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Supporting Information

Synthesis of Chiral Seven-membered Cyclic Sulfonamides through Pd-catalyzed Arylation of Cyclic Imines

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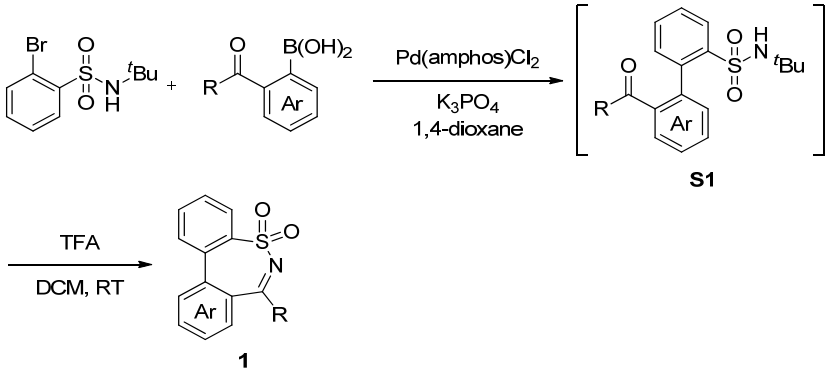
1. General

All reactions were carried out under an atmosphere of nitrogen using the standard Schlenk techniques, unless otherwise noted. Commercially available reagents were used without further purification. Solvents were treated prior to use according to the standard methods. ^{1}H NMR, ^{13}C NMR spectra were recorded at 400 MHz and 100 MHz with the Brucker spectrometer. ^{19}F was recorded at 376 MHz with Brucker spectrometer. Chemical shifts are reported in ppm using tetramethylsilane as internal standard when using $CDCl_3$ as solvent for ^{1}H NMR spectra. The following abbreviations were used to symbolize the multiplicities: s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet, br = broad. Flash column chromatography was performed on silica gel (200-300 mesh). All reactions were monitored by TLC analysis. Optical rotations were measured by the polarimeter. Enantiomeric excess was determined by HPLC analysis using chiral column described below in detail.

2. Synthesis of Seven-membered Cyclic *N*-Sulfonyl Imines

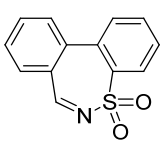
Seven-membered cyclic *N*-sulfonylimines **1** can be conveniently prepared by slightly modified procedure from readily available 2-bromobenzenesulfonamide and 2-acylphenylboronic acids according to the known literature procedure.[1-3] The detailed synthetic steps include palladium-catalyzed Suzuki coupling reaction and trifluoroacetic acid promoted intramolecular cyclization.



General Procedure: 2-Formylbenzeneboronic acid (3.000 g, 20 mmol), Pd(amphos)Cl_2 (0.212 g, 0.3 mmol), 2-bromo-*N*-(*tert*-butyl)benzenesulfonamide (2.922 g, 10.0 mmol) and potassium phosphate (6.368 g, 30.0 mmol) in 1,4-dioxane (50 mL) and water (30 mL) was stirred at reflux for 16 h, then cooled to ambient temperature, the solvent was removed under the reduced pressure, diluted with water (10 mL), then extracted with dichloromethane (30 mL × 3). The combined organic layer was dried over anhydrous sodium sulfate. After filtration, the solvent was concentrated in *vacuo*, and the residue was purified by flash chromatography to give products **S1**.

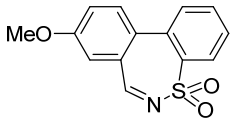
Subsequently, the above products (0.952 g, 3.0 mmol) and trifluoroacetic acid (7 mL/g of coupling product) in dichloromethane (45 mL) was stirred at ambient temperature for 20 min, then the mixture pH adjusted to 7 with saturated sodium bicarbonate solution. The organic layer was separated and the aqueous layer extracted with dichloromethane (30 mL × 3). The combined organic layer was dried over anhydrous sodium sulfate. After filtration, the solvent was removed under reduced pressure and the crude product was recrystallized with ethyl acetate to give the cyclic *N*-sulfonyl imines **1**.

Dibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (1a): 1.220 g, 41% yield (two steps), white solid, mp 268-269 ^{o}C, new compound, R_f = 0.45 (hexanes/ethyl acetate 3/1), ^{1}H NMR (400 MHz, $CDCl_3$) δ



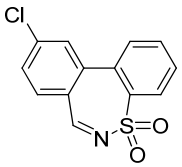
8.87 (s, 1H), 8.31 (dd, *J* = 7.9, 1.0 Hz, 1H), 7.92 (d, *J* = 7.8 Hz, 1H), 7.83-7.75 (m, 3H), 7.75-7.69 (m, 2H), 7.66 (td, *J* = 7.6, 1.0 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.8, 140.6, 138.9, 135.6, 133.8, 133.4, 132.9, 131.4, 131.3, 130.1, 129.7, 128.9 128.2. HRMS Calculated for $C_{13}H_{10}NO_2S$ $[M+H]^+$ 244.0427, found: 244.0426.

9-Methoxydibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (1b): 0.479 g, 50% yield (two steps), yellow solid, mp 232-233 °C, new compound, R_f = 0.40 (hexanes/ethyl acetate 3/1), ^{1}H NMR (400



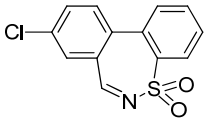
MHz, $CDCl_3$) δ 8.80 (s, 1H), 8.27 (d, *J* = 7.6 Hz, 1H), 7.84 (d, *J* = 8.6 Hz, 1H), 7.80-7.55 (m, 3H), 7.30 (d, *J* = 8.7 Hz, 2H), 3.94 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 172.4, 159.5, 138.0, 135.6, 134.1, 133.7, 133.1, 131.7, 131.0, 129.0, 128.2, 120.0, 115.0, 55.8. HRMS Calculated for $C_{14}H_{12}NO_3S$ $[M+H]^+$ 274.0532, found: 274.0531.

10-Chlorodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (1c): 1.135 g, 41% yield (two steps), white solid, mp 256-257 °C, new compound, R_f = 0.45 (hexanes/ethyl acetate 3/1), ^{1}H NMR (400 MHz,



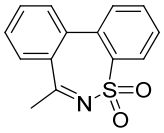
$CDCl_3$) δ 8.82 (s, 1H), 8.30 (d, *J* = 7.9 Hz, 1H), 7.90 (d, *J* = 1.6 Hz, 1H), 7.83-7.77 (m, 1H), 7.76-7.71 (m, 3H), 7.62 (dd, *J* = 8.3, 1.8 Hz, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.7, 142.2, 139.9, 138.9, 134.3, 134.0, 132.7, 131.3, 131.3, 130.3, 130.1, 129.1, 128.3. HRMS Calculated for $C_{13}H_9ClNO_2S$ $[M+H]^+$ 278.0037, found: 278.0034.

9-Chlorodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (1d): 0.801 g, 31% yield (two steps), white solid, mp 235-236 °C, new compound, R_f = 0.50 (hexanes/ethyl acetate 3/1), ^{1}H NMR (400 MHz,



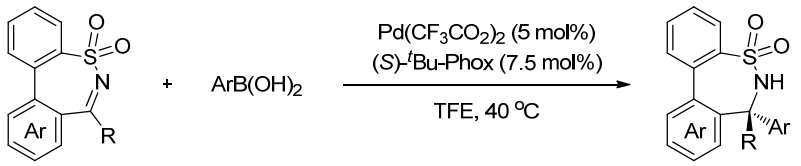
$CDCl_3$) δ 8.78 (s, 1H), 8.29 (d, *J* = 7.6 Hz, 1H), 7.84 (d, *J* = 8.5 Hz, 1H), 7.81-7.74 (m, 2H), 7.74-7.66 (m, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 171.2, 138.8, 138.7, 135.0, 134.7, 134.1, 134.0, 133.3, 131.5, 131.2, 130.6, 130.0, 128.5. HRMS Calculated for $C_{13}H_9ClNO_2S$ $[M+H]^+$ 278.0037, found: 278.0036.

7-Methyldibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (1e): 0.106 g, 7% yield (two steps), yellow solid, mp 192-193 °C, new compound, R_f = 0.25 (hexanes/ethyl acetate 5/1), ^{1}H NMR (400 MHz,



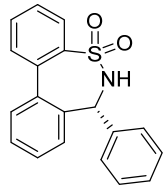
$CDCl_3$) δ 8.23 (d, *J* = 7.8 Hz, 1H), 7.80-7.61 (m, 6H), 7.57 (t, *J* = 7.6 Hz, 1H), 2.65 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 183.1, 140.2, 138.6, 136.3, 135.9, 133.5, 132.1, 130.9, 130.4, 129.0, 128.6, 128.3, 127.5, 29.1. HRMS Calculated for $C_{14}H_{12}NO_2S$ $[M+H]^+$ 258.0583, found: 258.0585.

3. Pd-catalyzed Asymmetric Arylation of Cyclic *N*-Sulfonyl Imines



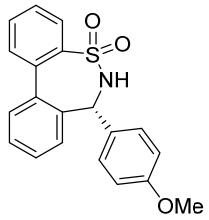
Ligand (*S*)-^{t}Bu-Phox (5.8 mg, 0.015 mmol) and $Pd(CF_3CO_2)_2$ (3.3 mg, 0.01 mmol) were placed in a dried Schlenk tube under nitrogen atmosphere, and degassed anhydrous acetone (1 mL) was added. The mixture was stirred at room temperature for 1 hour. The solvent was removed under vacuum to give the catalyst. Under nitrogen atmosphere, to the mixture of seven-membered cyclic *N*-sulfonyl imines (**1a-1d**, 0.20 mmol) and arylboronic acids (0.60 mmol) was added the above catalyst with 2,2,2-trifluoroethanol (3.0 mL). The solution was stirred at 40 °C for 4-72 h. The reaction mixture was cooled to room temperature, and the solvent was removed under reduced pressure. Flash chromatography on silica gel using hexanes/ethyl acetate as the eluent gave the chiral products **3**.

(*R*)-(+)-7-Phenyl-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3aa): 63 mg, 98% yield, white solid, mp 204-205 °C, new compound, R_f = 0.50 (hexanes/ethyl acetate 3/1), 99% ee,



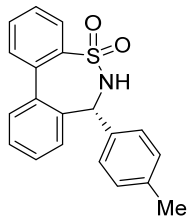
$[\alpha]^{20}_D$ = 51.35 (*c* 1.26, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 7.7 Hz, 1H), 7.80-7.70 (m, 1H), 7.69-7.54 (m, 2H), 7.50-7.34 (m, 6H), 7.31-7.23 (m, 2H), 6.84-6.71 (m, 1H), 5.35 (brs, 1H), 5.30 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.1, 139.0, 138.0, 137.1, 136.2, 133.5, 130.2, 129.5, 129.2, 129.1, 129.0, 128.8, 128.7, 128.5, 128.1, 125.9, 60.5. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 12.7 min and 18.3 min (major). HRMS Calculated for $C_{19}H_{16}NO_2S$ $[M+H]^+$ 322.0896, found: 322.0895.

(+)-7-(4-Methoxyphenyl)-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3ab): 69 mg, 98% yield, white solid, mp 114-115 °C, new compound, R_f = 0.60 (hexanes/ethyl acetate 3/1),



95% ee, $[\alpha]^{20}_D$ = 52.08 (*c* 0.72, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, *J* = 7.6 Hz, 1H), 7.80-7.72 (m, 1H), 7.68-7.56 (m, 2H), 7.43-7.40 (m, 2H), 7.38-7.25 (m, 3H), 6.92 (d, *J* = 8.1 Hz, 2H), 6.84-6.77 (m, 1H), 5.31 (brs, 1H), 5.26 (s, 1H), 3.83 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.0, 139.9, 139.0, 137.1, 136.4, 133.4, 130.2, 129.8, 129.4, 129.2, 129.1, 129.0, 128.6, 125.9, 114.3, 60.1, 55.4. HPLC: Chiracel OD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 20.0 min and 23.5 min (major). HRMS Calculated for $C_{20}H_{18}NO_3S$ $[M+H]^+$ 352.1002, found: 352.1006.

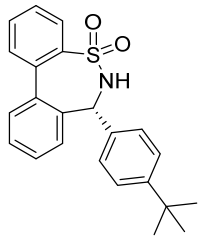
(+)-7-(*p*-Tolyl)-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3ac): 67 mg, 99% yield, white solid, mp 110-111 °C, new compound, R_f = 0.80 (hexanes/ethyl acetate 3/1), 97% ee, $[\alpha]^{20}_D$



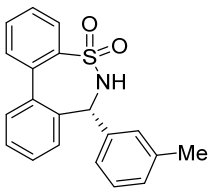
= 27.65 (*c* 1.28, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 7.7 Hz, 1H), 7.78-7.71 (m, 1H), 7.68-7.54 (m, 2H), 7.43-7.38 (m, 2H), 7.33-7.27 (m, 3H), 7.21-7.13 (m, 2H), 6.84-6.74 (m, 1H), 5.31 (brs, 1H), 5.26 (s, 1H), 2.36 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.0, 139.0, 138.4, 136.3, 134.9, 133.4, 130.2, 129.5, 129.5, 129.1, 129.0, 128.6, 128.0, 125.9, 60.4, 21.2. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 13.4 min and 21.8 min (major). HRMS Calculated for $C_{20}H_{18}NO_2S$

$[M+H]^+$ 336.1053, found: 336.1049.

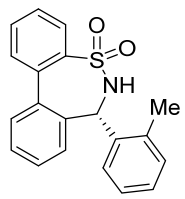
(+)-7-(4-(*tert*-Butyl)phenyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ad): 75 mg, 99% yield, white solid, mp 125-126 °C, new compound, R_f = 0.75 (hexanes/ethyl acetate 3/1), 96% ee, $[\alpha]^{20}_D$ = 50.12 (*c* 1.56, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 7.7 Hz, 1H), 7.71-7.63 (m, 1H), 7.61-7.55 (m, 1H), 7.51 (t, *J* = 7.5 Hz, 1H), 7.40-7.18 (m, 7H), 6.82-6.70 (m, 1H), 5.24 (brs, 1H), 5.19 (s, 1H), 1.26 (s, 9H) ^{13}C NMR (100 MHz, $CDCl_3$) δ 151.6, 140.0, 139.1, 137.1, 136.3, 134.8, 133.4, 130.2, 129.5, 129.1, 129.0, 128.6, 127.8, 125.9, 125.8, 60.4, 34.7, 31.4. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 13.1 min and 24.4 min (major). HRMS Calculated for $C_{23}H_{24}NO_2S$ $[M+H]^+$ 378.1522, found: 378.1524.



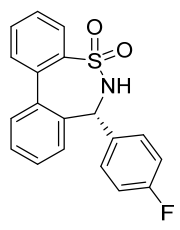
(+)-7-(*m*-Tolyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ae): 64 mg, 95% yield, white solid, mp 179-180 °C, new compound, R_f = 0.75 (hexanes/ethyl acetate 3/1), 98% ee, $[\alpha]^{20}_D$ = 47.26 (*c* 1.28, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.06 (d, *J* = 7.7 Hz, 1H), 7.79-7.72 (m, 1H), 7.68-7.56 (m, 2H), 7.47-7.40 (m, 2H), 7.31-7.15 (m, 5H), 6.86-6.74 (m, 1H), 5.33 (brs, 1H), 5.26 (s, 1H), 2.34 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.0, 139.0, 138.6, 137.9, 137.1, 136.2, 133.4, 130.2, 129.5, 129.2, 129.2, 129.0, 128.7, 128.7, 125.9, 125.2, 60.5, 21.4. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 12.0 min and 13.4 min (major). HRMS Calculated for $C_{20}H_{18}NO_2S$ $[M+H]^+$ 336.1053, found: 336.1056.



(+)-7-(*o*-Tolyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3af): 65 mg, 97% yield, white solid, mp 227-228 °C, new compound, R_f = 0.70 (hexanes/ethyl acetate 3/1), 95% ee, $[\alpha]^{20}_D$ = 2.27 (*c* 0.75, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, *J* = 7.8 Hz, 1H), 7.85 (d, *J* = 7.4 Hz, 1H), 7.78 (t, *J* = 7.5 Hz, 1H), 7.69 (d, *J* = 7.6 Hz, 1H), 7.61 (t, *J* = 7.6 Hz, 1H), 7.43 (d, *J* = 4.1 Hz, 2H), 7.34 (t, *J* = 7.5 Hz, 1H), 7.30-7.23 (m, 2H), 7.11 (d, *J* = 7.4 Hz, 1H), 6.70 (d, *J* = 7.8 Hz, 1H), 5.35 (brs, 1H), 5.25 (s, 1H), 1.82 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.3, 138.9, 136.9, 136.2, 135.6, 134.9, 133.5, 131.0, 129.8, 129.3, 129.2, 128.9, 128.8, 128.7, 128.3, 127.6, 126.5, 126.1, 57.3, 18.9. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 9.8 min and 12.1 min (major). HRMS Calculated for $C_{20}H_{18}NO_2S$ $[M+H]^+$ 336.1053, found: 336.1052.

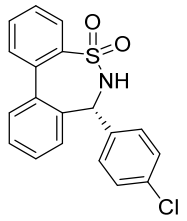


(+)-7-(4-Fluorophenyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxidee (3ag): 67 mg, 98% yield, white solid, mp 229-230 °C, new compound, R_f = 0.80 (hexanes/ethyl acetate 3/1), 98% ee, $[\alpha]^{20}_D$ = 44.38 (*c* 1.53, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 7.7 Hz, 1H), 7.79-7.72 (m, 1H), 7.68-7.55 (m, 2H), 7.52-7.36 (m, 4H), 7.30 (t, *J* = 7.0 Hz, 1H), 7.17-6.99 (m, 2H), 6.82-6.68 (m, 1H), 5.36 (brs, 1H), 5.29 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.6 (d, *J* = 246.0 Hz), 140.0, 138.9, 137.0, 136.0, 133.8, 133.5, 130.2, 129.8, 129.3, 129.2, 129.1, 128.7, 125.9, 115.8 (d, *J* = 22.0 Hz), 59.9. ^{19}F NMR (376 MHz, $CDCl_3$) δ -113.0. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 12.5 min and 18.5 min (major). HRMS Calculated for $C_{19}H_{15}FNO_2S$ $[M+H]^+$ 340.0802, found: 340.0800.

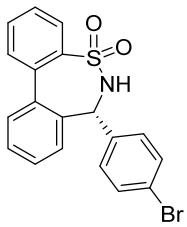


(+)-7-(4-Chlorophenyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ah): 69 mg,

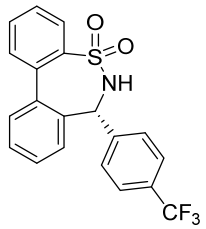
97% yield, white solid, mp 191-192 °C, new compound, R_f = 0.60 (hexanes/ ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 66.19 (*c* 0.63, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.03 (d, *J* = 7.7 Hz, 1H), 7.80-7.71 (m, 1H), 7.70-7.58 (m, 2H), 7.53-7.25 (m, 7H), 6.84-6.62 (m, 1H), 5.41 (brs, 1H), 5.28 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.0, 138.9, 136.6, 135.7, 134.4, 133.5, 130.2, 129.4, 129.3, 129.2, 129.1, 129.1, 128.8, 125.9, 60.0. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 13.3 min and 19.1 min (major). HRMS Calculated for $C_{19}H_{15}ClNO_2S$ $[M+H]^+$ 356.0507, found: 356.0510.



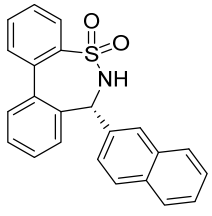
(+)-7-(4-Bromophenyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ai): 76 mg, 95% yield, white solid, mp 211-212 °C, new compound, R_f = 0.60 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 66.20 (*c* 1.16, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.01 (d, *J* = 4.7 Hz, 1H), 7.80-7.71 (m, 1H), 7.68-7.55 (m, 2H), 7.54-7.46 (m, 2H), 7.45-7.39 (m, 2H), 7.37-7.24 (m, 3H), 6.82-6.62 (m, 1H), 5.44 (brs, 1H), 5.26 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.0, 138.8, 137.1, 135.6, 133.5, 132.0, 130.2, 129.8, 129.4, 129.2, 129.1, 128.8, 125.9, 122.5, 60.00. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 14.1 min and 20.4 min (major). HRMS Calculated for $C_{19}H_{15}BrNO_2S$ $[M+H]^+$ 400.0001, found: 400.0006.



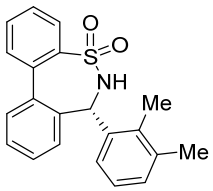
(+)-7-(4-(Trifluoromethyl)phenyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3aj): 73 mg, 94% yield, white solid, mp 223-224 °C, new compound, R_f = 0.60 (hexanes/ethyl acetate 3/1), 98% ee, $[\alpha]^{20}_D$ = 46.00 (*c* 1.80, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.04 (d, *J* = 7.6 Hz, 1H), 7.81-7.72 (m, 1H), 7.71-7.37 (m, 8H), 7.35-7.28 (m, 1H), 6.78-6.60 (m, 1H), 5.45 (brs, 1H), 5.37 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 142.2, 140.1, 138.8, 137.2, 135.4, 133.6, 130.2, 129.5, 129.3, 129.1, 128.8, 128.6, 126.0, 125.8, 123.9 (q, *J* = 271.0 Hz), 60.1. ^{19}F NMR (376 MHz, $CDCl_3$) δ -62.6. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/ *i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 10.5 min and 15.7 min (major). HRMS Calculated for $C_{20}H_{15}F_3NO_2S$ $[M+H]^+$ 390.0770, found: 390.0774.



(+)-7-(Naphthalen-2-yl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ak): 65 mg, 87% yield, white solid, mp 140-141 °C, new compound, R_f = 0.55 (hexanes/ethyl acetate 3/1), 95% ee, $[\alpha]^{20}_D$ = 63.58 (*c* 1.70, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.09 (d, *J* = 7.7 Hz, 1H), 8.01 (s, 1H), 7.90-7.57 (m, 6H), 7.55-7.49 (m, 2H), 7.47-7.33 (m, 3H), 7.25-7.17 (m, 1H), 6.82-6.70 (m, 1H), 5.50 (brs, 1H), 5.45 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.1, 139.0, 137.2, 136.0, 135.4, 133.5, 133.2, 130.2, 129.7, 129.3, 129.1, 129.0, 128.7, 128.6, 128.2, 127.8, 126.9, 126.7, 126.6, 126.0, 125.9, 60.5. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 18.2 min and 27.2 min (major). HRMS Calculated for $C_{23}H_{18}NO_2S$ $[M+H]^+$ 372.1053, found: 372.1050.

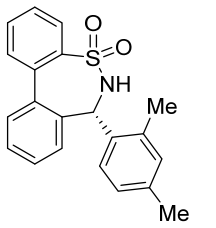


(+)-7-(2,3-Dimethylphenyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ai): 67 mg, 96% yield, white solid, mp 285-286 °C, new compound, R_f = 0.70 (hexanes/ethyl acetate 3/1), 91% ee, $[\alpha]^{20}_D$ = 18.77 (*c* 1.30, $CHCl_3$). ^1H NMR (400 MHz, $CDCl_3$) δ 8.11 (dd, *J* = 7.8, 1.0 Hz, 1H), 7.82 (td, *J* = 7.6, 1.3 Hz, 1H), 7.77-7.71 (m, J = 2H), 7.65 (td, *J* = 7.7, 1.3 Hz, 1H), 7.47 (d, *J* = 4.1 Hz, 2H), 7.34-7.24 (m, 2H), 7.23-7.17 (m, 1H), 6.76 (d, *J* = 7.8 Hz, 1H), 5.43 (d, *J* = 2.6 Hz,

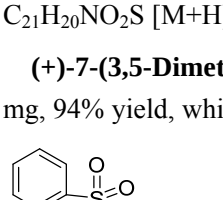


1H), 5.25 (d, *J* = 2.4 Hz, 1H), 2.25 (s, 3H), 1.75 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.1, 139.0, 137.6, 137.0, 136.0, 135.2, 134.1, 133.5, 130.0, 129.8, 129.3, 129.2, 128.9, 128.9, 128.7, 126.1, 125.9, 125.4, 57.7, 20.5, 14.6. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 9.5 min and 15.2 min (major). HRMS Calculated for $C_{21}H_{20}NO_2S$ $[M+H]^+$ 350.1209, found: 350.1212.

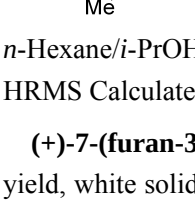
(+)-7-(2,4-Dimethylphenyl)-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3am): 69 mg, 99% yield, white solid, mp 214-215 °C, new compound, R_f = 0.70 (hexanes/ethyl acetate 3/1), 95% ee, $[\alpha]^{20}_D$ = 9.08 (*c* 1.30, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (dd, *J* = 7.8, 1.1 Hz, 1H), 7.74-7.60 (m, 3H), 7.54 (td, *J* = 7.7, 1.3 Hz, 1H), 7.36 (d, *J* = 4.0 Hz, 2H), 7.22-7.14 (m, 1H), 7.09 (d, *J* = 7.8 Hz, 1H), 6.88 (s, 1H), 6.66 (d, *J* = 7.8 Hz, 1H), 5.26 (d, *J* = 2.5 Hz, 1H), 5.14 (d, *J* = 2.4 Hz, 1H), 2.27 (s, 3H), 1.72 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.2, 139.0, 138.0, 136.9, 135.4, 135.1, 133.5, 133.1, 131.8, 129.8, 129.3, 129.2, 128.9, 128.7, 127.5, 127.1, 126.1, 57.2, 21.0, 18.8. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 10.1 min and 12.7 min (major). HRMS Calculated for $C_{21}H_{20}NO_2S$ $[M+H]^+$ 350.1209, found: 350.1204.



(+)-7-(3,5-Dimethylphenyl)-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3an): 66 mg, 94% yield, white solid, mp 202-203 °C, new compound, R_f = 0.80 (hexanes/ethyl acetate 3/1), 95% ee, $[\alpha]^{20}_D$ = 55.23 (*c* 1.28, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (dd, *J* = 7.8, 1.0 Hz, 1H), 7.79 (t, *J* = 7.3 Hz, 1H), 7.73-7.59 (m, 2H), 7.53-7.41 (m, 2H), 7.38-7.29 (m, 1H), 7.14-6.96 (m, 3H), 6.92-6.80 (m, 1H), 5.33 (brs, 1H), 5.25 (s, 1H), 2.33 (s, 6H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.0, 139.1, 138.5, 137.8, 137.2, 136.3, 133.3, 130.2, 130.1, 129.5, 129.1, 129.0, 128.6, 125.9, 60.5, 21.3. HPLC: Chiracel OD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 0.8 mL/min, retention time 12.1 min and 14.1 min (major). HRMS Calculated for $C_{21}H_{20}NO_2S$ $[M+H]^+$ 350.1209, found: 350.1212.



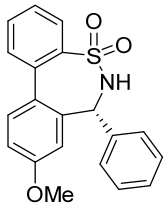
(+)-7-(furan-3-yl)-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3ao): 40 mg, 64% yield, white solid, mp 107-108 °C, new compound, R_f = 0.70 (hexanes/ethyl acetate 3/1), 98% ee, $[\alpha]^{20}_D$ = 19.30 (*c* 0.72, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (d, *J* = 7.7 Hz, 1H), 7.77-7.70 (m,1H), 7.69-7.51 (m, 3H), 7.49-7.34 (m, 4H), 7.15 (s, 1H), 6.33 (brs, 1H), 5.46 (s, 1H), 5.26 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 144.0, 141.0, 140.0, 138.9, 135.1, 133.5, 130.2, 129.5, 129.2, 128.9, 128.7, 125.9, 123.5, 110.0, 53.7. HPLC: Chiracel AD-H column, 254 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 13.5 min and 14.6 min (major). HRMS Calculated for $C_{17}H_{13}NNaO_3S$ $[M+Na]^+$ 334.0508, found: 334.0516.



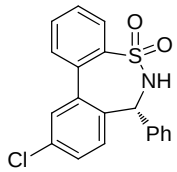
(+)-7-(benzofuran-2-yl)-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (3ap): 19 mg, 26% yield, white solid, mp 137-138 °C, new compound, R_f = 0.50 (hexanes/ethyl acetate 4/1), 97% ee, $[\alpha]^{20}_D$ = 29.09 (*c* 0.44, $CHCl_3$). ^{1}H NMR (400 MHz, MeOD) δ 7.91 (d, *J* = 7.7 Hz, 1H), 7.82-7.44 (m, 3H), 7.43-7.28 (m, 3H), 7.28-6.48 (m, 6H), 5.35 (s, 1H). ^{13}C NMR (100 MHz, MeOD) δ 154.9, 154.8, 140.3, 138.7, 134.4, 133.2, 130.0, 129.2, 128.6, 128.4, 127.9, 125.1, 124.1, 122.7, 120.7, 110.6, 105.0, 55.5. HPLC: Chiracel AD-H column, 254 nm, 30 °C, *n*-Hexane/*i*-PrOH

= 80/20, flow = 1.0 mL/min, retention time 15.8 min and 19.8 min (major). HRMS Calculated for $C_{21}H_{16}NO_3S$ $[M+H]^+$ 362.0845, found: 362.0856.

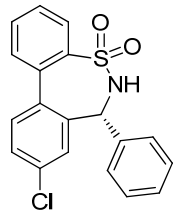
(-)-9-Methoxy-7-phenyl-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ba): 66 mg, 94% yield, white solid, mp 193-194 °C, new compound, R_f = 0.55 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = -56.42 (*c* 1.26, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 7.2 Hz, 1H), 7.76-7.69 (m, 1H), 7.68-7.51 (m, 2H), 7.47-7.29 (m, 6H), 6.95 (dd, *J* = 8.5, 2.6 Hz, 1H), 6.39-6.27 (m, 1H), 5.34 (brs, 1H), 5.29 (s, 1H), 3.68 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.0, 138.9, 137.9, 137.7, 133.4, 132.4, 130.3, 130.1, 128.9, 128.6, 128.1, 128.0, 125.9, 116.4, 113.6, 60.6, 55.2. HPLC: Chiracel IC column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 49.1 min (major) and 53.0 min. HRMS Calculated for $C_{20}H_{18}NO_3S$ $[M+H]^+$ 352.1002, found: 352.1003.



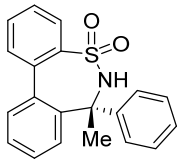
(+)-10-Chloro-7-phenyl-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ca): 67 mg, 94% yield, white solid, mp 236-237 °C, new compound, R_f = 0.80 (hexanes/ethyl acetate 3/1), 98% ee, $[\alpha]^{20}_D$ = 50.53 (*c* 1.30, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 7.6 Hz, 1H), 7.75-7.65 (m, 1H), 7.62-7.50 (m, 2H), 7.48-7.20 (m, 6H), 7.17-7.13 (m, 1H), 6.72-6.50 (m, 1H), 5.29 (brs, 1H), 5.16 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 141.6, 137.6, 137.6, 135.1, 134.8, 133.6, 130.9, 130.1, 129.3, 129.0, 128.9, 128.8, 128.0, 126.1, 60.0. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 0.8 mL/min, retention time 16.9 min and 18.4 min (major). HRMS Calculated for $C_{19}H_{15}ClNO_2S$ $[M+H]^+$ 356.0507, found: 356.0510.



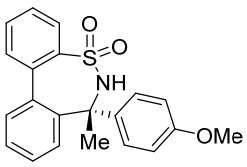
(-)-9-Chloro-7-phenyl-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3da): 68 mg, 96% yield, white solid, mp 227-228 °C, new compound, R_f = 0.60 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = -11.29 (*c* 1.16, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.05 (d, *J* = 7.5 Hz, 1H), 7.82-7.71 (m, 1H), 7.68-7.56 (m, 2H), 7.48-7.32 (m, 7H), 6.82-6.60 (m, 1H), 5.38 (brs, 1H), 5.24 (s, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 138.5, 138.0, 137.9, 137.2, 135.2, 133.5, 130.3, 130.1, 129.7, 129.4, 129.1, 129.0, 128.9, 128.0, 126.0, 60.3. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 13.2 min and 15.0 min (major). HRMS Calculated for $C_{19}H_{15}ClNO_2S$ $[M+H]^+$ 356.0507, found: 356.0502.



(+)-7-Methyl-7-phenyl-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ea): 28 mg, 84% yield, white solid, mp 239-240 °C, new compound, R_f = 0.70 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 68.61 (*c* 0.72, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.76 (dd, *J* = 13.5, 7.6 Hz, 2H), 7.53-7.41 (m, 2H), 7.25-7.11 (m, 3H), 6.82 (m, 3H), 6.74 (d, *J* = 7.3 Hz, 1H), 6.63 (d, *J* = 3.0 Hz, 2H), 5.94 (brs, 1H), 1.82 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.6, 140.7, 140.1, 138.0, 132.5, 130.9, 129.9, 129.2, 128.6, 127.6, 127.4, 127.0, 126.1, 124.6, 124.3, 63.2, 33.5. HPLC: Chiracel AD-H column, 220 nm, 30 °C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 10.2 min (major) and 15.1 min HRMS Calculated for $C_{20}H_{18}NO_2S$ $[M+H]^+$ 336.1053, found: 336.1050.

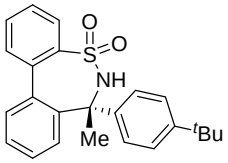


(+)-7-(4-Methoxyphenyl)-7-methyl-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine-5,5-dioxide (3eb): 32 mg, 88% yield, white solid, mp 164-165 °C, new compound, R_f = 0.55 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 47.85 (c 0.56, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86-7.76 (m, 2H), 7.58-7.46 (m, 3H), 7.30-7.22 (m, 2H), 6.89-6.80 (m, 1H), 6.61

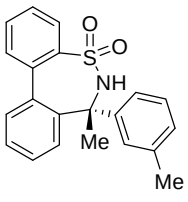


(d, *J* = 8.0 Hz, 2H), 6.41 (d, *J* = 8.0 Hz, 2H), 6.02 (brs, 1H), 3.63 (s, 3H), 1.87 (s, 3H).^{13}C NMR (100 MHz, $CDCl_3$) δ 157.6, 140.7, 140.3, 140.1, 138.0, 137.7, 132.5, 130.9, 129.8, 129.1, 128.5, 127.4, 126.9, 125.9, 124.3, 112.9, 62.8, 55.2, 33.6. HPLC: Chiracel IA column, 254 nm, 30 ^{o}C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 11.6 min and 12.6 min (major). HRMS Calculated for $C_{21}H_{20}NO_3S$ [M+H]+ 366.1158, found: 366.1162.

(+)-7-(4-(*tert*-Butyl)phenyl)-7-methyl-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ec): 35 mg, 90% yield, white solid, mp 257-258 ^{o}C, new compound, R_f = 0.75 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 56.53 (*c* 0.52, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88-7.74 (m, 2H), 7.58-7.46 (m, 2H), 7.25-7.07 (m, 3H), 6.87 (d, *J* = 7.9 Hz, 2H), 6.78-6.72 (m, 1H), 6.60 (d, *J* = 7.9 Hz, 2H), 6.10 (brs, 1H), 1.91 (s, 3H), 1.15 (s, 9H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 148.8, 142.5, 140.8, 140.5, 140.2, 138.1, 132.2, 130.7, 129.9, 129.1, 128.5, 127.2, 126.9, 124.6, 124.4, 124.3, 63.0, 34.2, 33.1, 31.1. HPLC: Chiracel IA column, 254 nm, 30 ^{o}C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 8.9 min and 10.2 min (major). HRMS Calculated for $C_{24}H_{26}NO_2S$ $[M+H]^+$ 392.1679, found: 392.1670.



(+)-7-methyl-7-(*p*-tolyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ed): 33 mg, 95% yield, white solid, mp 106-107 ^{o}C, new compound, R_f = 0.75 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 44.54 (c 0.66, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.81 (dd, *J* = 14.6, 7.2 Hz, 2H), 7.59-7.46 (m, 2H), 7.32-7.25 (m, 2H), 7.24-7.19 (m, 1H), 6.82 (d, *J* = 6.8 Hz, 1H), 6.68 (d, *J* = 7.5 Hz, 2H), 6.57 (d, *J* = 7.6 Hz, 2H), 6.08 (brs, 1H), 2.12 (s, 3H), 1.87 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 142.7, 140.7, 140.2, 140.1, 138.1, 135.6, 132.4, 130.9, 129.9, 129.1, 128.5, 128.2, 127.4, 127.0, 124.6, 124.3, 63.1, 33.6, 20.7. HPLC: Chiracel IA column, 254 nm, 30 ^{o}C, *n*-Hexane/ *i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 9.9 min and 11.8 min (major). HRMS Calculated for $C_{21}H_{20}NO_2S$ [M+H]+ 350.1209, found: 350.1223.



(+)-7-methyl-7-(*m*-tolyl)-6,7-dihydrodibenzo[*d,f*][1,2]thiazepine 5,5-dioxide (3ee): 32 mg, 92% yield, white solid, mp 178-179 ^{o}C, new compound, R_f = 0.50 (hexanes/ethyl acetate 3/1), 99% ee, $[\alpha]^{20}_D$ = 90.29 (c 0.68, $CHCl_3$). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (d, *J* = 7.3 Hz, 2H), 7.59-7.47 (m, 2H), 7.31-7.26 (m, 2H), 7.22-7.16 (m, 1H), 6.83-6.75 (m, 2H), 6.73-6.67 (m, 1H), 6.51 (s, 1H), 6.46-6.40 (m, 1H), 5.98 (brs, 1H), 2.04 (s, 3H), 1.88 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 145.3, 140.7, 140.1, 140.1, 138.2, 137.0, 132.5, 130.8, 129.9, 129.1, 128.5, 127.6, 127.3, 126.9, 126.7, 125.2, 124.2, 122.3, 63.2, 33.3, 21.1.HPLC: Chiracel IA column, 254 nm, 30 ^{o}C, *n*-Hexane/*i*-PrOH = 80/20, flow = 1.0 mL/min, retention time 7.5 min (major). and 9.9 min HRMS Calculated for $C_{21}H_{19}NNaO_2S$ [M+Na]+ 372.1029, found: 372.1041.

4. Determination of Absolute Configuration of Products

To determine the absolute configuration of (+)-7-Phenyl-6,7-dihydrodibenzo[*d*,*f*][1,2]thiazepine 5,5-dioxide (+)-**3aa** (99% ee), firstly, (+)-**3aa** was upgraded to >99% ee by recrystallization with *n*-hexane/ethyl acetate. Then, *n*-hexane was added into the solution of (+)-**3aa** (>99% ee) in dichloromethane, then the solution was slowly evaporated and single crystal of (+)-**3aa** was obtained after 1 days. The crystal was grown from the solution, which is suitable for X-ray diffraction analysis. The structure in **Figure S1** showed that the absolute configuration of (+)-**3aa** is *R* [CCDC 1877280] contains the structure and supplementary crystallographic data for (*R*)-(+)-**3aa**. These data can be obtained free of charge from the Cambridge Crystallographic Data Centre *via* www.ccdc. cam.ac.uk.

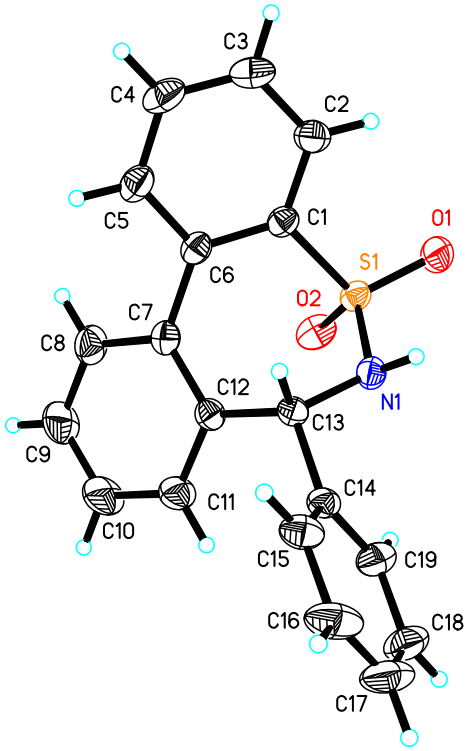


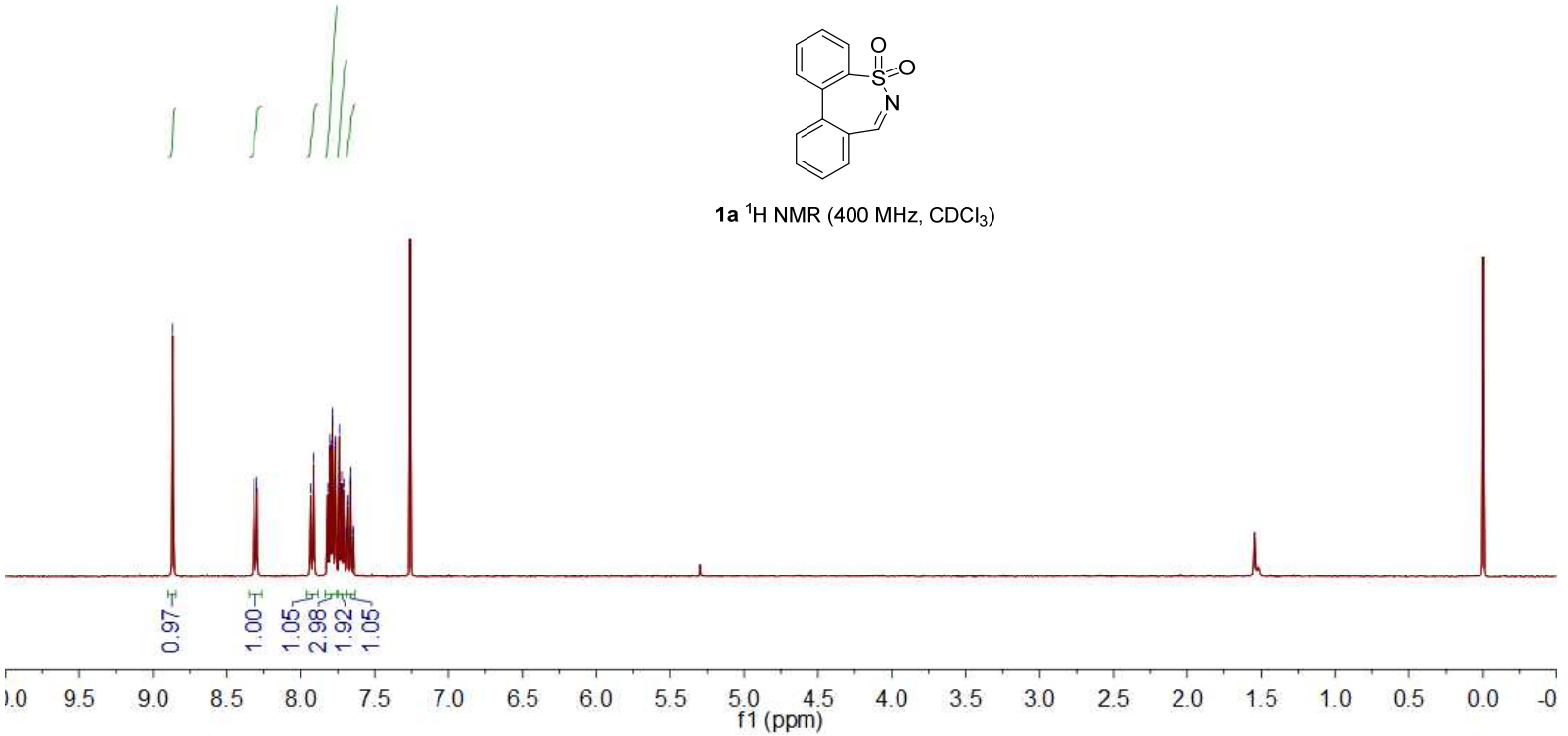
Figure S1. X-ray crystallographic analysis of (*R*)-(+)-**3aa**

5. References

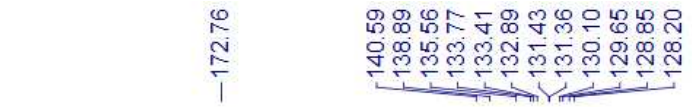
1. Burlein, C.; Wang, C.; Xu, M.; Bhatt, T.; Stahlhut, M.; Ou, Y.; Adam, G. C.; Heath, J.; Klein, D. J.; Sanders, J.; Narayan, K.; Abeywickrema, P.; Heo, M. R.; Carroll, S. S.; Grobler, J. A.; Sharma, S.; Diamond, T. L.; Converso, A.; Krosky, D. J. *ACS Chem. Biol*. **2017**, *12*, 2858.
2. France, S. P.; Aleku, G. A.; Sharma, M.; Mangas-Sanchez, J.; Howard, R. M.; Steflik, J.; Kumar, R.; Adams, R. W.; Slabu, I.; Crook, R.; Grogan, G.; Wallace, T. W.; Turner, N. J. *Angew. Chem. Int. Ed*. **2017**, *56*, 15589.
3. Ni, C.; Zha, D.; Ye, H.; Hai, Y.; Zhou, Y.; Anslyn, E. V.; You, L. *Angew. Chem. Int. Ed*. **2018**, *57*, 1300.

6. Copy of NMR and HPLC

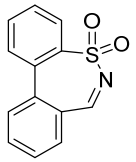
1H NMR ZZ-2-30 in CDCl3



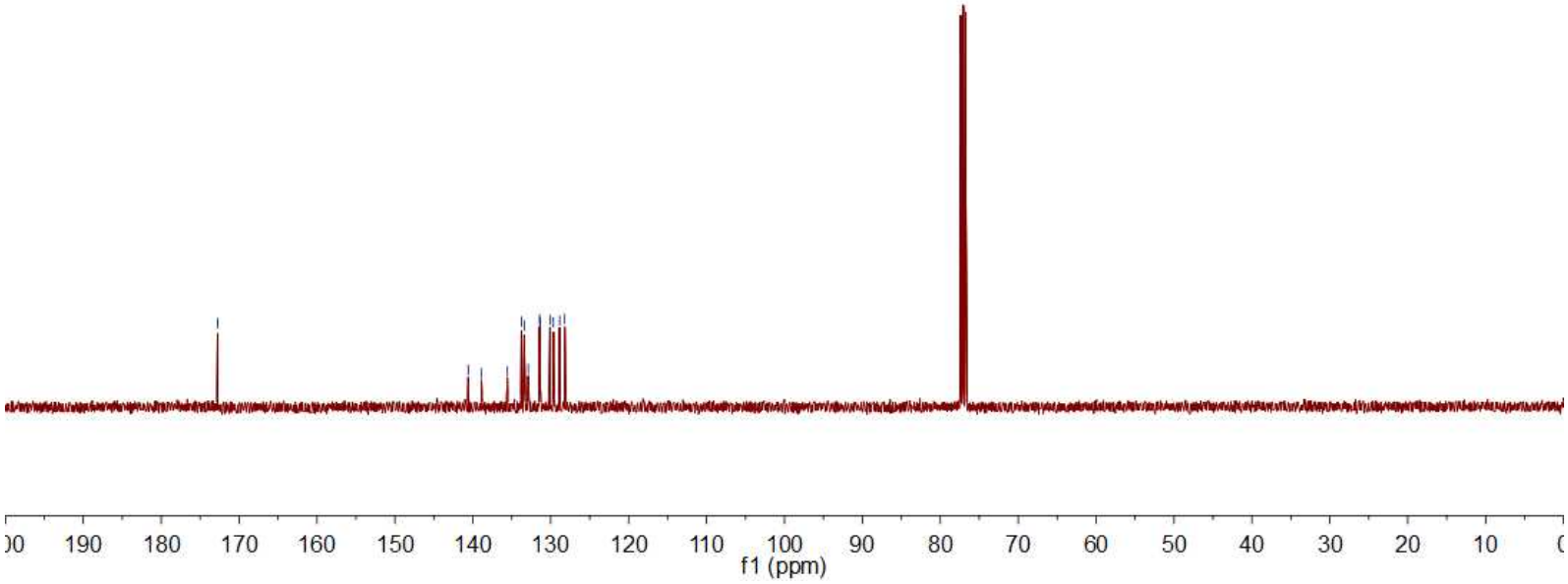
1a ^{1}H NMR (400 MHz, $CDCl_3$)



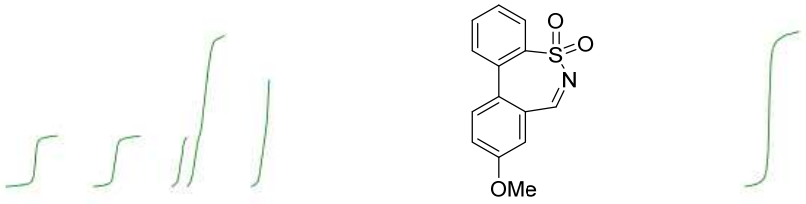
13C NMR ZZ-2-30 in CDCl3



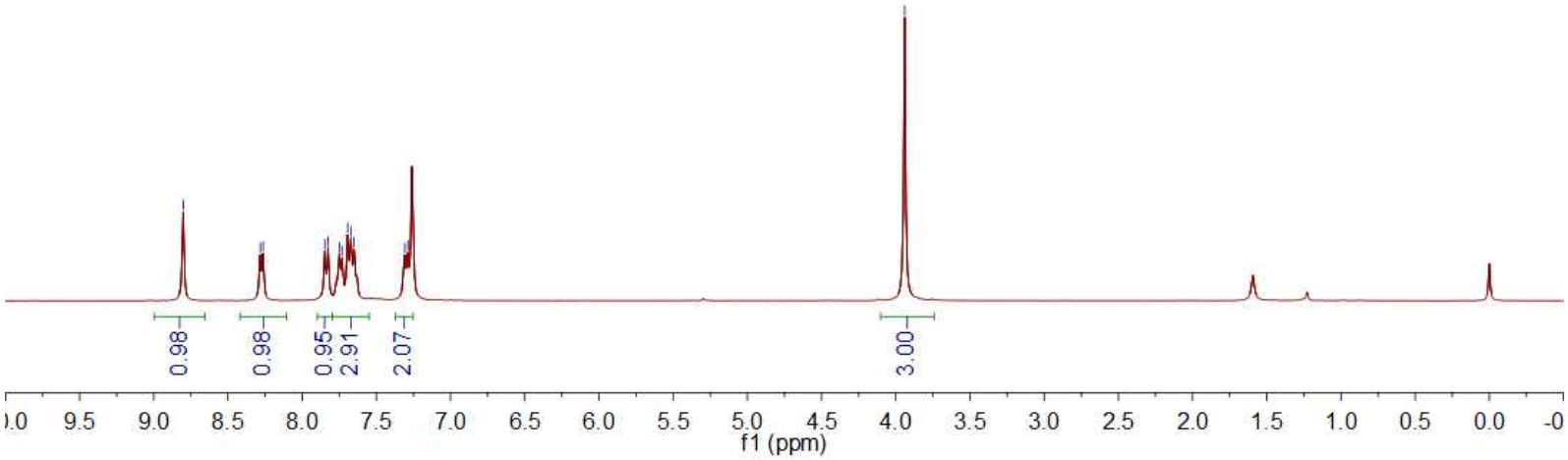
1a ^{13}C NMR (100 MHz, $CDCl_3$)

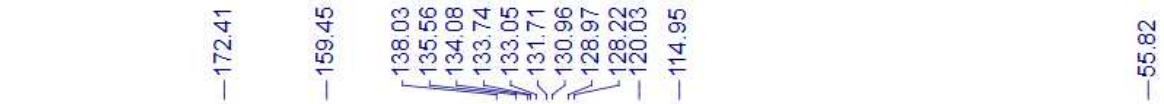


1H NMR ZZ-2-84 in CDCl3

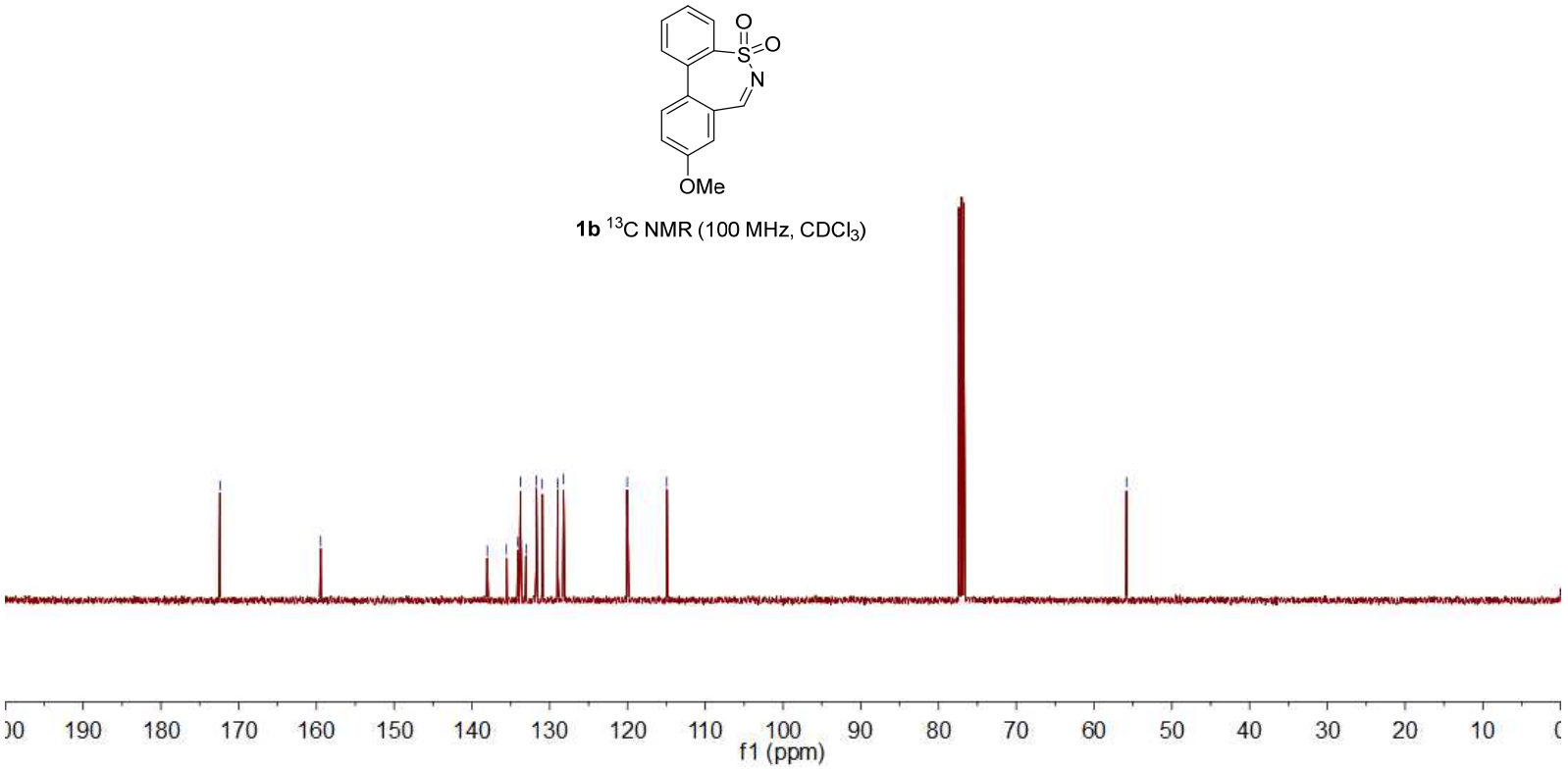


1b ^{1}H NMR (400 MHz, $CDCl_3$)

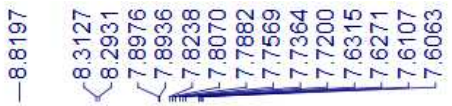




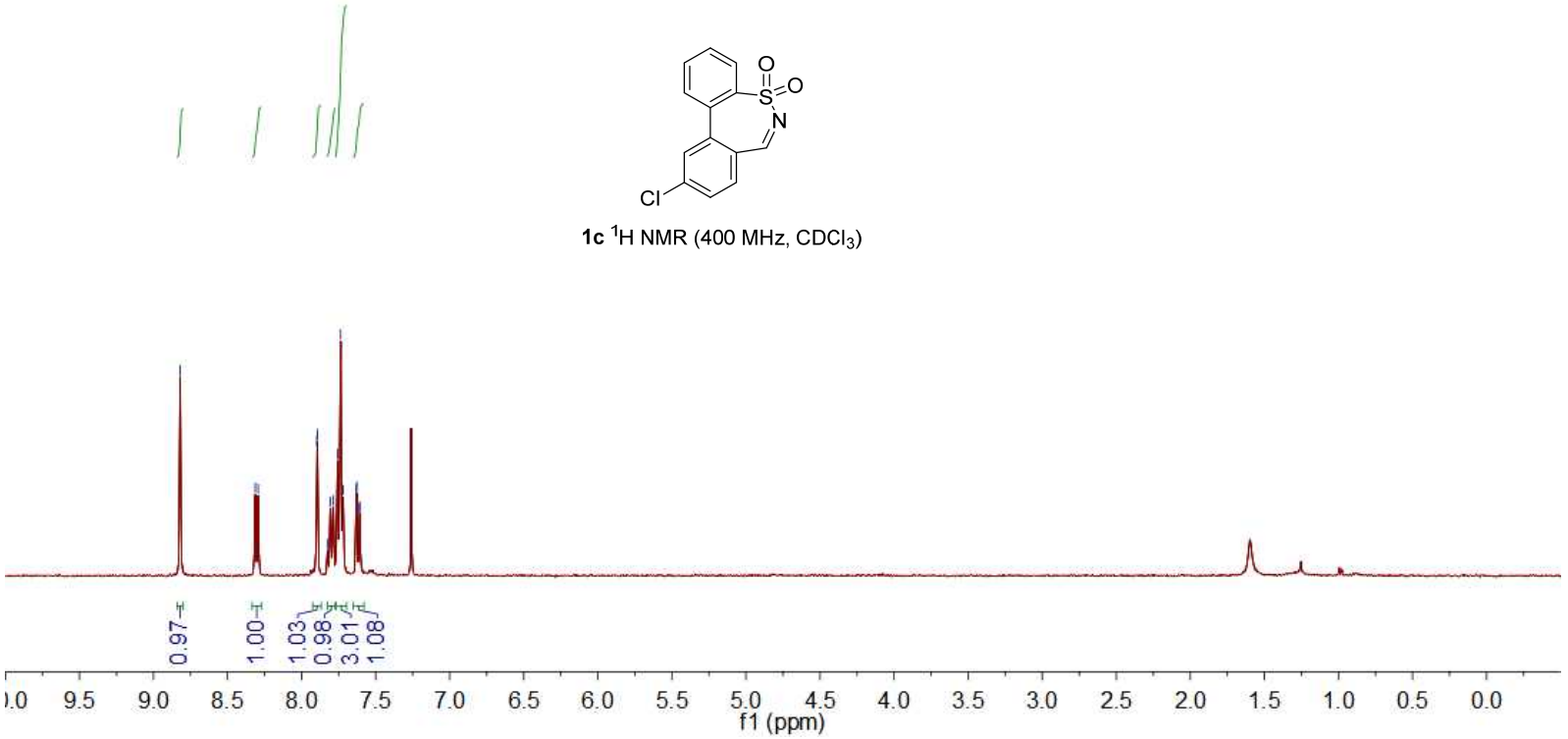
13C NMR ZZ-2-84 in CDCl3



1b ^{13}C NMR (100 MHz, $CDCl_3$)



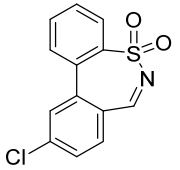
1H NMR ZZ-3-71 in CDCl3



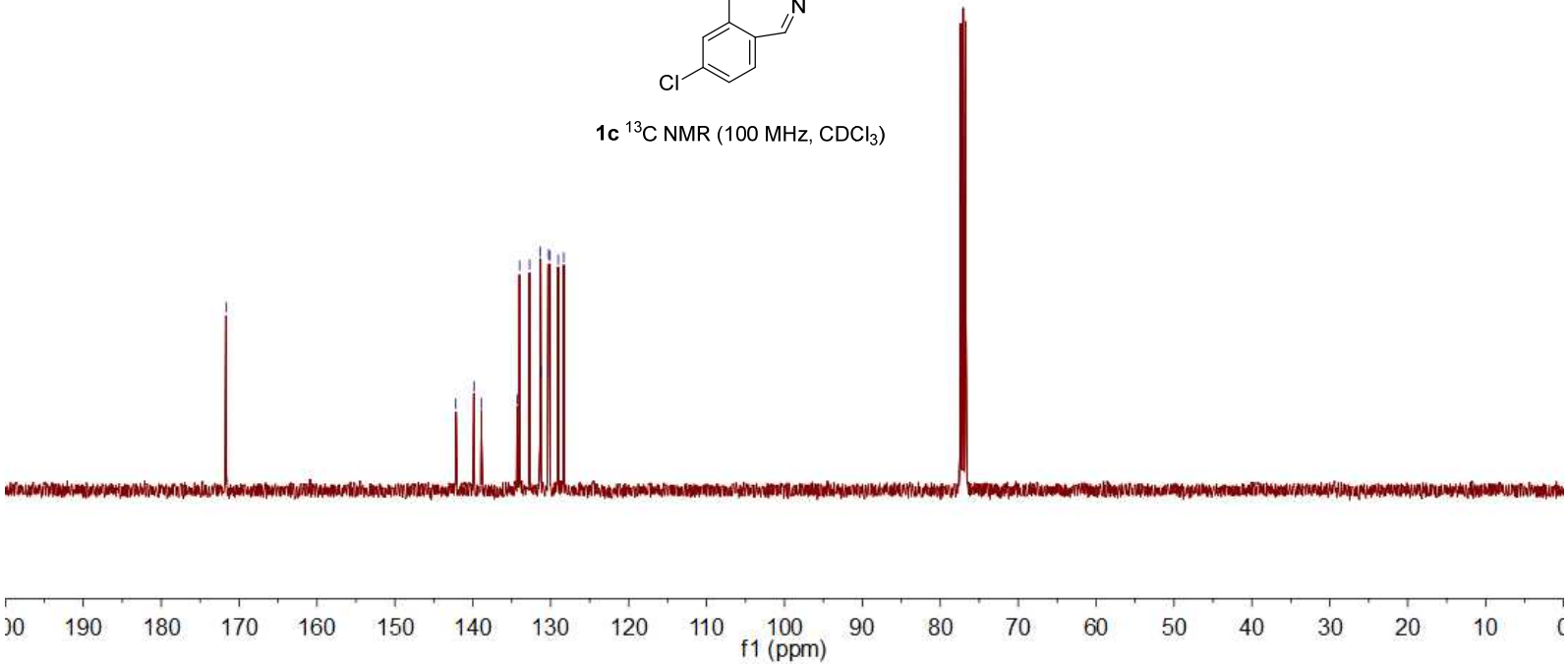
1c ^{1}H NMR (400 MHz, $CDCl_3$)

171.67
142.18
139.85
138.89
134.30
133.99
132.72
131.33
131.29
130.31
130.13
129.05
128.33

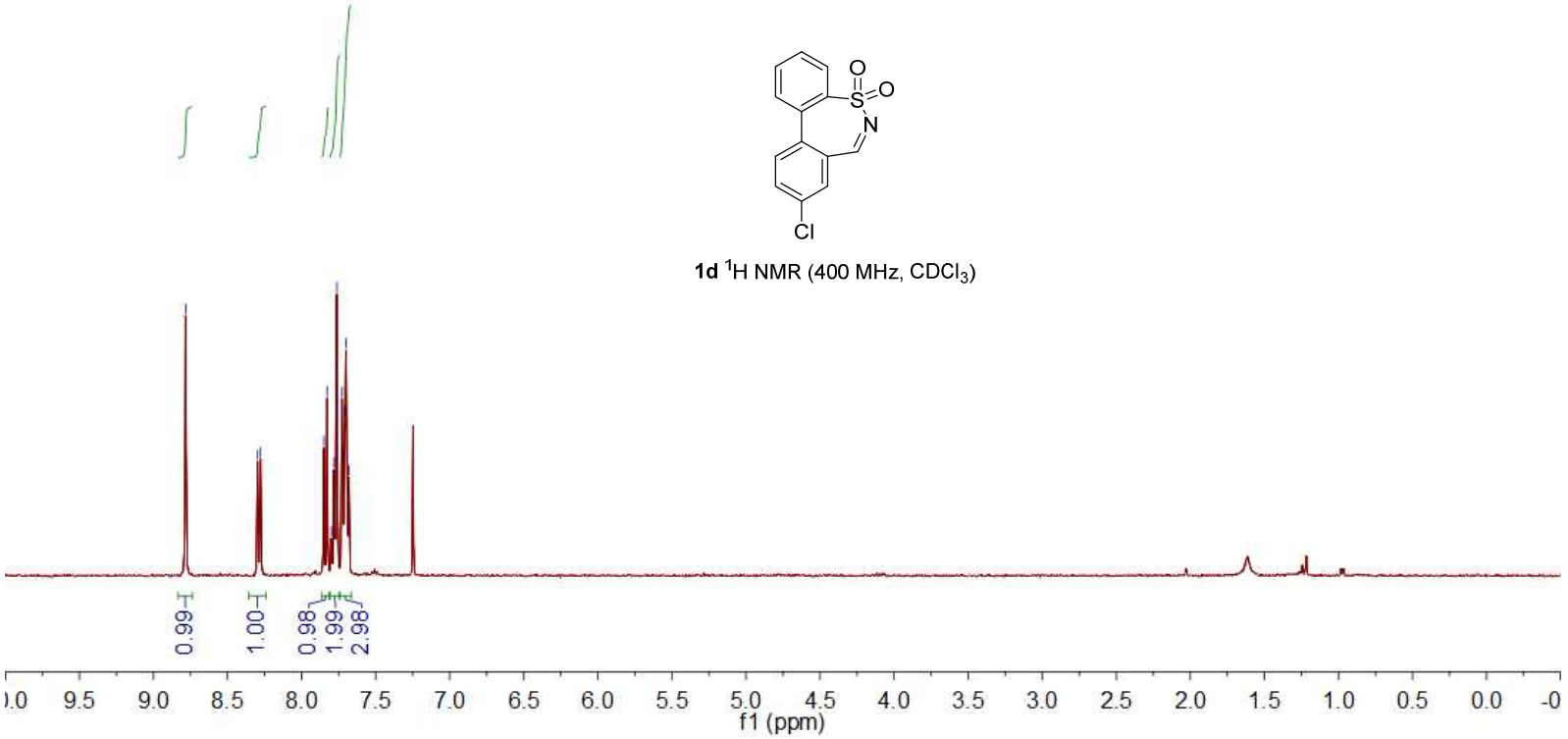
13C NMR ZZ-3-71 in CDCl3



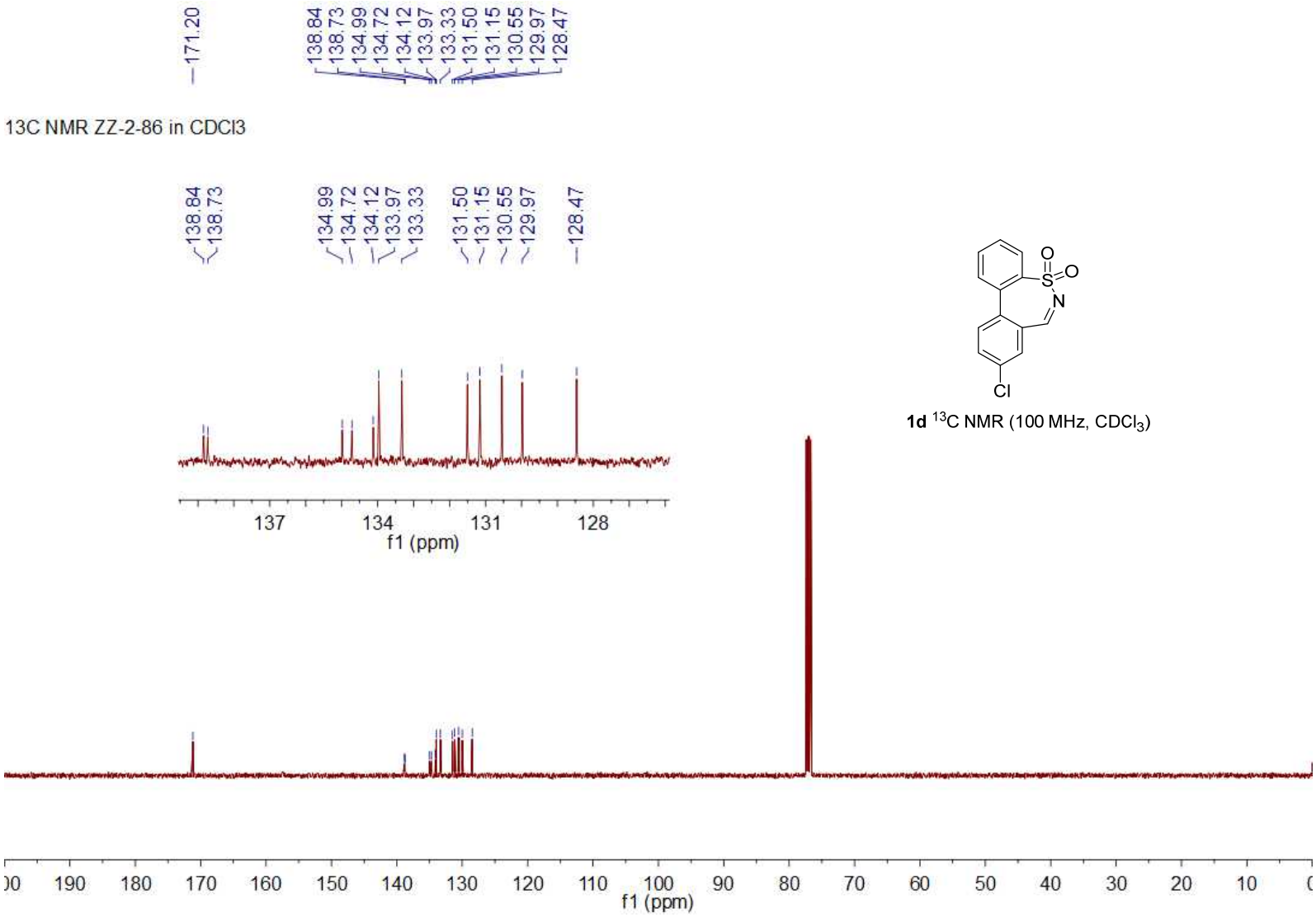
1c ^{13}C NMR (100 MHz, $CDCl_3$)



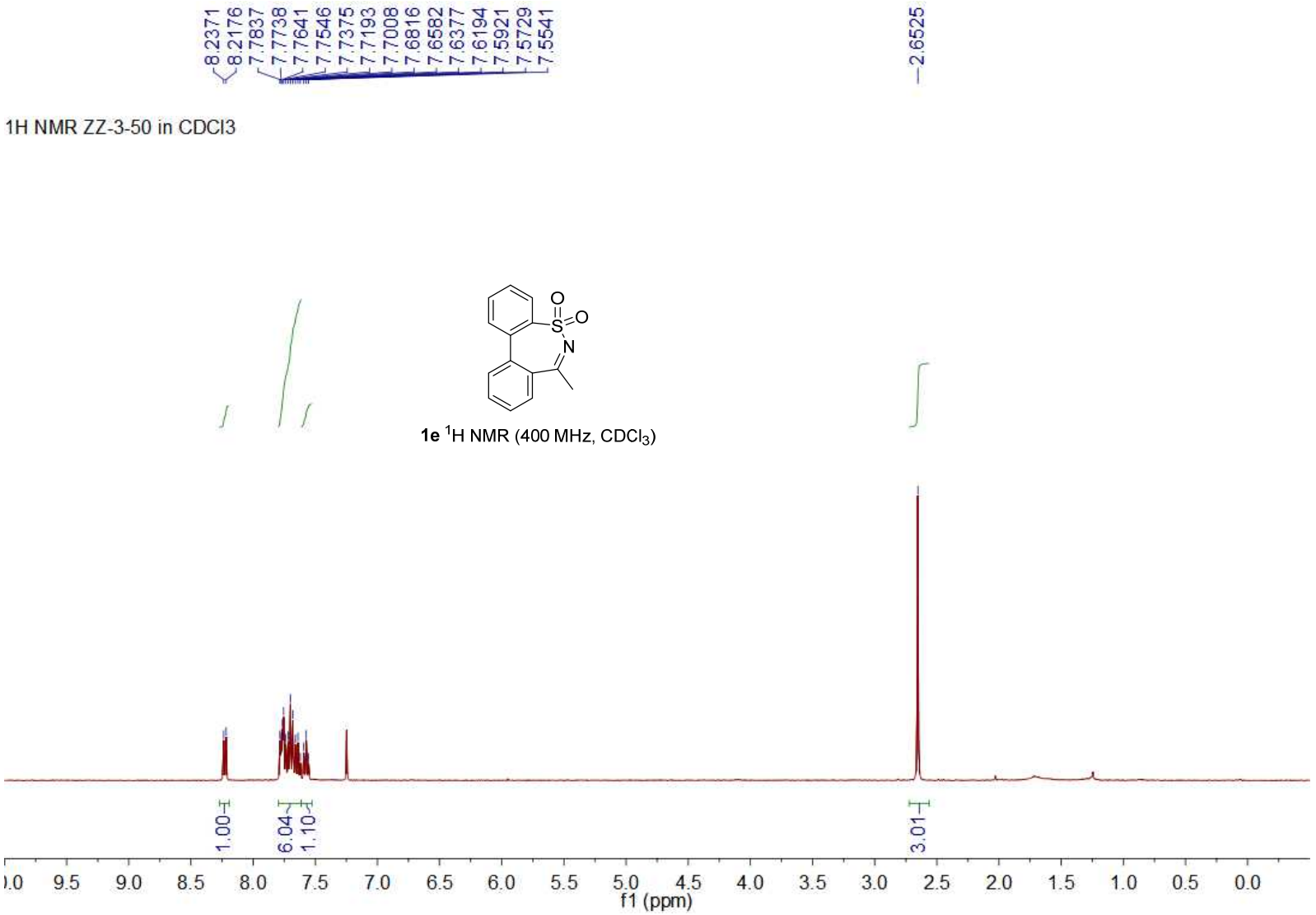
1H NMR ZZ-2-86 in CDCl3



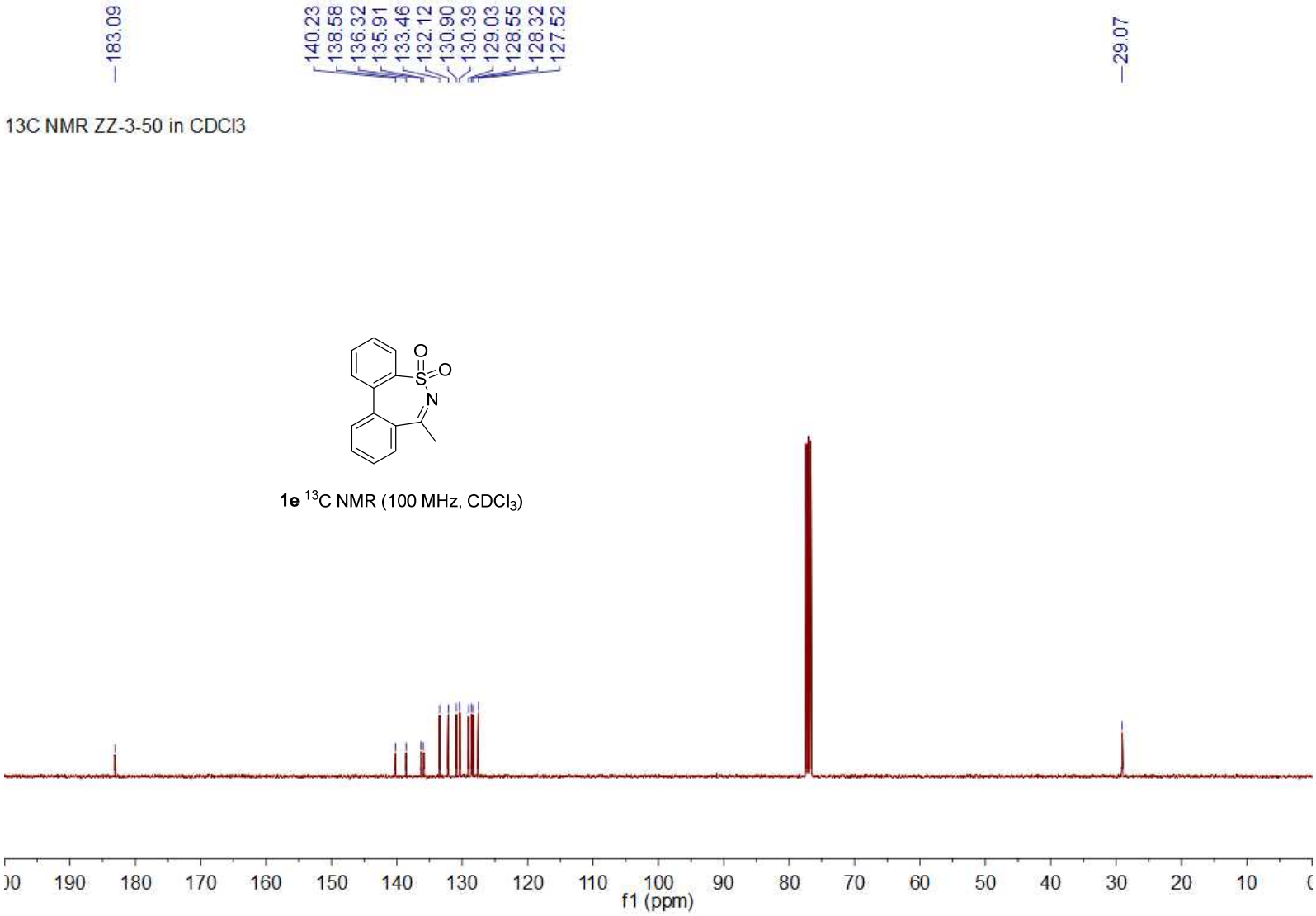
1d ^{1}H NMR (400 MHz, $CDCl_3$)



1d ^{13}C NMR (100 MHz, $CDCl_3$)

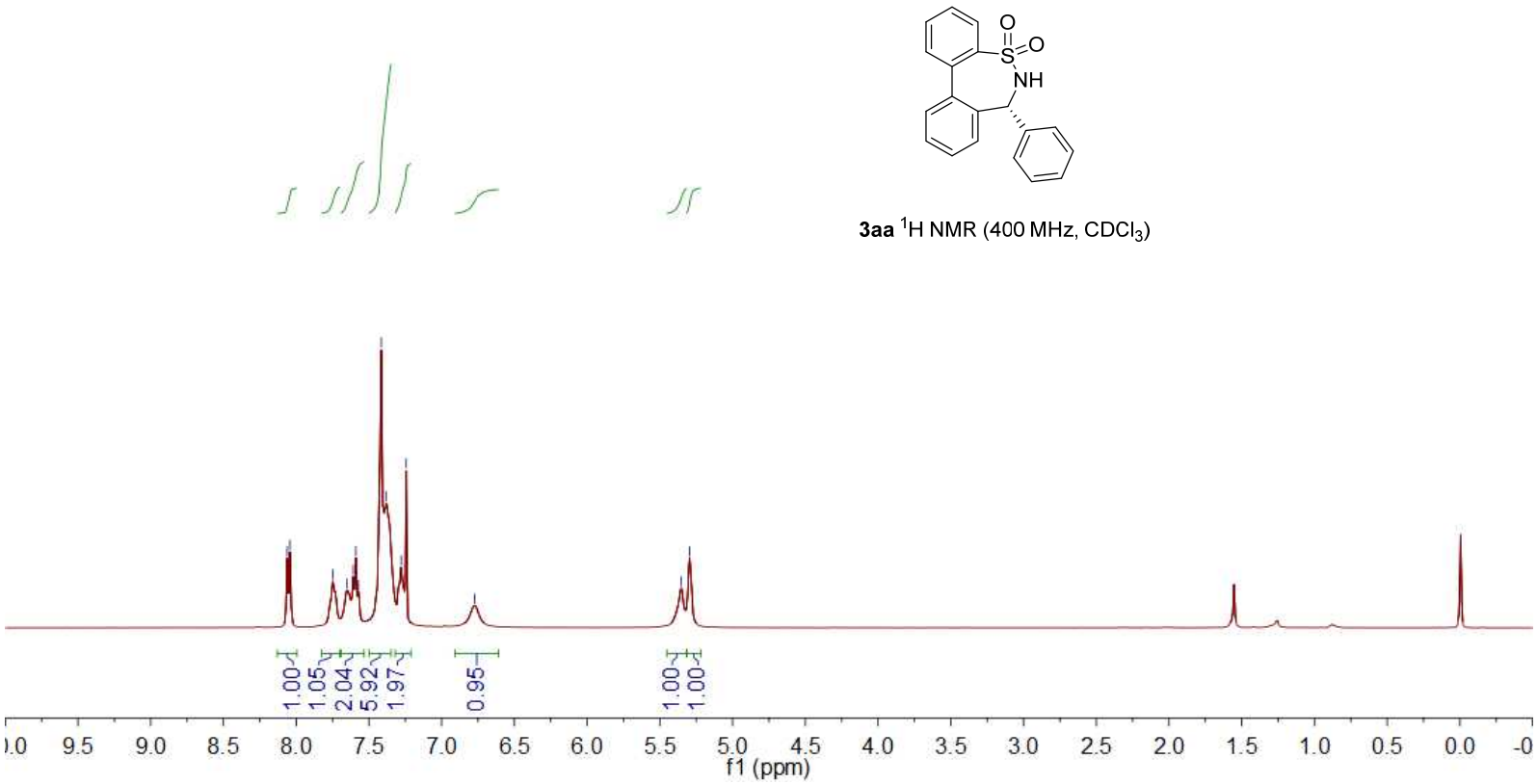


1e ^{1}H NMR (400 MHz, $CDCl_3$)

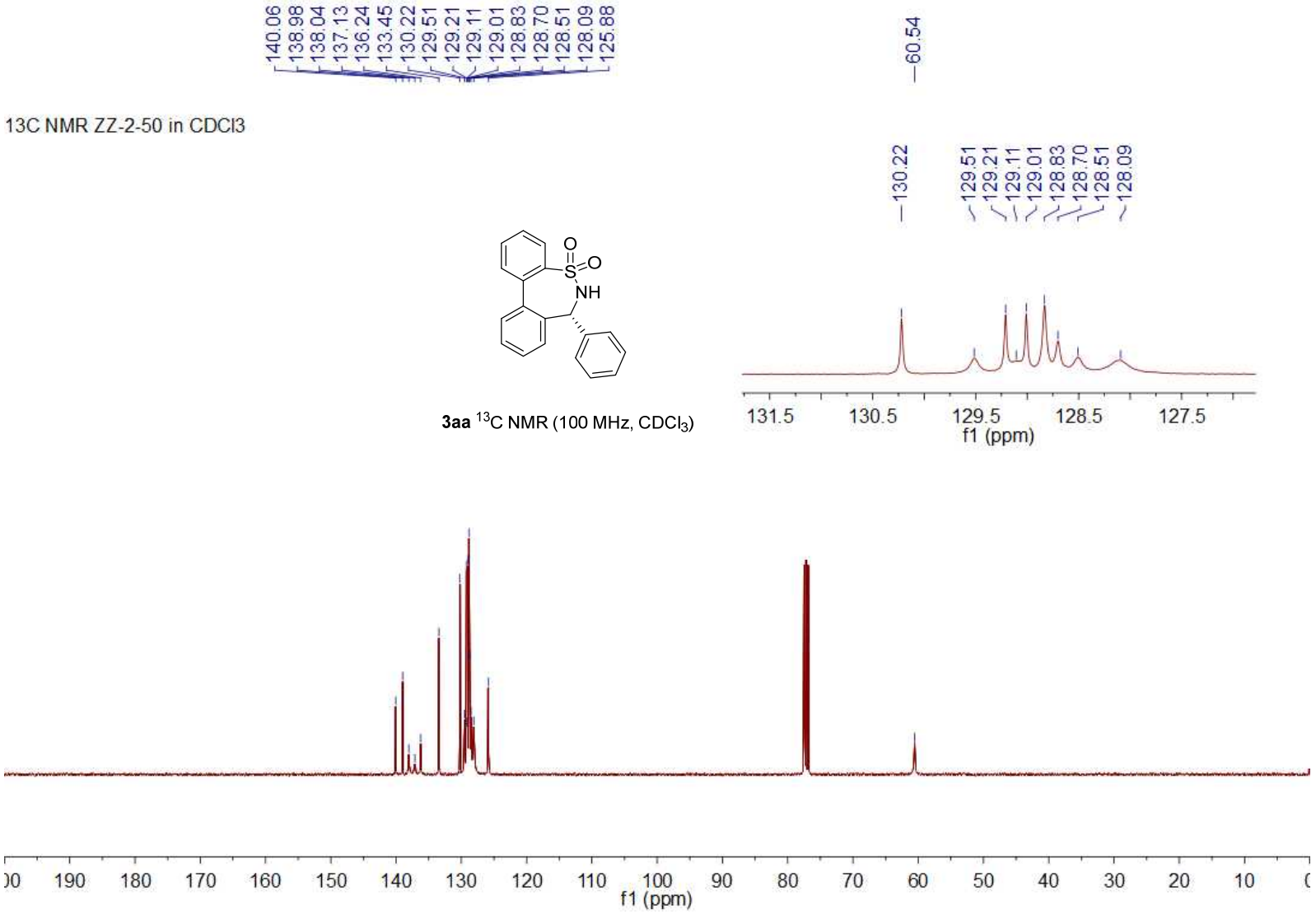


1e ^{13}C NMR (100 MHz, $CDCl_3$)

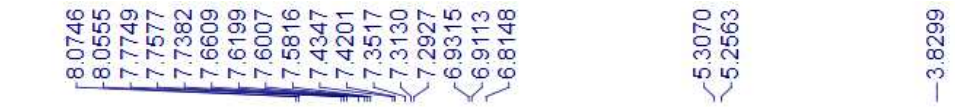
1H NMR ZZ-2-50 in CDCl3



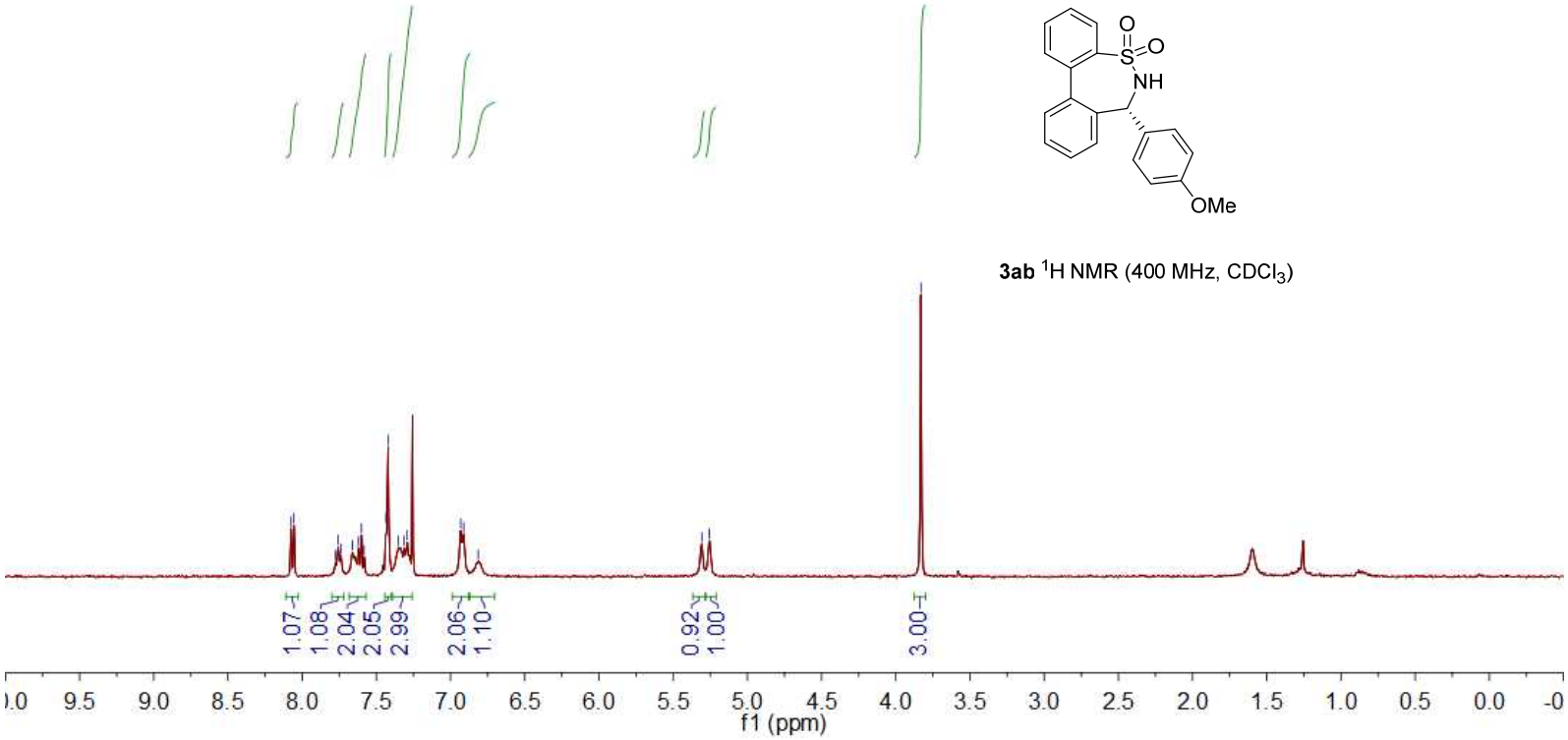
3aa ^{1}H NMR (400 MHz, $CDCl_3$)



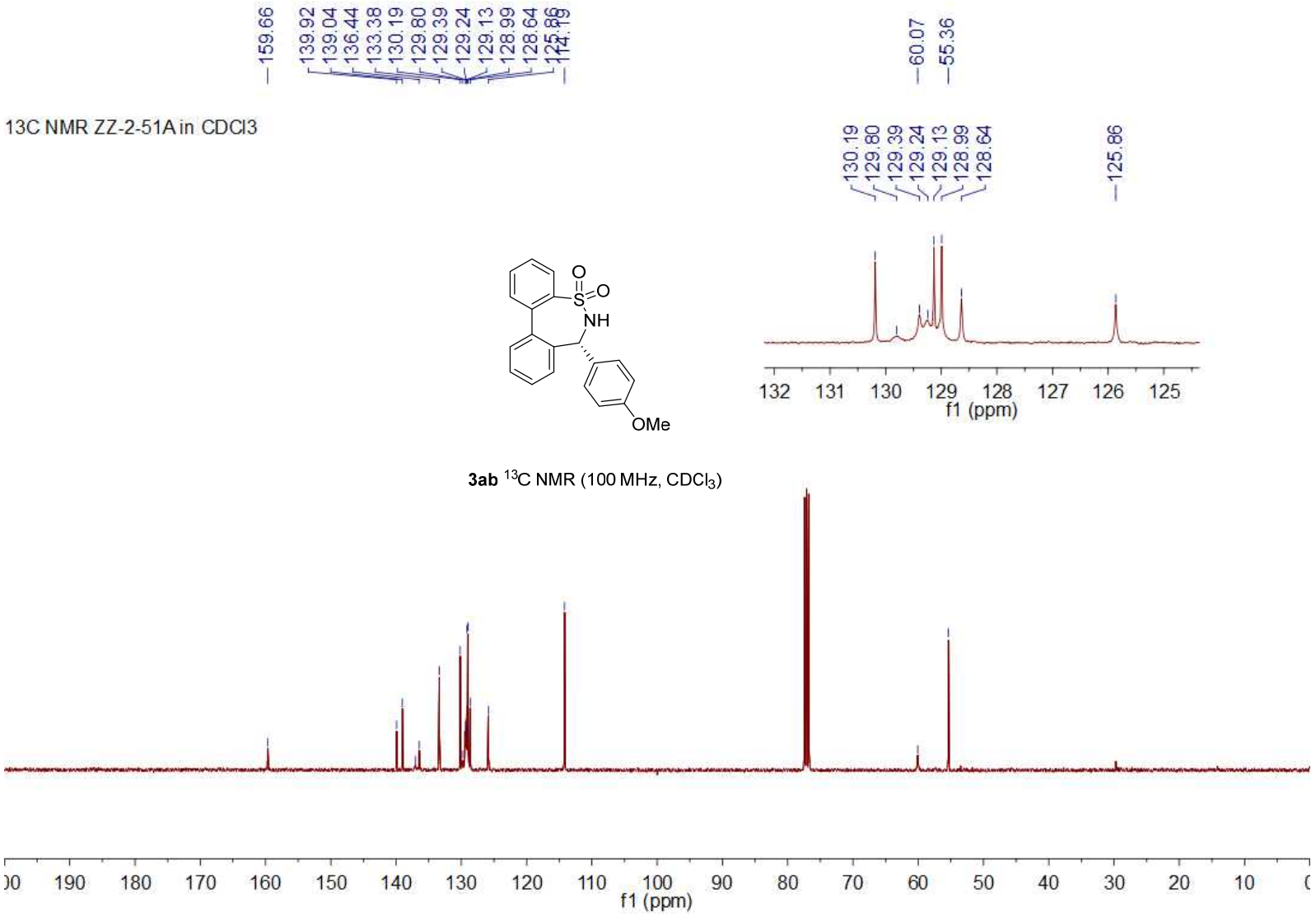
3aa ^{13}C NMR (100 MHz, $CDCl_3$)



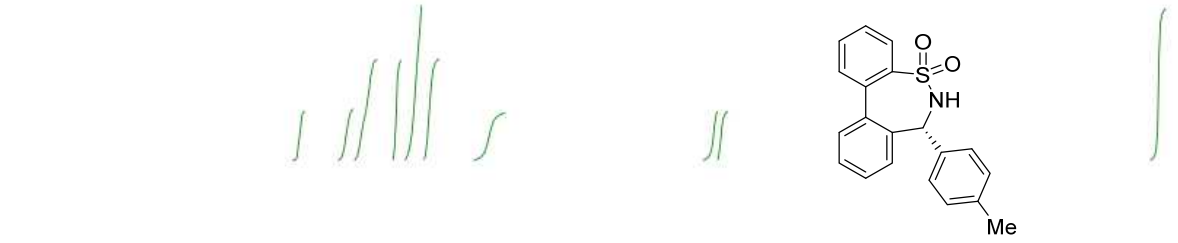
1H NMR ZZ-2-51A in CDCl3



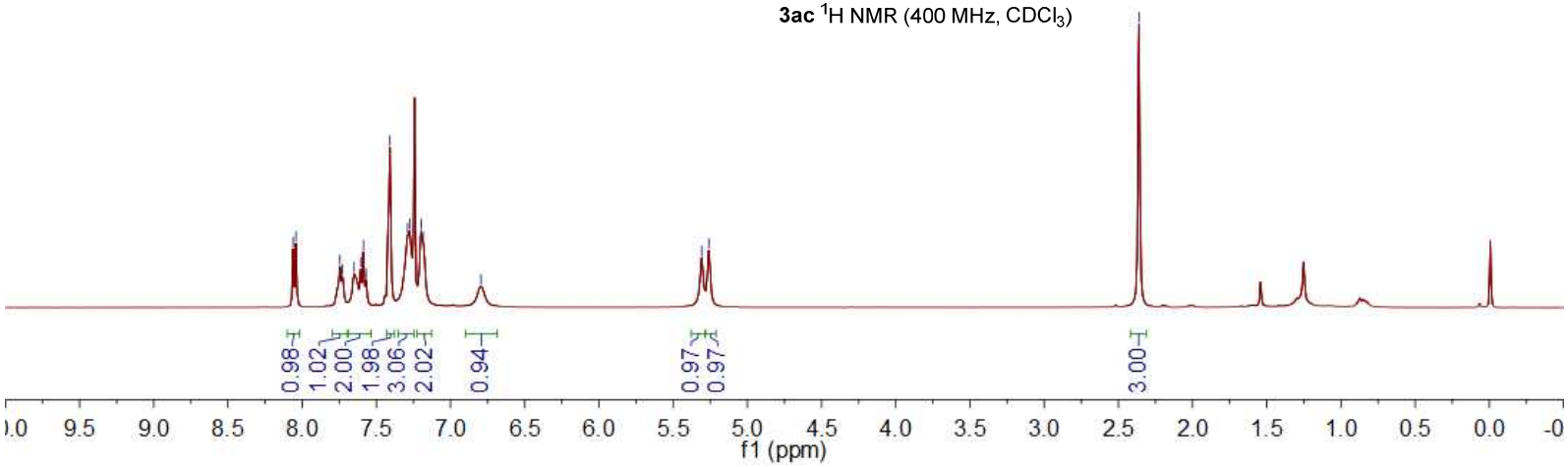
3ab ^{1}H NMR (400 MHz, $CDCl_3$)

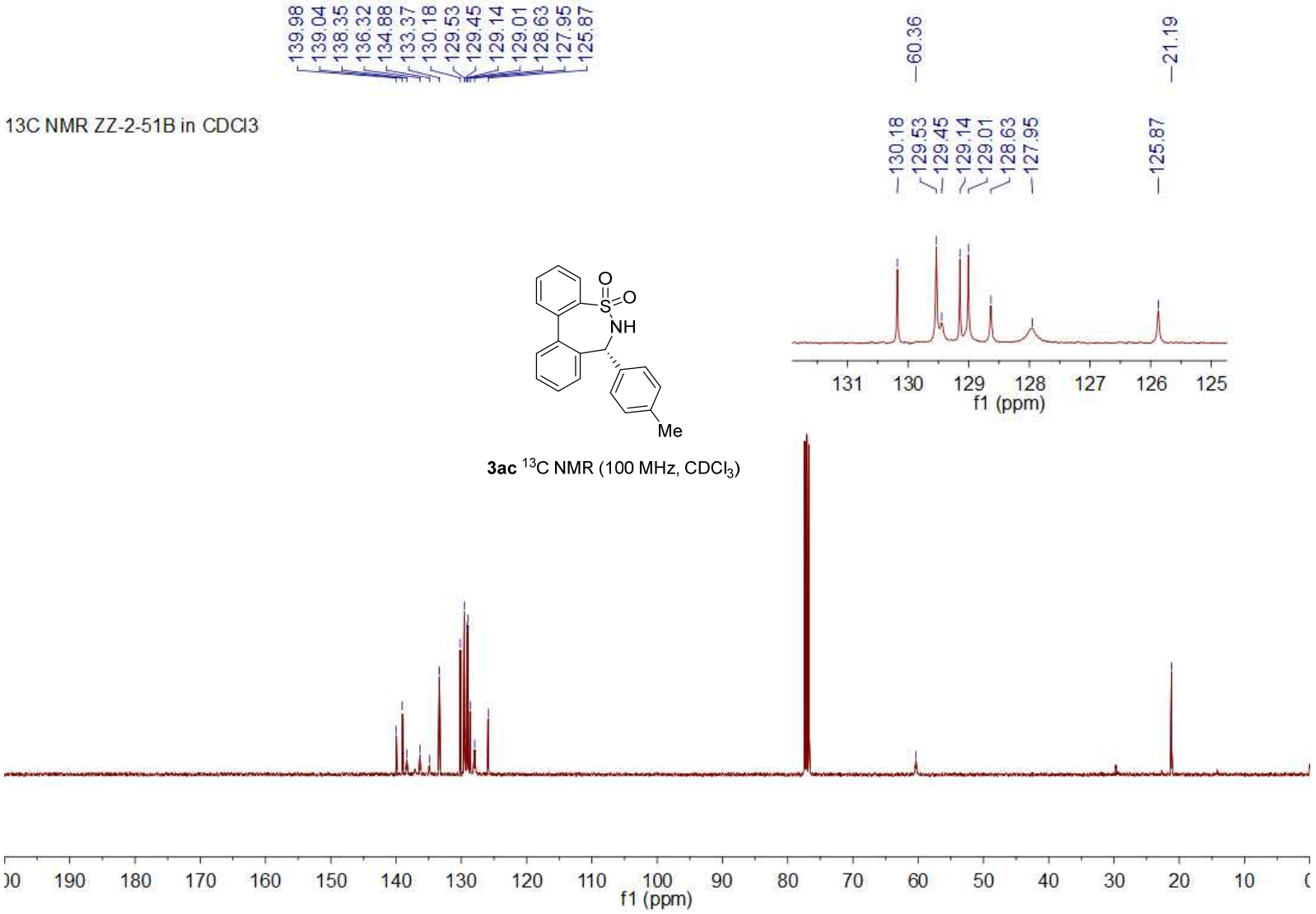

159.66
139.92
139.04
136.44
133.38
130.19
129.80
129.39
129.24
129.13
128.99
128.64
125.86
60.07
55.36
13C NMR ZZ-2-51A in CDCl3
O
S
O
NH
OMe
130.19
129.80
129.39
129.24
129.13
128.99
128.64
125.86
132 131 130 129 128 127 126 125
f1 (ppm)
3ab 13C NMR (100 MHz, CDCl3)
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10
f1 (ppm)

1H NMR ZZ-2-51B in CDCl3

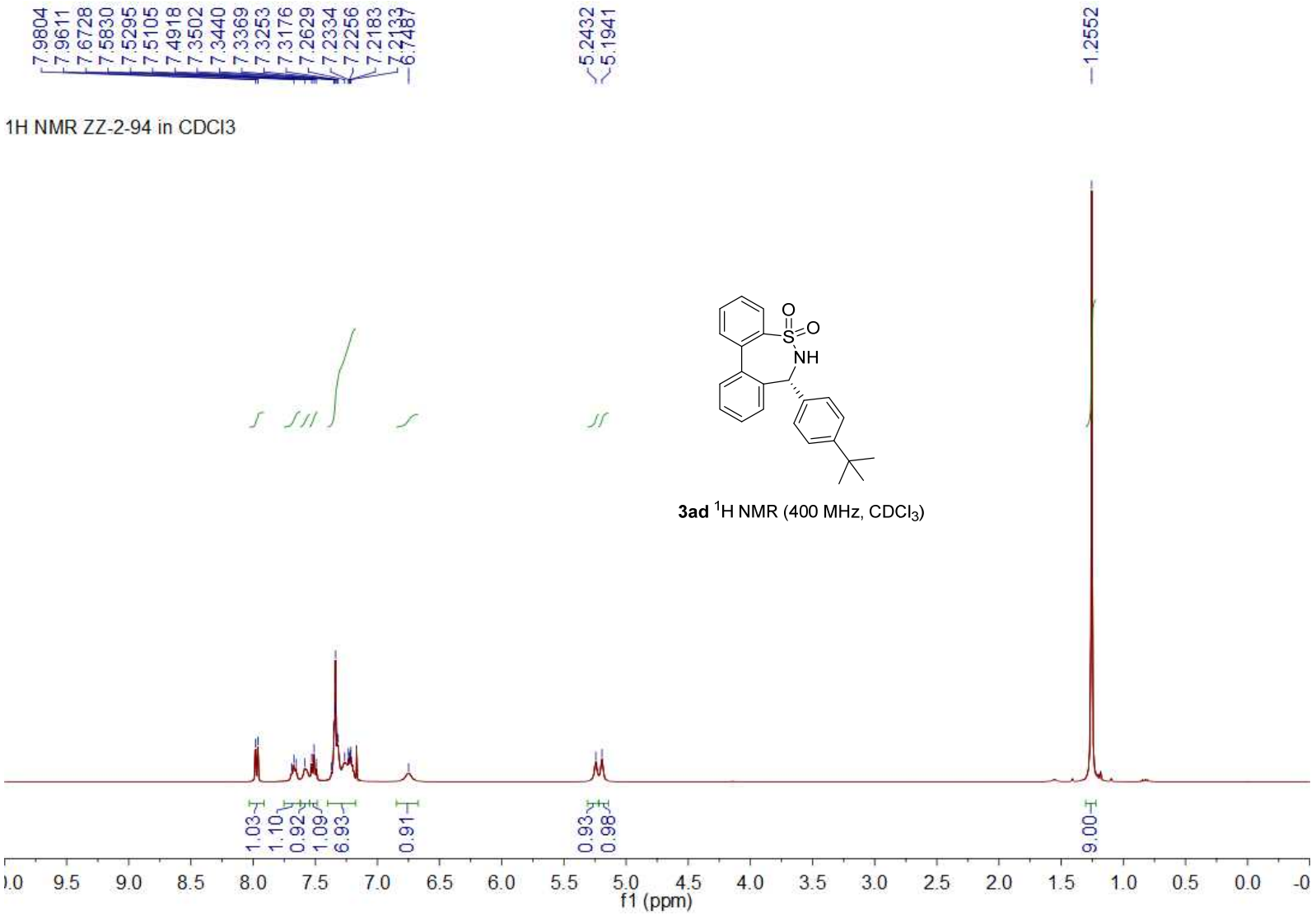


3ac ^{1}H NMR (400 MHz, $CDCl_3$)

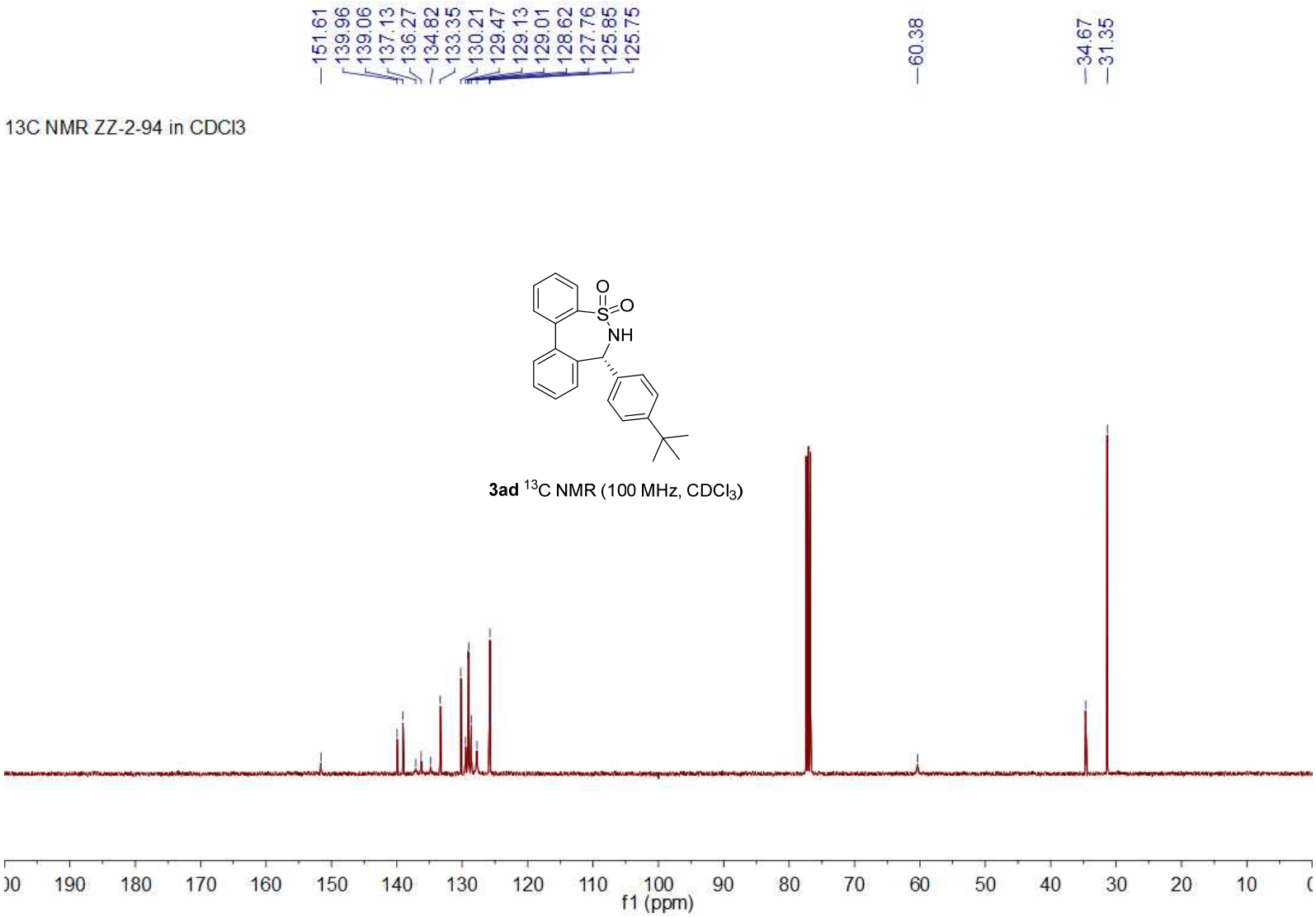




3ac ^{13}C NMR (100 MHz, $CDCl_3$)

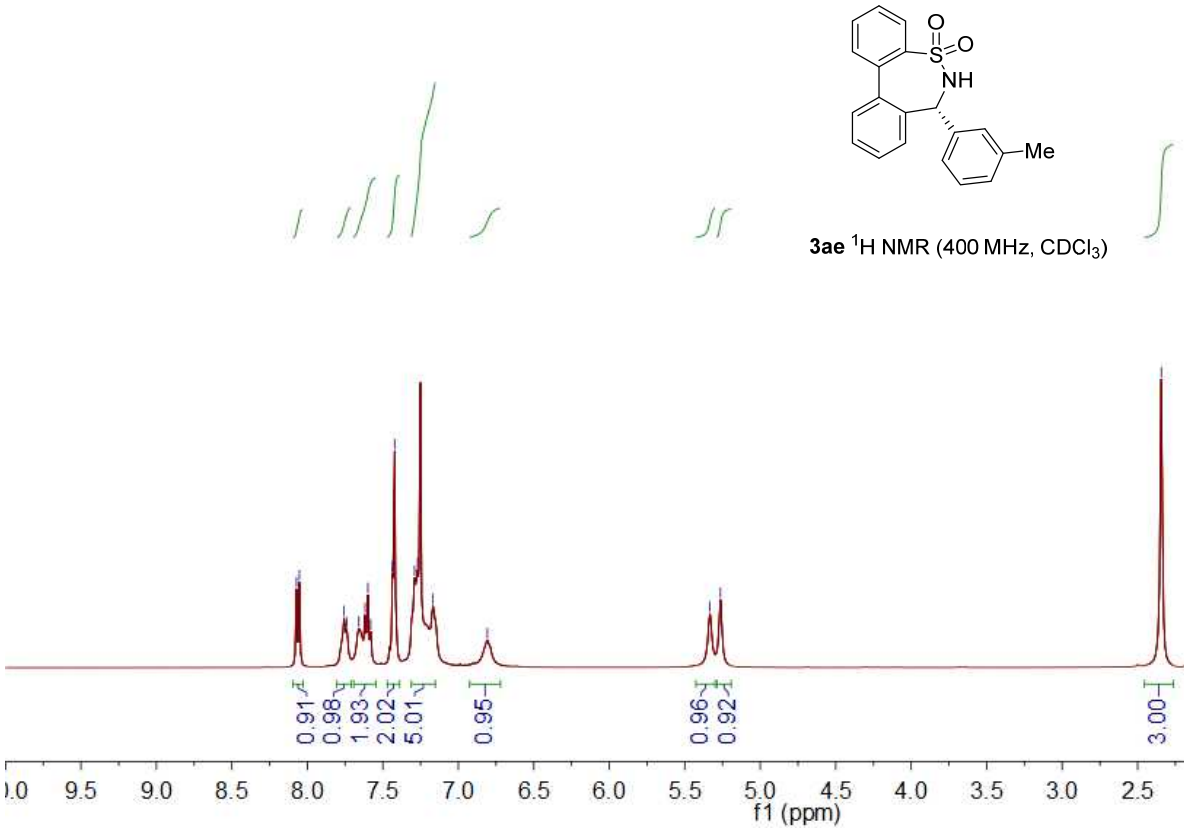


3ad ^{1}H NMR (400 MHz, $CDCl_3$)

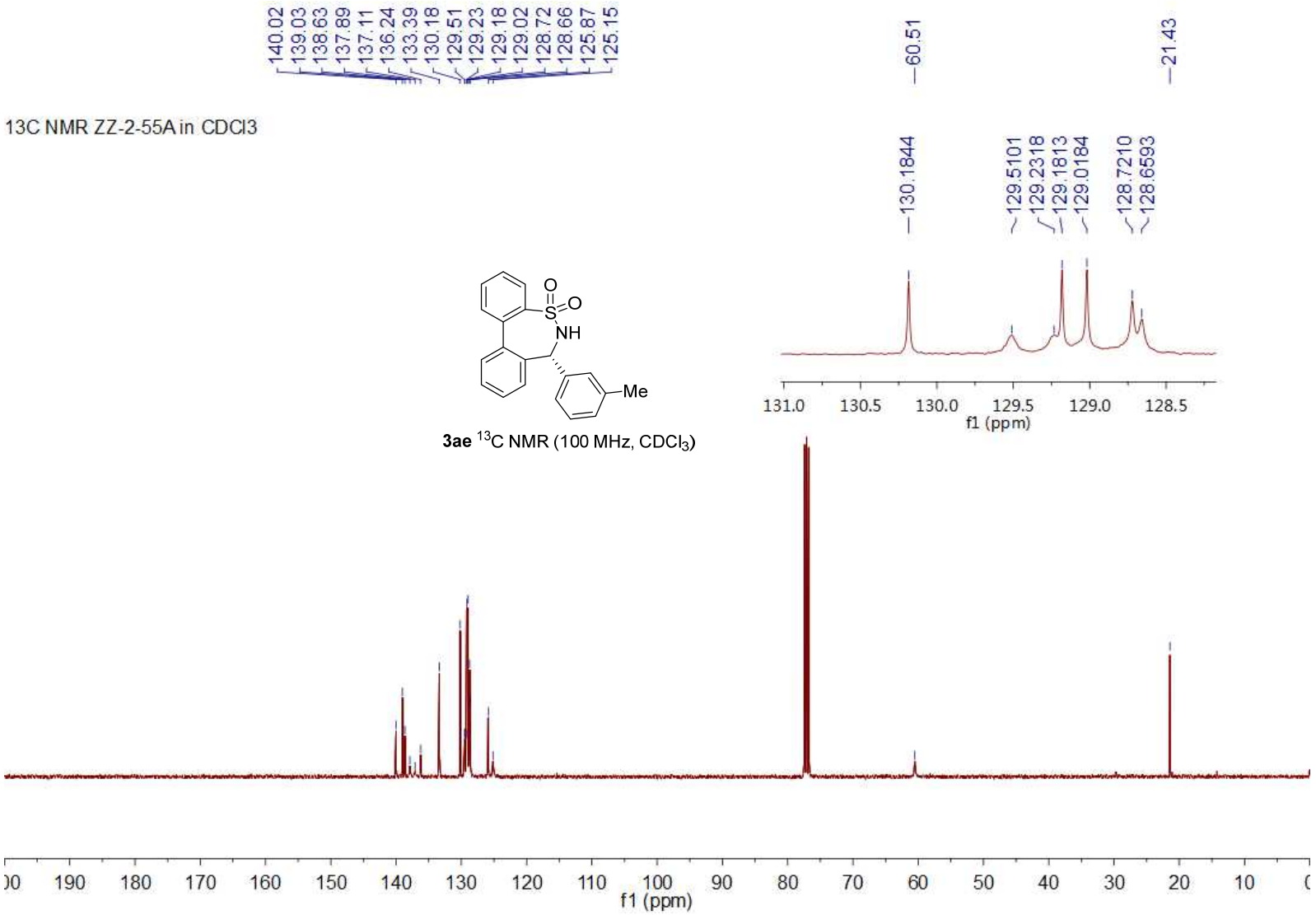


3ad ^{13}C NMR (100 MHz, $CDCl_3$)

1H NMR ZZ-2-55A in CDCl3



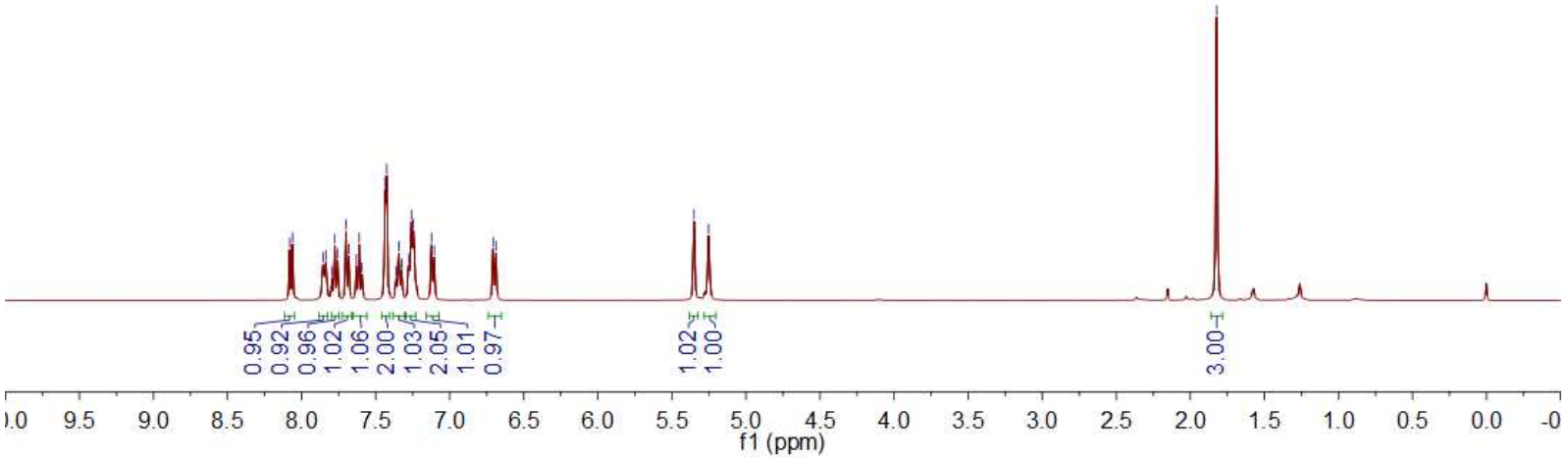
3ae ^{1}H NMR (400 MHz, $CDCl_3$)



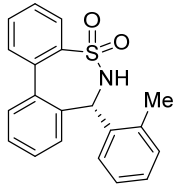
3ae ^{13}C NMR (100 MHz, $CDCl_3$)

1H NMR ZZ-2-55B in CDCl3

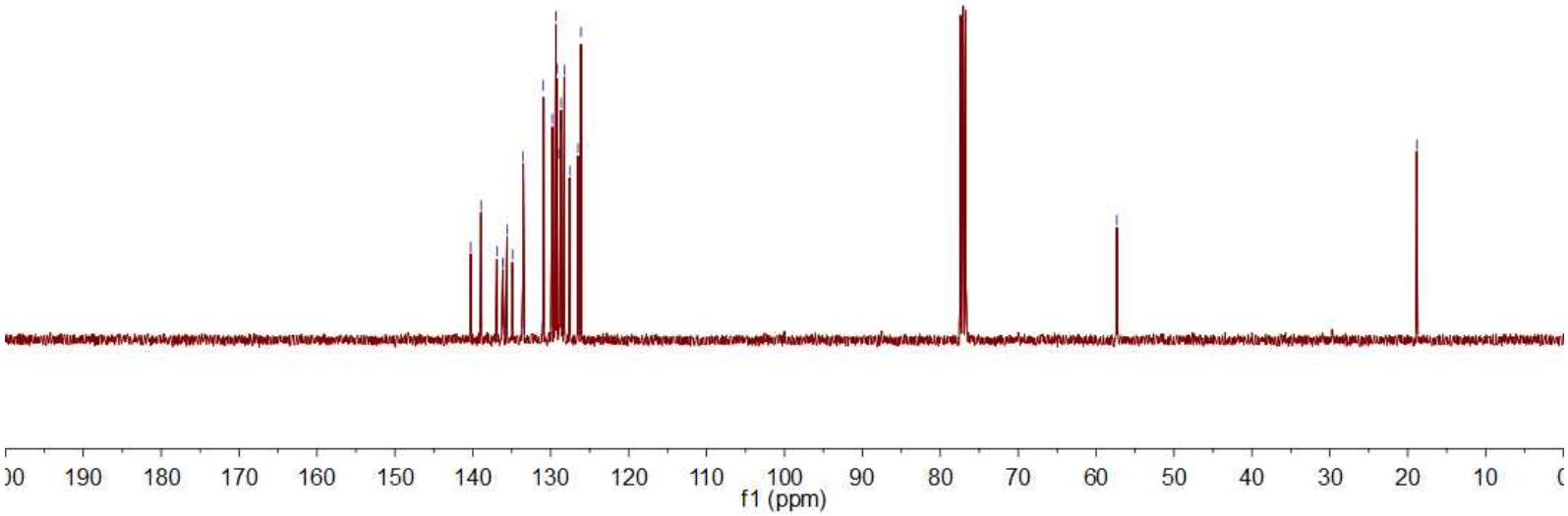
3af ^{1}H NMR (400 MHz, $CDCl_3$)



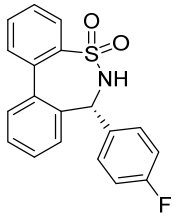
13C NMR ZZ-2-55B in CDCl3



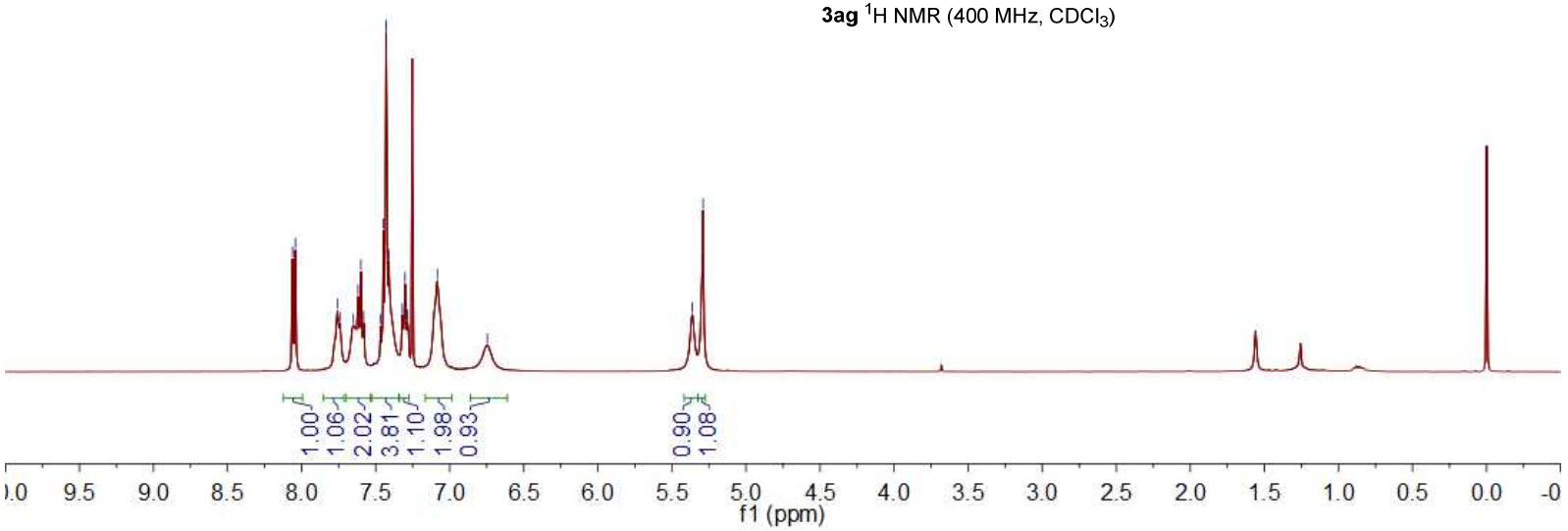
3af ^{13}C NMR (100 MHz, $CDCl_3$)

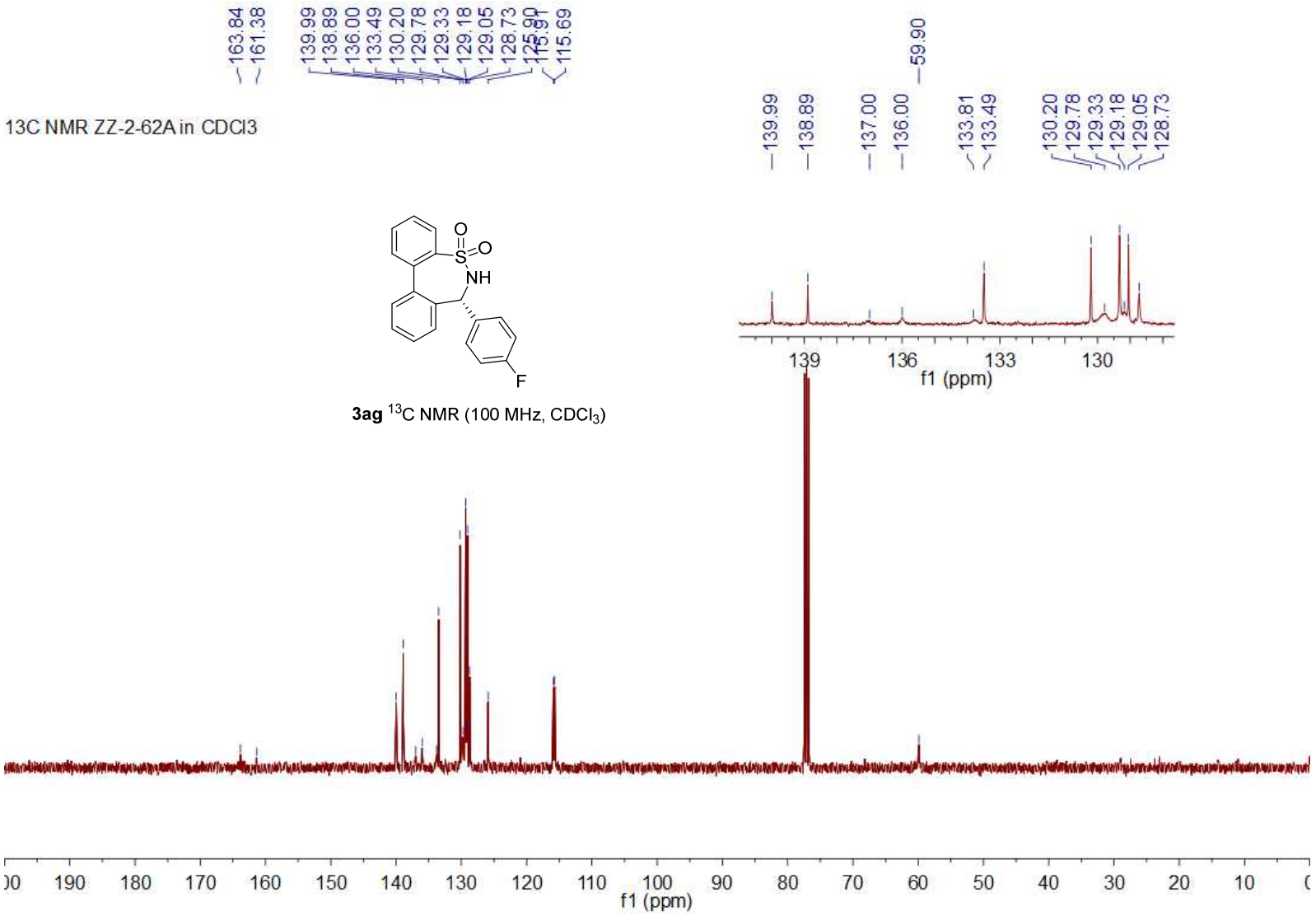


1H NMR ZZ-2-62A in CDCl3



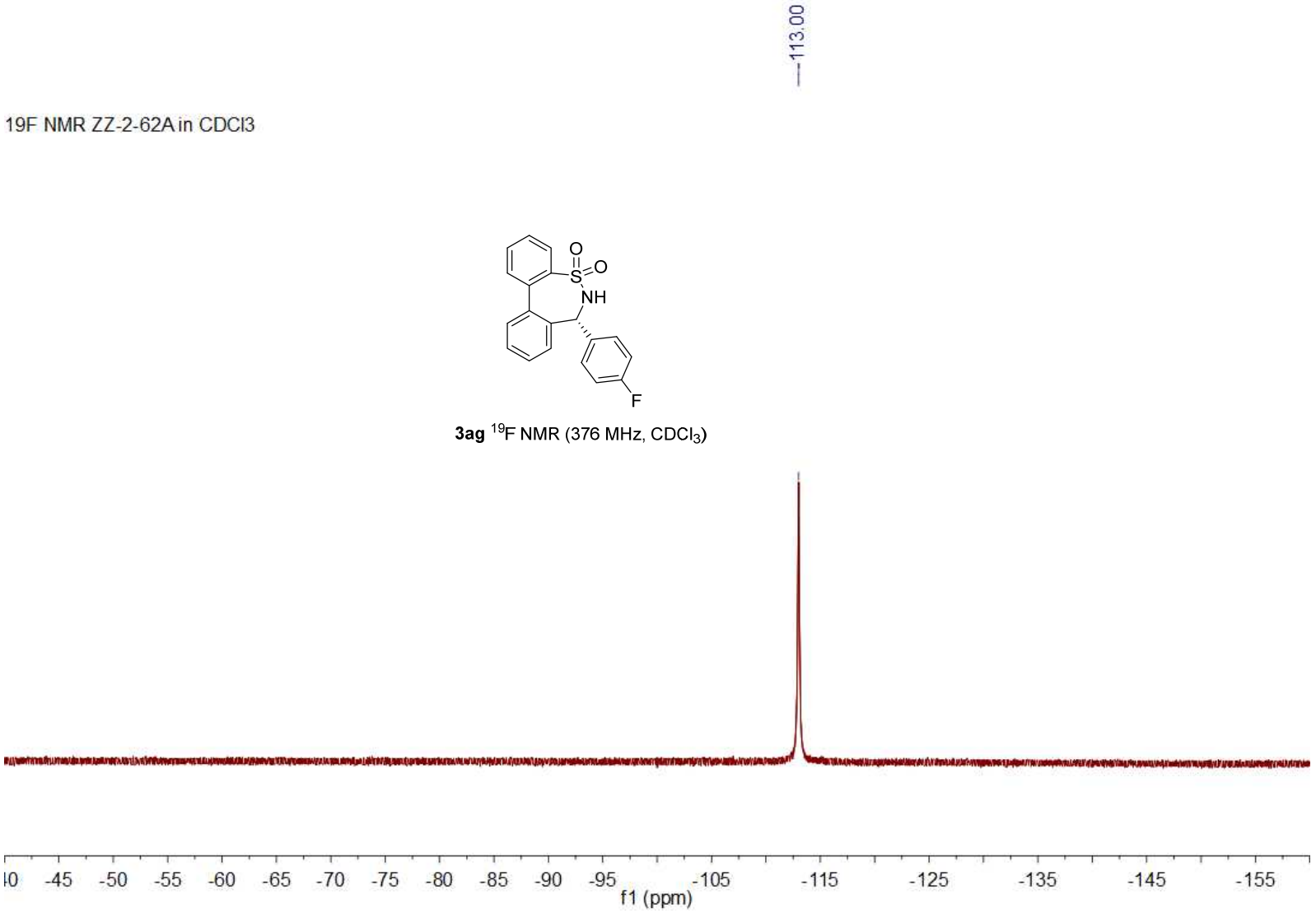
3ag ^{1}H NMR (400 MHz, $CDCl_3$)





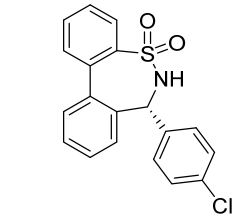
3ag ^{13}C NMR (100 MHz, $CDCl_3$)

19F NMR ZZ-2-62A in CDCl3

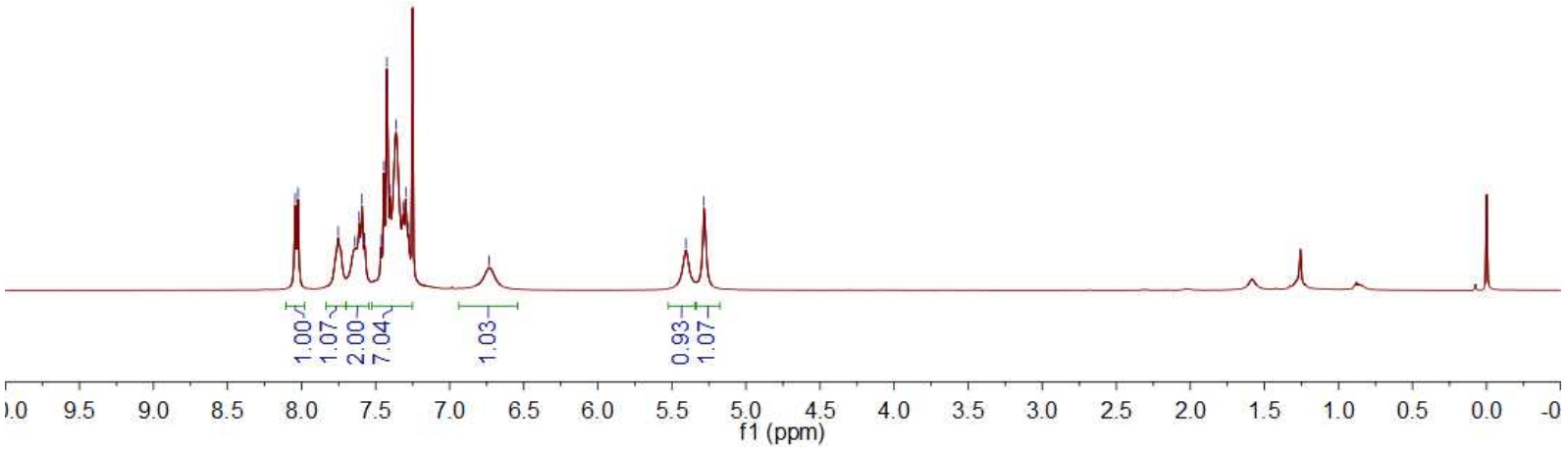


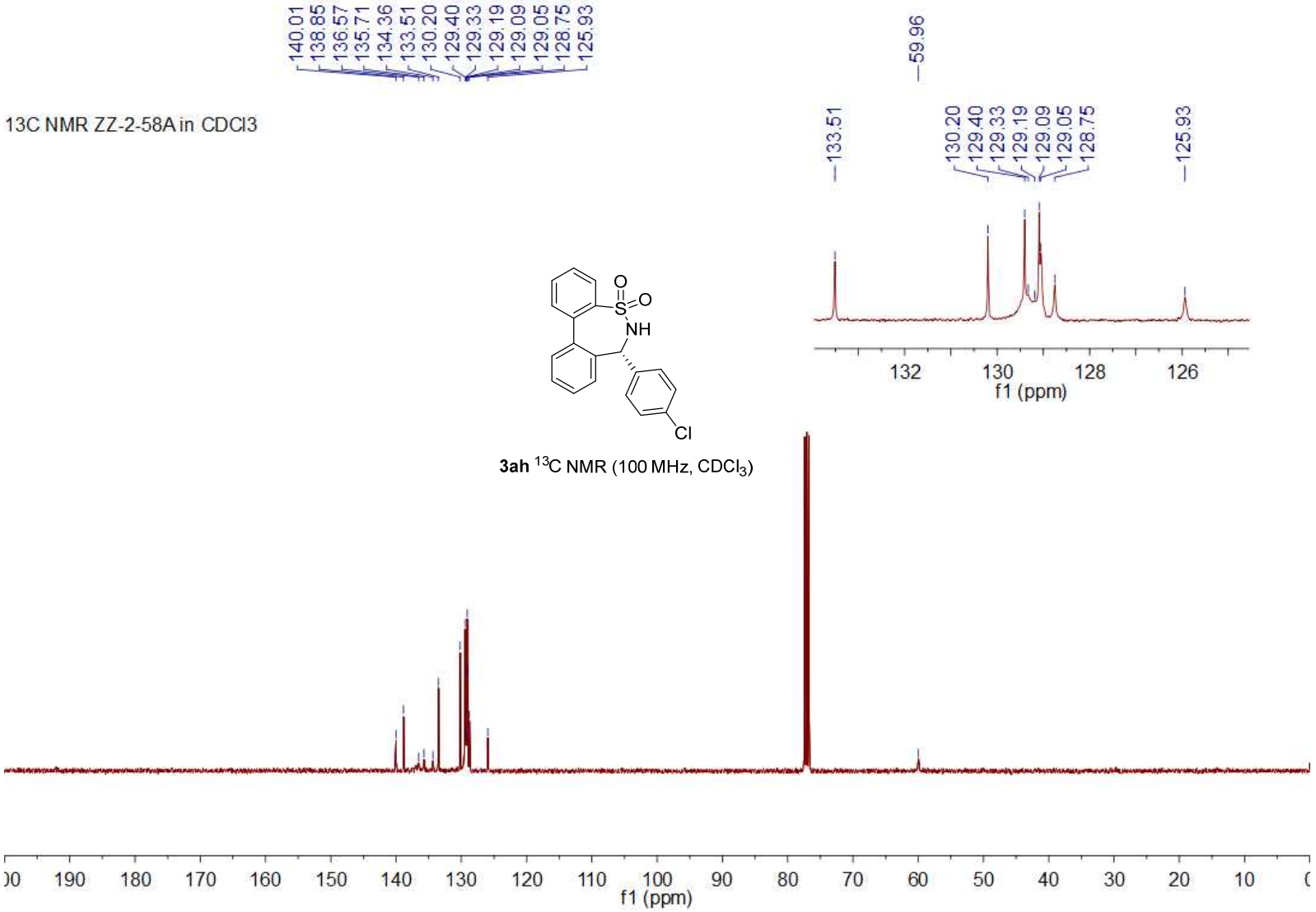
3ag ^{19}F NMR (376 MHz, $CDCl_3$)

1H NMR ZZ-2-58A in CDCl3



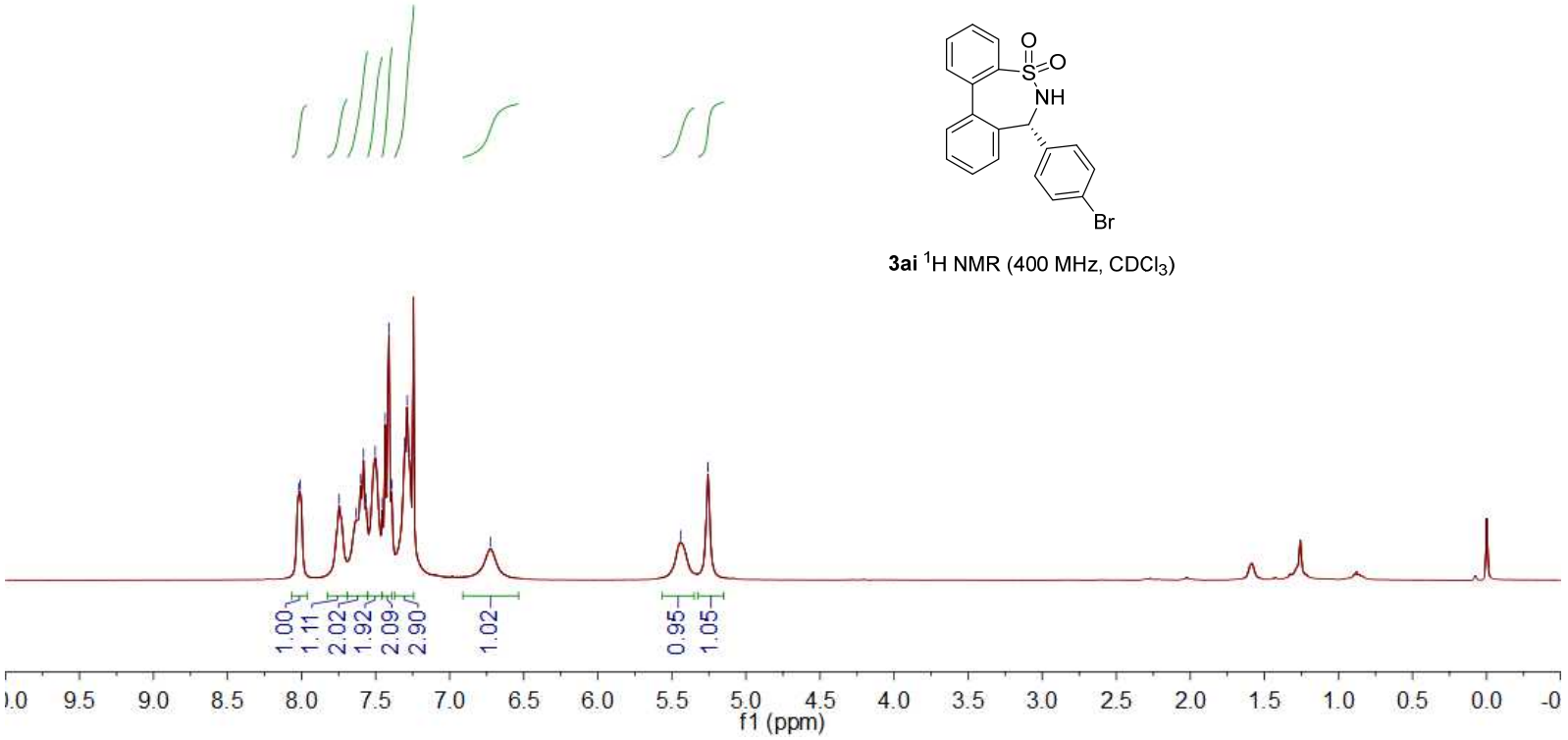
3ah ^{1}H NMR (400 MHz, $CDCl_3$)



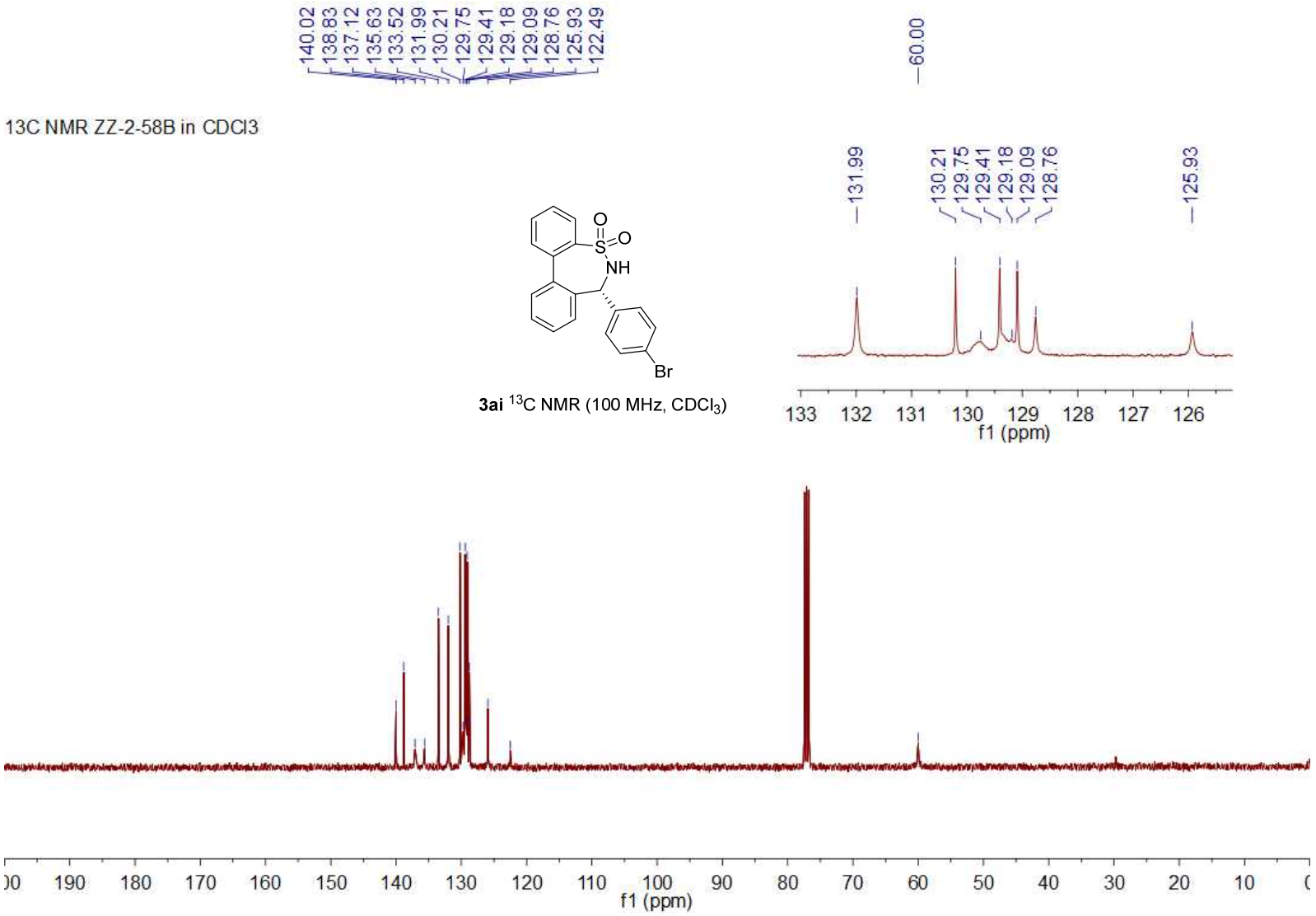


3ah ^{13}C NMR (100 MHz, $CDCl_3$)

1H NMR ZZ-2-58B in CDCl3

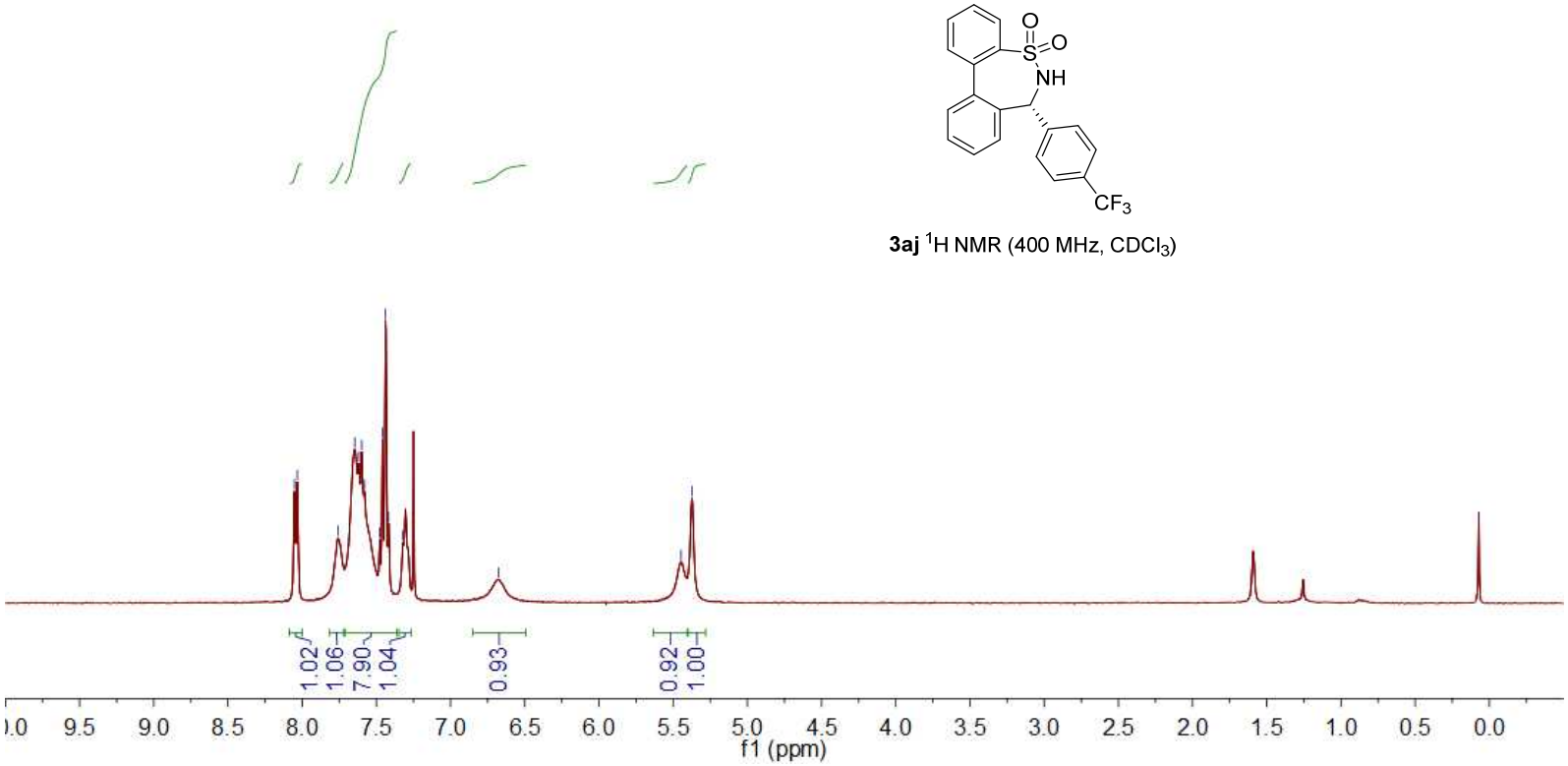


3ai ^{1}H NMR (400 MHz, $CDCl_3$)

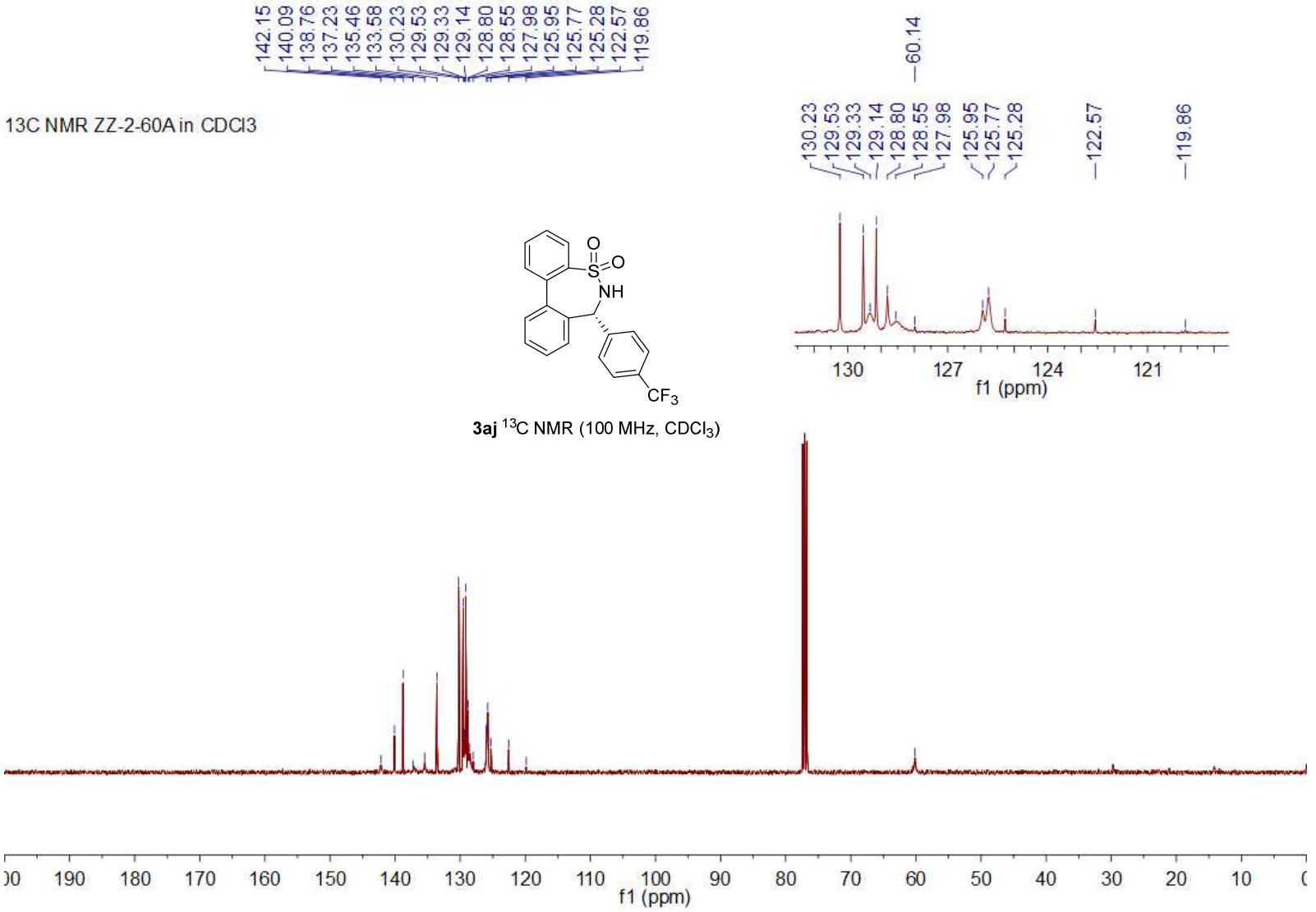


3ai ^{13}C NMR (100 MHz, $CDCl_3$)

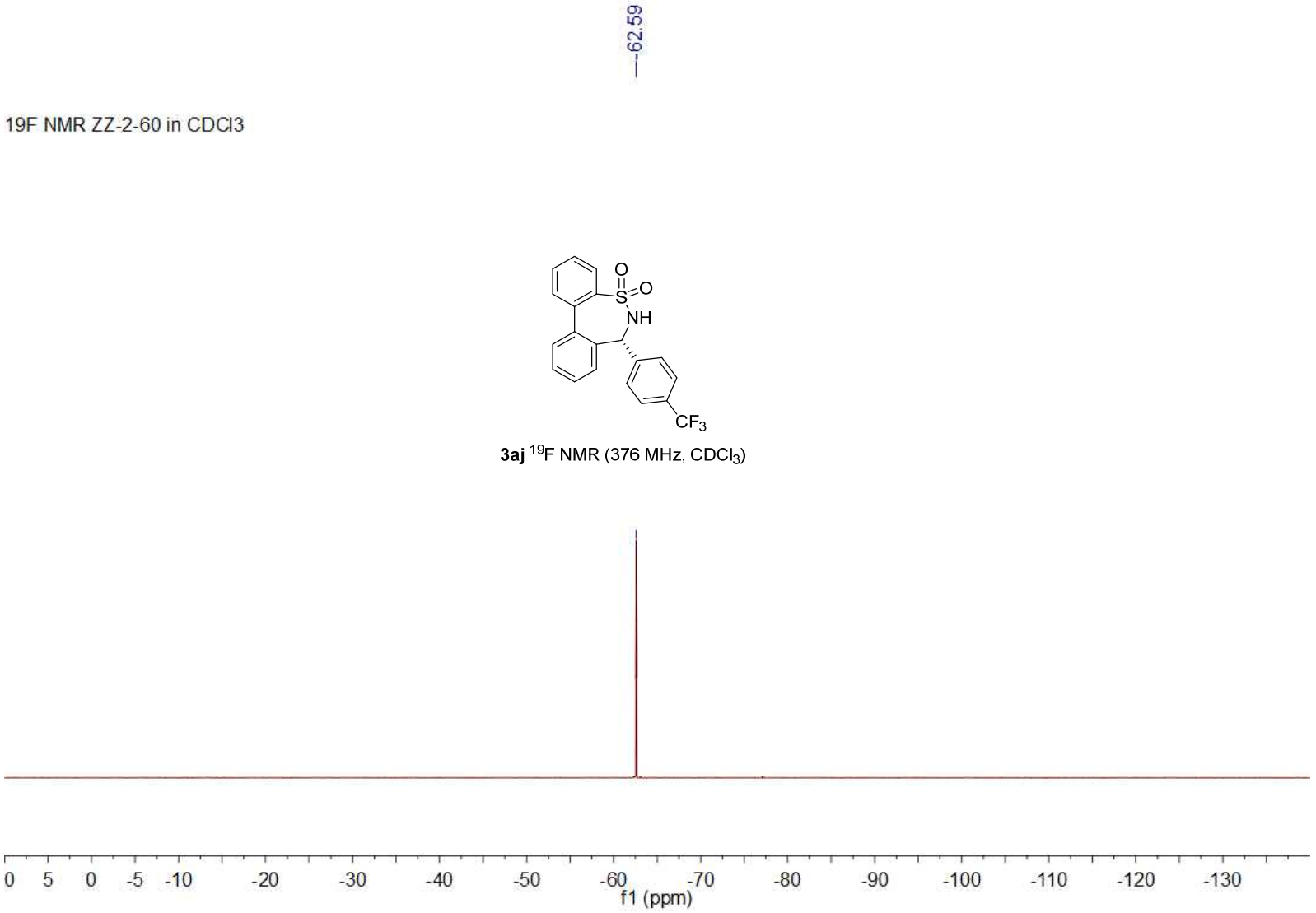
1H NMR ZZ-2-60A in CDCl3



3aj ^{1}H NMR (400 MHz, $CDCl_3$)

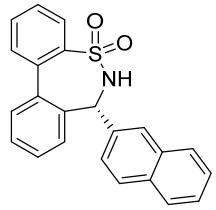


3aj ^{13}C NMR (100 MHz, $CDCl_3$)

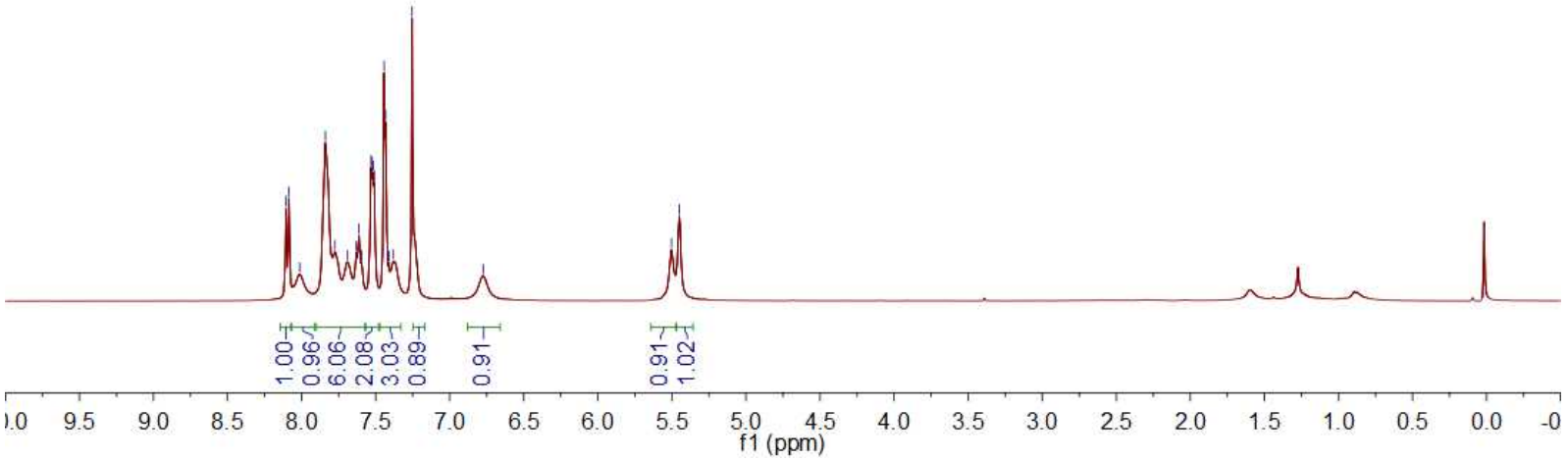


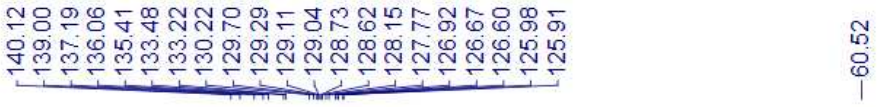
3aj ^{19}F NMR (376 MHz, $CDCl_3$)

1H NMR ZZ-2-61 in CDCl3

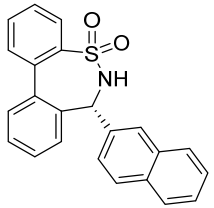


3ak ^{1}H NMR (400 MHz, $CDCl_3$)

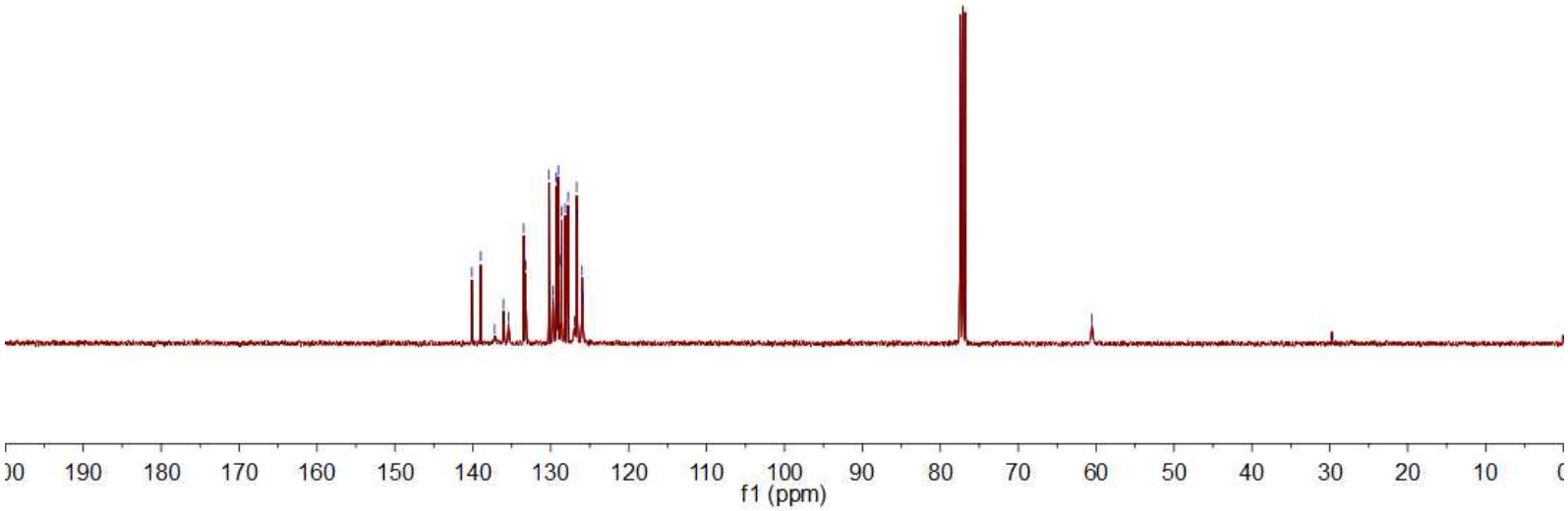


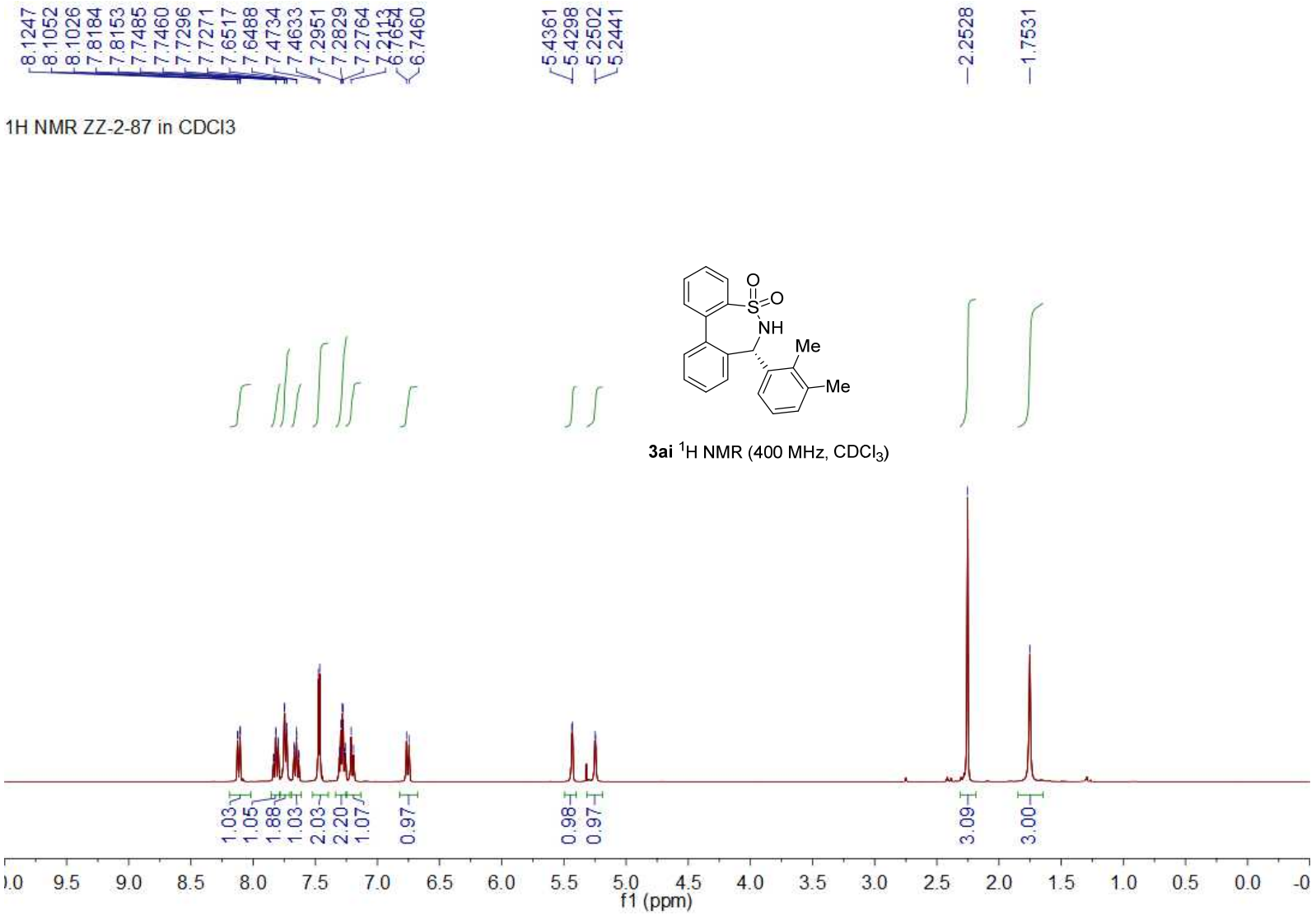


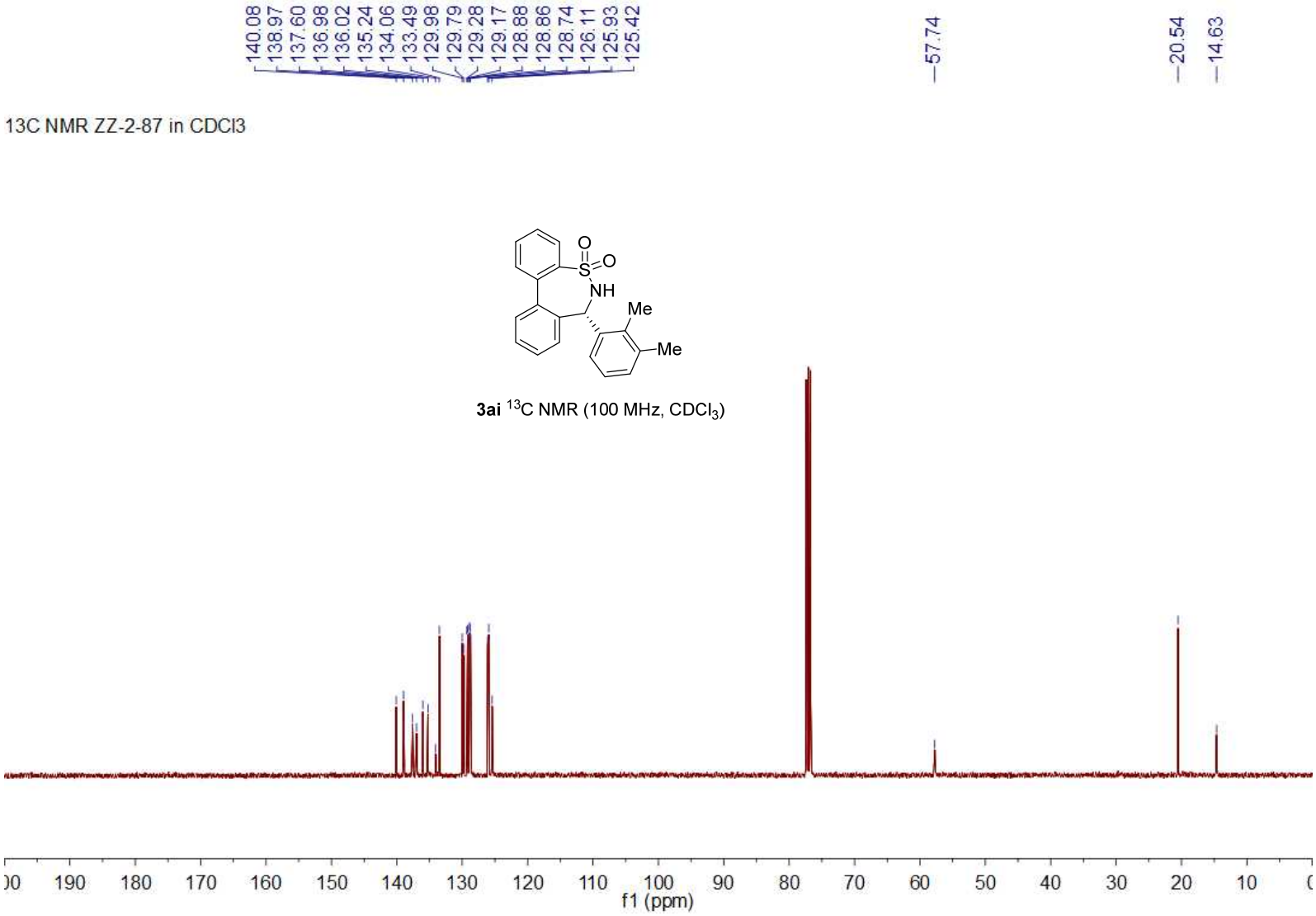
13C NMR ZZ-2-61A in CDCl3



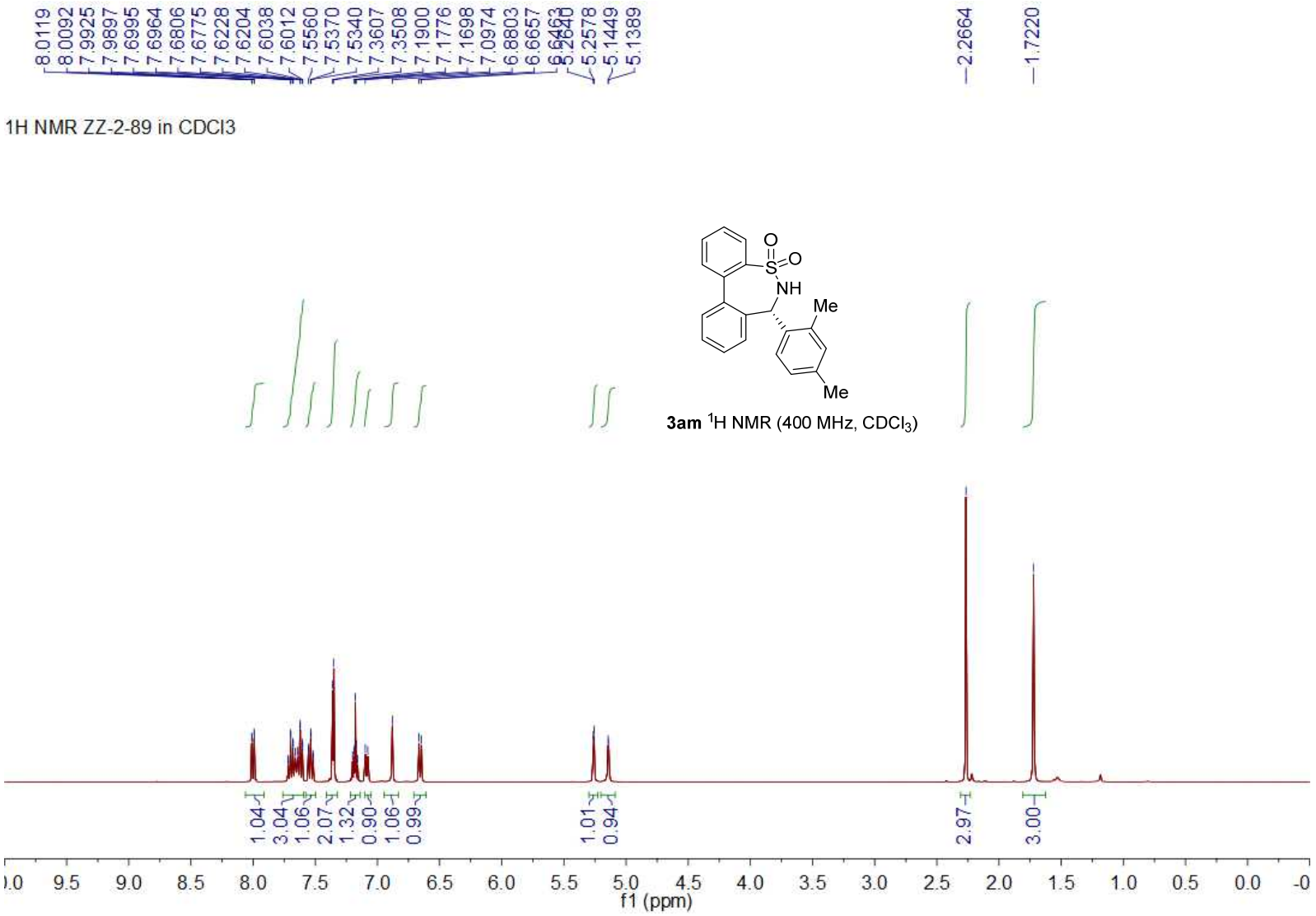
3ak ^{13}C NMR (100 MHz, $CDCl_3$)

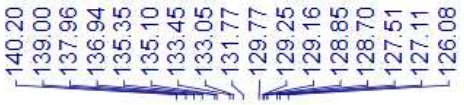



8.1247
8.1052
8.1026
7.8184
7.8153
7.7485
7.7460
7.7296
7.7271
7.6517
7.6488
7.4734
7.4633
7.2951
7.2829
7.2764
7.2113
6.7654
6.7460
5.4361
5.4298
5.2502
5.2441
2.2528
1.7531
1H NMR ZZ-2-87 in CDCl3
O
O
S
NH
Me
Me
3ai 1H NMR (400 MHz, CDCl3)
1.03
1.05
1.88
1.03
2.03
2.20
1.07
0.97
0.98
0.97
3.09
3.00
f1 (ppm)

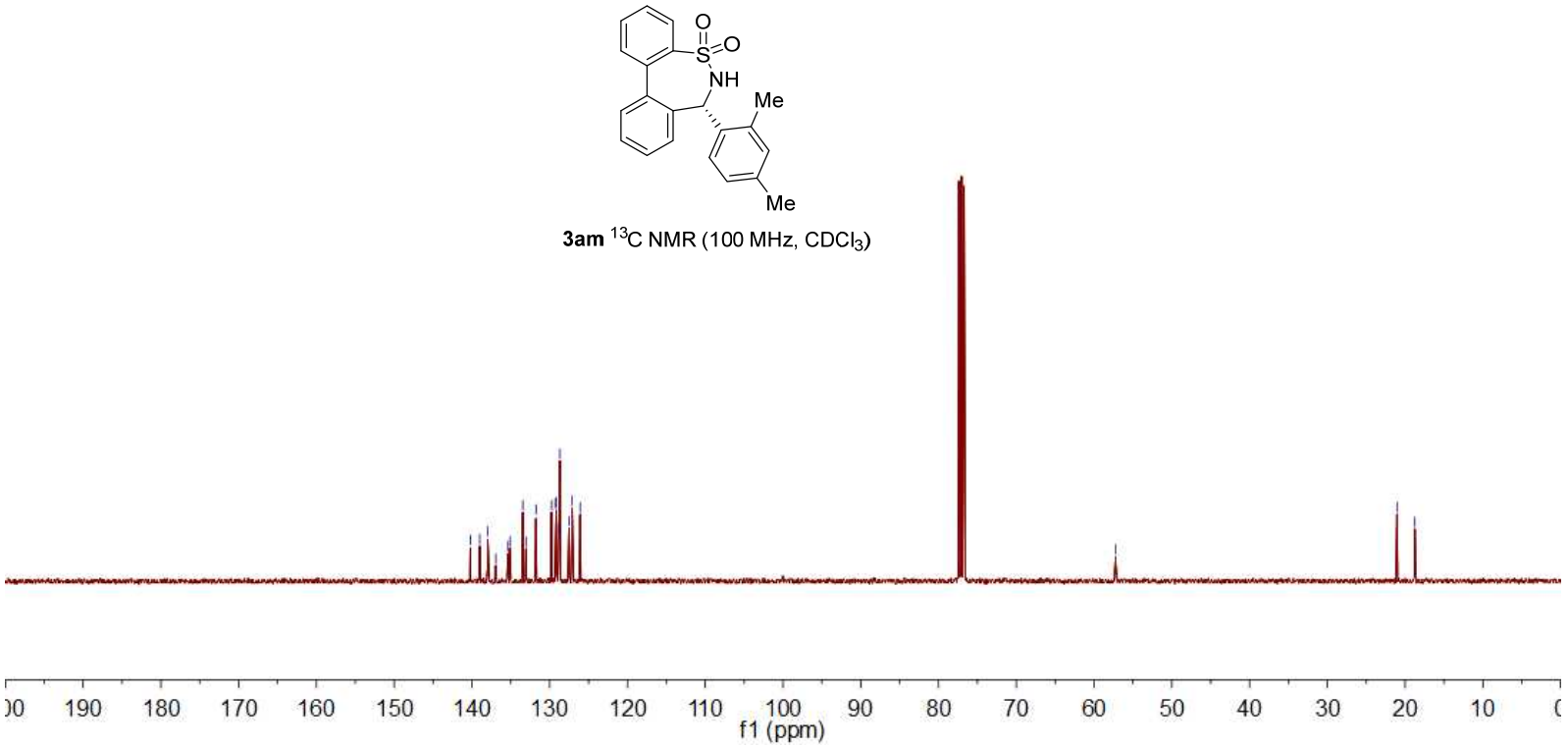


3ai ^{13}C NMR (100 MHz, $CDCl_3$)

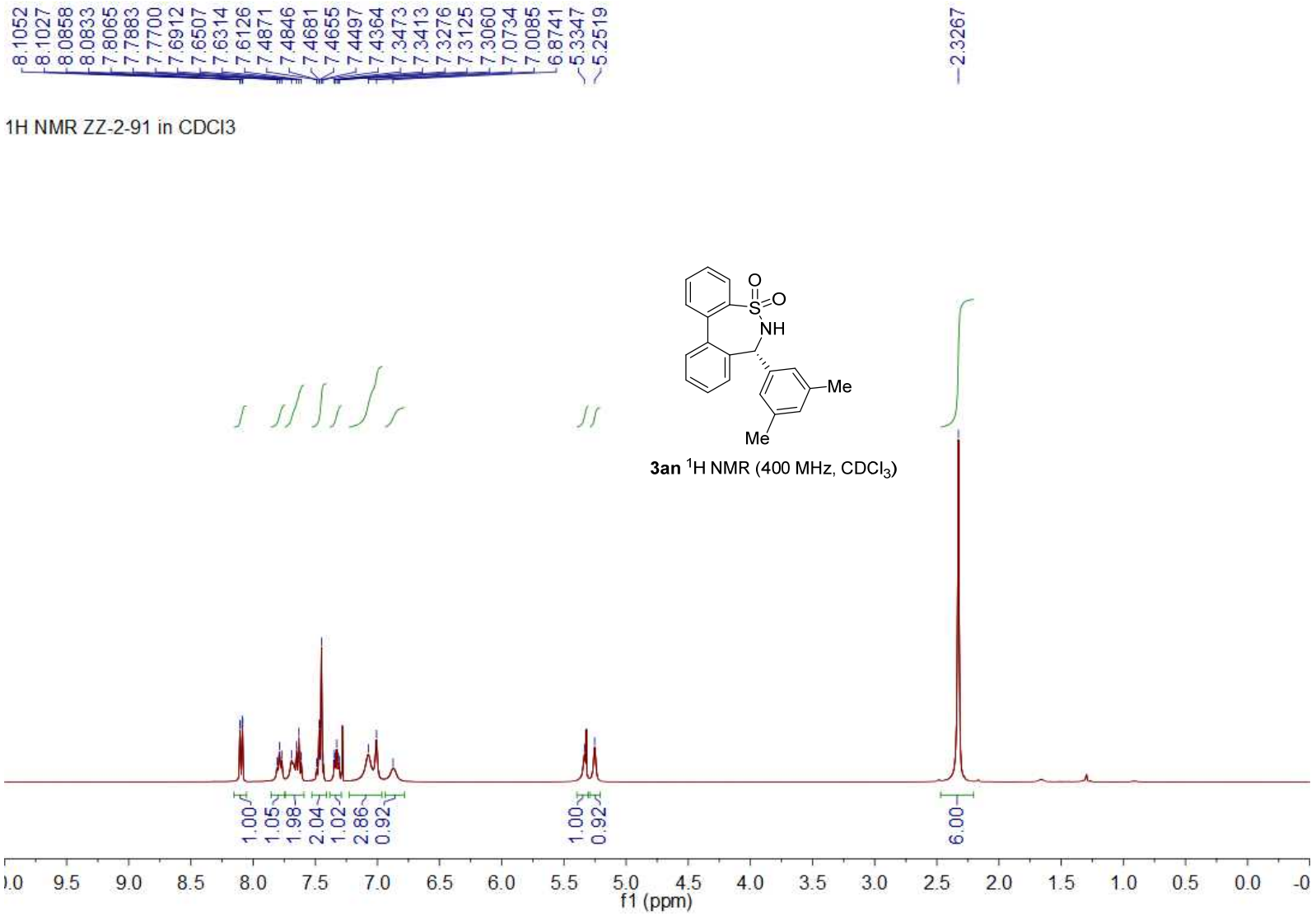

8.0119
8.0092
7.9925
7.9897
7.6995
7.6964
7.6806
7.6775
7.6228
7.6204
7.6038
7.6012
7.5560
7.5370
7.5340
7.3607
7.3508
7.1900
7.1776
7.1698
7.0974
6.8803
6.6657
5.2578
5.1449
5.1389
2.2664
1.7220
1H NMR ZZ-2-89 in CDCl3
O
S
O
NH
Me
Me
3am 1H NMR (400 MHz, CDCl3)
1.04
3.04
1.06
2.07
1.32
0.90
1.06
0.99
1.01
0.94
2.97
3.00
f1 (ppm)



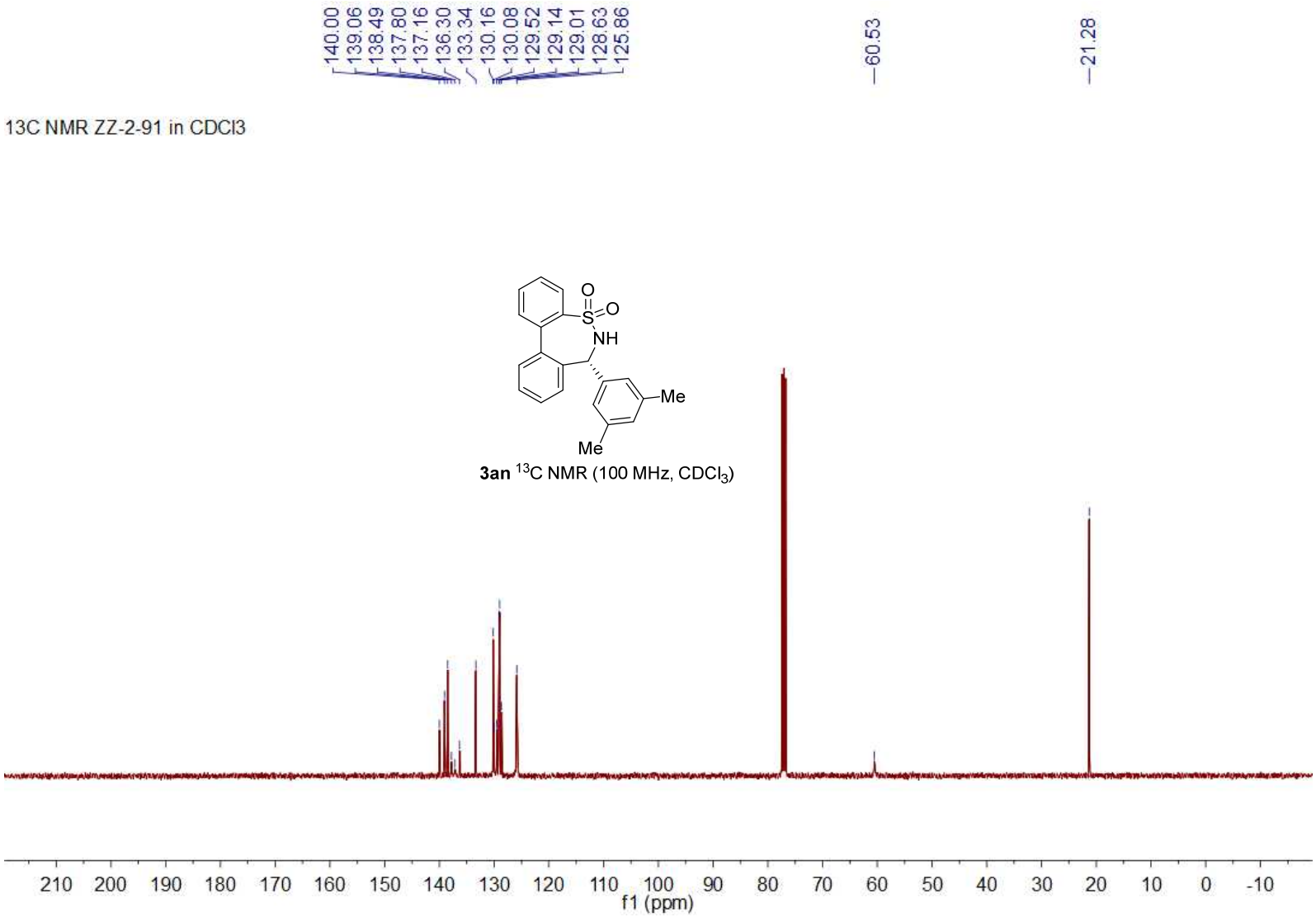
13C NMR ZZ-2-89 in CDCl3

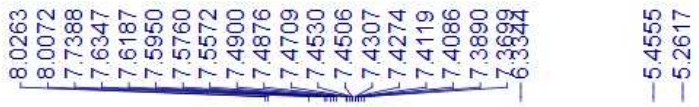


3am ^{13}C NMR (100 MHz, $CDCl_3$)

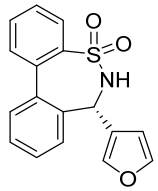


3an ^{1}H NMR (400 MHz, $CDCl_3$)

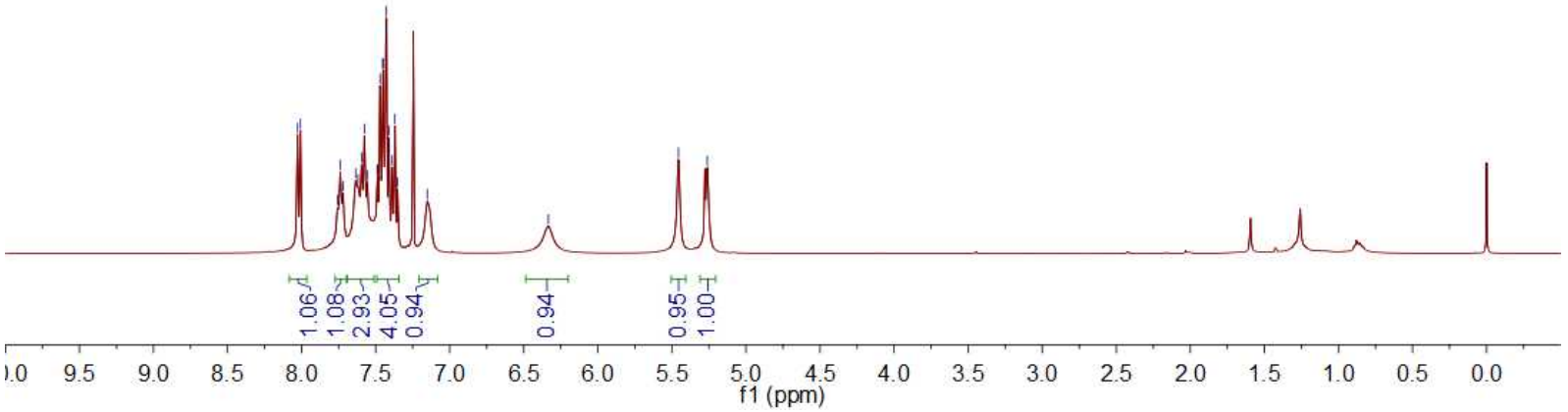

140.00
139.06
138.49
137.80
137.16
136.30
133.34
130.16
130.08
129.52
129.14
129.01
128.63
125.86
60.53
21.28
13C NMR ZZ-2-91 in CDCl3
O
S
O
NH
Me
Me
3an 13C NMR (100 MHz, CDCl3)
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

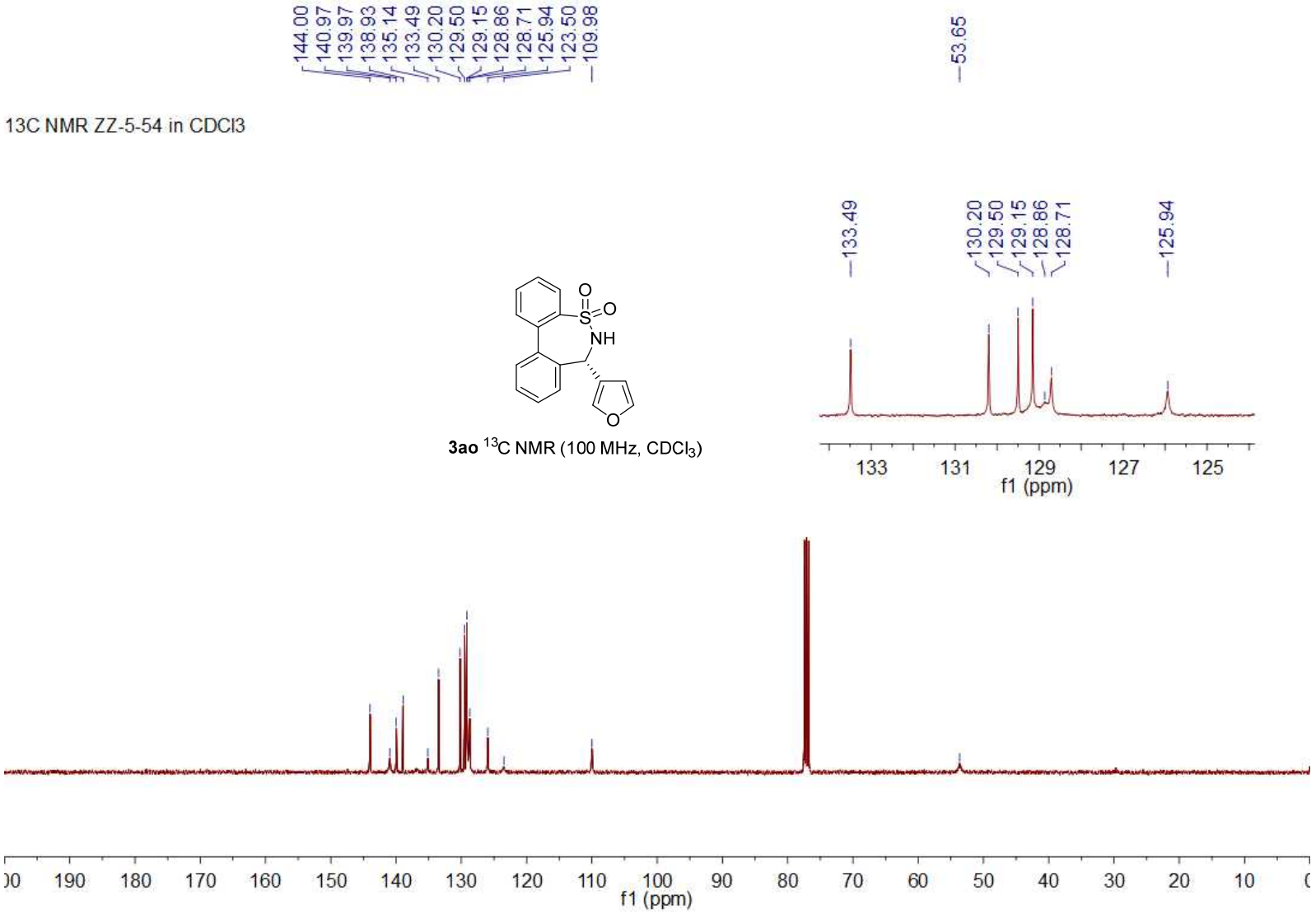


1H NMR ZZ-5-54 in CDCl3



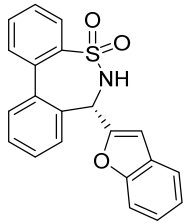
3ao^{1}H NMR (400 MHz, $CDCl_3$)



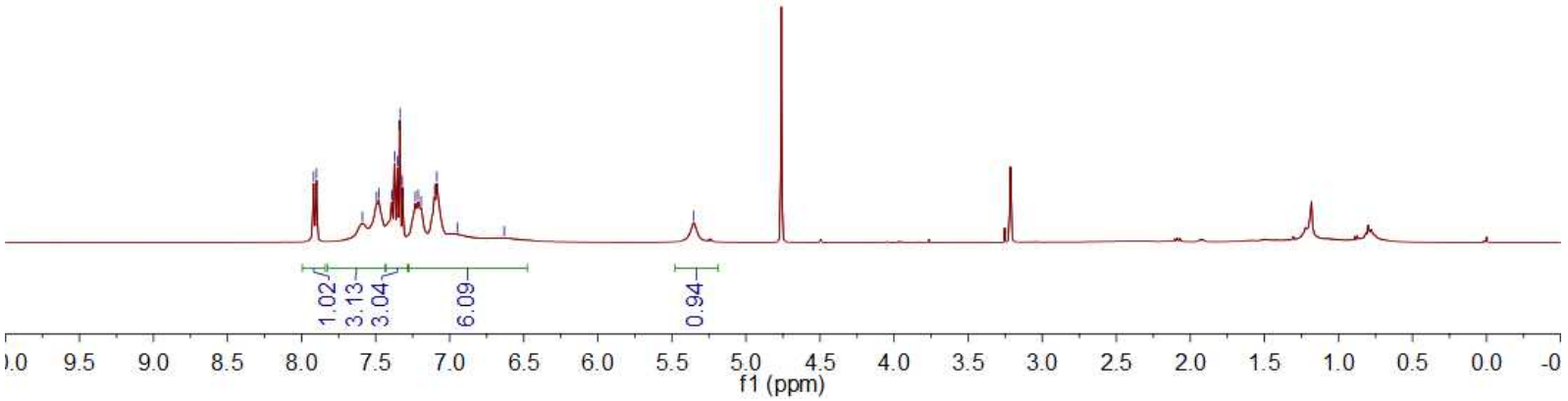


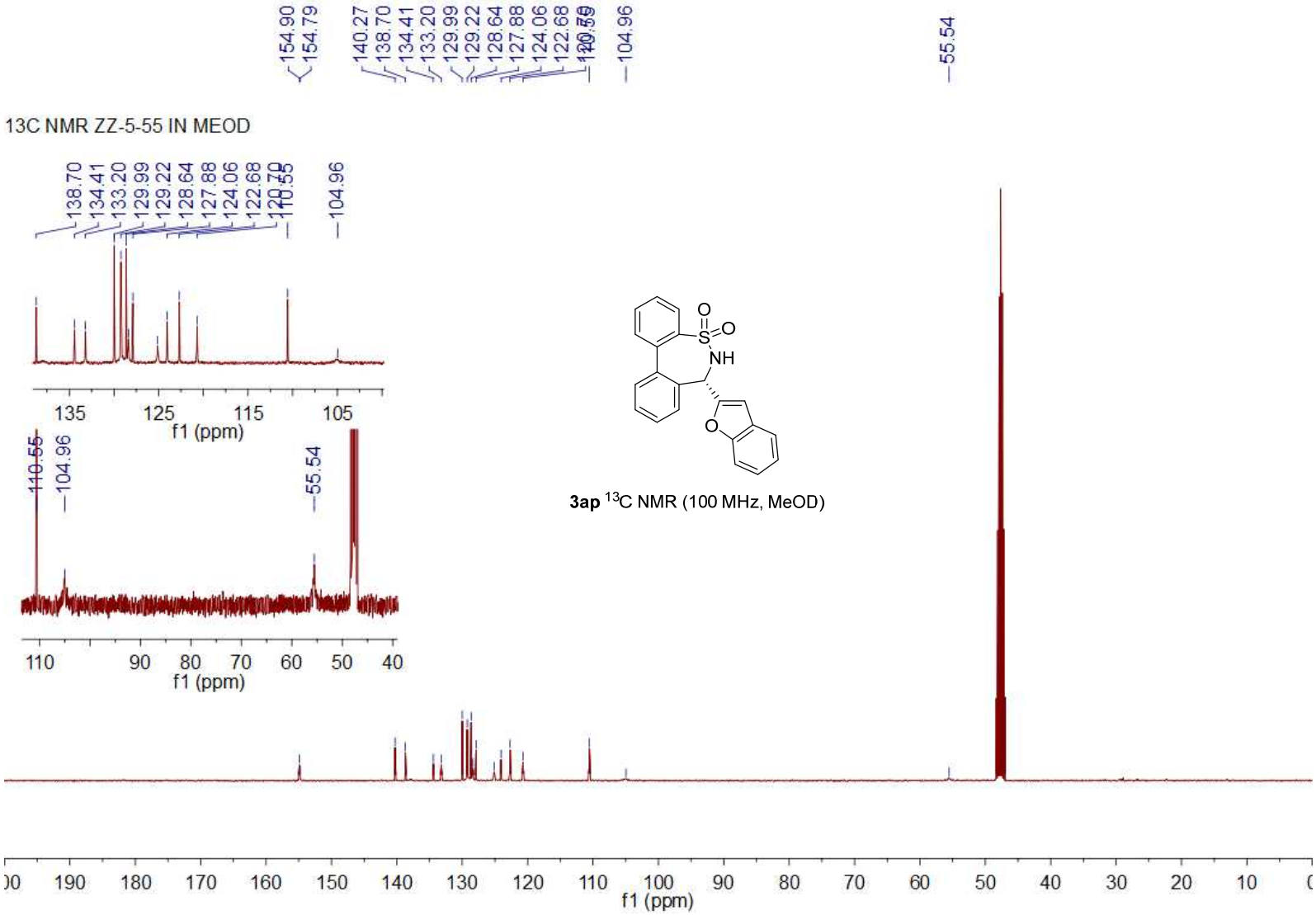
3ao ^{13}C NMR (100 MHz, $CDCl_3$)

1H NMR ZZ-5-55 IN MEOD

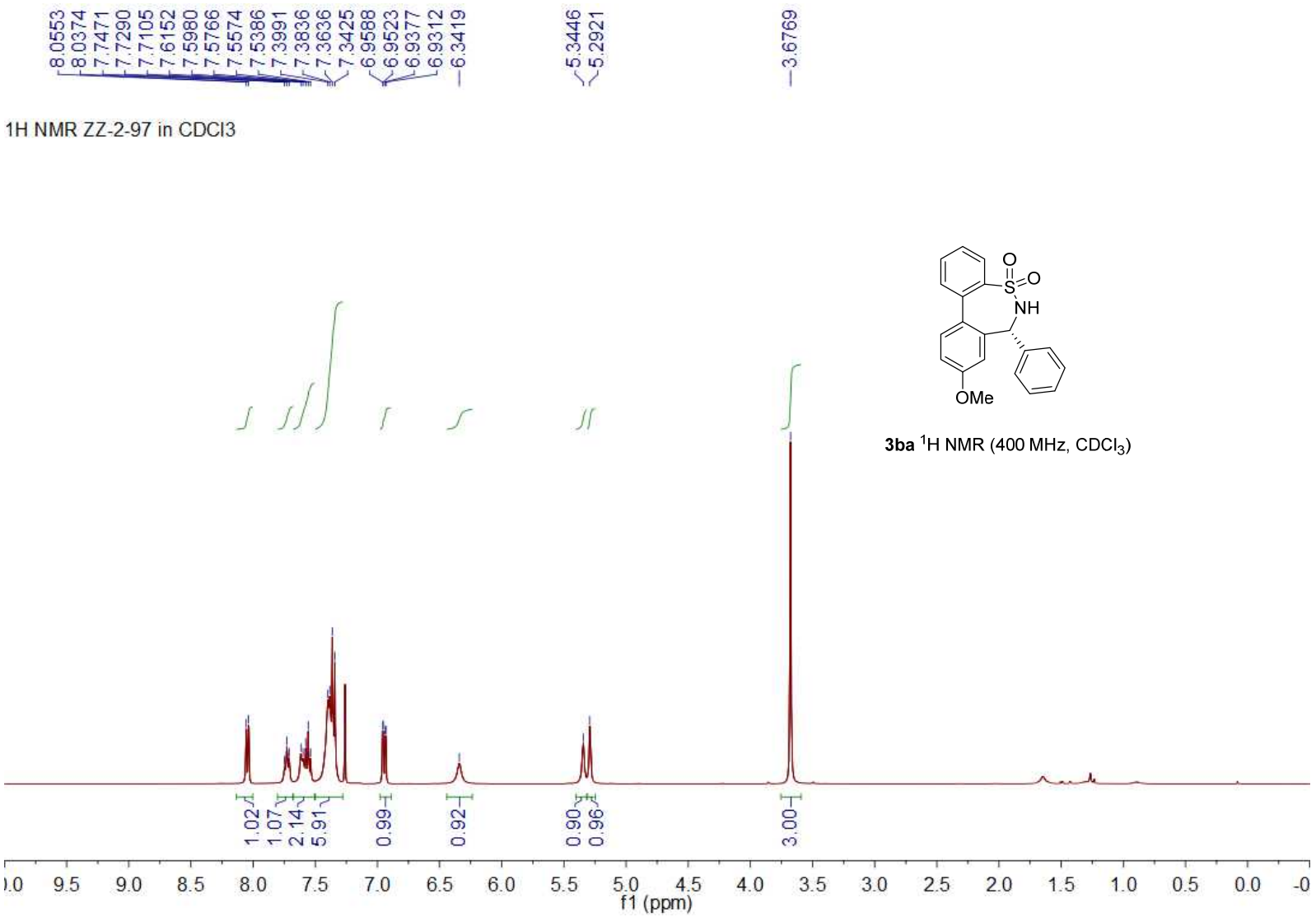


3ap ^{1}H NMR (400 MHz, MeOD)

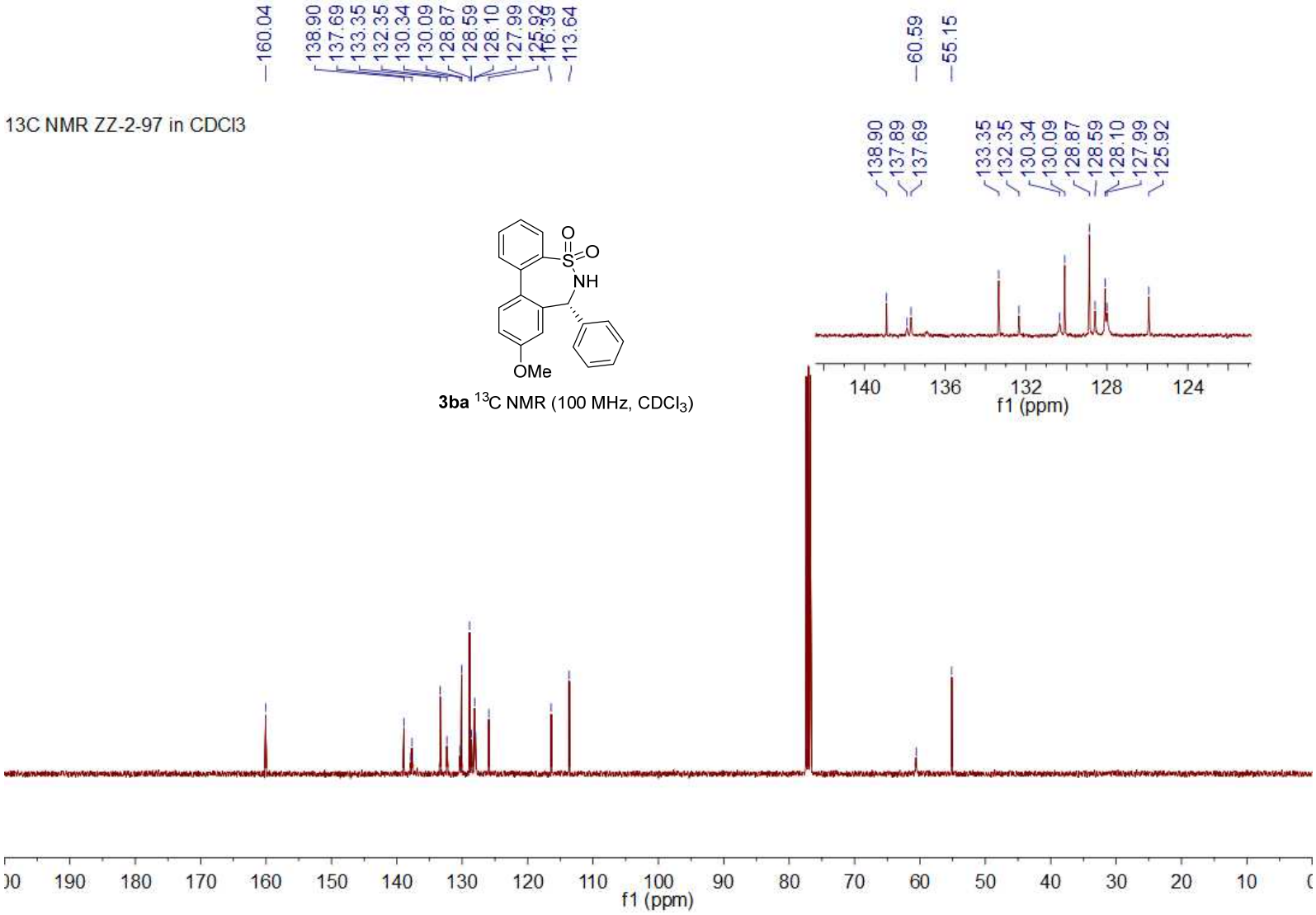




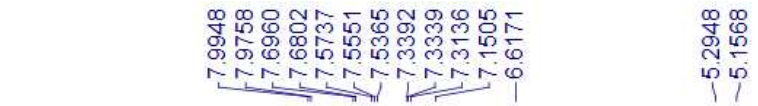
3ap ^{13}C NMR (100 MHz, MeOD)



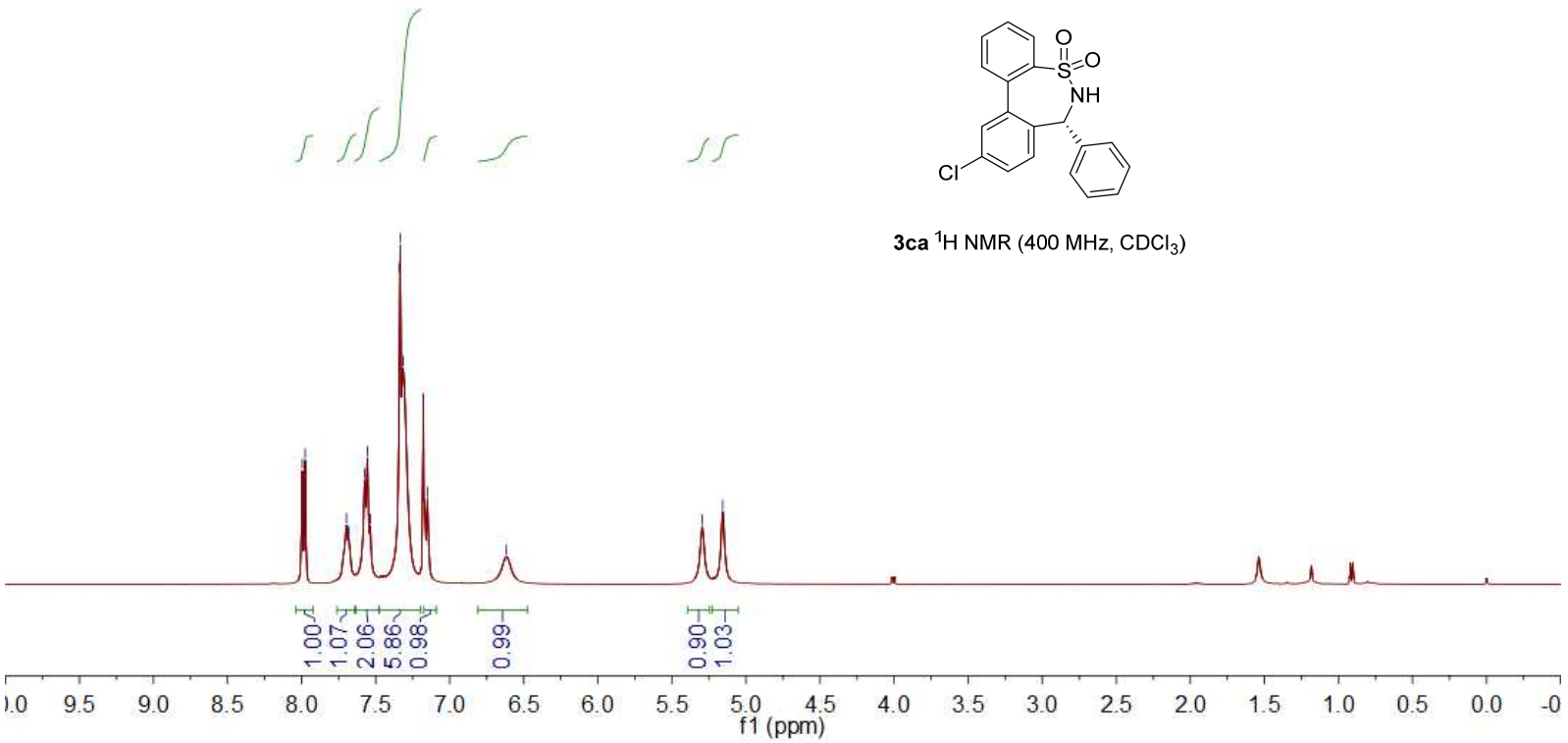
3ba ^{1}H NMR (400 MHz, $CDCl_3$)



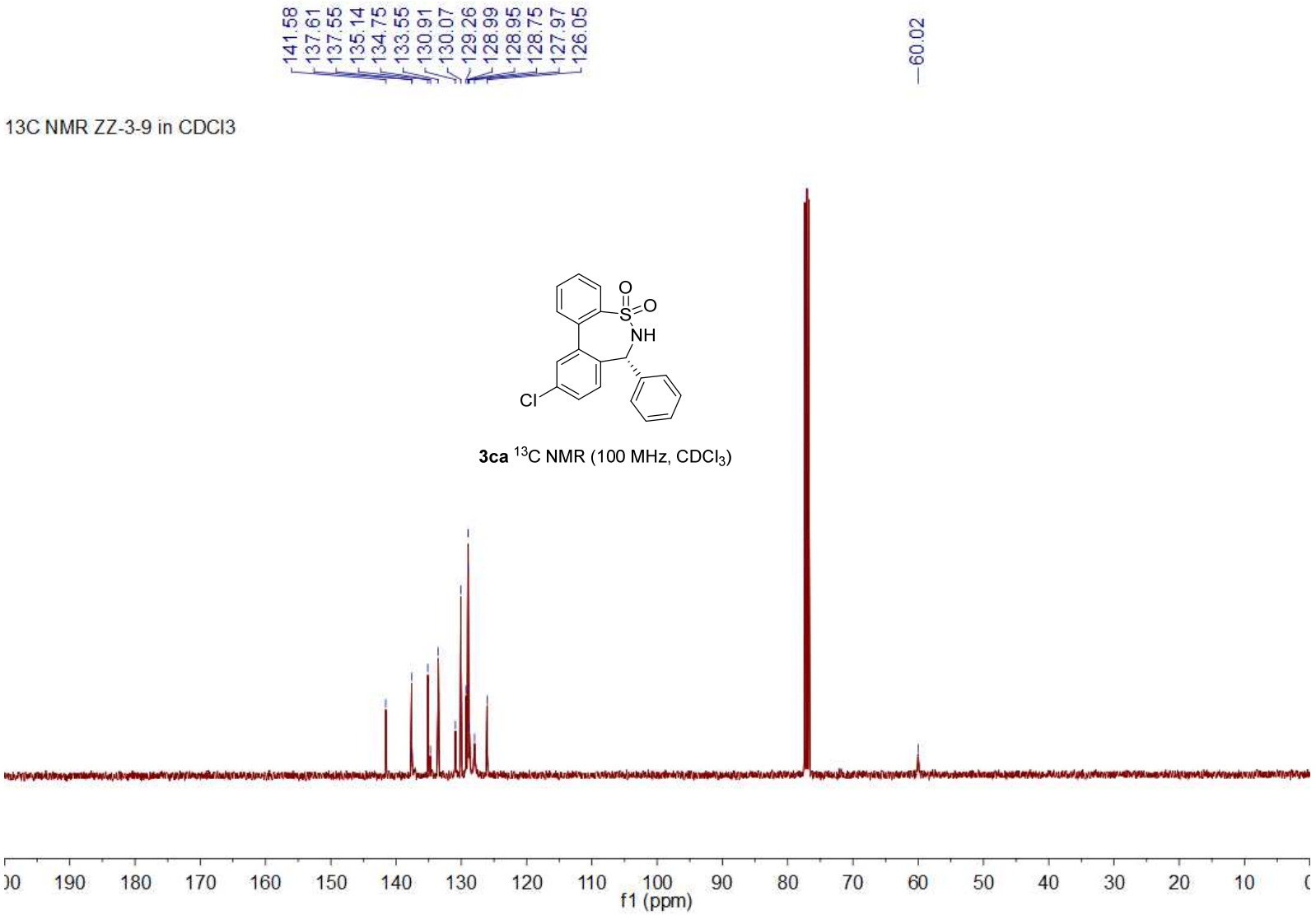
3ba ^{13}C NMR (100 MHz, $CDCl_3$)



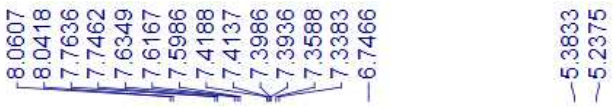
1H NMR ZZ-3-9 in CDCl3



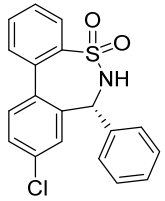
3ca ^{1}H NMR (400 MHz, $CDCl_3$)



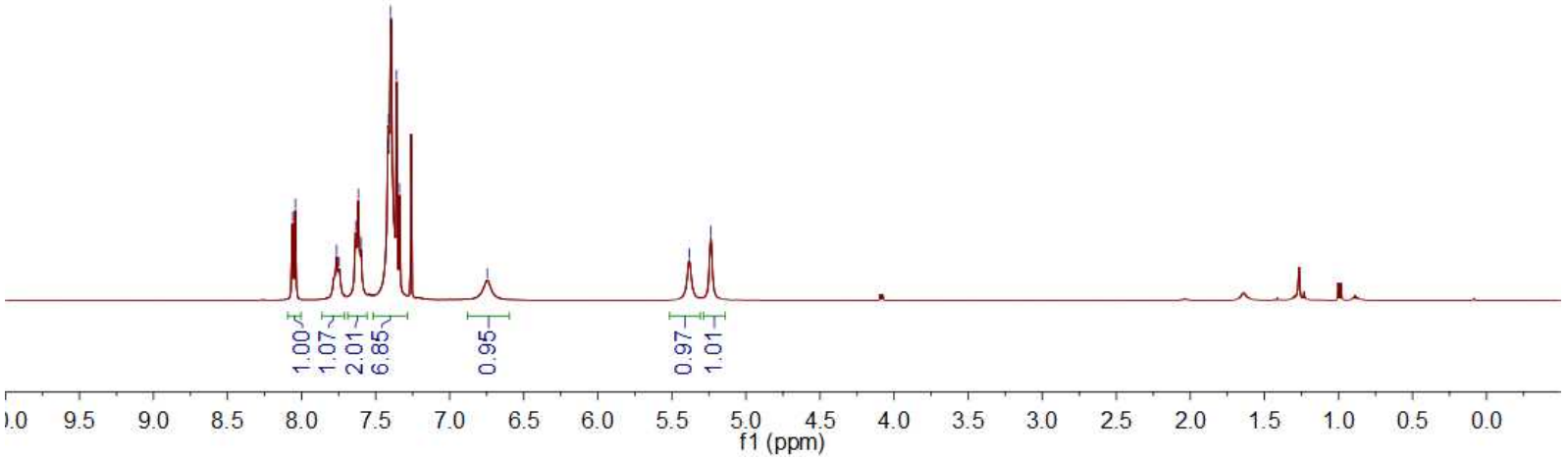
3ca ^{13}C NMR (100 MHz, $CDCl_3$)

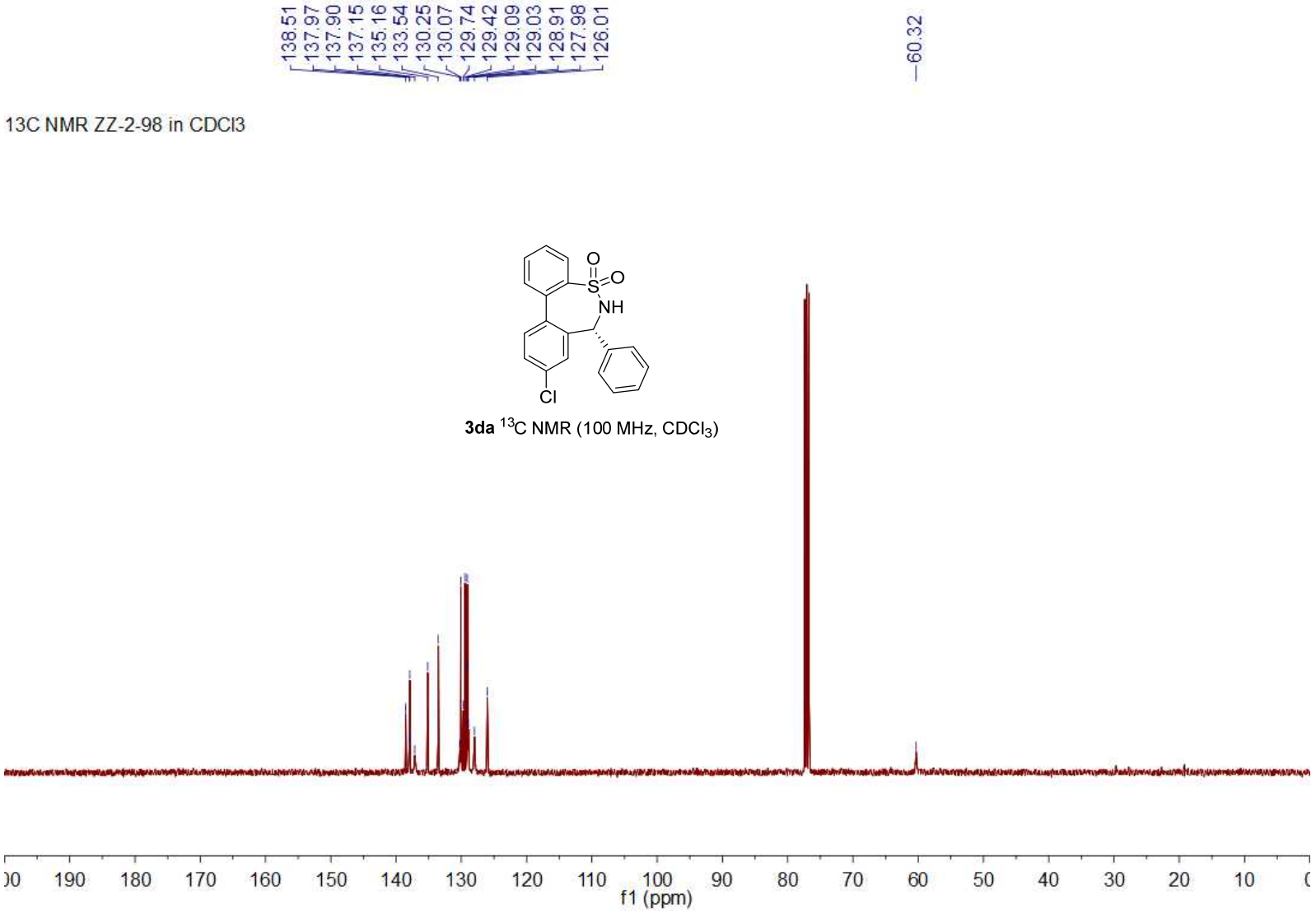


1H NMR ZZ-2-98 in CDCl3

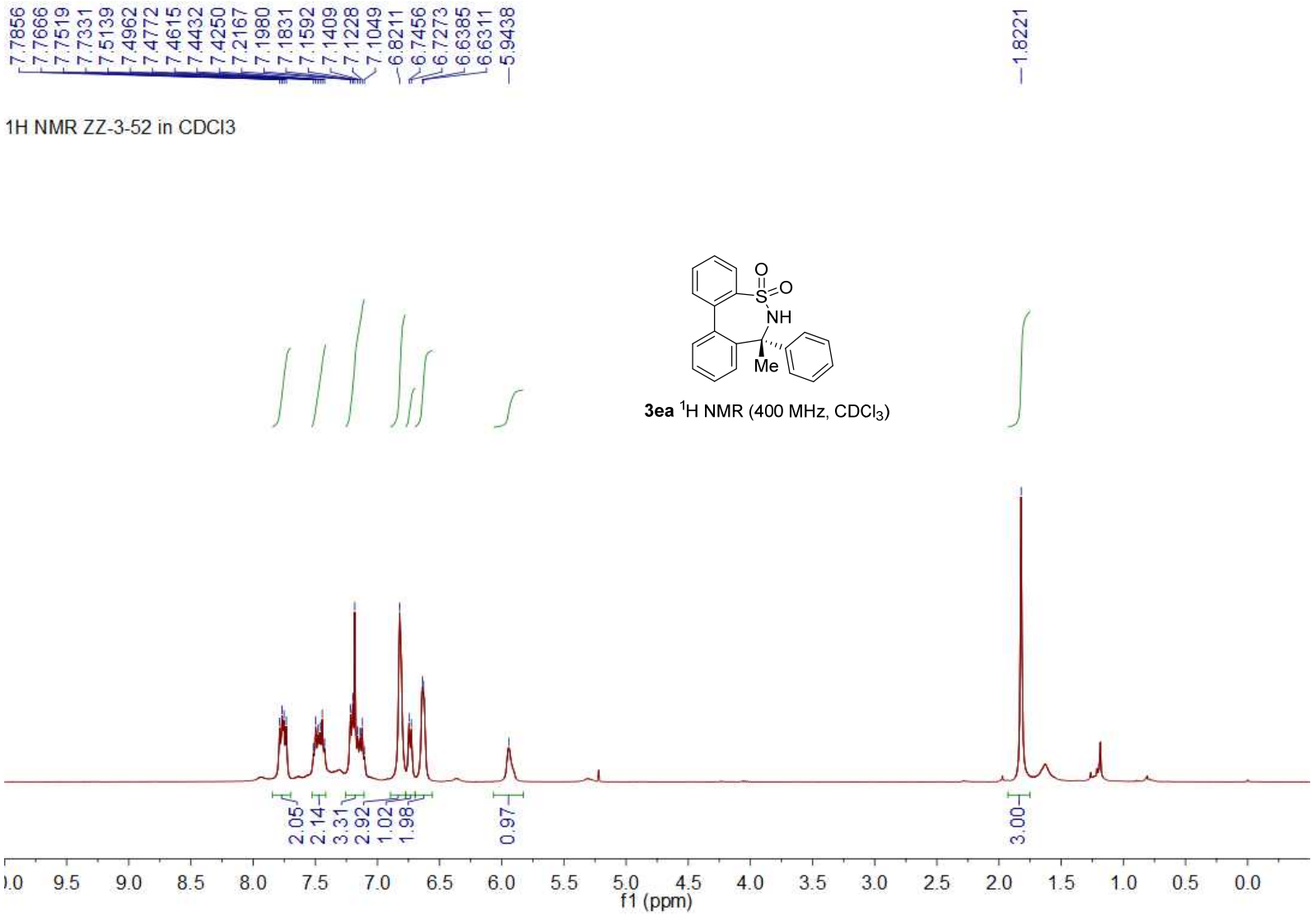


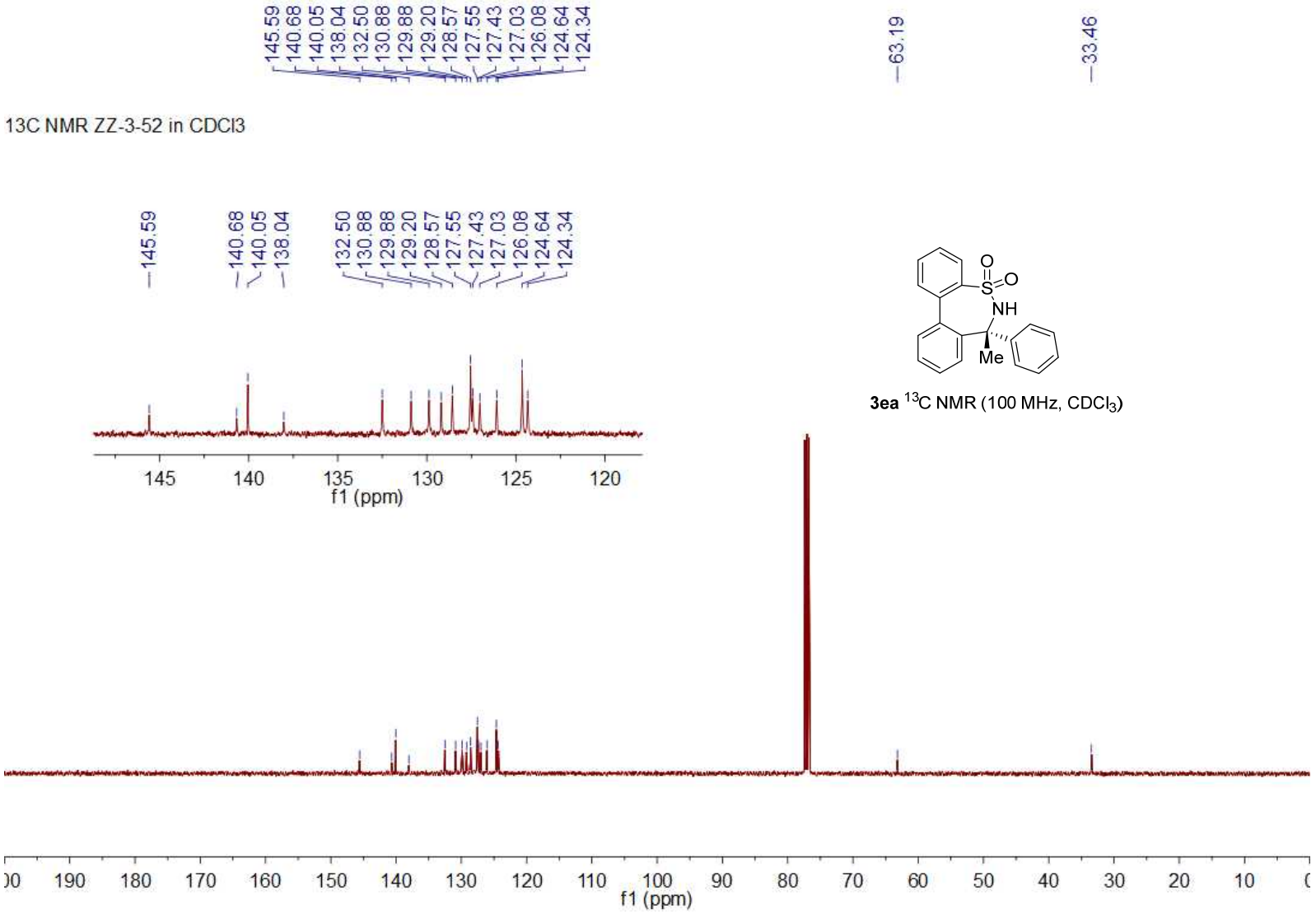
3da ^{1}H NMR (400 MHz, $CDCl_3$)



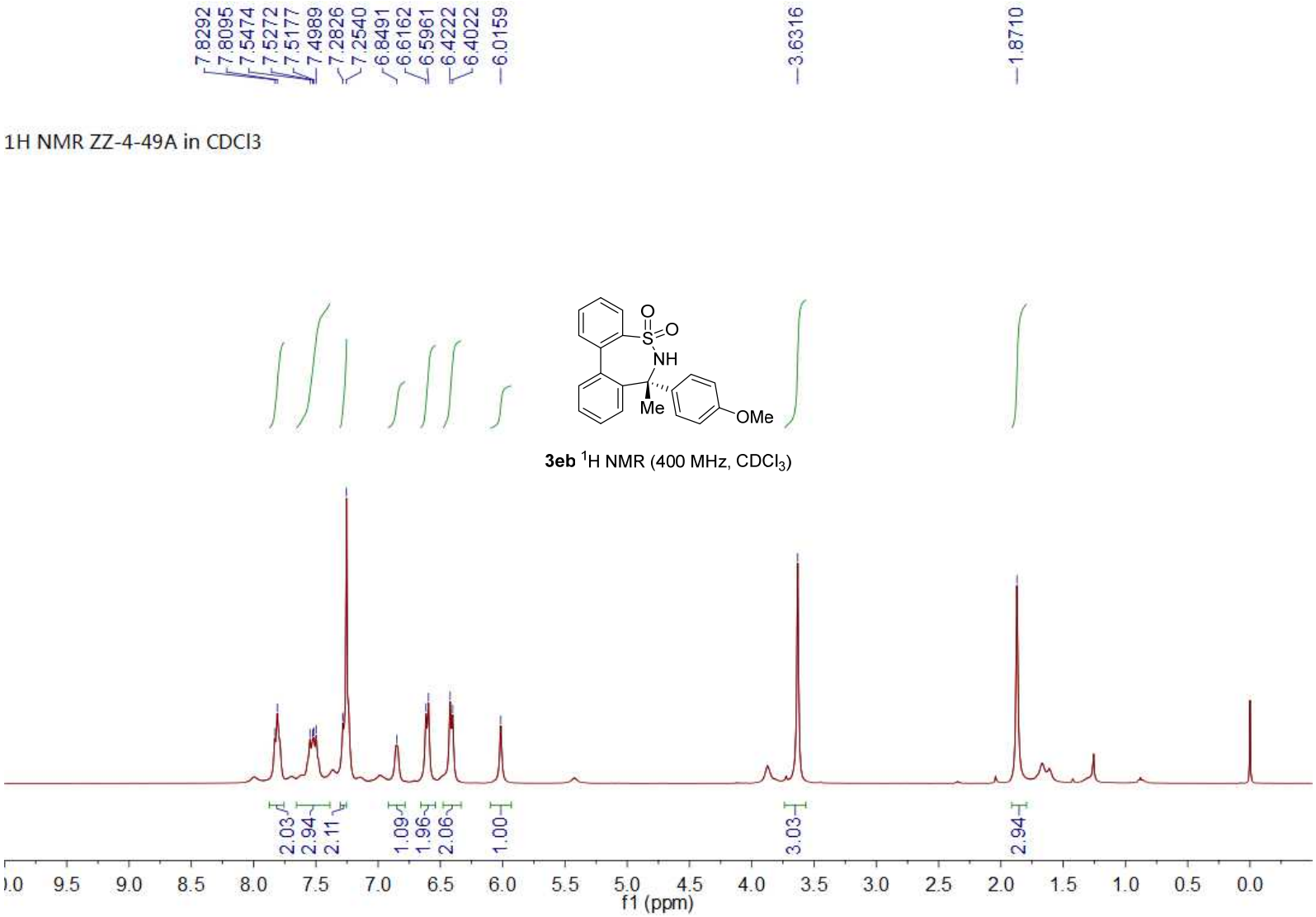


3da ^{13}C NMR (100 MHz, $CDCl_3$)

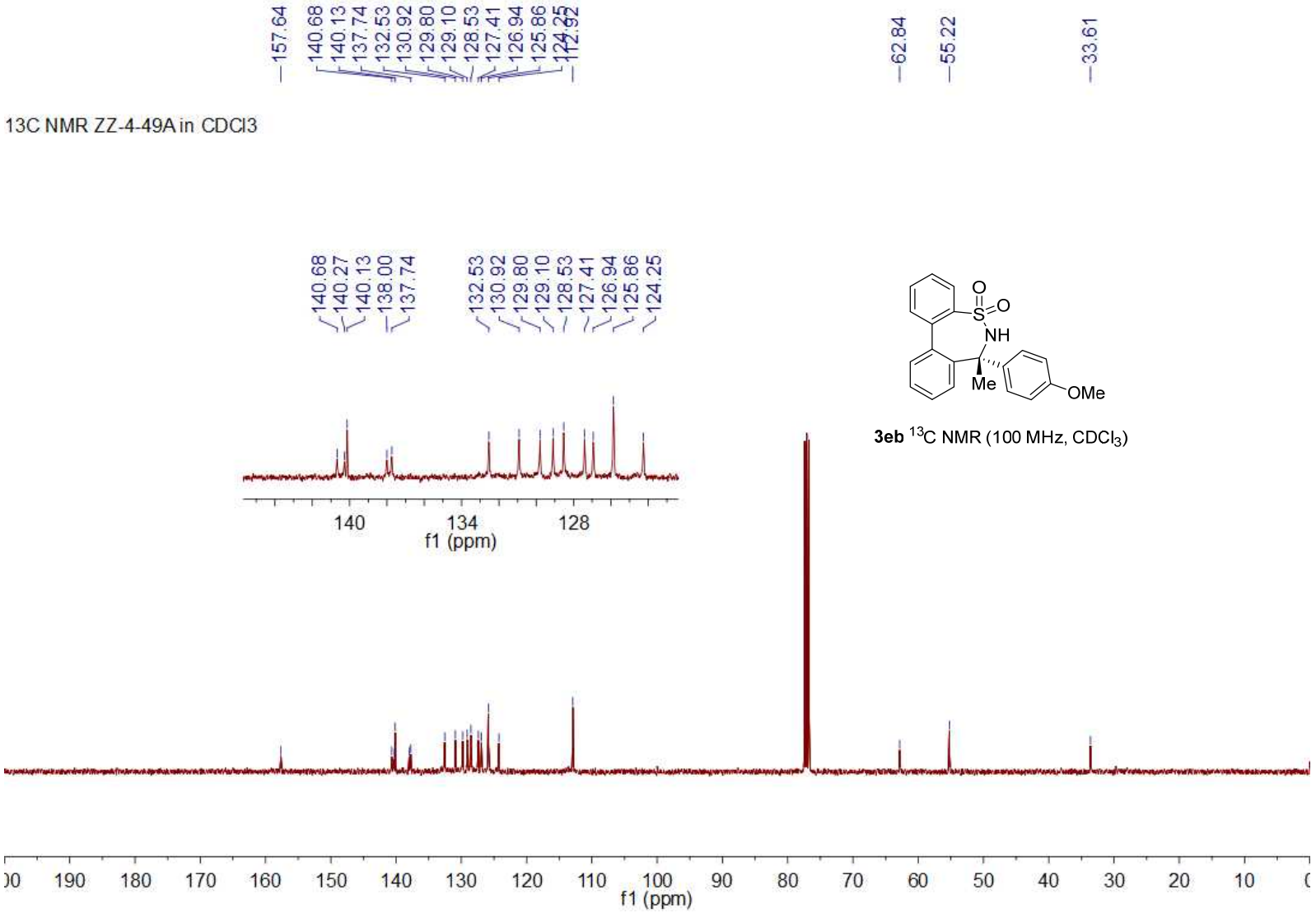

7.7856
7.7666
7.7519
7.7331
7.5139
7.4962
7.4772
7.4615
7.4432
7.4250
7.2167
7.1980
7.1831
7.1592
7.1409
7.1228
7.1049
6.8211
6.7456
6.7273
6.6385
6.6311
5.9438
1.8221
1H NMR ZZ-3-52 in CDCl3
O
S
O
NH
Me
3ea 1H NMR (400 MHz, CDCl3)
2.05
2.14
3.31
2.92
1.02
1.98
0.97
3.00
f1 (ppm)



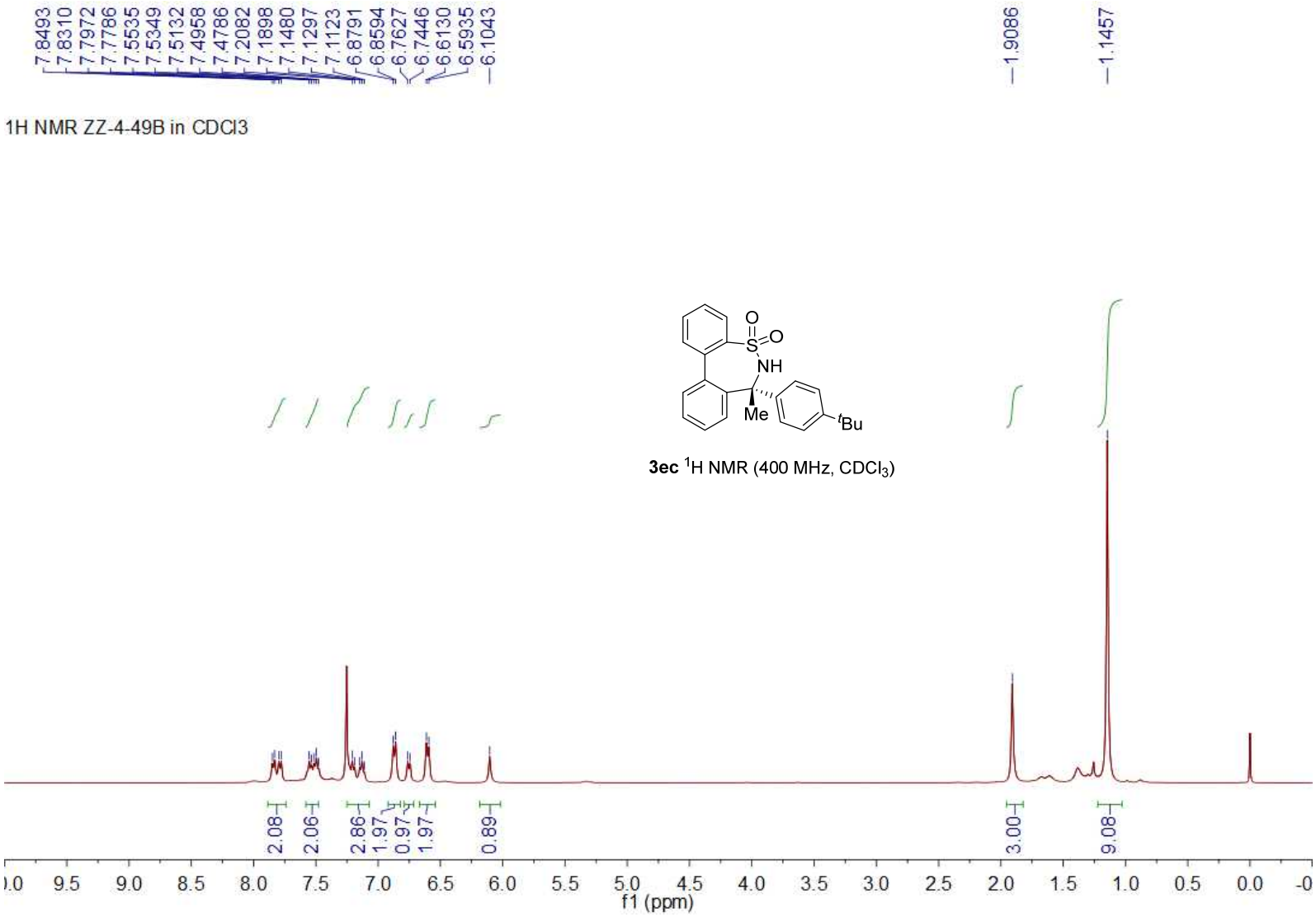
3ea ^{13}C NMR (100 MHz, $CDCl_3$)



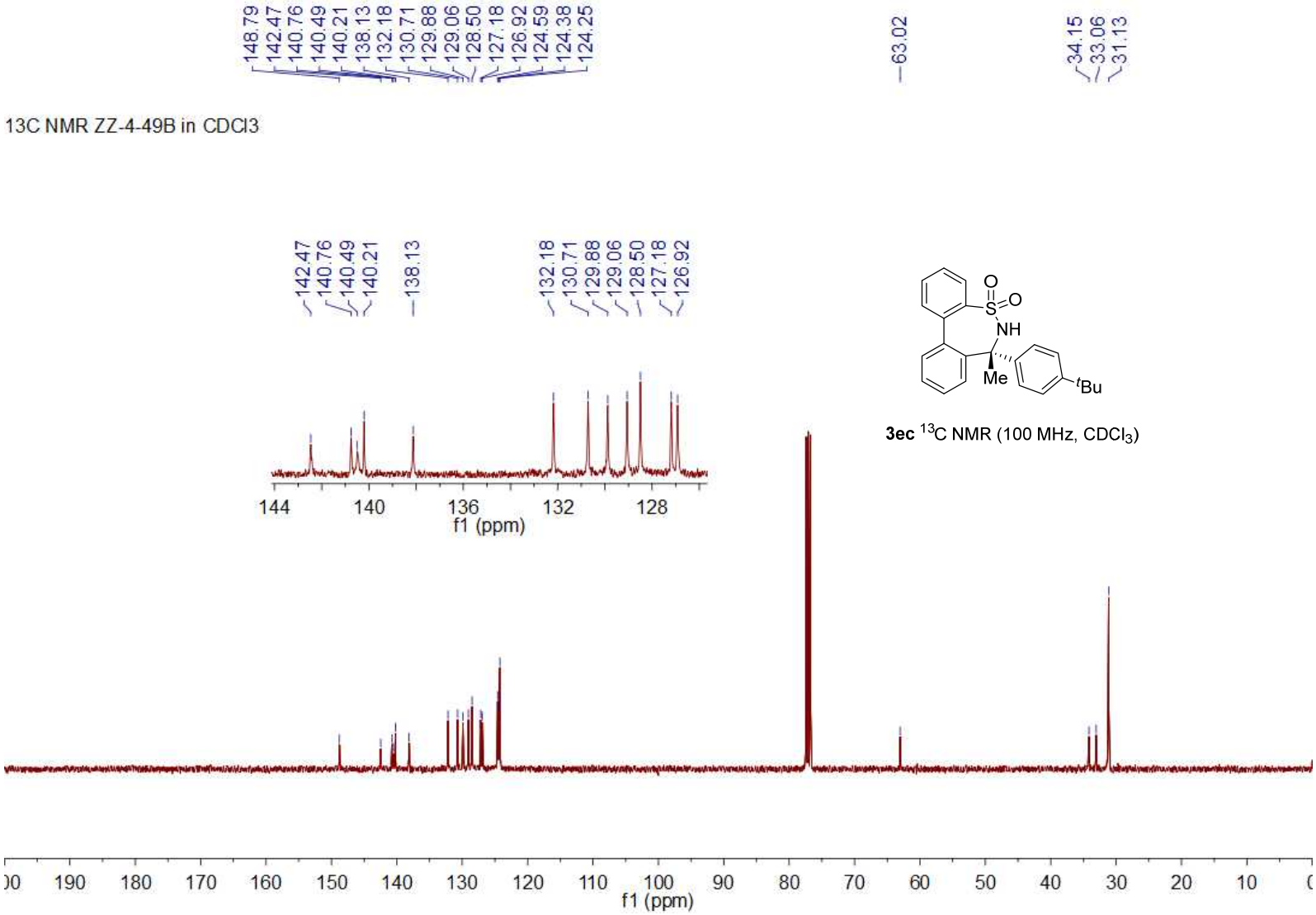
3eb ^{1}H NMR (400 MHz, $CDCl_3$)



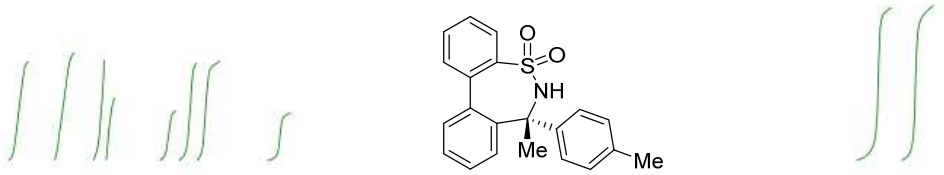
3eb ^{13}C NMR (100 MHz, $CDCl_3$)



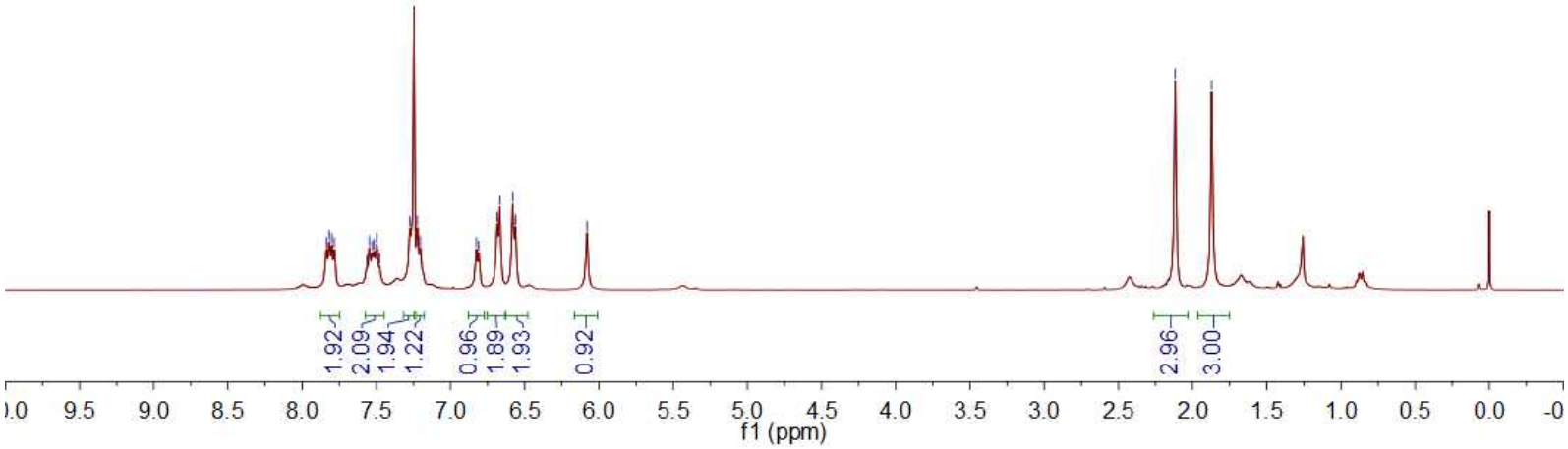
3ec ^{1}H NMR (400 MHz, $CDCl_3$)


148.79
142.47
140.76
140.49
140.21
138.13
132.18
130.71
129.88
129.06
128.50
127.18
126.92
124.59
124.38
124.25
63.02
34.15
33.06
31.13
13C NMR ZZ-4-49B in CDCl3
142.47
140.76
140.49
140.21
138.13
132.18
130.71
129.88
129.06
128.50
127.18
126.92
144
140
136
132
128
f1 (ppm)
O
S
O
NH
Me
tBu
3ec 13C NMR (100 MHz, CDCl3)
f1 (ppm)

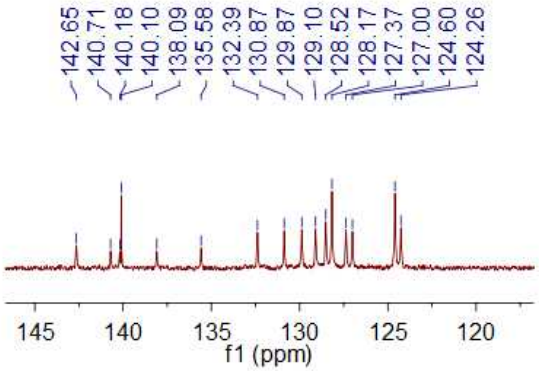
1H NMR ZZ-5-48A in CDCl3

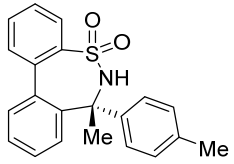


3ed ^{1}H NMR (400 MHz, $CDCl_3$)

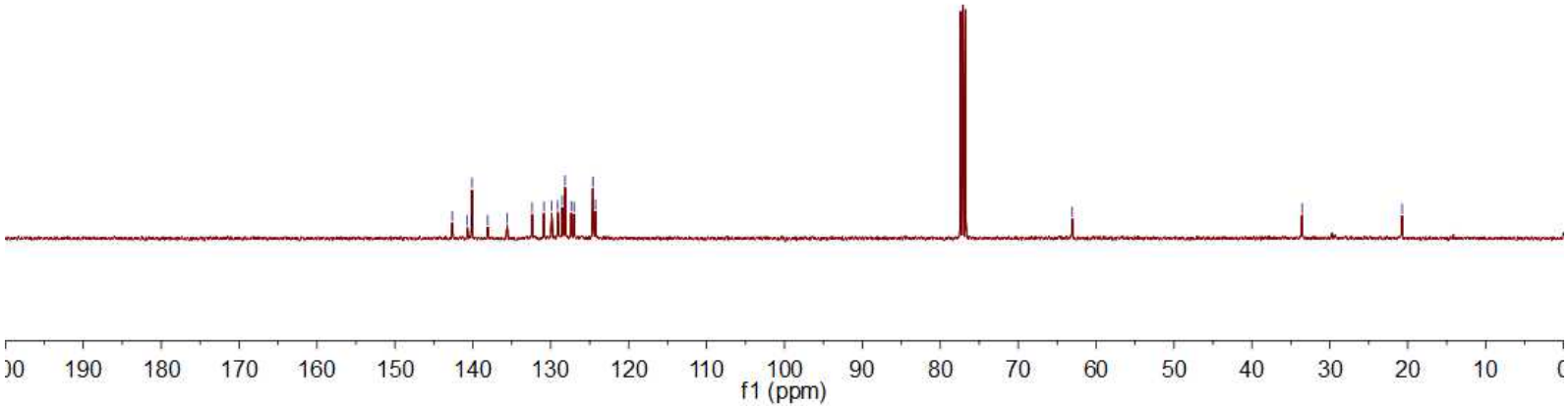


13C NMR ZZ-5-48A in CDCl3

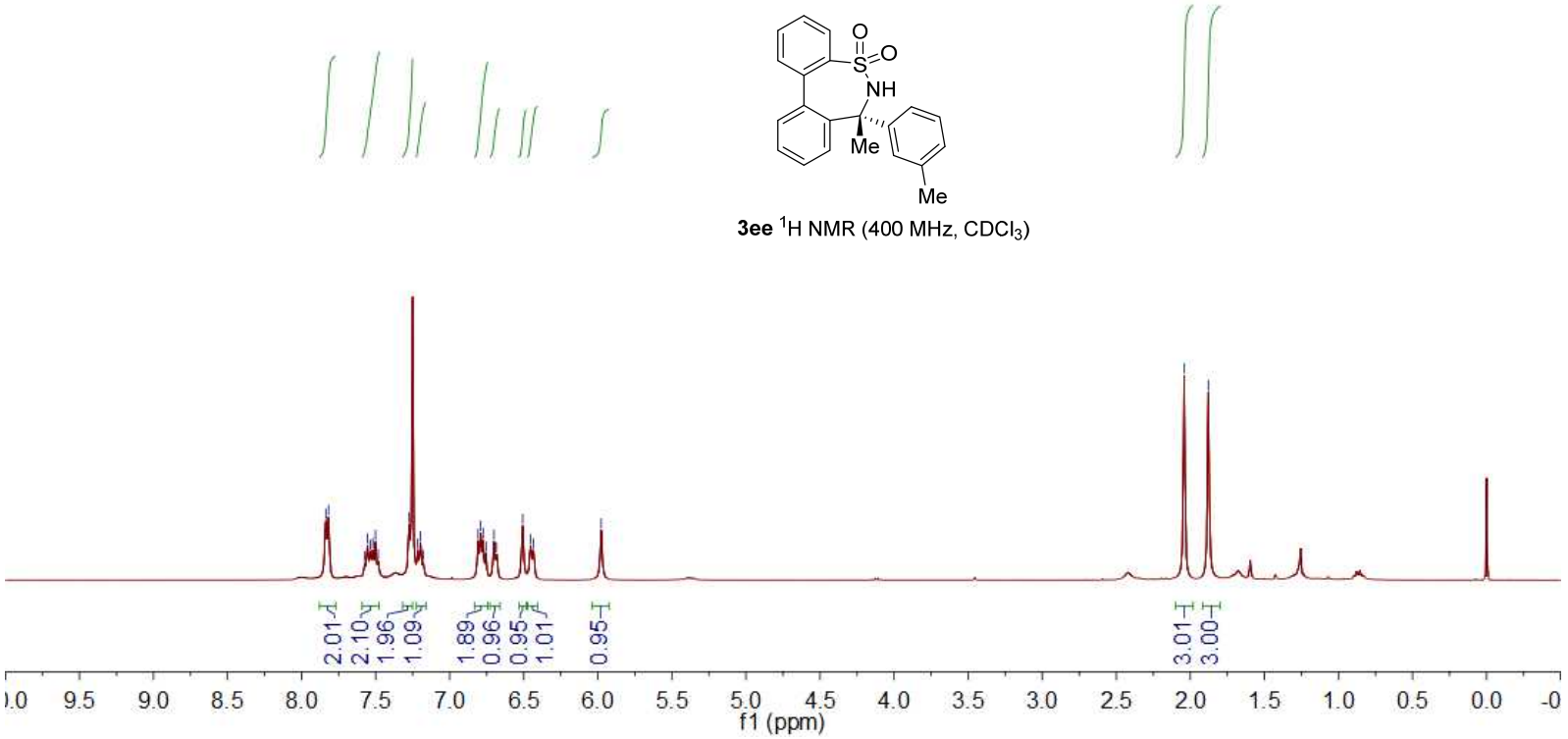




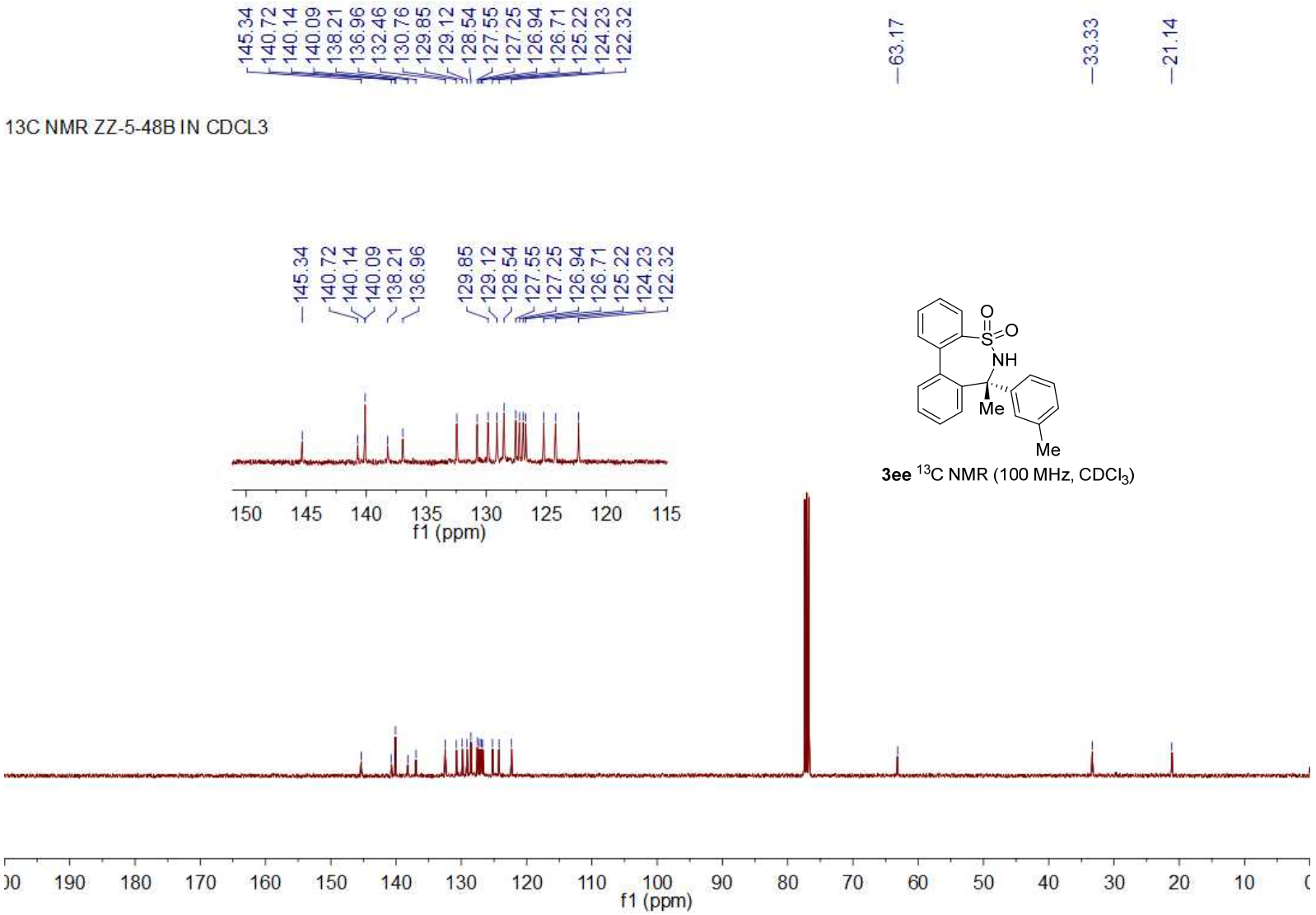
3ed ^{13}C NMR (100 MHz, $CDCl_3$)



1H NMR ZZ-5-48B IN CDCL3



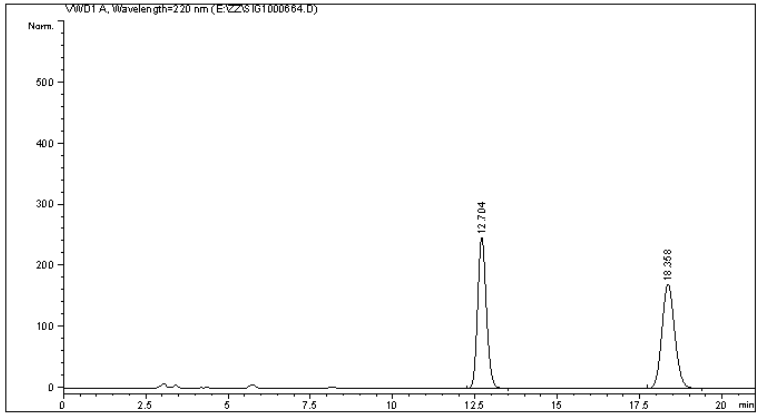
3ee ^{1}H NMR (400 MHz, $CDCl_3$)



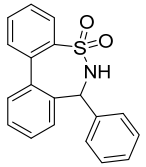
3ee ^{13}C NMR (100 MHz, $CDCl_3$)

Data File E:\ZZ\SIG1000664.D
Sample Name: zz-2-43(+-)

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 3/17/2018 3:45:26 PM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 3/17/2018 3:42:24 PM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 8:58:26 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



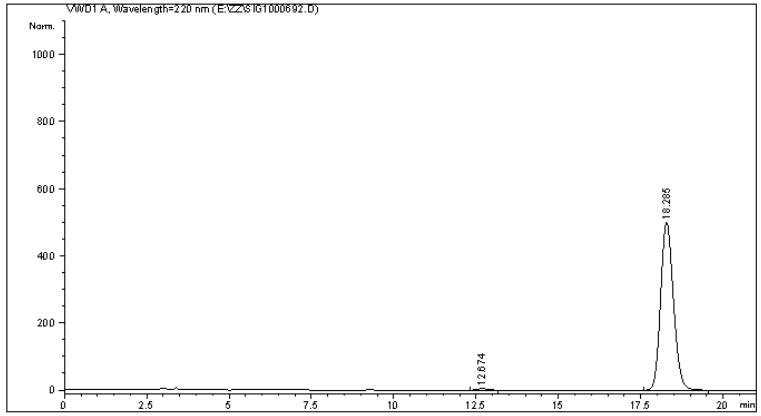

```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.704 BB    0.2845 4548.92041  247.39166  49.7963
       2  18.358 BB    0.4169 4586.14551  170.46342  50.2037

    Totals :                  9135.06592  417.85509

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



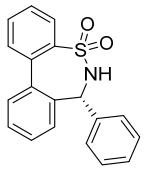
(+/-)-**3aa**

Data File E:\ZZ\SIG1000692.D
Sample Name: zz-2-50

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 3/23/2018 9:39:49 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 3/23/2018 9:39:23 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:00:44 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



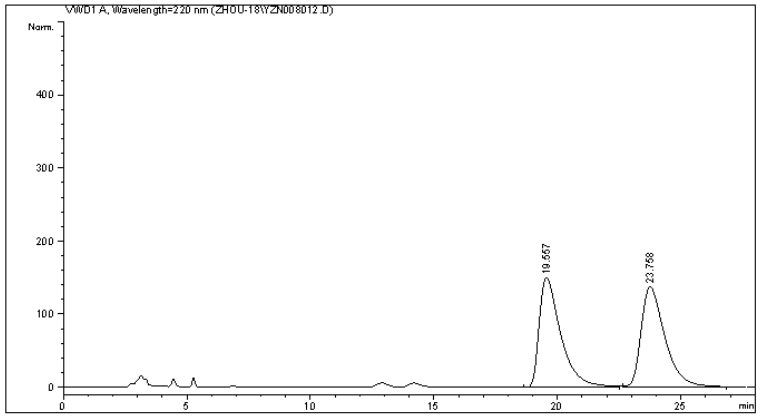

```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.674 BB    0.2936   85.69107    4.49208   0.6297
       2  18.285 BB    0.4209 1.35222e4   499.44681  99.3703

    Totals :                  1.36079e4   503.93888

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



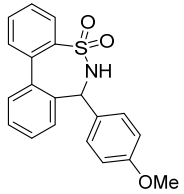
(+)-**3aa**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008012.D
Sample Name: zz-2-51A(+-)

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 3/24/2018 11:02:07 AM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/24/2018 10:55:11 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 10:55:20 AM
                  (modified after loading)
Sample Info     : OD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```




```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  19.557 BB    0.9050 9129.18555  150.02177  49.9948
   2  23.758 BB    1.0033 9131.08984  136.99435  50.0052

Totals :                  1.82603e4   287.01613
```

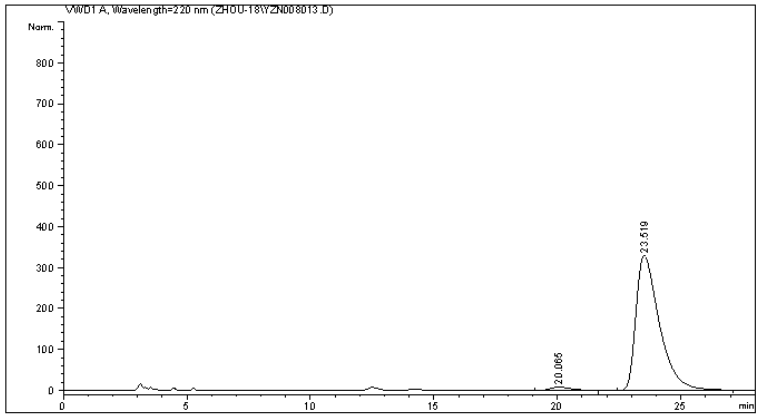


(+/-)-**3ab**

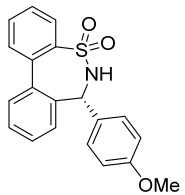
```
                          *** End of Report ***
```


Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008013.D
Sample Name: zz-2-51A

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 3/24/2018 11:43:51 AM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/24/2018 11:32:49 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 10:57:49 AM
                  (modified after loading)
Sample Info     : OD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```




```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  20.065 BB    0.8964  512.32758    8.40096   2.3077
   2  23.519 BB    0.9959 2.16888e4   329.13538  97.6923

Totals :                  2.22011e4   337.53634
```

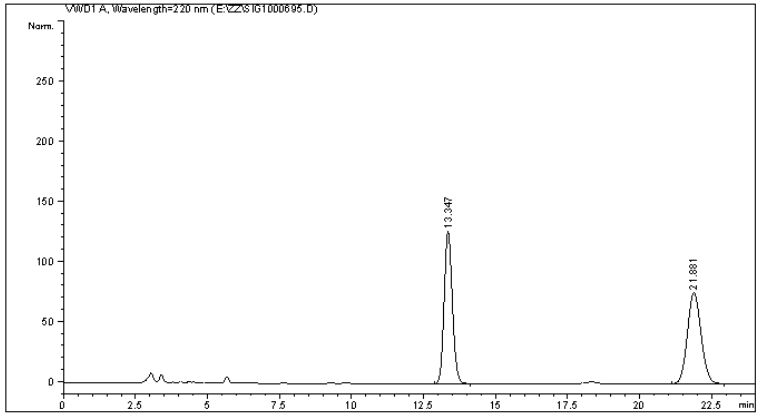


(+)-**3ab**

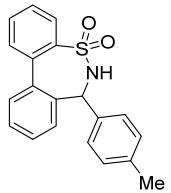
```
                          *** End of Report ***
```

Data File E:\ZZ\SIG1000695.D
Sample Name: zz-2-51B(+-)

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 3/24/2018 10:07:20 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 3/24/2018 9:26:44 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:05:09 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



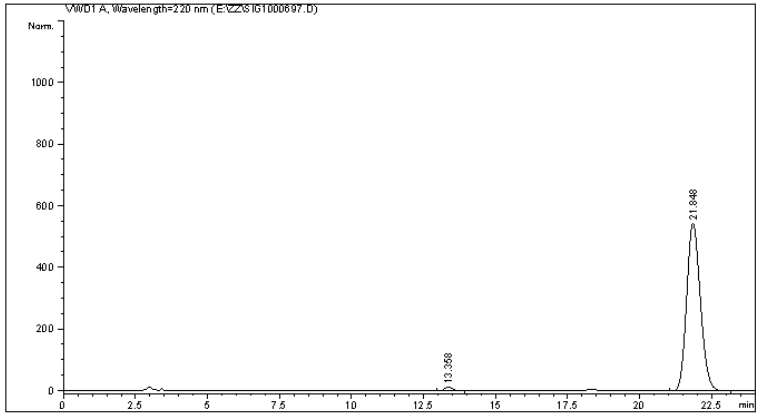

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.347 BB    0.3068 2504.27979  126.57328  49.9842
       2  21.881 BB    0.5136 2505.86230   75.81239  50.0158

    Totals :                  5010.14209  202.38567

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



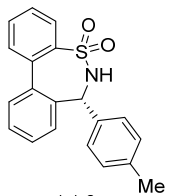
(+/-)-**3ac**

Data File E:\ZZ\SIG1000697.D
Sample Name: zz-2-51B

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 3/24/2018 11:06:34 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 3/24/2018 11:06:08 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:07:36 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



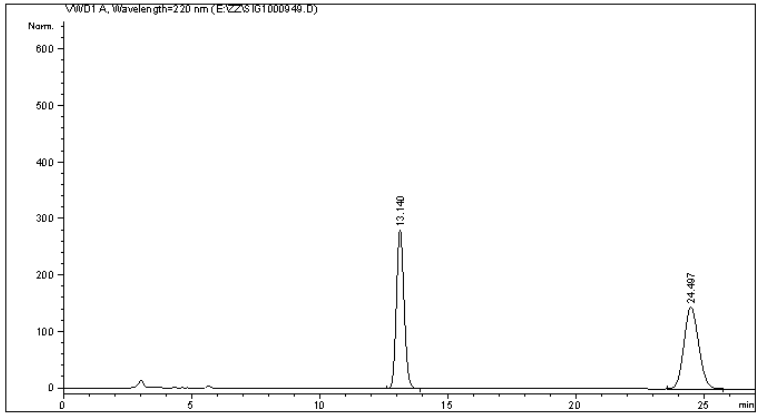

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.358 BB    0.3044  243.37157   12.37893   1.3269
       2  21.848 BB    0.5154 1.80974e4   544.99622  98.6731

    Totals :                  1.83407e4   557.37514

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



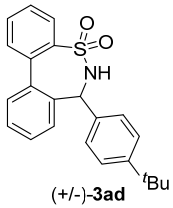
(+)-**3ac**

Data File E:\ZZ\SIG1000949.D
Sample Name: zz-2-94(+-)

```
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 91
Injection Date  : 5/9/2018 8:48:41 AM
                                                Inj Volume : 2.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
Last changed    : 5/9/2018 8:39:38 AM by zz
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/19/2018 9:32:04 PM
                  (modified after loading)
Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                  nm
```



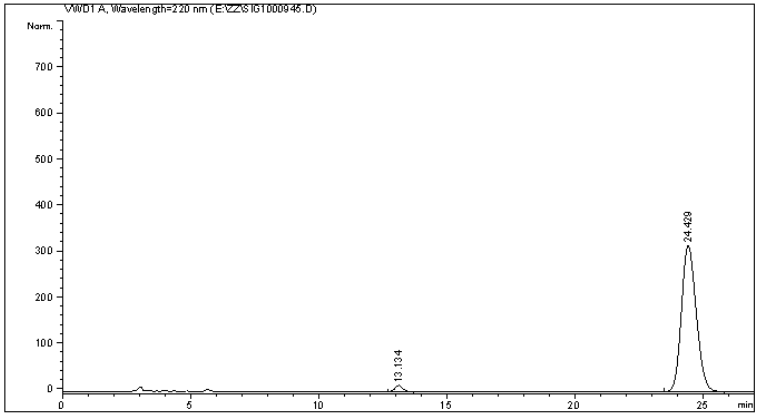

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  13.140 BB    0.3209 5793.94238  280.55783  50.0161
   2  24.497 BB    0.6214 5790.20215  145.13426  49.9839

Totals :                  1.1584le4   425.69209

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



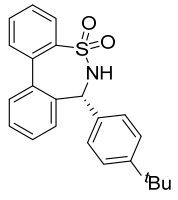
(+/-)-**3ad**

Data File E:\ZZ\SIG1000945.D
Sample Name: zz-2-94

```
Acq. Operator   : zz
Acq. Instrument : 仪器 1                        Location : Vial 91
Injection Date  : 5/8/2018 10:21:44 AM
                                                Inj Volume : 2.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
Last changed    : 5/8/2018 10:18:22 AM by zz
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/19/2018 9:33:04 PM
                  (modified after loading)
Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                  nm
```



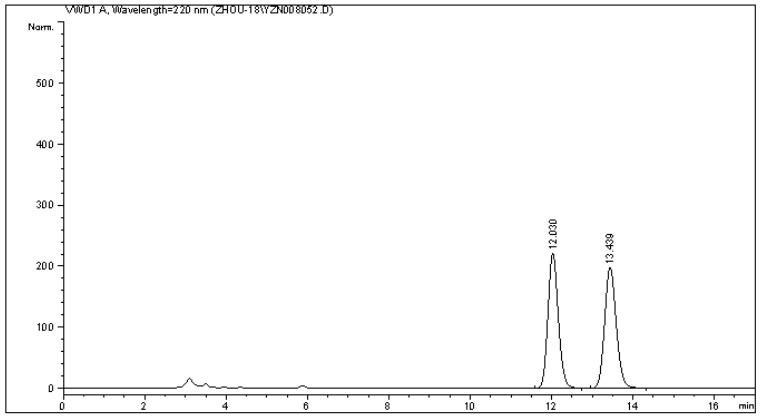

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  13.134 BB    0.3148  265.59509   13.08331   2.0413
   2  24.429 BB    0.6243 1.27458e4   317.54691  97.9587

Totals :                  1.30114e4   330.63021

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



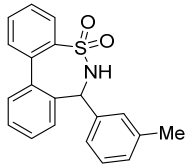
(+)-**3ad**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008052.D
Sample Name: zz-2-55A(+-)

```
==========================================================================
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 3/29/2018 7:45:17 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/29/2018 7:42:46 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 10:59:31 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```



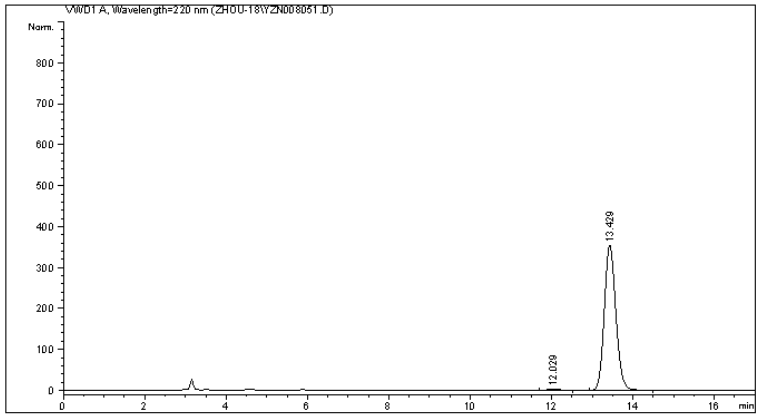

```
==========================================================================
                        Area Percent Report
==========================================================================

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.030 BB    0.2729 3892.30371  220.48262  49.8985
   2  13.439 BB    0.3069 3908.13745  197.20352  50.1015

Totals :                  7800.44116  417.68614

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



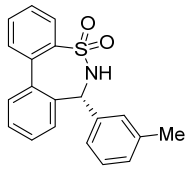
(+/-)-**3ae**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008051.D
Sample Name: zz-2-55A

```
==========================================================================
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 3/29/2018 7:21:24 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/29/2018 7:19:18 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:01:05 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```



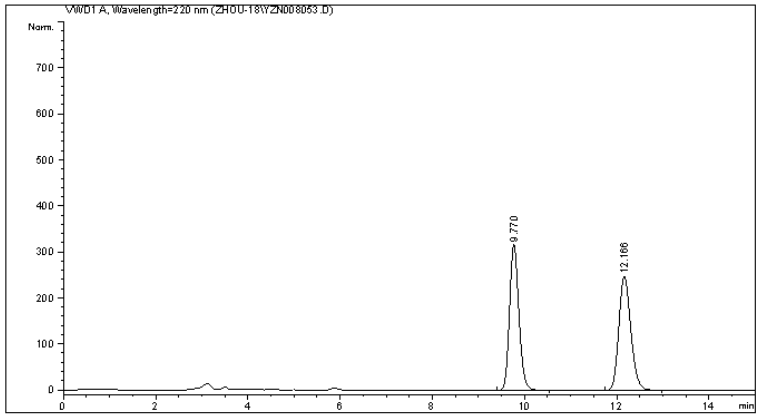

```
==========================================================================
                        Area Percent Report
==========================================================================

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.029 BB    0.2768   57.29067    3.18593   0.8163
   2  13.429 BB    0.3037 6961.36963  353.99603  99.1837

Totals :                  7018.66030  357.18196

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



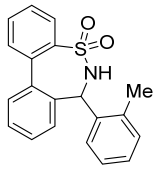
(+)-**3ae**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008053.D
Sample Name: zz-2-55B(+-)

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 3/29/2018 8:07:28 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/29/2018 8:04:53 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:02:29 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```



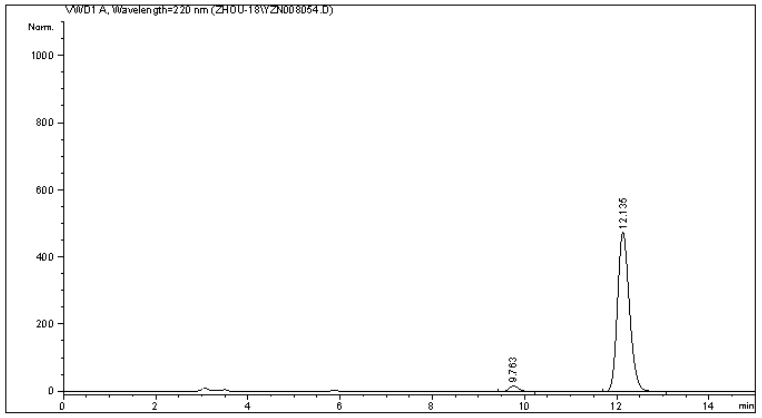

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.770 VB    0.2191 4479.27881  316.26987  50.0234
   2  12.166 BB    0.2795 4475.08936  247.34055  49.9766

Totals :                  8954.36816  563.61041

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



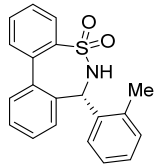
(+/-)-**3af**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008054.D
Sample Name: zz-2-55B

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 3/29/2018 8:30:32 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/29/2018 8:26:52 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:04:04 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```



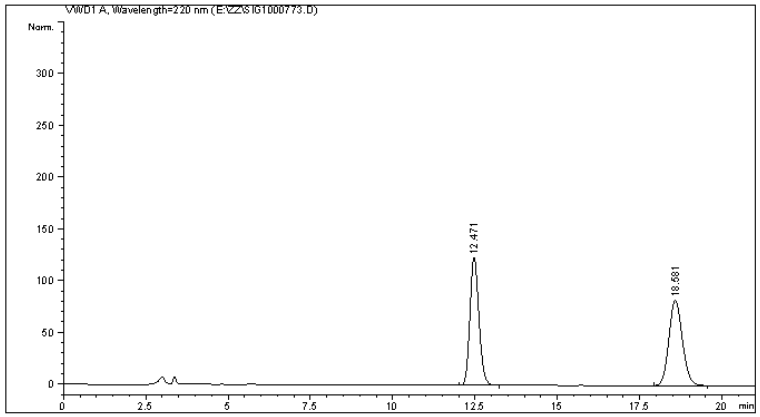

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.763 BB    0.2175  235.49289   16.64380   2.6824
   2  12.135 BB    0.2774 8543.53125  473.72354  97.3176

Totals :                  8779.02414  490.36734

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



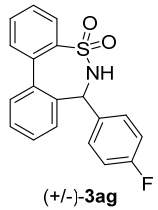
(+)-**3af**

Data File E:\ZZ\SIG1000773.D
Sample Name: zz-2-62A(+-)

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/10/2018 9:14:07 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/10/2018 8:47:37 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:28:52 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



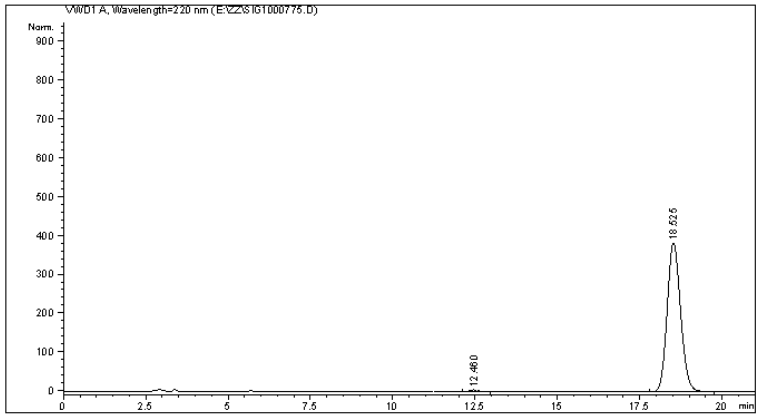

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.471 BB    0.2937 2350.76953  123.68821  49.9554
       2  18.581 BB    0.4414 2354.96387   82.65630  50.0446

    Totals :                  4705.73340  206.34451

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



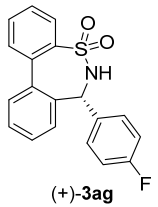
(+/-)-**3ag**

Data File E:\ZZ\SIG1000775.D
Sample Name: zz-2-62A

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/10/2018 10:04:53 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/10/2018 10:04:11 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:29:56 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



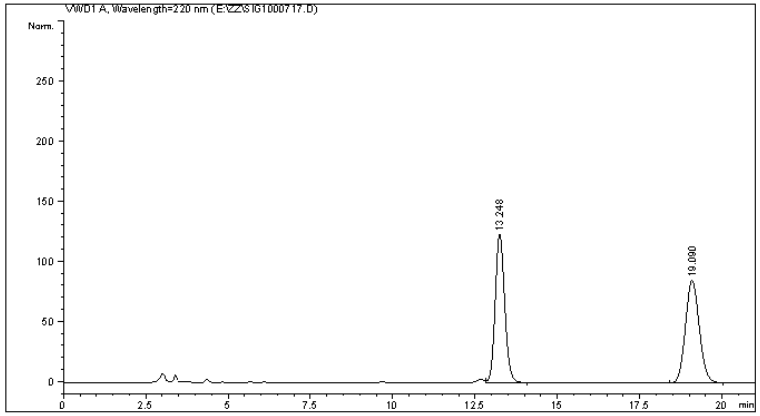

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.460 BB    0.2926   85.59999    4.50734   0.7801
       2  18.525 BB    0.4404 1.08877e4   383.33890  99.2199

    Totals :                  1.09733e4   387.84624

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



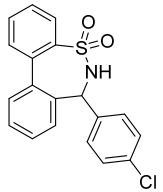
(+)-**3ag**

Data File E:\ZZ\SIG1000717.D
Sample Name: zz-2-58A(+-)

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/2/2018 10:28:18 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/2/2018 10:24:36 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:09:23 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



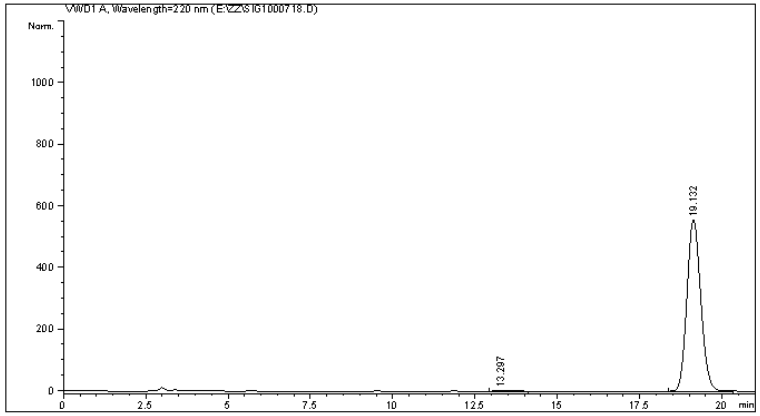

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.248 VB    0.3105 2484.96216  123.62598  50.0388
       2  19.090 BB    0.4513 2481.11328   85.31990  49.9612

    Totals :                  4966.07544  208.94588

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



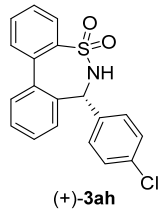
(+/-)-**3ah**

Data File E:\ZZ\SIG1000718.D
Sample Name: zz-2-58A

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/2/2018 11:09:59 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/2/2018 10:51:20 AM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:10:34 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



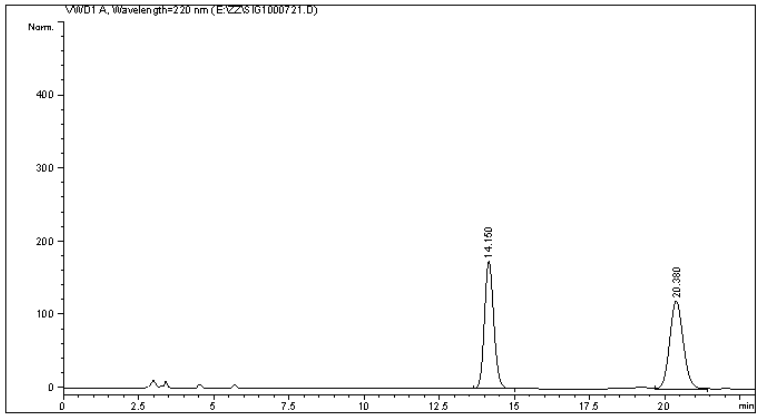

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.297 BB    0.3724   82.18174    3.22421   0.5029
       2  19.132 BB    0.4540 1.62600e4   556.24695  99.4971

    Totals :                  1.63422e4   559.47116

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



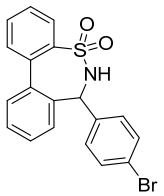
(+)-**3ah**

Data File E:\ZZ\SIG1000721.D
Sample Name: zz-2-58B(+-)

```
Acq. Operator   : HFE-258
Acq. Instrument : 仪器 1                        Location : Vial 91
Injection Date  : 4/2/2018 3:07:58 PM                Inj Volume : 2.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
Last changed    : 4/2/2018 3:05:01 PM by HFE-258
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/19/2018 9:14:35 PM
                  (modified after loading)
Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                  nm
```



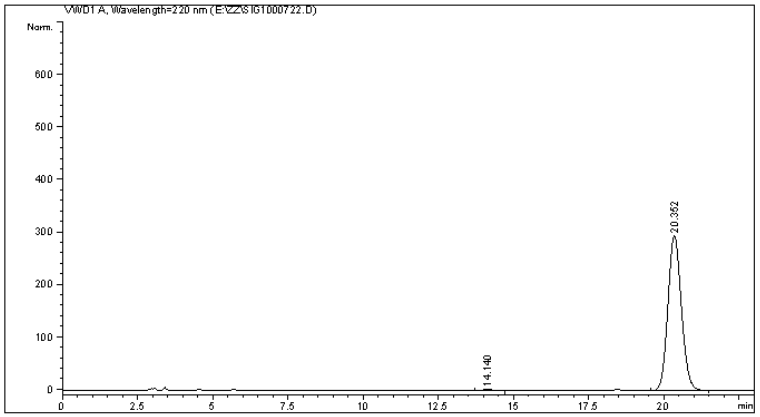

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #  [min]       [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  14.150 BB    0.3333 3751.73291  174.14243  49.9861
   2  20.380 VB    0.4855 3753.81616  120.15101  50.0139

Totals :                  7505.54907  294.29343

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



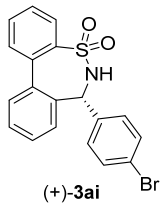
(+/-)-**3ai**

Data File E:\ZZ\SIG1000722.D
Sample Name: zz-2-58B

```
Acq. Operator   : HFE-258
Acq. Instrument : 仪器 1                        Location : Vial 91
Injection Date  : 4/2/2018 3:41:11 PM                Inj Volume : 2.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
Last changed    : 4/2/2018 3:37:06 PM by HFE-258
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/19/2018 9:15:34 PM
                  (modified after loading)
Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                  nm
```



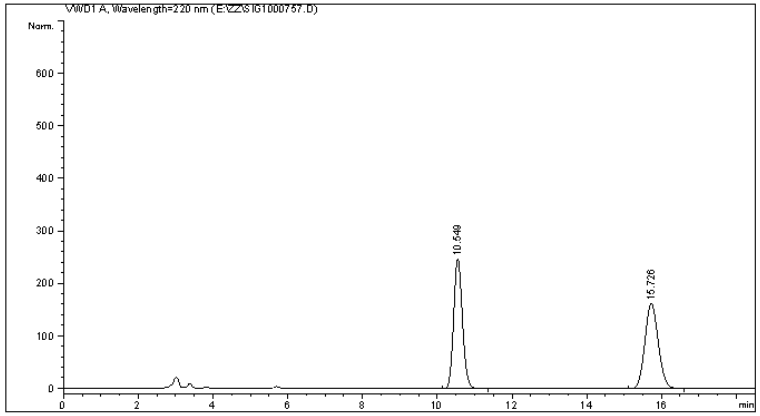

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #  [min]       [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  14.140 BB    0.3374   47.42809    2.18327   0.5130
   2  20.352 BB    0.4850 9197.86328  294.76514  99.4870

Totals :                  9245.29137  296.94841

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



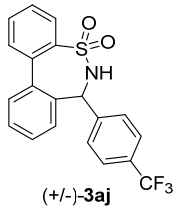
(+)-**3ai**

Data File E:\ZZ\SIG1000757.D
Sample Name: zz-2-60A(+-)

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/8/2018 2:27:32 PM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/8/2018 1:47:26 PM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:17:08 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



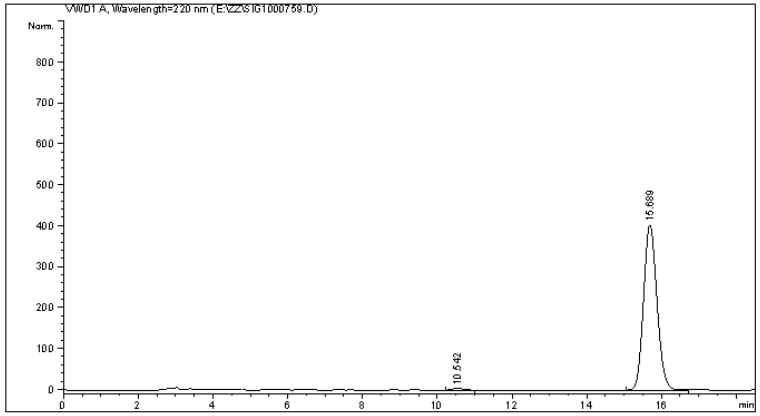

```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.549 BB    0.2531 4038.20068  246.57562  50.0410
       2  15.726 BB    0.3852 4031.58252  162.61316  49.9590

    Totals :                  8069.78320  409.18878

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



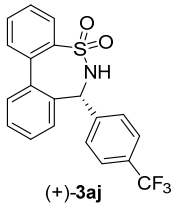
(+/-)-**3aj**

Data File E:\ZZ\SIG1000759.D
Sample Name: zz-2-60A

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/8/2018 3:12:05 PM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/8/2018 3:11:24 PM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:22:14 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



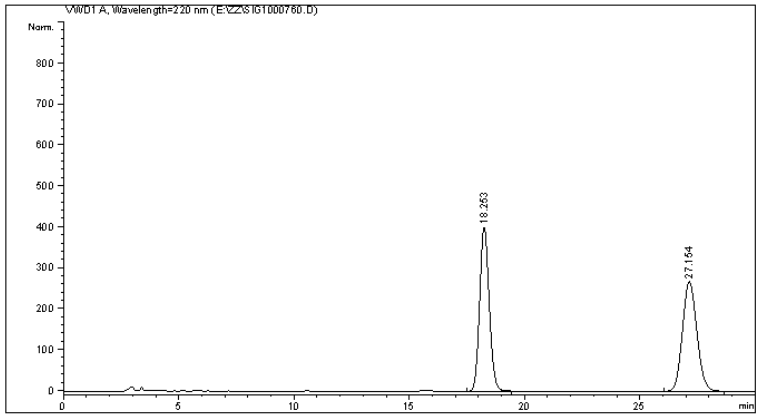

```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.542 BB    0.2511   92.49078    5.70737   0.9122
       2  15.689 BB    0.3860 1.00470e4   404.23911  99.0878

    Totals :                  1.01395e4   409.94648

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



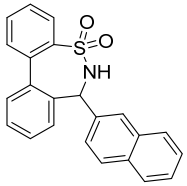
(+)-**3aj**

Data File E:\ZZ\SIG1000760.D
Sample Name: zz-2-61A(+-)

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/8/2018 3:36:01 PM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/8/2018 3:31:53 PM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:23:46 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



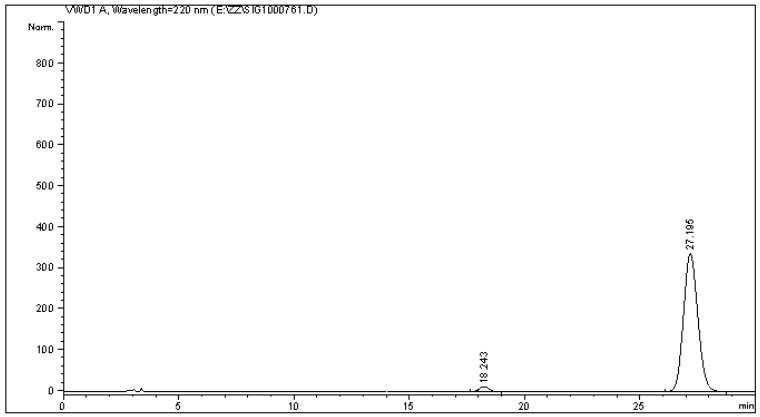

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  18.253 BB    0.4450 1.15551e4   401.24536  49.9594
       2  27.154 BB    0.6726 1.15738e4   267.57956  50.0406

    Totals :                  2.31289e4   668.82492

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



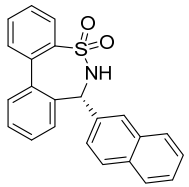
(+/-)-**3ak**

Data File E:\ZZ\SIG1000761.D
Sample Name: zz-2-61A

```
    ======================================================================
    Acq. Operator   : HFE-258
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 4/8/2018 4:10:16 PM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4 LC.M
    Last changed    : 4/8/2018 4:07:44 PM by HFE-258
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:23:46 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



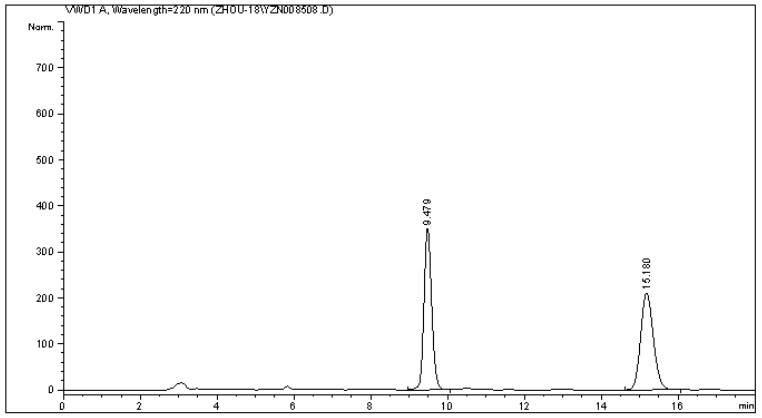

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  18.243 BB    0.4419  360.27094   12.62411   2.4091
       2  27.195 BB    0.6722 1.45943e4   337.69812  97.5909

    Totals :                  1.49546e4   350.32223

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



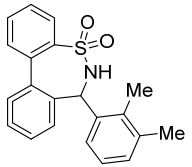
(+)-**3ak**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008508.D
Sample Name: zz-2-87(+-)

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 5/15/2018 9:02:40 AM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 5/15/2018 9:00:48 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:09:05 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220 nm
```



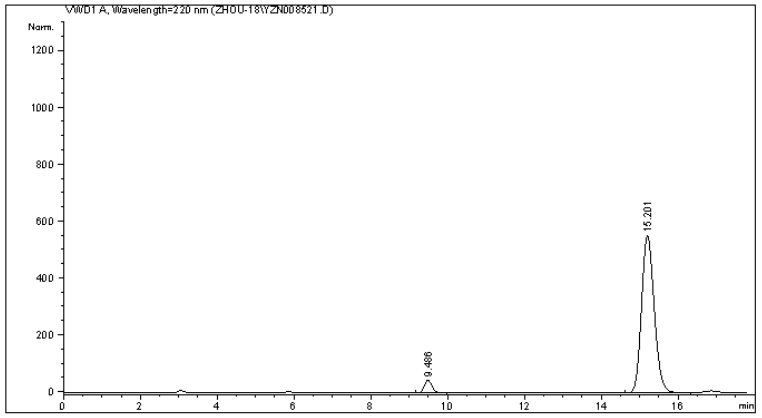

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.479 BB    0.2135 4896.93262  351.40527  50.2977
   2  15.180 BB    0.3562 4838.96924  211.11191  49.7023

Totals :                  9735.90186  562.51718

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



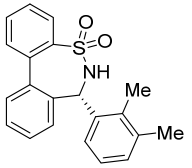
(+/-)-**3al**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008521.D
Sample Name: zz-2-87

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 5/15/2018 1:58:20 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 5/15/2018 1:57:48 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:11:22 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220 nm
```



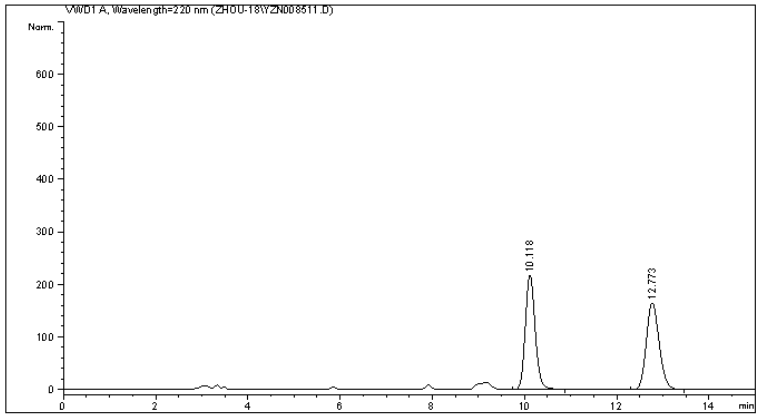

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1   9.486 BB    0.2102  607.35504   44.48985   4.5727
   2  15.201 BB    0.3562 1.26747e4   553.13171  95.4273

Totals :                  1.32821e4   597.62156

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



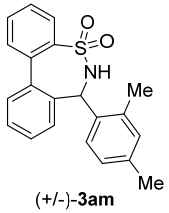
(+)-**3al**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008511.D
Sample Name: zz-2-89(+-)

```
==========================================================================
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 5/15/2018 10:09:31 AM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 5/15/2018 10:07:23 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:12:55 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220 nm
```



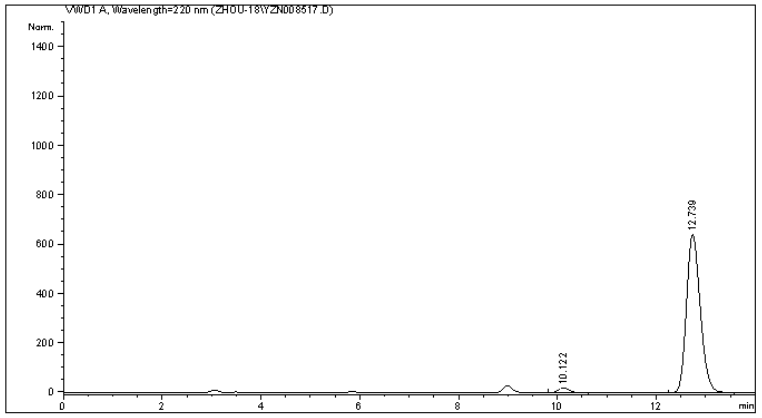

```
==========================================================================
                        Area Percent Report
==========================================================================

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  10.118 VB    0.2293 3250.50928  217.97568  50.3392
   2  12.773 BB    0.2999 3206.70776  165.76772  49.6608

Totals :                  6457.21704  383.74339

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



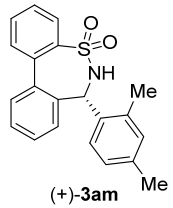
(+/-)-**3am**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008517.D
Sample Name: zz-2-89

```
==========================================================================
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 5/15/2018 12:42:23 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 5/15/2018 12:29:09 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:15:01 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220 nm
```



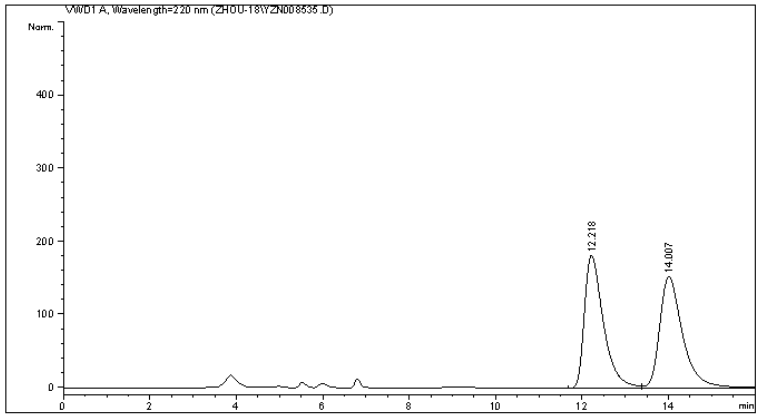

```
==========================================================================
                        Area Percent Report
==========================================================================

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  10.122 BB    0.2258  295.97800   20.25657   2.3356
   2  12.739 BB    0.2994 1.23767e4   641.25525  97.6644

Totals :                  1.26727e4   661.51182

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



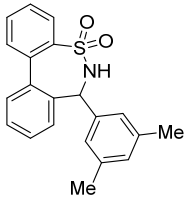
(+)-**3am**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008535.D
Sample Name: zz-2-91(+-)

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 5/16/2018 1:33:10 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 5/16/2018 1:32:30 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:16:43 AM
                  (modified after loading)
Sample Info     : OD-H, Hexane/i-PrOH = 80/20, 0.8 mL/min, 30 oC, 220 nm
```



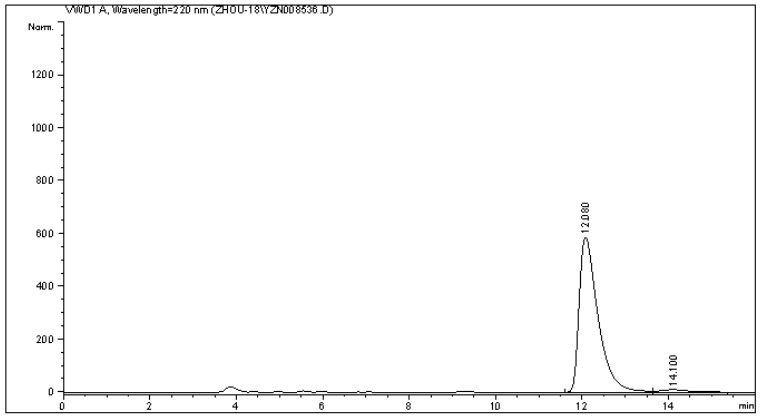

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.218 BV    0.4613 5556.32031  181.86340  49.7696
   2  14.007 VB    0.5564 5607.76709  152.23785  50.2304

Totals :                  1.1164le4   334.10126

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



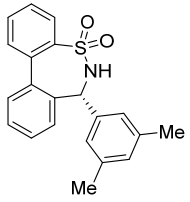
(+/-)-**3an**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008536.D
Sample Name: zz-2-91

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location : Vial 1
Injection Date  : 5/16/2018 1:53:46 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 5/16/2018 1:50:51 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:18:17 AM
                  (modified after loading)
Sample Info     : OD-H, Hexane/i-PrOH = 80/20, 0.8 mL/min, 30 oC, 220 nm
```



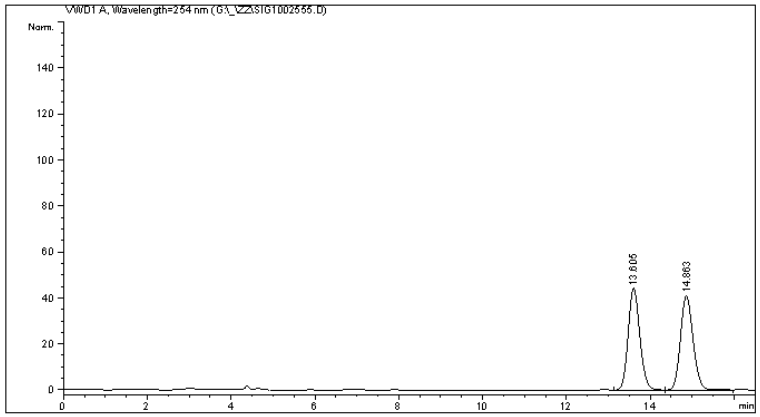

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.080 BV    0.4539 1.78074e4   587.76025  97.6556
   2  14.100 VB    0.6302  427.48941    9.87708   2.3444

Totals :                  1.82349e4   597.63733

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



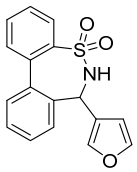
(+)-**3an**

Data File G:\ \ZZ\SIG1002555.D
Sample Name: zz-5-49(+-)

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                        Location : Vial 1
    Injection Date  : 2/22/2019 9:17:35 PM
                                                    Inj Volume : 5.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 2/22/2019 9:10:02 PM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 3/1/2019 7:23:22 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 254 n
                      m
```



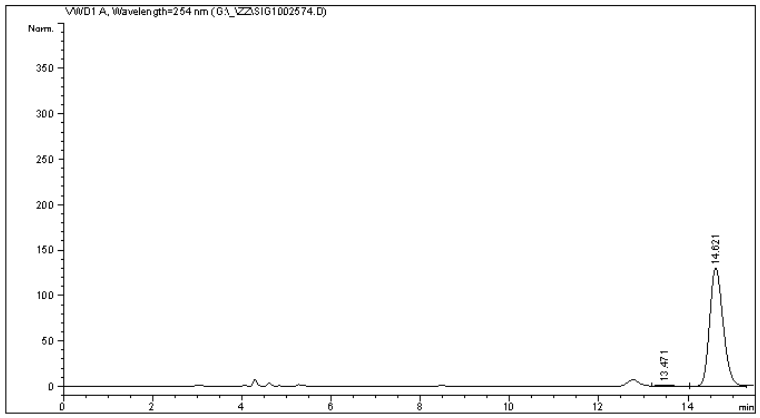

```
    ======================================================================
                               Area Percent Report
    ======================================================================

    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  13.605 VV    0.2983  859.40112   44.30006  49.8809
       2  14.863 VV    0.3254  863.50519   41.05014  50.1191

    Totals :                  1722.90631   85.35021

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



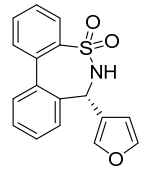
(+/-)-**3ao**

Data File G:\ \ZZ\SIG1002574.D
Sample Name: zz-5-54

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                        Location : Vial 1
    Injection Date  : 2/26/2019 10:54:30 AM
                                                    Inj Volume : 5.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 2/26/2019 10:30:13 AM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 3/1/2019 7:27:11 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/i-PrOH =80/20, 1.0 mL/min, 30 oC, 254 nm
```



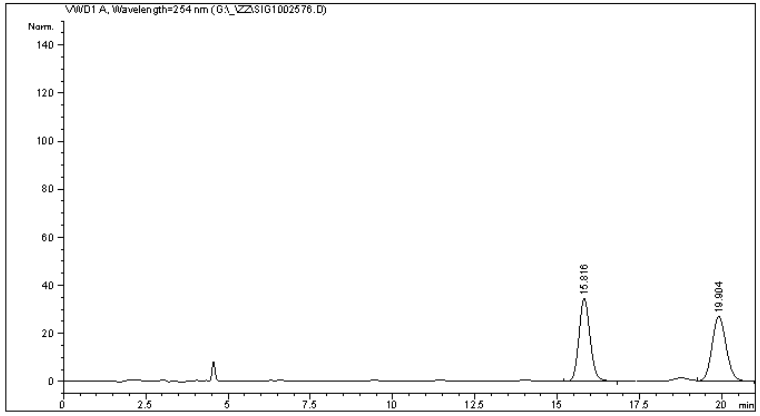

```
    ======================================================================
                               Area Percent Report
    ======================================================================

    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  13.471 VV    0.3159   33.24145    1.59020   1.2072
       2  14.621 VV    0.3245 2720.28979  129.78143  98.7928

    Totals :                  2753.53124  131.37163

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



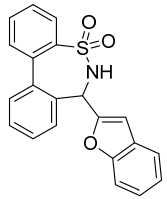
(+)-**3ao**

Data File G:\ \ZZ\SIG1002576.D
Sample Name: zz-5-55(+-)

```
==================================================================
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 1
Injection Date  : 2/26/2019 3:26:09 PM
                                              Inj Volume : 5.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 2/26/2019 3:24:22 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 3/1/2019 7:29:32 PM
                  (modified after loading)
Sample Info     : AD-H, n-hexane/i-PrOH =80/20, 1.0 mL/min, 30 oC, 254 nm
```



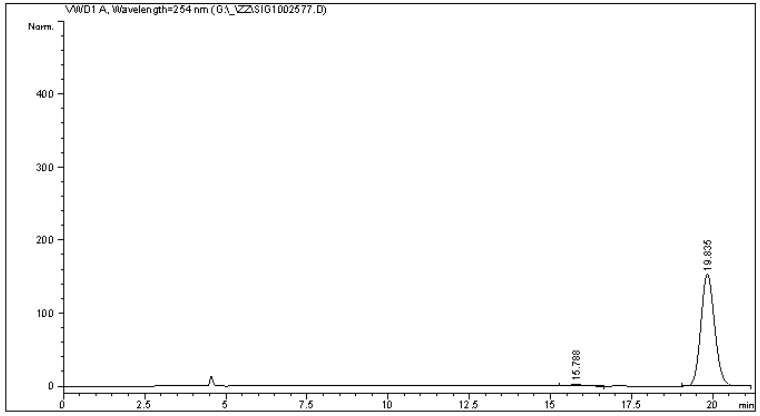

```
==================================================================
                      Area Percent Report
==================================================================

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  15.816 BV    0.3632  810.62933   34.36010  50.2031
   2  19.904 VV    0.4587  804.07184   27.05803  49.7969

Totals :                  1614.70117   61.41812

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



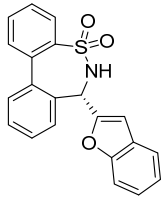
(+/-)-**3ap**

Data File G:\ \ZZ\SIG1002577.D
Sample Name: zz-5-55

```
==================================================================
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 1
Injection Date  : 2/26/2019 3:56:48 PM
                                              Inj Volume : 5.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 2/26/2019 3:47:33 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 3/1/2019 7:31:56 PM
                  (modified after loading)
Sample Info     : AD-H, n-hexane/i-PrOH =80/20, 1.0 mL/min, 30 oC, 254 nm
```



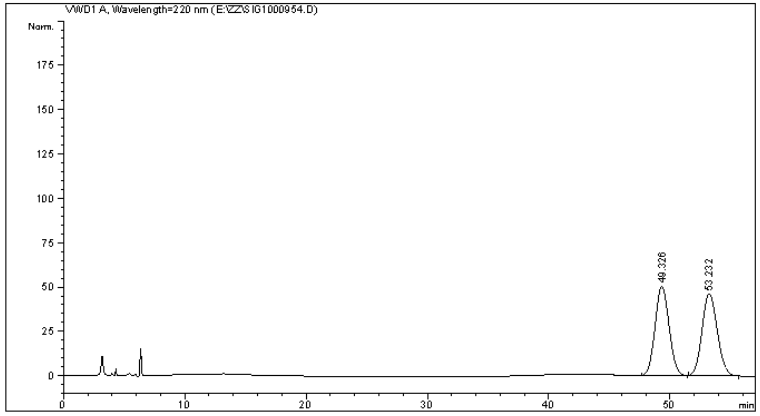

```
==================================================================
                      Area Percent Report
==================================================================

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  15.788 BB    0.3691   61.31554    2.58133   1.3448
   2  19.835 BBA   0.4549 4498.02295  153.03374  98.6552

Totals :                  4559.33849  155.61507

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



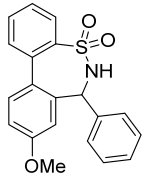
(+)-**3ap**

Data File E:\ZZ\SIG1000954.D
Sample Name: zz-2-97(+-)

```
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 91
Injection Date  : 5/9/2018 12:10:52 PM
                                                Inj Volume : 2.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
Last changed    : 5/9/2018 11:35:13 AM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/19/2018 9:38:47 PM
                  (modified after loading)
Sample Info     : IC, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220 nm
```



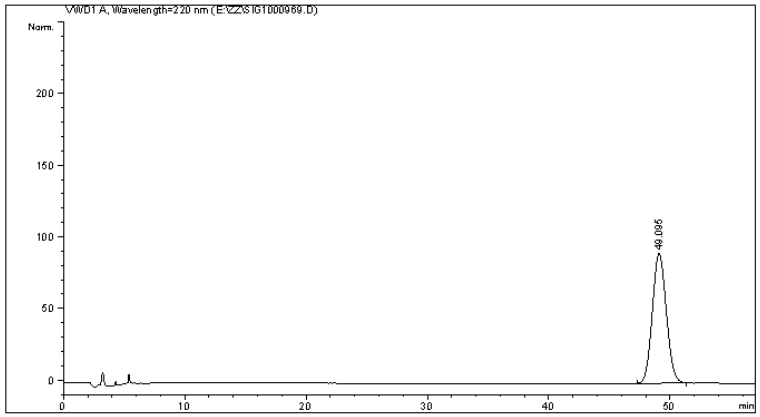

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  49.326 BB    1.2533 4067.06982   50.51767  49.9893
   2  53.232 BB    1.3803 4068.80591   46.38844  50.0107

Totals :                  8135.87573   96.90611

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



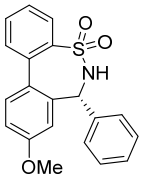
(+/-)-**3ba**

Data File E:\ZZ\SIG1000969.D
Sample Name: zz-2-97

```
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 91
Injection Date  : 5/10/2018 7:16:33 PM
                                                Inj Volume : 2.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
Last changed    : 5/10/2018 7:15:13 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/19/2018 9:40:20 PM
                  (modified after loading)
Sample Info     : IC, n-hexane / i-PrOH = 80/20 , 1.0 mL/min, 30 oC, 220
                  nm
```



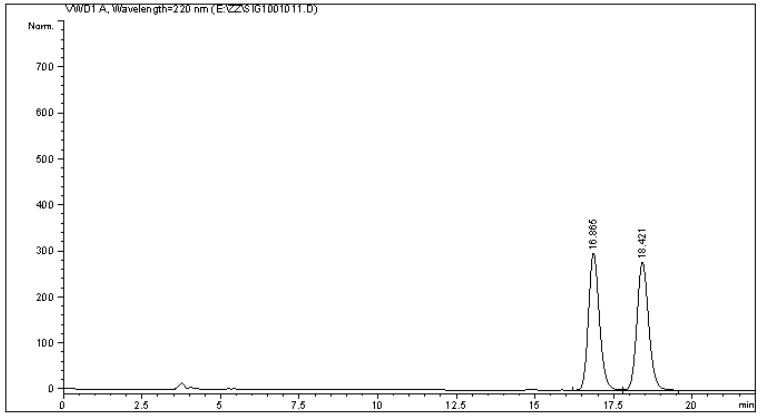

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  49.095 BB    1.2422 7254.51904   90.69852 100.0000

Totals :                  7254.51904   90.69852

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



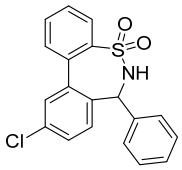
(-)-**3ba**

Data File E:\ZZ\SIG1001011.D
Sample Name: zz-3-9(+-)

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                         Location : Vial 91
    Injection Date  : 5/14/2018 10:20:38 PM
                                                     Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
    Last changed    : 5/14/2018 10:15:26 PM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:41:12 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane / i-PrOH = 80/20 , 0.8mL/min, 30 oC, 220
                      nm
```



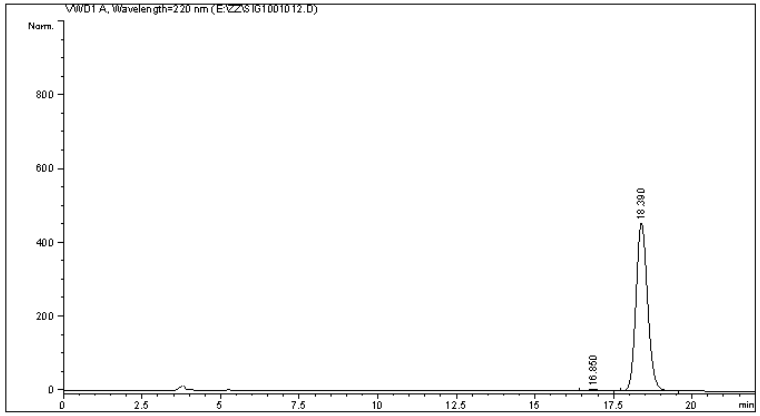

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  16.865 VV    0.3716 7184.28418  297.60495  49.9403
       2  18.421 VB    0.3993 7201.46191  277.90320  50.0597

    Totals :                  1.43857e4   575.50815

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



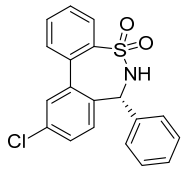
(+/-)-**3ca**

Data File E:\ZZ\SIG1001012.D
Sample Name: zz-3-9

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                         Location : Vial 91
    Injection Date  : 5/14/2018 10:54:58 PM
                                                     Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
    Last changed    : 5/14/2018 10:49:50 PM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:42:22 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane / i-PrOH = 80/20 , 0.8mL/min, 30 oC, 220
                      nm
```



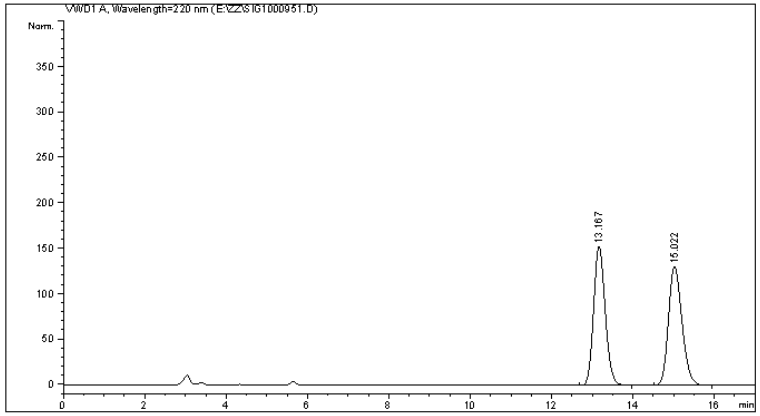

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  16.850 BB    0.3681  119.02818    4.95856   1.0060
       2  18.390 BB    0.3969 1.17133e4   455.73901  98.9940

    Totals :                  1.18323e4   460.69758

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



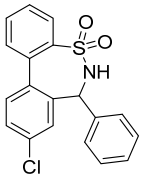
(+)-**3ca**

Data File E:\ZZ\SIG1000951.D
Sample Name: zz-2-98(+-)

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 5/9/2018 10:03:25 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
    Last changed    : 5/9/2018 10:02:33 AM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:34:27 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



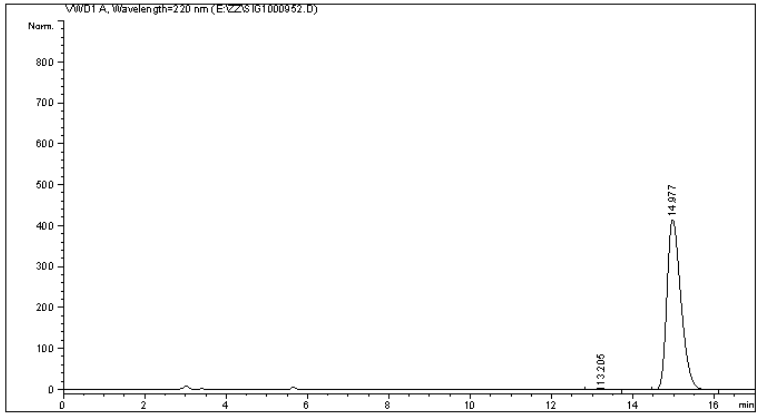

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.167 BB    0.3059 3025.71704  152.87488  49.9755
       2  15.022 BB    0.3601 3028.68823  130.32420  50.0245

    Totals :                  6054.40527  283.19908

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



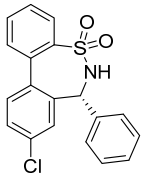
(+/-)-**3da**

Data File E:\ZZ\SIG1000952.D
Sample Name: zz-2-98

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                        Location : Vial 91
    Injection Date  : 5/9/2018 10:31:46 AM
                                                    Inj Volume : 2.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\FM-4-4_LC.M
    Last changed    : 5/9/2018 10:29:10 AM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 8/19/2018 9:36:04 PM
                      (modified after loading)
    Sample Info     : AD-H, n-hexane/ i-PrOH = 80/20, 1.0 mL/min, 30 oC, 220
                      nm
```



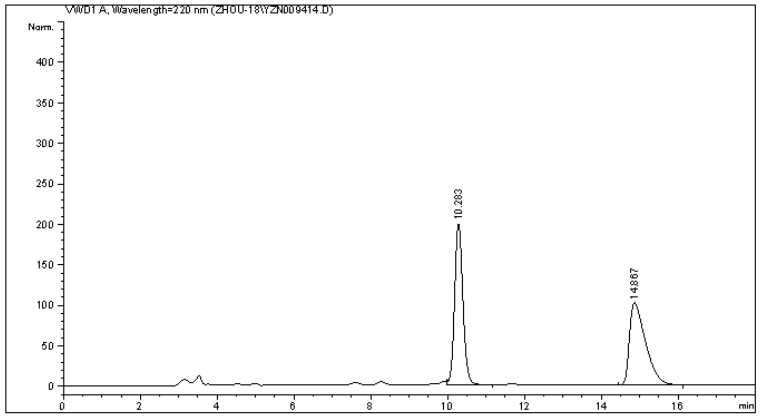

```
    ======================================================================
                               Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=220 nm

    Peak RetTime Type  Width     Area      Height     Area
      #  [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.205 BB    0.3089   70.28666    3.50581   0.7021
       2  14.977 BB    0.3686 9941.12891  416.31915  99.2979

    Totals :                  1.00114e4   419.82496

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



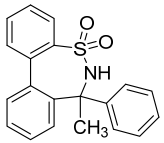
(-)-**3da**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN009414.D
Sample Name: zz-3-52(+-)

```
======================================================================
Acq. Operator   :
Acq. Instrument : Instrument 1                  Location :   -
Injection Date  : 7/20/2018 10:09:33 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 7/20/2018 9:54:07 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 8/20/2018 11:32:49 AM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH =80/20, 1.0 mL/min, 30 oC, 220 nm
```



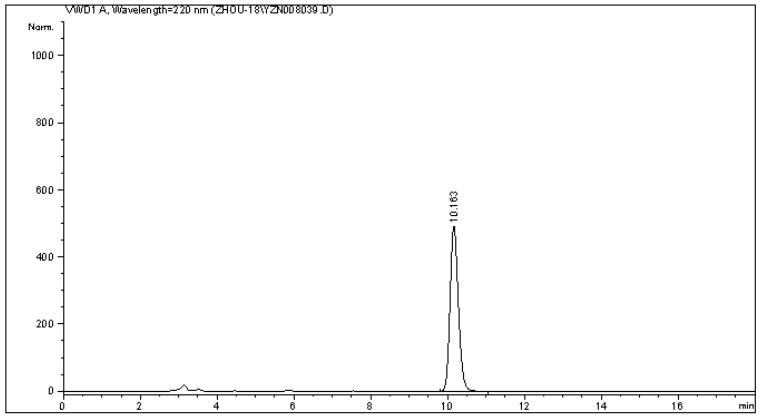

```
======================================================================
                        Area Percent Report
======================================================================

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  10.283 VB    0.2310 3006.07080  199.58835  50.4767
   2  14.867 BB    0.4363 2949.28784  101.57075  49.5233

Totals :                  5955.35864  301.15910

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



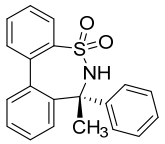
(+/-)-**3ea**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN008039.D
Sample Name: zz-2-48

```
======================================================================
Acq. Operator   :
Acq. Instrument : Instrument 1                  Location : Vial 1
Injection Date  : 3/28/2018 9:34:26 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC.M
Last changed    : 3/28/2018 9:22:11 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 11/7/2018 10:17:18 PM
                  (modified after loading)
Sample Info     : AD-H, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 220nm
```



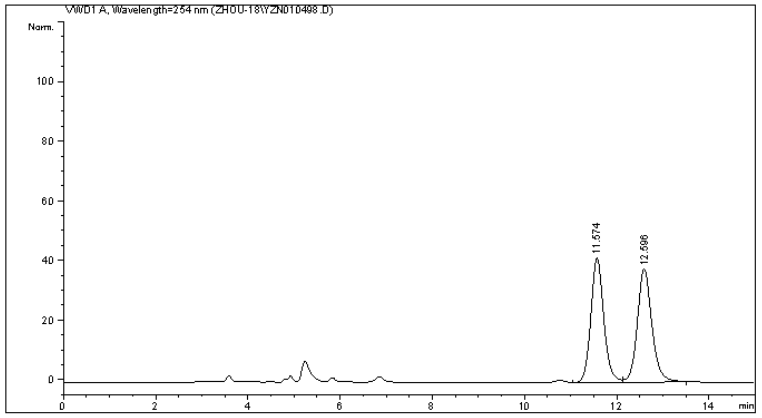

```
======================================================================
                        Area Percent Report
======================================================================

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


Signal 1: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  10.163 BB    0.2314 7374.13086  492.79382 100.0000

Totals :                  7374.13086  492.79382

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



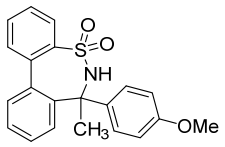
(+)-**3ea**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN010498.D
Sample Name: zz-4-49A(+-)

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location :   -
Injection Date  : 10/19/2018 1:35:12 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 10/19/2018 1:33:49 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 11/6/2018 2:26:03 PM
                  (modified after loading)
Sample Info     : IA, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 254 nm
```



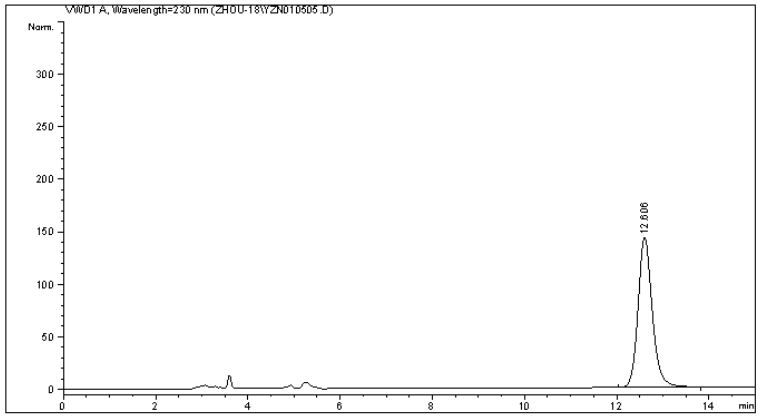

```
                          Area Percent Report

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  11.574 VV    0.2973  814.47351   41.77811  49.3550
   2  12.596 VB    0.3324  835.76007   37.99205  50.6450

Totals :                  1650.23358   79.77017

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



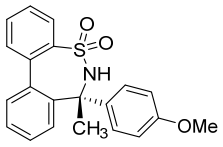
(+/-)-**3eb**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN010505.D
Sample Name: zz-4-49A

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location :   -
Injection Date  : 10/19/2018 7:51:53 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 10/19/2018 7:38:33 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 11/6/2018 2:28:25 PM
                  (modified after loading)
Sample Info     : IA, Hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 254 nm
```



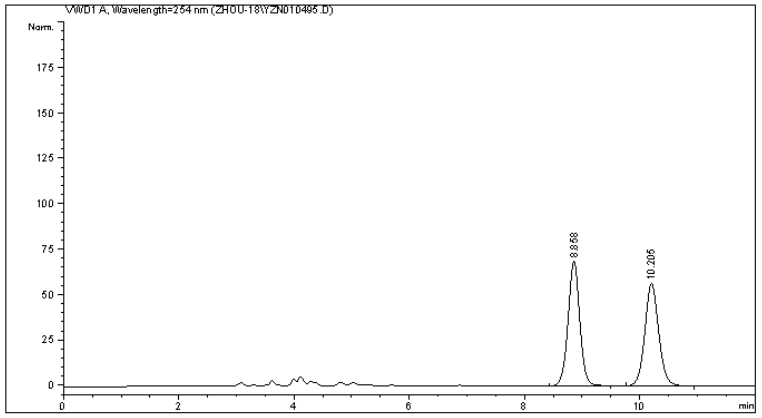

```
                          Area Percent Report

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


Signal 1: VWD1 A, Wavelength=230 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]      [min]  mAU   *s   [mAU   ]      %
----|-------|----|-------|----------|----------|--------|
   1  12.606 BB    0.3254 3083.32446  143.26038 100.0000

Totals :                  3083.32446  143.26038

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



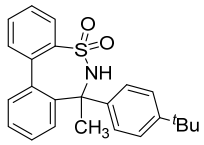
(+)-**3eb**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN010495.D
Sample Name: zz-4-49B(+-)

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location :   -
Injection Date  : 10/19/2018 12:47:00 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 10/19/2018 12:44:58 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 11/6/2018 2:30:01 PM
                  (modified after loading)
Sample Info     : IA, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 254 nm
```



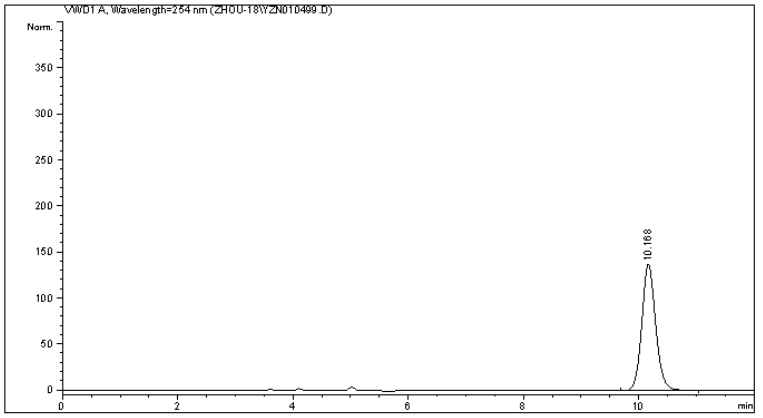

```
                          Area Percent Report

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   8.858 BB    0.2169  977.57111   68.73567  50.8132
   2  10.205 BB    0.2553  946.28217   56.43370  49.1868

Totals :                  1923.85327  125.16938

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



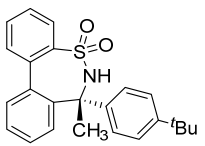
(+/-)-**3ec**

Data File C:\CHEM32\1\DATA\ZHOU-18\YZN010499.D
Sample Name: zz-4-49B

```
Acq. Operator   :
Acq. Instrument : Instrument 1                    Location :   -
Injection Date  : 10/19/2018 1:51:33 PM
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 10/19/2018 1:50:25 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 11/6/2018 2:31:20 PM
                  (modified after loading)
Sample Info     : IA, Hexane/i-PrOH = 80/20, 1.0mL/min, 30 oC, 254 nm
```



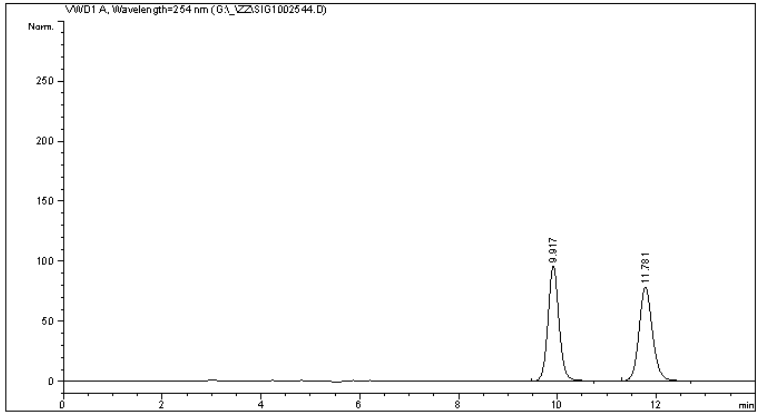

```
                          Area Percent Report

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  10.168 BB    0.2554 2310.54150  137.76035 100.0000

Totals :                  2310.54150  137.76035

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



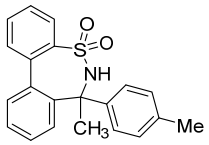
(+)-**3ec**

Data File G:\ \ZZ\SIG1002544.D
Sample Name: zz-5-48A(+-)

```
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 1
Injection Date  : 2/21/2019 8:14:21 PM
                                                Inj Volume : 5.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 2/21/2019 8:01:04 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 3/1/2019 7:11:01 PM
                  (modified after loading)
Sample Info     : IA, n-hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 254 nm
```



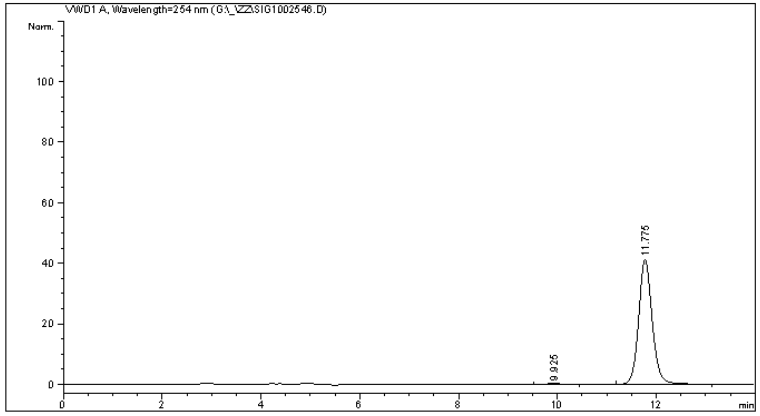

```
                        Area Percent Report

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   9.917 BB    0.2380 1497.90271   96.01641  50.2076
   2  11.781 BB    0.2893 1485.51697   78.32873  49.7924

Totals :                  2983.41968  174.34514


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



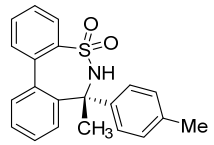
(+/-)-**3ed**

Data File G:\ \ZZ\SIG1002546.D
Sample Name: zz-5-48A

```
Acq. Operator   :
Acq. Instrument : 仪器 1                        Location : Vial 1
Injection Date  : 2/21/2019 8:47:53 PM
                                                Inj Volume : 5.000 µl
Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 2/21/2019 8:45:51 PM
                  (modified after loading)
Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
Last changed    : 3/1/2019 7:13:17 PM
                  (modified after loading)
Sample Info     : IA, n-hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 254 nm
```



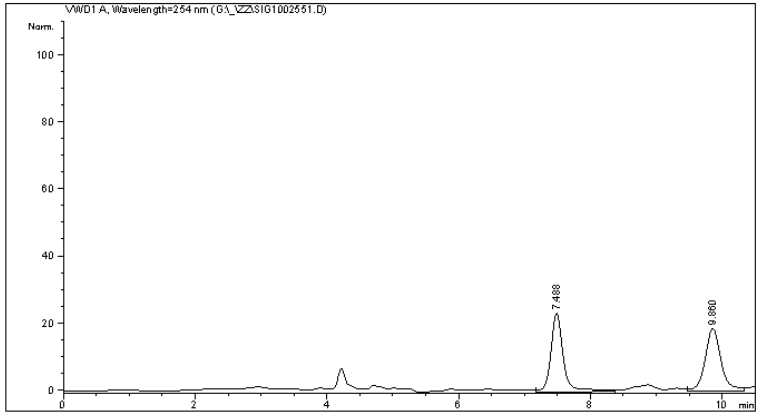

```
                        Area Percent Report

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   9.925 VB    0.2584    5.34911 3.08403e-1   0.6752
   2  11.775 BB    0.2906  786.92102   41.24401  99.3248

Totals :                   792.27013   41.55241


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



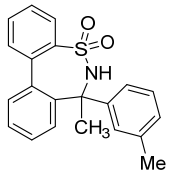
(+)-**3ed**

Data File G:\ \ZZ\SIG1002551.D
Sample Name: zz-5-48B(+-)

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                        Location : Vial 1
    Injection Date  : 2/22/2019 3:53:50 PM
                                                    Inj Volume : 5.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 2/22/2019 3:51:10 PM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 3/1/2019 7:16:47 PM
                      (modified after loading)
    Sample Info     : IA, n-hexane/i-PrOH = 80/20, 1.0 mL/min, 30 oC, 254 nm
```



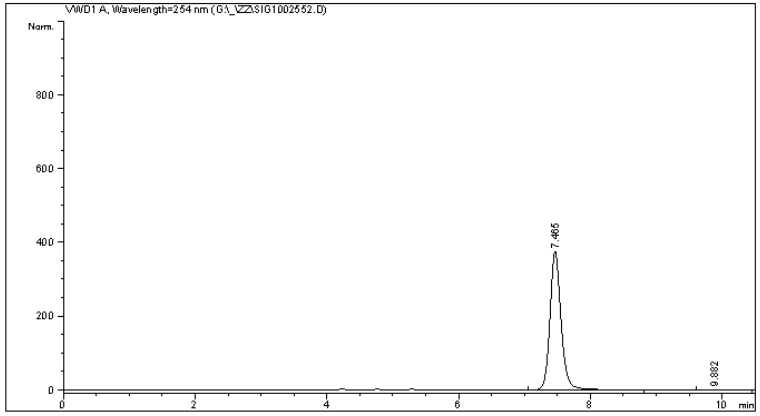

```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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   7.488 VV    0.1973  312.04053   23.43923  49.9383
       2   9.860 VV    0.2518  312.81171   18.63601  50.0617

    Totals :                    624.85223   42.07524

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



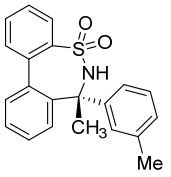
(+/-)-**3ee**

Data File G:\ \ZZ\SIG1002552.D
Sample Name: zz-5-48B

```
    ======================================================================
    Acq. Operator   :
    Acq. Instrument : 仪器 1                        Location : Vial 1
    Injection Date  : 2/22/2019 4:19:11 PM
                                                    Inj Volume : 5.000 µl
    Acq. Method     : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 2/22/2019 4:04:57 PM
                      (modified after loading)
    Analysis Method : C:\CHEM32\1\METHODS\DEF_LC11.M
    Last changed    : 3/1/2019 7:18:22 PM
                      (modified after loading)
    Sample Info     : IA, n-hexane/i-PrOH = 80/20, 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   7.465 VB    0.1764 4388.61963  375.36118  99.8846
       2   9.882 BB    0.2327    5.07140 3.38640e-1   0.1154

    Totals :                   4393.69103  375.69982

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



(+)-**3ee**