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Supporting Information

Facile Construction of Three Contiguous Stereogenic Centers *via* Dynamic Kinetic Resolution in Asymmetric Transfer Hydrogenation of Quinolines

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1. General and Materials:

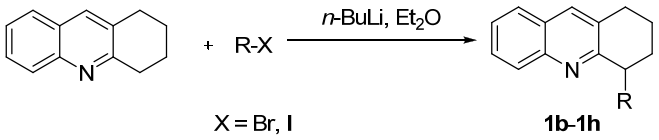
General: All reactions were carried out under an atmosphere of nitrogen using standard Schlenk techniques, unless otherwise noted. ^{1}H NMR and ^{13}C NMR spectra were recorded at room temperature in $CDCl_3$ on 400 MHz instrument with tetramethylsilane (TMS) as internal standard. Enantiomeric excess was determined by HPLC analysis, using chiral column described below in detail. Optical rotations were measured by polarimeter. Flash column chromatography was performed on silica gel (200-300 mesh). All reactions were monitored by TLC analysis.

Materials: Commercially available reagents were used throughout without further purification other than those detailed below. The solvents for asymmetric transfer hydrogenation reaction were purchased without further purification.

2. Synthesis of 4-Substituted-1,2,3,4-tetrahydroacridines:

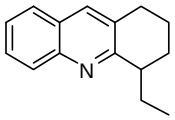
1,2,3,4-Tetrahydroacridine and 4-substituted-1,2,3,4-tetrahydroacridine derivatives **1a, 1i, 1f** are known compounds and can be conveniently synthesized from the easily accessible starting materials according to the known literature procedures. [1]

2.1. Synthesis of 4-substituted-1,2,3,4-tetrahydroacridines (1b-1h): [2]



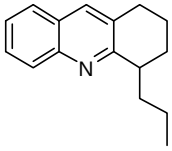
General procedure for synthesis of 4-substituted-1,2,3,4-tetrahydroacridine derivatives: To a stirred solution of 1,2,3,4-tetrahydroacridine (0.412 g, 2.3mmol) in anhydrous Et_2O (20 mL) at 0 ^{o}C under nitrogen was added a solution of 2.5 M *n*-butyllithium in hexanes (1.0 mL, 2.5mmol, 1.08 equiv). The resultant yellow solution was stirred at 0 ^{o}C for 10 min and stirred at room temperature for 2 h. After cooling down below 0 ^{o}C, R-X (2.8 mmol, 1.2 equiv) was added to the solution and stirred for overnight. A solution of saturated ammonium chloride (5 mL) was added to quench the reaction. This reaction mixture was then warmed to room temperature and was extracted with Et_2O (3×10 mL). The extracts were combined, dried over Na_2SO_4, and evaporated under reduced pressure. The residue was purified by flash chromatography on silica gel (petroleum ether/EtOAc = 15:1) to yield the products **1b-1h**.

4-Ethyl-1,2,3,4-tetrahydroacridine (1b): 62% yield, yellow oil, R_f = 0.50 (petroleum ether/EtOAc= 15:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 8.5 Hz, 1H), 7.79 (s, 1H), 7.69 (d, *J* = 8.2 Hz, 1H), 7.59 (dd, *J* = 11.2, 4.0 Hz, 1H), 7.43 (t, *J* = 7.5 Hz, 1H), 3.06 – 2.92 (m, 3H), 2.23 – 2.17 (m, 1H), 2.10 – 2.05 (m, 1H), 1.99 – (m, 1H), 1.87 – 1.77 (m, 2H), 1.71 – 1.65 (m, 1H), 1.05 (t, *J* = 7.5 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.7, 146.9, 134.8, 130.9, 128.6, 128.2, 127.1, 126.8, 125.5, 43.1, 29.7, 28.1, 27.0, 20.1, 11.8; HRMS (ESI) *m/z* Calculated for $C_{15}H_{18}N$ $[M+H]^+$ 212.1439, found 212.1437.

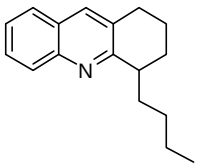


1. (a) C. S. Cho, B. T. Kim, T.-J. Kim, S. C. Shim, *Chem. Commun.* **2001**, 2576; (b) H. Vander Mierde, P. Van Der Voort, D. De Vos, F. Verpoort, *Eur. J. Org. Chem.* **2008**, 1625; (c) R. Martínez, D. J. Ramón, M. Yus, *J. Org. Chem.* **2008**, *73*, 9778; (d) V. A. Stonik, V. I. Vysotskii, M. N. Tilichenko, *Khim. Geterotsikl. Soedin.* **1972**, *8*, 611.
2. D.-W. Wang, X.-B. Wang, D.-S. Wang, S.-M. Lu, C.-B. Yu, Y.-G. Zhou, Y.-X. Li, *J. Org. Chem.* **2009**, *74*, 2780.

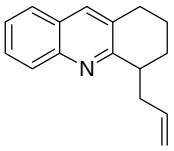
4-Propyl-1,2,3,4-tetrahydroacridine (1c): 42% yield, yellow oil, R_f = 0.48 (petroleum ether/EtOAc= 15:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 8.5 Hz, 1H), 7.79 (s, 1H), 7.69 (d, *J* = 8.1 Hz, 1H), 7.60 (t, *J* = 7.6 Hz, 1H), 7.43 (t, *J* = 7.4 Hz, 1H), 3.07 (dd, *J* = 10.0, 4.5 Hz, 1H), 2.96 (dd, *J* = 10.1, 6.0 Hz, 2H), 2.16 – 2.05 (m, 2H), 2.00 – 1.94 (m, 1H), 1.88 – 1.76 (m, 2H), 1.64 – 1.44 (m, 3H), 0.98 (t, *J* = 7.3 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.8, 146.8, 134.7, 130.8, 128.6, 128.2, 127.1, 126.8, 125.5, 41.6, 37.7, 29.6, 27.6, 20.6, 20.0, 14.3; HRMS (ESI) *m/z* Calculated for $C_{16}H_{20}N$ $[M+H]^+$ 226.1596, found 226.1600.



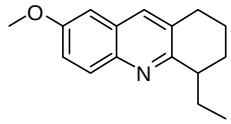
4-Butyl-1,2,3,4-tetrahydroacridine (1d): 41% yield, pale solid, mp = 41-42 °C, R_f = 0.60 (petroleum ether/EtOAc = 15:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 8.4 Hz, 1H), 7.78 (s, 1H), 7.69 (d, *J* = 7.6 Hz, 1H), 7.59 (ddd, *J* = 8.3, 6.8, 1.3 Hz, 1H), 7.46 – 7.38 (m, 1H), 3.06 (dd, *J* = 10.0, 4.3 Hz, 1H), 2.96 (dd, *J* = 10.3, 6.1 Hz, 2H), 2.20 – 2.03 (m, 2H), 2.03 – 1.91 (m, 1H), 1.89 – 1.72 (m, 2H), 1.65 (dd, *J* = 7.8, 2.4 Hz, 1H), 1.51 – 1.29 (m, 4H), 0.93 (t, *J* = 7.2 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 163.0, 146.9, 135.0, 131.0, 128.7, 128.4, 127.2, 126.9, 125.7, 41.9, 35.4, 29.9, 29.8, 27.6, 23.2, 20.1, 14.4; HRMS (ESI) *m/z* Calculated for $C_{17}H_{22}N$ $[M+H]^+$ 240.1752, found 240.1750.



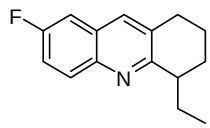
4-Allyl-1,2,3,4-tetrahydroacridine (1e): 81% yield, yellow oil, R_f = 0.68 (petroleum ether/EtOAc = 10:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (d, *J* = 8.6 Hz, 1H), 7.78 (s, 1H), 7.68 (d, *J* = 8.1 Hz, 1H), 7.59 (ddd, *J* = 8.4, 6.9, 1.3 Hz, 1H), 7.42 (t, *J* = 7.5 Hz, 1H), 6.02 – 5.78 (m, 1H), 5.07 (ddd, *J* = 13.6, 10.9, 0.6 Hz, 2H), 3.21 – 3.08 (m, 1H), 3.05 – 2.91 (m, 3H), 2.51 – 2.36 (m, 1H), 2.14 – 1.90 (m, 2H), 1.86 – 1.72 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 161.8, 147.2，137.7, 135.0, 131.1, 128.8, 128.5, 127.3, 127.0, 125.8, 116.4, 41.4, 39.9, 29.9, 27.5, 20.3; HRMS (ESI) *m/z* Calculated for $C_{16}H_{18}N$ $[M+H]^+$ 224.1439, found 224.1438.



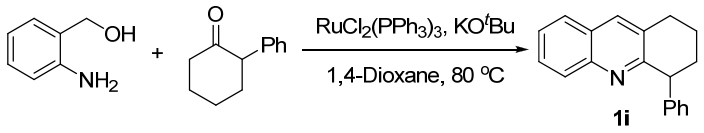
4-Ethyl-7-methoxy-1,2,3,4-tetrahydroacridine (1g): 61% yield, pale solid, mp = 92-93 °C, R_f = 0.67 (petroleum ether/EtOAc = 10:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.90 (d, *J* = 9.2 Hz, 1H), 7.68 (s, 1H), 7.27 – 7.24 (m, 1H), 6.96 (d, *J* = 2.8 Hz, 1H), 3.90 (s, 3H), 2.93 (t, *J* = 6.7 Hz, 3H), 2.20 – 2.14 (m, 1H), 2.09 – 2.03 (m, 1H), 1.97 – 1.92 (m, 1H), 1.87 – 1.73 (m, 2H), 1.69 – 1.64 (m, 1H), 1.03 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.0, 157.1, 143.0, 133.7, 131.1, 130.0, 127.8, 120.9, 104.3, 55.4, 42.8, 29.7, 28.1, 27.1, 20.1, 11.8; HRMS (ESI) *m/z* Calculated for $C_{16}H_{20}NO$ $[M+H]^+$ 242.1545, found 242.1543.



4-Ethyl-7-fluoro-1,2,3,4-tetrahydroacridine (1h): 53% yield, a yellow oil, R_f = 0.67 (petroleum ether/EtOAc = 10:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 – 7.91 (m, 1H), 7.35 (t, *J* = 8.7 Hz, 1H), 7.30 – 7.19 (m, 1H), 2.93 (s, 3H), 2.30 – 2.12 (m, 1H), 2.11 – 2.02 (m, 1H), 2.03 – 1.88 (m, 1H), 1.89 – 1.74 (m, 2H), 1.72 – 1.58 (m, 1H), 1.04 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.1, 160.1 (d, *J* = 244.0 Hz), 144.1, 134.2 (d, *J* = 5.3 Hz), 132.0, 131.2 (d, *J* = 9.1 Hz), 127.6 (d, *J* = 9.0 Hz), 118.5 (d, *J* = 15.0 Hz), 109.7 (d, *J* = 21.0 Hz), 43.2, 29.8, 28.2, 27.2, 20.2, 12.0; ^{19}F NMR (376 MHz, $CDCl_3$) δ -115.3; HRMS (ESI) *m/z* Calculated for $C_{15}H_{17}NF$ $[M+H]^+$ 230.1345, found 242.1340.

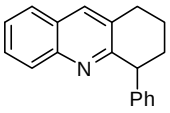


2.2. Synthesis of 4-phenyl-1,2,3,4-tetrahydroacridine (1i):

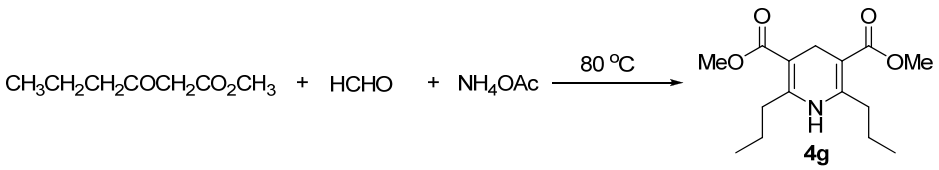


Typical procedure: a mixture of 2-aminobenzyl alcohol (0.616 mg, 5.0 mmol), 2-phenylcyclohexanone (1.307 mg, 7.5 mmol), $RuCl_2(PPh_3)_3$ (0.024 mg, 0.025 mmol) and KO^tBu (0.561 mg, 5.0 mmol) in 1,4-dioxane (10 ml) was placed in a dry 50 mL Schlenk tube. The system was flushed with argon and allowed to react at 80 °C for 16 h. The reaction mixture was filtered through a short silica gel column (ethyl acetate), washed with brine and dried over Na_2SO_4. Removal of the solvent left a crude mixture, which was separated by flash chromatography on silica gel (petroleum ether/EtOAc = 15:1) to yield the product **1i**.

4-Phenyl-1,2,3,4-tetrahydroacridine (1i): Pale solid, 72% yield, mp = 133-134 °C, R_f = 0.43 (petroleum ether/EtOAc = 15:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 – 7.83 (m, 2H), 7.70 (d, *J* = 8.1 Hz, 1H), 7.54 (t, *J* = 7.4 Hz, 1H), 7.41 (t, *J* = 7.3 Hz, 1H), 7.17 (dt, *J* = 13.2, 7.1 Hz, 3H), 6.96 (d, *J* = 7.1 Hz, 2H), 4.54 (d, *J* = 4.7 Hz, 1H), 3.16 – 2.85 (m, 2H), 2.38 – 2.07 (m, 2H), 1.98 – 1.63 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.3, 147.1, 146.3, 135.2, 131.5, 129.1, 128.8, 128.4, 128.1, 127.4, 126.8, 125.9, 125.8, 48.3, 32.6, 29.3, 19.2; HRMS (ESI) *m/z* Calculated for $C_{19}H_{18}N$ $[M+H]^+$ 260.1439, found 260.1440.

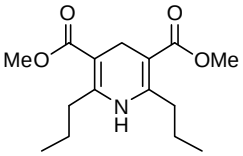


3. Synthesis of Dimethyl 2,6-dipropyl-1,4-dihydropyridine-3,5-dicarboxylate (4g)



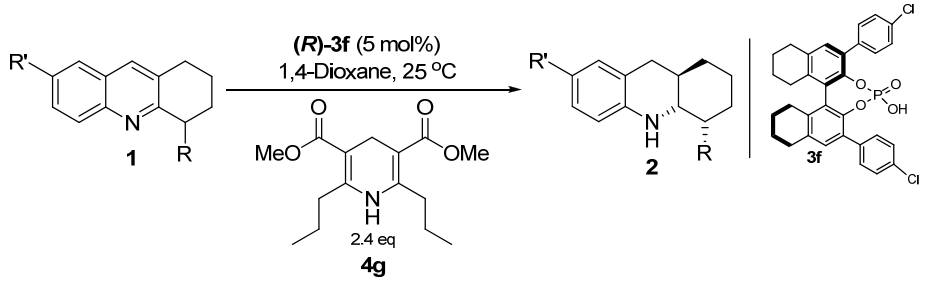
In a dry Schlenk tube, 7.209 g (50.0 mmol, 2.0 eq.) of methyl 3-oxohexanoate, 2.538 g (25.0 mmol, 1.0 eq.) of formaldehyde solution (37-40%) and 2.891 g (37.5 mmol, 1.5 eq.) of ammonium acetatein at 80 °C under a nitrogen atmosphere. The solution was stirred until complete consumption of methyl 3-oxohexanoate (monitored by TLC). Allowed to stand at room temperature and to facilitate crystallization of the compounds, the reaction mixture was scratched with a glass rod. Yellow crystals of dimethyl 2,6-dipropyl-1,4-dihydropyridine-3,5-dicarboxylate was formed. The product was recrystallized from ethanol. [3]

Dimethyl 2,6-dipropyl-1,4-dihydropyridine-3,5-dicarboxylate (4g): Yellow solid, 32% yield, mp = 107-108 °C, R_f = 0.46 (petroleum ether/EtOAc = 10:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 5.31 (s, 1H), 3.69 (s, 6H), 3.27 (s, 2H), 2.61 – 2.49 (m, 4H), 1.56 (dd, *J* = 15.3, 7.5 Hz, 4H), 0.97 (t, *J* = 7.3 Hz, 6H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 168.1, 149.9, 98.8, 51.1, 34.3, 25.1, 21.8, 14.1; HRMS (ESI) *m/z* Calculated for $C_{15}H_{24}NO_4$ $[M+H]^+$ 283.1778, found 283.1741.



[3] M. Anniyappan, D. Muralidharan, P. T. Perumal, *Synth. Commun.* **2002**, *32*, 659.

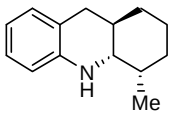
4. Typical Procedure for Asymmetric Transfer Hydrogenation of 4-Substituted -1,2,3,4-tetrahydroacridines 2:



Typical procedure: In a dry Schlenk tube, 4-substituted-1,2,3,4-tetrahydroacridines **1** (0.20mmol), and phosphoric acid (*R*)-**3f** (5.8 mg, 0.01 mmol) and Hanztsch ester **4g** (134.9 mg, 0.48 mmol) were dissolved in 1,4-dioxane (3 mL) at 25 °C under a nitrogen atmosphere. The solution was stirred until complete consumption of **1** (monitored by TLC). After removal of the solvent under reduced pressure, the residue was purified by flash chromatography (petroleum ether/ethyl acetate, 30:1) to afford the desired products.

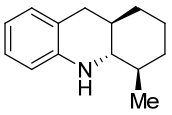
Typical procedure for preparation of racemates of **2**: In a dry Schlenk tube, 4-substituted -1,2,3,4-tetrahydroacridines **1** (0.20 mmol), and 1,1'-Binaphthyl-2,2'-diylhydrogenphosphate (3.5 mg, 0.01 mmol), and Hanztsch ester **4a** (134.9 mg, 0.48 mmol) were dissolved in 1,4-dioxane (3 mL) at 25 °C under a nitrogen atmosphere. The solution was stirred until complete consumption of **1** (monitored by TLC). After removal of the solvent under reduced pressure, the residue was purified by flash chromatography (petroleum ether/ethyl acetate, 30:1) to afford the desired products.

(4*S*,4*aS*,9*aR*)-4-Methyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2a): Pale solid, mp = 51-53 °C, 99% yield, R_f = 0.82 (petroleum ether/EtOAc =30:1), 82% ee, $[\alpha]^{21}_D$ = -45.8 (*c* 0.90, $CHCl_3$);



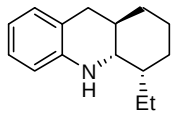
^{1}H NMR (400 MHz, $CDCl_3$) δ 6.96 (m, 2H), 6.56 (t, *J* = 7.3 Hz, 1H), 6.46 (d, *J* = 7.9 Hz, 1H), 3.50 (brs, 1H), 3.03 (dd, *J* = 10.4, 4.5 Hz, 1H), 2.65 (dd, *J* = 16.0, 4.8 Hz, 1H), 2.43 (dd, *J* = 15.9, 11.8 Hz, 1H), 2.09 – 1.91 (m, 1H), 1.90 – 1.80 (m, 1H), 1.79 – 1.70 (m, 1H), 1.67 – 1.58 (m, 2H), 1.57 – 1.45 (m, 2H), 0.98 (d, *J* = 7.1 Hz, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.0, 129.0, 126.7, 120.9, 116.4, 113.3, 58.6, 34.9, 32.6, 32.4, 31.4, 30.1, 19.9, 11.9; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 0.8 mL/min), 30 °C, t_1 = 11.7 min (maj), t_2 = 18.0 min; HRMS (ESI) *m/z* Calculated for $C_{14}H_{20}N$ $[M+H]^+$ 202.1596, found 202.1591.

(*4R,4aS,9aR*)-4-methyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2a'): R_f = 0.83 (petroleum ether/EtOAc = 30:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.94 (dd, *J* = 14.8, 7.5 Hz, 2H), 6.56 (dd, *J* =



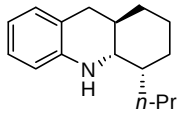
10.6, 4.0 Hz, 1H), 6.46 (d, *J* = 7.9 Hz, 1H), 3.58 (s, 1H), 3.37 (t, *J* = 2.6 Hz, 1H), 3.04 (dd, *J* = 16.2, 5.7 Hz, 1H), 2.41 (d, *J* = 15.3 Hz, 1H), 1.86 (s, 1H), 1.77 – 1.62 (m, 2H), 1.33 (dt, *J* = 8.0, 6.3 Hz, 5H), 1.01 (d, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.0, 129.8, 126.5, 119.7, 116.6, 113.6, 54.3, 36.0, 34.9, 34.0, 27.4, 26.0, 25.9, 18.5; HRMS (ESI) *m/z* Calculated for $C_{14}H_{20}N$ $[M+H]^+$ 202.1596, found 202.1599.

(4*S*,4*aS*,9*aR*)-4-Ethyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2b): Pale solid, mp = 66-68 °C, 91% yield, R_f = 0.83 (petroleum ether/EtOAc = 30:1), 88% ee, $[\alpha]^{20}_D$ = -49.2 (*c* 1.0, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.99 – 6.86 (m, 2H), 6.54 (td, *J* = 7.4, 0.9 Hz, 1H), 6.45 (d, *J* = 7.9 Hz, 1H), 3.48 (brs, 1H), 3.06 (dd, *J* = 10.5, 4.2 Hz, 1H), 2.62 (dd, *J* = 16.0, 4.8 Hz, 1H), 2.40 (dd, *J* = 16.0, 11.7 Hz, 1H), 1.89 – 1.80 (m, 2H), 1.75 – 1.59 (m, 3H), 1.54 – 1.38 (m, 3H), 1.36 – 1.22



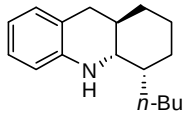
(m, 1H), 1.05 – 0.95 (m, 1H), 0.92 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.0, 129.0, 126.7, 120.8, 116.3, 113.3, 59.3, 40.6, 35.0, 32.6, 30.8, 27.2, 19.9, 17.3, 12.9; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 0.8 mL/min), 30 ^{o}C, t_1 = 9.2 min (maj), t_2 = 16.1 min; HRMS (ESI) *m/z* Calculated for $C_{15}H_{22}N$ $[M+H]^+$ 216.1752, found 216.1758.

(4*S*,4*aS*,9*aR*)-4-Propyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2c): Pale solid, mp = 39-40 °C, 84% yield, R_f = 0.80 (petroleum ether/EtOAc = 30:1), 84% ee, $[\alpha]^{22}_D$ = -39.9 (*c* 0.80, $CHCl_3$);



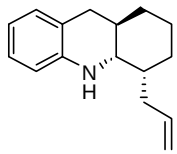
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.00 – 6.85 (m, 2H), 6.55 (t, *J* = 7.1 Hz, 1H), 6.46 (d, *J* = 7.9 Hz, 1H), 3.48 (brs, 1H), 3.05 (dd, *J* = 10.5, 4.4 Hz, 1H), 2.63 (dd, *J* = 16.0, 4.8 Hz, 1H), 2.41 (dd, *J* = 15.9, 11.7 Hz, 1H), 1.91 – 1.63 (m, 4H), 1.62 – 1.39 (m, 6H), 1.37 – 1.15 (m, 2H), 1.05 – 0.95 (m, 1H), 0.92 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.0, 129.0, 126.7, 120.8, 116.3, 113.2, 59.2, 38.4, 35.0, 32.6, 30.8, 27.9, 27.0, 21.6, 20.0, 14.5; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 0.8 mL/min), 30 ^{o}C, t_1 = 7.2 min (maj), t_2 = 8.3 min; HRMS (ESI) *m/z* Calculated for $C_{16}H_{24}N$ $[M+H]^+$ 230.1909, found 230.1918.

(4*S*,4*aS*,9*aR*)-4-Butyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2d): Pale solid, mp = 44-45 °C, 71% yield, R_f = 0.81 (petroleum ether/EtOAc = 30:1), 85% ee, $[\alpha]^{21}_D$ = -37.9 (*c* 0.87, $CHCl_3$);



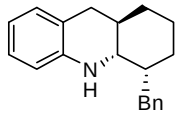
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.00 – 6.84 (m, 2H), 6.55 (td, *J* = 7.4, 0.9 Hz, 1H), 6.46 (d, *J* = 7.9 Hz, 1H), 3.48 (brs, 1H), 3.06 (dd, *J* = 10.5, 4.4 Hz, 1H), 2.63 (dd, *J* = 16.0, 4.8 Hz, 1H), 2.41 (dd, *J* = 16.0, 11.7 Hz, 1H), 1.89 – 1.77 (m, 2H), 1.76 – 1.63 (m, 2H), 1.63 – 1.46 (m, 4H), 1.45 – 1.28 (m, 4H), 1.23 – 1.12 (m, 1H), 1.06 – 0.94 (m, 1H), 0.91 (t, *J* = 7.1 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.0, 129.0, 126.7, 120.8, 116.3, 113.2, 59.2, 38.6, 35.0, 32.6, 30.8, 30.7, 27.8, 24.3, 23.1, 20.0, 14.2; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 98/2, detector: 254 nm, flow rate: 0.7 mL/min), 30 ^{o}C, t_1 = 9.7 min (maj), t_2 = 11.1 min; HRMS (ESI) *m/z* Calculated for $C_{17}H_{26}N$ $[M+H]^+$ 244.2065, found 244.2068.

(4*R*,4*aS*,9*aR*)-4-Allyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2e): Pale oil, 82% yield, R_f = 0.65 (petroleum ether/EtOAc = 30:1), 89% ee, $[\alpha]^{22}_D$ = -52.6 (*c* 0.67, $CHCl_3$); ^{1}H NMR (400 MHz,



$CDCl_3$) δ 6.96 – 6.74 (m, 2H), 6.49 (td, *J* = 7.4, 0.9 Hz, 1H), 6.39 (d, *J* = 7.9 Hz, 1H), 5.81 – 5.61 (m, 1H), 5.06 – 4.81 (m, 2H), 3.46 (s, 1H), 3.04 (dd, *J* = 10.5, 4.4 Hz, 1H), 2.57 (dd, *J* = 16.0, 4.8 Hz, 1H), 2.35 (dd, *J* = 15.9, 11.8 Hz, 2H), 2.08 – 1.88 (m, 1H), 1.86 – 1.70 (m, 3H), 1.70 – 1.54 (m, 1H), 1.50 – 1.30 (m, 3H), 1.01 – 0.87 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.8, 138.5, 129.0, 126.7, 120.8, 116.5, 115.5, 113.4, 58.8, 38.2, 34.9, 32.5, 30.8, 29.7, 27.5, 19.8; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 0.8 mL/min), 30 ^{o}C, t_1 = 11.2 min (maj), t_2 = 13.0 min; HRMS (ESI) *m/z* Calculated for $C_{16}H_{22}N$ $[M+H]^+$ 228.1752, found 228.1741.

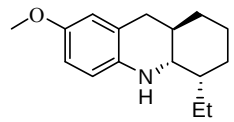
(4*R*,4*aS*,9*aR*)-4-Benzyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2f): Pale solid, mp = 72-74 °C, 82% yield, R_f = 0.82 (petroleum ether/EtOAc = 30:1), 67% ee, $[\alpha]^{22}_D$ = -103.9 (*c* 1.03, $CHCl_3$);



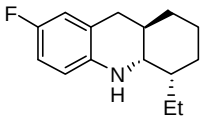
^{1}H NMR (400 MHz, $CDCl_3$) δ 7.35 – 7.26 (m, 2H), 7.23 – 7.15 (m, 3H), 6.95 (dd, *J* = 15.1, 7.4 Hz, 2H), 6.59 (dd, *J* = 10.5, 4.1 Hz, 1H), 6.45 (d, *J* = 7.9 Hz, 1H), 3.57 (s, 1H), 3.19 (dd, *J* = 10.5, 4.5 Hz, 1H), 3.03 (dd, *J* = 14.0, 3.6 Hz, 1H), 2.69 (dd, *J* = 16.0, 4.7 Hz, 1H), 2.51 (ddd, *J* = 27.6, 14.9, 11.2 Hz, 2H), 2.18 – 2.04 (m, 1H), 2.00 – 1.78 (m, 2H), 1.74 – 1.59 (m, 2H), 1.61 – 1.47 (m, 1H), 1.46 – 1.32 (m, 1H), 1.99-0.99 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.8, 142.4, 129.1, 129.0, 128.3, 126.8, 125.7, 120.8, 116.6, 113.5, 59.0, 40.8, 34.9, 32.6, 31.7, 30.9, 27.5, 20.0; HPLC (AD-H, elute: Hexanes/*i*-PrOH = 98/2,

detector: 254 nm, flow rate: 0.8 mL/min), 30 °C, t_1 = 10.1 min (maj), t_2 = 13.0 min; HRMS (ESI) *m/z* Calculated for $C_{20}H_{24}N$ $[M+H]^+$ 278.1909, found 278.1906.

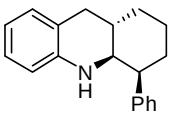
(4*S*,4*aS*,9*aR*)-4-Ethyl-7-methoxy-1,2,3,4,4a,9,9a,10-octahydroacridine (2g): Pale solid, mp = 71-72 °C, 60% yield, R_f = 0.67 (petroleum ether/EtOAc = 30:1), 87% ee, $[\alpha]^{29}_D$ = -45.5 (*c* 1.03, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.60 (d, *J* = 8.6 Hz, 1H), 6.55 (s, 1H), 6.44 (d, *J* = 8.5 Hz, 1H), 3.73 (s, 3H), 3.29 (s, 1H), 3.03 (d, *J* = 10.6 Hz, 1H), 2.69 – 2.59 (m, 1H), 2.51 – 2.36 (m, 1H), 1.86 (d, *J* = 12.7 Hz, 2H), 1.68 (dd, *J* = 13.0, 7.4 Hz, 3H), 1.59 – 1.21 (m, 4H), 0.97 (dt, *J* = 14.2, 8.8 Hz, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.5, 139.4, 122.2, 114.8, 114.5, 113.05, 59.6, 56.1, 40.7, 35.4, 32.9, 31.1, 27.4, 20.0, 17.5, 13.0; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 0.8 mL/min), 30 °C, t_1 = 11.7 min (maj), t_2 = 15.8 min; HRMS (ESI) *m/z* Calculated for $C_{16}H_{24}NO$ $[M+H]^+$ 246.1858, found 246.1861.



(4*S*,4*aS*,9*aR*)-4-Ethyl-7-fluoro-1,2,3,4,4a,9,9a,10-octahydroacridine (2h): Pale oil, 97% yield, R_f = 0.69 (petroleum ether/EtOAc = 30:1), 88% ee, $[\alpha]^{29}_D$ = -53.5 (*c* 0.80, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.64 (ddd, *J* = 9.1, 7.5, 4.3 Hz, 2H), 6.37 (dd, *J* = 8.5, 4.8 Hz, 1H), 3.41 (brs, 1H), 3.02 (dd, *J* = 10.6, 4.2 Hz, 1H), 2.60 (dd, *J* = 16.3, 5.0 Hz, 1H), 2.38 (dd, *J* = 16.0, 11.8 Hz, 1H), 1.84 (dd, *J* = 12.9, 2.6 Hz, 2H), 1.71 – 1.59 (m, 3H), 1.54 – 1.38 (m, 2H), 1.37 – 1.23 (m, 2H), 1.03 – 0.87 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 155.1 (d, *J* = 233 Hz), 141.2, 122.0 (d, *J* = 6.6 Hz), 115.1 (d, *J* = 21 Hz), 113.79 (d, *J* = 7.6 Hz), 113.1 (d, *J* = 22 Hz), 59.3, 40.5, 35.0, 32.5, 30.6, 27.1, 19.8, 17.3, 12.8; ^{19}F NMR (376 MHz, $CDCl_3$) δ -129.2; HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 0.8 mL/min), 30 °C, t_1 = 6.9 min (maj), t_2 = 7.7 min; HRMS (ESI) *m/z* Calculated for $C_{15}H_{21}NF$ $[M+H]^+$ 234.1658, found 234.1668.

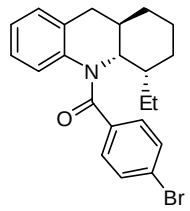


(4*R*,4*aR*,9*aR*)-4-Phenyl-1,2,3,4,4a,9,9a,10-octahydroacridine (2i): Pale oil, 40% yield, R_f = 0.60 (petroleum ether/EtOAc = 30:1), 46% ee, $[\alpha]^{29}_D$ = +32.4 (*c* 0.16, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.44 (d, *J* = 7.4 Hz, 2H), 7.31 – 7.23 (m, 2H), 7.20 (dt, *J* = 9.4, 4.3 Hz, 1H), 6.92 (dd, *J* = 16.9, 8.0 Hz, 2H), 6.57 (td, *J* = 7.4, 1.0 Hz, 1H), 6.34 (d, *J* = 8.0 Hz, 1H), 3.48 (brs, 1H), 3.43 – 3.15 (m, 2H), 2.75 (dd, *J* = 15.9, 4.6 Hz, 1H), 2.48 (dd, *J* = 15.9, 11.5 Hz, 1H), 2.34 – 2.20 (m, 1H), 2.08 – 1.98 (m, 2H), 1.98 – 1.85 (m, 1H), 1.63 – 1.49 (m, 3H), 1.17 – 1.04 (m, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.5, 142.3, 130.1, 129.1, 128.2, 126.7, 126.1, 121.1, 116.6, 113.9, 58.6, 43.5, 35.8, 32.8, 32.2, 31.4, 20.7;HPLC (OJ-H, elute: Hexanes/*i*-PrOH = 90/10, detector: 254 nm, flow rate: 1.0 mL/min), 30 °C, t_1 = 9.4 min (maj), t_2 = 13.2 min; HRMS (ESI) *m/z* Calculated for $C_{19}H_{22}N$ $[M+H]^+$ 264.1752, found 264.1745.

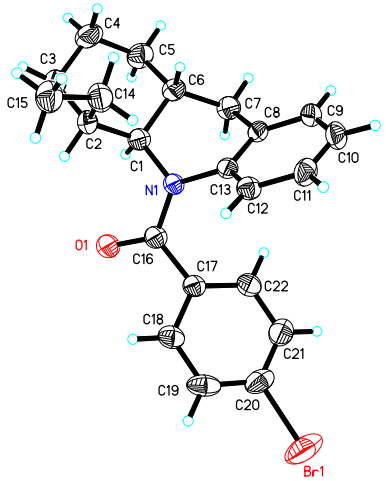


(*4R,4aS,9aS*)-4-phenyl-1,2,3,4,4a,9,9a,10-octahydroacridine (**2i'**): Pale oil, 9% yield, R_f = 0.59 (petroleum ether/EtOAc = 30:1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32 (t, *J* = 7.3 Hz, 2H), 7.23 (d, *J* = 7.3 Hz, 1H), 7.16 (d, *J* = 7.2 Hz, 2H), 6.98 (d, *J* = 7.3 Hz, 1H), 6.92 (t, *J* = 7.5 Hz, 1H), 6.60 (t, *J* = 7.3 Hz, 1H), 6.25 (d, *J* = 7.9 Hz, 1H), 3.72 (s, 1H), 3.32 (dd, *J* = 10.7, 4.1 Hz, 1H), 3.09 (dd, *J* = 15.1, 12.1 Hz, 1H), 2.77 (dd, *J* = 15.3, 7.2 Hz, 1H), 2.63 – 2.46 (m, 2H), 1.90 – 1.84 (m, 2H), 1.65 (qd, *J* = 12.1, 6.3 Hz, 3H), 1.27 (s, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.1, 143.1, 129.6, 128.7, 128.1, 126.9, 126.7, 120.4, 116.8, 114.1, 57.5, 46.6, 33.3, 31.8, 30.6, 27.7, 20.8; HRMS (ESI) *m/z* Calculated for $C_{19}H_{22}N$ $[M+H]^+$ 264.1752, found 264.1776.

(4-Bromophenyl)((4*S*,4*aS*,9*aR*)-4-ethyl-2,3,4,4a,9,9a-hexahydroacridin-10(1H)-yl)metha none (5b) Pale solid, mp = 154-156 °C, 94% yield, R_f = 0.21 (petroleum ether/EtOAc = 30:1), 98% ee, $[\alpha]^{29}_D$ = +355.4 (*c* 1.77, $CHCl_3$); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28 (d, *J* = 7.9 Hz, 2H), 7.11 (d, *J* = 6.8 Hz, 1H), 6.96 (dd, *J* = 34.5, 7.3 Hz, 3H), 6.83 (d, *J* = 7.4 Hz, 1H), 6.47 (d, *J* = 7.6 Hz, 1H), 4.05 (d, *J* = 11.4 Hz, 1H), 2.82 (s, 1H), 2.57 – 2.33 (m, 2H), 1.91 (s, 1H), 1.80 (d, *J* = 13.4 Hz, 1H), 1.59 (s, 2H), 1.49 – 1.33 (m, 2H), 1.17 (s, 2H), 0.89 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 169.9, 139.2, 136.3, 136.2, 131.1, 130.1, 126.9, 126.3, 125.3, 123.7, 67.6, 40.1, 39.1, 35.2, 33.5, 27.2, 21.2, 18.9, 12.9; HPLC (AD-H, elute: Hexanes/*i*-PrOH = 95/5, detector: 254 nm, flow rate: 1.0 mL/min), 30 °C, t_1 = 12.0 min (maj), t_2 = 20.1 min; HRMS (ESI) *m/z* Calculated for $C_{22}H_{24}NOBrNa$ $[M+Na]^+$ 420.0939, found 420.0940.



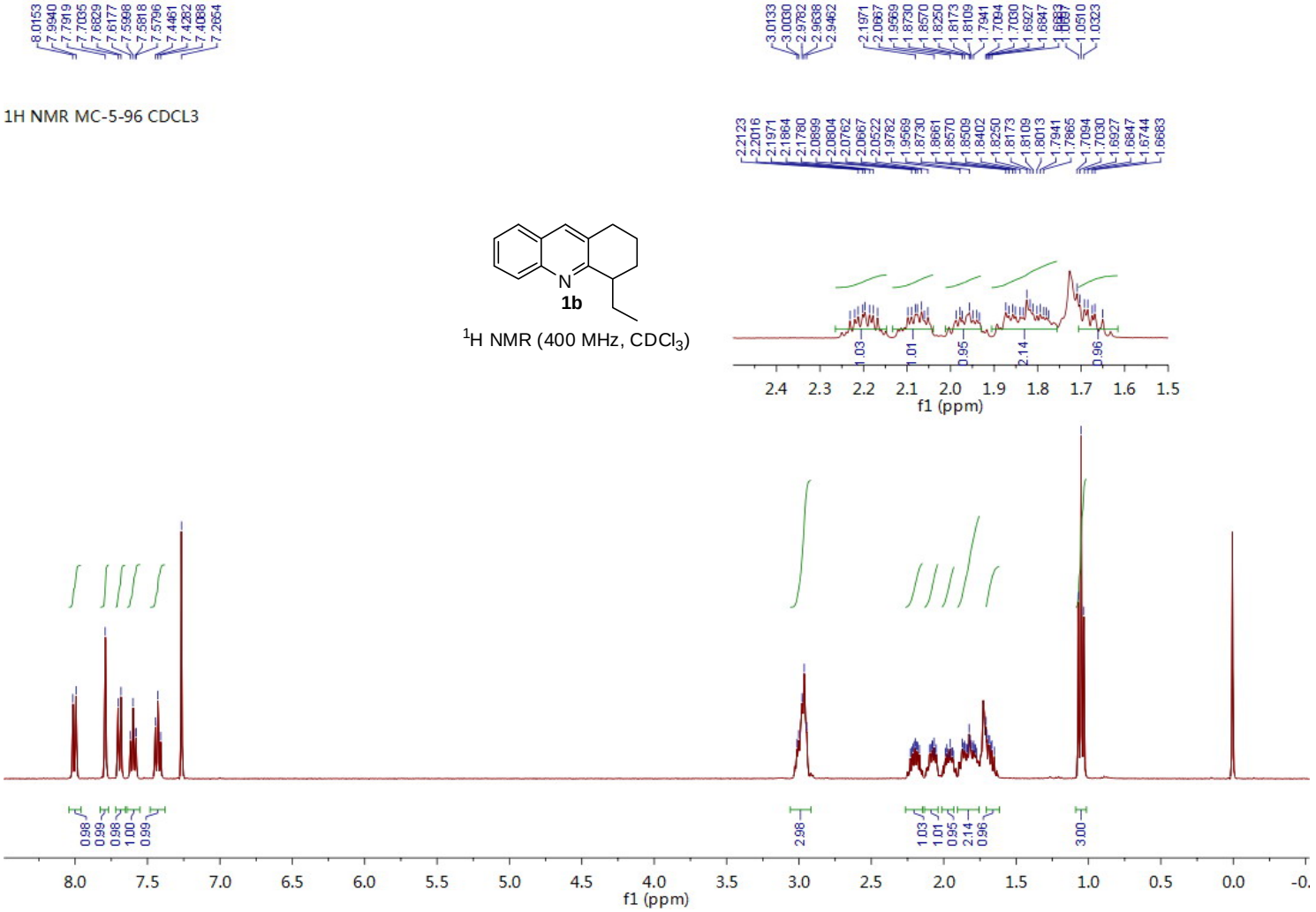
5. The Determination of the Absolute Configuration of 2b

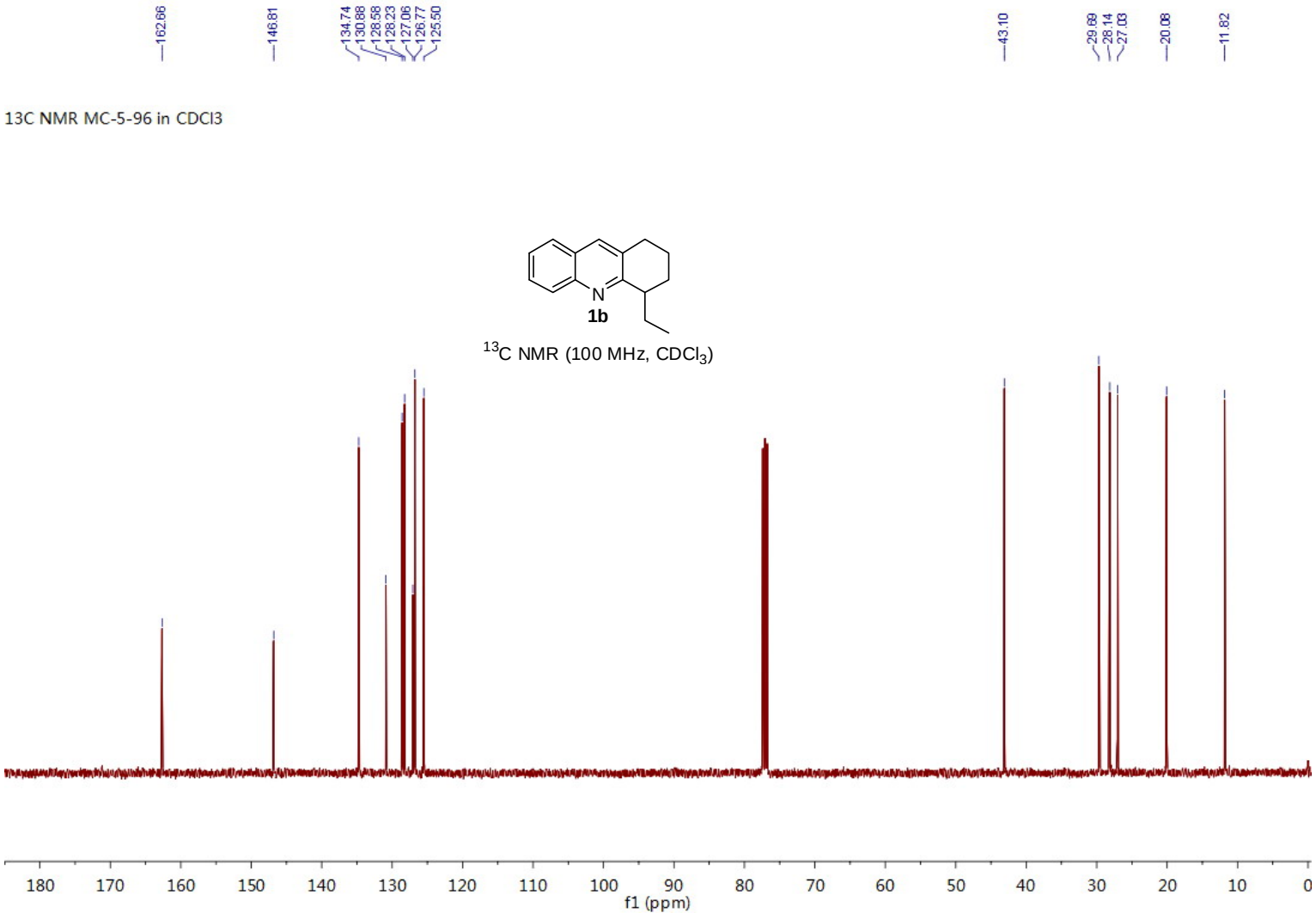


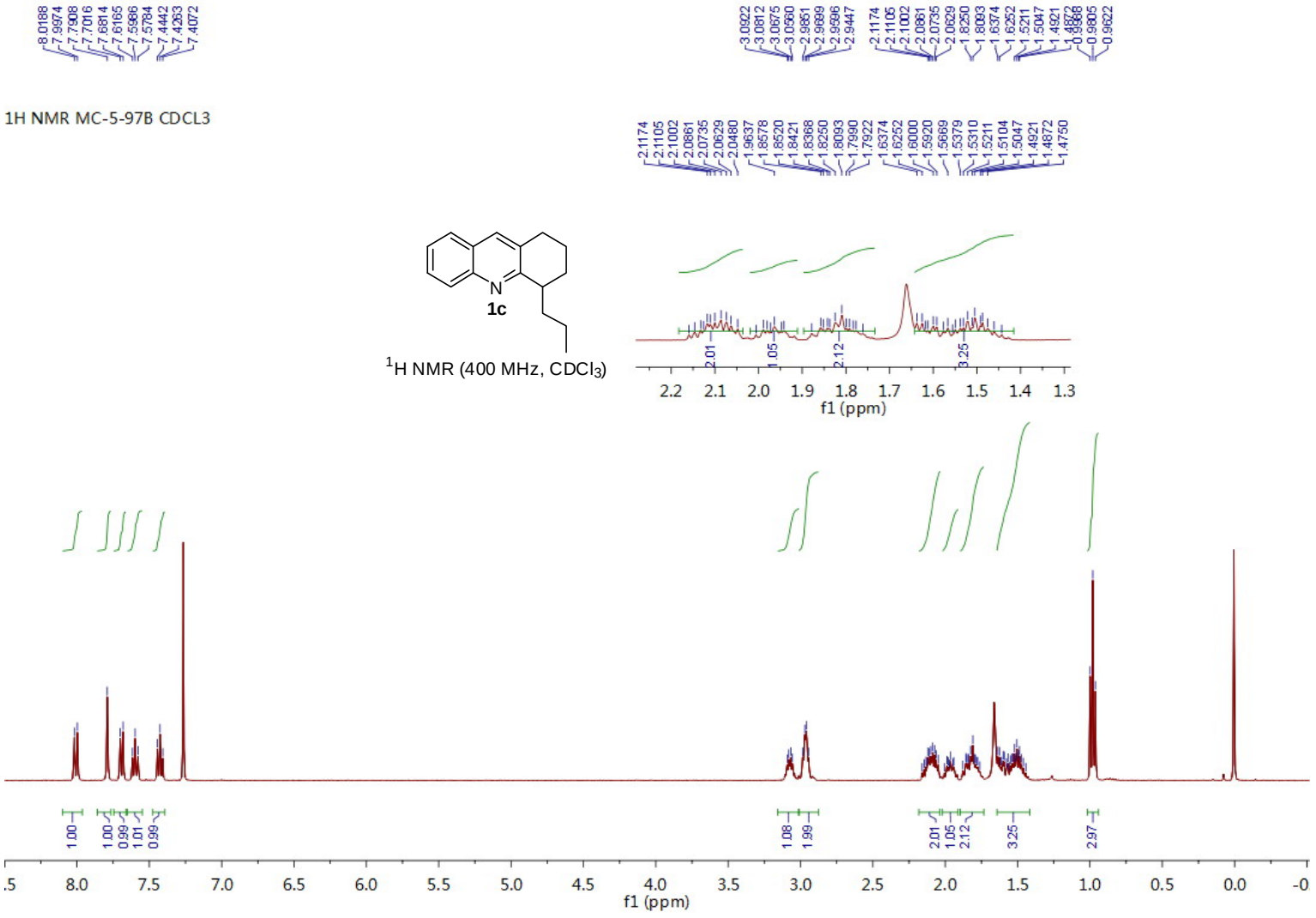
A mixture of 4-bromobenzoyl chloride (88 mg, 0.40 mmol), Et_3N (56 μL, 0.40 mmol) and 4-Ethyl-1,2,3,4,4a,9,9a,10-octahydroacridine **2b** (82 mg, 0.38 mmol) dissolved in 5 mL CH_2Cl_2 was stirred for 2 h. After concentrating in *vacuo*, the resulting precipitate was directly purified by column chromatography on silica gel using hexane/EtOAc (30:1) to give the corresponding *N*-4-bromobenzoyl derivative **5b**. The product was recrystallized from DCM/hexane, and ee up to >98%.

CCDC 994490 contains the structure and supplementary crystallographic data for the crystal structure of (4-bromophenyl) ((*4S*,*4aS*,*9aR*)-4-ethyl-2,3,4,4a,9,9a-hexahydroacridin-10(1H)-yl) methanone **5b**. These data can be obtained free of charge via www.ccdc.com.ac.uk/data_ request/cif from the Cambridge Crystallographic Data Centre.

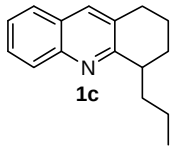
6.1 Copy of NMR for 4-Substituted-1,2,3,4-tetrahydroacridines




162.66
146.81
134.74
130.88
128.58
128.23
127.06
126.77
125.50
43.10
29.69
28.14
27.03
20.08
11.82
13C NMR MC-5-96 in CDCl3
N
1b
13C NMR (100 MHz, CDCl3)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

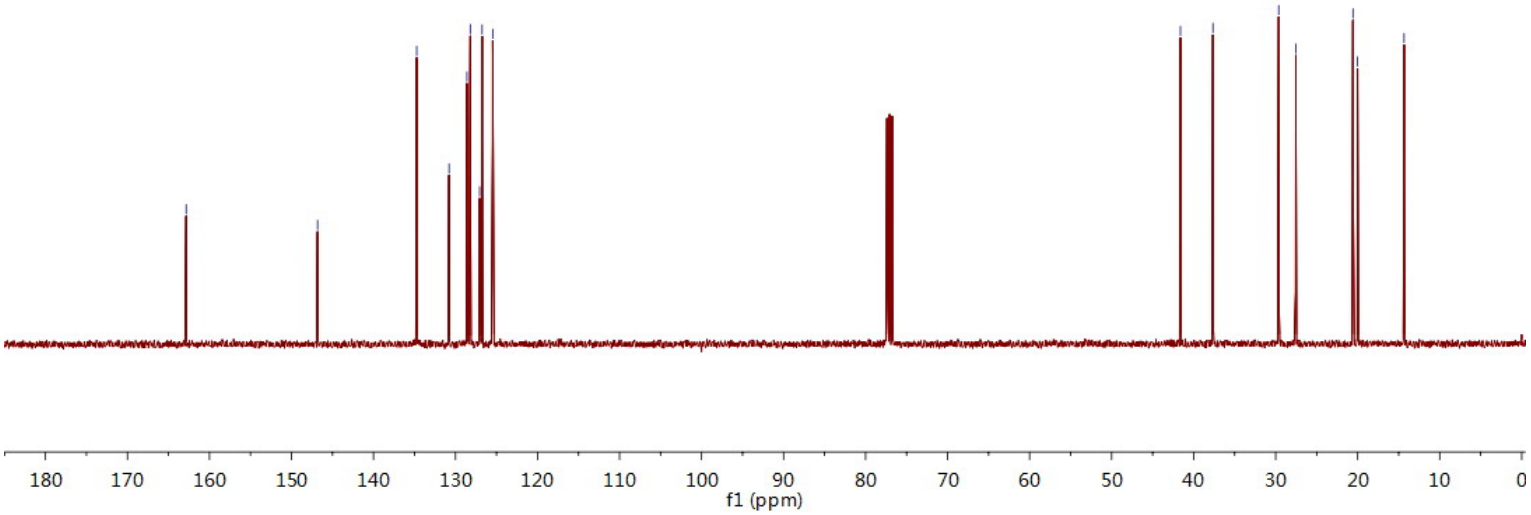

1H NMR MC-5-97B CDCL3
1c
^{1}H NMR (400 MHz, $CDCl_3$)
f1 (ppm)

13C NMR MC-5-97B in CDCl3

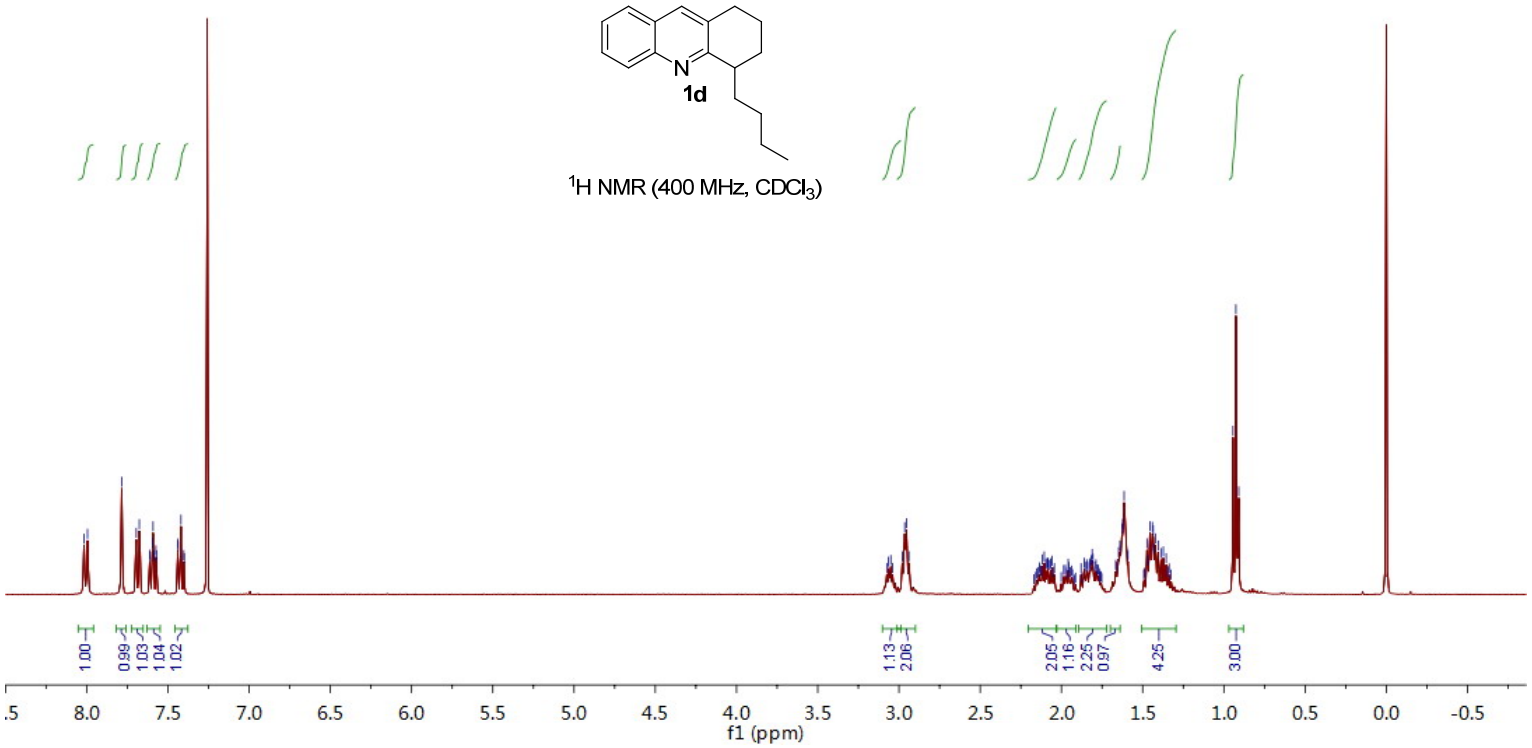


1c

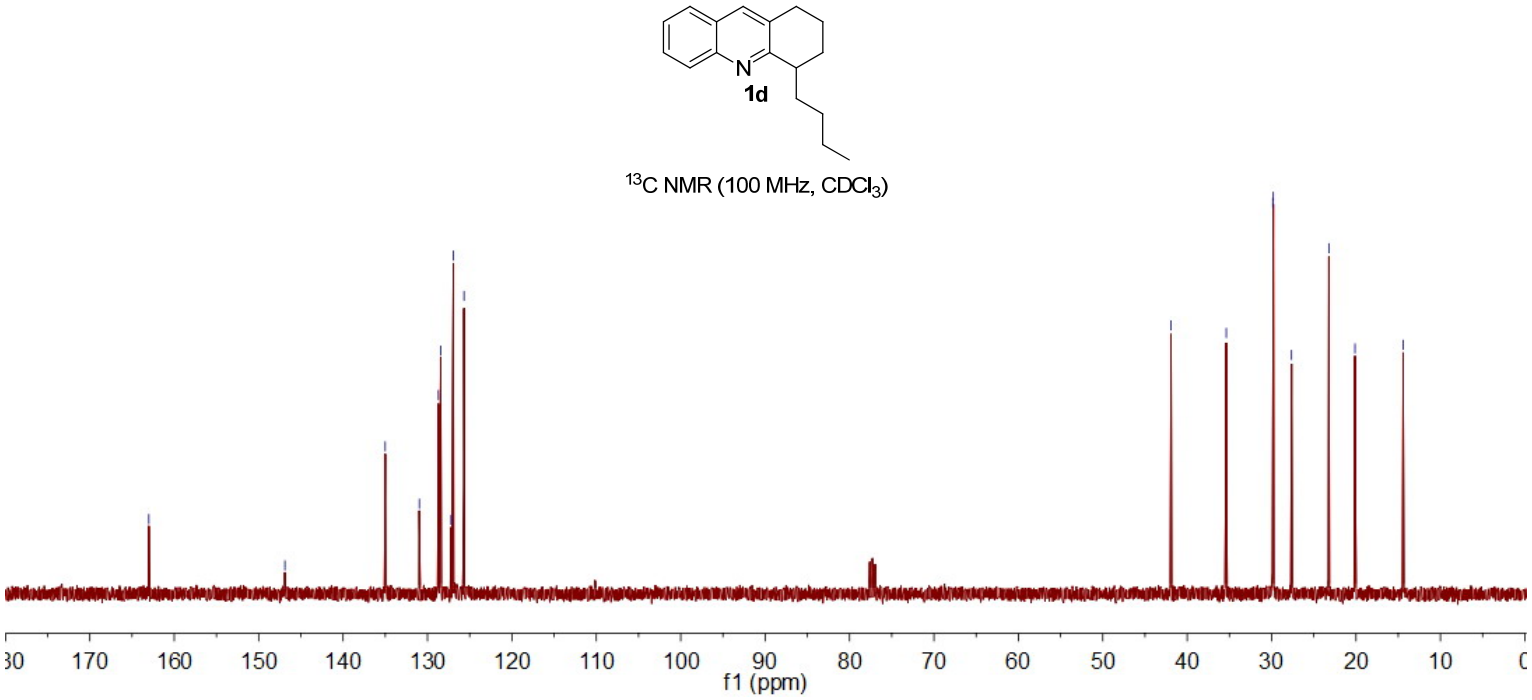
^{13}C NMR (100 MHz, $CDCl_3$)



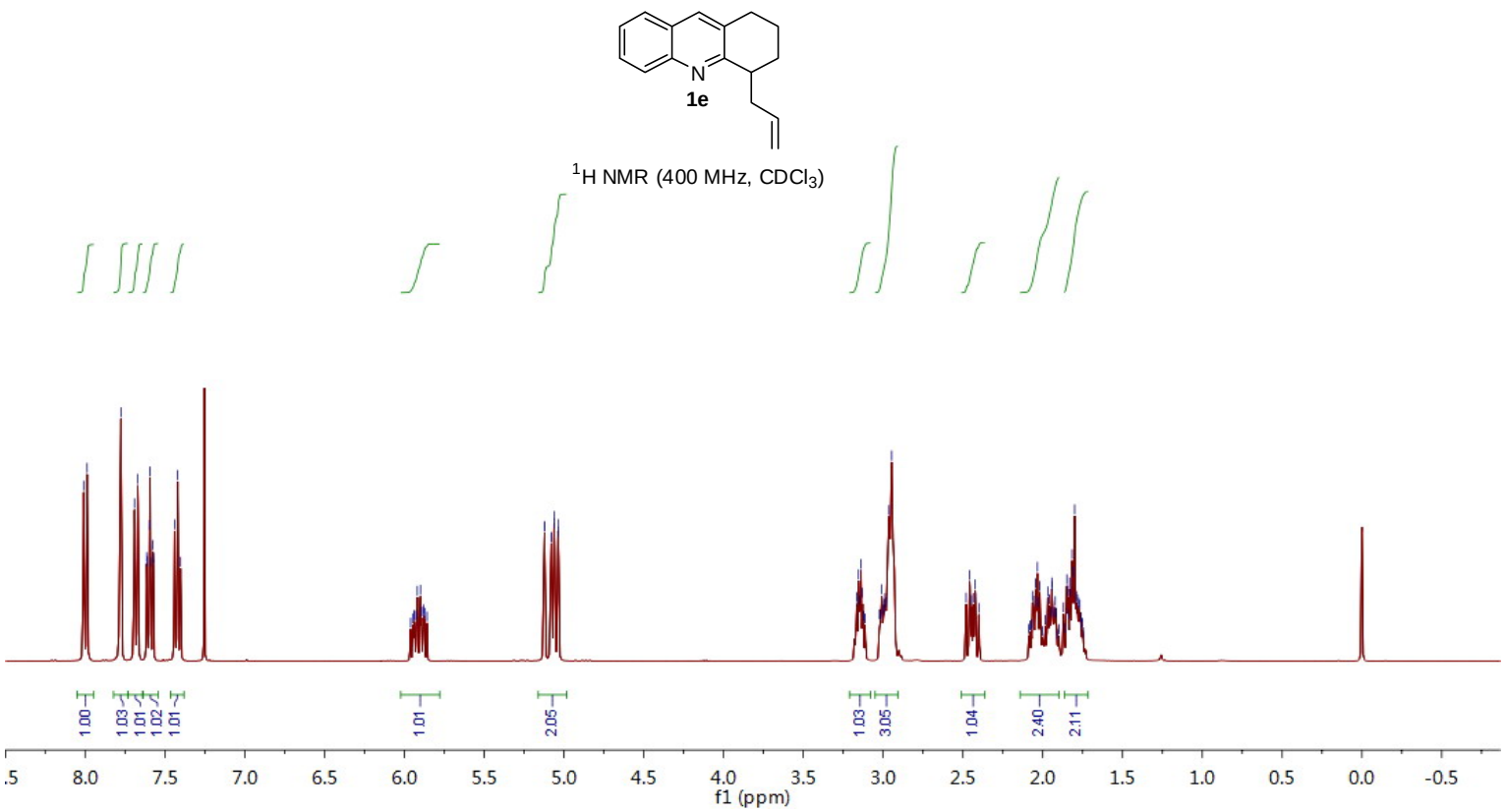
1H NMR MC-5-100B in CDCl3

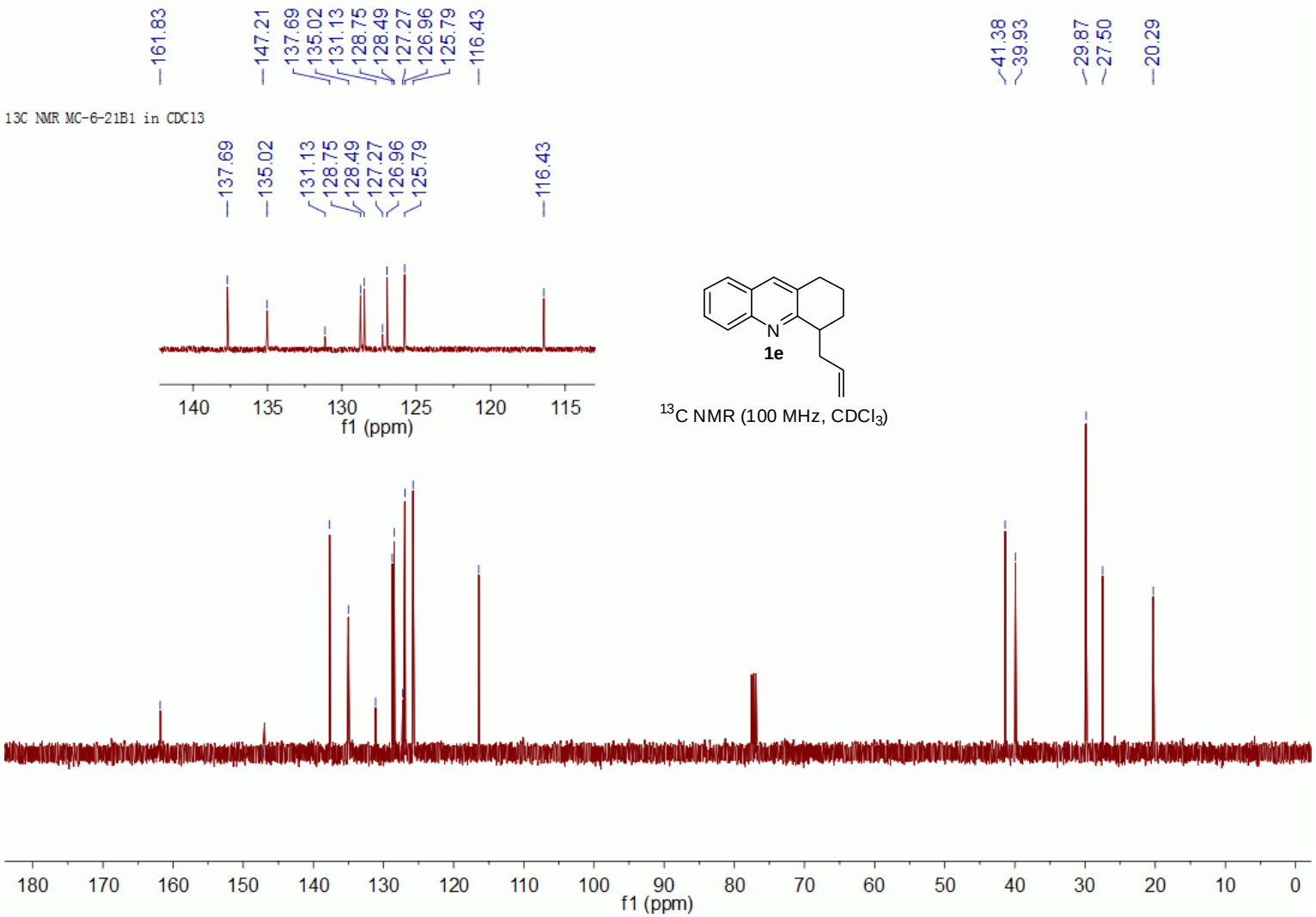


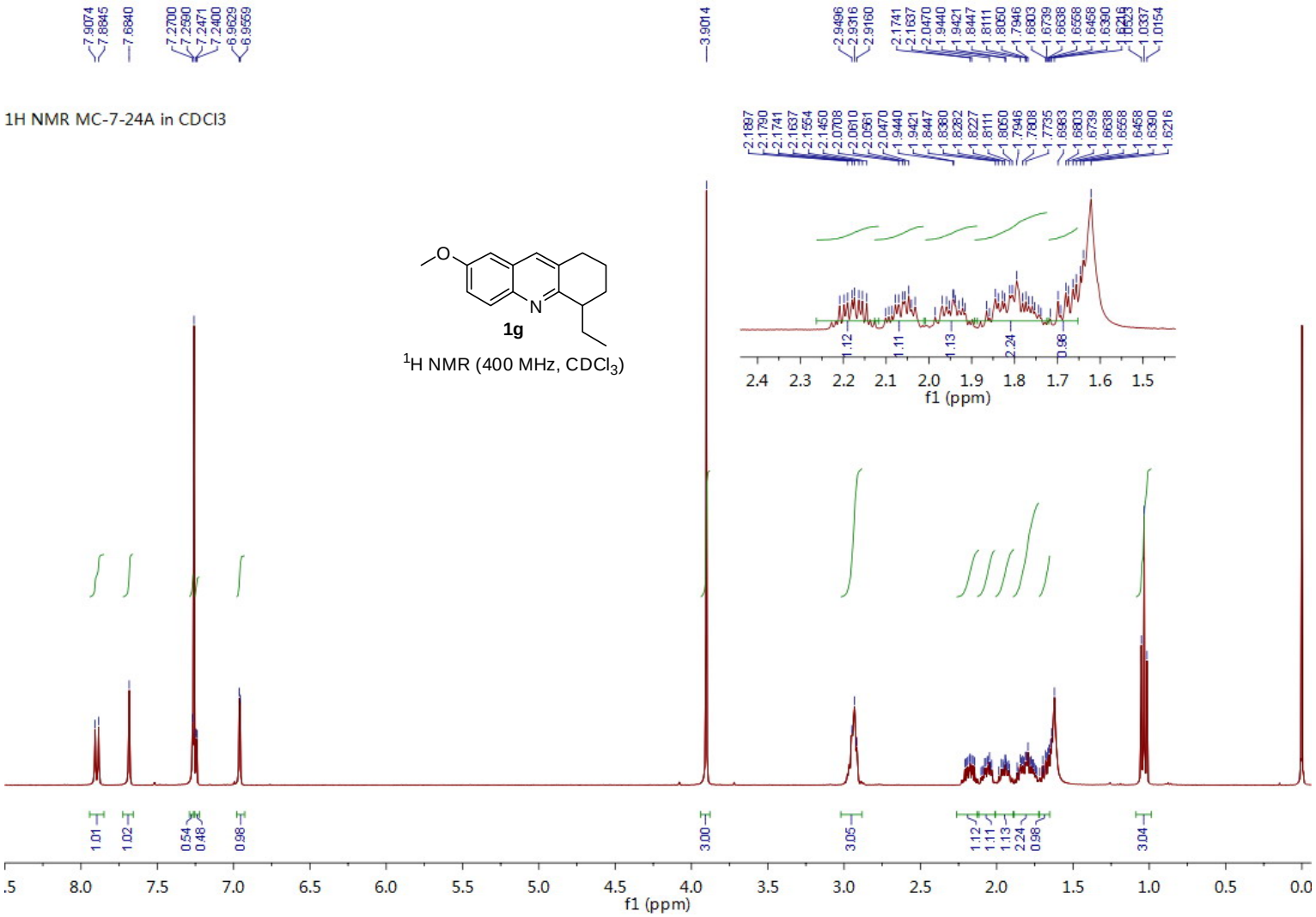
13C NMR MC-5-100B in CDCl3



1H N MR MC-6-20B in CDCl3

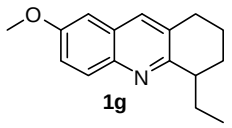



161.83
147.21
137.69
135.02
131.13
128.75
128.49
127.27
126.96
125.79
116.43
41.38
39.93
29.87
27.50
20.29
13C NMR MC-6-21B1 in CDCl3
137.69
135.02
131.13
128.75
128.49
127.27
126.96
125.79
116.43
140
135
130
125
120
115
f1 (ppm)
N
1e
13C NMR (100 MHz, CDCl3)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


1H NMR MC-7-24A in CDCl3
1g
1H NMR (400 MHz, CDCl3)
f1 (ppm)

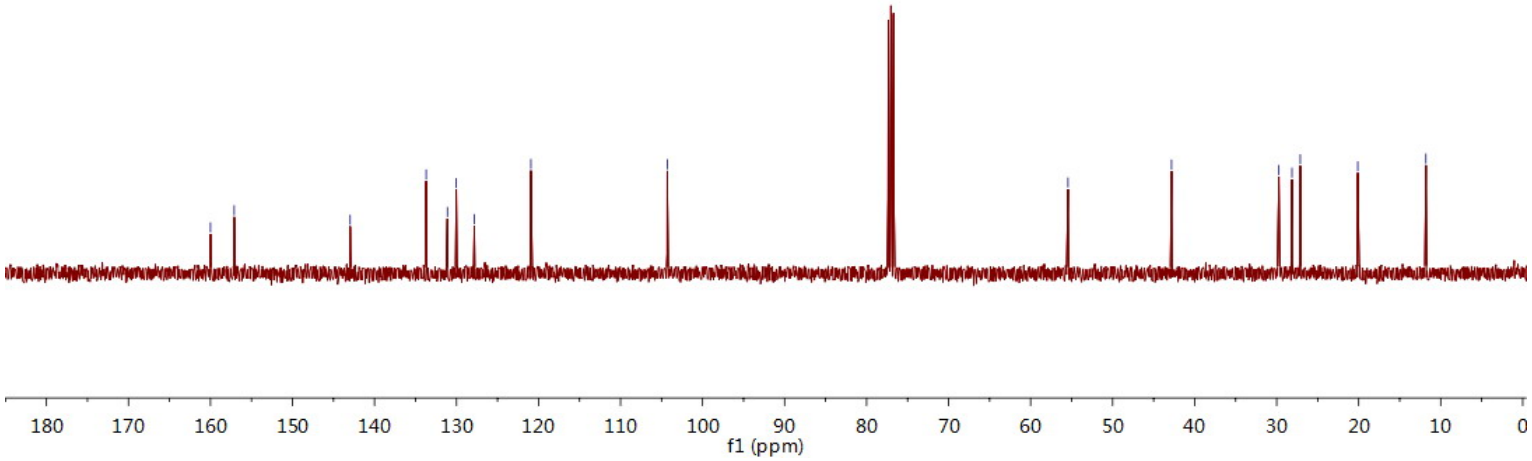
160.00
157.10
142.97
133.70
131.11
130.03
127.83
120.93
104.31
55.44
42.82
29.73
28.13
27.12
20.11
11.80

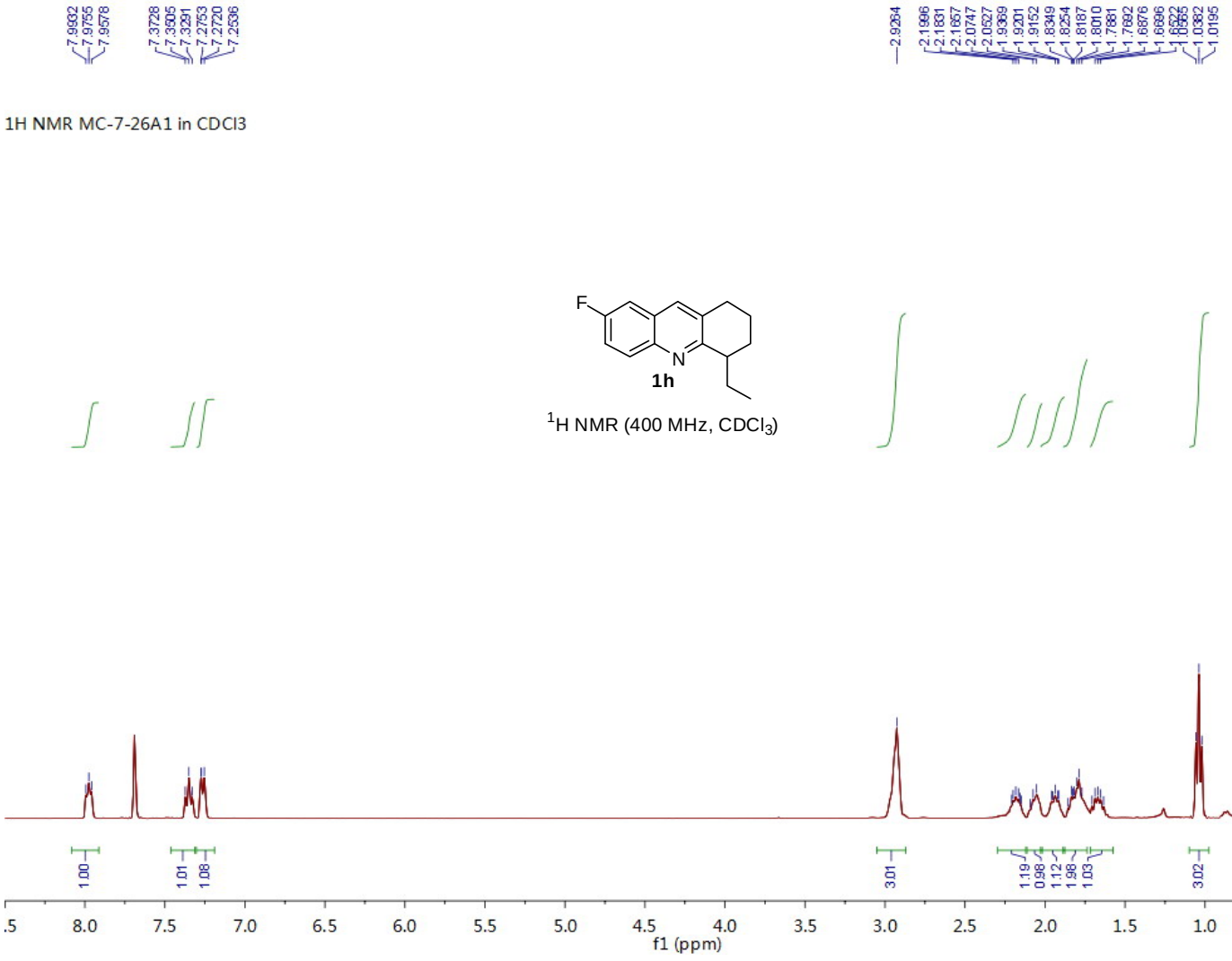
13 C NMR MC-7-24A in CDCl3

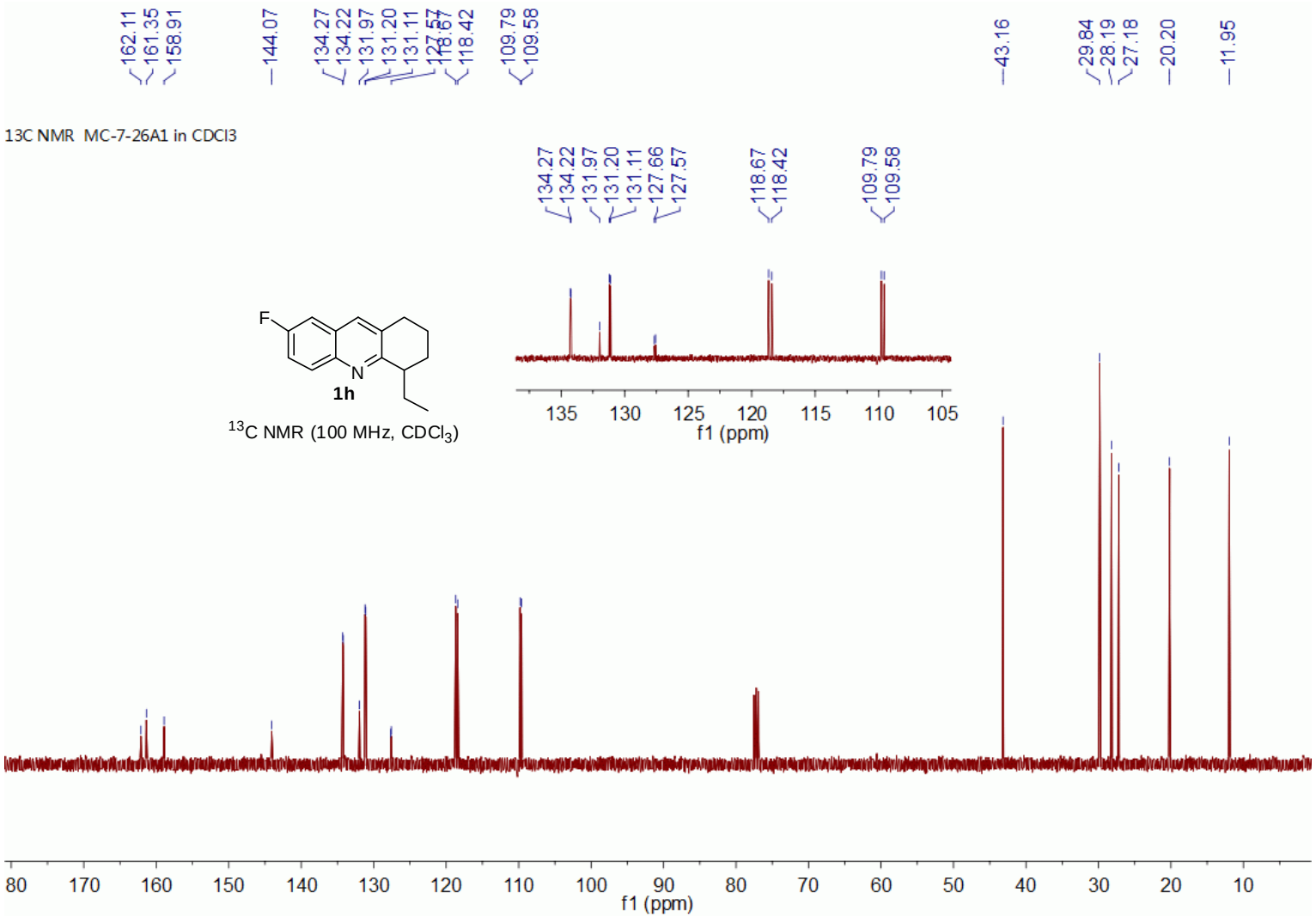


1g

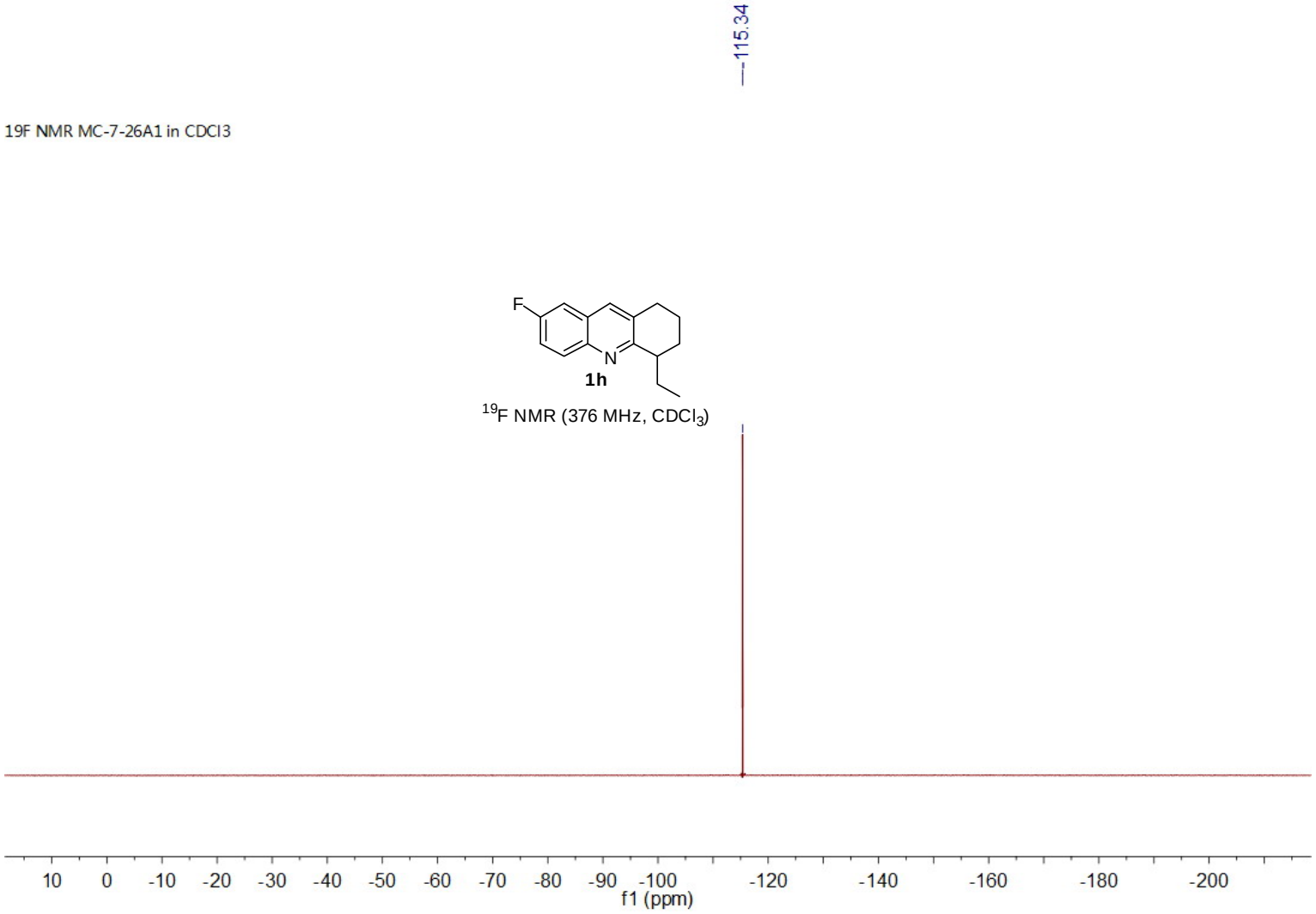
^{13}C NMR (100 MHz, $CDCl_3$)




7.9932
7.9755
7.9578
7.3728
7.3505
7.3291
7.2753
7.2720
7.2536
2.9264
2.1996
2.1831
2.1657
2.0747
2.0527
1.9369
1.9201
1.9152
1.8349
1.8254
1.8187
1.8010
1.7881
1.7692
1.6876
1.6696
1.6522
1.0382
1.0195
1H NMR MC-7-26A1 in CDCl3
F
N
1h
1H NMR (400 MHz, CDCl3)
1.00
1.01
1.08
3.01
1.19
0.98
1.12
1.98
1.03
3.02
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)


13C NMR MC-7-26A1 in CDCl3
162.11
161.35
158.91
144.07
134.27
134.22
131.97
131.20
131.11
127.57
118.67
118.42
109.79
109.58
43.16
29.84
28.19
27.18
20.20
11.95
F
N
1h
13C NMR (100 MHz, CDCl3)
f1 (ppm)
f1 (ppm)

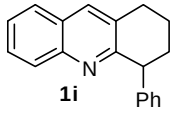
19F NMR MC-7-26A1 in CDCl3



1h

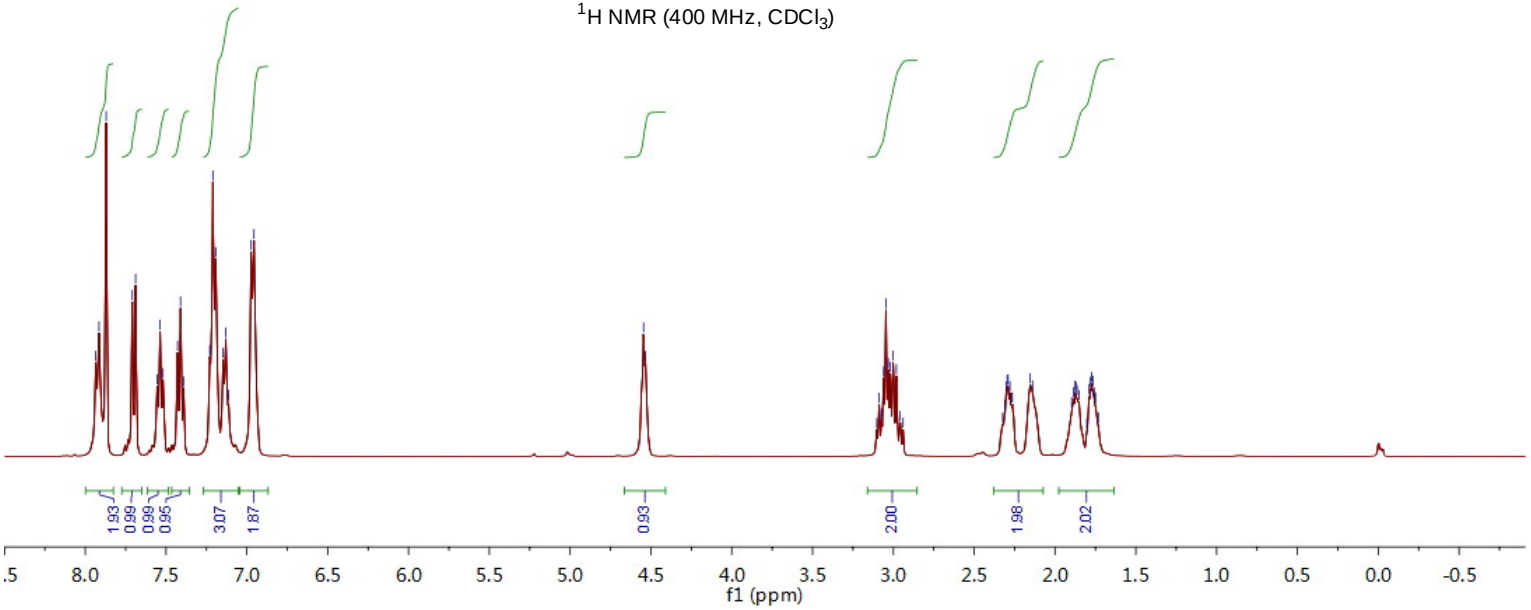
^{19}F NMR (376 MHz, $CDCl_3$)

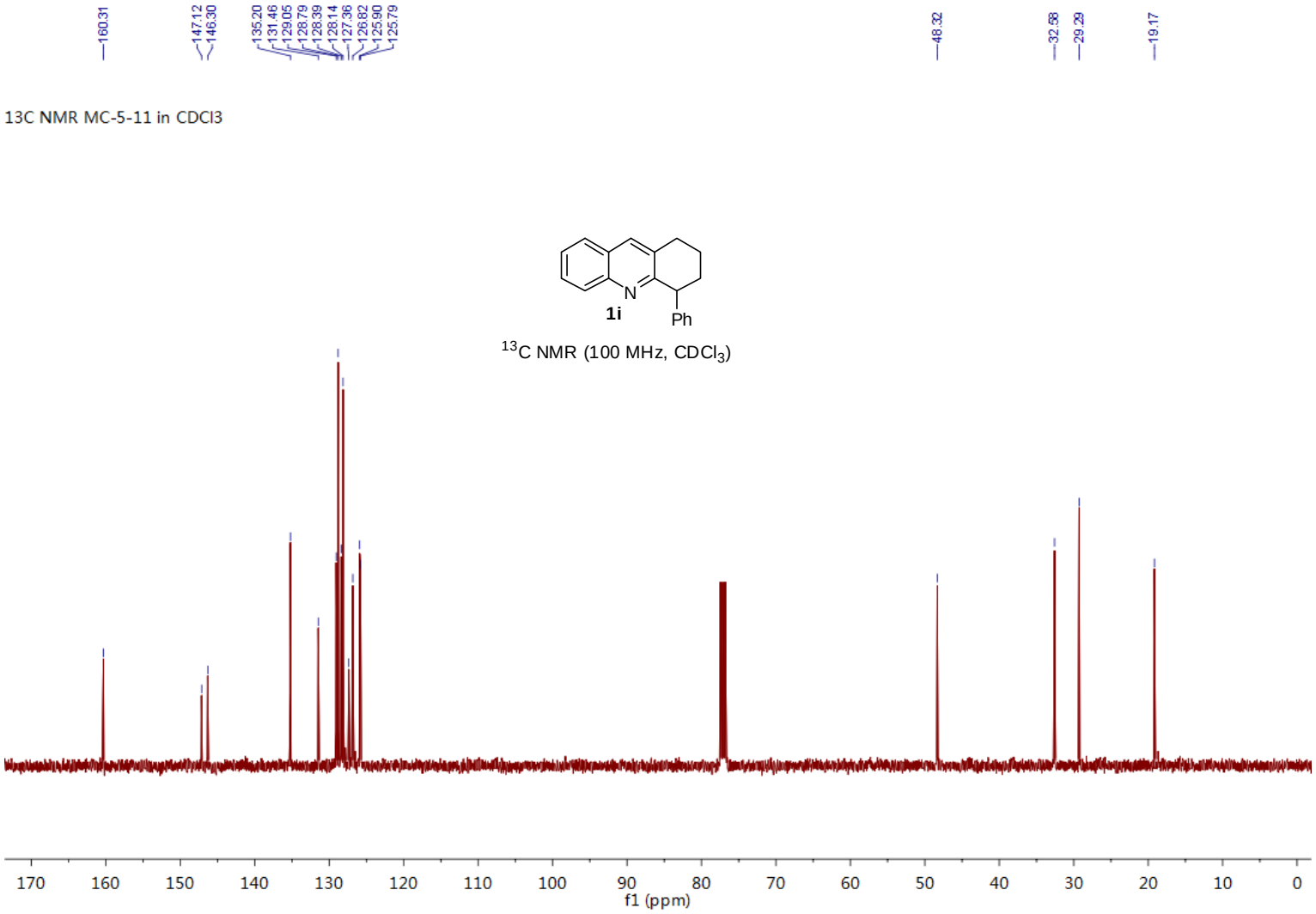
1H NMR MC-5-11 in CDCl3



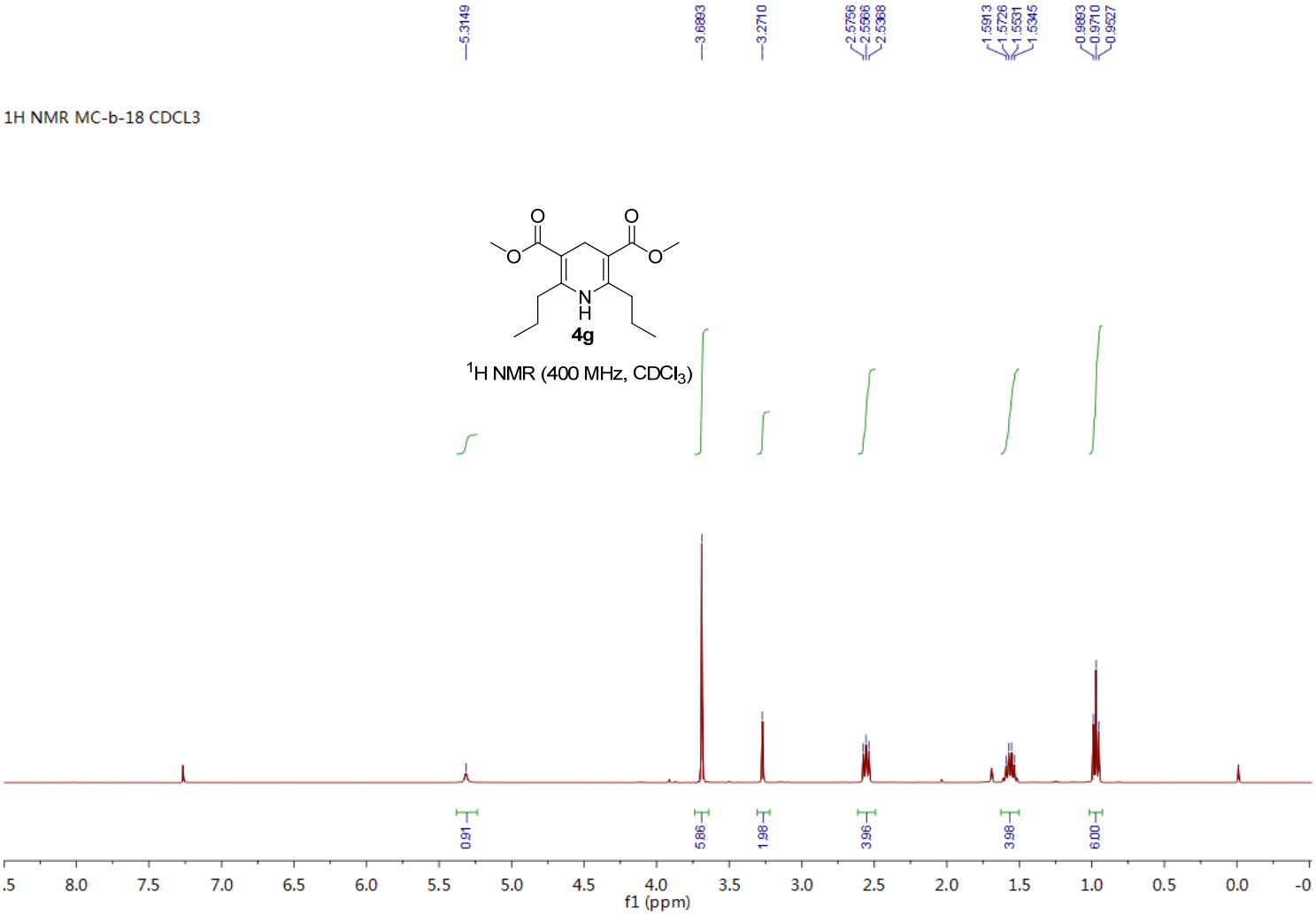
1i

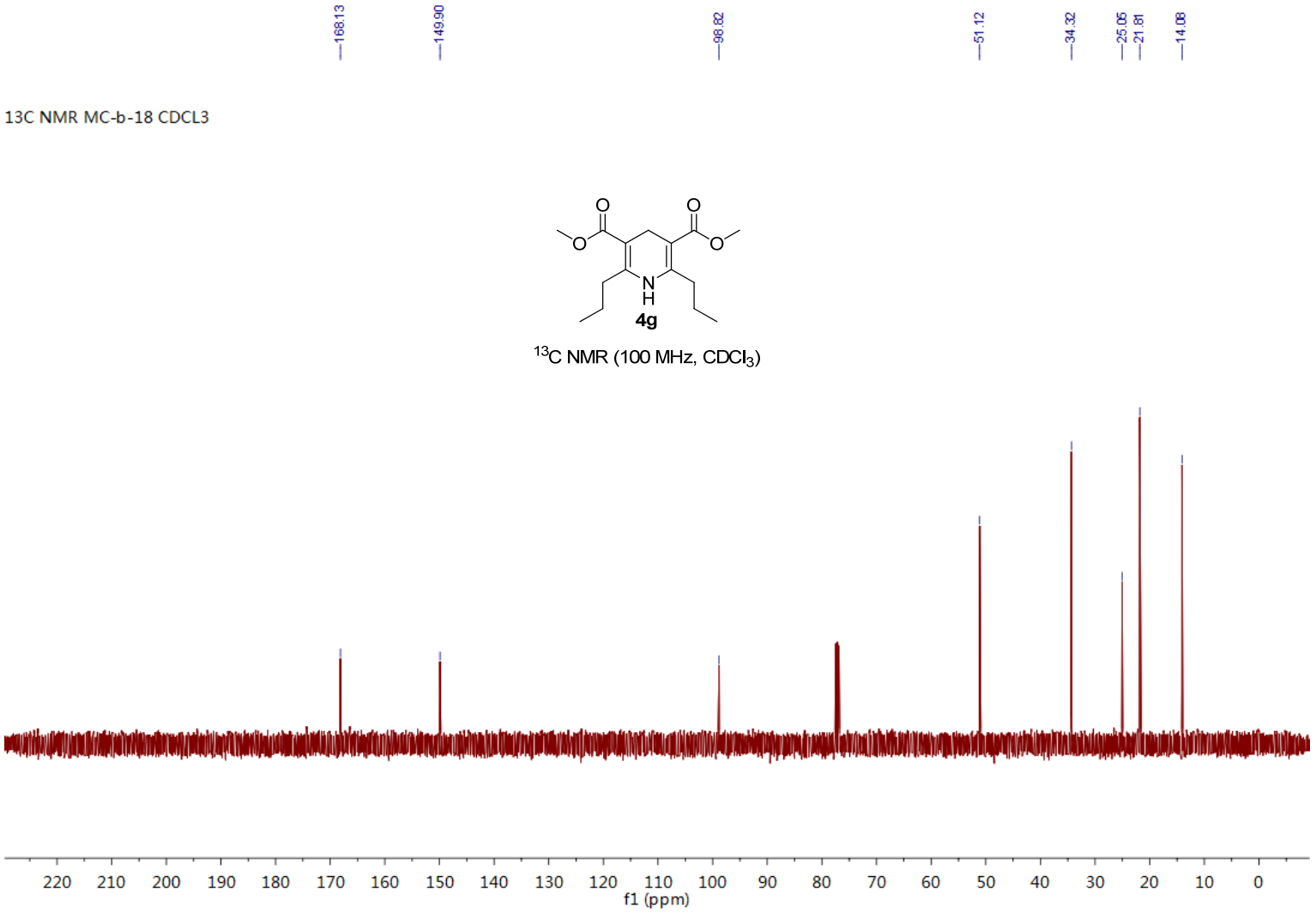
^{1}H NMR (400 MHz, $CDCl_3$)



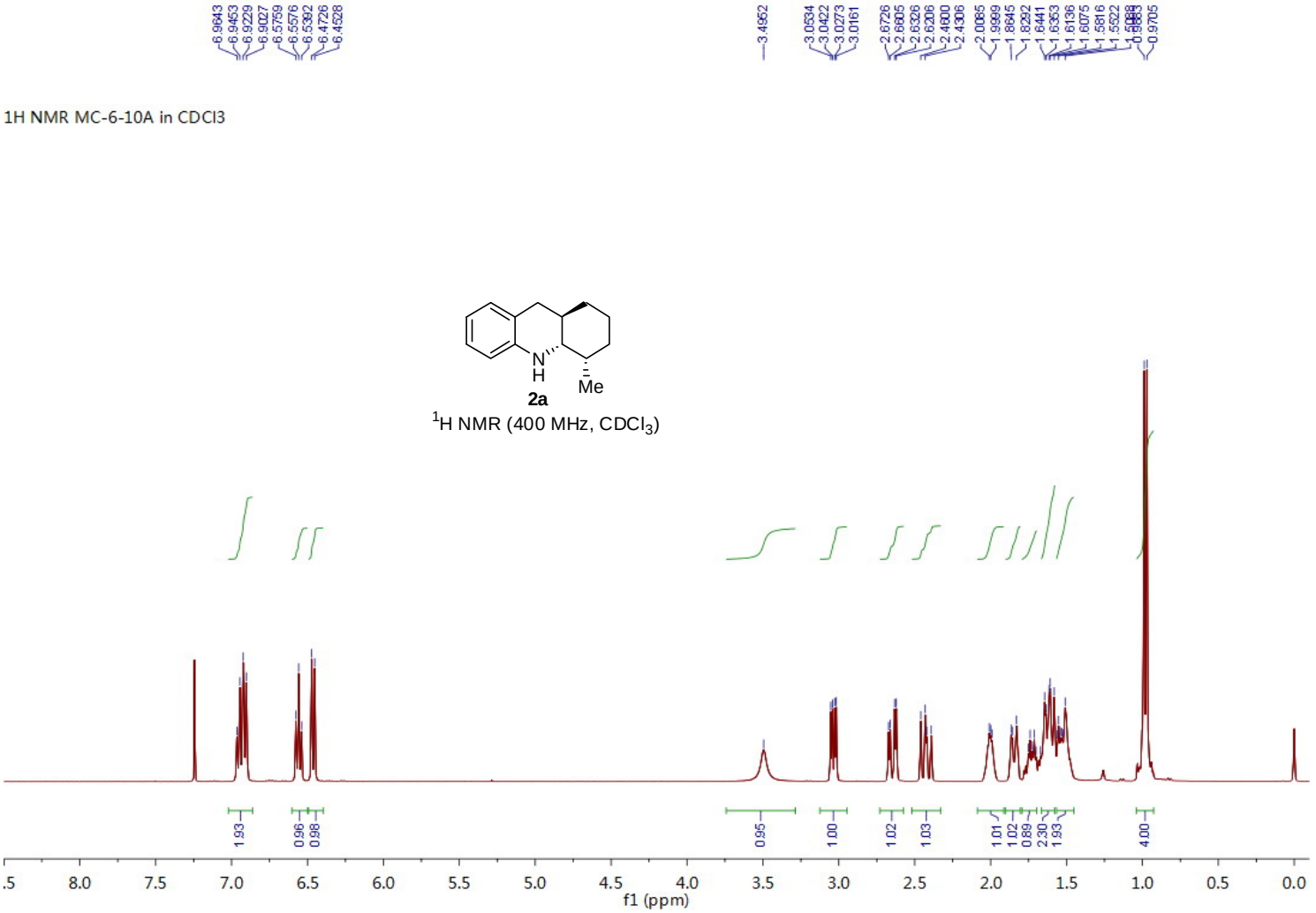

160.31
147.12
146.30
135.20
131.46
129.05
128.79
128.39
128.14
127.36
126.82
125.90
125.79
48.32
32.68
29.29
19.17
13C NMR MC-5-11 in CDCl3
N
1i
Ph
13C NMR (100 MHz, CDCl3)
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

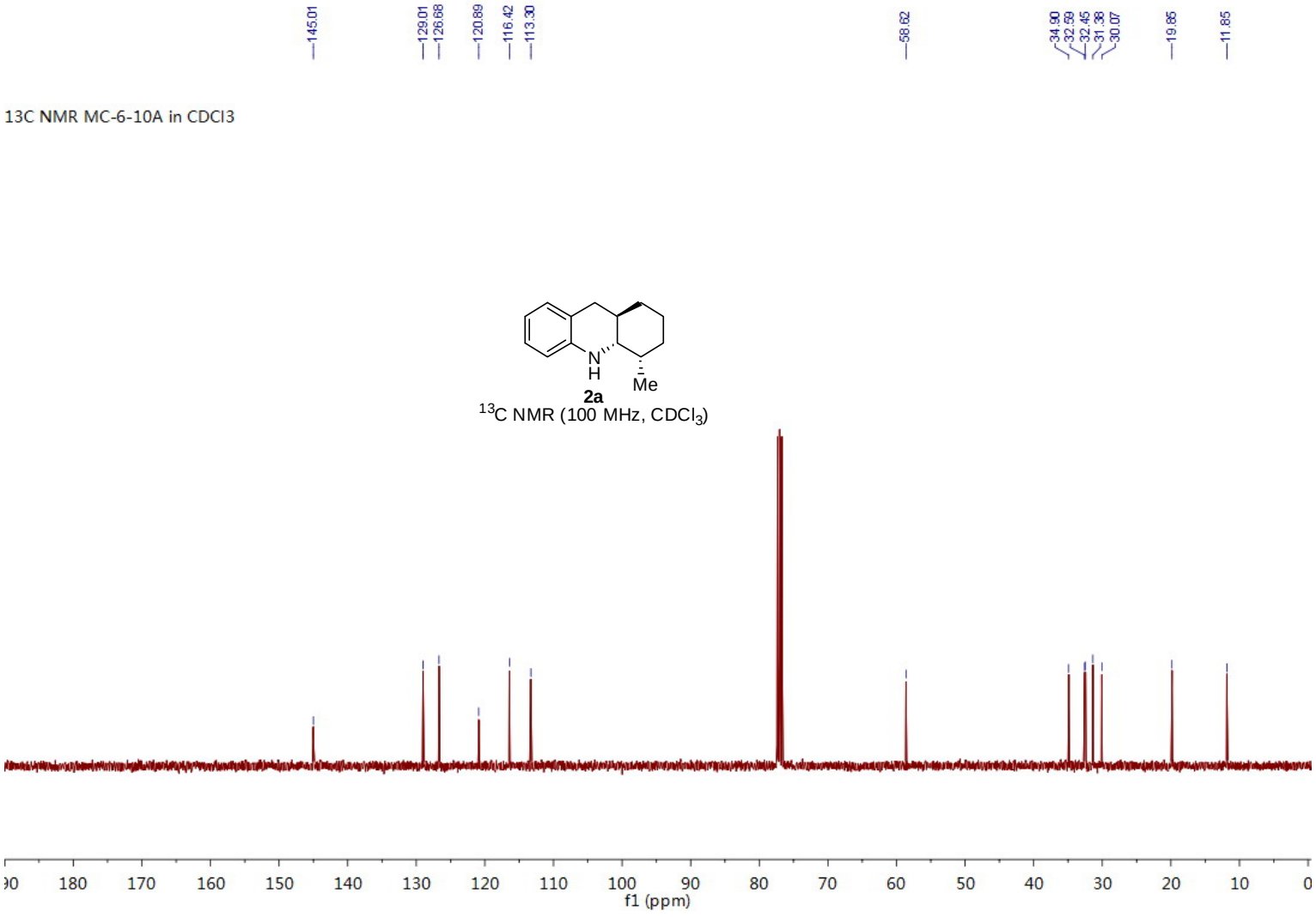
6.2 Copy of NMR for 4g

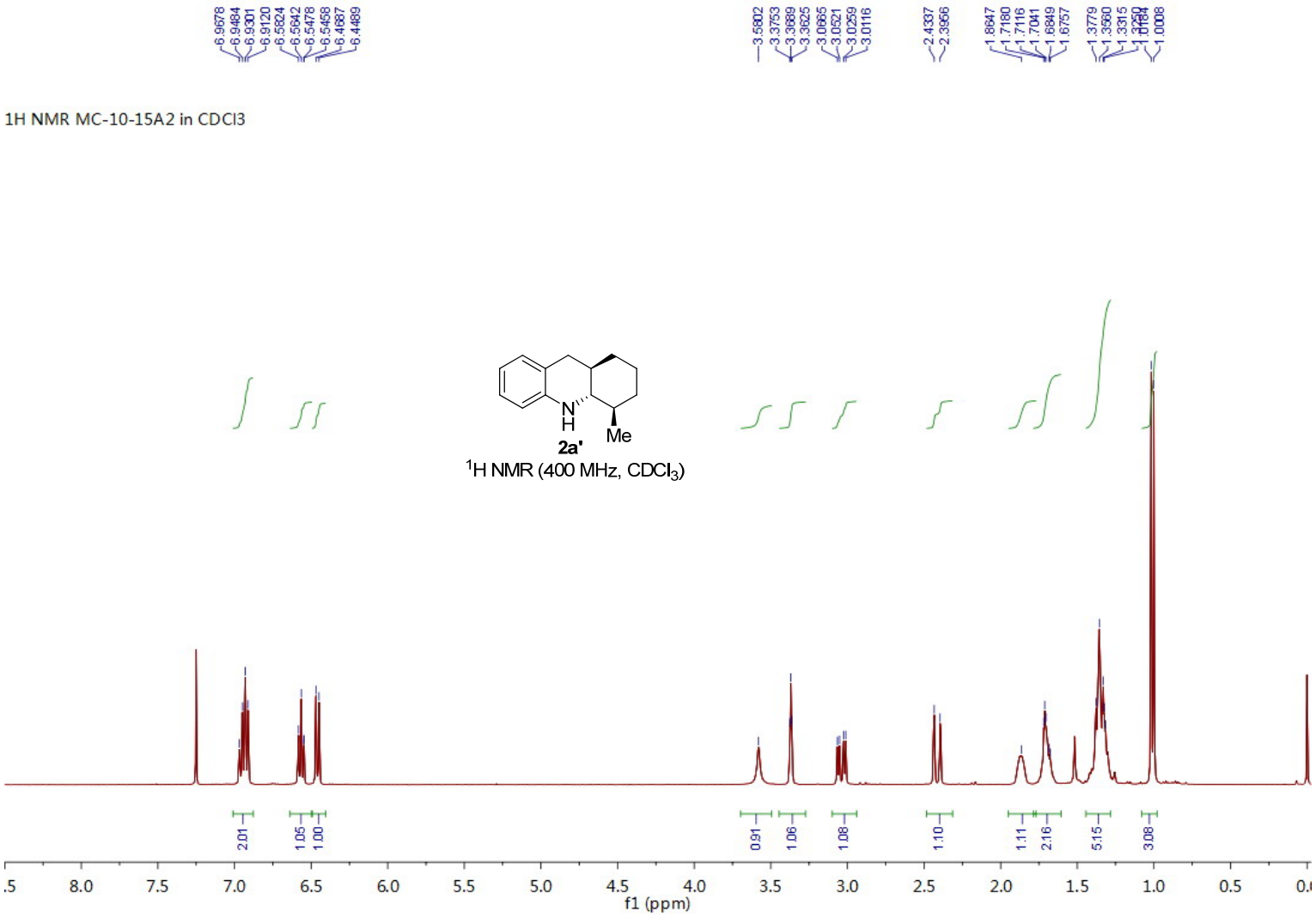


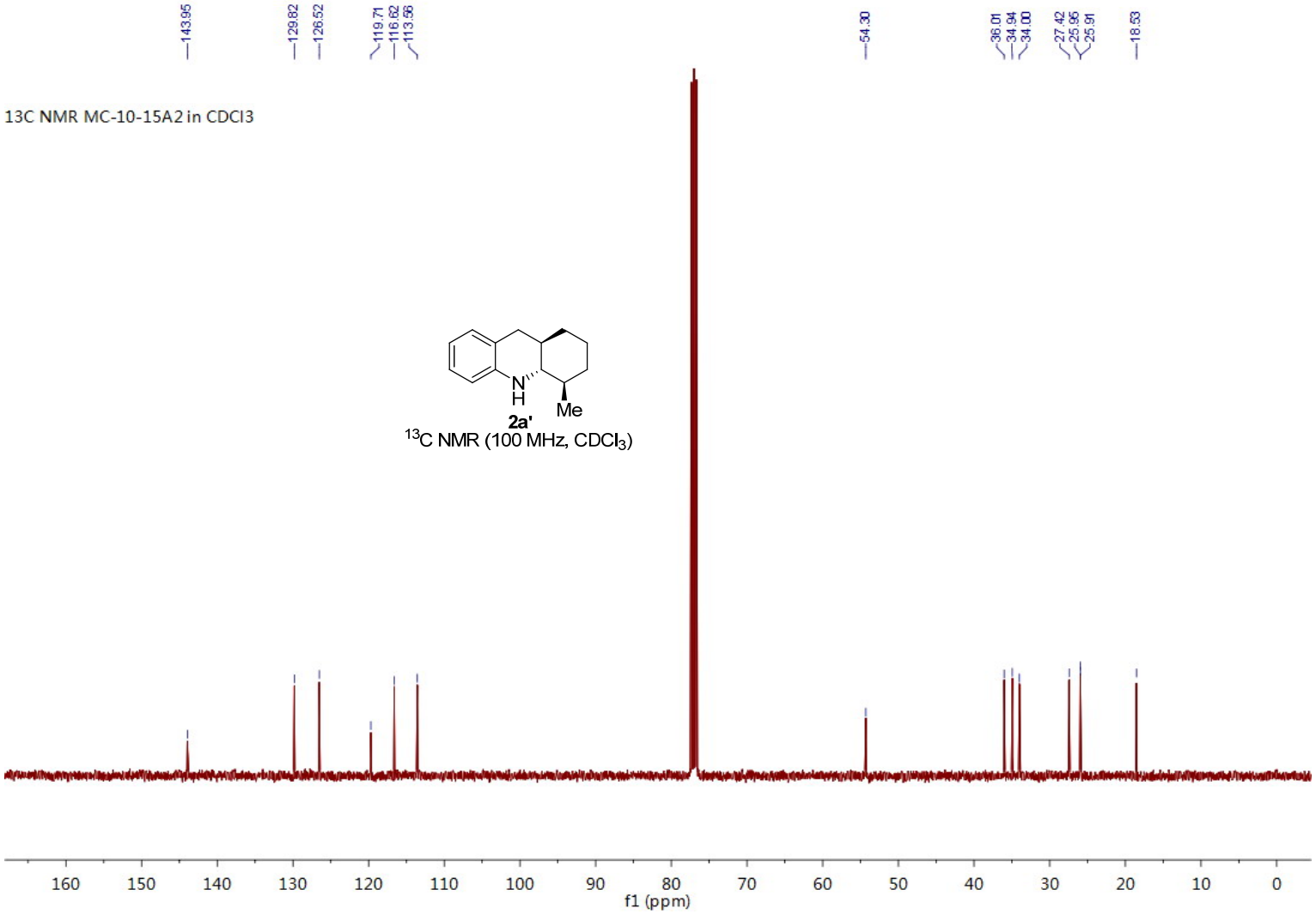

168.13
149.90
98.82
51.12
34.32
25.05
21.81
14.08
13C NMR MC-b-18 CDCL3
O
O
O
O
N
H
4g
^{13}C NMR (100 MHz, $CDCl_3$)
220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
f1 (ppm)

6.3 Copy of NMR for 1,2,3,4-tetrahydroquinolines

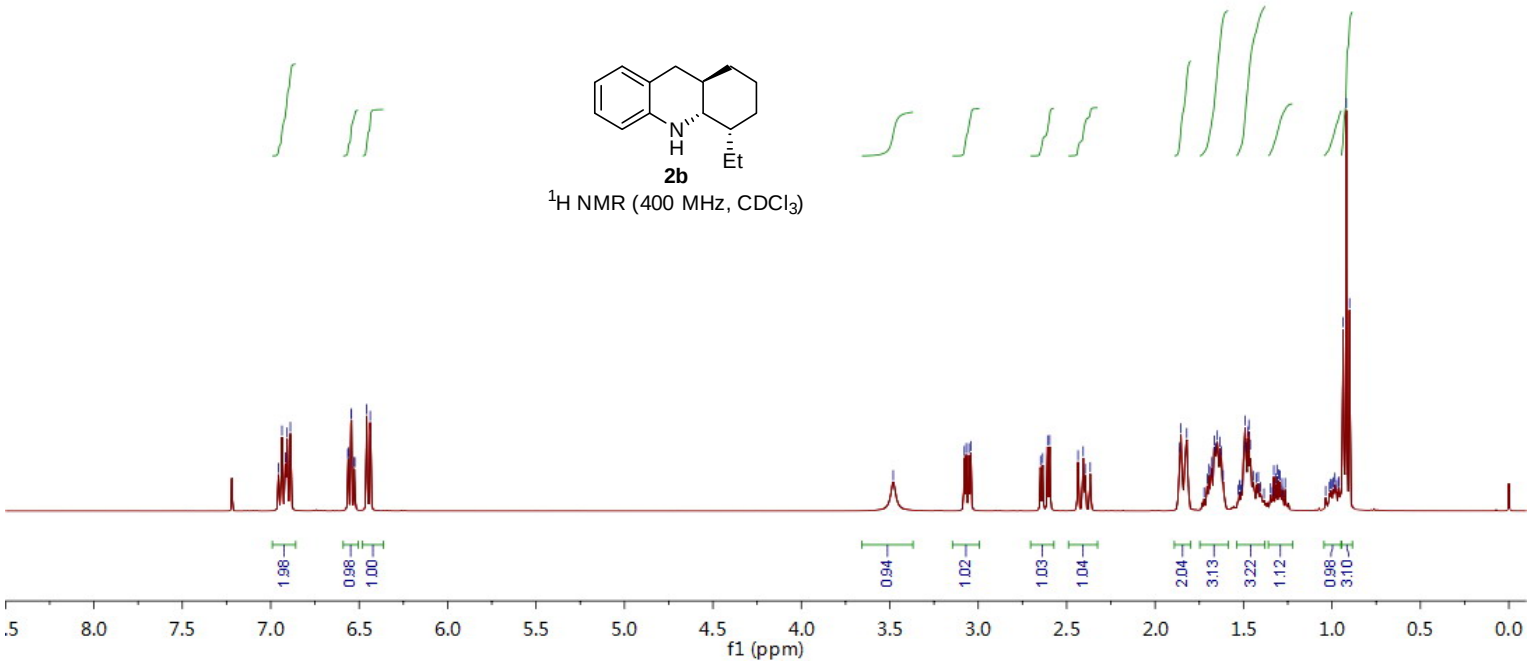


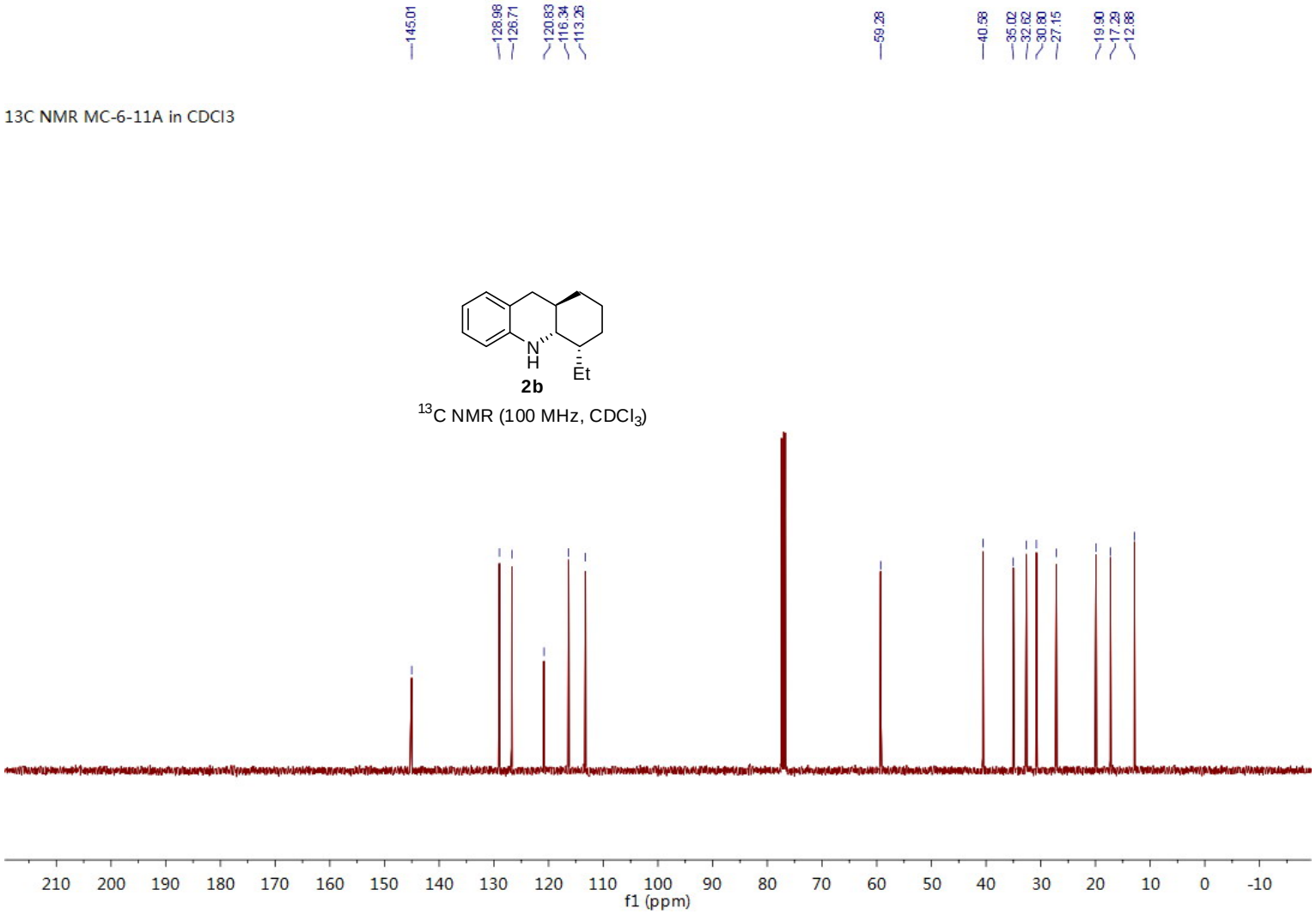

145.01
129.01
126.68
120.89
116.42
113.30
58.62
34.90
32.59
32.45
31.38
30.07
19.85
11.85
13C NMR MC-6-10A in CDCl3
N
H
Me
2a
13C NMR (100 MHz, CDCl3)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


6.9678
6.9484
6.9301
6.9120
6.5824
6.5642
6.5478
6.5458
6.4887
6.4489
3.5802
3.3753
3.3689
3.3625
3.0865
3.0521
3.0259
3.0116
2.4337
2.3956
1.8647
1.7180
1.7116
1.7041
1.6849
1.6757
1.3779
1.3560
1.3315
1.0008
1H NMR MC-10-15A2 in CDCl3
N
H
Me
2a'
1H NMR (400 MHz, CDCl3)
2.01
1.05
1.00
0.91
1.06
1.08
1.10
1.11
2.16
5.15
3.08
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
f1 (ppm)

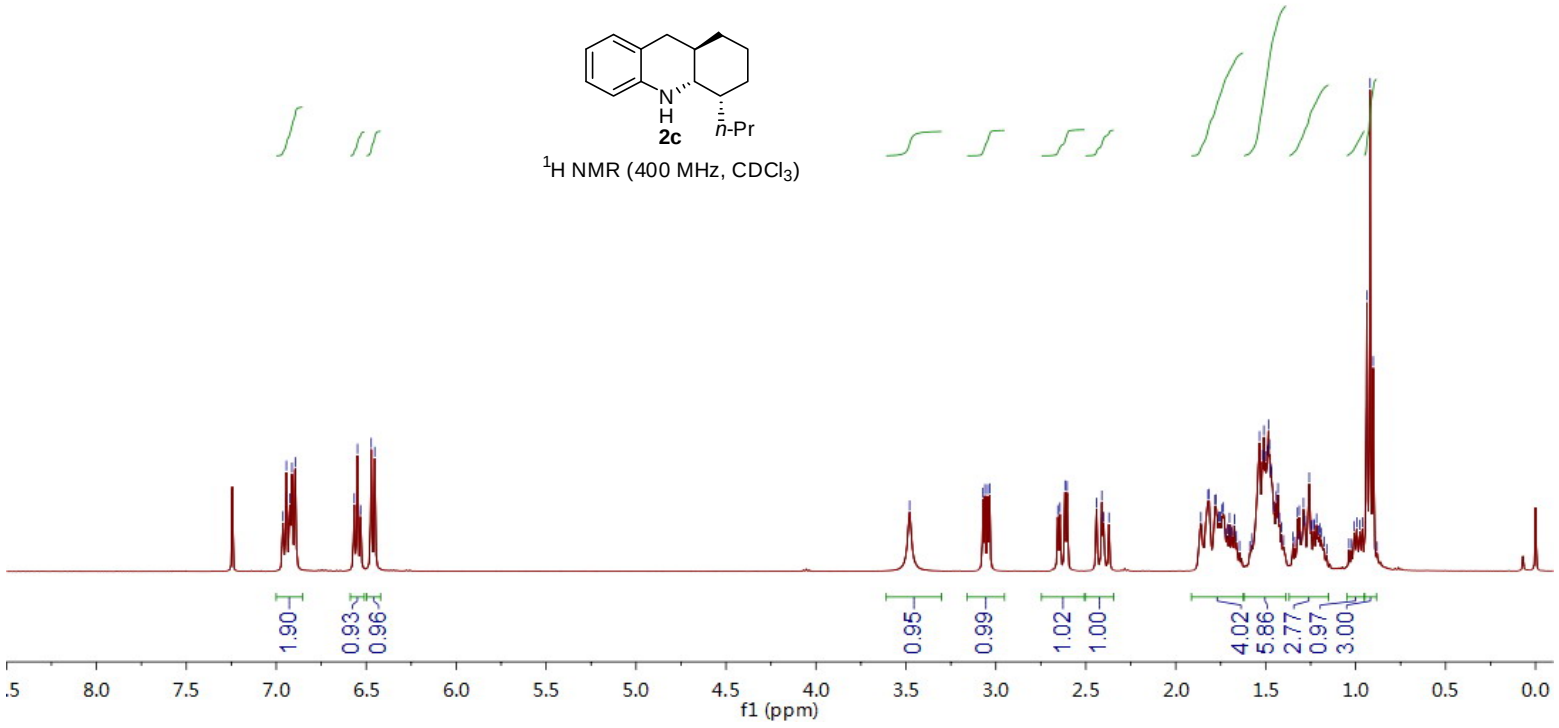

143.95
129.82
126.52
119.71
116.62
113.56
54.30
36.01
34.94
34.00
27.42
25.96
25.91
18.63
13C NMR MC-10-15A2 in CDCl3
N
H
Me
2a'
13C NMR (100 MHz, CDCl3)
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

1H NMR MC-6-11A in CDCl3

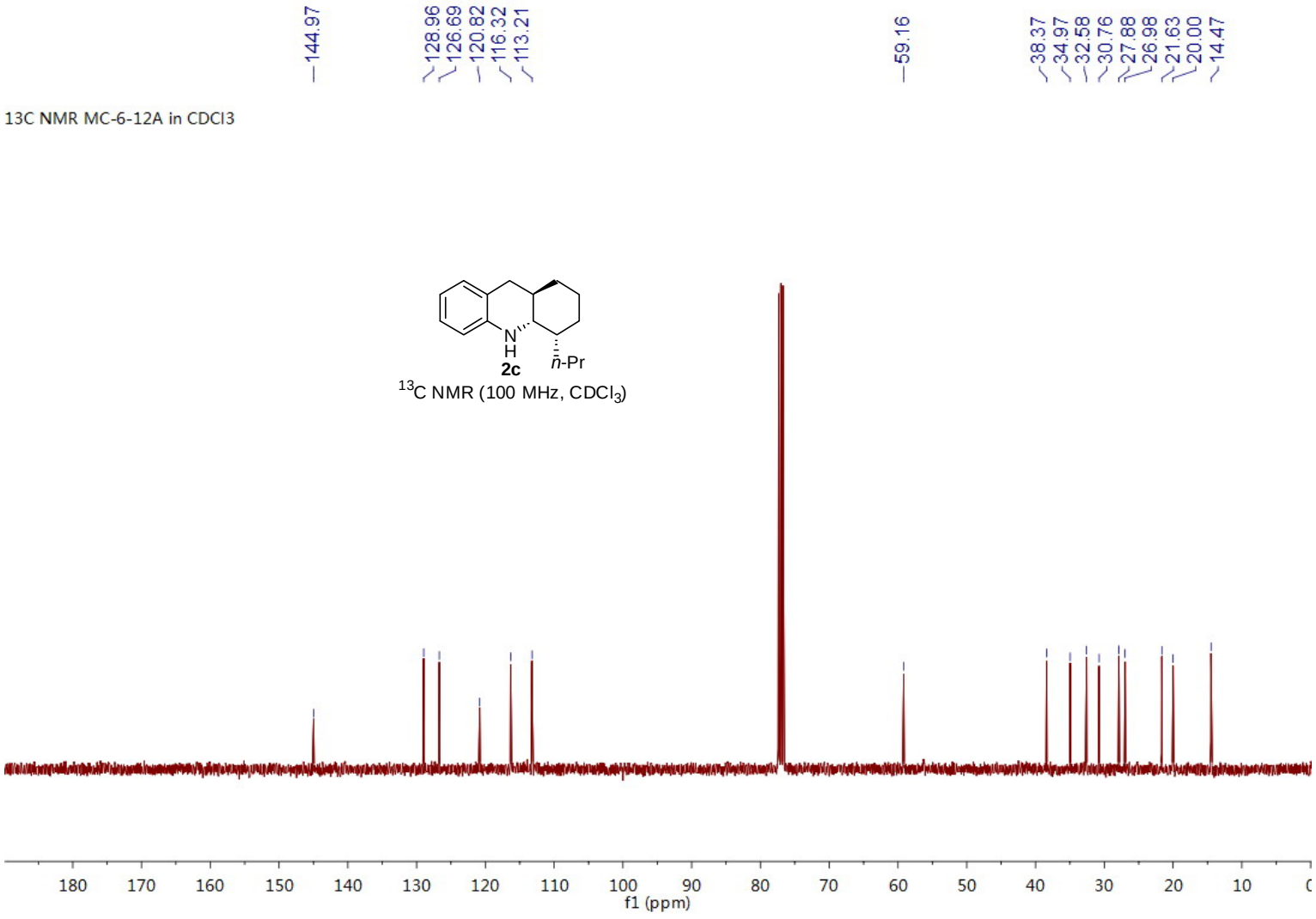



145.01
128.98
126.71
120.83
116.34
113.26
59.28
40.58
35.02
32.62
30.80
27.15
19.90
17.29
12.88
13C NMR MC-6-11A in CDCl3
N
H
Et
2b
13C NMR (100 MHz, CDCl3)
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

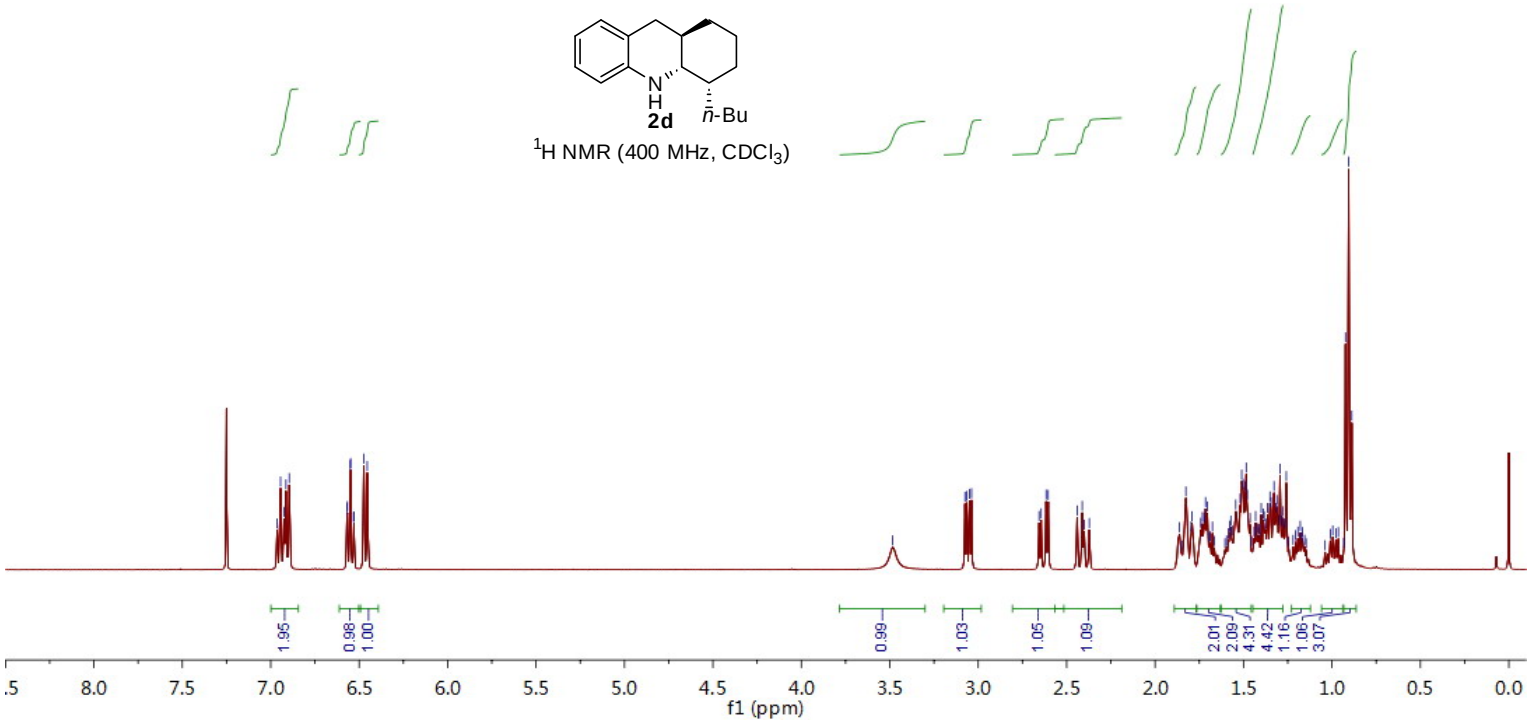
1H NMR MC-6-12A in CDCl3

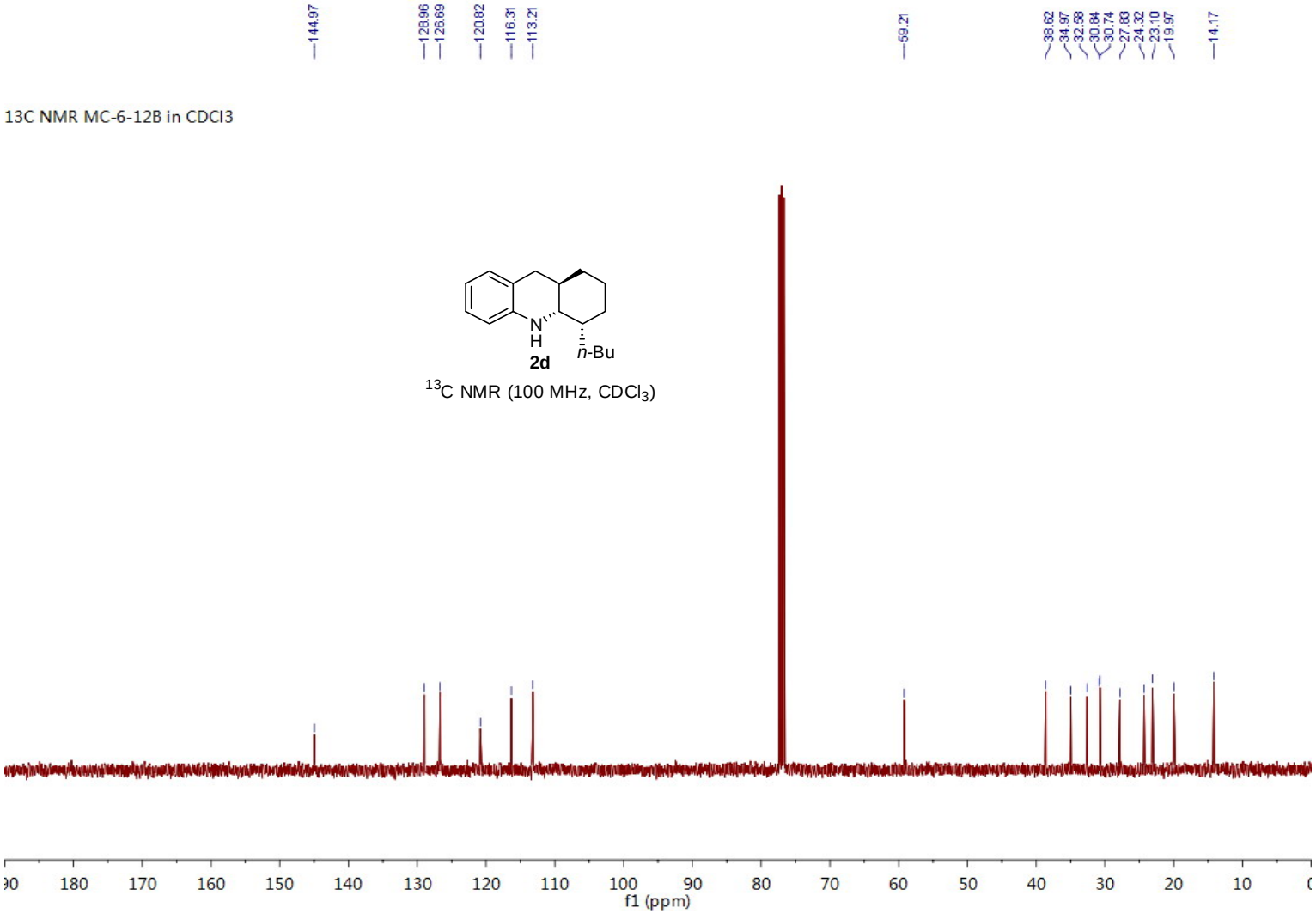


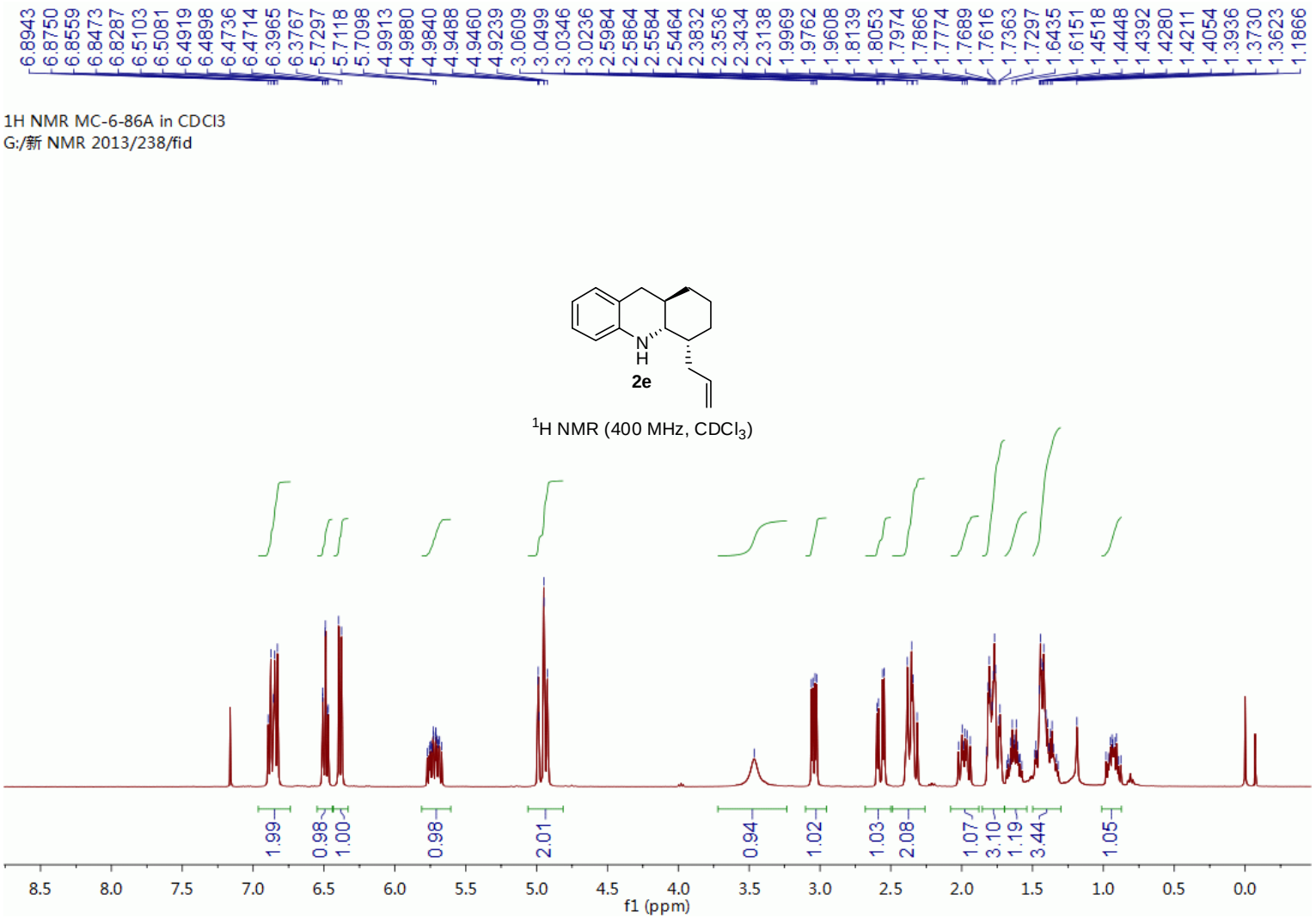
^{1}H NMR (400 MHz, $CDCl_3$)


144.97
128.96
126.69
120.82
116.32
113.21
59.16
38.37
34.97
32.58
30.76
27.88
26.98
21.63
20.00
14.47
13C NMR MC-6-12A in CDCl3
n-Pr
2c
13C NMR (100 MHz, CDCl3)
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

1H NMR MC-6-12B in CDCl3

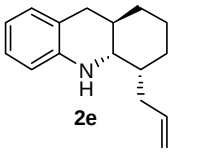



144.97
128.96
126.69
120.82
116.31
113.21
59.21
38.62
34.97
32.58
30.84
30.74
27.83
24.32
23.10
19.97
14.17
13C NMR MC-6-12B in CDCl3
N
H
n-Bu
2d
13C NMR (100 MHz, CDCl3)
f1 (ppm)


6.8943
6.8750
6.8559
6.8473
6.8287
6.5103
6.5081
6.4919
6.4898
6.4736
6.4714
6.3965
6.3767
5.7297
5.7118
5.7098
4.9913
4.9880
4.9840
4.9488
4.9460
4.9239
3.0609
3.0499
3.0346
3.0236
2.5984
2.5864
2.5584
2.5464
2.3832
2.3536
2.3434
2.3138
1.9969
1.9762
1.9608
1.8139
1.8053
1.7974
1.7866
1.7774
1.7689
1.7616
1.7363
1.7297
1.6435
1.6151
1.4518
1.4448
1.4392
1.4280
1.4211
1.4054
1.3936
1.3730
1.3623
1.1866
1H NMR MC-6-86A in CDCl3
G:/新 NMR 2013/238/fid
N
H
2e
1H NMR (400 MHz, CDCl3)
1.99
0.98
1.00
0.98
2.01
0.94
1.02
1.03
2.08
1.07
3.10
1.19
3.44
1.05
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

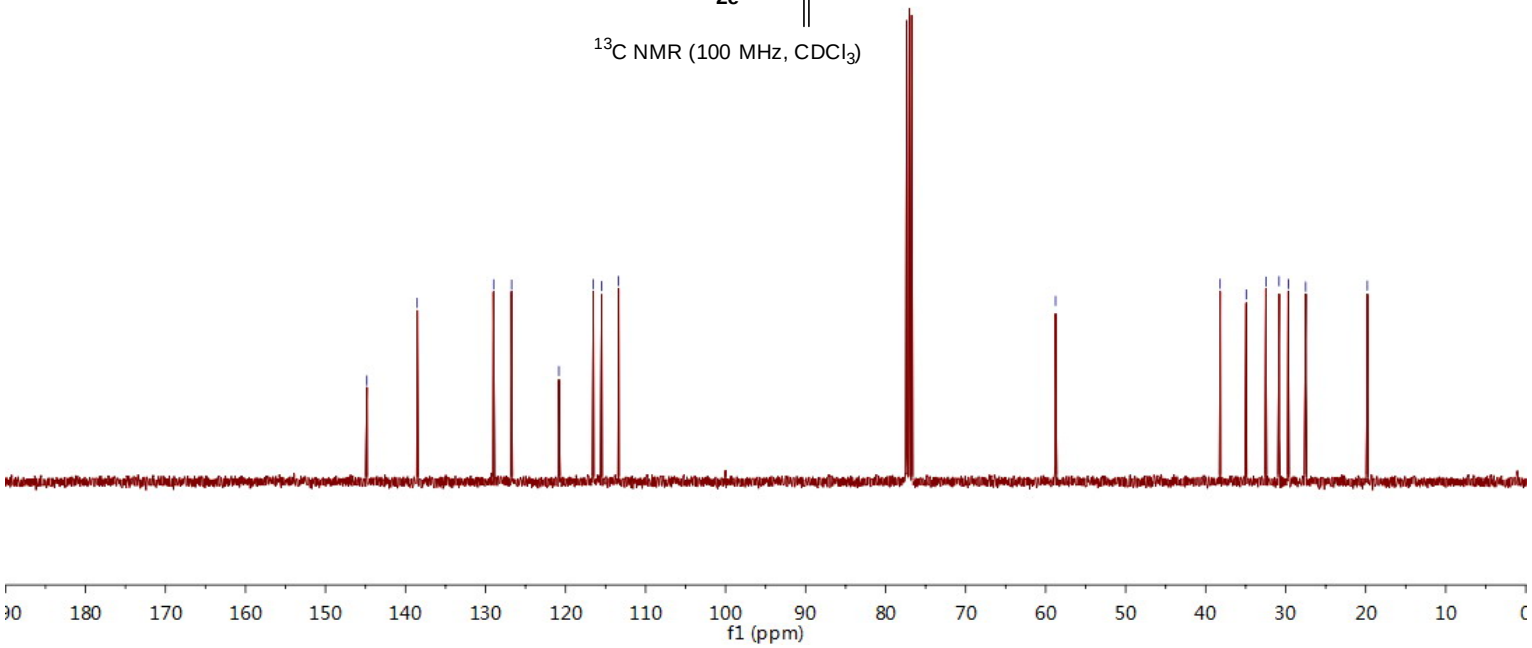
144.82
138.54
128.99
126.74
120.83
116.53
115.49
113.37
58.76
38.19
34.93
32.47
30.82
29.67
27.50
19.80

13C NMR MC-6-86A in CDCl3

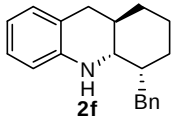


2e

^{13}C NMR (100 MHz, $CDCl_3$)

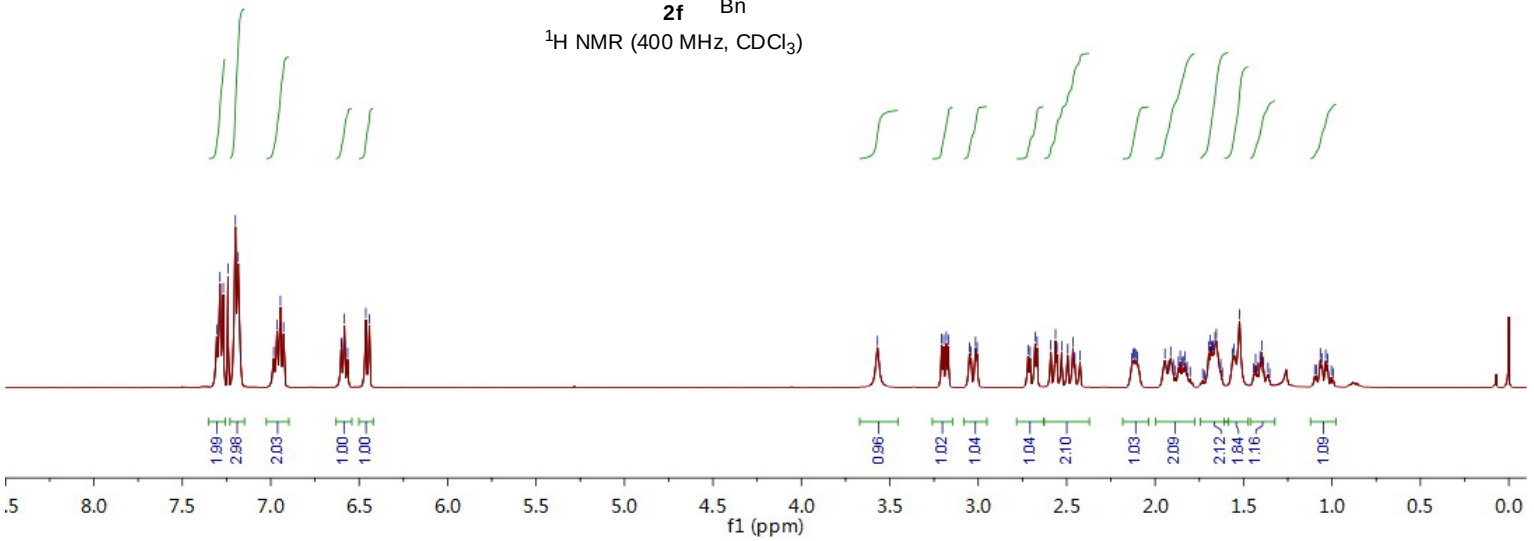


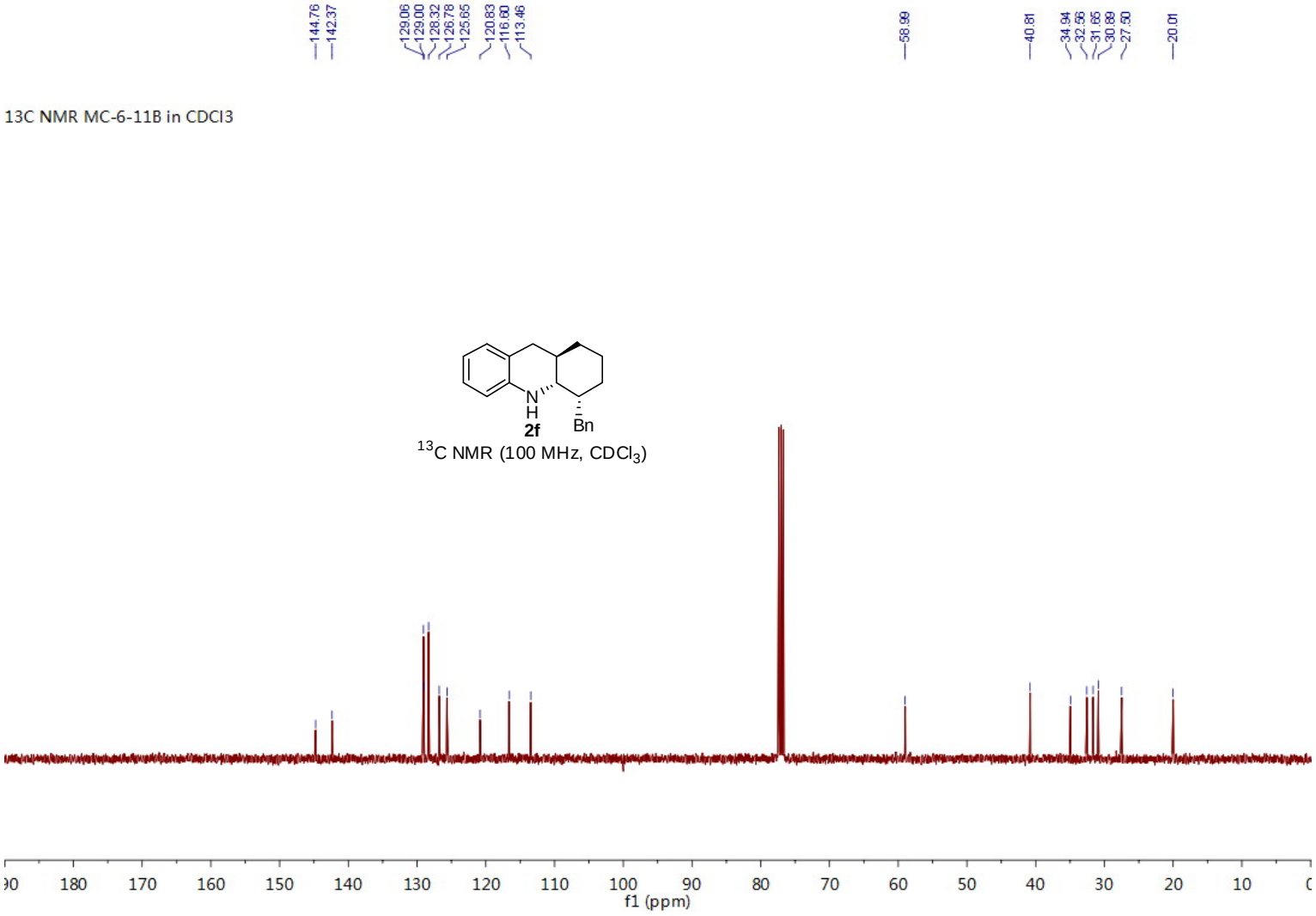
1H NMR MC-6-11B in CDCl3

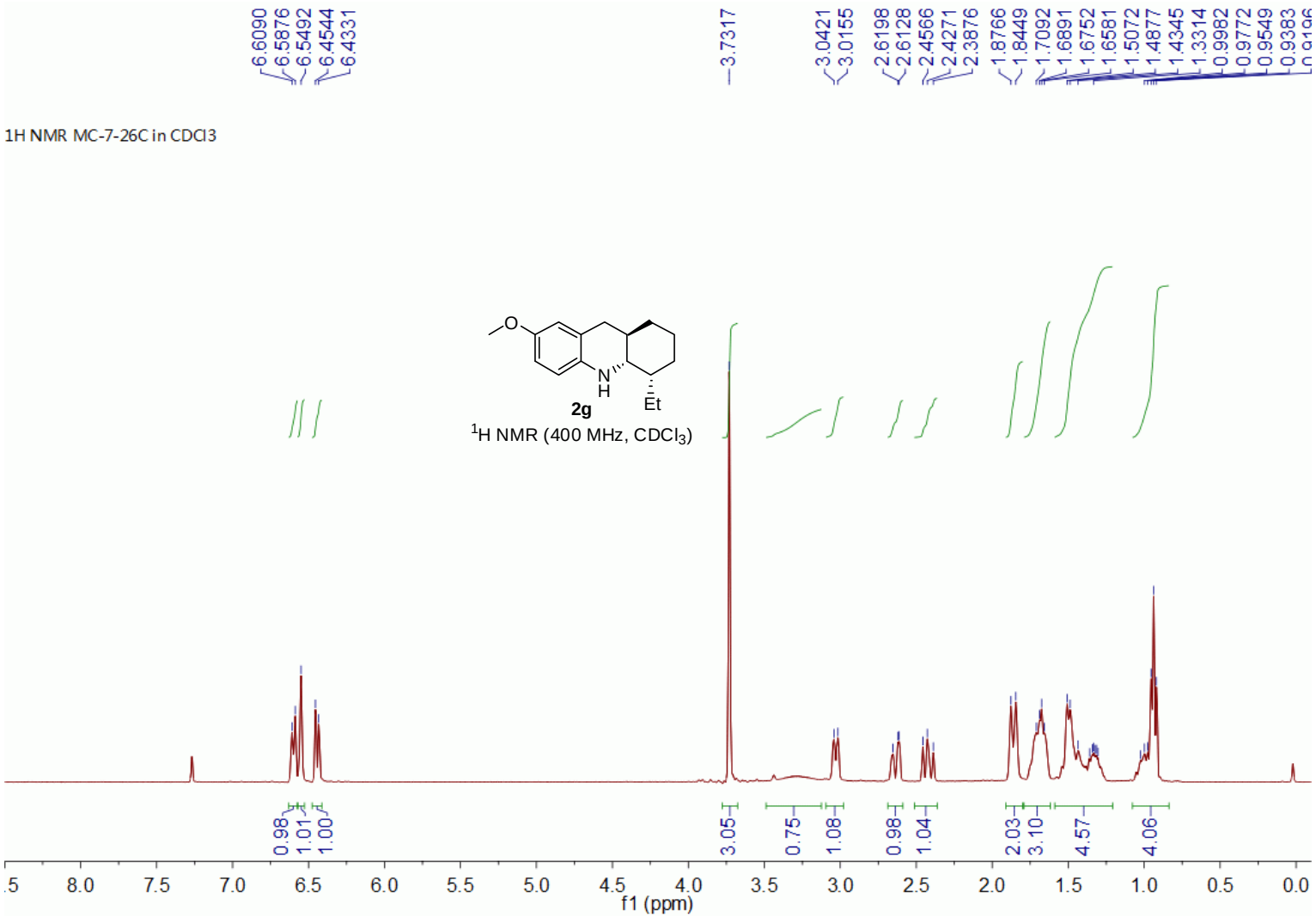


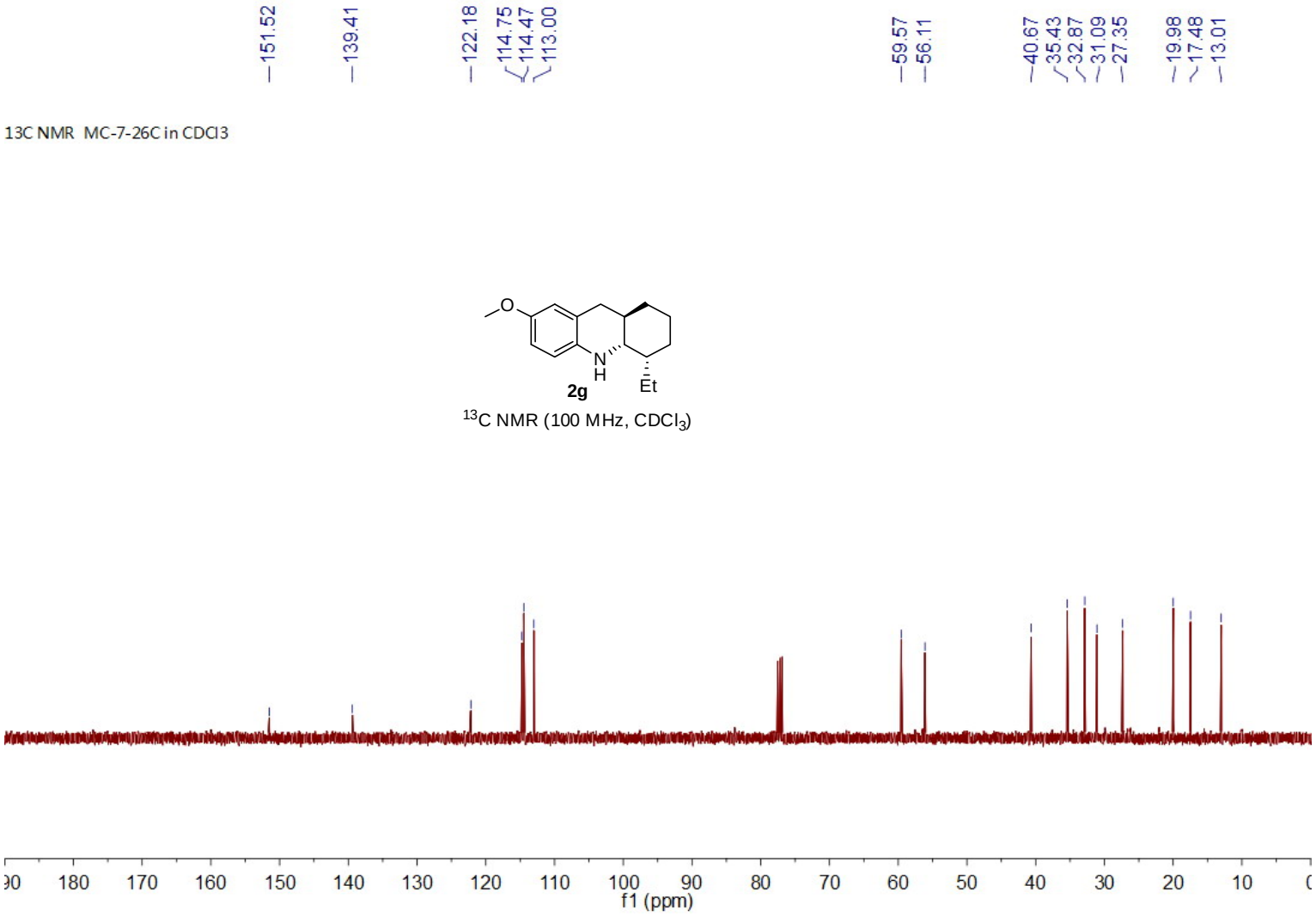
2f

^{1}H NMR (400 MHz, $CDCl_3$)

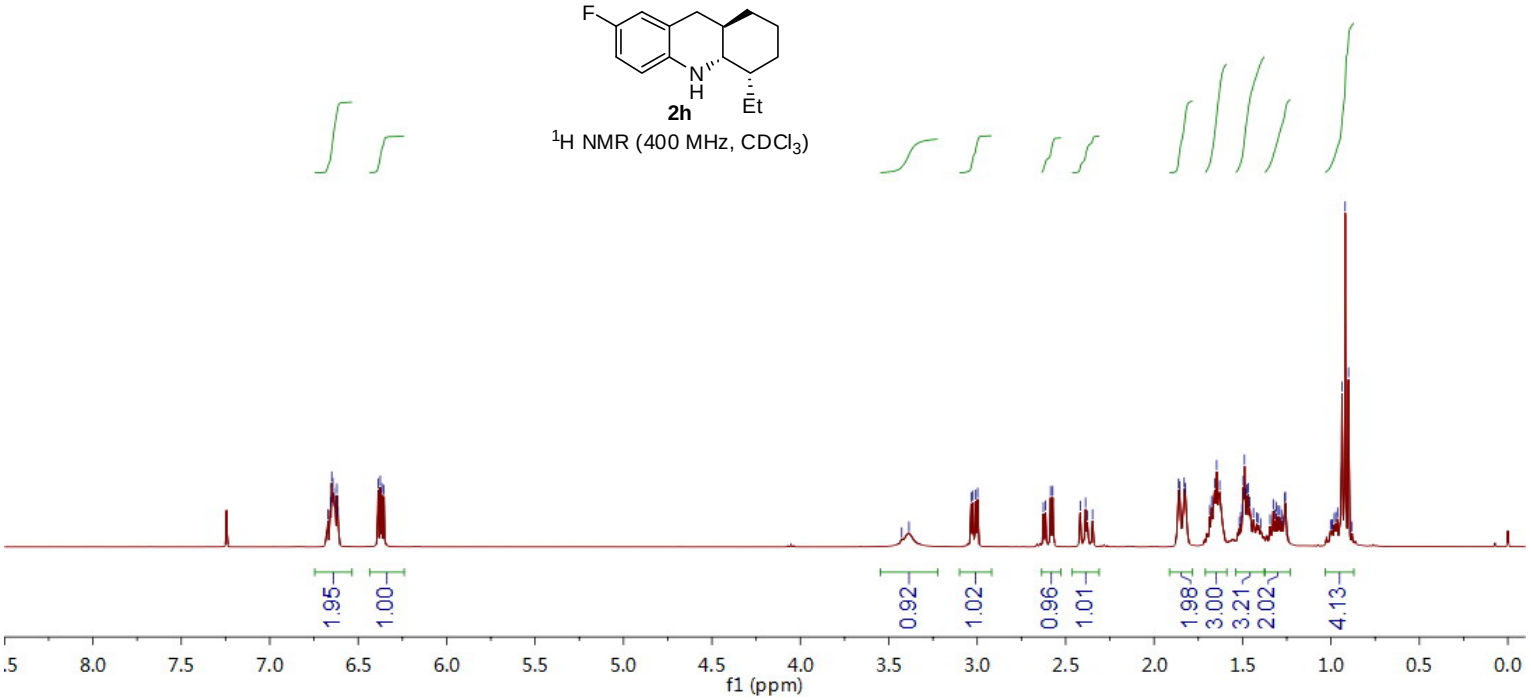



144.76
142.37
129.06
129.00
128.32
126.78
125.65
120.83
116.60
113.46
58.99
40.81
34.94
32.56
31.85
30.89
27.90
20.01
13C NMR MC-6-11B in CDCl3
N
H
Bn
2f
^{13}C NMR (100 MHz, $CDCl_3$)
f1 (ppm)

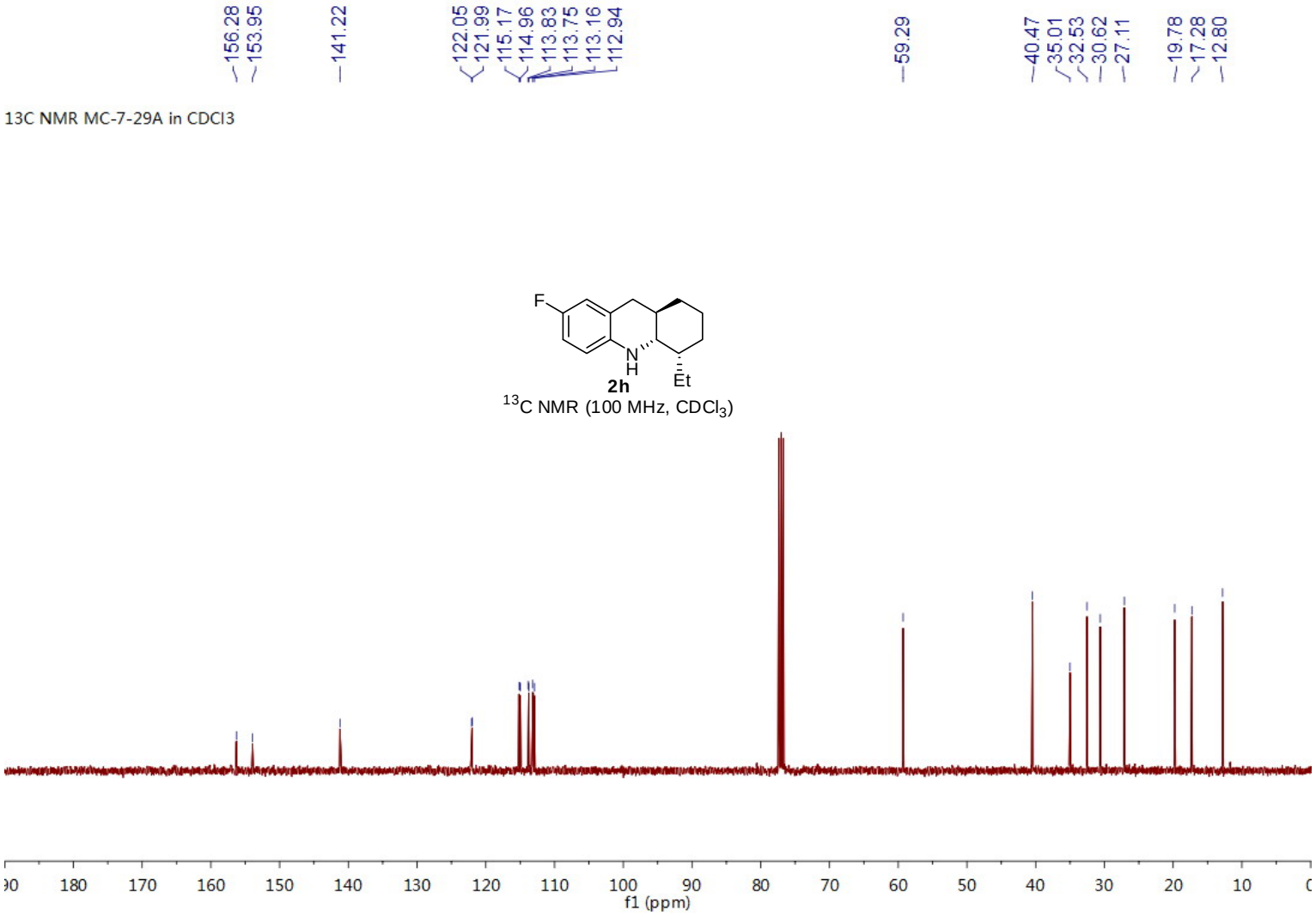

1H NMR MC-7-26C in CDCl3
6.6090
6.5876
6.5492
6.4544
6.4331
3.7317
3.0421
3.0155
2.6198
2.6128
2.4566
2.4271
2.3876
1.8766
1.8449
1.7092
1.6891
1.6752
1.6581
1.5072
1.4877
1.4345
1.3314
0.9982
0.9772
0.9549
0.9383
O
N
H
Et
2g
1H NMR (400 MHz, CDCl3)
0.98
1.01
1.00
3.05
0.75
1.08
0.98
1.04
2.03
3.10
4.57
4.06
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)


151.52
139.41
122.18
114.75
114.47
113.00
59.57
56.11
40.67
35.43
32.87
31.09
27.35
19.98
17.48
13.01
13C NMR MC-7-26C in CDCl3
O
N
H
Et
2g
13C NMR (100 MHz, CDCl3)
f1 (ppm)

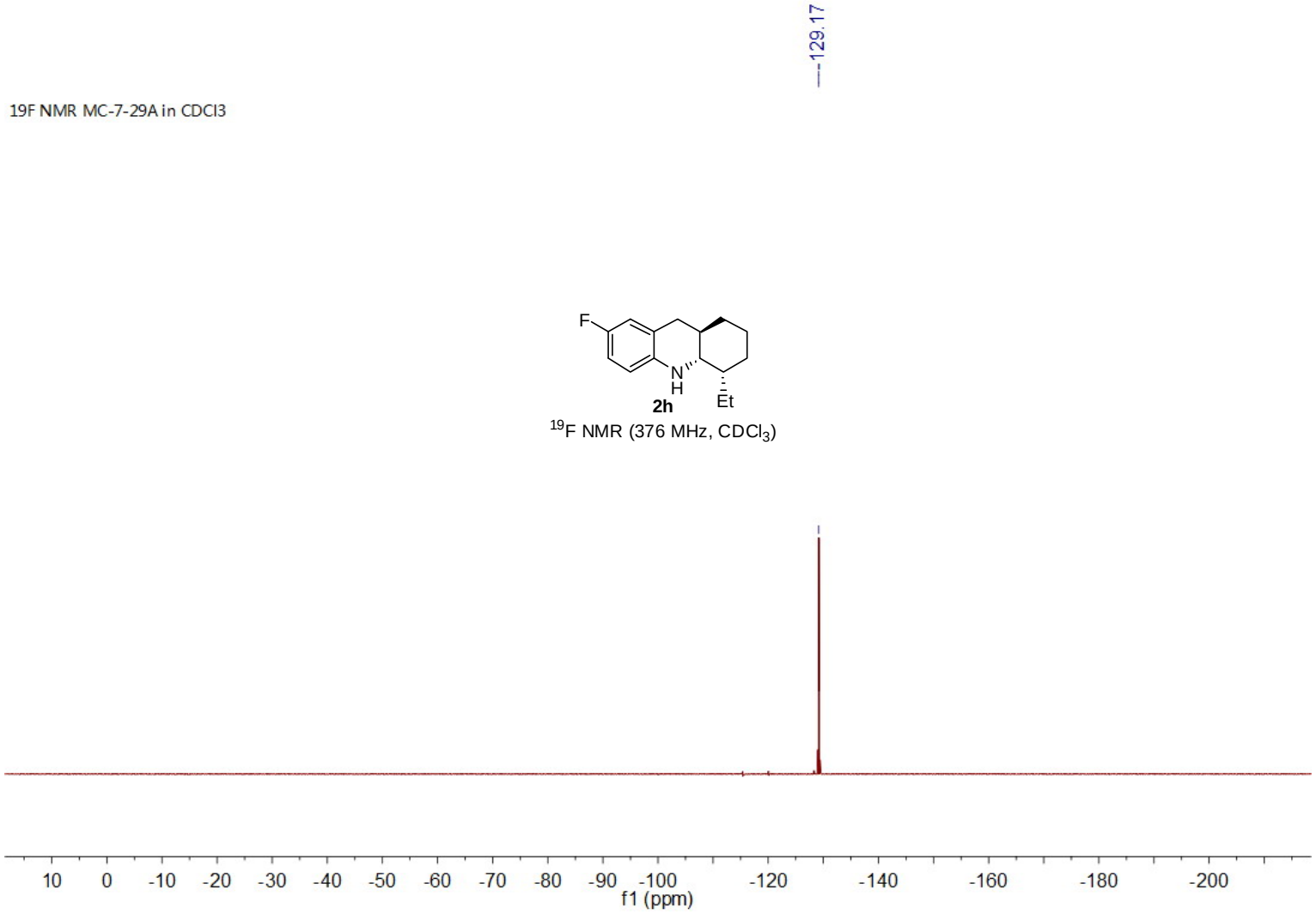
1H NMR MC-7-29A in CDCl3



^{1}H NMR (400 MHz, $CDCl_3$)

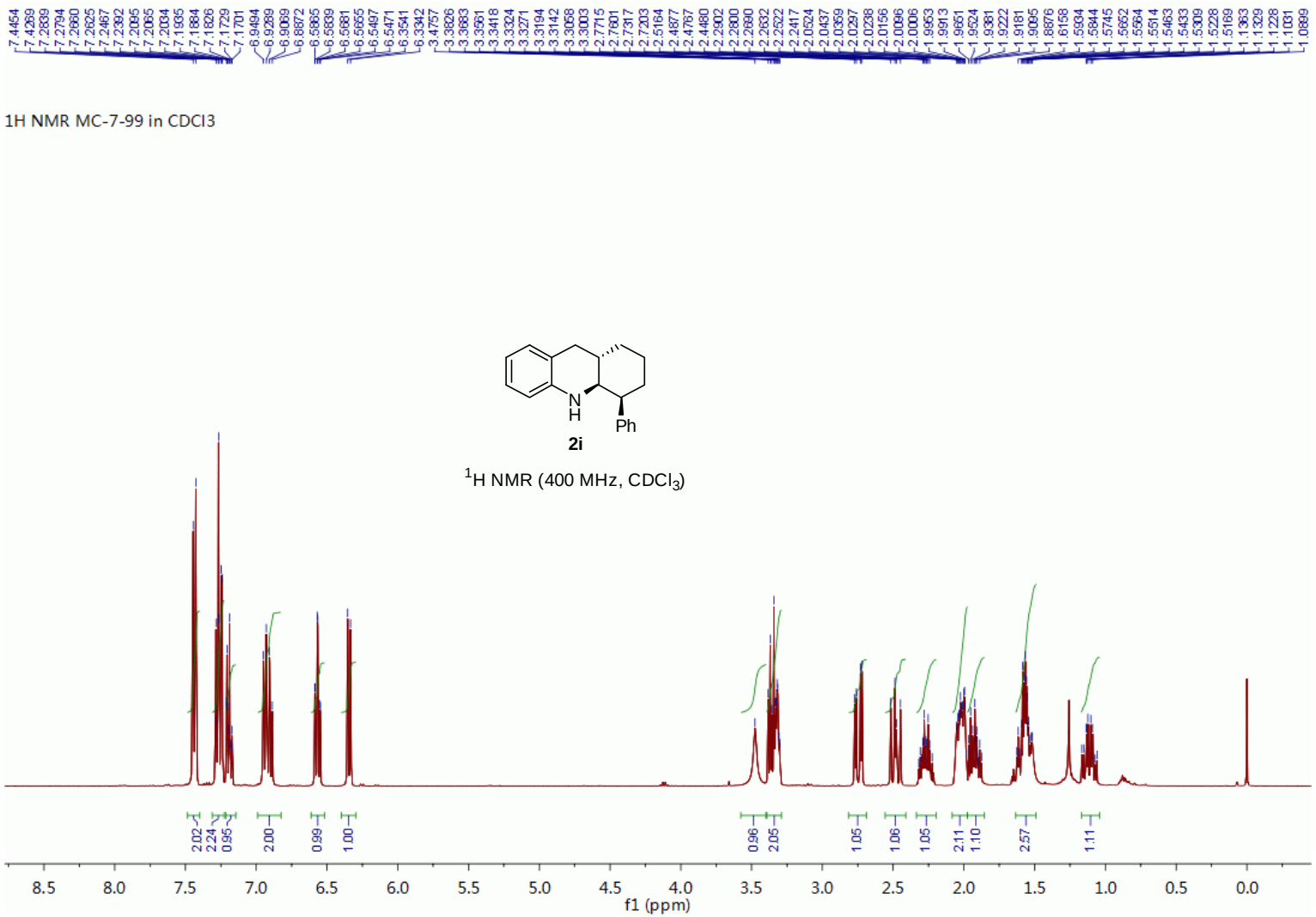

156.28
153.95
141.22
122.05
121.99
115.17
114.96
113.83
113.75
113.16
112.94
59.29
40.47
35.01
32.53
30.62
27.11
19.78
17.28
12.80
13C NMR MC-7-29A in CDCl3
F
N
H
Et
2h
13C NMR (100 MHz, CDCl3)
f1 (ppm)

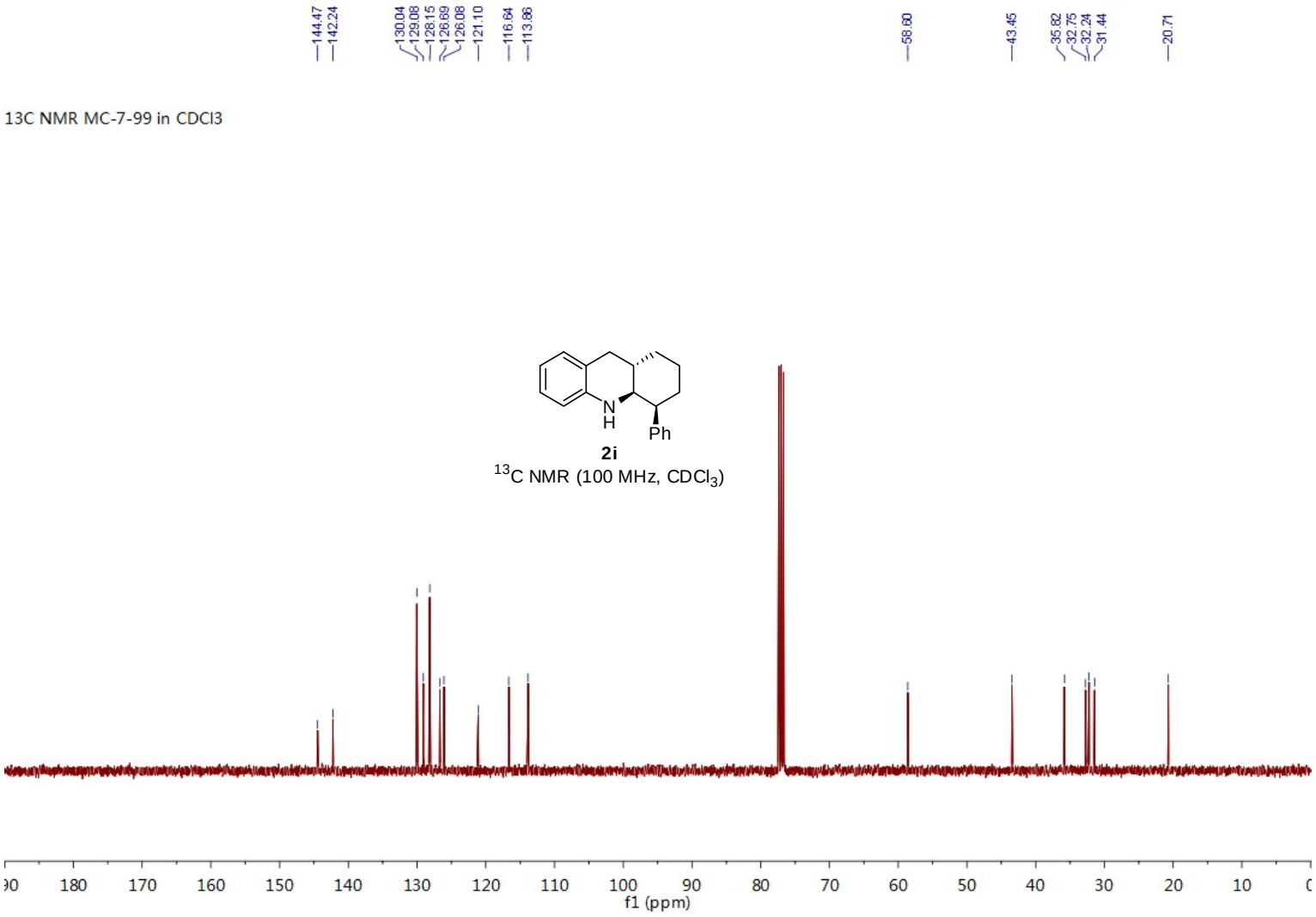
19F NMR MC-7-29A in CDCl3



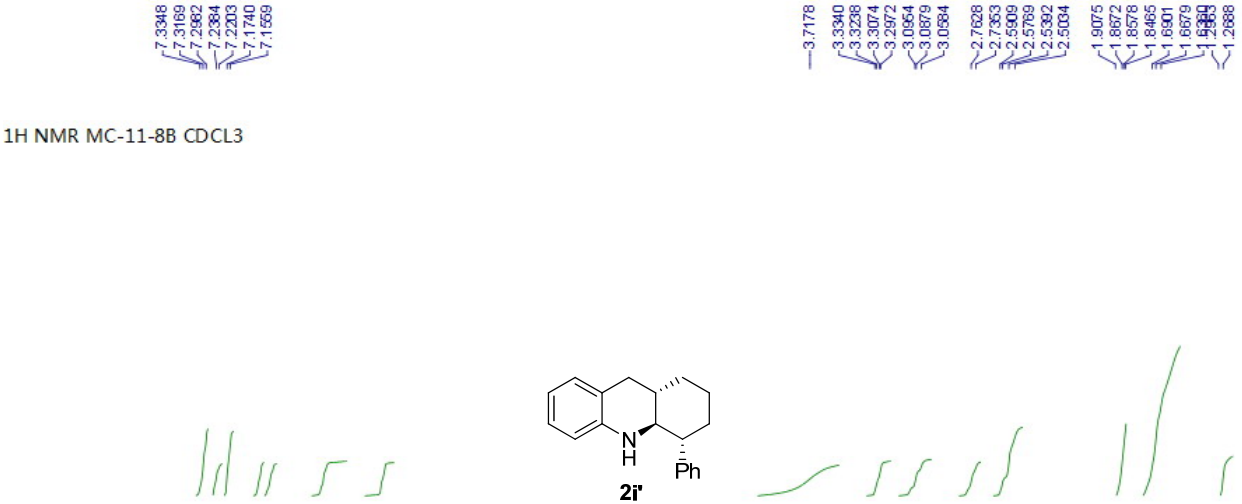
2h

^{19}F NMR (376 MHz, $CDCl_3$)


1H NMR MC-7-99 in CDCl3
2i
1H NMR (400 MHz, CDCl3)
f1 (ppm)

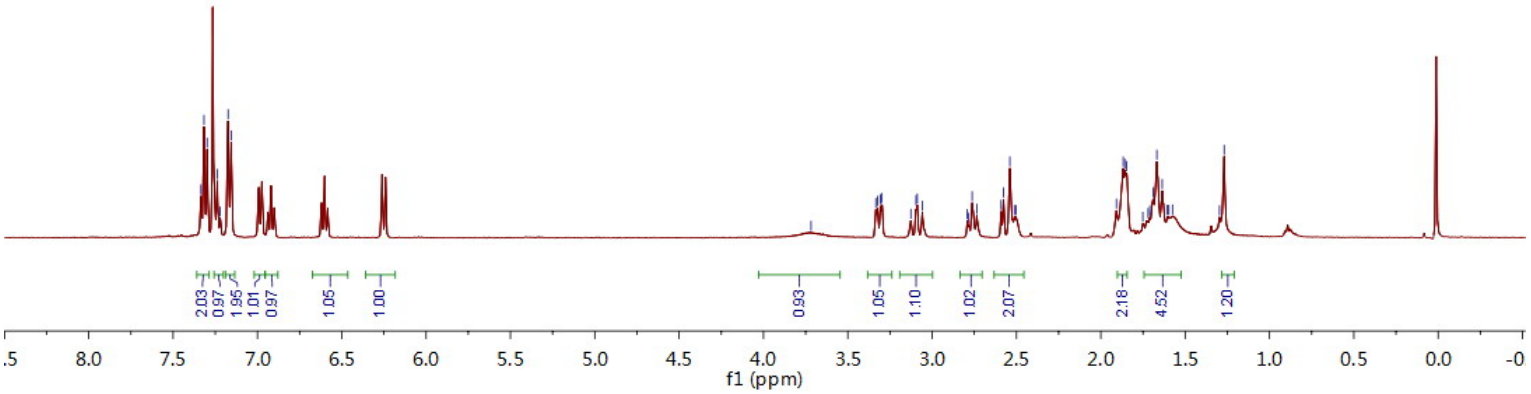

144.47
142.24
130.04
129.08
128.15
126.69
126.08
121.10
116.64
113.86
58.60
43.45
35.82
32.75
32.24
31.44
20.71
13C NMR MC-7-99 in CDCl3
N
H
Ph
2i
13C NMR (100 MHz, CDCl3)
f1 (ppm)

1H NMR MC-11-8B CDCL3



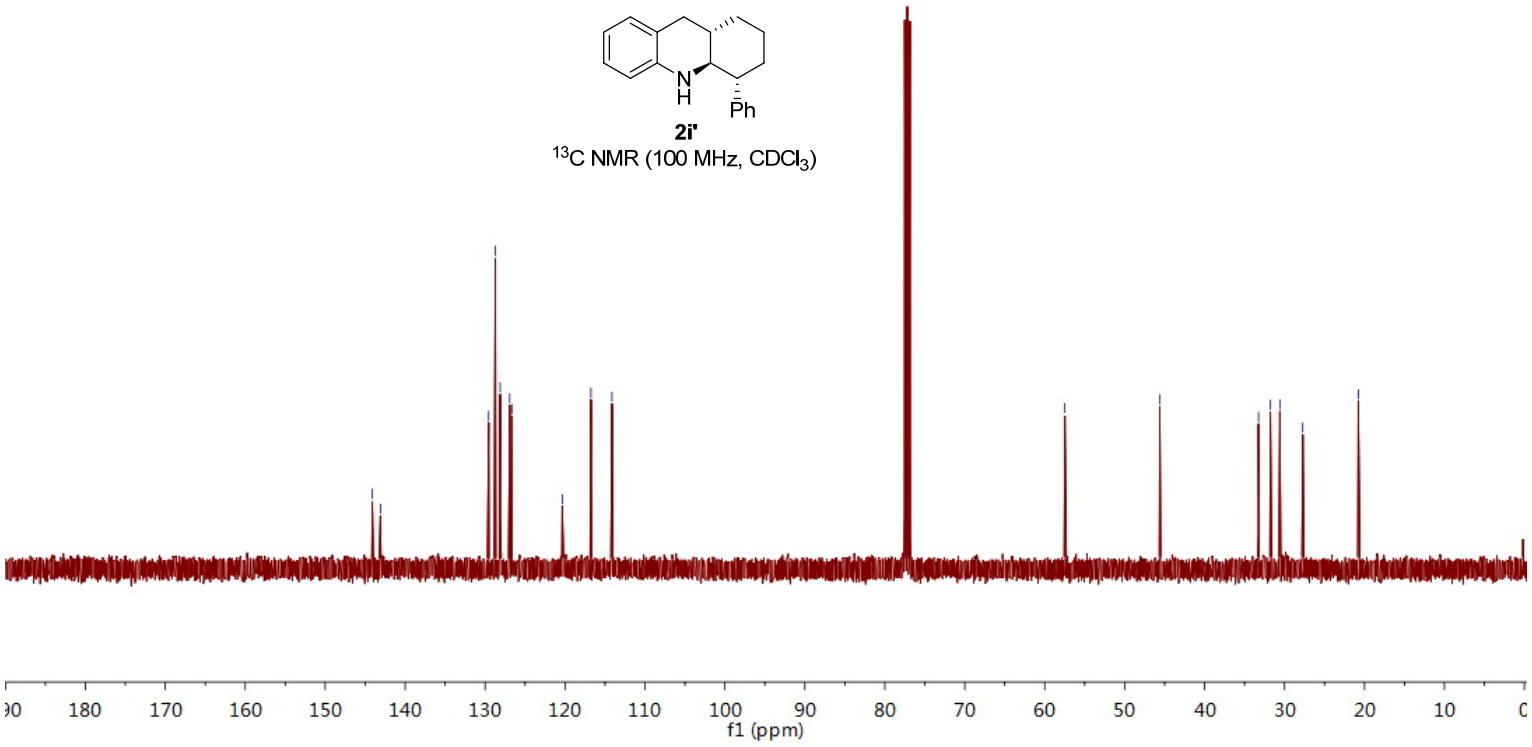
2i'

^{1}H NMR (400 MHz, $CDCl_3$)



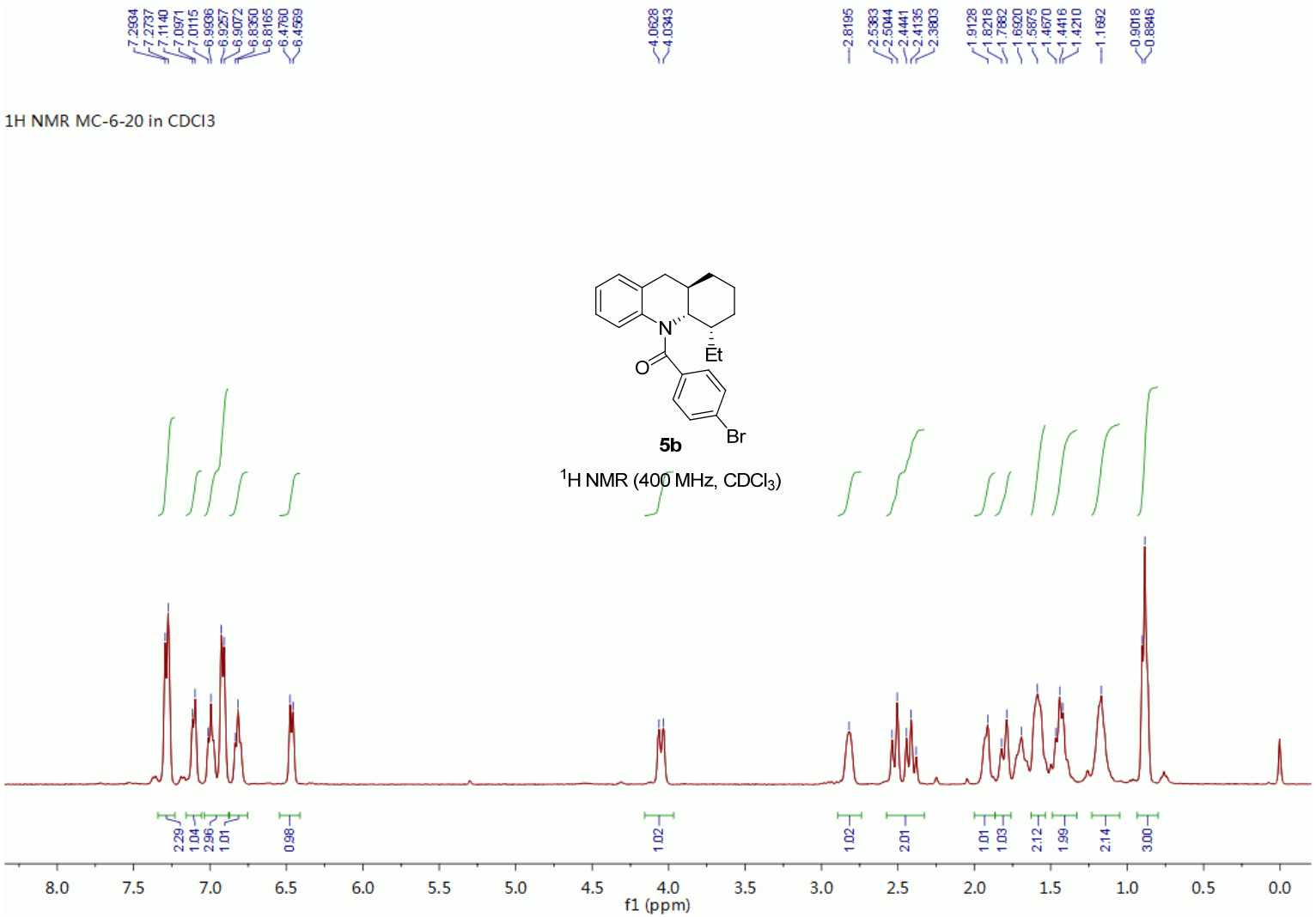
144.11
143.10
129.56
128.72
128.11
126.92
126.65
120.35
116.76
114.13
57.48
45.60
33.25
31.77
30.58
27.72
20.77

13C NMR MC-11-8B CDCL3

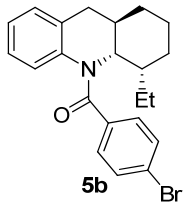


2i'

^{13}C NMR (100 MHz, $CDCl_3$)

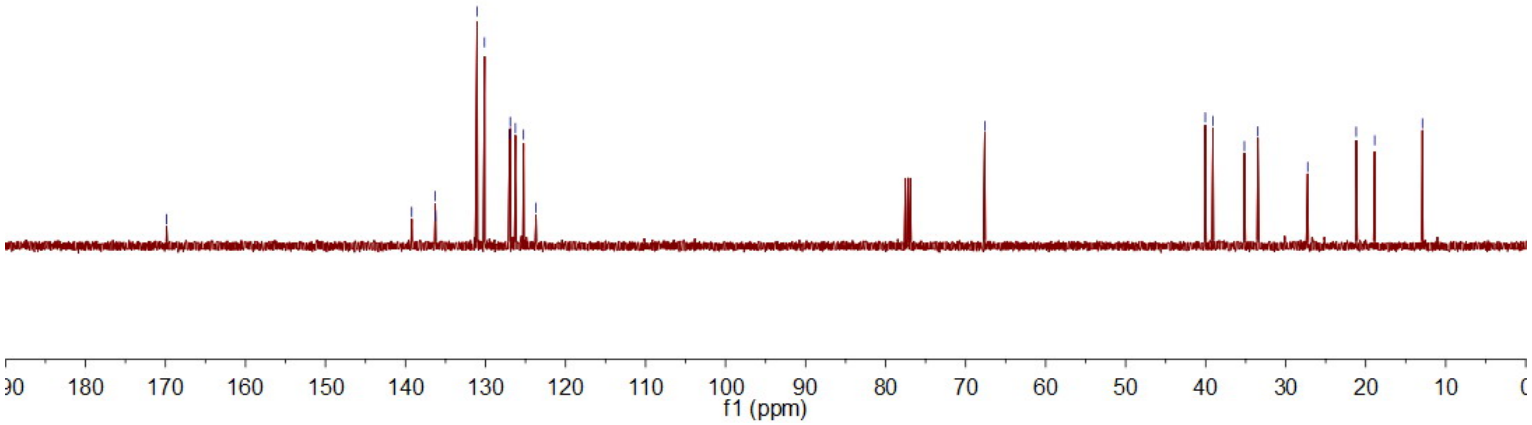

7.2934
7.2737
7.1140
7.0971
7.0115
6.9936
6.9257
6.9072
6.8350
6.8165
6.4760
6.4569
4.0628
4.0343
2.8195
2.5383
2.5044
2.4441
2.4135
2.3803
1.9128
1.8218
1.7882
1.6920
1.5875
1.4670
1.4416
1.4210
1.1892
0.9018
0.8846
1H NMR MC-6-20 in CDCl3
N
Et
O
Br
5b
1H NMR (400 MHz, CDCl3)
2.29
1.04
2.96
1.01
0.98
1.02
1.02
2.01
1.01
1.03
2.12
1.99
2.14
3.00
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

13C NMR MC-6-20 in CDCl3



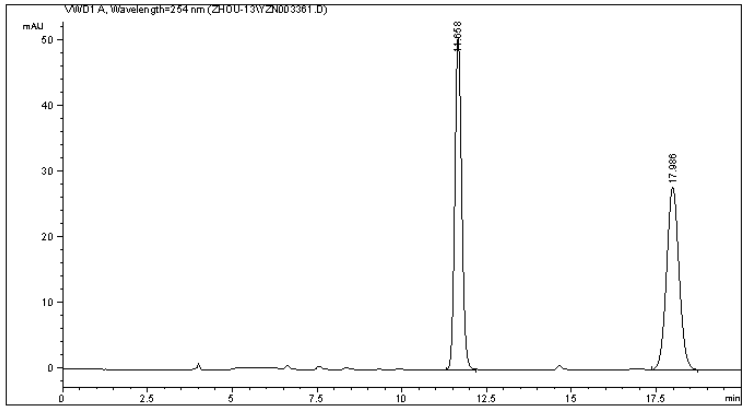
5b

^{13}C NMR (100 MHz, $CDCl_3$)



Data File C:\CHEM32\1\DATA\ZHOU-13\YZN003361.D
Sample Name: MC-5-27+-

Acq. Operator : YZ
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 8/21/2013 2:14:53 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed : 8/21/2013 1:53:40 PM by YZ
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed : 11/13/2013 4:45:07 PM by B
(modified after loading)
Sample Info : OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30oC, 254nm

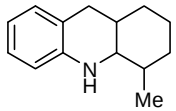


Area Percent Report

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.658	BB	0.2168	713.17542	50.61831	50.1338
2	17.986	BB	0.3918	709.36865	27.85067	49.8662
Totals :				1422.54407	78.46898	

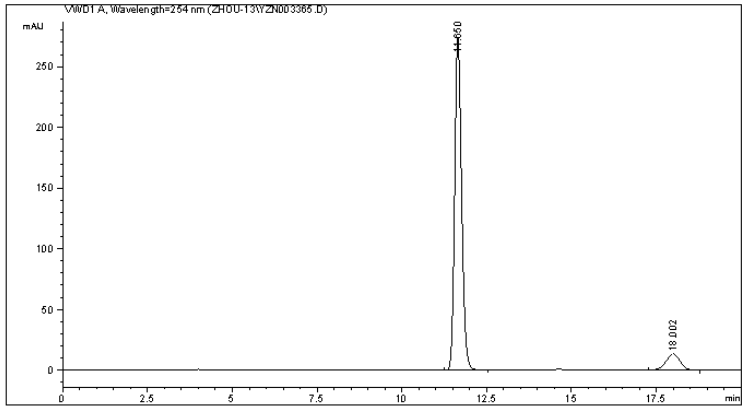


(+/-)-2a

*** End of Report ***

Data File C:\CHEM32\1\DATA\ZHOU-13\YZN003365.D
Sample Name: MC-6-10A

Acq. Operator : YZ
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 8/21/2013 4:10:53 PM
Acq. Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed : 8/21/2013 4:07:54 PM by YZ
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed : 11/13/2013 4:45:07 PM by B
(modified after loading)
Sample Info : OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30oC, 254nm

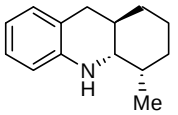


Area Percent Report

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	11.650	BB	0.2188	3905.93799	273.89850	90.7243
2	18.002	BB	0.4503	399.34677	13.54464	9.2757
Totals :				4305.28476	287.44314	

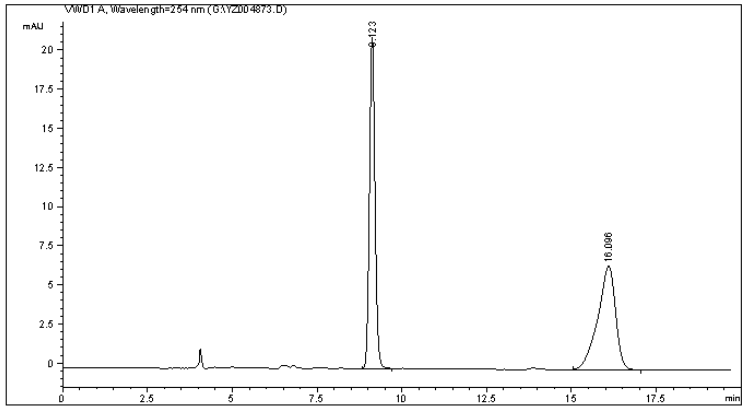


(-)-2a

*** End of Report ***

Data File G:\YZ004873.D
Sample Name: MC-6-10C+-

Acq. Operator : ZHOU
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 8/27/2013 10:41:52 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 8/27/2013 9:51:22 AM by ZHOU
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed : 11/19/2013 2:42:02 PM by B
(modified after loading)
Sample Info : OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm

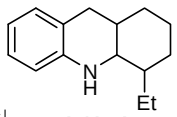


Area Percent Report

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	9.123	BB	0.1771	241.63203	21.13414	50.1311
2	16.096	BB	0.5276	240.36856	6.63346	49.8689
Totals :				482.00060	27.76760	

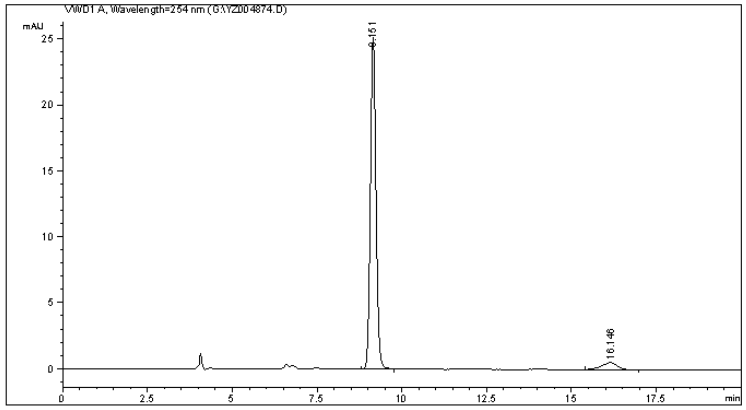


(+/-)-2b

*** End of Report ***

Data File G:\YZ004874.D
Sample Name: MC-6-11A

Acq. Operator : ZHOU
Acq. Instrument : Instrument 1 Location : Vial 1
Injection Date : 8/27/2013 11:02:30 AM
Acq. Method : C:\HPCHEM\1\METHODS\DEF LC.M
Last changed : 8/27/2013 9:51:22 AM by ZHOU
(modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed : 11/19/2013 2:42:02 PM by B
(modified after loading)
Sample Info : OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm

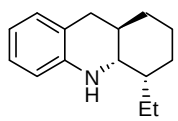


Area Percent Report

Sorted By : Signal
Multiplier: : 1.0000
Dilution: : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	9.151	BB	0.1781	289.67542	25.13462	94.2609
2	16.146	BB	0.4565	17.63706	5.50867e-1	5.7391
Totals :				307.31247	25.68549	

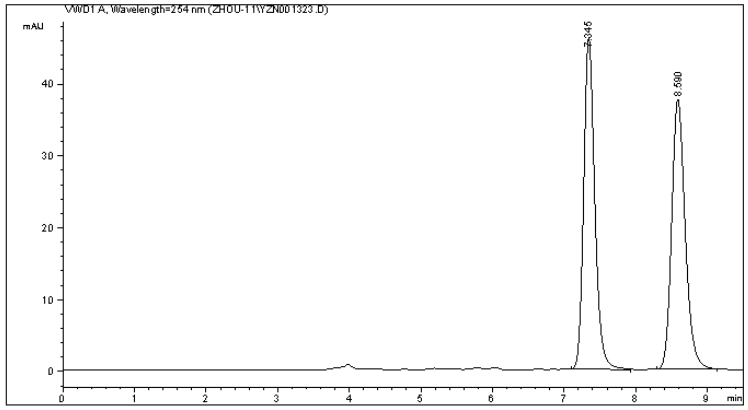


(-)-2b

*** End of Report ***

Data File C:\CHEM32\1\DATA\ZHOU-11\YZN001323.D
Sample Name: MC-6-12C+-

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/27/2011 10:25:11 AM
Acq. Method     : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/27/2011 10:21:06 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\ABC LC.M
Last changed    : 9/20/2012 5:02:06 PM by ZC
                  (modified after loading)
Sample Info     : OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm
```

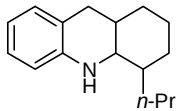


Area Percent Report

```
Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	7.345	BB	0.1636	497.28882	46.15646	50.1161
2	8.590	BB	0.2017	494.98401	37.58570	49.8839
Totals :				992.27283	83.74216	

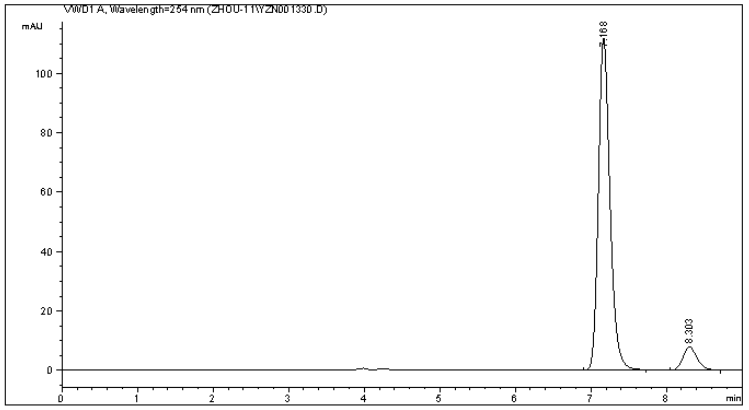


(+/-)-2c

*** End of Report ***

Data File C:\CHEM32\1\DATA\ZHOU-11\YZN001330.D
Sample Name: MC-6-12A

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/27/2011 4:22:17 PM
Acq. Method     : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/27/2011 4:17:03 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\ABC LC.M
Last changed    : 9/20/2012 4:59:37 PM by ZC
                  (modified after loading)
Sample Info     : OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm
```

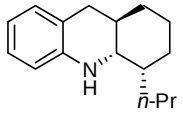


Area Percent Report

```
Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	7.168	VB	0.1636	1191.63025	111.81642	92.1396
2	8.303	BB	0.1970	101.65765	7.88729	7.8604
Totals :				1293.28790	119.70371	

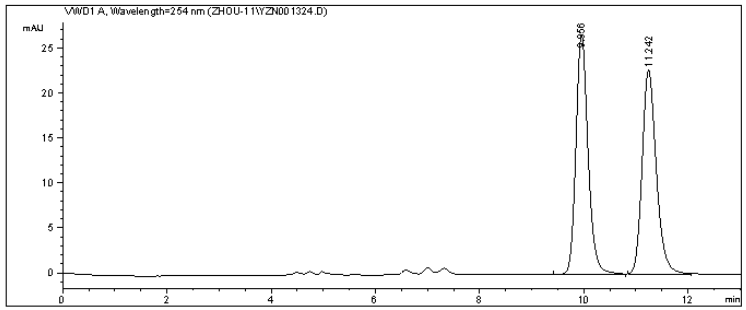


(-)-2c

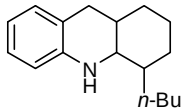
*** End of Report ***

Data File C:\CHEM32\1\DATA\ZHOU-11\YZN001324.D
Sample Name: MC-6-12D+-

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/27/2011 10:55:34 AM
Acq. Method     : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/27/2011 10:49:42 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/1/2011 7:50:33 PM
Sample Info     : OJ-H, H/i-PrOH = 98/2, 0.7 mL/min, 30 oC, 254 nm
```




```
                        Area Percent Report

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|-------|
   1   9.956 BB    0.2476  432.08426   26.62695  50.2199
   2  11.242 BB    0.2890  428.30002   22.65200  49.7801

Totals :                   860.38428   49.27895
```

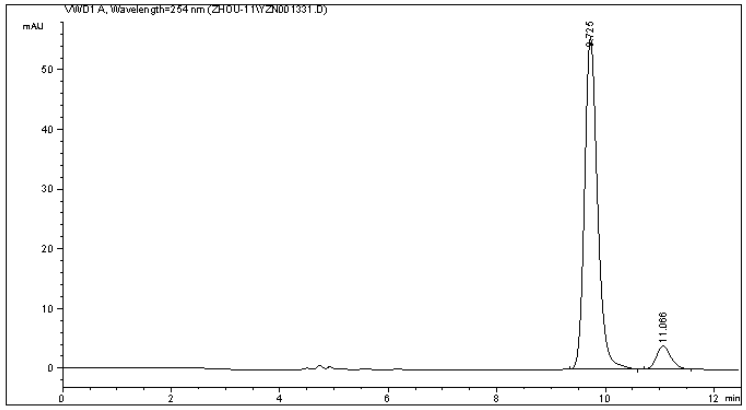


(+/-)-2d

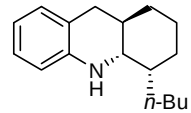
```
                          *** End of Report ***
```


Data File C:\CHEM32\1\DATA\ZHOU-11\YZN001331.D
Sample Name: MC-6-12B

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/27/2011 4:35:50 PM
Acq. Method     : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/27/2011 4:32:33 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\ABC LC.M
Last changed    : 9/20/2012 5:00:51 PM by ZC
                  (modified after loading)
Sample Info     : OJ-H, H/i-PrOH = 98/2, 0.7 mL/min, 30 oC, 254 nm
```




```
                        Area Percent Report

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|-------|
   1   9.725 BB    0.2534  922.24341   55.54384  92.7427
   2  11.066 BB    0.2851   72.16734    3.88573   7.2573

Totals :                   994.41075   59.42957
```

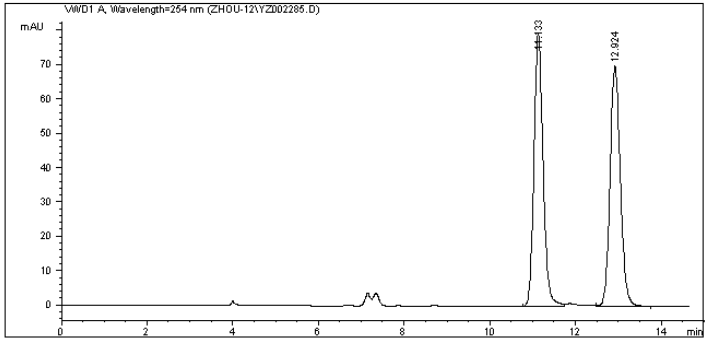


(-)-2d

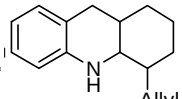
```
                          *** End of Report ***
```

Data File C:\HPCHEM\1\DATA\ZHOU-12\YZ002285.D Sample Name: MC-6-86B(+_)
OJ-H, H/i-PrOH =95/5, 0.8 mL/min, 30 oC, 254 nm

```
==================================================================
Injection Date  : 5/16/2012 10:32:06 AM
Sample Name     : MC-6-86B(+ )                  Location : Vial 1
Acq. Operator   : ZX
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 5/16/2012 10:12:47 AM by ZX
                  (modified after loading)
Analysis Method : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 9/20/2012 3:58:10 PM by ZX
                  (modified after loading)
==================================================================
```



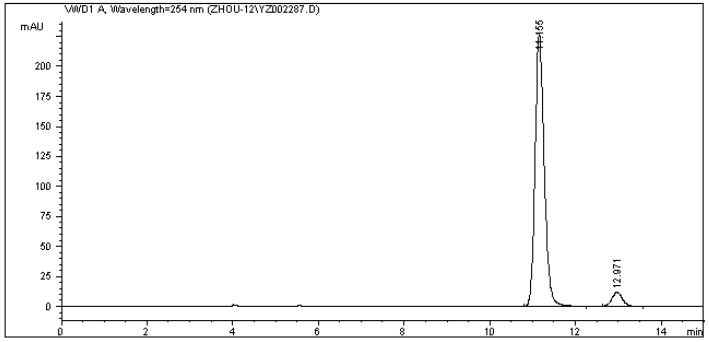

```
==================================================================
                      Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.133 BV    0.2271 1165.26477   79.12371  50.1144
   2  12.924 VB    0.2577 1159.94458   69.89375  49.8856

Totals :                  2325.20935  149.01746

 Results obtained with enhanced integrator!
==================================================================
                      *** End of Report ***
```



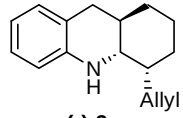
(+/-)-2e

Data File C:\HPCHEM\1\DATA\ZHOU-12\YZ002287.D Sample Name: MC-6-86A
OJ-H, H/i-PrOH =95/5, 0.8 mL/min, 30 oC, 254 nm

```
==================================================================
Injection Date  : 5/16/2012 2:42:26 PM
Sample Name     : MC-6-86A                      Location : Vial 1
Acq. Operator   : ZX
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 5/16/2012 2:34:06 PM by ZX
                  (modified after loading)
Analysis Method : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 9/20/2012 3:59:01 PM by ZX
                  (modified after loading)
==================================================================
```



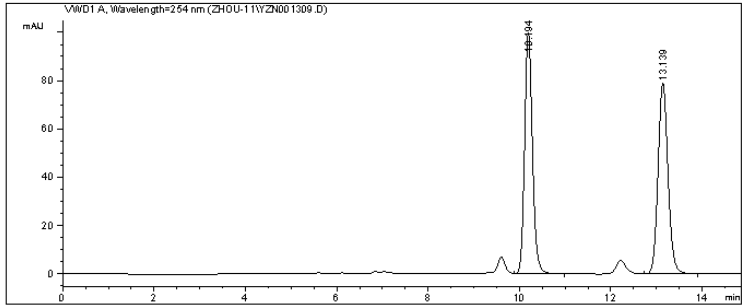

```
==================================================================
                      Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.155 BB    0.2264 3325.18237  226.72318  94.5259
   2  12.971 BP    0.2560  192.56522   11.53094   5.4741

Totals :                  3517.74759  238.25412

 Results obtained with enhanced integrator!
==================================================================
                      *** End of Report ***
```



(-)-2e

Data File C:\CHEM32\1\DATA\ZHOU-11\YZN001309.D
Sample Name: MC-6-10D(+-)

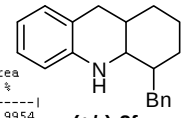
```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/23/2011 4:09:43 PM
Acq. Method     : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/23/2011 4:06:48 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/1/2011 7:50:33 PM
Sample Info     : AD-H, H/i-PrOH = 98/2, 0.8 mL/min, 30 oC, 254 nm
```



Area Percent Report

```
Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm
```

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	10.194	VB	0.1833	1199.73535	100.25727	49.9954
2	13.139	VB	0.2339	1199.95398	79.03433	50.0046
Totals :				2399.68933	179.29160	

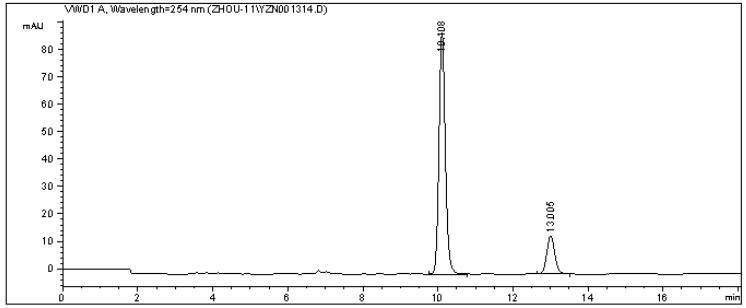


(+/-)-2f

*** End of Report ***

Data File C:\CHEM32\1\DATA\ZHOU-11\YZN001314.D
Sample Name: MC-6-11B

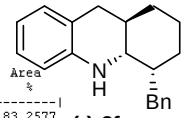
```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/24/2011 10:51:01 AM
Acq. Method     : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/24/2011 10:30:53 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\SW.M
Last changed    : 12/1/2011 7:50:33 PM
Sample Info     : AD-H, H/i-PrOH = 98/2, 0.8 mL/min, 30 oC, 254 nm
```



Area Percent Report

```
Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm
```

Peak #	RetTime [min]	Type	Width [min]	Area mAU *s	Height [mAU]	Area %
1	10.108	BB	0.1816	1041.04370	88.07798	83.2577
2	13.005	BB	0.2291	209.34323	14.05595	16.7423
Totals :				1250.38693	102.13393	



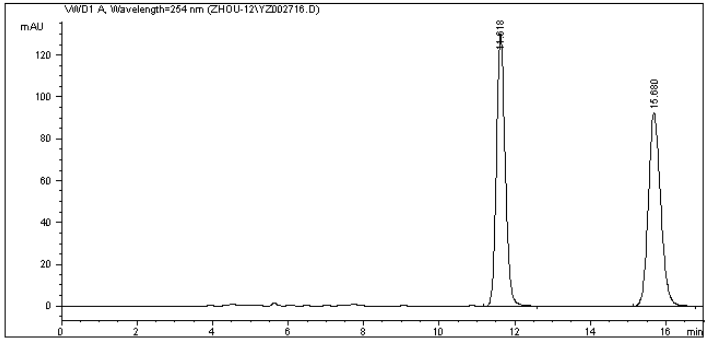
(-)-2f

*** End of Report ***

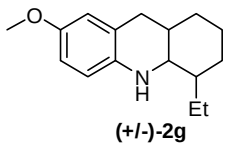
Data File C:\HPCHEM\1\DATA\ZHOU-12\YZ002716.D Sample Name: MC-7-26C

OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm

```
==================================================================
Injection Date  : 7/16/2012 1:49:32 PM
Sample Name     : MC-7-26C                      Location : Vial 1
Acq. Operator   : ZX
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 7/16/2012 1:35:02 PM by ZX
                  (modified after loading)
Analysis Method : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 9/20/2012 4:02:40 PM by ZX
                  (modified after loading)
==================================================================
```




```
==================================================================
                      Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.618 VB    0.2447 2077.62183  129.96194  49.9905
   2  15.680 BB    0.3477 2078.41040   92.11869  50.0095

Totals :                  4156.03223  222.08064

 Results obtained with enhanced integrator!
==================================================================
                        *** End of Report ***
```

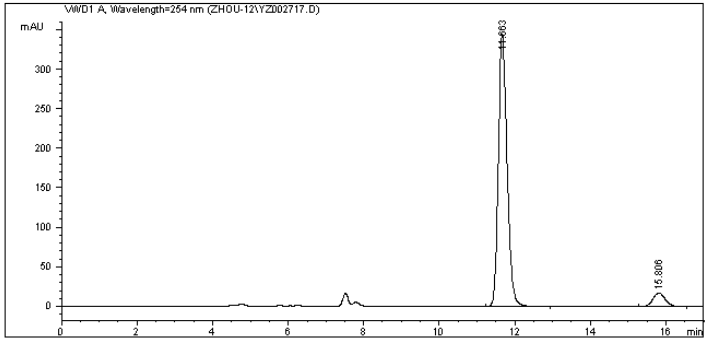


(+/-)-2g

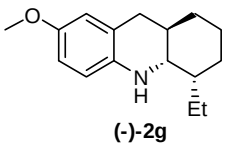
Data File C:\HPCHEM\1\DATA\ZHOU-12\YZ002717.D Sample Name: MC-7-26B

OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm

```
==================================================================
Injection Date  : 7/16/2012 2:09:19 PM
Sample Name     : MC-7-26B                      Location : Vial 1
Acq. Operator   : ZX
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 7/16/2012 2:06:38 PM by ZX
                  (modified after loading)
Analysis Method : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 9/20/2012 4:02:33 PM by ZX
                  (modified after loading)
==================================================================
```




```
==================================================================
                      Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  11.663 VB    0.2443 5491.03906  344.37958  93.5109
   2  15.806 VB    0.3525  381.04581   16.76591   6.4891

Totals :                  5872.08487  361.14548

 Results obtained with enhanced integrator!
==================================================================
                        *** End of Report ***
```

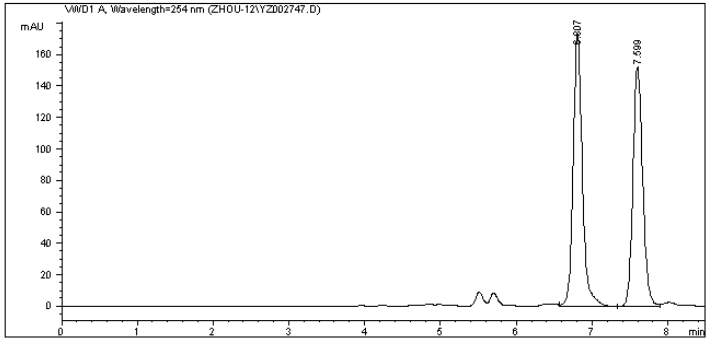


(-)-2g

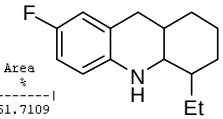
Data File C:\HPCHEM\1\DATA\ZHOU-12\YZ002747.D Sample Name: MC-7-27B

OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm

```
==================================================================
Injection Date  : 7/18/2012 2:40:47 PM
Sample Name     : MC-7-27B                      Location : Vial 1
Acq. Operator   : ZX
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 7/18/2012 2:39:14 PM by ZX
                  (modified after loading)
Analysis Method : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 9/20/2012 4:06:20 PM by ZX
                  (modified after loading)
==================================================================
```




```
==================================================================
                      Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   6.807 VV    0.1309 1467.12720  173.08138  51.7109
   2   7.599 VV    0.1402 1370.04639  151.84178  48.2891

Totals :                  2837.17358  324.92316

 Results obtained with enhanced integrator!
==================================================================
                        *** End of Report ***
```

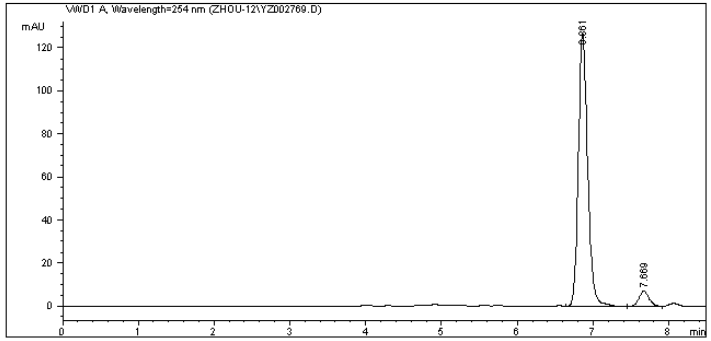


(+/-)-2h

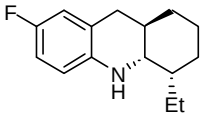
Data File C:\HPCHEM\1\DATA\ZHOU-12\YZ002769.D Sample Name: MC-7-29A

OJ-H, H/i-PrOH = 95/5, 0.8 mL/min, 30 oC, 254 nm

```
==================================================================
Injection Date  : 7/19/2012 6:47:17 PM
Sample Name     : MC-7-29A                      Location : Vial 1
Acq. Operator   : ZX
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 7/19/2012 6:36:10 PM by ZX
                  (modified after loading)
Analysis Method : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 9/20/2012 4:05:48 PM by ZX
                  (modified after loading)
==================================================================
```



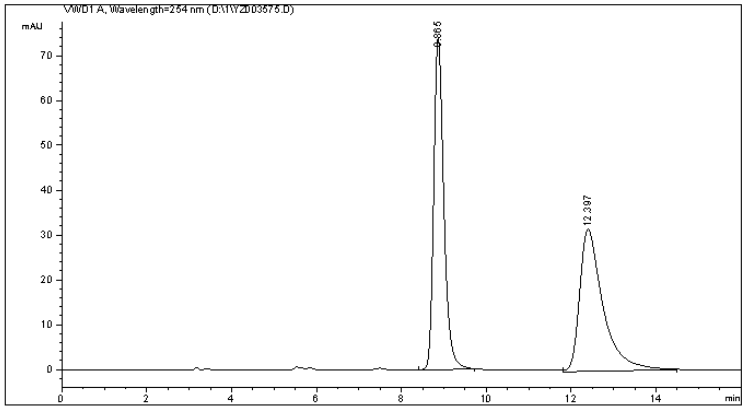

```
==================================================================
                      Area Percent Report
==================================================================

Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s    [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   6.861 VV    0.1322 1085.46399  126.43060  94.1642
   2   7.669 VV    0.1460   67.27153    7.06579   5.8358

Totals :                  1152.73552  133.49640

 Results obtained with enhanced integrator!
==================================================================
                        *** End of Report ***
```



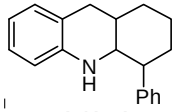
(-)-2h

Data File D:\1\YZ003575.D
Sample Name: MC-7-95B(+-)

```
Acq. Operator   : ZX
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/18/2012 6:33:10 AM
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 12/18/2012 6:30:42 AM by ZX
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed    : 4/17/2014 2:51:12 PM by Z
                  (modified after loading)
Sample Info     : OJ-H, H/i-PrOH = 90/10, 1.0 mL/min, 30 oC, 254 nm
```




```
                        Area Percent Report

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s    [mAU   ]     %
----|-------|----|-------|----------|----------|-------|
   1   8.865 BB    0.2510 1221.93494   73.97406  50.1783
   2  12.397 MM R  0.6383 1213.25208   31.68060  49.8217

Totals :                  2435.18701  105.65466
```

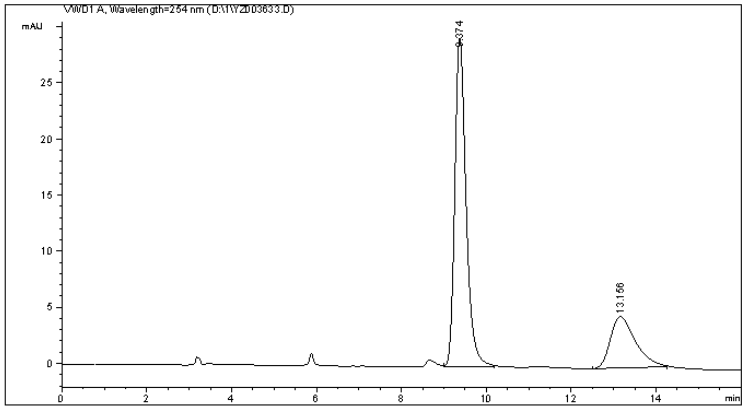


(+/-)-2i

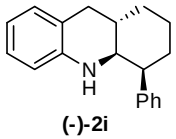
```
                        *** End of Report ***
```


Data File D:\1\YZ003633.D
Sample Name: MC-7-99

```
Acq. Operator   : ZX
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 12/25/2012 1:01:48 AM
Acq. Method     : C:\HPCHEM\1\METHODS\SW.M
Last changed    : 12/25/2012 12:51:22 AM by ZX
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed    : 4/17/2014 2:51:12 PM by Z
                  (modified after loading)
Sample Info     : OJ-H, H/i-PrOH = 90/10, 1.0 mL/min, 30 oC, 254 nm
```




```
                        Area Percent Report

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s    [mAU   ]     %
----|-------|----|-------|----------|----------|-------|
   1   9.374 VB    0.2803  539.14673   29.28313  74.2562
   2  13.156 BB    0.6150  186.91609    4.56129  25.7438

Totals :                   726.06282   33.84442
```

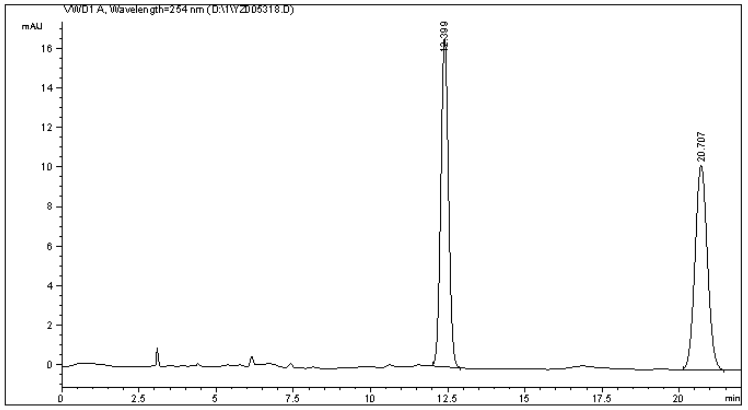


(-)-2i

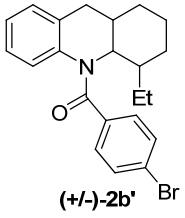
```
                        *** End of Report ***
```

Data File D:\1\YZ005318.D
Sample Name: MC-6-20A+-

```
Acq. Operator   : ZHOU
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 11/23/2013 7:01:17 AM
Acq. Method     : C:\HPCHEM\1\METHODS\DEMOCAL2.M
Last changed    : 11/23/2013 6:55:42 AM by ZHOU
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed    : 4/17/2014 2:53:03 PM by Z
                  (modified after loading)
Sample Info     : AD-H, H/i-PrOH = 95/5, 1.0 mL/min, 30 oC, 254 nm
```




```
                        Area Percent Report

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s    [mAU   ]     %
----|-------|----|-------|----------|----------|-------|
   1  12.399 BB    0.2685  287.15543   16.62440  49.9719
   2  20.707 BB    0.4321  287.47855   10.34006  50.0281

Totals :                   574.63397   26.96446
```

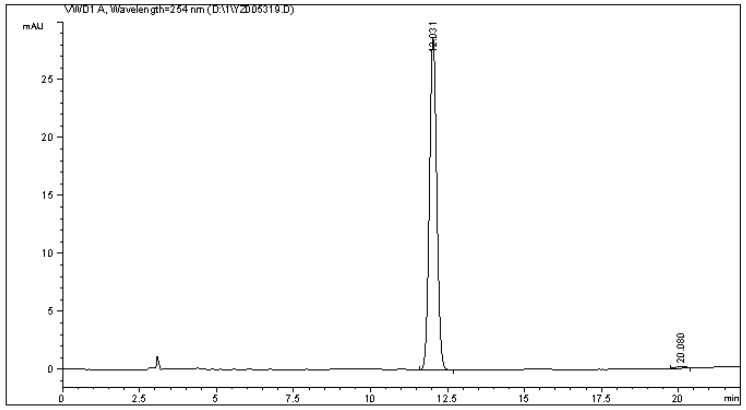


(+/-)-2b'

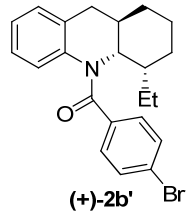
```
                        *** End of Report ***
```


Data File D:\1\YZ005319.D
Sample Name: MC-6-20A

```
Acq. Operator   : ZHOU
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 11/23/2013 7:29:52 AM
Acq. Method     : C:\HPCHEM\1\METHODS\DEMOCAL2.M
Last changed    : 11/23/2013 6:55:42 AM by ZHOU
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF LC.M
Last changed    : 4/17/2014 2:54:34 PM by Z
                  (modified after loading)
Sample Info     : AD-H, H/i-PrOH = 95/5, 1.0 mL/min, 30 oC, 254 nm
```




```
                        Area Percent Report

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=254 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]  mAU   *s    [mAU   ]     %
----|-------|----|-------|----------|----------|-------|
   1  12.031 BB    0.2580  476.76553   28.68786  99.2005
   2  20.080 MM R  0.4072    3.84263 1.57294e-1   0.7995

Totals :                   480.60817   28.84515
```



(+)-2b'

```
                        *** End of Report ***
```