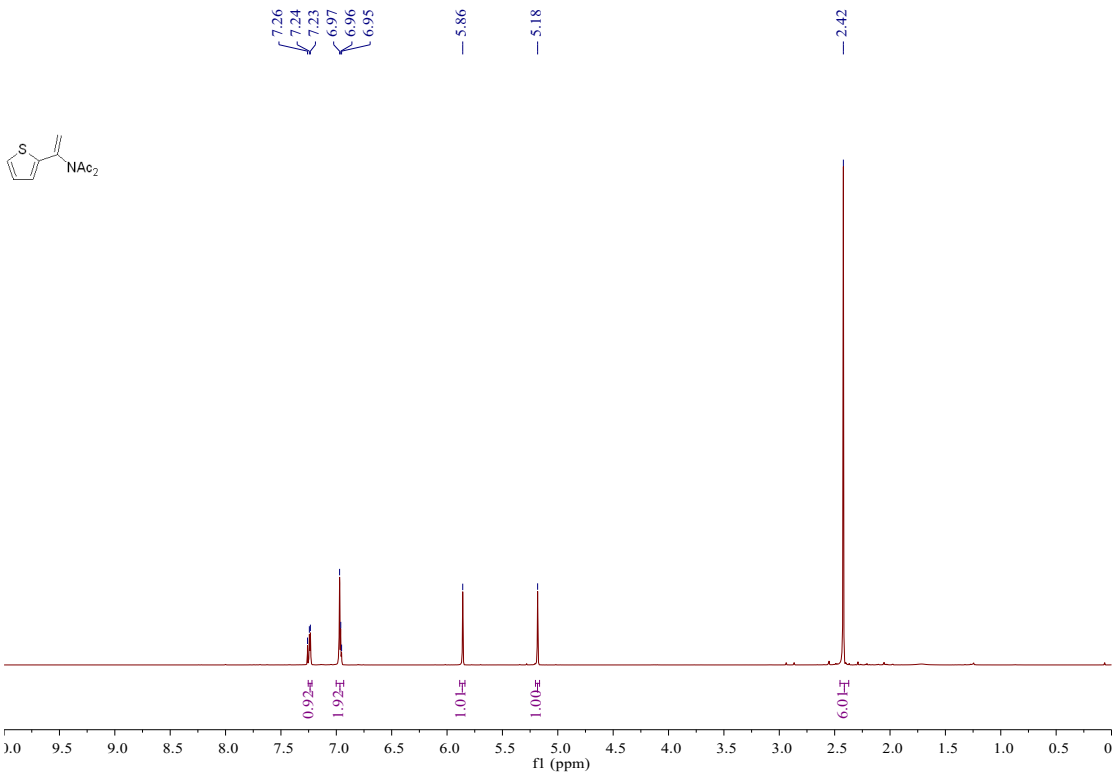
144.3
142.0
140.1
134.0
128.9
127.7
127.0
125.4
115.6
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.3
NAc2
Ph
0.19
0.13
0.12
0.10
0.10
0.52
0.77
0.52
0.53
0.28
0.47
f1 (ppm)


8.51
8.49
7.89
7.87
7.83
7.82
7.58
7.57
7.55
7.53
7.53
7.52
7.50
7.50
7.45
7.43
7.42
7.37
7.36
7.35
7.35
7.26
5.87
5.74
2.46
NAc2
0.96
0.95
0.94
1.02
0.97
0.99
0.95
0.99
0.98
6.00
f1 (ppm)


173.3
141.4
134.3
134.2
130.9
129.4
128.7
126.9
126.0
124.9
124.8
124.2
121.1
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.4
NAc2
f1 (ppm)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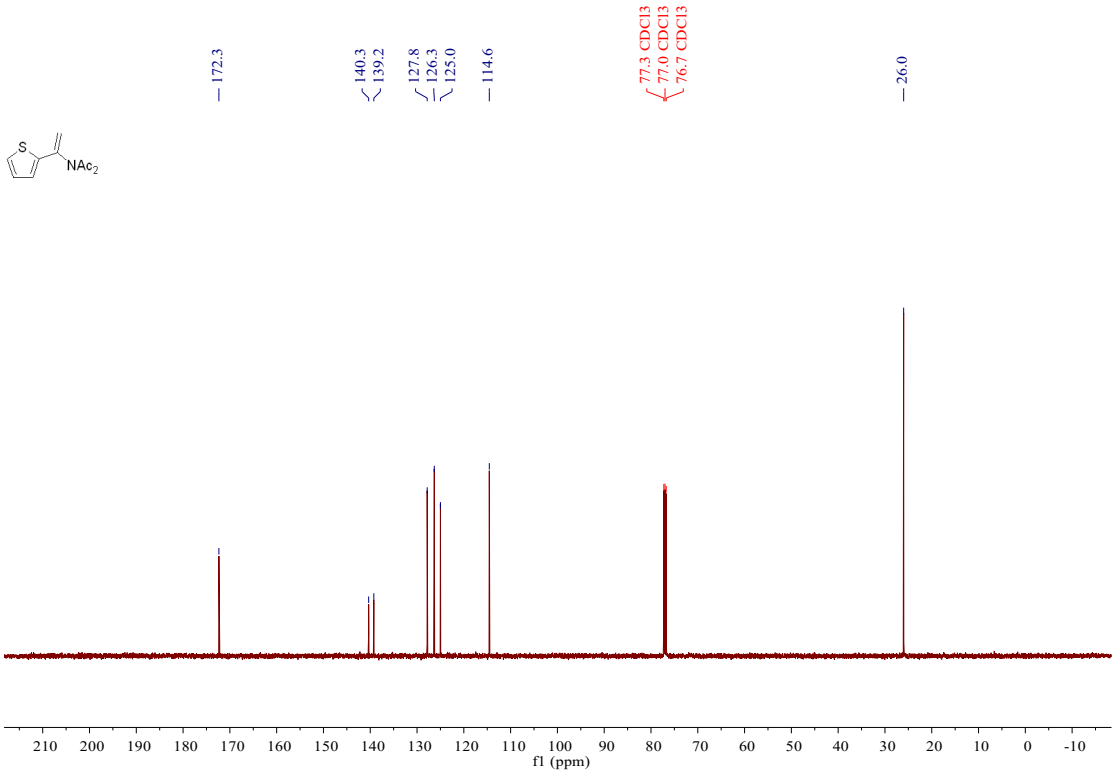
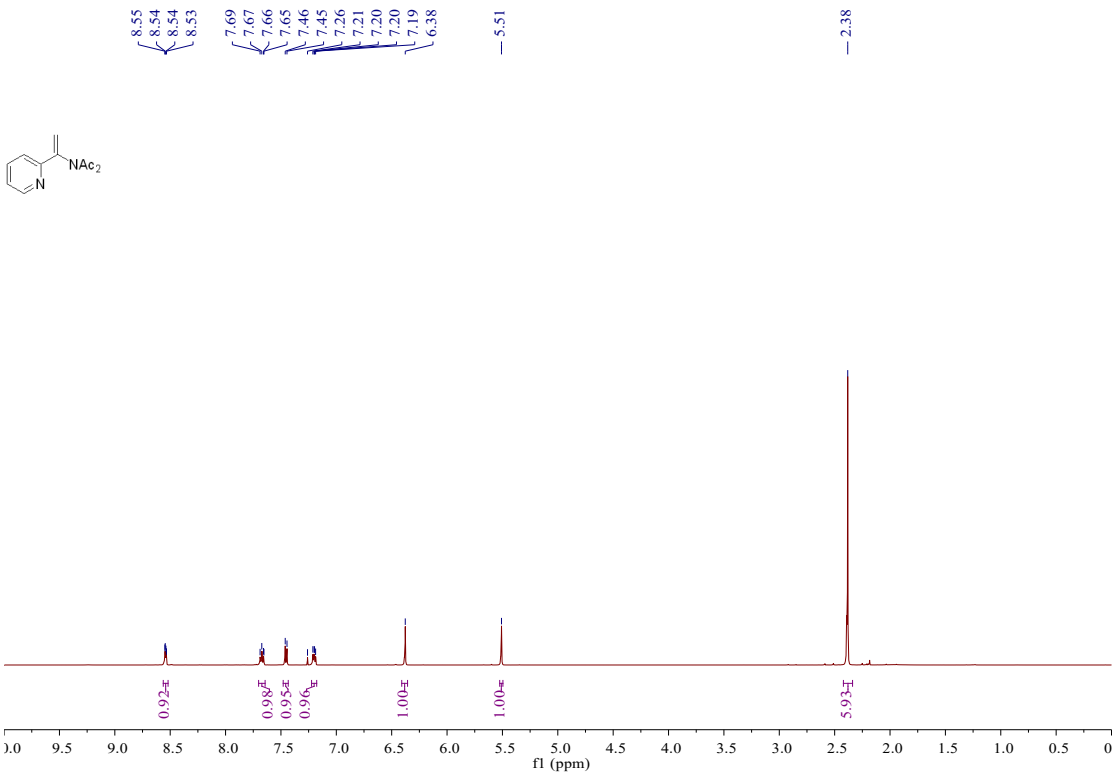
7.24
7.23
6.97
6.96
6.95
5.86
5.18
2.42
S
NAc2
0.92
1.92
1.01
1.00
6.01
f1 (ppm)


172.3
140.3
139.2
127.8
126.3
125.0
114.6
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.0
S
NAc2
f1 (ppm)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8.54
8.53
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7.67
7.66
7.65
7.46
7.45
7.26
7.21
7.20
7.20
7.19
6.38
5.51
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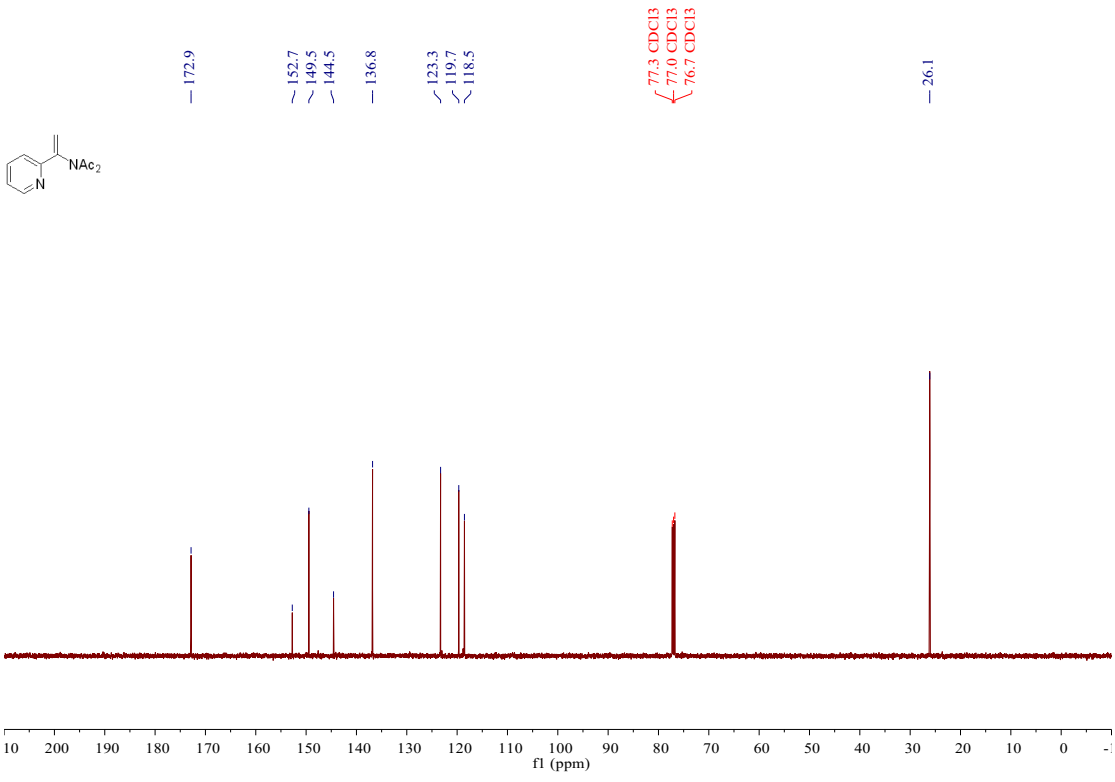
NAc2
N
0.92
0.98
0.95
0.96
1.00
1.00
5.93
f1 (ppm)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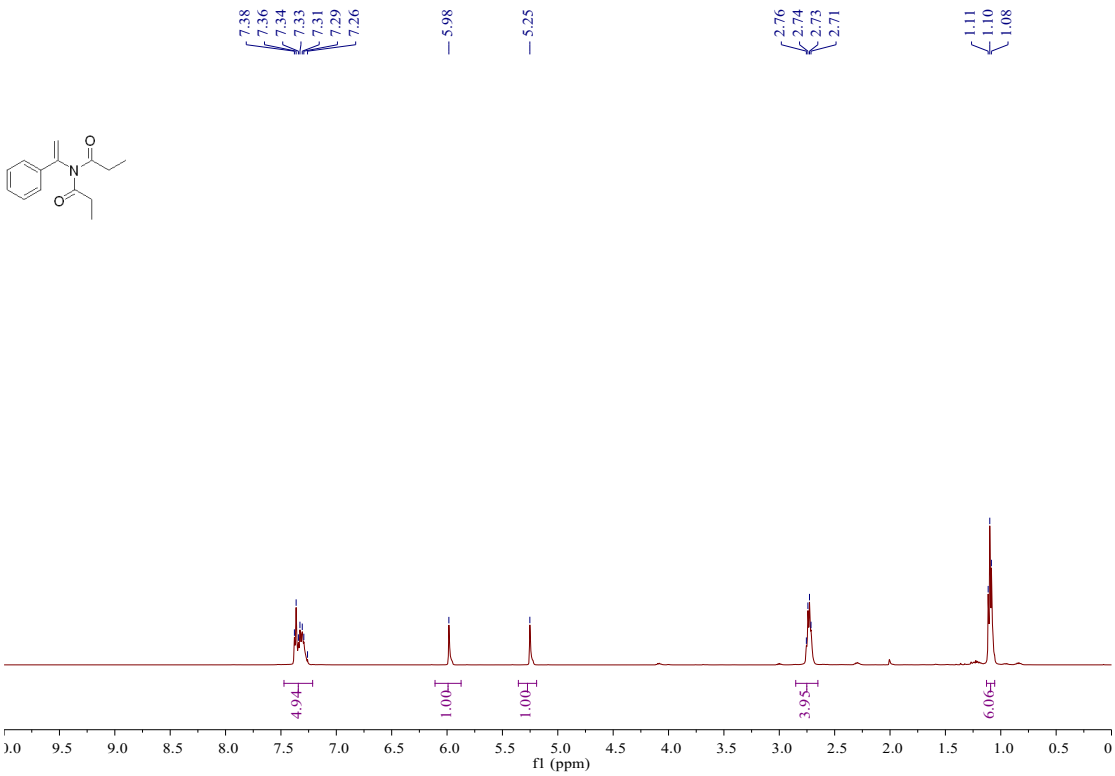
152.7
149.5
144.5
136.8
123.3
119.7
118.5
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
26.1
NAc2
N
f1 (ppm)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7.36
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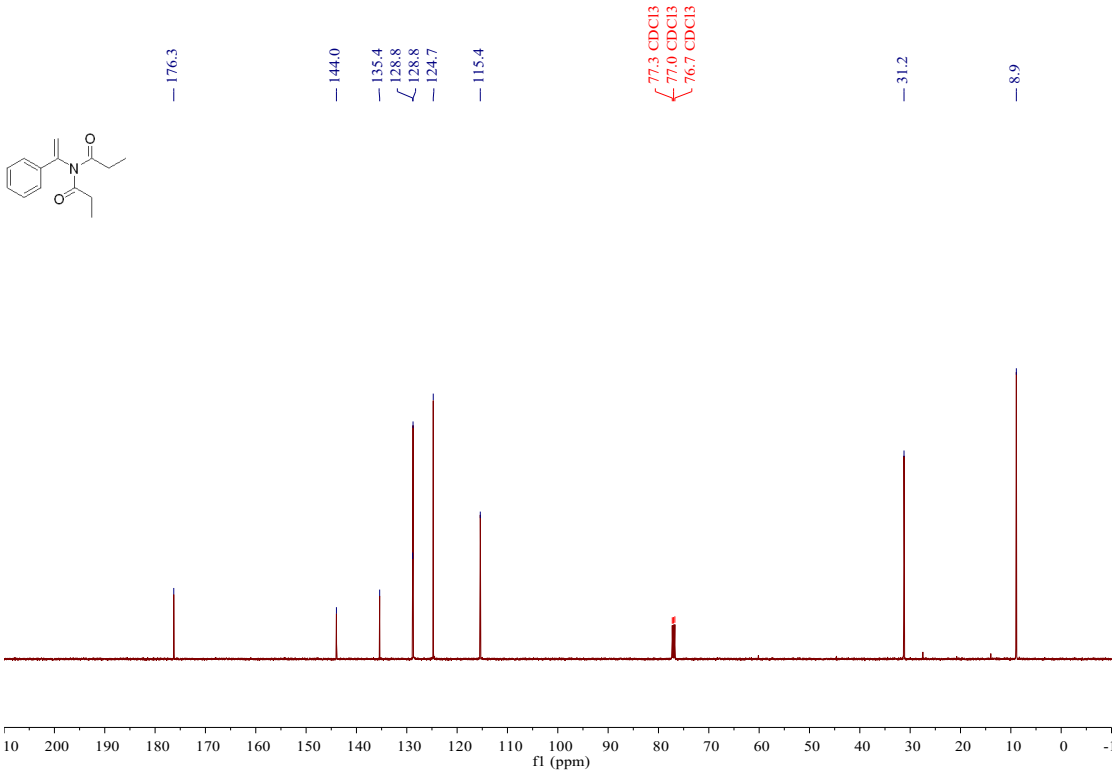
5.98
5.25
2.76
2.74
2.73
2.71
1.11
1.10
1.08
4.94
1.00
1.00
3.95
6.06
f1 (ppm)


176.3
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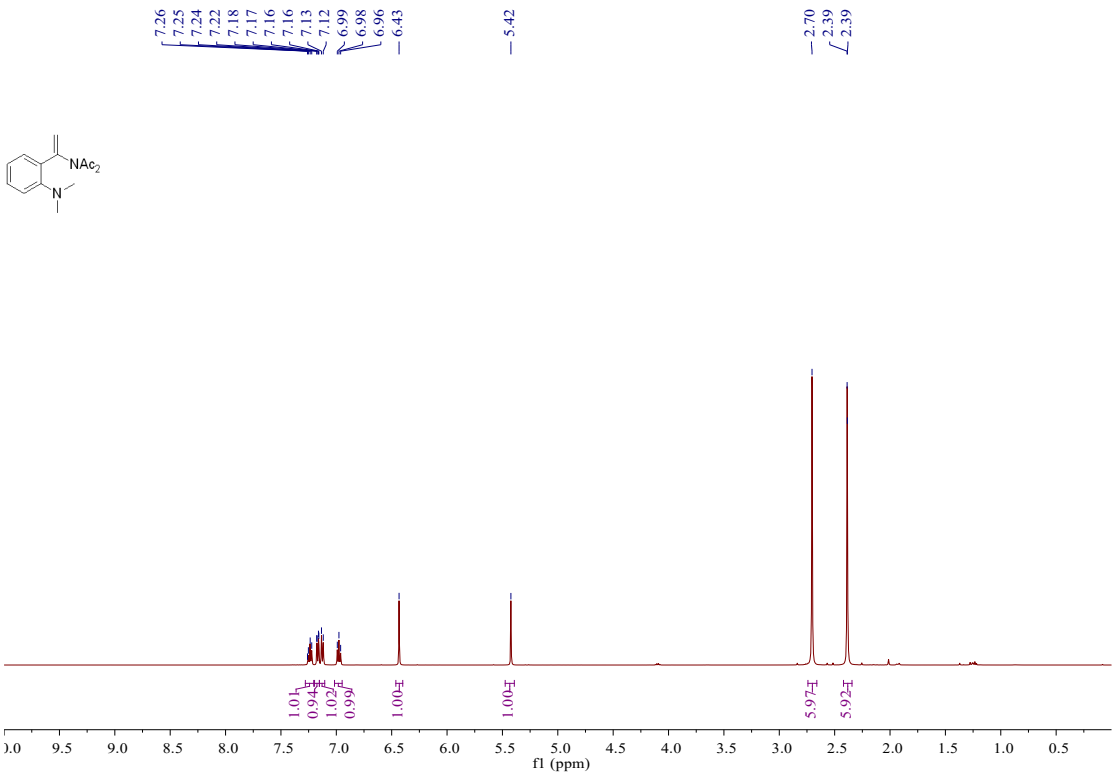
135.4
128.8
128.8
124.7
115.4
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
31.2
8.9
f1 (ppm)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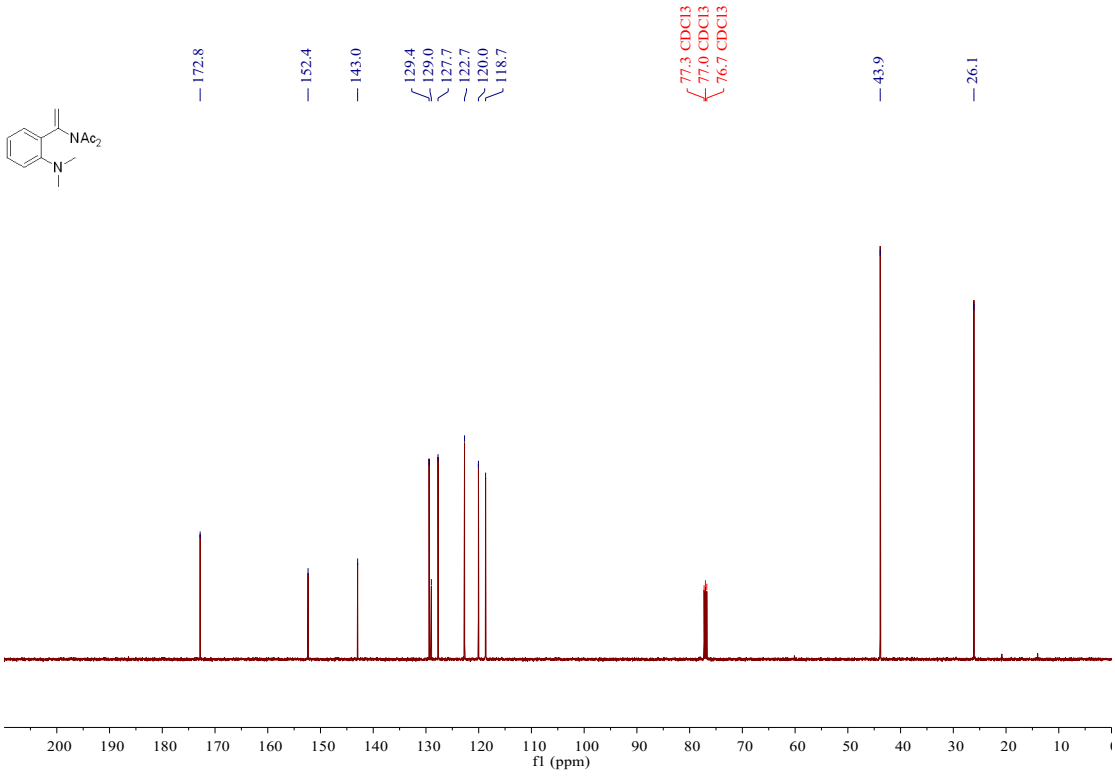
7.17
7.16
7.16
7.13
7.12
6.99
6.98
6.96
6.43
5.42
2.70
2.39
2.39
NAc2
N
1.01
0.94
1.02
0.99
1.00
1.00
5.97
5.92
f1 (ppm)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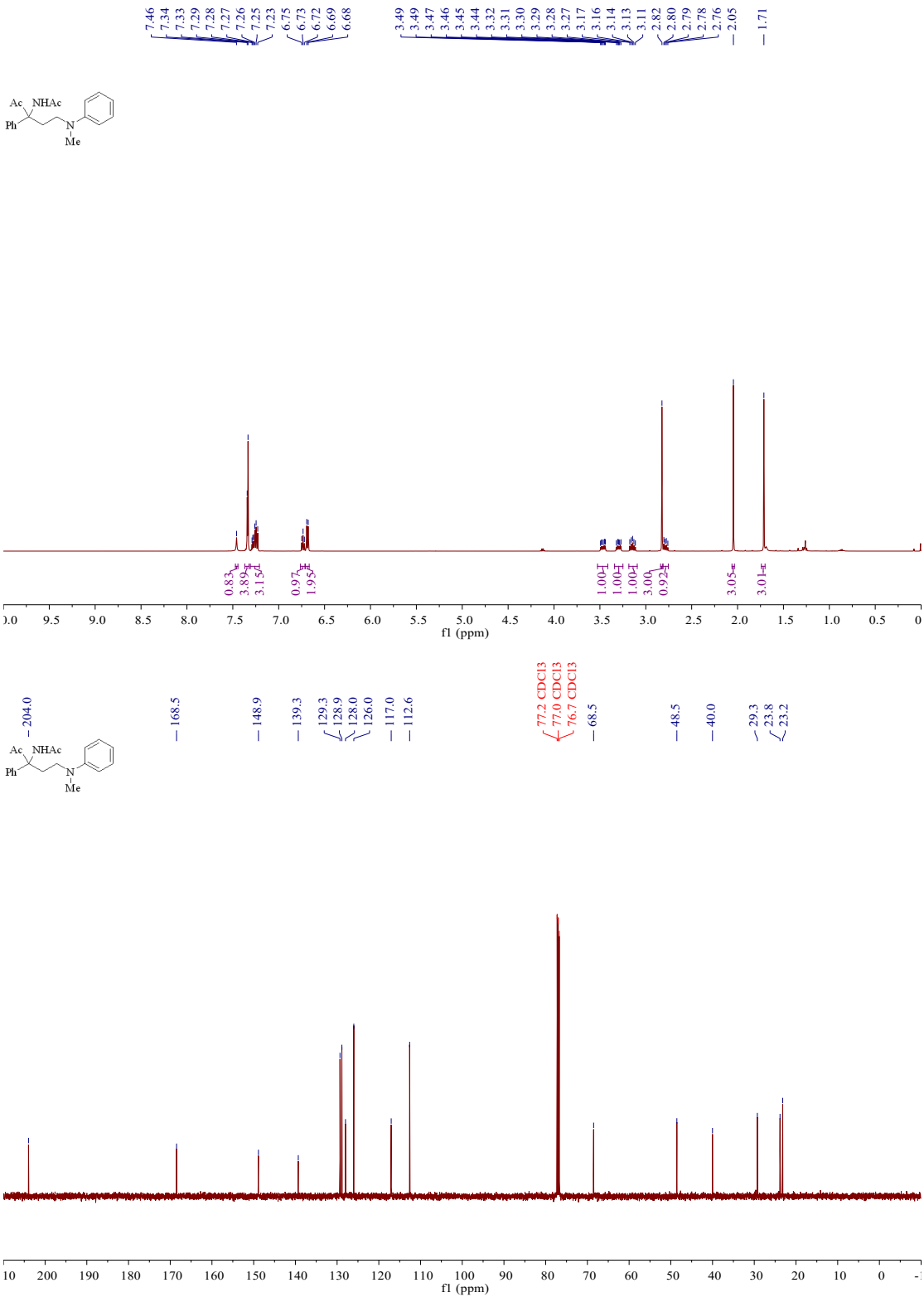
129.4
129.0
127.7
122.7
120.0
118.7
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
43.9
26.1
NAc2
N
f1 (ppm)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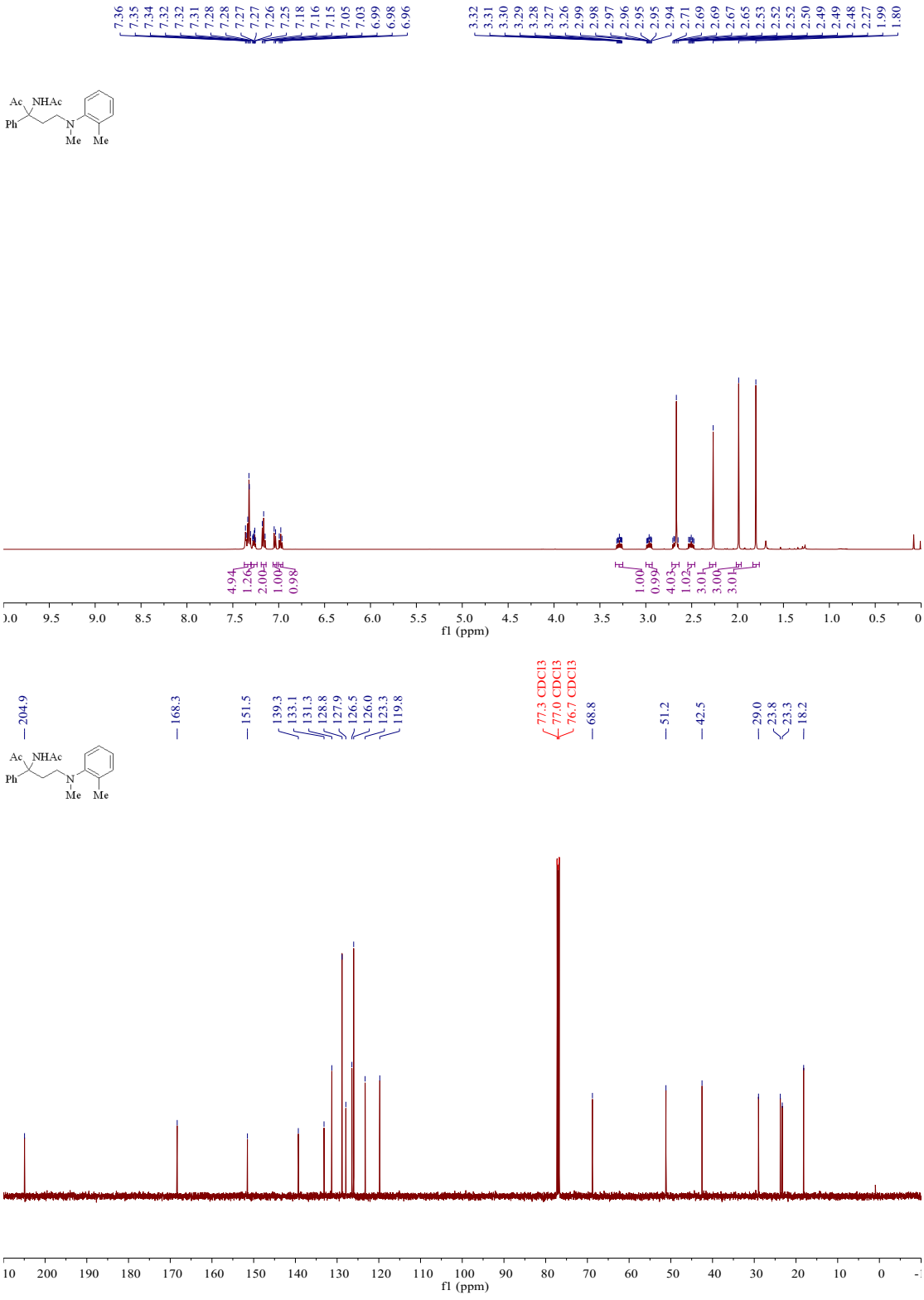
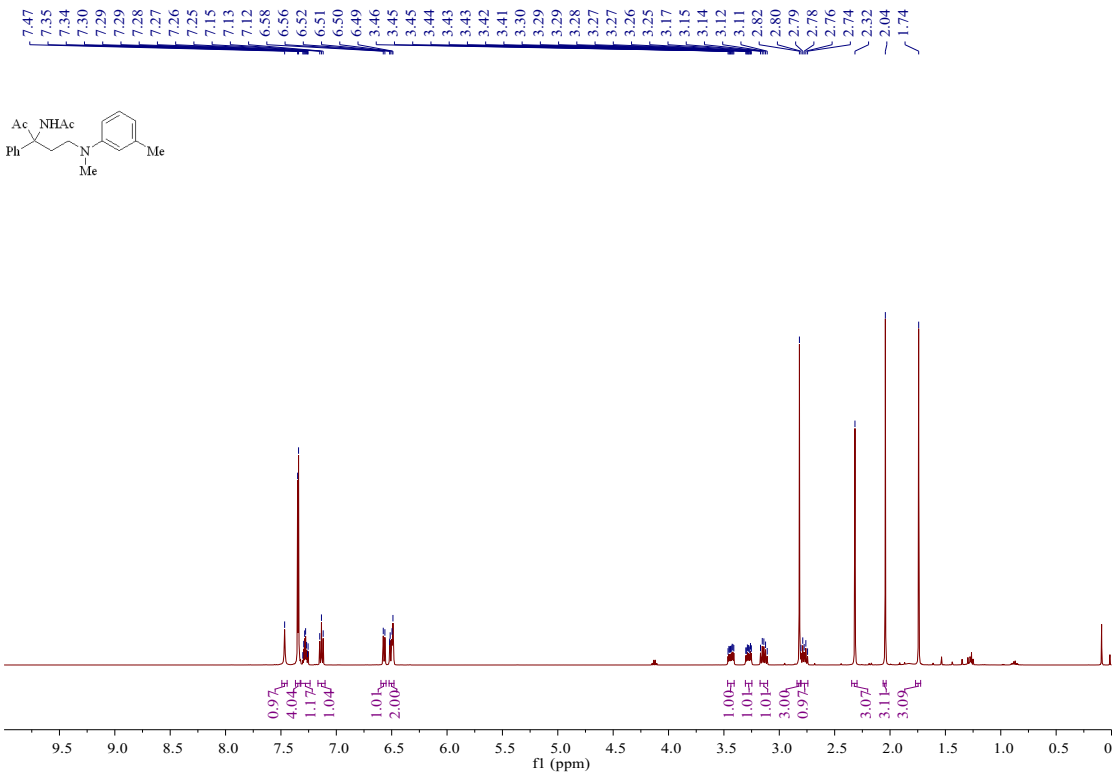
6.73
6.72
6.69
6.68
3.49
3.49
3.47
3.46
3.45
3.44
3.32
3.31
3.30
3.29
3.28
3.27
3.17
3.16
3.14
3.13
3.11
2.82
2.80
2.79
2.78
2.76
2.05
1.71
Ac
NHAc
Ph
N
Me
0.83
3.89
3.15
0.97
1.95
1.00
1.00
1.00
3.00
0.92
3.05
3.01
f1 (ppm)
204.0
168.5
148.9
139.3
129.3
128.9
128.0
126.0
117.0
112.6
77.2 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
48.5
40.0
29.3
23.8
23.2
f1 (ppm)


7.36 7.35 7.34 7.32 7.32 7.31 7.28 7.28 7.27 7.27 7.26 7.25 7.18 7.16 7.15 7.05 7.03 6.99 6.98 6.96
3.32 3.31 3.30 3.29 3.28 3.27 3.26 2.99 2.98 2.97 2.96 2.95 2.95 2.94 2.71 2.69 2.69 2.67 2.65 2.53 2.52 2.52 2.50 2.49 2.49 2.48 2.27 1.99 1.80
Ac NHAc
Ph
N
Me Me
4.94 1.26 2.00 1.00 0.98
1.00 0.99 4.03 1.02 3.01 3.00 3.01
f1 (ppm)
204.9 168.3 151.5 139.3 133.1 131.3 128.8 127.9 126.5 126.0 123.3 119.8
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.8 51.2 42.5 29.0 23.8 23.3 18.2
f1 (ppm)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7.27
7.26
7.25
7.15
7.13
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6.56
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6.51
6.50
6.49
3.46
3.45
3.45
3.44
3.43
3.43
3.42
3.41
3.30
3.29
3.29
3.28
3.27
3.27
3.26
3.25
3.17
3.15
3.14
3.12
3.11
2.82
2.80
2.79
2.78
2.76
2.74
2.32
2.04
1.74
Ac
NHAc
Ph
N
Me
Me
0.97
4.04
1.17
1.04
1.01
2.00
1.00
1.01
1.01
3.00
0.97
3.07
3.11
3.09
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
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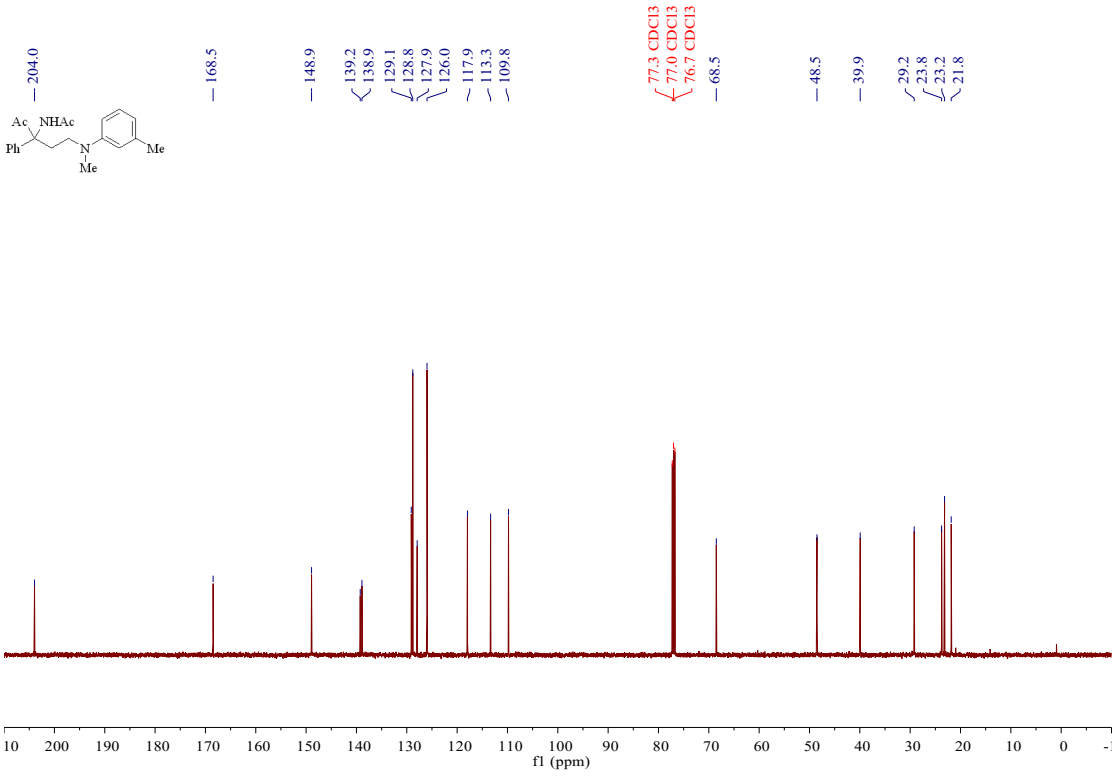
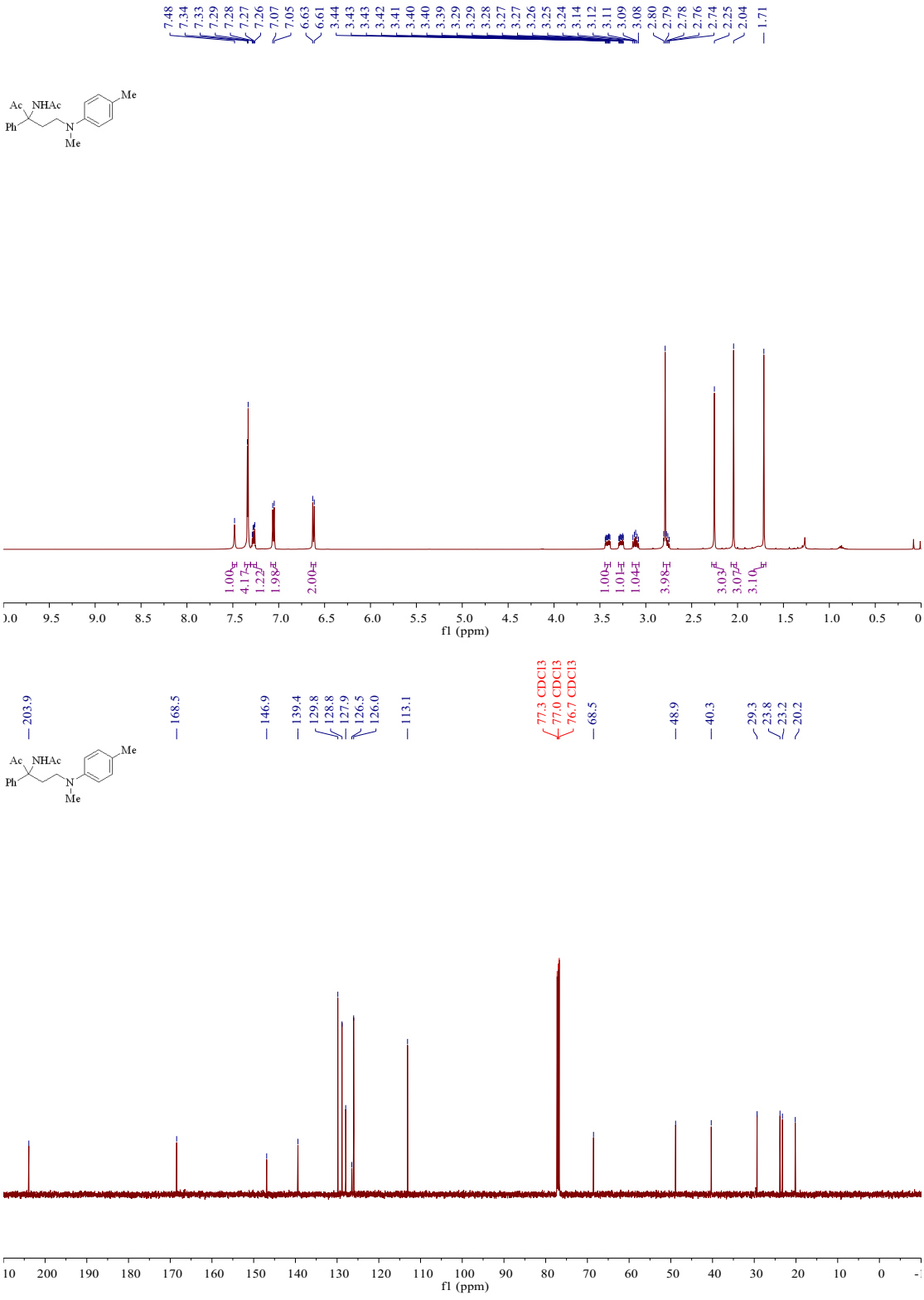
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
f1 (ppm)


204.0
168.5
148.9
139.2
138.9
129.1
128.8
127.9
126.0
117.9
113.3
109.8
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
48.5
39.9
29.2
23.8
23.2
21.8
Ac
NHAc
Ph
N
Me
Me
10
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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7.27
7.26
7.07
7.05
6.63
6.61
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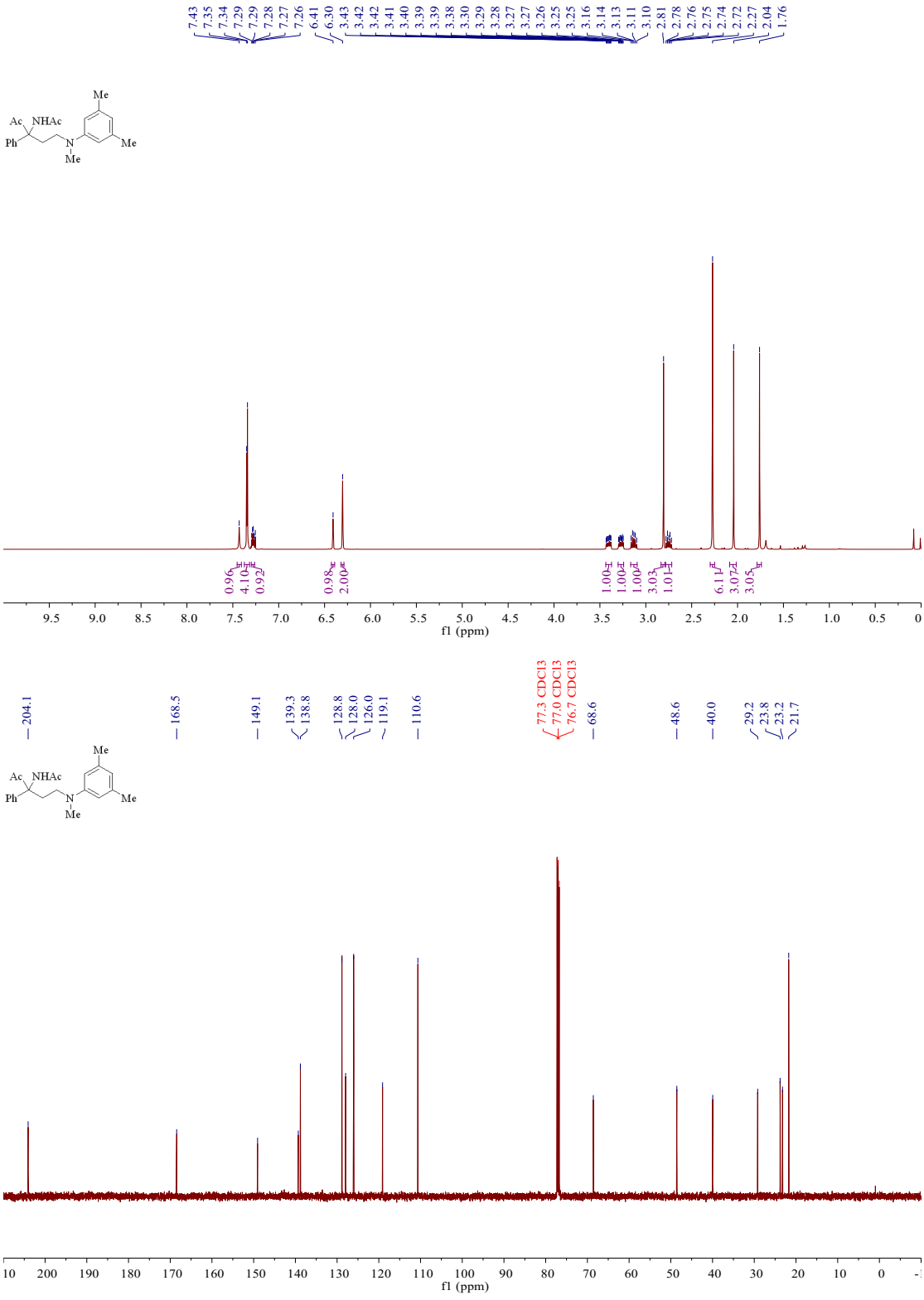
3.43
3.43
3.42
3.41
3.40
3.40
3.39
3.29
3.29
3.28
3.27
3.27
3.26
3.25
3.24
3.14
3.12
3.11
3.09
3.08
2.80
2.79
2.78
2.76
2.74
2.25
2.04
1.71
Ac
NHAc
Ph
N
Me
Me
1.00
4.17
1.22
1.98
2.00
1.00
1.01
1.04
3.98
3.03
3.07
3.10
f1 (ppm)
203.9
168.5
146.9
139.4
129.8
128.8
127.9
126.5
126.0
113.1
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
48.9
40.3
29.3
23.8
23.2
20.2
f1 (ppm)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7.26
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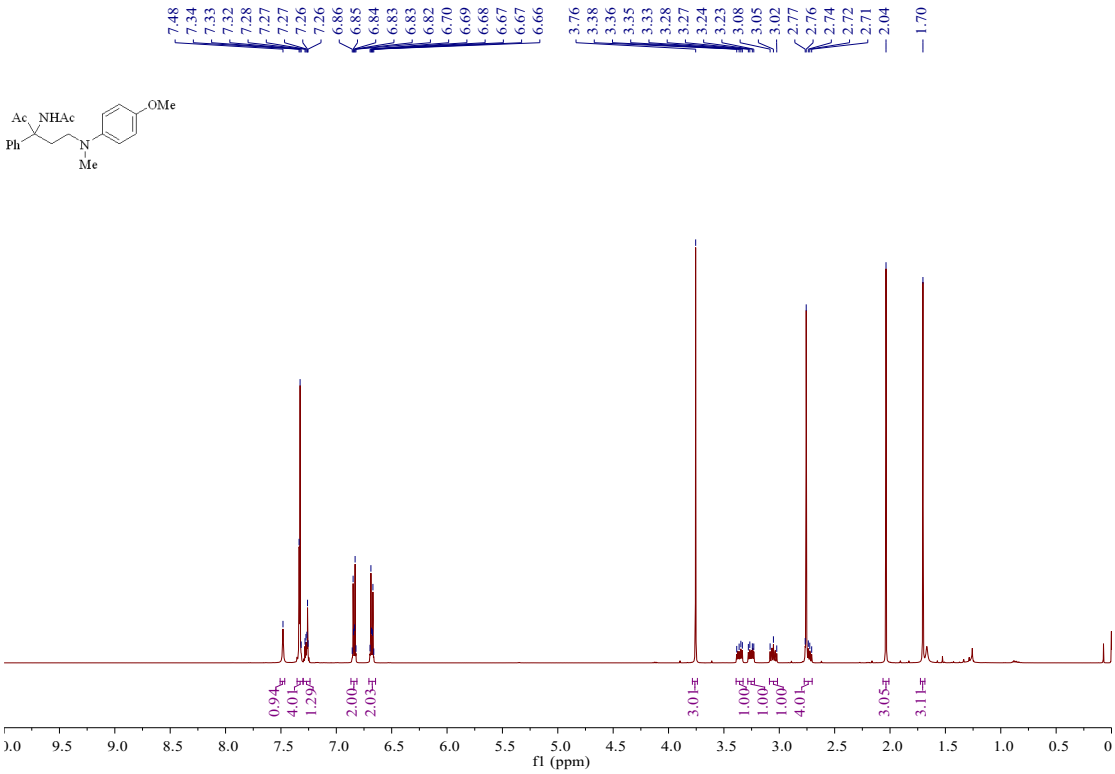
6.30
3.43
3.42
3.42
3.41
3.40
3.39
3.39
3.38
3.30
3.29
3.28
3.27
3.27
3.26
3.25
3.25
3.16
3.14
3.13
3.11
3.10
2.81
2.78
2.76
2.75
2.74
2.72
2.27
2.04
1.76
Me
Ac
NHAc
Ph
N
Me
Me
0.96
4.10
0.92
0.98
2.00
1.00
1.00
1.00
3.03
1.01
6.11
3.07
3.05
fl (ppm)
204.1
168.5
149.1
139.3
138.8
128.8
128.0
126.0
119.1
110.6
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.6
48.6
40.0
29.2
23.8
23.2
21.7
fl (ppm)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6.70
6.69
6.68
6.67
6.67
6.66
3.76
3.38
3.36
3.35
3.33
3.28
3.27
3.24
3.23
3.08
3.05
3.02
2.77
2.76
2.74
2.72
2.71
2.04
1.70
Ac
NHAc
Ph
N
Me
OMe
0.94
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1.29
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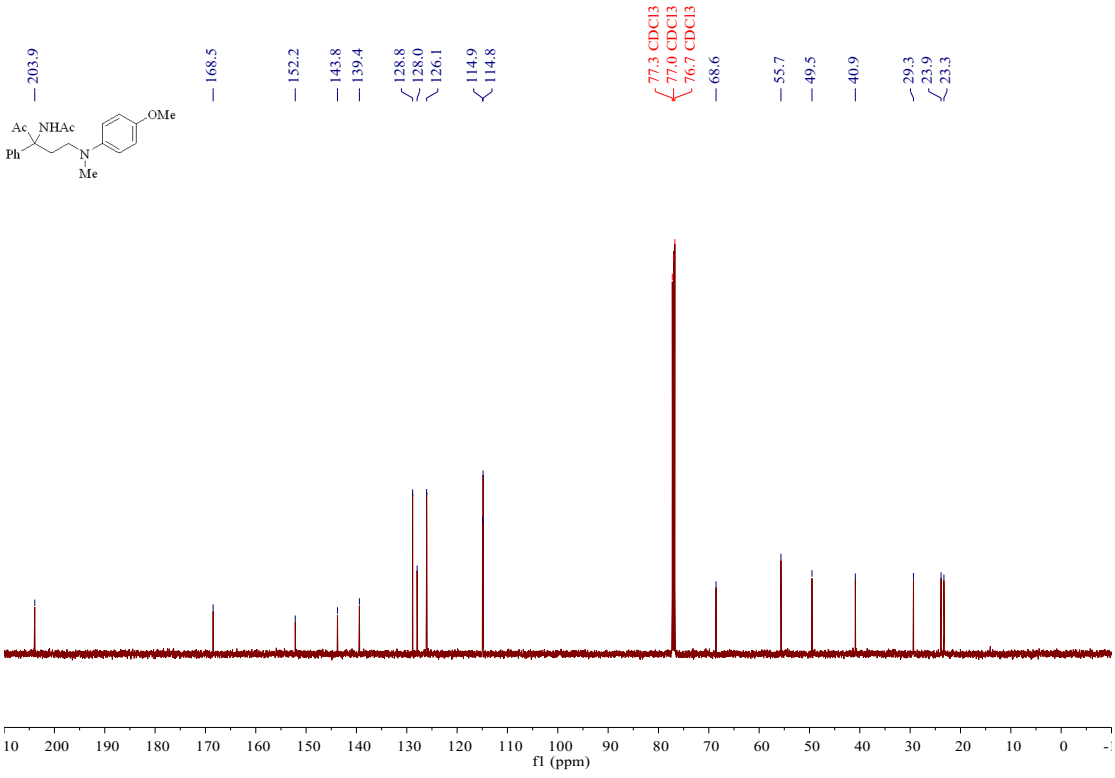
2.03
3.01
1.00
1.00
1.00
4.01
3.05
3.11
f1 (ppm)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128.0
126.1
114.9
114.8
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.6
55.7
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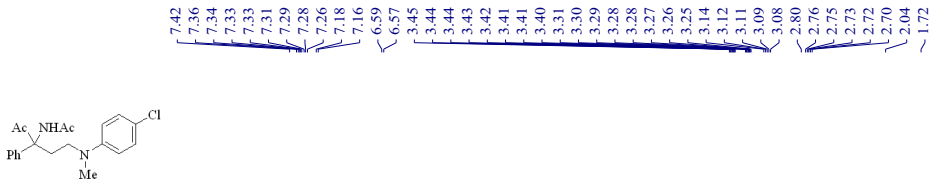
40.9
29.3
23.9
23.3
Ac
NHAc
Ph
N
Me
OMe
f1 (ppm)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3.44
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3.43
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3.25
3.14
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3.08
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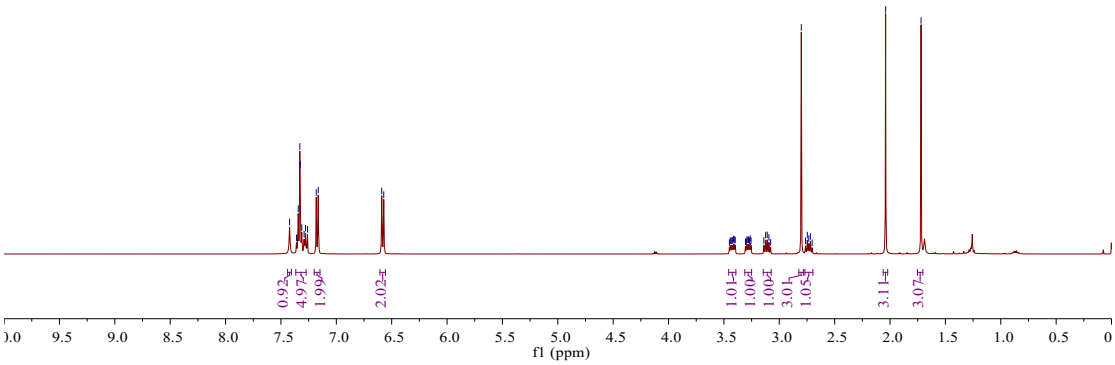
2.72
2.70
2.04
1.72


Ac
NHAc
Ph
N
Me
Cl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1.00
3.01
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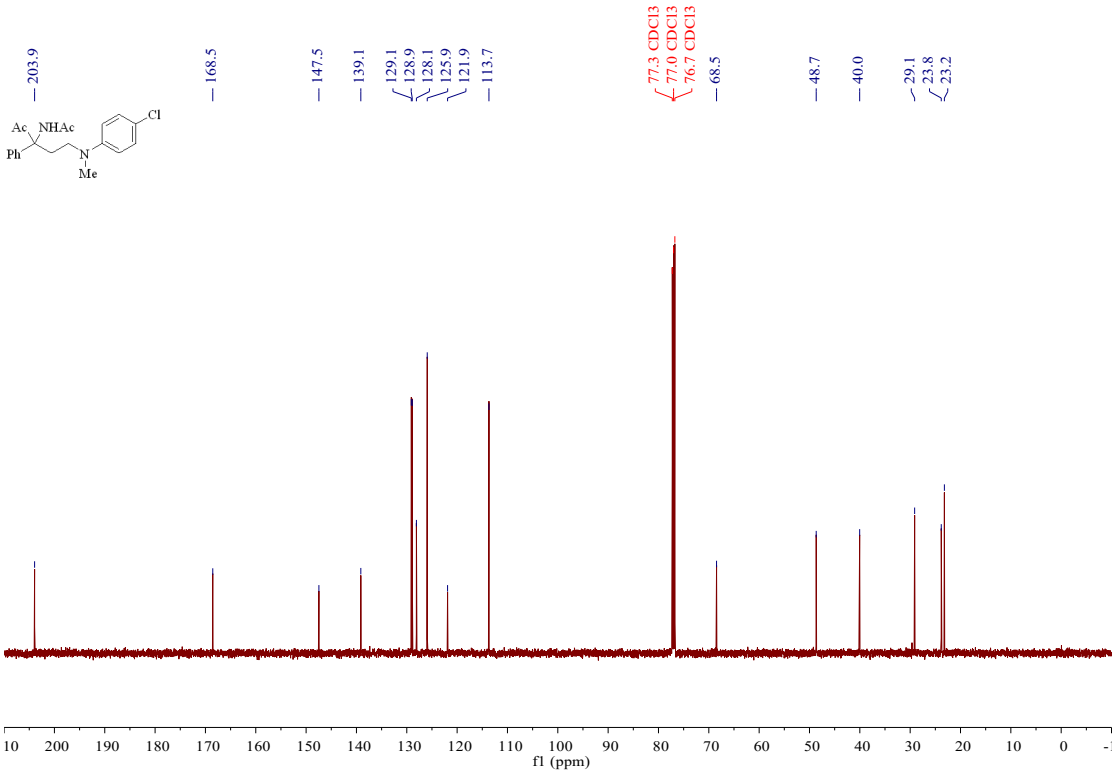
3.07
f1 (ppm)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113.7
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
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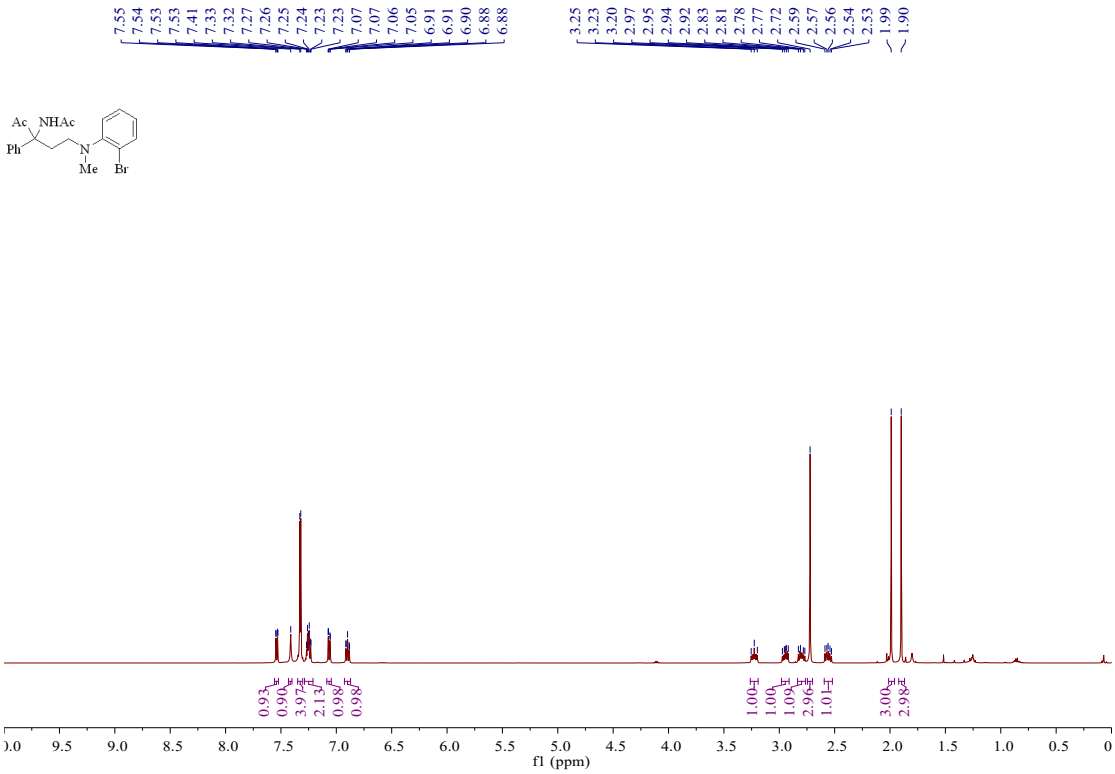
40.0
29.1
23.8
23.2
f1 (ppm)


Ac
NHAc
Ph
N
Me
Cl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7.23
7.07
7.07
7.06
7.05
6.91
6.91
6.90
6.88
6.88
3.25
3.23
3.20
2.97
2.95
2.94
2.92
2.83
2.81
2.78
2.77
2.72
2.59
2.57
2.56
2.54
2.53
1.99
1.90
Ac
NHAc
Ph
N
Me
Br
0.93
0.90
3.97
2.13
0.98
0.98
1.00
1.00
1.09
2.96
1.01
3.00
2.98
fl (ppm)
204.6
168.7
150.9
138.7
133.8
128.8
128.2
127.8
126.0
124.5
121.9
120.0
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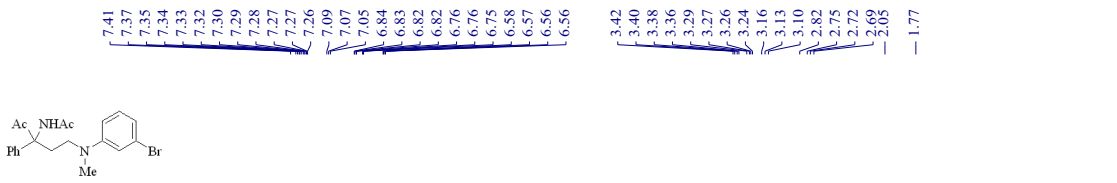
77.0 CDCl3
76.7 CDCl3
69.0
51.6
41.7
28.9
23.6
23.6
fl (ppm)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7.07
7.05
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6.82
6.76
6.76
6.75
6.58
6.57
6.56
6.56
3.42
3.40
3.38
3.36
3.29
3.27
3.26
3.24
3.16
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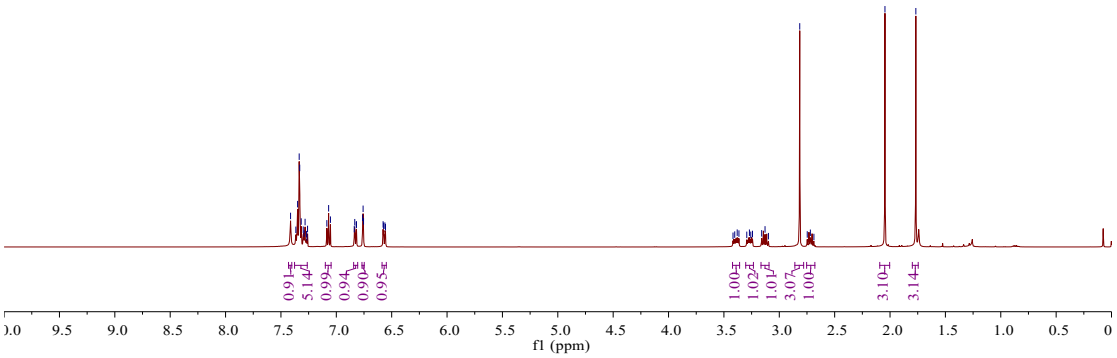
2.82
2.75
2.72
2.69
2.05
1.77


Ac
NHAc
Ph
N
Me
Br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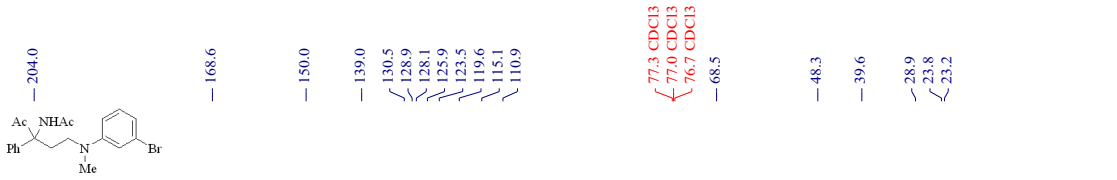
0.94
0.90
0.95
1.00
1.02
1.01
3.07
1.00
3.10
3.14
f1 (ppm)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139.0
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128.9
128.1
125.9
123.5
119.6
115.1
110.9
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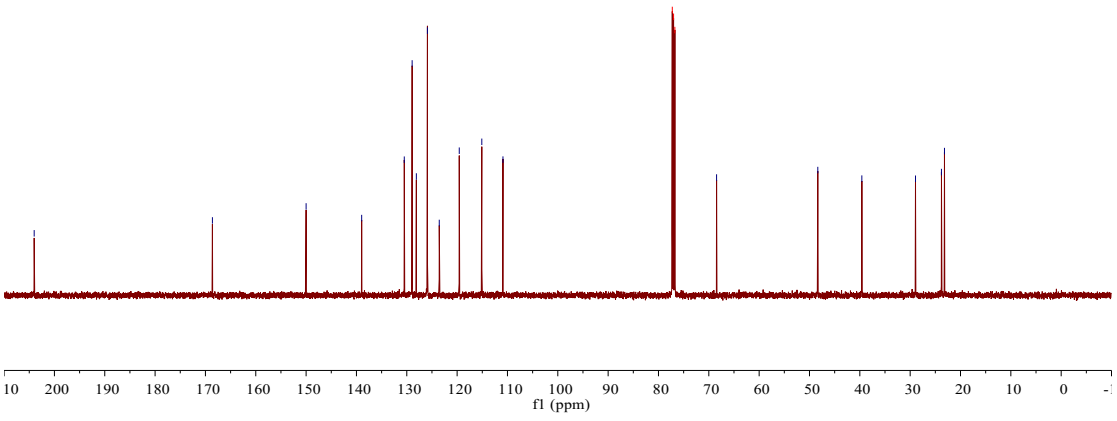
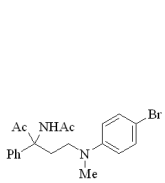
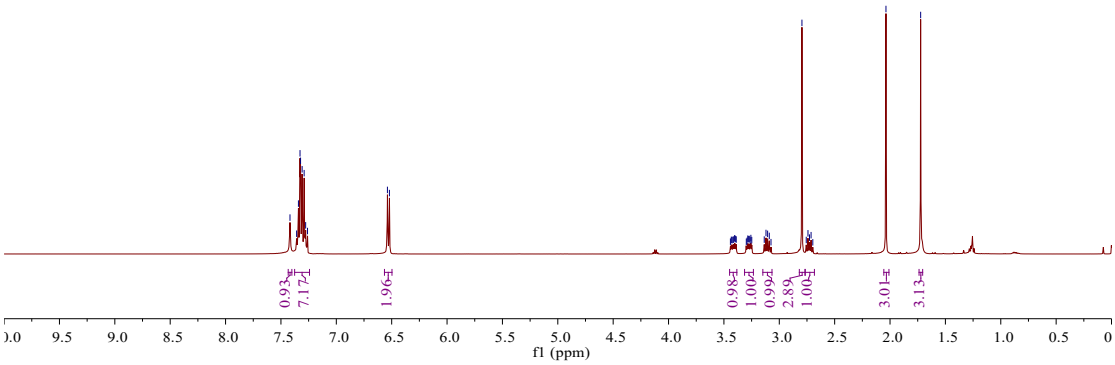
77.0 CDCl3
76.7 CDCl3
68.5
48.3
39.6
28.9
23.8
23.2


Ac
NHAc
Ph
N
Me
Br


f1 (ppm)


Ac
NHAc
Ph
N
Me
Br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0.99
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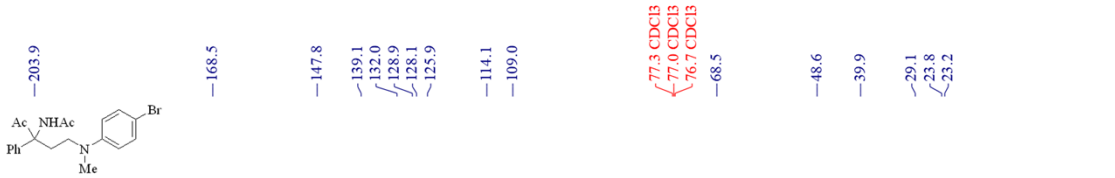
1.00
3.01
3.13
f1 (ppm)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139.1
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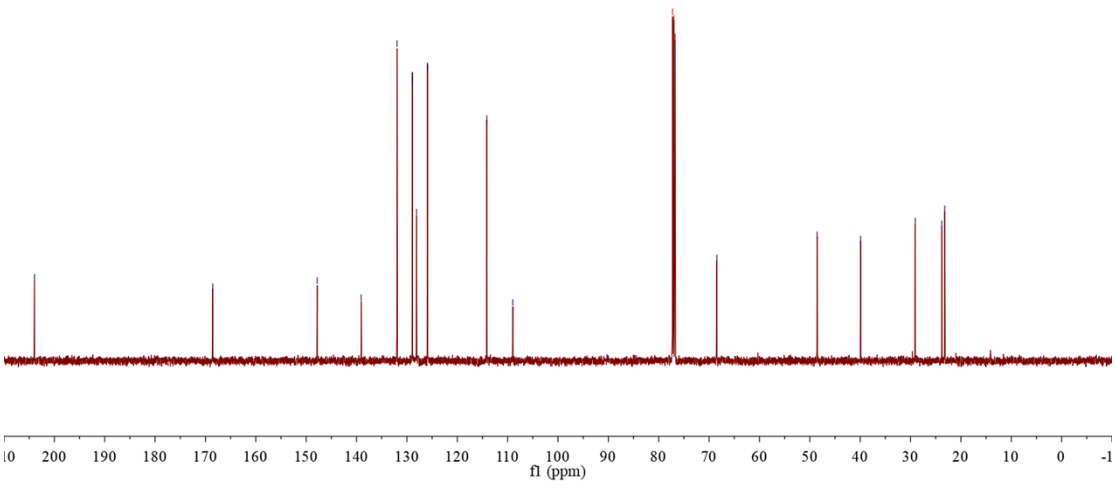
128.9
128.1
125.9
114.1
109.0
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
48.6
39.9
29.1
23.8
23.2


Ac
NHAc
Ph
N
Me
Br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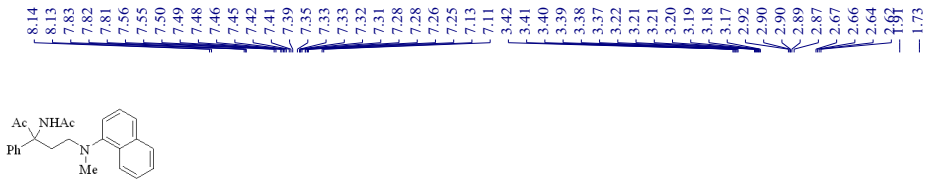
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7.42
7.41
7.39
7.35
7.33
7.33
7.32
7.31
7.28
7.28
7.26
7.25
7.13
7.11
3.42
3.41
3.40
3.39
3.38
3.37
3.22
3.21
3.21
3.20
3.19
3.18
3.17
2.92
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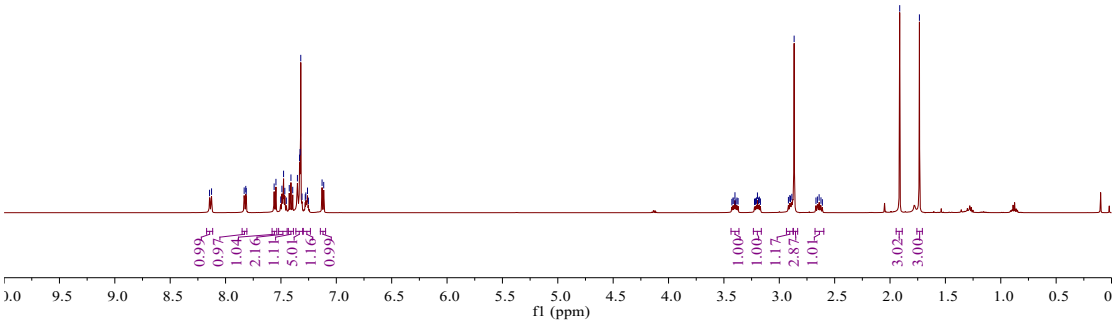
2.66
2.64
1.91
1.73


Ac
NHAc
Ph
N
Me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0.99
1.00
1.00
1.17
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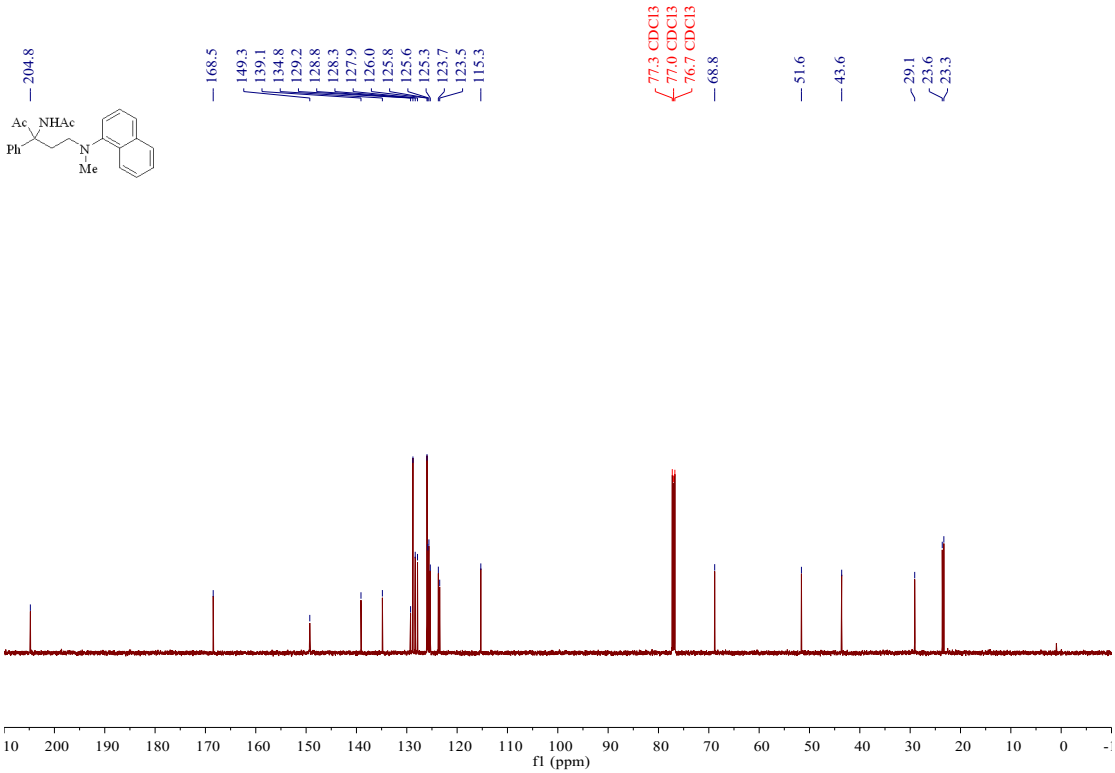
1.01
3.02
3.00
f1 (ppm)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128.3
127.9
126.0
125.8
125.6
125.3
123.7
123.5
115.3
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.8
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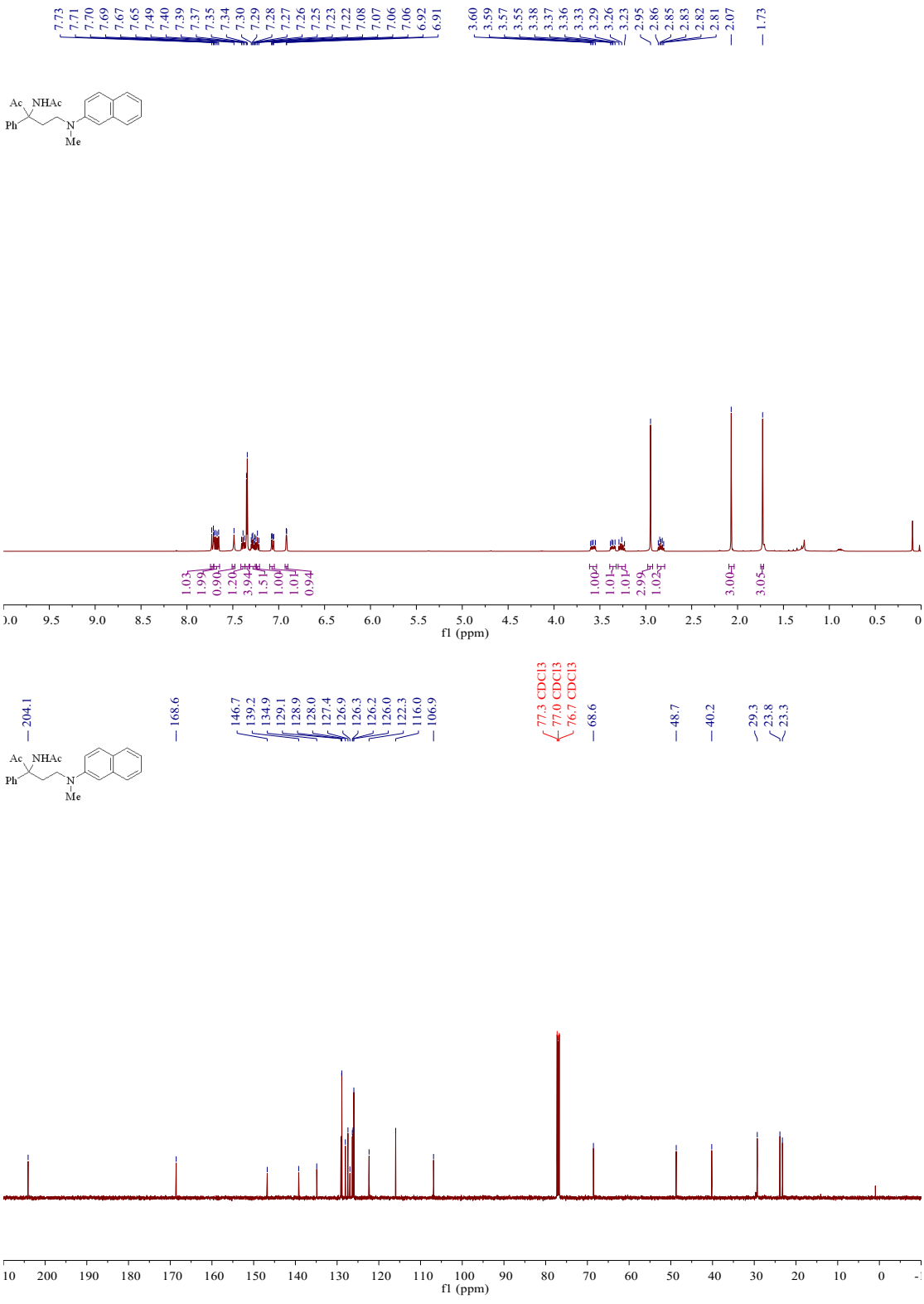
43.6
29.1
23.6
23.3
f1 (ppm)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7.27
7.26
7.25
7.23
7.22
7.08
7.07
7.06
7.06
6.92
6.91
3.60
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3.37
3.36
3.33
3.29
3.26
3.23
2.95
2.86
2.85
2.83
2.82
2.81
2.07
1.73
Ac
NHAc
Ph
N
Me
1.03
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1.20
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1.51
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1.01
0.94
1.00
1.01
1.01
2.99
1.02
3.00
3.05
f1 (ppm)
204.1
168.6
146.7
139.2
134.9
129.1
128.9
128.0
127.4
126.9
126.3
126.2
126.0
122.3
116.0
106.9
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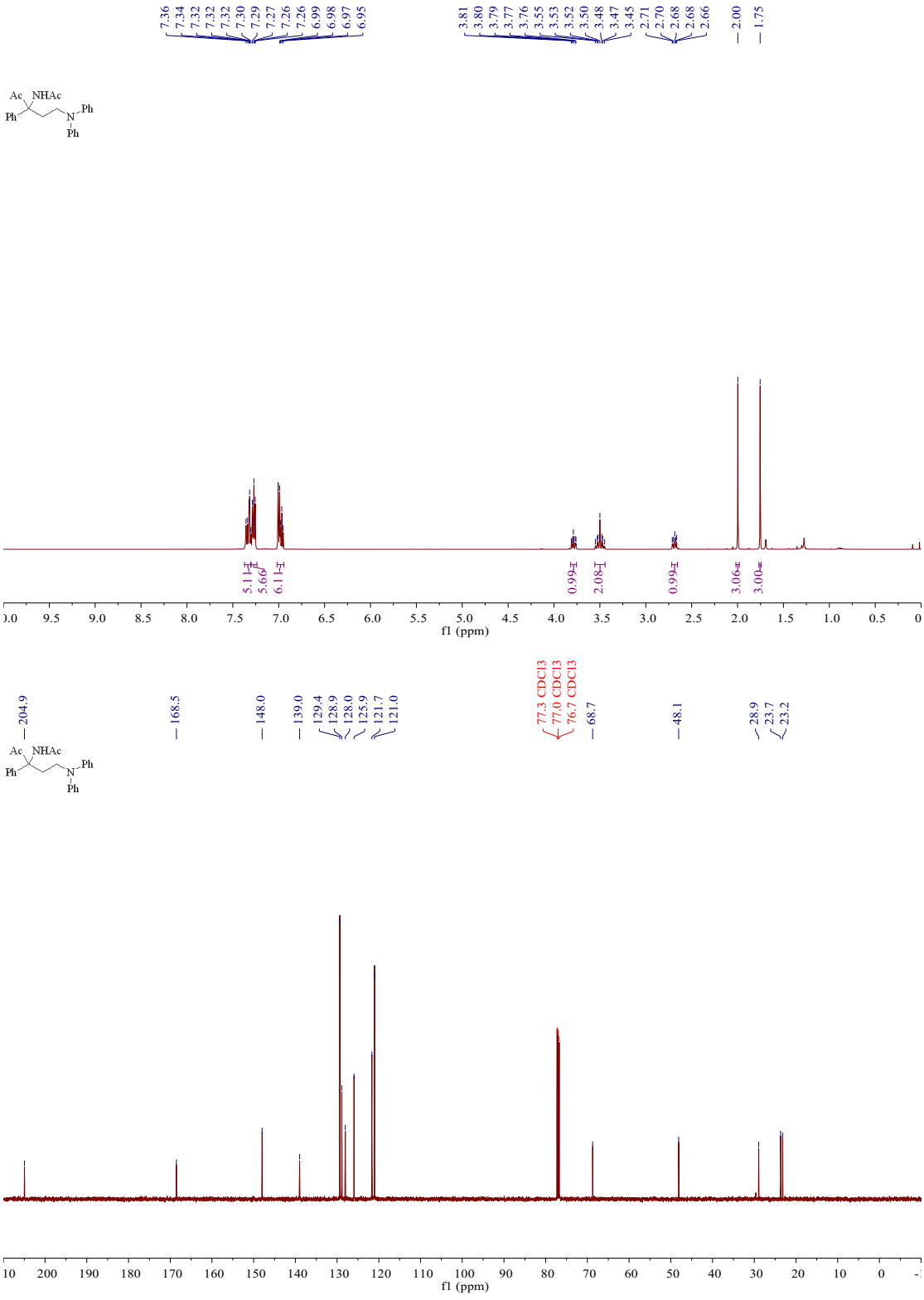
77.0 CDCl3
76.7 CDCl3
68.6
48.7
40.2
29.3
23.8
23.3
f1 (ppm)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3.53
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3.50
3.48
3.47
3.45
2.71
2.70
2.68
2.68
2.66
2.00
1.75
Ac
NHAc
Ph
Ph
N
Ph
5.11
5.66
6.11
0.99
2.08
0.99
3.06
3.00
f1 (ppm)
204.9
168.5
148.0
139.0
129.4
128.9
128.0
125.9
121.7
121.0
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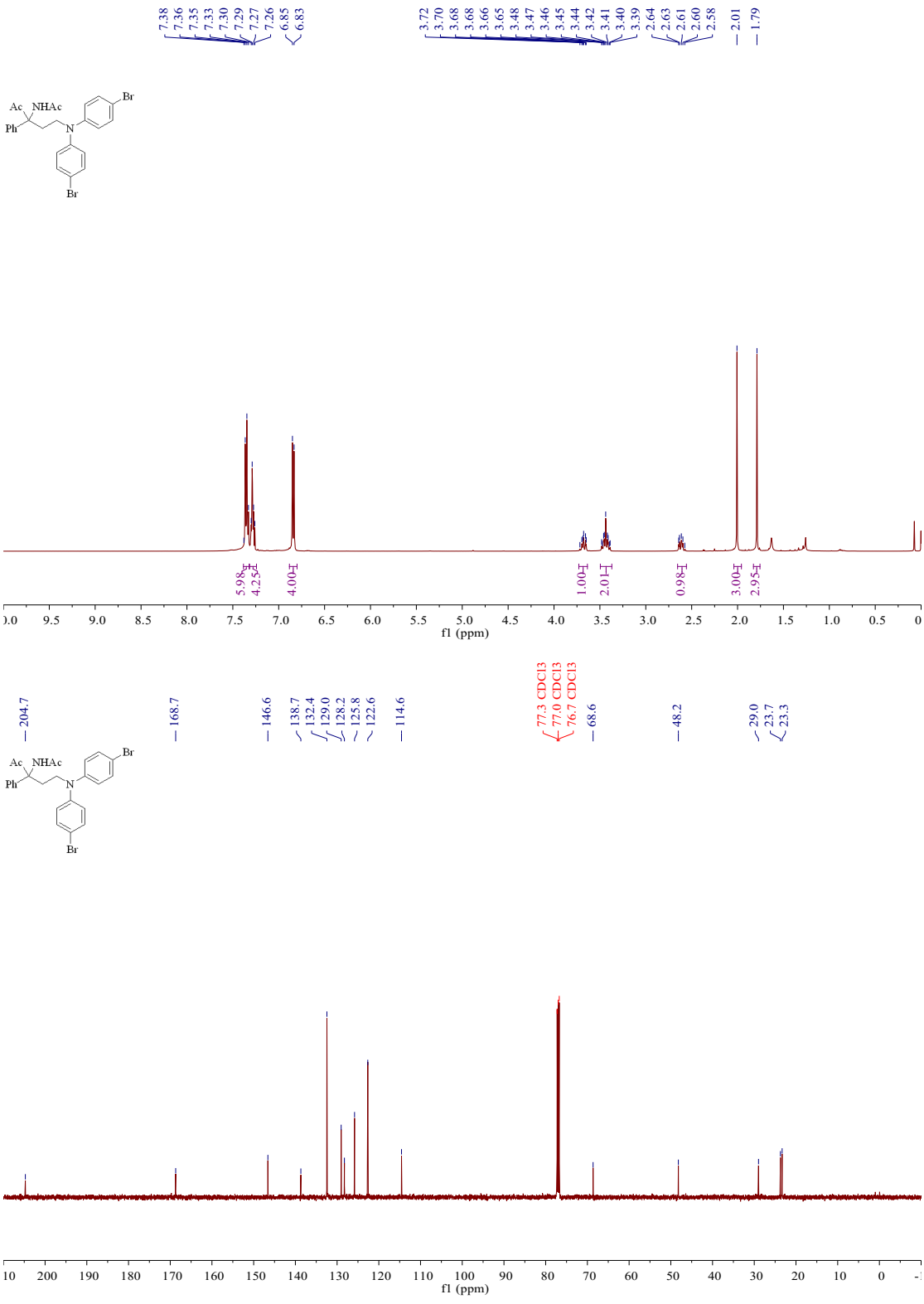
77.0 CDCl3
76.7 CDCl3
68.7
48.1
28.9
23.7
23.2
f1 (ppm)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3.68
3.66
3.65
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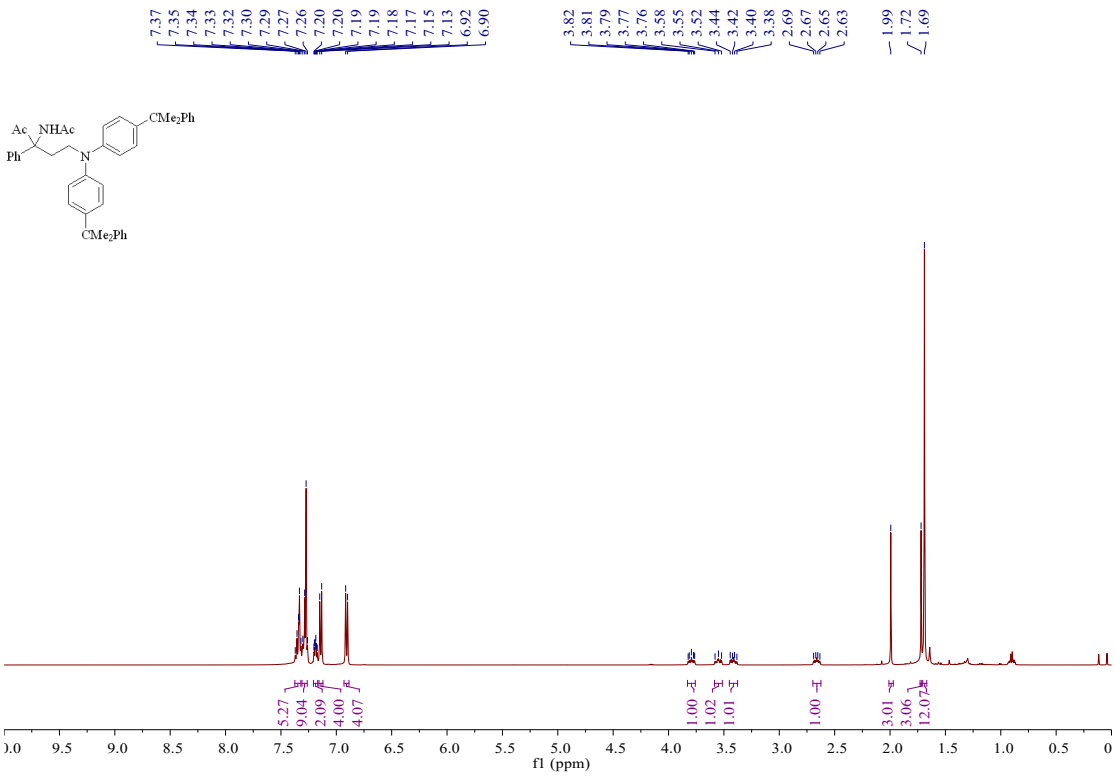
3.46
3.45
3.44
3.42
3.41
3.40
3.39
2.64
2.63
2.61
2.60
2.58
2.01
1.79
Ac
NHAc
Ph
N
Br
Br
5.98
4.25
4.00
1.00
2.01
0.98
3.00
2.95
f1 (ppm)
204.7
168.7
146.6
138.7
132.4
129.0
128.2
125.8
122.6
114.6
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.6
48.2
29.0
23.7
23.3
f1 (ppm)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7.18
7.17
7.15
7.13
6.92
6.90
3.82
3.81
3.79
3.77
3.76
3.58
3.55
3.52
3.44
3.42
3.40
3.38
2.69
2.67
2.65
2.63
1.99
1.72
1.69
Ac
NHAc
Ph
N
CMe2Ph
CMe2Ph
5.27
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2.09
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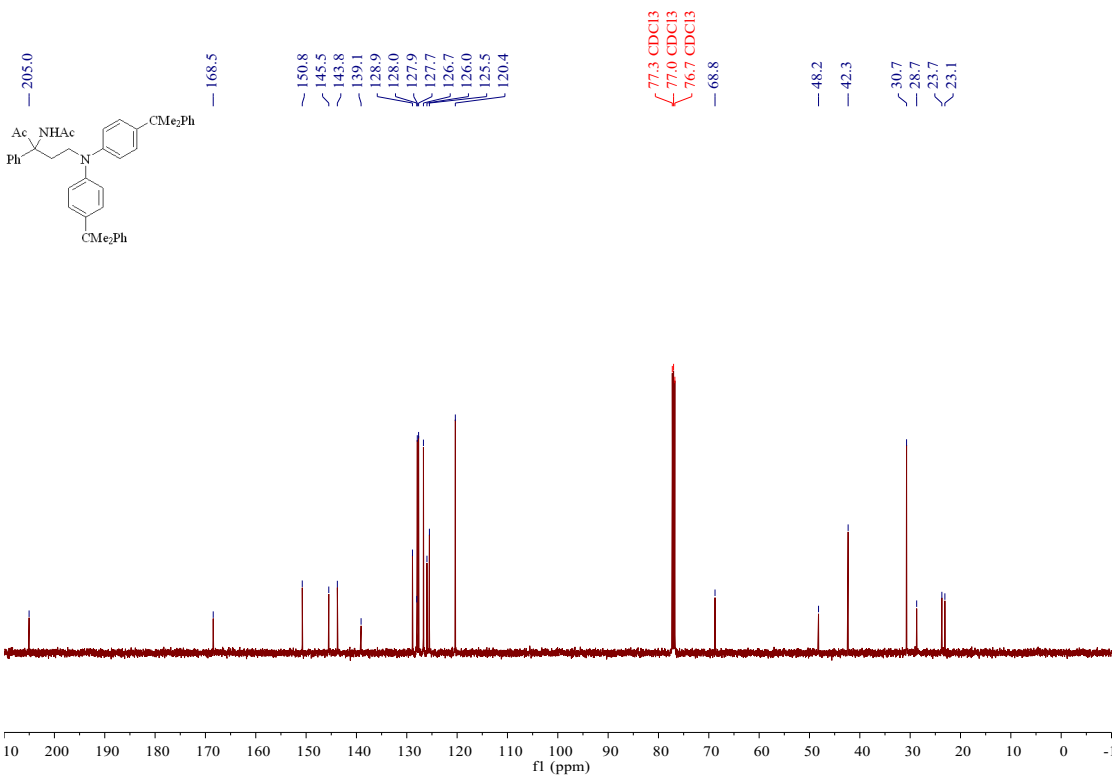
4.07
1.00
1.02
1.01
1.00
3.01
3.06
12.07
f1 (ppm)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145.5
143.8
139.1
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128.0
127.9
127.7
126.7
126.0
125.5
120.4
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.8
48.2
42.3
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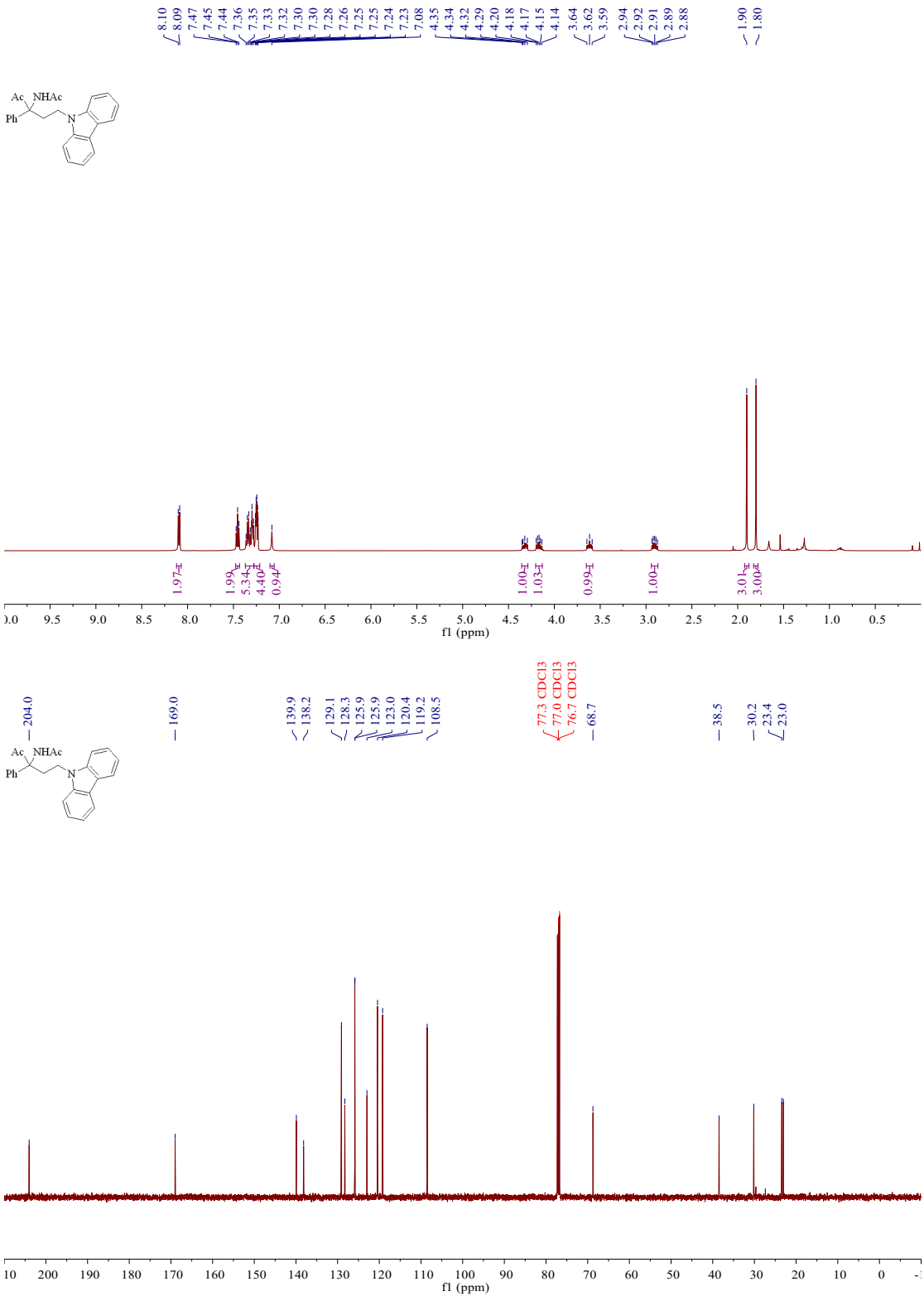
28.7
23.7
23.1
Ac
NHAc
Ph
N
CMe2Ph
CMe2Ph
f1 (ppm)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7.28
7.26
7.25
7.25
7.24
7.23
7.08
4.35
4.34
4.32
4.29
4.20
4.18
4.17
4.15
4.14
3.64
3.62
3.59
2.94
2.92
2.91
2.89
2.88
1.90
1.80
Ac
NHAc
Ph
N
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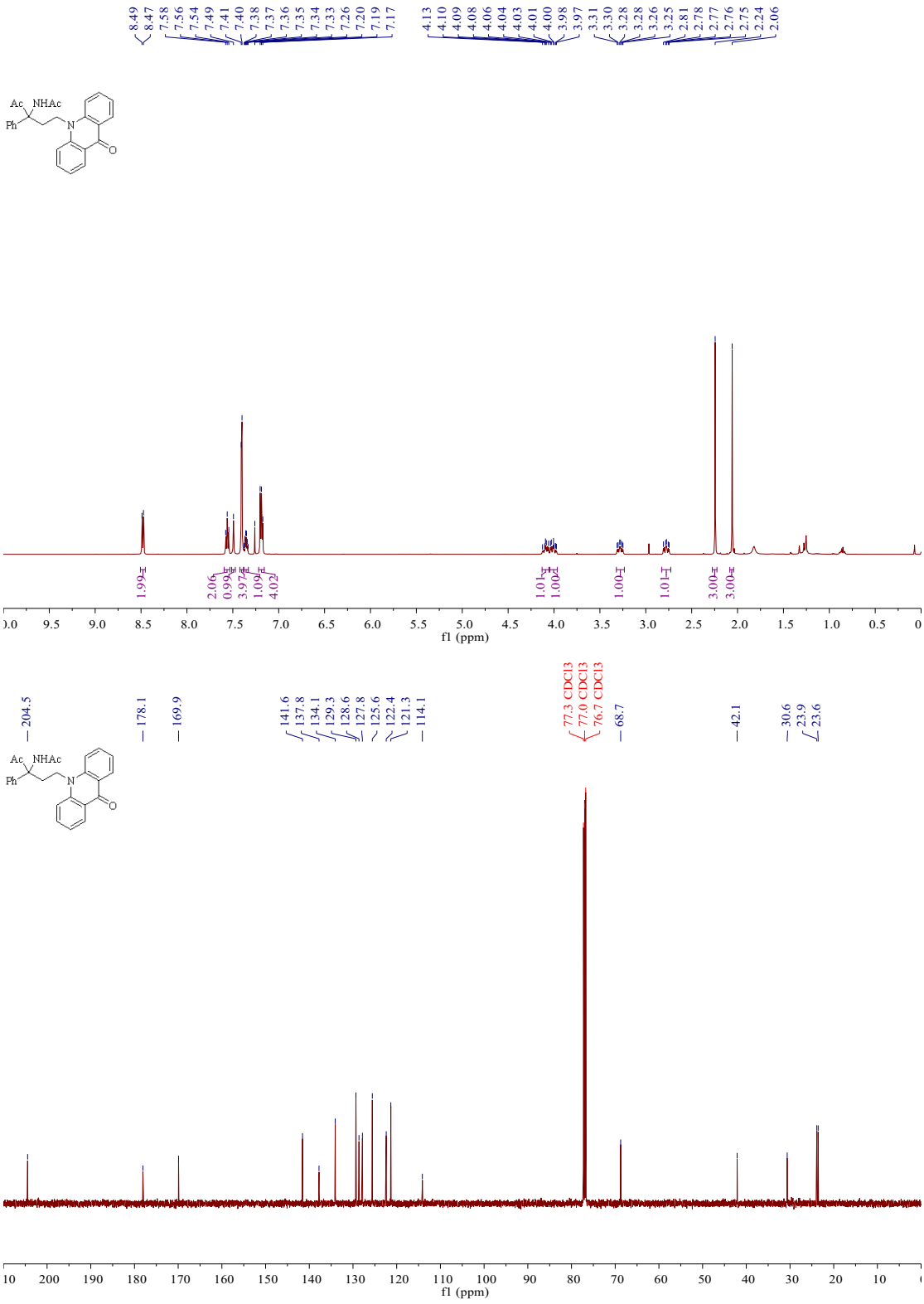
1.99
5.34
4.40
0.94
1.00
1.03
0.99
1.00
3.01
3.00
f1 (ppm)
204.0
169.0
139.9
138.2
129.1
128.3
125.9
125.9
123.0
120.4
119.2
108.5
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.7
38.5
30.2
23.4
23.0
f1 (ppm)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7.33
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7.20
7.19
7.17
4.13
4.10
4.09
4.08
4.06
4.04
4.03
4.01
4.00
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3.97
3.31
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3.26
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2.81
2.78
2.77
2.76
2.75
2.24
2.06
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NHAc
Ph
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O
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1.09
4.02
1.01
1.00
1.00
1.01
3.00
3.00
f1 (ppm)
204.5
178.1
169.9
141.6
137.8
134.1
129.3
128.6
127.8
125.6
122.4
121.3
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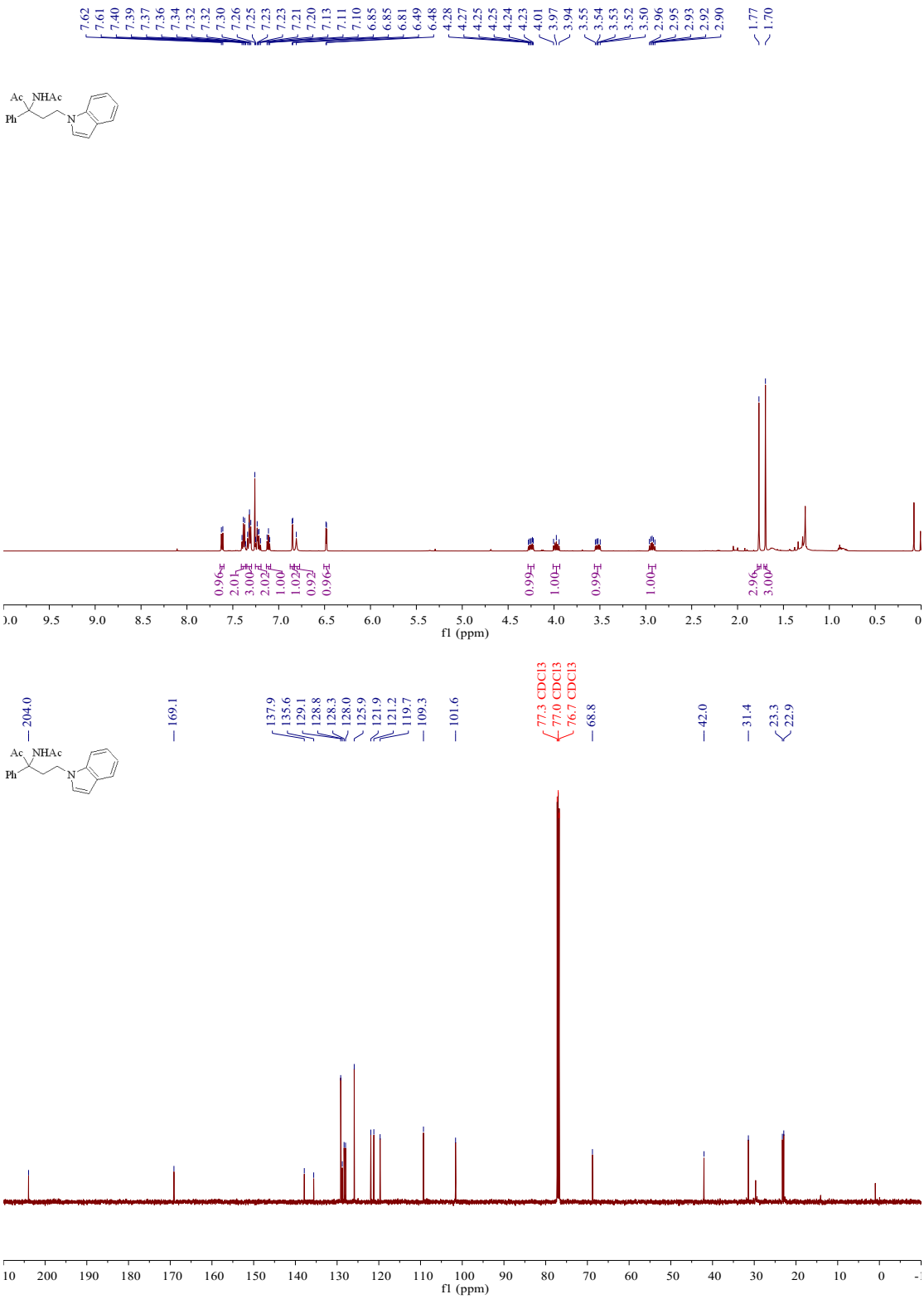
77.0 CDCl3
76.7 CDCl3
68.7
42.1
30.6
23.9
23.6
f1 (ppm)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7.23
7.21
7.20
7.13
7.11
7.10
6.85
6.85
6.81
6.49
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4.28
4.27
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4.23
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3.53
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2.93
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2.90
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1.70
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NHAc
Ph
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2.02
1.00
1.02
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135.6
129.1
128.8
128.3
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109.3
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76.7 CDCl3
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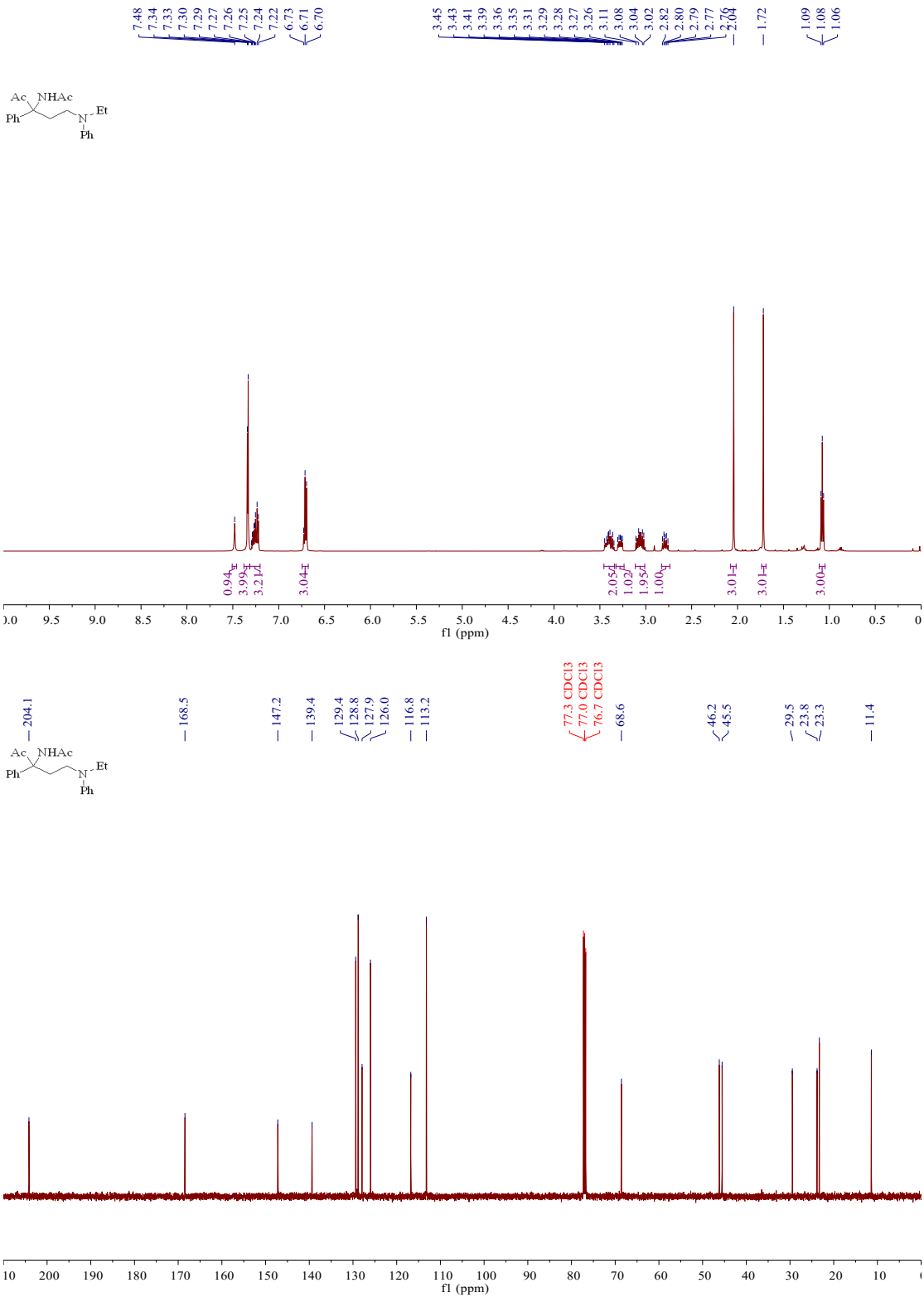
f1 (ppm)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1.09
1.08
1.06
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NHAc
Ph
N
Et
Ph
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2.05
1.02
1.95
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3.01
3.01
3.00
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147.2
139.4
129.4
128.8
127.9
126.0
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77.3 CDCl3
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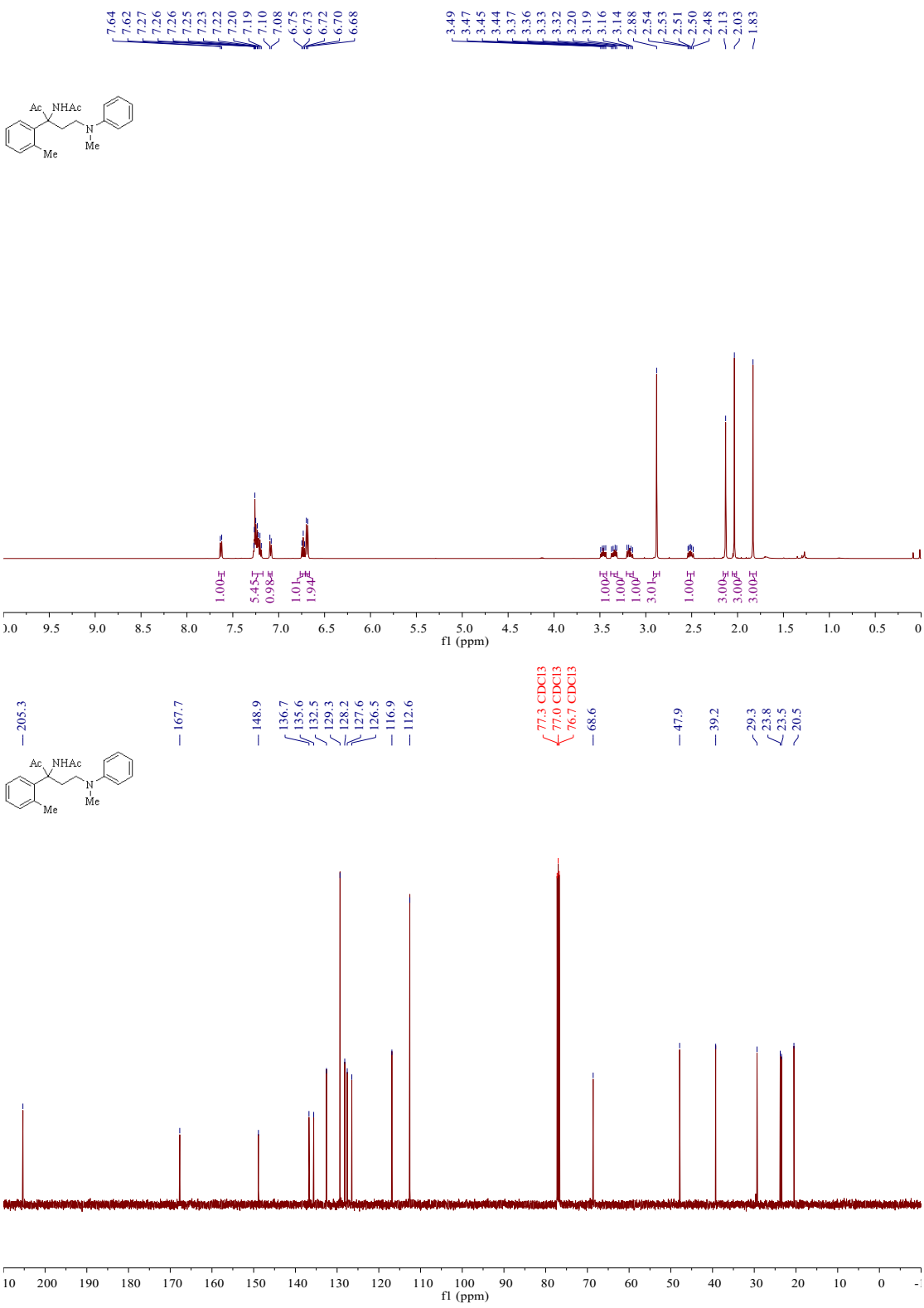
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6.70
6.68
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3.47
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3.36
3.33
3.32
3.20
3.19
3.16
3.14
2.88
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2.03
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Me
Me
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3.01
1.00
3.00
3.00
3.00
f1 (ppm)
205.3
167.7
148.9
136.7
135.6
132.5
129.3
128.2
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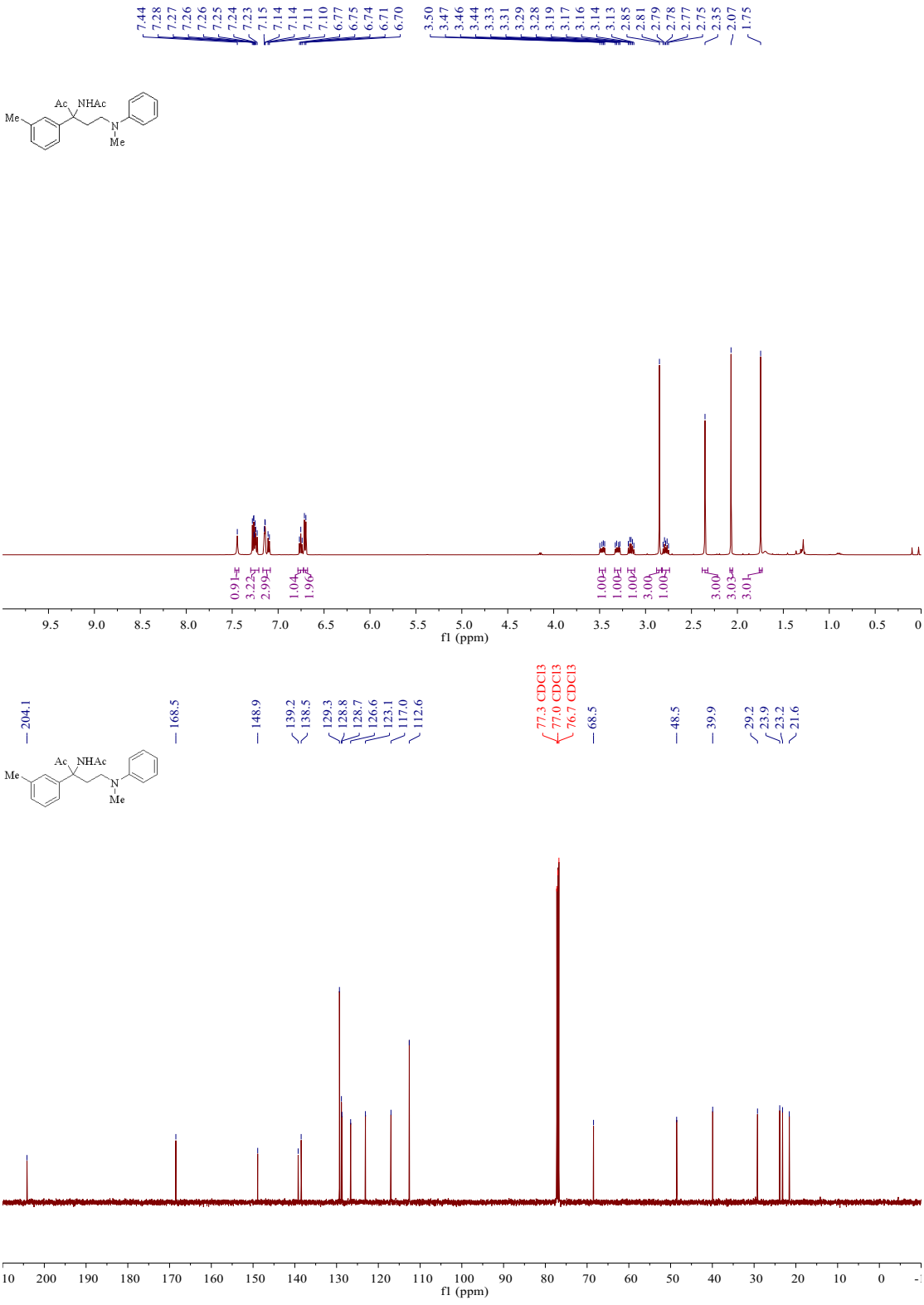
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6.75
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1.00
3.00
1.00
3.00
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3.01
f1 (ppm)
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148.9
139.2
138.5
129.3
128.8
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123.1
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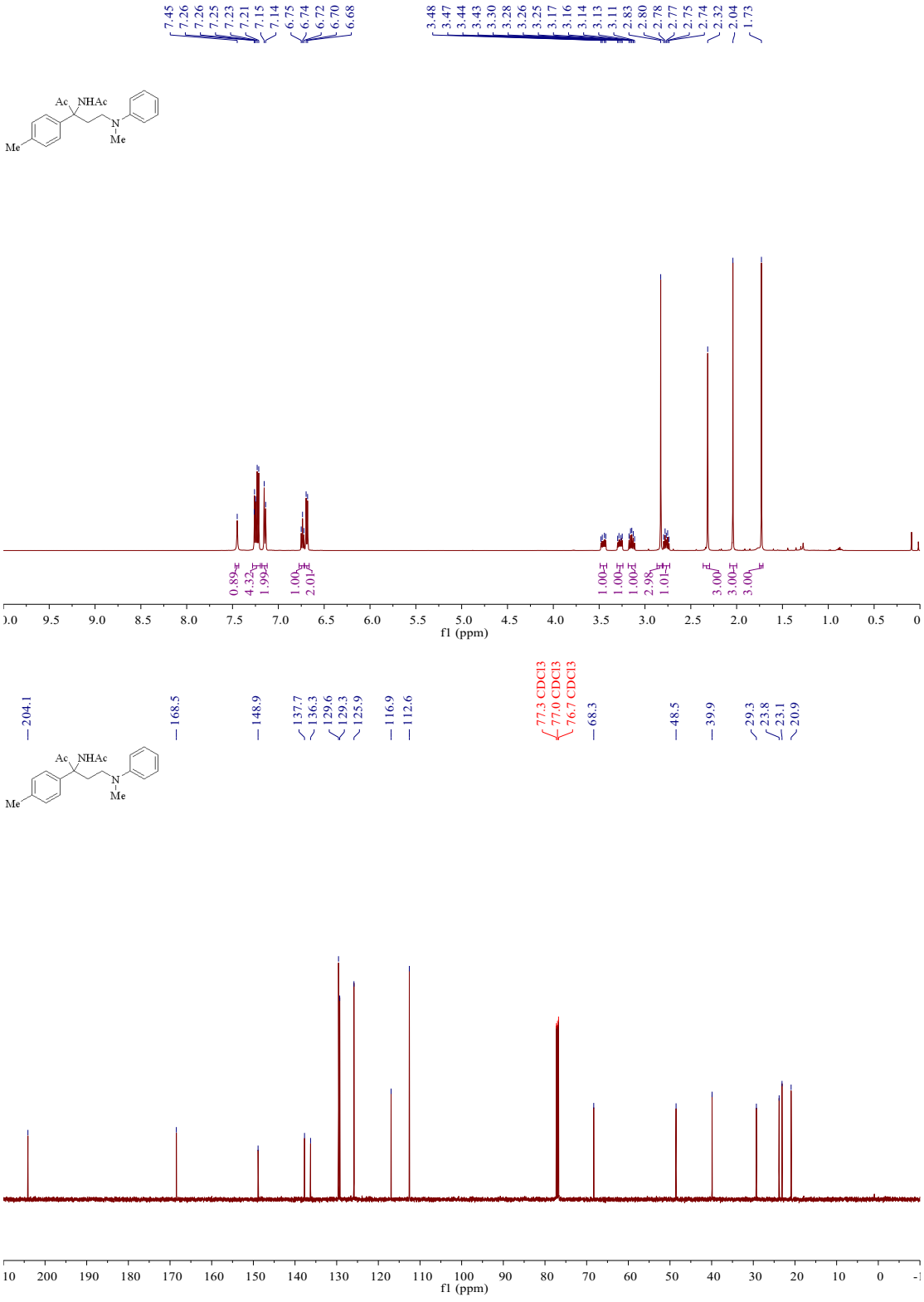
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3.13
3.11
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3.00
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136.3
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129.3
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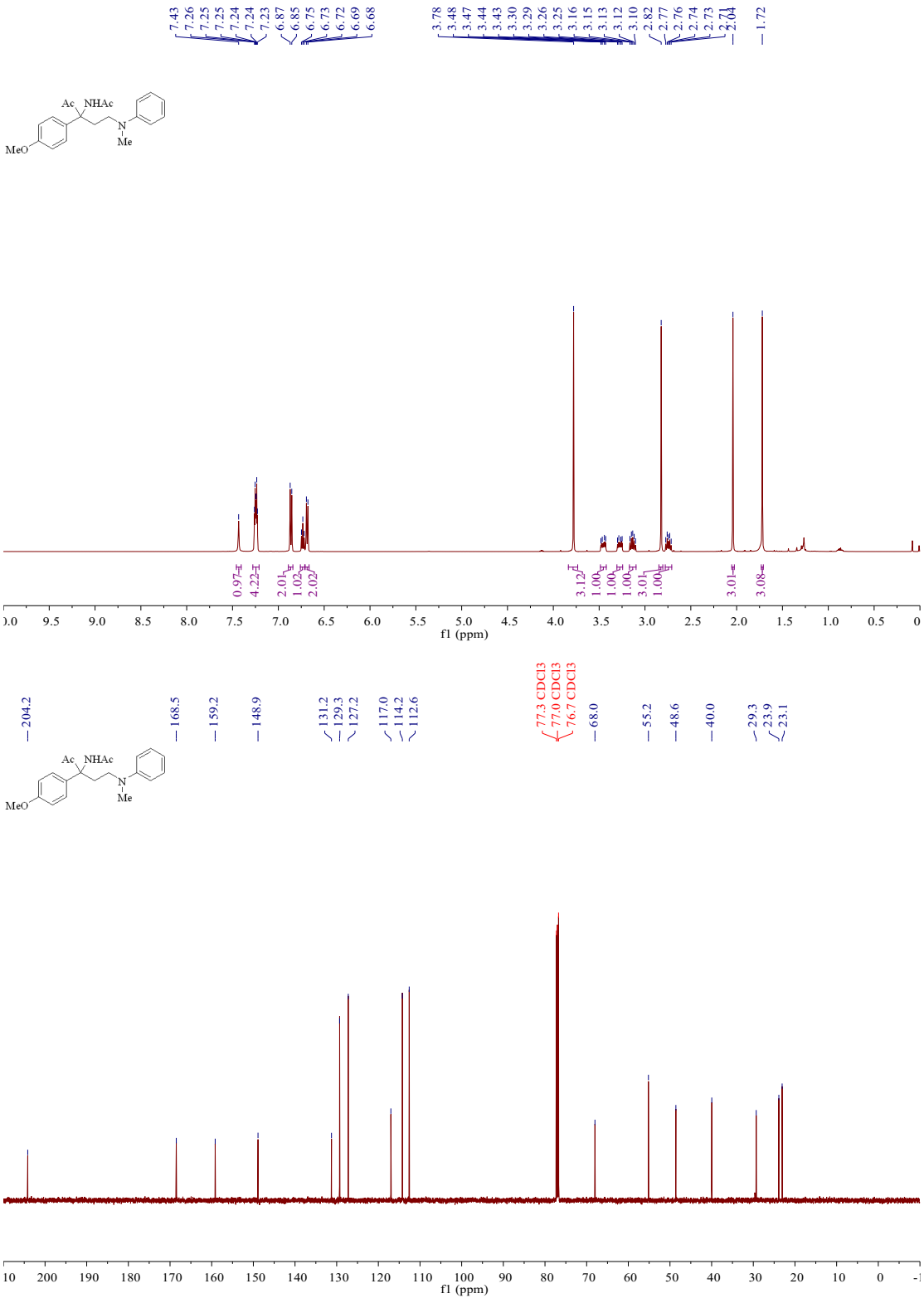
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3.78
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3.43
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3.29
3.26
3.25
3.16
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3.13
3.12
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2.82
2.77
2.76
2.74
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2.71
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Me
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2.02
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3.01
3.08
f1 (ppm)
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129.3
127.2
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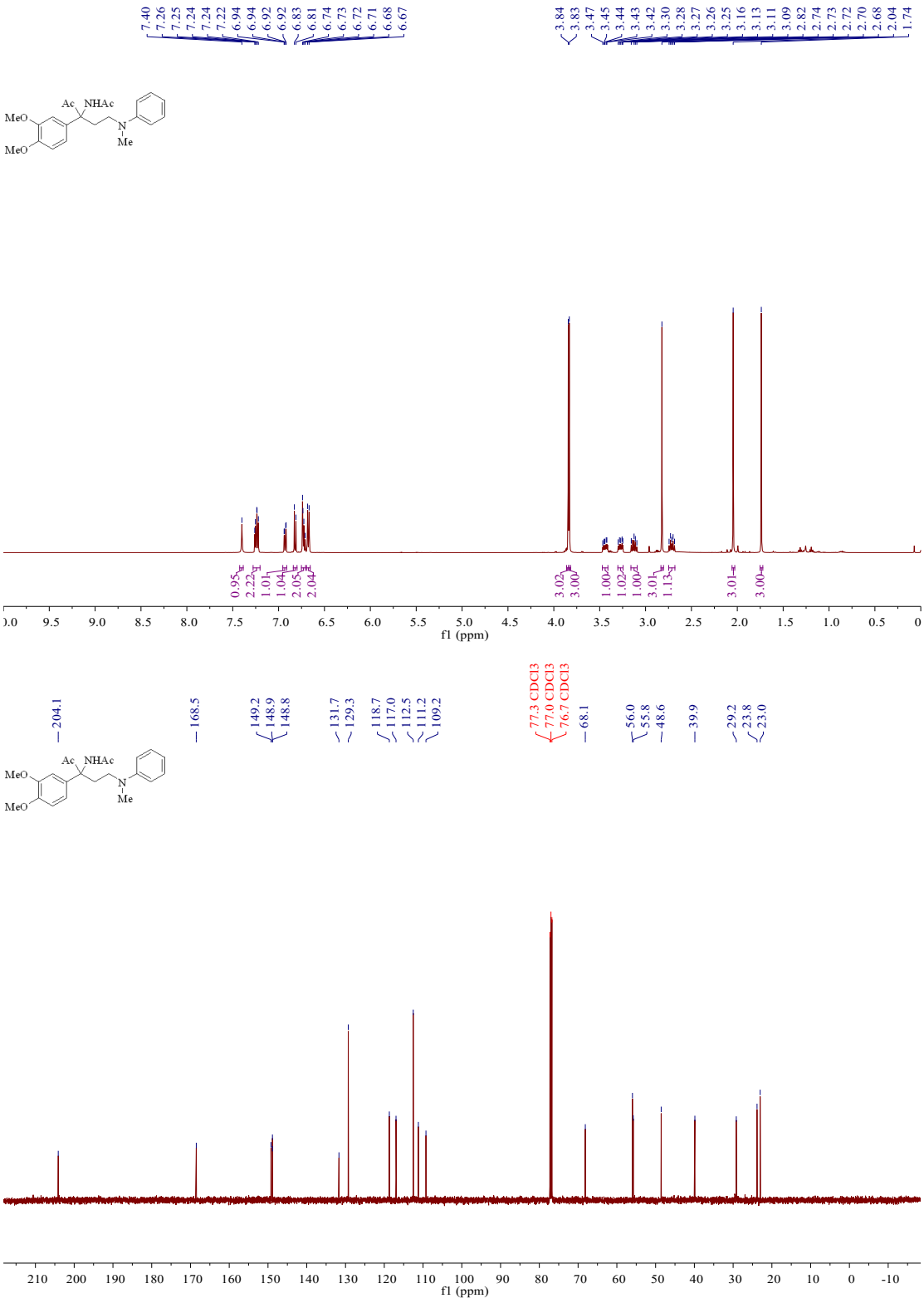
f1 (ppm)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3.11
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MeO
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Me
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1.04
2.05
2.04
3.02
3.00
1.00
1.02
1.00
3.01
1.13
3.01
3.00
f1 (ppm)
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168.5
149.2
148.9
148.8
131.7
129.3
118.7
117.0
112.5
111.2
109.2
77.3 CDCl3
77.0 CDCl3
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55.8
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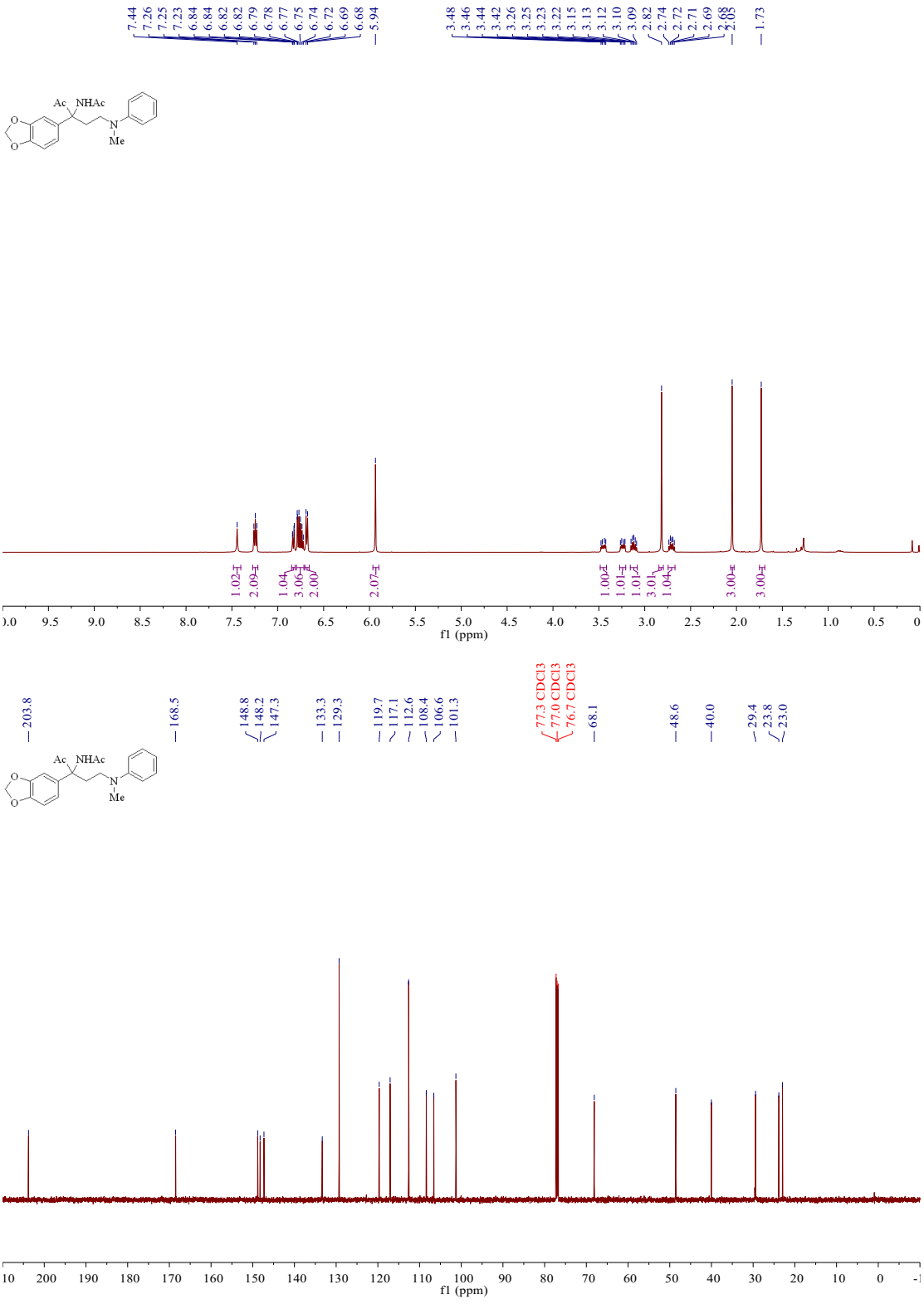
23.8
23.0
f1 (ppm)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6.69
6.68
5.94
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3.46
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3.23
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3.09
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2.71
2.69
2.68
2.65
1.73
Ac
NHAc
N
Me
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3.06
2.00
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1.01
1.01
3.01
1.04
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3.00
f1 (ppm)
203.8
168.5
148.8
148.2
147.3
133.3
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108.4
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76.7 CDCl3
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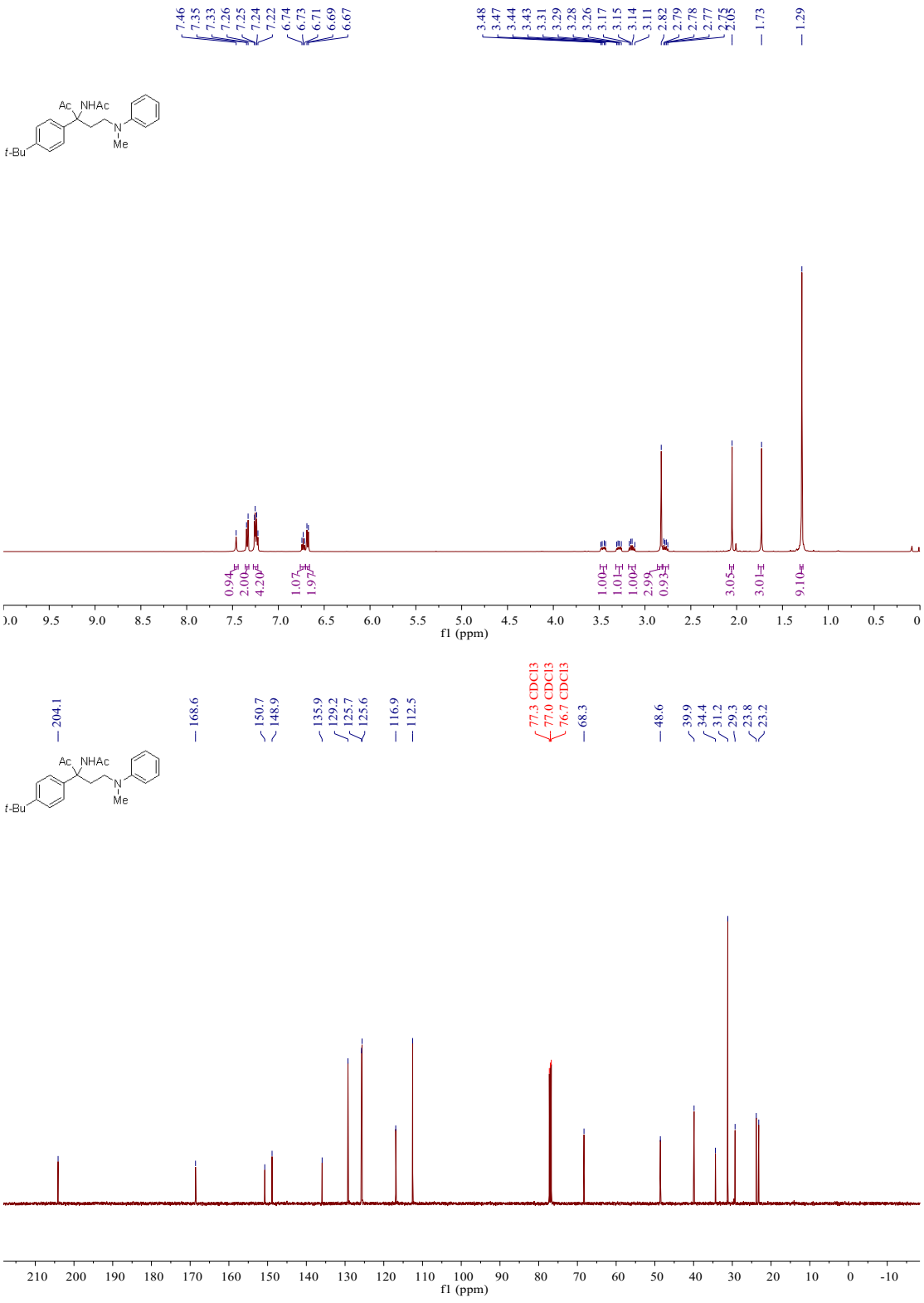
23.0
f1 (ppm)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Me
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1.00
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9.10
f1 (ppm)
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125.6
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77.3 CDCl3
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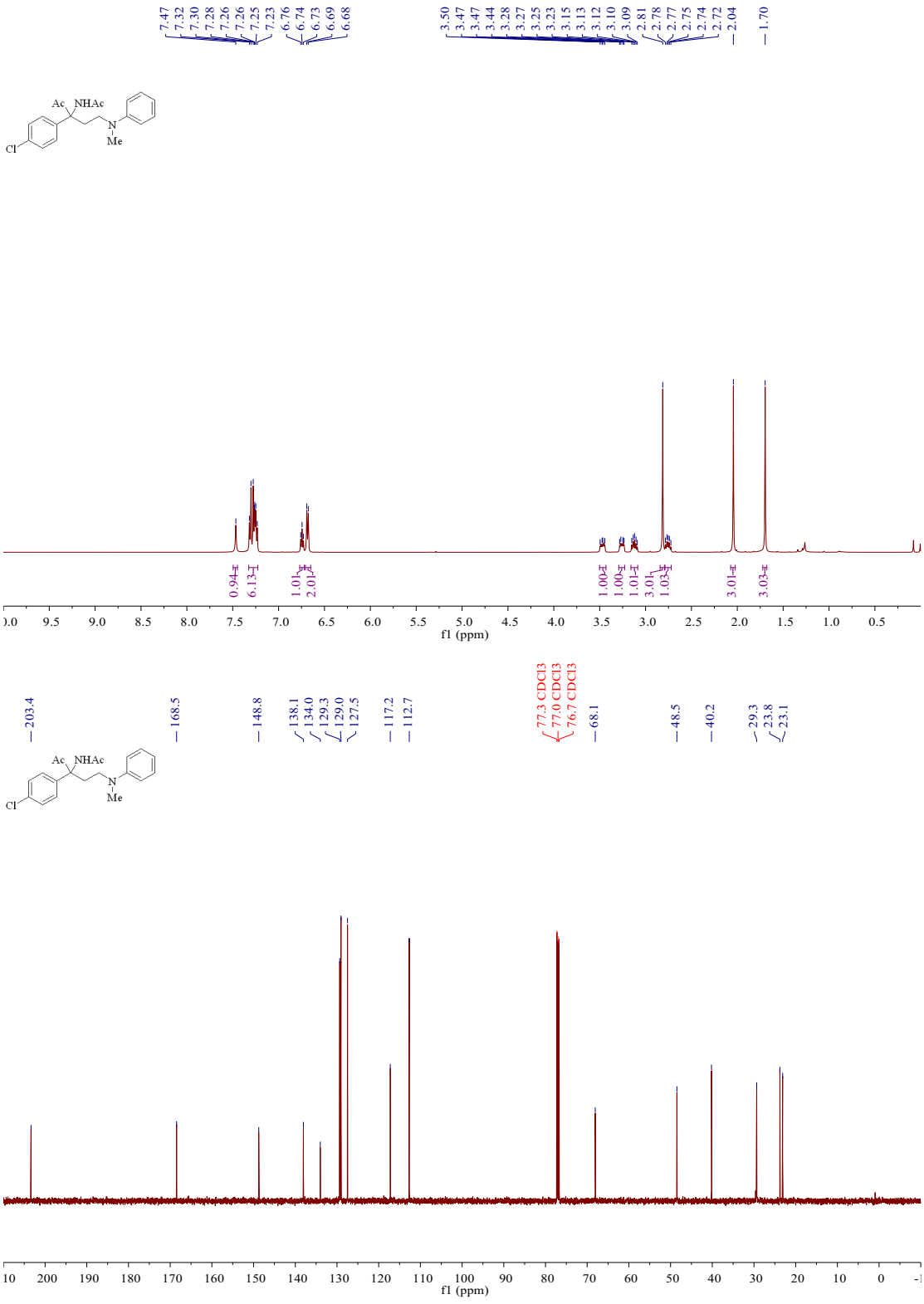
23.2
f1 (ppm)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3.15
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2.75
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N
Me
Cl
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6.13
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2.01
1.00
1.00
1.01
3.01
1.03
3.01
3.03
f1 (ppm)
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168.5
148.8
138.1
134.0
129.3
129.0
127.5
117.2
112.7
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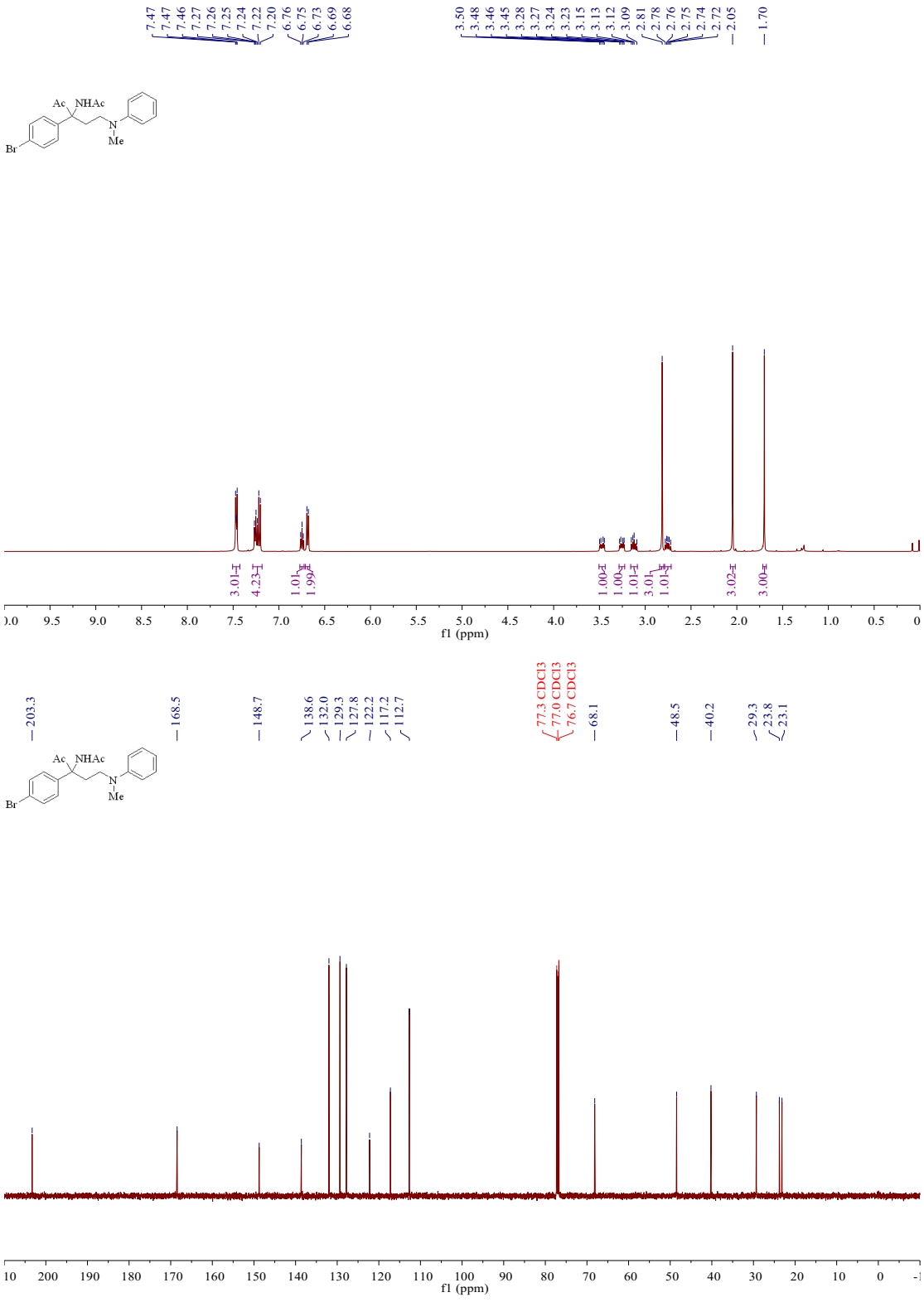
23.1
f1 (ppm)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2.76
2.75
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Me
Br
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1.00
1.01
3.01
1.01
3.02
3.00
f1 (ppm)
203.3
168.5
148.7
138.6
132.0
129.3
127.8
122.2
117.2
112.7
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76.7 CDCl3
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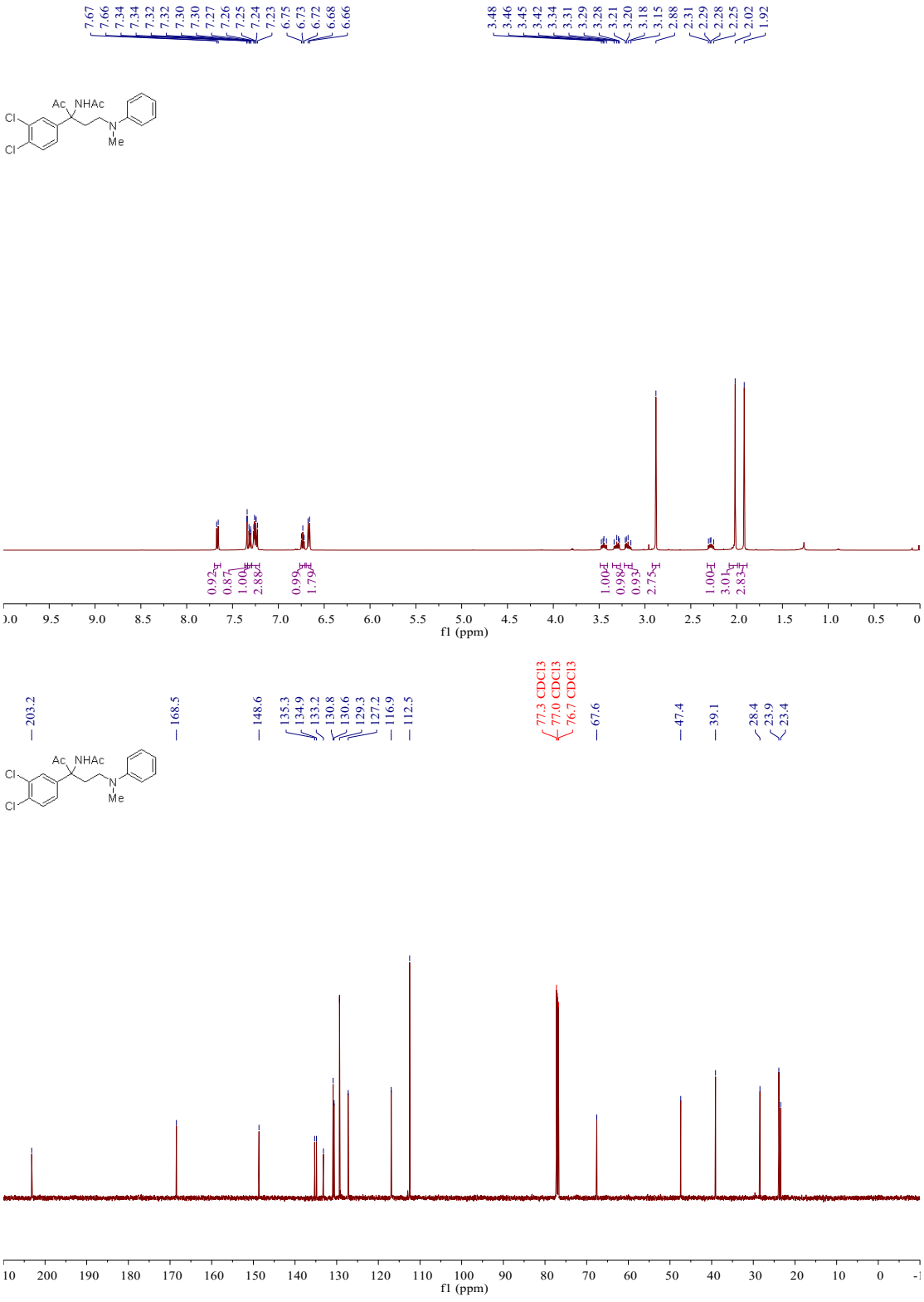
f1 (ppm)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Cl
Cl
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f1 (ppm)
203.2
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148.6
135.3
134.9
133.2
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129.3
127.2
116.9
112.5
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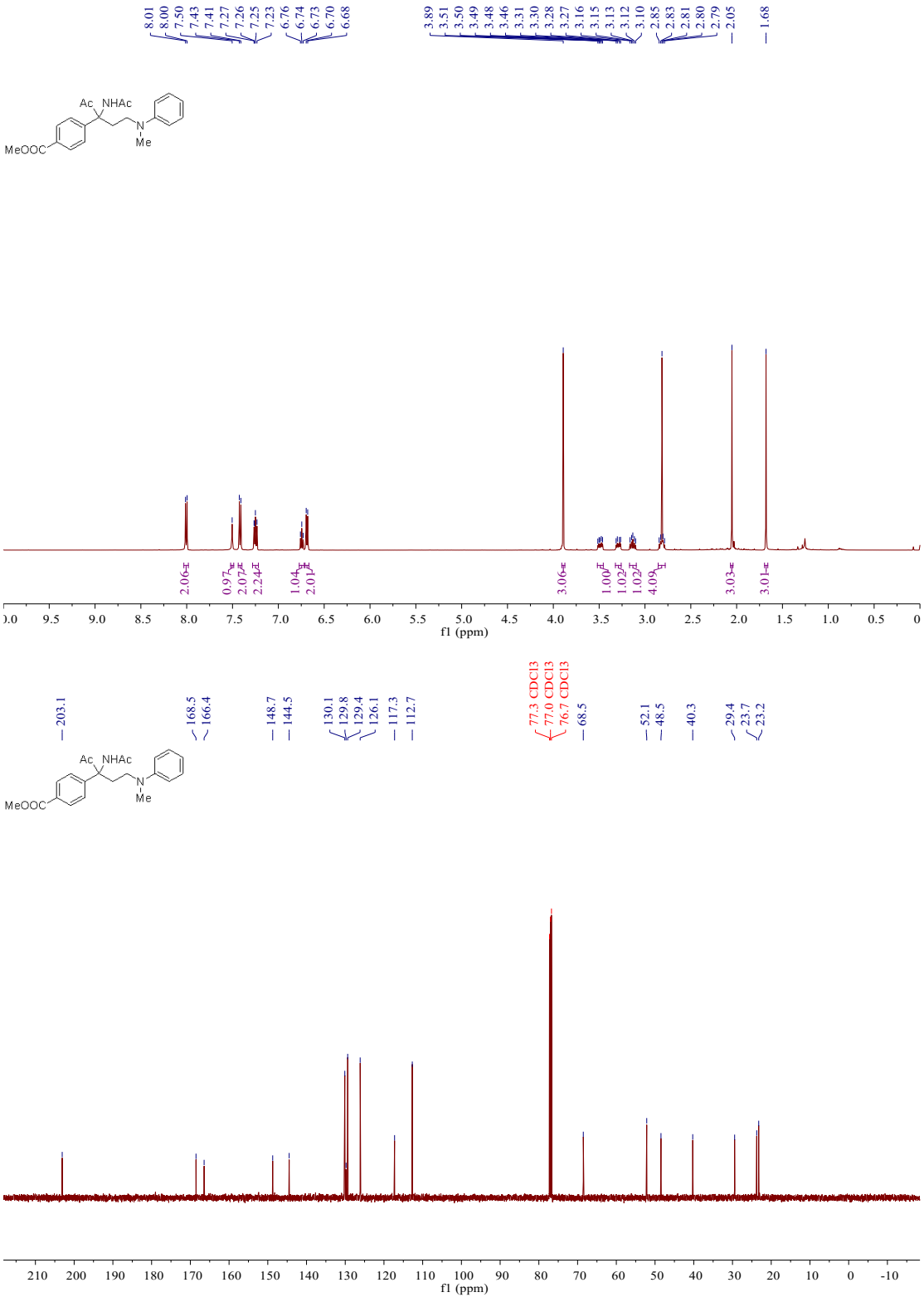
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Me
MeOOC
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1.00
1.02
1.02
4.09
3.03
3.01
f1 (ppm)
203.1
168.5
166.4
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144.5
130.1
129.8
129.4
126.1
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112.7
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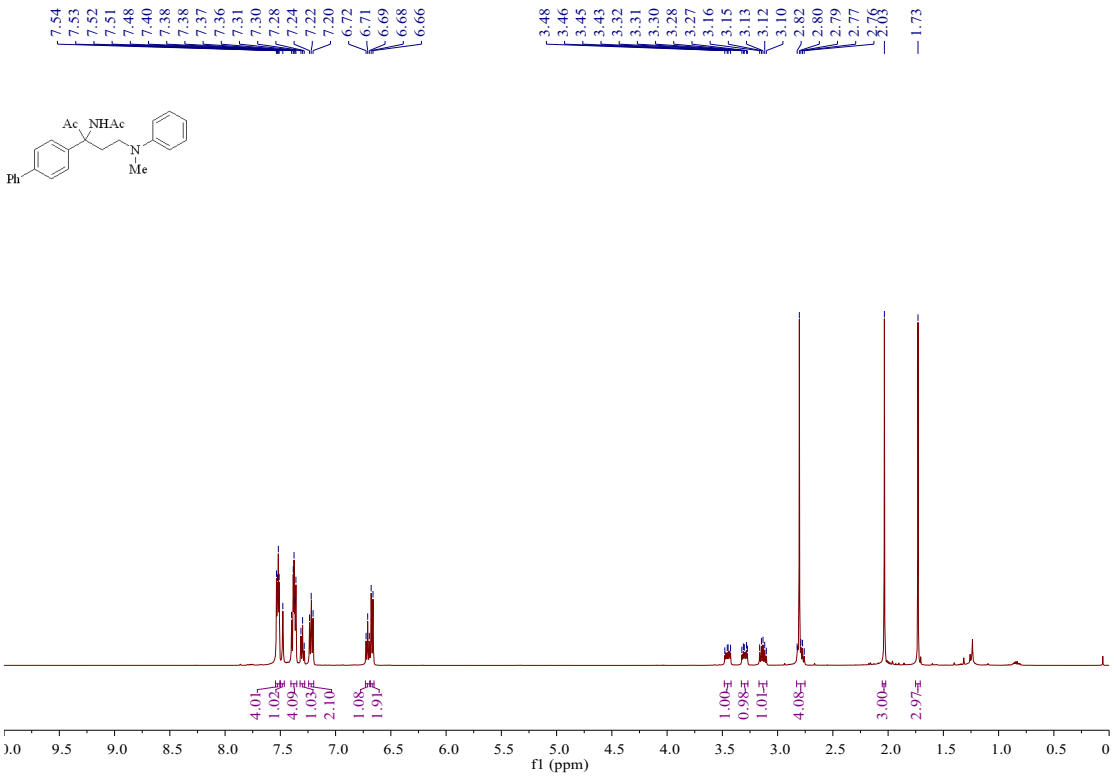
23.2
f1 (ppm)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3.43
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3.27
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3.13
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NHAc
N
Me
Ph
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1.02
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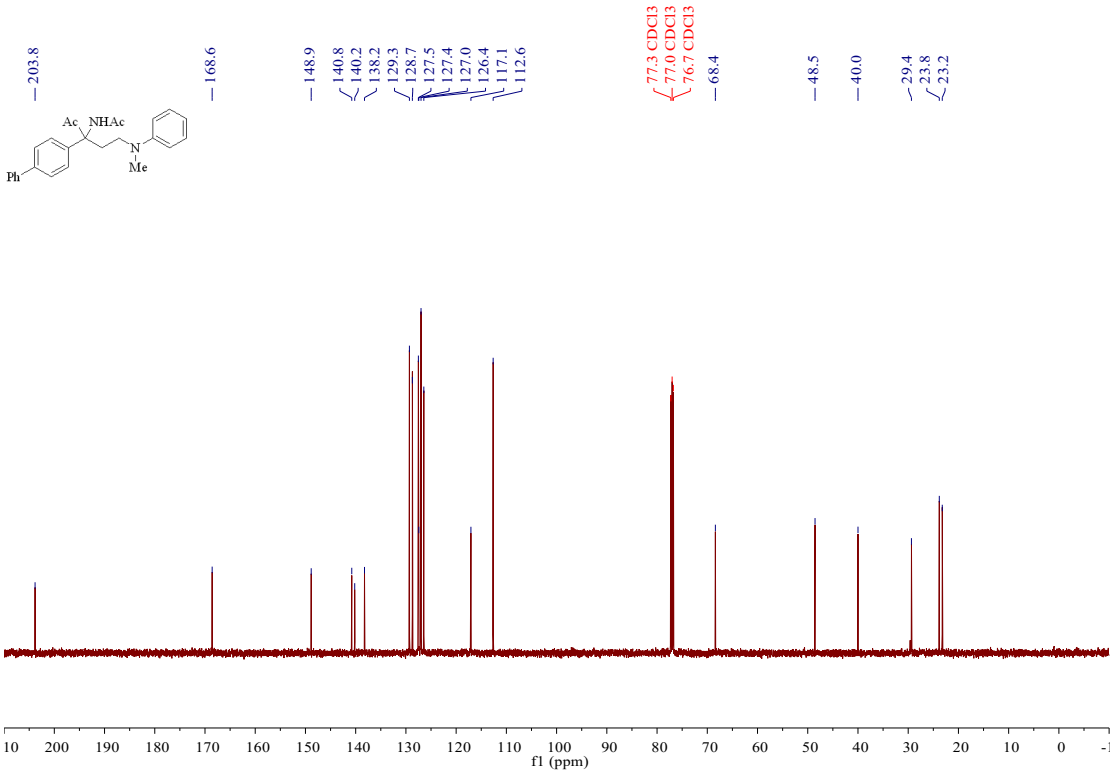
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77.3 CDCl3
77.0 CDCl3
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Ac
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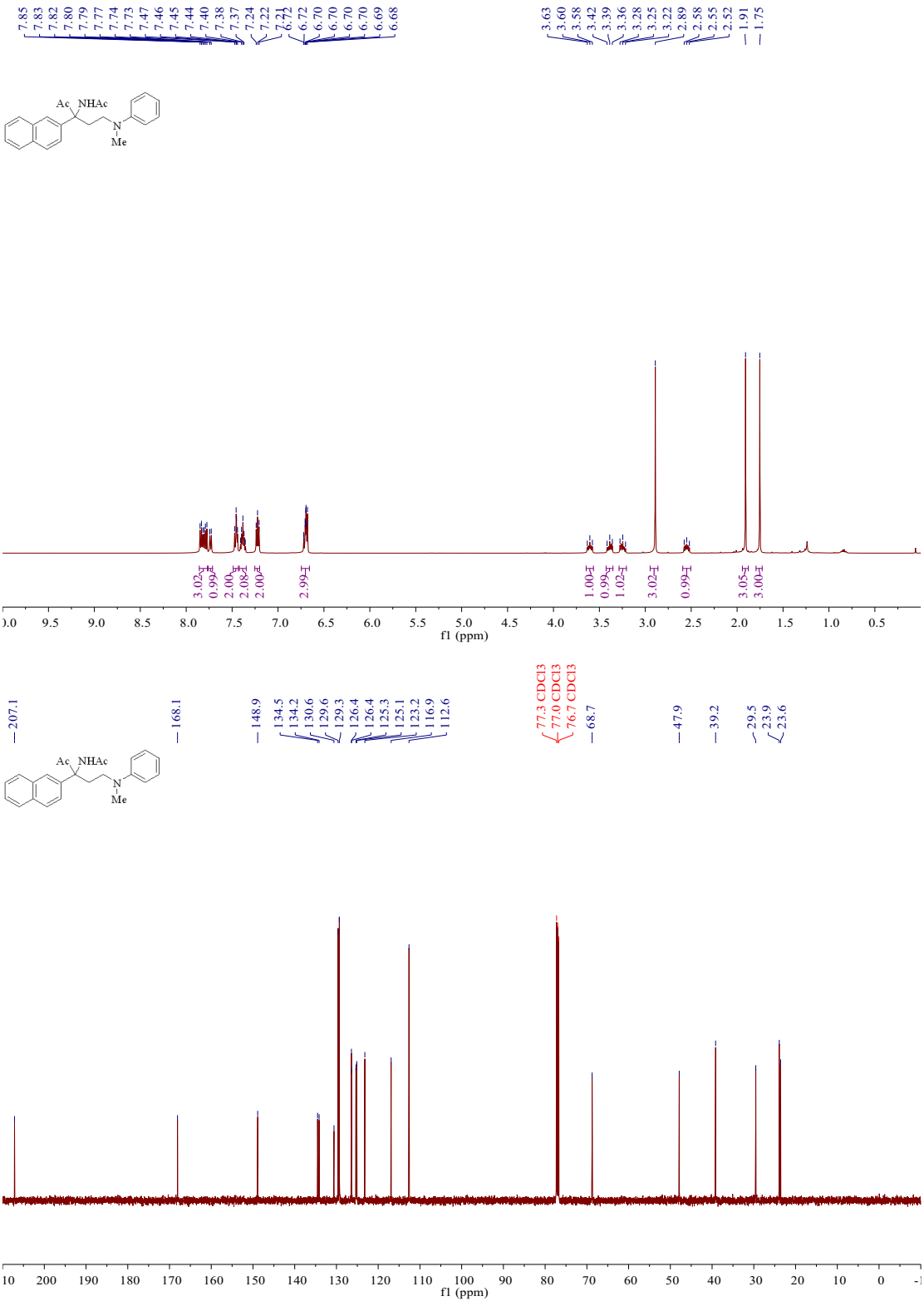
Me
Ph
f1 (ppm)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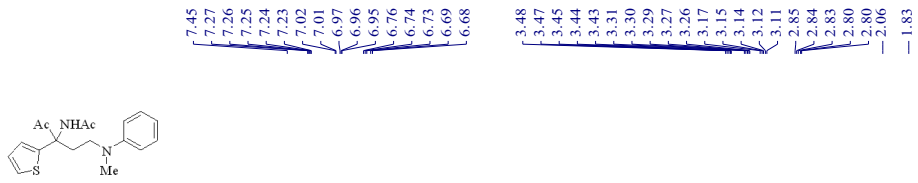
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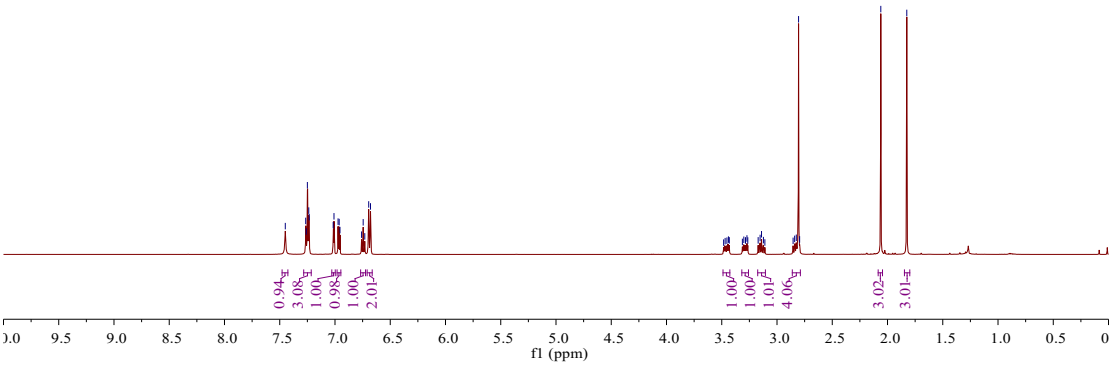
2.06
1.83


Ac
NHAc
N
Me
S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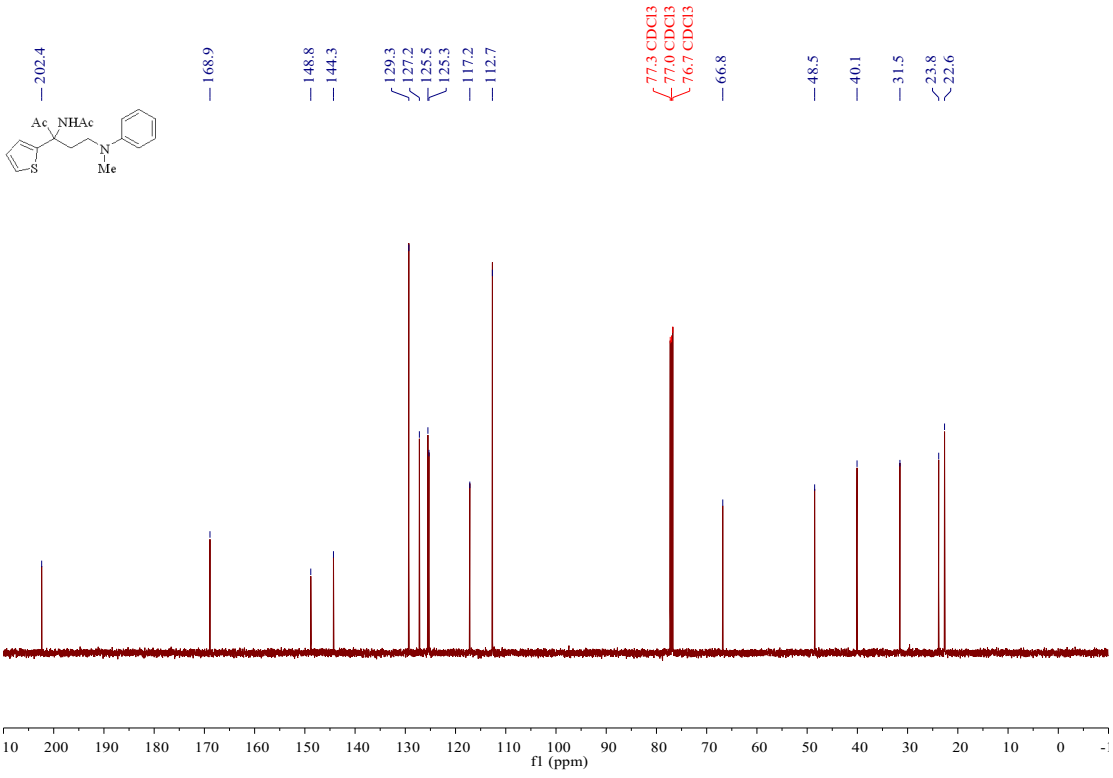
3.01
f1 (ppm)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125.3
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112.7
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
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31.5
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Ac
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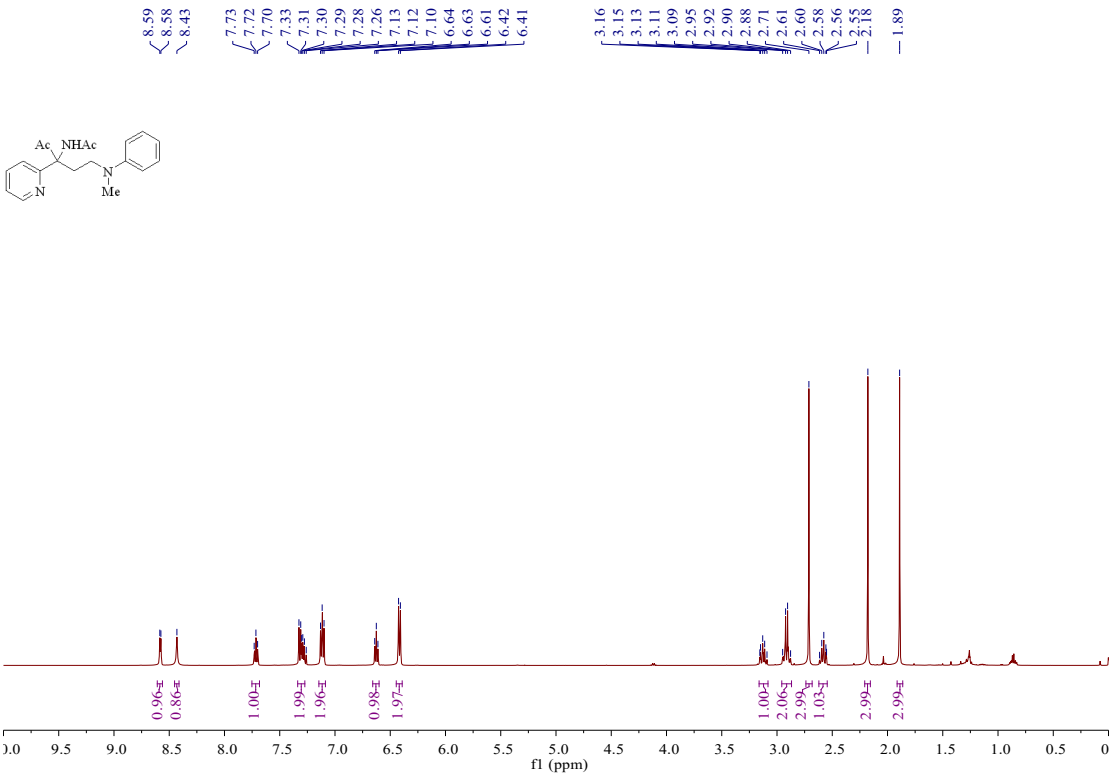
Me
S
f1 (ppm)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6.63
6.61
6.42
6.41
3.16
3.15
3.13
3.11
3.09
2.95
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2.90
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2.71
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2.60
2.58
2.56
2.55
2.18
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Me
0.96
0.86
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1.00
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2.99
1.03
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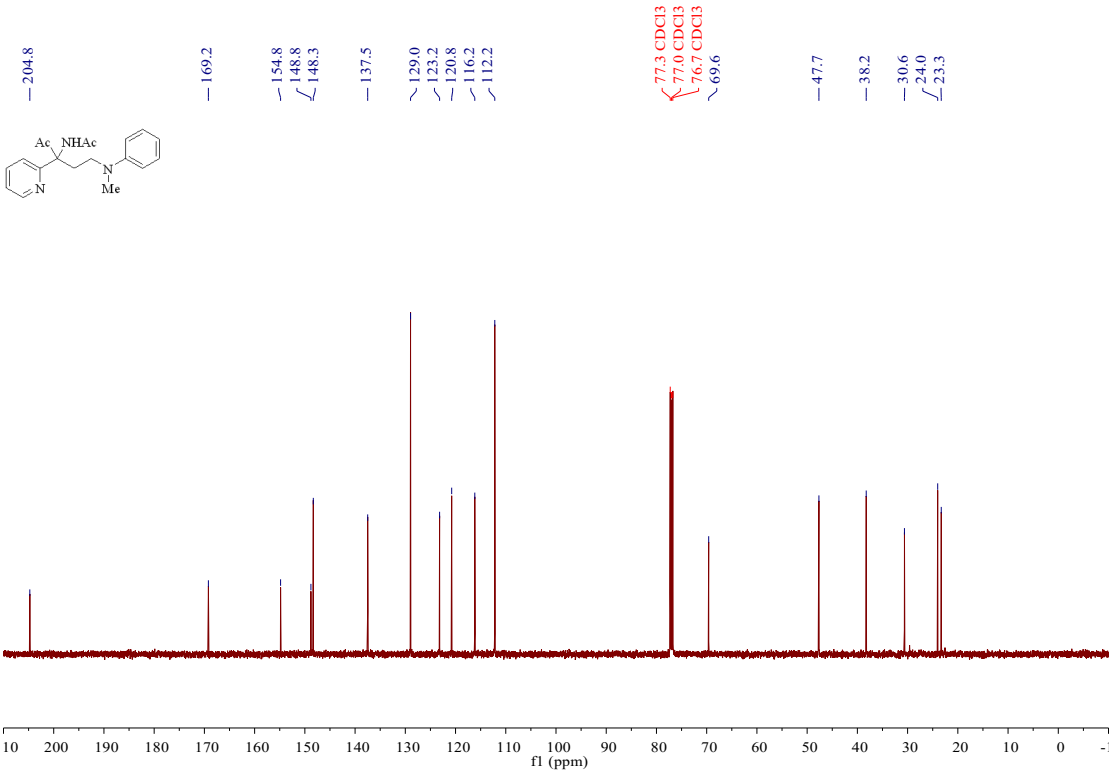
f1 (ppm)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123.2
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116.2
112.2
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
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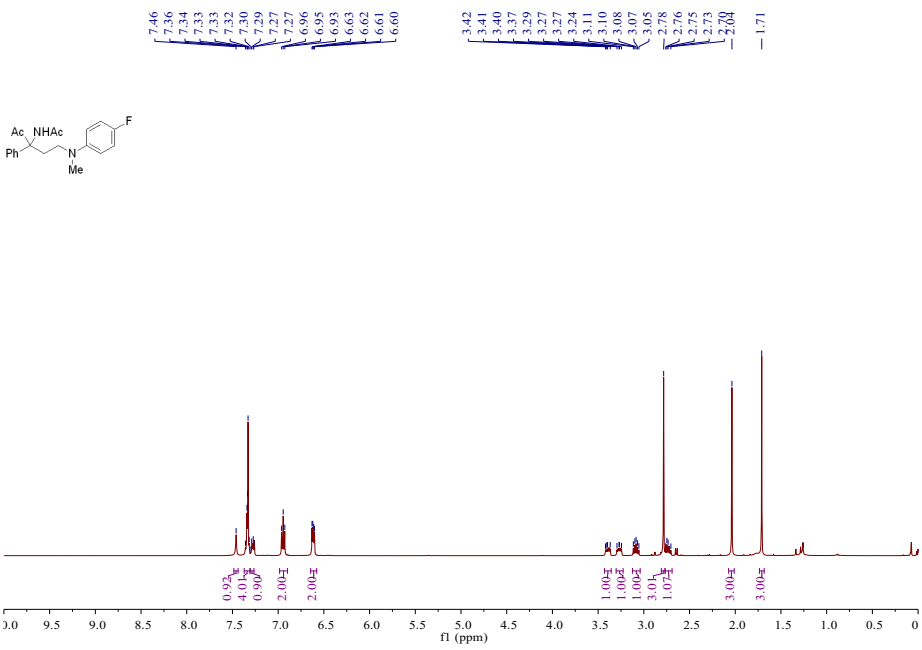
N
Me
f1 (ppm)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6.62
6.61
6.60
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3.41
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3.37
3.29
3.27
3.27
3.24
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3.10
3.08
3.07
3.05
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2.76
2.75
2.73
2.70
2.04
1.71
Ac
NHAc
Ph
N
Me
F
0.92
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1.00
1.00
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1.07
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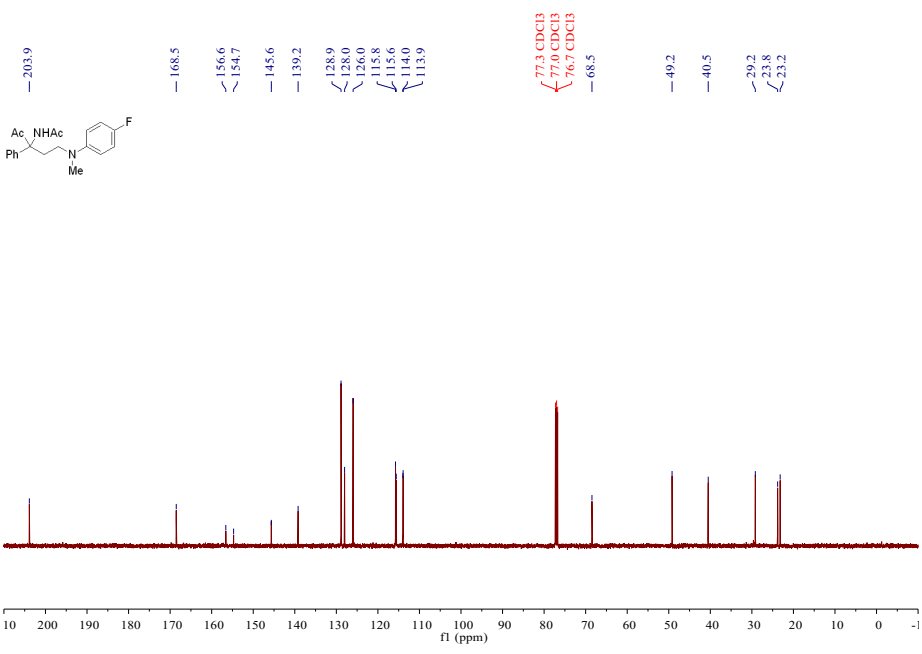
3.00
f1 (ppm)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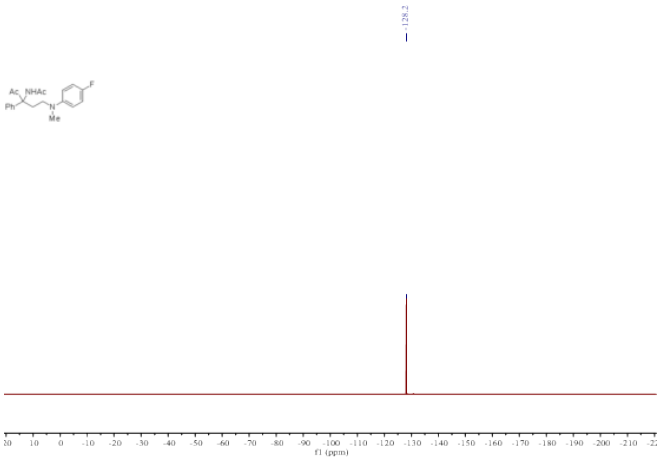
115.8
115.6
114.0
113.9
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
49.2
40.5
29.2
23.8
23.2
Ac
NHAc
Ph
N
Me
F
f1 (ppm)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Me
F
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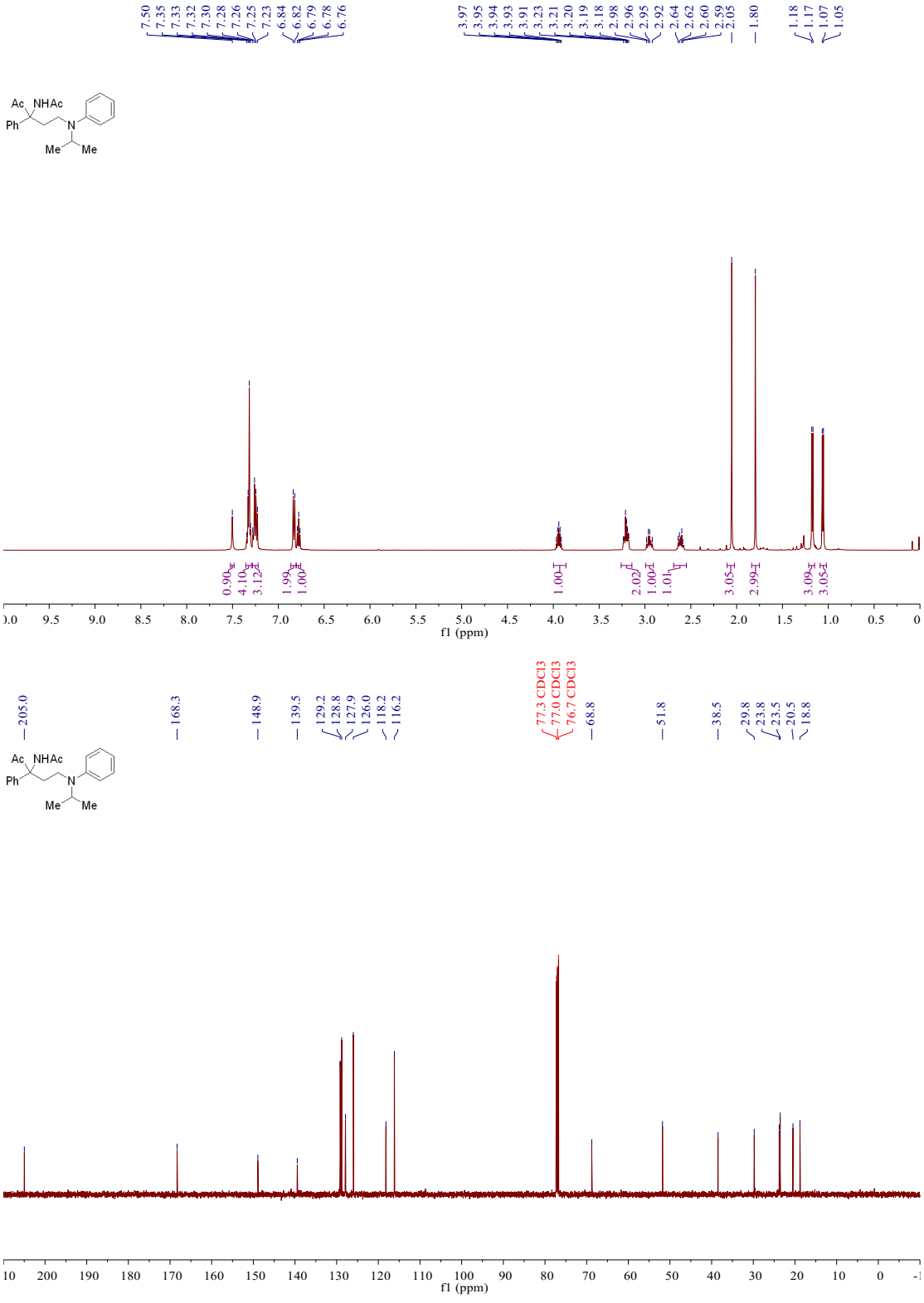
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6.82
6.79
6.78
6.76
3.97
3.95
3.94
3.93
3.91
3.23
3.21
3.20
3.19
3.18
2.98
2.96
2.95
2.92
2.64
2.62
2.60
2.59
2.05
1.80
1.18
1.17
1.07
1.05
Ac
NHAc
Ph
N
Me
Me
0.90
4.10
3.12
1.99
1.00
1.00
2.02
1.00
1.01
3.05
2.99
3.09
3.05
f1 (ppm)
205.0
168.3
148.9
139.5
129.2
128.8
127.9
126.0
118.2
116.2
77.3 CDCl3
77.0 CDCl3
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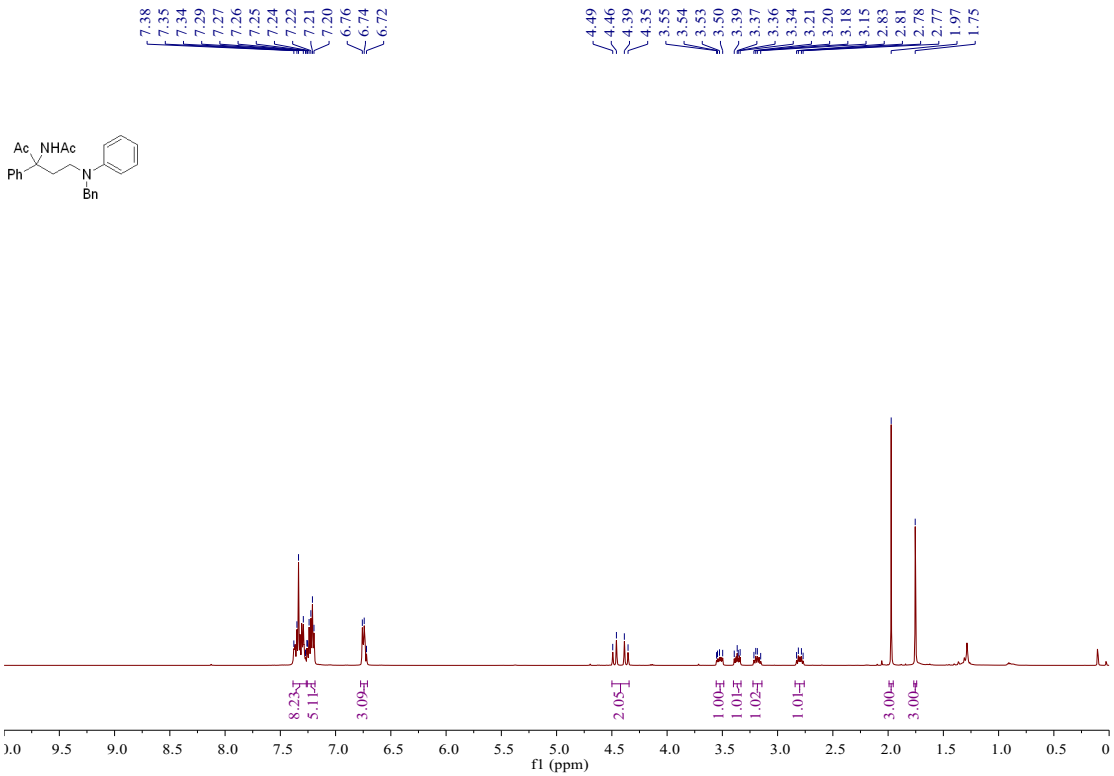
68.8
51.8
38.5
29.8
23.8
23.5
20.5
18.8
f1 (ppm)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6.74
6.72
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4.46
4.39
4.35
3.55
3.54
3.53
3.50
3.39
3.37
3.36
3.34
3.21
3.20
3.18
3.15
2.83
2.81
2.78
2.77
1.97
1.75
Ac
NHAc
Ph
N
Bn
8.23
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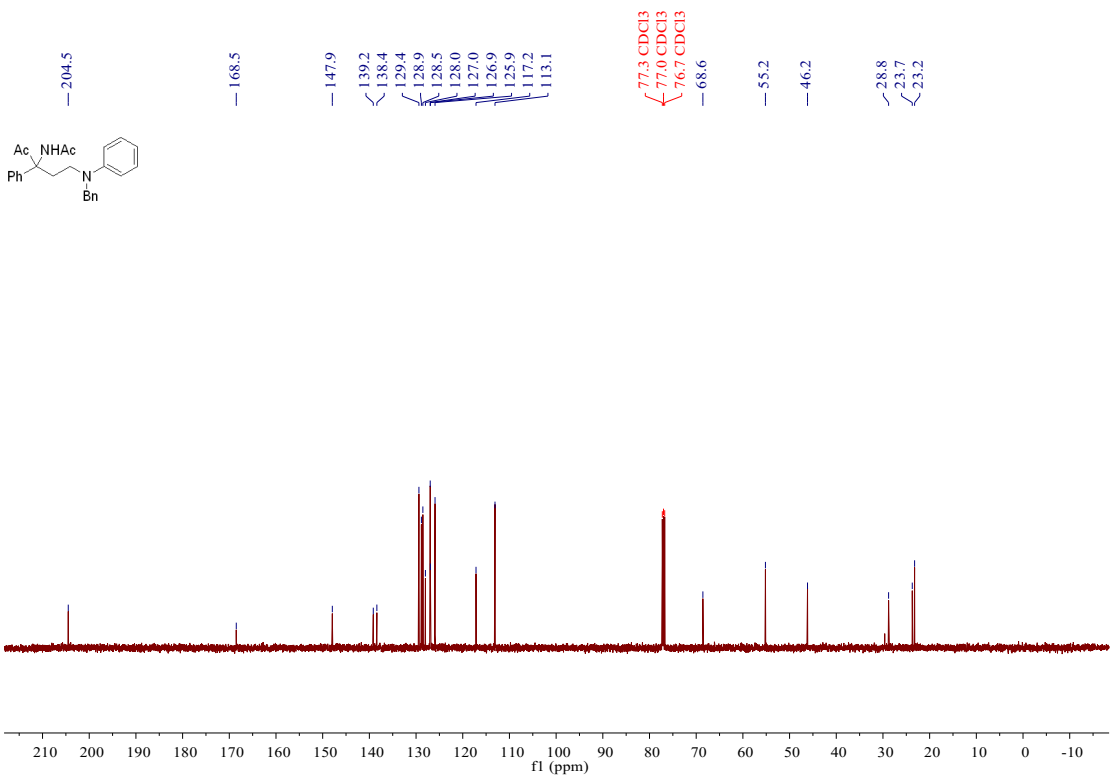
3.09
2.05
1.00
1.01
1.02
1.01
3.00
3.00
f1 (ppm)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139.2
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129.4
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128.5
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127.0
126.9
125.9
117.2
113.1
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
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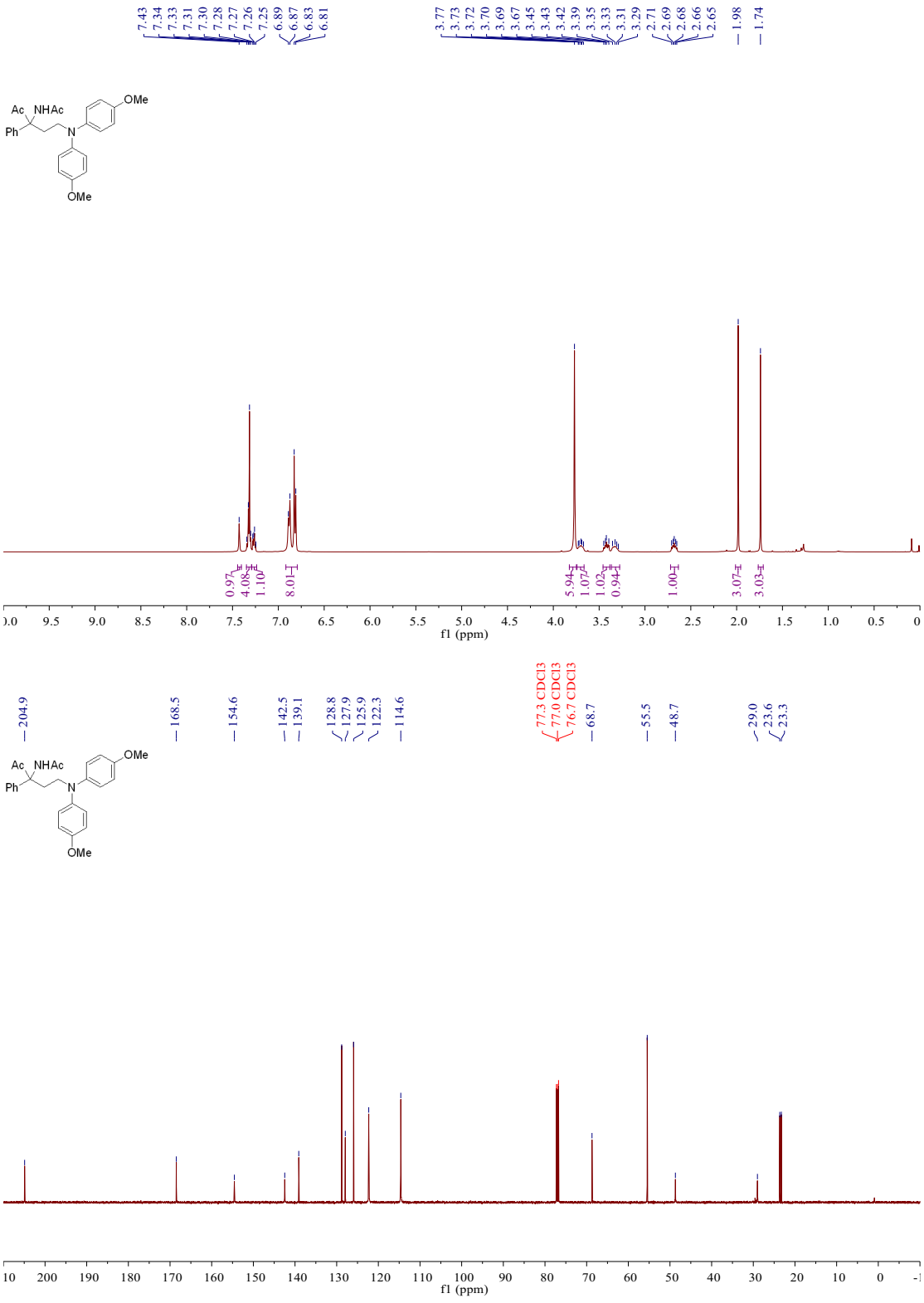
55.2
46.2
28.8
23.7
23.2
Ac
NHAc
Ph
N
Bn
f1 (ppm)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6.87
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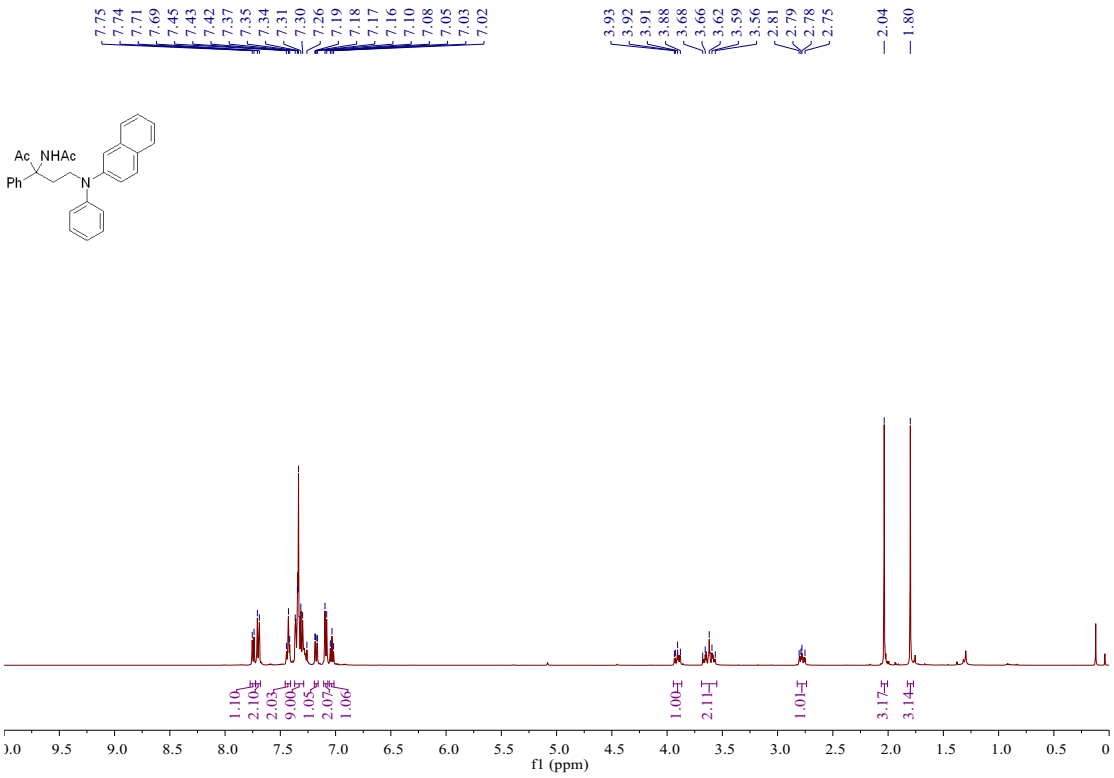
6.81
3.77
3.73
3.72
3.70
3.69
3.67
3.45
3.43
3.42
3.39
3.35
3.33
3.31
3.29
2.71
2.69
2.68
2.66
2.65
1.98
1.74
Ac
NHAc
Ph
N
OMe
OMe
0.97
4.08
1.10
8.01
5.94
1.07
1.02
0.94
1.00
3.07
3.03
f1 (ppm)
204.9
168.5
154.6
142.5
139.1
128.8
127.9
125.9
122.3
114.6
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.7
55.5
48.7
29.0
23.6
23.3
f1 (ppm)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7.19
7.18
7.17
7.16
7.10
7.08
7.05
7.03
7.02
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3.92
3.91
3.88
3.68
3.66
3.62
3.59
3.56
2.81
2.79
2.78
2.75
2.04
1.80
Ac
NHAc
Ph
N
1.10
2.10
2.03
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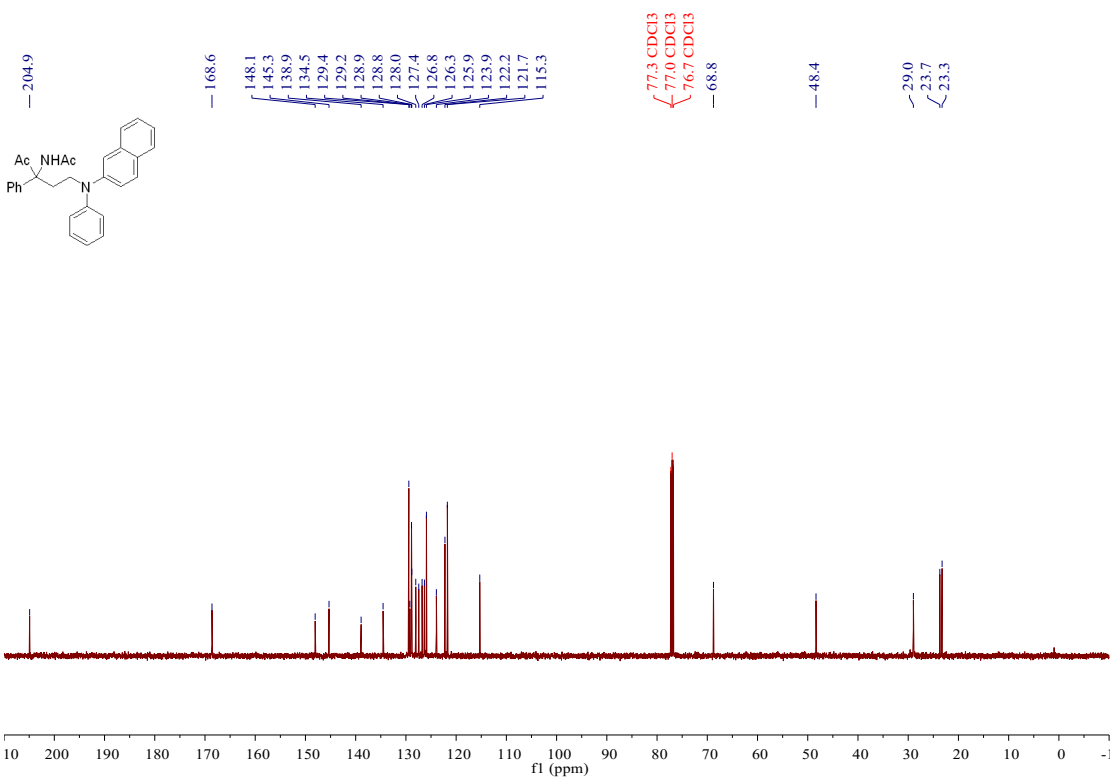
1.05
2.07
1.06
1.00
2.11
1.01
3.17
3.14
f1 (ppm)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129.4
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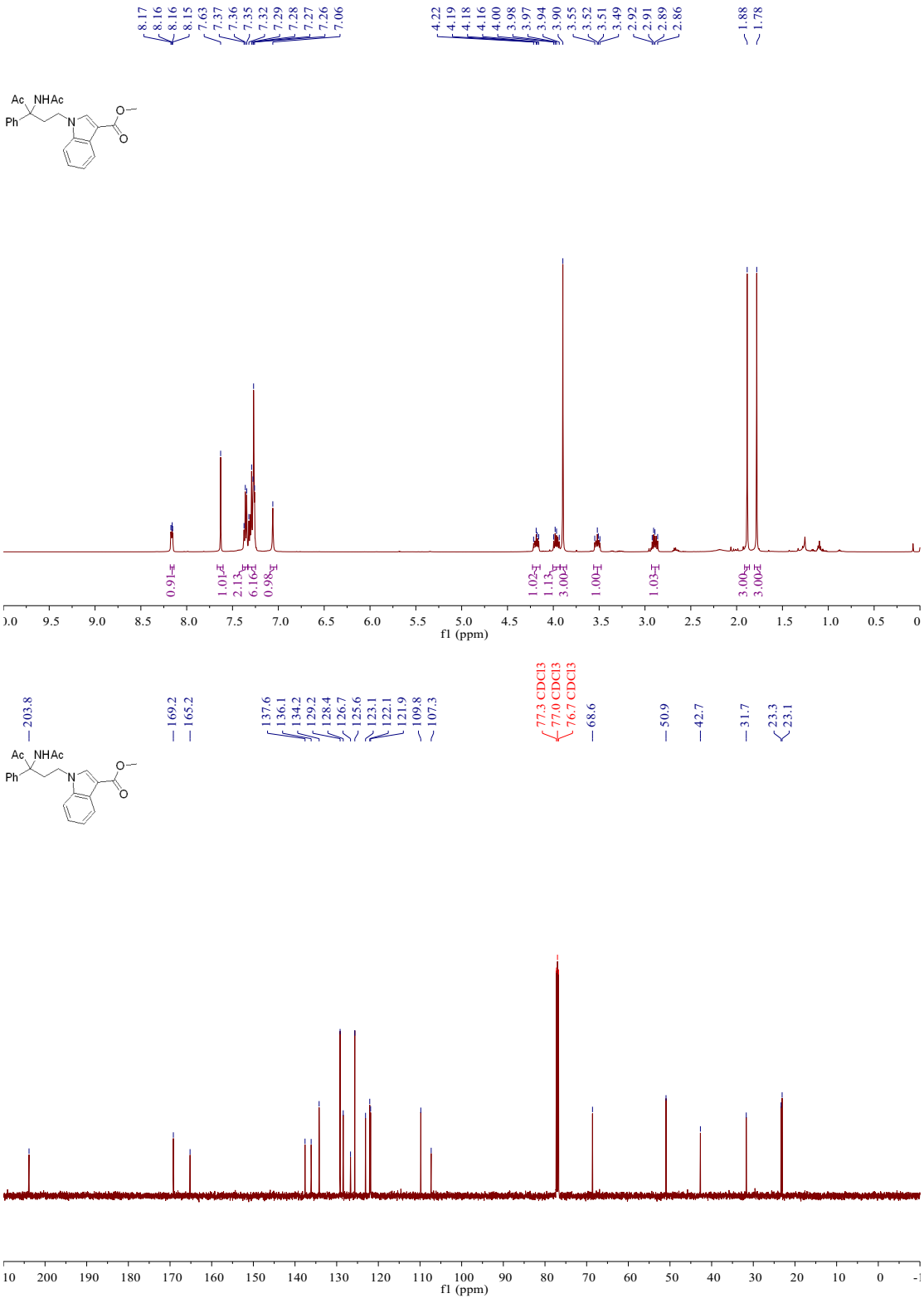
128.8
128.0
127.4
126.8
126.3
125.9
123.9
122.2
121.7
115.3
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.8
48.4
29.0
23.7
23.3
Ac
NHAc
Ph
N
f1 (ppm)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7.35
7.32
7.29
7.28
7.27
7.26
7.06
4.22
4.19
4.18
4.16
4.00
3.98
3.97
3.94
3.90
3.55
3.52
3.51
3.49
2.92
2.91
2.89
2.86
1.88
1.78
Ac
NHAc
Ph
N
O
O
0.91
1.01
2.13
6.16
0.98
1.02
1.13
3.00
1.00
1.03
3.00
3.00
f1 (ppm)
203.8
169.2
165.2
137.6
136.1
134.2
129.2
128.4
126.7
125.6
123.1
122.1
121.9
109.8
107.3
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.6
50.9
42.7
31.7
23.3
23.1
f1 (ppm)


7.49
7.36
7.33
7.29
7.28
7.26
7.09
7.07
7.06
6.97
6.95
6.63
6.62
6.59
6.58
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3.35
3.32
3.29
3.27
3.22
3.21
3.20
3.18
3.11
3.10
3.08
3.05
2.86
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2.04
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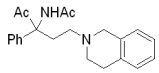
1.84
1.81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Ph
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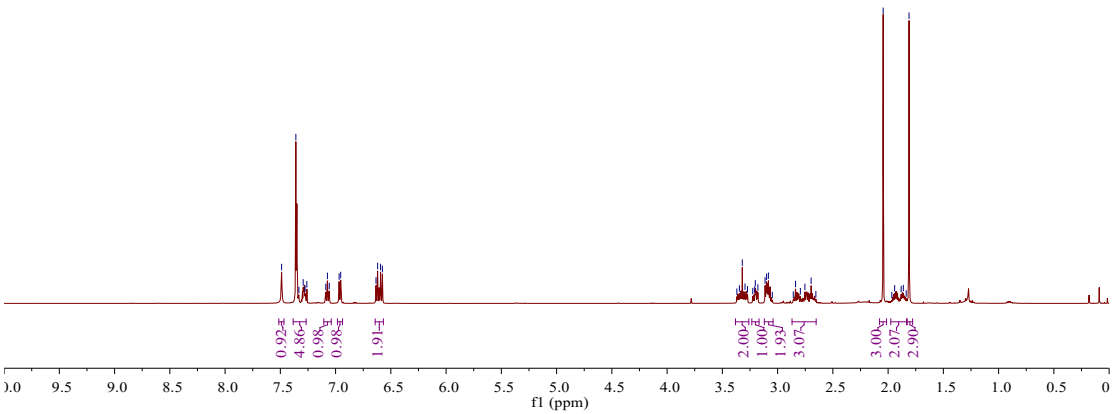
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0.98
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1.00
1.93
3.07
3.00
2.07
2.90
f1 (ppm)


204.3
168.5
145.1
139.4
129.3
128.8
128.0
127.1
126.0
123.4
116.5
110.8
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
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50.3
47.4
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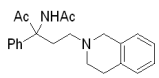
23.3
21.7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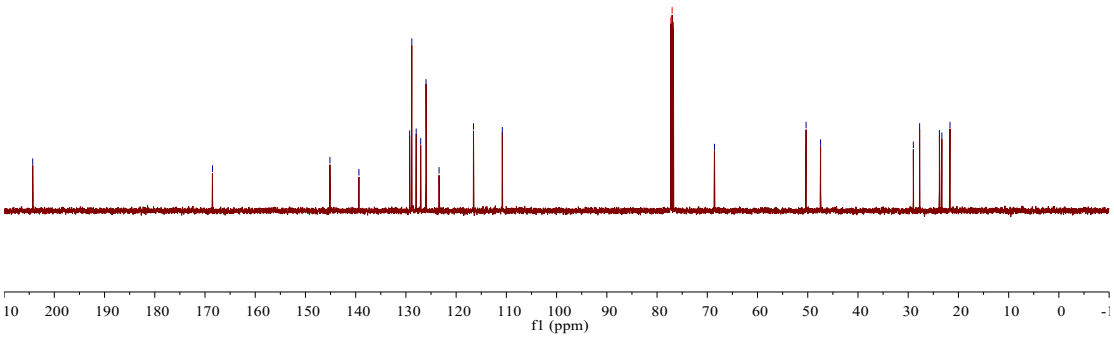
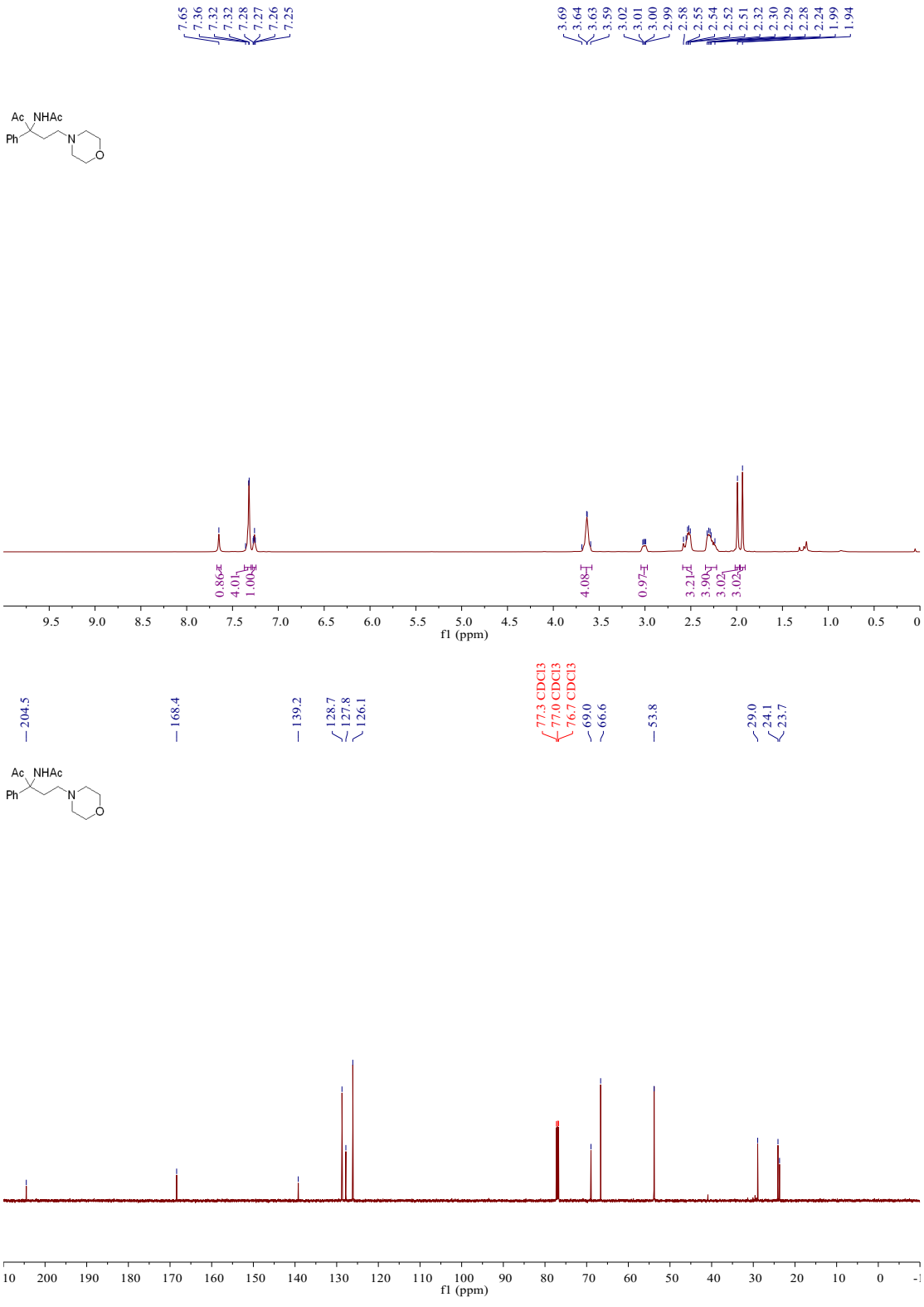

f1 (ppm)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3.02
3.01
3.00
2.99
2.58
2.55
2.54
2.52
2.51
2.32
2.30
2.29
2.28
2.24
1.99
1.94
Ac NHAc
Ph
N
O
0.86
4.01
1.00
4.08
0.97
3.21
3.90
3.02
3.02
f1 (ppm)
204.5
168.4
139.2
128.7
127.8
126.1
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77.0 CDCl3
76.7 CDCl3
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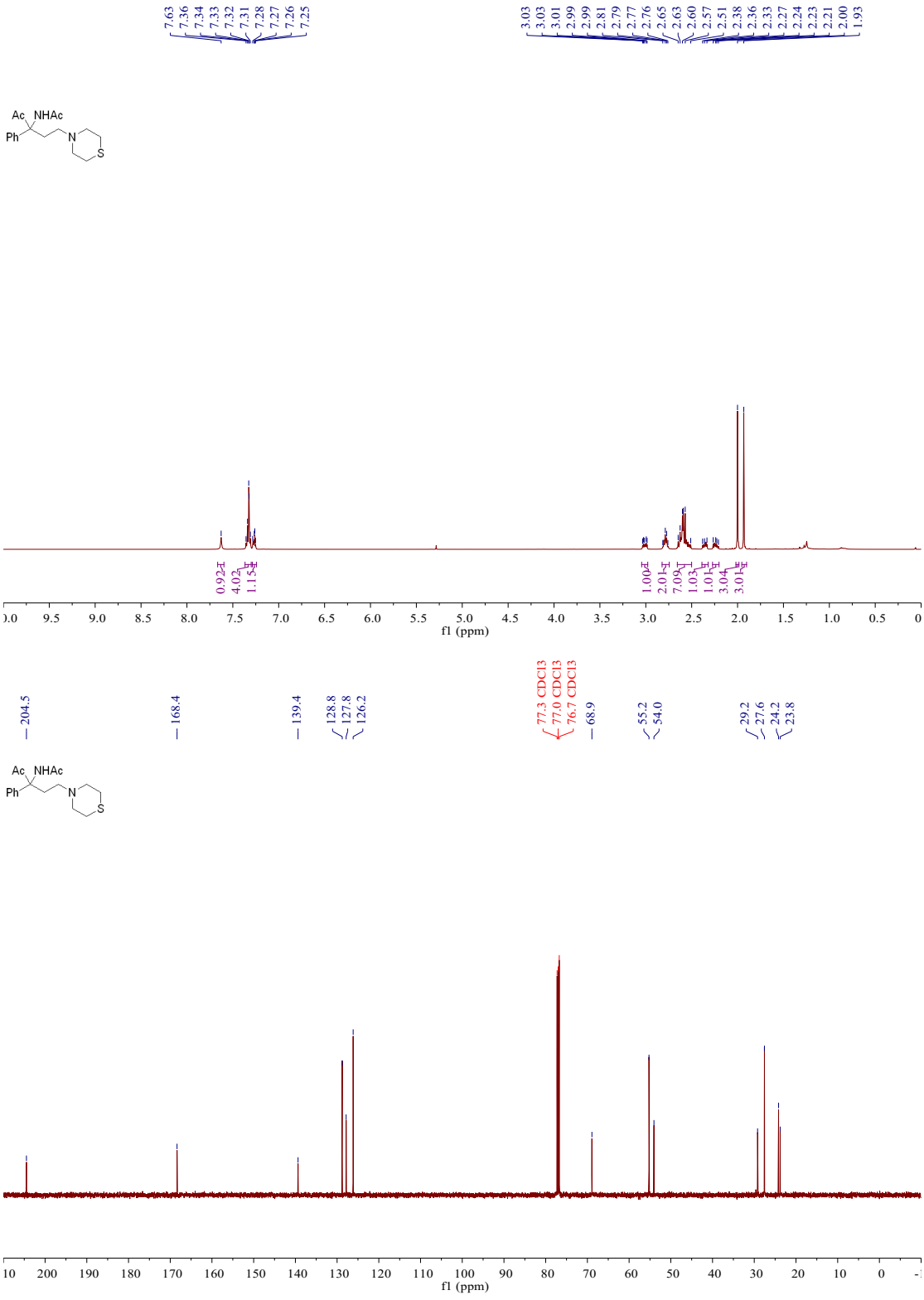
66.6
53.8
29.0
24.1
23.7
f1 (ppm)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2.99
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2.63
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2.38
2.36
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2.27
2.24
2.23
2.21
2.00
1.93
Ac
NHAc
Ph
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S
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1.00
2.01
7.09
1.03
1.01
3.04
3.01
fl (ppm)
204.5
168.4
139.4
128.8
127.8
126.2
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
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55.2
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27.6
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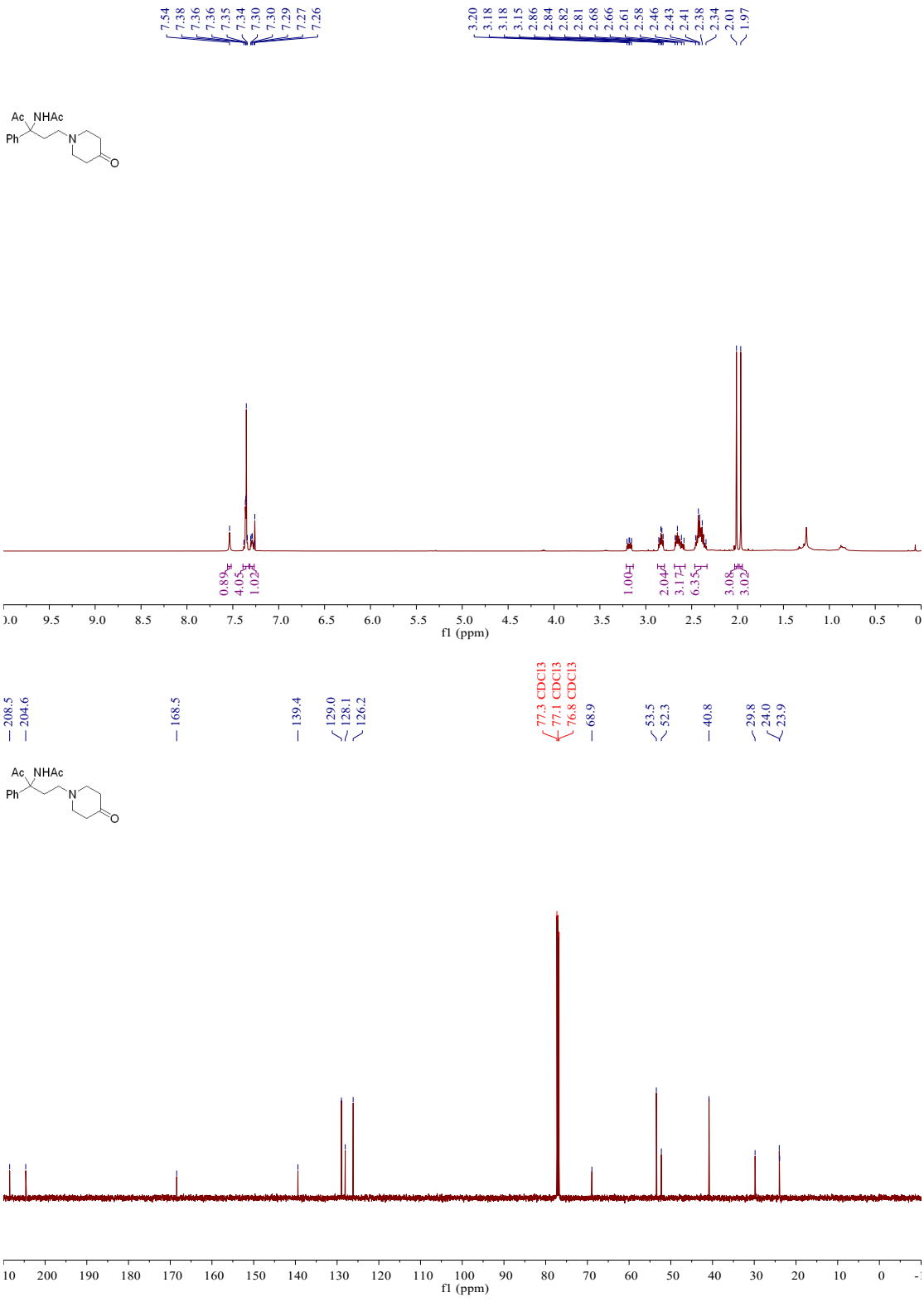
23.8
fl (ppm)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7.27
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3.18
3.18
3.15
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2.84
2.82
2.81
2.68
2.66
2.61
2.58
2.46
2.43
2.41
2.38
2.34
2.01
1.97
Ac
NHAc
Ph
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O
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4.05
1.02
1.00
2.04
3.17
6.35
3.08
3.02
f1 (ppm)
208.5
204.6
168.5
139.4
129.0
128.1
126.2
77.3 CDCl3
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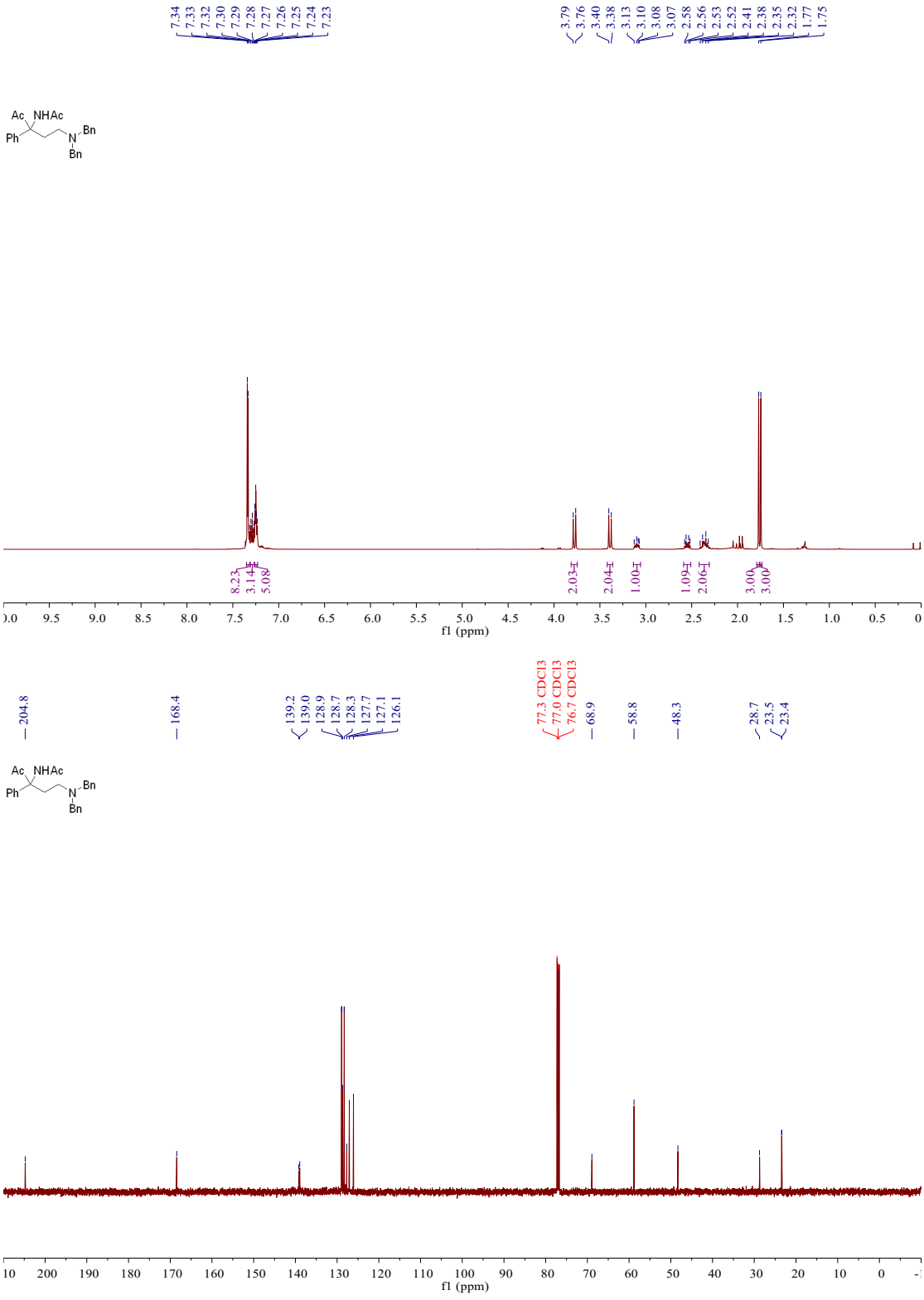
53.5
52.3
40.8
29.8
24.0
23.9
f1 (ppm)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3.76
3.40
3.38
3.13
3.10
3.08
3.07
2.58
2.56
2.53
2.52
2.41
2.38
2.35
2.32
1.77
1.75
Ac
NHAc
Ph
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Bn
Bn
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3.14
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2.04
1.00
1.09
2.06
3.00
3.00
f1 (ppm)
204.8
168.4
139.2
139.0
128.9
128.7
128.3
127.7
127.1
126.1
77.3 CDCl3
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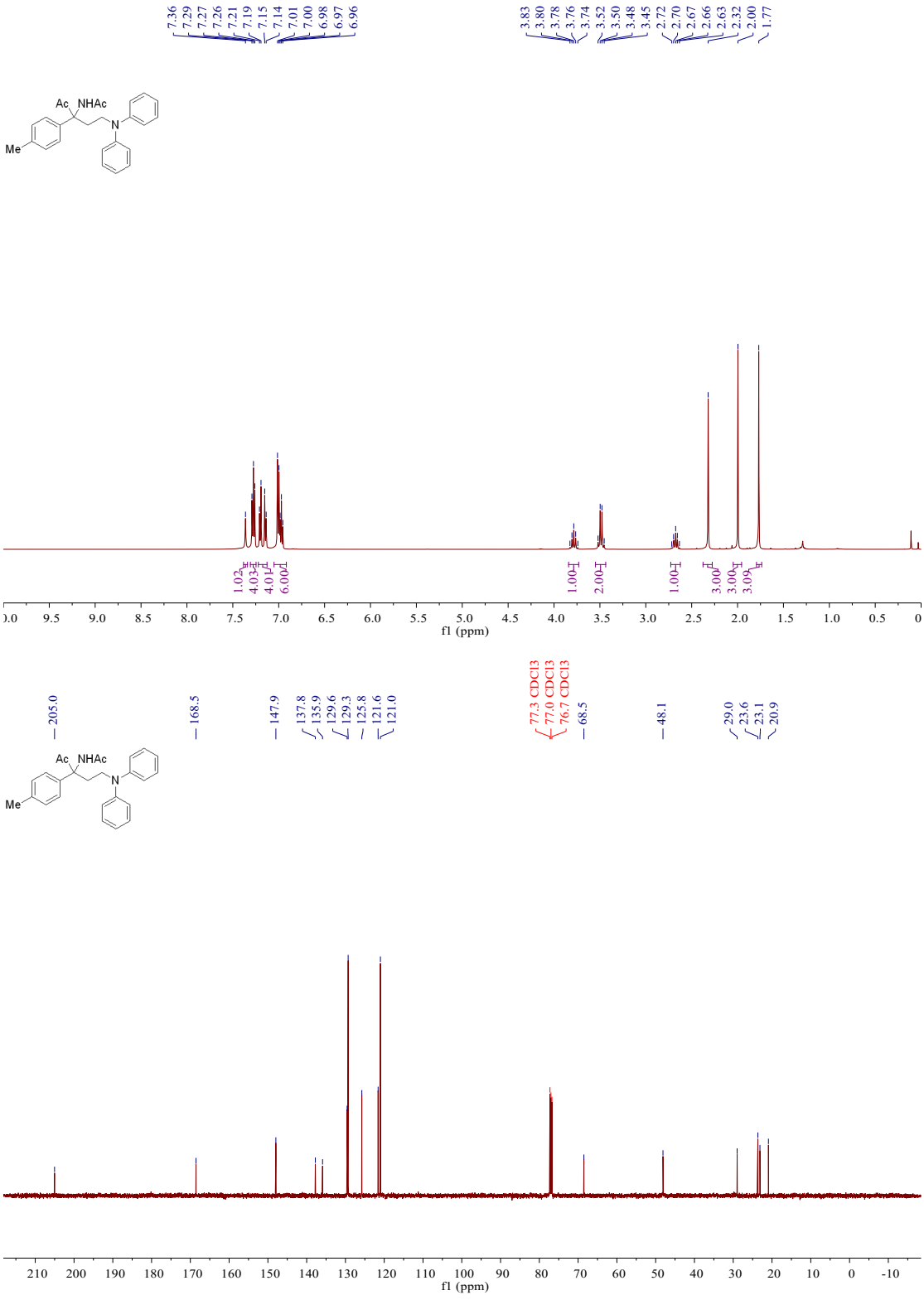
76.7 CDCl3
68.9
58.8
48.3
28.7
23.5
23.4
f1 (ppm)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6.97
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3.80
3.78
3.76
3.74
3.52
3.50
3.48
3.45
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2.70
2.67
2.66
2.63
2.32
2.00
1.77
Ac
NHAc
N
Me
1.02
4.03
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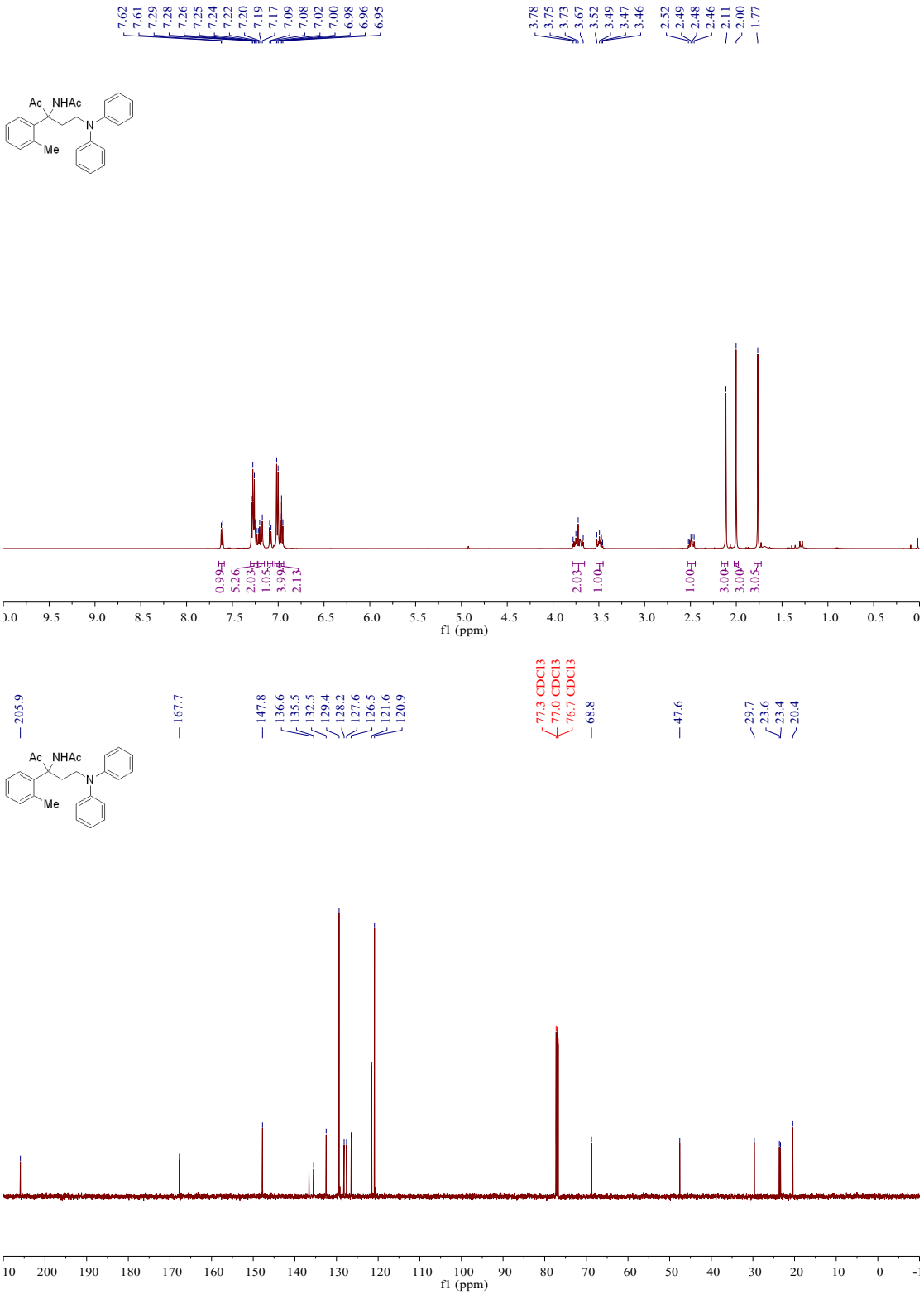
6.00
1.00
2.00
1.00
3.00
3.00
3.09
f1 (ppm)
205.0
168.5
147.9
137.8
135.9
129.6
129.3
125.8
121.6
121.0
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.5
48.1
29.0
23.6
23.1
20.9
f1 (ppm)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7.17
7.09
7.08
7.02
7.00
6.98
6.96
6.95
3.78
3.75
3.73
3.67
3.52
3.49
3.47
3.46
2.52
2.49
2.48
2.46
2.11
2.00
1.77
Ac
NHAc
N
Me
0.99
5.26
2.03
1.05
3.99
2.13
2.03
1.00
1.00
3.00
3.00
3.05
f1 (ppm)
205.9
167.7
147.8
136.6
135.5
132.5
129.4
128.2
127.6
126.5
121.6
120.9
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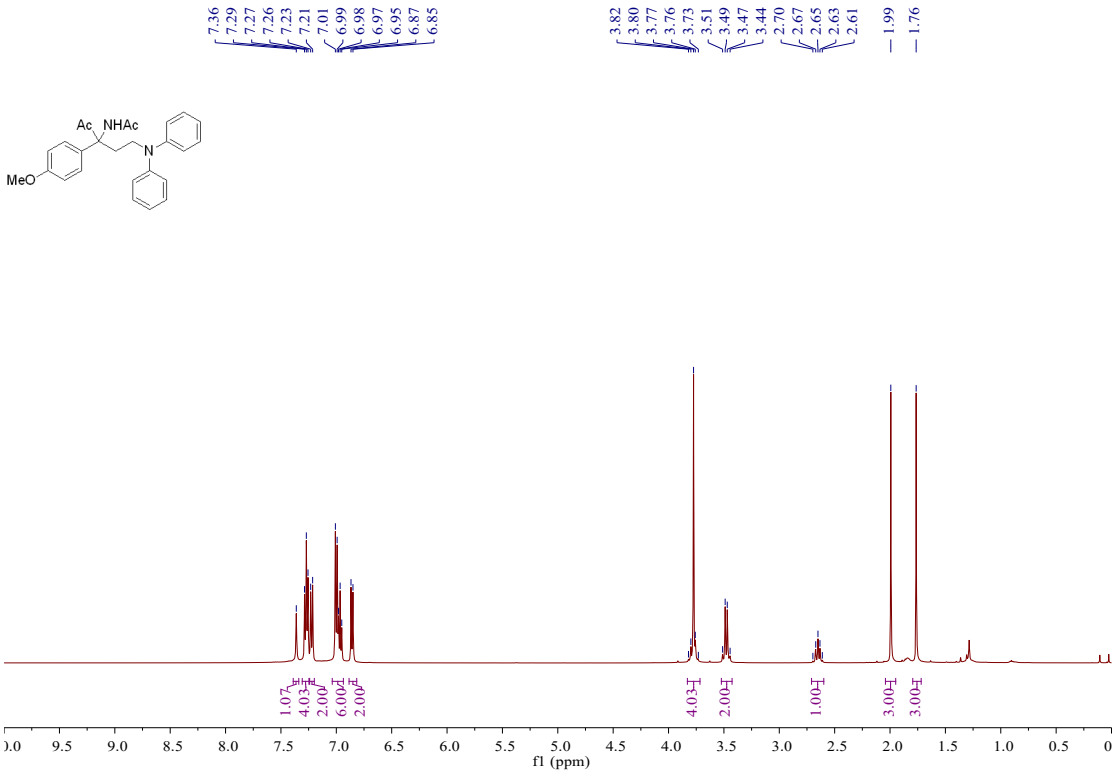
77.0 CDCl3
76.7 CDCl3
68.8
47.6
29.7
23.6
23.4
20.4
f1 (ppm)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7.21
7.01
6.99
6.98
6.97
6.95
6.87
6.85
3.82
3.80
3.77
3.76
3.73
3.51
3.49
3.47
3.44
2.70
2.67
2.65
2.63
2.61
1.99
1.76
Ac
NHAc
N
MeO
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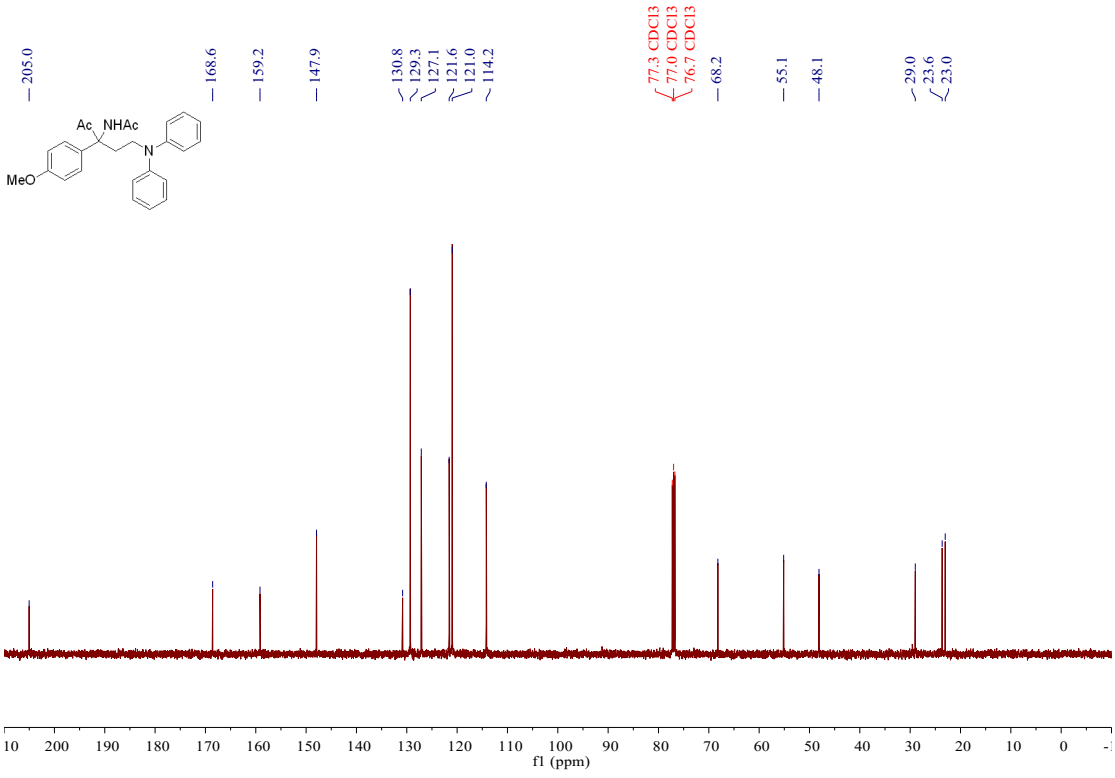
6.00
2.00
4.03
2.00
1.00
3.00
3.00
f1 (ppm)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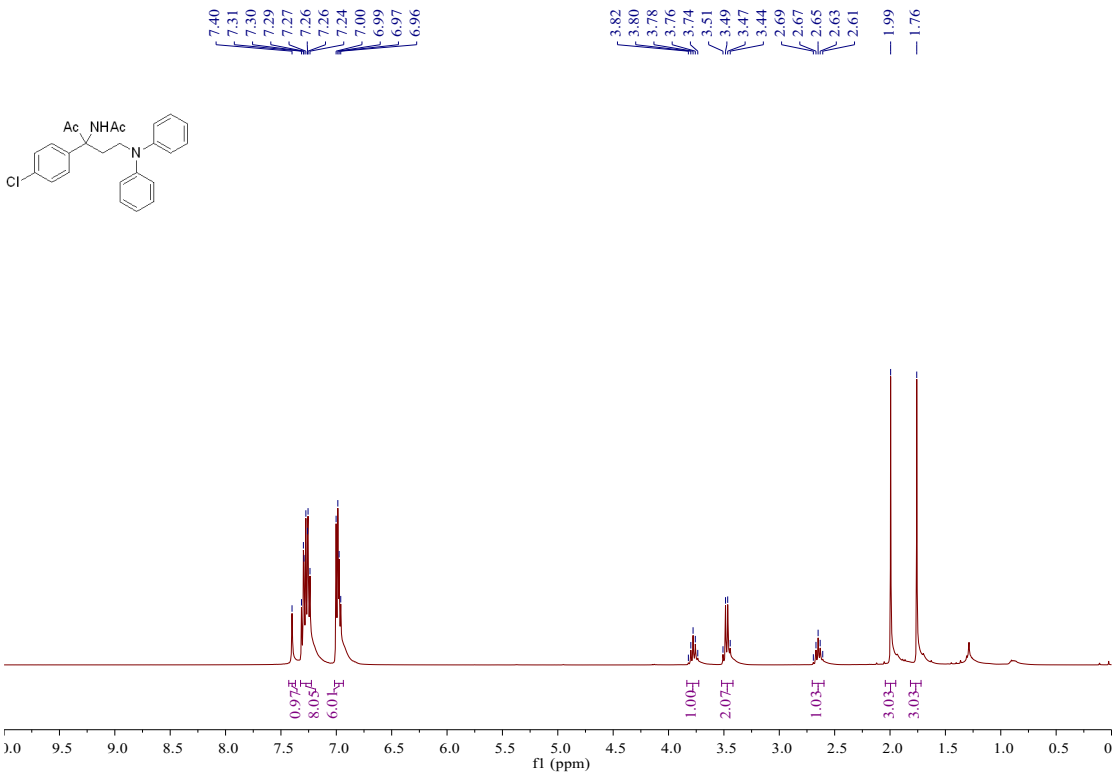
147.9
130.8
129.3
127.1
121.6
121.0
114.2
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.2
55.1
48.1
29.0
23.6
23.0
Ac
NHAc
N
MeO
f1 (ppm)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7.26
7.26
7.24
7.00
6.99
6.97
6.96
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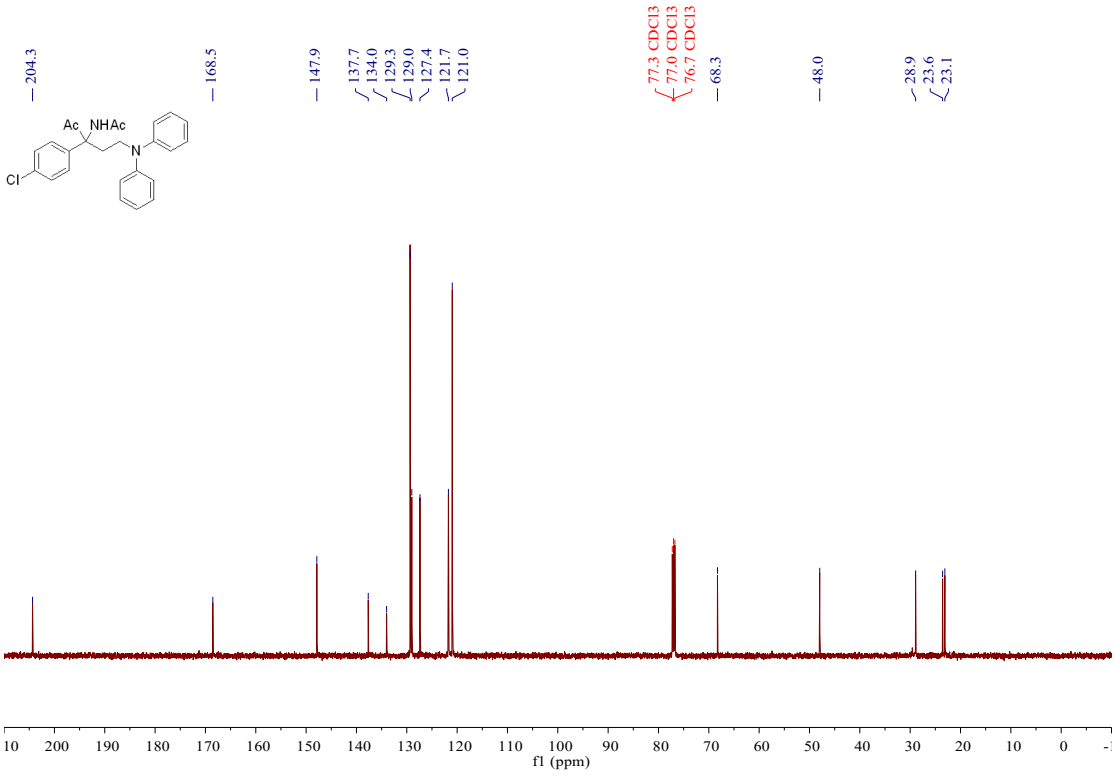
3.80
3.78
3.76
3.74
3.51
3.49
3.47
3.44
2.69
2.67
2.65
2.63
2.61
1.99
1.76
Ac
NHAc
N
Cl
0.97
8.05
6.01
1.00
2.07
1.03
3.03
3.03
fl (ppm)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137.7
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129.3
129.0
127.4
121.7
121.0
77.3 CDCl3
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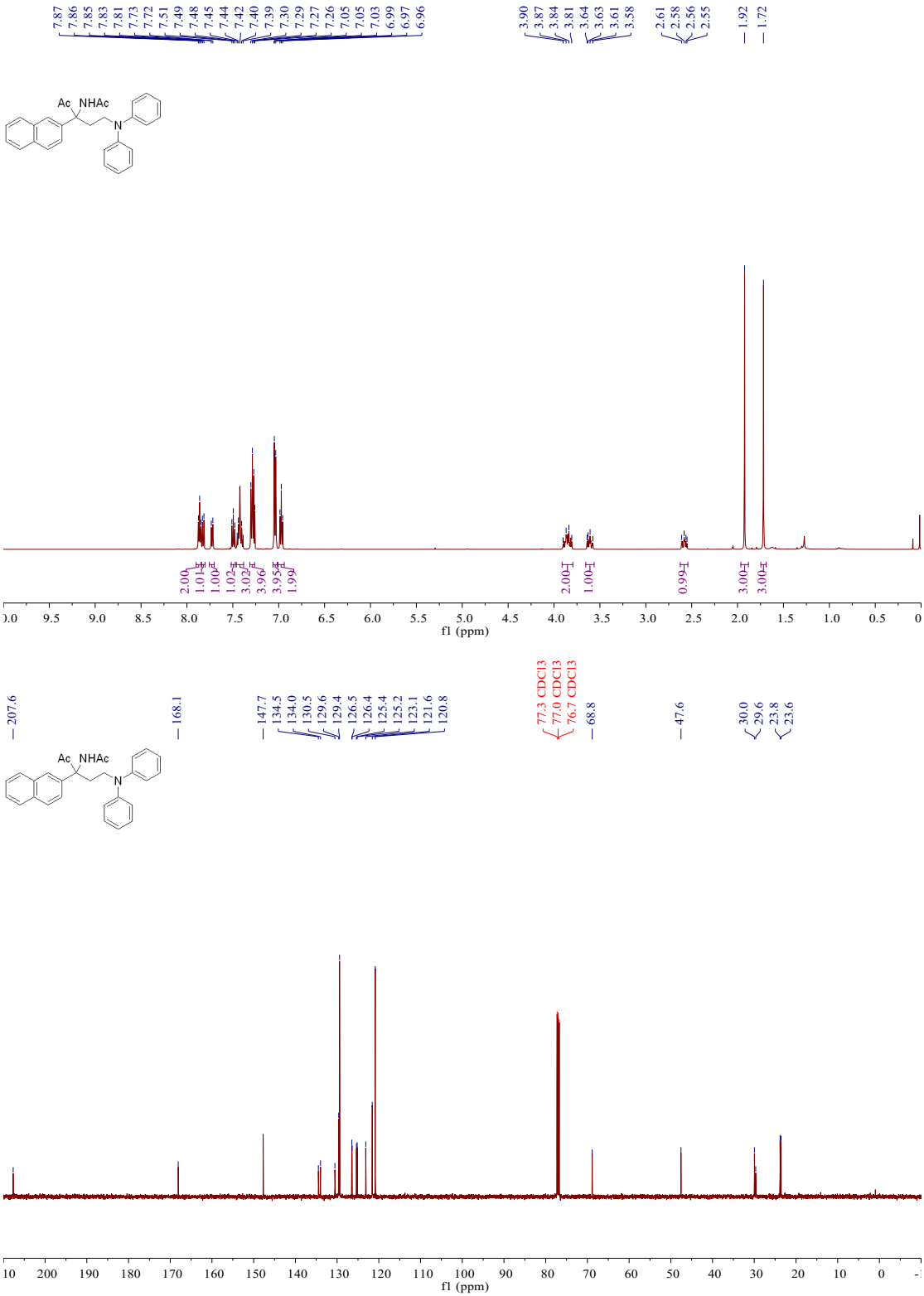
76.7 CDCl3
68.3
48.0
28.9
23.6
23.1
Ac
NHAc
N
Cl
fl (ppm)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7.48
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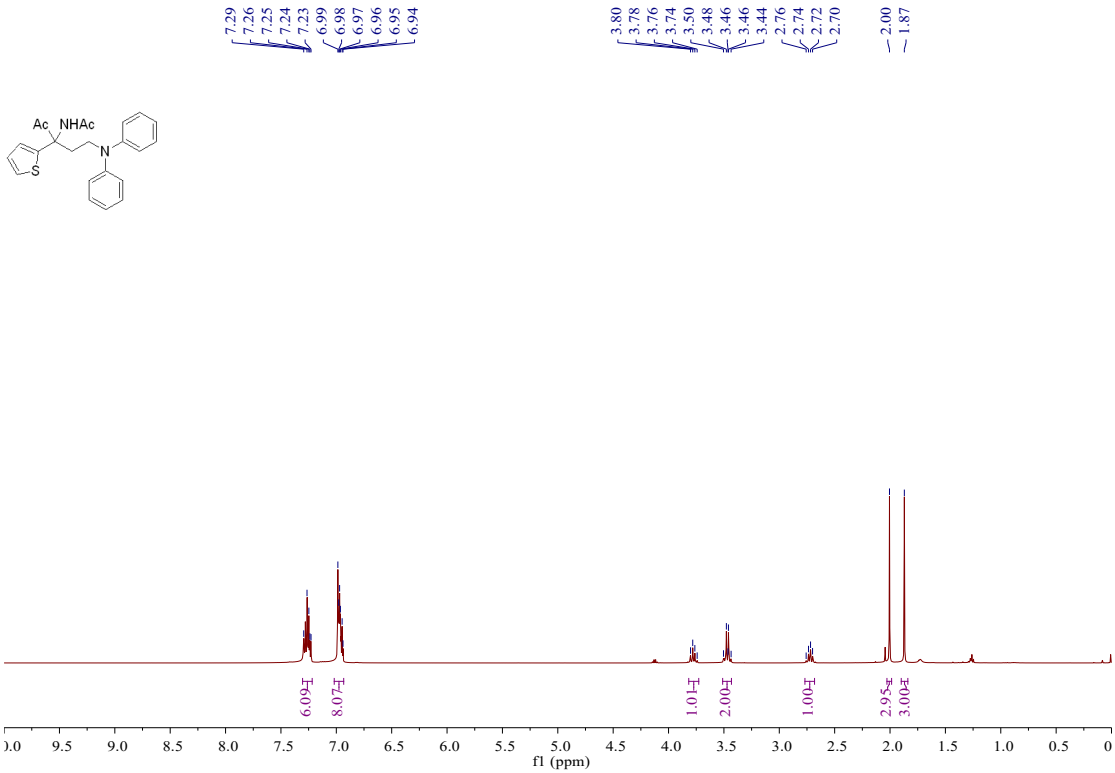
7.42
7.40
7.39
7.30
7.29
7.27
7.26
7.05
7.05
7.03
6.99
6.97
6.96
3.90
3.87
3.84
3.81
3.64
3.63
3.61
3.58
2.61
2.58
2.56
2.55
1.92
1.72
Ac
NHAc
N
2.00
1.01
1.00
1.02
3.02
3.96
3.95
1.99
2.00
1.00
0.99
3.00
3.00
f1 (ppm)
207.6
168.1
147.7
134.5
134.0
130.5
129.6
129.4
126.5
126.4
125.4
125.2
123.1
121.6
120.8
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.8
47.6
30.0
29.6
23.8
23.6
Ac
NHAc
N
f1 (ppm)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6.95
6.94
3.80
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3.76
3.74
3.50
3.48
3.46
3.46
3.44
2.76
2.74
2.72
2.70
2.00
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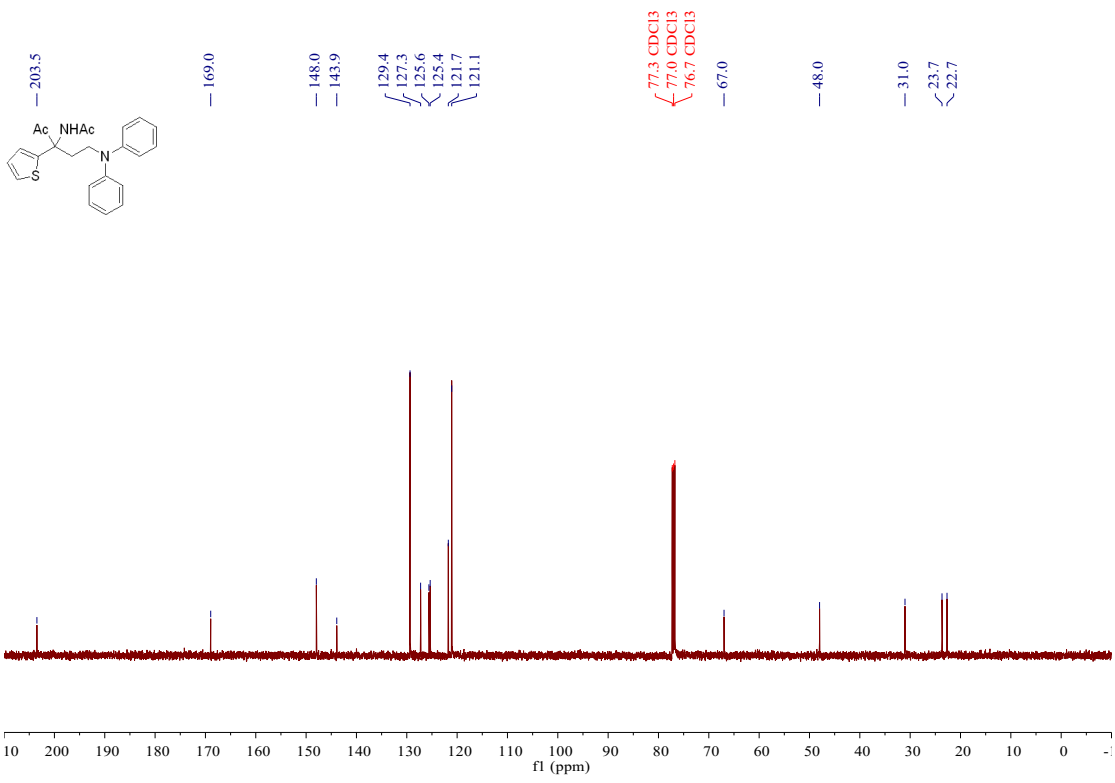
S
N
6.09
8.07
1.01
2.00
1.00
2.95
3.00
f1 (ppm)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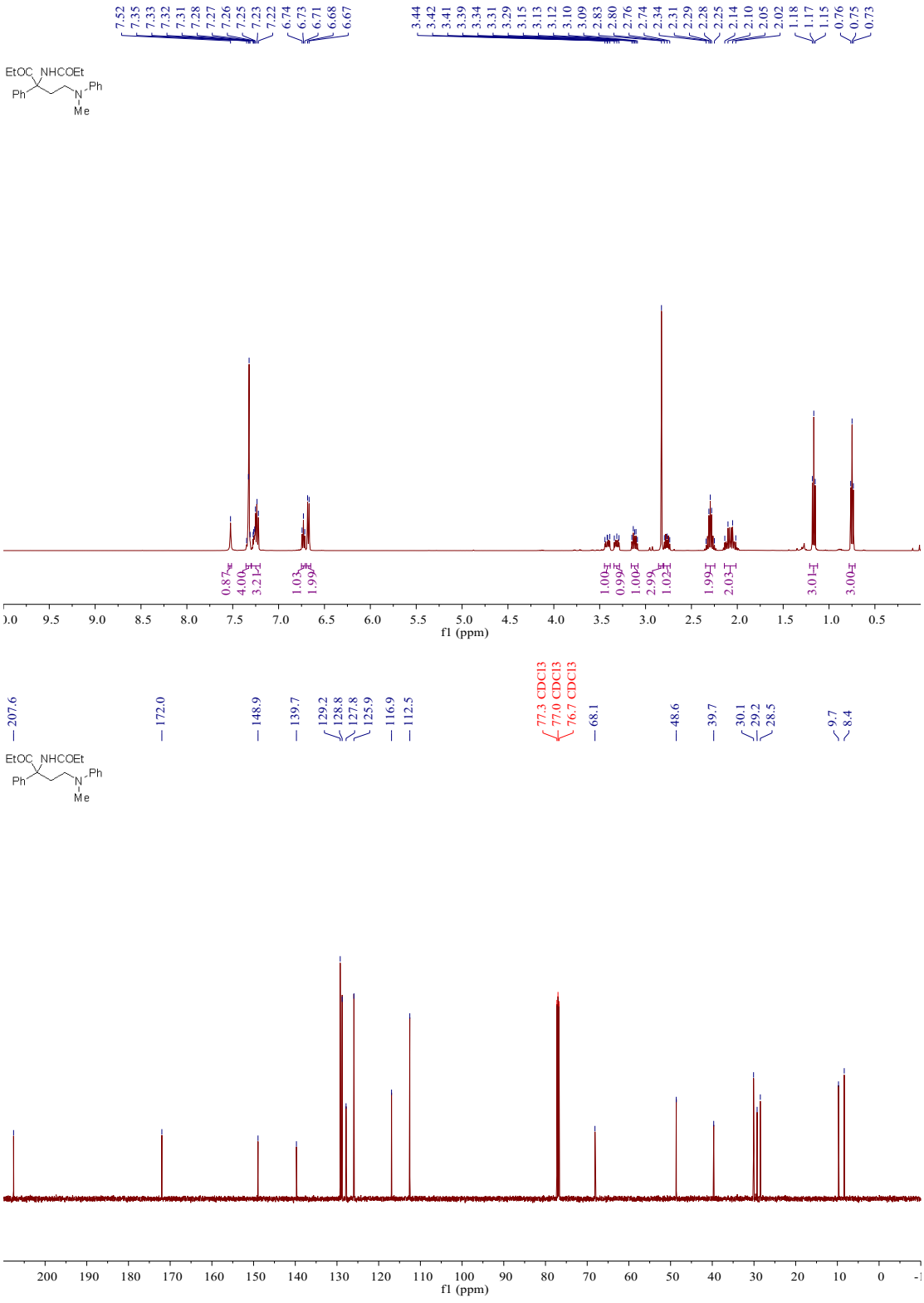
148.0
143.9
129.4
127.3
125.6
125.4
121.7
121.1
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
67.0
48.0
31.0
23.7
22.7
Ac
NHAc
S
N
f1 (ppm)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7.23
7.22
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6.73
6.71
6.68
6.67
3.44
3.42
3.41
3.39
3.34
3.31
3.29
3.15
3.13
3.12
3.10
3.09
2.83
2.80
2.76
2.74
2.34
2.31
2.29
2.28
2.25
2.14
2.10
2.05
2.02
1.18
1.17
1.15
0.76
0.75
0.73
EtOC NHCOEt
Ph
N
Ph
Me
0.87
4.00
3.21
1.03
1.99
1.00
0.99
1.00
2.99
1.02
1.99
2.03
3.01
3.00
f1 (ppm)
207.6
172.0
148.9
139.7
129.2
128.8
127.8
125.9
116.9
112.5
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
68.1
48.6
39.7
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29.2
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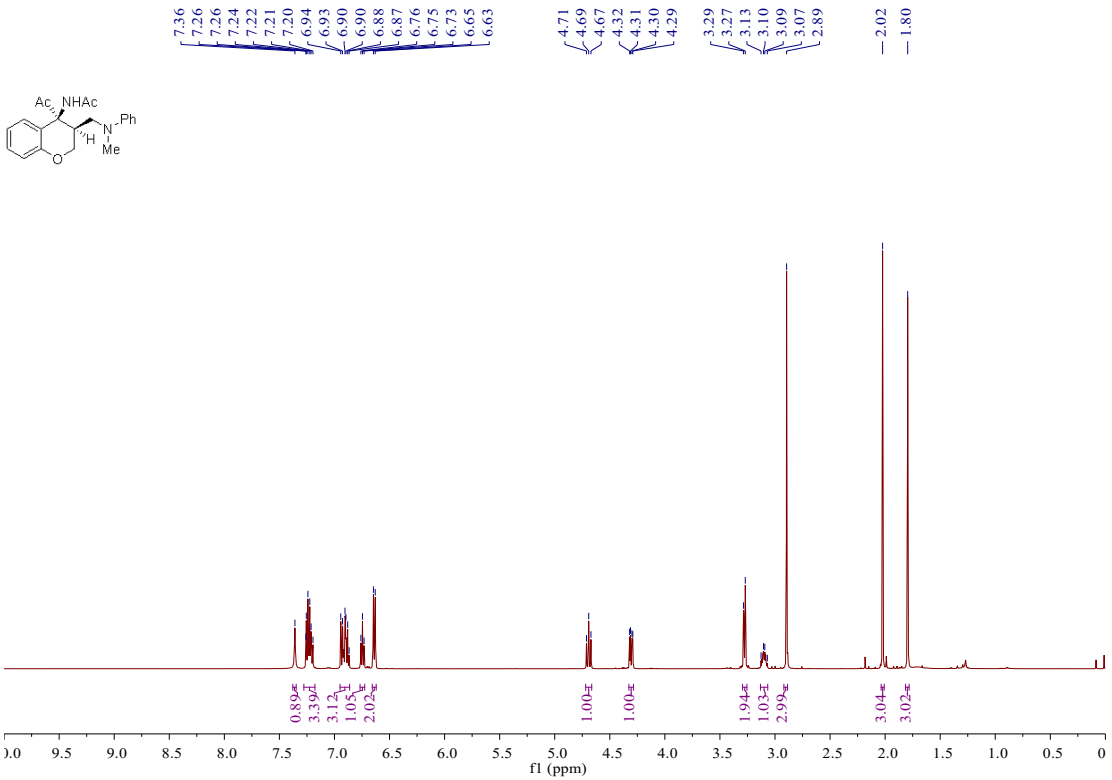
9.7
8.4
EtOC NHCOEt
Ph
N
Ph
Me
f1 (ppm)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6.90
6.90
6.88
6.87
6.76
6.75
6.73
6.65
6.63
4.71
4.69
4.67
4.32
4.31
4.30
4.29
3.29
3.27
3.13
3.10
3.09
3.07
2.89
2.02
1.80
Ac
NHAc
Ph
N
Me
H
O
0.89
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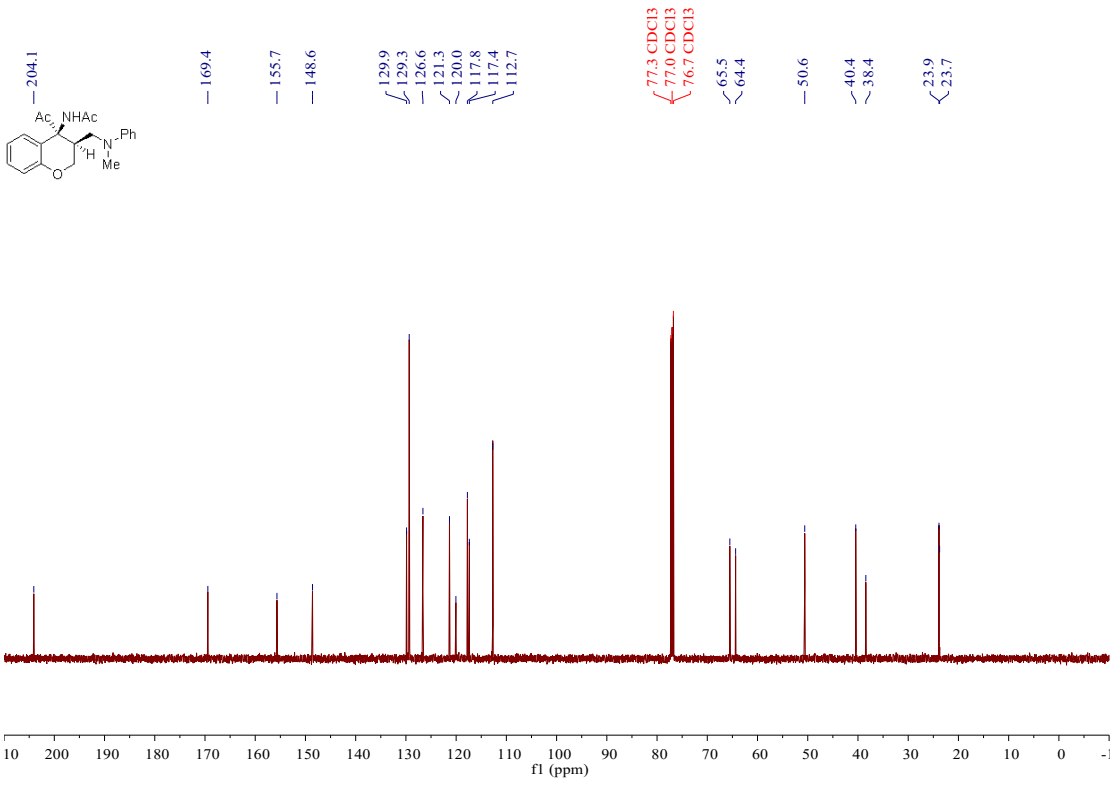
2.02
1.00
1.00
1.94
1.03
2.99
3.04
3.02
f1 (ppm)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129.3
126.6
121.3
120.0
117.8
117.4
112.7
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
65.5
64.4
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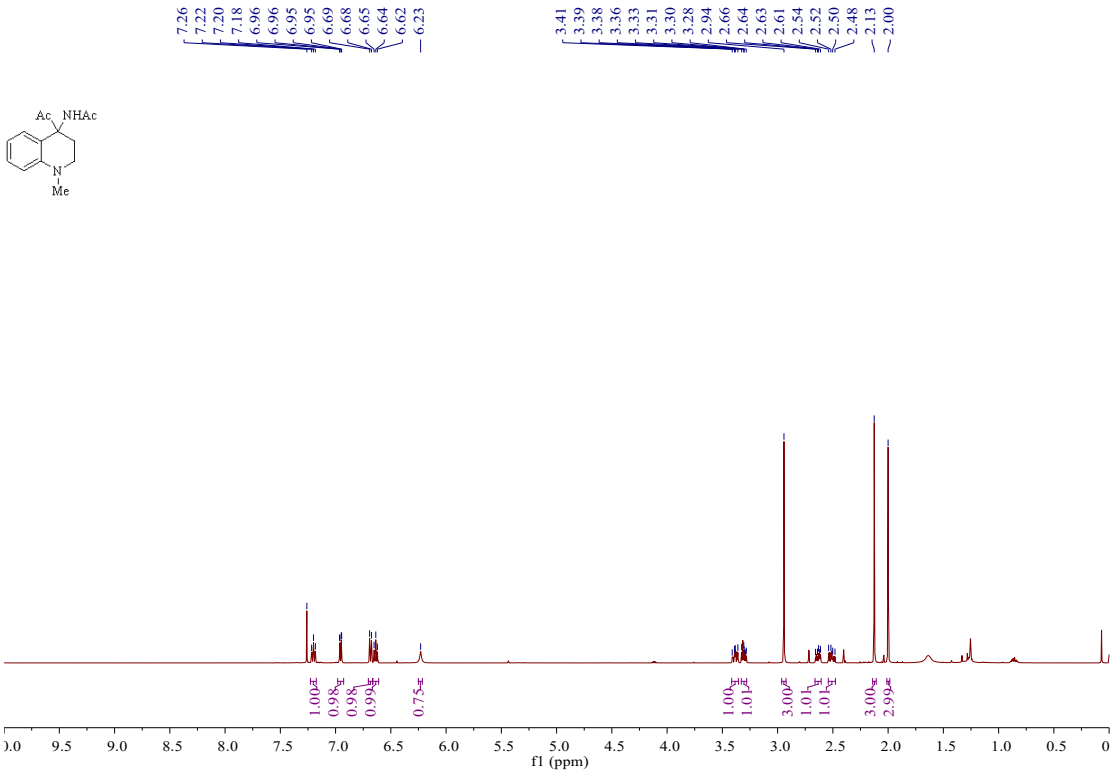
40.4
38.4
23.9
23.7
Ac
NHAc
Ph
N
Me
H
O
f1 (ppm)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6.95
6.69
6.68
6.65
6.64
6.62
6.23
3.41
3.39
3.38
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3.33
3.31
3.30
3.28
2.94
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2.63
2.61
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2.52
2.50
2.48
2.13
2.00
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NHAc
N
Me
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0.75
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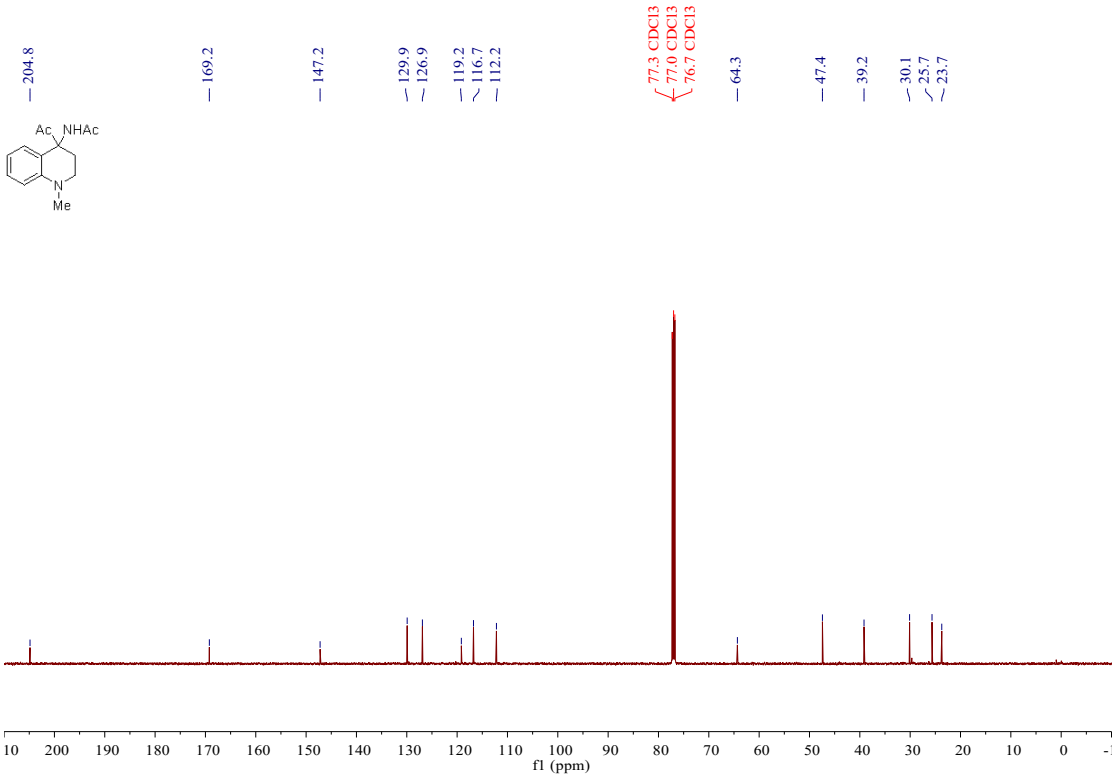
1.01
3.00
1.01
1.01
3.00
2.99
f1 (ppm)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126.9
119.2
116.7
112.2
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
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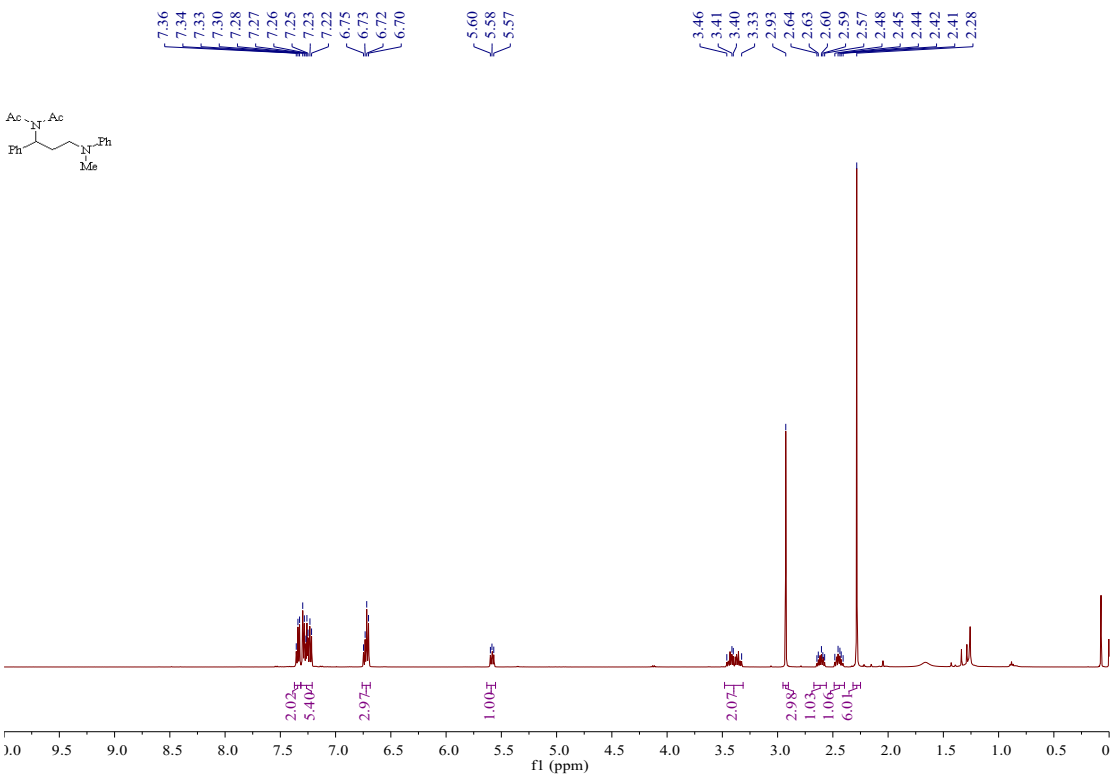
47.4
39.2
30.1
25.7
23.7
Ac
NHAc
N
Me
f1 (ppm)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5.57
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2.45
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2.42
2.41
2.28
Ac
Ac
N
Ph
N
Ph
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1.00
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1.03
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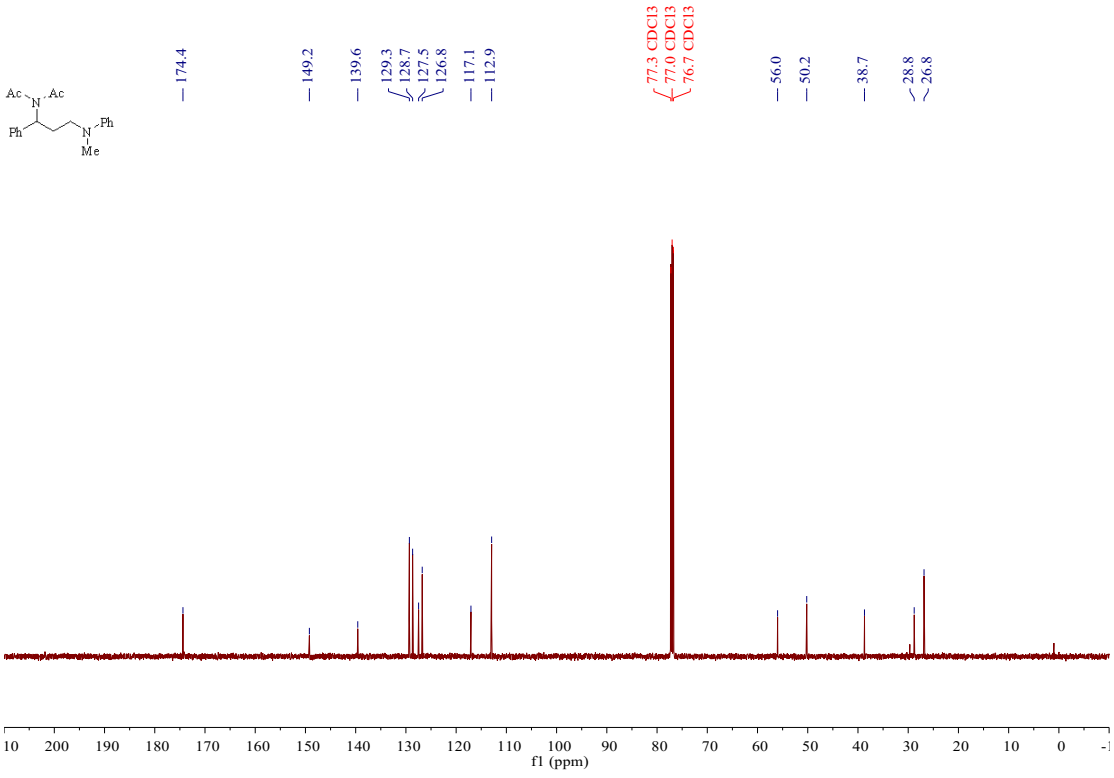
6.01
f1 (ppm)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139.6
129.3
128.7
127.5
126.8
117.1
112.9
77.3 CDCl3
77.0 CDCl3
76.7 CDCl3
56.0
50.2
38.7
28.8
26.8
Ac
Ac
N
Ph
N
Ph
Me
f1 (ppm)