

Chirality Memory of α -Methylene- π -allyl Iridium Species

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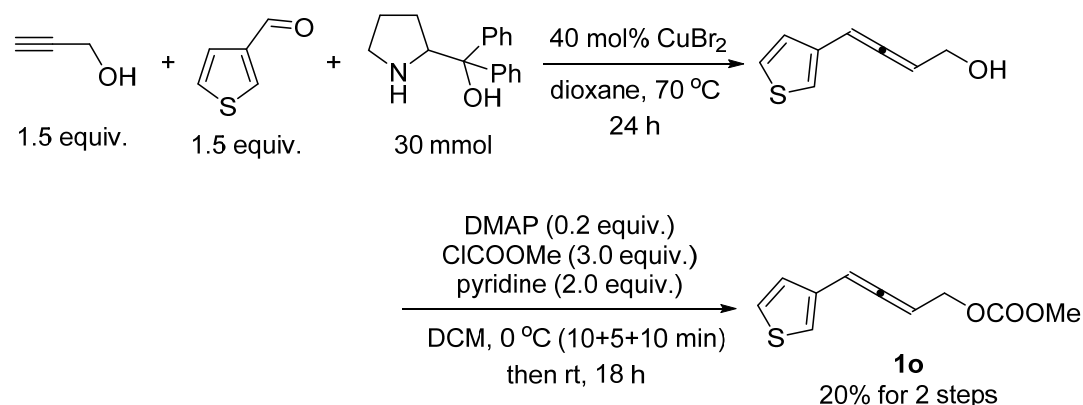
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General Information: NMR spectra were recorded on Agilent, Varian Mercury, or Bruker NMR spectrometer (^1H at 400 MHz or 500 MHz, ^{13}C at 100 MHz or 126 MHz, ^{19}F at 376 MHz). Tetramethylsilane (TMS) was used as the internal standard for the ^1H NMR analysis; ^{13}C NMR experiments were measured in relative to the signal of CDCl_3 (77.00 ppm); ^{19}F NMR chemical shifts were referred to an internal CFCl_3 standard. $[\text{Ir}(\text{COD})\text{Cl}]_2$ (98%) was purchased from J&K Chemical LTD and kept in a glove box. THF and dioxane were dried over sodium wire with benzophenone as the indicator and distilled freshly before use. DCM was dried over CaH_2 and distilled freshly before use. Other reagents were used as received without further treatment unless noted otherwise. All the temperatures are referred to the oil baths used. 2,3-Allenyl carbonates **1a**,^[1] **1b**,^[2] **1c-1f**,^[1] **1g-1m**,^[3] **1q**,^[4] **1t**^[1] and **1u**^[4] were synthesized according to the reported procedures.

1. Synthesis of racemic 2,3-alkadienyl carbonates

(1) Synthesis of methyl 4-(thiophen-3-yl)buta-2,3-dienyl carbonate (**1o**) (zwf-6-168)

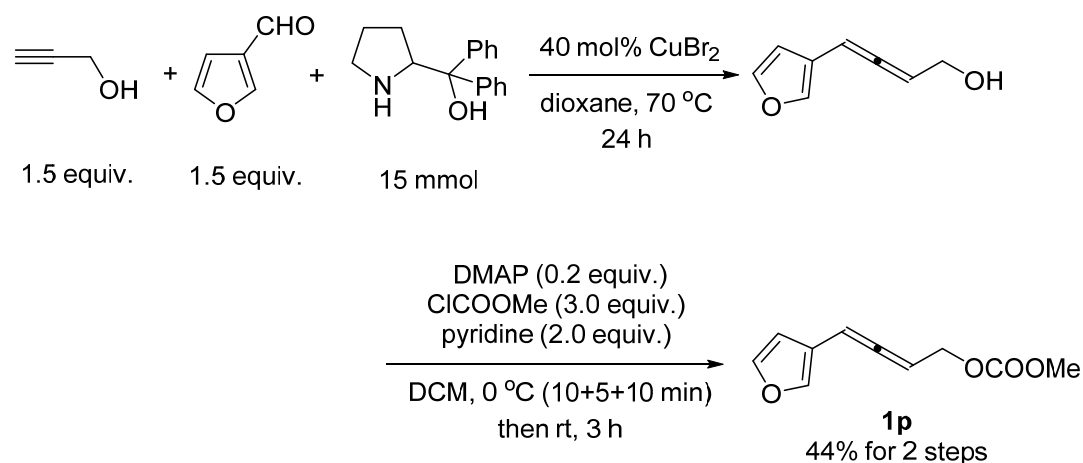


To an oven-dried Schlenk tube (100 mL) with a polytetrafluoroethylene plug were added α,α -diphenylprolinol (7.6000 g, 30 mmol) and CuBr_2 (2.6806 g, 12 mmol). After replacing air with argon for three times at room temperature by vacuum, 3-thiophenecarboxaldehyde (3.94 mL, $d = 1.28\text{ g/mL}$, 5.0468 g, 45 mmol), propargyl alcohol (2.59 mL, $d = 0.963\text{ g/mL}$, 2.4942 g, 45 mmol), and dioxane (60 mL) were added sequentially. The Schlenk tube was then sealed by screwing the polytetrafluoroethylene plug tightly. After being vigorously stirred in an oil bath preheated at $70\text{ }^\circ\text{C}$ for 24 h, the reaction was complete as monitored by TLC. The resulting mixture was diluted with ethyl ether (100 mL) and washed with an aqueous solution of hydrochloric acid (2 M, 100 mL). The organic layer was separated and the aqueous layer was extracted with ethyl ether ($3 \times 100\text{ mL}$). The combined organic layer was washed with brine (100 mL) and dried over anhydrous Na_2SO_4 . After removal of the solvent under vacuum, the residue was purified by flash chromatography on silica gel to afford 4-(thiophen-3-yl)buta-2,3-dienol (1.9871 g) (eluent: petroleum ether ($60\text{--}90\text{ }^\circ\text{C}$)/ethyl acetate = 10/1 (990 mL) to 5/1 (720 mL)) as an oil, which was used in the next step without further purification.

Typical Procedure I: To a flame-dried round bottle flask (50 mL) were added DMAP (317.5 mg, 2.6 mmol), 4-(thiophen-3-yl)buta-2,3-dienol (1.9786 g, 13 mmol), pyridine (2.1 mL, $d = 0.98\text{ g/mL}$, 2.0566 g, 26 mmol), and DCM (26 mL) sequentially. The resulting mixture was stirred at $0\text{ }^\circ\text{C}$ for 10 min and then methyl chloroformate (3.0 mL, $d = 1.23\text{ g/mL}$, 3.7 g, 39 mmol) was added dropwise via a syringe within 5 min at $0\text{ }^\circ\text{C}$.

After the addition, the resulting mixture was stirred at this temperature for 10 min, removed from the cooling bath, allowed to warm up to room temperature gradually, and stirred at room temperature for 18 h. After the reaction was complete as monitored by TLC, the resulting mixture was quenched with an aqueous solution of hydrochloric acid (2 M, 26 mL), extracted with DCM (3 × 26 mL), washed with brine, and dried over anhydrous Na₂SO₄. After filtration, evaporation of the solvent and chromatography on silica gel (eluent: petroleum ether (60-90 °C)/ethyl acetate = 10/1 (440 mL) to 8/1 (450 mL)) afforded **1o** (1.2573 g, 20% for 2 steps) as an oil: ¹H NMR (400 MHz, CDCl₃): δ = 7.26 (dd, *J* = 4.8, 3.2 Hz, 1 H, ArH), 7.14-7.08 (m, 1 H, ArH), 7.06 (d, *J* = 4.8 Hz, 1 H, ArH), 6.45-6.27 (m, 1 H, =CH), 5.67 (q, *J* = 6.5 Hz, 1 H, =CH), 4.77-4.63 (m, 2 H, OCH₂), 3.77 (s, 3 H, OCH₃); ¹³C NMR (100 MHz, CDCl₃): δ = 206.9, 155.4, 134.2, 126.2, 126.0, 121.6, 91.2, 89.8, 65.2, 54.7; IR (neat) ν = 2956, 1955, 1743, 1440, 1248 cm⁻¹; MS (EI) *m/z* (%) 210 (M⁺, 17.82), 134 (100); HRMS Calcd. for C₁₀H₁₀O₃S [M⁺]: 210.0345. Found: 210.0352.

(2) Synthesis of methyl 4-(fur-3-yl)buta-2,3-dienyl carbonate (**1p**) (QAN-5-71)



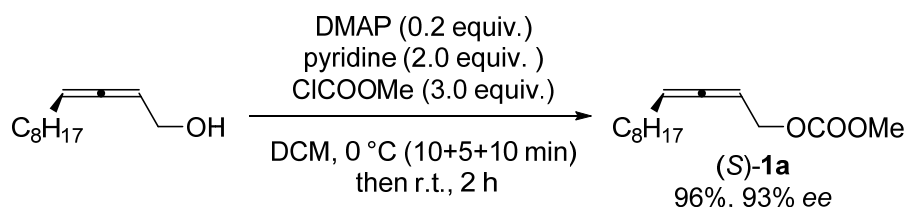
To an oven-dried Schlenk tube (100 mL) with a polytetrafluoroethylene plug were added α,α-diphenylprolinol (7.6003 g, 30 mmol) and CuBr₂ (2.6804 g, 12 mmol). After replacing air with argon for three times at room temperature by vacuum, 3-furancarboxaldehyde (3.8 mL, d = 1.16 g/mL, 4.41 g, 45 mmol), propargyl alcohol (2.6 mL, d = 0.963 g/mL, 2.5038 g, 45 mmol), and dioxane (60 mL) were added sequentially. The Schlenk tube was then sealed by screwing the polytetrafluoroethylene plug tightly.

After being vigorously stirred in an oil bath preheated at 70 °C for 24 h, the reaction was complete as monitored by TLC. The resulting mixture was diluted with ethyl ether (100 mL) and washed with an aqueous solution of hydrochloric acid (2 M, 100 mL). The organic layer was separated and the aqueous layer was extracted with ethyl ether (3 × 100 mL). The combined organic layer was washed with brine (100 mL) and dried over anhydrous Na₂SO₄. After removal of the solvent under vacuum, the residue was purified by flash chromatography on silica gel to afford 4-(fur-3-yl)buta-2,3-dienol (2.3501 g) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 10/1 (990 mL) to 5/1 (720 mL)) as an oil, which was used in the next step without further purification.

Following **Typical Procedure I**, the reaction of DMAP (391.2 mg, 3.2 mmol), 4-(fur-3-yl)buta-2,3-dienol (2178.4 mg, 16 mmol), pyridine (2.6 mL, d = 0.983 g/mL, 2531.2 mg, 32 mmol), and methyl chloroformate (3.7 mL, d = 1.223 g/mL, 4536.0 mg, 48 mmol) in DCM (32 mL) afforded **1p** as an oil (2.5423 g, 44% for two steps) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 10/1 (440 mL) to 8/1 (450 mL)): ¹H NMR (400 MHz, CDCl₃) δ 7.41 (s, 1 H, ArH), 7.37 (s, 1 H, ArH), 6.39 (s, 1 H, =CH), 6.23 (dd, *J* = 6.8, 2.4 Hz, 1 H, =CH), 5.70-5.54 (m, 1 H, CH), 4.77-4.59 (m, 2 H, OCH₂), 3.79 (d, *J* = 2.8 Hz, 3 H, OCH₃); ¹³C NMR (100 MHz, CDCl₃) δ 206.5, 155.5, 143.5, 139.8, 118.9, 108.8, 89.7, 86.9, 65.3, 54.8; IR (neat) ν = 2958, 1957, 1744, 1590, 1509, 1442, 1250, 1155 cm⁻¹; MS (EI) *m/z* (%) 194 (M⁺, 44.7), 77 (100); HRMS Calcd for C₁₀H₁₀O₄ (M⁺): 194.0574. Found: 194.0571.

2. Synthesis of optically active methyl 2,3-dienyl carbonates

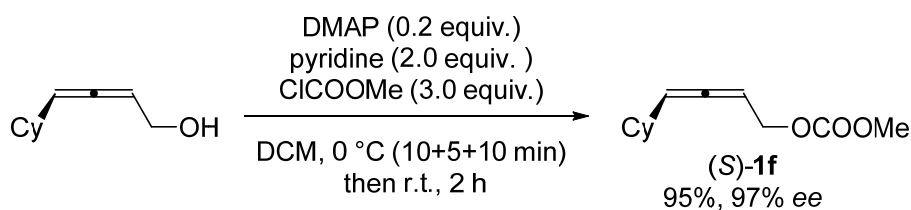
(1) Synthesis of (S)-methyl dodeca-2,3-dienyl carbonate ((S)-**1a**) (cyf-4-101)



Following **Typical Procedure I**, the reaction of DMAP (247.5 mg, 2.0 mmol), (S)-dodeca-2,3-dienol (1.8221 g, 10.0 mmol),^[5] pyridine (1.61 mL, d = 0.98 g/mL, 1.58 g, 20.0 mmol), and methyl chloroformate (2.30 mL, d = 1.23 g/mL, 2.83 g, 30.0 mmol) in

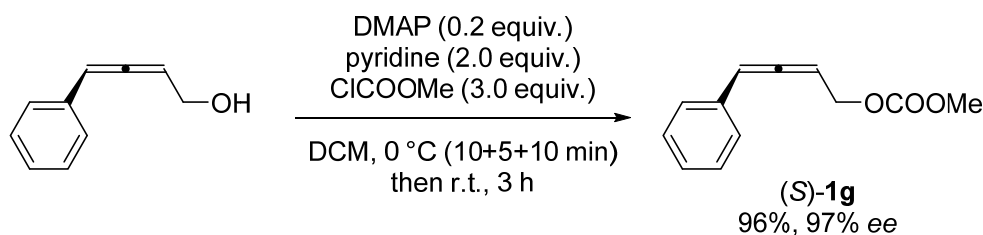
DCM (20 mL) afforded (*S*)-**1a** (2.3070 g, 96%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: 93% ee (HPLC conditions: OD-H column, hexane/*i*-PrOH = 400/1, 0.7 mL/min, λ = 214 nm, t_R (major) = 10.1 min, t_R (minor) = 11.3 min); $[\alpha]_D^{28}$ = +43.5 (c = 0.95, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 5.32-5.23 (m, 2 H, 2 $\times$ =CH), 4.63-4.57 (m, 2 H, OCH₂), 3.79 (s, 3 H, OCH₃), 2.06-1.97 (m, 2 H, CH₂), 1.45-1.20 (m, 12 H, 6 $\times$ CH₂), 0.88 (t, J = 6.8 Hz, 3 H, CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 205.6, 155.5, 93.0, 86.3, 66.3, 54.6, 31.8, 29.3, 29.2, 29.0, 28.9, 28.2, 22.6, 14.0; MS (ESI) m/z 263 ([M+Na]⁺); IR (neat) ν = 2956, 2925, 2854, 1966, 1748, 1444, 1367, 1252, 1111 cm⁻¹; HRMS Calcd for C₁₄H₂₄O₃Na ([M+Na]⁺): 263.1618. Found: 263.1613.

(2) Synthesis of (*S*)-methyl 4-cyclohexylbuta-2,3-dienyl carbonate ((*S*)-**1f**) (cyf-4-122)



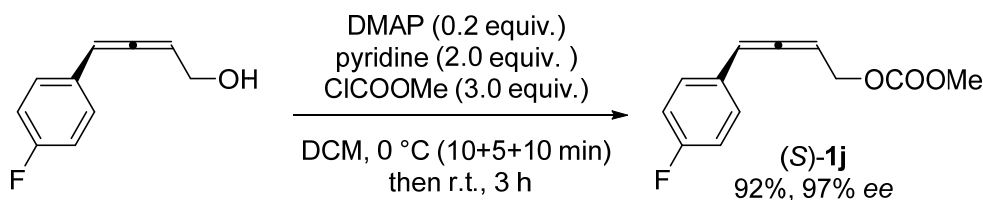
Following **Typical Procedure I**, the reaction of DMAP (246.5 mg, 2.0 mmol), (*S*)-4-cyclohexylbuta-2,3-dienol (1.5231 g, 10.0 mmol),^[5] pyridine (1.61 mL, d = 0.98 g/mL, 1.58 g, 20.0 mmol), and methyl chloroformate (2.30 mL, d = 1.23 g/mL, 2.82 g, 30.0 mmol) in DCM (20 mL) afforded (*S*)-**1f** (1.9977 g, 95%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: 97% ee (HPLC conditions: OD-H column, hexane, 1.0 mL/min, λ = 214 nm, t_R (major) = 12.3 min, t_R (minor) = 17.1 min); $[\alpha]_D^{25}$ = +67.2 (c = 0.98, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 5.35-5.24 (m, 2 H, 2 $\times$ =CH), 4.65-4.55 (m, 2 H, OCH₂), 3.79 (s, 3 H, OCH₃), 2.06-1.95 (m, 1 H, CH), 1.80-1.58 (m, 5 H, 2 $\times$ CH₂ and one proton of CH₂), 1.34-1.03 (m, 5 H, 2 $\times$ CH₂ and one proton of CH₂); ¹³C NMR (100 MHz, CDCl₃) δ 204.6, 155.5, 99.0, 87.3, 66.3, 54.6, 36.7, 32.7, 25.9, 25.8; MS (DART) m/z 228 ([M+NH₄]⁺); IR (neat) ν = 2923, 2851, 1964, 1746, 1446, 1368, 1247, 1128, 1108 cm⁻¹; HRMS calcd for C₁₂H₁₉O₃ ([M+H]⁺): 211.1329. Found: 211.1328.

(3) Synthesis of (S)-methyl 4-phenylbuta-2,3-dienyl carbonate ((S)-**1g**) (cyf-5-5)



Following **Typical Procedure I**, the reaction of DMAP (222.5 mg, 1.8 mmol), (S)-4-phenylbuta-2,3-dienol (1.3167 g, 9.0 mmol),^[5] pyridine (1.45 mL, d = 0.98 g/mL, 1.42 g, 18.0 mmol), and methyl chloroformate (2.07 mL, d = 1.23 g/mL, 2.55 g, 27.0 mmol) in DCM (18 mL) afforded (S)-**1f** (1.7645 g, 96%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1) as an oil: 97% ee (SFC conditions: OJ-3 column, CO₂/MeOH = 98/2, 1.0 mL/min, λ = 254 nm, *t_R*(major) = 4.0 min, *t_R*(minor) = 3.5 min); [α]_D²⁷ = +187.1 (c = 1.025, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.35-7.27 (m, 4 H, ArH), 7.25-7.18 (m, 1 H, ArH), 6.32 (dt, *J* = 6.0, 2.4 Hz, 1 H, =CH), 5.74 (q, *J* = 6.7 Hz, 1 H, =CH), 4.78-4.68 (m, 2 H, OCH₂), 3.78 (s, 3 H, OCH₃); ¹³C NMR (126 MHz, CDCl₃) δ 206.5, 155.4, 133.0, 128.5, 127.3, 126.9, 96.6, 90.6, 65.2, 54.7; MS (DART) *m/z* 222 ([M+NH₄]⁺); IR (neat) ν = 3031, 2956, 1954, 1744, 1597, 1495, 1443, 1366, 1249, 1120, 1074, 1026 cm⁻¹; HRMS calcd for C₁₂H₁₃O₃ ([M+H]⁺): 205.0859. Found: 205.0861.

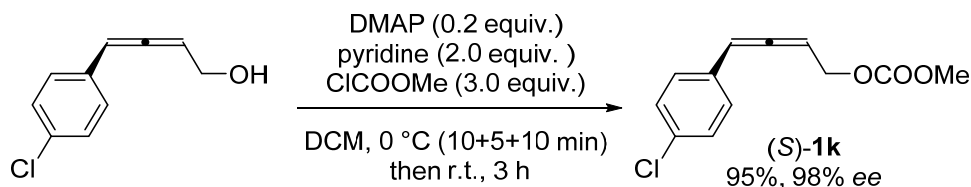
(4) Synthesis of (S)-methyl 4-(4-fluorophenyl)buta-2,3-dienyl carbonate ((S)-**1j**) (cyf-5-12, 4-14)



Following **Typical Procedure I**, the reaction of DMAP (443.8 mg, 3.6 mmol), (S)-4-(4-fluorophenyl)buta-2,3-dienol (2.9573 g, 18.0 mmol),^[5] pyridine (2.91 mL, d = 0.98 g/mL, 2.85 g, 36.0 mmol), and methyl chloroformate (4.15 mL, d = 1.23 g/mL, 5.10 g, 54.0 mmol) in DCM (36 mL) afforded (S)-**1j** (3.6781 g, 92%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: 97% ee (HPLC conditions: AD-H

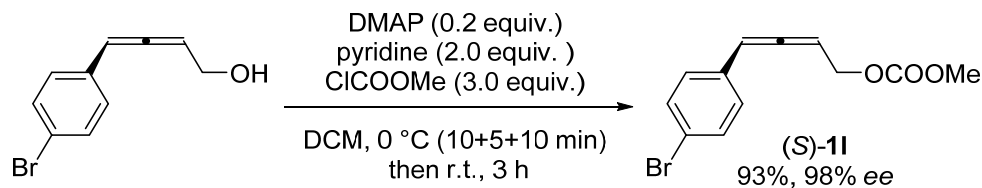
column, hexane/*i*-PrOH = 200/1, 1.0 mL/min, λ = 214 nm, t_R (major) = 12.4 min, t_R (minor) = 14.2 min); $[\alpha]_D^{27}$ = +163.4 (c = 0.975, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.29-7.23 (m, 2 H, ArH), 7.04-6.97 (m, 2 H, ArH), 6.29 (dt, J = 6.4, 2.4 Hz, 1 H, =CH), 5.74 (q, J = 6.5 Hz, 1 H, =CH), 4.78-4.67 (m, 2 H, OCH₂), 3.78 (s, 3 H, OCH₃); ¹³C NMR (100 MHz, CDCl₃) δ 206.2 (d, J = 2.3 Hz), 162.0 (d, J = 245.2 Hz), 155.4, 129.0 (d, J = 3.1 Hz), 128.3 (d, J = 8.4 Hz), 115.5 (d, J = 21.5 Hz), 95.6, 90.8, 64.9, 54.6; ¹⁹F NMR (376 MHz, CDCl₃) δ -115.0; MS (EI) m/z 222 (M^+ , 16.63), 146 (100); IR (neat) ν = 3001, 2958, 1954, 1745, 1602, 1507, 1442, 1398, 1366, 1253, 1223, 1156, 1119, 1094, 1014 cm⁻¹; HRMS calcd for C₁₂H₁₁O₃F (M^+): 222.0687. Found: 222.0682.

(5) Synthesis of (*S*)-methyl 4-(4-chlorophenyl)buta-2,3-dienyl carbonate ((*S*)-**1k**) (cyf-5-18)



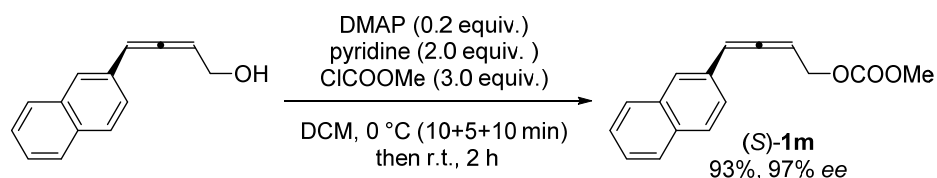
Following **Typical Procedure I**, the reaction of DMAP (371.0 mg, 3 mmol), (*S*)-4-(4-chlorophenyl)buta-2,3-dienyl (2.7120 g, 15.0 mmol),^[5] pyridine (2.42 mL, d = 0.98 g/mL, 2.37 g, 30.0 mmol), and methyl chloroformate (3.46 mL, d = 1.23 g/mL, 4.25 g, 45.0 mmol) in DCM (30 mL) afforded (*S*)-**1k** (3.4025 g, 95%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: 98% ee (HPLC conditions: IB column, hexane/*i*-PrOH = 400/1, 1.0 mL/min, λ = 254 nm, t_R (major) = 10.4 min, t_R (minor) = 9.9 min); $[\alpha]_D^{25}$ = +156.7 (c = 0.98, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.29-7.23 (m, 2 H, ArH), 7.23-7.17 (m, 2 H, ArH), 6.27 (dt, J = 6.4, 2.5 Hz, 1 H, =CH), 5.75 (q, J = 6.4 Hz, 1 H, =CH), 4.78-4.65 (m, 2 H, OCH₂), 3.77 (s, 3 H, OCH₃); ¹³C NMR (100 MHz, CDCl₃) δ 206.5, 155.4, 132.9, 131.6, 128.7, 128.1, 95.8, 91.0, 64.9, 54.8; MS (ESI) m/z 239 ($[M(^{35}\text{Cl})+H]^+$), 241 ($[M(^{37}\text{Cl})+H]^+$); IR (neat) ν = 3004, 2957, 1955, 1745, 1590, 1491, 1444, 1393, 1365, 1254, 1090, 1013 cm⁻¹; HRMS calcd for C₁₂H₁₂O₃³⁵Cl ($[M(^{35}\text{Cl})+H]^+$): 239.0469. Found: 239.0470.

(6) Synthesis of (S)-methyl 4-(4-bromophenyl)buta-2,3-dienyl carbonate ((S)-**1l**) (cyf-5-1)



Following **Typical Procedure I**, the reaction of DMAP (492.7 mg, 4 mmol), (S)-4-(4-bromophenyl)buta-2,3-dienol (4.5027 g, 20 mmol),^[5] pyridine (3.23 mL, d = 0.98 g/mL, 3.16 g, 40 mmol), and methyl chloroformate (4.61 mL, d = 1.23 g/mL, 5.67 g, 60 mmol) in DCM (40 mL) afforded (S)-**1l** (5.2733 g, 93%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: 98% ee (HPLC conditions: AD-H column, hexane/*i*-PrOH = 200/1, 1.0 mL/min, λ = 214 nm, t_R (major) = 12.8 min, t_R (minor) = 14.1 min); $[\alpha]_D^{27}$ = +159.2 (c = 1.015, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.40 (d, J = 8.4 Hz, 2 H, ArH), 7.13 (d, J = 8.4 Hz, 2 H, ArH), 6.25 (dt, J = 6.4, 2.4 Hz, 1 H, =CH), 5.73 (q, J = 6.5 Hz, 1 H, =CH), 4.78-4.66 (m, 2 H, OCH₂), 3.76 (s, 3 H, OCH₃); ¹³C NMR (100 MHz, CDCl₃) δ 206.4, 155.3, 132.0, 131.6, 128.4, 120.9, 95.8, 91.0, 64.7, 54.7; MS (EI) m/z 300 ([M (⁷⁹Br)+NH₄]⁺), 302 ([M (⁸¹Br)+NH₄]⁺); IR (neat) ν = 3002, 2956, 2854, 1955, 1744, 1586, 1487, 1442, 1393, 1364, 1253, 1104, 1069, 1009 cm⁻¹; HRMS calcd for C₁₂H₁₂O₃Br ([M (⁷⁹Br)+H]⁺): 282.9964. Found: 282.9965.

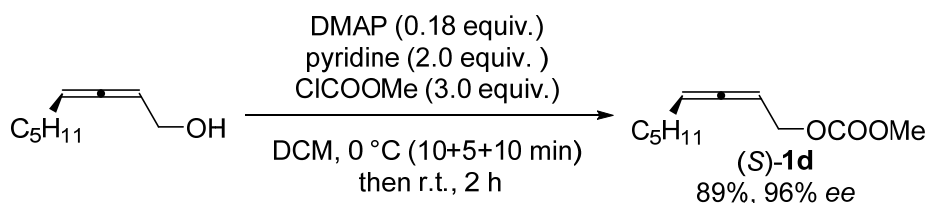
(7) Synthesis of (S)-methyl 4-(naphth-2-yl)buta-2,3-dienyl carbonate ((S)-**1m**) (cyf-4-89)



Following **Typical Procedure I**, the reaction of DMAP (371.3 mg, 3 mmol), (S)-4-(naphth-2-yl)buta-2,3-dienol (2.9445 g, 15.0 mmol),^[5] pyridine (2.42 mL, d = 0.98 g/mL, 2.37 g, 30.0 mmol), and methyl chloroformate (3.46 mL, d = 1.23 g/mL, 4.26 g, 45.0 mmol) in DCM (30 mL) afforded (S)-**1m** (3.5460 g, 93%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as a solid: 97% ee (HPLC conditions: AS-H column,

hexane/*i*-PrOH = 100/1, 1.0 mL/min, λ = 214 nm, t_R (major) = 8.1 min, t_R (minor) = 9.6 min); $[\alpha]_D^{26}$ = +181.2 (c = 0.995, CHCl₃); recrystallization in petroleum ether (30-60 °C)/ethyl acetate afforded (m.p. 74.1-75.0 °C, 97% ee); ¹H NMR (400 MHz, CDCl₃) δ 7.82-7.73 (m, 3 H, ArH), 7.66 (s, 1 H, ArH), 7.49 - 7.40 (m, 3 H, ArH), 6.49 (dt, J = 5.9, 2.0 Hz, 1 H, =CH), 5.81 (q, J = 6.5 Hz, 1 H, =CH), 4.83-4.72 (m, 2 H, OCH₂), 3.78 (s, 3 H, OCH₃); ¹³C NMR (100 MHz, CDCl₃) δ 207.1, 155.5, 133.5, 132.8, 130.6, 128.3, 127.71, 127.69, 126.3, 126.0, 125.8, 124.6, 97.1, 90.9, 65.3, 54.9; MS (EI) m/z (%) 254 (M^+ , 18.08), 178 (100); IR (neat) ν = 3055, 3008, 2961, 2853, 1949, 1734, 1625, 1594, 1504, 1438, 1368, 1339, 1257, 1240, 1128, 1108, 1060, 1019 cm⁻¹; Anal. Calcd for C₁₆H₁₄O₃: C 75.58, H 5.55. Found: C 75.77, H 5.81.

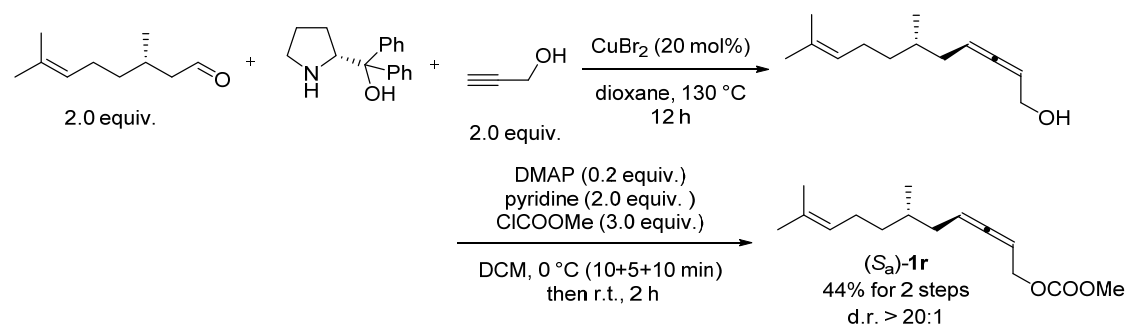
(8) Synthesis of (*S*)-methyl nona-2,3-dienyl carbonate ((*S*)-**1d**) (cyf-4-64)



Following **Typical Procedure I**, the reaction of DMAP (246.6 mg, 2.0 mmol), (*S*)-nona-2,3-dienol (1.5408 g, 11.0 mmol),^[5] pyridine (1.78 mL, d = 0.98 g/mL, 1.74 g, 22.0 mmol), and methyl chloroformate (2.54 mL, d = 1.23 g/mL, 3.12 g, 33.0 mmol) in DCM (22 mL) afforded (*S*)-**1d** (1.9384 g, 89%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: 96% ee (SFC conditions: OJ-3 column, CO₂/MeOH = 99/1, 1.0 mL/min, λ = 217 nm, t_R (major) = 4.7 min, t_R (minor) = 4.5 min); $[\alpha]_D^{27}$ = +54.0 (c = 1.065, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 5.32-5.23 (m, 2 H, 2×=CH), 4.63-4.57 (m, 2 H, OCH₂), 3.79 (s, 3 H, OCH₃), 2.06-1.97 (m, 2 H, CH₂), 1.46-1.36 (m, 2 H, CH₂), 1.36-1.24 (m, 4 H, 2×CH₂), 0.89 (t, J = 6.8 Hz, 3 H, CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 205.7, 155.6, 93.1, 86.4, 66.3, 54.7, 31.2, 28.6, 28.2, 22.4, 14.0; MS (DART) m/z 216 ($[M+\text{NH}_4]^+$); IR (neat) ν = 2927, 2858, 1966, 1748, 1446, 1368, 1251, 1142, 1109 cm⁻¹; HRMS calcd for C₁₁H₁₉O₃ ($[M+\text{H}]^+$): 199.1329. Found: 199.1328.

(9) Synthesis of (*S_a*,6*S*)-methyl 6,10-dimethylundeca-2,3,9-trienyl carbonate ((*S_a*)-**1r**)

(cyf-4-83, cyf-4-88)

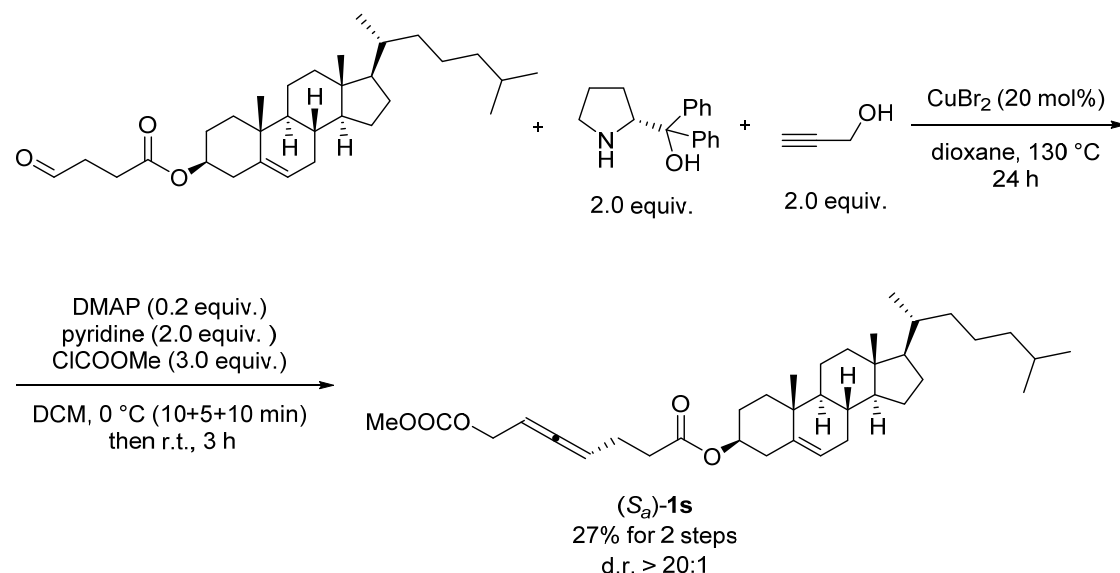


To a flame-dried round bottle flask (25 mL) with a reflux condenser were added CuBr_2 (451.5 mg, 2.0 mmol), (*R*)- α,α -diphenylprolinol (2.5345 g, 10.0 mmol), (*S*)-citronellal (3.2207 g, 20.0 mmol)/dioxane (5 mL), and propargyl alcohol (1.1289 g, 20 mmol)/dioxane (2 mL) sequentially under Ar atmosphere. The reaction was complete after being stirred in a preheated oil bath at 130 °C for 12 h as monitored by TLC. After cooling to room temperature, the resulting mixture was diluted with ethyl ether (40 mL) and washed with an aqueous solution of hydrochloric acid (2 M, 40 mL). The aqueous layer was extracted with ethyl ether (3 $\times$ 40 mL). The combined organic layer was washed with brine and dried over anhydrous Na_2SO_4 . After filtration and evaporation, the residue was purified by chromatography on silica gel to afford (*S_a*,6*S*)-6,10-dimethylundeca-2,3,9-trienol (893.8 mg) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 30/1) as an oil, which was used in the next step without further purification.

Following **Typical Procedure I**, the reaction of DMAP (99.1 mg, 0.8 mmol), (*S_a*,6*S*)-6,10-dimethylundeca-2,3,9-trienol (776.9 g, 4.0 mmol), pyridine (650 μL , $d = 0.98 \text{ g/mL}$, 637 mg, 8.0 mmol), and methyl chloroformate (920 μL , $d = 1.23 \text{ g/mL}$, 1.132 g, 12.0 mmol) in DCM (8 mL) afforded (*S_a*)-**1r** (962.5 mg, 44% for 2 steps, > 20:1 d.r.) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: $[\alpha]_{\text{D}}^{25} = +53.5$ ($c = 0.995$, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 5.29-5.18 (m, 2 H, $2\times=\text{CH}$), 5.13-5.05 (m, 1 H, $=\text{CH}$), 4.65-4.55 (m, 2 H, OCH_2), 3.78 (s, 3 H, OCH_3), 2.10-1.83 (m, 4 H, $2\times\text{CH}_2$), 1.68 (s, 3 H, CH_3), 1.63-1.47 (m, 4 H, CH_3 and CH), 1.42-1.32 (m, 1 H, one proton of CH_2), 1.23-1.12 (m, 1 H, one proton of CH_2), 0.91 (d, $J = 6.4 \text{ Hz}$, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) 206.2, 155.6, 131.2, 124.6, 91.3, 85.7, 66.4, 54.7, 36.4, 35.8, 32.5, 25.7, 25.4, 19.2, 17.6; MS (ESI) m/z 253 ($[\text{M}+\text{H}]^+$); IR (neat) ν

= 2957, 2914, 1966, 1748, 1443, 1369, 1251, 1110 cm^{-1} ; HRMS calcd for $\text{C}_{15}\text{H}_{25}\text{O}_3$ ($[\text{M}+\text{H}]^+$): 253.1798. Found: 253.1790.

(10) Synthesis of (*S_a*)-**1s** (cyf-4-146, cyf-4-147)



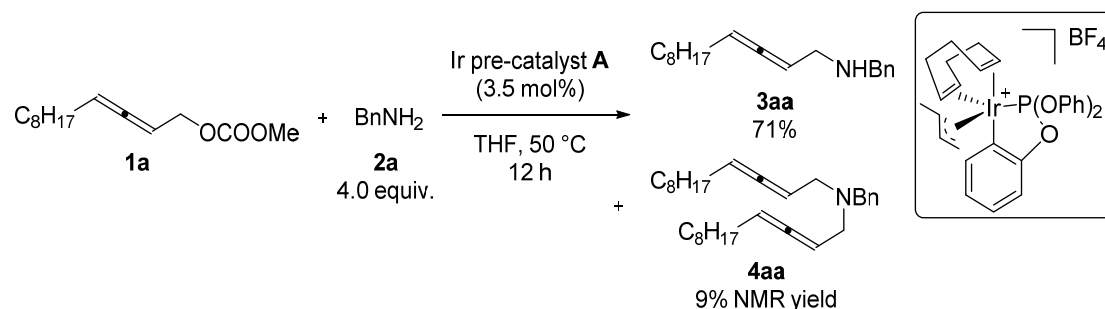
To a flame-dried round bottle flask (25 mL) with a reflux condenser were added CuBr_2 (90.5 mg, 0.4 mmol), (*R*)- α,α -diphenylprolinol (760.5 mg, 3.0 mmol), aldehyde (942.2 mg, 2.0 mmol)/dioxane (3 mL), and propargyl alcohol (174 μL , $d = 0.963 \text{ g/mL}$, 168 mg, 3.0 mmol)/dioxane (3 mL) sequentially under Ar atmosphere. The reaction was complete after being stirred in a preheated oil bath at 130 °C for 24 h as monitored by TLC. After cooling to room temperature, the resulting mixture was quenched with an aqueous solution of hydrochloric acid (2 M, 6 mL) and diluted with ethyl ether (30 mL). The aqueous layer was extracted with ethyl ether ($3 \times 30 \text{ mL}$). The combined organic layer was washed by brine and dried over anhydrous Na_2SO_4 . After filtration and evaporation, the residue was purified by chromatography on silica gel to afford the corresponding (*S_a*)-alka-2,3-dienol (283.2 mg) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20/1) as an oil, which was used in the next step without further purification.

Following **Typical Procedure I**, the reaction of DMAP (13.3 mg, 0.11 mmol), (*S_a*)-alka-2,3-dienol (280.8 mg, 0.55 mmol) prepared above, pyridine (89 μL , $d = 0.98 \text{ g/mL}$, 87 mg, 1.1 mmol), and methyl chloroformate (127 μL , $d = 1.23 \text{ g/mL}$, 156 mg,

1.65 mmol) in DCM (1.1 mL) afforded (*S_a*)-**1s** (300.2 mg, 27% for 2 steps, > 20:1 d.r.) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20/1) as an oil: $[\alpha]_D^{27} = +0.8$ ($c = 0.975$, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 5.40-5.29 (m, 3 H, $3\times=\text{CH}$), 4.67-4.55 (m, 3 H, OCH_2 and OCH), 3.79 (s, 3 H, OCH_3), 2.45-2.25 (m, 6 H), 2.05-1.92 (m, 2 H), 1.90-1.77 (m, 3 H), 1.65-0.77 (m, 33 H), 0.68 (s, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.4, 172.1, 155.5, 139.6, 122.6, 91.9, 87.8, 74.0, 65.9, 56.6, 56.1, 54.7, 49.9, 42.2, 39.7, 39.5, 38.1, 36.9, 36.5, 36.1, 35.7, 33.4, 31.84, 31.79, 28.2, 28.0, 27.7, 24.2, 23.8, 23.3, 22.8, 22.5, 21.0, 19.2, 18.7, 11.8; MS (ESI) m/z 591 ($[\text{M}+\text{Na}]^+$); IR (neat) $\nu = 3025, 2937, 2897, 2865, 2797, 2750, 2323, 1968, 1735, 1458, 1368, 1253, 1173, 1135, 1089, 1055, 1001\text{ cm}^{-1}$; HRMS calcd for $\text{C}_{36}\text{H}_{56}\text{O}_5\text{Na}$ ($[\text{M}+\text{Na}]^+$): 591.4020. Found: 591.4023.

3. Ir-catalyzed synthesis of terminal or racemic *N*-2,3-dienyl amines

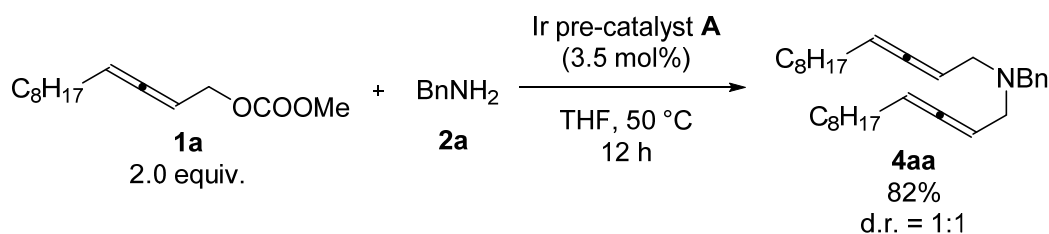
(1) Synthesis of *N*-dodeca-2,3-dienyl benzylamine (**3aa**) (cyf-3-68)



Typical Procedure II: To a flame-dried Schlenk tube (25 mL) were added Ir pre-catalyst **A**^[6] (26.6 mg, 0.035 mmol)/THF (3 mL), benzylamine **2a** (437.9 mg, 4.0 mmol)/THF (1 mL), and **1a** (239.8 mg, 1.0 mmol)/THF (1 mL) sequentially under Ar atmosphere. The resulting mixture was stirred at 50 °C for 12 h. After the completion of the reaction as monitored by TLC, the crude reaction mixture was transferred to a round-bottom flask with ethyl acetate (5 mL). After evaporation, the residue was purified by column chromatography on silica gel to afford **3aa** (193.4 mg, 71%) (9% NMR yield of **4aa** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: dichloromethane/ethyl acetate = 10/1 (100 mL) to dichloromethane/ethyl acetate = 2/1 (200 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3)

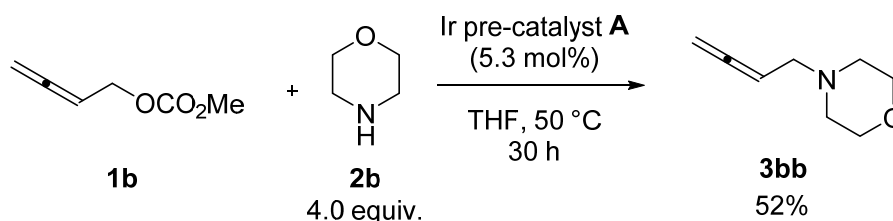
δ 7.35-7.28 (m, 4 H, ArH), 7.28-7.20 (m, 1 H, ArH), 5.19 (quint, $J = 4.6$ Hz, 2 H, $2\times=CH$), 3.86-3.78 (m, 2 H, NCH_2), 3.25 (t, $J = 4.4$ Hz, 2 H, NCH_2), 2.06-1.97 (m, 2 H, CH_2), 1.59 (s, 1 H, NH), 1.45-1.20 (m, 12 H, $6\times CH_2$), 0.88 (t, $J = 6.6$ Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, $CDCl_3$) δ 203.9, 140.2, 128.3, 128.2, 126.9, 92.4, 89.8, 53.0, 47.9, 31.8, 29.4, 29.3, 29.2, 29.1, 28.8, 22.6, 14.1; MS (ESI) m/z 272 ($[M+H]^+$); IR (neat) $\nu = 3063, 3027, 2955, 2922, 2852, 1961, 1602, 1494, 1453, 1376, 1357, 1330, 1198, 1108, 1075, 1028\text{ cm}^{-1}$; HRMS calcd for $C_{19}H_{30}N$ ($[M+H]^+$): 272.2373. Found: 272.2379.

(2) Synthesis of *N*, *N*-didodeca-2,3-dienyl benzylamine (**4aa**) (cyf-5-2)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (5.4 mg, 0.007 mmol), **2a** (96.4 mg, 0.4 mmol), and **2a** (22.1 mg, 0.2 mmol) in THF (2 mL) afforded **4aa** (71.4 mg, 82%) (eluent: petroleum ether (60-90 °C)/ ethyl acetate = 10/1) as an oil: 1H NMR (400 MHz, $CDCl_3$): δ 7.36-7.26 (m, 4 H, ArH), 7.25-7.19 (m, 1 H, ArH), 5.18-5.06 (m, 4 H, $4\times=CH$), 3.72-3.60 (m, 2 H, NCH_2), 3.21-3.09 (m, 4 H, $2\times NCH_2$), 2.09-1.92 (m, 4 H, $2\times CH_2$), 1.45-1.18 (m, 24 H, $12\times CH_2$), 0.88 (t, $J = 6.8$ Hz, 6 H, $2\times CH_3$); MS (ESI) m/z : 436 ($[M+H]^+$); IR (neat) $\nu = 3028, 2955, 2923, 2853, 1960, 1602, 1494, 1454, 1353, 1329, 1262, 1118, 1073, 1027, 1008\text{ cm}^{-1}$; HRMS Calcd. for $C_{31}H_{50}N$ ($[M+H]^+$): 436.3938. Found: 436.3938.

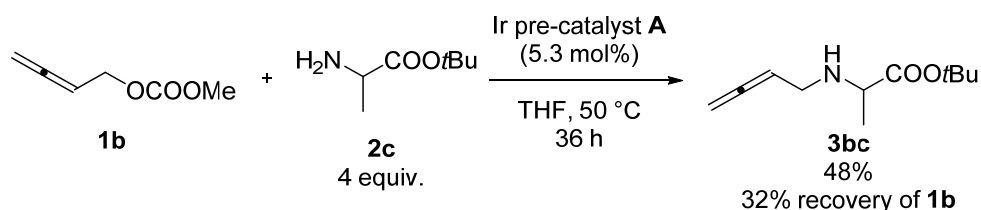
(3) Synthesis of *N*-buta-2,3-dienyl morpholine (**3bb**) (xjz-3-148)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (39.8 mg, 0.053 mmol), **1b** (127.9 mg, 1.0 mmol), and **2b** (346.2 mg, 4.0 mmol) in THF (5 mL) afforded

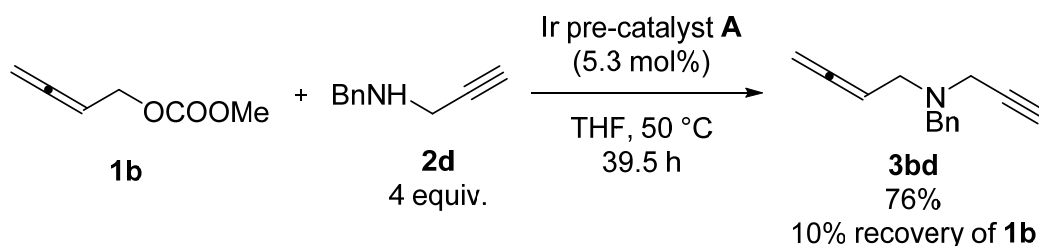
3bb (75.2 mg, 52%, 97% purity) (eluent: petroleum ether (60-90 °C)/acetone = 40/1 (205 mL) to 10/1 (550 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3): δ 5.15 (quint, J = 6.8 Hz, 1 H, =CH), 4.78-4.67 (m, 2 H, =CH₂), 3.80-3.65 (m, 4 H, 2 $\times$ CH₂), 3.08-2.96 (m, 2 H, CH₂), 2.66-2.33 (m, 4 H, 2 $\times$ CH₂); ^{13}C NMR (100 MHz, CDCl_3): δ 209.5, 86.2, 74.8, 66.8, 57.6, 53.1; IR (neat) ν = 2854, 2806, 1955, 1707, 1453, 1114 cm^{-1} ; MS (ESI) m/z 140 ($[\text{M}+\text{H}]^+$); HRMS Calcd. for $\text{C}_8\text{H}_{14}\text{NO}$ ($[\text{M}+\text{H}]^+$): 140.1070, found 140.1072.

(4) Synthesis of *N*-buta-2,3-dienyl *tert*-butyl alaninate (**3bc**) (cyf-3-89)



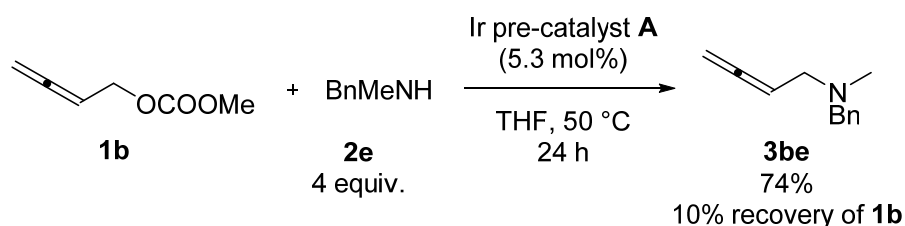
Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (39.8 mg, 0.053 mmol), **1b** (127.8 mg, 1.0 mmol), and **2c** (579.9 mg, 4.0 mmol) in THF (5 mL) afforded **3bc** (94.6 mg, 48%) (32% recovery of **1b** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1 (100 mL) to 20/1 (800 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 5.18 (quint, J = 6.6 Hz, 1 H, =CH), 4.77 (dt, J = 6.4, 3.2 Hz, 2 H, 2 $\times$ =CH), 3.32-3.22 (m, 2 H, CH and one proton of NCH_2), 3.22-3.13 (m, 1 H, one proton of NCH_2), 2.01 (brs, 1 H, NH), 1.47 (s, 9 H, 3 $\times$ CH₃), 1.27 (d, J = 6.8 Hz, 3 H, CH); ^{13}C NMR (100 MHz, CDCl_3) δ 208.5, 175.0, 88.9, 80.9, 75.9, 56.3, 46.1, 28.0, 18.9; MS (ESI) m/z 198 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 2977, 2933, 1956, 1725, 1453, 1392, 1368, 1337, 1297, 1253, 1212, 1144, 1067 cm^{-1} ; HRMS calcd for $\text{C}_{11}\text{H}_{20}\text{NO}_2$ ($[\text{M}+\text{H}]^+$): 198.1489. Found: 198.1488.

(5) Synthesis of *N*-buta-2,3-dienyl-*N*-(2-propynyl) benzylamine (**3bd**) (lc-1-16)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (39.9 mg, 0.053 mmol), **1b** (128.7 mg, 1.0 mmol), and **2d** (581.2 mg, 4.0 mmol) in THF (5 mL) afforded **3bd** (150.3 mg, 76%) (10% recovery of **1b** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/dichloromethane = 10/1 (200 mL) to 4/1 (300 mL) to 2/1 (200 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.40-7.20 (m, 5 H, ArH), 5.18 (quint, $J = 7.0$ Hz, 1 H, =CH), 4.81-4.71 (m, 2 H, =CH₂), 3.68 (s, 2 H, NCH₂), 3.40-3.34 (m, 2 H, NCH₂), 3.26-3.16 (m, 2 H, NCH₂), 2.83-2.21 (m, 1 H, $\equiv\text{CH}$); ^{13}C NMR (100 MHz, CDCl_3) δ 209.6, 138.4, 129.1, 128.3, 127.2, 87.4, 78.5, 75.1, 73.2, 56.9, 52.5, 41.3; MS (ESI) m/z 198 ($[\text{M}+\text{H}]^+$); IR (neat) $\nu = 3296, 2923, 2832, 1954, 1494, 1452, 1326, 1117\text{ cm}^{-1}$; HRMS calcd for $\text{C}_{14}\text{H}_{16}\text{N}$ ($[\text{M}+\text{H}]^+$): 198.1277, Found: 198.1278.

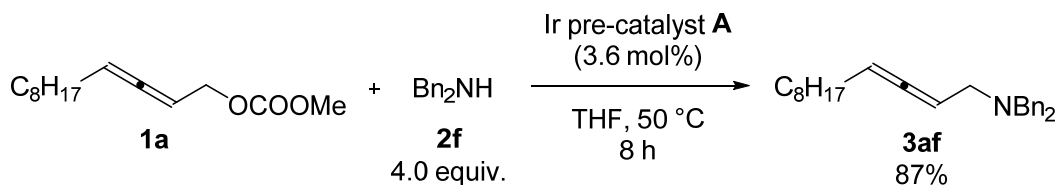
(6) Synthesis of *N*-buta-2,3-dienyl-*N*-methyl benzylamine (**3be**) (zyz-5-61)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (40.2 mg, 0.053 mmol), **1b** (129.7 mg, 1.0 mmol), and **2e** (486.3 mg, 4.0 mmol) in THF (5 mL) afforded **3be**^[7] (129.7 mg, 74%) (10% recovery of **1b** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate/triethylamine = 100/20/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.34-7.20 (m, 5 H, ArH), 5.20 (quint, $J = 6.9$ Hz, 1 H, =CH), 4.72 (dt, $J = 6.8$ Hz, 2.5 Hz, 2 H, =CH₂), 3.53 (s, 2 H, CH₂), 3.09 (dt, $J = 7.2, 2.5$ Hz, 2 H, CH₂), 2.23 (s, 3 H, CH₃); ^{13}C NMR (100 MHz, CDCl_3) δ 209.4, 138.7, 129.1, 128.2, 126.9, 86.8, 74.7,

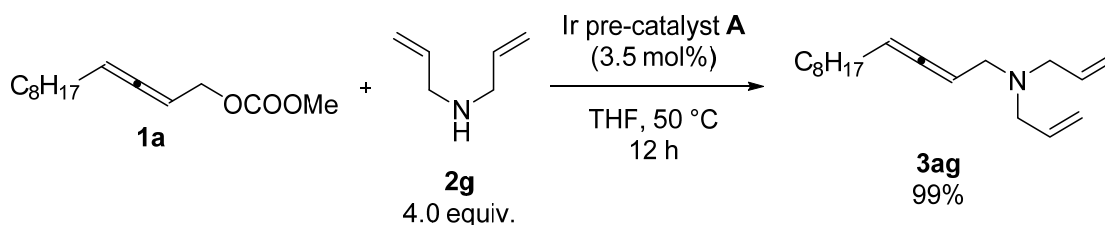
61.0, 55.9, 41.7; MS (ESI) m/z 174 ($[M+H]^+$); IR (neat) ν = 3062, 3028, 2978, 2942, 2876, 2835, 2785, 2707, 1954, 1602, 1494, 1453, 1418, 1363, 1323, 1262, 1193, 1130, 1075, 1024 cm^{-1} .

(7) Synthesis of *N*-dodeca-2,3-dienyl dibenzyl amine (**3af**) (zyz-5-58)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.8 mg, 0.036 mmol), **1a** (242.1 mg, 1.0 mmol), and **2f** (789.7 mg, 4.0 mmol) in THF (5 mL) afforded **3af** (317.7 mg, 87%) (eluent: petroleum ether (60-90 °C)/dichloromethane/triethylamine = 200/1/2) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.37 (d, J = 7.2 Hz, 4 H, ArH), 7.30 (t, J = 7.4 Hz, 4 H, ArH), 7.25-7.19 (m, 2 H, ArH), 5.18-5.07 (m, 2 H, 2 $\times$ =CH), 3.67-3.58 (m, 4 H, 2 $\times$ NCH₂), 3.09 (dd, J = 6.4, 1.2 Hz, 2 H, NCH₂), 1.99 (qd, J = 7.2, 3.2 Hz, 2 H, CH₂), 1.45-1.19 (m, 12 H, 6 $\times$ CH₂), 0.87 (t, J = 6.8 Hz, 3 H, CH₃); ^{13}C NMR (100 MHz, CDCl_3) δ 205.2, 139.6, 128.8, 128.1, 126.8, 91.0, 87.2, 57.3, 52.4, 31.9, 29.4, 29.3, 29.2, 29.1, 28.9, 22.7, 14.1; MS (ESI) m/z 362 ($[M+H]^+$); IR (neat) ν = 3027, 2954, 2923, 2852, 2796, 1959, 1602, 1494, 1454, 1364, 1329, 1242, 1120, 1072, 1028, 1009 cm^{-1} ; HRMS Calcd for $\text{C}_{26}\text{H}_{36}\text{N}$ ($[M+H]^+$): 362.2842, Found: 362.2848.

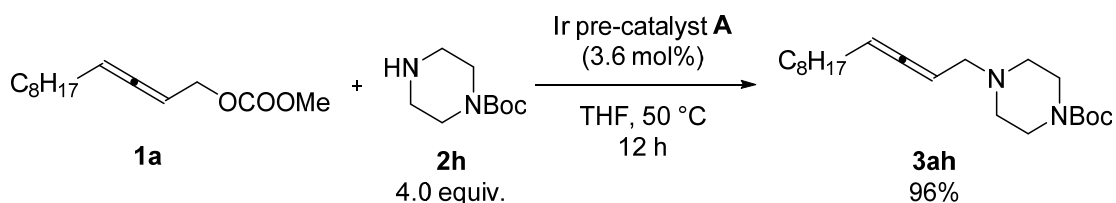
(8) Synthesis of *N*-dodeca-2,3-dienyl diallylamine (**3ag**) (cyf-3-93)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.6 mg, 0.035 mmol), **1a** (241.0 mg, 1.0 mmol), and **2g** (396.8 mg, 4.0 mmol) in THF (5 mL) afforded **3ag** (258.9 mg, 99%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1) as an oil:

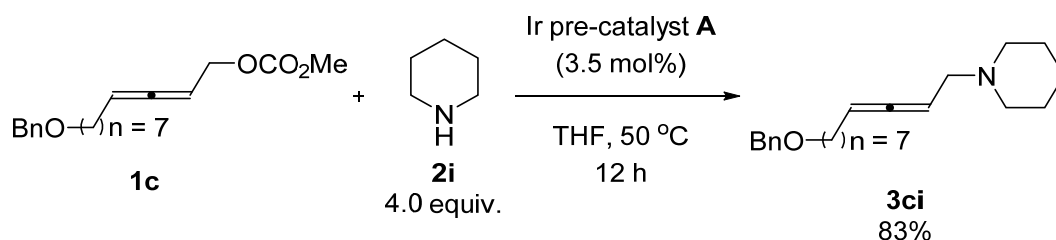
^1H NMR (400 MHz, CDCl_3) δ 5.92-5.79 (m, 2 H, $2\times=\text{CH}$), 5.23-5.08 (m, 6 H, $2\times=\text{CH}_2$ and $2\times=\text{CH}$), 3.18-3.07 (m, 6 H, $3\times\text{CH}_2$), 2.02-1.94 (m, 2 H, CH_2), 1.44-1.20 (m, 12 H, $6\times\text{CH}_2$), 0.88 (t, $J = 6.8$ Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.3, 135.6, 117.6, 90.9, 86.8, 56.1, 52.6, 31.9, 29.4, 29.3, 29.2, 29.1, 28.8, 22.7, 14.1; MS (ESI) m/z 262 ($[\text{M}+\text{H}]^+$); IR (neat) $\nu = 3077, 2956, 2923, 2854, 2809, 1960, 1642, 1448, 1417, 1352, 1332, 1257, 1146, 1115, 1074$ cm^{-1} ; HRMS calcd for $\text{C}_{18}\text{H}_{32}\text{N}$ ($[\text{M}+\text{H}]^+$): 262.2529. Found: 262.2536.

(9) Synthesis of *N*-(dodeca-2,3-dienyl) 1-(*tert*-butoxycarbonyl)piperazine (**3ah**) (cyf-3-95)



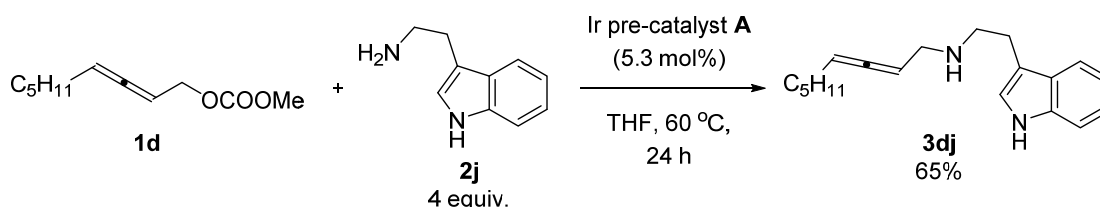
Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.7 mg, 0.036 mmol), **1a** (240.9 mg, 1.0 mmol), and **2h** (758.7 mg, 4.0 mmol) in THF (5 mL) afforded **3ah** (336.4 mg, 96%) (eluent: petroleum ether (60-90 $^\circ\text{C}$)/ethyl acetate/ triethylamine = 100/10/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 5.17-5.05 (m, 2 H, $2\times=\text{CH}$), 3.52-3.38 (m, 4 H, $2\times\text{NCH}_2$), 3.07-2.95 (m, 2 H, NCH_2), 2.52-2.35 (m, 4 H, $2\times\text{NCH}_2$), 1.99 (qd, $J = 6.9, 2.8$ Hz, 2 H, CH_2), 1.46 (s, 9 H, $3\times\text{CH}_3$), 1.44-1.22 (m, 12 H, $6\times\text{CH}_2$), 0.88 (t, $J = 6.8$ Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.3, 154.7, 91.2, 87.0, 79.5, 58.3, 52.5, 44.1, 31.8, 29.4, 29.2, 29.1, 29.0, 28.6, 28.4, 22.6, 14.1; MS (ESI) m/z 351 ($[\text{M}+\text{H}]^+$); IR (neat) $\nu = 2924, 2854, 2802, 2757, 1962, 1697, 1456, 1416, 1365, 1352, 1289, 1243, 1169, 1121, 1087, 1000$ cm^{-1} ; HRMS calcd for $\text{C}_{21}\text{H}_{39}\text{N}_2\text{O}_2$ ($[\text{M}+\text{H}]^+$): 351.3006. Found: 351.3016.

(10) Synthesis of *N*-11-benzyloxyundeca-2,3-dienyl piperidine (**3ci**) (cyf-5-63, hcf-4-118)



Following **Typical Procedure II**, the reaction of Ir catalyst (26.4 mg, 0.035 mmol), **1c** (332.4 mg, 1.0 mmol), and **2i** (340.6 mg, 4.0 mmol) in THF (5 mL) afforded **3ci** (283.2 mg, 83%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 2/1) as an oil: ^1H NMR (400 MHz, CDCl_3): δ 7.38-7.24 (m, 5 H, ArH), 5.17-5.05 (m, 2 H, $2\times=\text{CH}$), 4.49 (s, 2 H, OCH_2), 3.45 (t, J = 6.6 Hz, 2 H, OCH_2), 3.03-2.91 (m, 2 H, NCH_2), 2.50-2.30 (m, 4 H, $2\times\text{CH}_2$), 2.02-1.93 (m, 2 H, CH_2), 1.68-1.51 (m, 6 H, $3\times\text{CH}_2$), 1.50-1.24 (m, 10 H, $5\times\text{CH}_2$); ^{13}C NMR (100 MHz, CDCl_3): δ 205.0, 138.6, 128.2, 127.5, 127.3, 90.7, 87.5, 72.7, 70.3, 58.8, 53.9, 29.6, 29.2, 29.0, 28.9, 28.6, 26.0, 25.9, 24.2; MS (ESI) m/z : 342 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 2929, 2852, 2787, 2747, 1962, 1454, 1299, 1108 cm^{-1} ; HRMS calcd for $\text{C}_{23}\text{H}_{36}\text{NO}$ ($[\text{M}+\text{H}]^+$): 342.2791, found: 342.2795.

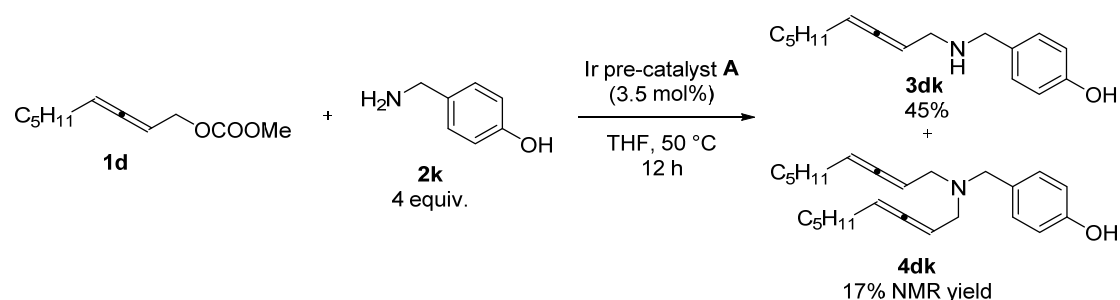
(11) Synthesis of *N*-nona-2,3-dienyl 2-(1*H*-indol-3-yl)ethanamine (**3dj**) (cyf-4-78)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (39.8 mg, 0.053 mmol), **1d** (198.5 mg, 1.0 mmol), and **2k** (660.1 mg, 4.0 mmol) in THF (5 mL) afforded **3dj** (183.5 mg, 65%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 1/2) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 8.59 (brs, 1 H, NH), 7.61 (d, J = 8.0 Hz, 1 H, ArH), 7.31 (d, J = 8.0 Hz, 1 H, ArH), 7.17 (t, J = 7.6 Hz, 1 H, ArH), 7.09 (t, J = 7.2 Hz, 1 H, ArH), 6.96 (s, 1 H, ArH), 5.18-5.07 (m, 2 H, $2\times=\text{CH}$), 3.26 (dd, J = 6.0, 2.8 Hz, 2 H, NCH_2), 3.02-2.95 (m, 4 H, CH_2 and NCH_2), 2.30 (brs, 1 H, NH), 1.93 (qd, J = 6.9, 3.2 Hz, 2 H, CH_2), 1.40-1.20 (m, 6 H, $3\times\text{CH}_2$), 0.87 (t, J = 6.6 Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) 203.8, 136.4, 127.3, 122.1, 121.8, 119.1, 118.7, 113.4, 111.1, 92.4, 89.4, 48.9,

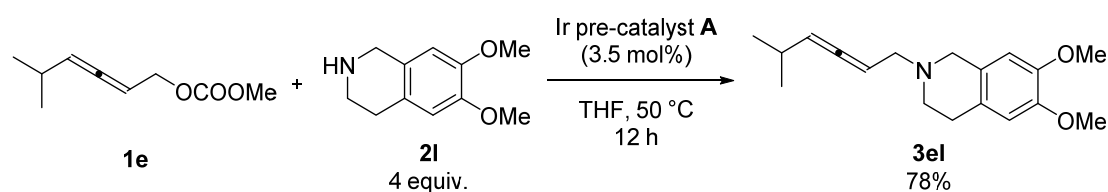
48.2, 31.2, 28.8, 28.6, 25.5, 22.4, 14.0; MS (ESI) m/z 283 ($[M+H]^+$); IR (neat) ν = 3414, 3145, 3057, 2955, 2923, 2853, 1961, 1491, 1455, 1297, 1104, 1010 cm^{-1} ; HRMS calcd for $\text{C}_{19}\text{H}_{27}\text{N}_2$ ($[M+H]^+$): 283.2169. Found: 283.2161.

(12) Synthesis of *N*-nona-2,3-dienyl 4-hydroxybenzylamine (**3dk**) (cyf-4-126)



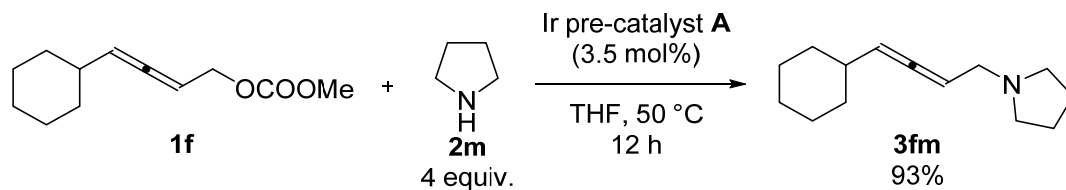
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), **1d** (198.1 mg, 1.0 mmol), and **2k** (503.2 mg, 4.0 mmol) in THF (5 mL) afforded **3dk** (110.4 mg, 45%) (17% NMR yield of **4dk** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60–90 °C)/ethyl acetate = 5/1 (180 mL) to ethyl acetate (300 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.07 (d, J = 8.4 Hz, 2 H, ArH), 6.92 (d, J = 8.0 Hz, 2 H, ArH), 5.80–5.50 (m, 2 H, NH and OH), 5.20 (quint, J = 4.7 Hz, 2 H, $2\times=\text{CH}$), 3.78–3.68 (m, 2 H, NH_2), 3.28 (t, J = 4.4 Hz, 2 H, NH_2), 2.03–1.93 (m, 2 H, CH_2), 1.45–1.21 (m, 6 H, $3\times\text{CH}_2$), 0.87 (t, J = 6.8 Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 204.1, 156.4, 129.9, 129.0, 115.9, 93.0, 88.5, 52.1, 47.1, 31.2, 28.8, 28.6, 22.4, 14.0; MS (ESI) m/z 246 ($[M+H]^+$); IR (neat) ν = 2956, 2925, 2855, 1961, 1613, 1594, 1515, 1447, 1378, 1250, 1170, 1088, 1013 cm^{-1} ; HRMS calcd for $\text{C}_{16}\text{H}_{24}\text{NO}$ ($[M+H]^+$): 246.1852. Found: 246.1849.

(13) Synthesis of *N*-5-methylhexa-2,3-dienyl 6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline (**3el**) (cyf-3-107)



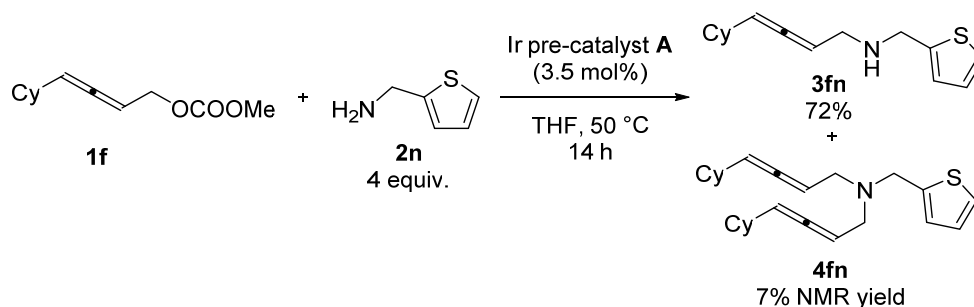
Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.6 mg, 0.035 mmol), **1e** (171.0 mg, 1.0 mmol), and **2l** (773.3 mg, 4.0 mmol) in THF (5 mL) afforded **3el** (225.1 mg, 78%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 6.59 (s, 1 H, ArH), 6.52 (s, 1 H, ArH), 5.30-5.23 (m, 1 H, =CH), 5.23-5.17 (m, 1 H, =CH), 3.88-3.79 (m, 6 H, 2×OCH₃), 3.61 (s, 2 H, NCH₂), 3.20 (dd, *J* = 6.8, 2.0 Hz, 2 H, NCH₂), 2.87-2.74 (m, 4 H, NCH₂ and CH₂), 2.39-2.28 (m, 1 H, CH), 1.04 (d, *J* = 6.8 Hz, 6 H, 2×CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 203.5, 147.3, 147.0, 126.4, 125.9, 111.2, 109.3, 98.5, 88.9, 57.8, 55.7, 55.6, 55.0, 50.1, 28.4, 27.7, 22.40, 22.37; MS (ESI) *m/z* 288 ([M+H]⁺); IR (neat) *ν* = 2957, 2929, 2867, 2833, 2788, 2744, 1959, 1611, 1515, 1462, 1415, 1379, 1359, 1334, 1284, 1255, 1226, 1192, 1125, 1096, 1016 cm⁻¹; HRMS calcd for C₁₈H₂₆NO₂ ([M+H]⁺): 288.1958. Found: 288.1959.

(14) Synthesis of *N*-4-cyclohexylbuta-2,3-dienyl pyrrolidine (**3fm**) (cyf-3-134)



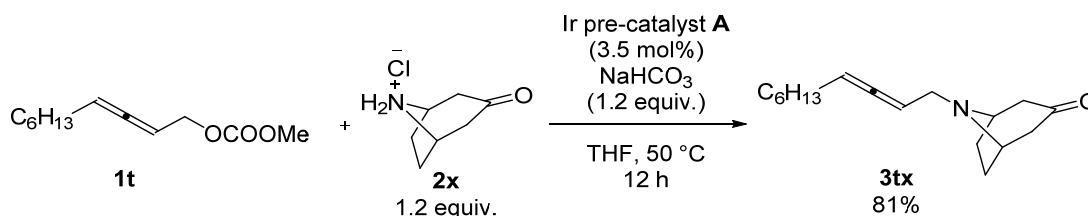
Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.6 mg, 0.035 mmol), **1f** (210.4 mg, 1.0 mmol), and **2m** (291.2 mg, 4.0 mmol) in THF (5 mL) afforded **3fm** (190.7 mg, 93%) (eluent: dichloromethane/ethyl acetate = 20/1 (200 mL) to 1:1 (500 mL)) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 5.22 (qd, *J* = 6.8, 2.8 Hz, 1 H, =CH), 5.15-5.09 (m, 1 H, =CH), 3.15 (ddd, *J* = 12.4, 6.8, 2.7 Hz, 1 H, one proton of NCH₂), 3.06 (ddd, *J* = 12.8, 7.2, 2.4 Hz, 1 H, one proton of NCH₂), 2.60-2.48 (m, 4 H, 2×NCH₂), 2.04-1.93 (m, 1 H, CH), 1.85-1.58 (m, 9 H, 4×CH₂ and one proton of CH₂), 1.34-1.02 (m, 5 H, 2×CH₂ and one proton of CH₂); ¹³C NMR (100 MHz, CDCl₃) δ 203.4, 97.2, 89.3, 55.4, 53.5, 37.0, 33.0, 32.9, 26.0, 25.9, 23.4; MS (ESI) *m/z* 206 ([M+H]⁺); IR (neat) *ν* = 2923, 2850, 2792, 1961, 1639, 1447, 1345, 1318, 1290, 1271, 1198, 1124, 1030 cm⁻¹; HRMS calcd for C₁₄H₂₄N ([M+H]⁺): 206.19033. Found: 206.19050.

(15) Synthesis of *N*-4-cyclohexylbuta-2,3-dienyl thiophen-2-ylmethanamine (**3fn**) (cyf-3-169)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.5 mg, 0.035 mmol), **1f** (209.8 mg, 1.0 mmol), and **2n** (465.6 mg, 4.0 mmol) in THF (5 mL) afforded **3fn** (178.0 mg, 72%) (7% NMR yield of **4fn** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1 (200 mL) to 10/1 (200 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.21 (dd, J = 5.0, 1.4 Hz, 1 H, ArH), 6.97-6.90 (m, 2 H, ArH), 5.26-5.15 (m, 2 H, $2\times=\text{CH}$), 4.08-3.98 (m, 2 H, NCH_2), 3.28 (dd, J = 6.0, 3.2 Hz, 2 H, NCH_2), 2.10-1.94 (m, 1 H, CH), 1.80-1.55 (m, 6 H, $2\times\text{CH}_2$, NH, and one proton of CH_2), 1.35-1.02 (m, 5 H, $2\times\text{CH}_2$ and one proton of CH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 202.7, 143.9, 126.5, 124.8, 124.3, 98.4, 90.5, 47.6, 47.3, 37.1, 33.1, 33.0, 26.0, 25.9; MS (ESI) m/z 248 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3312, 3069, 2920, 2848, 1957, 1592, 1445, 1366, 1329, 1299, 1258, 1226, 1167, 1102, 1036 cm^{-1} ; HRMS calcd for $\text{C}_{15}\text{H}_{22}\text{NS}$ ($[\text{M}+\text{H}]^+$): 248.14675. Found: 248.14715.

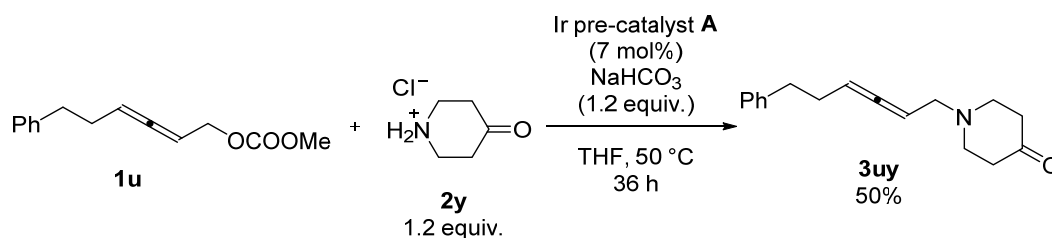
(16) Synthesis of *N*-deca-2,3-dienyl nortropinone (**3tx**) (cyf-4-92)



Typical Procedure III: To a flame-dried Schlenk tube (25 mL) were added nortropinone hydrochloride **2x** (199.7 mg, 1.2 mmol), NaHCO_3 (100.9, 1.2 mmol), and THF (2.5 mL). The resulting mixture was stirred at room temperature for 0.5 h. Methyl

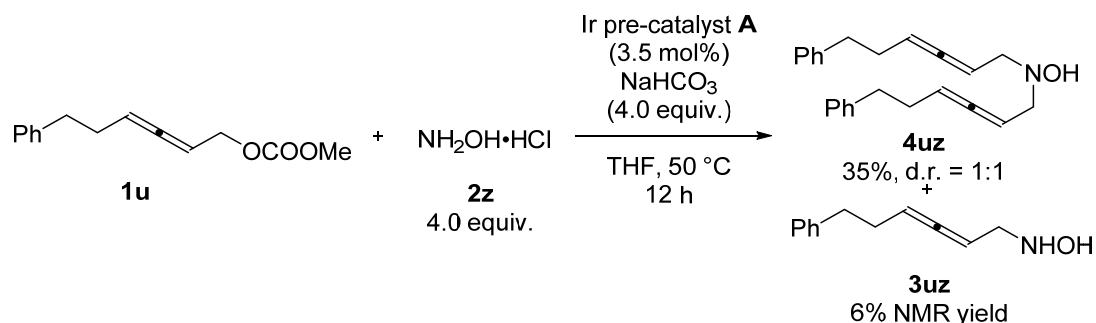
deca-2,3-dienyl carbonate **1t** (212.4 mg, 1.0 mmol)/THF (2.5 mL) and Ir pre-catalyst **A** (26.5 mg, 0.035 mmol) were then added sequentially under Ar atmosphere. The resulting mixture was stirred at 50 °C for 12 h. After the completion of the reaction as monitored by TLC, the crude reaction mixture was transferred with ethyl acetate (5 mL). After evaporation, the residue was purified by column chromatography on silica gel to afford **3tx** (211.7 mg, 81%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 8/1) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 5.27-5.13 (m, 2 H, 2×=CH), 3.67-3.55 (m, 2 H, 2×NCH), 3.20 (dd, *J* = 6.8, 2.4 Hz, 2 H, NCH₂), 2.66 (dd, *J* = 16.4, 2.8 Hz, 2 H, CH₂), 2.21 (d, *J* = 14.8 Hz, 2 H, CH₂), 2.12-1.95 (m, 4 H, 2×CH₂), 1.66-1.56 (m, 2 H, CH₂), 1.46-1.21 (m, 8 H, 4×CH₂), 0.88 (t, *J* = 6.6 Hz, 3 H, CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 210.0, 204.8, 91.7, 88.9, 58.3, 58.2, 50.5, 47.7, 47.6, 31.6, 29.1, 28.7, 27.69, 27.68, 22.5, 14.0; MS (EI) *m/z* 261 (M⁺, 1.56), 138 (100); IR (neat) ν = 2954, 2925, 2854, 1962, 1714, 1465, 1411, 1340, 1279, 1236, 1193, 1149, 1098, 1006 cm⁻¹; HRMS calcd for C₁₇H₂₇NO (M⁺): 261.2093. Found: 261.2089.

(17) Synthesis of *N*-6-phenylhexa-2,3-dienyl 4-piperidinone (**3uy**) (cyf-4-105)



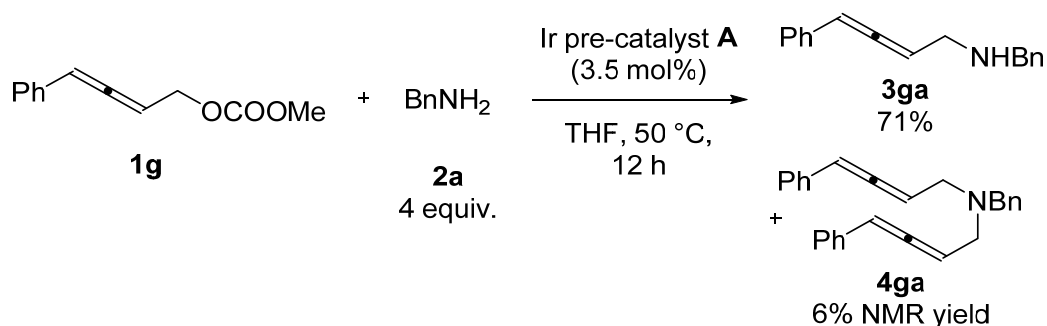
Following **Typical Procedure III**, the reaction of Ir pre-catalyst **A** (52.8 mg, 0.07 mmol), **1u** (232.1 mg, 1.0 mmol), **2y** (171.1 mg, 1.2 mmol), and NaHCO₃ (101.5 mg, 1.2 mmol) in THF (5 mL) afforded **3uy** (127.8 mg, 50%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 7.31-7.25 (m, 2 H, ArH), 7.21-7.15 (m, 3 H, ArH), 5.23-5.10 (m, 2 H, 2×=CH), 3.11-3.01 (m, 2 H, NCH₂), 2.80-2.66 (m, 6 H, 2×NCH₂ and CH₂), 2.45 (t, *J* = 6.2 Hz, 4 H, 2×CH₂), 2.42-2.25 (m, 2 H, CH₂); ¹³C NMR (100 MHz, CDCl₃) δ 209.0, 205.4, 141.4, 128.4, 128.2, 125.9, 90.6, 87.6, 56.9, 52.3, 41.1, 35.3, 30.3; MS (ESI) *m/z* 256 ([M+H]⁺); IR (neat) ν = 3026, 2910, 2800, 1960, 1715, 1603, 1496, 1454, 1341, 1218, 1195, 1152, 1124, 1086, 1027 cm⁻¹; HRMS calcd for C₁₇H₂₂NO ([M+H]⁺): 256.1696. Found: 256.1690.

(18) Synthesis of *N,N*-bis(6-phenylhexa-2,3-dienyl)hydroxylamine (**3uz**) (cyf-4-98)



Following **Typical Procedure III**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), **1u** (232.4 mg, 1.0 mmol), **2z** (281.1 mg, 4.0 mmol), and NaHCO_3 (336.9 mg, 4.0 mmol) in THF (5 mL) afforded **4uz** (132.2 mg, 35%, 93% purity) (6% NMR yield of **4uz** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.31-7.23 (m, 4 H, ArH), 7.22-7.14 (m, 6 H, ArH), 6.06 (brs, 1 H, OH), 5.27-5.17 (m, 4 H, $4\times=\text{CH}$), 3.35-3.22 (m, 4 H, $2\times\text{NCH}_2$), 2.80-2.65 (m, 4 H, $2\times\text{CH}_2$), 2.41-2.24 (m, 4 H, $2\times\text{CH}_2$); MS (ESI) m/z 346 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3063, 3027, 2920, 2855, 1963, 1603, 1495, 1453, 1333, 1283, 1103, 1078, 1029 cm^{-1} ; HRMS calcd for $\text{C}_{24}\text{H}_{28}\text{NO}$ ($[\text{M}+\text{H}]^+$): 346.2165. Found: 346.2163.

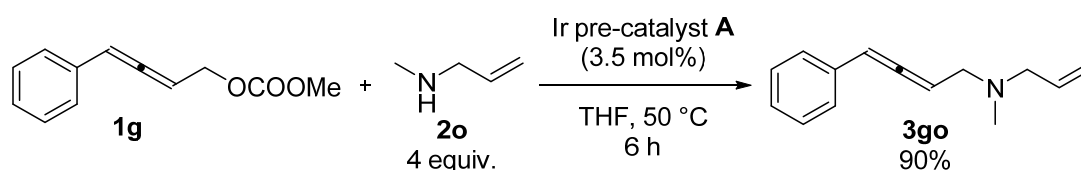
(19) Synthesis of *N*-4-phenylbuta-2,3-dienyl benzylamine (**3ga**) (cyf-5-7)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), **1g** (204.5 mg, 1.0 mmol), and **2a** (436.7 mg, 4.0 mmol) in THF (5 mL) afforded **3ga** (169.8 mg, 71%) (6% NMR yield of **4ga** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ^1H NMR (500 MHz, CDCl_3) δ 7.35-7.17 (m, 10 H,

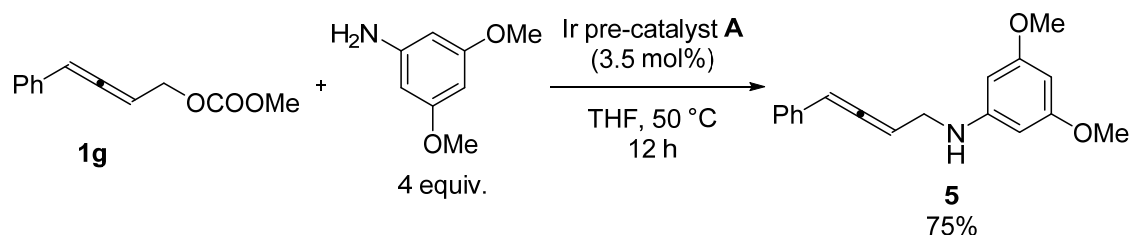
ArH), 6.24 (dt, $J = 6.5, 3.1$ Hz, 1 H, =CH), 5.68 (q, $J = 6.3$ Hz, 1 H, =CH), 3.84 (dd, $J = 16.0, 13.0$ Hz, 2 H, NCH₂), 3.40 (dd, $J = 6.5, 3.0$ Hz, 2 H, NCH₂); ¹³C NMR (126 MHz, CDCl₃) 204.9, 139.9, 134.2, 128.5, 128.3, 128.1, 126.9, 126.8, 126.6, 95.7, 94.0, 52.9, 47.4; MS (ESI) m/z 236 ([M+H]⁺); IR (neat) $\nu = 3316, 3061, 3028, 2832, 1947, 1598, 1493, 1453, 1357, 1331, 1262, 1197, 1103, 1072, 1027$ cm⁻¹; HRMS calcd for C₁₇H₁₈N ([M+H]⁺): 236.1434. Found: 236.1434.

(20) Synthesis of *N*-4-phenylbuta-2,3-dienyl *N*-methyl allylamine (**3go**) (cyf-3-159)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.6 mg, 0.035 mmol), **1g** (204.3 mg, 1.0 mmol), and **2o** (294.1 mg, 4.0 mmol) in THF (5 mL) afforded **3go** (180.3 mg, 90%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1 (200 mL) to 1/1 (200 mL)) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 7.34-7.23 (m, 4 H, ArH), 7.23-7.14 (m, 1 H, ArH), 6.22-6.13 (m, 1 H, =CH), 5.98-5.80 (m, 1 H, =CH), 5.59 (q, $J = 6.9$ Hz, 1 H, =CH), 5.24-5.10 (m, 2 H, =CH₂), 3.25-3.13 (m, 2 H, NCH₂), 3.09 (d, $J = 6.8$ Hz, 2 H, NCH₂), 2.31 (s, 3 H, NCH₃); ¹³C NMR (100 MHz, CDCl₃) δ 206.1, 135.5, 134.3, 128.5, 126.8, 126.7, 117.7, 94.5, 91.4, 59.8, 55.9, 41.7; MS (EI) m/z (%) 199 (M⁺, 1.10), 84 (100); IR (neat) $\nu = 3070, 3025, 2975, 2934, 2780, 1945, 1748, 1641, 1596, 1493, 1451, 1344, 1321, 1267, 1193, 1138, 1075, 1028, 1000$ cm⁻¹; HRMS calcd for C₁₄H₁₈N ([M+H]⁺): 200.14338. Found: 200.14371.

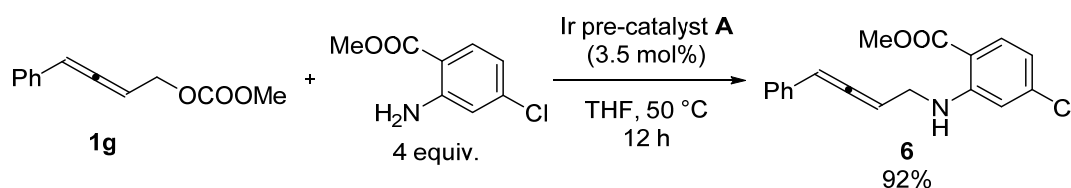
(21) Synthesis of *N*-4-phenylbuta-2,3-dienyl 3,5-dimethoxyaniline (**5**) (cyf-4-139)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.4 mg, 0.035

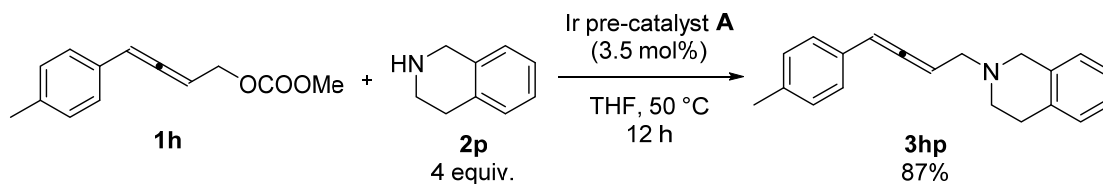
mmol), **1g** (204.5 mg, 1.0 mmol), and 3,5-dimethoxy aniline (632.6 mg, 4.0 mmol) in THF (5 mL) afforded **5** (210.8 mg, 75%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.32-7.22 (m, 4 H, ArH), 7.22-7.16 (m, 1 H, ArH), 6.28 (dt, J = 6.4, 3.1 Hz, 1 H, =CH), 5.89 (t, J = 2.0 Hz, 1 H, ArH), 5.83 (d, J = 2.4 Hz, 2 H, ArH), 5.70 (q, J = 6.0 Hz, 1 H, =CH), 3.97-3.83 (m, 3 H, NCH_2 and NH), 3.71 (s, 6 H, $2\times\text{OCH}_3$); ^{13}C NMR (100 MHz, CDCl_3) δ 204.7, 161.7, 149.5, 133.9, 128.6, 127.1, 126.9, 97.0, 93.3, 92.1, 90.2, 55.1, 42.5; MS (DART) m/z 282 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3407, 2999, 2936, 2839, 1949, 1614, 1593, 1511, 1495, 1483, 1457, 1415, 1340, 1202, 1175, 1150, 1096, 1069, 1028 cm^{-1} ; HRMS calcd for $\text{C}_{18}\text{H}_{20}\text{O}_2\text{N}$ ($[\text{M}+\text{H}]^+$): 282.1489. Found: 282.1486.

(22) Synthesis of *N*-4-phenylbuta-2,3-dienyl 2-methoxycarbonyl-5-chloroaniline (**6**) (cyf-4-140)



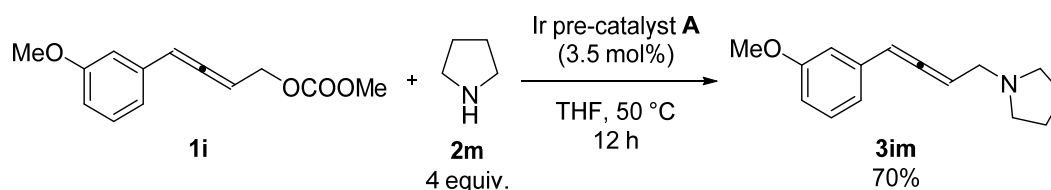
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), **1g** (203.7 mg, 1.0 mmol), and 2-methoxycarbonyl-5-chloroaniline (757.1 mg, 4.0 mmol) in THF (5 mL) afforded **6** (288.7 mg, 92%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 8.15-7.97 (m, 1 H, ArH), 7.79 (d, J = 8.4 Hz, 1 H, ArH), 7.35-7.15 (m, 5 H, ArH), 6.74 (d, J = 1.2 Hz, 1 H, ArH), 6.55 (dd, J = 8.6, 1.8 Hz, 1 H, ArH), 6.30 (dt, J = 6.4, 3.0 Hz, 1 H, =CH), 5.64 (q, J = 6.0 Hz, 1 H, =CH), 4.03-3.92 (m, 2 H, NCH_2), 3.80 (s, 3 H, OCH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.2, 168.3, 151.2, 140.8, 133.7, 132.9, 128.6, 127.1, 126.9, 115.3, 111.5, 109.0, 97.1, 92.5, 51.6, 41.7; MS (DART) m/z 314 ($[\text{M}(^{35}\text{Cl})+\text{H}]^+$), 316 ($[\text{M}(^{37}\text{Cl})+\text{H}]^+$); IR (neat) ν = 3349, 3030, 2949, 2842, 1947, 1683, 1599, 1569, 1505, 1458, 1437, 1342, 1327, 1291, 1246, 1213, 1189, 1146, 1099, 1072, 1027 cm^{-1} ; HRMS calcd for $\text{C}_{18}\text{H}_{17}\text{NO}_2^{35}\text{Cl}$ ($[\text{M}(^{35}\text{Cl})+\text{H}]^+$): 314.0942. Found: 314.0939.

(23) Synthesis of *N*-(4-(4-methylphenyl)buta-2,3-dienyl) 1,2,3,4-tetrahydroisoquinoline (**3hp**) (wgl-2-75)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.6 mg, 0.035 mmol), **1h** (218.7 mg, 1.0 mmol), and **2p** (544.1 mg, 4.0 mmol) in THF (5 mL) afforded **3hp** (239.5 mg, 87%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20:1 (210 mL) to 10:1 (220 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.23-7.16 (m, 2 H, ArH), 7.15-7.05 (m, 5 H, ArH), 7.04-6.96 (m, 1 H, ArH), 6.22-6.15 (m, 1 H, =CH), 5.66 (q, J = 6.8 Hz, 1 H, =CH), 3.72 (dd, J = 21.8, 15.0 Hz, 2 H, NCH_2), 3.32 (dd, J = 7.2, 2.0 Hz, 2 H, NCH_2), 2.95-2.87 (m, 2 H, NCH_2), 2.86-2.77 (m, 2 H, CH_2), 2.32 (s, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 206.0, 136.6, 134.6, 134.1, 131.2, 129.3, 128.6, 126.6, 126.5, 126.1, 125.5, 94.6, 91.4, 57.2, 55.5, 50.2, 29.0, 21.1; IR (neat) ν = 3022, 2914, 2794, 2746, 1946, 1594, 1505, 1449, 1325, 1270, 1195, 1133, 1092, 1025 cm^{-1} ; MS (ESI) m/z (%) 276 ($[\text{M}+\text{H}]^+$); HRMS calcd for $\text{C}_{20}\text{H}_{22}\text{N}$ ($[\text{M}+\text{H}]^+$): 276.1747. Found: 276.1736.

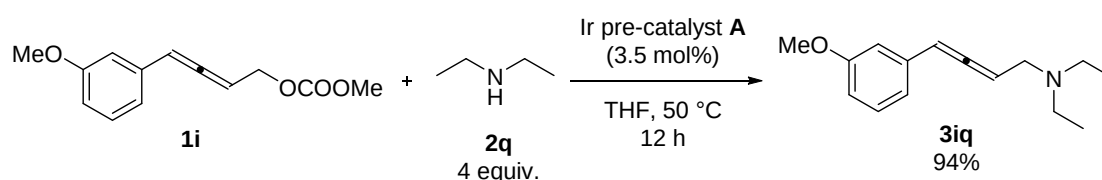
(24) Synthesis of *N*-(4-(3-methoxyphenyl)buta-2,3-dienyl) pyrrolidine (**3im**) (cyf-3-167)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.5 mg, 0.035 mmol), **1i** (234.5 mg, 1.0 mmol), and **2m** (291.2 mg, 4.0 mmol) in THF (5 mL) afforded **3im** (160.4 mg, 70%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 1/1 (200 mL) to ethyl acetate (300 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.21 (t, J = 7.8 Hz, 1 H, ArH), 6.88 (d, J = 7.6 Hz, 1 H, ArH), 6.84 (s, 1 H, ArH), 6.75 (dd, J = 8.4, 2.6 Hz, 1 H, ArH), 6.16 (dt, J = 6.4, 2.6 Hz, 1 H, =CH), 5.67 (q, J = 6.8 Hz, 1 H, =CH), 3.80 (s,

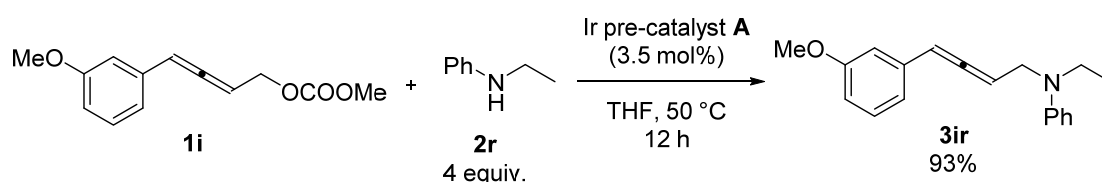
3 H, OCH₃), 3.30 (ddd, $J = 12.8, 6.8, 2.4$ Hz, 1 H, one proton of NCH₂), 3.22 (ddd, $J = 13.2, 7.6, 2.4$ Hz, 1 H, one proton of NCH₂), 2.67-2.55 (m, 4 H, 2×NCH₂), 1.87-1.77 (m, 4 H, 2×CH₂); ¹³C NMR (100 MHz, CDCl₃) δ 205.7, 159.8, 135.8, 129.5, 119.3, 112.6, 111.7, 94.7, 92.8, 55.0, 54.6, 53.6, 23.5; MS (ESI) m/z 230 ([M+H]⁺); IR (neat) $\nu = 3051, 2967, 2810, 1947, 1597, 1489, 1461, 1381, 1315, 1261, 1120, 1153, 1044$ cm⁻¹; HRMS calcd for C₁₅H₂₀NO ([M+H]⁺): 230.15394. Found: 230.15425.

(25) Synthesis of *N*-(4-(3-methoxyphenyl)buta-2,3-dienyl) diethylamine (**3iq**) (cyf-3-189)



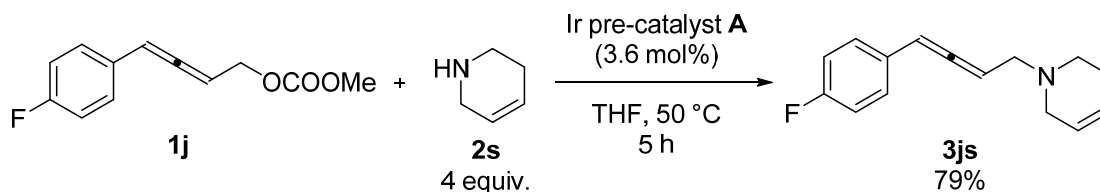
Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.6 mg, 0.035 mmol), **1i** (233.9 mg, 1.0 mmol), and **2q** (293.5 mg, 4.0 mmol) in THF (5 mL) afforded **3iq** (217.5 mg, 94%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1 (200 mL) to ethyl acetate (300 mL)) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 7.21 (t, $J = 7.8$ Hz, 1 H, ArH), 6.90-6.81 (m, 2 H, ArH), 6.75 (dd, $J = 8.2, 2.2$ Hz, 1 H, ArH), 6.13 (dt, $J = 6.4, 2.2$ Hz, 1 H, =CH), 5.58 (q, $J = 7.0$ Hz, 1 H, =CH), 3.79 (s, 3 H, OCH₃), 3.39-3.27 (m, 2 H, NCH₂), 2.68-2.55 (m, 4 H, 2×NCH₂), 1.07 (t, $J = 7.0$ Hz, 6 H, 2×CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 205.8, 159.8, 135.9, 129.5, 119.3, 112.7, 111.6, 94.3, 90.6, 55.1, 51.3, 46.6, 12.1; MS (ESI) m/z 232 ([M+H]⁺); IR (neat) $\nu = 2967, 2933, 2808, 1945, 1594, 1487, 1458, 1379, 1317, 1261, 1201, 1155, 1118, 1045$ cm⁻¹; HRMS calcd for C₁₅H₂₂NO ([M+H]⁺): 232.16959. Found: 232.16954.

(26) Synthesis of *N*-(4-(3-methoxyphenyl)buta-2,3-dienyl) *N*-ethyl aniline (**3ir**) (cyf-4-157)



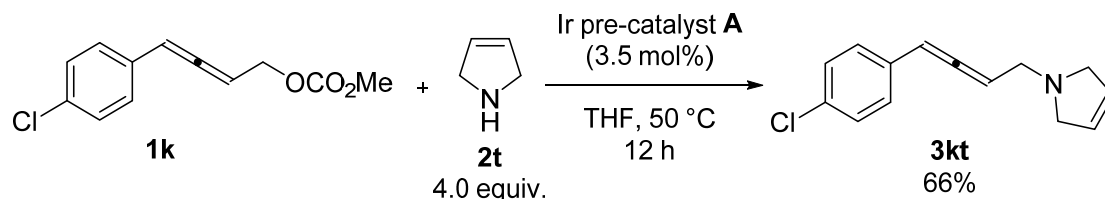
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), **1i** (234.1 mg, 1.0 mmol), and **2r** (495.2 mg, 4.0 mmol) in THF (5 mL) afforded **3ir** (260.3 mg, 93%) (eluent: petroleum ether (60-90 °C)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.25-7.15 (m, 3 H, ArH), 6.86-6.64 (m, 6 H, ArH), 6.20-6.14 (m, 1 H, =CH), 5.59 (q, J = 6.3 Hz, 1 H, =CH), 4.03 (dd, J = 6.0, 2.0 Hz, 2 H, NCH_2), 3.73 (s, 3 H, OCH_3), 3.41 (q, J = 7.1 Hz, 2 H, NCH_2), 1.19 (t, J = 7.2 Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.6, 159.8, 147.6, 135.6, 129.5, 129.2, 119.5, 116.2, 112.9, 112.5, 111.7, 95.7, 91.9, 55.1, 49.2, 44.9, 12.6; MS (ESI) m/z 280 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3025, 2968, 2931, 2834, 1945, 1596, 1502, 1462, 1439, 1389, 1376, 1345, 1263, 1241, 1184, 1153, 1123, 1075, 1039 cm^{-1} ; HRMS calcd for $\text{C}_{19}\text{H}_{22}\text{NO}$ ($[\text{M}+\text{H}]^+$): 280.1696. Found: 280.1696.

(27) Synthesis of *N*-(4-(4-fluorophenyl)buta-2,3-dienyl)-1,2,5,6-tetrahydropyridine (**3js**) (cyf-3-101)



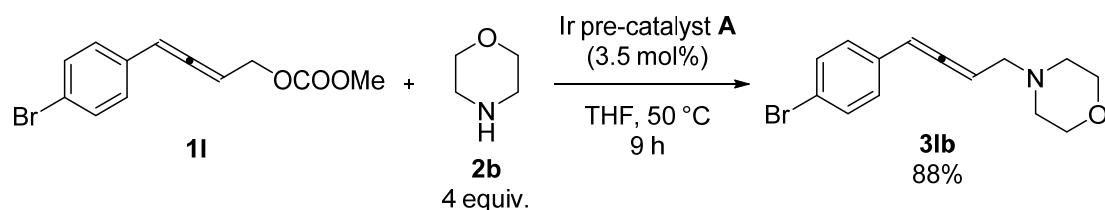
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.7 mg, 0.036 mmol), **1j** (222.4 mg, 1.0 mmol), and **2s** (333.0 mg, 4.0 mmol) in THF (5 mL) afforded **3js** (194.9 mg, 79%, 93% purity) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.27-7.20 (m, 2 H, ArH), 7.03-6.96 (m, 2 H, ArH), 6.18-6.13 (m, 1 H, =CH), 5.81-5.74 (m, 1 H, =CH), 5.73-5.61 (m, 2 H, 2 $\times$ =CH), 3.24 (dd, J = 7.2, 2.4 Hz, 2 H, NCH_2), 3.14-3.00 (m, 2 H, NCH_2), 2.71-2.61 (m, 2 H, NCH_2), 2.25-2.18 (m, 2 H, CH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 205.8 (d, J = 2.5 Hz), 161.8 (d, J = 244.4 Hz), 130.2 (d, J = 3.3 Hz), 128.1 (d, J = 8.3 Hz), 125.2, 125.1, 115.5 (d, J = 21.9 Hz), 93.6, 91.8, 57.2, 52.1, 49.3, 26.1; ^{19}F NMR (376 MHz, CDCl_3) δ -115.9 (m); MS (ESI) m/z 230 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3033, 2907, 2787, 2742, 1948, 1657, 1601, 1505, 1383, 1329, 1194, 1155, 1132, 1114, 1092, 1031, 1001 cm^{-1} ; HRMS calcd for $\text{C}_{15}\text{H}_{17}\text{NF}$ ($[\text{M}+\text{H}]^+$): 230.1340. Found: 230.1340.

(28) Synthesis of *N*-(4-(4-chlorophenyl)buta-2,3-dienyl) 3-pyrroline (**3kt**) (hcf-4-113)



Following **Typical Procedure I**, the reaction of Ir catalyst (26.6 mg, 0.035 mmol), **2k** (238.6 mg, 1.0 mmol), and **1t** (276.7 mg, 4 mmol) in THF (5 mL) afforded **3kt** (152.9 mg, 66%) as an oil (eluent: dichloromethane/ethyl acetate/triethylamine = 100/20/1): ^1H NMR (400 MHz, CDCl_3): δ 7.26 (d, J = 8.4 Hz, 2 H, ArH), 7.20 (d, J = 8.4 Hz, 2 H, ArH), 6.20-6.11 (m, 1 H, =CH), 5.78 (s, 2 H, $2\times\text{=CH}$), 5.66 (q, J = 6.7 Hz, 1 H, =CH), 3.65-3.50 (m, 4 H, $2\times\text{NCH}_2$), 3.41 (dd, J = 6.6, 2.6 Hz, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 205.7, 133.0, 132.4, 128.7, 127.9, 127.6, 94.2, 93.1, 59.3, 54.2; MS (ESI) m/z 232 ($[\text{M} (^{35}\text{Cl})+\text{H}]^+$), 234 ($[\text{M} (^{37}\text{Cl})+\text{H}]^+$); IR (neat) ν = 3376, 3072, 2938, 2869, 2774, 2111, 1950, 1641, 1619, 1591, 1490, 1435, 1389, 1366, 1330, 1277, 1156, 1088, 1011 cm^{-1} ; HRMS calcd for $\text{C}_{14}\text{H}_{15}\text{N}^{35}\text{Cl}$ ($[\text{M} (^{35}\text{Cl})+\text{H}]^+$): 232.0888. Found: 232.0889.

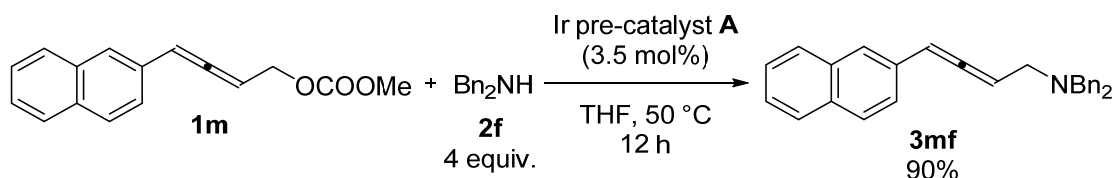
(29) Synthesis of *N*-(4-(4-bromophenyl)buta-2,3-dienyl) morpholine (**3lb**) (cyf-3-151)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.6 mg, 0.035 mmol), **1l** (283.2 mg, 1.0 mmol), and **2b** (349.8 mg, 4.0 mmol) in THF (5 mL) afforded **3lb** (257.7 mg, 88%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.42 (d, J = 8.0 Hz, 2 H, ArH), 7.13 (d, J = 8.4 Hz, 2 H, ArH), 6.16-6.10 (m, 1 H, =CH), 5.59 (q, J = 7.0 Hz, 1 H, =CH), 3.74 (t, J = 4.6 Hz, 4 H, $2\times\text{OCH}_2$), 3.21-3.10 (m, 2 H, NCH_2), 2.60-2.47 (m, 4 H, $2\times\text{NCH}_2$); ^{13}C NMR (100 MHz, CDCl_3) δ 206.2, 133.1, 131.6, 128.1, 120.5, 93.9, 91.5, 66.8, 57.5, 53.0; MS (EI)

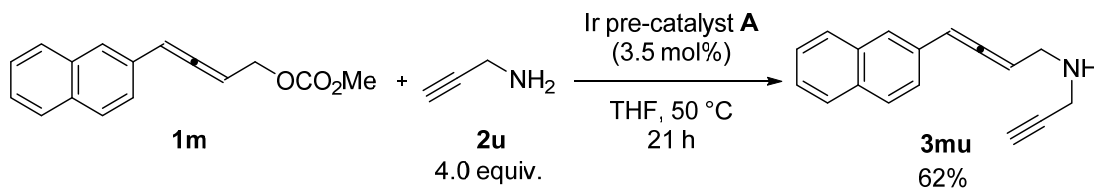
m/z (%) 293 ($M(^{79}\text{Br})^+$, 1.15), 295 ($M(^{81}\text{Br})^+$, 1.10), 100 (100); IR (neat) ν = 2961, 2800, 1948, 1485, 1428, 1342, 1262, 1251, 1110, 1069, 1037, 1003 cm^{-1} ; HRMS calcd for $\text{C}_{14}\text{H}_{17}\text{NO}^{79}\text{Br}$ ($[M(^{79}\text{Br})+\text{H}]^+$): 294.04880. Found: 294.04878.

(30) Synthesis of *N*-(4-(naphth-2-yl)buta-2,3-dienyl) dibenzyl amine (**3mf**) (cyf-4-159)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.3 mg, 0.035 mmol), **1m** (254.4 mg, 1.0 mmol), and **2f** (804.7 mg, 4.0 mmol) in THF (5 mL) afforded **3mf** (337.5 mg, 90%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as a solid: recrystallization in petroleum ether (30-60 °C)/ethyl acetate afforded **3mf**: (m.p. 84.6-85.9 °C); ^1H NMR (400 MHz, CDCl_3) δ 7.80-7.70 (m, 3 H, ArH), 7.65 (s, 1 H, ArH), 7.51-7.34 (m, 7 H, ArH), 7.34-7.26 (m, 4 H, ArH), 7.26-7.19 (m, 2 H, ArH), 6.38-6.32 (m, 1 H, =CH), 5.69 (q, J = 6.8 Hz, 1 H, =CH), 3.71 (dd, J = 19.6, 13.6 Hz, 4 H, $2\times\text{NCH}_2$), 3.28 (dd, J = 7.0, 2.2 Hz, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 206.7, 139.4, 133.7, 132.6, 132.0, 128.8, 128.23, 128.20, 127.7, 127.6, 126.9, 126.2, 125.6, 125.5, 124.7, 95.1, 91.7, 57.6, 51.9; MS (ESI) m/z 376 ($[M+\text{H}]^+$); IR (neat) ν = 3053, 3028, 2935, 2905, 2834, 2805, 1936, 1597, 1493, 1453, 1433, 1363, 1316, 1300, 1285, 1237, 1208, 1121, 1091, 1073, 1027, 1004 cm^{-1} ; Anal. Calcd for $\text{C}_{28}\text{H}_{25}\text{N}$: C 89.56, H 6.71. Found: C 89.65, H 6.82.

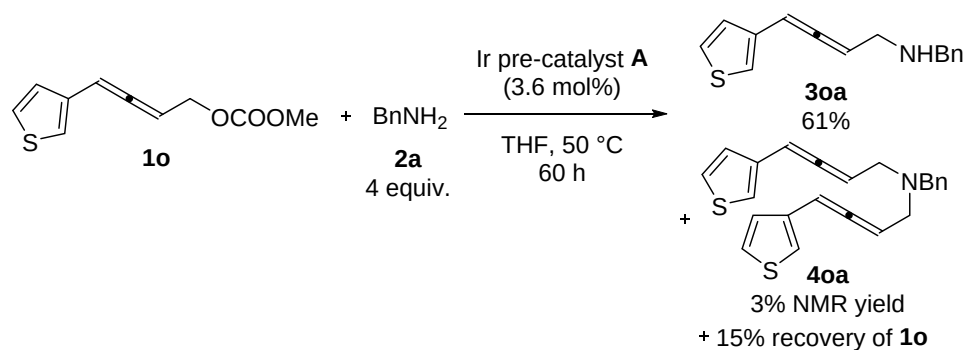
(31) Synthesis of *N*-(4-(naphth-2-yl)buta-2,3-dienyl) 2-propynylamine (**3mu**) (xjz-3-147)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.4 mg, 0.035 mmol), **1m** (254.0 mg, 1.0 mmol), and **2u** (220.8 mg, 4.0 mmol) in THF (5 mL)

afforded **3mu** (144.6 mg, 62%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.82-7.68 (m, 3 H, ArH), 7.63 (s, 1 H, ArH), 7.52-7.35 (m, 3 H, ArH), 6.40 (dt, J = 6.4, 2.9 Hz, 1 H, =CH), 5.70 (q, J = 6.4 Hz, 1 H, =CH), 3.57-3.40 (m, 4 H, $2\times\text{NCH}_2$), 2.21 (t, J = 2.4 Hz, 1 H, $\equiv\text{CH}$), 1.86-1.16 (brs, 1 H, NH); ^{13}C NMR (100 MHz, CDCl_3) δ 205.6, 133.5, 132.5, 131.6, 128.2, 127.60, 127.59, 126.1, 125.6, 125.5, 124.5, 96.3, 93.7, 81.7, 71.6, 46.7, 37.3; IR (neat) ν = 3290, 3052, 2912, 2826, 2110, 1945, 1597, 1507, 1449, 1326, 1269, 1113 cm^{-1} ; MS (ESI) m/z 234 ($[\text{M}+\text{H}]^+$); HRMS Calcd. for $\text{C}_{17}\text{H}_{16}\text{N}$ ($[\text{M}+\text{H}]^+$): 234.1277. Found 234.1279.

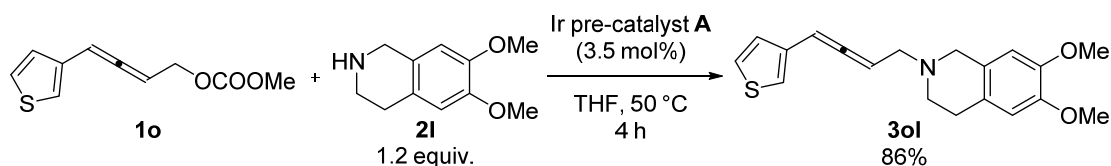
(32) Synthesis of *N*-(4-(thiophen-3-yl)buta-2,3-dienyl) benzylamine (**3oa**) (cyf-3-196)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.7 mg, 0.036 mmol), **1o** (210.4 mg, 1.0 mmol), and **2a** (436.8 mg, 4.0 mmol) in THF (5 mL) afforded **3oa** (147.1 mg, 61%) (3% NMR yield of **4oa**, 15% recovery of **1o** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 10/1 (300 mL) to 1/1 (300 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.38-7.13 (m, 6 H, ArH), 7.08 (d, J = 4.2 Hz, 2 H, ArH), 6.34-6.28 (m, 1 H, =CH), 5.60 (q, J = 6.2 Hz, 1 H, =CH), 3.88-3.78 (m, 2 H, NCH_2), 3.38 (dd, J = 6.4, 2.9 Hz, 2 H, NCH_2), 1.53 (s, 1 H, NH); ^{13}C NMR (100 MHz, CDCl_3) δ 205.2, 139.9, 135.5, 128.3, 128.1, 126.9, 126.2, 125.9, 120.7, 93.2, 90.4, 52.9, 47.5; MS (ESI) m/z 242 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3063, 3027, 2834, 1950, 1494, 1452, 1357, 1325, 1233, 1116, 1079, 1028 cm^{-1} ; HRMS calcd for $\text{C}_{15}\text{H}_{16}\text{NS}$ ($[\text{M}+\text{H}]^+$): 242.09980. Found: 242.10033.

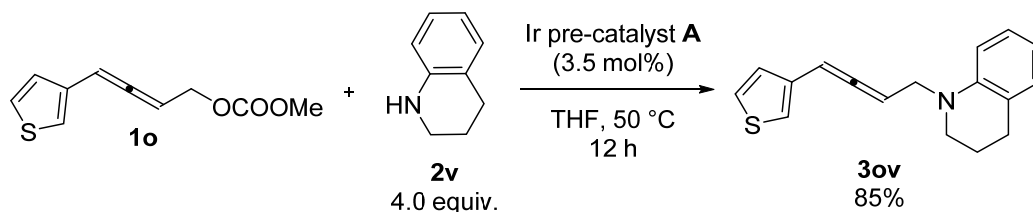
(33) Synthesis of *N*-(4-(thiophen-3-yl)buta-2,3-dienyl) 6,7-dimethoxy-1,2,3,4-

tetrahydro-isoquinoline (**3ol**) (cyf-4-71)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.5 mg, 0.035 mmol), **1o** (209.5 mg, 1.0 mmol), and **2l** (232.5 mg, 1.2 mmol) in THF (5 mL) afforded **3ol** (281.6 mg, 86%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 3/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.32-7.25 (m, 1 H, ArH), 7.09 (d, J = 4.0 Hz, 2 H, ArH), 6.60 (s, 1 H, ArH), 6.51 (s, 1 H, ArH), 6.34-6.27 (m, 1 H, =CH), 5.63 (q, J = 6.8 Hz, 1 H, =CH), 3.88-3.79 (m, 6 H, $2\times\text{OCH}_3$), 3.66 (s, 2 H, NCH_2), 3.37-3.27 (m, 2 H, NCH_2), 2.89-2.78 (m, 4 H, CH_2 and NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 206.6, 147.5, 147.1, 135.4, 126.3, 126.2, 125.9, 120.8, 111.3, 109.4, 90.8, 89.3, 57.0, 55.84, 55.80, 55.0, 50.2, 28.5; MS (ESI) m/z 328 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3099, 2999, 2936, 2808, 1947, 1610, 1517, 1461, 1362, 1284, 1256, 1227, 1127, 1089, 1008 cm^{-1} ; HRMS calcd for $\text{C}_{19}\text{H}_{22}\text{O}_2\text{NS}$ ($[\text{M}+\text{H}]^+$): 328.1366. Found: 328.1353.

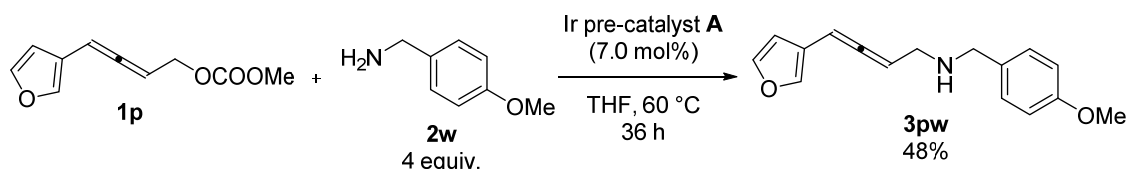
(34) Synthesis of *N*-(4-(thiophen-3-yl)buta-2,3-dienyl) 6,7-dimethoxy-1,2,3,4-tetrahydroquinoline (**3ov**) (zwf-6-117)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.6 mg, 0.035 mmol), **1o** (210.0 mg, 1.0 mmol), and **2v** (532.6 mg, 4.0 mmol) in THF (5 mL) afforded **3ov** (226.8 mg, 85%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 10/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.32-7.22 (m, 1 H, ArH), 7.20-6.86 (m, 6 H, ArH), 6.40-6.13 (m, 1 H, =CH), 5.62 (q, J = 6.8 Hz, 1 H, =CH), 3.71 (dd, J = 18.0, 15.2 Hz, 2 H, NCH_2), 3.31 (dd, J = 7.2, 2.0 Hz, 2 H, NCH_2), 2.92 (t, J = 5.8 Hz, 2 H, CH_2), 2.82 (t, J = 6.0 Hz, 2 H, CH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 206.5, 135.4, 134.5, 134.0, 128.6,

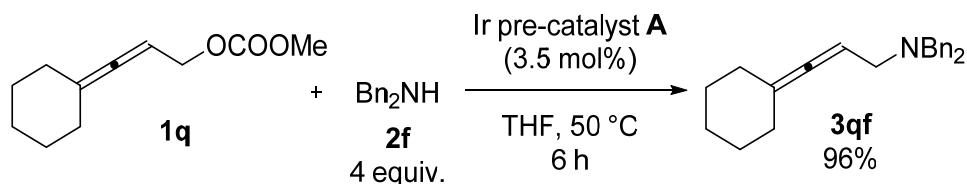
126.5, 126.2, 126.1, 125.9, 125.6, 120.7, 90.7, 89.4, 57.2, 55.5, 50.2, 29.0; IR (neat) ν = 2916, 2780, 1950, 1497, 1454, 1328, 1057 cm^{-1} ; MS (EI) m/z (%): 267 (M^+ , 1.13), 146 (100); HRMS Calcd. for $\text{C}_{17}\text{H}_{18}\text{NS}$ ($[\text{M}+\text{H}]^+$): 268.1154. Found 268.1159.

(35) Synthesis of *N*-(4-(fur-3-yl)buta-2,3-dienyl) 4-methoxybenzylamine (**3pw**) (cyf-3-148)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (53.3 mg, 0.07 mmol), **1p** (194.3 mg, 1.0 mmol), and **2w** (560.3 mg, 4.0 mmol) in THF (5 mL) afforded **3pw** (122.6 mg, 48%) (eluent: dichloromethane/ethyl acetate = 10/1 (200 mL) to 1:1 (200 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.37 (m, 2 H, ArH), 7.25-7.19 (m, 2 H, ArH), 6.88-6.81 (m, 2 H, ArH), 6.39 (m, 1 H, ArH), 6.14 (dt, J = 6.4, 2.9 Hz, 1 H, =CH), 5.57 (q, J = 6.3 Hz, 1 H, =CH), 3.82-3.75 (m, 5 H, NCH_2 and OCH_3), 3.35 (dd, J = 6.0, 2.8 Hz, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 204.9, 158.6, 143.4, 139.4, 132.0, 129.4, 120.0, 113.7, 108.8, 93.1, 85.9, 55.2, 52.2, 47.3; MS (ESI) m/z 256 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3317, 3132, 2998, 2906, 2831, 1947, 1606, 1507, 1451, 1362, 1297, 1242, 1164, 1103, 1069, 1025 cm^{-1} ; HRMS calcd for $\text{C}_{16}\text{H}_{18}\text{NO}_2$ ($[\text{M}+\text{H}]^+$): 256.13321. Found: 256.13323.

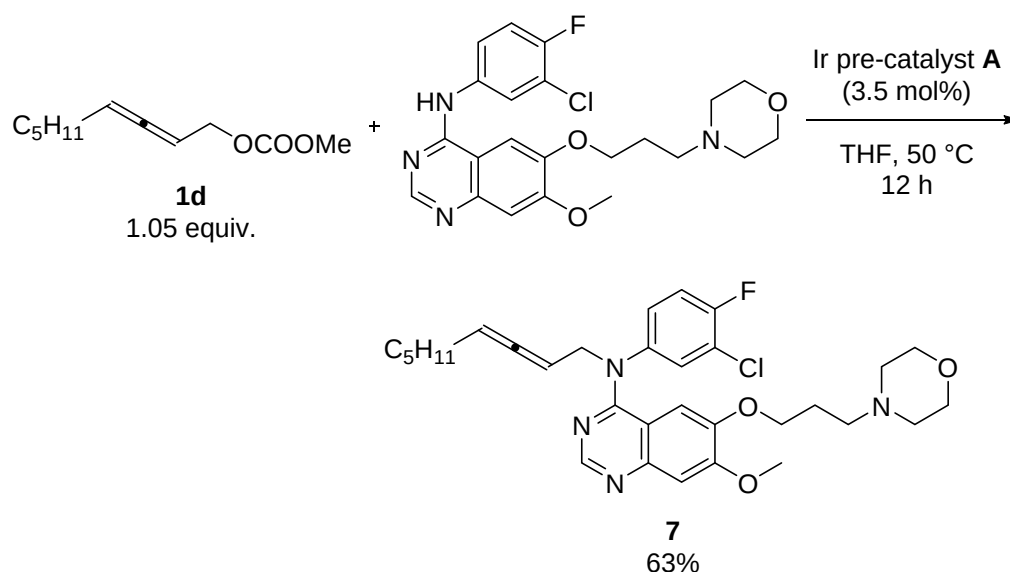
(36) Synthesis of *N*-(3-cyclohexylidene)prop-2-enyl dibenzylamine (**3qf**) (cyf-5-43)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.2 mg, 0.035 mmol), **1q** (196.2 mg, 1.0 mmol), and **2f** (804.9 mg, 4.0 mmol) in THF (5 mL) afforded **3qf** (304.1 mg, 96%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.40-7.34 (m, 4 H, ArH), 7.33-7.26 (m, 4 H, ArH),

7.25-7.19 (m, 2 H, ArH), 5.05-4.98 (m, 1 H, =CH), 3.63 (s, 4 H, 2×NCH₂), 3.06 (d, *J* = 6.8 Hz, 2 H, NCH₂), 2.16-2.08 (m, 4 H, 2×CH₂), 1.63-1.46 (m, 6 H, 3×CH₂); ¹³C NMR (100 MHz, CDCl₃) δ 200.1, 139.6, 128.8, 128.1, 126.7, 101.9, 84.9, 57.1, 52.6, 31.5, 27.2, 26.1; MS (ESI) *m/z* 318 ([M+H]⁺); IR (neat) *v* = 3027, 2975, 2852, 2794, 1960, 1602, 1493, 1446, 1366, 1326, 1262, 1239, 1117, 1072, 1027 cm⁻¹; HRMS calcd for C₂₃H₂₈N ([M+H]⁺): 318.2216. Found: 318.2216.

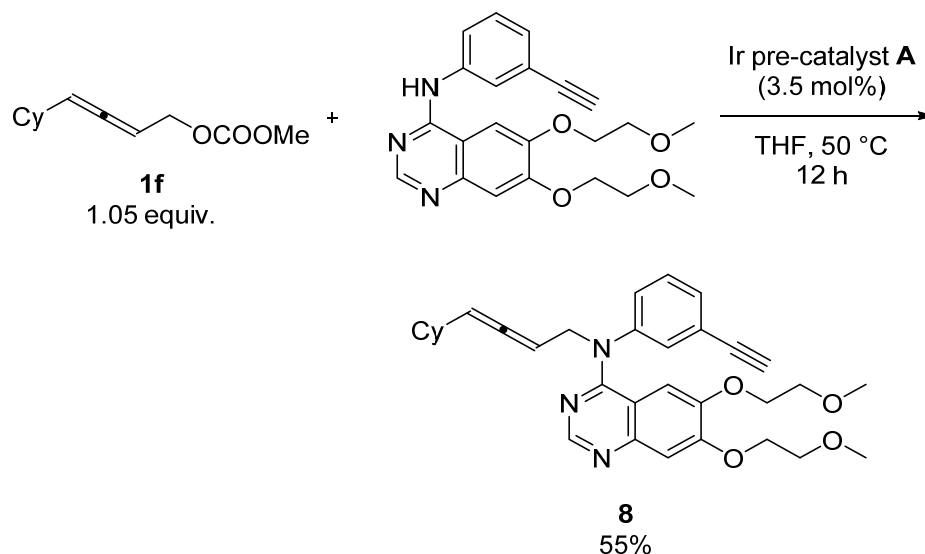
(37) Synthesis of **7** (cyf-4-114)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.3 mg, 0.035 mmol), **1d** (208.3 mg, 1.05 mmol), and gefitinib (456.1 mg, 1.0 mmol) in THF (5 mL) afforded **7** (358.3 mg, 63%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 1/1 (200 mL) to dichloromethane/methanol = 30/1 (300 mL)) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 7.81 (s, 1 H, ArH), 7.68 (s, 1 H, ArH), 7.22-7.13 (m, 1 H, ArH), 7.07 (t, *J* = 9.0 Hz, 1 H, ArH), 7.00-6.90 (m, 1 H, ArH), 6.64 (s, 1 H, ArH), 5.32-5.21 (m, 2 H, 2×=CH), 4.52-4.40 (m, 2 H, CH₂), 4.22 (t, *J* = 6.6 Hz, 2 H, CH₂), 3.95 (s, 3 H, OCH₃), 3.72 (t, *J* = 4.4 Hz, 4 H, 2×OCH₂), 2.60-2.40 (m, 6 H, 3×NCH₂), 2.07 (quint, *J* = 6.9 Hz, 2 H, CH₂), 1.97-1.79 (m, 2 H, CH₂), 1.34-1.12 (m, 6 H, 3×CH₂), 0.86 (t, *J* = 6.8 Hz, 3 H, CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 204.4, 153.8 (d, *J* = 241.3 Hz), 153.1, 148.7, 147.6, 132.4, 124.3 122.2 (d, *J* = 6.1 Hz), 120.2 (d, *J* = 7.6 Hz), 116.1 (d, *J* = 21.5 Hz), 113.8, 108.5, 97.5, 95.7, 86.3, 67.4, 66.9, 56.2, 55.3, 53.6, 48.6, 31.1, 28.6, 28.3, 26.1,

22.3, 13.9; ^{19}F NMR (376 MHz, CDCl_3) δ -121.4 (m); MS (ESI) m/z 569 ($[\text{M}(^{35}\text{Cl})+\text{H}]^+$); IR (neat) ν = 2928, 2855, 1964, 1616, 1575, 1551, 1530, 1501, 1485, 1459, 1427, 1401, 1359, 1277, 1257, 1210, 1141, 1116, 1069, 1053, 1012 cm^{-1} ; HRMS calcd for $\text{C}_{31}\text{H}_{39}\text{N}_4\text{O}_3\text{F}^{35}\text{Cl}$ ($[\text{M}(^{35}\text{Cl})+\text{H}]^+$): 569.2689. Found: 569.2675.

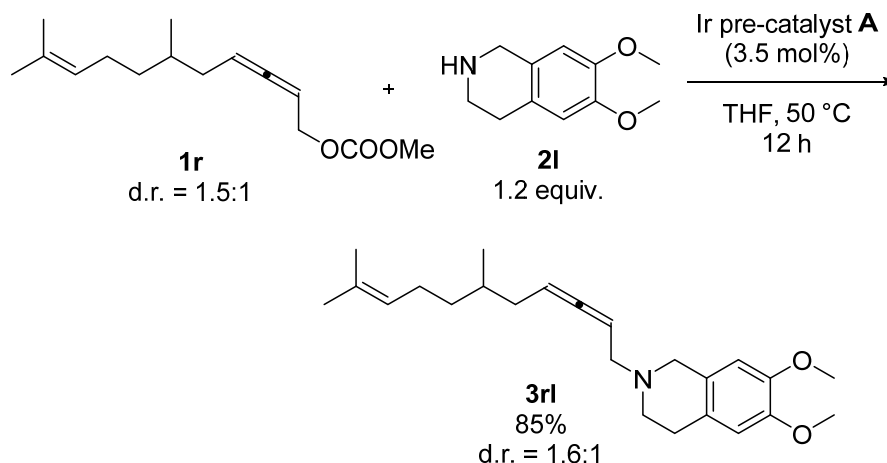
(38) Synthesis of **8** (cyf-4-128)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.4 mg, 0.035 mmol), **1f** (221.2 mg, 1.05 mmol), and erotinib (401.7 mg, 1.0 mmol) in THF (5 mL) afforded **8** (289.9 mg, 55%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1 (200 mL) to ethyl acetate (400 mL)) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.83 (s, 1 H, ArH), 7.64 (s, 1 H, ArH), 7.30-7.17 (m, 2 H, ArH), 7.14 (d, J = 6.8 Hz, 1 H, ArH), 7.05 (d, J = 8.4 Hz, 1 H, ArH), 6.73 (s, 1 H, ArH), 5.32-5.19 (m, 2 H, $2\times=\text{CH}$), 4.45-4.38 (m, 2 H, OCH_2), 4.33-4.20 (m, 4 H, OCH_2 and NCH_2), 3.85-3.78 (m, 4 H, $2\times\text{OCH}_2$), 3.51-3.43 (m, 6 H, $2\times\text{OCH}_3$), 3.00 (s, 1 H, $\equiv\text{CH}$), 1.92-1.70 (m, 2 H, CH_2), 1.70-1.50 (m, 4 H, CH_2 , CH , and one proton of CH_2), 1.27-1.02 (m, 3 H, CH_2 and one proton of CH_2), 0.96-0.83 (m, 2 H, CH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 203.1, 152.5, 152.3, 151.0, 148.8, 147.8, 132.5, 128.6, 126.1, 123.3, 122.1, 114.4, 109.3, 101.6, 100.2, 87.3, 84.4, 76.1, 70.8, 70.7, 69.1, 68.5, 59.2, 59.0, 48.1, 36.9, 32.8, 32.5, 25.8, 25.74, 25.68; MS (EI) m/z 527 (M^+ , 14.32), 67 (100); IR (neat) ν = 3298, 3052, 2924, 2850, 1963, 1615, 1579, 1551, 1502, 1473, 1449, 1406, 1359, 1274, 1242, 1198, 1125, 1058, 1033

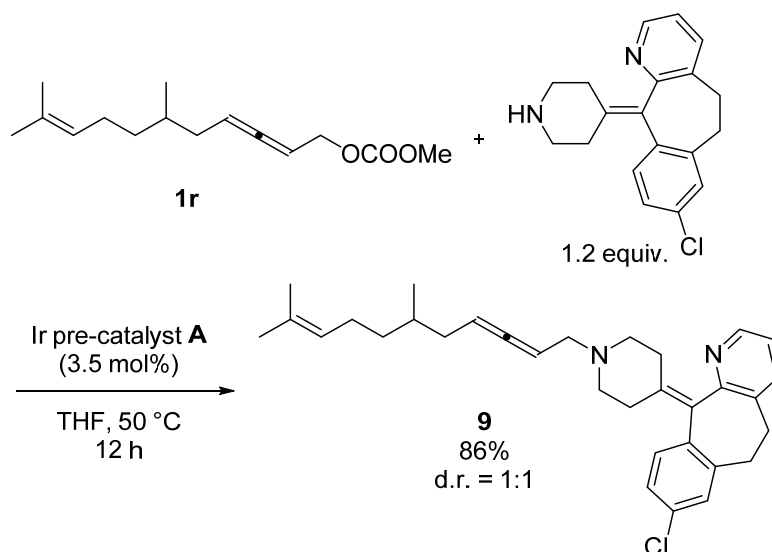
cm⁻¹; HRMS calcd for C₃₂H₃₇N₃O₄ (M⁺): 527.2784. Found: 527.2787.

(39) Synthesis of *N*-6,10-dimethylundeca-2,3,9-trienyl 6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline (**3rl**) (cyf-4-145)



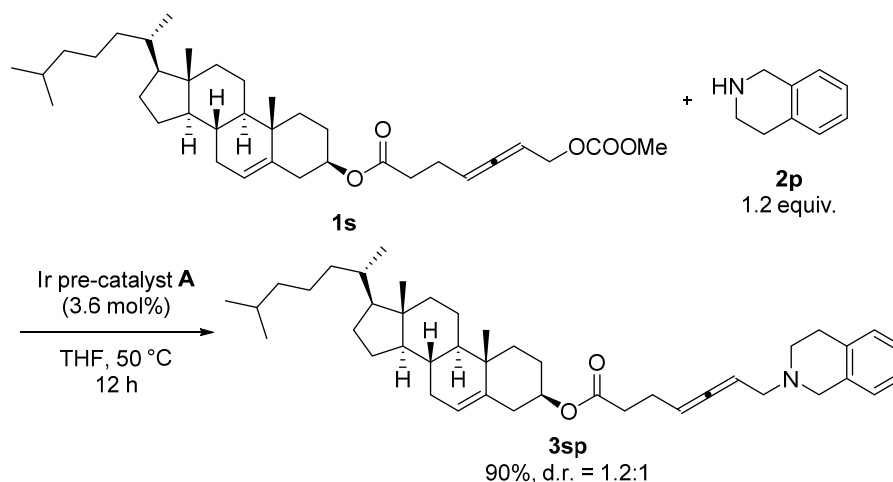
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), **1r** (252.6 mg, 1.0 mmol), and **2l** (232.0 mg, 1.2 mmol) in THF (5 mL) afforded **3rl** (314.2 mg, 85%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 8/1) as an oil: ¹H NMR (400 MHz, CDCl₃) δ 6.59 (s, 1 H, ArH), 6.51 (s, 1 H, ArH), 5.26-5.02 (m, 3 H, 3×=CH), 3.93-3.75 (m, 6 H, 2×OCH₃), 3.60 (s, 2 H, NCH₂), 3.19 (d, *J* = 6.8 Hz, 2 H, NCH₂), 2.88-2.40 (m, 4 H, 2×NCH₂), 2.13-1.82 (m, 4 H, 2×CH₂), 1.75-1.47 (m, 7 H, 2×CH₃ and CH), 1.46-1.34 (m, 1 H, one proton of CH₂), 1.28-1.14 (m, 1 H, one proton of CH₂), 0.93 (d, *J* = 6.8 Hz, 3 H, CH₃); MS (DART) *m/z* 370 ([M+H]⁺); IR (neat) ν = 2910, 2835, 2743, 1960, 1612, 1516, 1460, 1378, 1359, 1334, 1282, 1255, 1227, 1126, 1097, 1017 cm⁻¹; HRMS calcd for C₂₄H₃₆NO₂ ([M+H]⁺): 370.2741. Found: 370.2737.

(40) Synthesis of **9** (cyf-5-64, 4-54)



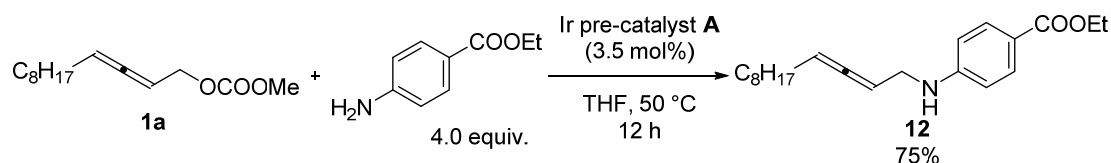
Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.2 mg, 0.035 mmol), **1r** (252.1 mg, 1.0 mmol), and desloratadine (380.9 mg, 1.2 mmol) in THF (5 mL) afforded **9** (442.9 mg, 86%, 95% purity) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 1/2) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 8.40 (d, J = 3.6 Hz, 1 H, ArH), 7.41 (d, J = 6.8 Hz, 1 H, ArH), 7.17-7.09 (m, 3 H, ArH), 7.09-7.03 (m, 1 H, ArH), 5.15-4.99 (m, 3 H, $3\times=\text{CH}$), 3.48-3.30 (m, 2 H, NCH_2), 3.09-2.95 (m, 2 H, NCH_2) 2.90-2.74 (m, 4 H, NCH_2 and CH_2), 2.60-2.50 (m, 1 H, one proton of CH_2), 2.50-2.32 (m, 3 H, CH_2 and one proton of CH_2), 2.22-2.10 (m, 2 H, CH_2) 2.05-1.75 (m, 4 H, $2\times\text{CH}_2$), 1.67 (s, 3 H, CH_3), 1.61-1.30 (m, 5 H, CH_3 , CH and one proton of CH_2), 1.21-1.08 (m, 1 H, one proton of CH_2), 0.89 (d, J = 6.8 Hz, 3 H, CH_3); MS (EI) m/z 486 ($\text{M}(^{35}\text{Cl})^+$, 5.63), 488 ($\text{M}(^{37}\text{Cl})^+$, 2.90), 323 (100); IR (neat) ν = 3046, 2909, 2793, 2748, 1959, 1643, 1584, 1435, 1377, 1336, 1296, 1249, 1207, 1173, 1115, 1016 cm^{-1} ; HRMS calcd for $\text{C}_{32}\text{H}_{39}\text{N}_2^{35}\text{Cl}$ ($\text{M}(^{35}\text{Cl})^+$): 486.2802. Found: 486.2795.

(41) Synthesis of **3sp** (cyf-4-59)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (13.4 mg, 0.018 mmol), **1s** (284.3 mg, 0.5 mmol), and **2p** (81.9 mg, 0.6 mmol) in THF (2.5 mL) afforded **3sp** (281.5 mg, 90%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.16-7.06 (m, 3 H, ArH), 7.06-6.99 (m, 1 H, ArH), 5.42-5.33 (m, 1 H, =CH), 5.33-5.20 (m, 2 H, $2\times\text{=CH}$), 4.70-4.57 (m, 1 H, OCH), 3.76-3.63 (m, 2 H, NCH_2), 3.26-3.13 (m, 2 H, NCH_2), 2.98-2.81 (m, 2 H, NCH_2), 2.81-2.72 (m, 2 H, CH_2), 2.50-2.25 (m, 6 H), 2.08-1.75 (m, 6 H), 1.65-0.77 (m, 32 H), 0.67 (s, 3 H, CH_3); MS (EI) m/z (%) 625 (M^+ , 3.95), 131 (100); IR (neat) ν = 3025, 2937, 2897, 2865, 2797, 2750, 2323, 1963, 1729, 1458, 1368, 1253, 1173, 1135, 1089, 1055, 1001 cm^{-1} ; HRMS calcd for $\text{C}_{43}\text{H}_{63}\text{NO}_2$ (M^+): 625.4859. Found: 625.4863.

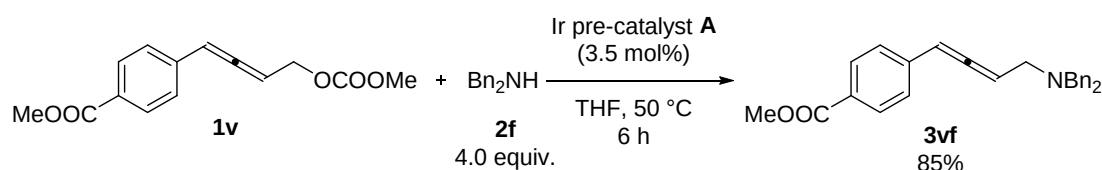
(42) Synthesis of *N*-dodeca-2,3-dienyl 4-(ethoxycarbonyl)aniline (**12**) (cyf-5-100)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), **1a** (240.2 mg, 1.0 mmol), and 4-(ethoxycarbonyl)aniline (674.5 mg, 4.0 mmol) in THF (5 mL) afforded **12** (247.0 mg, 75%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.86 (d, J = 8.8 Hz, 2 H, ArH), 6.56 (d, J = 8.4 Hz, 2 H, ArH), 5.31-5.18 (m, 2 H, $2\times\text{=CH}$), 4.43-4.26 (m, 3 H, OCH_2 and NH), 3.81-3.70 (m, 2 H, NCH_2), 2.03-1.90 (m, 2 H, CH_2), 1.41-1.18 (m, 15 H, CH_3 and $6\times\text{CH}_2$), 0.88 (t, J = 6.8 Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 203.4, 166.8,

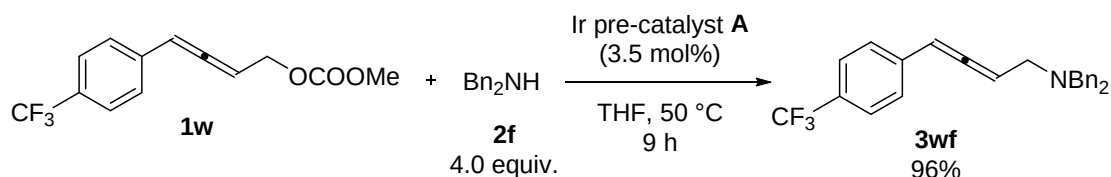
151.5, 131.3, 118.7, 111.7, 94.3, 88.4, 60.1, 41.9, 31.8, 29.4, 29.2, 29.1, 29.0, 28.7, 22.6, 14.4, 14.0; MS (ESI) m/z 330 ($[M+H]^+$); IR (neat) ν = 3374, 2923, 2853, 1962, 1689, 1602, 1525, 1463, 1416, 1390, 1366, 1331, 1311, 1267, 1172, 1104, 1021 cm^{-1} ; HRMS calcd for $\text{C}_{21}\text{H}_{32}\text{NO}_2$ ($[M+H]^+$): 330.2428. Found: 330.2428.

(43) Synthesis of *N*-(4-(4-(methoxycarbonyl)phenyl)buta-2,3-dienyl) dibenzylamine (**3vf**) (cyf-5-99)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.3 mg, 0.035 mmol), **1v** (261.8 mg, 1.0 mmol), and **2f** (805.0 mg, 4.0 mmol) in THF (5 mL) afforded **3vf** (325.6 mg, 85%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.96 (d, J = 7.6 Hz, 2 H, ArH), 7.42-7.18 (m, 12 H, ArH), 6.23-6.17 (m, 1 H, =CH), 5.67 (q, J = 6.5 Hz, 1 H, =CH), 3.89 (s, 3 H, OCH_3), 3.68 (dd, J = 17.2, 14.0 Hz, 4 H, $2\times\text{NCH}_2$), 3.26 (d, J = 6.8 Hz, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 207.0, 166.9, 139.6, 139.2, 129.9, 128.7, 128.3, 128.2, 127.0, 126.5, 94.3, 91.7, 57.5, 52.0, 51.5; MS (ESI) m/z 384 ($[M+H]^+$); IR (neat) ν = 3027, 2942, 1906, 2884, 2833, 2803, 1944, 1707, 1605, 1493, 1452, 1436, 1279, 1240, 1202, 1175, 1111, 1090, 1073, 1030, 1002 cm^{-1} ; HRMS calcd for $\text{C}_{26}\text{H}_{26}\text{NO}_2$ ($[M+H]^+$): 384.1958. Found: 384.1960.

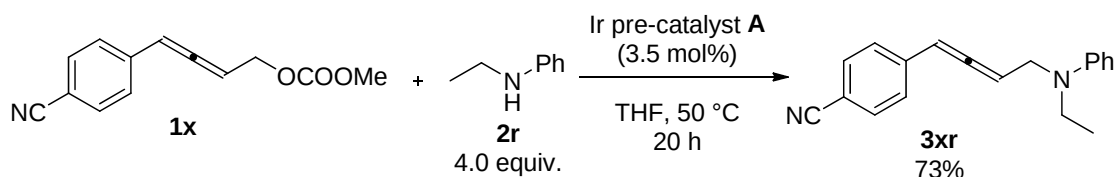
(44) Synthesis of *N*-(4-(4-(trifluoromethyl)phenyl)buta-2,3-dienyl) dibenzylamine (**3wf**) (cyf-5-98)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.4 mg, 0.035 mmol), **1w** (272.3 mg, 1.0 mmol), and **2f** (804.7 mg, 4.0 mmol) in THF (5 mL) afforded

3wf (377.2 mg, 96%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.52 (d, J = 8.0 Hz, 2 H, ArH), 7.40-7.20 (m, 12 H, ArH), 6.23-6.17 (m, 1 H, =CH), 5.68 (q, J = 6.8 Hz, 1 H, =CH), 3.68 (dd, J = 16.2, 14.2 Hz, 4 H, $2\times\text{NCH}_2$), 3.26 (d, J = 6.4 Hz, 2 H, NCH_2); ^{13}C NMR (126 MHz, CDCl_3) δ 206.8, 139.2, 138.5, 128.7, 128.6 (q, J = 32.4 Hz), 128.2, 127.0, 126.8, 125.4 (q, J = 3.8 Hz), 123.8 (q, J = 271.9 Hz), 93.9, 92.0, 57.6, 51.5; ^{19}F NMR (376 MHz, CDCl_3) δ -62.9 (s); MS (ESI) m/z 394 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3029, 2918, 2805, 1947, 1613, 1494, 1452, 1365, 1323, 1239, 1203, 1163, 1120, 1064, 1014, 1003 cm^{-1} ; HRMS calcd for $\text{C}_{25}\text{H}_{23}\text{NF}_3$ ($[\text{M}+\text{H}]^+$): 394.1777. Found: 394.1780.

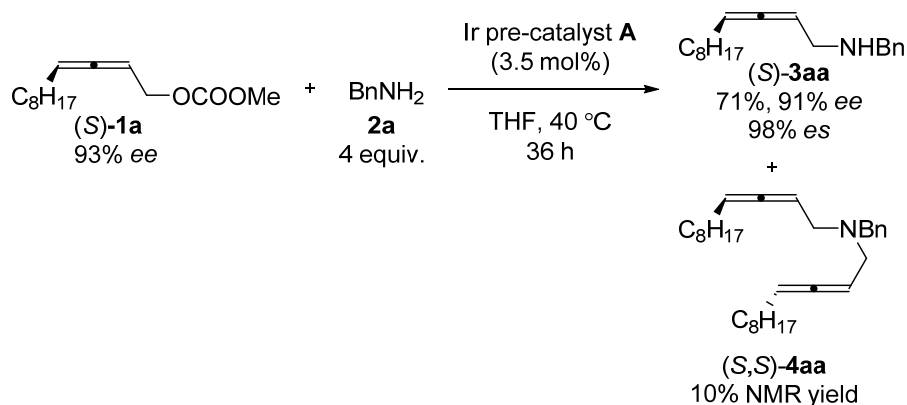
(45) Synthesis of *N*-(4-(4-cyanophenyl)buta-2,3-dienyl) dibenzylamine (**3xr**) (cyf-5-102)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.4 mg, 0.035 mmol), **1x** (229.3 mg, 1.0 mmol), and **2r** (494.1 mg, 4.0 mmol) in THF (5 mL) afforded **3xr** (199.8 mg, 73%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as an oil: ^1H NMR (400 MHz, CDCl_3) δ 7.52 (d, J = 8.0 Hz, 2 H, ArH), 7.30-7.10 (m, 4 H, ArH), 6.76-6.65 (m, 3 H, ArH), 6.19 (dt, J = 6.8, 2.9 Hz, 1 H, =CH), 5.68 (q, J = 6.1 Hz, 1 H, =CH), 4.08 (dd, J = 6.0, 2.8 Hz, 2 H, NCH_2), 3.49-3.30 (m, 2 H, NCH_2), 1.20 (t, J = 7.0 Hz, 3 H, CH_3); ^{13}C NMR (126 MHz, CDCl_3) δ 206.7, 147.4, 139.3, 132.2, 129.2, 127.2, 119.0, 116.5, 112.6, 109.9, 95.1, 92.7, 48.9, 45.1, 12.6; MS (ESI) m/z 275 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3040, 2971, 2928, 2871, 2225, 1943, 1598, 1574, 1502, 1461, 1390, 1345, 1268, 1228, 1178, 1123, 1074, 1038, 1019 cm^{-1} ; HRMS calcd for $\text{C}_{19}\text{H}_{19}\text{N}_2$ ($[\text{M}+\text{H}]^+$): 275.1543. Found: 275.1540.

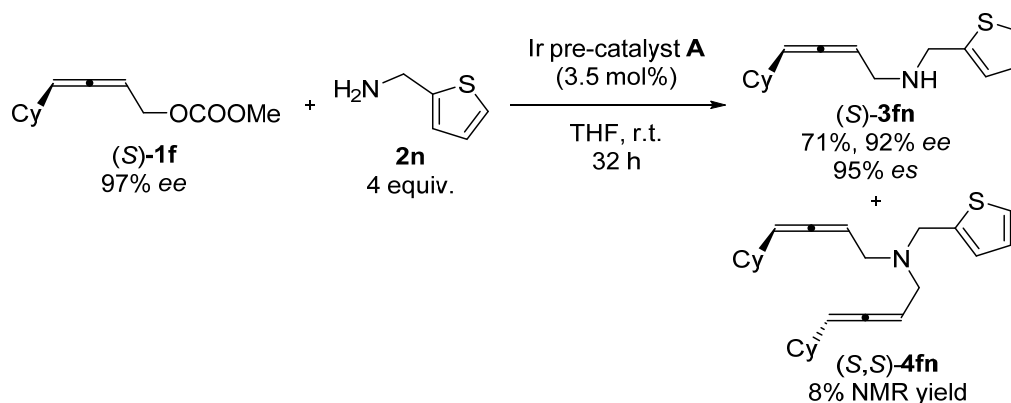
4. Ir-catalyzed asymmetric synthesis of (S)-*N*-2,3-dienyl amines.

(1) Synthesis of (S)-*N*-dodeca-2,3-dienyl benzylamine ((S)-**3aa**) (cyf-4-103)



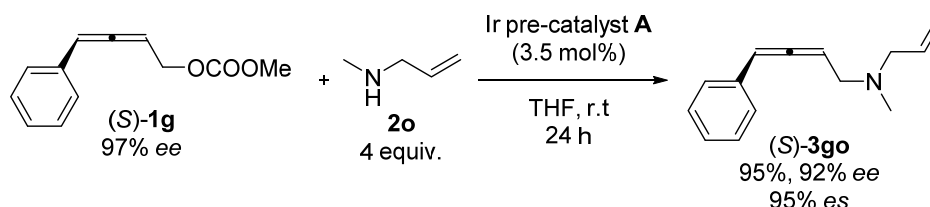
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (157.7 mg, 0.21 mmol), (S)-**1a** (1.4417 g, 6.0 mmol), and **2a** (2.6253 g, 24.0 mmol) in THF (30 mL) afforded (S)-**3aa** (1.1541 g, 71%) (10% NMR yield of (S,S)-**4aa** as determined by ^1H NMR analysis of the crude product using mesitylene as internal standard) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20/1 (525 mL) to 2/1 (1.5 L)) as an oil: 91% ee (HPLC conditions: OD-H column, hexane, 1 mL/min, $\lambda = 214$ nm, $t_{\text{R}}(\text{major}) = 24.8$ min, $t_{\text{R}}(\text{minor}) = 27.5$ min); $[\alpha]_{\text{D}}^{28} = +54.1$ ($c = 1.02$, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 7.38-7.20 (m, 5 H, ArH), 5.19 (quintet, $J = 4.6$ Hz, 2 H, $2\times=\text{CH}$), 3.86-3.78 (m, 2 H, NCH_2), 3.25 (t, $J = 4.4$ Hz, 2 H, NCH_2), 2.01 (quintet, $J = 5.9$ Hz, 2 H, CH_2), 1.45-1.20 (m, 12 H, $6\times\text{CH}_2$), 0.88 (t, $J = 6.8$ Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 203.9, 140.2, 128.3, 128.2, 126.9, 92.4, 89.8, 53.0, 47.9, 31.8, 29.4, 29.3, 29.2, 29.1, 28.8, 22.6, 14.1; MS (EI) m/z 271 (M^+ , 1.22), 91 (100); IR (neat) $\nu = 3063, 3027, 2955, 2923, 2853, 1961, 1727, 1494, 1452, 1358, 1331, 1198, 1108, 1075, 1028$ cm^{-1} ; HRMS calcd for $\text{C}_{19}\text{H}_{29}\text{N}$ (M^+): 271.2300. Found: 271.2296.

(2) Synthesis of (S)-N-4-cyclohexylbuta-2,3-dienyl thiophen-2-ylmethanamine ((S)-**3fn**) (cyf-3-173, 4-166)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), **(S)-1f** (210.4 mg, 1.0 mmol), and **2n** (467.1 mg, 4.0 mmol) in THF (5 mL) afforded **(S)-3fn** (175.8 mg, 71%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 20/1) as an oil: 92% ee (HPLC conditions: AD-H column, hexane/*i*PrOH = 95/5, 1 mL/min, λ = 214 nm, $t_{\text{R}}(\text{major})$ = 6.2 min, $t_{\text{R}}(\text{minor})$ = 7.0 min); $[\alpha]_{\text{D}}^{24}$ = +82.8 (c = 1.015, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.23-7.18 (m, 1 H, ArH), 6.97-6.90 (m, 2 H, ArH), 5.26-5.16 (m, 2 H, 2 $\times$ =CH), 4.06-3.98 (m, 2 H, NCH₂), 3.28 (dd, J = 6.0, 3.2 Hz, 2 H, NCH₂), 2.05-1.93 (m, 1 H, CH), 1.80-1.55 (m, 6 H, 2 $\times$ CH₂, NH, and one proton of CH₂), 1.35-1.04 (m, 5 H, 2 $\times$ CH₂ and one proton of CH₂); ¹³C NMR (100 MHz, CDCl₃) δ 202.7, 143.9, 126.5, 124.8, 124.3, 98.5, 90.5, 47.6, 47.3, 37.1, 33.1, 33.0, 26.0, 25.9; MS (ESI) m/z 248 ([M+H]⁺); IR (neat) ν = 2921, 2849, 1958, 1446, 1367, 1345, 1299, 1259, 1227, 1167, 1104, 1077, 1037 cm⁻¹; HRMS calcd for C₁₅H₂₂NS ([M+H]⁺): 248.14675. Found: 248.14718.

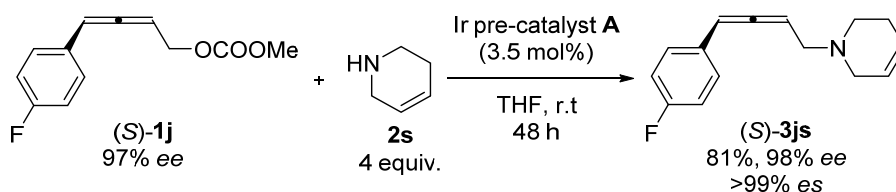
(3) Synthesis of **(S)-N-4-phenylbuta-2,3-dienyl N-methyl allylamine ((S)-3go)** (cyf-5-6, 3-172)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), **(S)-1g** (204.1 mg, 1.0 mmol), and **2o** (294.1 mg, 4.0 mmol) in THF (5 mL) afforded **(S)-3go** (189.1 mg, 95%) (eluent: petroleum ether (60-90 °C)/ethyl acetate =

5/1) as an oil: 92% ee (HPLC conditions: OD-3 column, hexane/*i*-PrOH = 98/2, 0.5 mL/min, λ = 230 nm, $t_{\text{R}}(\text{minor})$ = 8.4 min, $t_{\text{R}}(\text{major})$ = 8.9 min); $[\alpha]_{\text{D}}^{28}$ = +287.4 (c = 1.015, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 7.32-7.25 (m, 4 H, ArH), 7.22-7.15 (m, 1 H, ArH), 6.17 (dt, J = 6.4, 2.4 Hz, 1 H, =CH), 5.93-5.81 (m, 1 H, =CH), 5.59 (q, J = 6.9 Hz, 1 H, =CH), 5.22-5.13 (m, 2 H, =CH₂), 3.25-3.13 (m, 2 H, NCH₂), 3.09 (d, J = 6.4 Hz, 2 H, NCH₂), 2.31 (s, 3 H, NCH₃); ^{13}C NMR (126 MHz, CDCl_3) δ 206.1, 135.4, 134.3, 128.6, 126.8, 126.7, 117.8, 94.5, 91.4, 59.8, 55.9, 41.7; MS (ESI) m/z 200 ($[\text{M}+\text{H}]^+$); IR (neat) ν = 3078, 3030, 2977, 2942, 2875, 2781, 1947, 1749, 1642, 1597, 1494, 1454, 1415, 1351, 1330, 1314, 1264, 1194, 1154, 1129, 1071, 1025 cm^{-1} ; HRMS calcd for $\text{C}_{14}\text{H}_{18}\text{N}$ ($[\text{M}+\text{H}]^+$): 200.14338. Found: 200.14320.

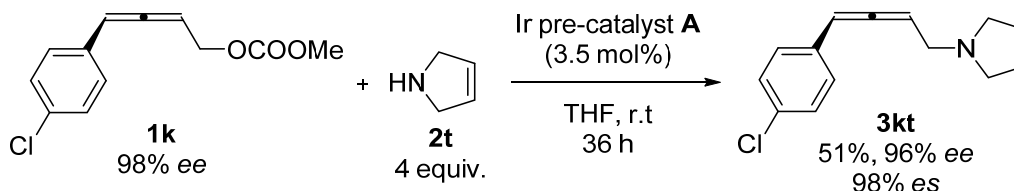
(4) Synthesis of (*S*)-*N*-(4-(4-fluorophenyl)buta-2,3-dienyl) 1,2,5,6-tetrahydropyridine ((*S*)-**3js**) (cyf-5-15, 4-15)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), (*S*)-**1j** (222.3 mg, 1.0 mmol), and **2s** (332.8 mg, 4.0 mmol) in THF (5 mL) afforded (*S*)-**3js** (185.8 mg, 81%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: 98% ee (HPLC conditions: IG column, hexane/*i*-PrOH = 400/1, 1 mL/min, λ = 214 nm, $t_{\text{R}}(\text{major})$ = 18.5 min, $t_{\text{R}}(\text{minor})$ = 23.5 min); $[\alpha]_{\text{D}}^{24}$ = +228.0 (c = 1.035, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 7.27-7.18 (m, 2 H, ArH), 7.04-6.95 (m, 2 H, ArH), 6.15 (dt, J = 6.4, 2.0 Hz, 1 H, =CH), 5.81-5.60 (m, 3 H, 3 $\times$ =CH), 3.27-3.20 (m, 2 H, NCH₂), 3.14-3.00 (m, 2 H, NCH₂), 2.72-2.60 (m, 2 H, NCH₂), 2.26-2.17 (m, 2 H, CH₂); ^{13}C NMR (126 MHz, CDCl_3) δ 205.8 (d, J = 1.9 Hz), 161.8 (d, J = 246.7 Hz), 130.2 (d, J = 2.8 Hz), 128.1 (d, J = 7.7 Hz), 125.14, 125.09, 115.5 (d, J = 22.0 Hz), 93.6, 91.8, 57.1, 52.1, 49.3, 26.1; ^{19}F NMR (376 MHz, CDCl_3) δ -115.9 (m); MS (EI) m/z (%) 229 (M^+ , 100); IR (neat) ν = 3033, 2907, 2787, 2742, 1948, 1657, 1601, 1505, 1383, 1329, 1194, 1155, 1132, 1114, 1092, 1031, 1001 cm^{-1} ; HRMS calcd for $\text{C}_{15}\text{H}_{17}\text{NF}$

([M+H]⁺): 230.13395. Found: 230.13381.

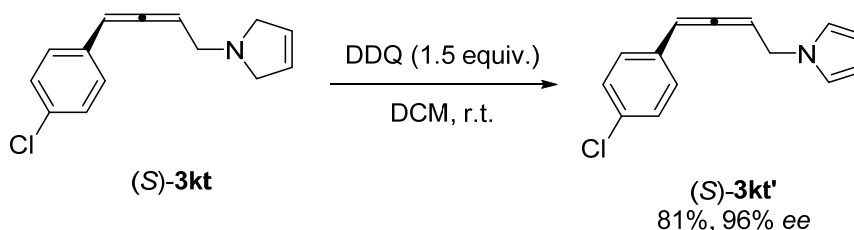
(5) Synthesis of (*S*)-*N*-(4-(4-chlorophenyl)buta-2,3-dienyl) 3-pyrroline ((*S*)-**3kt**) (cyf-5-23, 4-90)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), (*S*)-**1k** (239.1 mg, 1.0 mmol), and **2t** (284.3 mg, 4.0 mmol) in THF (5 mL) afforded (*S*)-**3kt** (118.4 mg, 51%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 2/1) as an oil: $[\alpha]_D^{27} = +262.1$ ($c = 1.045$, CHCl₃); ¹H NMR (500 MHz, CDCl₃) δ 7.29-7.24 (m, 2 H, ArH), 7.23-7.17 (m, 2 H, ArH), 6.17 (dt, $J = 6.5, 3.0$ Hz, 1 H, =CH), 5.78 (s, 2 H, HC=CH), 5.65 (q, $J = 6.7$ Hz, 1 H, =CH), 3.61-3.53 (m, 4 H, 2×NCH₂), 3.41 (dd, $J = 6.8, 2.3$ Hz, 2 H, NCH₂); ¹³C NMR (126 MHz, CDCl₃) δ 205.6, 132.9, 132.3, 128.7, 127.8, 127.6, 94.1, 93.1, 59.2, 54.2; MS (ESI) m/z (%) 232 ([M(³⁵Cl)+H]⁺), 234 ([M(³⁷Cl)+H]⁺); IR (neat) $\nu = 3071, 2936, 2868, 2773, 1947, 1709, 1638, 1590, 1488, 1433, 1364, 1331, 1276, 1158, 1089, 1008$ cm⁻¹; HRMS calcd for C₁₄H₁₅N³⁵Cl ([M(³⁵Cl)+H]⁺): 232.0888. Found: 232.0881.

The ee of (*S*)-**3kt** was determined by HPLC analysis after being converted to (*S*)-**3kt'**.

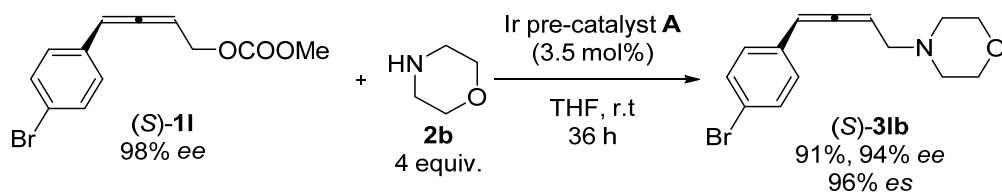
Synthesis of (*S*)-*N*-(4-(4-chlorophenyl)buta-2,3-dienyl) pyrrole ((*S*)-**3kt'**) (cyf-5-28)



To an oven-dried test tube was added (*S*)-**3kt** (57.7 mg, 0.25 mmol), DCM (1 mL) and 2,3-dicyano-5,6-dichlorobenzoquinone (87.0 mg, 0.375 mmol). After the completion of the reaction as monitored by TLC. The crude reaction mixture was filtrated through a short column of silica gel and eluted with DCM (20 mL). After

evaporation, the residue was purified by column chromatography on silica gel to afford (S)-**3kt'** (45.7 mg, 81%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1) as an oil: 96% ee (HPLC conditions: IG column, hexane/*i*-PrOH = 400/1, 1 mL/min, λ = 214 nm, t_R (major) = 9.9 min, t_R (minor) = 11.3 min); $[\alpha]_D^{30}$ = +205.2 (c = 1.015, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.32-7.25 (m, 2 H, ArH), 7.22-7.15 (m, 2 H, ArH), 6.72 (t, J = 2.0 Hz, 2 H, ArH), 6.24 (dt, J = 6.4, 2.6 Hz, 1 H, =CH), 6.18 (t, J = 2.0 Hz, 2 H, ArH), 5.77 (q, J = 6.7 Hz, 1 H, =CH), 3.59 (dd, J = 6.8, 2.4 Hz, 2 H, NCH₂); ¹³C NMR (100 MHz, CDCl₃) δ 205.8, 133.0, 132.0, 128.9, 128.0, 120.5, 108.6, 95.7, 93.3, 48.4; MS (ESI) m/z (%) 230 ([M(³⁵Cl)+H]⁺), 232 ([M(³⁷Cl)+H]⁺); IR (neat) ν = 3099, 2998, 2922, 2777, 1952, 1700, 1592, 1547, 1491, 1436, 1389, 1335, 1275, 1218, 1086, 1068, 1012 cm⁻¹; HRMS calcd for C₁₄H₁₃N³⁵Cl ([M(³⁵Cl)+H]⁺): 230.0731. Found: 230.0732.

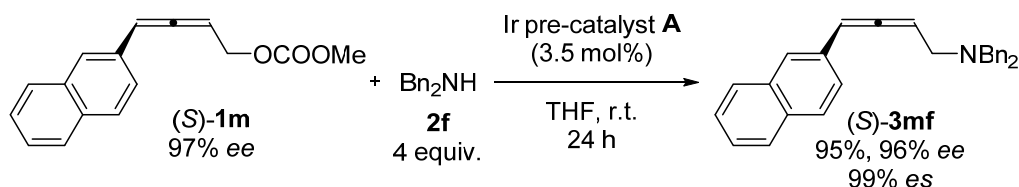
(6) Synthesis of (S)-N-(4-(4-bromophenyl)buta-2,3-dienyl) morpholine ((S)-**3lb**) (cyf-5-9, 3-162)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), (S)-**11** (282.8 mg, 1.0 mmol), and **2b** (349.2 mg, 4.0 mmol) in THF (5 mL) afforded (S)-**3lb** (268.8 mg, 91%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 5/1) as an oil: 94% ee (HPLC conditions: AD-H column, hexane/*i*-PrOH = 100/1, 1 mL/min, λ = 214 nm, t_R (major) = 17.2 min, t_R (minor) = 25.7 min); $[\alpha]_D^{28}$ = +224.4 (c = 1.04, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.46-7.39 (m, 2 H, ArH), 7.17-7.10 (m, 2 H, ArH), 6.14 (dt, J = 6.0, 2.6 Hz, 1 H, =CH), 5.59 (q, J = 6.9 Hz, 1 H, =CH), 3.75 (t, J = 4.6 Hz, 4 H, 2×OCH₂), 3.21-3.11 (m, 2 H, NCH₂), 2.54 (t, J = 4.6 Hz, 4 H, 2×NCH₂); ¹³C NMR (126 MHz, CDCl₃) δ 206.3, 133.2, 131.7, 128.2, 120.6, 94.0, 91.5, 66.9, 57.9, 53.1; MS (ESI) m/z (%) 294 ([M(⁷⁹Br)+H]⁺), 296 ([M(⁸¹Br)+H]⁺); IR (neat) ν = 2964, 2900, 2877, 2800, 1949, 1486, 1445, 1329, 1308, 1263, 1110, 1070, 1003 cm⁻¹.

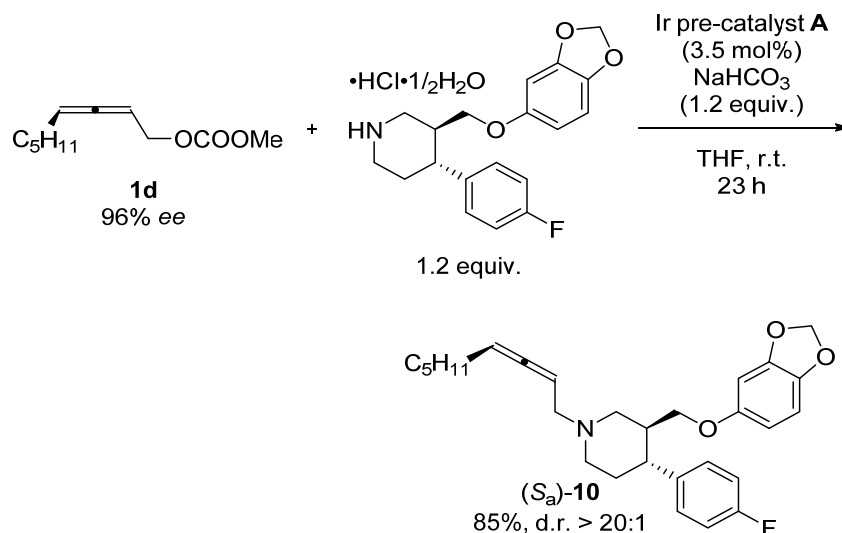
¹; HRMS calcd for C₁₄H₁₇NO⁷⁹Br ([M(⁷⁹Br)+H]⁺): 294.04880. Found: 294.04826.

(7) Synthesis of (S)-N-(4-(naphth-2-yl)buta-2,3-dienyl) dibenzyl amine ((S)-**3mf**) (cyf-4-91)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.4 mg, 0.035 mmol), (S)-**1m** (254.4 mg, 1.0 mmol), and **2f** (796.2 mg, 4.0 mmol) in THF (5 mL) afforded (S)-**3mf** (356.5 mg, 95%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as a solid: 96% ee (HPLC conditions: OD-H column, hexane/*i*-PrOH = 9/1, 1 mL/min, λ = 214 nm, t_R (major) = 4.7 min, t_R (minor) = 6.0 min); $[\alpha]_D^{26}$ = +200.4 (c = 1.04, CHCl₃); recrystallization in petroleum ether (30-60 °C)/ethyl acetate afforded (m.p. 84.6-85.8 °C, 98% ee, $[\alpha]_D^{26}$ = +209.2 (c = 0.985, CHCl₃)); ¹H NMR (400 MHz, CDCl₃) δ 7.82-7.69 (m, 3 H, ArH), 7.64 (s, 1 H, ArH), 7.54 - 7.17 (m, 13 H, ArH), 6.39-6.30 (m, 1 H, =CH), 5.69 (q, J = 6.6 Hz, 1 H, =CH), 3.70 (dd, J = 19.6, 13.2 Hz, 4 H, 2×NCH₂), 3.28 (dd, J = 6.7, 2.1 Hz, 2 H, NCH₂); ¹³C NMR (100 MHz, CDCl₃) δ 206.7, 139.4, 133.7, 132.6, 132.0, 128.8, 128.23, 128.21, 127.7, 127.6, 126.9, 126.2, 125.6, 125.5, 124.7, 95.1, 91.7, 57.6, 51.9; MS (ESI) m/z (%) 376 ([M+H]⁺); IR (neat) ν = 3053, 3026, 2908, 2803, 1938, 1598, 1493, 1454, 1361, 1317, 1241, 1120, 1004 cm⁻¹; Anal. Calcd for C₂₈H₂₅N: C 89.56, H 6.71. Found: C 89.60, H 6.93.

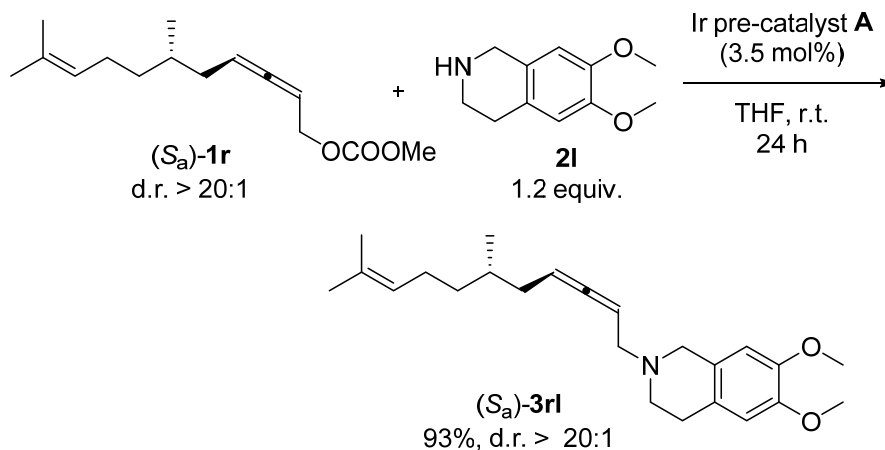
(8) Synthesis of (S_a)-**10** (cyf-4-112)



Following **Typical Procedure III**, the reaction of Ir pre-catalyst A (26.3 mg, 0.035 mmol), (S)-**1d** (198.4 mg, 1.0 mmol), paroxetine $\cdot\text{HCl}\cdot\frac{1}{2}\text{H}_2\text{O}$ (459.4 mg, 1.2 mmol), and NaHCO_3 (101.6 mg, 1.2 mmol) in THF (10 mL) afforded (Sa)-**10** (383.5 mg, 85%, d.r. > 20:1) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 8/1) as an oil: $[\alpha]_{\text{D}}^{27} = -68.6$ ($c = 1.04$, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 7.16 (dd, $J = 8.2, 5.5$ Hz, 2 H, ArH), 6.95 (t, $J = 8.6$ Hz, 2 H, ArH), 6.60 (d, $J = 8.4$ Hz, 1 H, ArH), 6.34 (d, $J = 2.4$ Hz, 1 H, ArH), 6.12 (dd, $J = 8.4, 2.2$ Hz, 1 H, ArH), 5.87 (s, 2 H, OCH_2), 5.22-5.10 (m, 2 H, $2\times=\text{CH}$), 3.57 (dd, $J = 9.2, 2.8$ Hz, 1 H, one proton of OCH_2), 3.45 (dd, $J = 9.2, 7.2$ Hz, 1 H, one proton of OCH_2), 3.37-3.30 (m, 1 H, one proton of NCH_2), 3.16-3.03 (m, 3 H, NCH_2 and one proton of NCH_2), 2.46 (td, $J = 11.0, 5.2$ Hz, 1 H, one proton of NCH_2), 2.28-1.95 (m, 5 H, CH_2 , $2\times\text{CH}$, and one proton of CH_2), 1.95-1.78 (m, 2 H, CH_2), 1.48-1.35 (m, 2 H, CH_2), 1.33-1.20 (m, 4 H, $2\times\text{CH}_2$), 0.92 - 0.80 (m, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.3, 161.4 (d, $J = 242.8$ Hz), 154.3, 148.0, 141.4, 139.6 (d, $J = 3.0$ Hz), 128.7 (d, $J = 7.3$ Hz), 115.3 (d, $J = 21.1$ Hz), 107.7, 105.4, 100.9, 97.8, 91.1, 87.2, 69.5, 58.4, 56.9, 53.6, 44.0, 42.0, 34.2, 31.2, 28.7, 28.6, 22.4, 14.0; ^{19}F NMR (376 MHz, CDCl_3) δ -117.1 (m); MS (EI) m/z 451 (M^+ , 9.64), 342 (100); IR (neat) $\nu = 2920, 2857, 2798, 1962, 1632, 1605, 1509, 1487, 1467, 1390, 1363, 1338, 1268, 1223, 1182, 1159, 1133, 1100, 1039\text{ cm}^{-1}$; HRMS calcd for $\text{C}_{28}\text{H}_{34}\text{NO}_3\text{F}$ (M^+): 451.2523. Found: 451.2519.

The following signals are discernible for (Ra)-**10**: ^{13}C NMR (100 MHz, CDCl_3) δ 205.2, 57.0, 53.4.

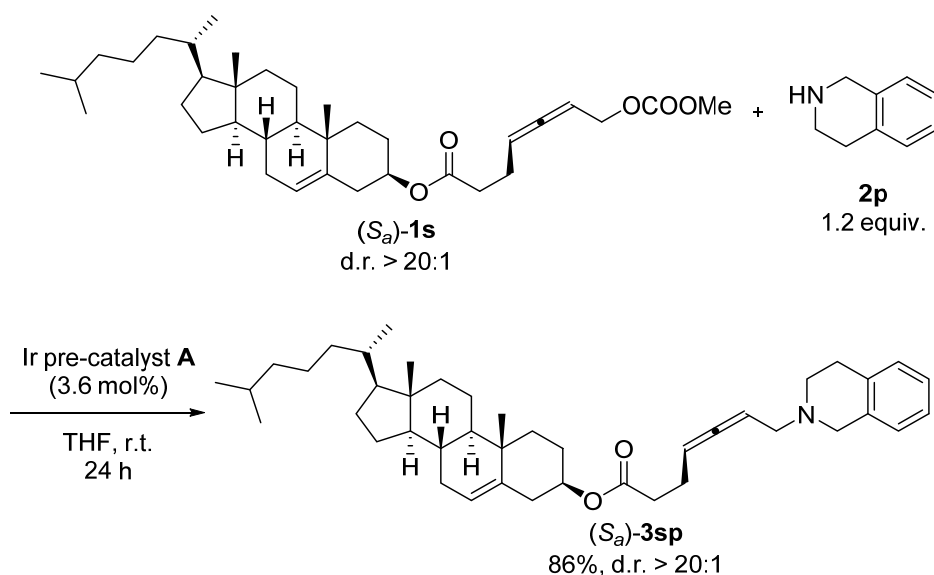
(9) Synthesis of (*S_a*,6*S*)-*N*-6,10-dimethylundeca-2,3,9-trienyl 6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline ((*S_a*)-**3rl**) (cyf-4-130)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (26.3 mg, 0.035 mmol), (*S_a*)-**1r** (252.3 mg, 1.0 mmol), and **2l** (232.0 mg, 1.2 mmol) in THF (12.5 mL) afforded (*S_a*)-**3rl** (343.8 mg, 93%, 20:1 d.r.) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 10/1) as an oil: $[\alpha]_D^{26} = +31.2$ ($c = 0.96$, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 6.58 (s, 1 H, ArH), 6.51 (s, 1 H, ArH), 5.23-5.05 (m, 3 H, $3\times=\text{CH}$), 3.86-3.78 (m, 6 H, $2\times\text{OCH}_3$), 3.59 (s, 2 H, NCH_2), 3.18 (dd, $J = 7.0, 2.2$ Hz, 2 H, NCH_2), 2.86-2.79 (m, 2 H, NCH_2), 2.79-2.73 (m, 2 H, CH_2), 2.11-1.82 (m, 4 H, $2\times\text{CH}_2$), 1.68 (s, 3 H, CH_3), 1.64-1.50 (m, 4 H, CH_3 and CH), 1.46-1.35 (m, 1 H, one proton of CH_2), 1.28-1.14 (m, 1 H, one proton of CH_2), 0.93 (d, $J = 6.4$ Hz, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 205.6, 147.2, 146.9, 130.8, 126.3, 125.8, 124.5, 111.1, 109.2, 89.13, 86.6, 57.5, 55.6, 55.5, 54.9, 50.0, 36.3, 36.1, 32.4, 28.4, 25.5, 25.3, 19.1, 17.4; MS (EI) m/z 369 (M^+ , 3.58), 206 (100); IR (neat) $\nu = 2954, 2912, 2744, 1961, 1750, 1613, 1517, 1463, 1450, 1416, 1378, 1360, 1336, 1255, 1226, 1126, 1097, 1018$ cm^{-1} ; HRMS calcd for $\text{C}_{24}\text{H}_{35}\text{NO}_2$ (M^+): 369.2668. Found: 369.2672.

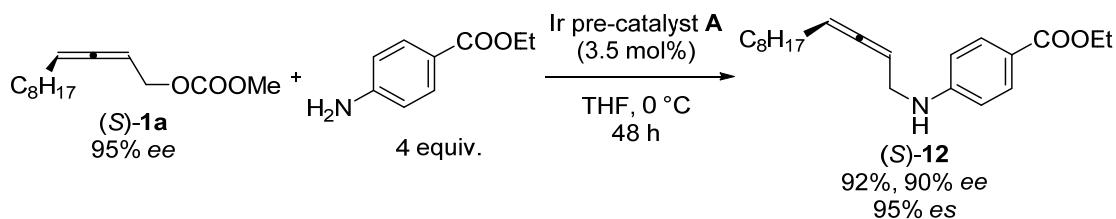
The following signals are discernible for (*R_a*)-**3rl**: ^{13}C NMR (100 MHz, CDCl_3) δ 89.08, 36.2, 36.0, 19.2.

(10) Synthesis of (*S_a*)-**3sp** (cyf-4-148)



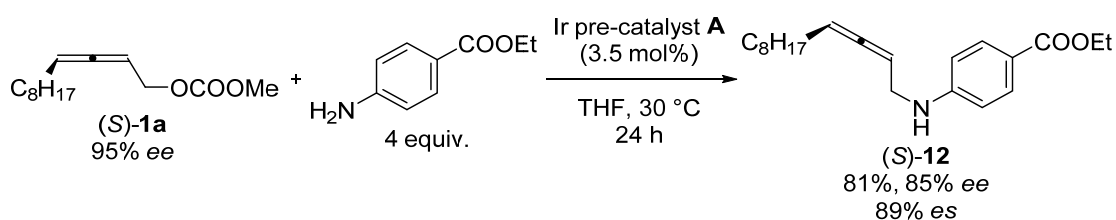
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (5.4 mg, 0.007 mmol), $(S_a)\text{-1s}$ (113.5 mg, 0.2 mmol), and **2p** (32.9 mg, 0.24 mmol) in THF (1 mL) afforded $(S_a)\text{-3sp}$ (107.2 mg, 86%, > 20:1 d.r.) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 8/1) as a solid: m.p. 93.3-95.3 °C; $[\alpha]_D^{29} = +8.6$ ($c = 1.02$, CHCl_3); ^1H NMR (400 MHz, CDCl_3) δ 7.15-6.98 (m, 4 H, ArH), 5.39-5.33 (m, 1 H, =CH), 5.31-5.19 (m, 2 H, 2 $\times$ =CH), 4.68-4.56 (m, 1 H, OCH), 3.73-3.62 (m, 2 H, NCH_2), 3.25-3.14 (m, 2 H, NCH_2), 2.95-2.86 (m, 2 H, NCH_2), 2.85-2.72 (m, 2 H, CH_2) 2.47-2.25 (m, 6 H), 2.05-1.77 (m, 5 H), 1.65-0.81 (m, 33 H), 0.67 (s, 3 H, CH_3); ^{13}C NMR (100 MHz, CDCl_3) 205.0, 172.2, 139.5, 134.4, 134.0, 128.6, 126.5, 126.1, 125.5, 122.6, 89.9, 88.9, 73.9, 57.5, 56.6, 56.0, 55.4, 50.1, 49.9, 42.2, 39.6, 39.4, 38.1, 36.9, 36.5, 36.1, 35.7, 33.7, 31.8, 31.7, 28.9, 28.1, 27.9, 27.7, 24.2, 23.75, 23.73, 22.8, 22.5, 20.9, 19.2, 18.6, 11.8; MS (ESI) m/z 626 ($[\text{M}+\text{H}]^+$); IR (neat) $\nu = 3019, 2937, 1868, 1961, 1725, 1497, 1466, 1363, 1334, 1255, 1215, 1162, 1091\text{ cm}^{-1}$; HRMS calcd for $\text{C}_{43}\text{H}_{64}\text{NO}_2$ ($[\text{M}+\text{H}]^+$): 626.4932. Found: 626.4938.

(11) Synthesis of $(S)\text{-N}$ -dodeca-2,3-dienyl 4-(ethoxycarbonyl)aniline ($(S)\text{-12}$) (cyf-5-104)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.3 mg, 0.035 mmol), (S)-1a (240.3 mg, 1.0 mmol), and 4-ethoxycarbonyl aniline (674.9 mg, 4.0 mmol) in THF (5 mL) afforded (S)-12 (303.9 mg, 92%) (eluent: petroleum ether (60–90 °C)/ethyl acetate = 50/1) as an oil: 90% *ee* (HPLC conditions: AD-H column, hexane/*i*-PrOH = 500/1, 1 mL/min, λ = 284 nm, t_R (major) = 42.0 min, t_R (minor) = 40.6 min); $[\alpha]_D^{26}$ = +55.7 (c = 1.02, CHCl₃); ¹H NMR (400 MHz, CDCl₃) δ 7.86 (d, J = 8.4 Hz, 2 H, ArH), 6.56 (d, J = 8.4 Hz, 2 H, ArH), 5.31–5.18 (m, 2 H, 2 $\times$ =CH), 4.50–4.26 (m, 3 H, OCH₂ and NH), 3.80–3.69 (m, 2 H, NCH₂), 2.02–1.92 (m, 2 H, CH₂), 1.40–1.18 (m, 15 H, CH₃ and 6 $\times$ CH₂), 0.88 (t, J = 6.6 Hz, 3 H, CH₃); ¹³C NMR (126 MHz, CDCl₃) δ 203.4, 166.8, 151.5, 131.3, 118.6, 111.7, 94.3, 88.4, 60.1, 41.9, 31.8, 29.3, 29.2, 29.1, 29.0, 28.7, 22.6, 14.4, 14.0; MS (ESI) m/z 330 ([M+H]⁺); IR (neat) ν = 3375, 2924, 2853, 1690, 1603, 1525, 1464, 1416, 1366, 1331, 1312, 1269, 1173, 1106, 1021 cm⁻¹; HRMS calcd for C₂₁H₃₂NO₂ ([M+H]⁺): 330.2428. Found: 330.2425.

(12) Synthesis of (S)-*N*-dodeca-2,3-dienyl 4-(ethoxycarbonyl)aniline ((S)-12) (cyf-5-103)

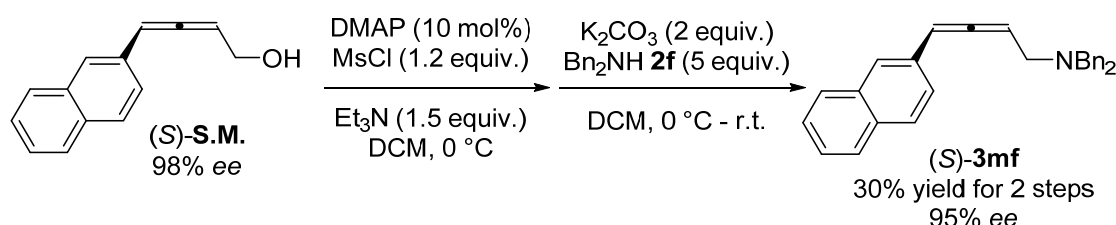


Following **Typical Procedure II**, the reaction of Ir pre-catalyst A (26.3 mg, 0.035 mmol), (S)-1a (240.5 mg, 1.0 mmol), and 4-ethoxycarbonyl aniline (674.8 mg, 4.0 mmol) in THF (5 mL) afforded (S)-12 (266.7 mg, 81%) (eluent: petroleum ether (60–90 °C)/ethyl acetate = 50/1) as an oil: 85% *ee* (HPLC conditions: AD-H column, hexane/*i*-PrOH = 500/1, 1 mL/min, λ = 284 nm, t_R (major) = 47.0 min, t_R (minor) = 45.0 min); ¹H NMR (400 MHz, CDCl₃) δ 7.87 (dt, J = 8.8, 2.2 Hz, 2 H, ArH), 6.56 (dt, J =

8.8, 2.2 Hz, 2 H, ArH), 5.30-5.18 (m, 2 H, 2 $\times$ =CH), 4.41-4.26 (m, 3 H, OCH₂ and NH), 3.76 (dd, J = 5.4, 3.4 Hz, 2 H, NCH₂), 2.02-1.93 (m, 2 H, CH₂), 1.40-1.16 (m, 15 H, CH₃ and 6 $\times$ CH₂), 0.88 (t, J = 6.8 Hz, 3 H, CH₃); ¹³C NMR (100 MHz, CDCl₃) δ 203.5, 166.8, 151.5, 131.3, 118.7, 111.7, 94.4, 88.4, 60.1, 41.9, 31.8, 29.4, 29.2, 29.08, 29.05, 28.7, 22.6, 14.4, 14.0.

5. Mechanistic Studies

(1) Determination of the absolute configuration in the products-synthesis of (*S*)-*N*-(4-(naphth-2-yl)buta-2,3-dienyl) dibenzyl amine ((*S*)-**3mf**) via known method^[8] (cyf-4-70)



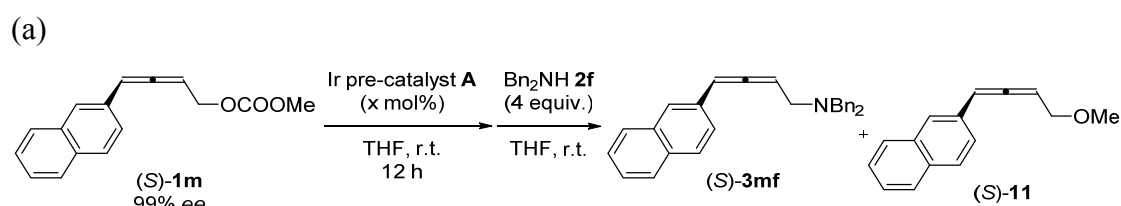
To a flame-dried Schlenk tube were added DMAP (24.3 mg, 0.2 mmol), (*S*)-4-(naphth-2-yl)buta-2,3-dienol (392.9 g, 2.0 mmol),⁶ DCM (4 mL), and Et₃N (0.42 mL, d = 0.727 g/mL, 305 mg, 3.0 mmol) sequentially. The resulting mixture was stirred at 0 °C for 10 min and then methanesulfonyl chloride (0.19 mL, d = 1.475 g/mL, 280 mg, 2.4 mmol) was added dropwise via a syringe within 5 min at 0 °C. After the addition, the resulting mixture was stirred at 0 °C for 1 h. After the reaction was complete as monitored by TLC, it was quenched with water (6 mL). The aqueous layer was separated and extracted with DCM (3 $\times$ 6 mL). The organic layer was combined, washed with smashed ice (3 g)/1 M HCl (aq., 6 mL)/saturated aqueous NaHCO₃ solution (6 mL)/brine (6 mL), and dried over anhydrous Na₂SO₄. After filtration and evaporation of the solvent, the crude product was used in the next steps without further purification.

To a flame-dried Schlenk tube were added K₂CO₃ (553.5 mg, 4.0 mmol) and dibenzyl amine (1.9952 g, 10.0 mmol) in DCM (4 mL). The resulting mixture was stirred at 0 °C for 10 min and then a solution of (*S*)-(4-(naphth-2-yl)buta-2,3-dienyl) mesylate (DCM (4 mL)) was added dropwise via a syringe within 1 h at 0 °C. After the addition, the resulting mixture was allowed to react at 0 °C for 8 h, removed from the

cooling bath, allowed to warm up to room temperature gradually, and stirred at room temperature for 5 h. After the reaction was complete as monitored by TLC, the crude reaction mixture was filtrated through a short column of silica gel eluted with DCM (30 mL). Evaporation of the solvent and chromatography on silica gel (eluent: petroleum ether (60-90 °C) (300 mL) to petroleum ether (60-90 °C)/ethyl acetate 100/1 (500 mL)) afforded (*S*)-**3mf** (224.9 mg, 30% for 2 steps) as a solid: 95% ee (HPLC conditions: OD-H column, hexane/*i*-PrOH = 9/1, 1 mL/min, λ = 214 nm, t_R (major) = 5.4 min, t_R (minor) = 8.0 min); ^1H NMR (400 MHz, CDCl_3) δ 7.82-7.72 (m, 3 H, ArH), 7.65 (s, 1 H, ArH), 7.52- 7.35 (m, 7 H, ArH), 7.35-7.26 (m, 4 H, ArH), 7.26-7.18 (m, 2 H, ArH), 6.39-6.32 (m, 1 H, =CH), 5.70 (q, J = 6.7 Hz, 1 H, =CH), 3.72 (dd, J = 19.2, 13.6 Hz, 4 H, $2\times\text{NCH}_2$), 3.28 (dd, J = 6.8, 2.4 Hz, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 206.7, 139.4, 133.7, 132.5, 132.0, 128.8, 128.23, 128.20, 127.7, 127.6, 126.9, 126.2, 125.6, 125.4, 124.7, 95.1, 91.7, 57.6, 51.9.

The absolute configuration in the products of Ir-catalyzed asymmetric synthesis of (*S*)-**3mf** is established by comparing its retention time with (*S*)-**3mf** synthesized here.

(2) Synthesis of (*S*)-*N*-(4-(naphth-2-yl)buta-2,3-dienyl) dibenzyl amine ((*S*)-**3mf**) via step-wise addition of (*S*)-**1m** and different amount of the catalyst for 12 h first followed by the addition of dibenzyl amine (Scheme 4a)

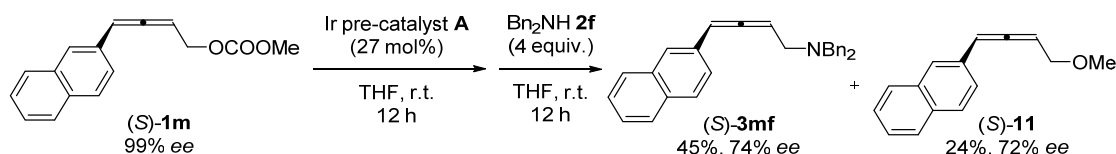


General Procedure: To a flame-dried Schlenk tube were added Ir pre-catalyst **A** (x mol%)/THF (1.5 mL), and (*S*)-**1m** (0.5 mmol)/THF (0.5 mL) sequentially under Ar atmosphere. The resulting mixture was stirred at room temperature for 12 h. Dibenzyl amine **2f** (2.0 mmol)/THF (0.5 mL) were then added sequentially under Ar atmosphere. The resulting mixture was stirred at room temperature for 12 h. After the completion of the reaction as monitored by TLC, the crude reaction mixture was transferred with ethyl acetate (2.5 mL). After evaporation, the residue was purified by column

chromatography on silica gel to afford (S)-**3mf** (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) as a solid.

Entry	x/mol%	Yield of (S)- 3mf /%	ee of (S)- 3mf /%	Yield of (S)- 11 /%
1	3.5	90	93	n.d.
2	8.9	68	89	11
3	18	57	87	15
4	27	45	74	24(72% ee)
5	35	32	70	24
6	44	19	53	15

(b) Synthesis of (S)-N-(4-(naphth-2-yl)buta-2,3-dienyl) dibenzyl amine ((S)-**3mf**) and (S)-4-(naphth-2-yl)buta-2,3-dienyl methyl ether ((S)-**11**) via the reaction of (S)-**1m** with 27 mol% of the catalyst for 12 h first followed by the addition of dibenzyl amine (Scheme 4b) (cyf-4-96)



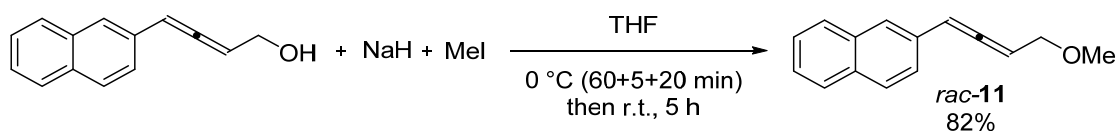
Following **General Procedure**, the reaction of Ir pre-catalyst A (101.3 mg, 0.135 mmol), (S)-**1m** (127.4 mg, 0.5 mmol), and **2f** (397.9 mg, 2.0 mmol) in THF (2.5 mL) afforded (S)-**3mf** (84.5 mg, 45%) and (S)-**11** (25.2 mg, 24%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1).

(S)-**3mf**: solid; 74% ee (HPLC conditions: OD-H column, hexane/*i*-PrOH = 9/1, 1 mL/min, λ = 214 nm, t_R (major) = 4.0 min, t_R (minor) = 5.3 min); ^1H NMR (400 MHz, CDCl_3) δ 7.80-7.70 (m, 3 H, ArH), 7.65 (s, 1 H, ArH), 7.51-7.34 (m, 7 H, ArH), 7.34-7.18 (m, 6 H, ArH), 6.37-6.32 (m, 1 H, =CH), 5.69 (q, J = 6.5 Hz, 1 H, =CH), 3.71 (dd, J = 19.6, 13.6 Hz, 4 H, $2\times\text{NCH}_2$), 3.32-3.24 (m, 2 H, NCH_2); ^{13}C NMR (100 MHz, CDCl_3) δ 206.7, 139.4, 133.7, 132.5, 132.0, 128.8, 128.22, 128.19, 127.7, 127.6, 126.9, 126.2, 125.6, 125.4, 124.7, 95.1, 91.7, 57.6, 51.9;

(S)-**11**: solid, m.p. 55.7-56.6 °C (without recrystallization); 72% ee (HPLC conditions: IF column, hexane/*i*-PrOH = 400/1, 1 mL/min, λ = 214 nm, t_R (major) = 7.8 min,

$t_R(\text{minor}) = 7.4 \text{ min}$); ^1H NMR (400 MHz, CDCl_3) δ 7.82-7.73 (m, 3 H, ArH), 7.66 (s, 1 H, ArH), 7.51 - 7.39 (m, 3 H, ArH), 6.42 (dt, $J = 6.0, 2.2 \text{ Hz}$, 1 H, =CH), 5.73 (q, $J = 6.6 \text{ Hz}$, 1 H, =CH), 4.11 (dd, $J = 6.7, 2.3 \text{ Hz}$, 2 H, OCH_2), 3.40 (s, 3 H, OCH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 206.4, 133.6, 132.6, 131.3, 128.3, 127.69, 127.67, 126.2, 125.71, 125.70, 124.6, 95.8, 92.6, 70.2, 57.9; MS (EI) m/z 210 (M^+ , 17.01), 165 (100); IR (neat) $\nu = 3050, 2929, 2898, 2820, 1943, 1625, 1597, 1505, 1446, 1362, 1186, 1104, 1087 \text{ cm}^{-1}$; HRMS calcd for $\text{C}_{15}\text{H}_{14}\text{O}$ (M^+): 210.1045. Found: 210.1046.

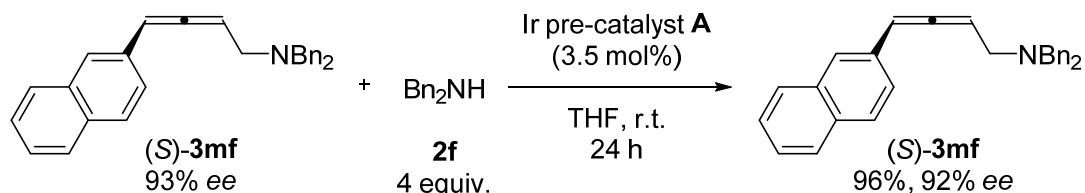
(c) Synthesis of racemic 4-(naphth-2-yl)buta-2,3-dienyl methyl ether (**11**) for *ee* determination (Scheme 4b) (cyf-4-87)



To a flame-dried Schlenk tube were added 4-(2-naphthyl)buta-2,3-dienol (98.2 mg, 0.5 mmol) and NaH (60% in mineral oil, 24.2 mg, 0.6 mmol) under Ar atmosphere. The resulting mixture was cooled to 0 °C. After the addition of THF (2 mL), the resulting mixture was stirred at 0 °C for 1 h. Then MeI (63.5 μL , $d = 2.28 \text{ g/mL}$, 145 mg, 1.0 mmol) was added dropwise via syringe within 5 min at 0 °C. After the addition, the resulting mixture was stirred at this temperature for 20 min, removed from the cooling bath, allowed to warm up to room temperature gradually, and reacted at room temperature for 5 h. After the reaction was complete as monitored by TLC, the crude reaction mixture was filtered through a short column of silica gel and eluted with ethyl acetate (5 mL). Evaporation of the solvent and chromatography on silica gel (eluent: petroleum ether (60-90 °C)/ethyl acetate = 100/1) afforded **11** (86.2 mg, 82%) as a solid: m.p. 55.6-56.7 °C; ^1H NMR (400 MHz, CDCl_3) δ 7.82-7.70 (m, 3 H, ArH), 7.65 (s, 1 H, ArH), 7.51 - 7.37 (m, 3 H, ArH), 6.41 (dt, $J = 6.0, 2.2 \text{ Hz}$, 1 H, =CH), 5.72 (q, $J = 6.6 \text{ Hz}$, 1 H, =CH), 4.10 (dd, $J = 6.7, 2.3 \text{ Hz}$, 2 H, OCH_2), 3.40 (s, 3 H, OCH_3); ^{13}C NMR (100 MHz, CDCl_3) δ 206.4, 133.6, 132.6, 131.3, 128.3, 127.69, 127.67, 126.2, 125.71, 125.70, 124.6, 95.8, 92.6, 70.2, 57.9; MS (EI) m/z 210 (M^+ , 16.67), 165 (100); IR (neat) $\nu = 3051, 2996, 2929, 2897, 2821, 1943, 1625, 1505, 1446, 1383, 1155, 1125$

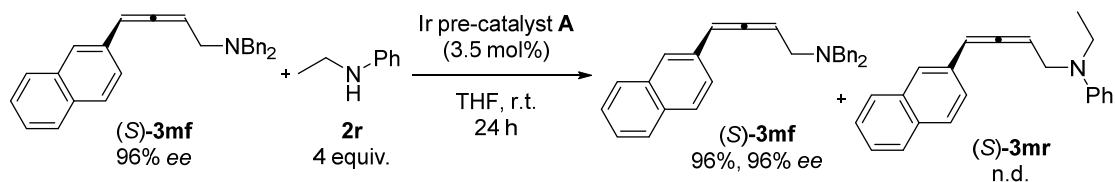
cm⁻¹; HRMS calcd for C₁₅H₁₄O (M⁺): 210.1045. Found: 210.1047.

(3) The treatment of (S)-**3mf** under the standard reaction conditions (Scheme 4e) (cyf-4-80)



Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (13.2 mg, 0.0175 mmol), (S)-**3mf** (187.6 mg, 0.5 mmol), and **2f** (399.2 mg, 2.0 mmol) in THF (2.5 mL) afforded (S)-**3mf** (180.2 mg, 96%) (eluent: petroleum ether (60-90 °C)/ethyl acetate = 50/1) as a solid: 92% ee (HPLC conditions: OD-H column, hexane/*i*-PrOH = 9/1, 1 mL/min, λ = 214 nm, t_R (major) = 5.3 min, t_R (minor) = 7.5 min); ¹H NMR (400 MHz, CDCl₃) δ 7.80-7.72 (m, 3 H, ArH), 7.65 (s, 1 H, ArH), 7.50-7.36 (m, 7 H, ArH), 7.34-7.26 (m, 4 H, ArH), 7.26-7.19 (m, 2 H, ArH), 6.38-6.33 (m, 1 H, =CH), 5.70 (q, J = 6.7 Hz, 1 H, =CH), 3.71 (dd, J = 19.6, 13.6 Hz, 4 H, 2×NCH₂), 3.28 (dd, J = 6.8, 2.0 Hz, 2 H, NCH₂); ¹³C NMR (100 MHz, CDCl₃) δ 206.7, 139.4, 133.7, 132.5, 132.0, 128.23, 128.20, 127.69, 127.7, 127.6, 126.9, 126.2, 125.6, 125.4, 124.7, 95.1, 91.7, 57.6, 51.9. Thus, racemization of (S)-**3mf** under the standard reaction conditions were not observed.

(4) The treatment of (S)-**3mf** with **2r** under the standard reaction conditions (Scheme 4f) (cyf-5-101)



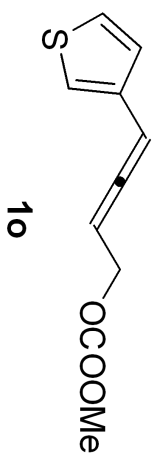
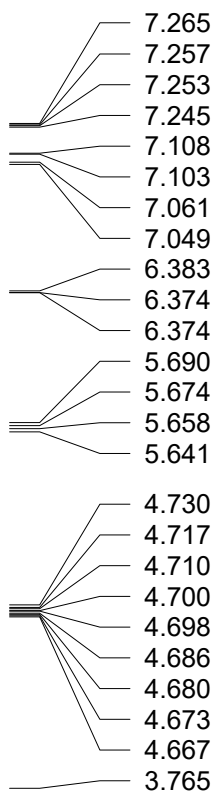
Following **Typical Procedure II**, the reaction of Ir pre-catalyst **A** (3.3 mg, 0.0044 mmol), (S)-**3mf** (46.7 mg, 0.125 mmol), and **2r** (61.9 mg, 0.5 mmol) in THF (0.625 mL) afforded (S)-**3mf** (44.8 mg, 96%) (eluent: petroleum ether (60-90 °C)) as a solid: 96% ee (HPLC conditions: OD-H column, hexane/*i*-PrOH = 9/1, 1 mL/min, λ = 289 nm, t_R (major) = 5.3 min, t_R (minor) = 7.7 min); ¹H NMR (400 MHz, CDCl₃) δ 7.80-7.72

(m, 3 H, ArH), 7.65 (s, 1 H, ArH), 7.50-7.36 (m, 7 H, ArH), 7.33-7.26 (m, 4 H, ArH), 7.26-7.18 (m, 2 H, ArH), 6.35 (dt, $J = 2.8, 2.1$ Hz, 1 H, =CH), 5.70 (q, $J = 6.5$ Hz, 1 H, =CH), 3.72 (dd, $J = 19.6, 13.6$ Hz, 4 H, $2 \times \text{NCH}_2$), 3.29 (dd, $J = 7.0, 2.2$ Hz, 2 H, NCH₂); ¹³C NMR (100 MHz, CDCl₃) δ 206.7, 139.4, 133.6, 132.5, 132.0, 128.8, 128.2, 127.7, 127.6, 126.9, 126.2, 125.5, 125.4, 124.7, 95.0, 91.7, 57.5, 51.8.

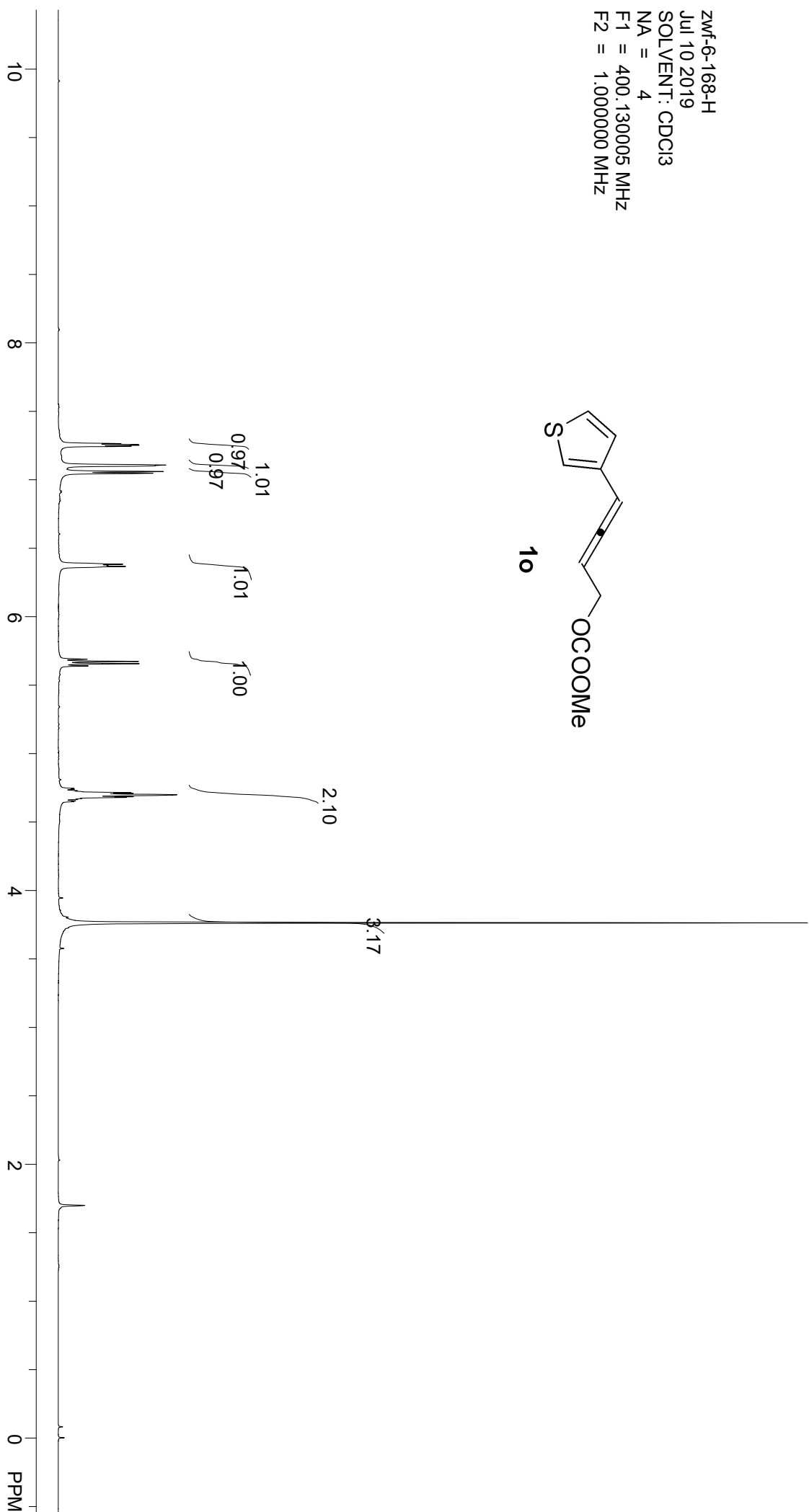
Thus, the scrambling experiment indicated that the nucleophilic attack of amine is irreversible.

References:

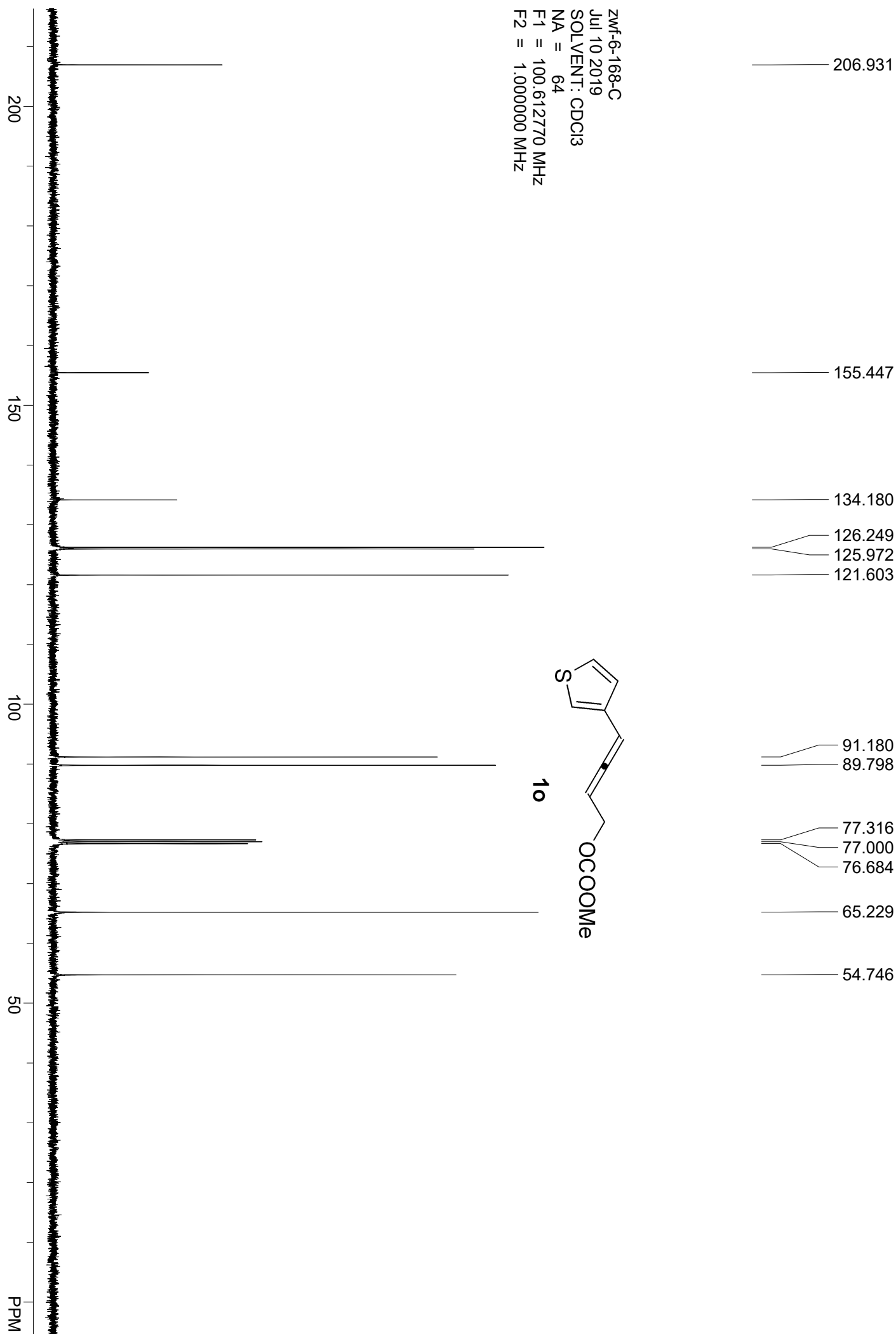
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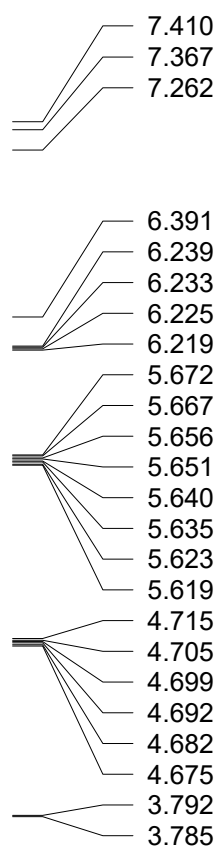


zwf-6-168-H
Jul 10 2019
SOLVENT: CDCl3
NA = 4
F1 = 400.130005 MHz
F2 = 1.000000 MHz

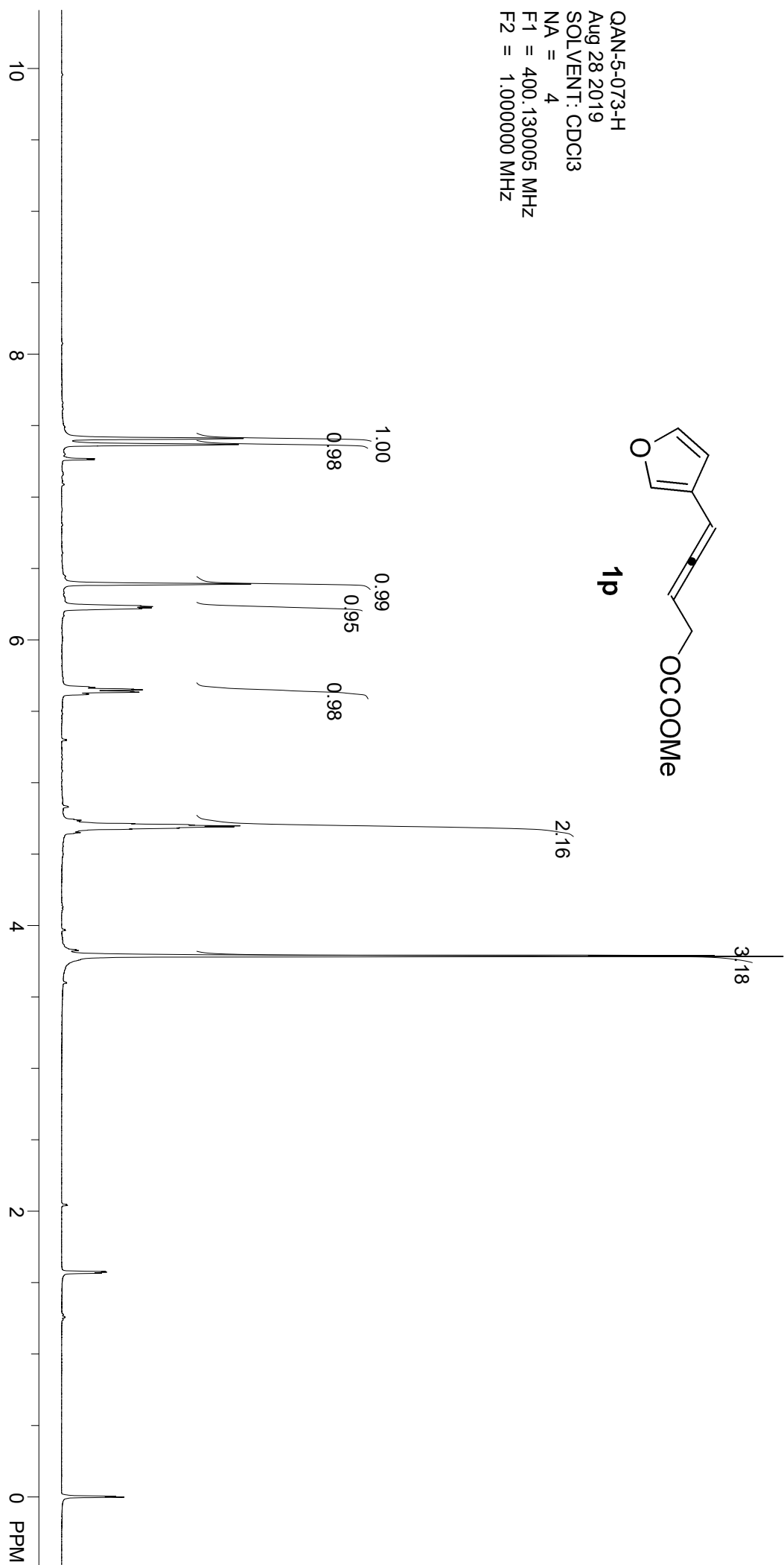


zwf-6-168-C
Jul 10 2019
SOLVENT: CDCl3
NA = 64
F1 = 100.612770 MHz
F2 = 1.000000 MHz





QAN-5-073-H
 Aug 28 2019
 SOLVENT: CDCl₃
 NA = 4
 F1 = 400.130005 MHz
 F2 = 1.000000 MHz



206.538

155.478

143.495

139.806

118.913

108.841

89.741

86.890

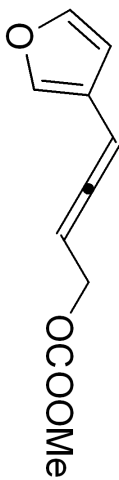
77.316

77.000

76.684

65.286

54.796



1p

QAN-5-073-C

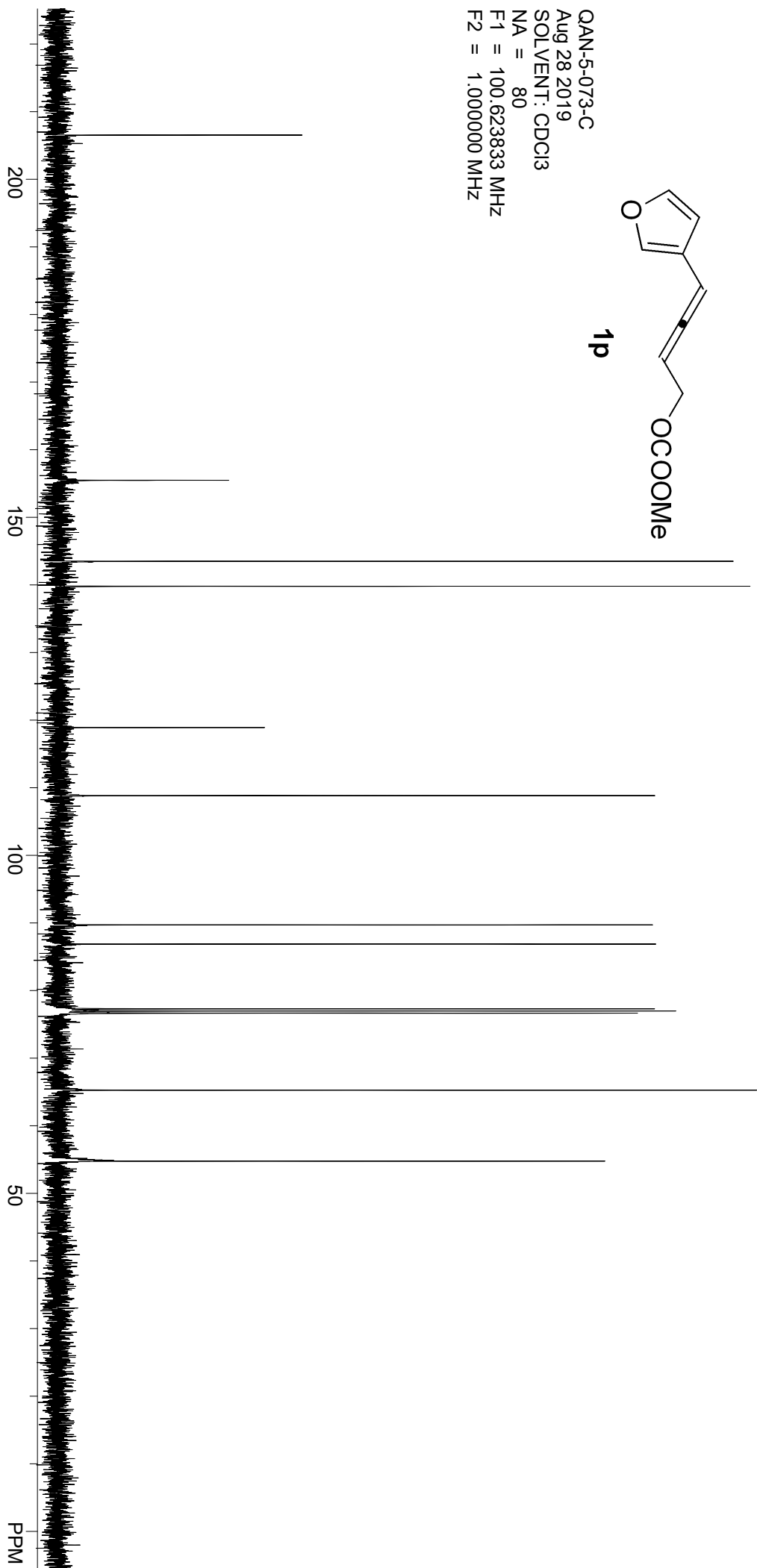
Aug 28 2019

SOLVENT: CDCl₃

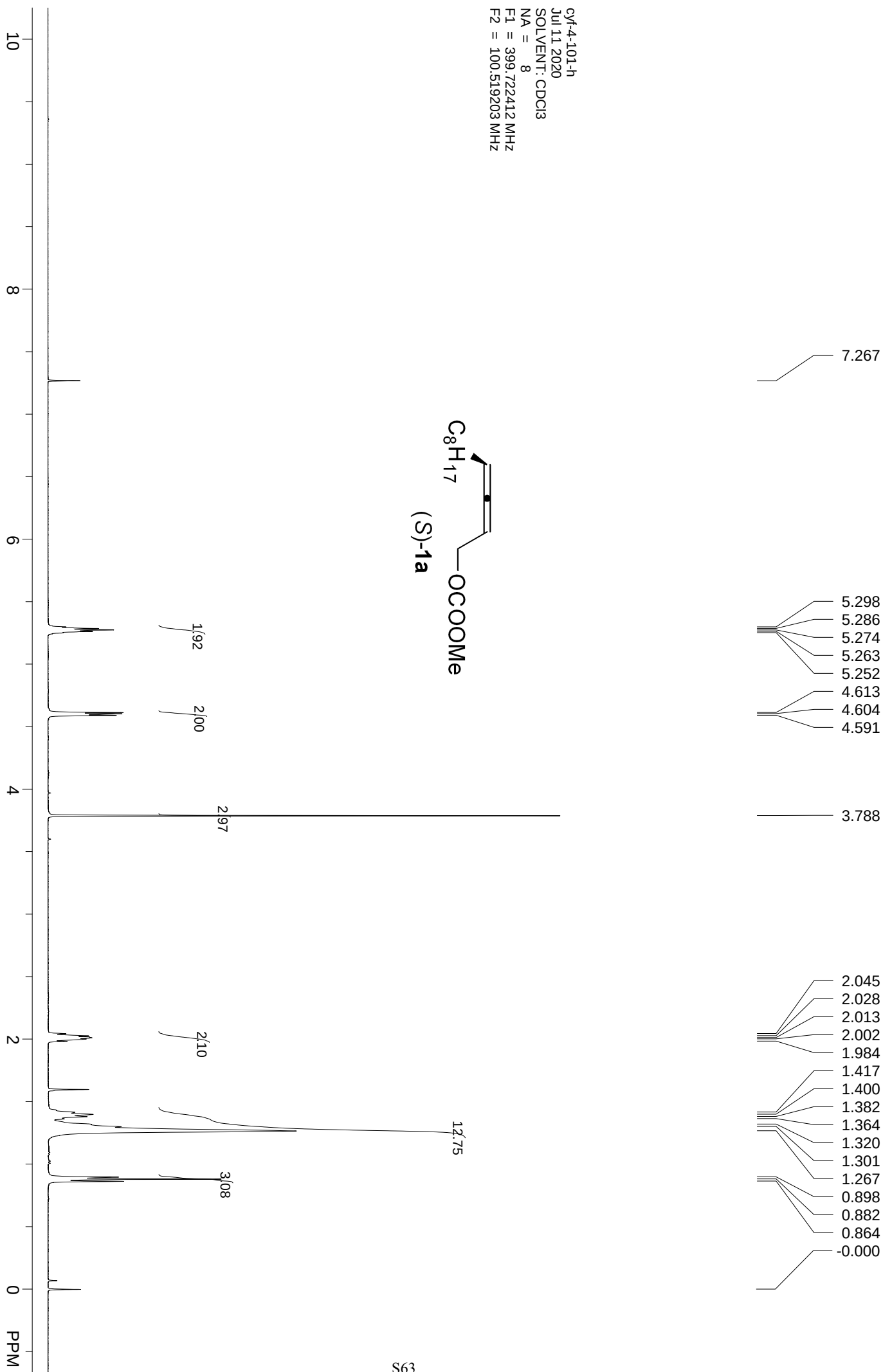
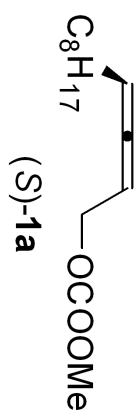
NA = 80

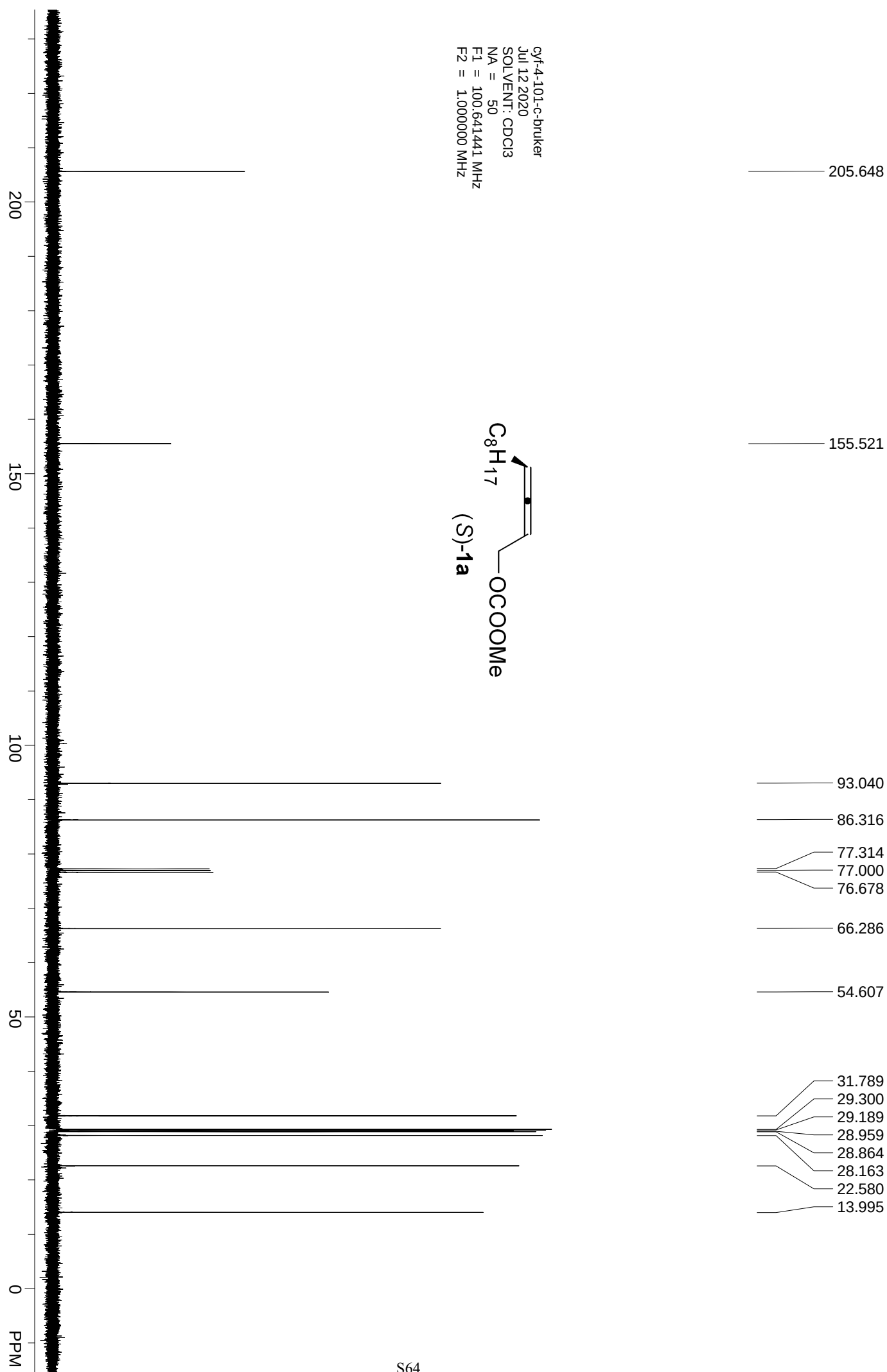
F1 = 100.623833 MHz

F2 = 1.000000 MHz



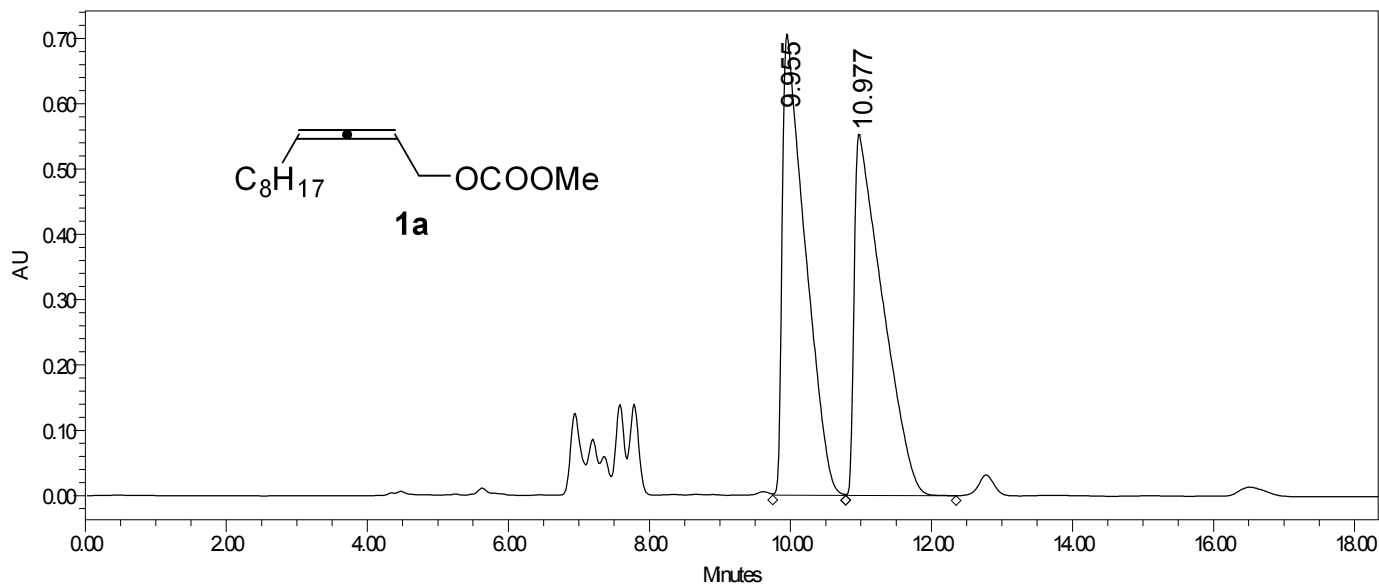
cvf-4-101-h
 Jul 11 2020
 SOLVENT: CDCl3
 NA = 8
 F1 = 399.722412 MHz
 F2 = 100.519203 MHz





SAMPLE INFORMATION

Sample Name:	cyf-3-54-odh-400-1-0.7-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	120.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/12/2020 4:47:07 AM CST		
Date Processed:	7/12/2020 5:06:05 AM CST		



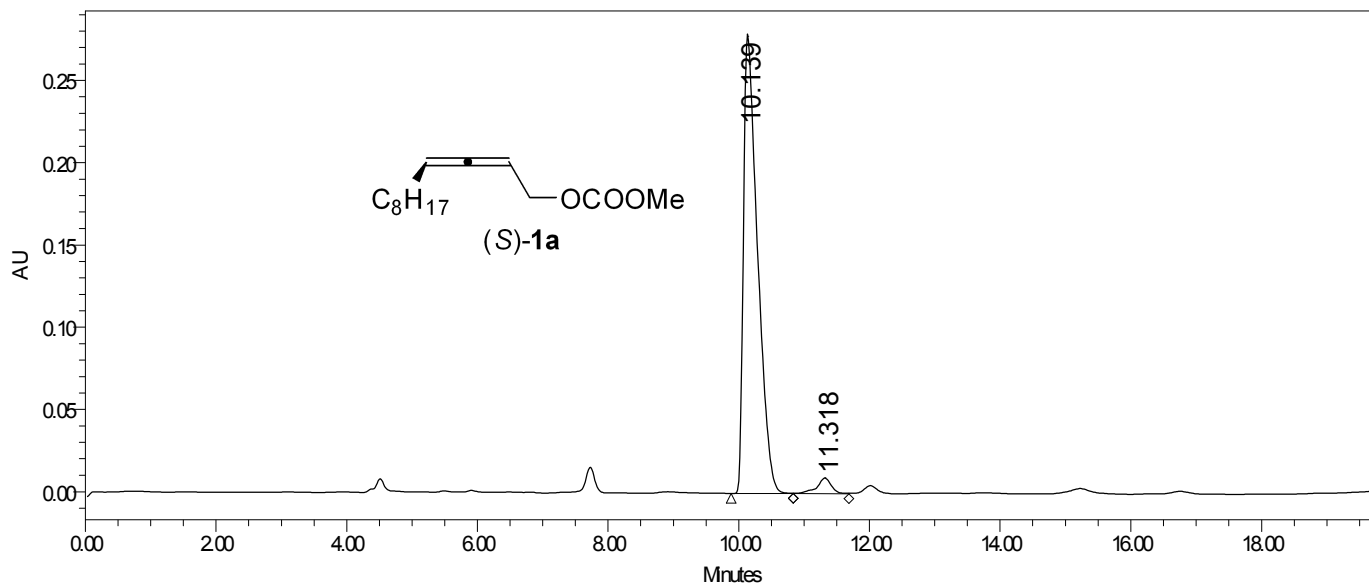
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7243; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	9.955	15881956	50.77	707547
2	W2489 ChA.214nm	10.977	15400066	49.23	556928

SAMPLE INFORMATION

Sample Name:	cyf-4-101-odh-400-1-0.7-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	2	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/12/2020 5:53:18 AM CST		
Date Processed:	7/12/2020 6:14:17 AM CST		

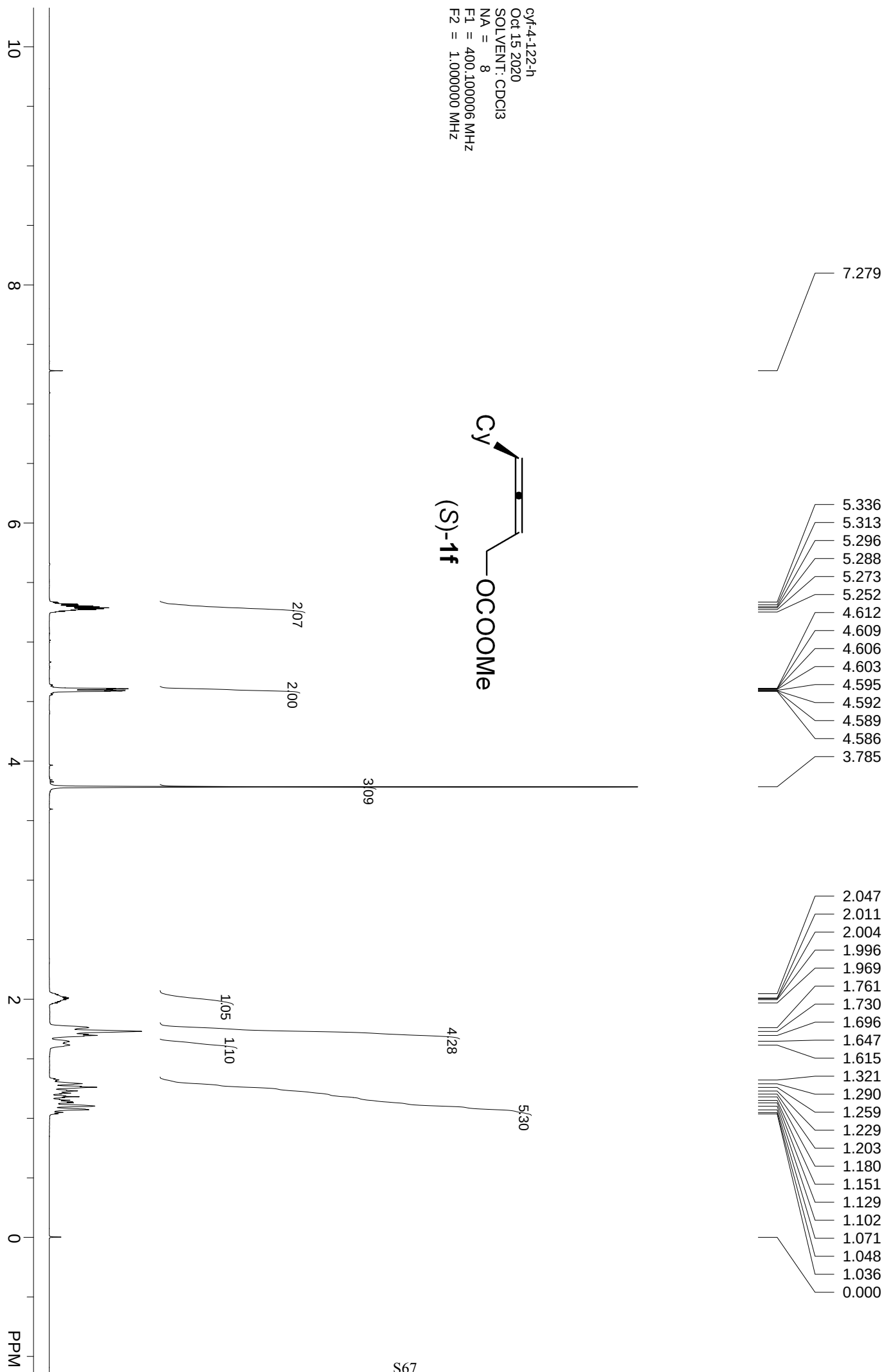
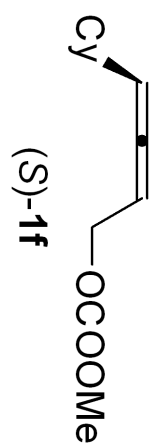


Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7251; Processing Method: Default

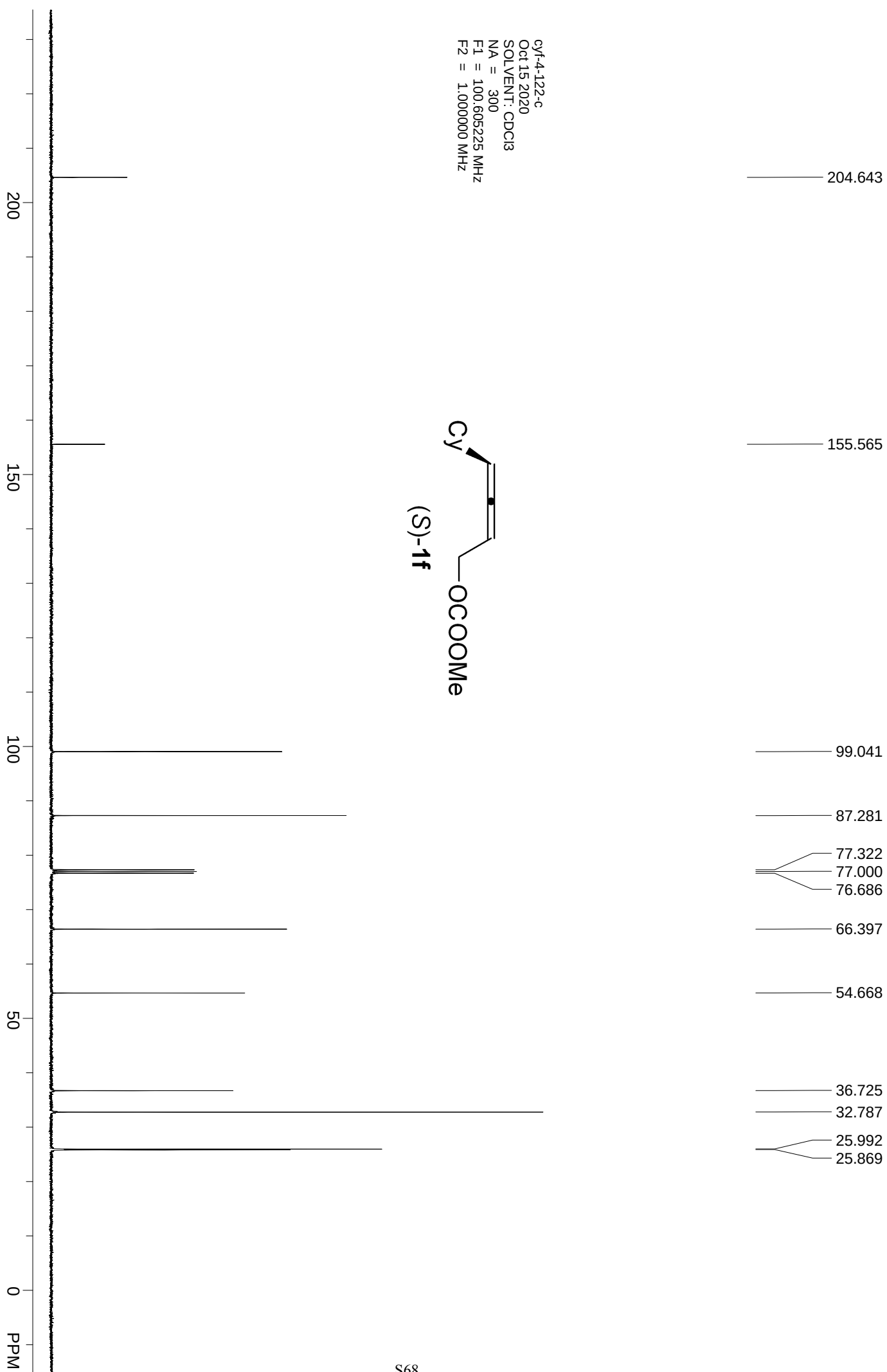
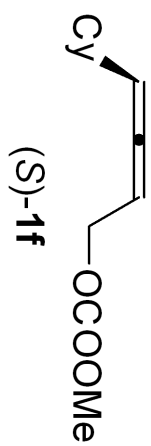
Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	10.139	4183522	96.62	279978
2	W2489 ChA.214nm	11.318	146167	3.38	9475

cvf-4-122-h
 Oct 15 2020
 SOLVENT: CDCl3
 NA = 8
 F1 = 400.100006 MHz
 F2 = 1.000000 MHz

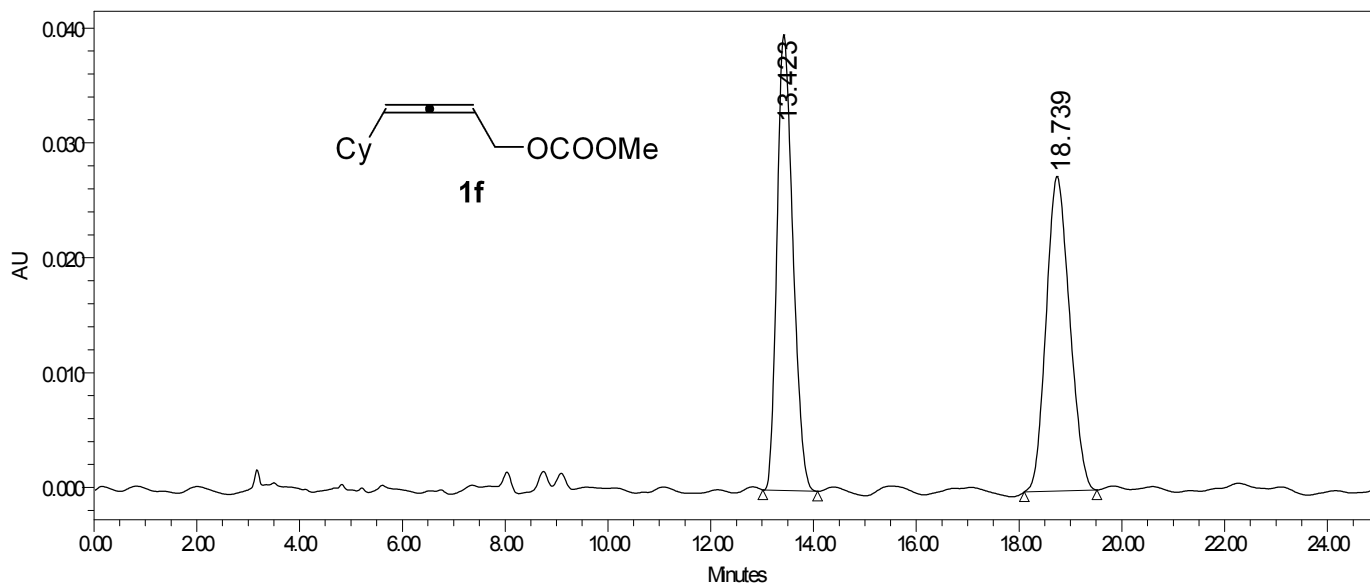


cyf-4-122-c
Oct 15 2020
SOLVENT: CDCl3
NA = 300
F1 = 100.605225 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-131-odh-100-0-1-214-1015-2	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 u	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	10/16/2020 10:20:20 AM CST		
Date Processed:	10/16/2020 11:09:17 AM CST		



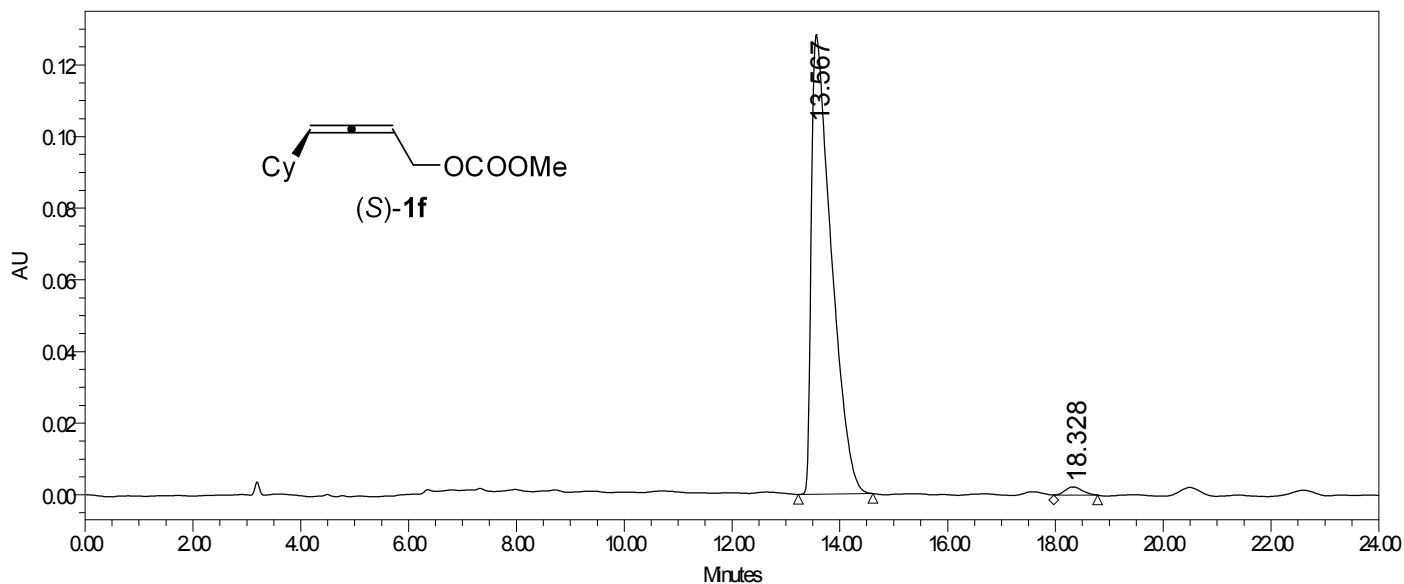
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8285; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	13.423	851758	49.54	39743
2	W2489 ChA.214nm	18.739	867698	50.46	27407

SAMPLE INFORMATION

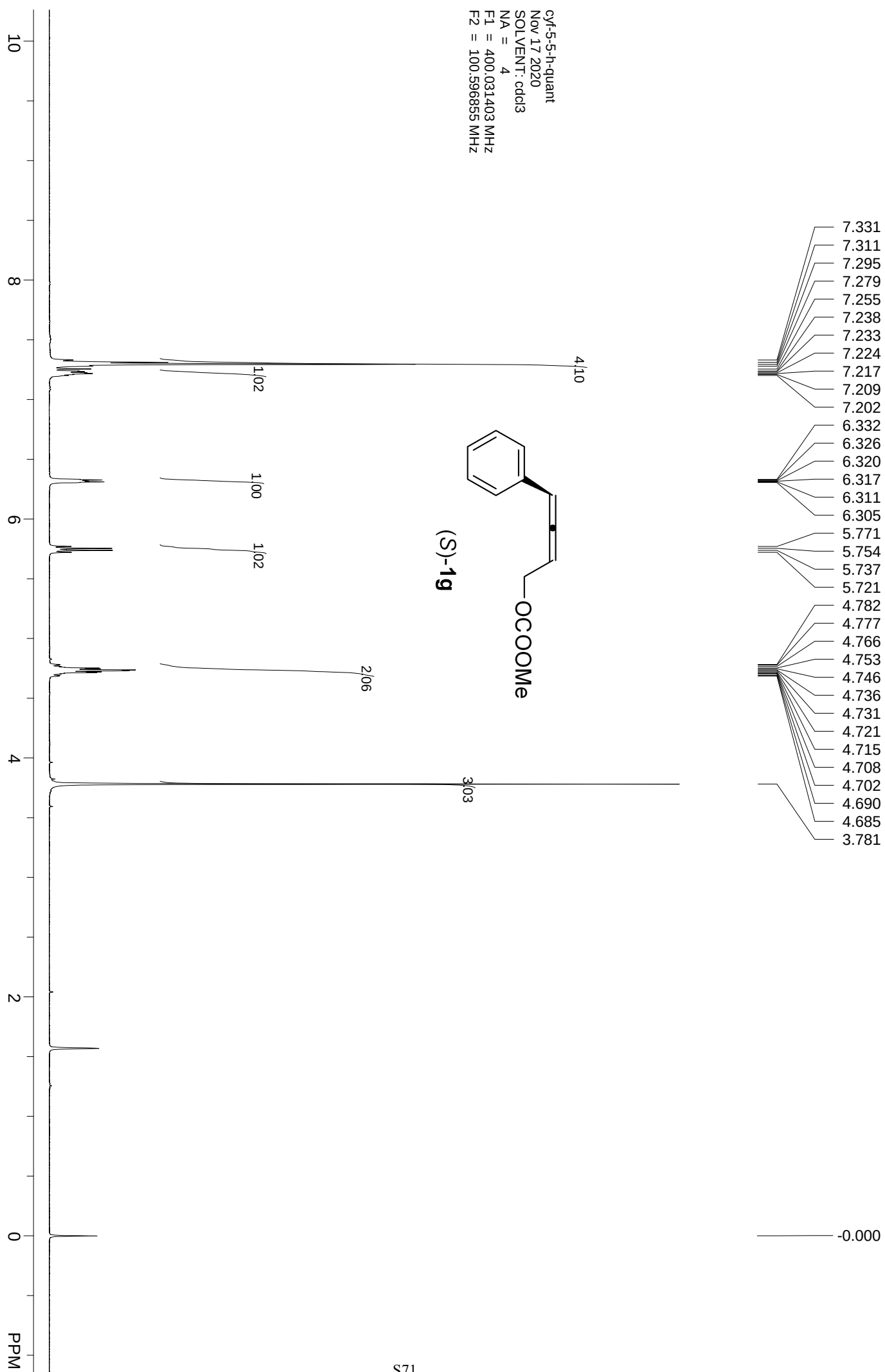
Sample Name:	cyf-4-122-odh-100-0-1-214-1015	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	2	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	10/16/2020 7:25:02 AM CST		
Date Processed:	10/20/2020 6:24:00 AM CST		

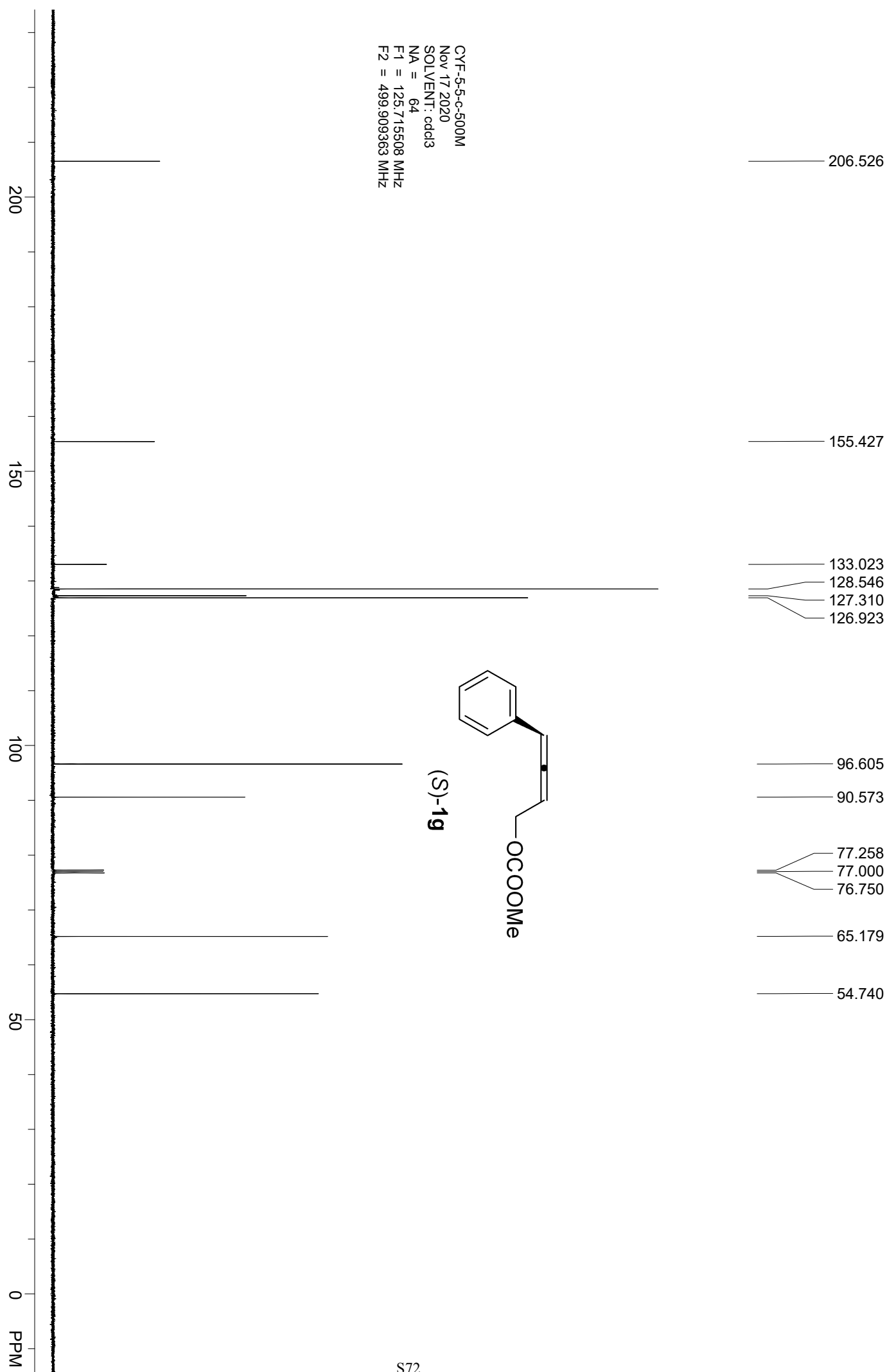


Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8320; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

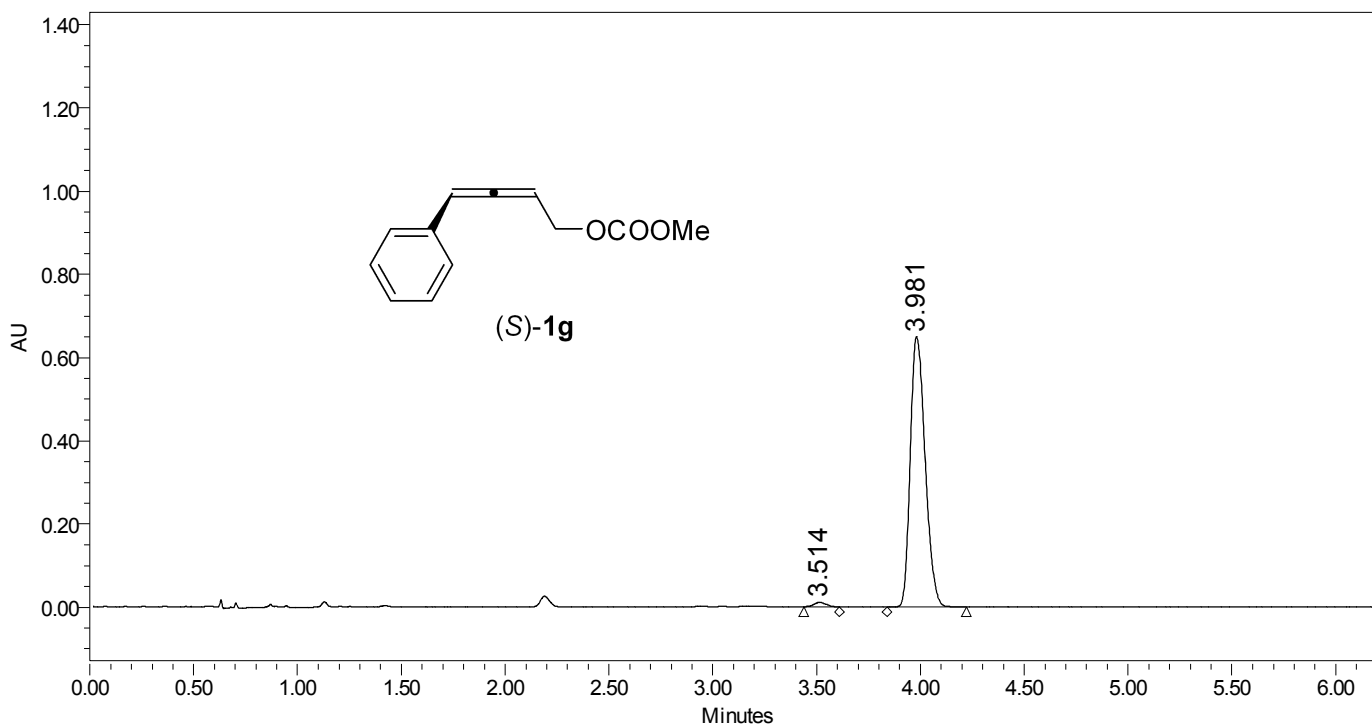
	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	13.567	3284471	98.43	128306
2	W2489 ChA.214nm	18.328	52530	1.57	2338





SAMPLE INFORMATION

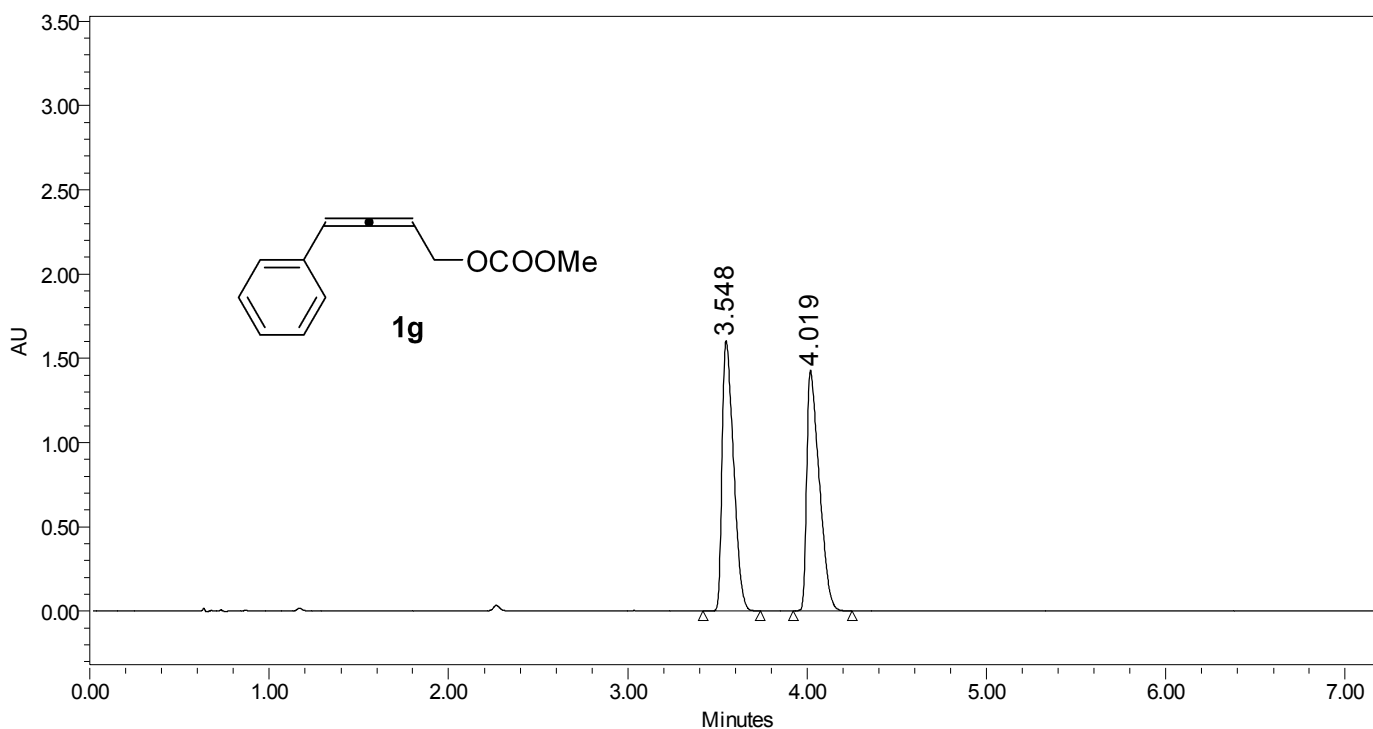
Sample Name:	CYF-5-5	Acquired By:	System
Sample Type:	Unknown	Sample Set Name	
Vial:	1:E,2	Acq. Method Set:	upc_pda_2019m
Injection #:	2	Processing Method	Default
Injection Volume:	3.00 ul	Channel Name:	PDA Ch2 254nm@4.8nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Ch2 254nm@4.8nm
Date Acquired:	11/18/2020 1:15:08 PM CST		
Date Processed:	11/18/2020 4:19:28 PM CST		



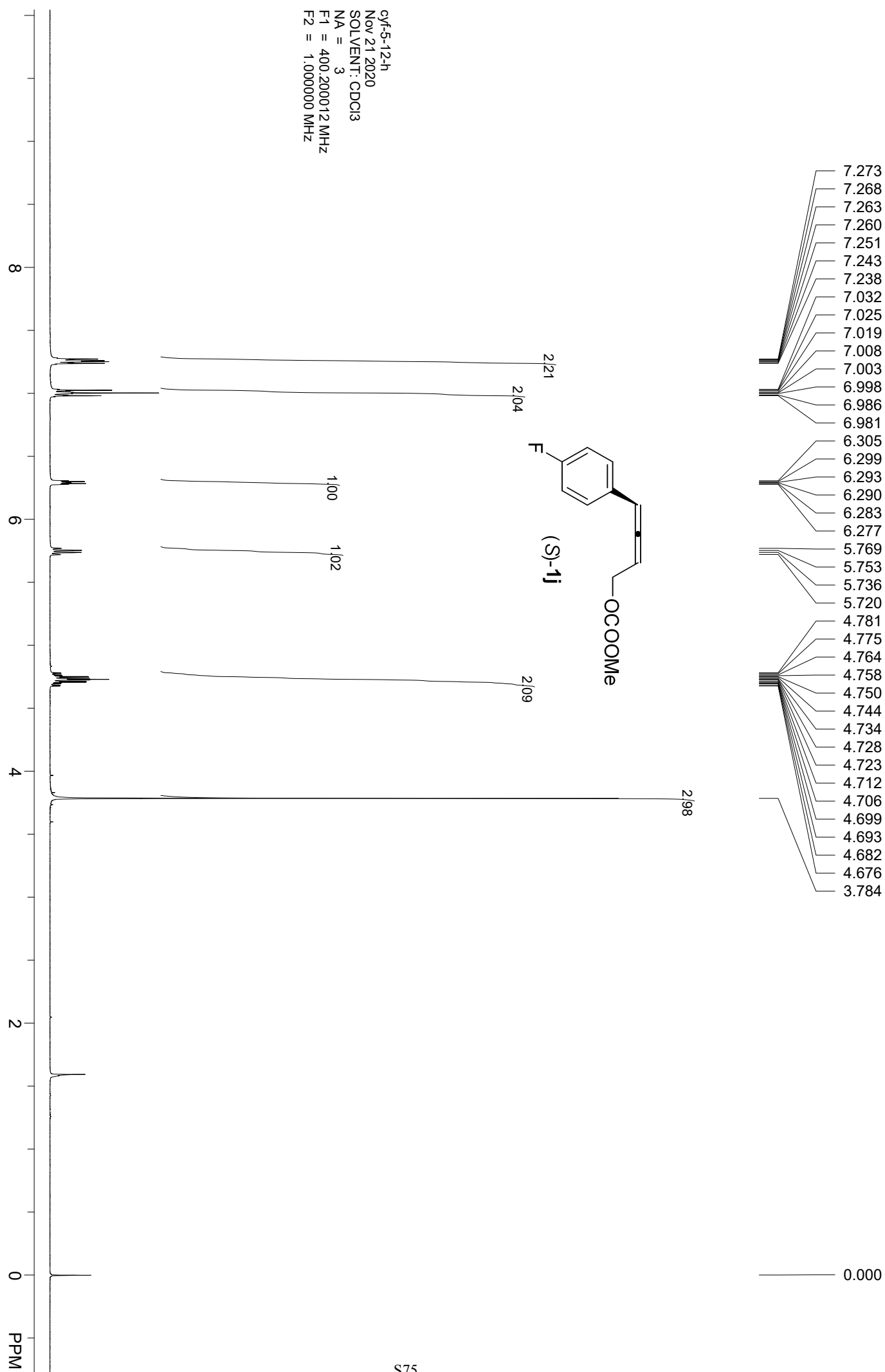
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.514	Unknown	10683	10.300	43834	1.34
2	3.981	Unknown	648961	22.900	3229937	98.66

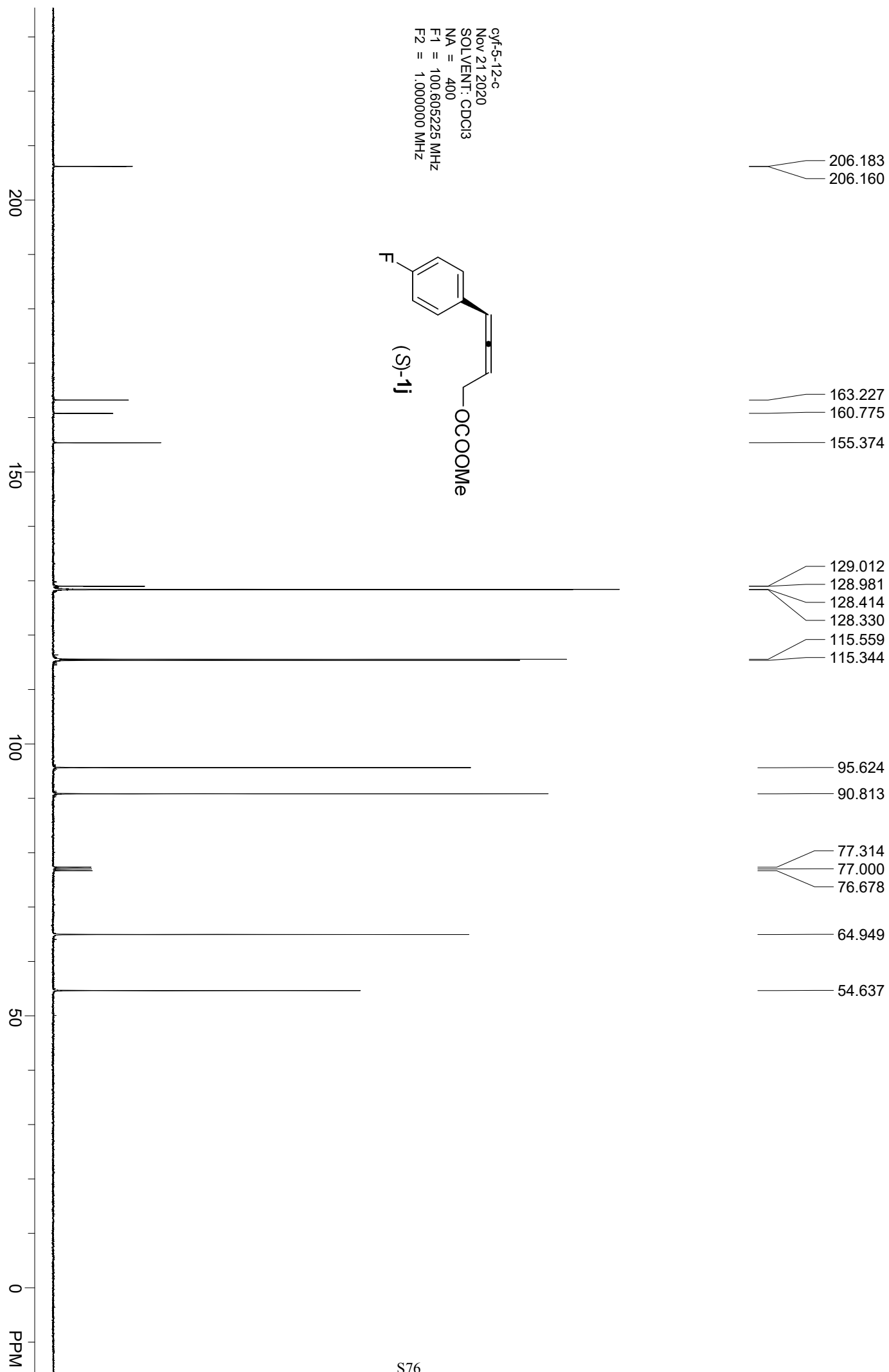
SAMPLE INFORMATION

Sample Name:	XHB-2-124-RAC	Acquired By:	System
Sample Type:	Unknown	Sample Set Name	
Vial:	1:E,1	Acq. Method Set:	upc_pda_2019m
Injection #:	1	Processing Method	TEST
Injection Volume:	1.50 ul	Channel Name:	PDA Ch2 254nm@4.8nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Ch2 254nm@4.8nm
Date Acquired:	11/18/2020 12:59:53 PM CST		
Date Processed:	11/18/2020 4:20:21 PM CST		

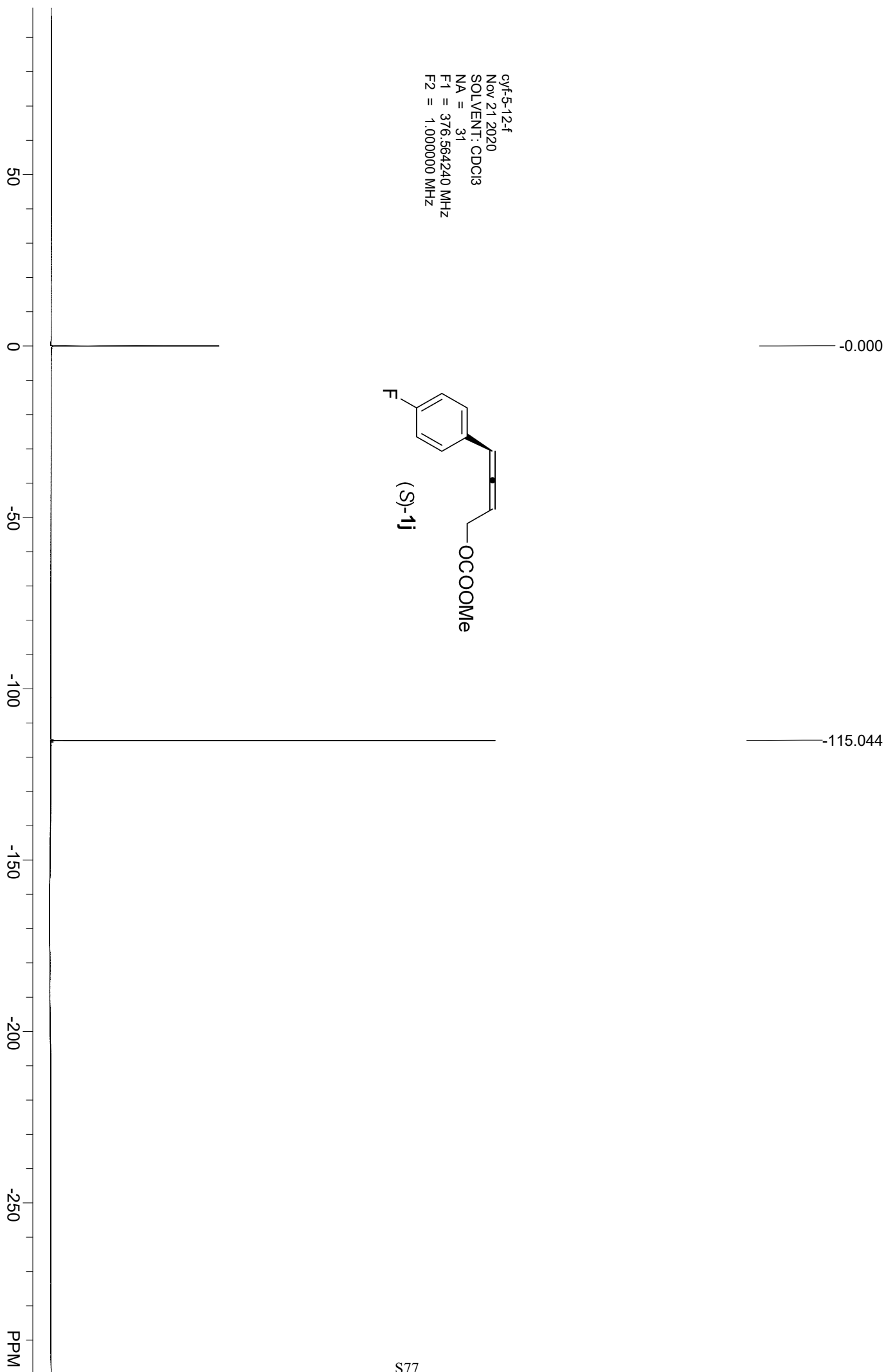
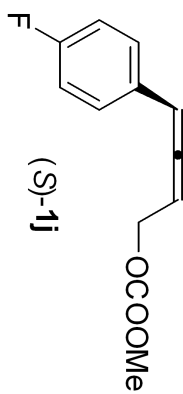


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.548	Unknown	1602432	19.200	7088912	50.51
2	4.019	Unknown	1425956	19.700	6946904	49.49



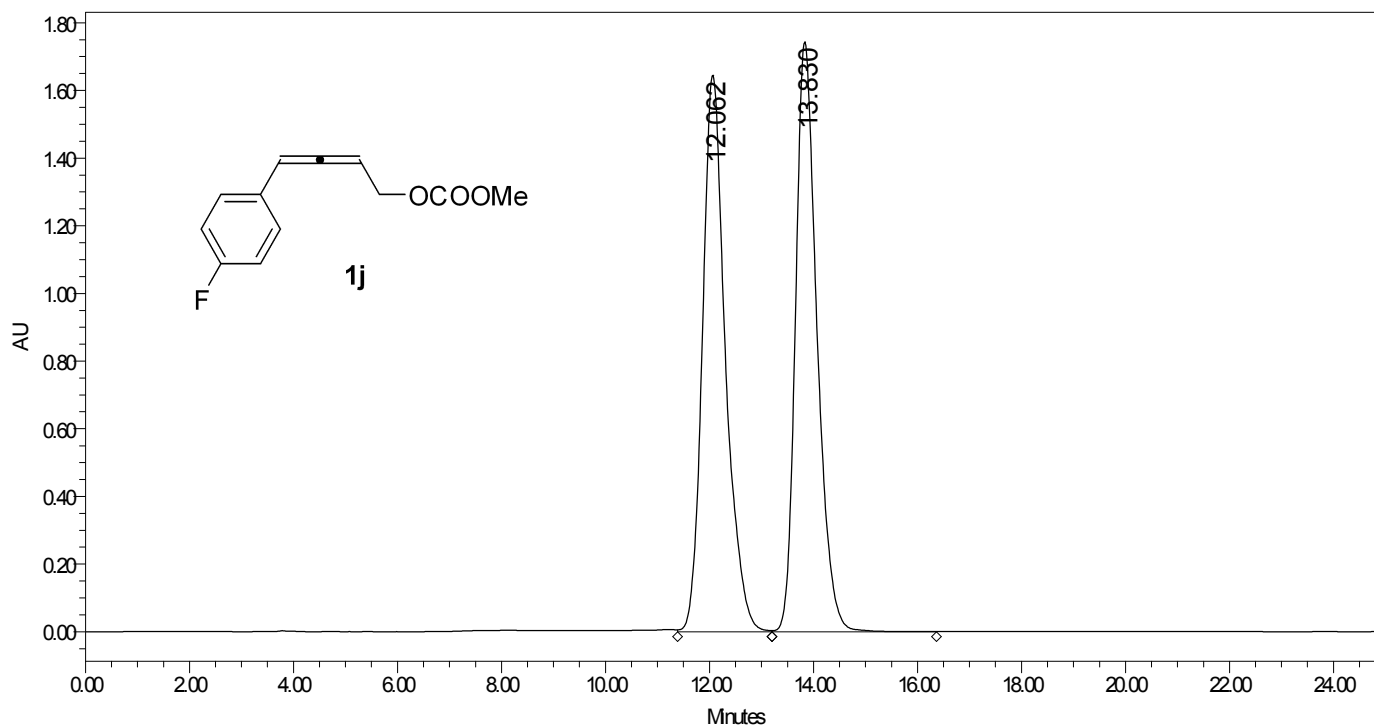


cyf-5-12-f
Nov 21 2020
SOLVENT: CDCl₃
NA = 31
F1 = 376,564240 MHz
F2 = 1,000000 MHz



SAMPLE INFORMATION

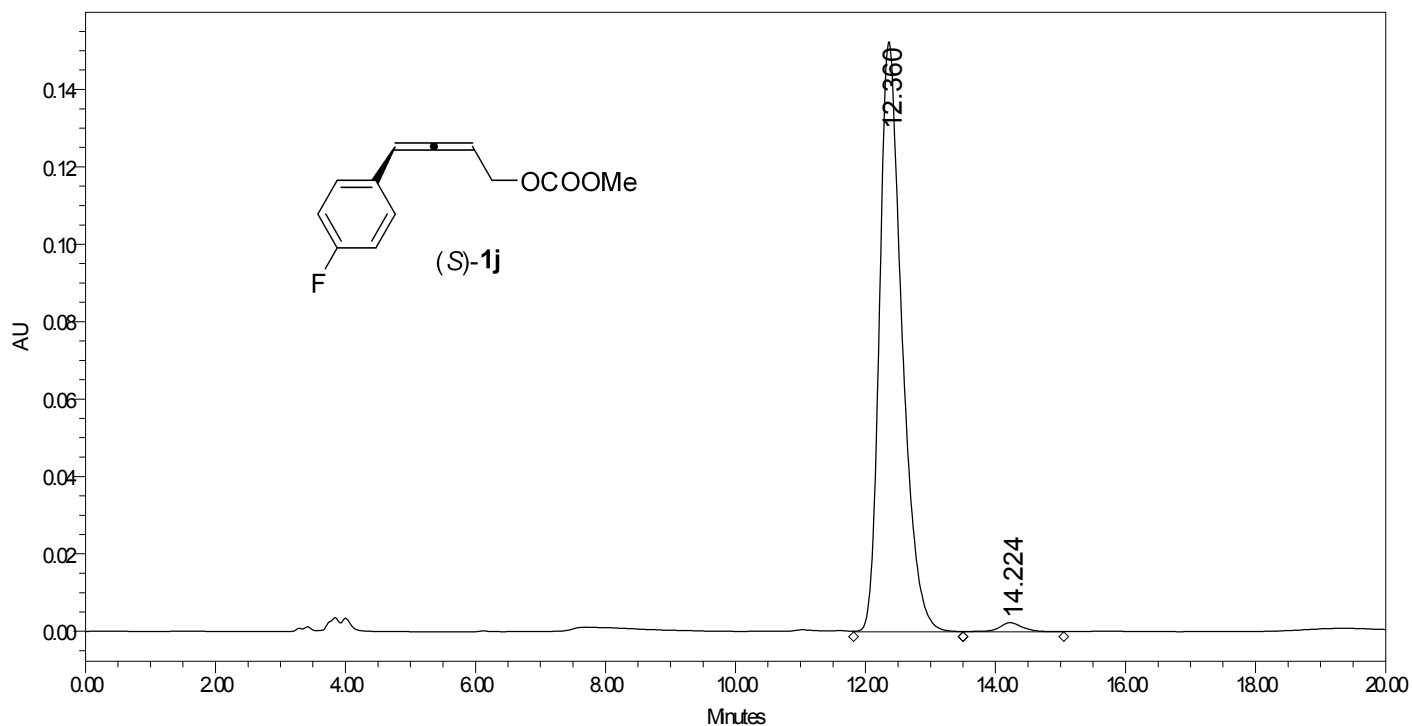
Sample Name:	cyf-3-100-ad-h-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	6	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/23/2020 7:13:51 PMEST		
Date Processed:	11/23/2020 8:16:07 PMEST		



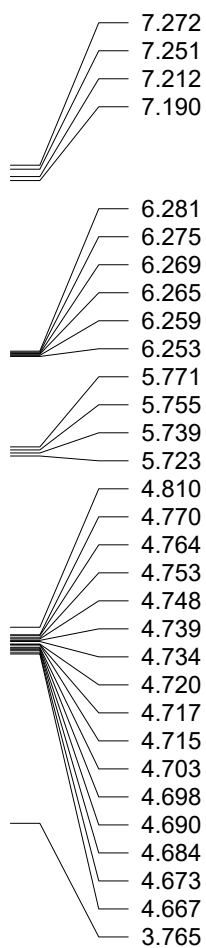
	RT	Area	%Area	Height
1	12.062	50408808	50.30	1645787
2	13.830	49807939	49.70	1743521

SAMPLE INFORMATION

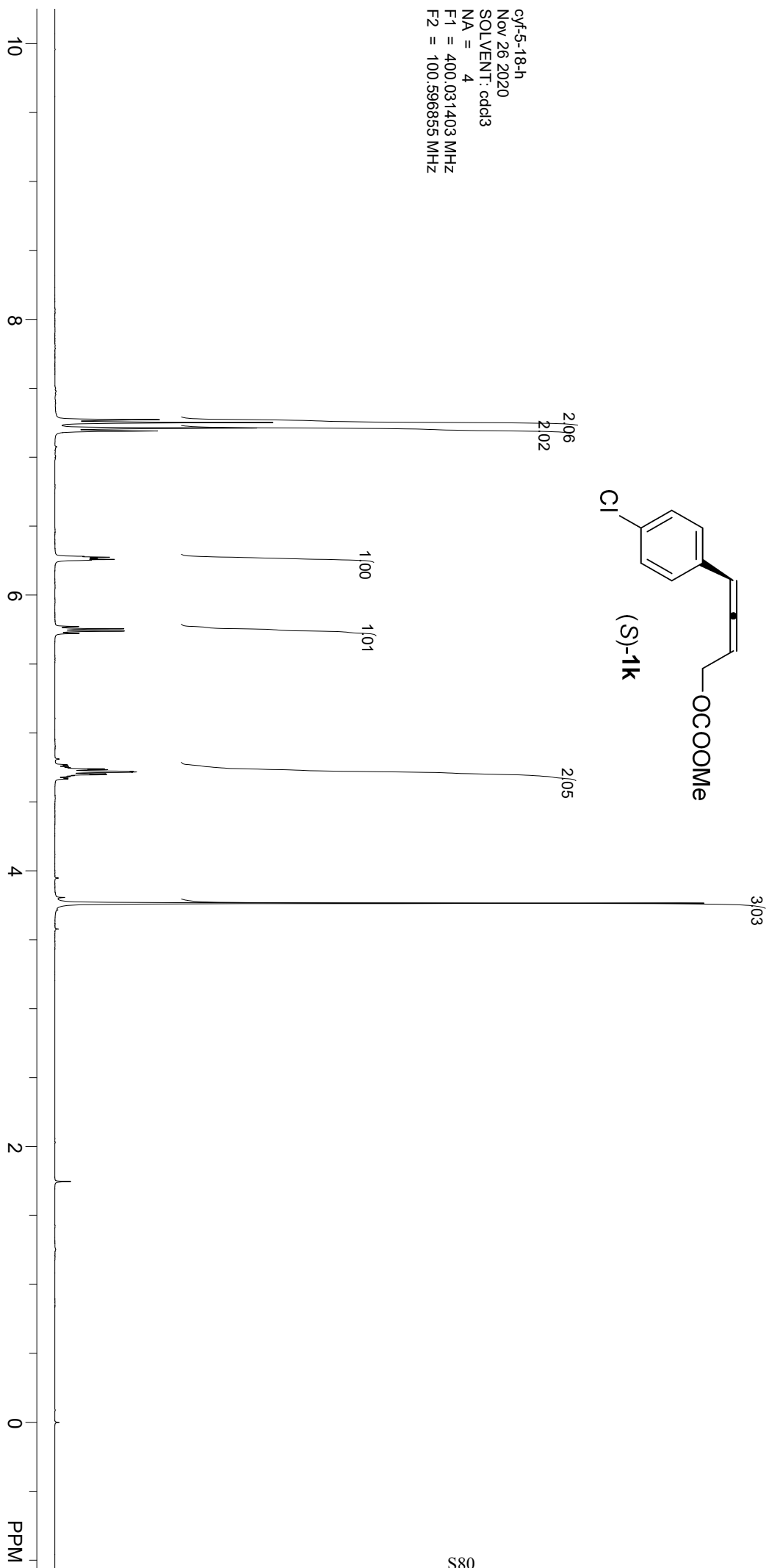
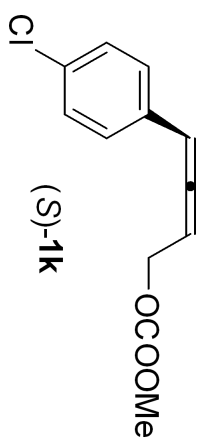
Sample Name:	cyf-5-12-ad-h-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	5	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/23/2020 6:50:26 PMEST		
Date Processed:	11/23/2020 8:16:18 PMEST		



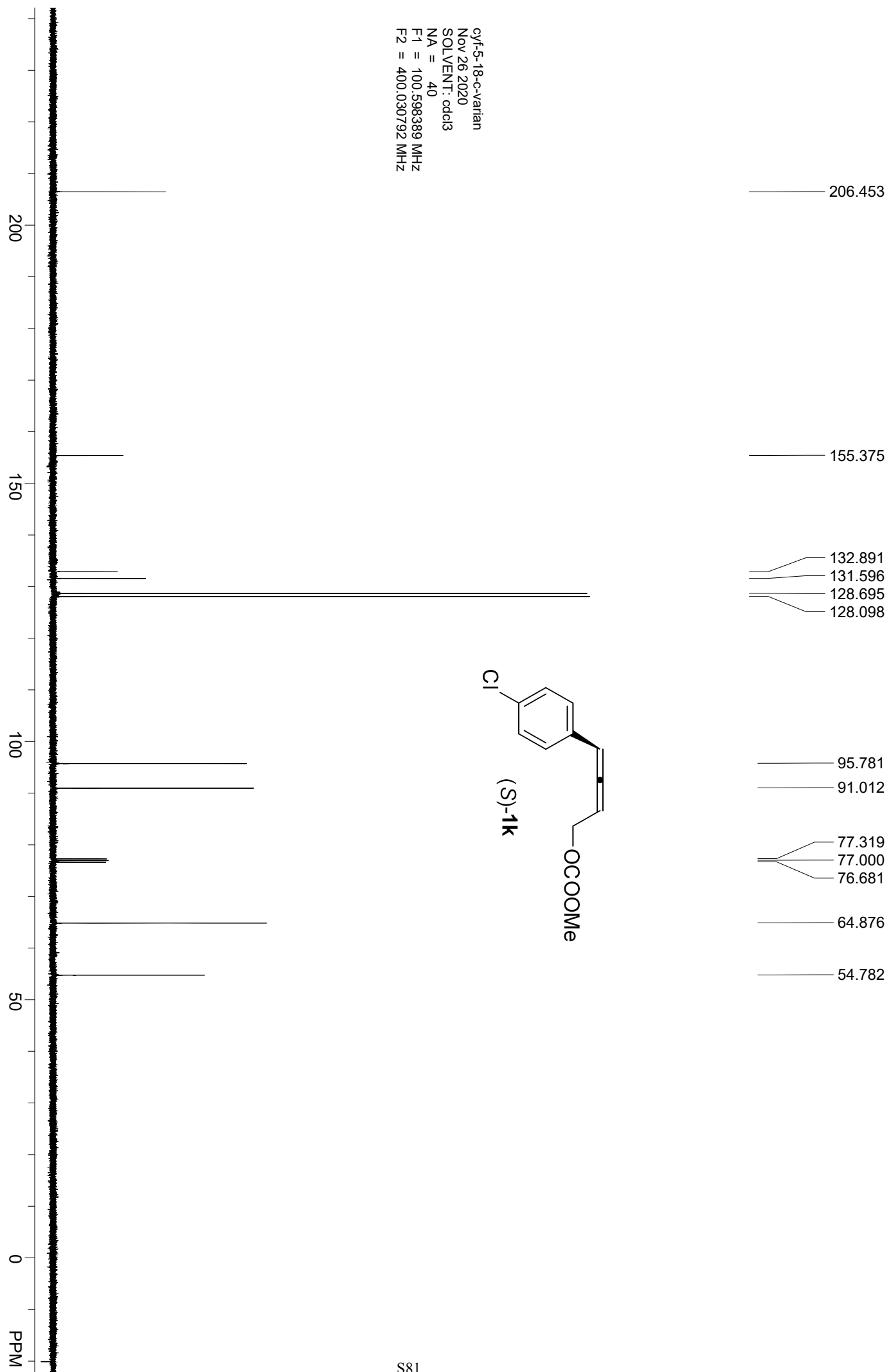
	RT	Area	%Area	Height
1	12.360	3661332	98.40	152530
2	14.224	59628	1.60	2363



-0.001

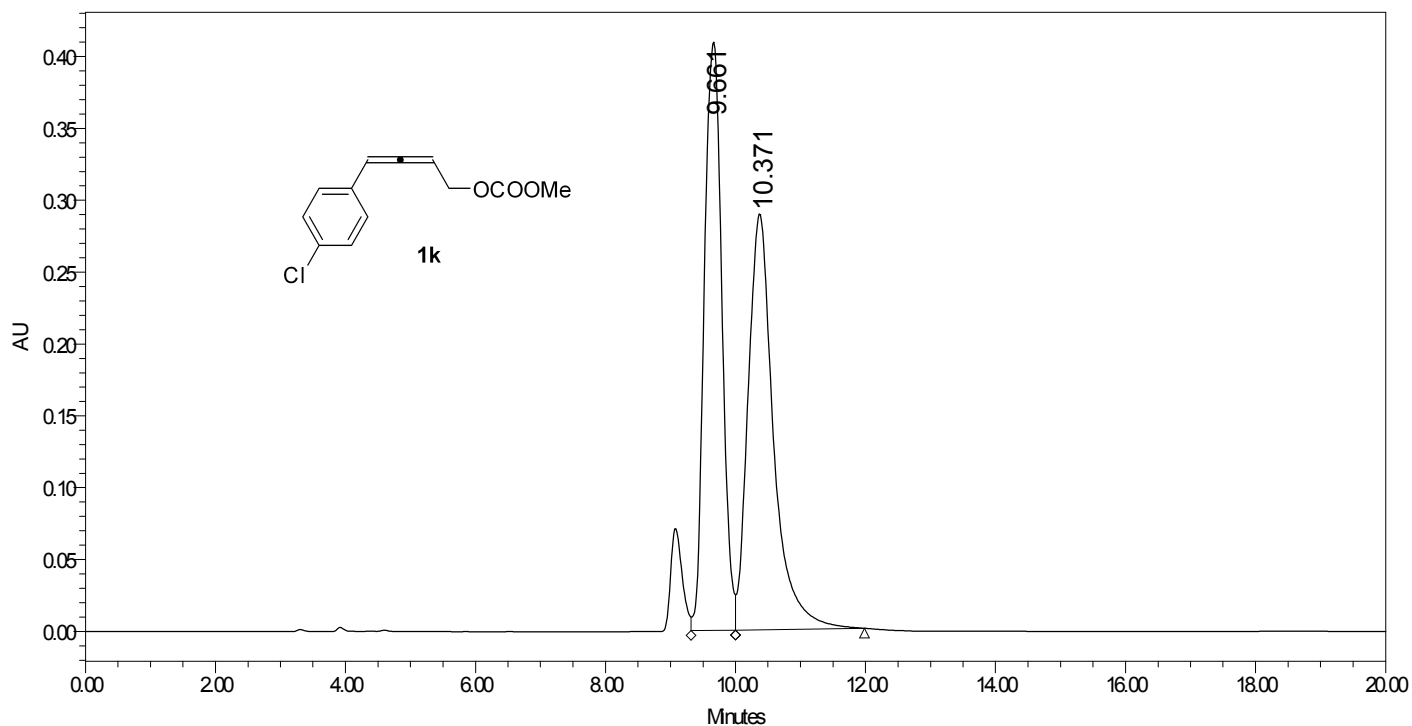


cyf-5-18-c-varian
Nov 26 2020
SOLVENT: cdc13
NA = 40
F1 = 100.598389 MHz
F2 = 400.030792 MHz



SAMPLE INFORMATION

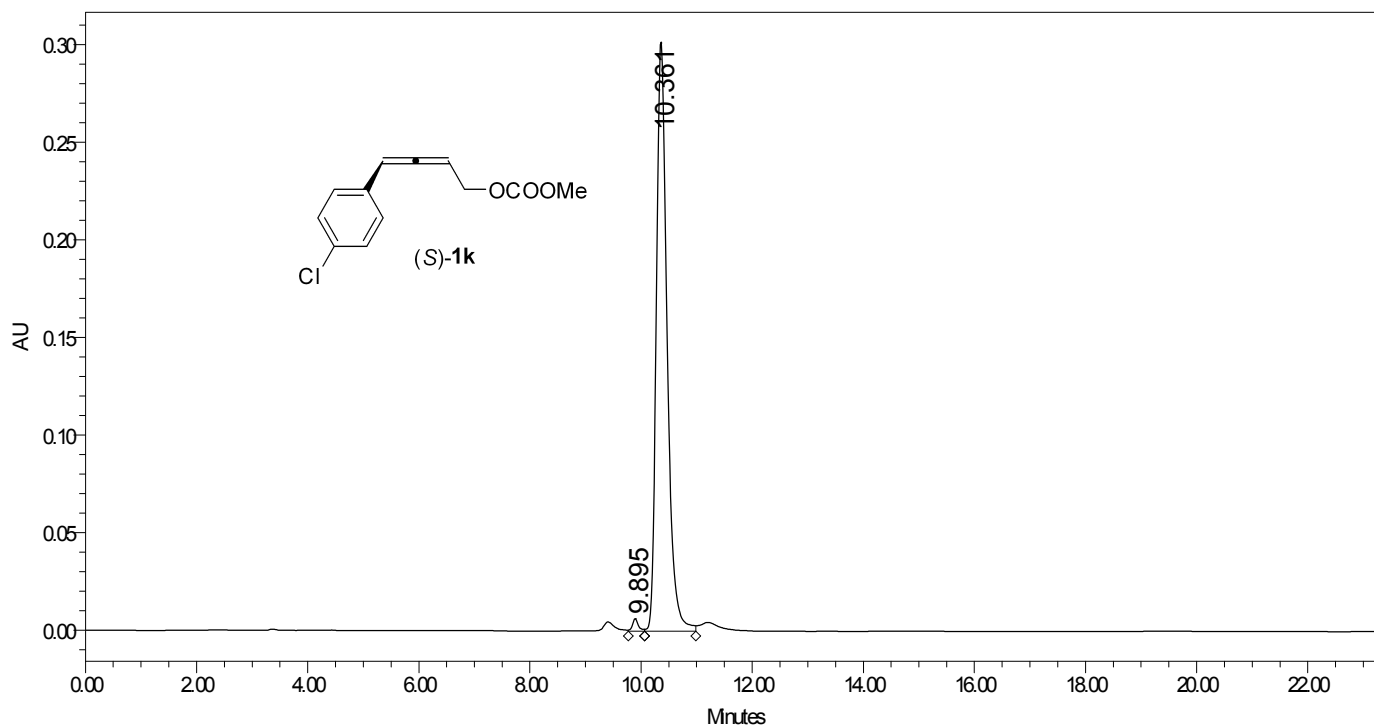
Sample Name:	cyf-4-10-ib-400-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	10	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/24/2020 1:00:07 PMEST		
Date Processed:	11/24/2020 8:42:54 PMEST		



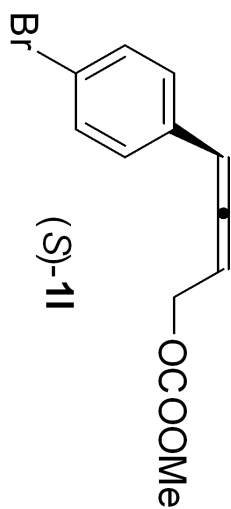
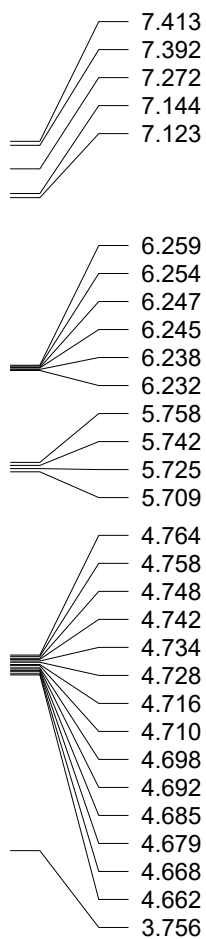
	RT	Area	%Area	Height
1	9.661	7699230	49.43	409702
2	10.371	7877722	50.57	289314

SAMPLE INFORMATION

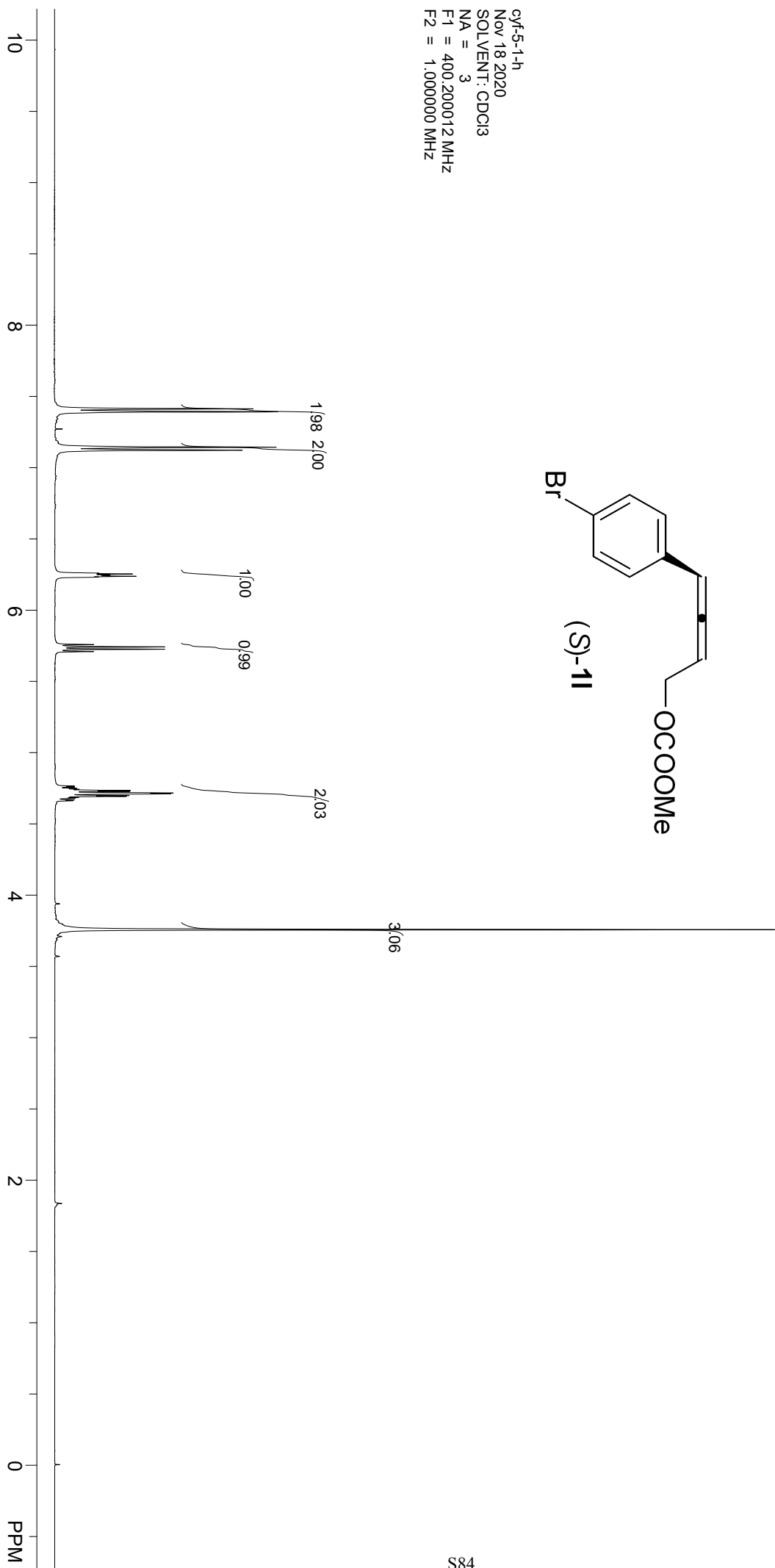
Sample Name:	cyf-5-18-ib-400-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	9	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	55.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/24/2020 12:35:04 PMEST		
Date Processed:	11/24/2020 8:43:42 PMEST		

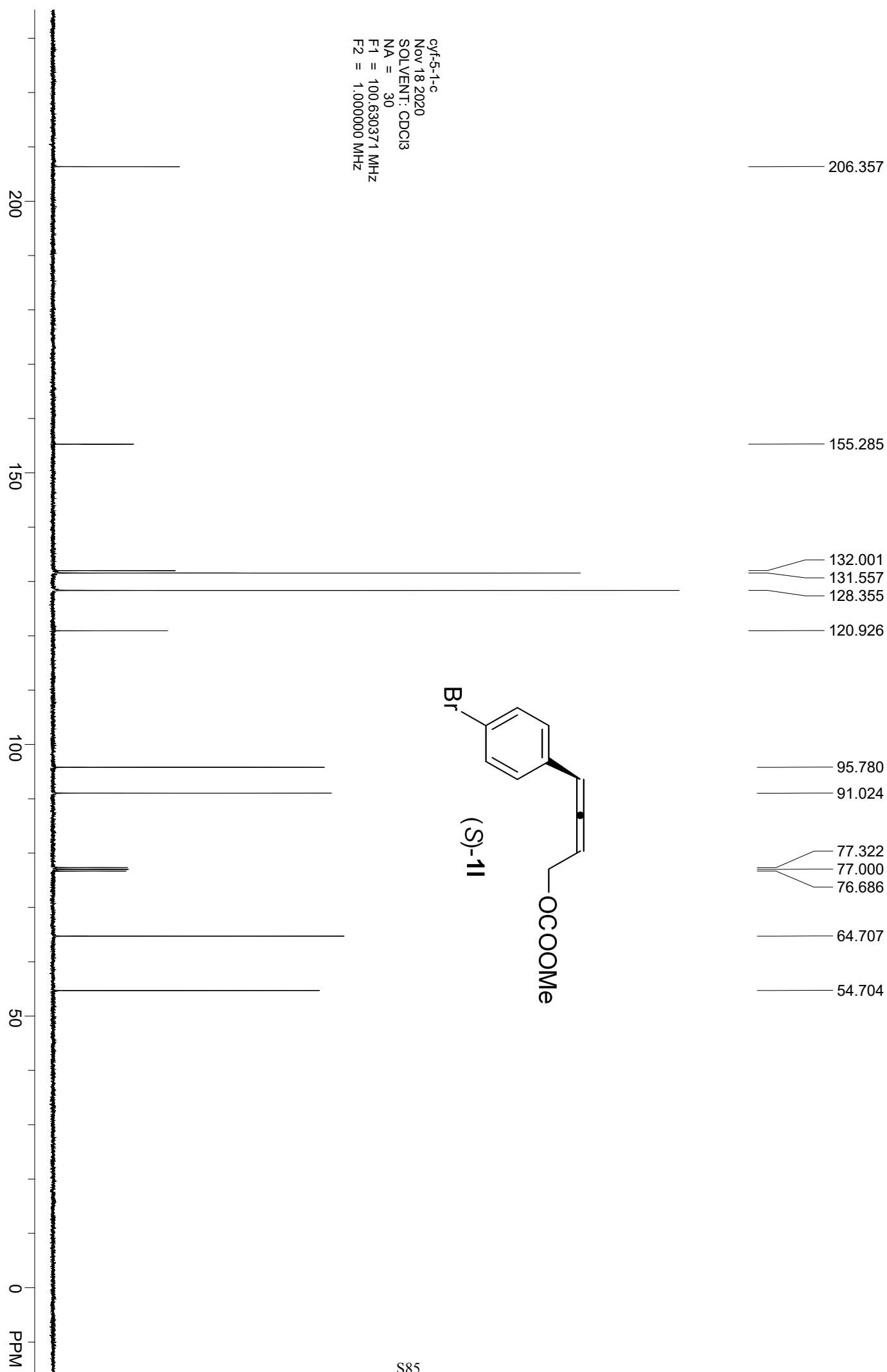


	RT	Area	%Area	Height
1	9.895	49383	1.19	6429
2	10.361	4087870	98.81	302454



cyf-5-1-h
Nov 18 2020
SOLVENT: CDCl3
NA = 3
F1 = 400.200012 MHz
F2 = 1.000000 MHz





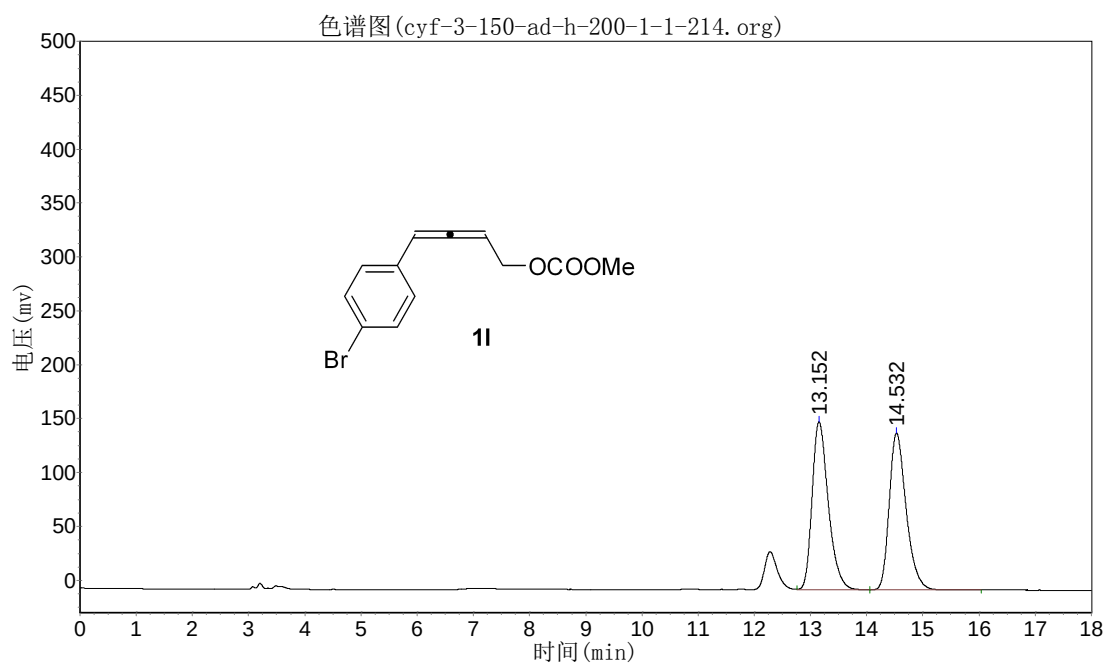
cyf-3-150-ad-h-200-1-1-214

实验时间: 2020/11/19, 12:25:17

报告时间: 2020/11/19, 17:29:06

谱图文件: D:\zhuguangjiong\cyf\20201119\cyf-3-150-ad-h-200-1-1-214. org

实验内容简介:



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		13.152	156063.484	3134200.000	50.6897
2		14.532	145520.031	3048905.750	49.3103
总计			301583.516	6183105.750	100.0000

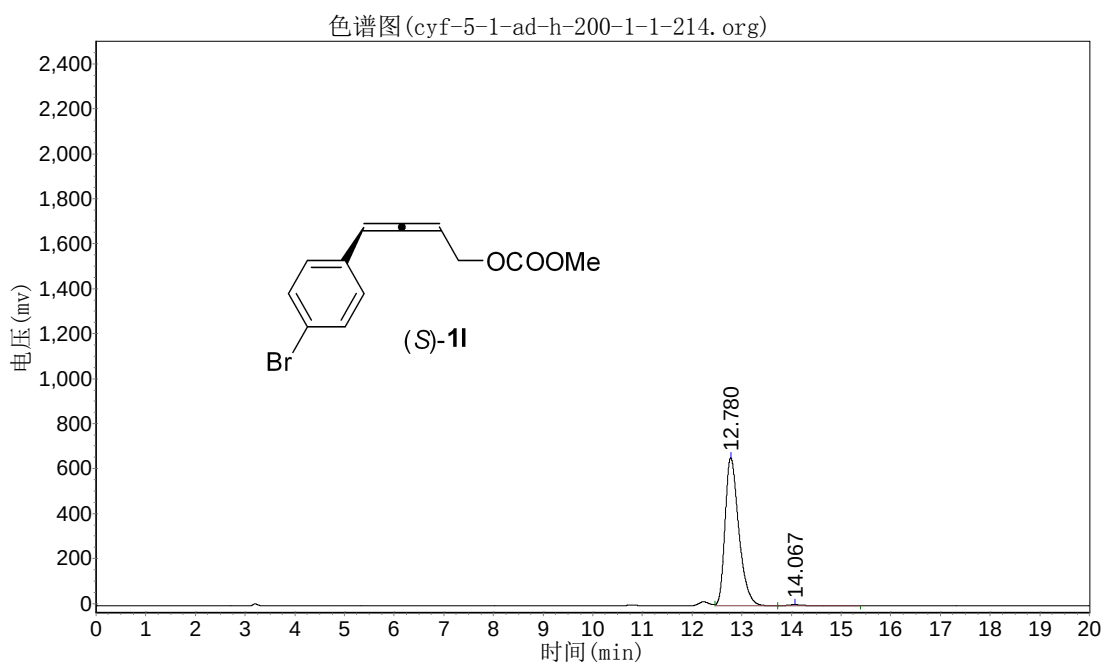
cyf-5-1-ad-h-200-1-1-214

实验时间: 2020/11/19, 13:00:28

报告时间: 2020/11/19, 17:30:19

谱图文件: D:\zhuguangjiong\cyf\20201119\cyf-5-1-ad-h-200-1-1-214.org

实验内容简介:

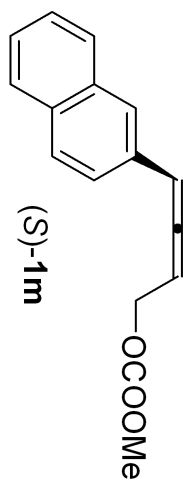
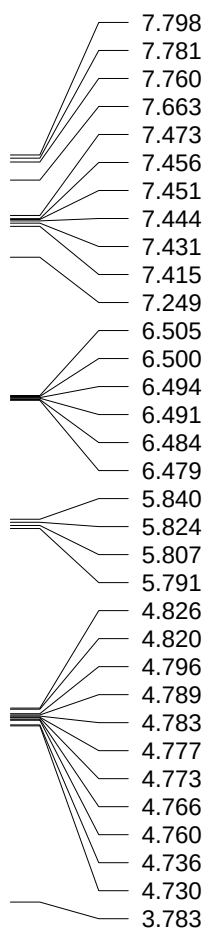


分析结果表

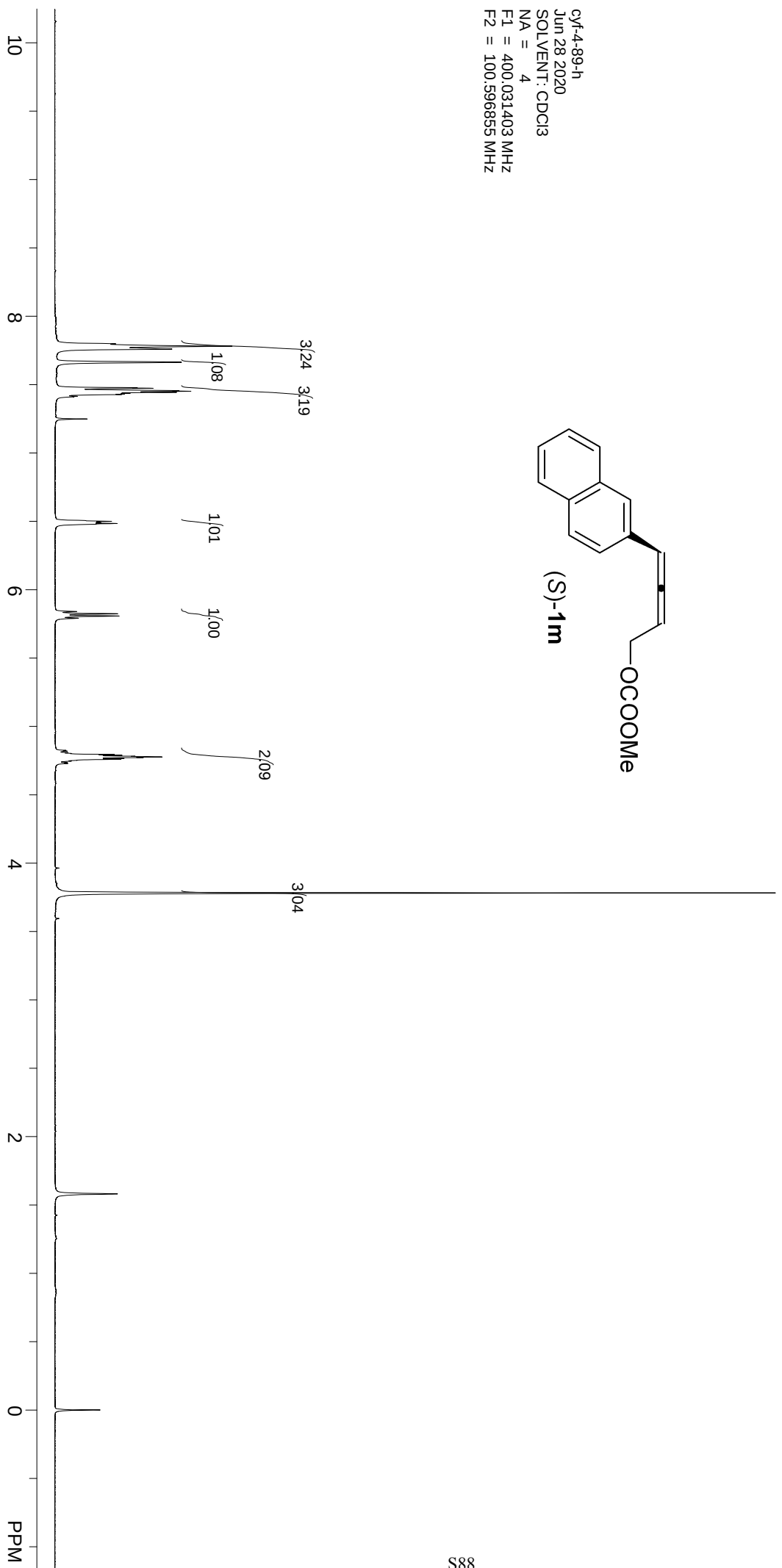
峰号	峰名	保留时间	峰高	峰面积	含量
1		12.780	658634.813	12682768.000	99.1806
2		14.067	5108.150	104781.594	0.8194
总计			663742.962	12787549.594	100.0000

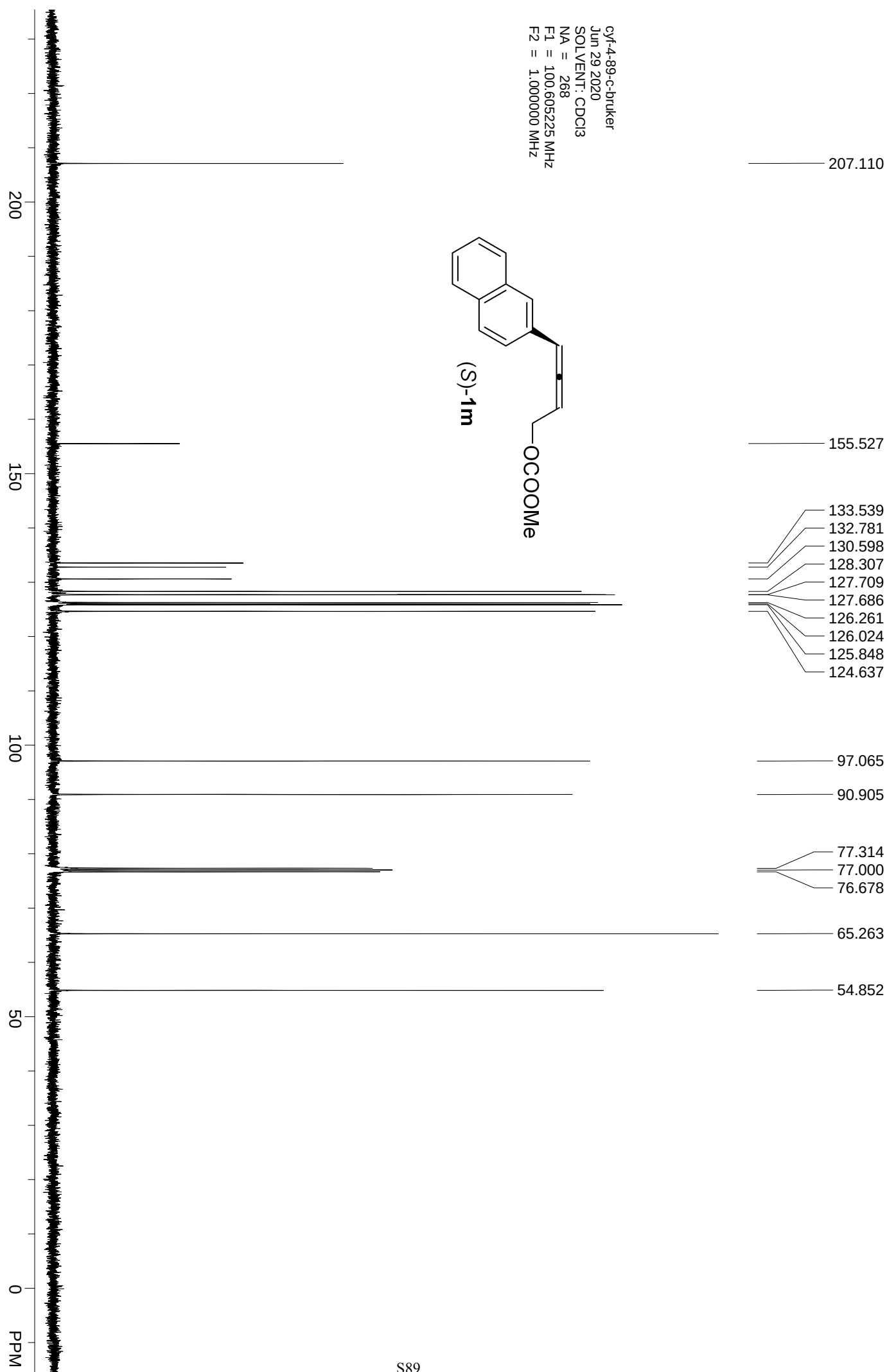
系统评价

峰号	峰名	保留时间	半峰宽	理论塔板数	分离度	拖尾因子	不对称度
1		12.780	0.293	10532.414	1.013	1.383	1.659
2		14.067	0.298	12357.431	2.197	1.163	1.374



cyf-4-89-h
Jun 28 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz





cyf-3-115-rac

实验时间: 2020-06-30, 14:59:37

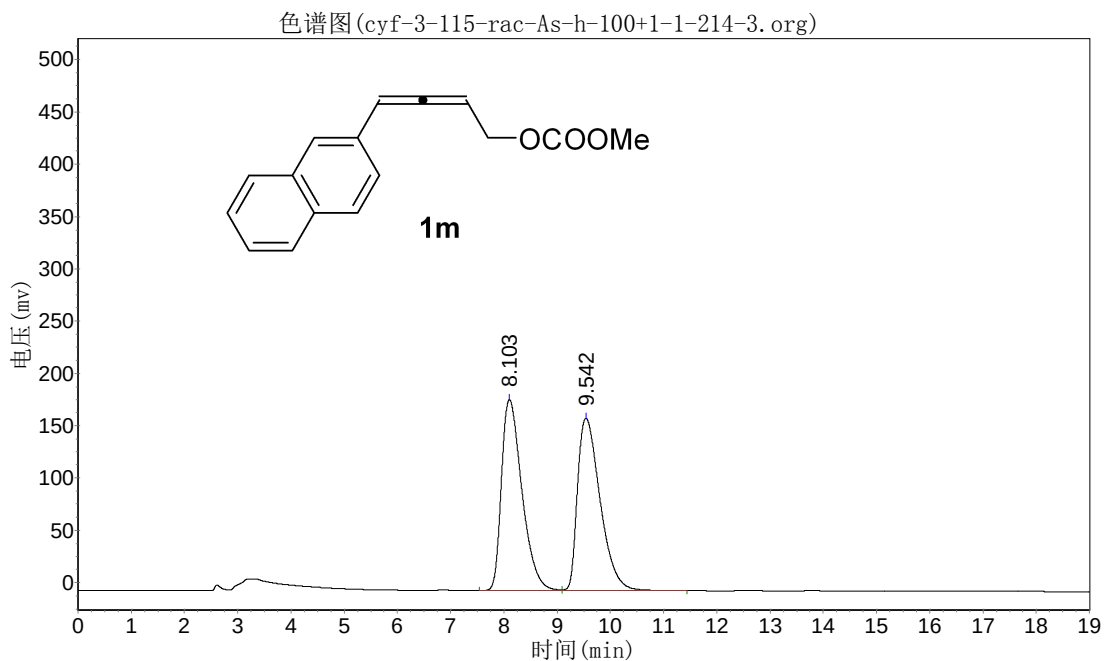
报告时间: 2020-06-30, 15:31:26

谱图文件: D:\data\slf\cyf\2020-06-30\cyf-3-115-rac-As-h-100+1-1-214-3. org

实验内容简介:

As-h 100+1

214nm 1.0ml/min



分析结果表

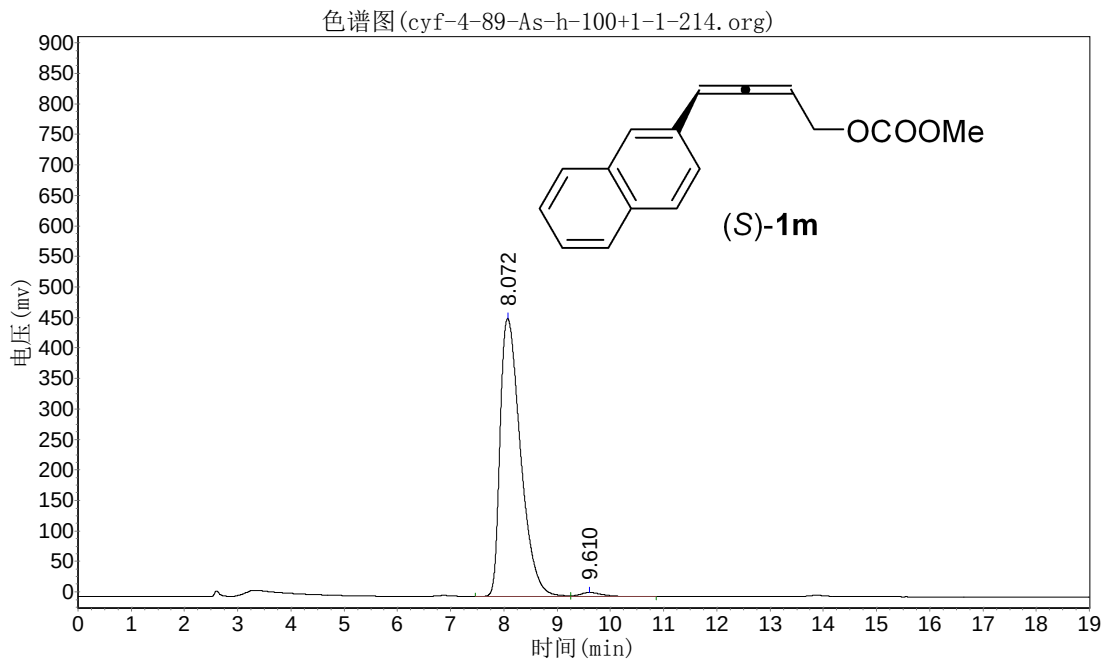
峰号	峰名	保留时间	峰高	峰面积	含量
1		8.103	182554.438	4887959.500	50.0705
2		9.542	164891.578	4874194.000	49.9295
总计			347446.016	9762153.500	100.0000

cyf-4-89

实验时间: 2020-06-30, 15:24:09
 谱图文件: D:\data\slf\cyf\2020-06-30\cyf-4-89-As-h-100+1-1-214. org

报告时间: 2020-06-30, 16:34:56

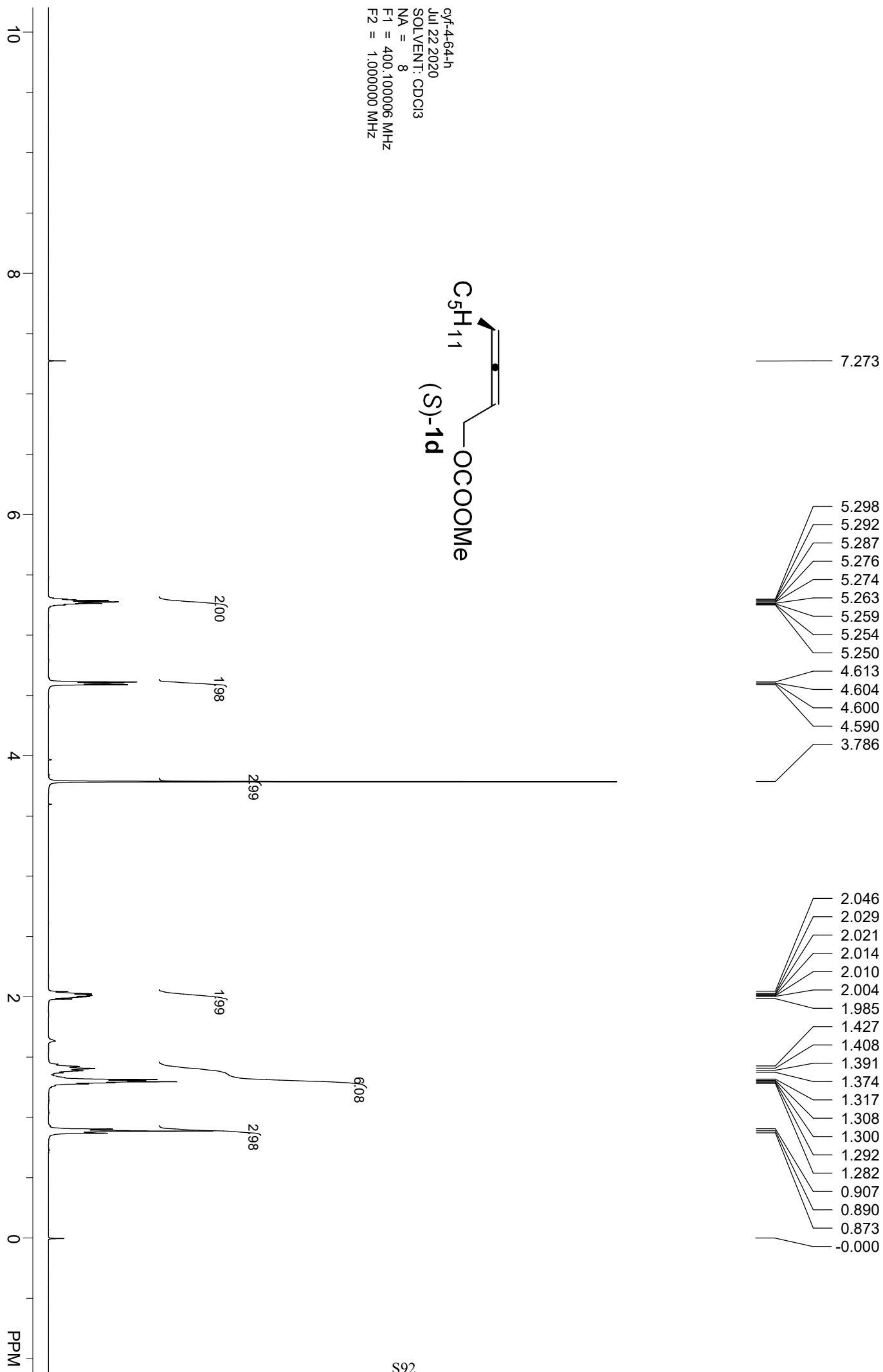
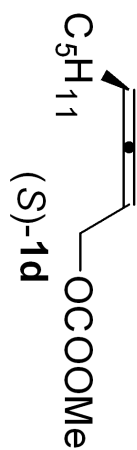
实验内容简介:
 As-h 100+1
 214nm 1.0ml/min



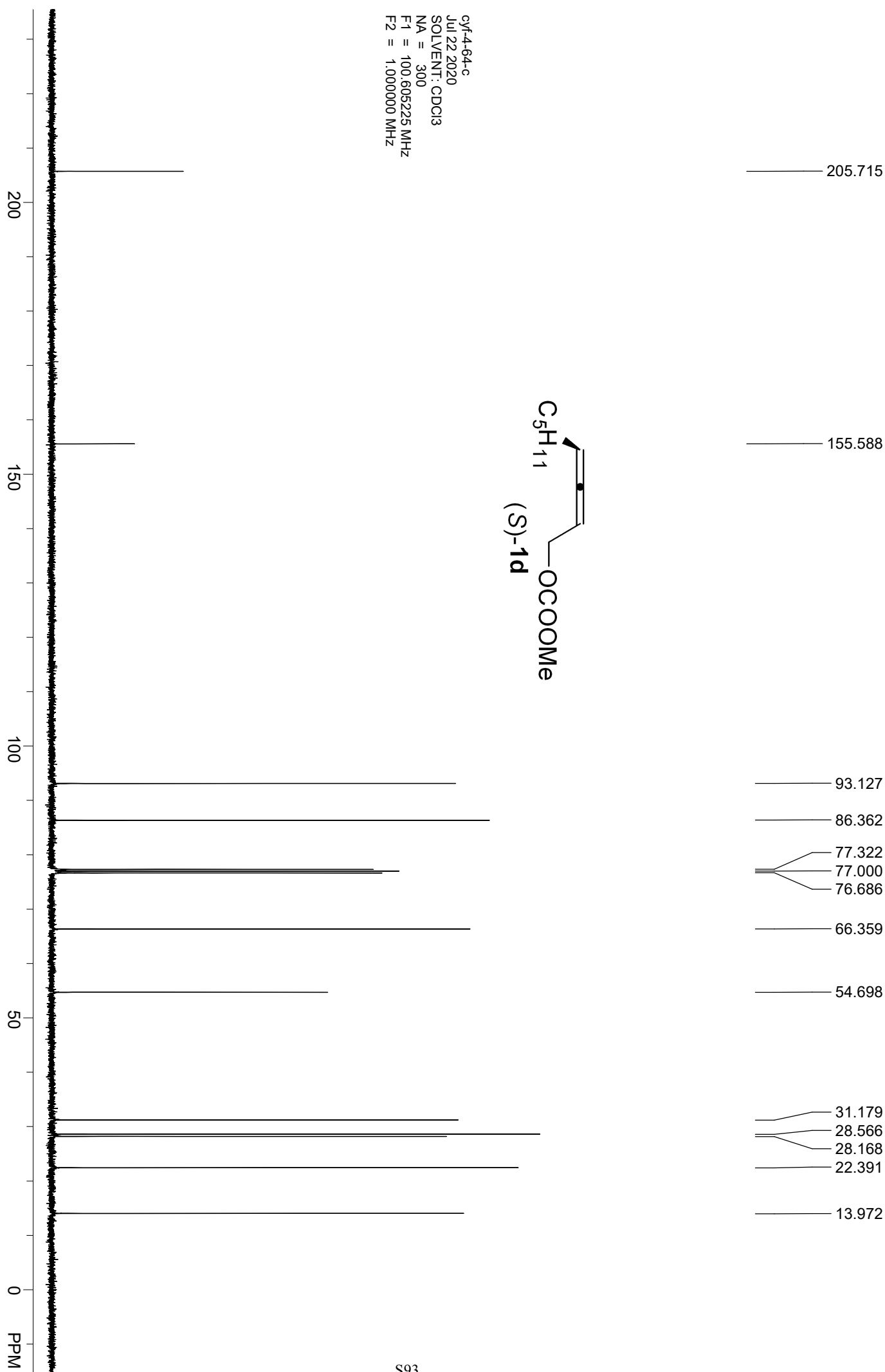
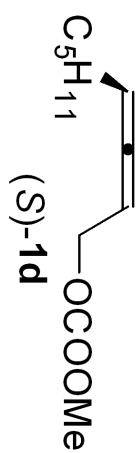
分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		8.072	455865.281	12153841.000	98.4057
2		9.610	6622.654	196908.047	1.5943
总计			462487.936	12350749.047	100.0000

cvf-4-64-h
 Jul 22 2020
 SOLVENT: CDCl₃
 NA = 8
 F1 = 400.100006 MHz
 F2 = 1.000000 MHz

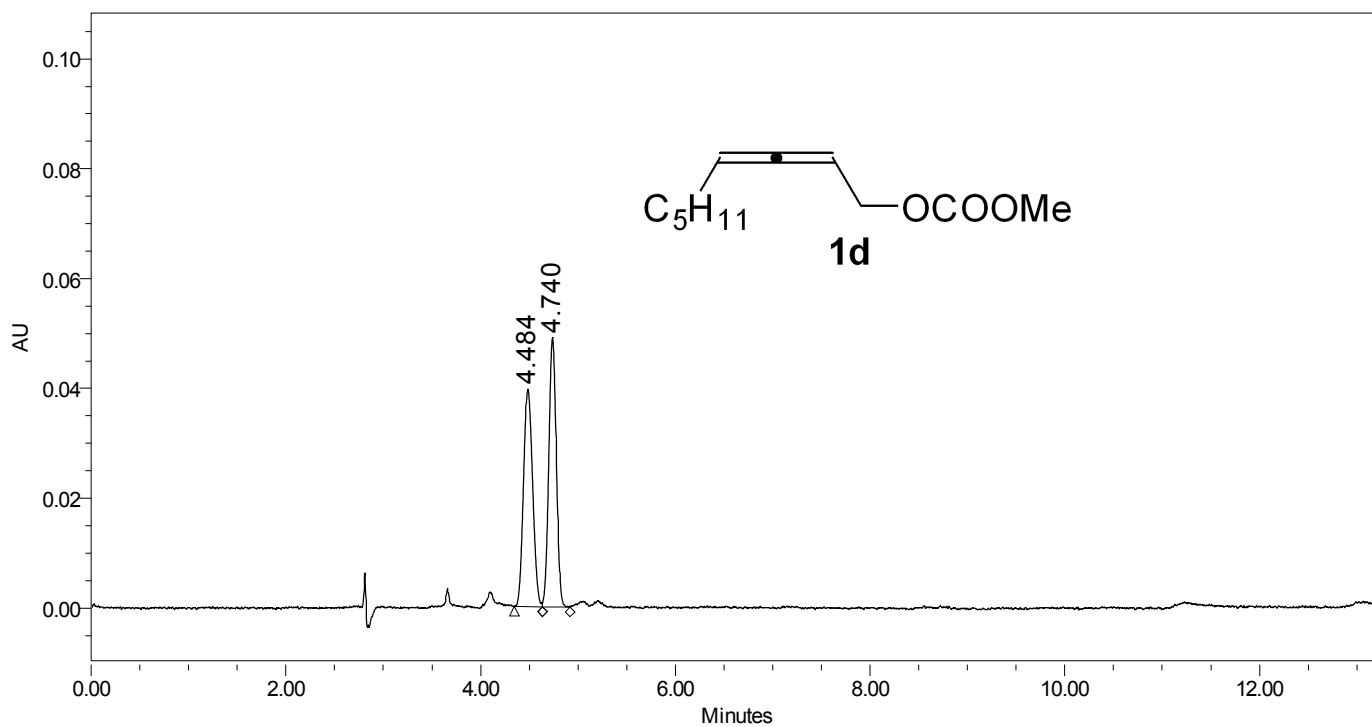


cyf-4-64-c
Jul 22 2020
SOLVENT: CDCl3
NA = 300
F1 = 100.605225 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

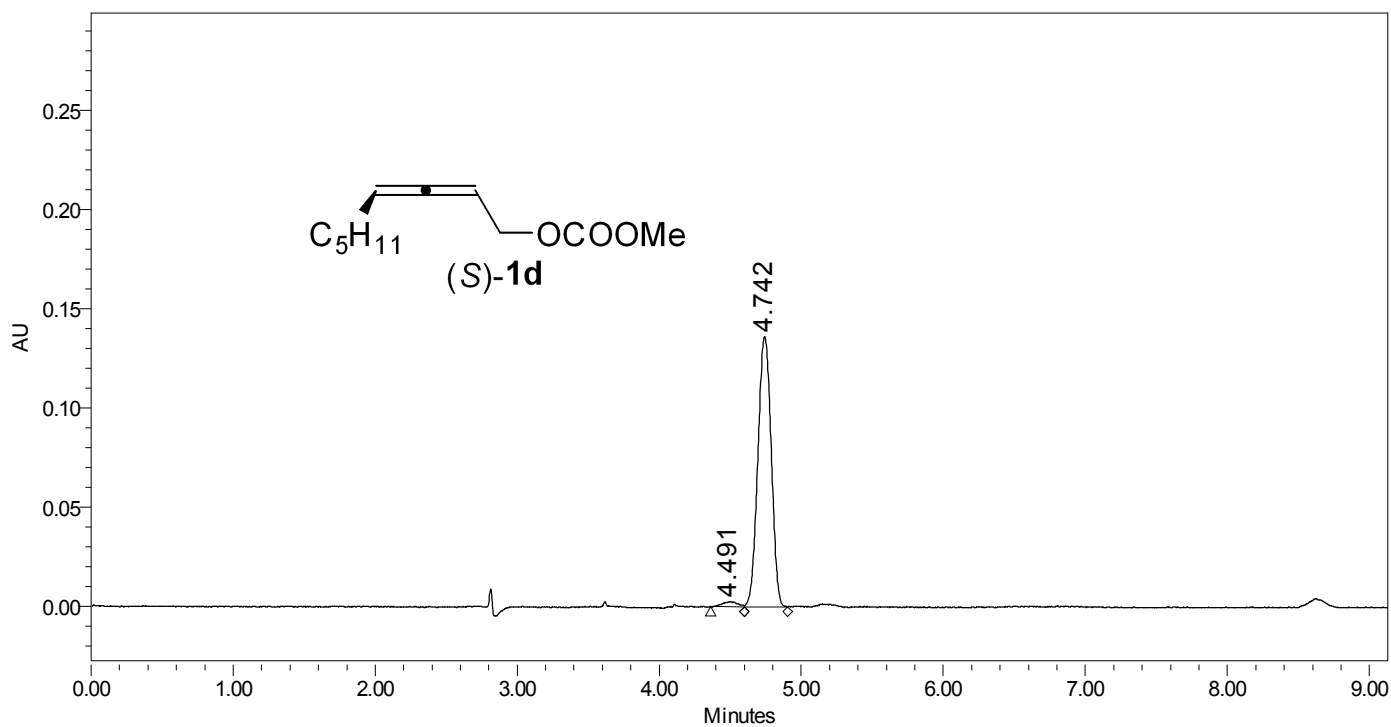
Sample Name:	cyf-3-191-rac	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	2:F,1	Acq. Method Set:	upc_pda_2019m
Injection #:	1	Processing Method:	Default
Injection Volume:	2.00 ul	Channel Name:	217.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Spectrum PDA 217.0 nm
Date Acquired:	8/10/2020 3:47:45 PM CST		
Date Processed:	8/11/2020 3:08:35 PM CST		



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.484	Unknown	39563	17.399	258754	49.44
2	4.740	Unknown	49032	17.099	264658	50.56

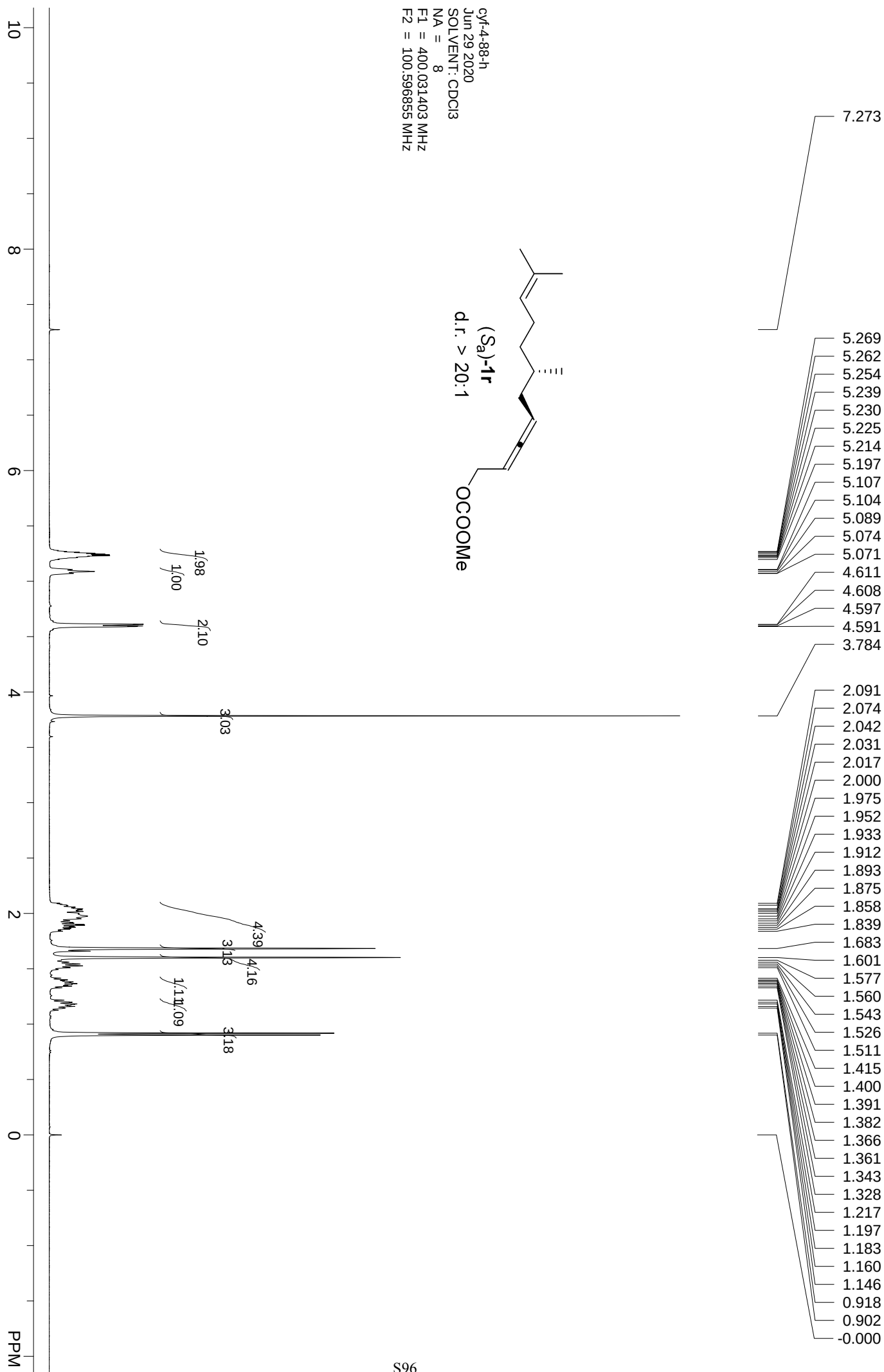
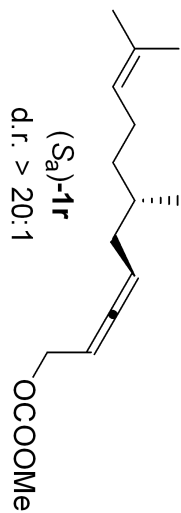
SAMPLE INFORMATION

Sample Name:	cyf-4-64	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	2:F,2	Acq. Method Set:	upc_pda_2019m
Injection #:	1	Processing Method:	Default
Injection Volume:	3.00 ul	Channel Name:	217.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Spectrum PDA 217.0 nm
Date Acquired:	8/10/2020 4:02:10 PM CST		
Date Processed:	8/11/2020 3:07:58 PM CST		

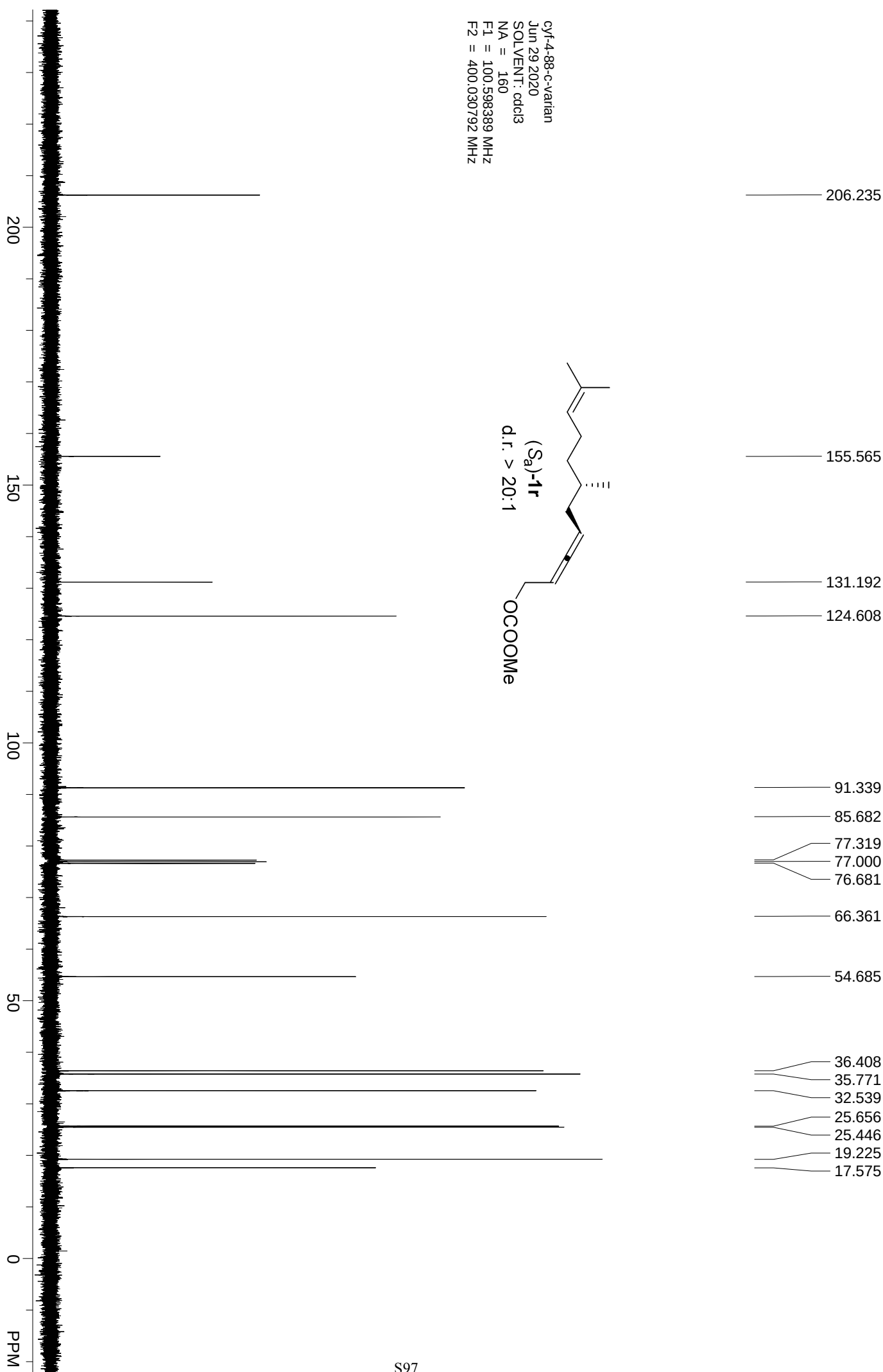
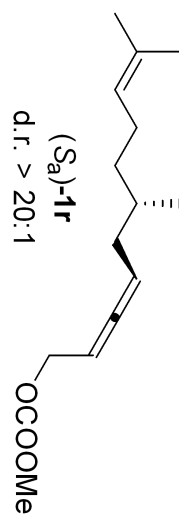


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.491	Unknown	2554	14.299	18944	2.09
2	4.742	Unknown	136141	18.199	886991	97.91

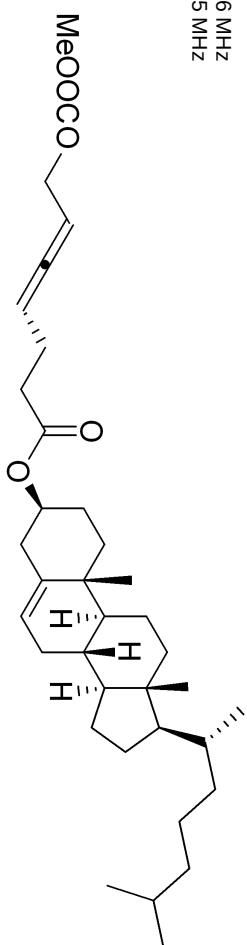
cyf-4-88-h
 Jun 29 2020
 SOLVENT: CDCl₃
 NA = 8
 F1 = 400.031403 MHz
 F2 = 100.596855 MHz



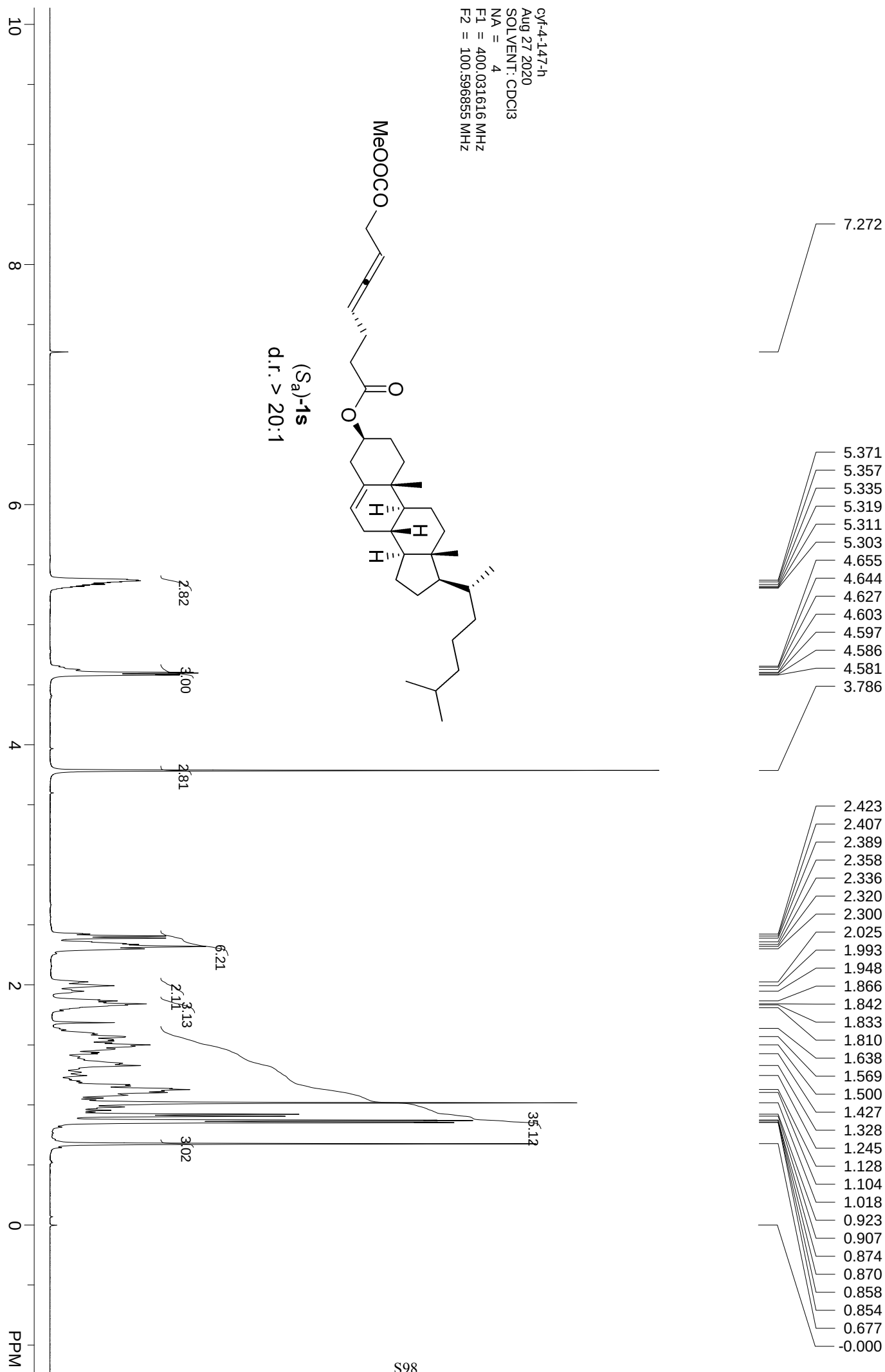
cyf-4-88-c-varian
 Jun 29 2020
 SOLVENT: cdcl3
 NA = 160
 F1 = 100.598389 MHz
 F2 = 400.030792 MHz

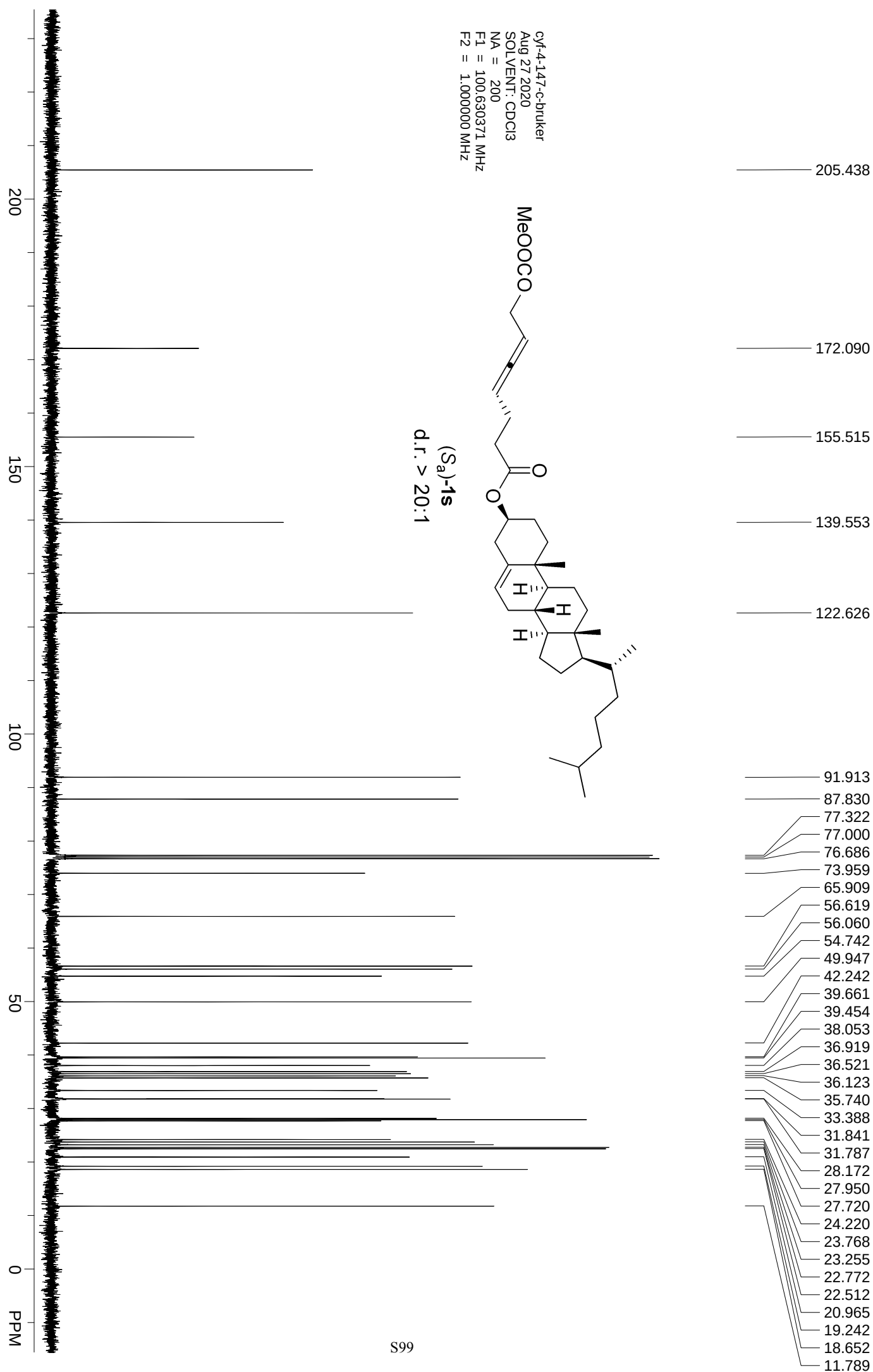


cyf-4-147-h
 Aug 27 2020
 SOLVENT: CDCl3
 NA = 4
 F1 = 400.031616 MHz
 F2 = 100.596855 MHz



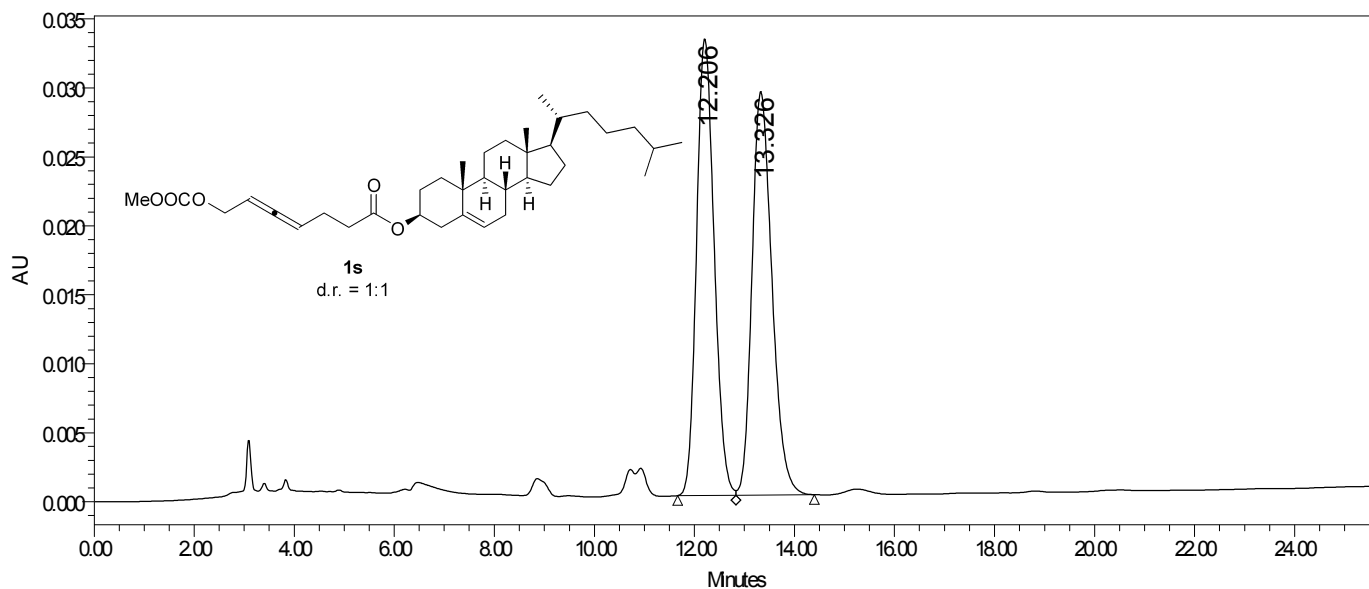
(S_a)-1s
 d.r. > 20:1





SAMPLE INFORMATION

Sample Name:	zyz-6-111-OD-h-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	9/4/2020 6:07:15 AM CST		
Date Processed:	9/4/2020 9:51:28 AM CST		



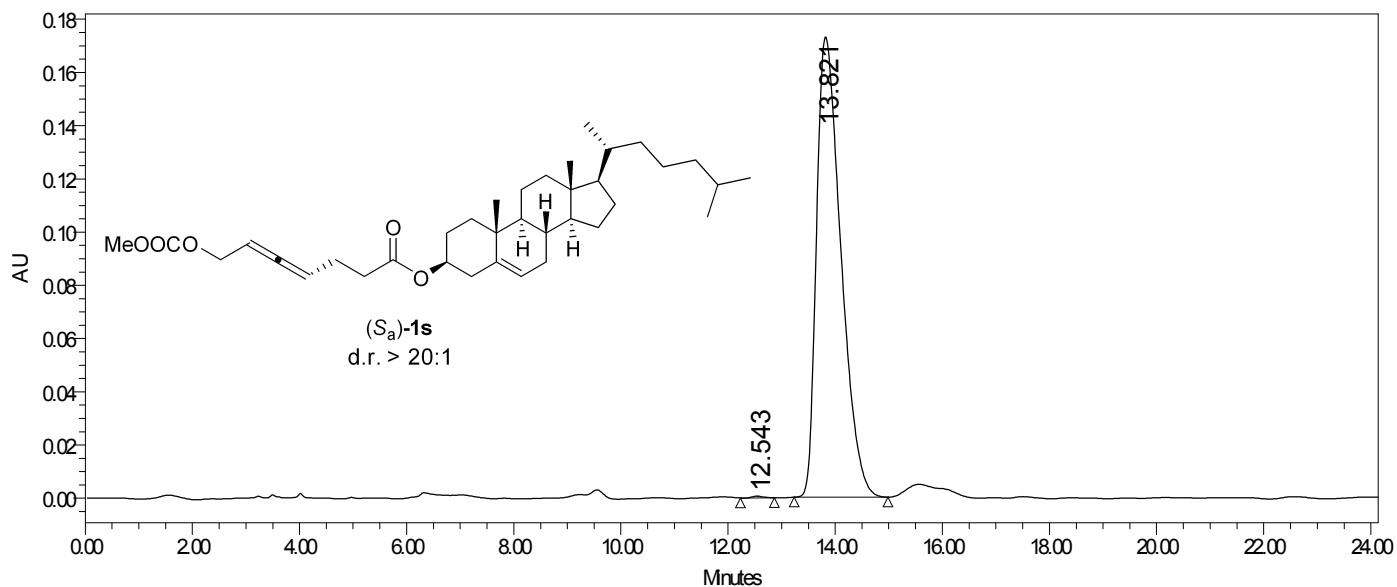
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7974; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	12.206	809659	50.00	33102
2	W2489 ChA.214nm	13.326	809591	50.00	29260

SAMPLE INFORMATION

Sample Name:	cyf-4-147-OD-H-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	3	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	9/4/2020 10:23:37 AM CST		
Date Processed:	9/4/2020 10:51:13 AM CST		



Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7982; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

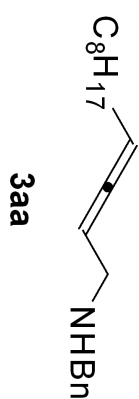
	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	12.543	8634	0.16	610
2	W2489 ChA.214nm	13.821	5460016	99.84	172971

7.325
7.314
7.300
7.292
7.274
7.263
7.252
7.242
7.231

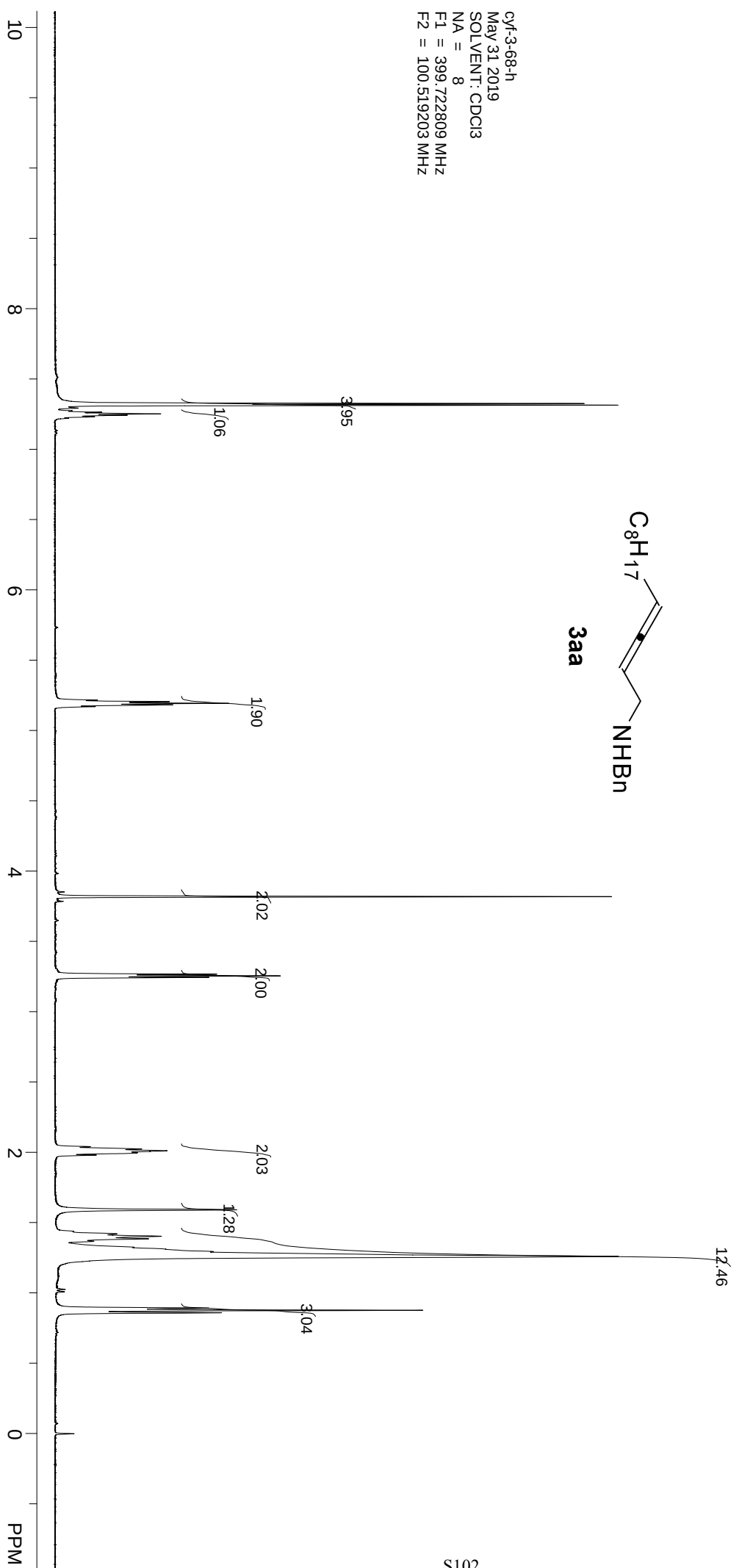
5.216
5.205
5.193
5.182
5.170

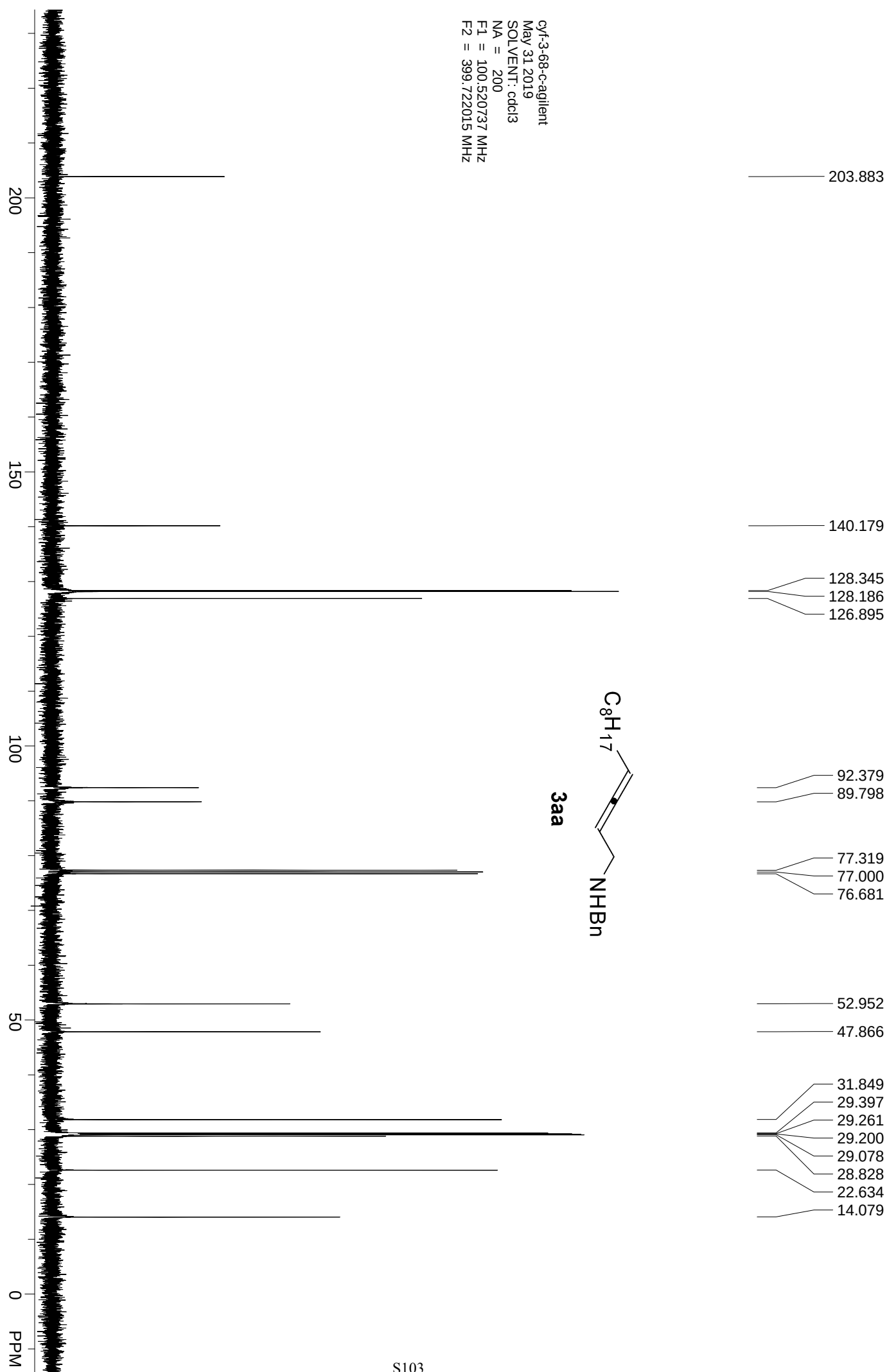
3.852
3.818
3.785
3.266
3.254
3.244

2.041
2.024
2.012
2.006
1.999
1.997
1.981
1.592
1.438
1.436
1.421
1.404
1.385
1.368
1.326
1.323
1.295
1.260
0.893
0.878
0.860
-0.000



cyf-3-68-h
May 31 2019
SOLVENT: CDCl3
NA = 8
F1 = 399.722809 MHz
F2 = 100.519203 MHz



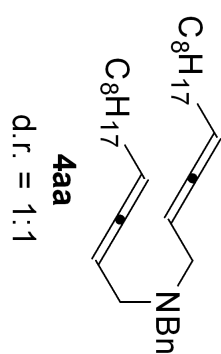


7.340
7.323
7.309
7.291
7.272
7.241
7.222
7.205

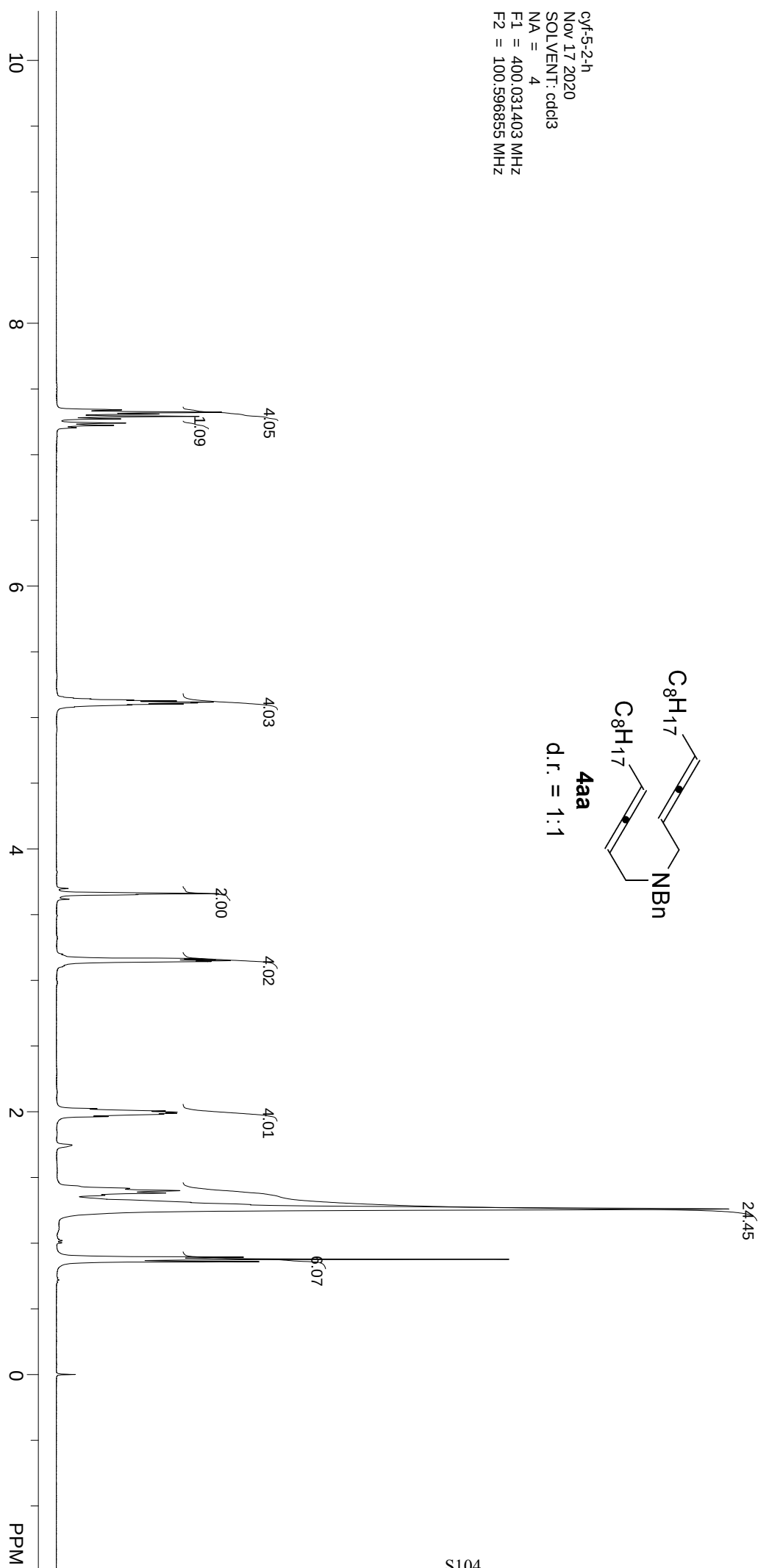
5.149
5.142
5.133
5.126
5.117
5.111
5.102
5.095
5.080

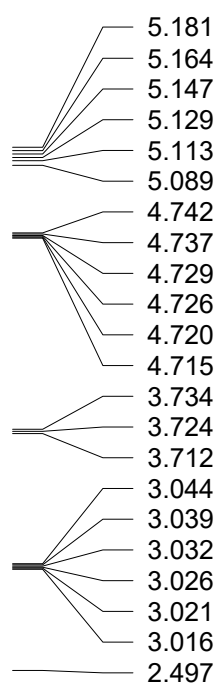
3.699
3.660
3.653
3.618
3.166
3.160
3.151
3.143

2.023
2.006
1.997
1.988
1.981
1.963
1.417
1.399
1.382
1.364
1.310
1.293
1.260
0.893
0.877
0.859
0.000

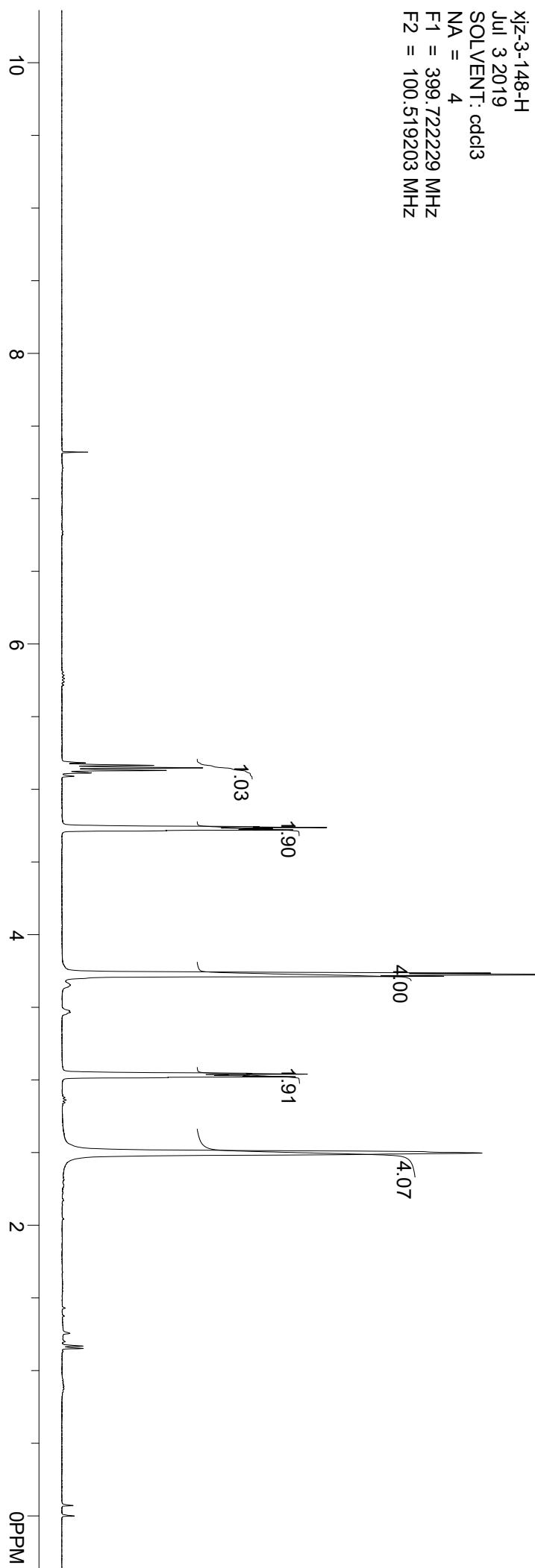
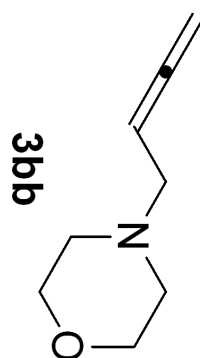


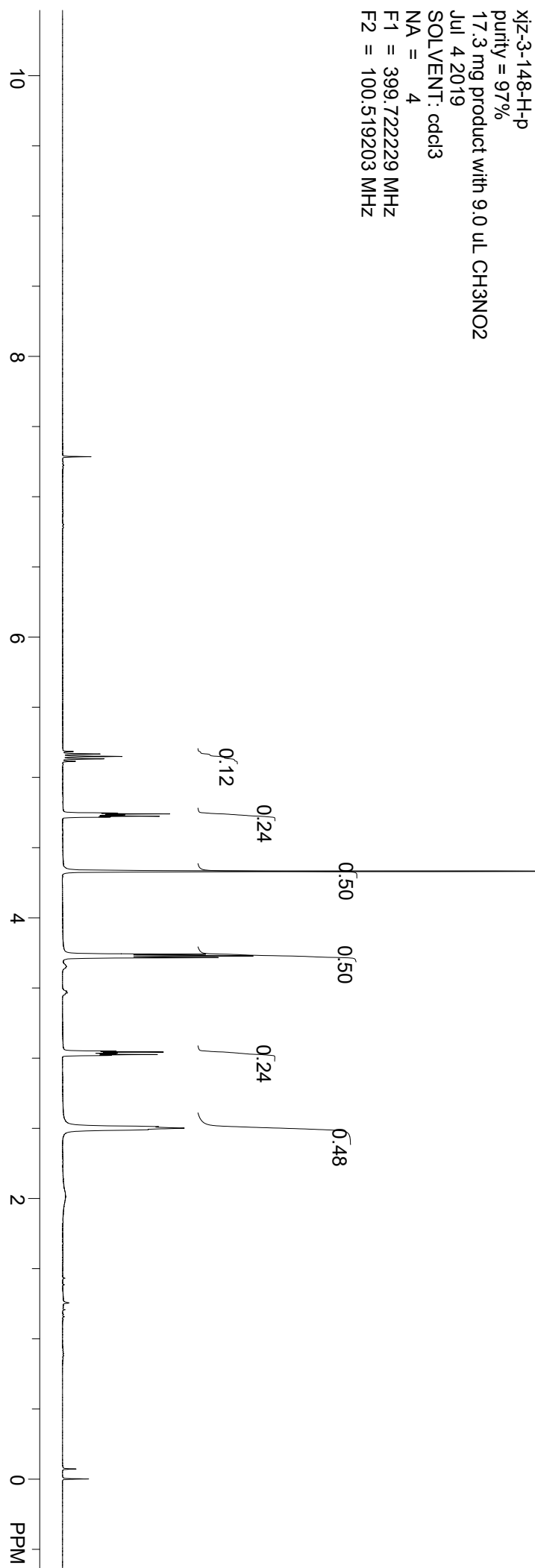
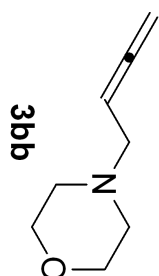
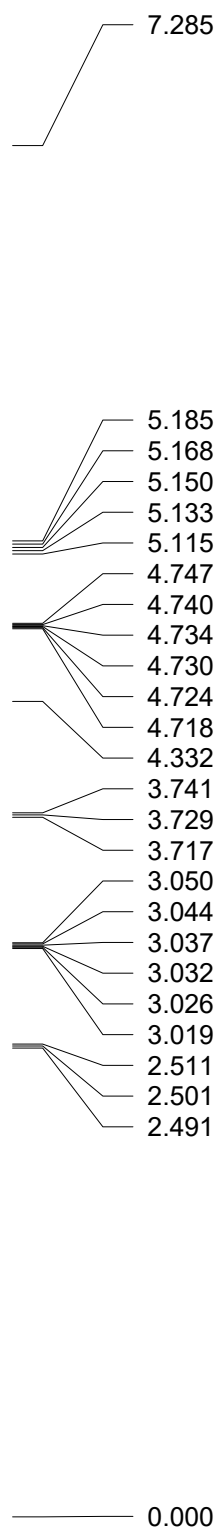
cyf-5-2-h
Nov 17 2020
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz



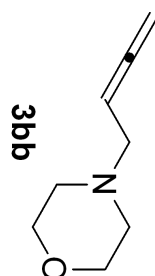


0.000





209.520



86.160

77.314

77.000

76.678

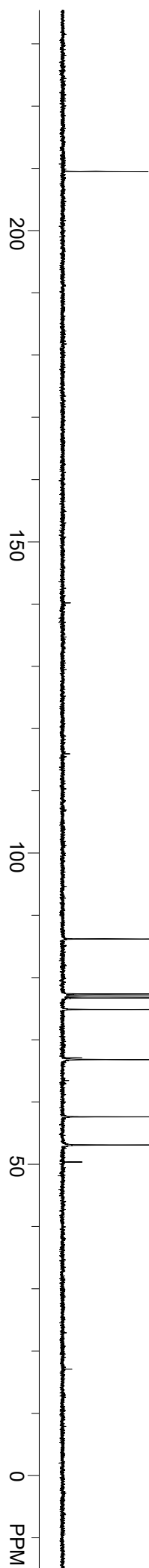
74.832

66.790

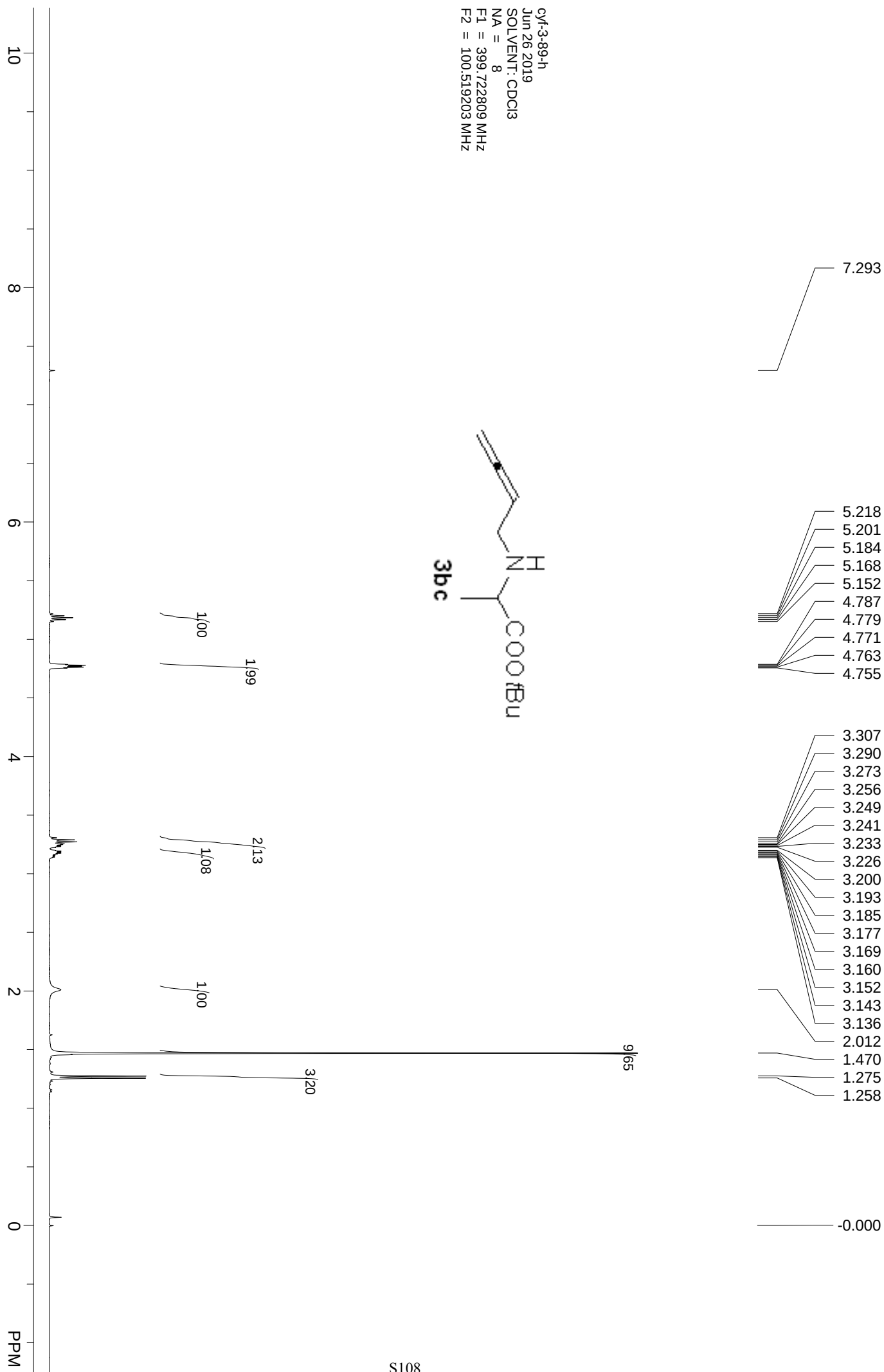
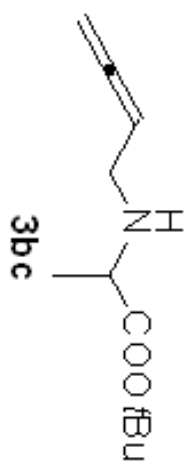
57.599

53.072

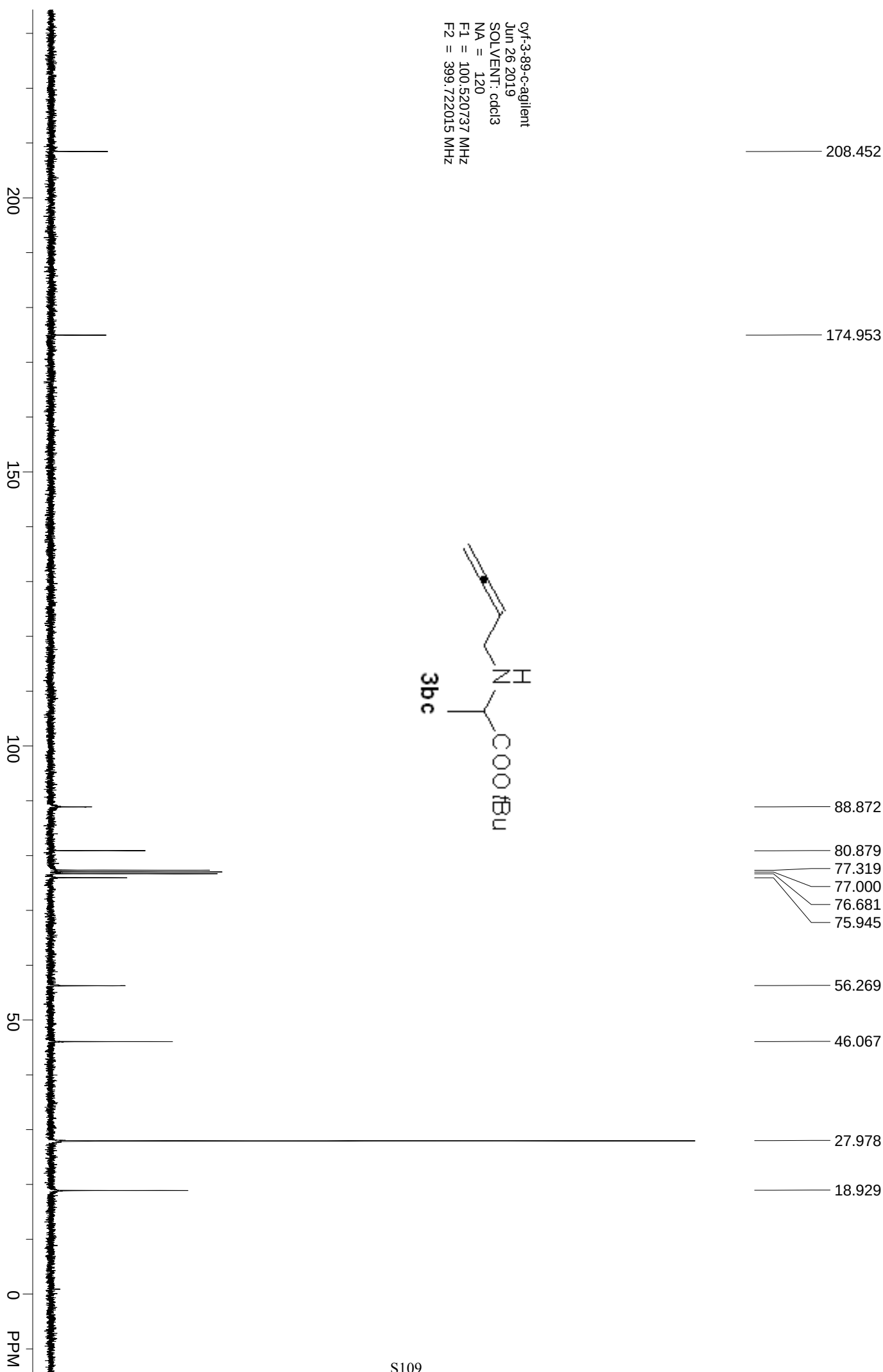
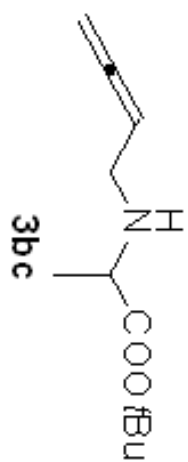
xjz-3-148-C
Jul 3 2019
SOLVENT: CDCl3
NA = 127
F1 = 100.630371 MHz
F2 = 1.000000 MHz



cyf-3-89-h
 Jun 26 2019
 SOLVENT: CDCl₃
 NA = 8
 F1 = 399.722809 MHz
 F2 = 100.519203 MHz



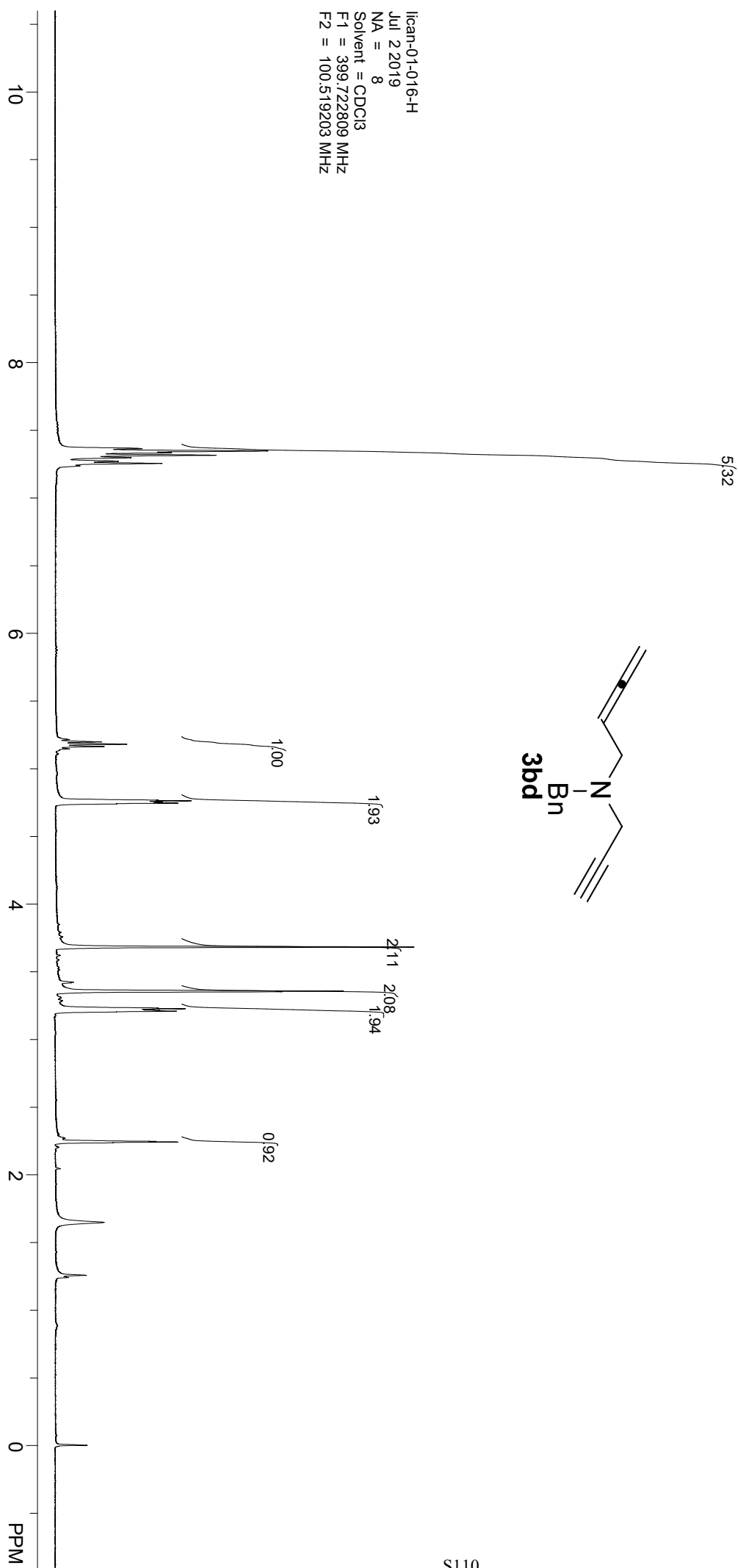
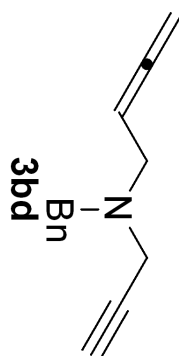
cyf-3-89-C-agilent
Jun 26 2019
SOLVENT: cdcl3
NA = 120
F1 = 100.520737 MHz
F2 = 399.722015 MHz



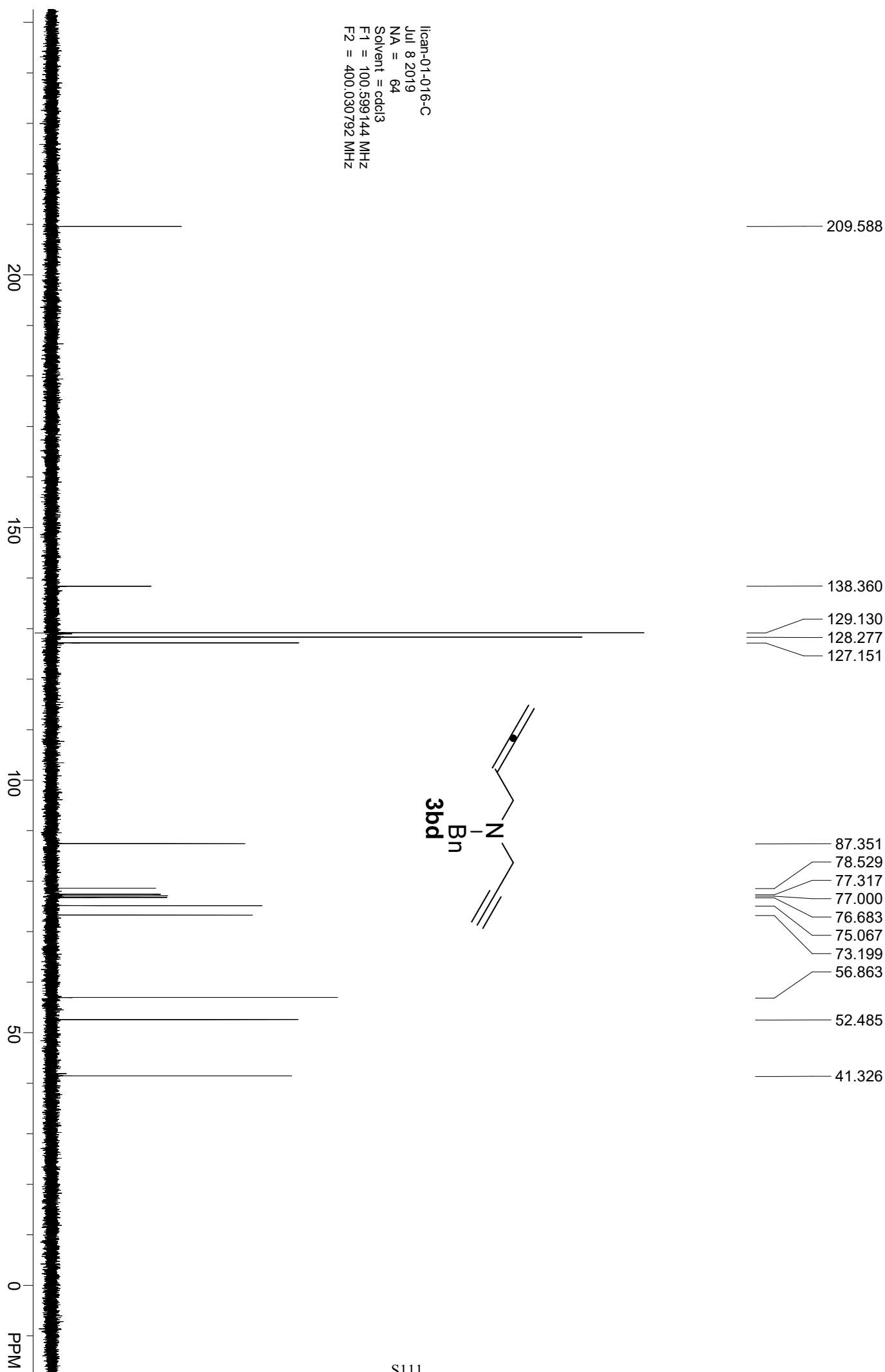
7.365
7.348
7.335
7.316
7.298
7.271
7.256
7.237

5.216
5.199
5.182
5.165
5.146
4.768
4.763
4.756
4.752
4.747
4.741
3.683
3.358
3.353
3.232
3.227
3.221
3.215
3.210
2.247
2.242

-0.000

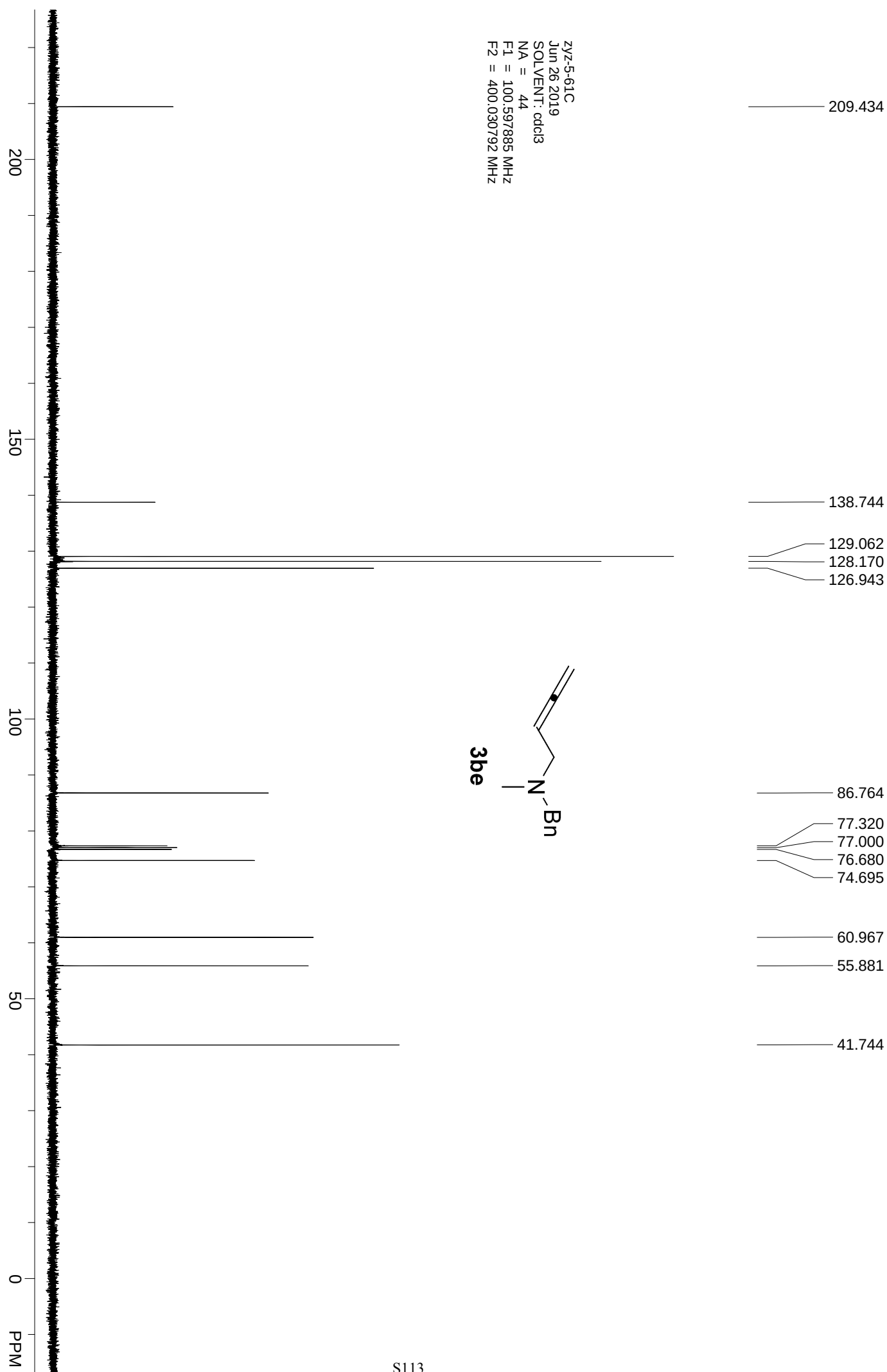


lican-01-016-H
Jul 2 2019
NA = 8
Solvent = CDCl3
F1 = 399.722809 MHz
F2 = 100.519203 MHz

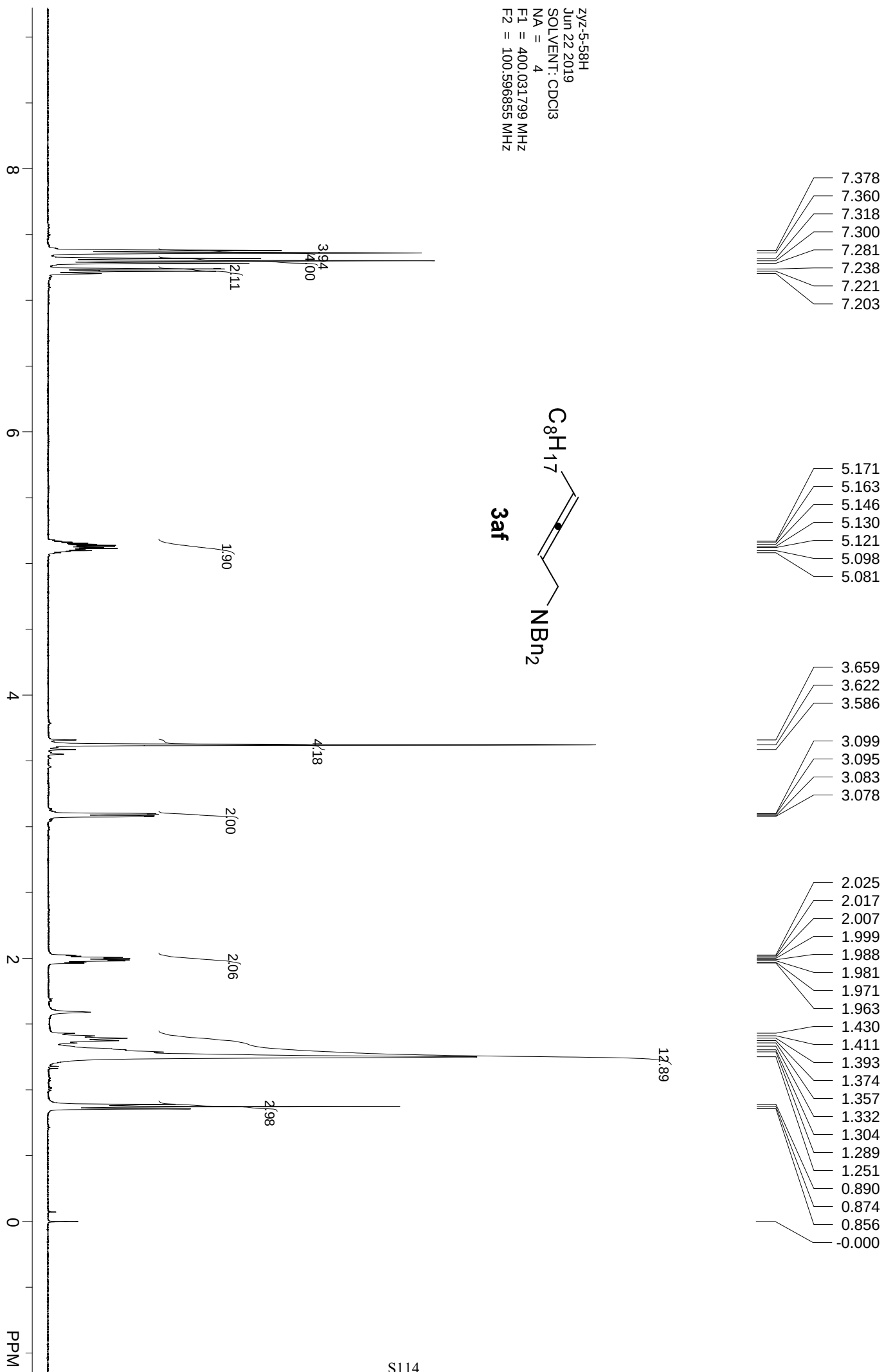


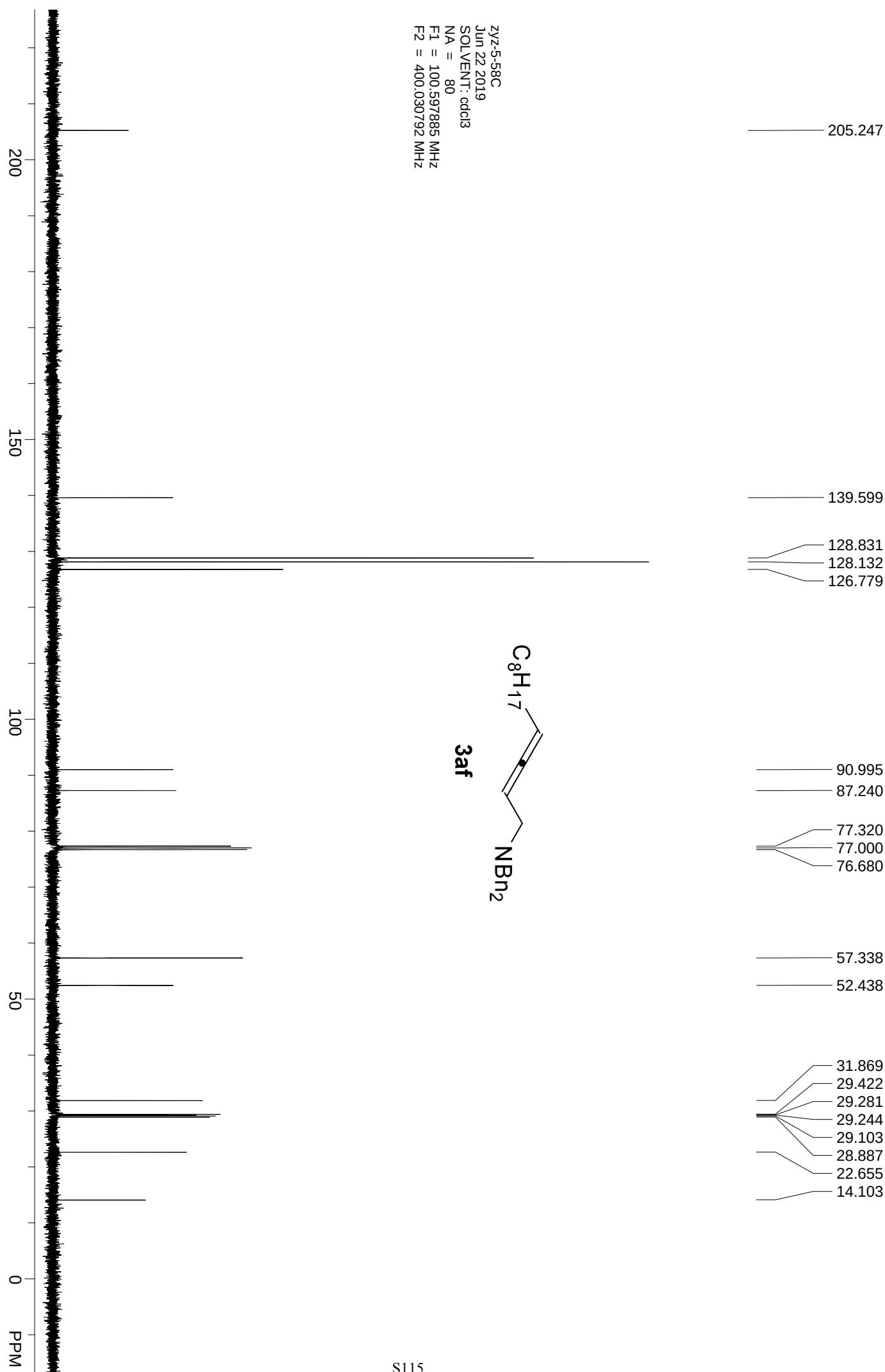
3be

CN(C)CC(=O)C=C

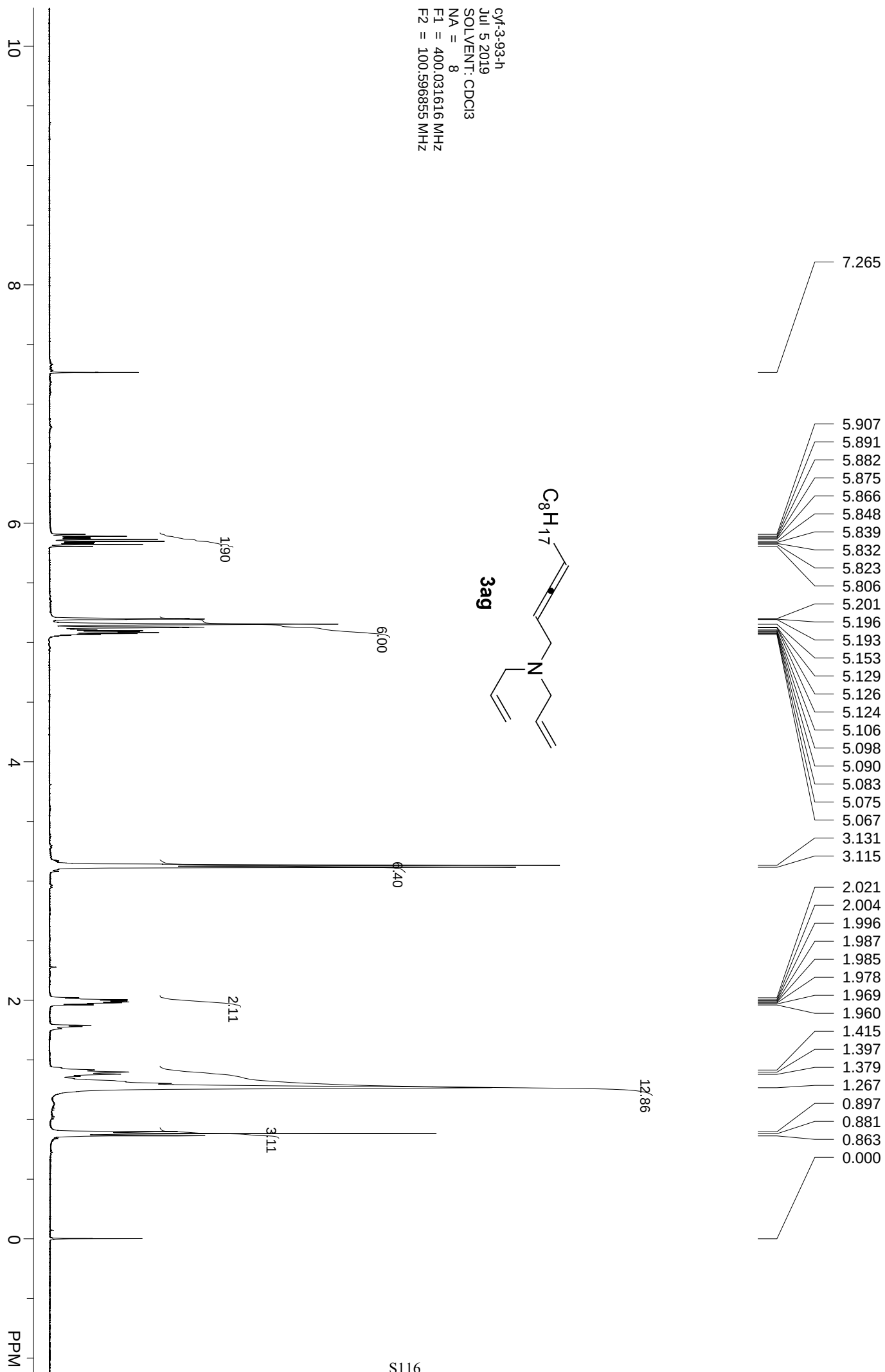


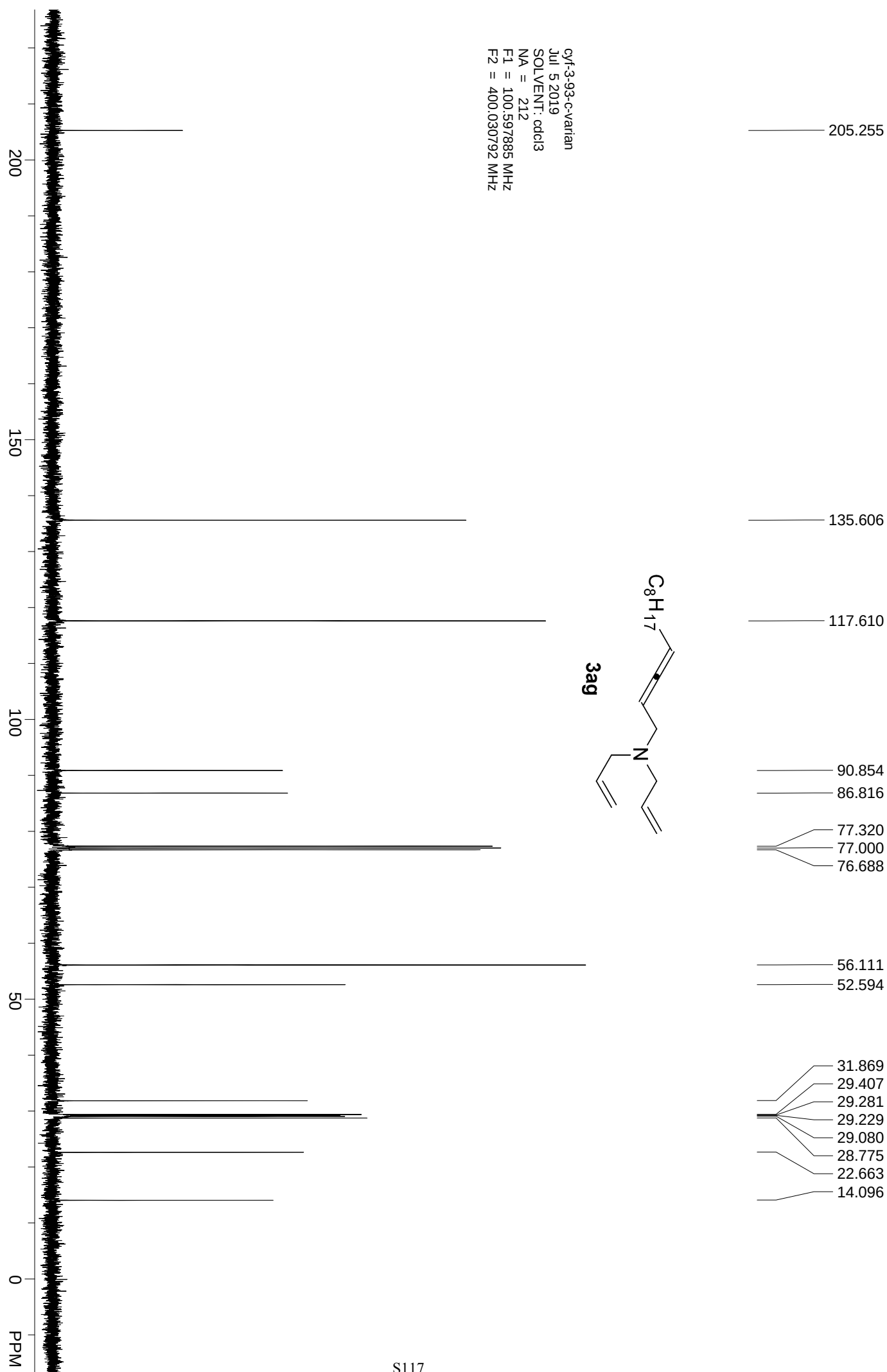
zyz-5-58H
 Jun 22 2019
 SOLVENT: CDCl₃
 NA = 4
 F1 = 400.031799 MHz
 F2 = 100.596855 MHz



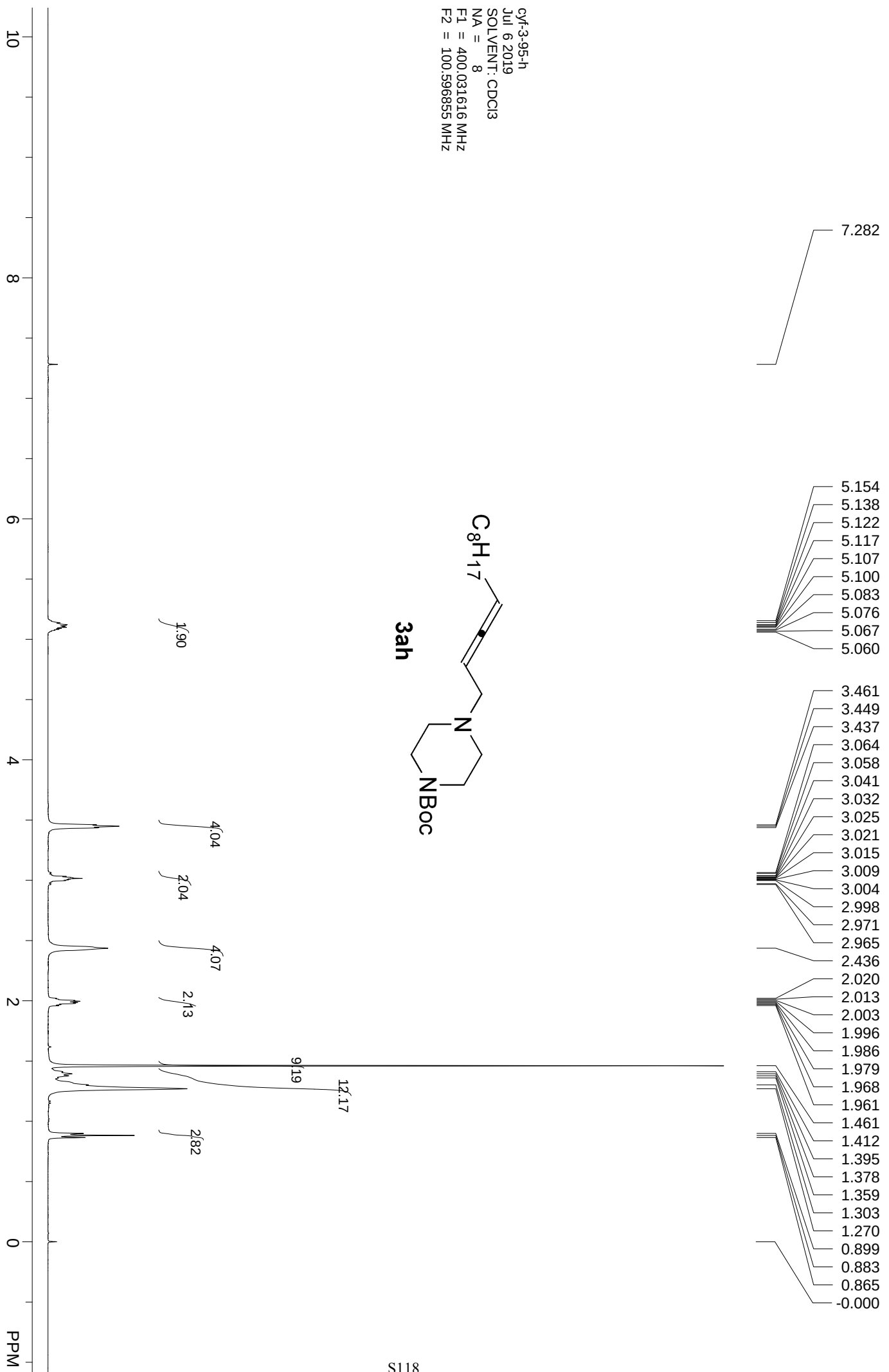
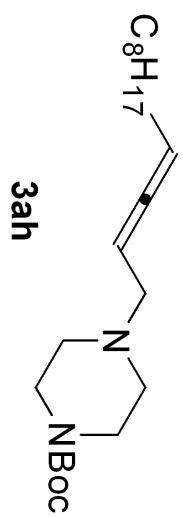


cvf-3-93-h
 Jul 5 2019
 SOLVENT: CDCl3
 NA = 8
 F1 = 400.031616 MHz
 F2 = 100.596855 MHz

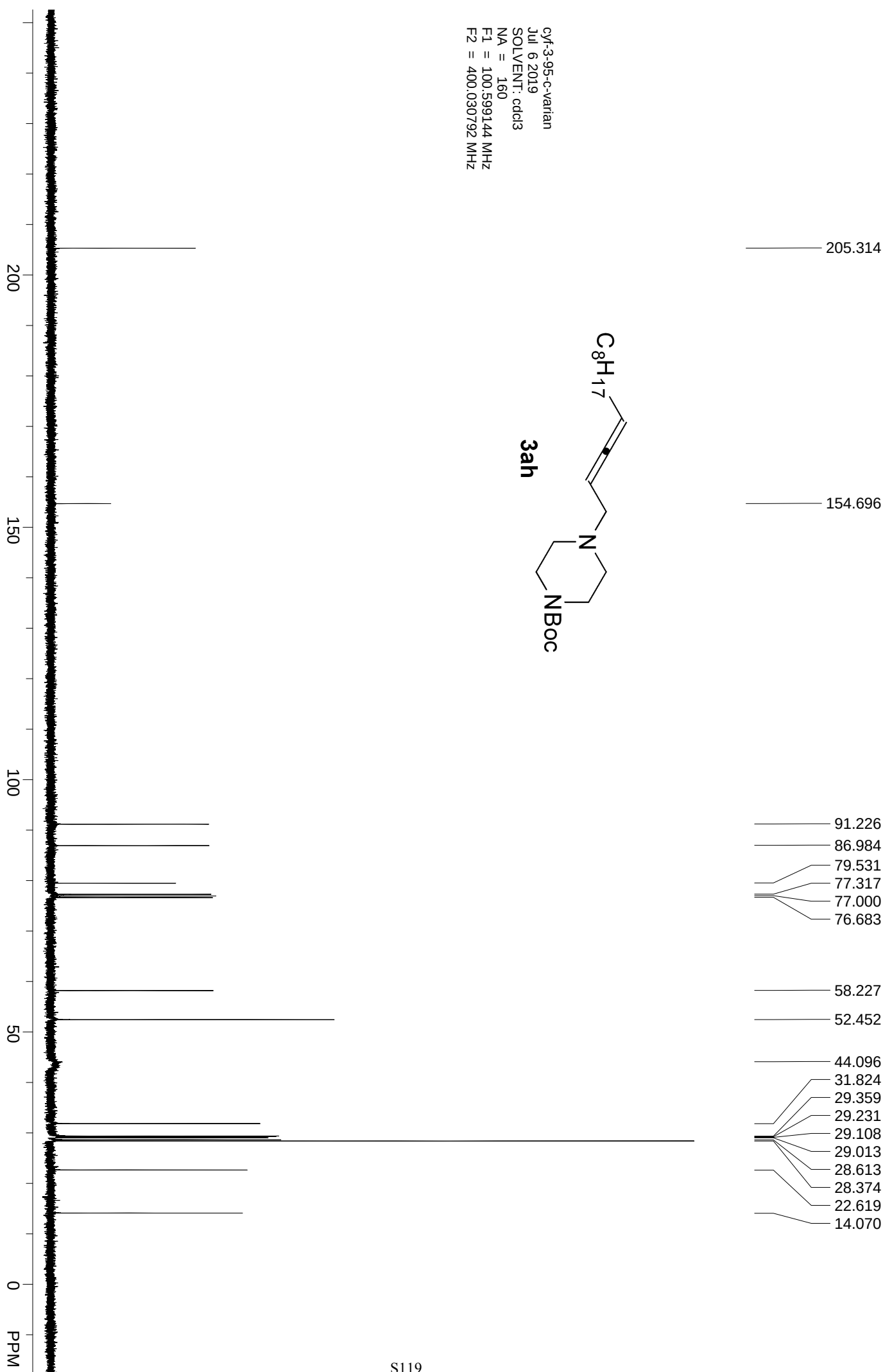
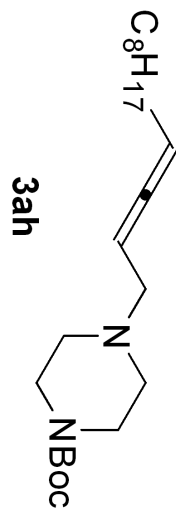




cyf-3-95-h
 Jul 6 2019
 SOLVENT: CDCl3
 NA = 8
 F1 = 400.031616 MHz
 F2 = 100.596855 MHz



cyf-3-95-c-varian
Jul 6 2019
SOLVENT: cdcl3
NA = 160
F1 = 100.599144 MHz
F2 = 400.030792 MHz

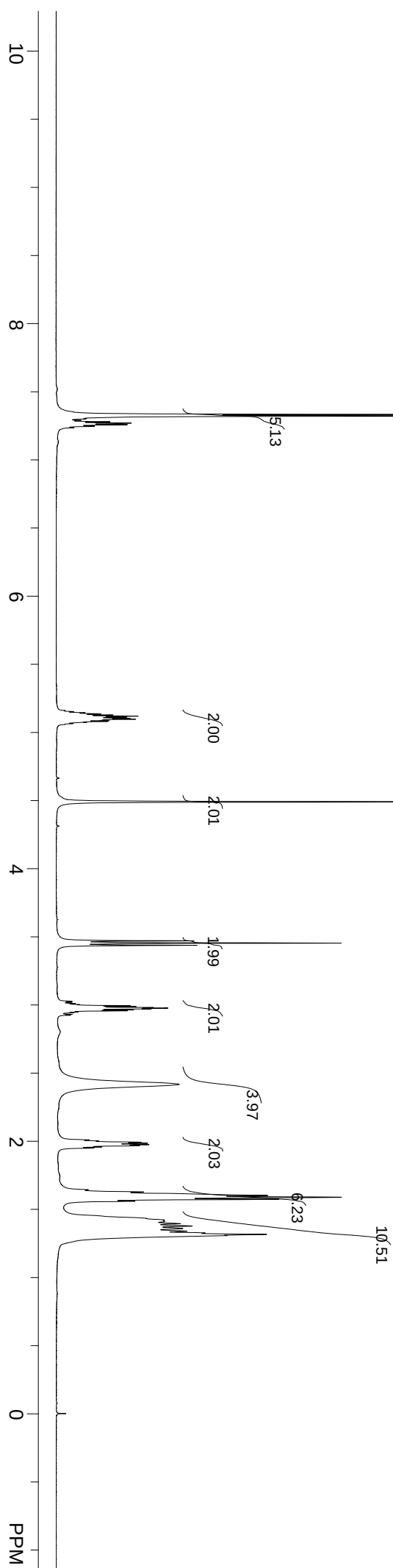
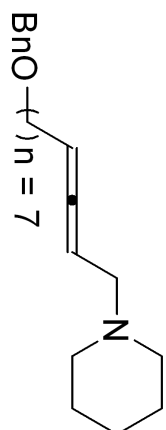


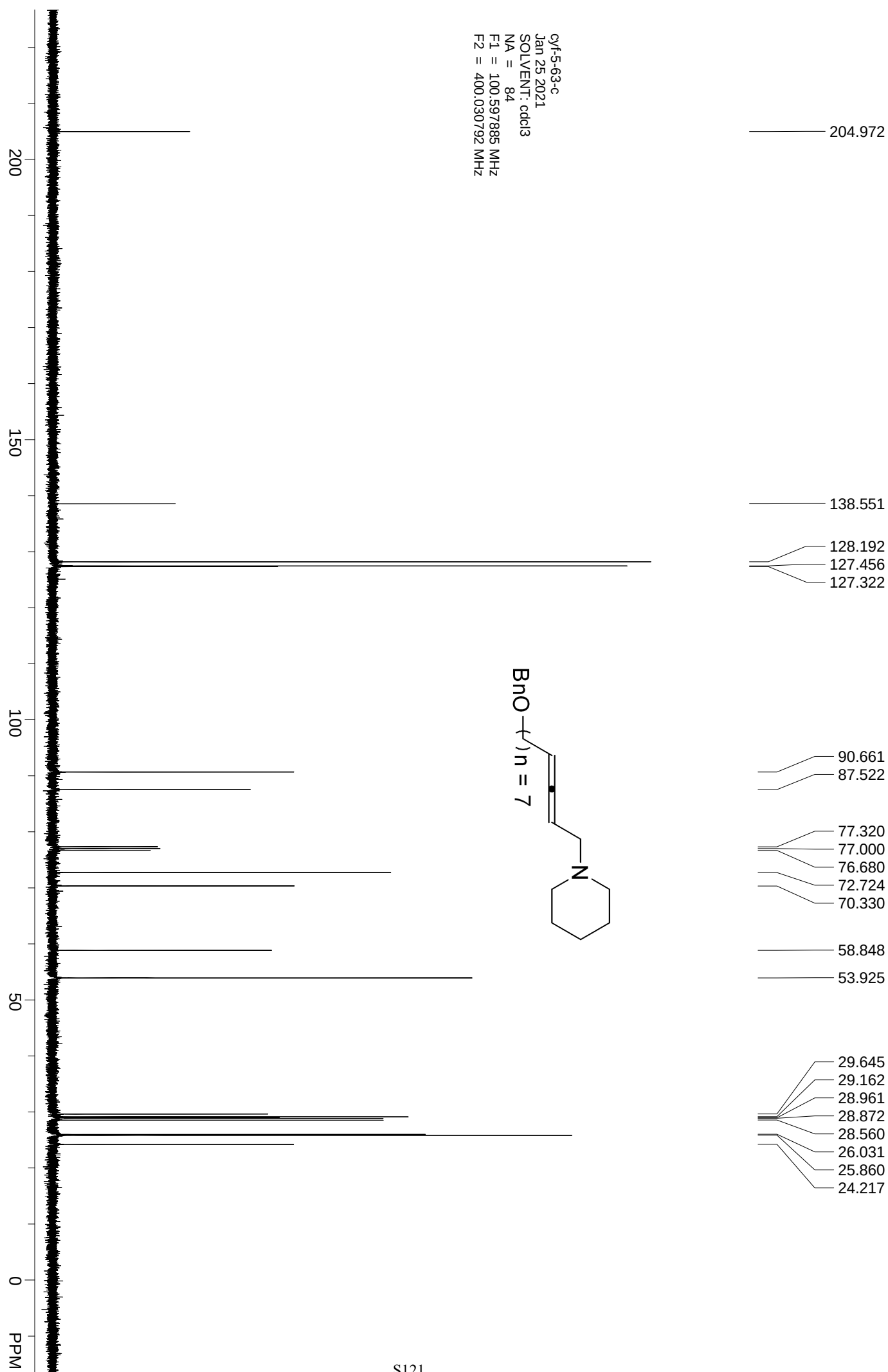
7.334
7.323
7.304
7.301
7.289
7.279
7.270
7.259
7.249
7.246
7.237

5.160
5.145
5.127
5.112
5.102
5.081
5.065
5.059
4.491

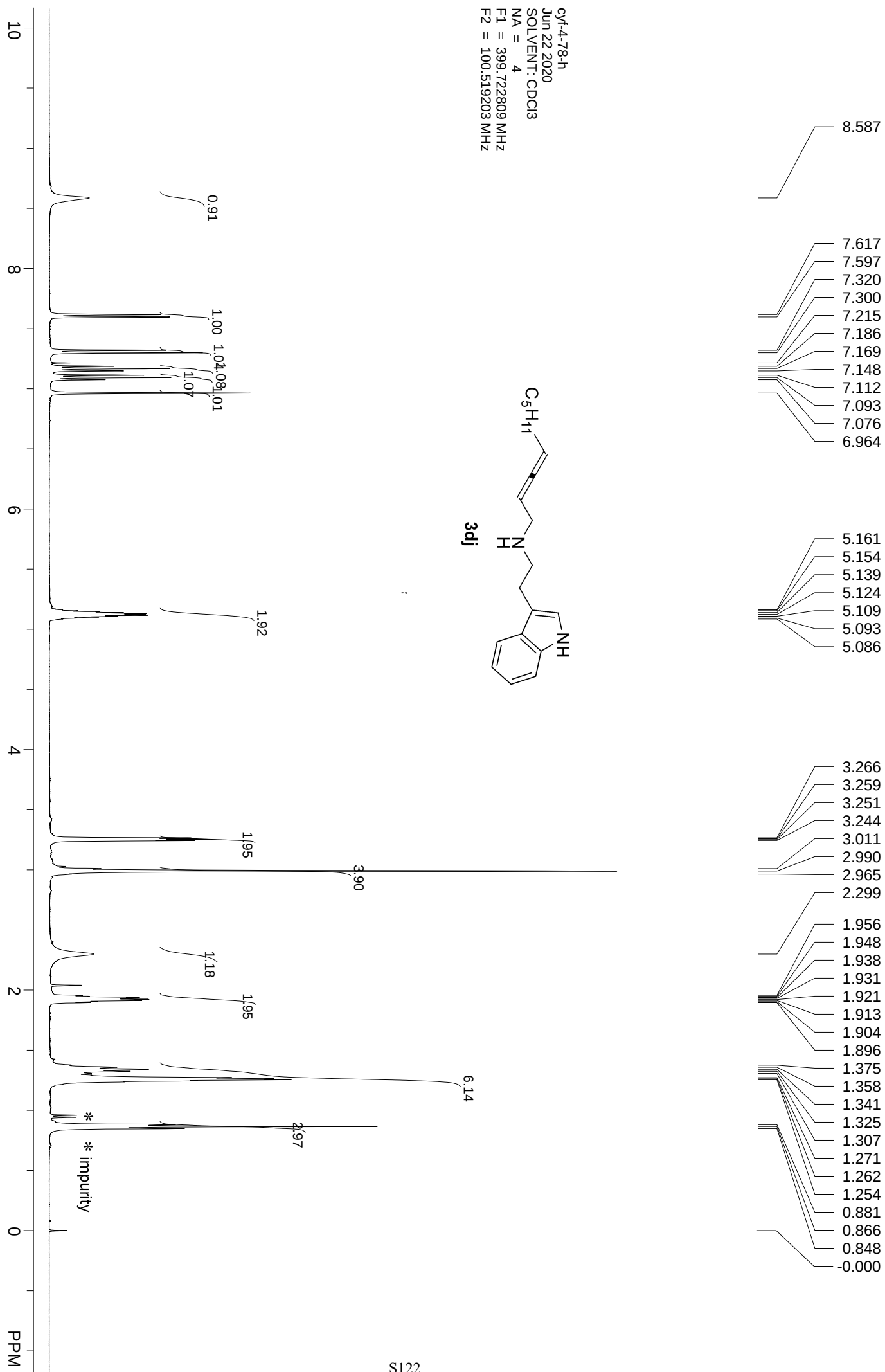
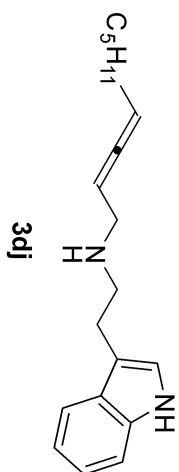
3.470
3.454
3.437
3.026
3.009
2.994
2.980
2.976
2.975
2.970
2.956
2.942
2.924
2.417
2.009
2.001
1.992
1.984
1.974
1.967
1.957
1.949
1.643
1.601
1.588
1.573
1.559
1.421
1.377
1.339
1.315
0.000

cyf-5-63-h
Jan 25 2021
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz

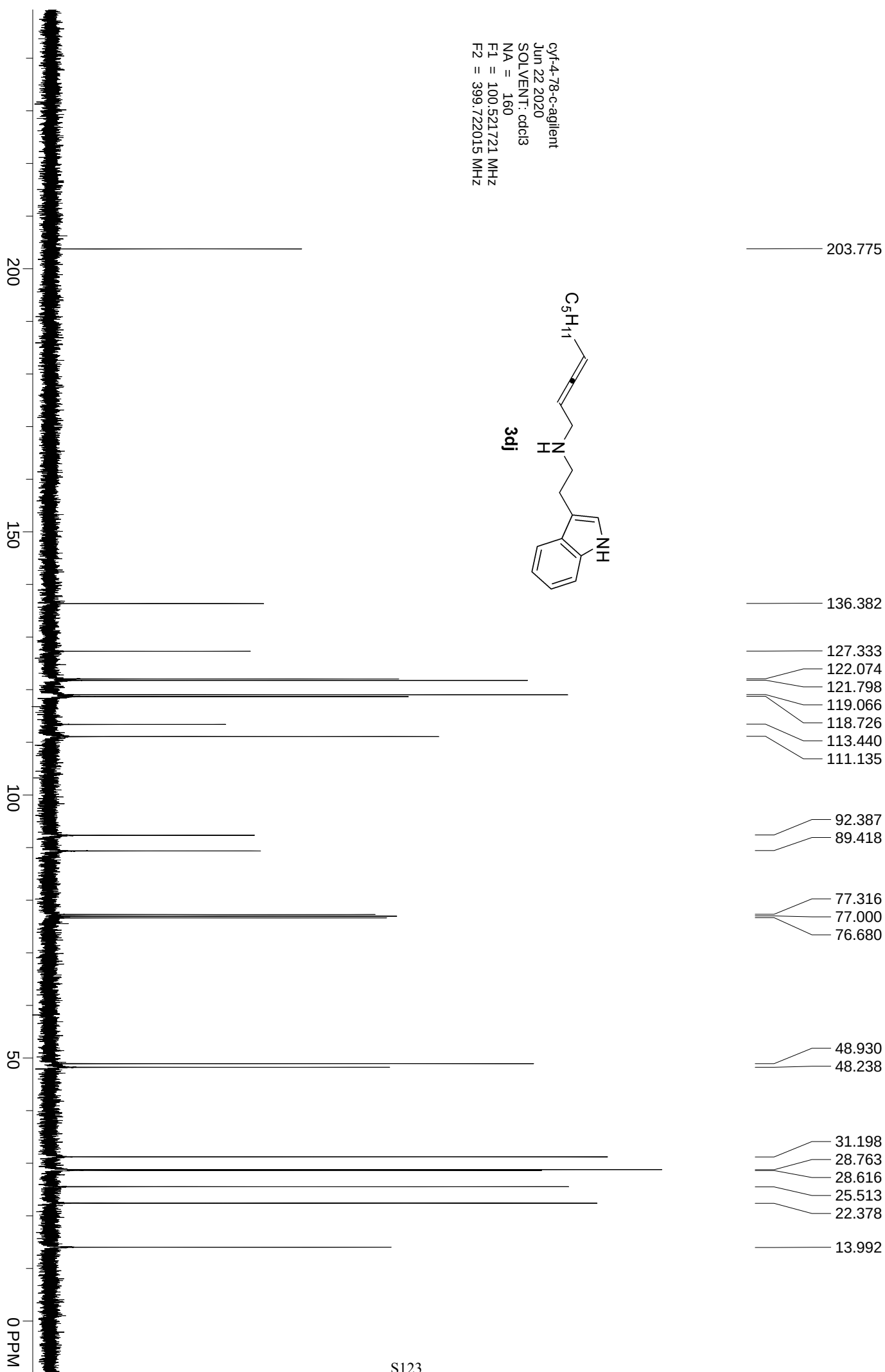
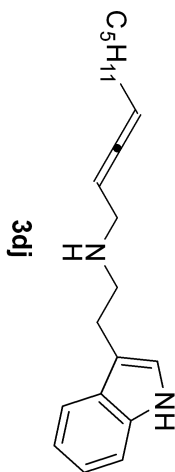




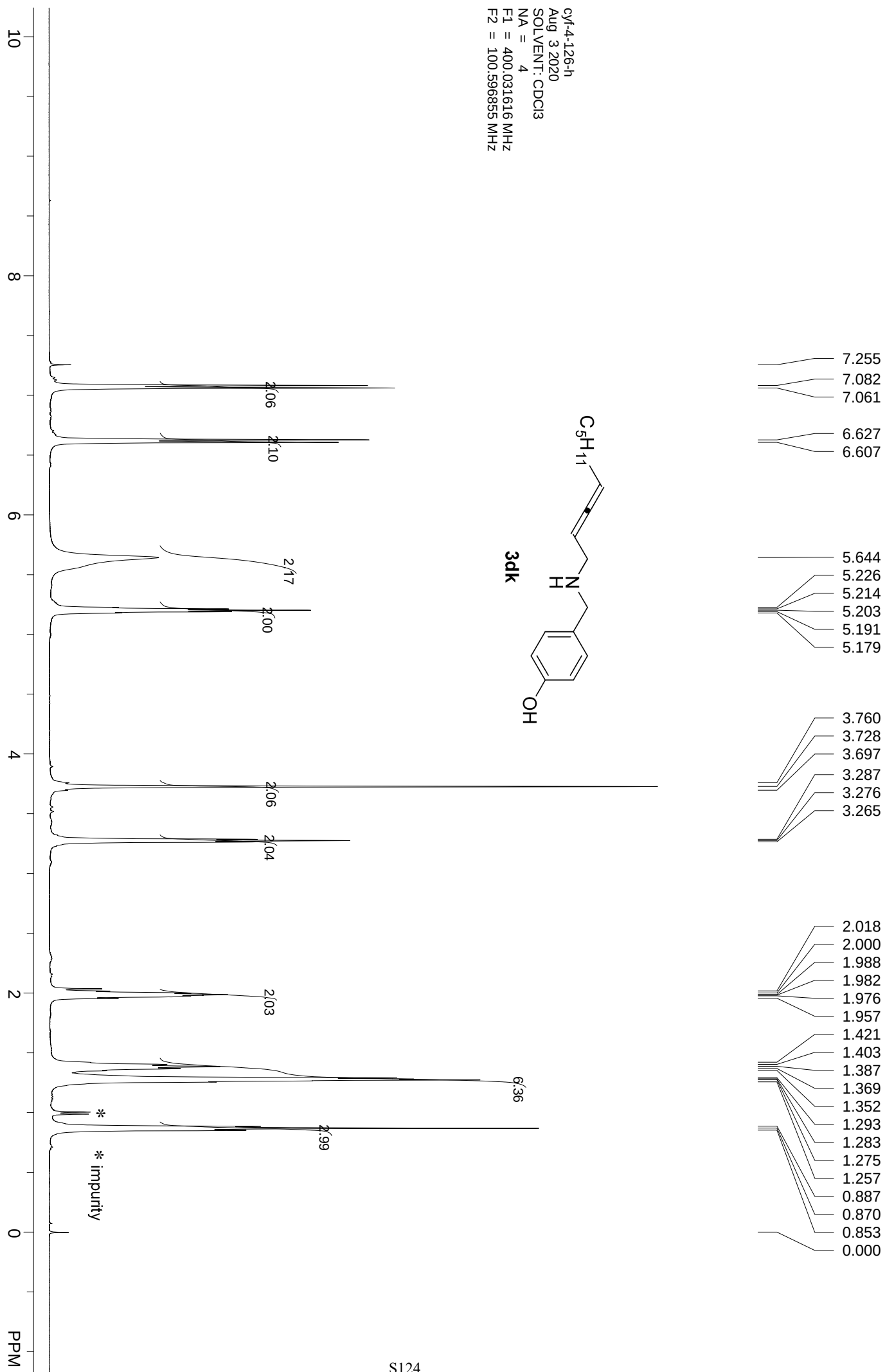
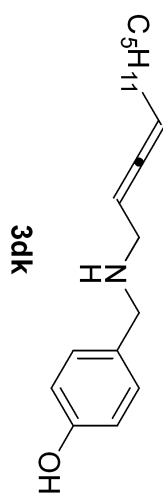
cyf-4-78-h
 Jun 22 2020
 SOLVENT: CDCl3
 NA = 4
 F1 = 399.722809 MHz
 F2 = 100.519203 MHz



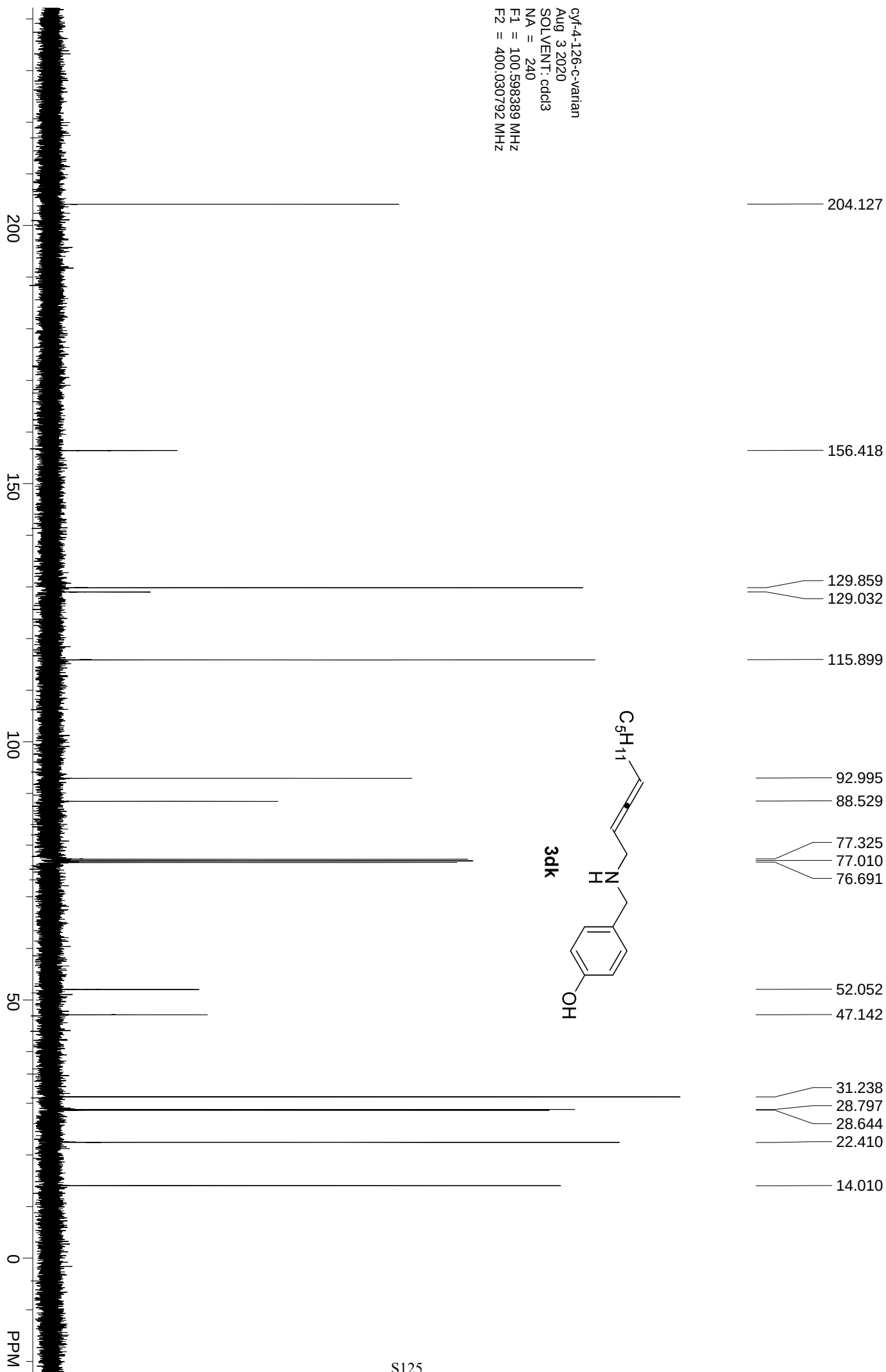
cyt-4-78-c-agilent
Jun 22 2020
SOLVENT: cdcl3
NA = 160
F1 = 100.521721 MHz
F2 = 399.722015 MHz

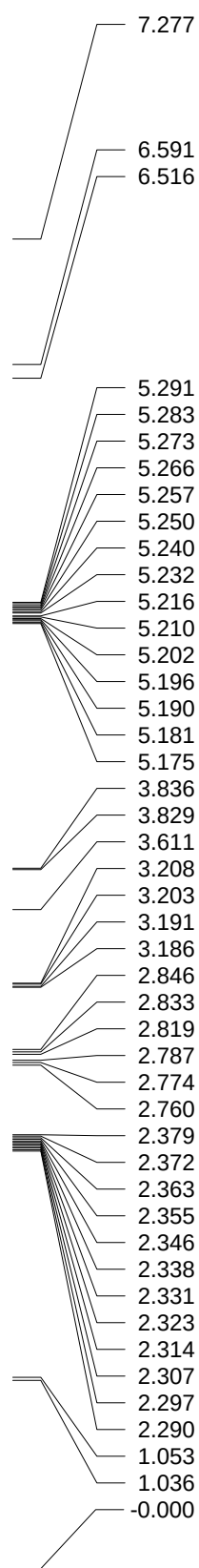


cyf4-126-h
 Aug 3 2020
 SOLVENT: CDCl₃
 NA = 4
 F1 = 400.031616 MHz
 F2 = 100.596855 MHz

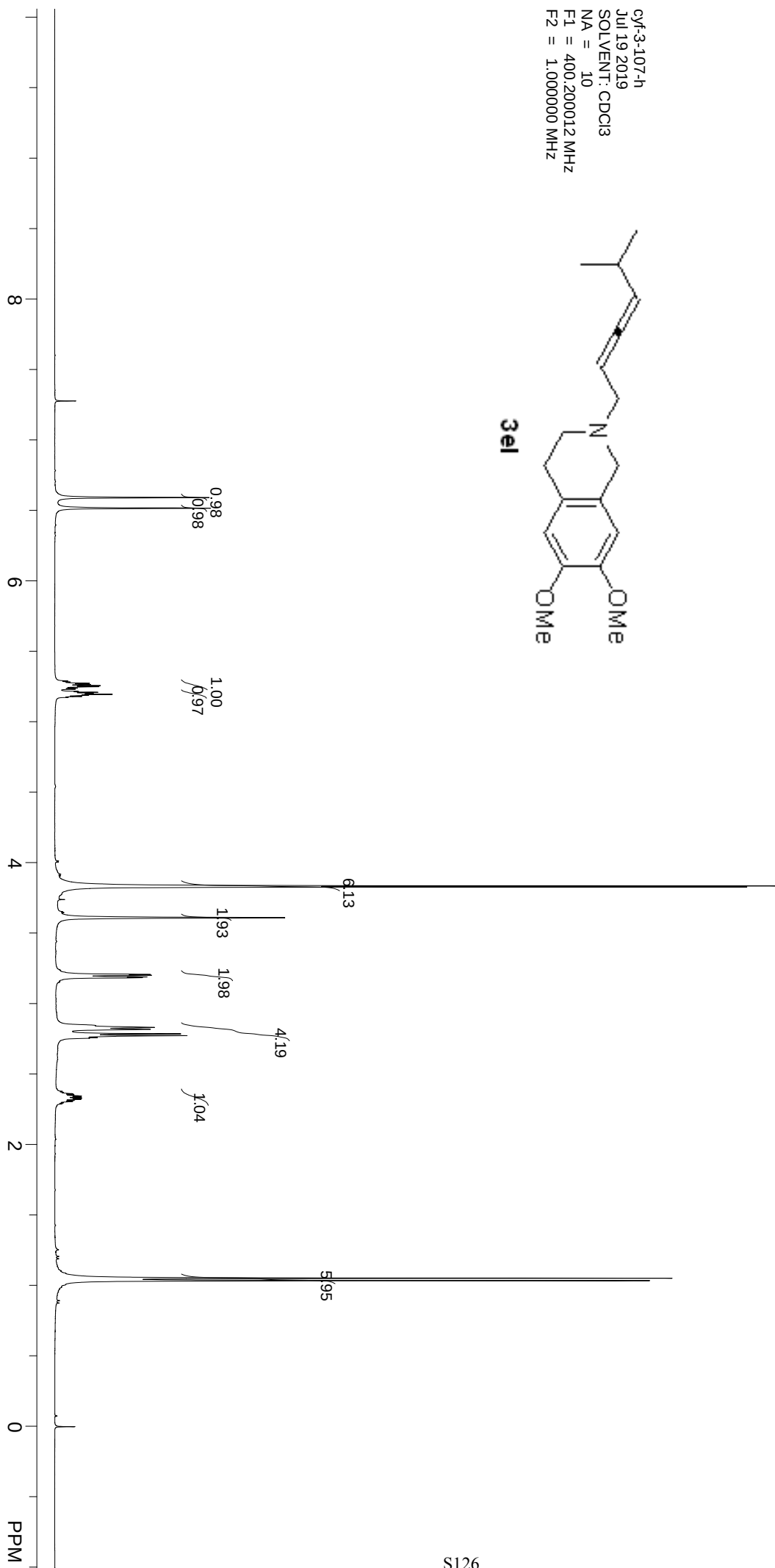
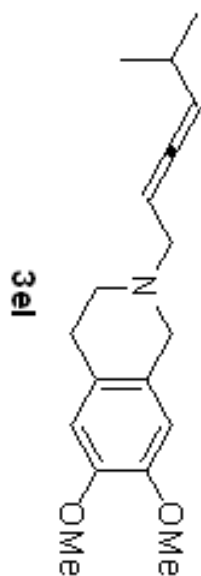


cyf-4-126-c-varian
Aug 3 2020
SOLVENT: cdc13
NA = 240
F1 = 100.598389 MHz
F2 = 400.030792 MHz

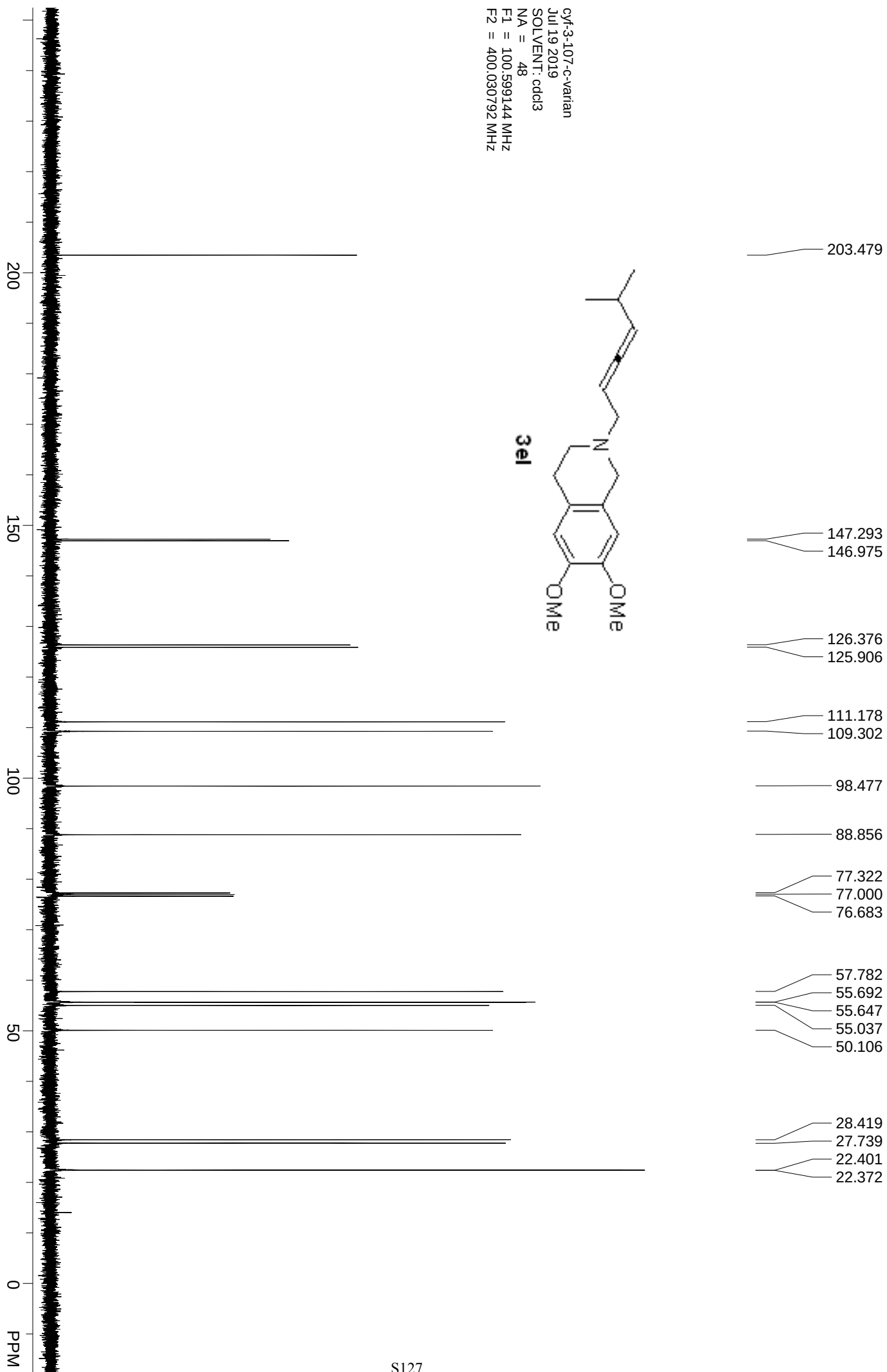
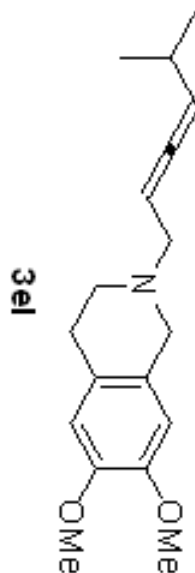




cyf-3-107-h
Jul 19 2019
SOLVENT: CDCl3
NA = 10
F1 = 400.200012 MHz
F2 = 1.000000 MHz



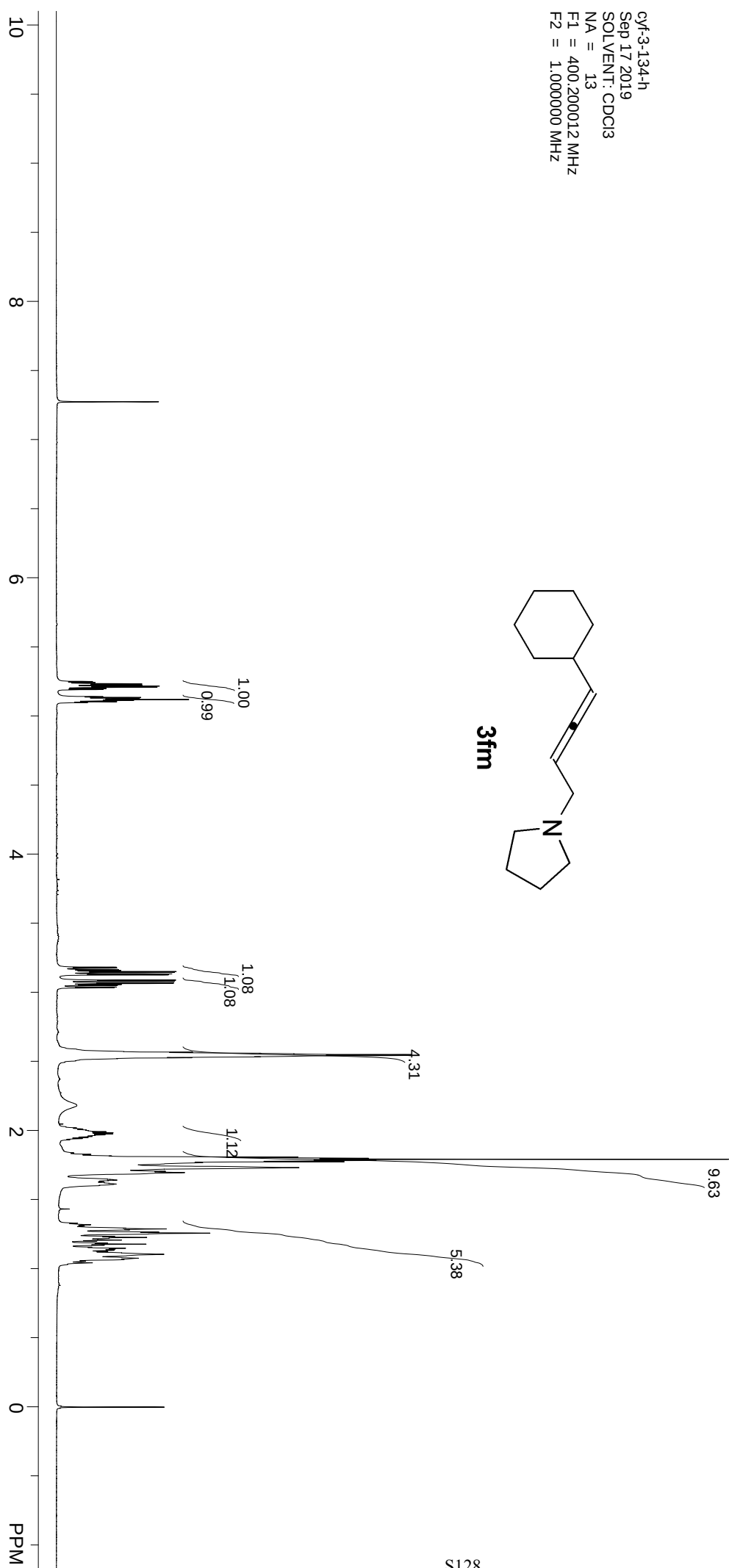
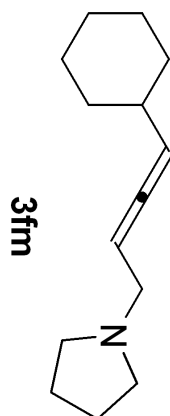
cyf-3-107-c-varian
 Jul 19 2019
 SOLVENT: cdc13
 NA = 48
 F1 = 100.599144 MHz
 F2 = 400.030792 MHz



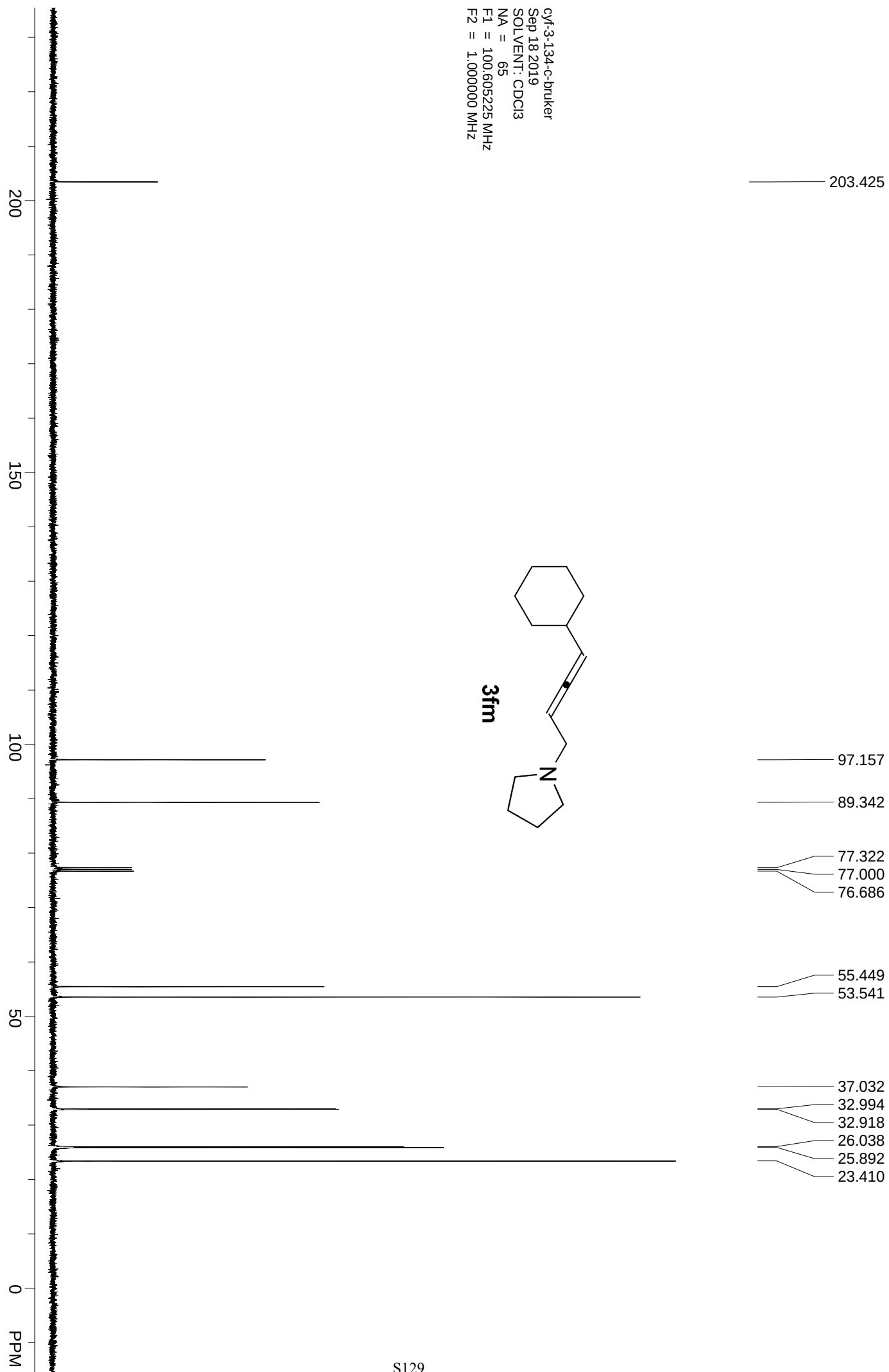
7.273

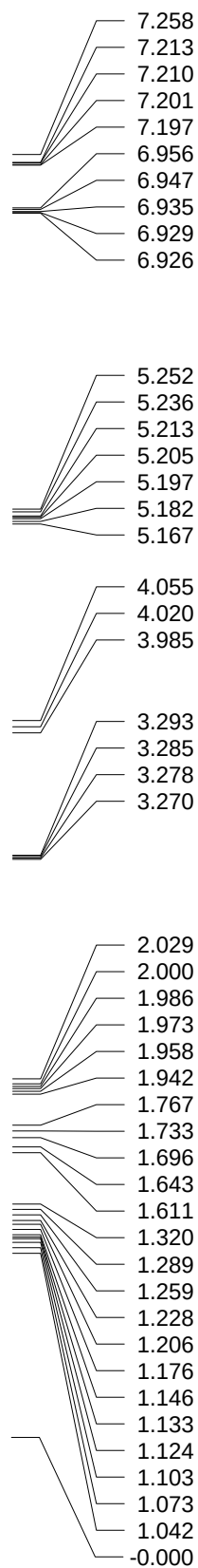
5.248
5.241
5.231
5.224
5.215
5.208
5.198
5.190
5.139
5.133
5.124
5.118
5.111
5.102
5.096
3.180
3.174
3.163
3.156
3.149
3.142
3.131
3.124
3.087
3.081
3.069
3.063
3.055
3.049
3.037
3.031
2.570
2.548
2.542
2.519
2.011
1.984
1.956
1.941
1.791
1.731
1.704
1.695
1.648
1.602
1.318
1.288
1.258
1.226
1.207
1.178
1.148
1.104
1.076
1.043
-0.000

cyf-3-134-h
Sep 17 2019
SOLVENT: CDCl3
NA = 13
F1 = 400.200012 MHz
F2 = 1.000000 MHz

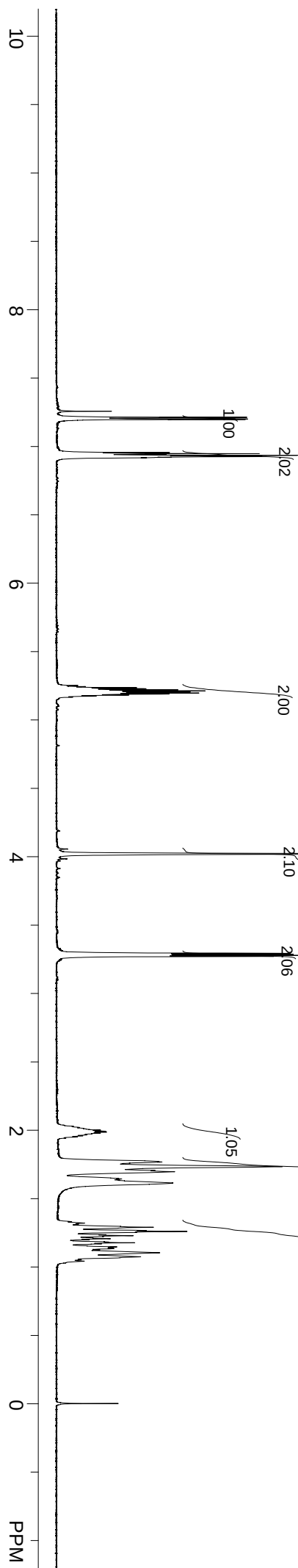
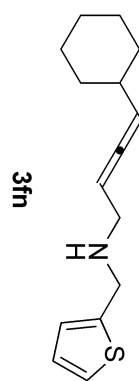


cyf-3-134-c-bruker
Sep 18 2019
SOLVENT: CDCl3
NA = 65
F1 = 100.605225 MHz
F2 = 1.000000 MHz

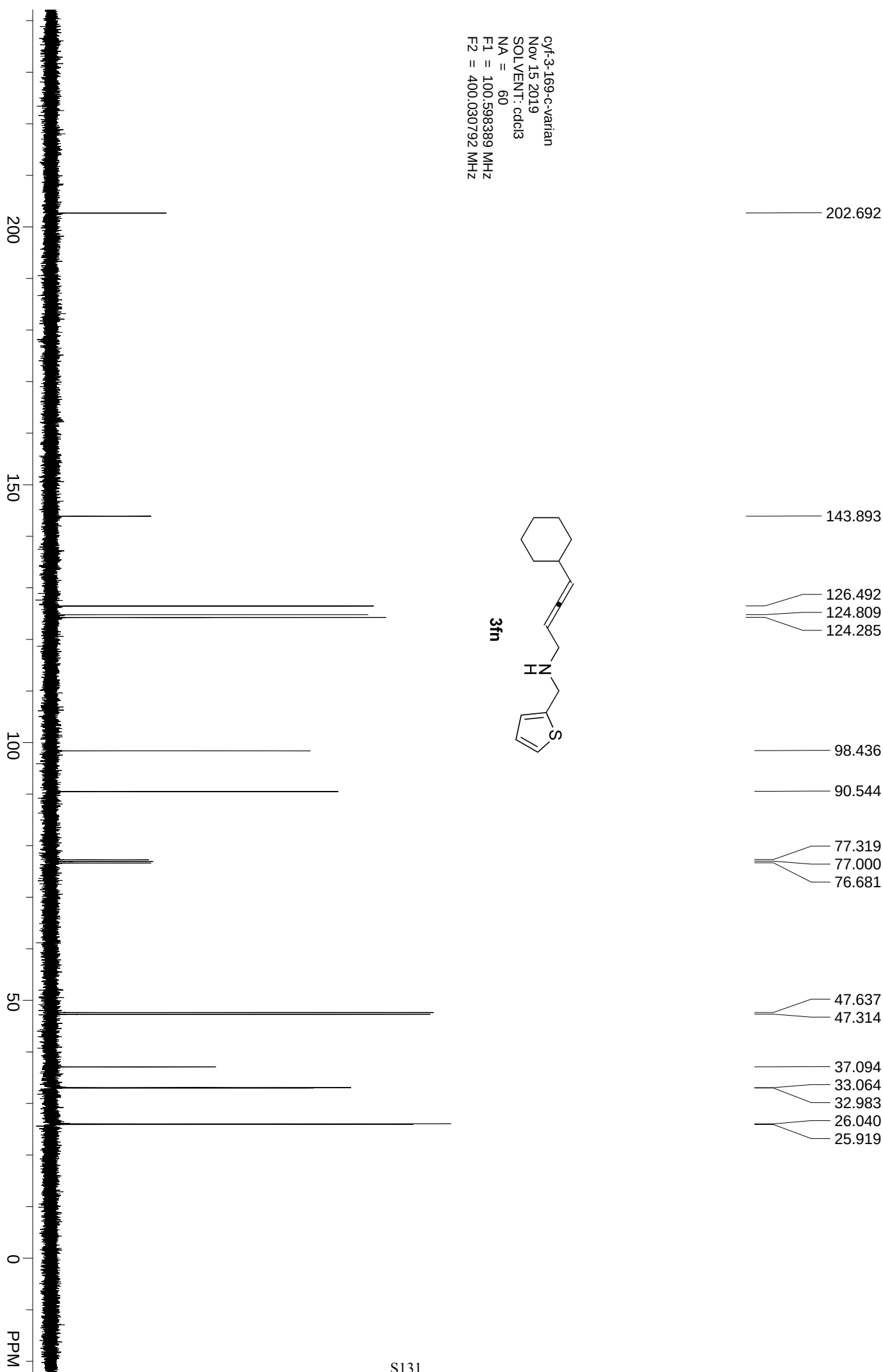
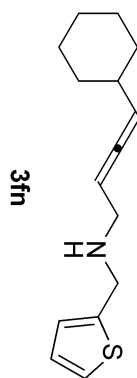




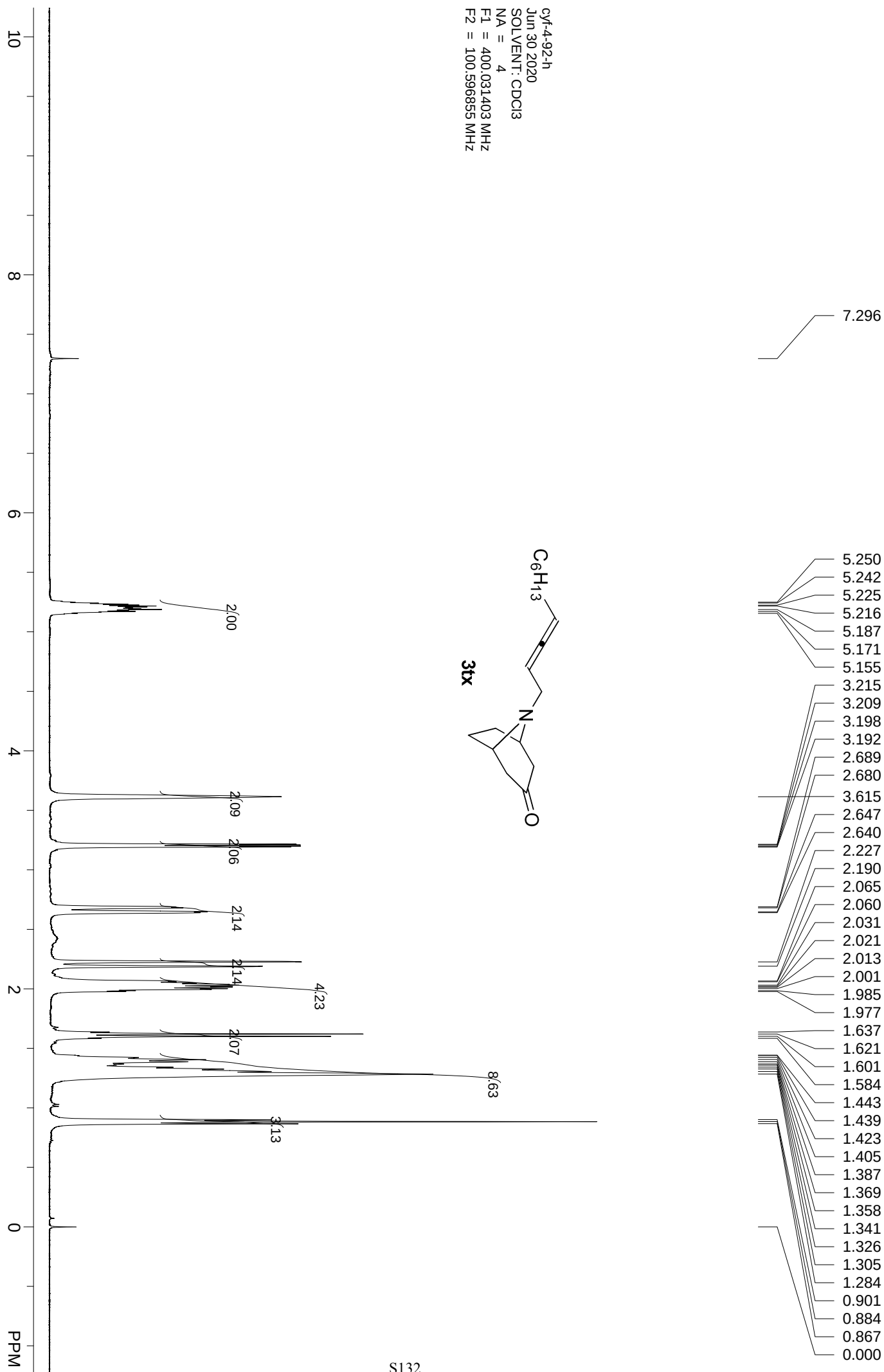
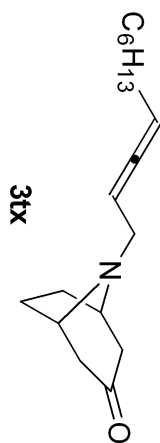
cyf-3-169-h
Nov 15 2019
SOLVENT: CDCl3
NA = 8
F1 = 399.722809 MHz
F2 = 100.519203 MHz



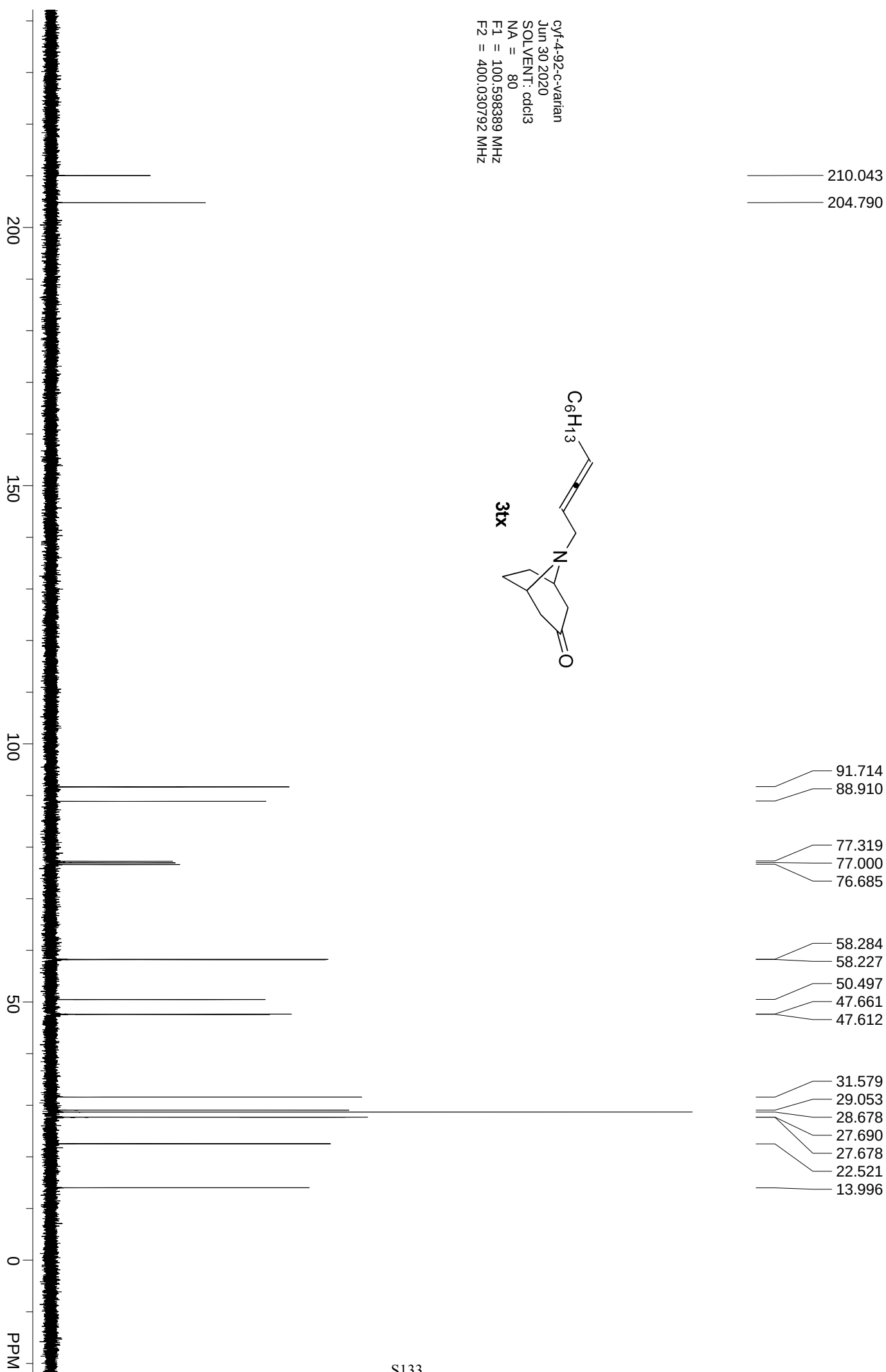
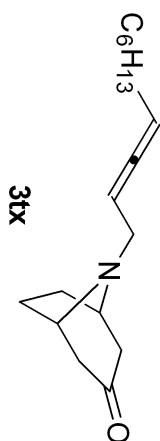
cyf-3-169-c-varian
 Nov 15 2019
 SOLVENT: cdcl3
 NA = 60
 F1 = 100.598389 MHz
 F2 = 400.030792 MHz



cyf-4-92-h
 Jun 30 2020
 SOLVENT: CDCl₃
 NA = 4
 F1 = 400.031403 MHz
 F2 = 100.596855 MHz



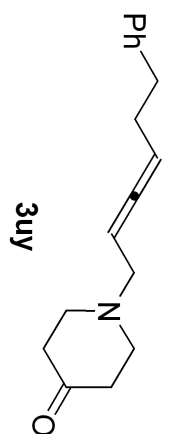
cyf-4-92-c-varian
 Jun 30 2020
 SOLVENT: cdc13
 NA = 80
 F1 = 100.598389 MHz
 F2 = 400.030792 MHz



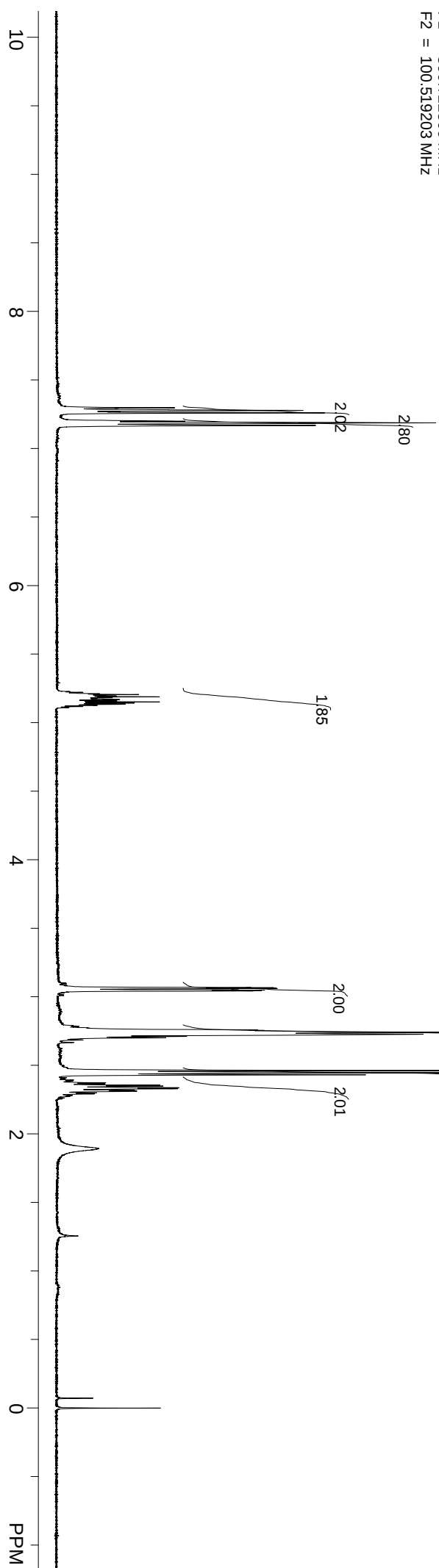
7.297
7.278
7.260
7.199
7.187
7.182
7.168

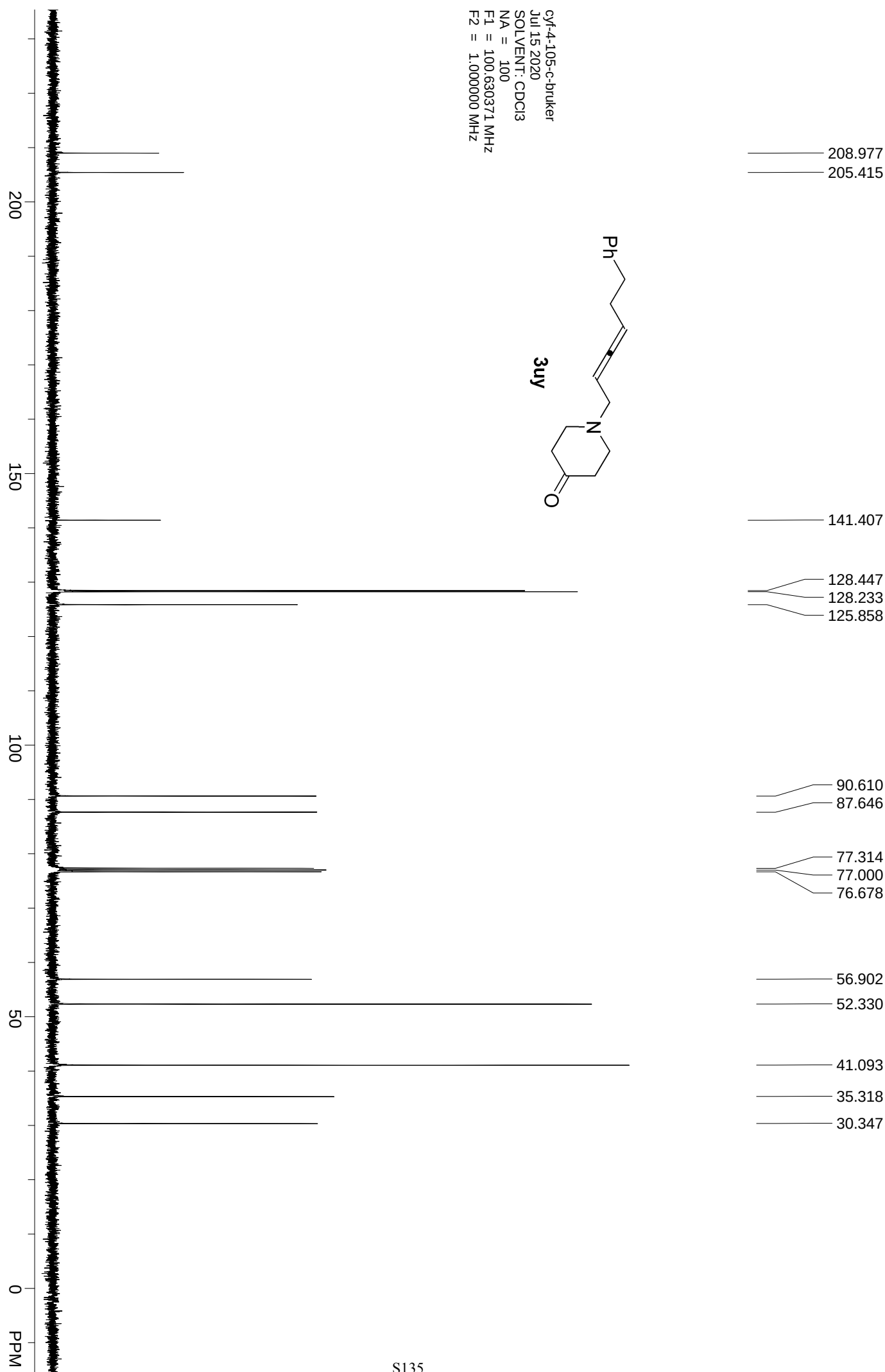
5.227
5.205
5.188
5.168
5.158
5.151
5.133
5.110

3.067
3.066
3.061
3.059
3.050
3.047
3.044
3.041
2.786
2.784
2.772
2.758
2.755
2.740
2.726
2.710
2.700
2.684
2.461
2.446
2.430
2.372
2.365
2.355
2.348
2.336
2.329
2.319
2.316
2.311
2.309
2.298
2.291
1.902
1.892
-0.000



cyf-4-105-h
Jul 15 2020
SOLVENT: CDCl3
NA = 4
F1 = 399.722809 MHz
F2 = 100.519203 MHz





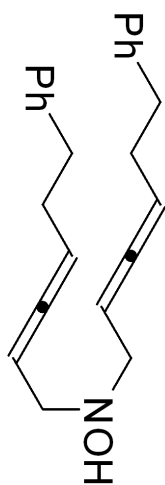
7.287
7.267
7.249
7.187
7.173
7.169

6.064
5.244
5.225
5.216
5.210
5.202
5.194
5.187

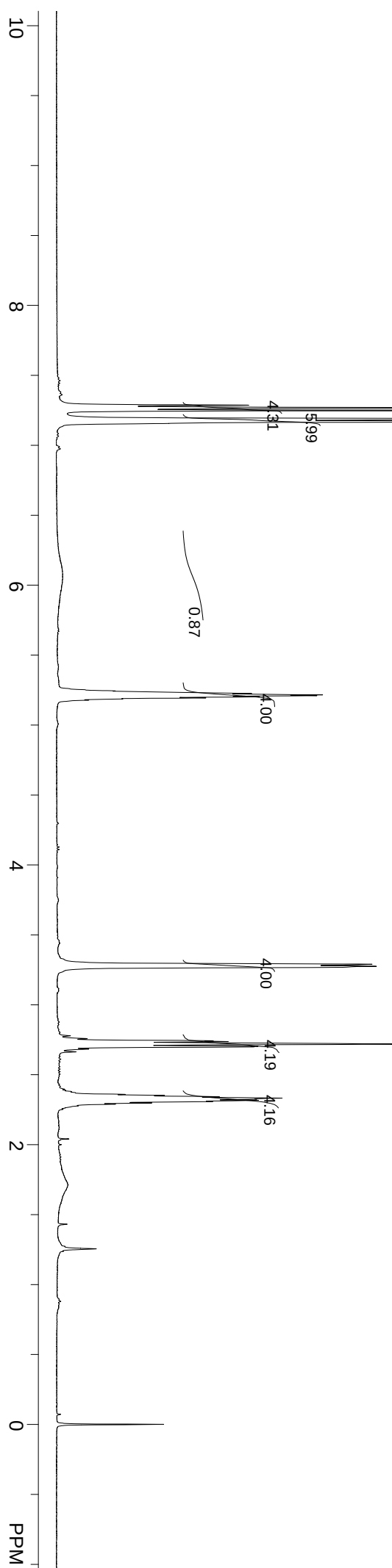
3.290
3.274
2.778
2.758
2.742
2.736
2.719
2.704
2.699
2.683
2.663
2.359
2.351
2.342
2.332
2.326
2.317
2.308
2.298
2.289

0.000

cyf-4-98-h
Jul 8 2020
SOLVENT: CDCl3
NA = 12
F1 = 399.722809 MHz
F2 = 100.519203 MHz



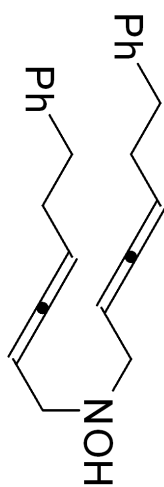
4uz
d.r. = 1:1



5.227
5.215
5.204
5.191
4.929

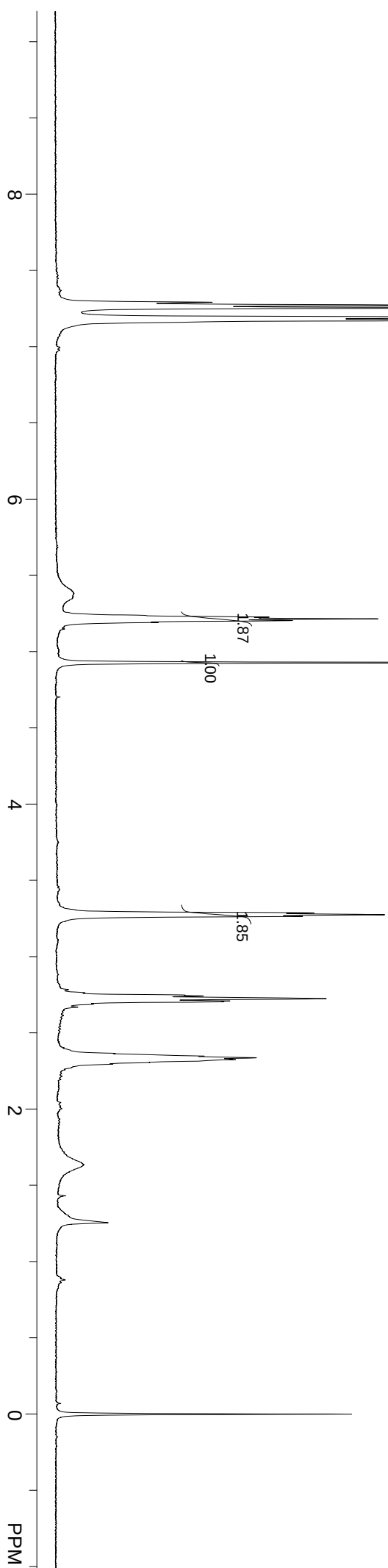
3.286
3.275
3.264

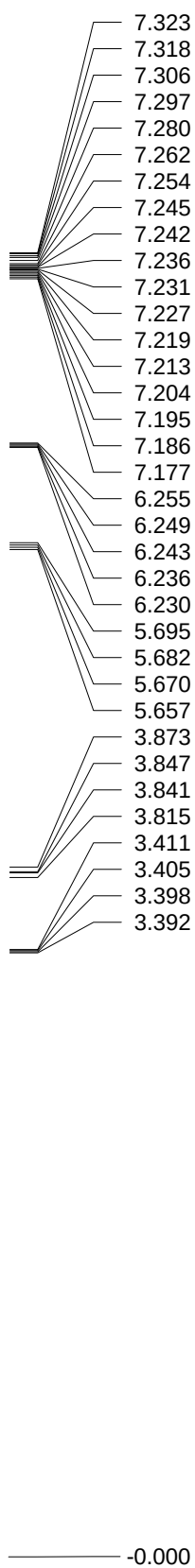
-0.000



4uz
d.r. = 1:1

cyf-4-98-h-purity
purity = 93%
49.4 mg product with 7.0 uL dibromomethane
Jul 8 2020
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz

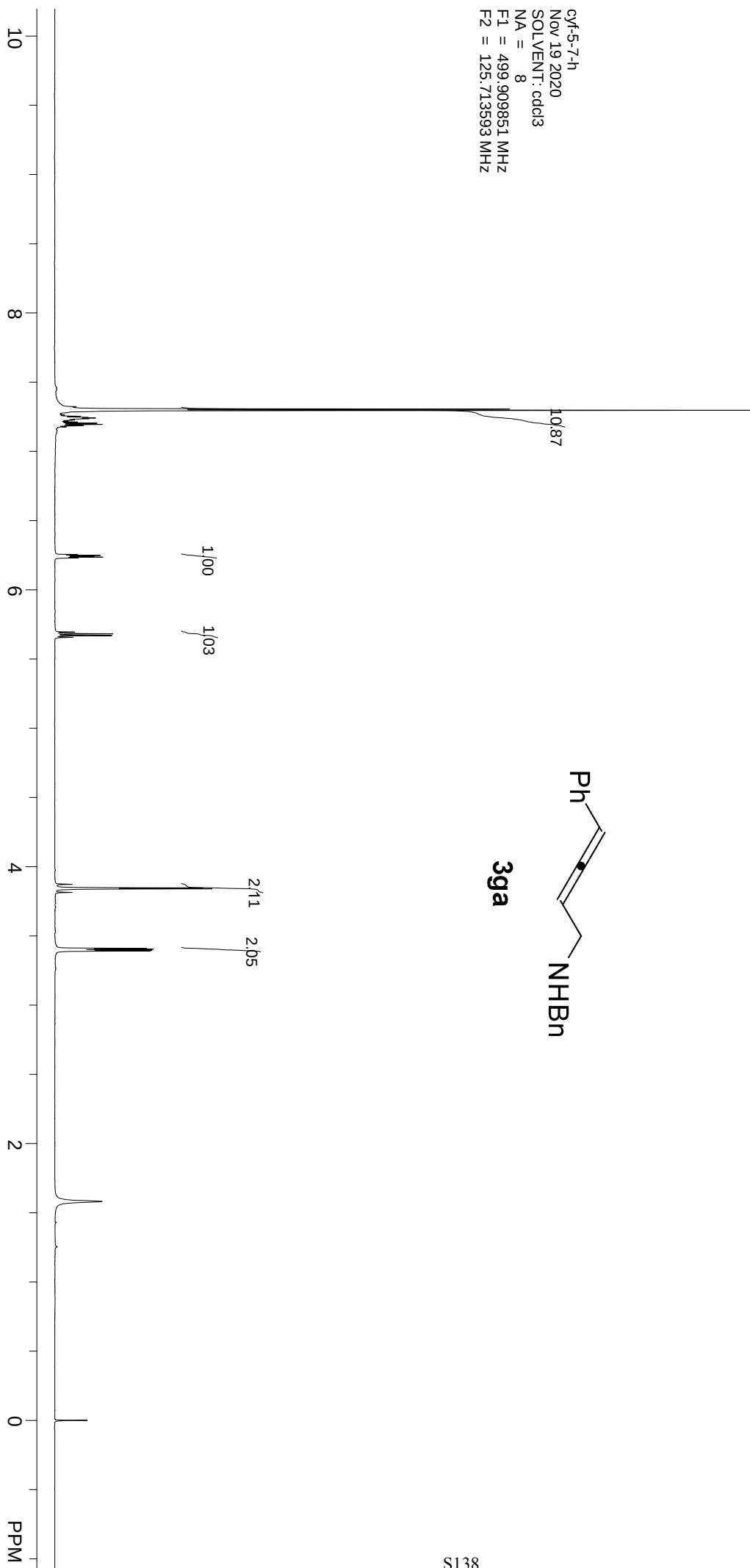




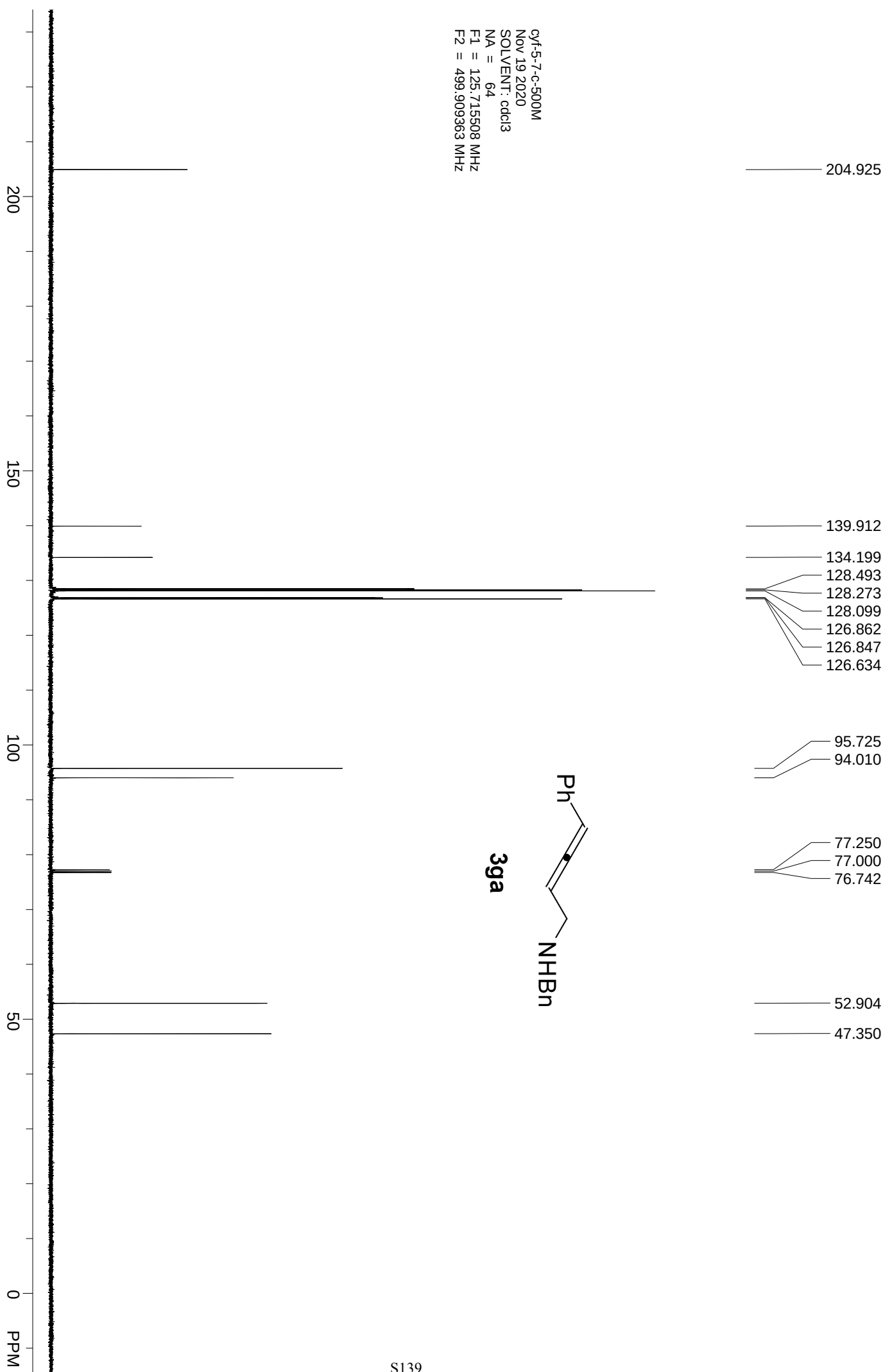
cyf-5-7-h
Nov 19 2020
SOLVENT: cdcl3
NA = 8
F1 = 499.909851 MHz
F2 = 125.713593 MHz

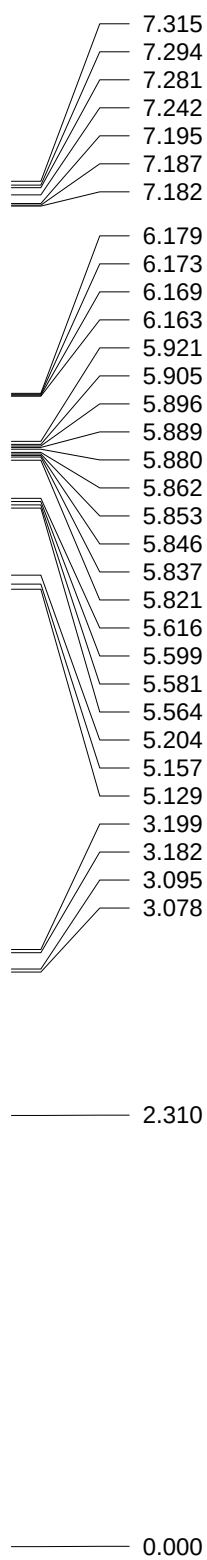


3ga

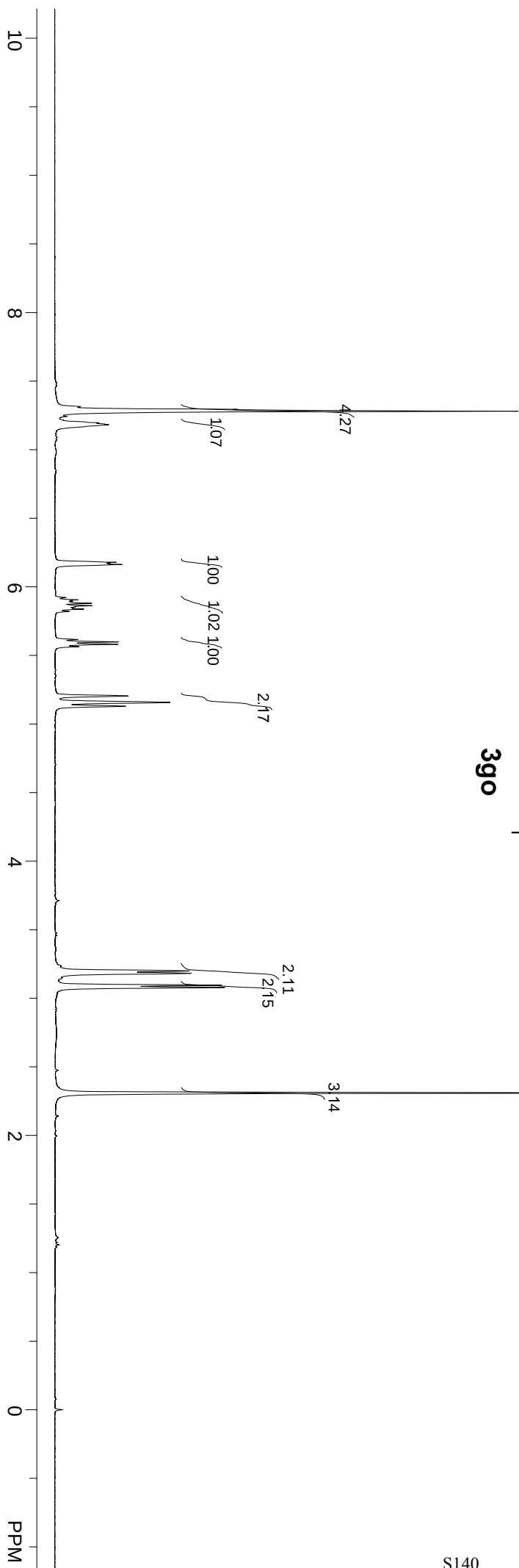
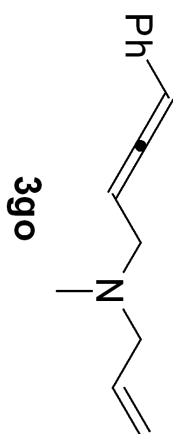


cyf-5-7-c-500M
Nov 19 2020
SOLVENT: cdd13
NA = 64
F1 = 125.715508 MHz
F2 = 499.909363 MHz

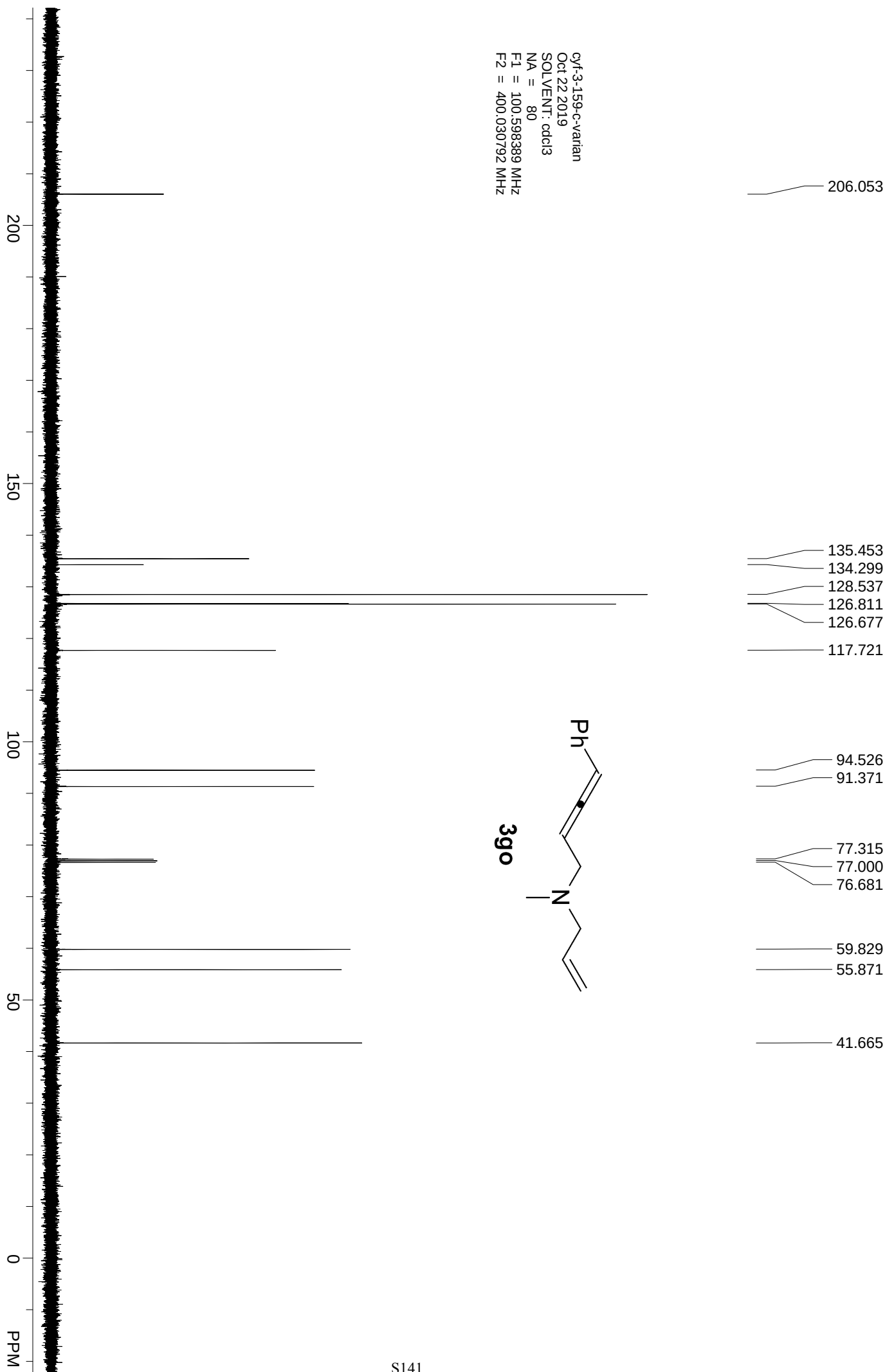


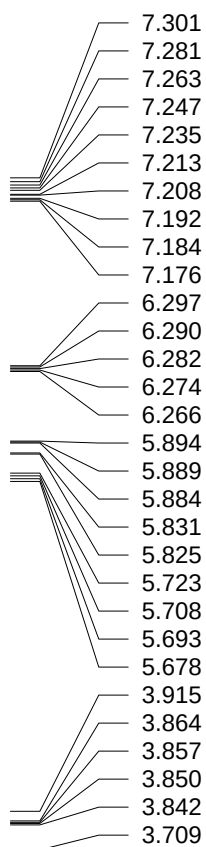


cyf-3-159-h
Oct 22 2019
SOLVENT: CDCl3
NA = 8
PTSD = 32768
F1 = 400.031616 MHz
F2 = 100.596855 MHz



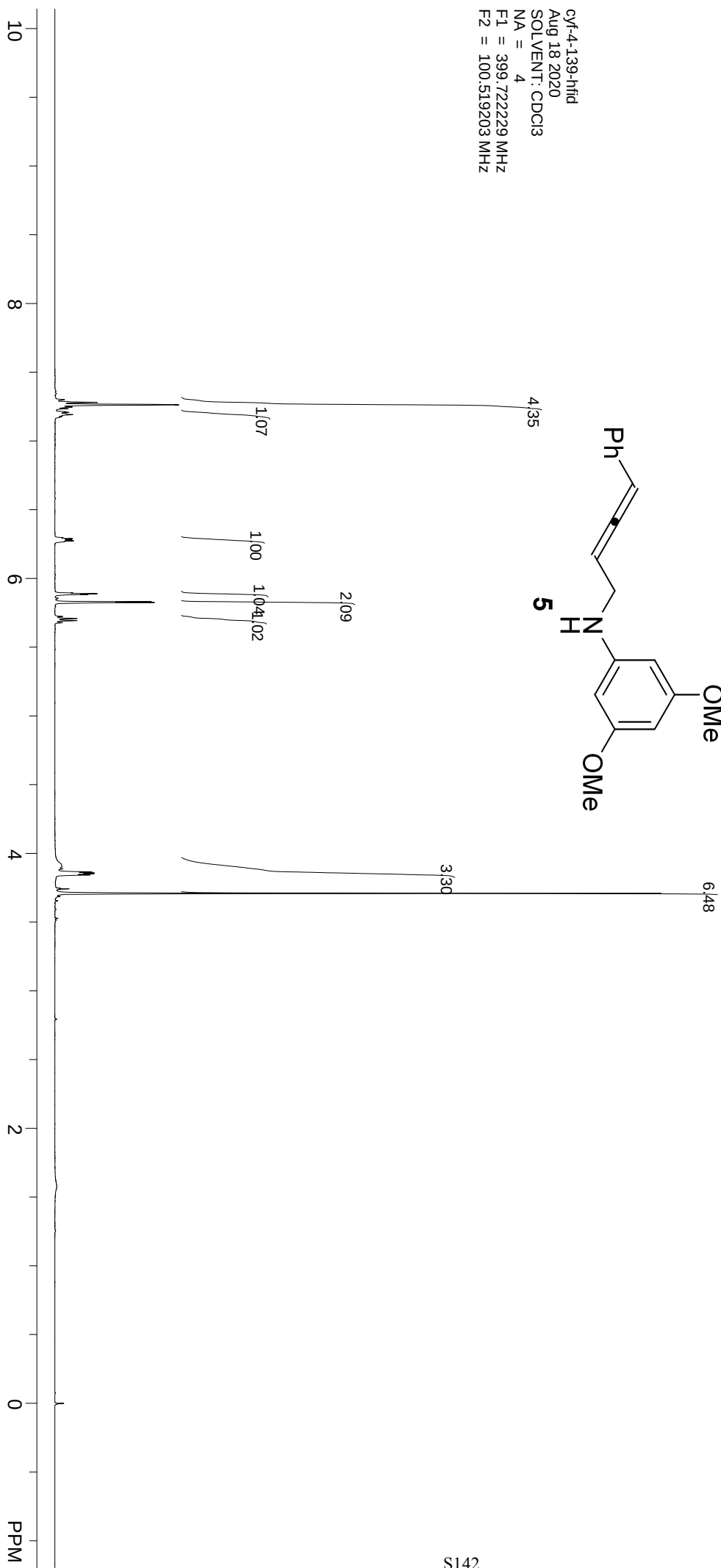
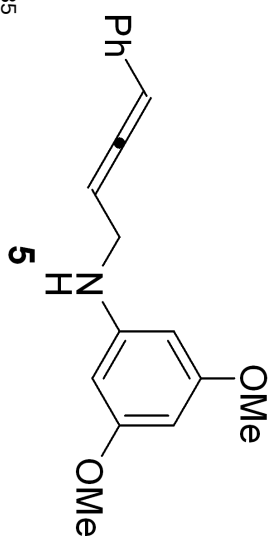
cyf-3-159-c-varian
Oct 22 2019
SOLVENT: cdcl3
NA = 80
F1 = 100.598389 MHz
F2 = 400.030792 MHz



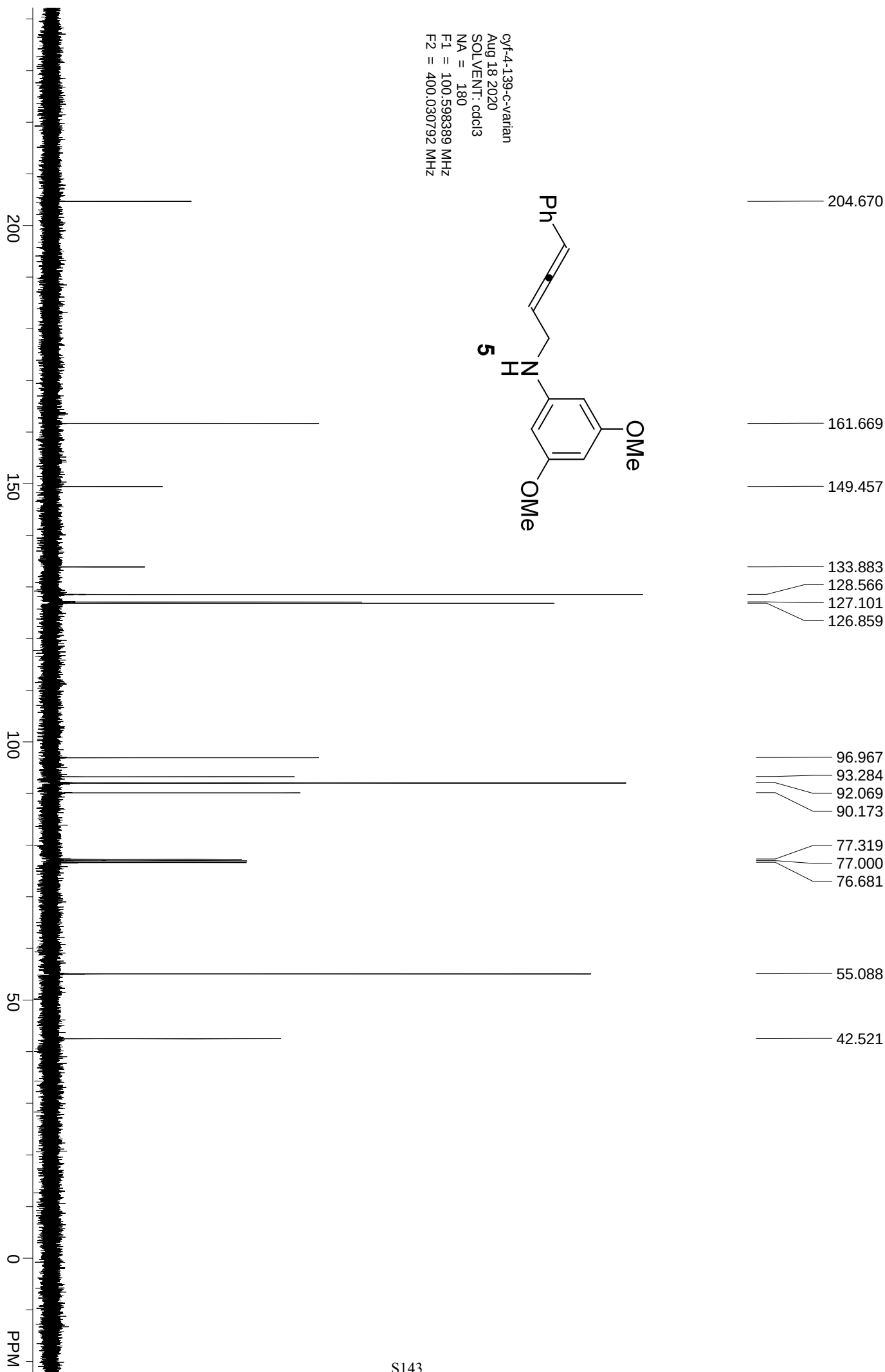
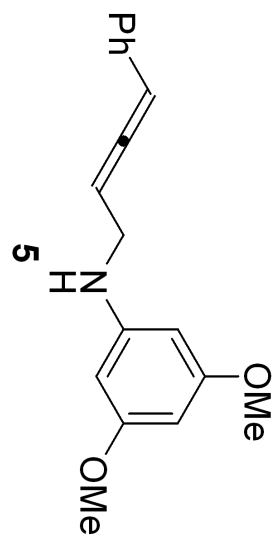


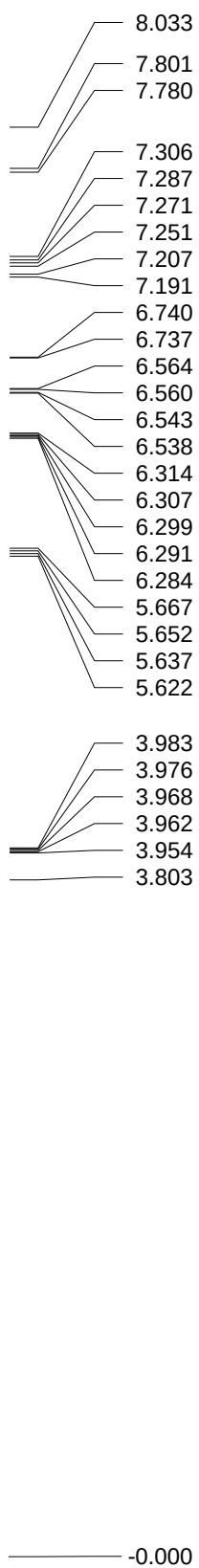
0.000

cyf-4-139-hfid
Aug 18 2020
SOLVENT: CDCl3
NA = 4
F1 = 399.722229 MHz
F2 = 100.519203 MHz

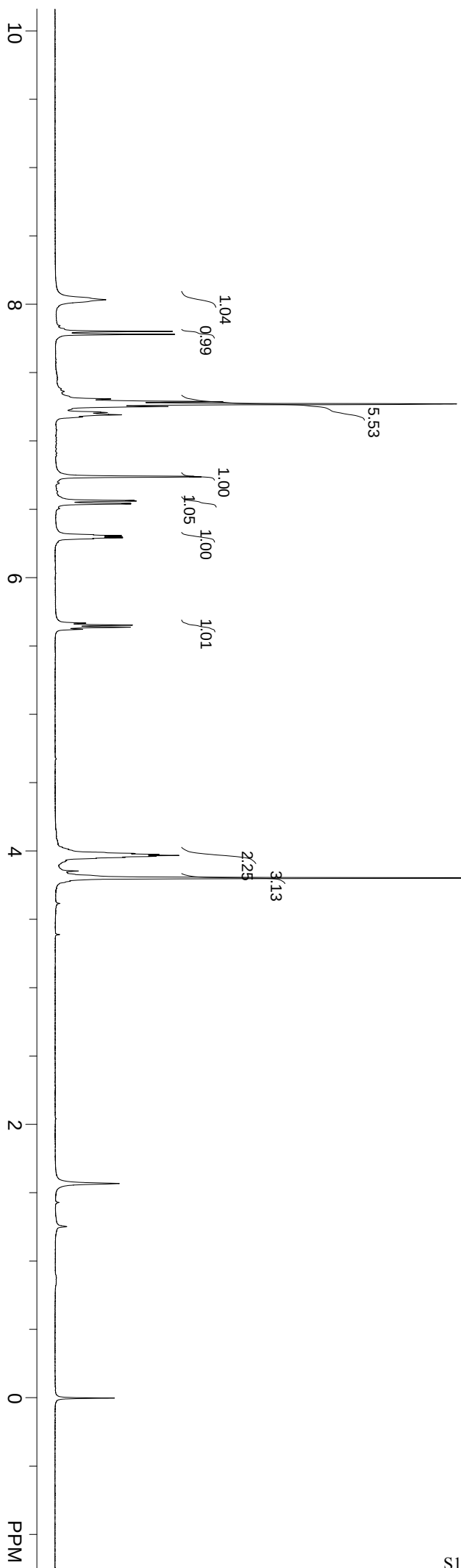
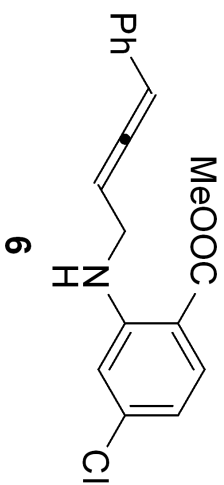


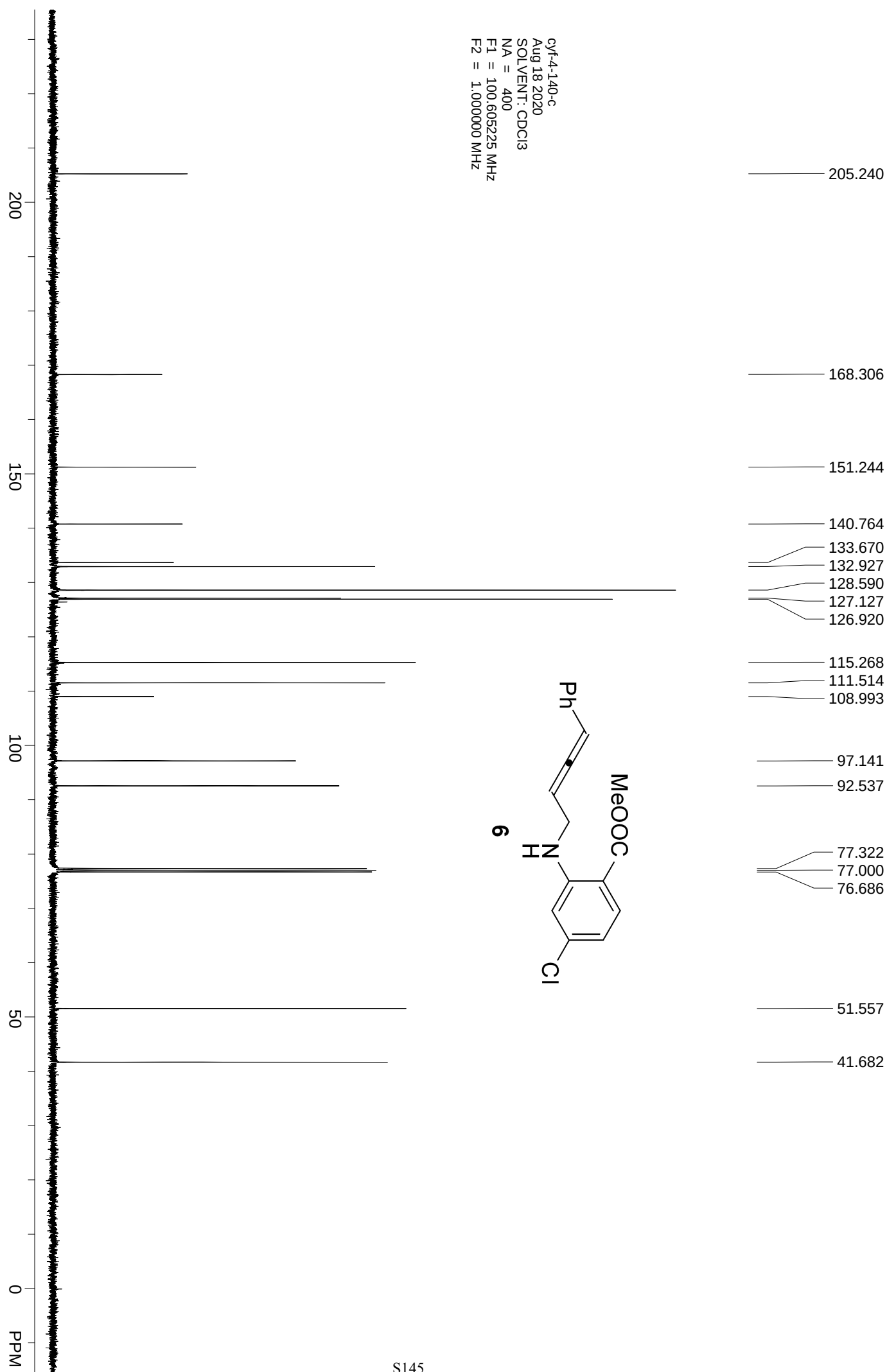
cyf-4-139-c-varian
Aug 18 2020
SOLVENT: cdcl3
NA = 180
F1 = 100.598389 MHz
F2 = 400.030792 MHz





cyf-4-140-h
Aug 18 2020
SOLVENT: CDCl3
NA = 7
F1 = 400.200012 MHz
F2 = 1.000000 MHz

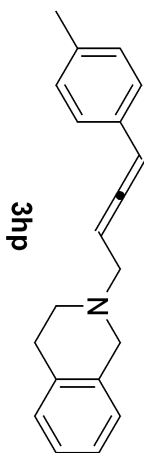




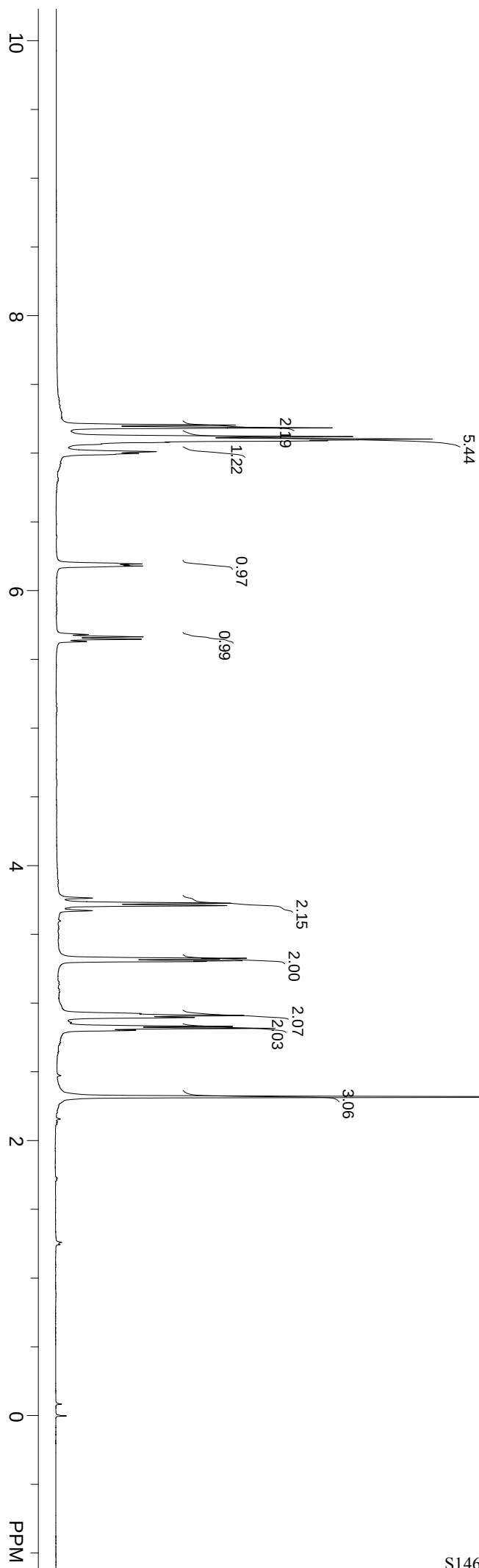
7.204
7.184
7.120
7.103
7.090
7.079
7.065
7.011
6.997
6.991
6.195
6.185
6.179
5.682
5.664
5.647
5.630

3.765
3.728
3.711
3.673
3.327
3.322
3.310
3.304
2.925
2.911
2.897
2.832
2.818
2.805
2.319

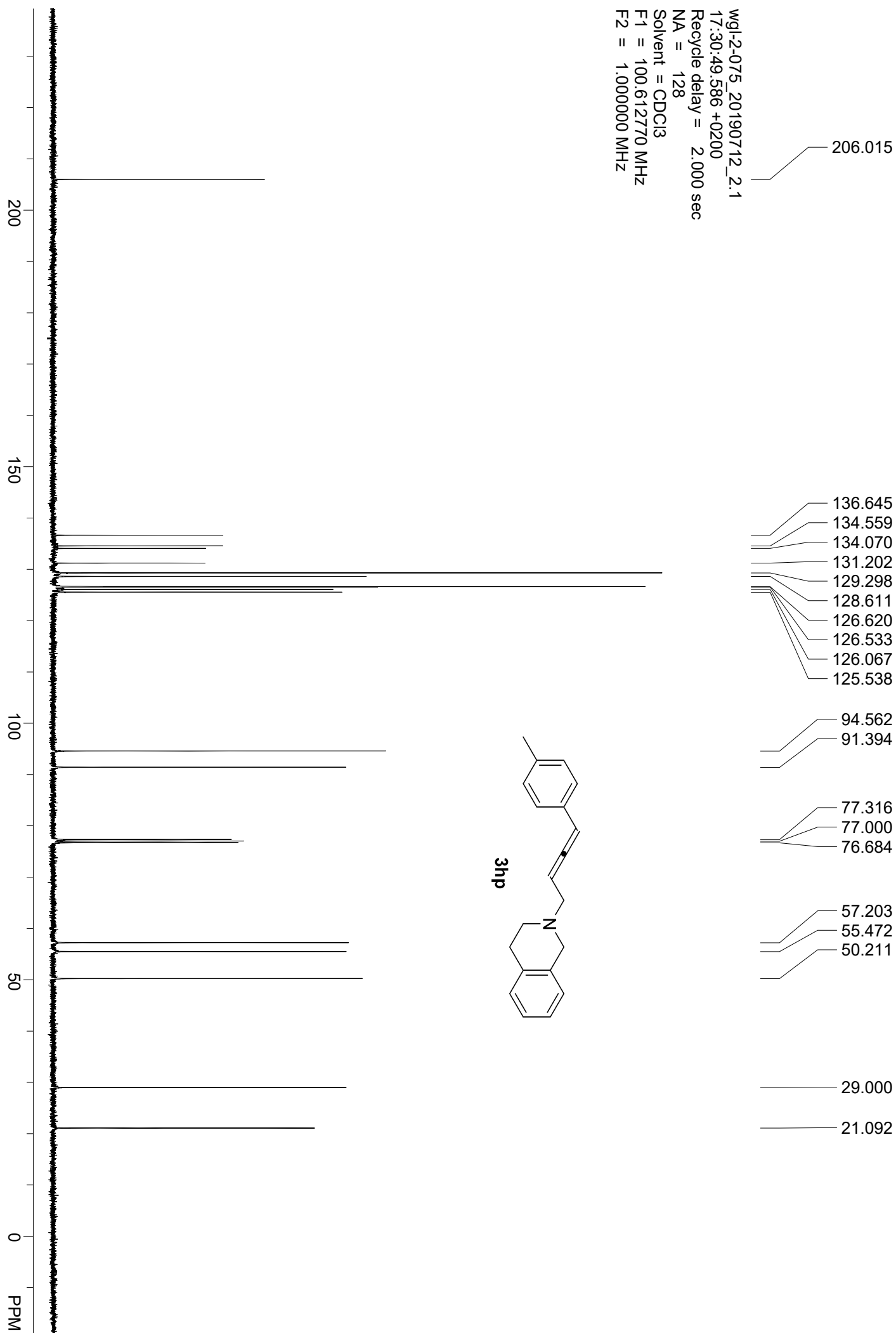
0.000

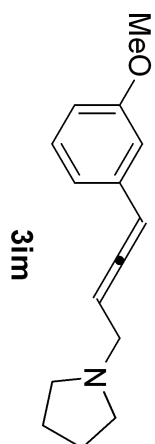
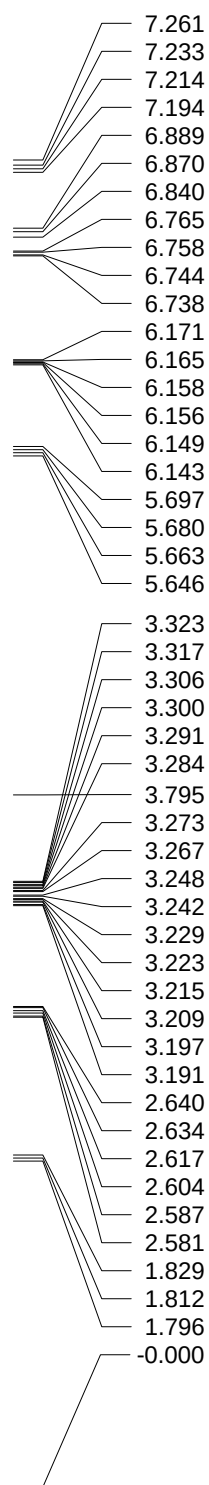


wgl-2-075_20190712_1.1
17:22:52.814 +0200
SOLVENT: CDCl3
Recycle delay = 5.000 sec
NA = 8
F1 = 400.130035 MHz
F2 = 1.000000 MHz

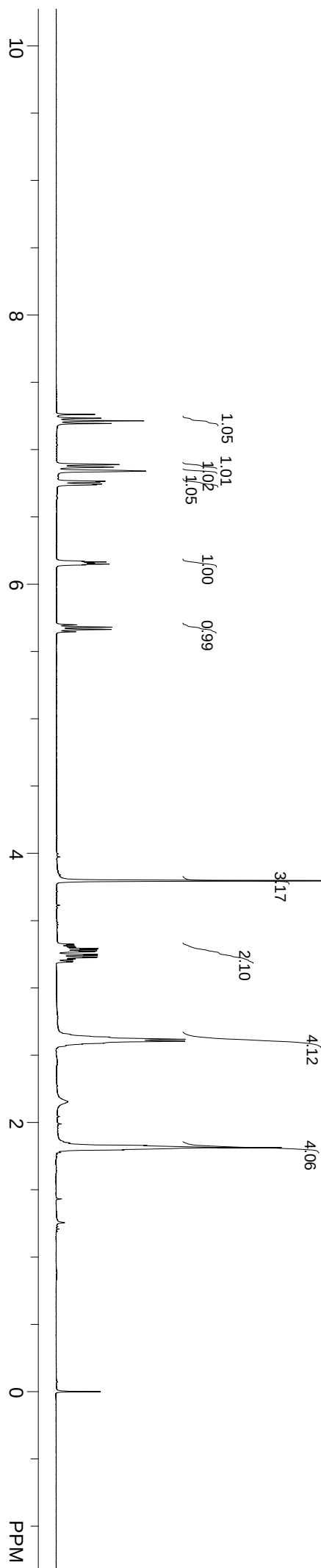


wgl-2-075_20190712_2.1
17:30:49.586 +0200
Recycle delay = 2.000 sec
NA = 128
Solvent = CDCl₃
F1 = 100.612770 MHz
F2 = 1.000000 MHz

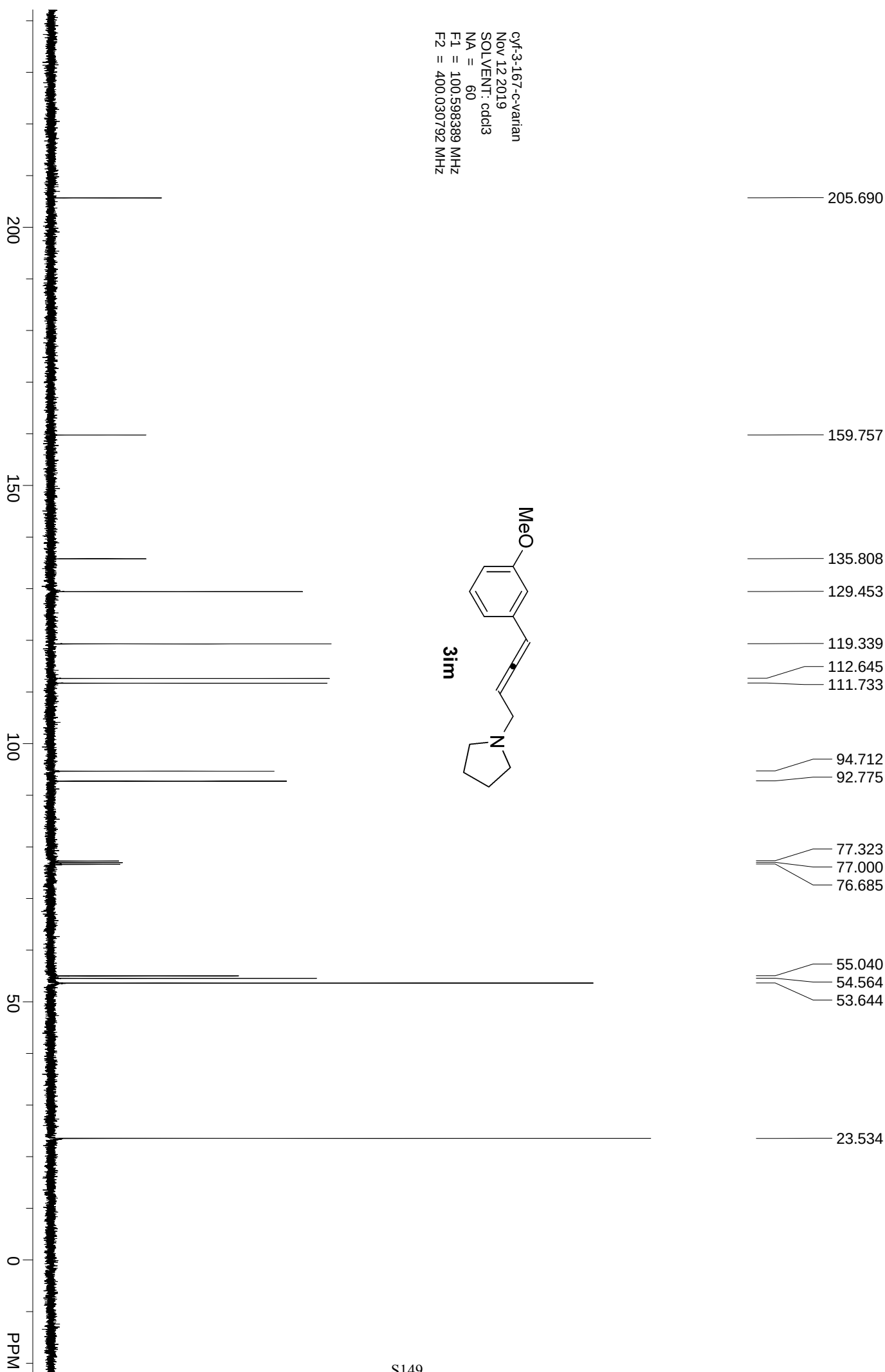
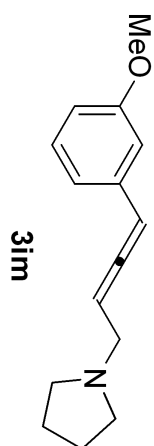


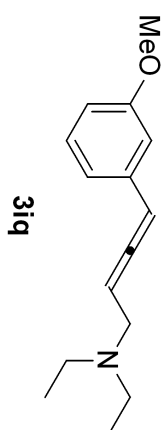
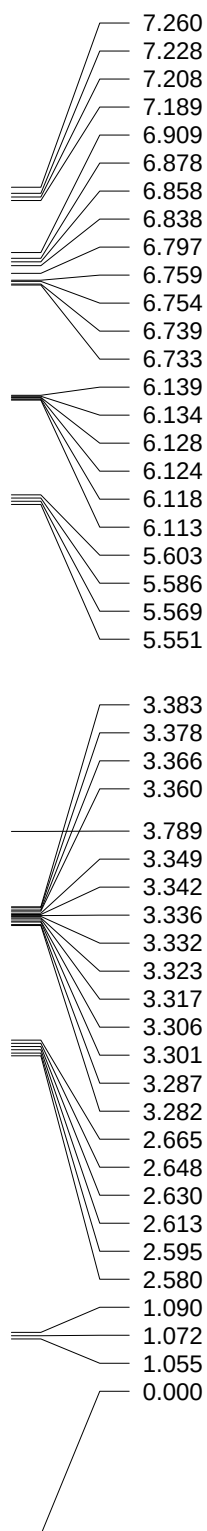


cyf-3-167-h
Nov 12 2019
SOLVENT: CDCl3
NA = 8
F1 = 399.722809 MHz
F2 = 100.519203 MHz

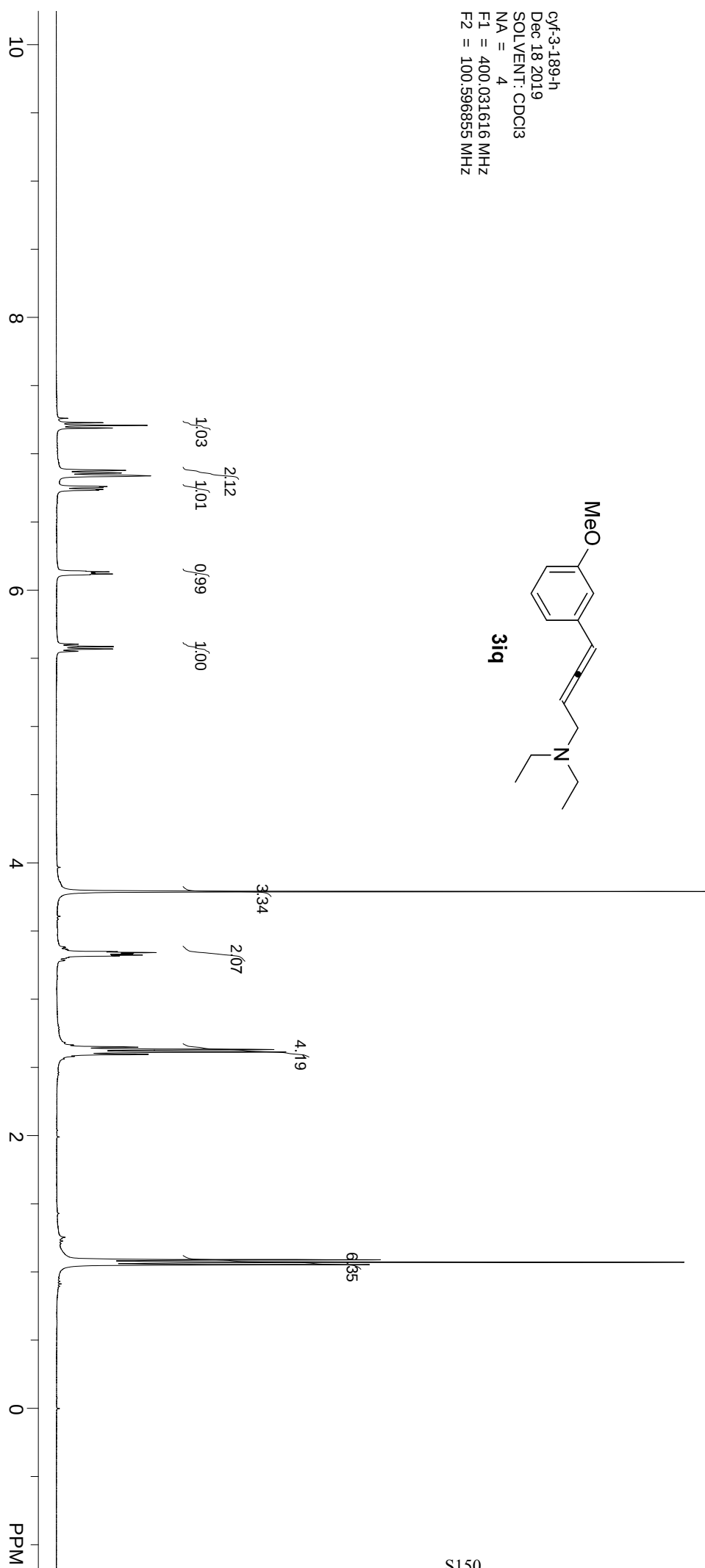


cyf-3-167-c-varian
Nov 12 2019
SOLVENT: cdcl3
NA = 60
F1 = 100.598389 MHz
F2 = 400.030792 MHz

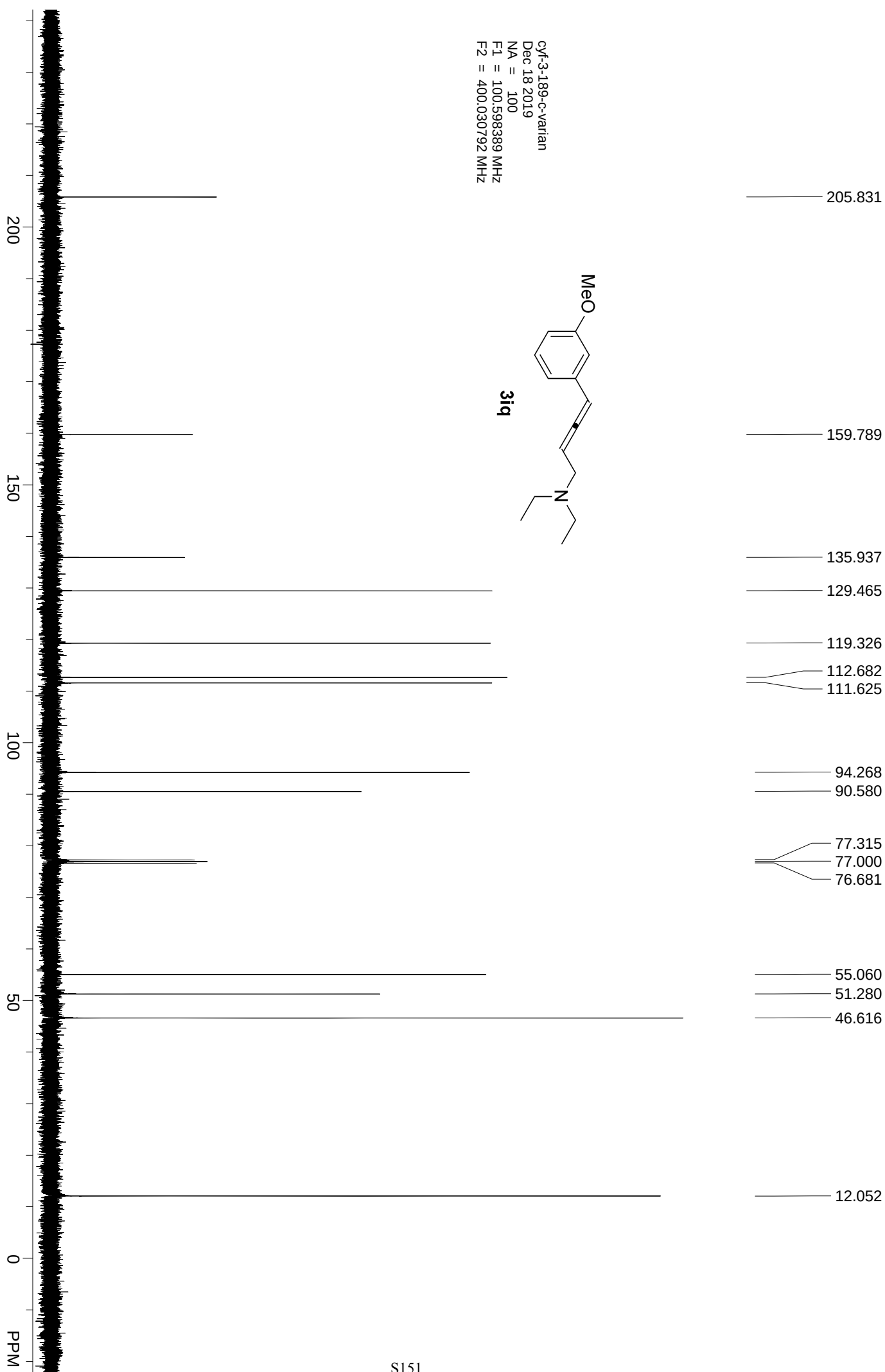
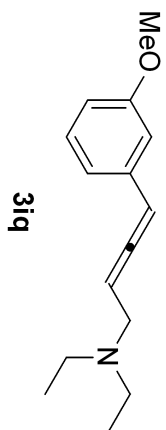


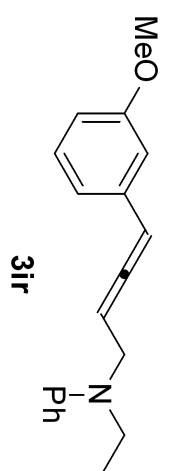
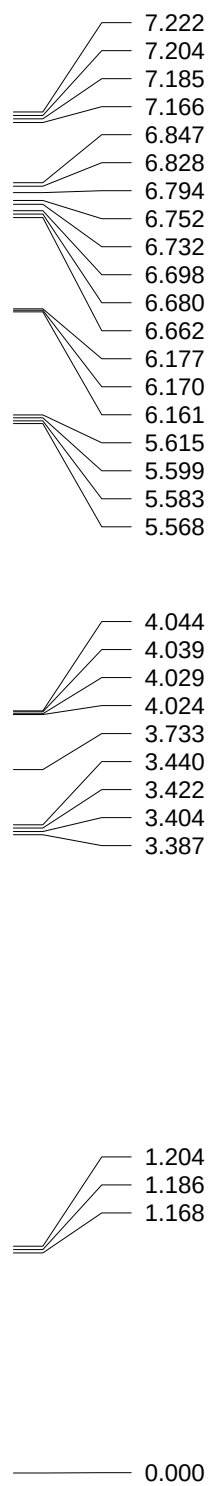


cyf-3-189-h
Dec 18 2019
SOLVENT: CDCl3
NA = 4
F1 = 400.031616 MHz
F2 = 100.596855 MHz

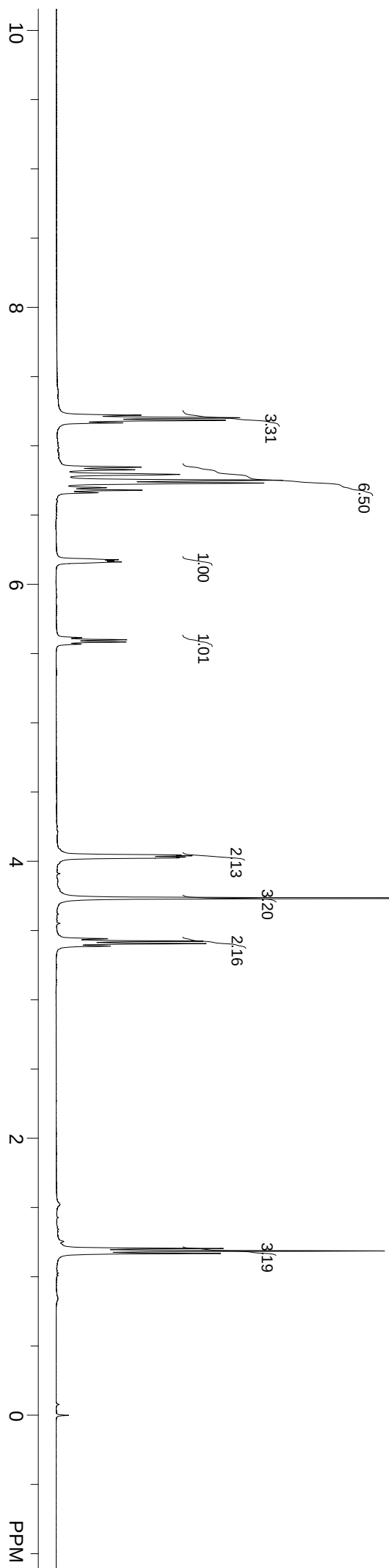


cvf-3-189-c-varian
Dec 18 2019
NA = 100
F1 = 100.598389 MHz
F2 = 400.030792 MHz

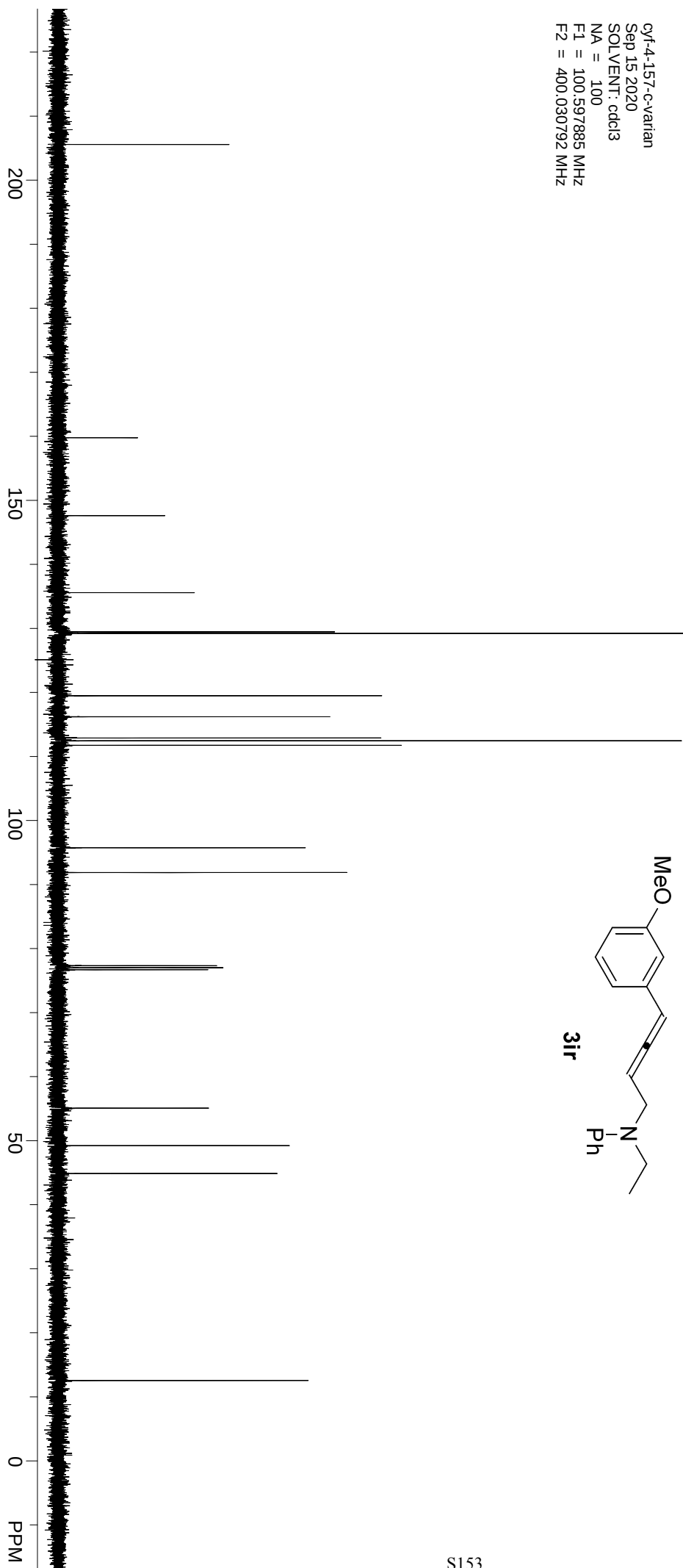
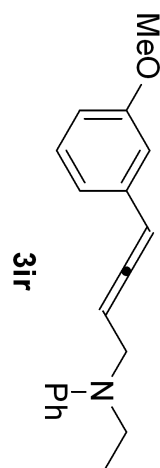


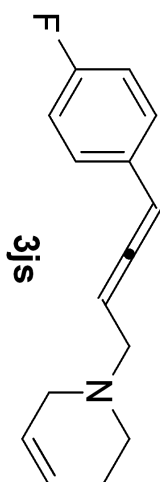
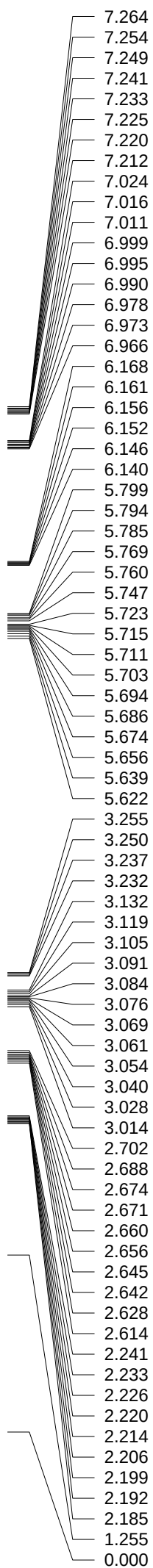


cyf-4-157-h
Sep 15 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031219 MHz
F2 = 100.596855 MHz



cyf-4-157-c-varian
 Sep 15 2020
 SOLVENT: cdcl3
 NA = 100
 F1 = 100.597885 MHz
 F2 = 400.030792 MHz





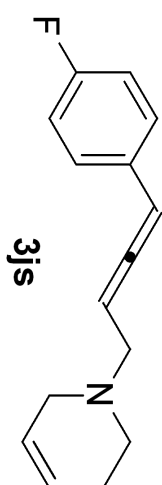
cyf-3-101-h
 Jul 13 2020
 SOLVENT: CDCl3
 NA = 5
 F1 = 400.202606 MHz
 F2 = 1.000000 MHz



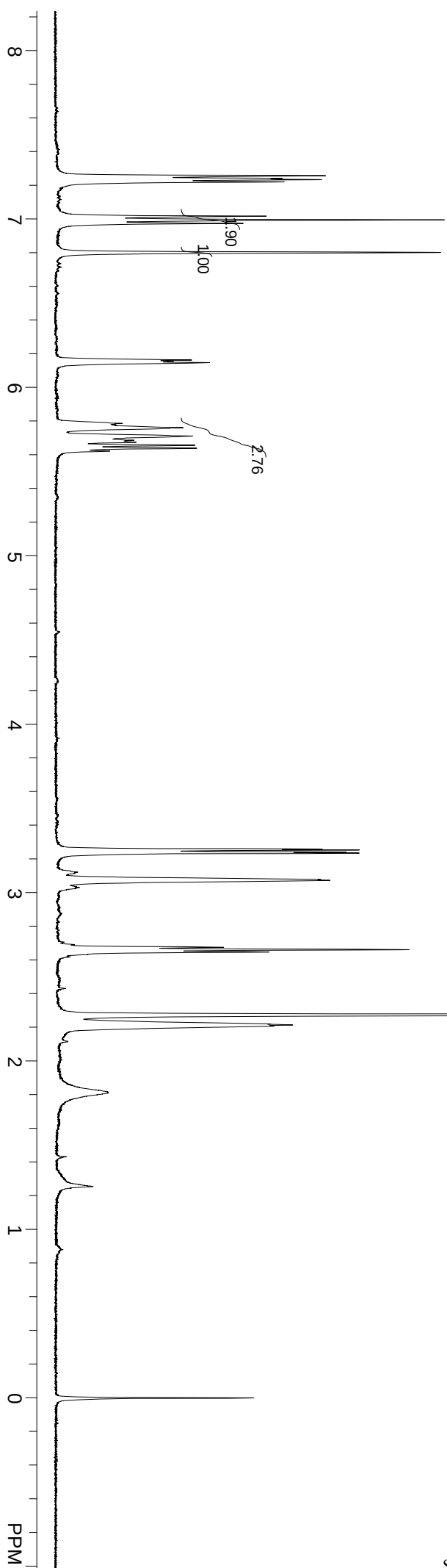
7.017
6.995
6.974
6.801

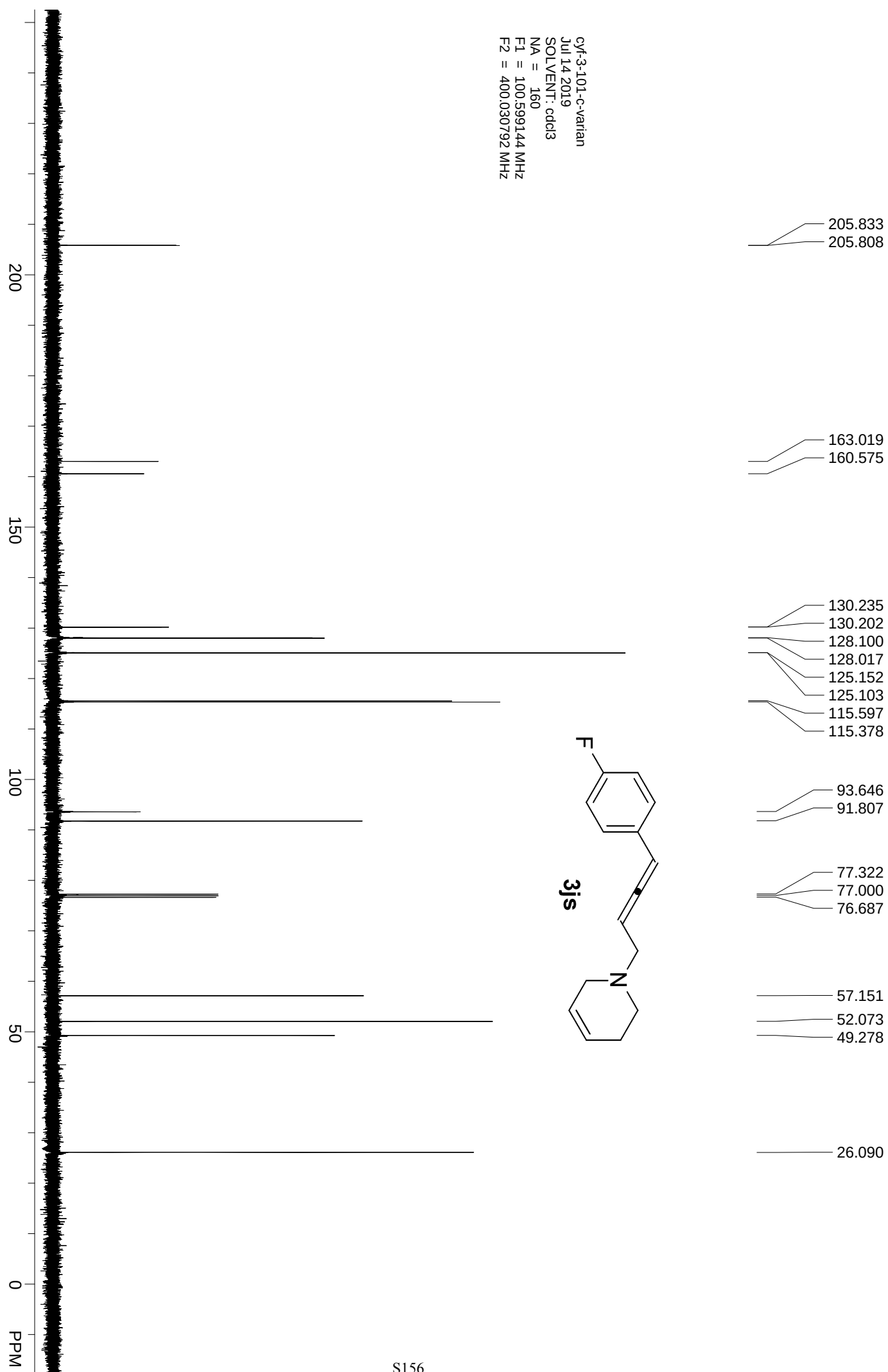
5.785
5.761
5.711
5.686
5.674
5.656
5.638
5.622

-0.000

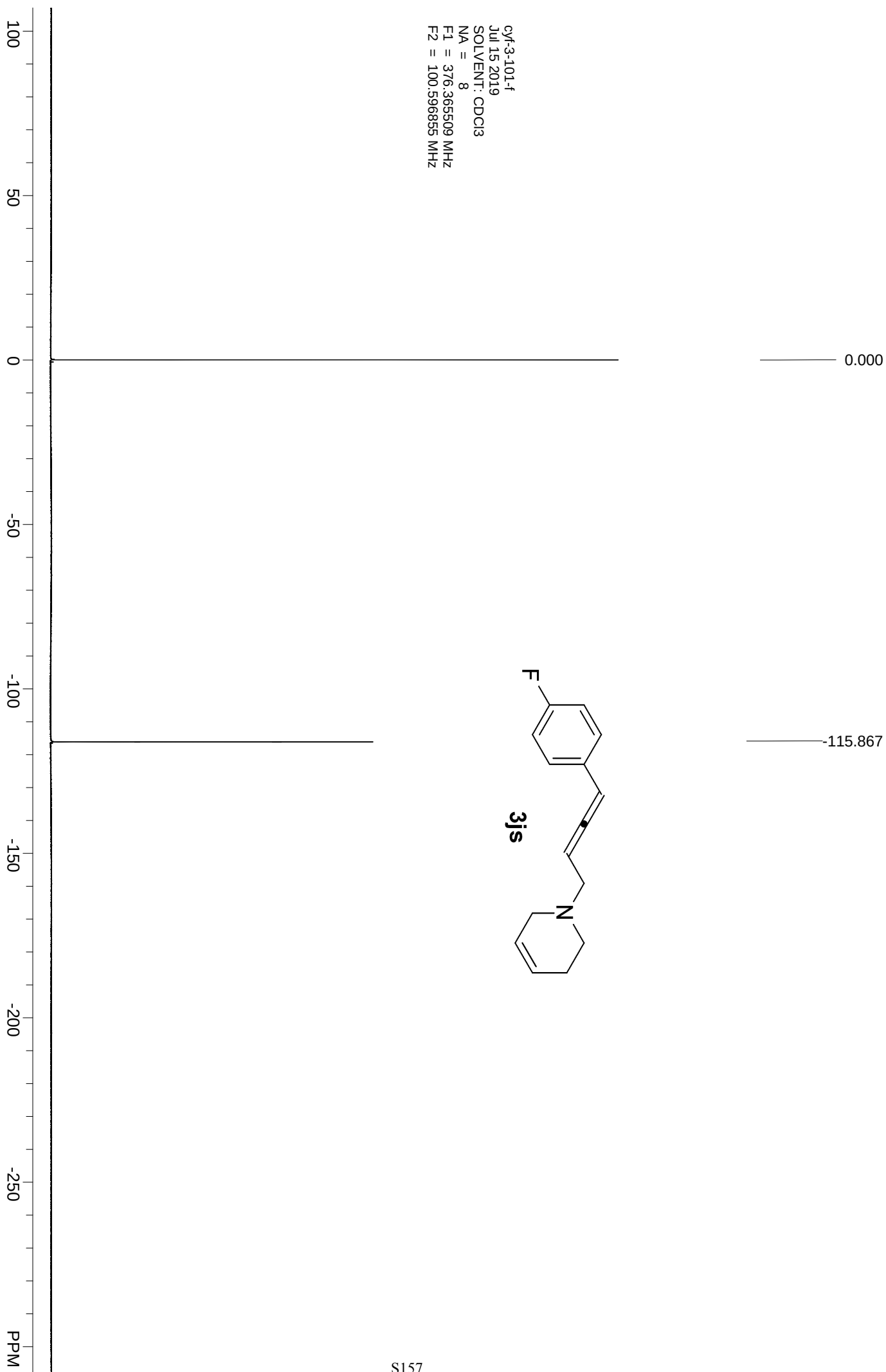


cyf-3-101-h-purity
purity = 93%
20.7 mg product with 4.3 uL mesitylene
Jul 13 2019
NA = 4
Solvent = cdcl3
F1 = 400.031403 MHz
F2 = 100.596855 MHz





cyf-3-101-f
Jul 15 2019
SOLVENT: CDCl3
NA = 8
F1 = 376.365509 MHz
F2 = 100.596855 MHz

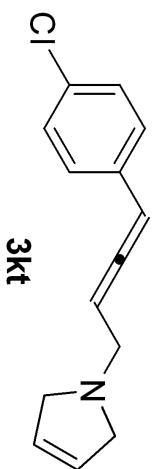


7.275
7.254
7.212
7.191

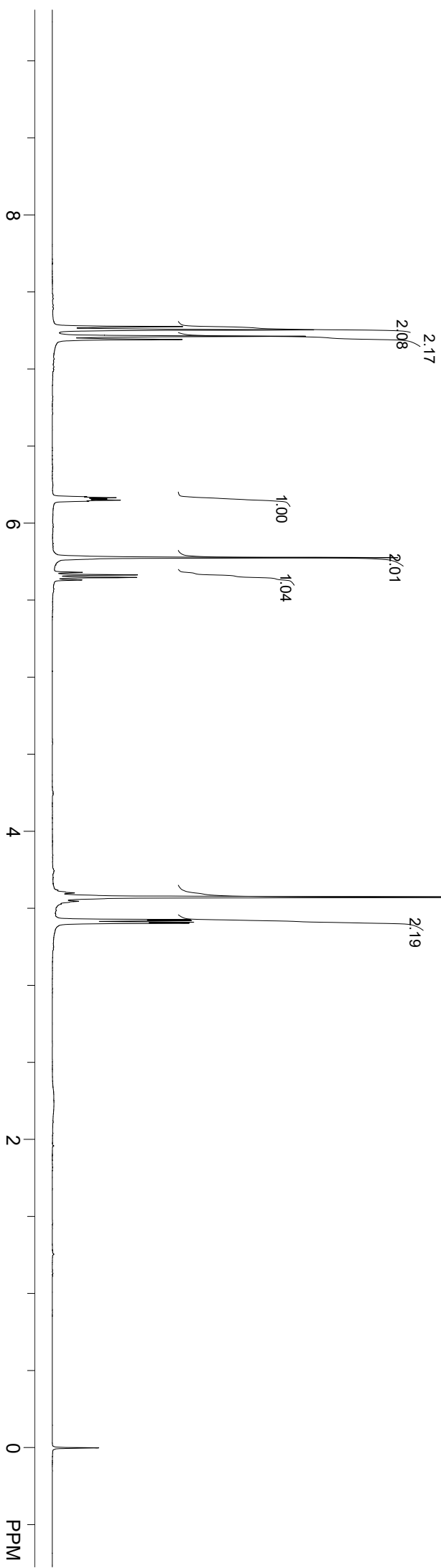
6.170
6.164
6.156
6.148
6.142
5.775
5.663
5.647

3.572
3.425
3.419
3.409
3.402

-0.000



hcf-4-113-H
Jul 8 2019
SOLVENT: CDCl3
NA = 8
F1 = 400.130005 MHz
F2 = 1.000000 MHz



205.738

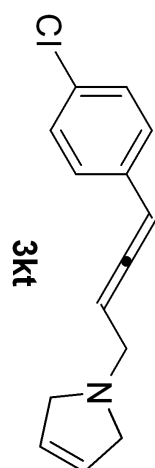
132.956
132.418
128.737
127.884
127.607

94.151
93.132

77.316
77.000
76.684

59.288

54.224



hcf-4-113-C
Jul 8 2019
SOLVENT: CDCl₃
NA = 512
F1 = 100.612770 MHz
F2 = 1.000000 MHz



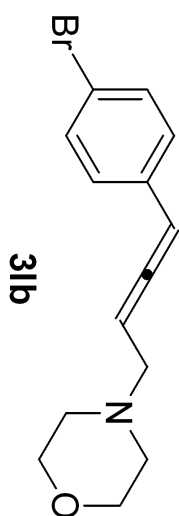
7.426
7.405
7.269
7.138
7.117

6.139
6.134
6.130
6.123
5.615
5.597
5.580
5.563

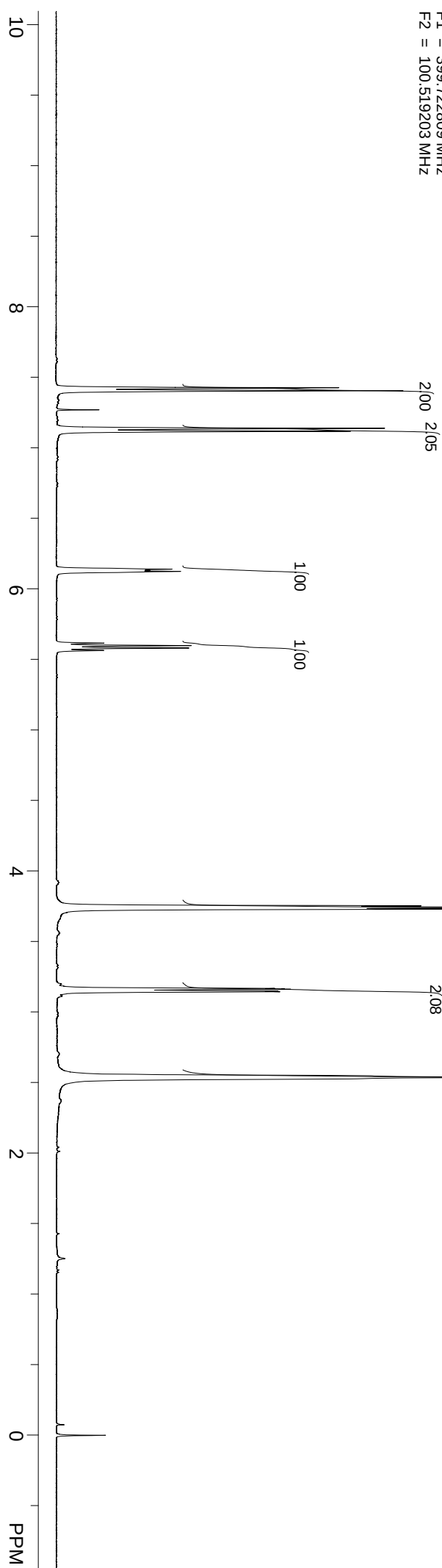
3.752
3.740
3.729

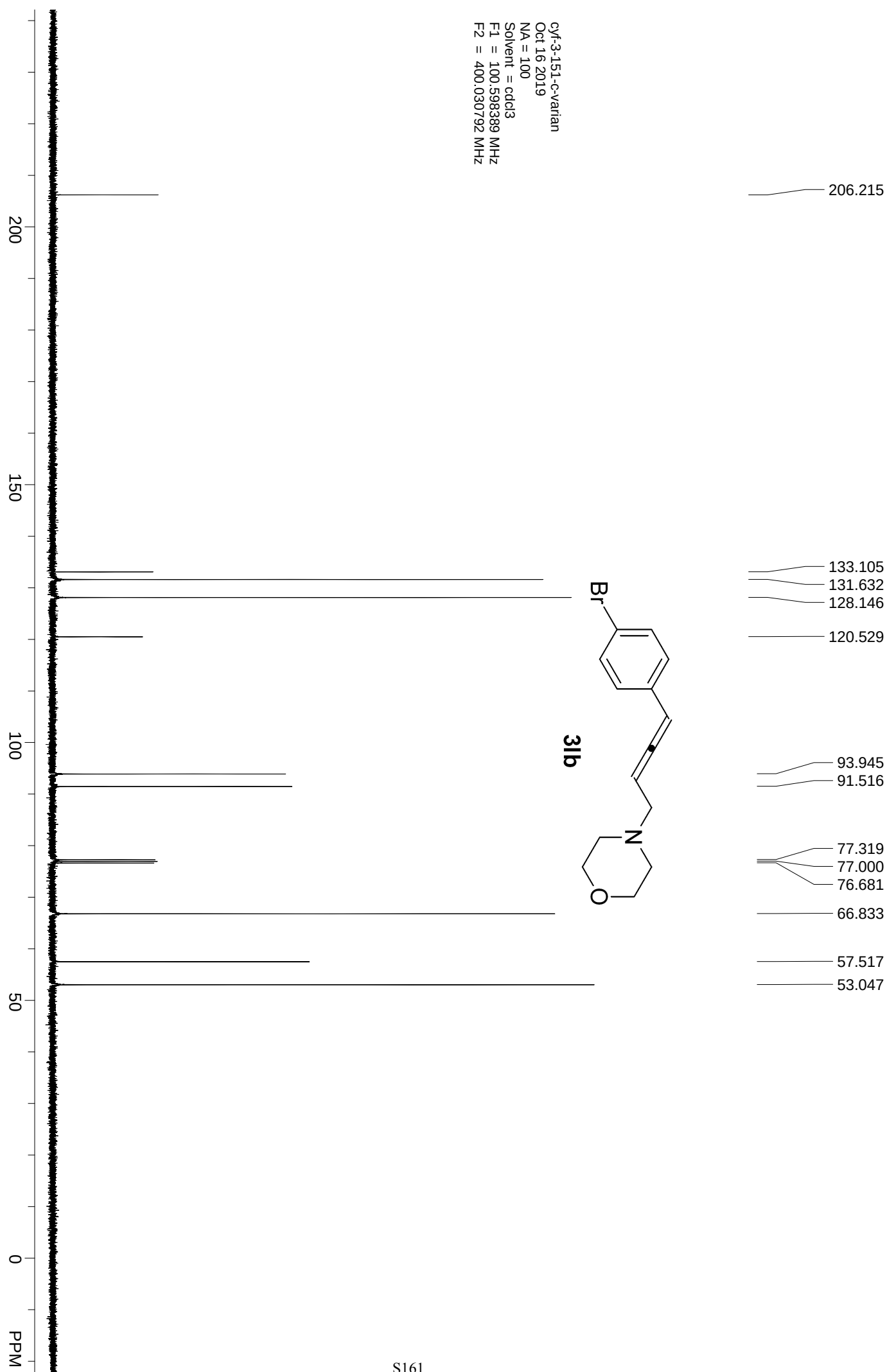
3.166
3.163
3.161
3.148
3.145
3.143
2.537

0.000



cvf-3-151-h
Oct 15 2019
SOLVENT: CDCl3
NA = 8
F1 = 399.722809 MHz
F2 = 100.519203 MHz

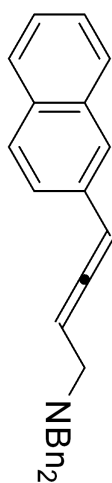




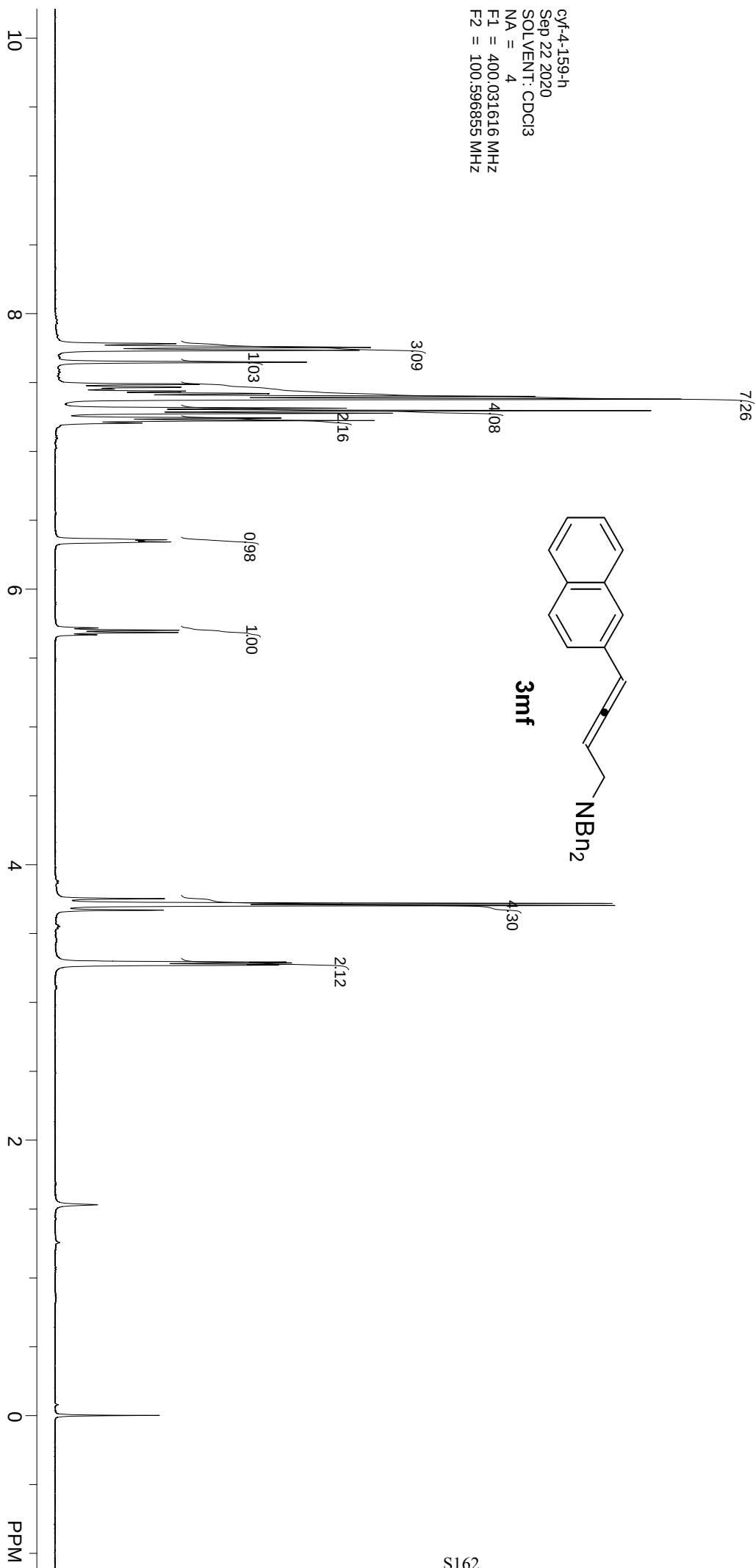
7.782
7.755
7.734
7.648
7.486
7.465
7.452
7.435
7.420
7.400
7.380
7.314
7.296
7.277
7.242
7.224
7.206
6.358
6.349
6.343
5.719
5.702
5.685
5.668

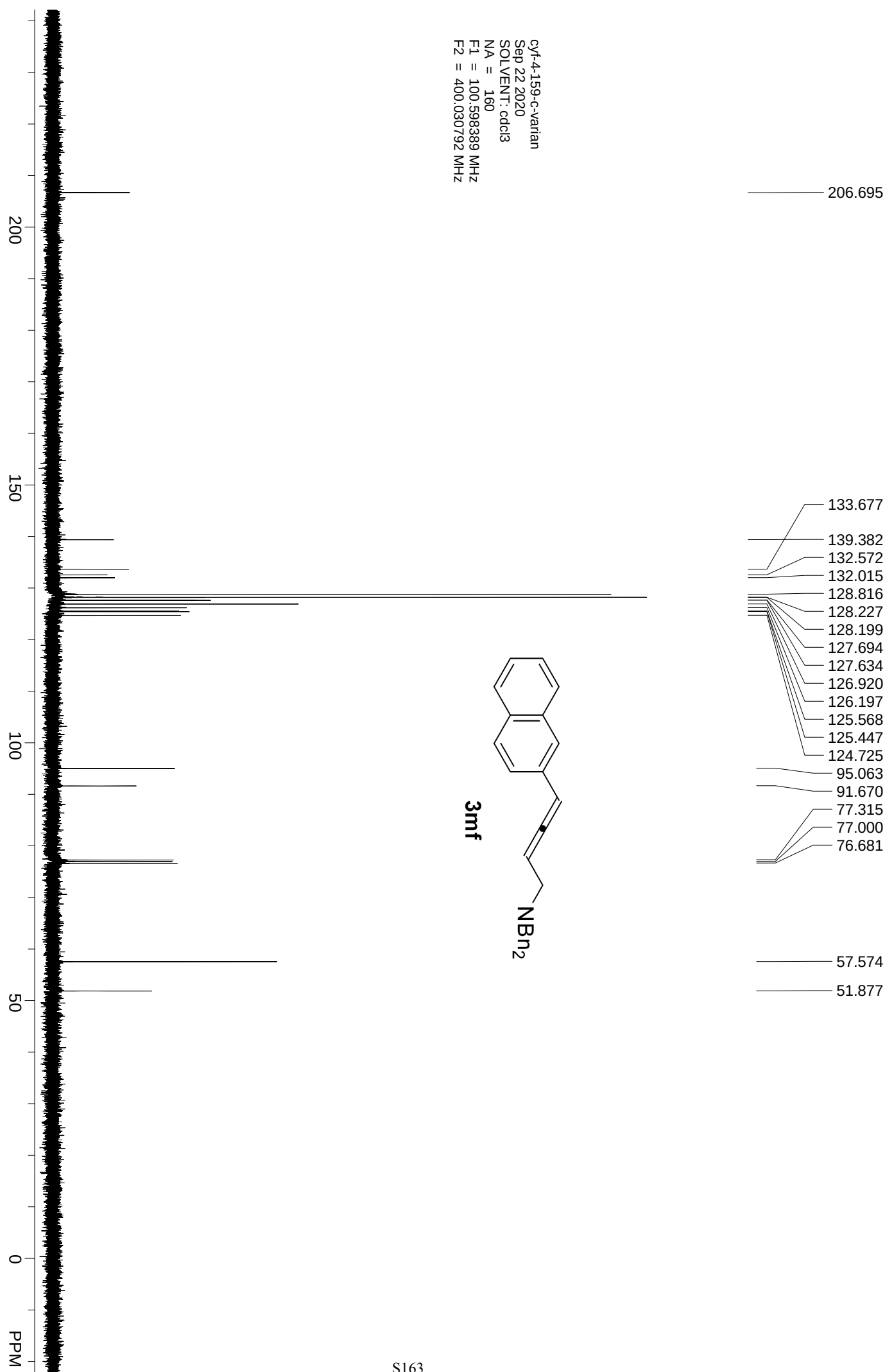
3.752
3.718
3.703
3.669
3.293
3.287
3.275
3.270

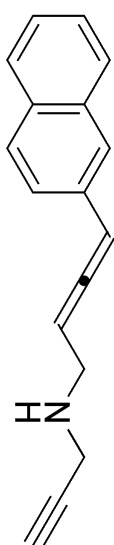
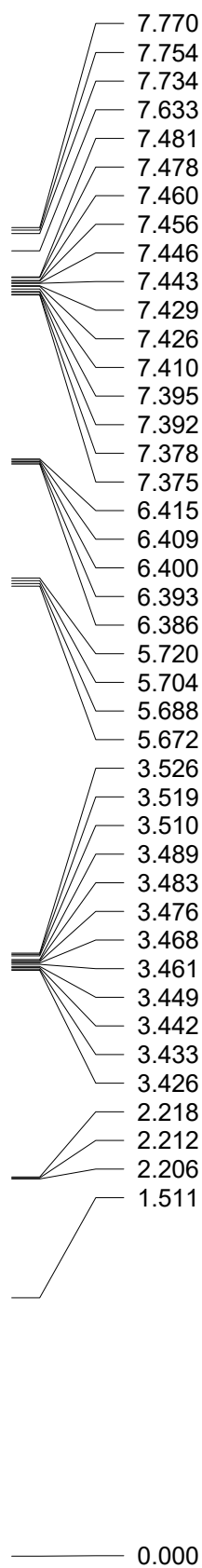
-0.000



cyf-4-159-h
Sep 22 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031616 MHz
F2 = 100.596855 MHz

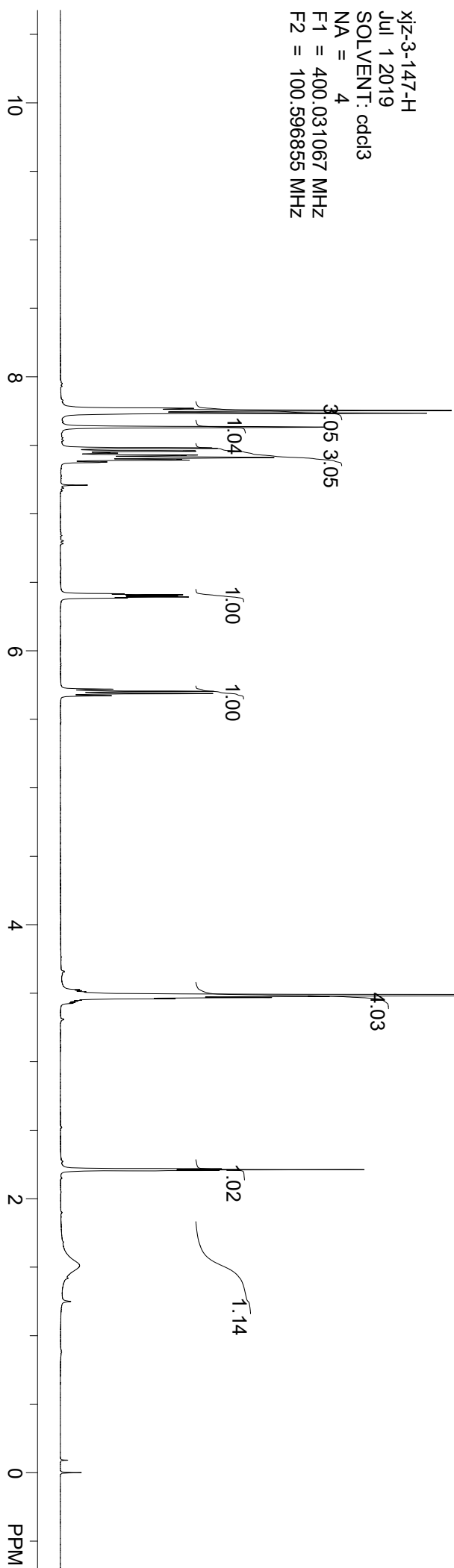


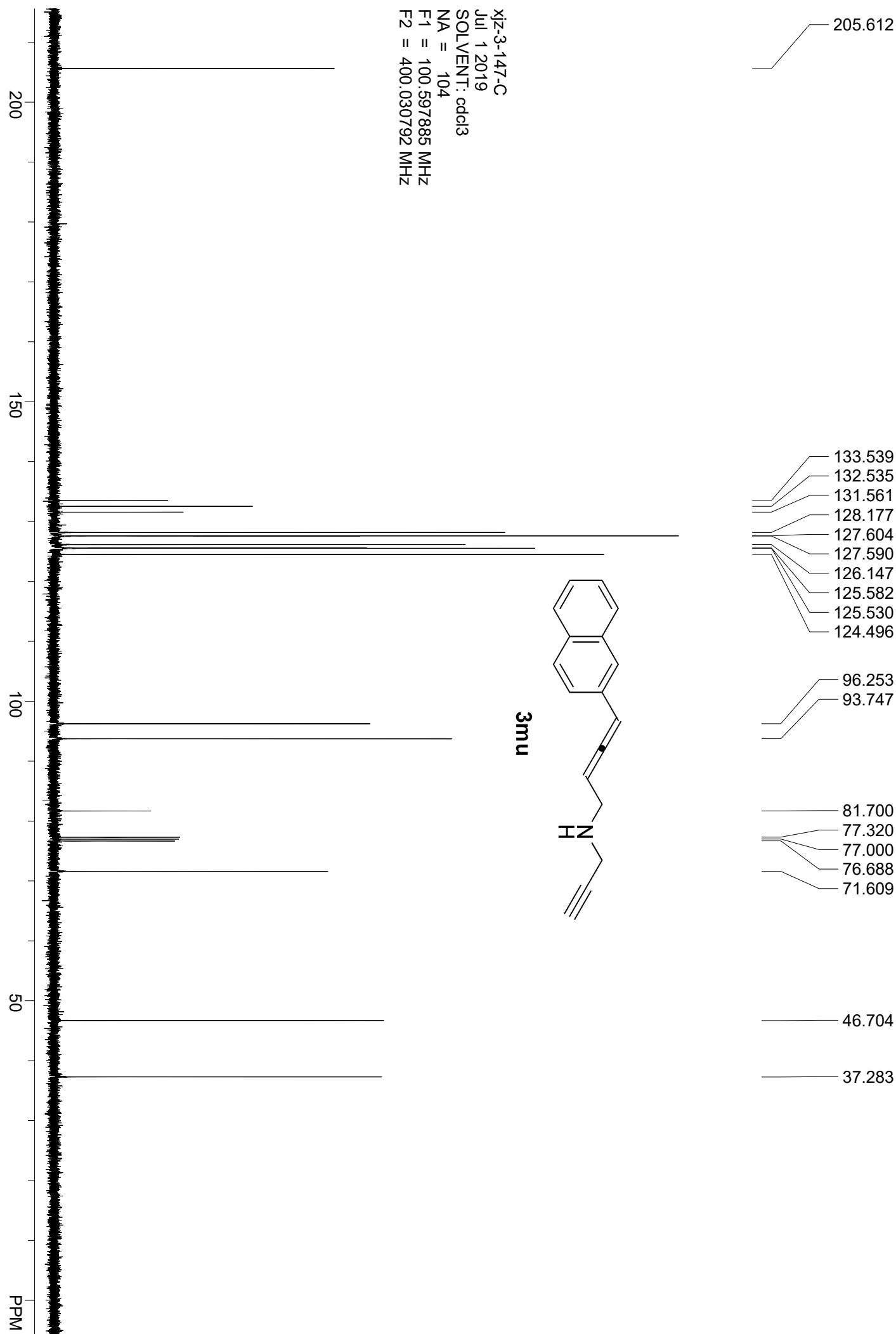




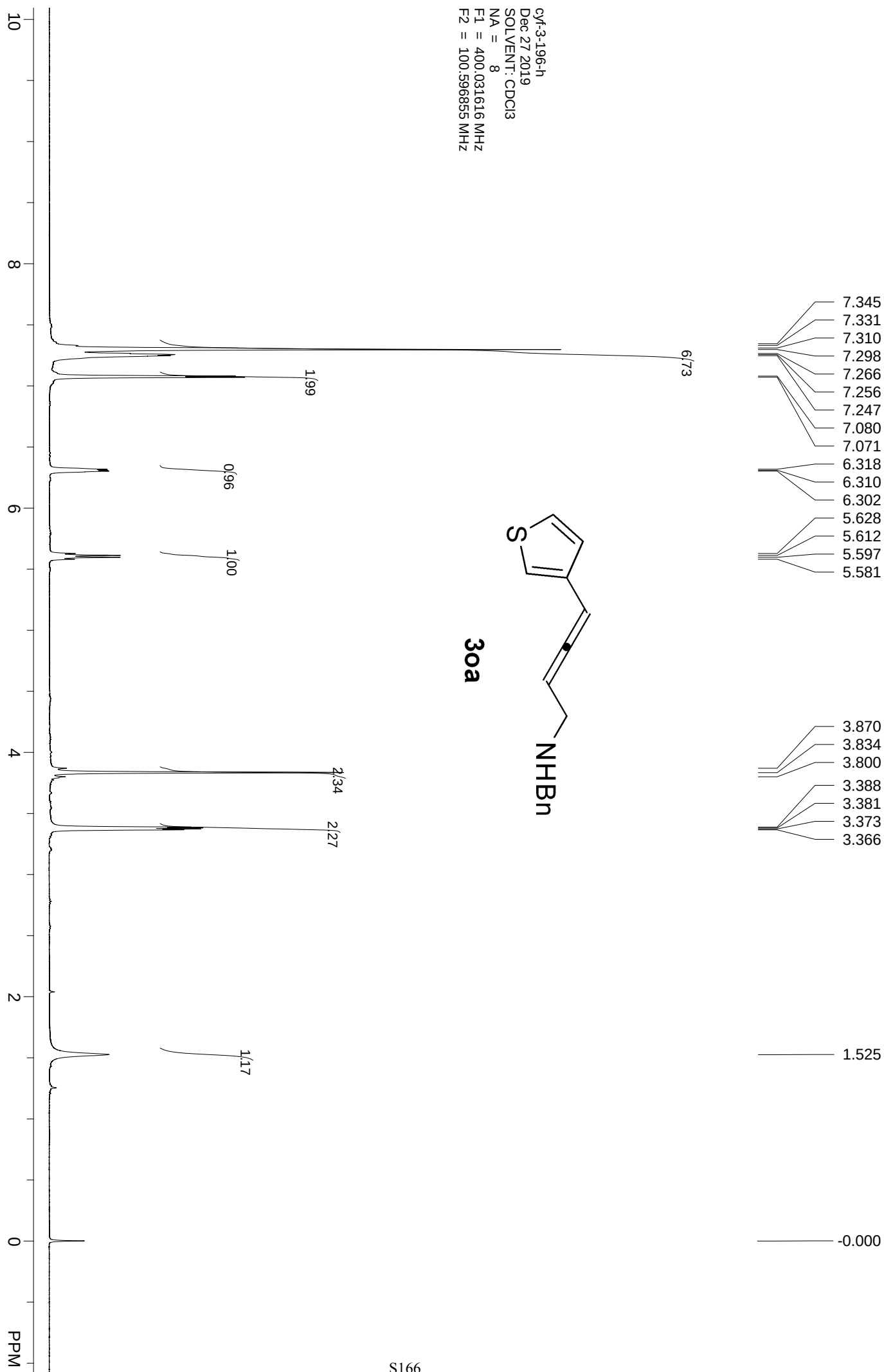
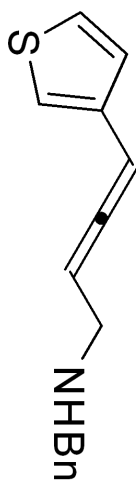
3mu

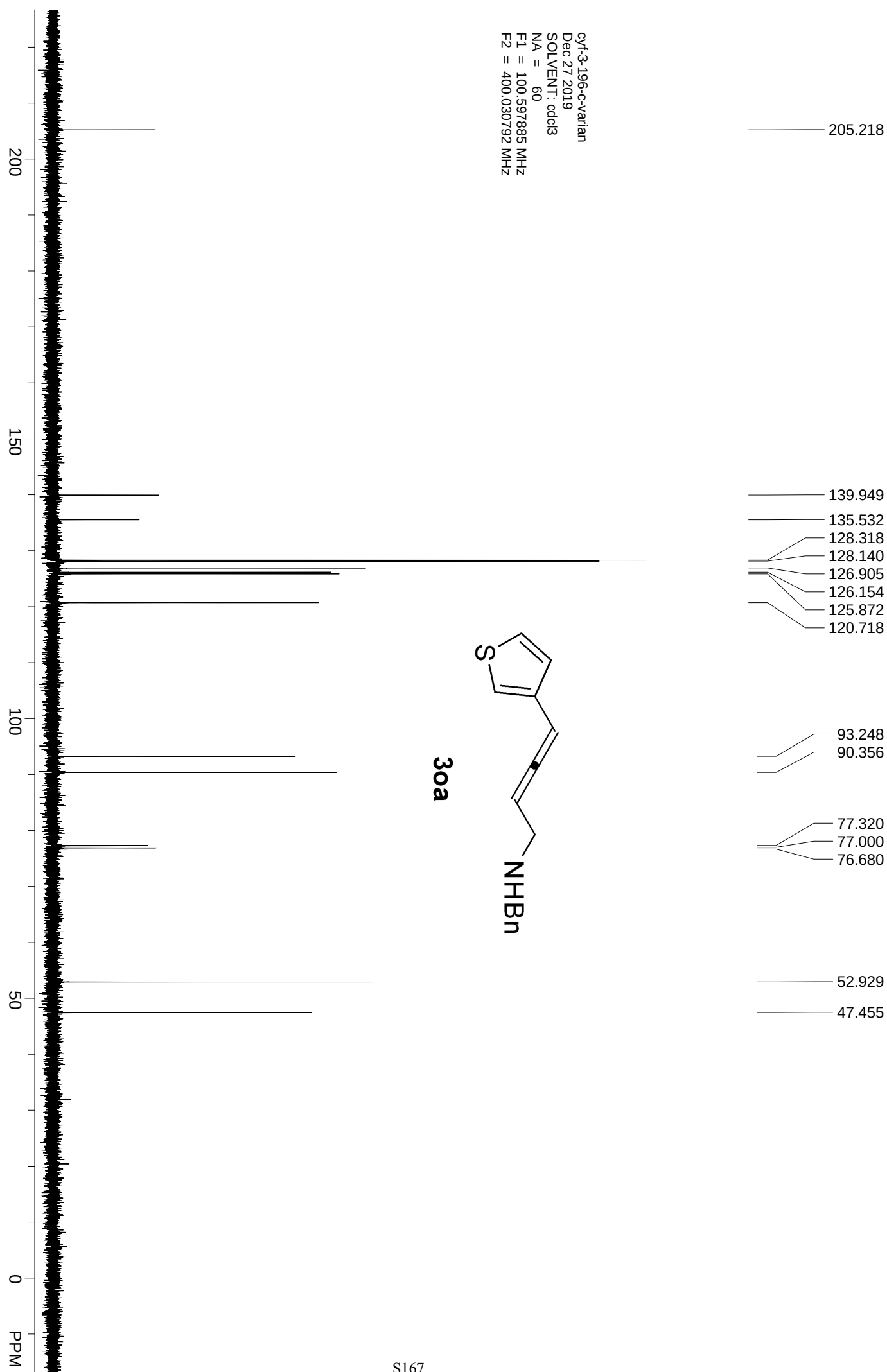
xyz-3-147-H
Jul 1 2019
SOLVENT: cdcl3
NA = 4
F1 = 400.031067 MHz
F2 = 100.596855 MHz



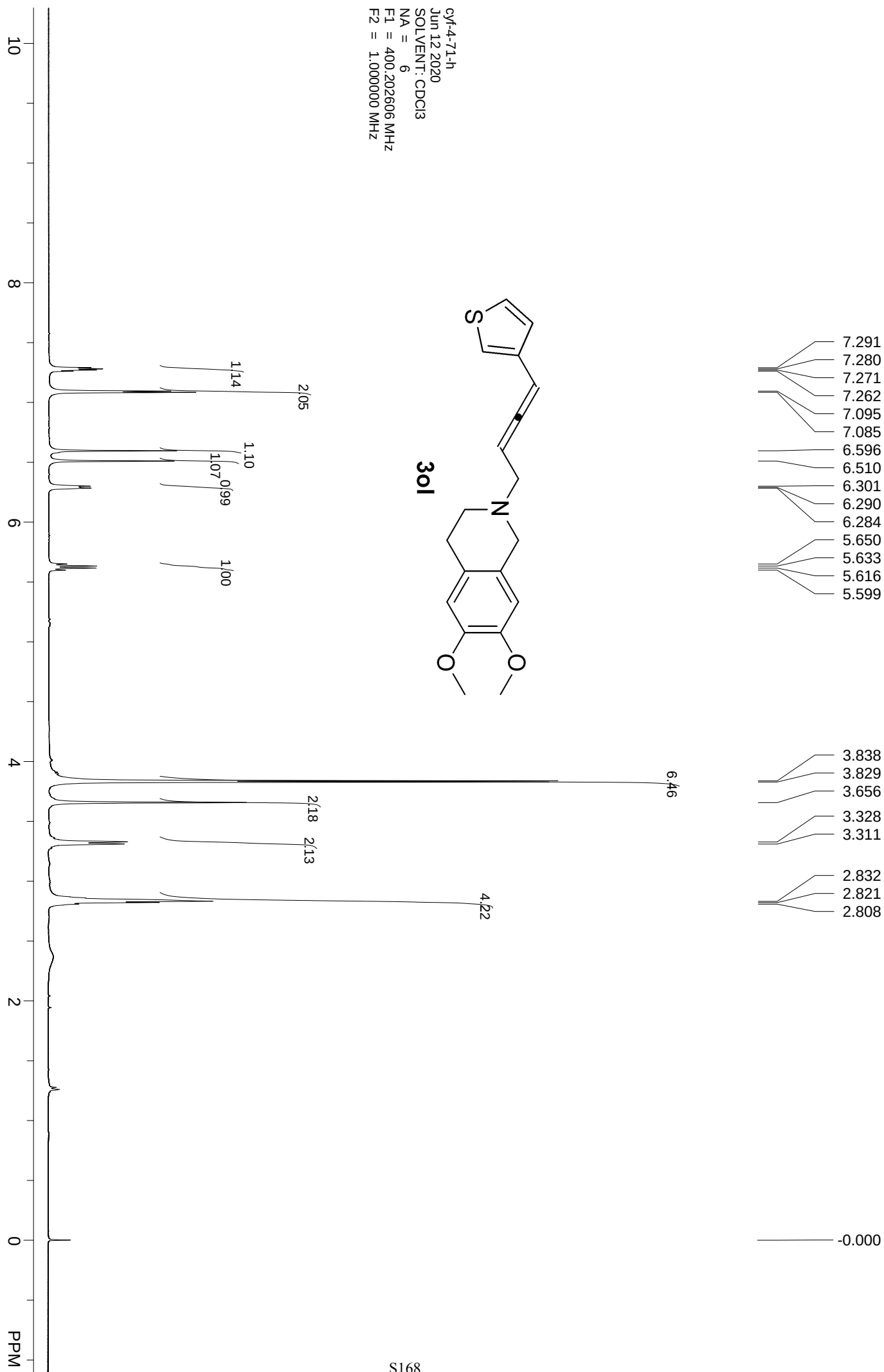
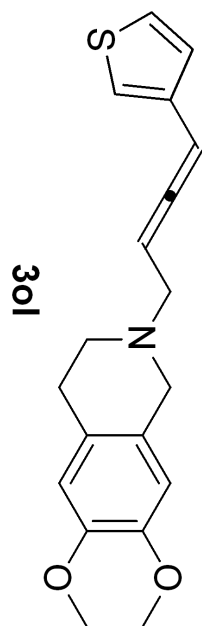


cyf-3-196-h
 Dec 27 2019
 SOLVENT: CDCl₃
 NA = 8
 F1 = 400.031616 MHz
 F2 = 100.596855 MHz

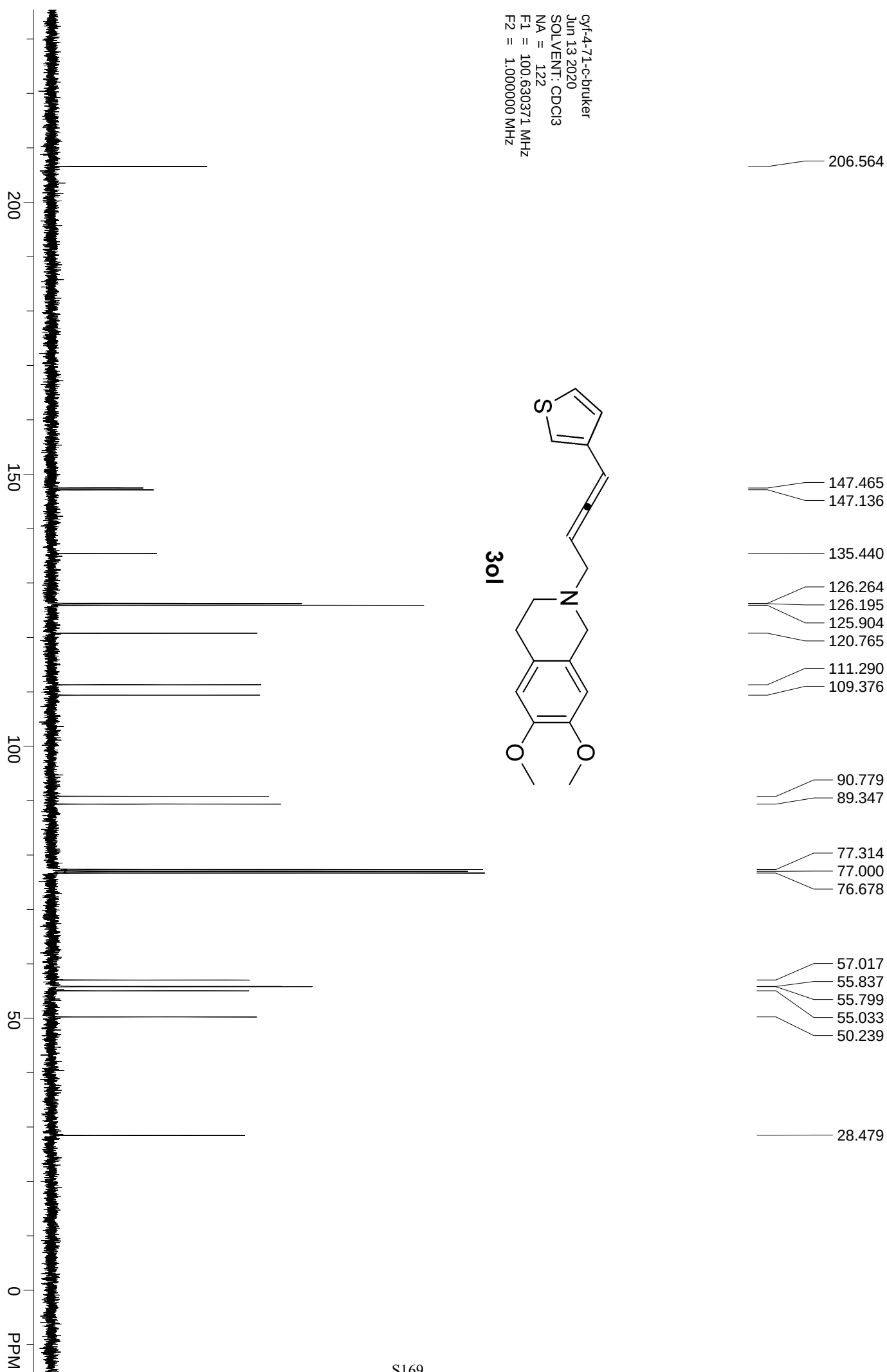
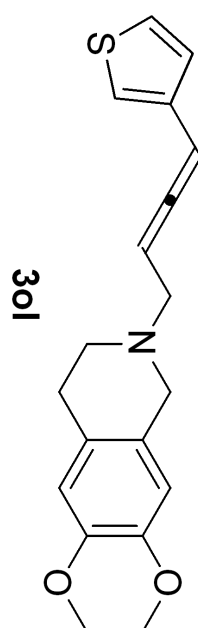


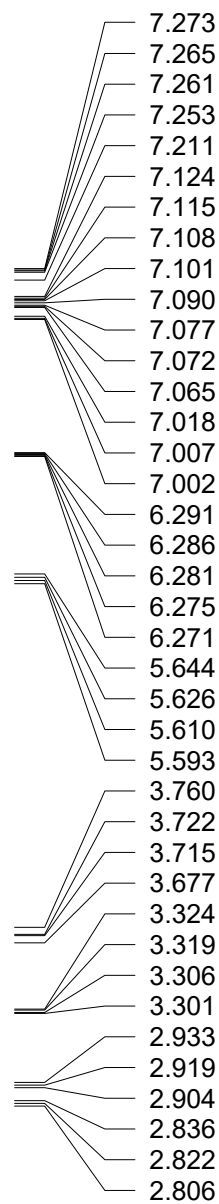


CYF-4-71-h
 Jun 12 2020
 SOLVENT: CDCl₃
 NA = 6
 F1 = 400.202606 MHz
 F2 = 1.000000 MHz



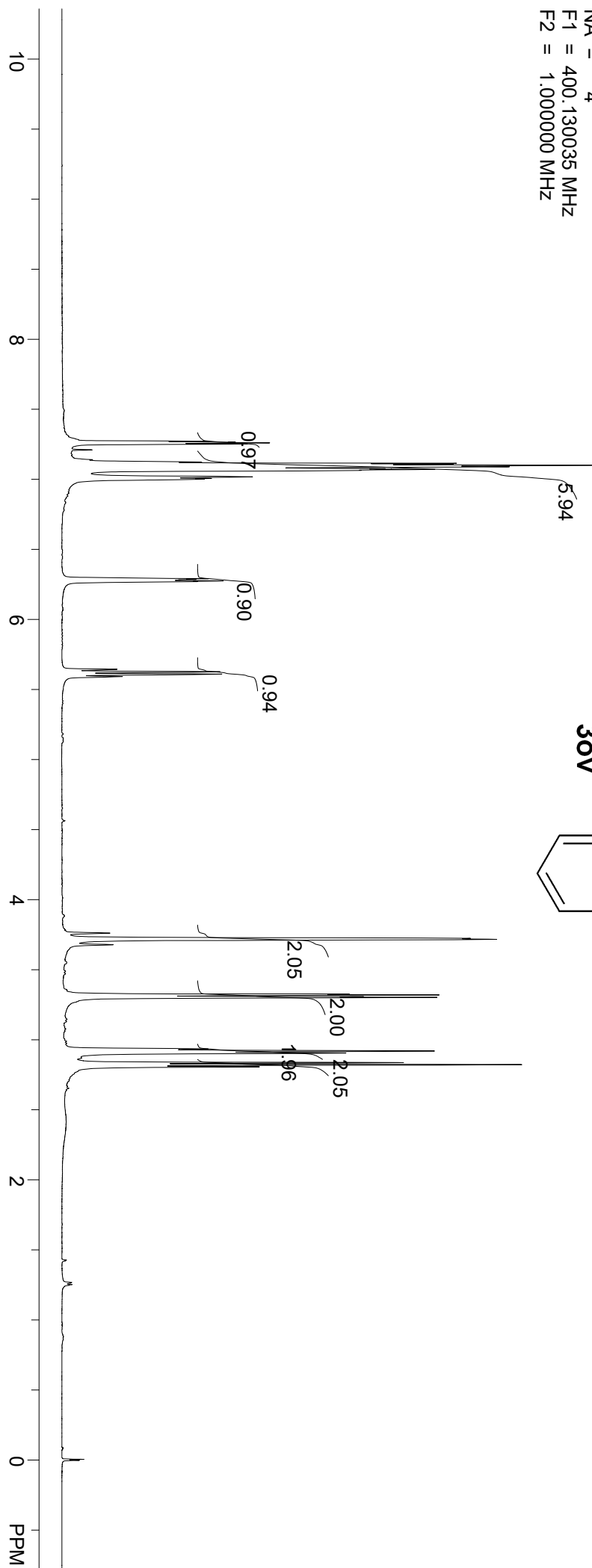
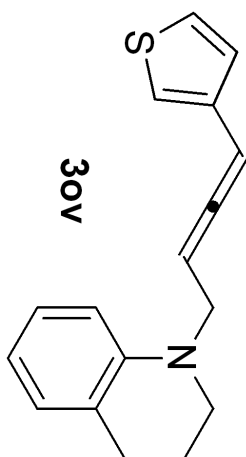
cyf-4-71-c-bruker
Jun 13 2020
SOLVENT: CDCl₃
NA = 122
F1 = 100.630371 MHz
F2 = 1.000000 MHz



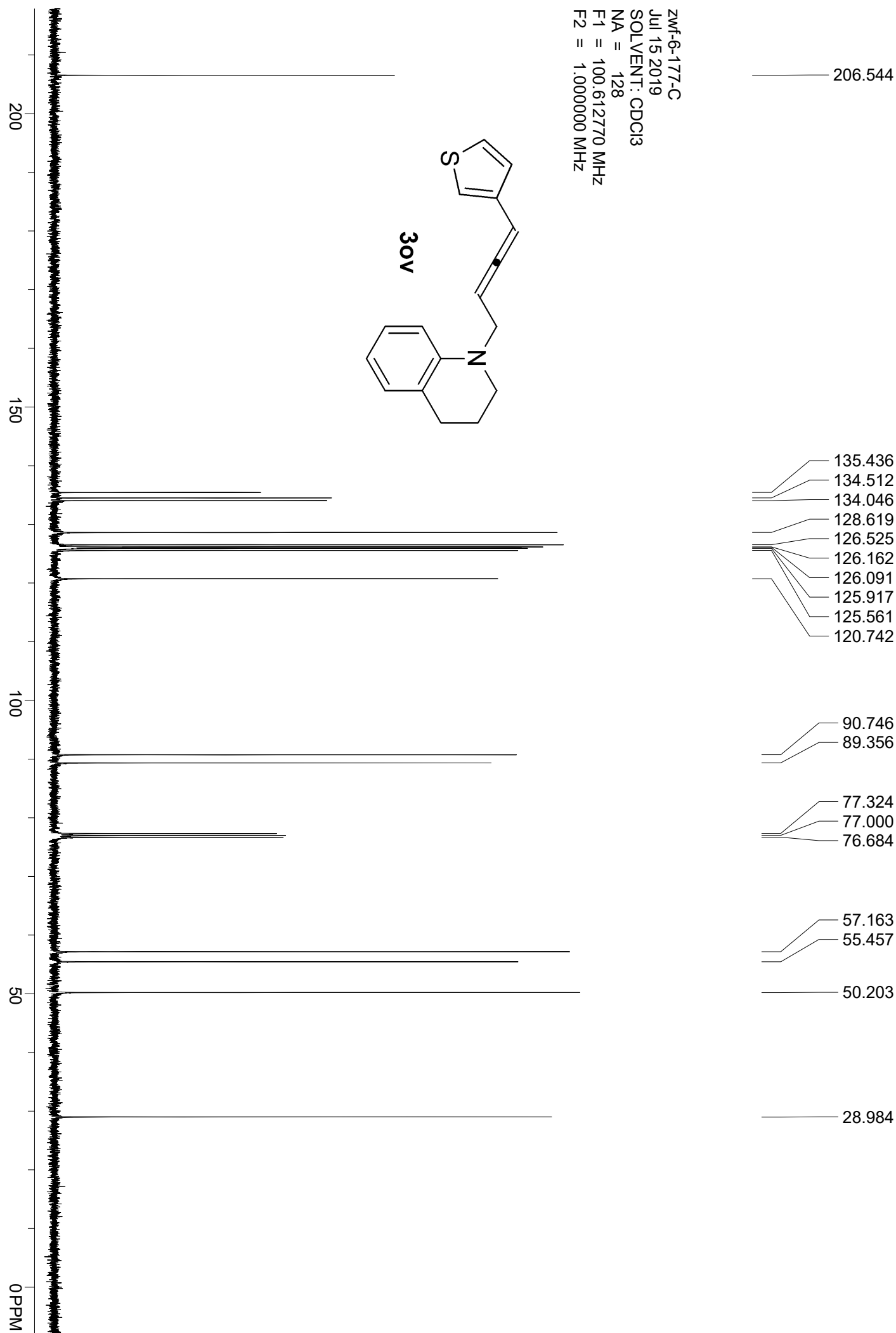
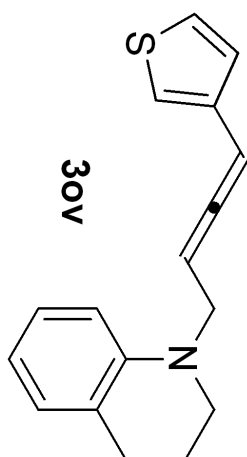


-0.000

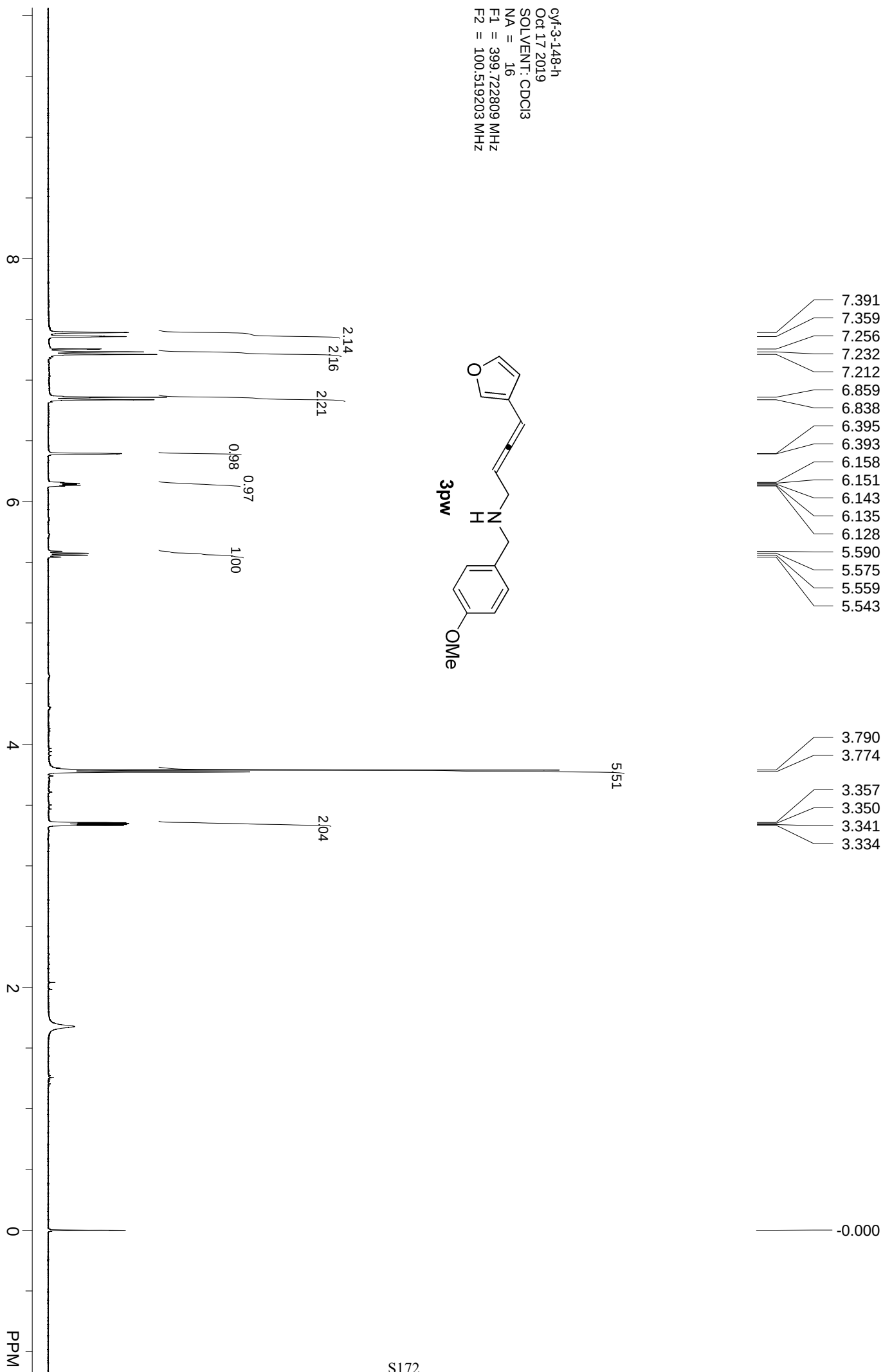
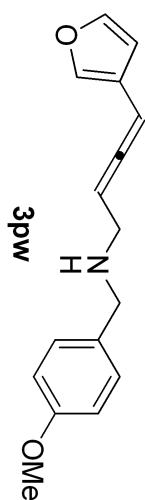
zwf-6-177-H
Jul 15 2019
SOLVENT: CDCl3
NA = 4
F1 = 400.130035 MHz
F2 = 1.000000 MHz

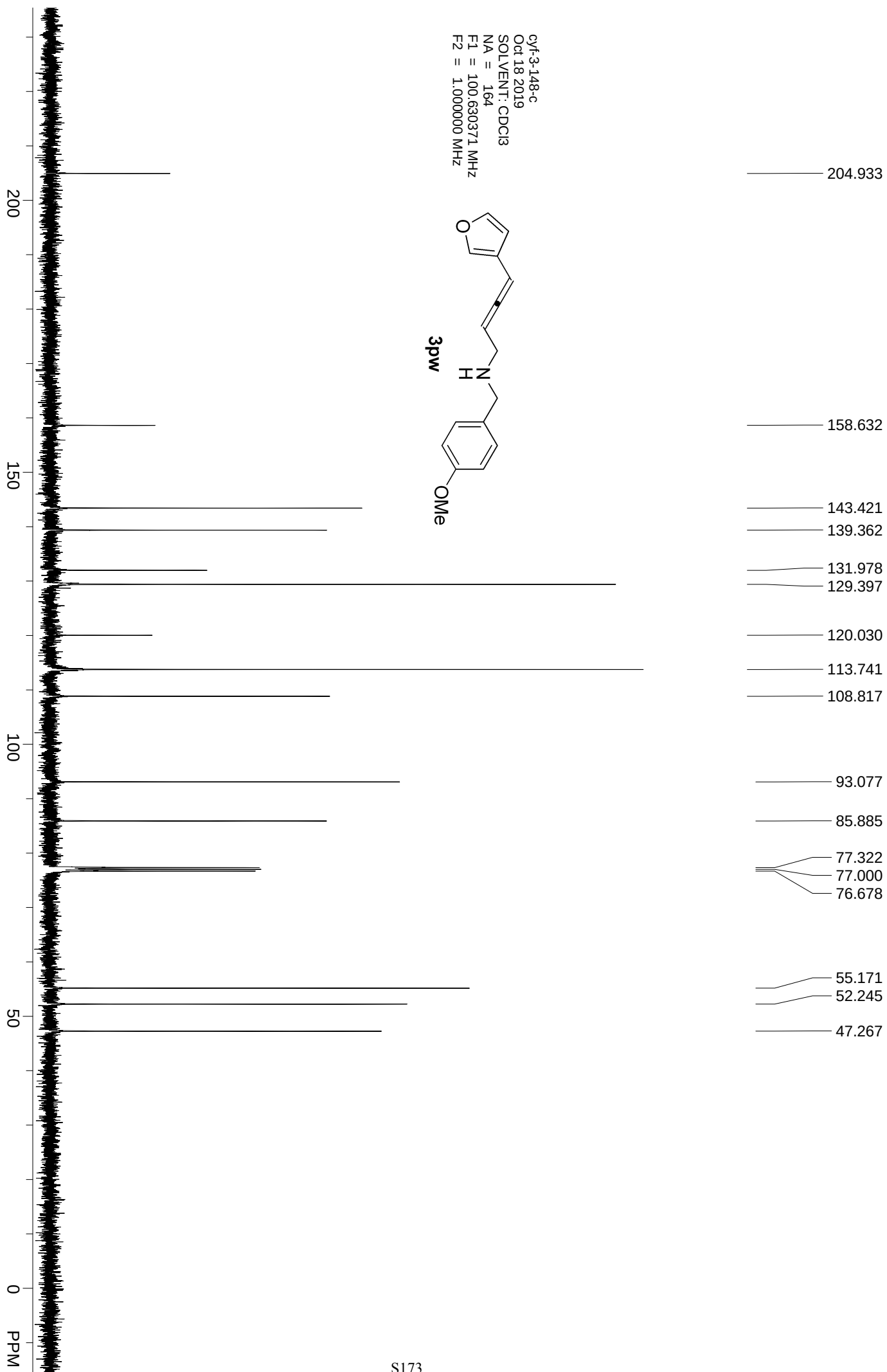


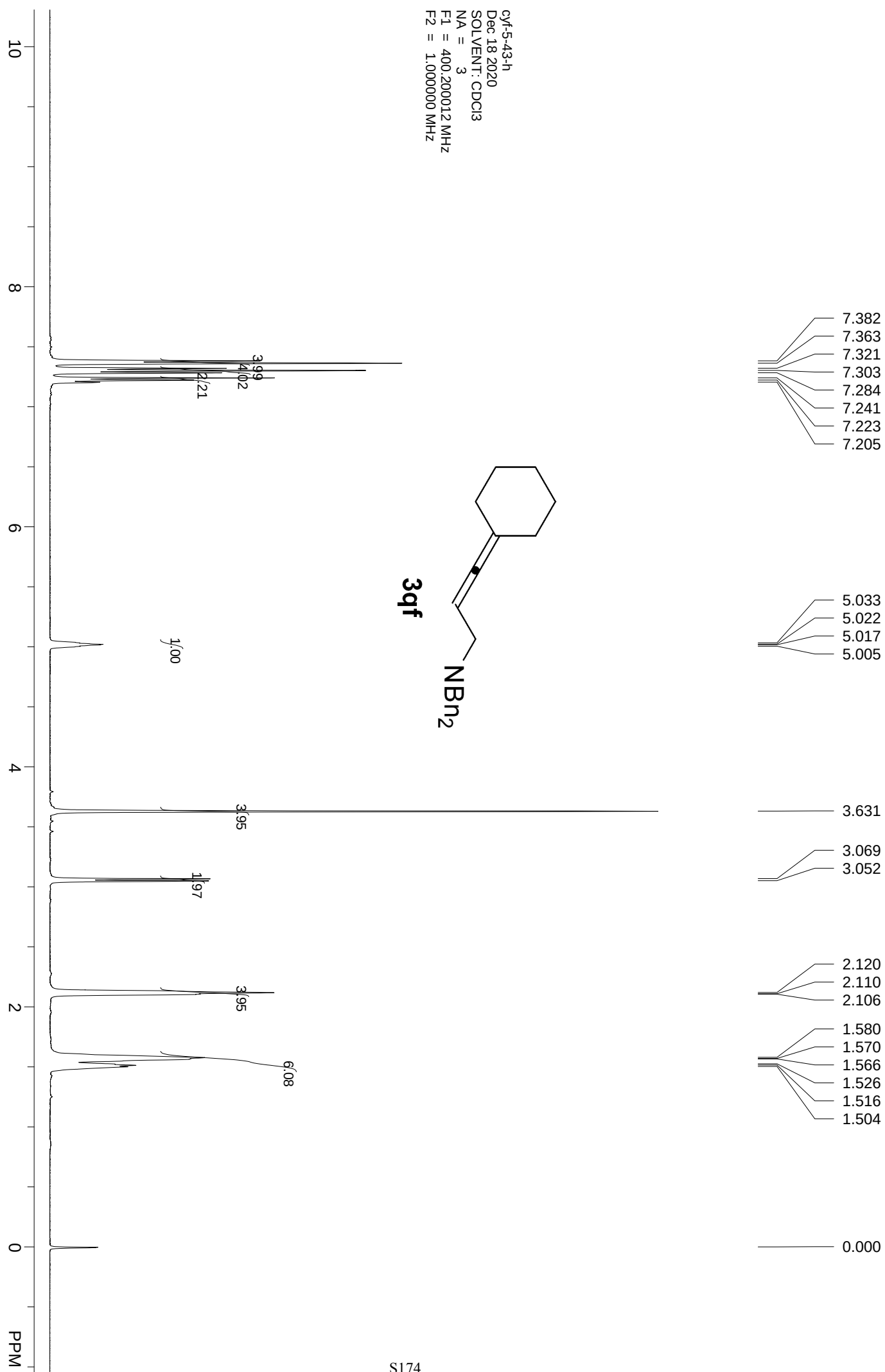
zmf-6-177-C
Jul 15 2019
SOLVENT: CDCl3
NA = 128
F1 = 100.612770 MHz
F2 = 1.000000 MHz



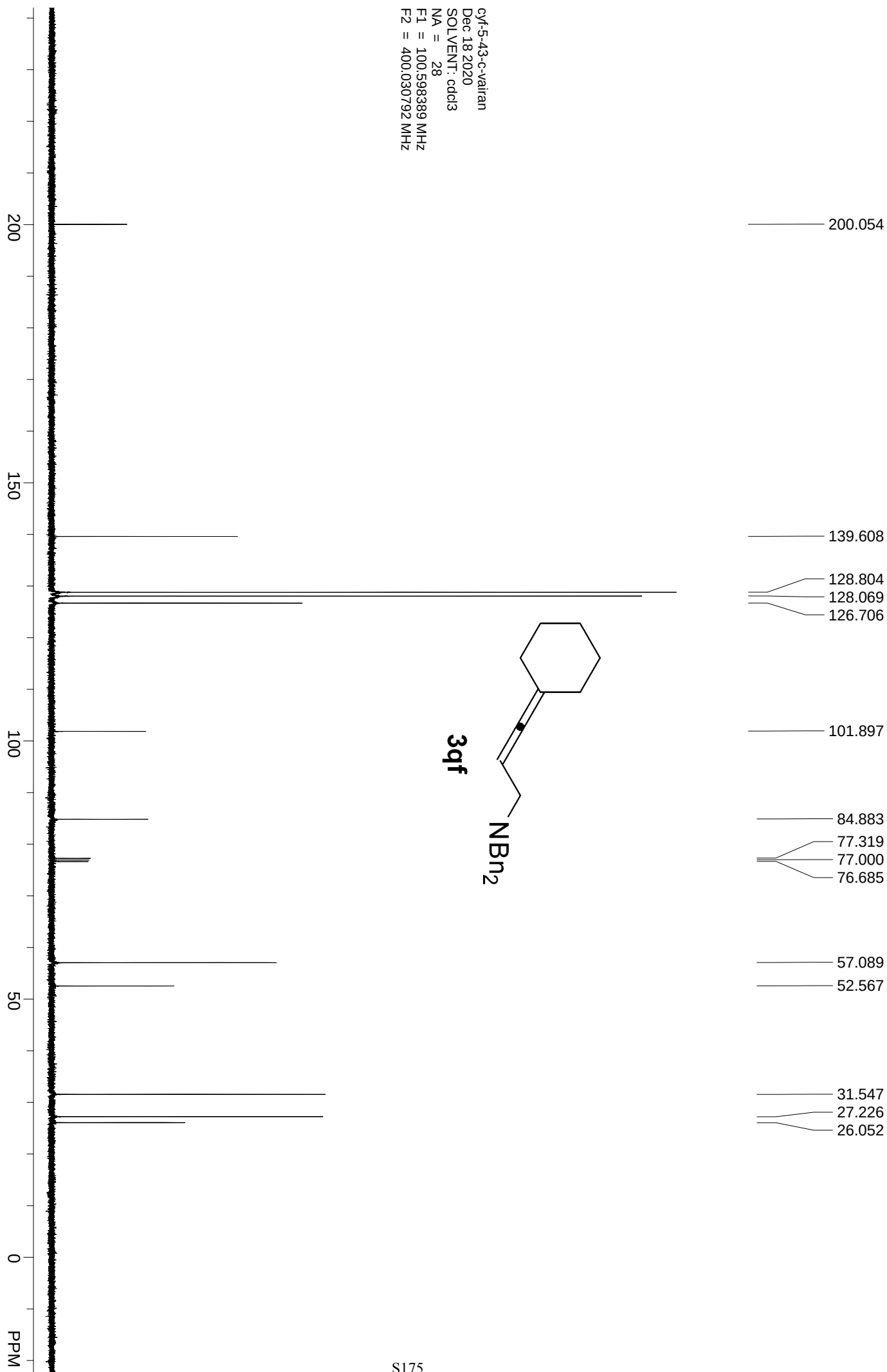
cyf-3-148-h
 Oct 17 2019
 SOLVENT: CDCl3
 NA = 16
 F1 = 399.722809 MHz
 F2 = 100.519203 MHz

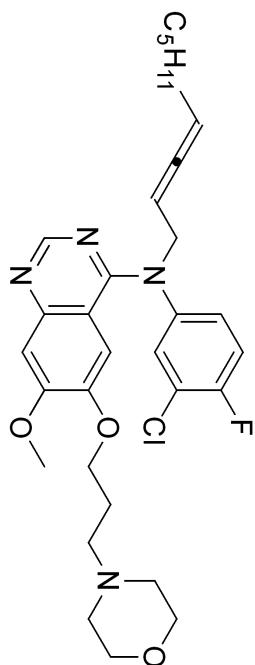
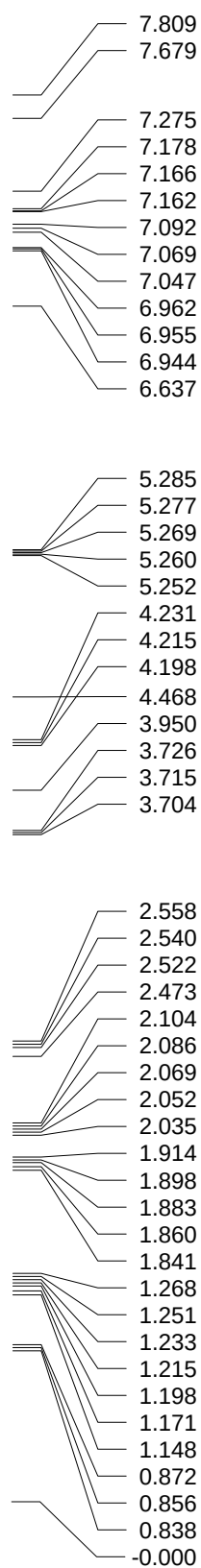






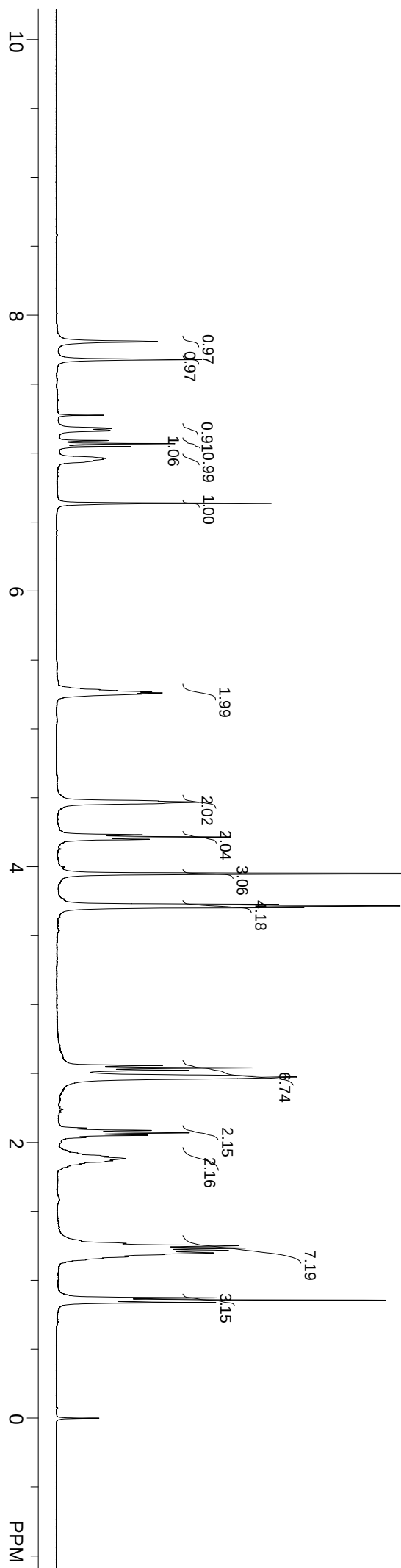
cyf-5-43-c-vairan
Dec 18 2020
SOLVENT: cdcl3
NA = 28
F1 = 100.598389 MHz
F2 = 400.030792 MHz

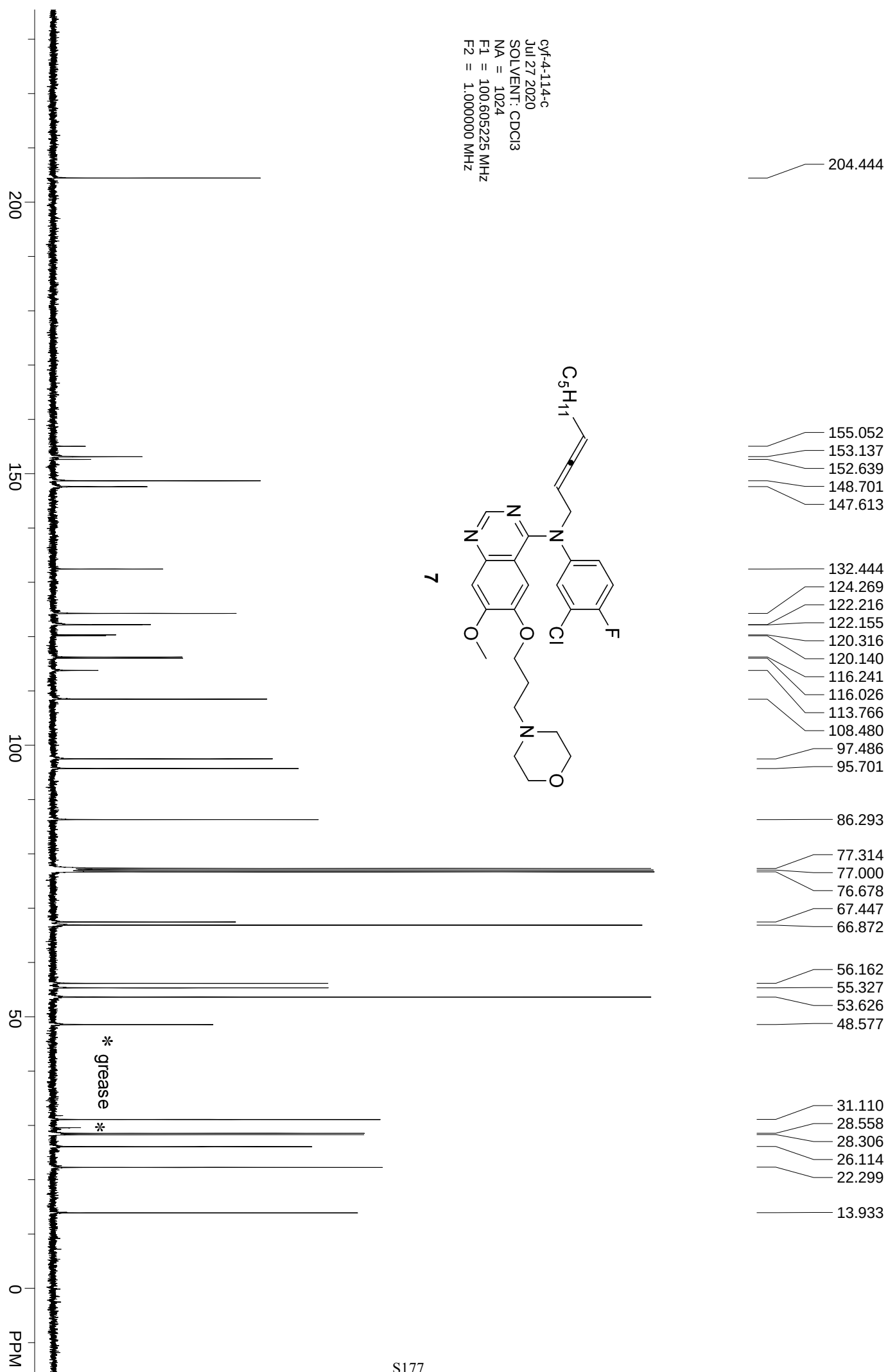




7

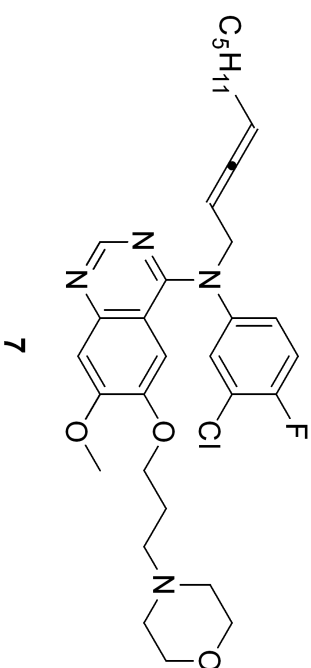
cyf-4-115-h
Jul 25 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031616 MHz
F2 = 100.596855 MHz





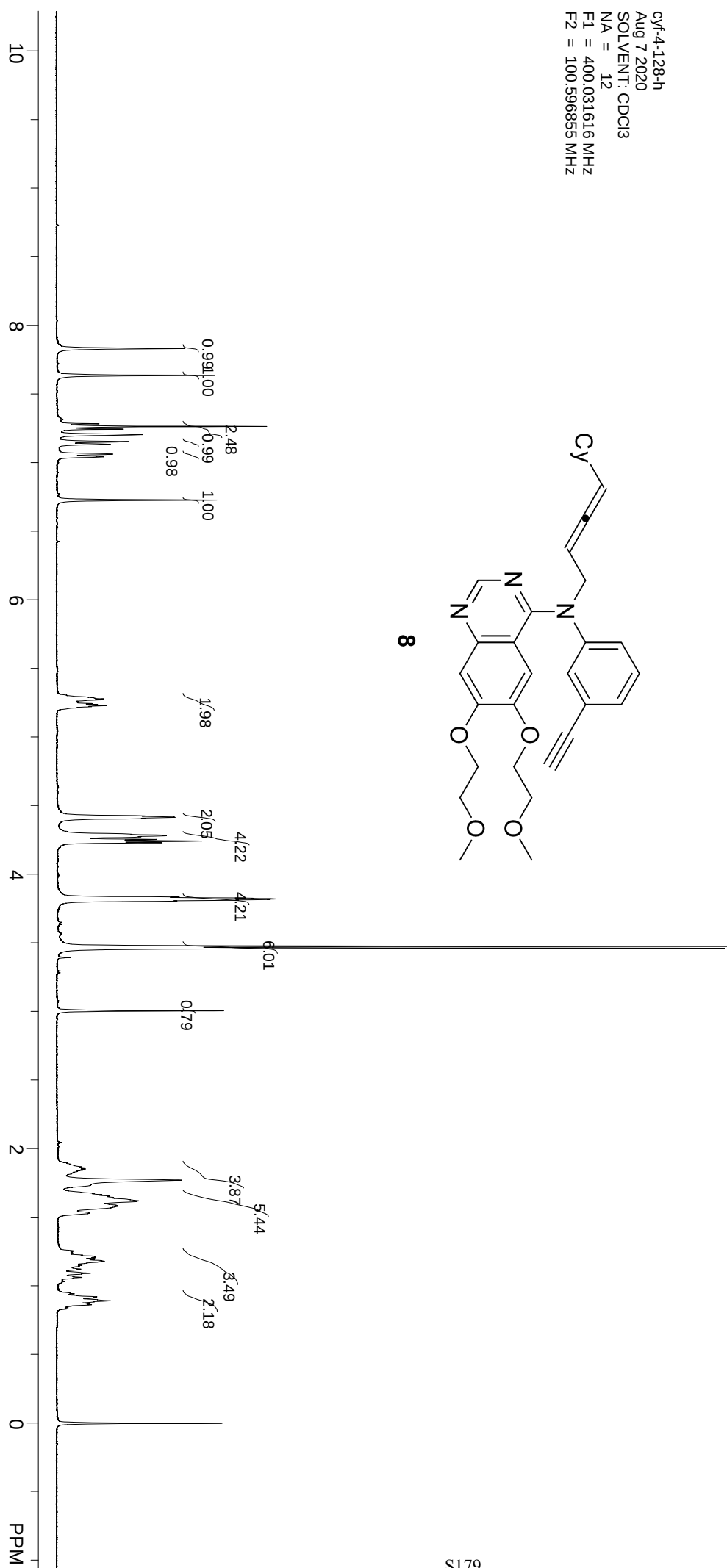
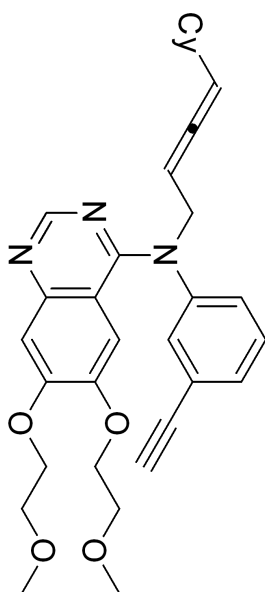
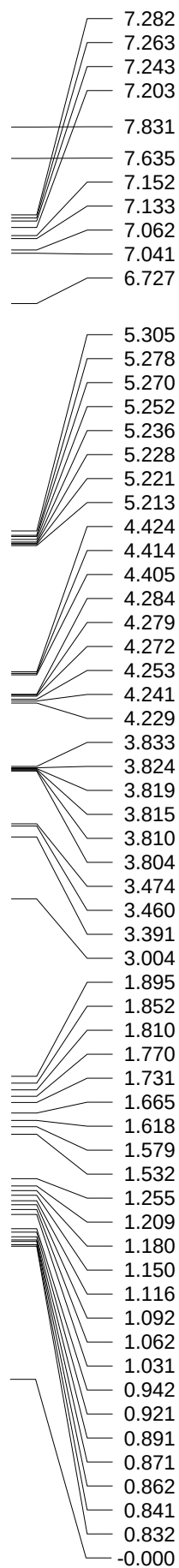
0.000

-121.379

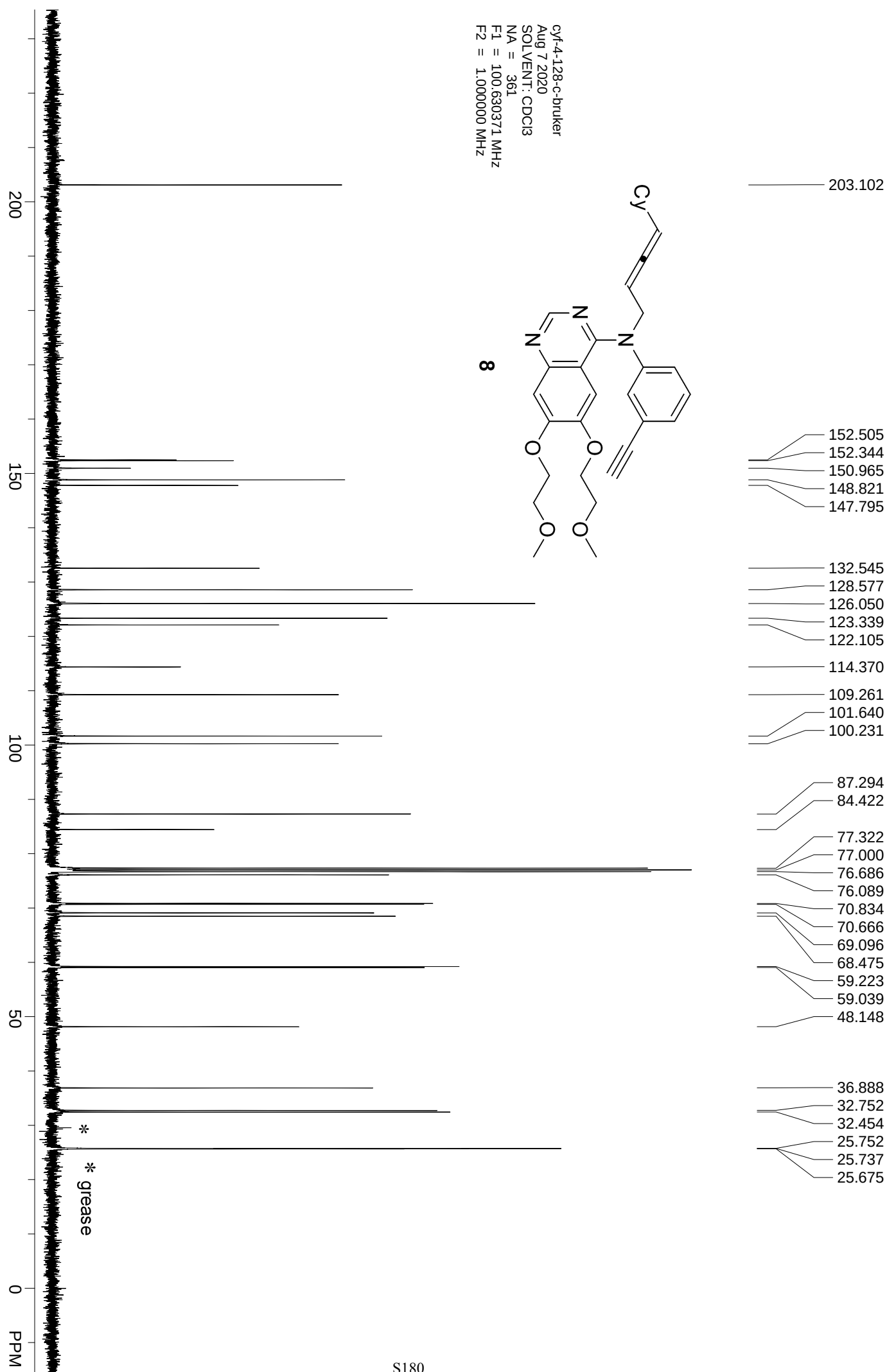


cyf-4-114-f
Jul 27 2020
SOLVENT: CDCl3
NA = 4
F1 = 376.359863 MHz
F2 = 100.596855 MHz

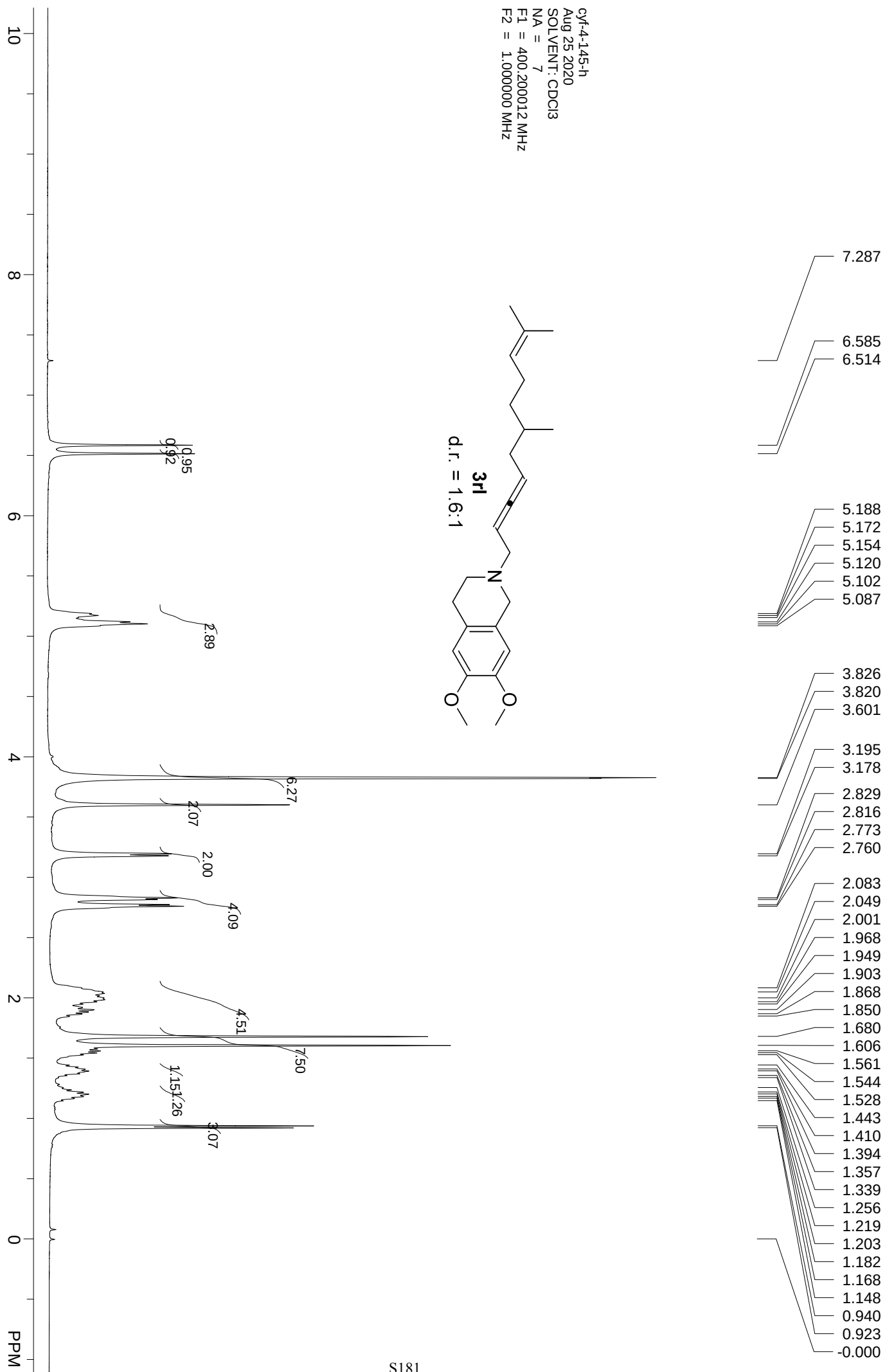
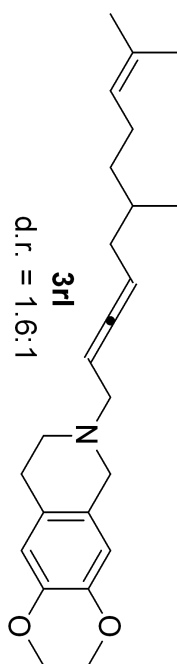


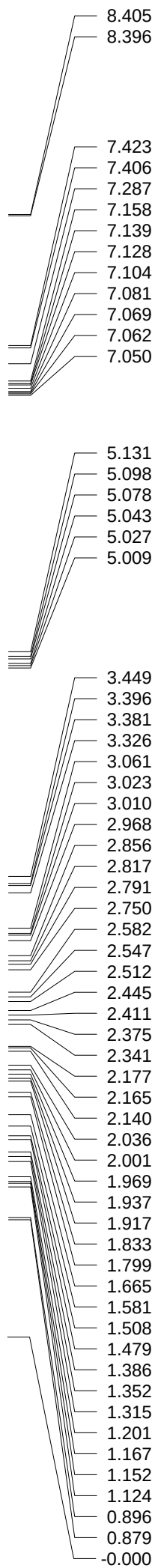


cyf-4-128-h
Aug 7 2020
SOLVENT: CDCl3
NA = 12
F1 = 400.031616 MHz
F2 = 100.596855 MHz

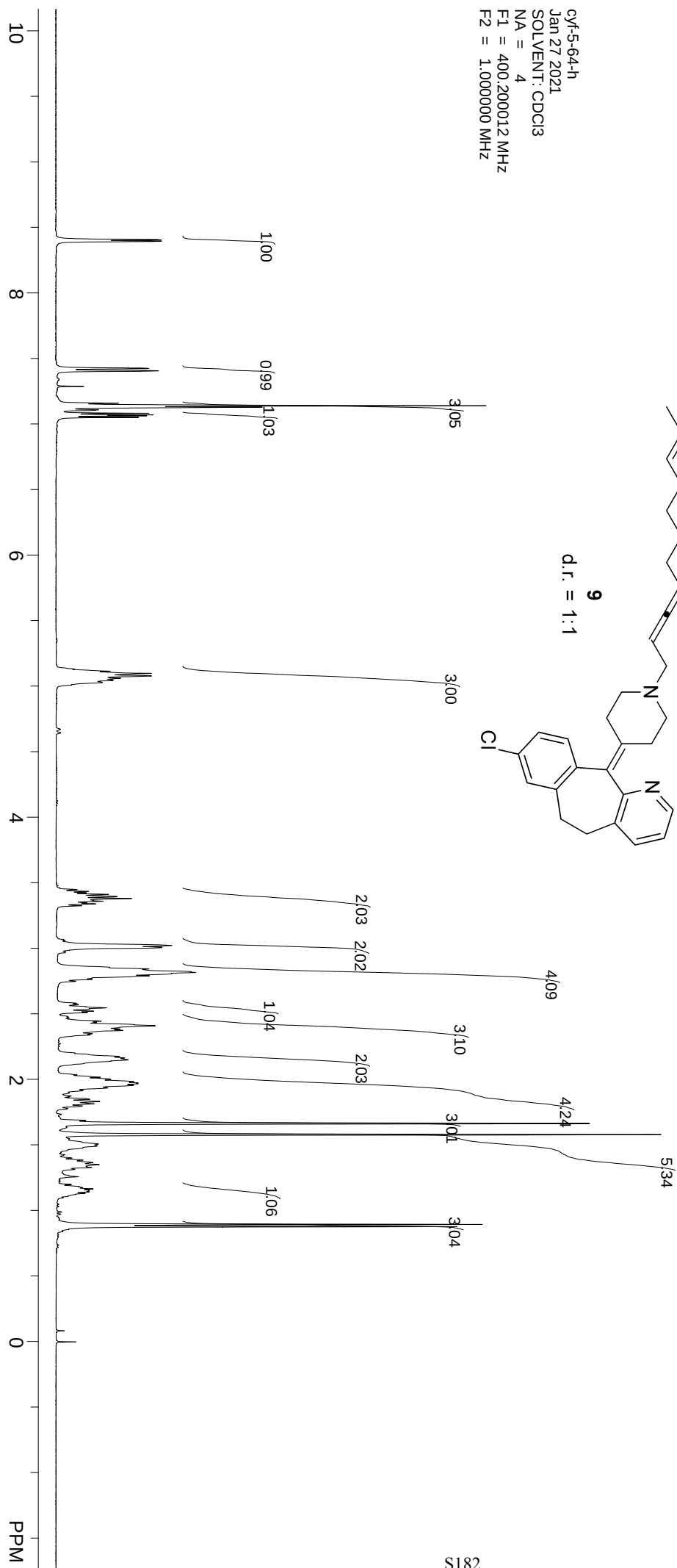
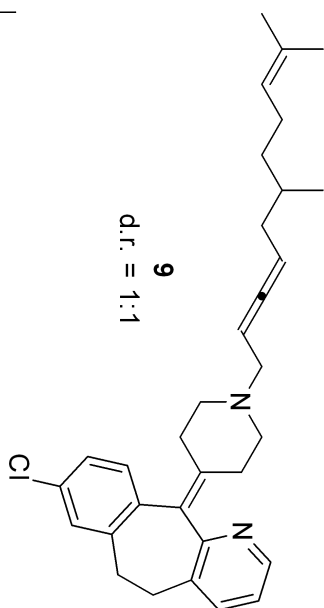


CYF-4-145-h
 Aug 25 2020
 SOLVENT: CDCl₃
 NA = 7
 F1 = 400.200012 MHz
 F2 = 1.000000 MHz



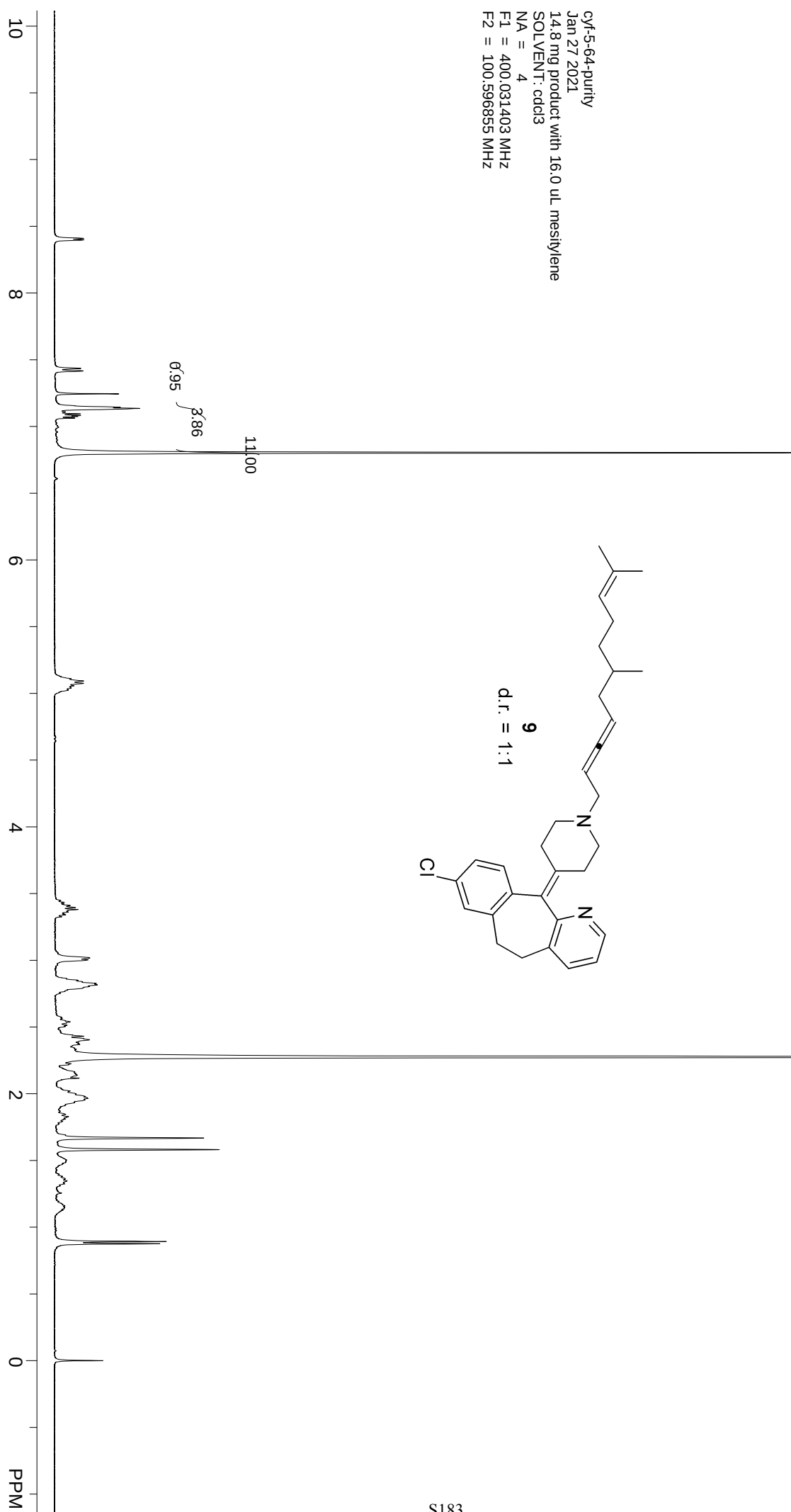


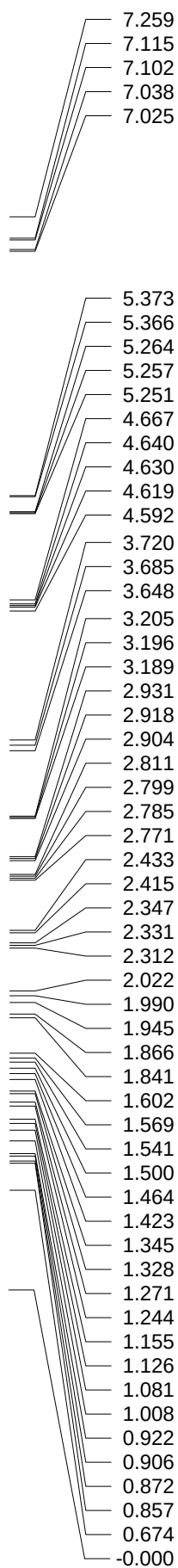
cyf-5-64-h
Jan 27 2021
SOLVENT: CDCl3
NA = 4
F1 = 400.200012 MHz
F2 = 1.000000 MHz



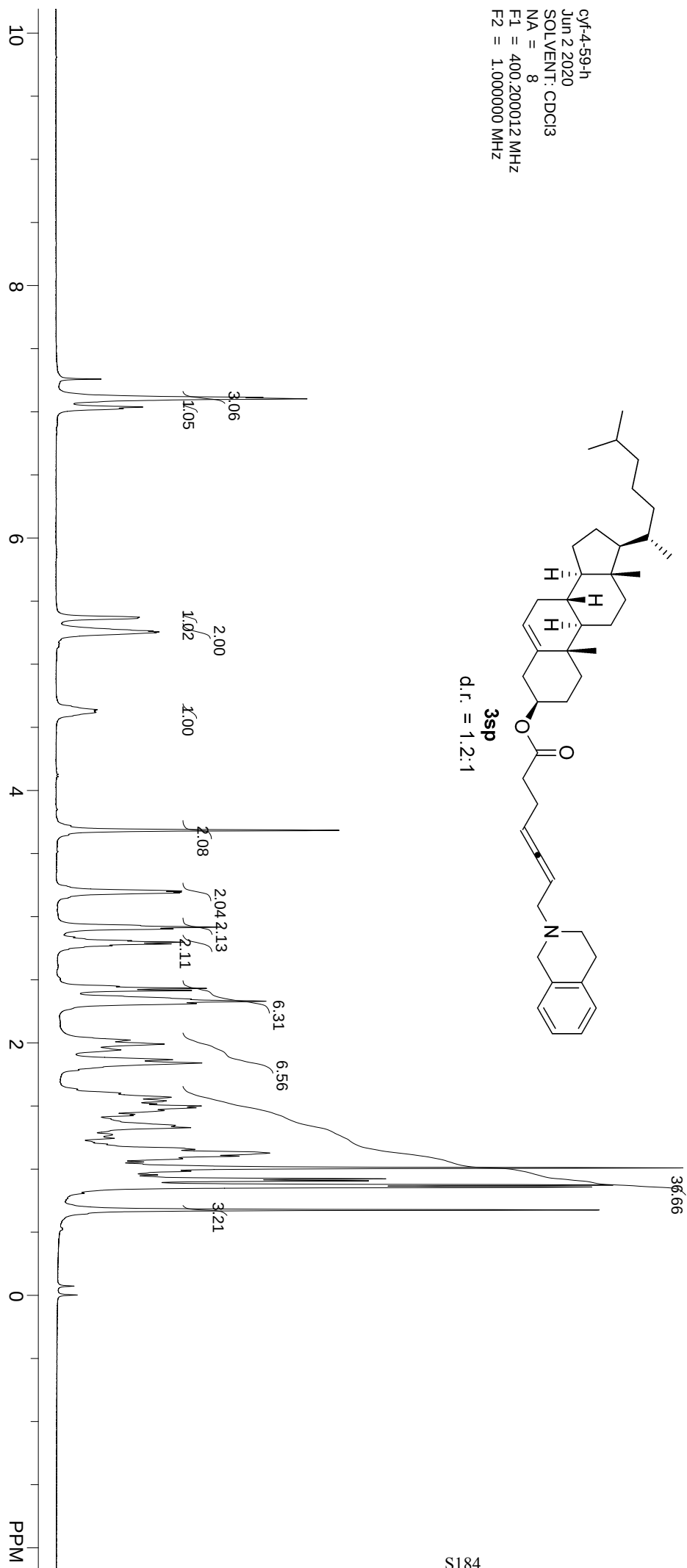
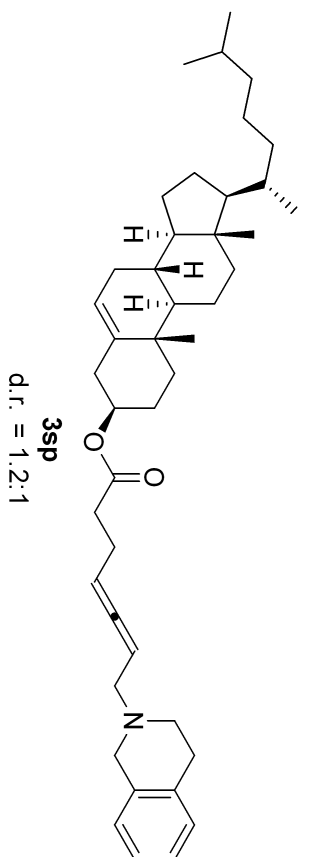
7.435
7.416
7.143
7.135
7.094
7.082
7.075
7.063
6.803

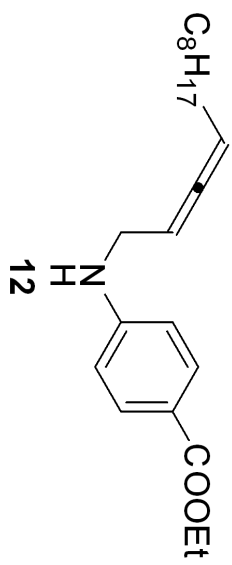
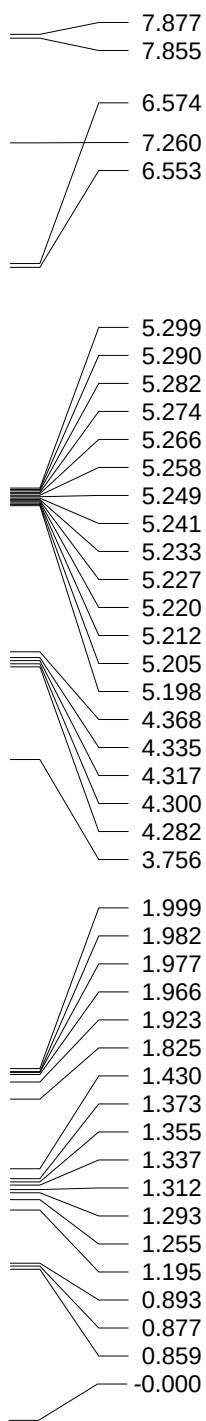
cyf-5-64-purity
Jan 27 2021
14.8 mg product with 16.0 μ L mesitylene
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz



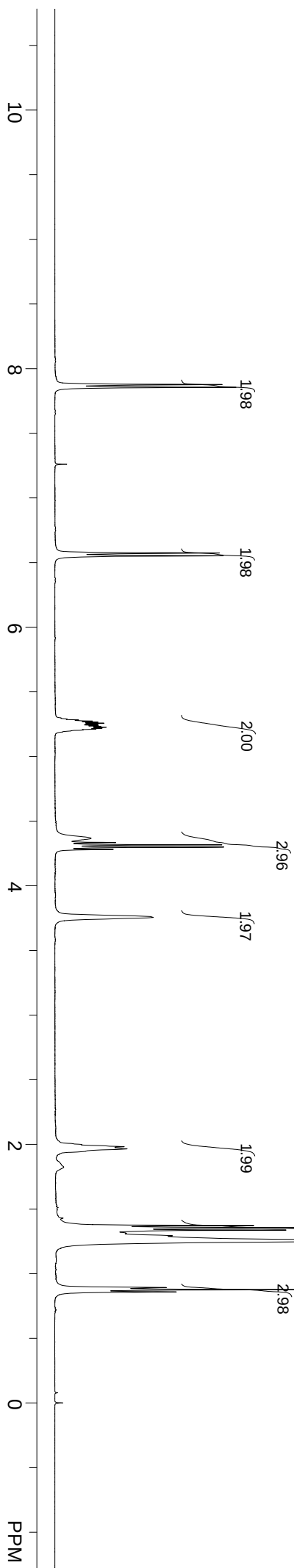


CVI-4-59-h
Jun 2 2020
SOLVENT: CDCl3
NA = 8
F1 = 400.200012 MHz
F2 = 1.000000 MHz

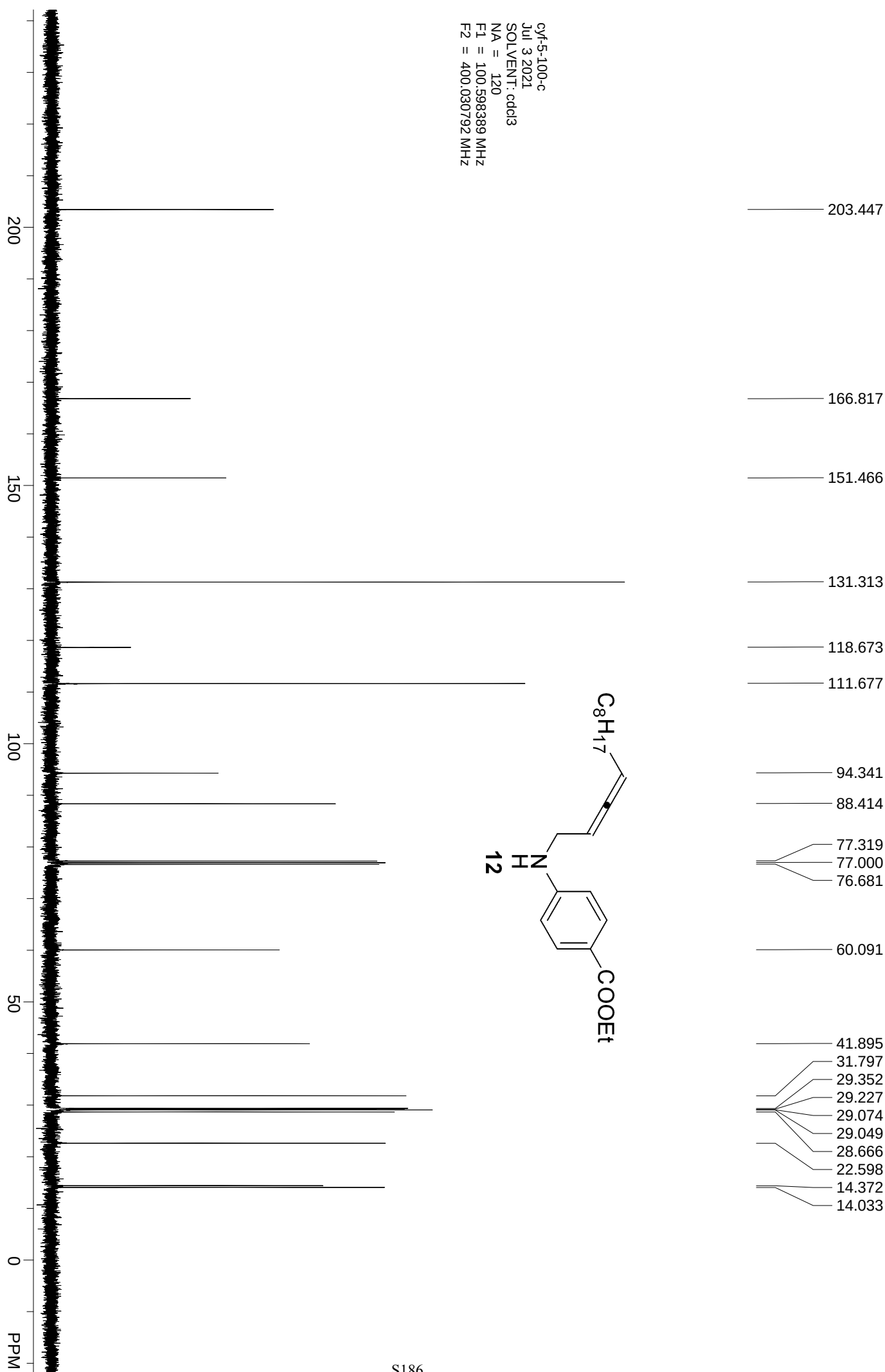




cyf-5-100-h
 Jul 3 2021
 SOLVENT: cdcl3
 NA = 4
 F1 = 400.031403 MHz
 F2 = 100.596855 MHz



cyf-5-100-c
 Jul 3 2021
 SOLVENT: cdcl3
 NA = 120
 F1 = 100.598389 MHz
 F2 = 400.030792 MHz

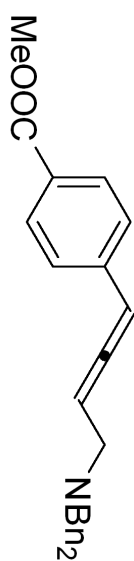


7.968
7.949

7.373
7.355
7.336
7.314
7.294
7.276
7.242
7.226
7.207
6.209
6.195
5.695
5.679
5.662
5.646

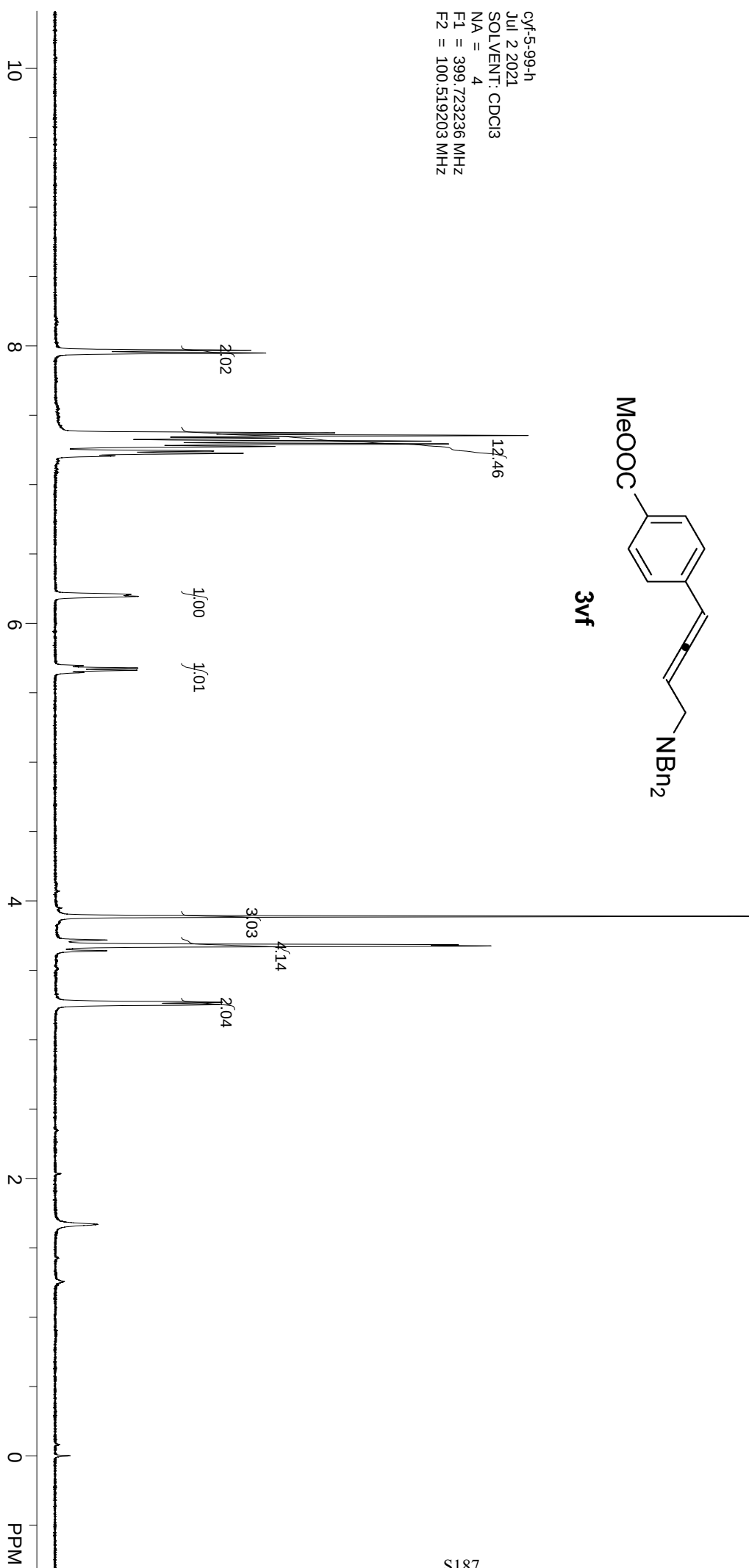
3.889
3.718
3.683
3.675
3.640
3.269
3.252

0.000

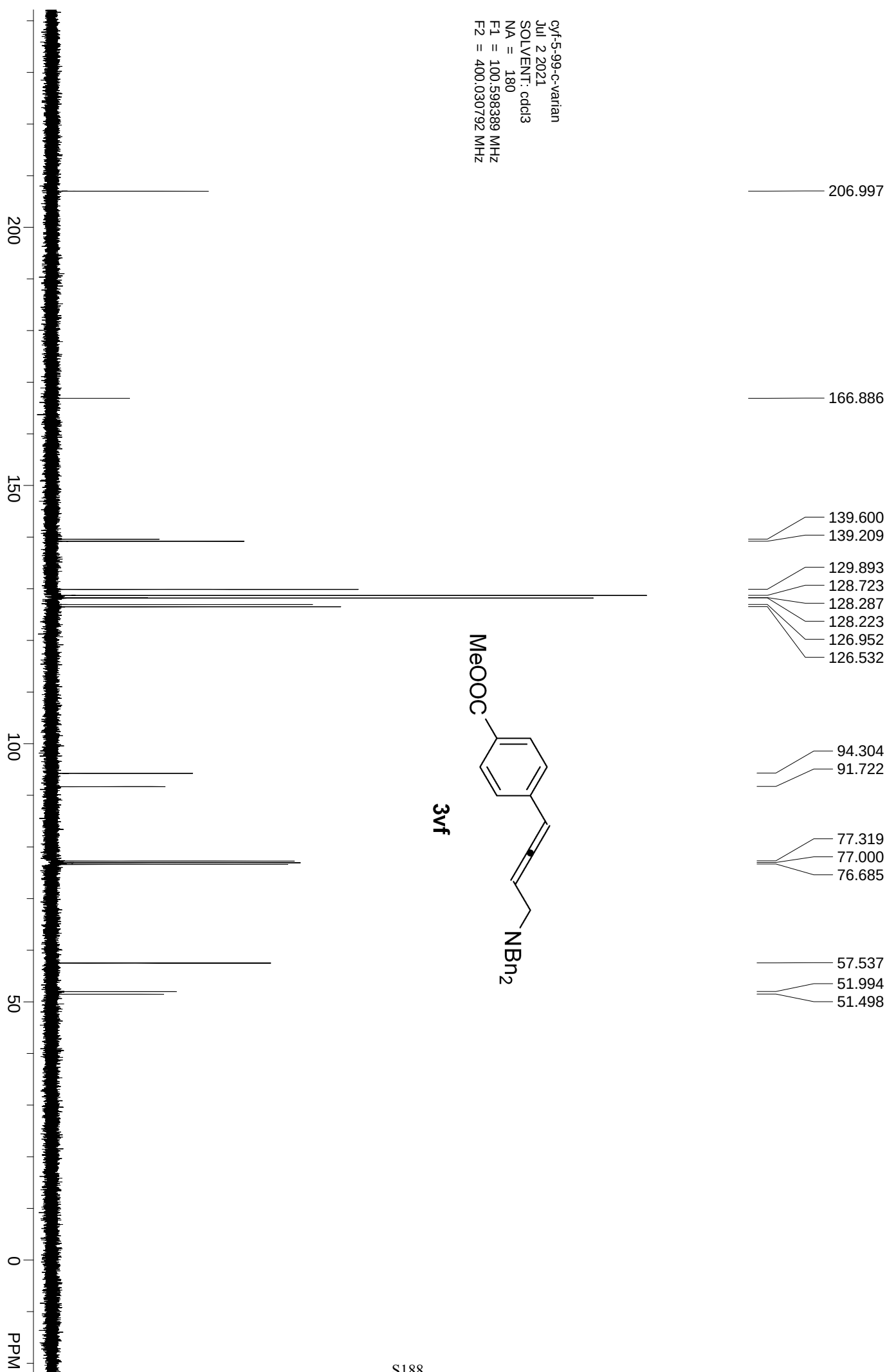


3vf

cyf-5-99-h
Jul 2 2021
SOLVENT: CDCl3
NA = 4
F1 = 399.723236 MHz
F2 = 100.519203 MHz



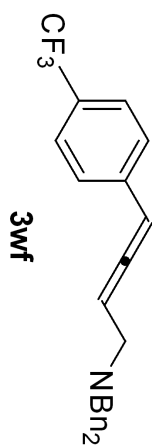
cyf-5-99-c-varian
Jul 2 2021
SOLVENT: cdcl3
NA = 180
F1 = 100.598389 MHz
F2 = 400.030792 MHz



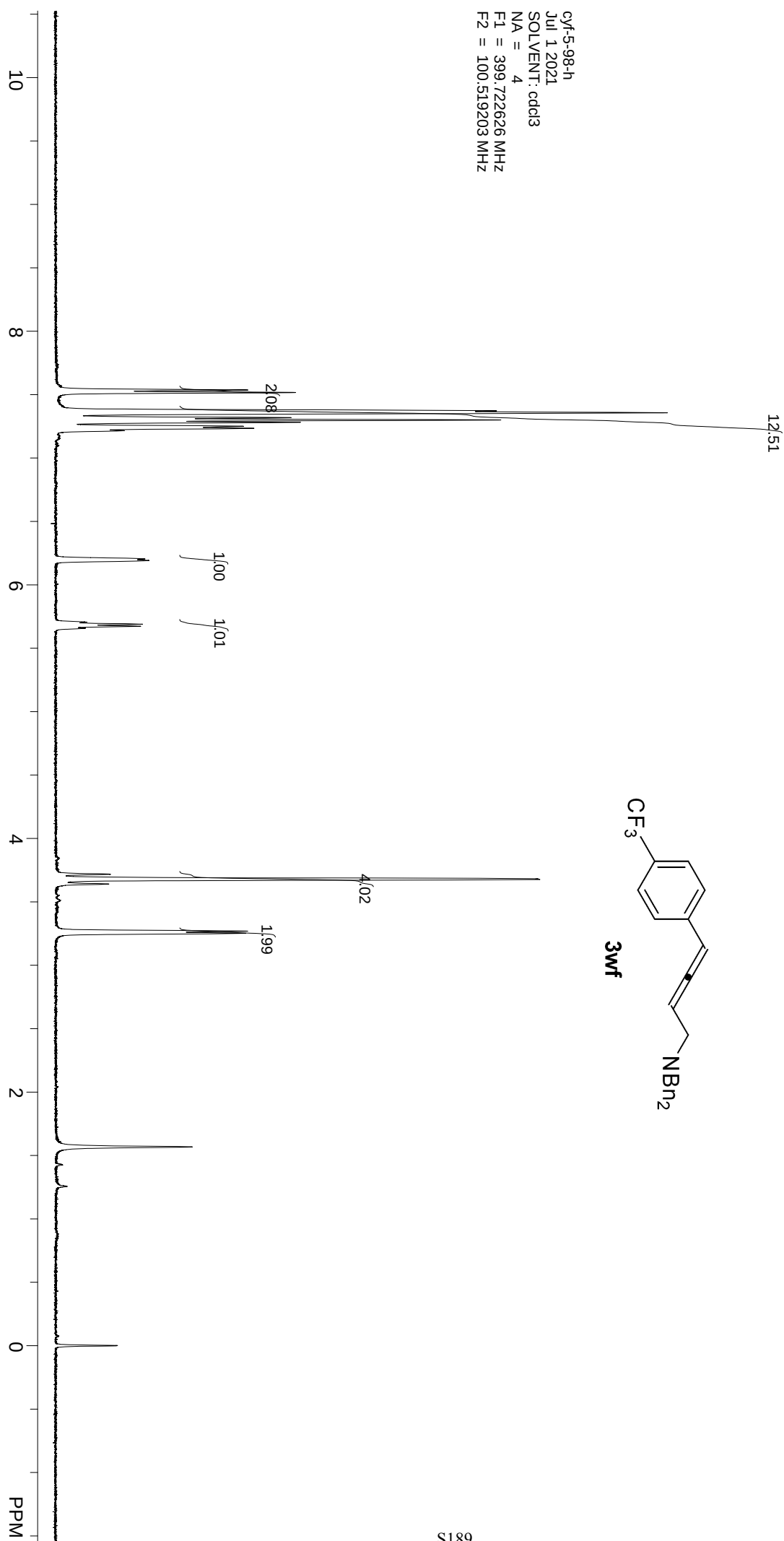
7.537
7.517
7.373
7.357
7.318
7.300
7.282
7.250
7.235
7.216
6.204
6.192
5.708
5.690
5.674
5.657

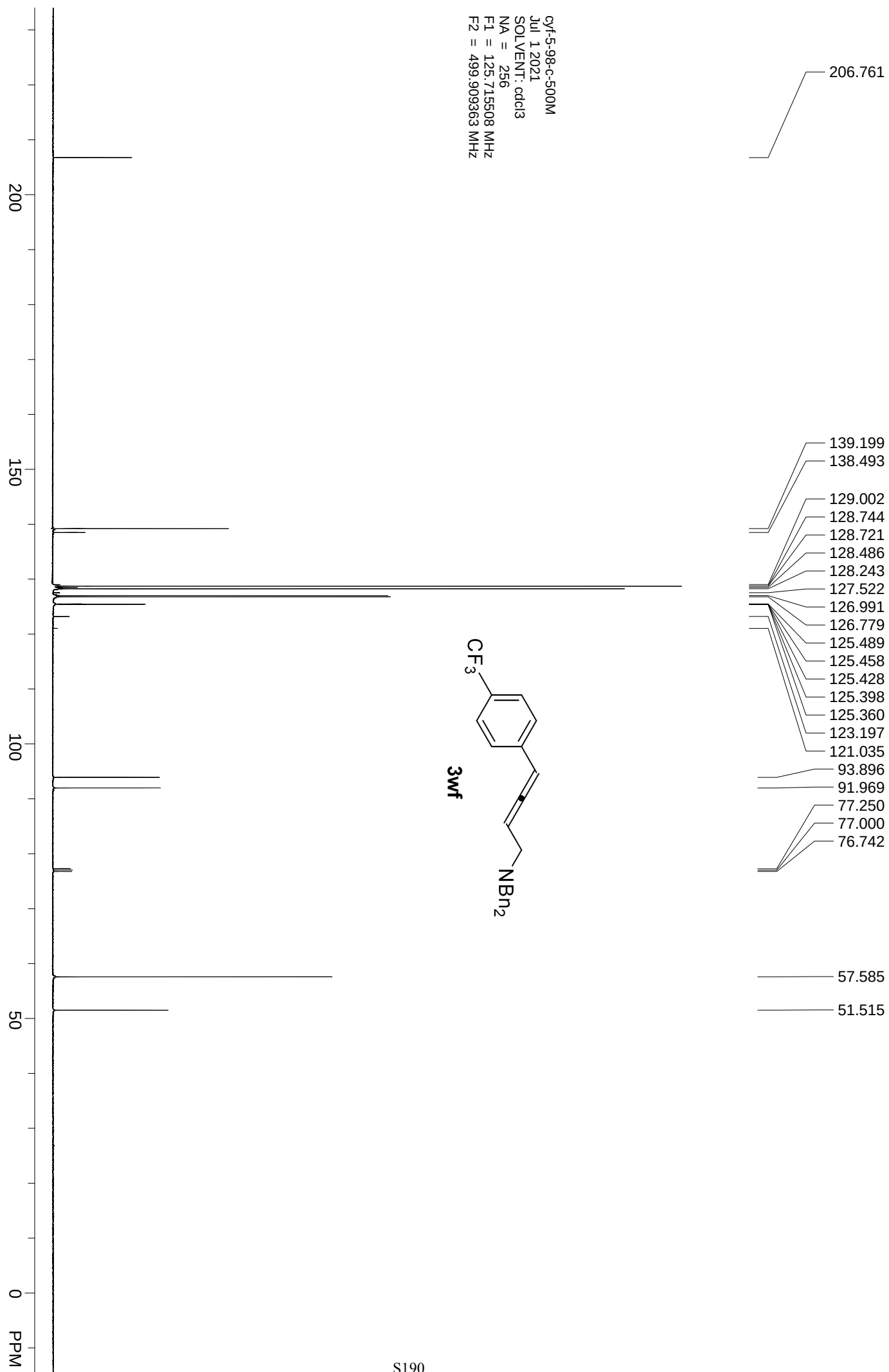
3.717
3.682
3.677
3.641
3.269
3.253

0.000

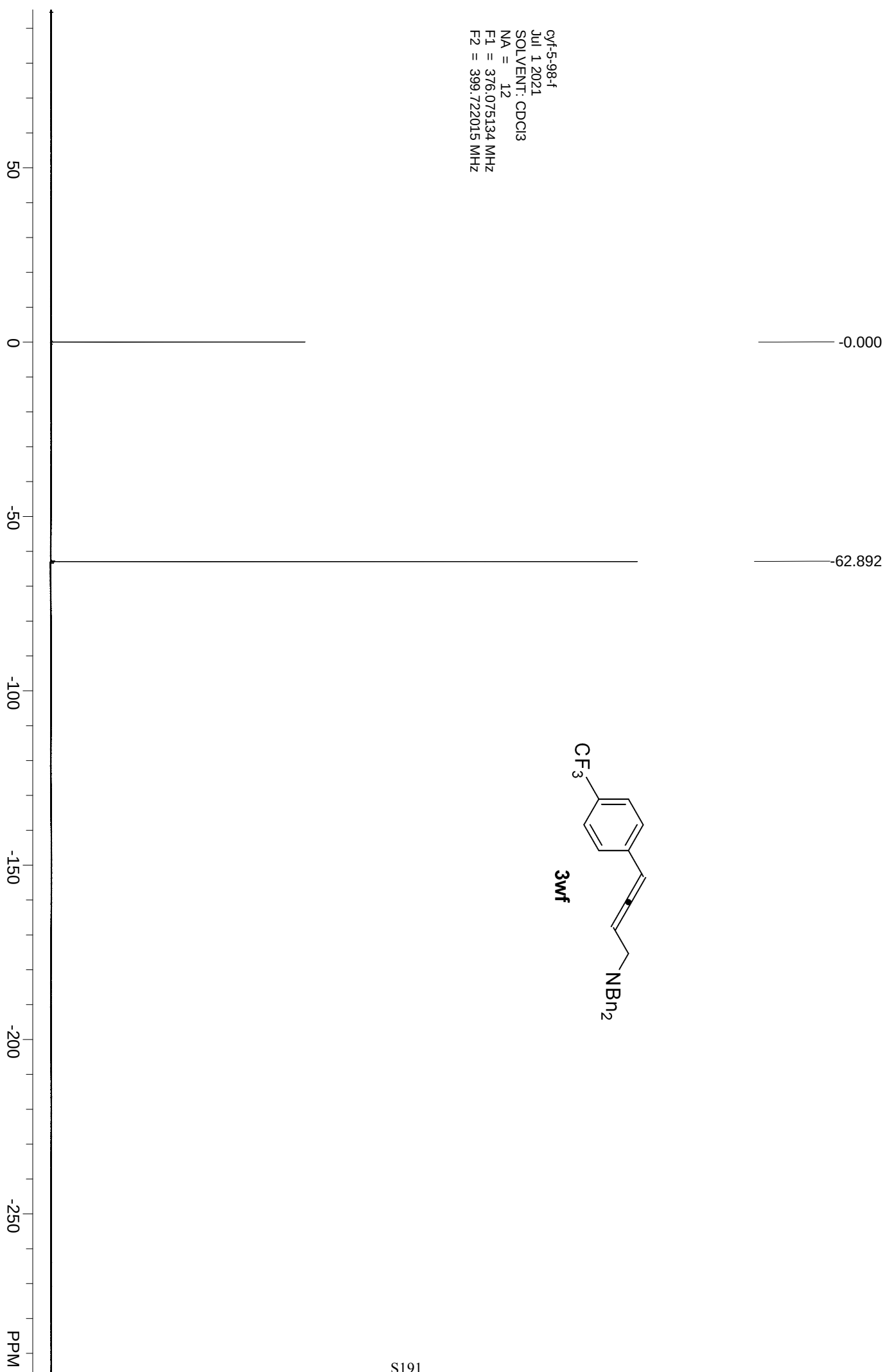


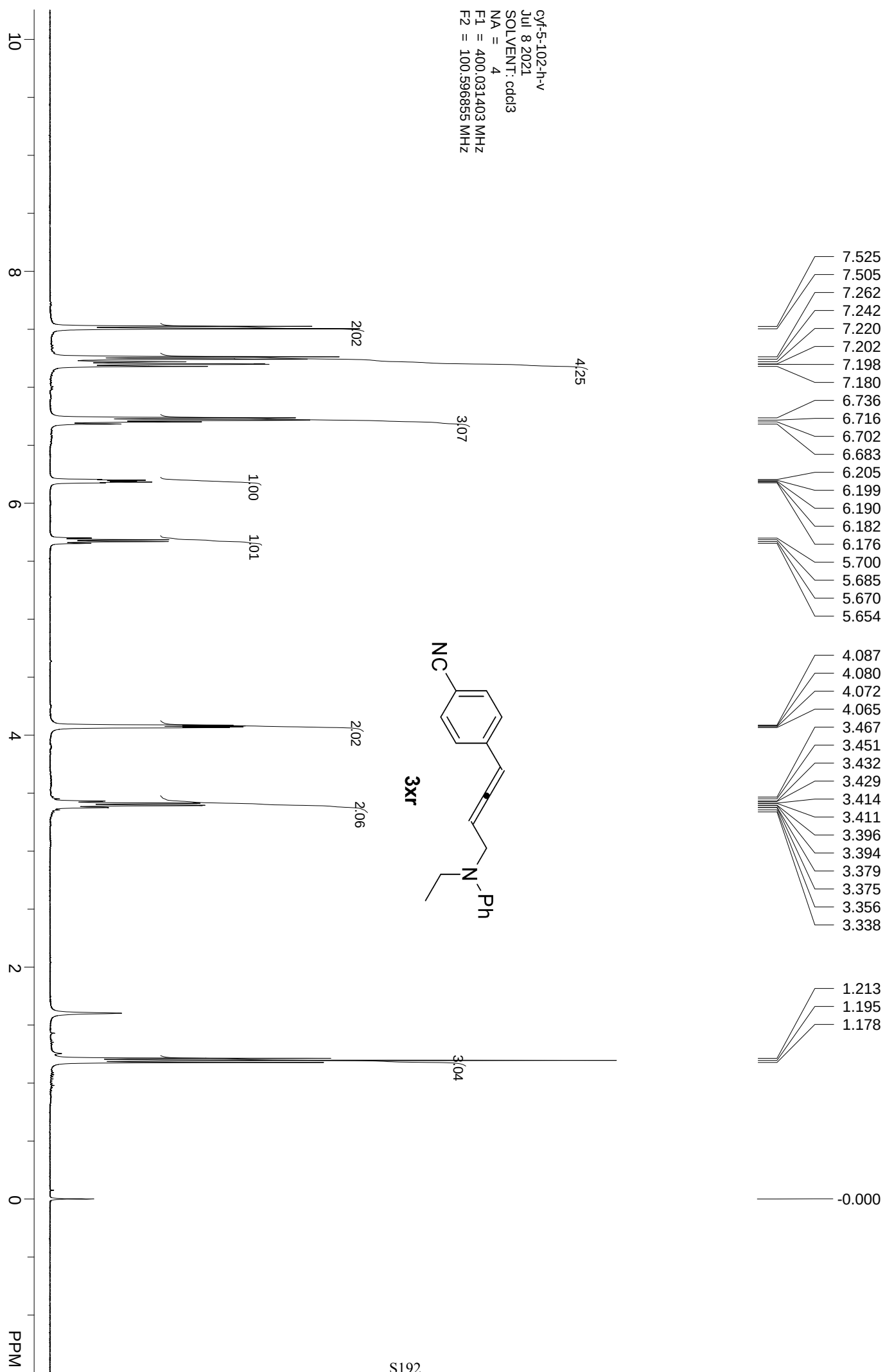
cyf-5-98-h
 Jul 1 2021
 SOLVENT: cdc13
 NA = 4
 F1 = 399.722626 MHz
 F2 = 100.519203 MHz

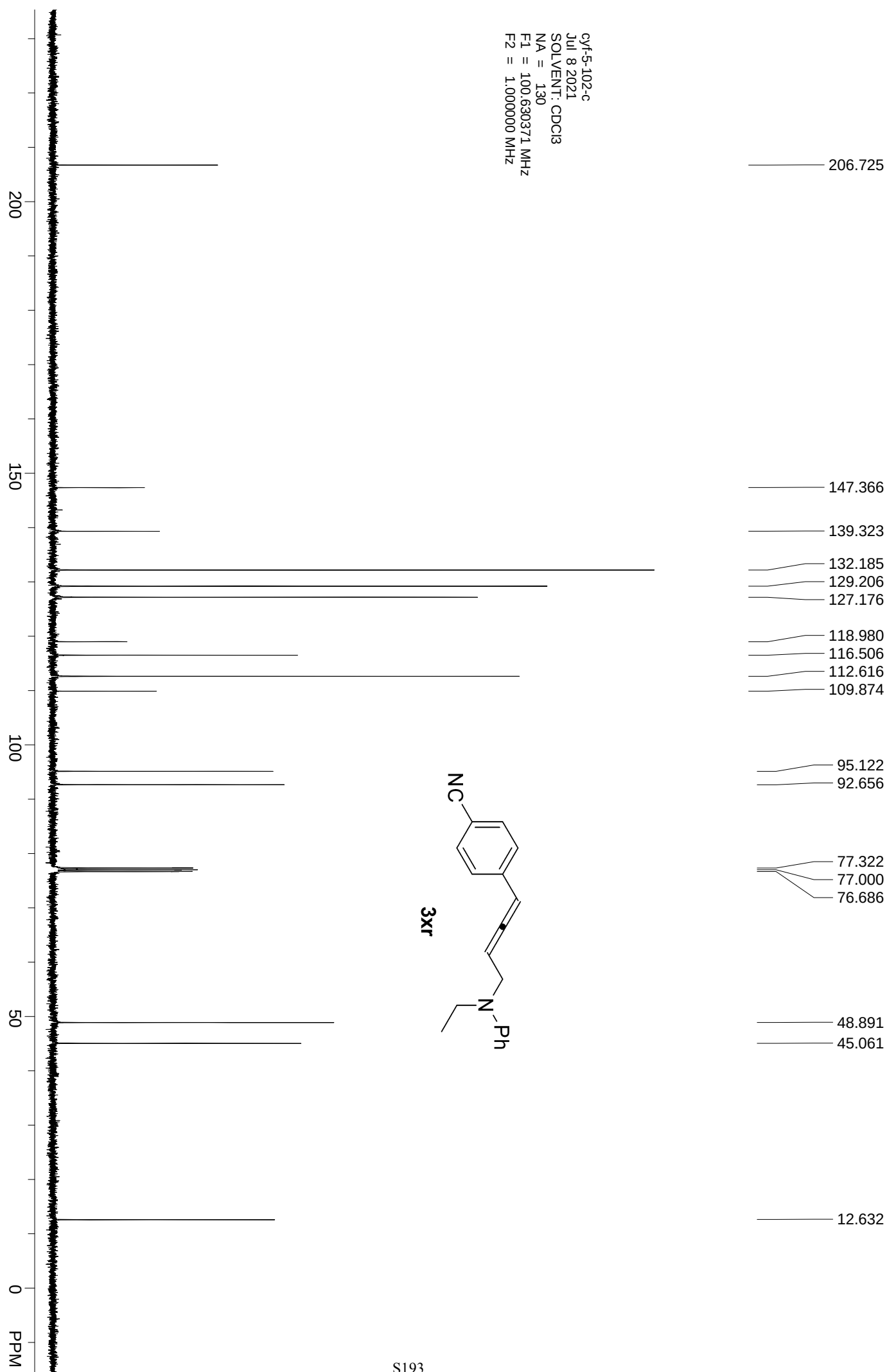




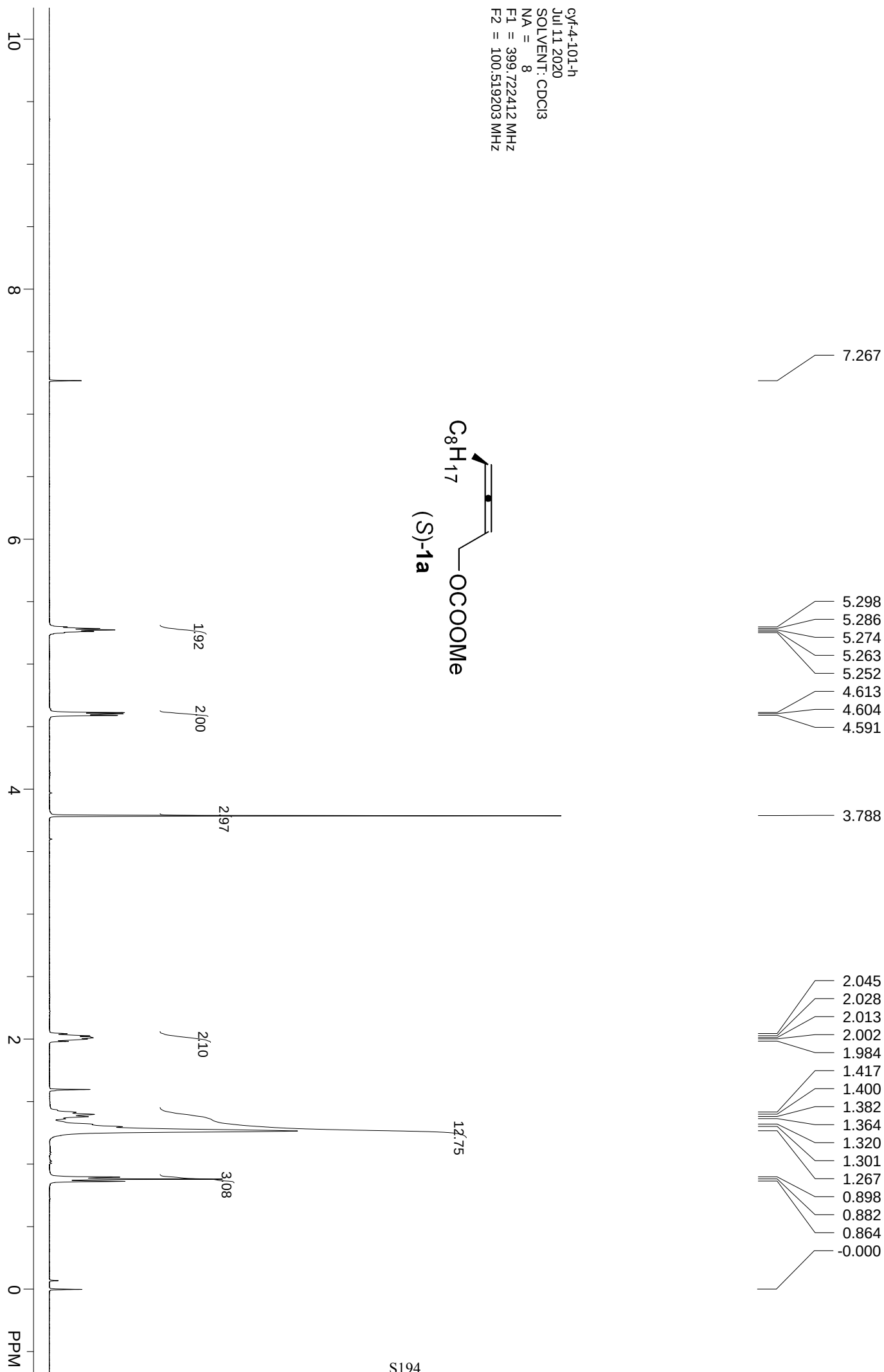
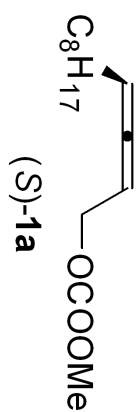
cyf-5-98-f
Jul 1 2021
SOLVENT: CDCl3
NA = 12
F1 = 376.075134 MHz
F2 = 399.722015 MHz



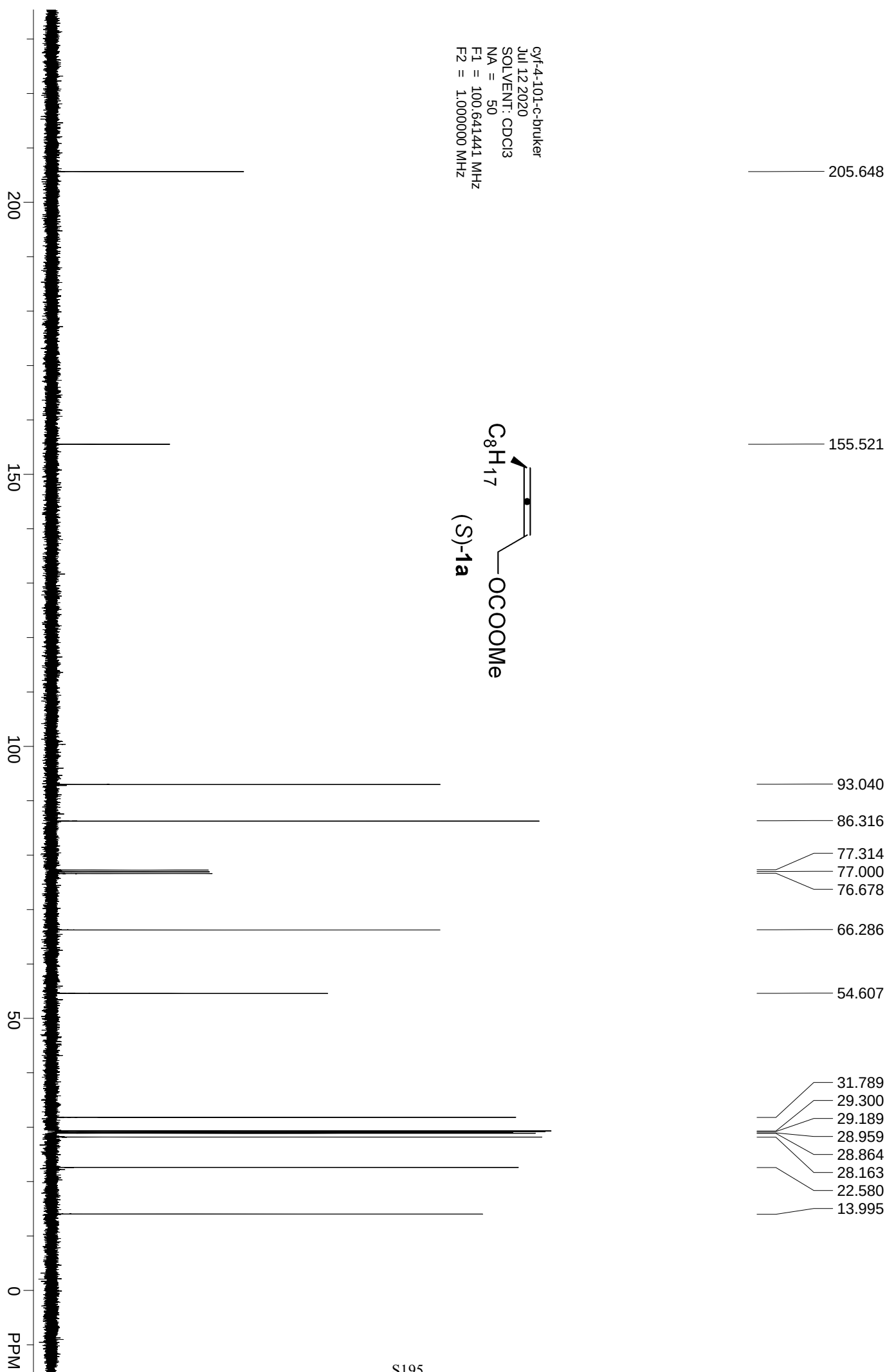
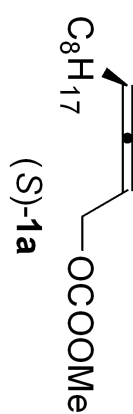




cvf-4-101-h
 Jul 11 2020
 SOLVENT: CDCl3
 NA = 8
 F1 = 399.722412 MHz
 F2 = 100.519203 MHz

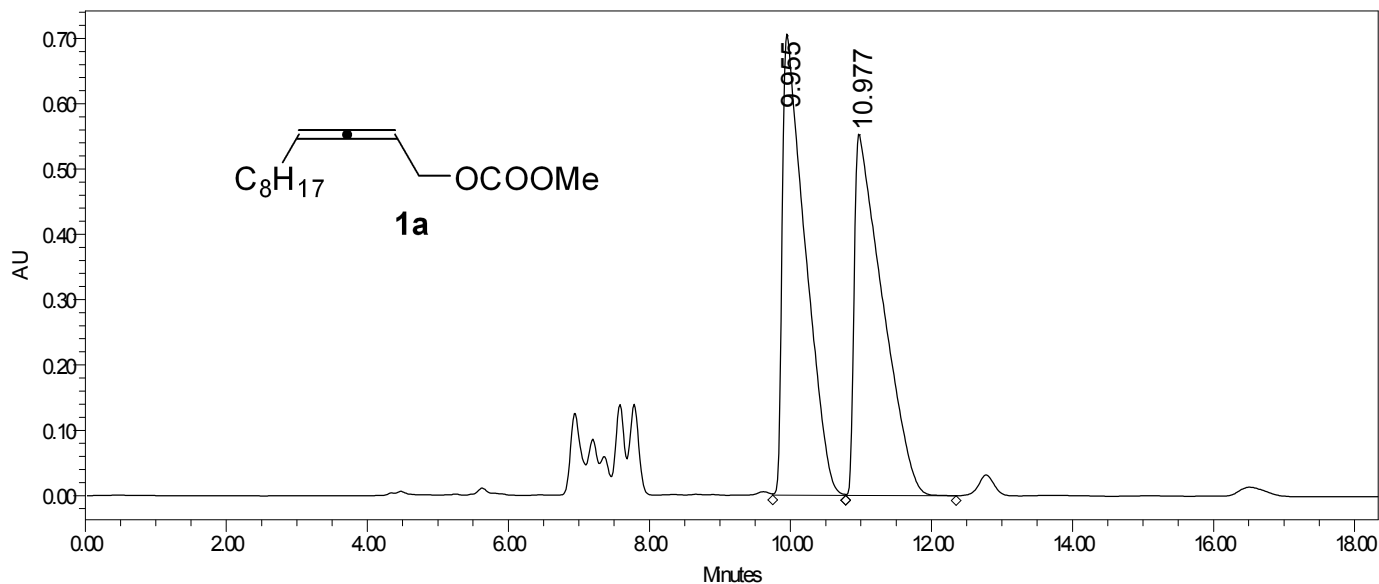


cyf-4-101-c-bruker
Jul 12 2020
SOLVENT: CDCl3
NA = 50
F1 = 100.641441 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-54-odh-400-1-0.7-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	120.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/12/2020 4:47:07 AM CST		
Date Processed:	7/12/2020 5:06:05 AM CST		



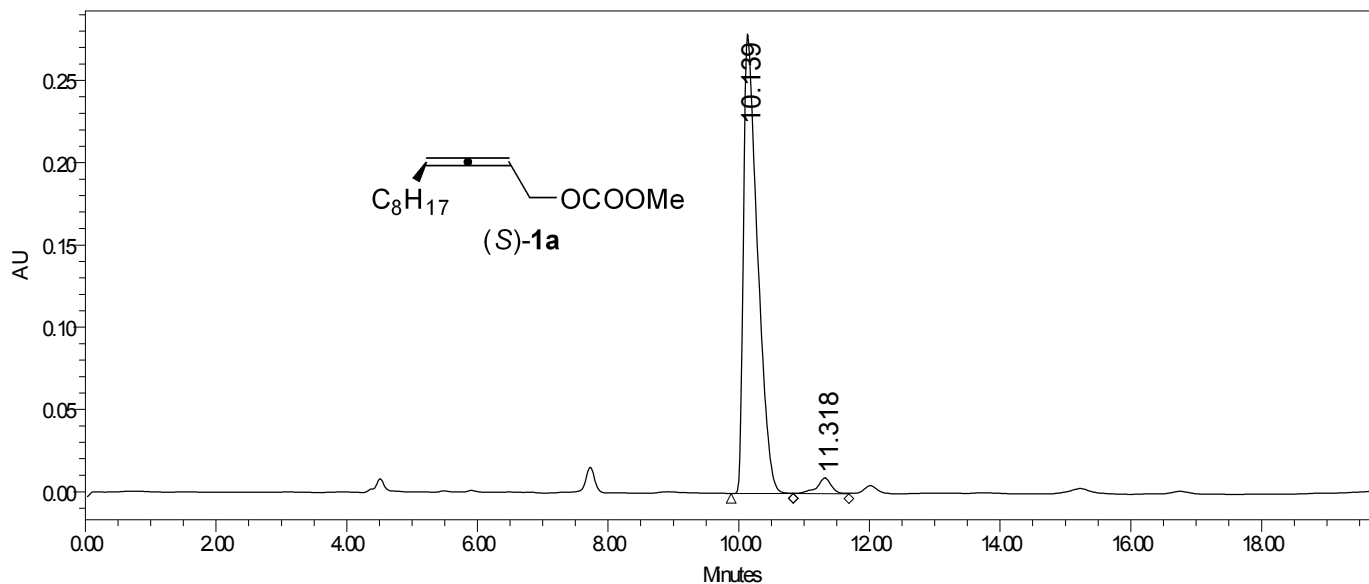
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7243; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	9.955	15881956	50.77	707547
2	W2489 ChA.214nm	10.977	15400066	49.23	556928

SAMPLE INFORMATION

Sample Name:	cyf-4-101-odh-400-1-0.7-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	2	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/12/2020 5:53:18 AM CST		
Date Processed:	7/12/2020 6:14:17 AM CST		



Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7251; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	10.139	4183522	96.62	279978
2	W2489 ChA.214nm	11.318	146167	3.38	9475

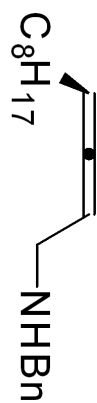
7.329
7.318
7.300
7.279
7.268
7.260
7.247
7.237

5.219
5.208
5.195
5.185
5.172

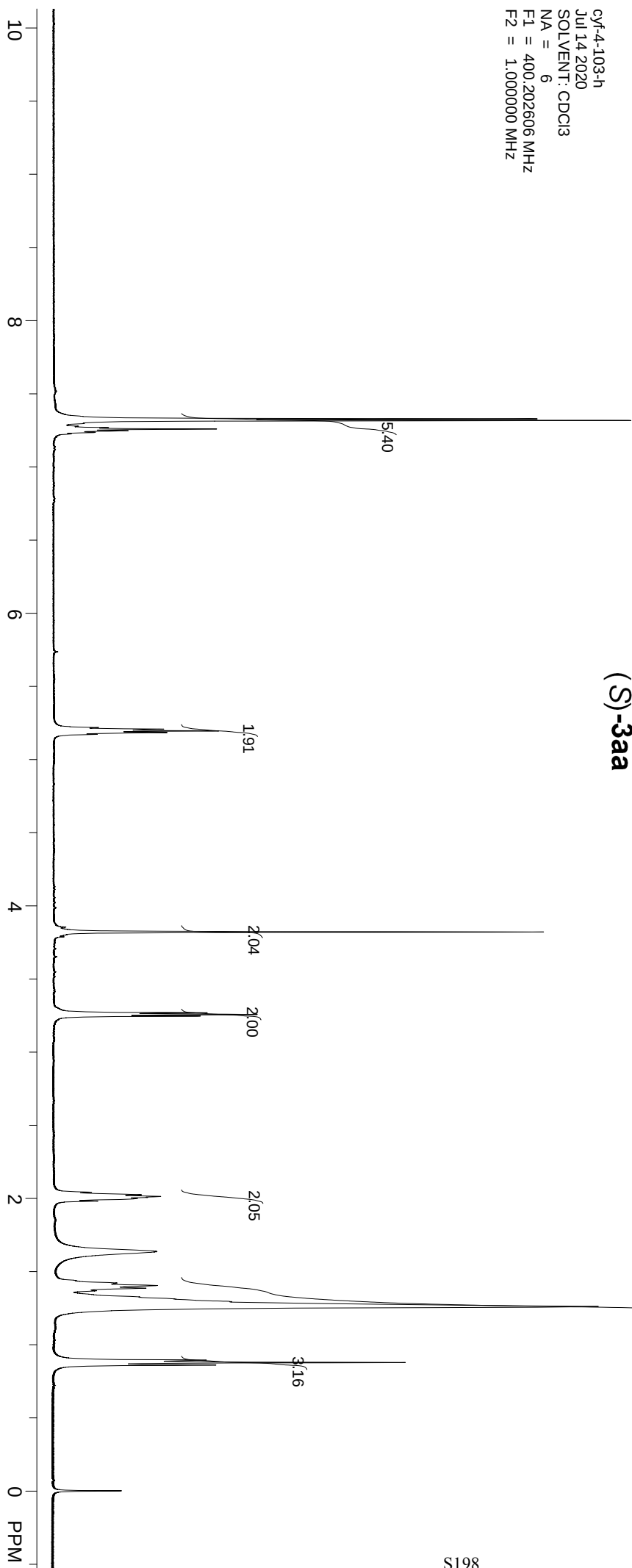
3.854
3.820
3.786

3.268
3.256
3.246

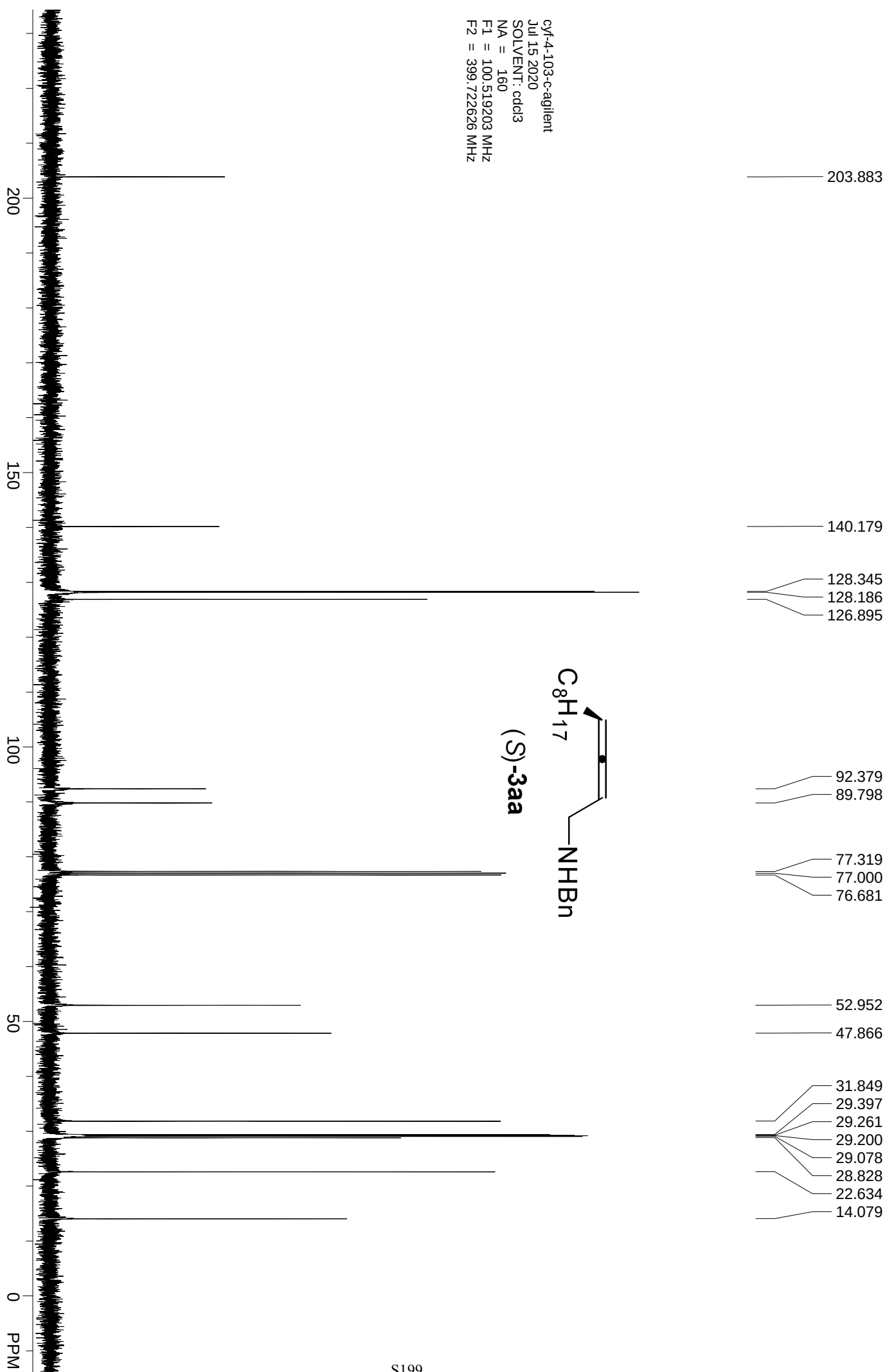
2.041
2.024
2.012
2.006
2.000
1.981
1.421
1.403
1.385
1.368
1.293
1.260
0.893
0.877
0.859
0.000



cyf-4-103-h
Jul 14 2020
SOLVENT: CDCl3
NA = 6
F1 = 400.202606 MHz
F2 = 1.000000 MHz

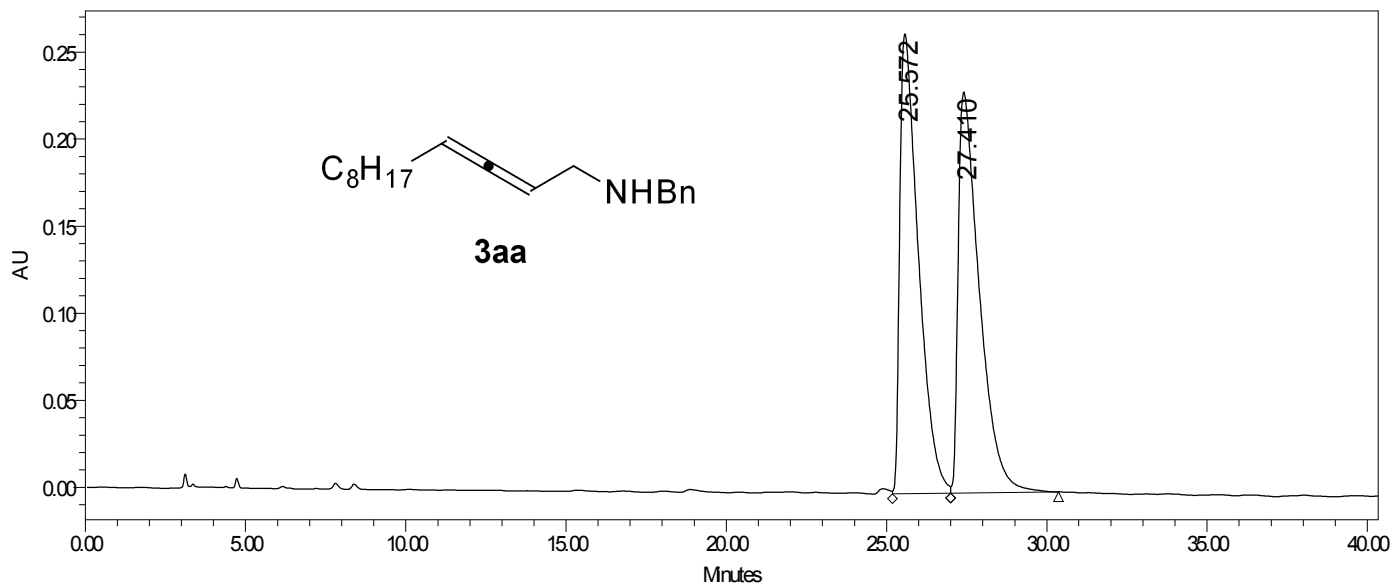


cyf-4-103-c-agilent
Jul 15 2020
SOLVENT: cdd3
NA = 160
F1 = 100.519203 MHz
F2 = 399.722626 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-68-odh-100-0-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/15/2020 11:57:20 AM CST		
Date Processed:	7/15/2020 12:39:08 PM CST		



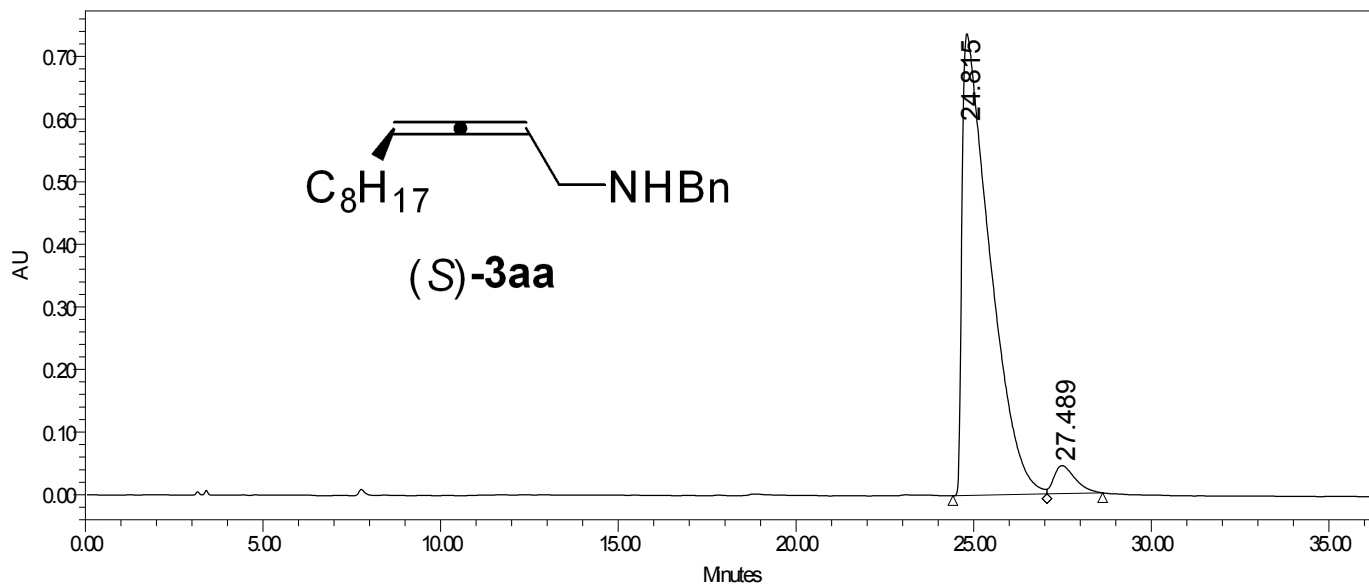
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7284; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	25.572	10659091	50.24	264055
2	W2489 ChA.214nm	27.410	10556373	49.76	230312

SAMPLE INFORMATION

Sample Name:	cyf-4-103-odh-100-0-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	2	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/15/2020 12:43:09 PM CST		
Date Processed:	7/15/2020 1:20:19 PM CST		

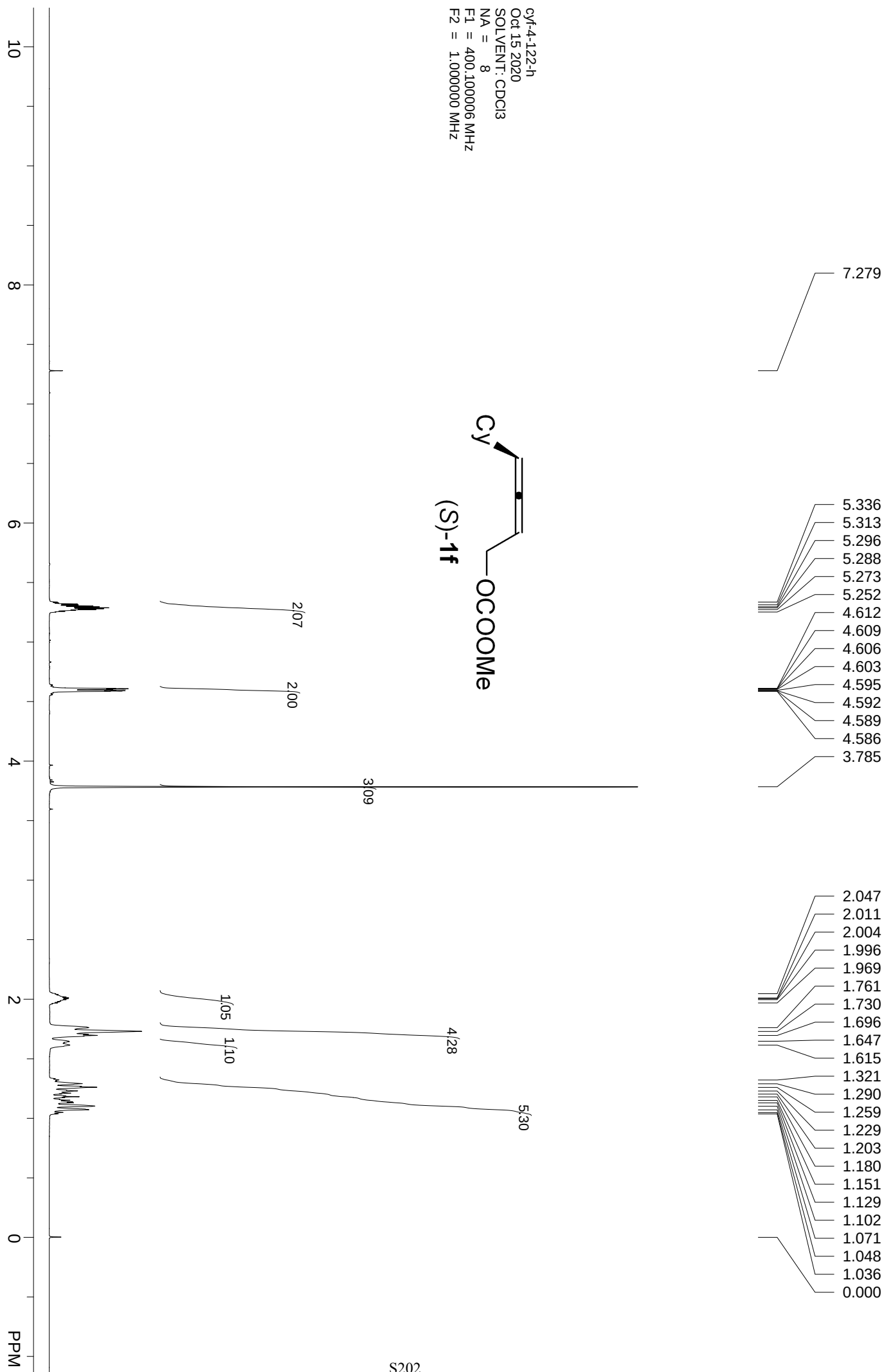


Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7288; Processing Method: Default

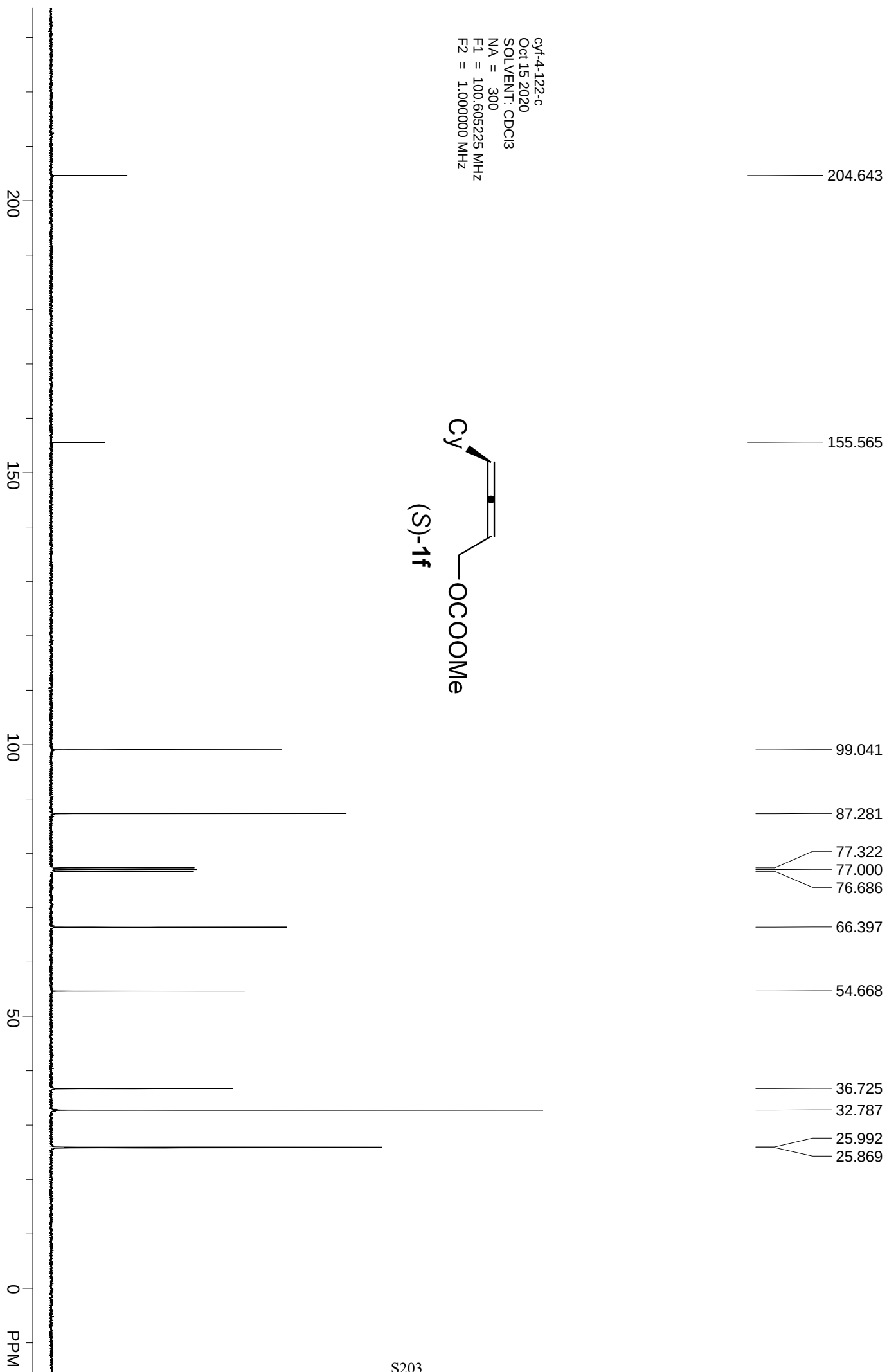
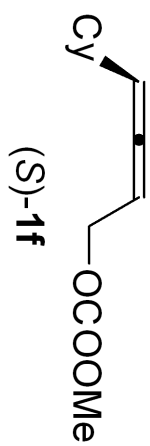
Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	24.815	40026395	95.52	737386
2	W2489 ChA.214nm	27.489	1879115	4.48	44887

cyf-4-122-h
Oct 15 2020
SOLVENT: CDCl3
NA = 8
F1 = 400.100006 MHz
F2 = 1.000000 MHz

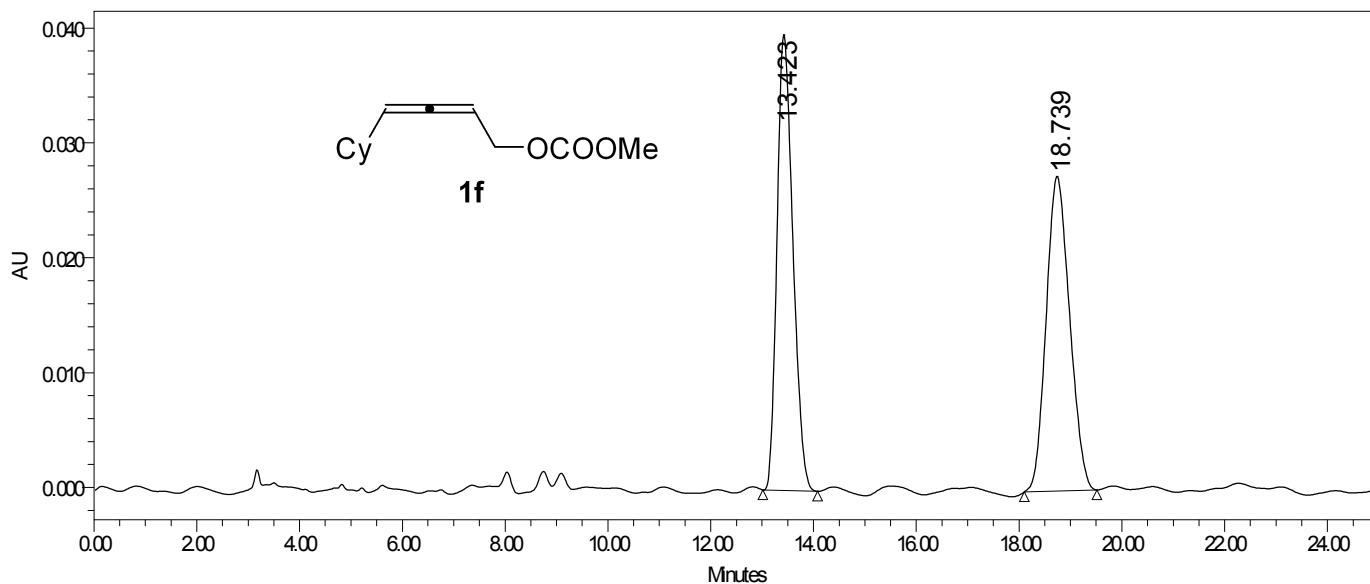


cyf-4-122-c
Oct 15 2020
SOLVENT: CDCI3
NA = 300
F1 = 100.605225 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-131-odh-100-0-1-214-1015-2	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 u	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	10/16/2020 10:20:20 AM CST		
Date Processed:	10/16/2020 11:09:17 AM CST		



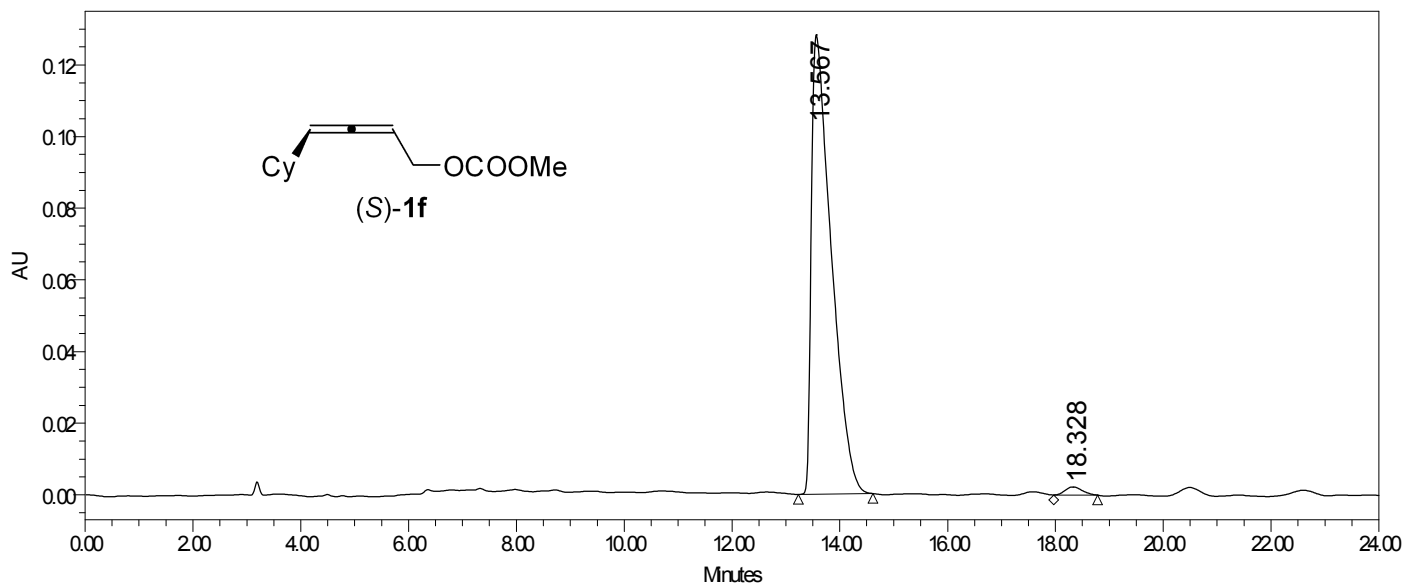
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8285; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	13.423	851758	49.54	39743
2	W2489 ChA.214nm	18.739	867698	50.46	27407

SAMPLE INFORMATION

Sample Name:	cyf-4-122-odh-100-0-1-214-1015	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	2	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	10/16/2020 7:25:02 AM CST		
Date Processed:	10/20/2020 6:24:00 AM CST		



Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8320; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	13.567	3284471	98.43	128306
2	W2489 ChA.214nm	18.328	52530	1.57	2338

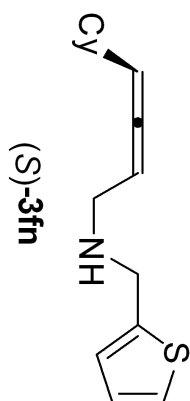
7.258
7.211
7.198
6.956
6.947
6.935
6.927

5.251
5.236
5.220
5.205
5.189
5.174
5.167

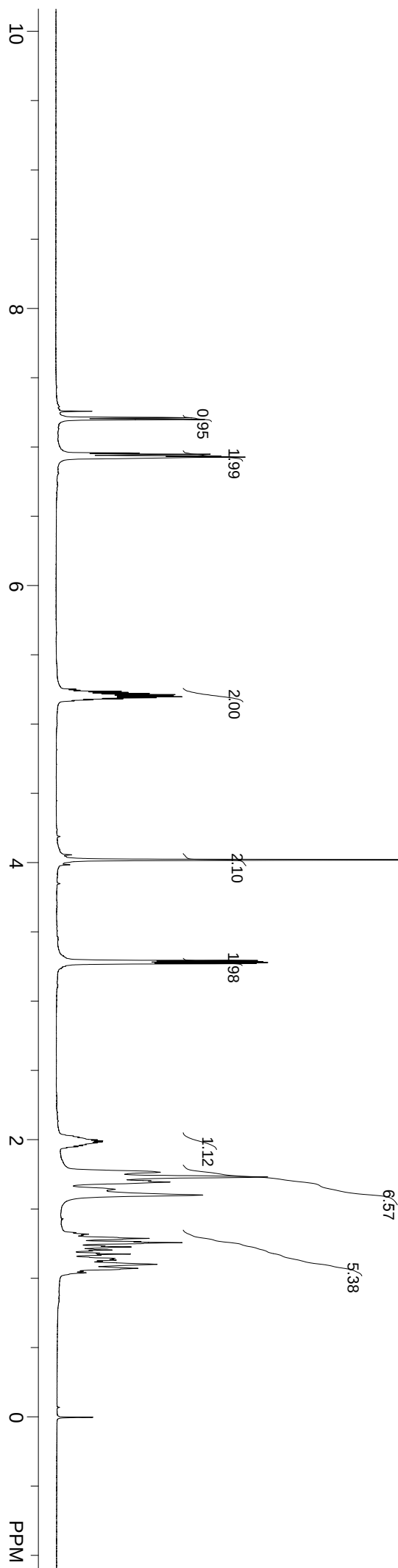
4.055
4.020
3.984

3.293
3.286
3.278
3.270

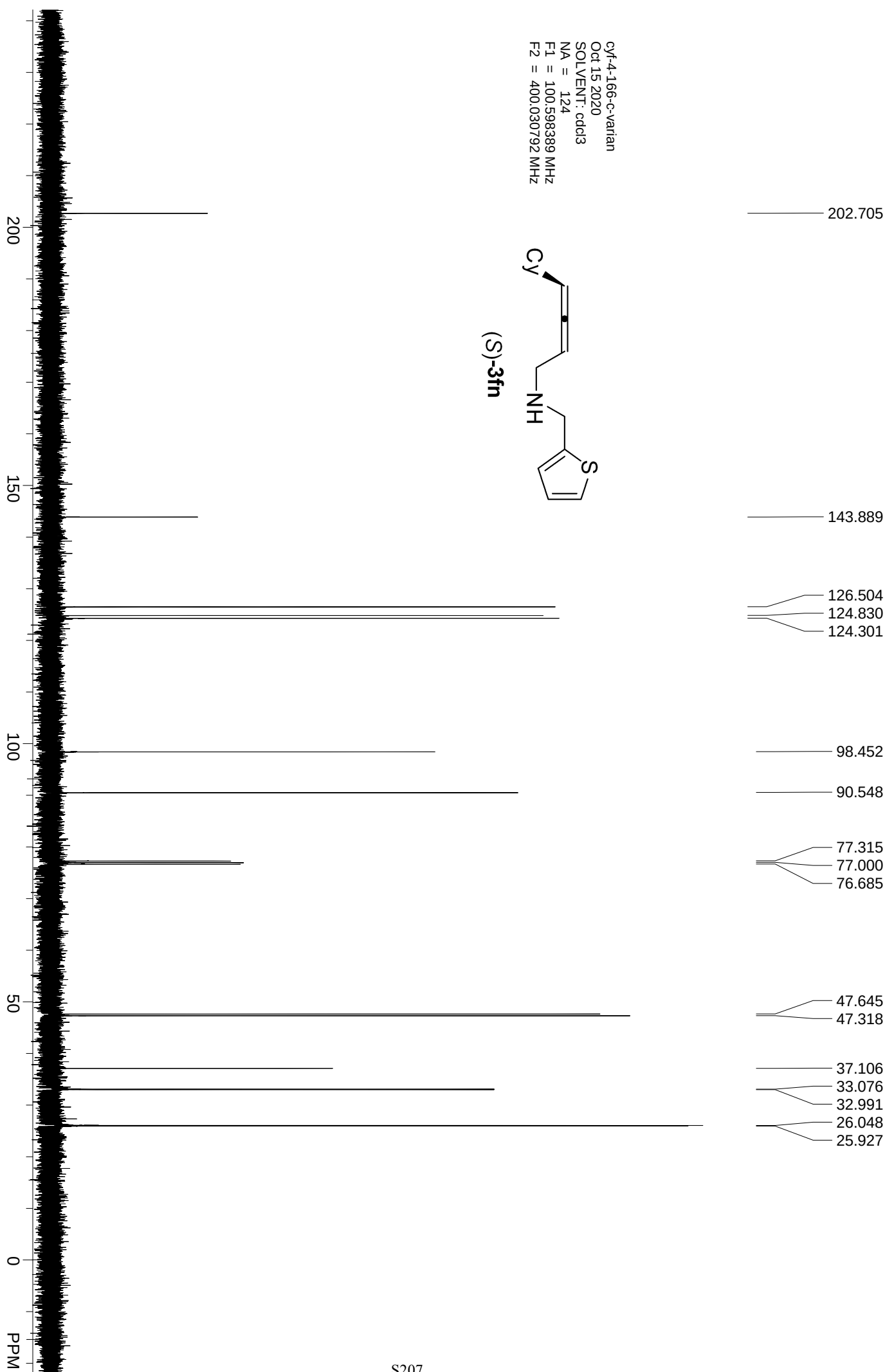
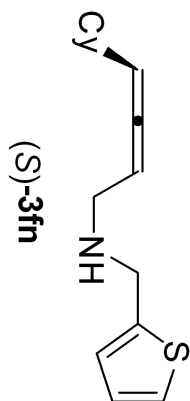
2.020
1.993
1.986
1.966
1.950
1.766
1.733
1.696
1.643
1.602
1.320
1.290
1.259
1.228
1.206
1.176
1.141
1.103
1.074
1.042
0.000



cyf-4-166-h
Oct 14 2020
SOLVENT: CDCl3
NA = 5
F1 = 400.200012 MHz
F2 = 1.000000 MHz

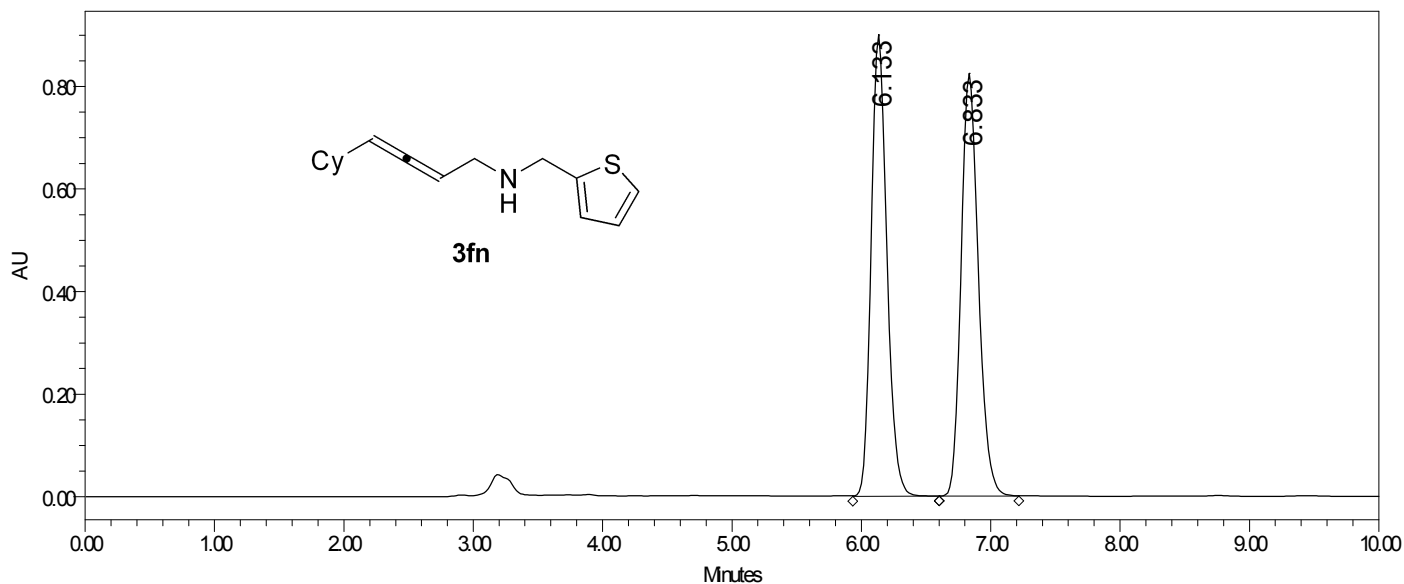


cyf-4-166-c-varian
Oct 15 2020
SOLVENT: cddcl3
NA = 124
F1 = 100.598389 MHz
F2 = 400.030792 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-169-adh-95-5-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	10/16/2020 5:23:36 AM CST		
Date Processed:	10/16/2020 5:34:38 AM CST		



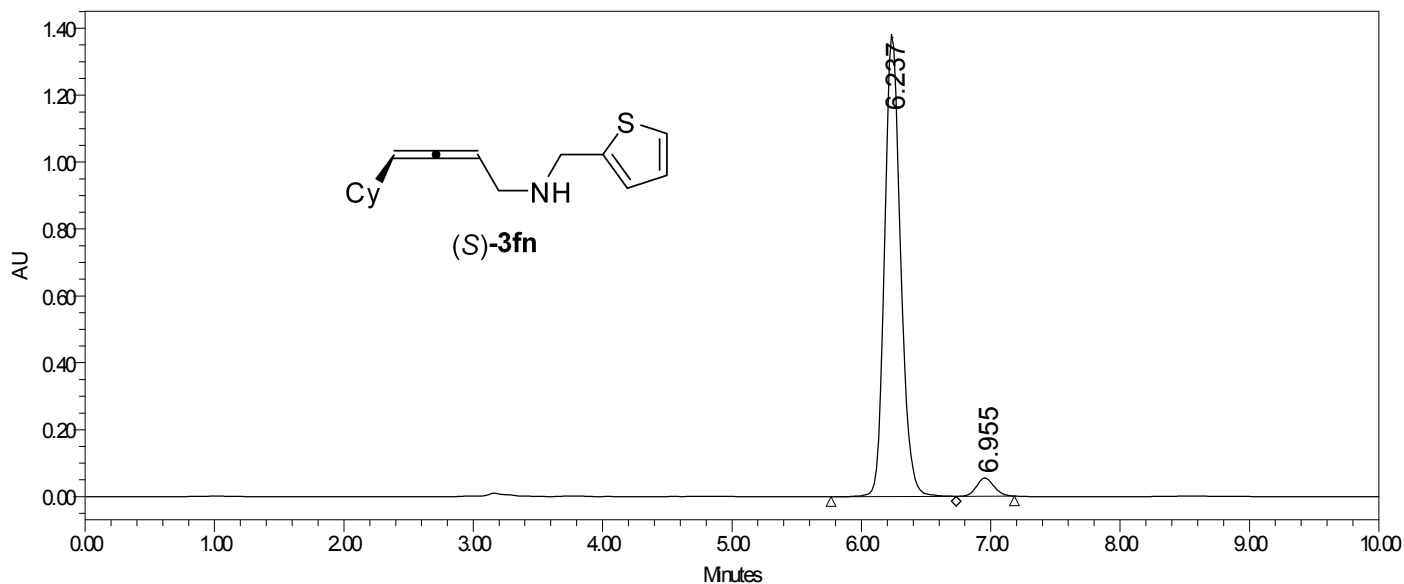
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8263; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	6.133	7589263	49.80	898149
2	W2489 ChA.214nm	6.833	7650558	50.20	823260

SAMPLE INFORMATION

Sample Name:	cyf-4-166-adh-95-5-1-214-2	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	3	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	15.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	10/16/2020 5:58:23 AM CST		
Date Processed:	10/16/2020 6:09:27 AM CST		



Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8272; Processing Method: Default

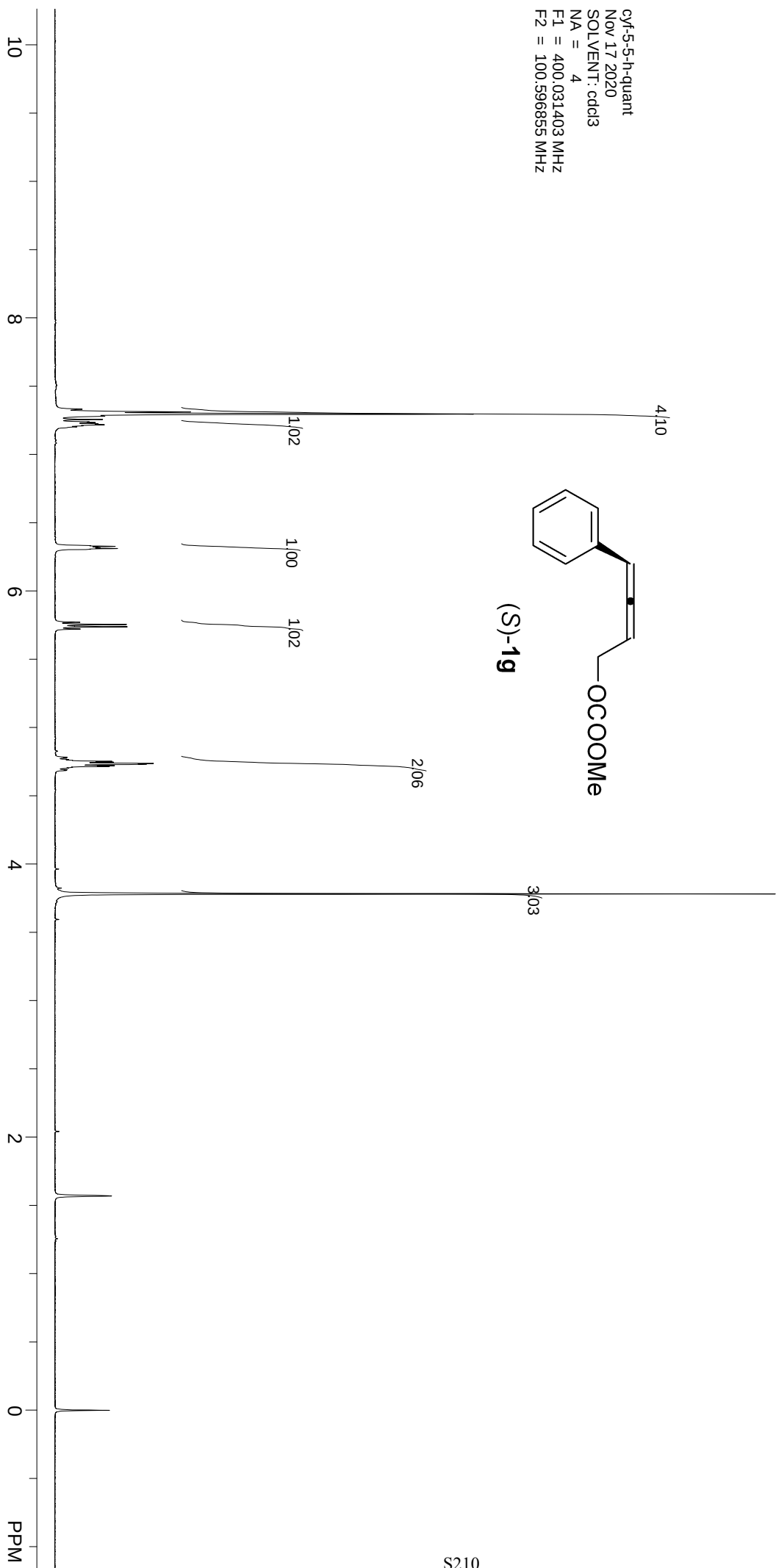
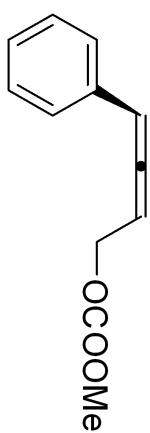
Processed Channel Descr.: W2489 ChA.214nm

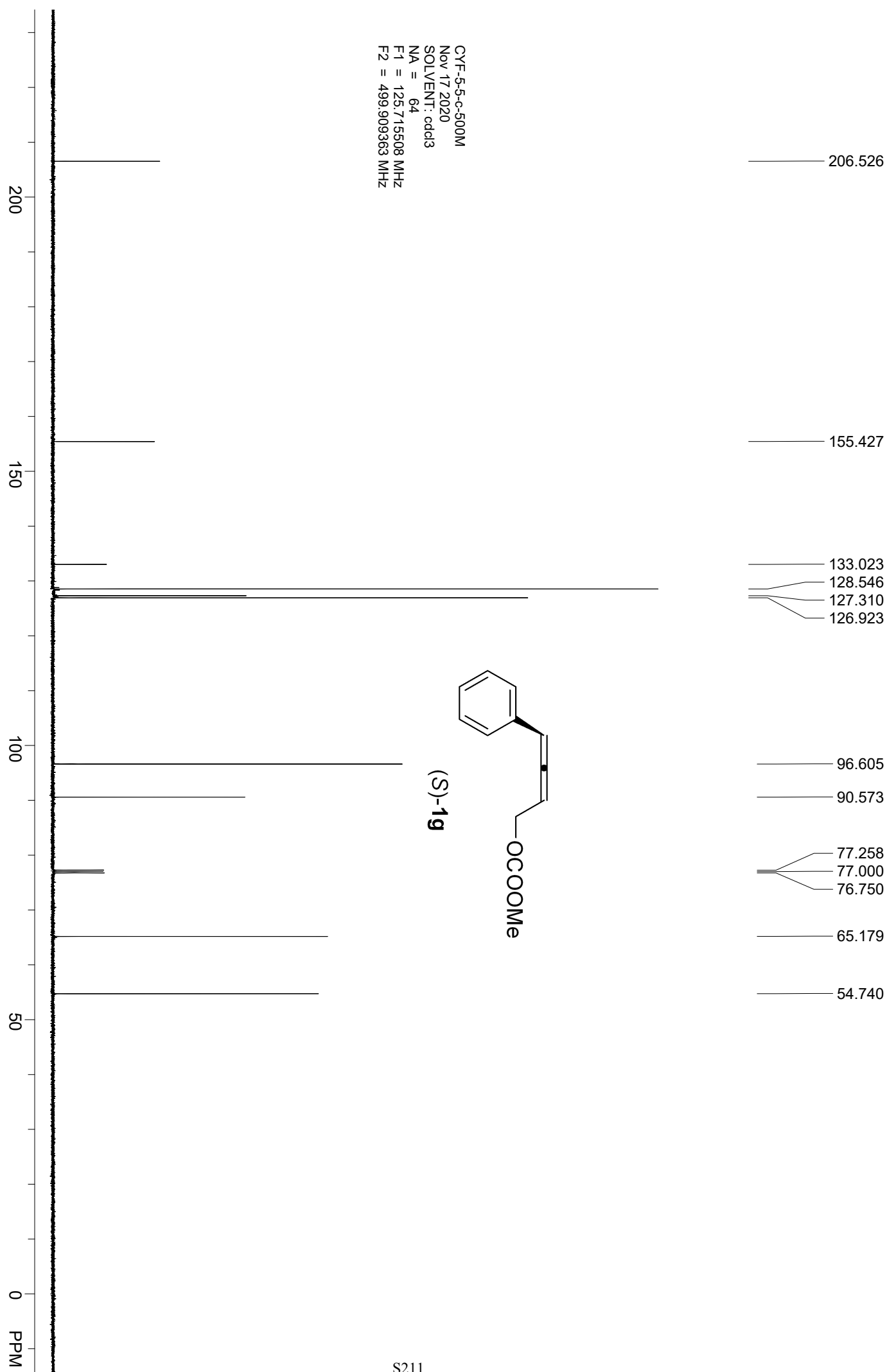
	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	6.237	11864036	95.88	1380422
2	W2489 ChA.214nm	6.955	510029	4.12	54426

7.331
7.311
7.295
7.279
7.255
7.238
7.233
7.224
7.217
7.209
7.202
6.332
6.326
6.320
6.317
6.311
6.305
5.771
5.754
5.737
5.721
4.782
4.777
4.766
4.753
4.746
4.736
4.731
4.721
4.715
4.708
4.702
4.690
4.685
3.781

-0.000

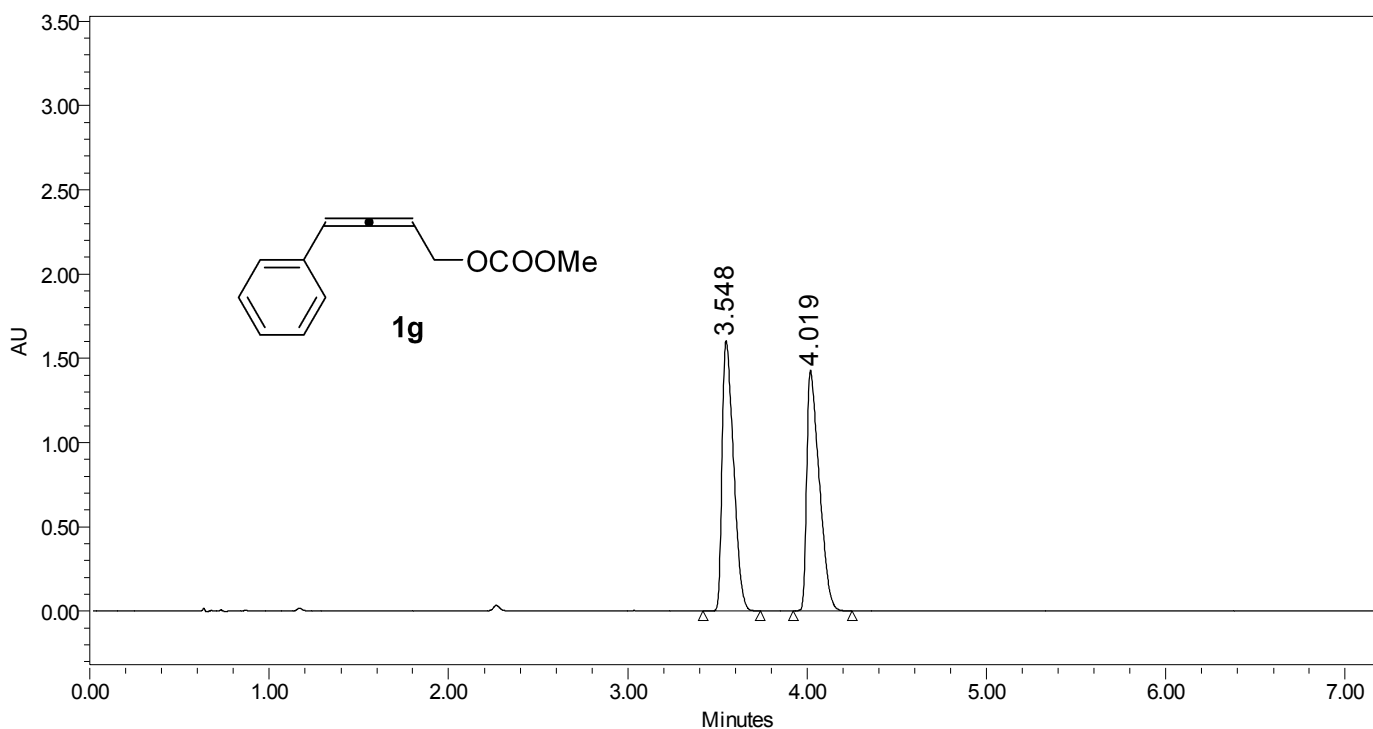
cyf-5-5-h-quant
Nov 17 2020
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz





SAMPLE INFORMATION

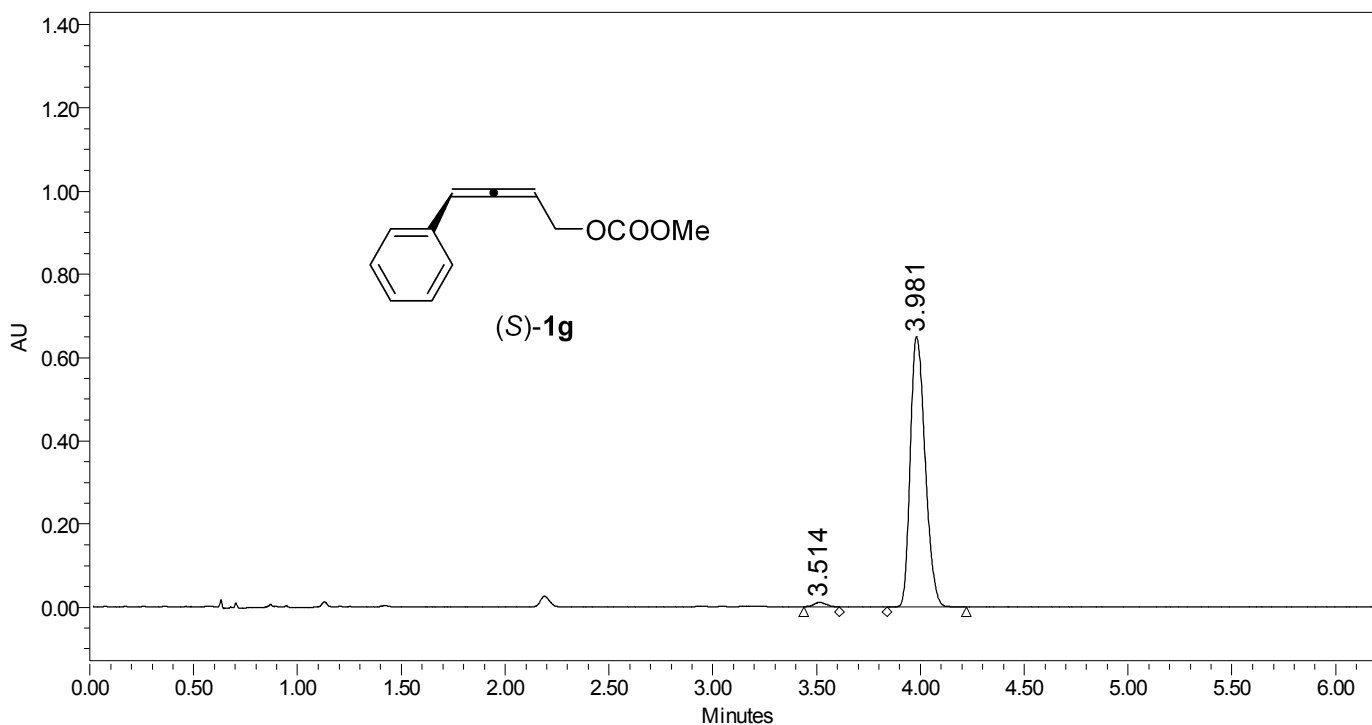
Sample Name:	XHB-2-124-RAC	Acquired By:	System
Sample Type:	Unknown	Sample Set Name	
Vial:	1:E,1	Acq. Method Set:	upc_pda_2019m
Injection #:	1	Processing Method	TEST
Injection Volume:	1.50 ul	Channel Name:	PDA Ch2 254nm@4.8nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Ch2 254nm@4.8nm
Date Acquired:	11/18/2020 12:59:53 PM CST		
Date Processed:	11/18/2020 4:20:21 PM CST		



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.548	Unknown	1602432	19.200	7088912	50.51
2	4.019	Unknown	1425956	19.700	6946904	49.49

SAMPLE INFORMATION

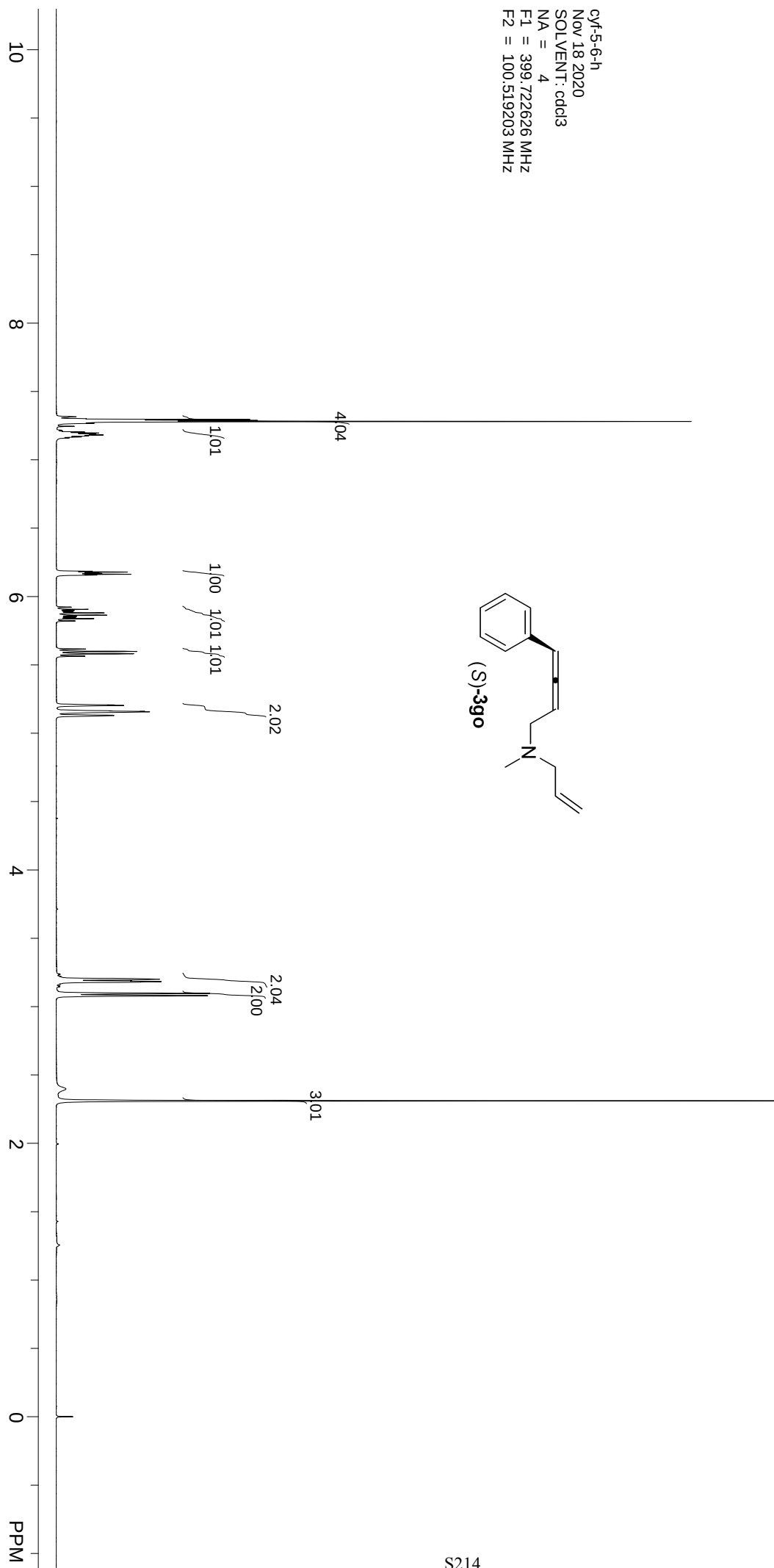
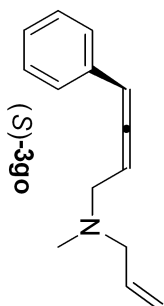
Sample Name:	CYF-5-5	Acquired By:	System
Sample Type:	Unknown	Sample Set Name	
Vial:	1:E,2	Acq. Method Set:	upc_pda_2019m
Injection #:	2	Processing Method	Default
Injection Volume:	3.00 ul	Channel Name:	PDA Ch2 254nm@4.8nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Ch2 254nm@4.8nm
Date Acquired: 11/18/2020 1:15:08 PM CST			
Date Processed: 11/18/2020 4:19:28 PM CST			



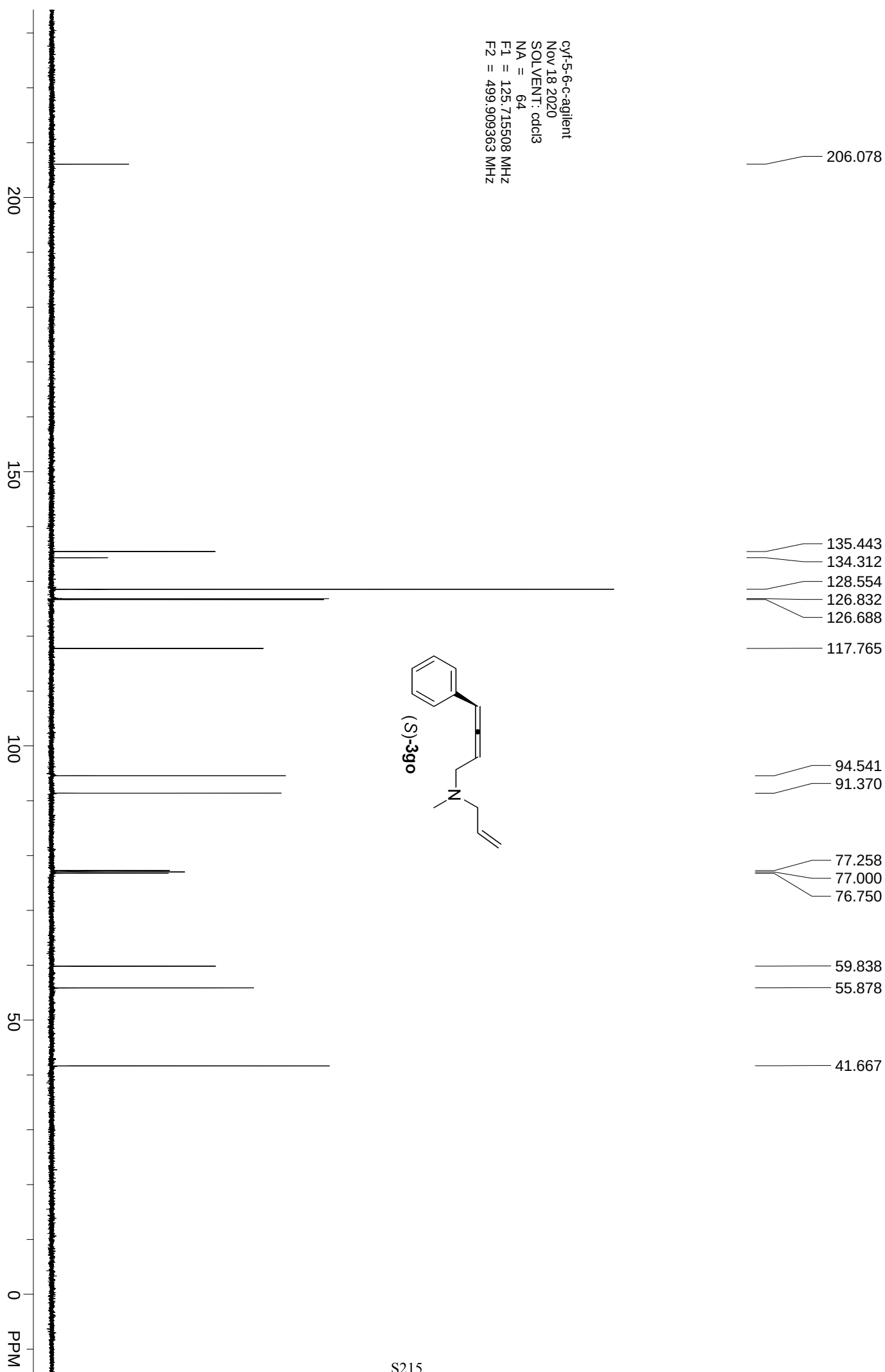
	RT	Peak Type	Height	Width (sec)	Area	% Area
1	3.514	Unknown	10683	10.300	43834	1.34
2	3.981	Unknown	648961	22.900	3229937	98.66

7.315
7.295
7.288
7.281
7.267
7.245
7.203
7.188
7.182
7.168
7.161
6.185
6.179
6.173
6.169
6.163
6.157
5.923
5.907
5.897
5.890
5.881
5.864
5.855
5.847
5.839
5.822
5.616
5.599
5.582
5.564
5.207
5.203
5.164
5.160
5.157
5.131
5.130
3.240
3.234
3.222
3.201
3.184
3.164
3.152
3.146
3.097
3.081
2.312
0.000

cyf-5-6-h
Nov 18 2020
SOLVENT: cdcl3
NA = 4
F1 = 399.722626 MHz
F2 = 100.519203 MHz



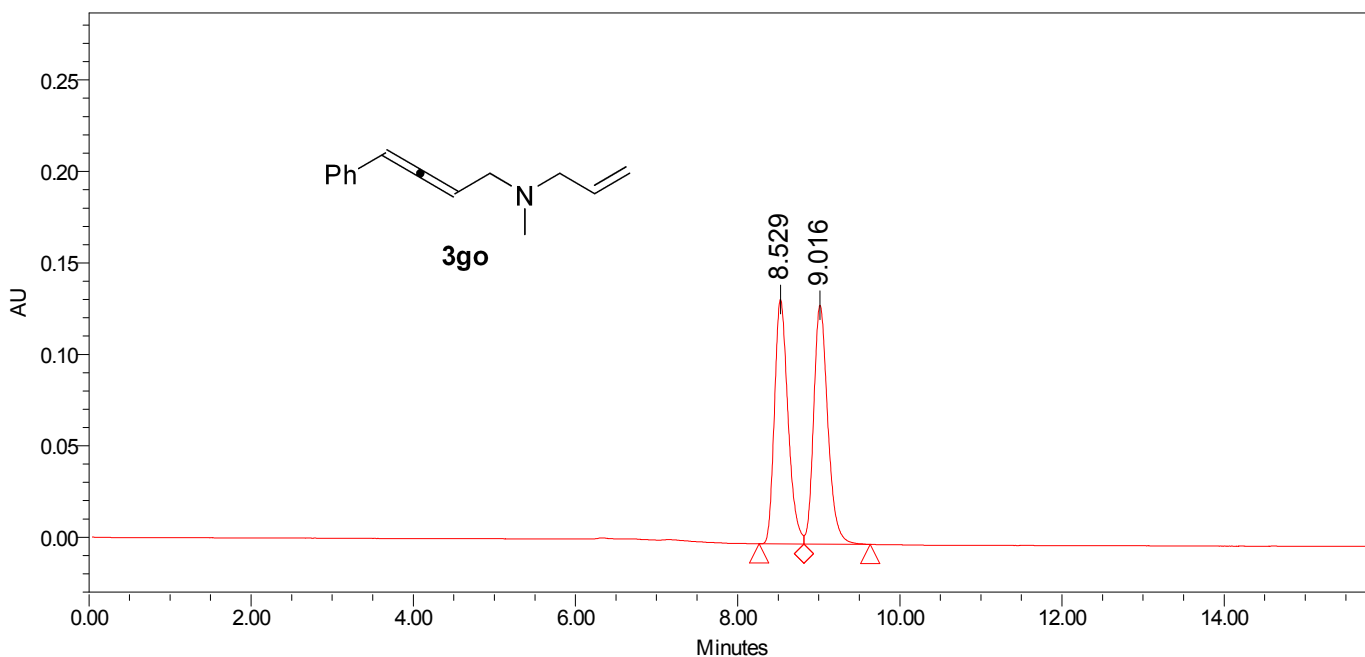
cyf-5-6-c-agilent
Nov 18 2020
SOLVENT: cdcl3
NA = 64
F1 = 125.715508 MHz
F2 = 499.909363 MHz



SAMPLE INFORMATION

Sample Name:	CYF-3-159-RAC	Acquired By:	System
Sample Type:	Unknown	Sample Set Name	
Vial:	15	Acq. Method Set:	2695PDA
Injection #:	1	Processing Method	Default
Injection Volume:	2.00 ul	Channel Name:	2998 Ch1 230nm@1.2nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 Ch1 230nm@1.2nm
Date Acquired:	2020/11/19 13:46:57 CST		
Date Processed:	2020/11/19 14:17:34 CST		

Auto-Scaled Chromatogram



Peak Results

CYF-3-159-RAC	15	8.529	8.529	33.000	133759	1556235	49.60
CYF-3-159-RAC	15	9.016	9.016	49.100	130736	1581411	50.40

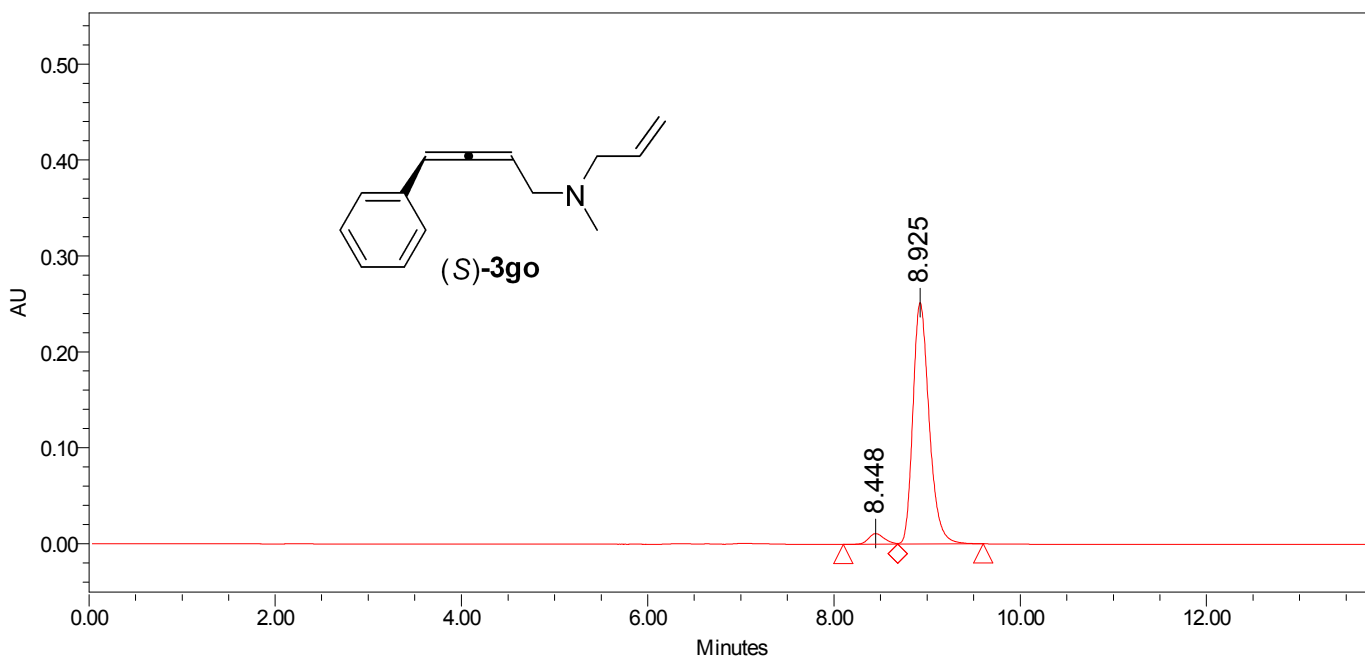
Reported by User: System
 Report Method: Default Individual Report
 Report Method ID: 27608
 Page: 1 of 1

Project Name: installation
 Date Printed:
 2020/11/19
 14:18:16 PRC

SAMPLE INFORMATION

Sample Name:	CYF-5-6	Acquired By:	System
Sample Type:	Unknown	Sample Set Name	
Vial:	16	Acq. Method Set:	2695PDA
Injection #:	1	Processing Method	Default
Injection Volume:	2.00 ul	Channel Name:	2998 Ch1 230nm@1.2nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	2998 Ch1 230nm@1.2nm
Date Acquired: 2020/11/19 14:03:31 CST			
Date Processed: 2020/11/19 14:17:46 CST			

Auto-Scaled Chromatogram

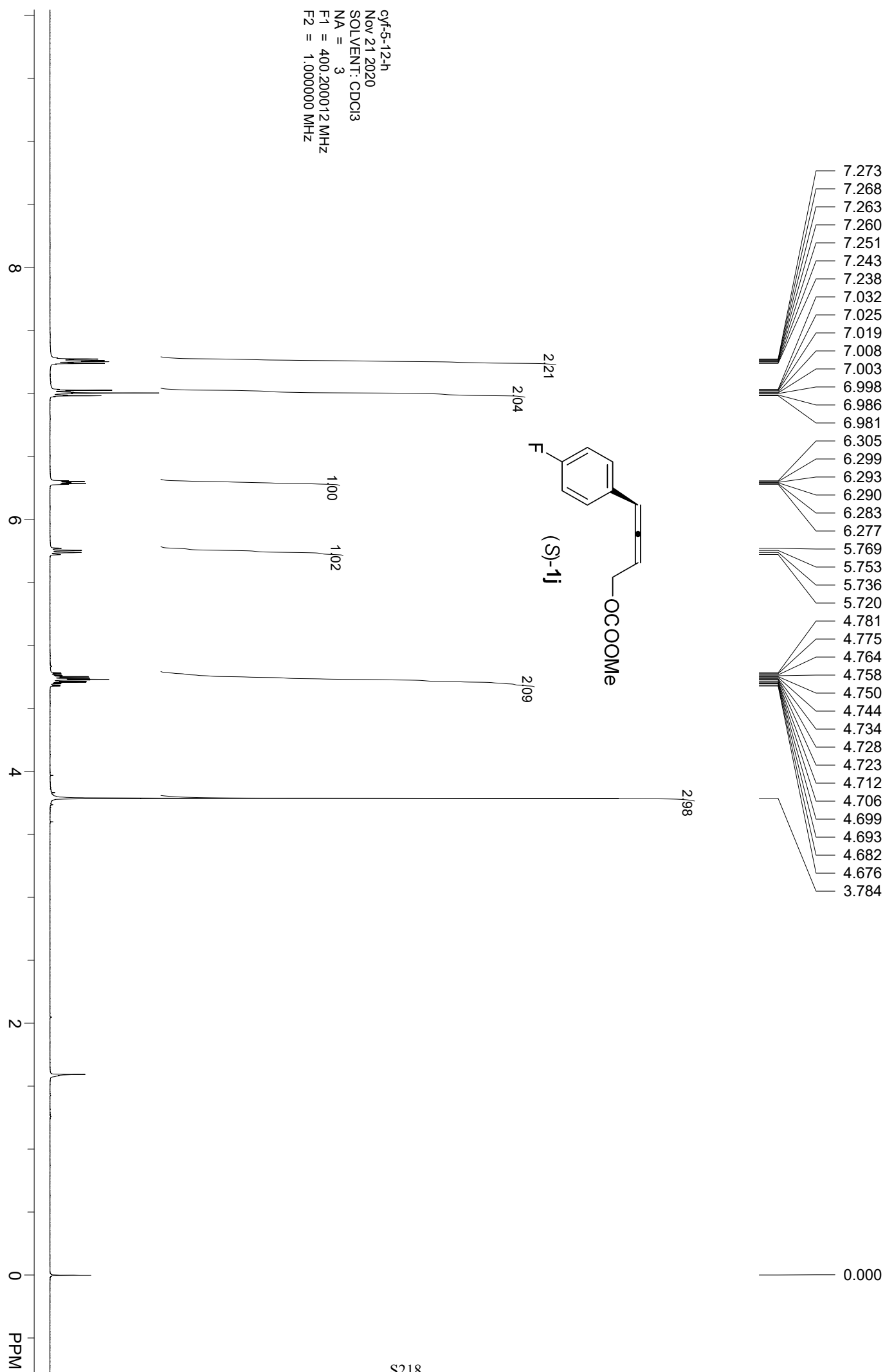


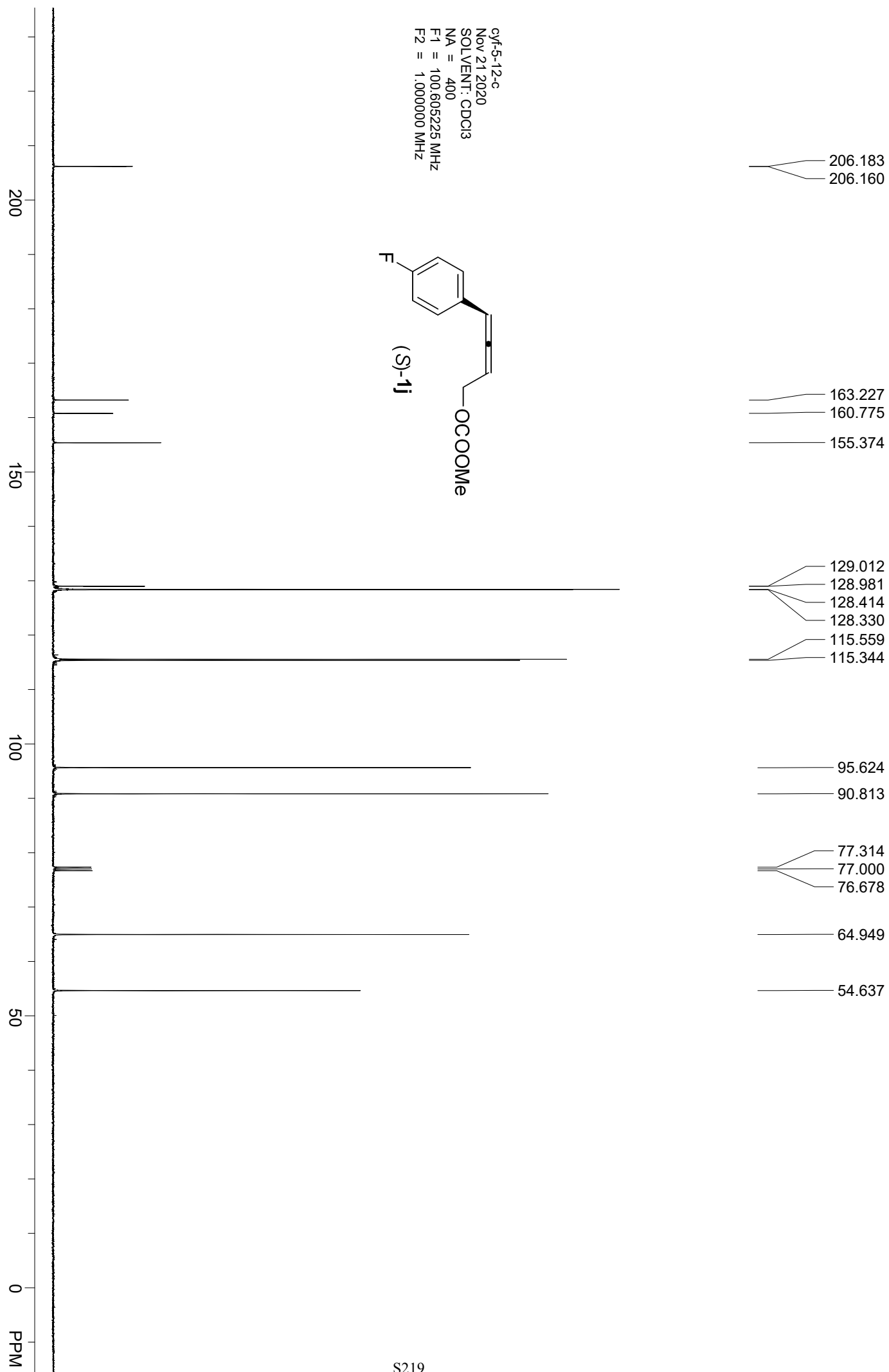
Peak Results

CYF-5-6	16	8.448	8.448	35.000	11001	128138	4.04
CYF-5-6	16	8.925	8.925	55.000	251619	3046802	95.96

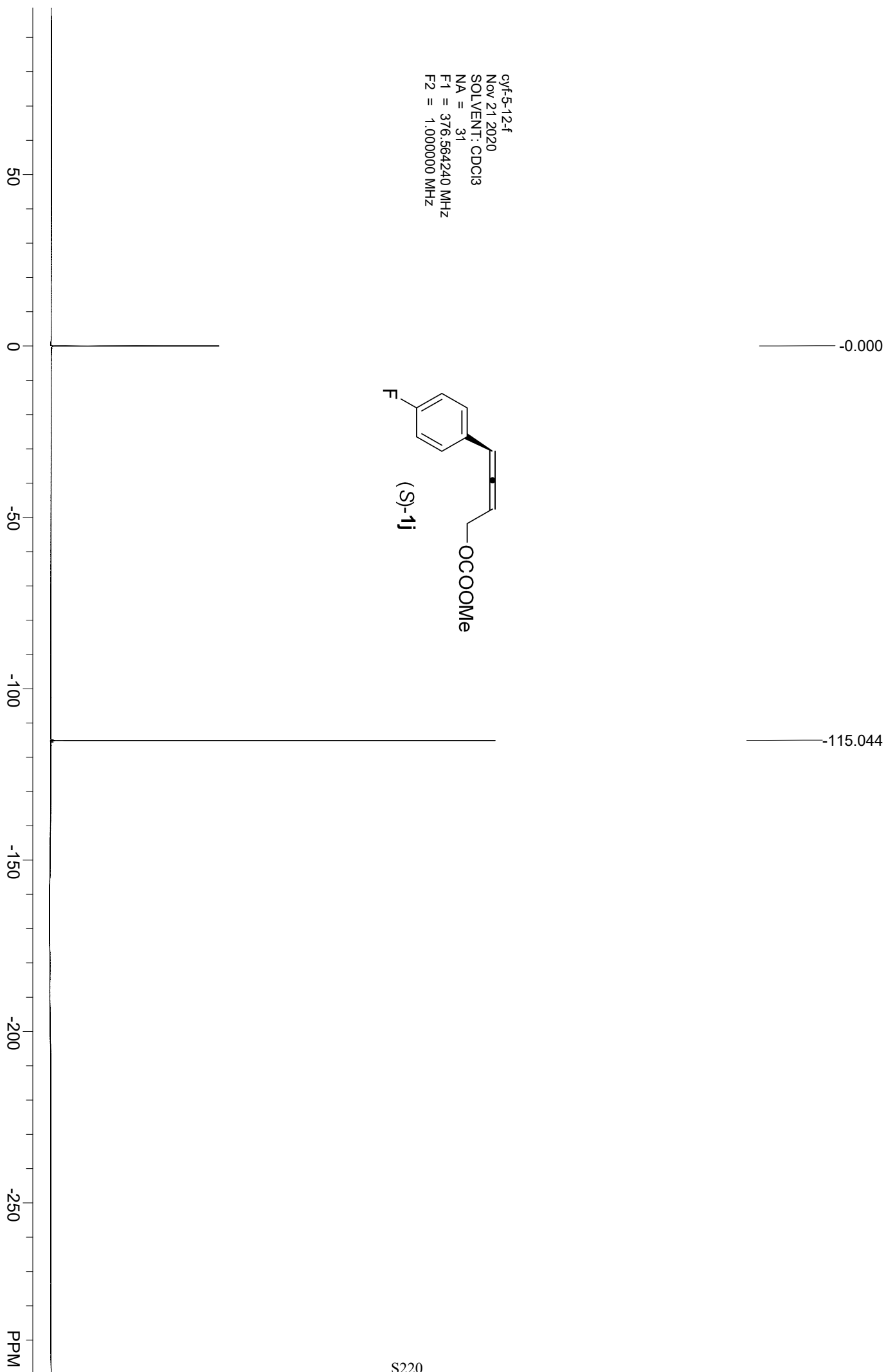
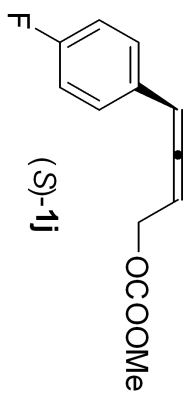
Reported by User: System
 Report Method: Default Individual Report
 Report Method ID: 27608
 Page: 1 of 1

Project Name: installation
 Date Printed:
 2020/11/19
 14:18:41 PRC



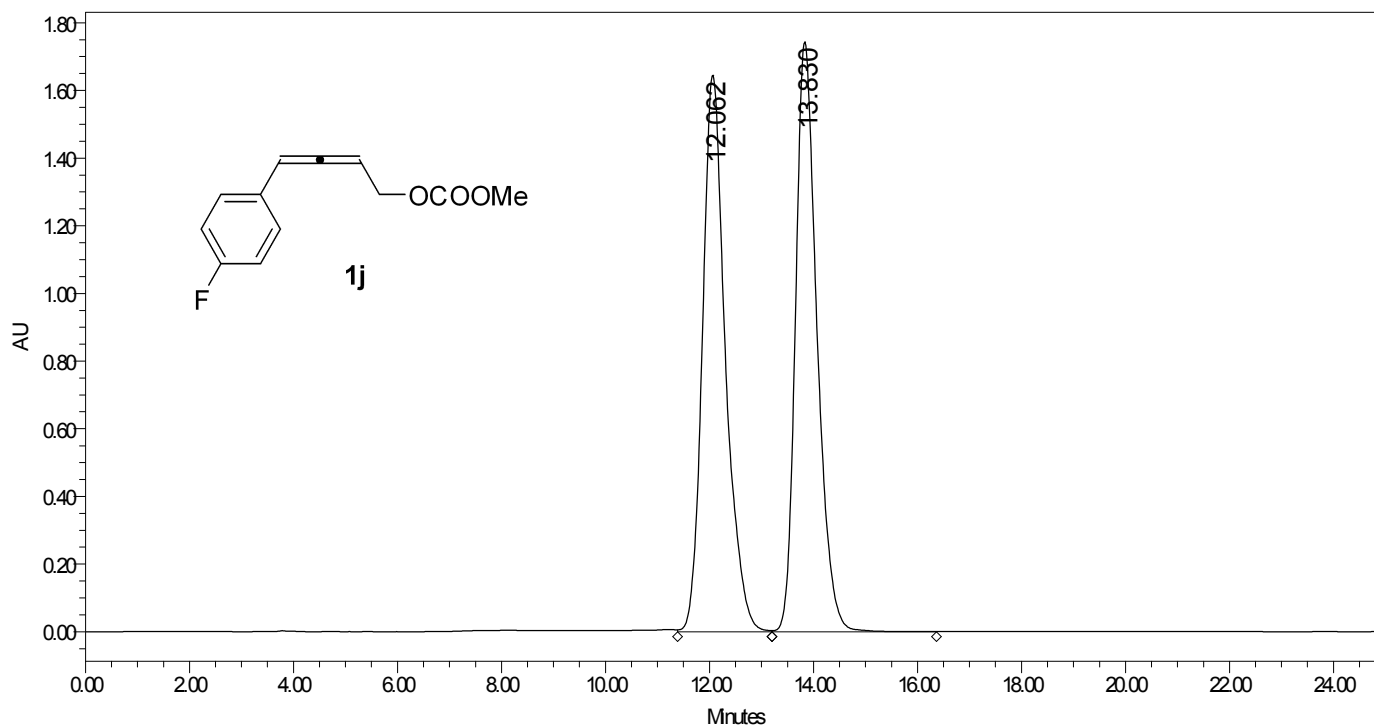


cyf-5-12-f
Nov 21 2020
SOLVENT: CDCl₃
NA = 31
F1 = 376,564240 MHz
F2 = 1,000000 MHz



SAMPLE INFORMATION

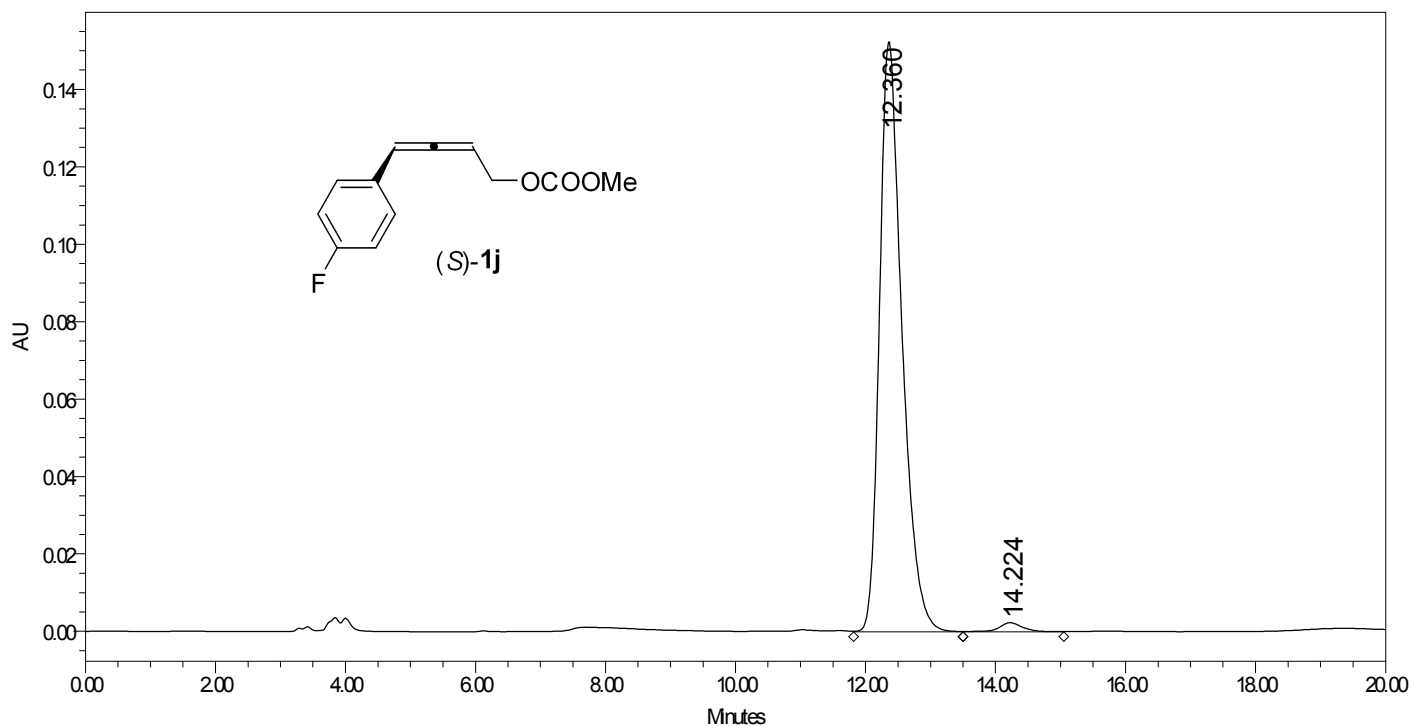
Sample Name:	cyf-3-100-ad-h-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	6	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/23/2020 7:13:51 PMEST		
Date Processed:	11/23/2020 8:16:07 PMEST		



	RT	Area	%Area	Height
1	12.062	50408808	50.30	1645787
2	13.830	49807939	49.70	1743521

SAMPLE INFORMATION

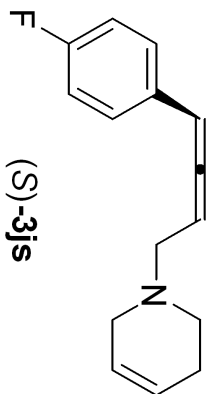
Sample Name:	cyf-5-12-ad-h-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	5	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/23/2020 6:50:26 PMEST		
Date Processed:	11/23/2020 8:16:18 PMEST		



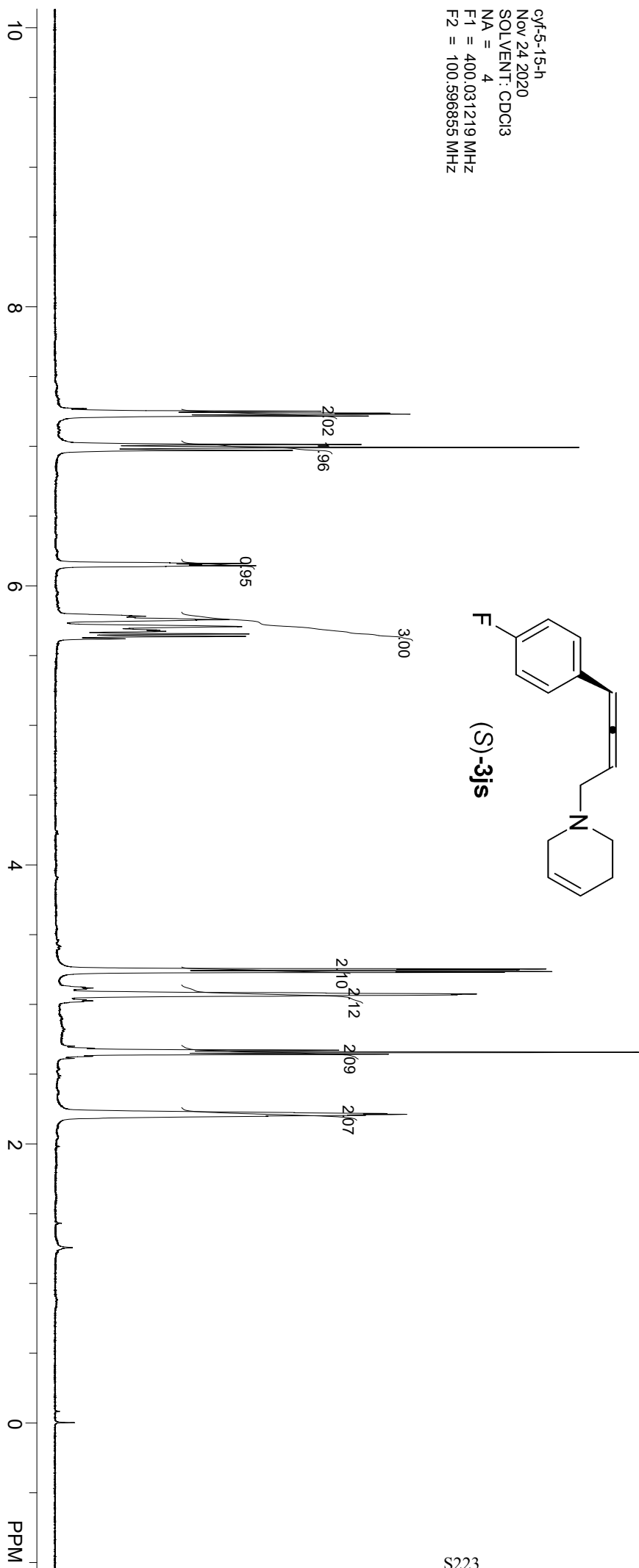
	RT	Area	%Area	Height
1	12.360	3661332	98.40	152530
2	14.224	59628	1.60	2363

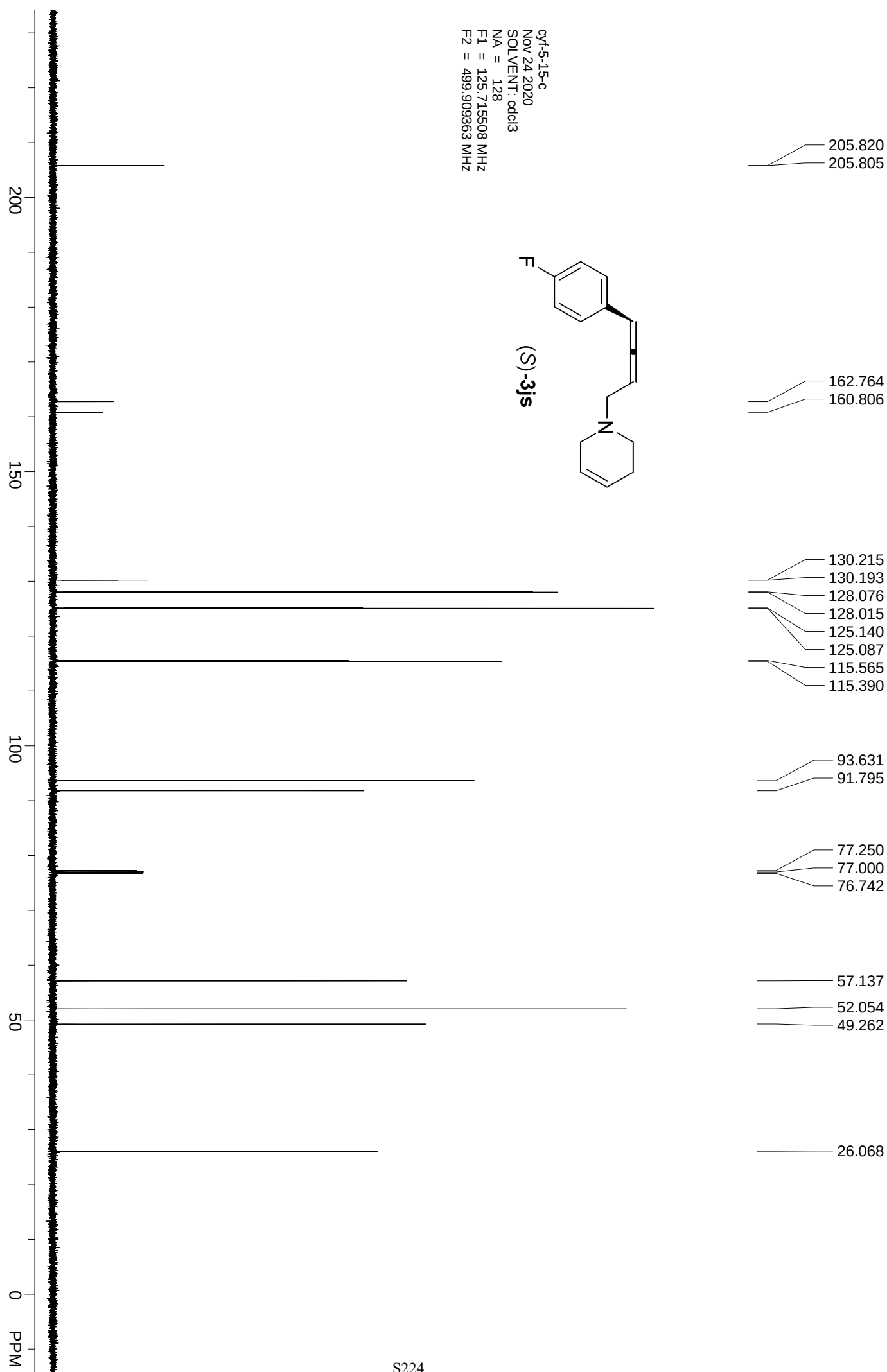
7.270
7.252
7.238
7.231
7.217
7.029
7.013
6.991
6.970
6.165
6.160
6.152
6.144
6.139
5.786
5.781
5.757
5.709
5.682
5.674
5.655
5.638
5.620

3.269
3.253
3.248
3.247
3.235
3.230
3.122
3.117
3.110
3.073
3.071
3.068
3.032
3.025
3.018
2.700
2.685
2.671
2.656
2.642
2.627
2.612
2.217
2.211
2.204
2.197
-0.000

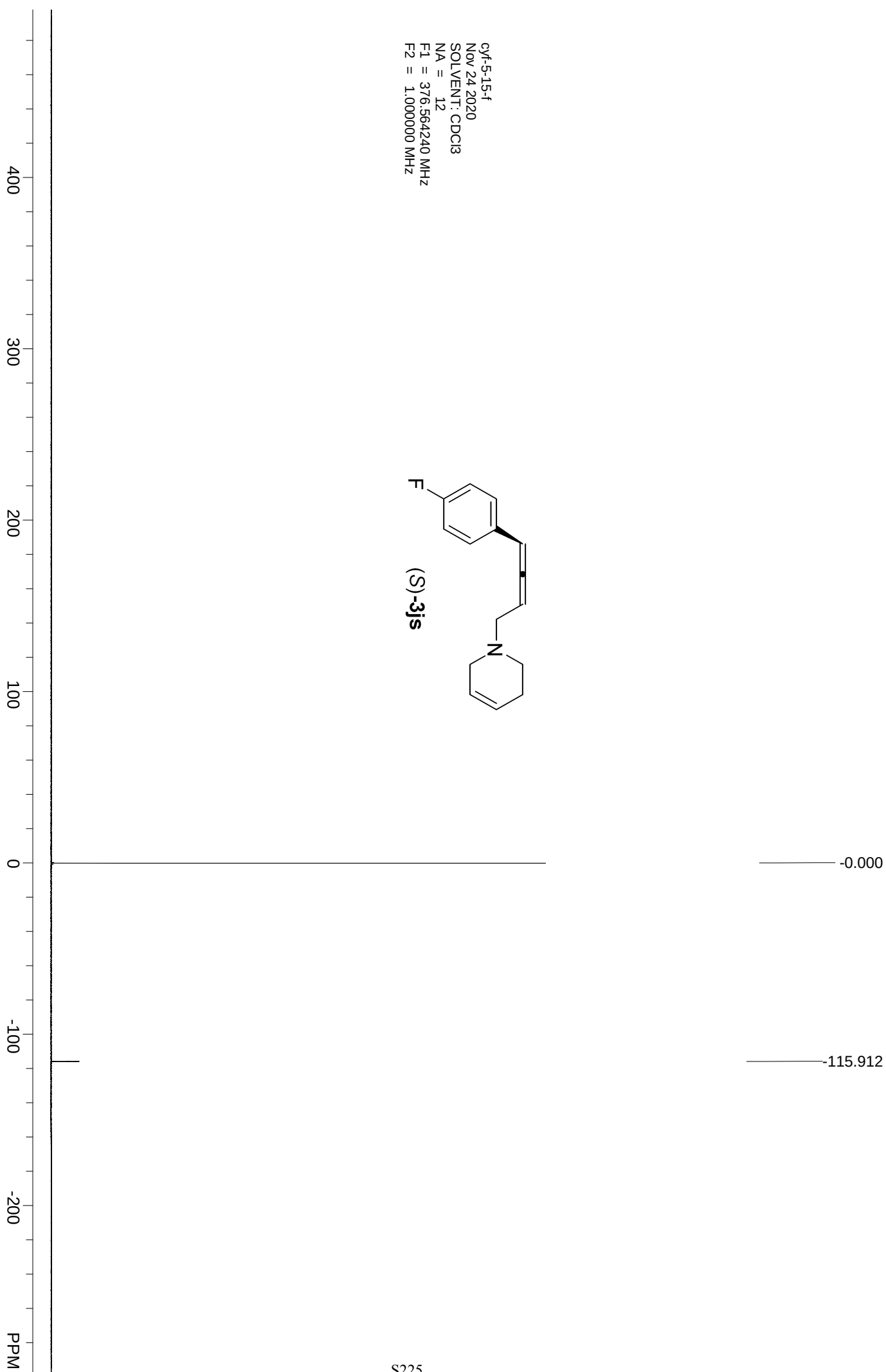
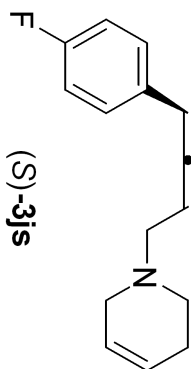


cyf-5-15-h
Nov 24 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031219 MHz
F2 = 100.596855 MHz



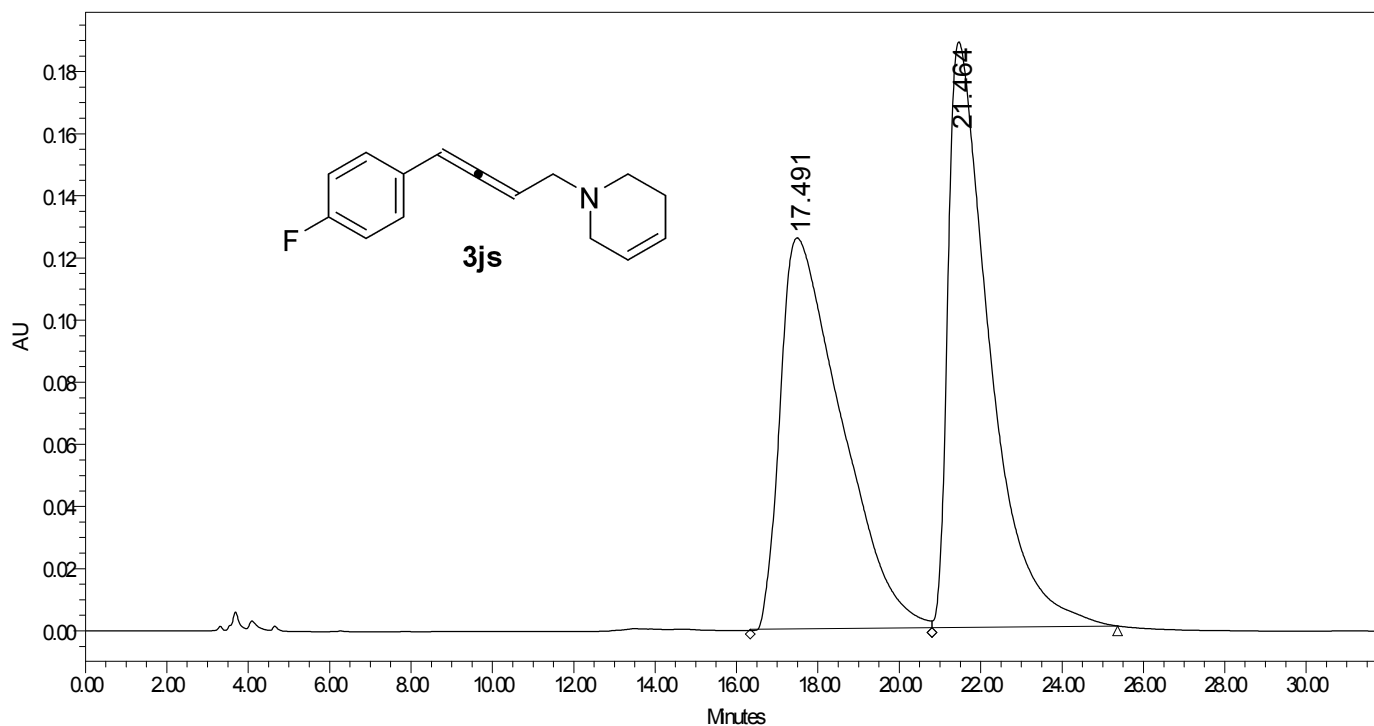


cyf-5-15-f
Nov 24 2020
SOLVENT: CDCl3
NA = 12
F1 = 376.564240 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-101-ig-400-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	15	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	40.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/24/2020 6:44:38 PMEST		
Date Processed:	11/24/2020 8:42:01 PMEST		



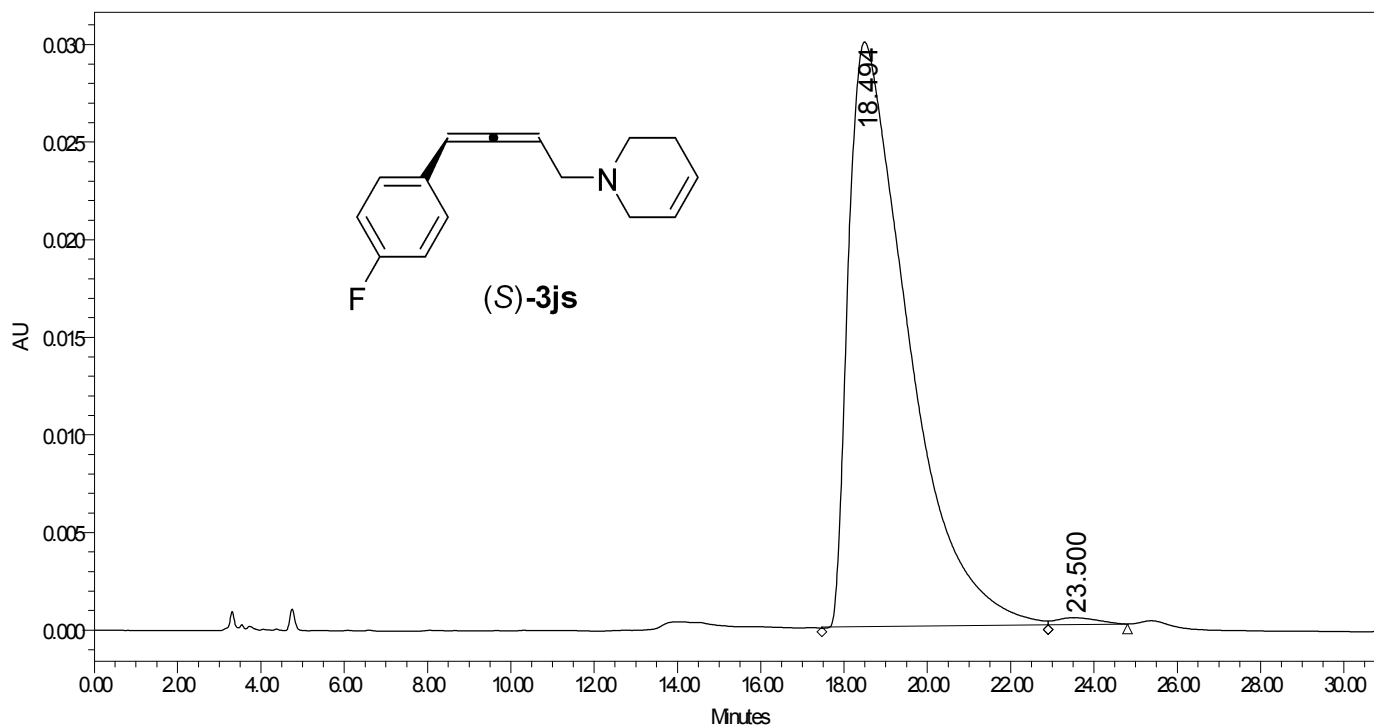
	RT	Area	%Area	Height
1	17.491	13112769	49.52	125760
2	21.464	13366399	50.48	188404

SAMPLE INFORMATION

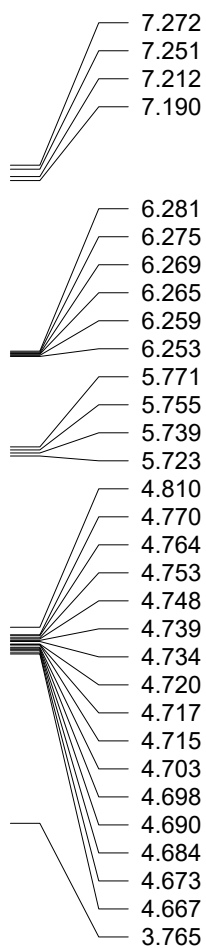
Sample Name: cyf-5-15-2-ig400-1-1-214
Sample Type: Unknown
Vial: 1
Injection#: 14
Injection Volume: 10.00 µl
Run Time: 40.0 Minutes

Acquired By: System
Sample Set Name:
Acq. Method Set: HPLC
Processing Method: Default
Channel Name: W2489 ChA
Proc. Chnl. Descr.: W2489 ChA.214nm

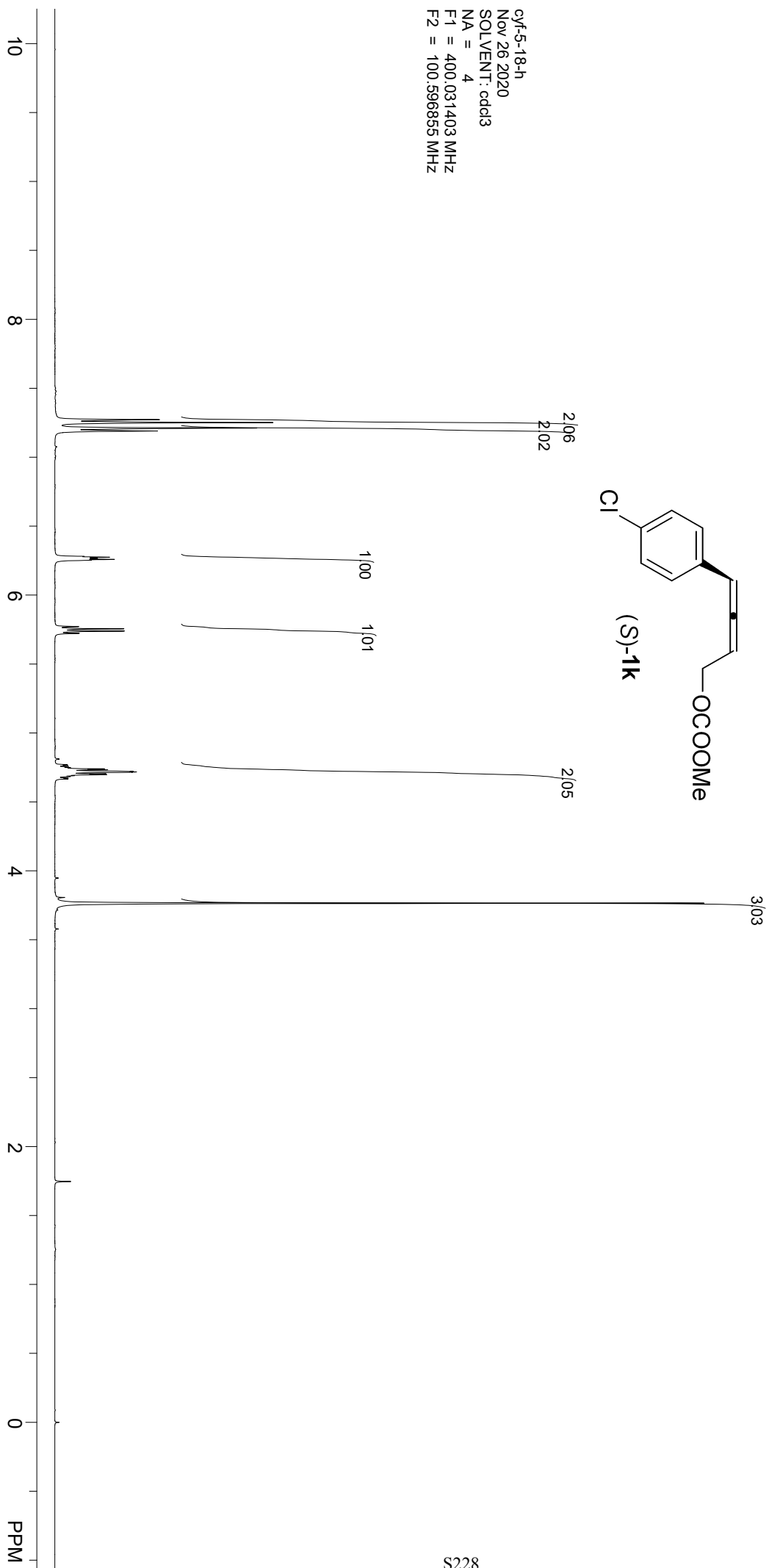
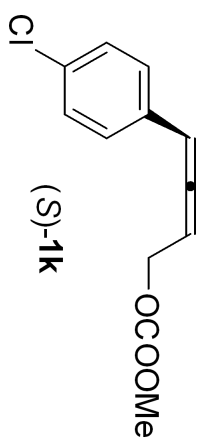
Date Acquired: 11/24/2020 6:12:26 PMEST
Date Processed: 11/24/2020 8:42:19 PMEST



	RT	Area	%Area	Height
1	18.494	2979538	99.19	29949
2	23.500	24278	0.81	352

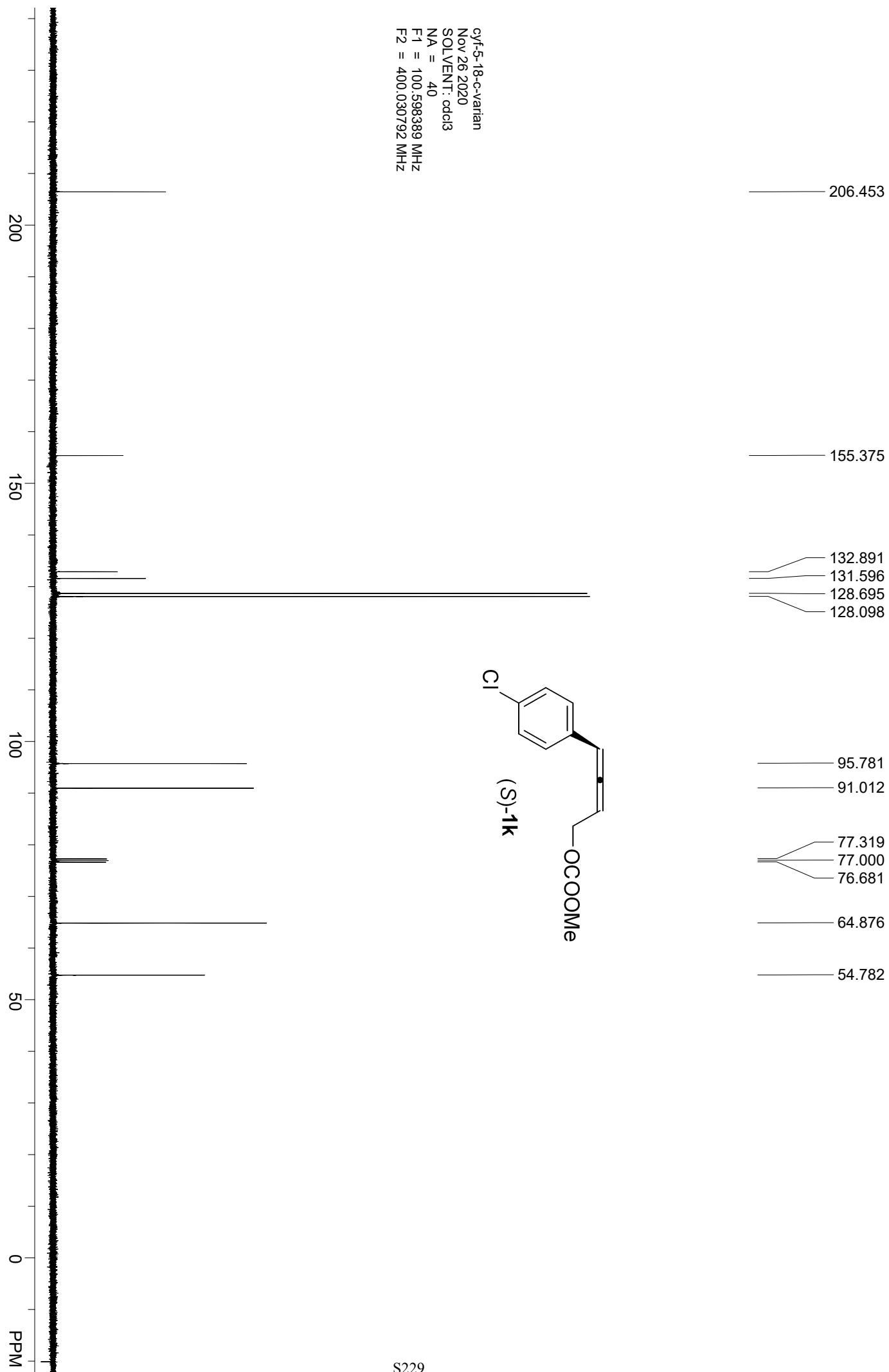
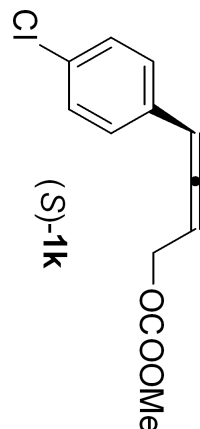


-0.001



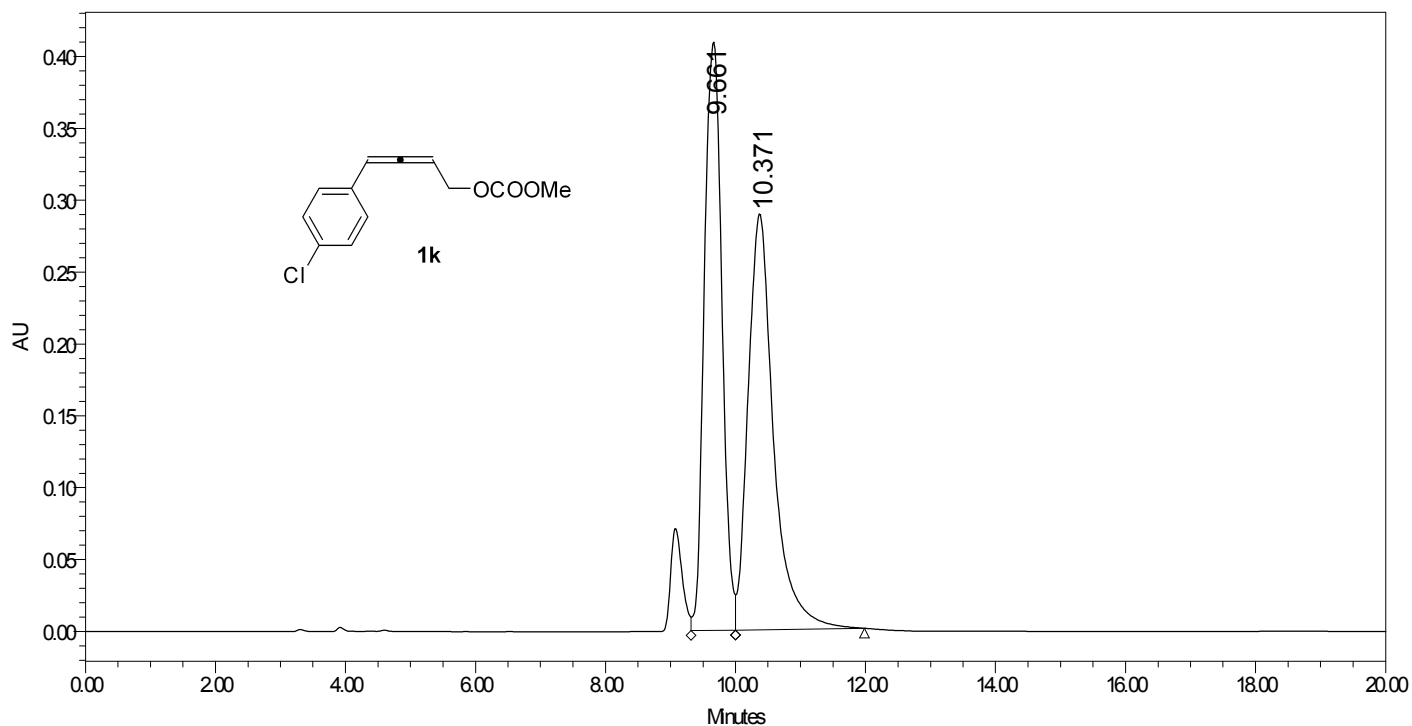
cyf-5-18-h
Nov 26 2020
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz

cyf-5-18-c-varian
Nov 26 2020
SOLVENT: cdc13
NA = 40
F1 = 100.598389 MHz
F2 = 400.030792 MHz



SAMPLE INFORMATION

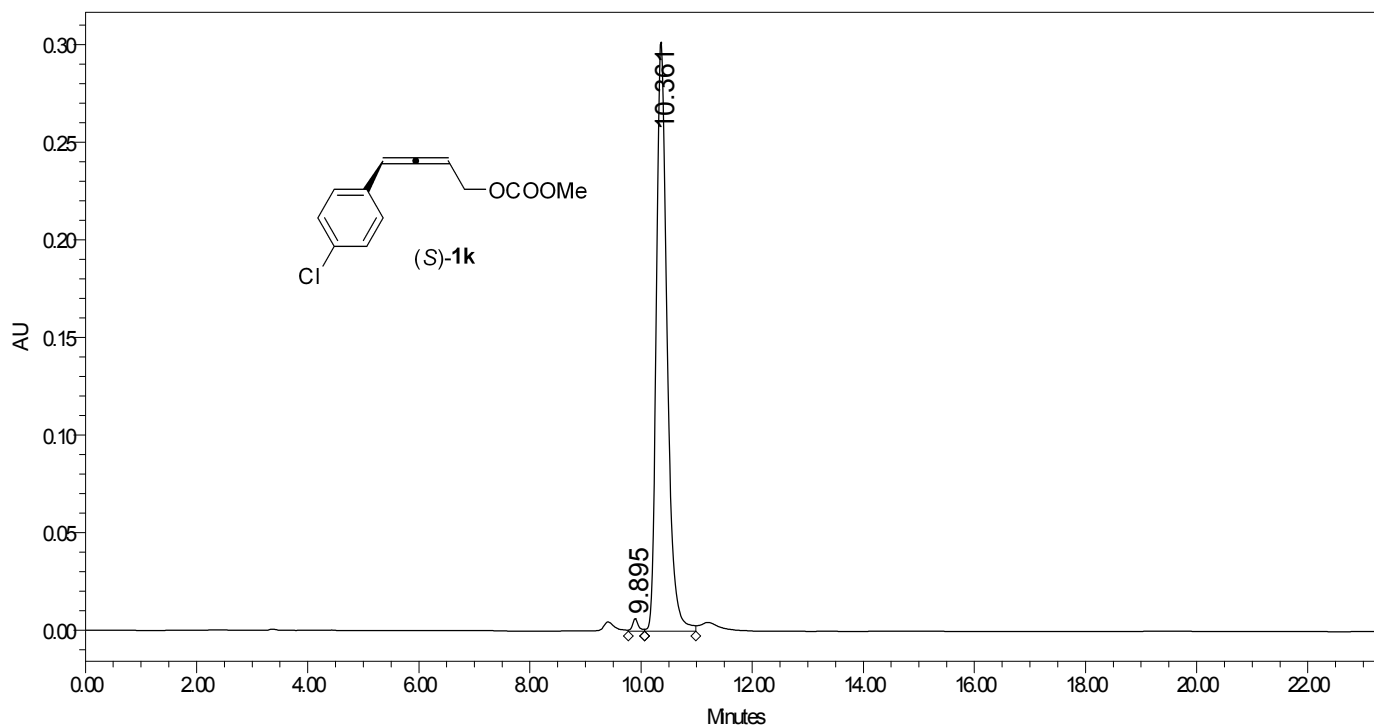
Sample Name:	cyf-4-10-ib-400-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	10	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	20.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/24/2020 1:00:07 PMEST		
Date Processed:	11/24/2020 8:42:54 PMEST		



	RT	Area	%Area	Height
1	9.661	7699230	49.43	409702
2	10.371	7877722	50.57	289314

SAMPLE INFORMATION

Sample Name:	cyf-5-18-ib-400-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	9	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	55.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/24/2020 12:35:04 PMEST		
Date Processed:	11/24/2020 8:43:42 PMEST		

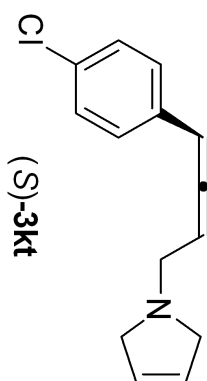


	RT	Area	%Area	Height
1	9.895	49383	1.19	6429
2	10.361	4087870	98.81	302454

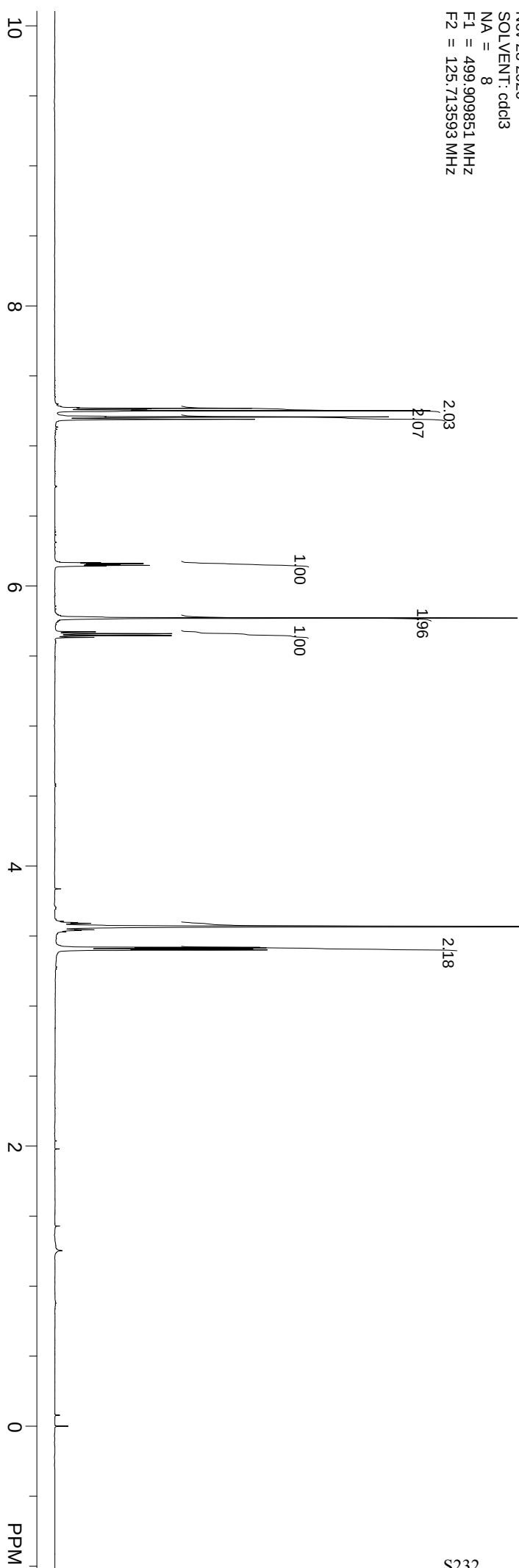
7.283
7.273
7.269
7.265
7.256
7.252
7.212
7.208
7.190
6.166
6.160
6.154
6.147
6.142
5.771
5.673
5.660
5.646
5.633

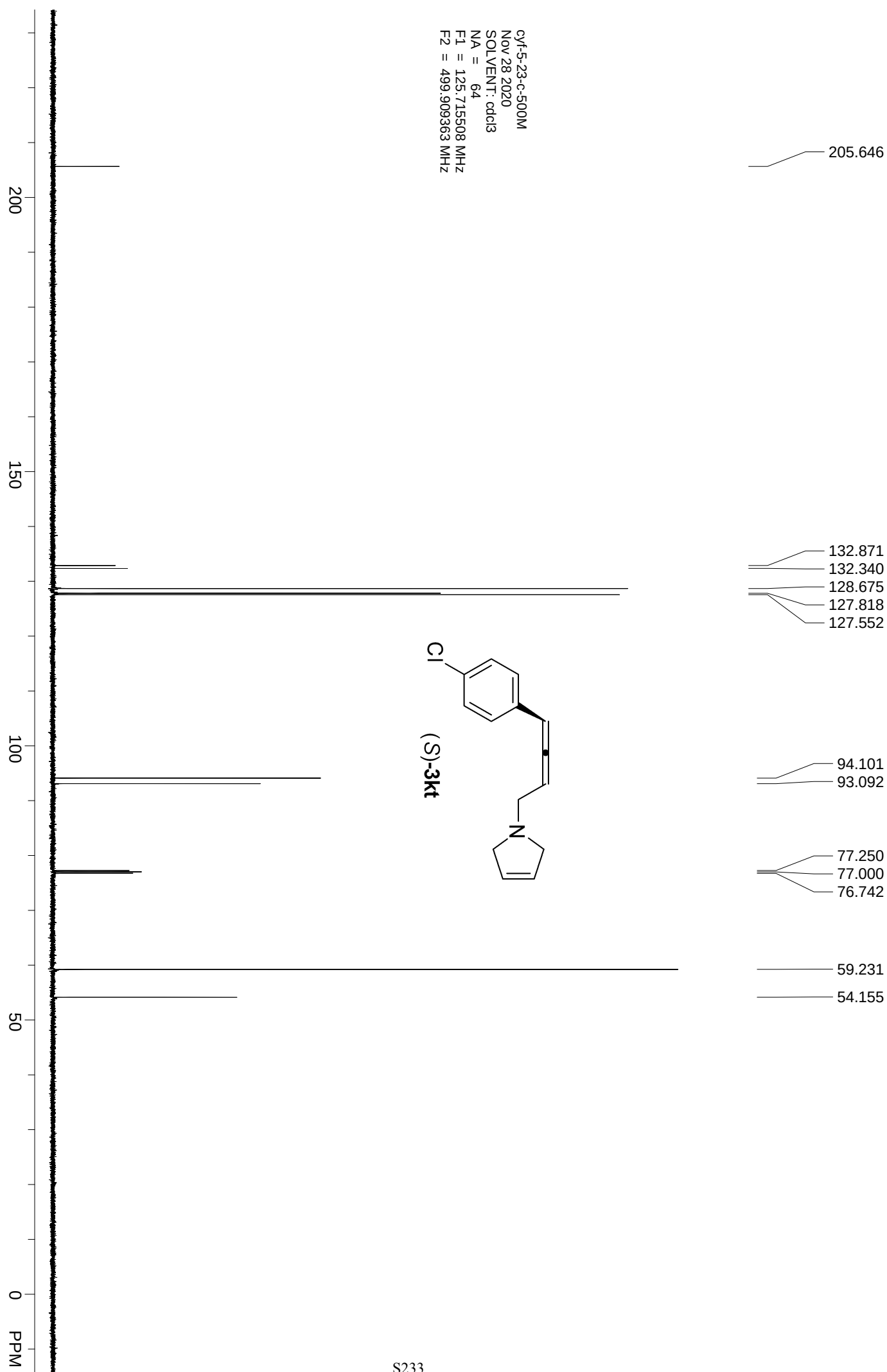
3.605
3.596
3.591
3.569
3.567
3.545
3.541
3.531
3.419
3.415
3.406
3.401

0.000



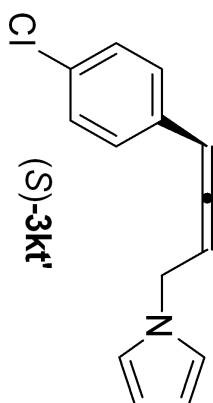
cyf-5-23-h-500M
 Nov 28 2020
 SOLVENT: cdcl3
 NA = 8
 F1 = 499.909851 MHz
 F2 = 125.713593 MHz



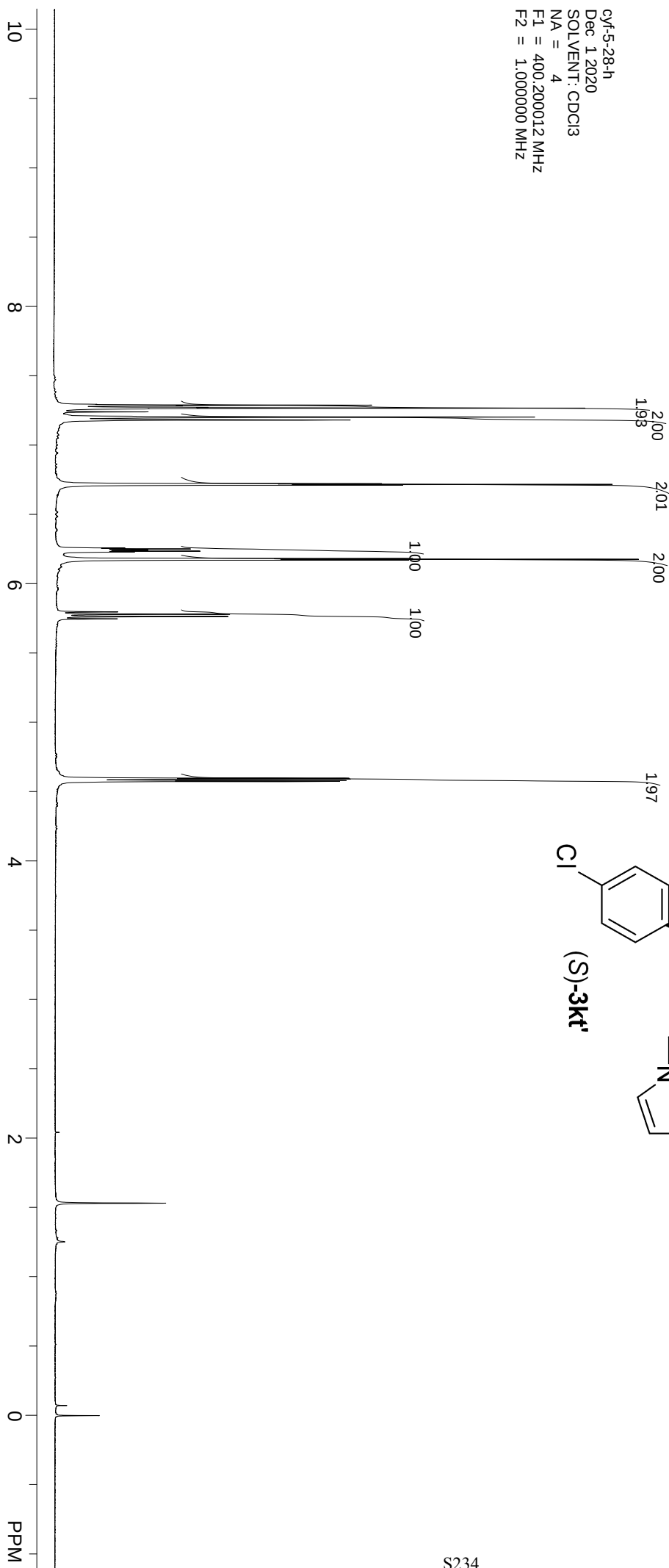


7.293
7.288
7.283
7.272
7.267
7.261
7.239
7.202
7.180
6.721
6.716
6.711
6.256
6.250
6.243
6.241
6.234
6.228
6.181
6.176
6.171
5.796
5.780
5.763
5.746
4.597
4.591
4.580
4.574

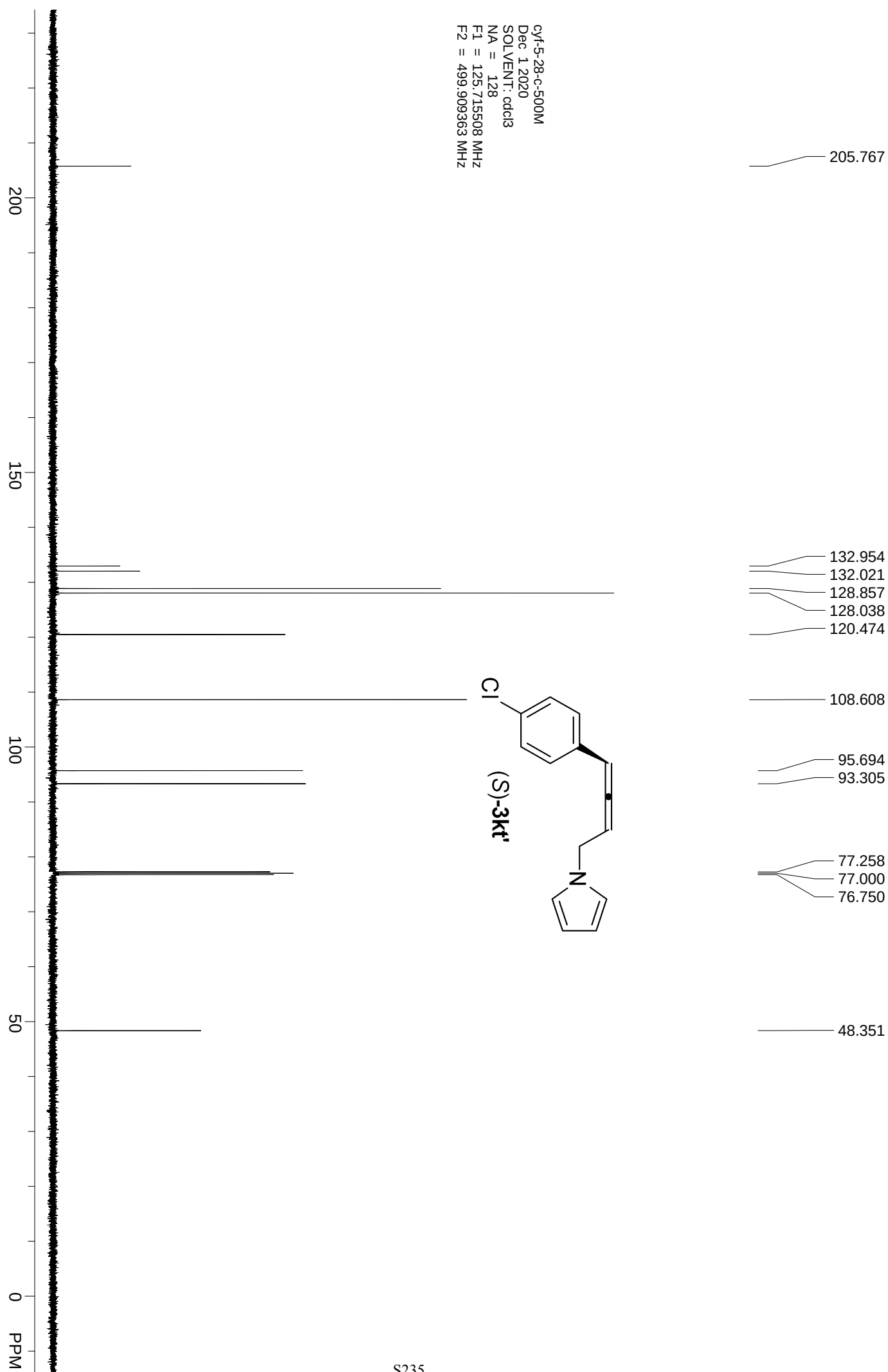
0.000



cyf-5-28-h
Dec 1 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.20012 MHz
F2 = 1.000000 MHz



cyf-5-28-c-500M
Dec 1 2020
SOLVENT: cdcl3
NA = 128
F1 = 125.71508 MHz
F2 = 499.909363 MHz

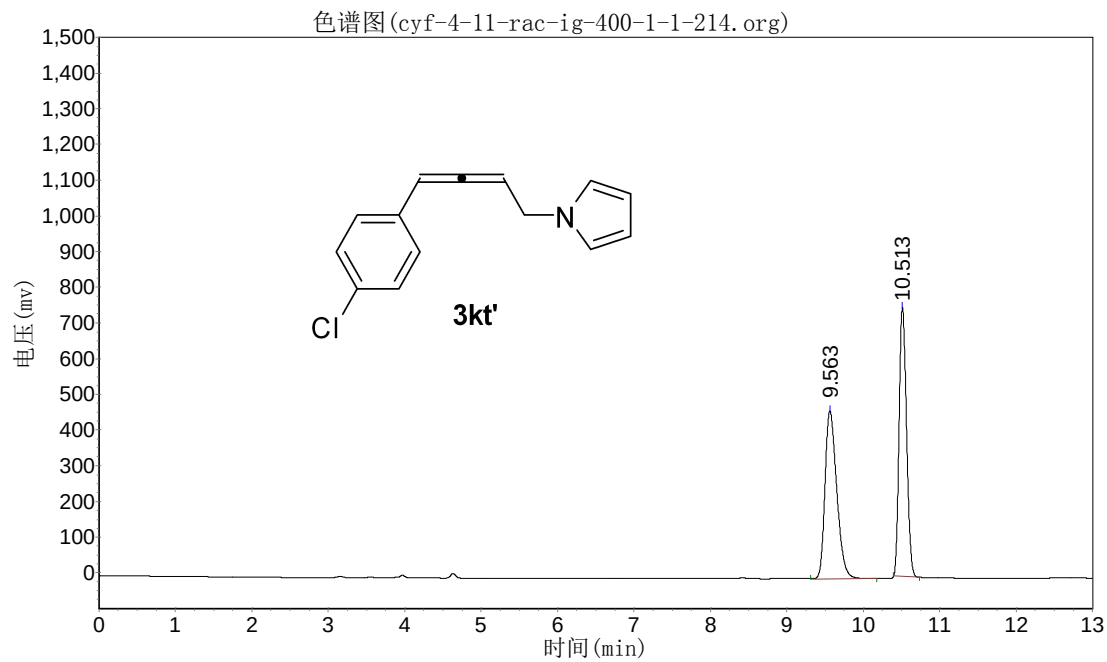


cyf-4-11-rac-ig-400-1-1-214

实验时间: 2020/12/2, 13:55:59
谱图文件:D:\zhuguangjiong\cyf\20201202\cyf-4-11-rac-ig-400-1-1-214.org

报告时间: 2020/12/2, 14:43:06

实验内容简介:



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		9.563	470932.625	5024342.500	49.7179
2		10.513	753501.563	5081361.500	50.2821
总计			1224434.188	10105704.000	100.0000

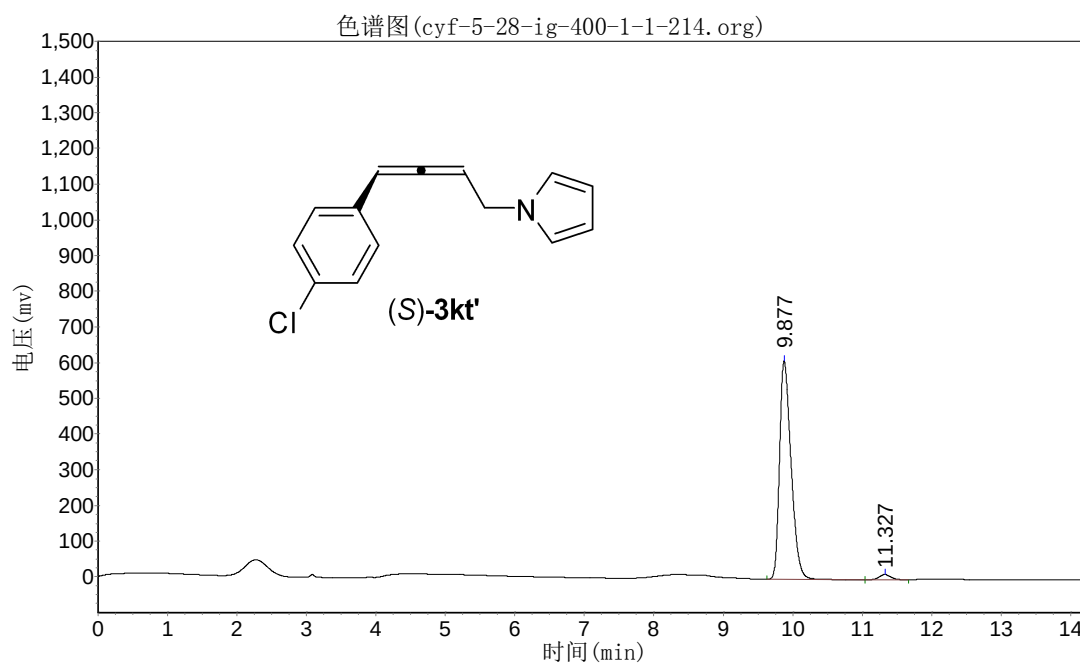
cyf-5-28-ig-400-1-1-214

实验时间: 2020/12/2, 14:24:33

报告时间: 2020/12/2, 14:41:14

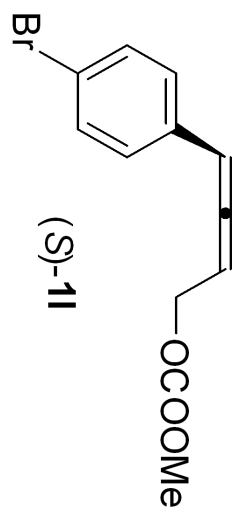
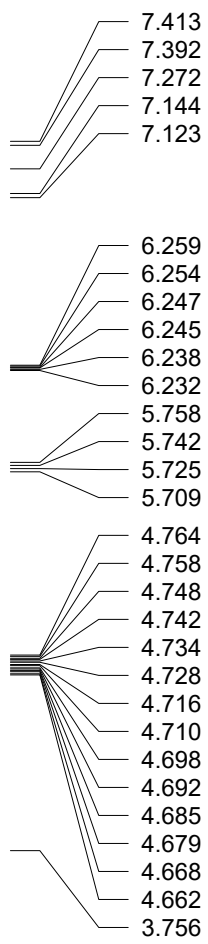
谱图文件: D:\zhuguangjiong\cyf\20201202\cyf-5-28-ig-400-1-1-214.org

实验内容简介:

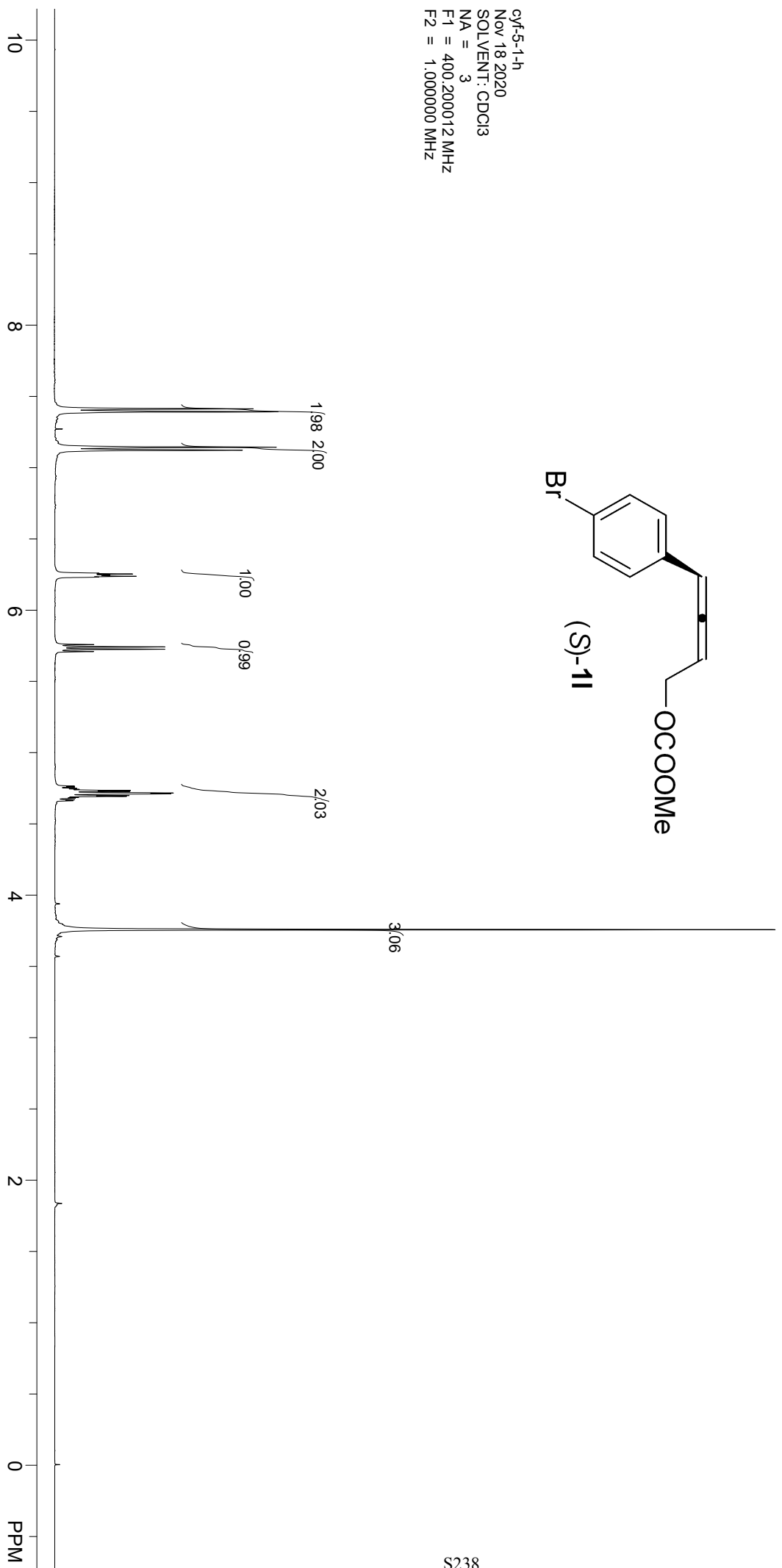


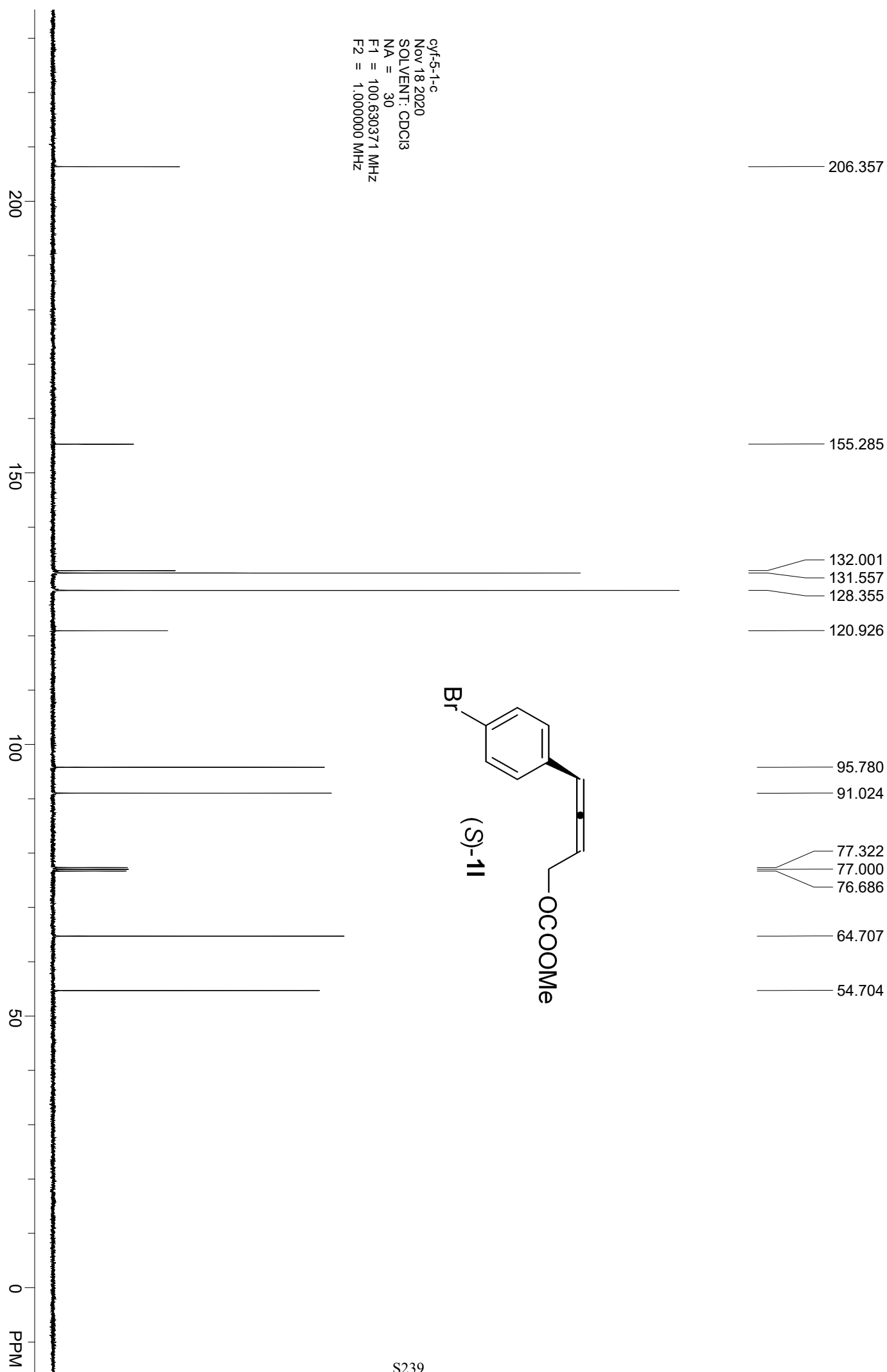
分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		9.877	612408.375	7046183.000	97.7675
2		11.327	14242.266	160895.000	2.2325
总计			626650.641	7207078.000	100.0000



cyf-5-1-h
Nov 18 2020
SOLVENT: CDCl3
NA = 3
F1 = 400.200012 MHz
F2 = 1.000000 MHz





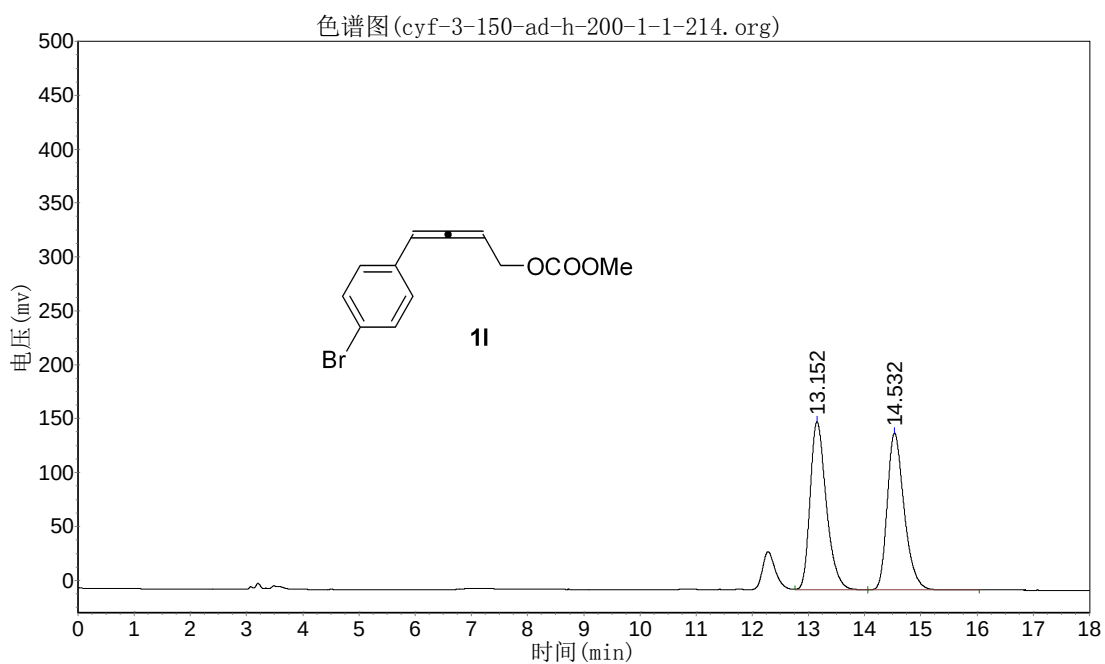
cyf-3-150-ad-h-200-1-1-214

实验时间: 2020/11/19, 12:25:17

报告时间: 2020/11/19, 17:29:06

谱图文件: D:\zhuguangjiong\cyf\20201119\cyf-3-150-ad-h-200-1-1-214. org

实验内容简介:



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		13.152	156063.484	3134200.000	50.6897
2		14.532	145520.031	3048905.750	49.3103
总计			301583.516	6183105.750	100.0000

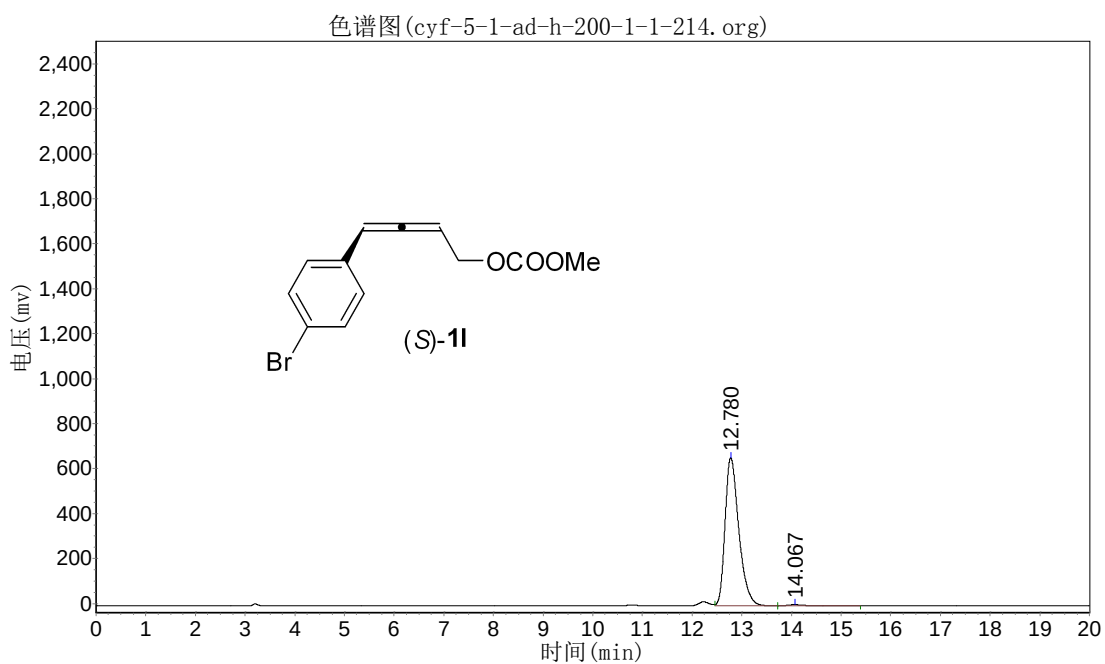
cyf-5-1-ad-h-200-1-1-214

实验时间: 2020/11/19, 13:00:28

报告时间: 2020/11/19, 17:30:19

谱图文件: D:\zhuguangjiong\cyf\20201119\cyf-5-1-ad-h-200-1-1-214.org

实验内容简介:

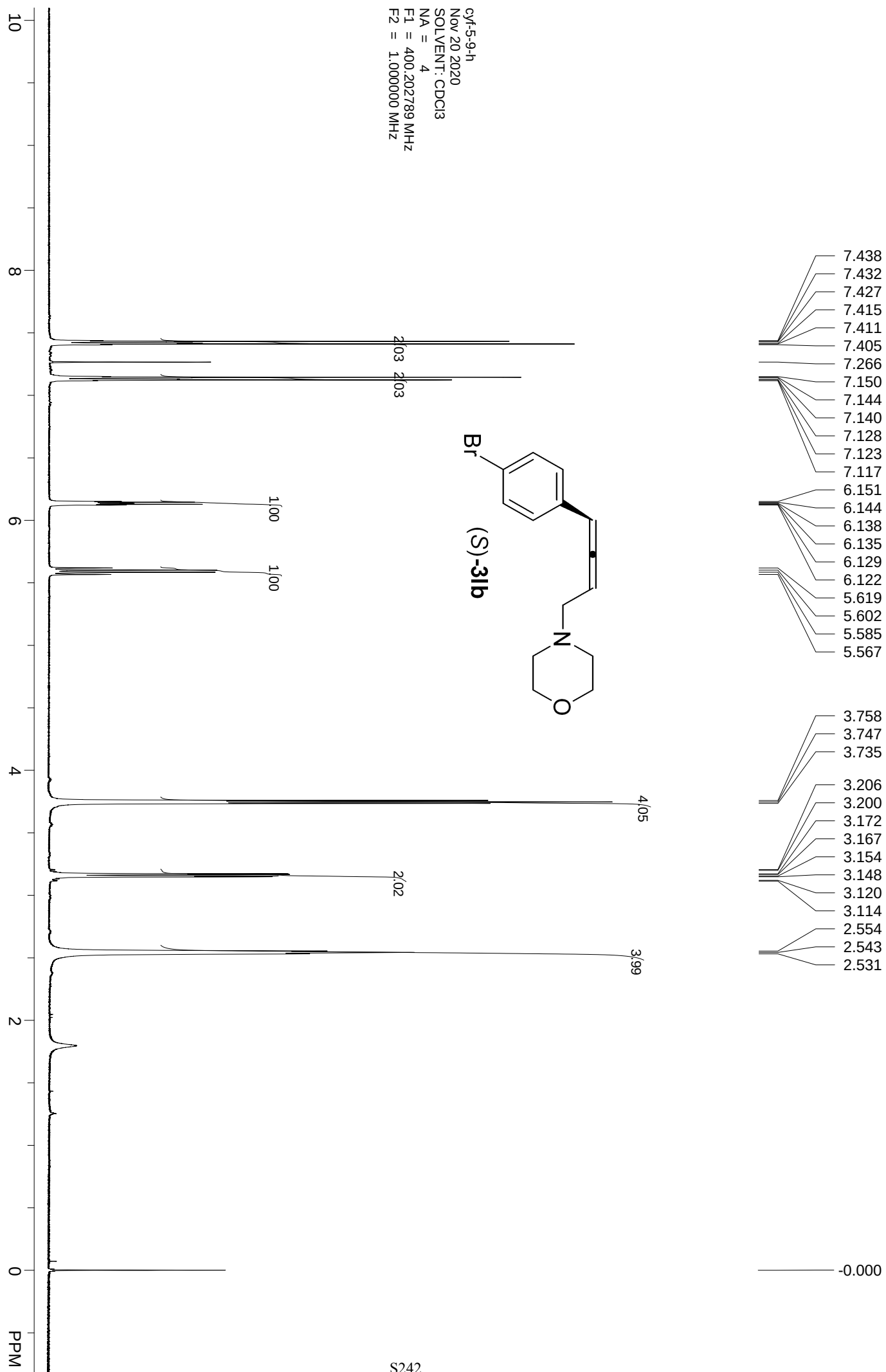


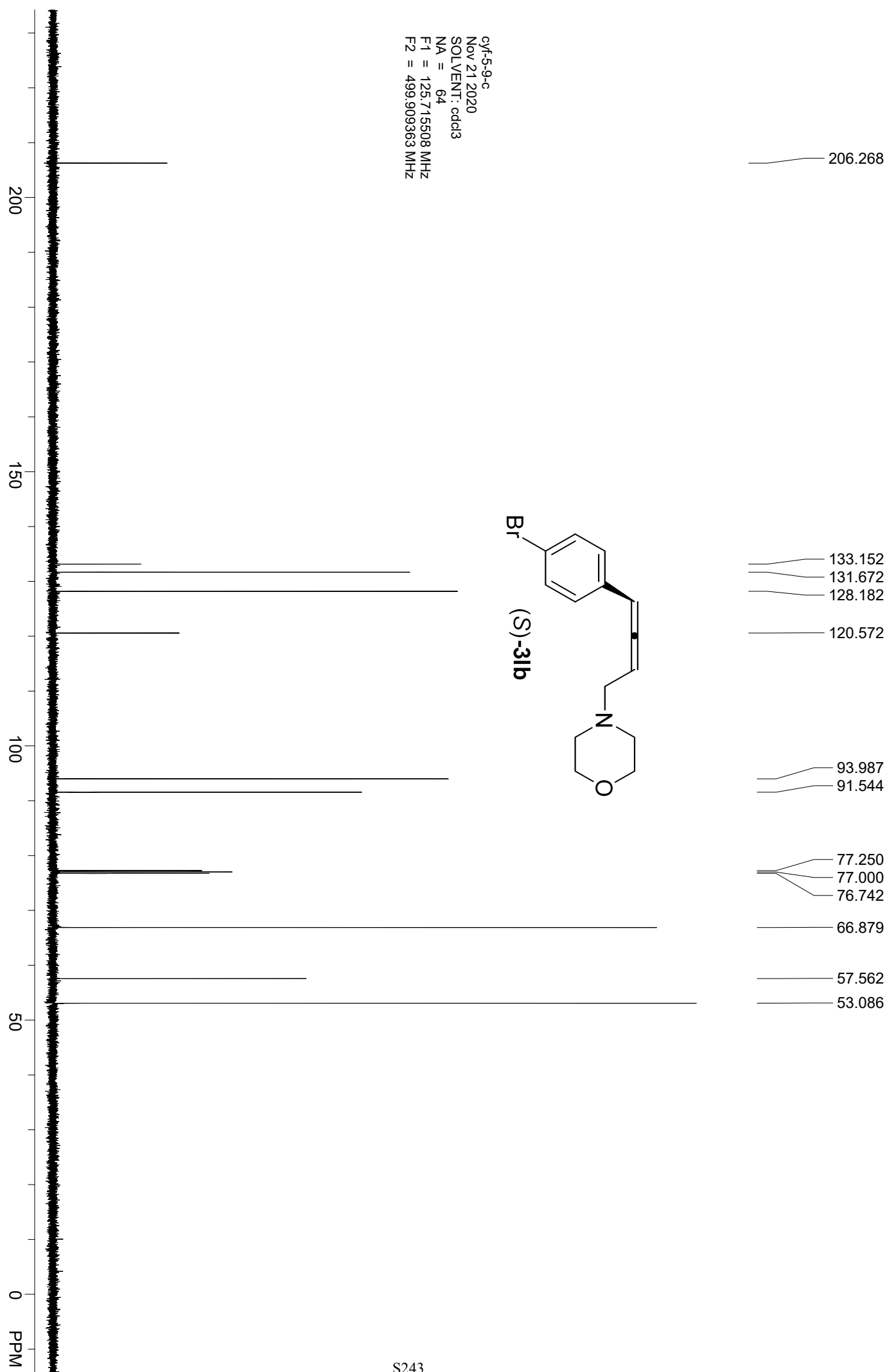
分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		12.780	658634.813	12682768.000	99.1806
2		14.067	5108.150	104781.594	0.8194
总计			663742.962	12787549.594	100.0000

系统评价

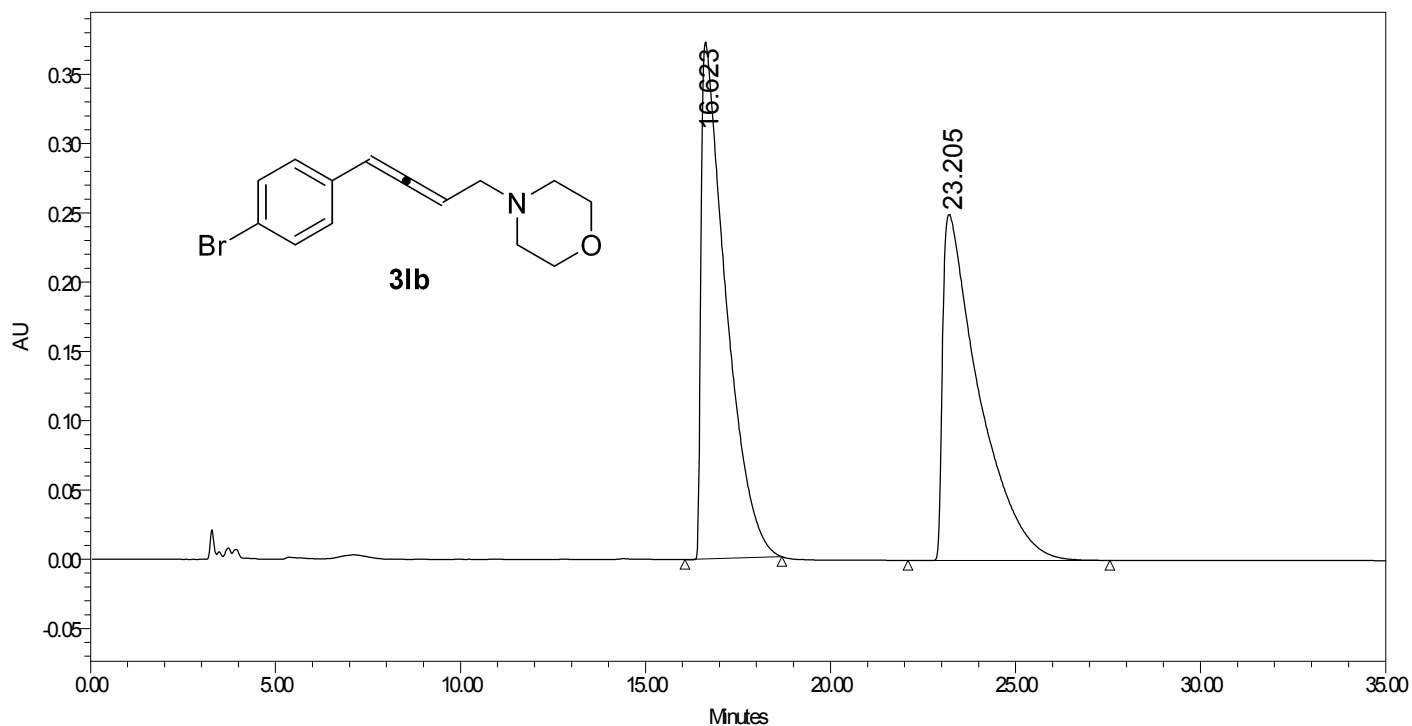
峰号	峰名	保留时间	半峰宽	理论塔板数	分离度	拖尾因子	不对称度
1		12.780	0.293	10532.414	1.013	1.383	1.659
2		14.067	0.298	12357.431	2.197	1.163	1.374





SAMPLE INFORMATION

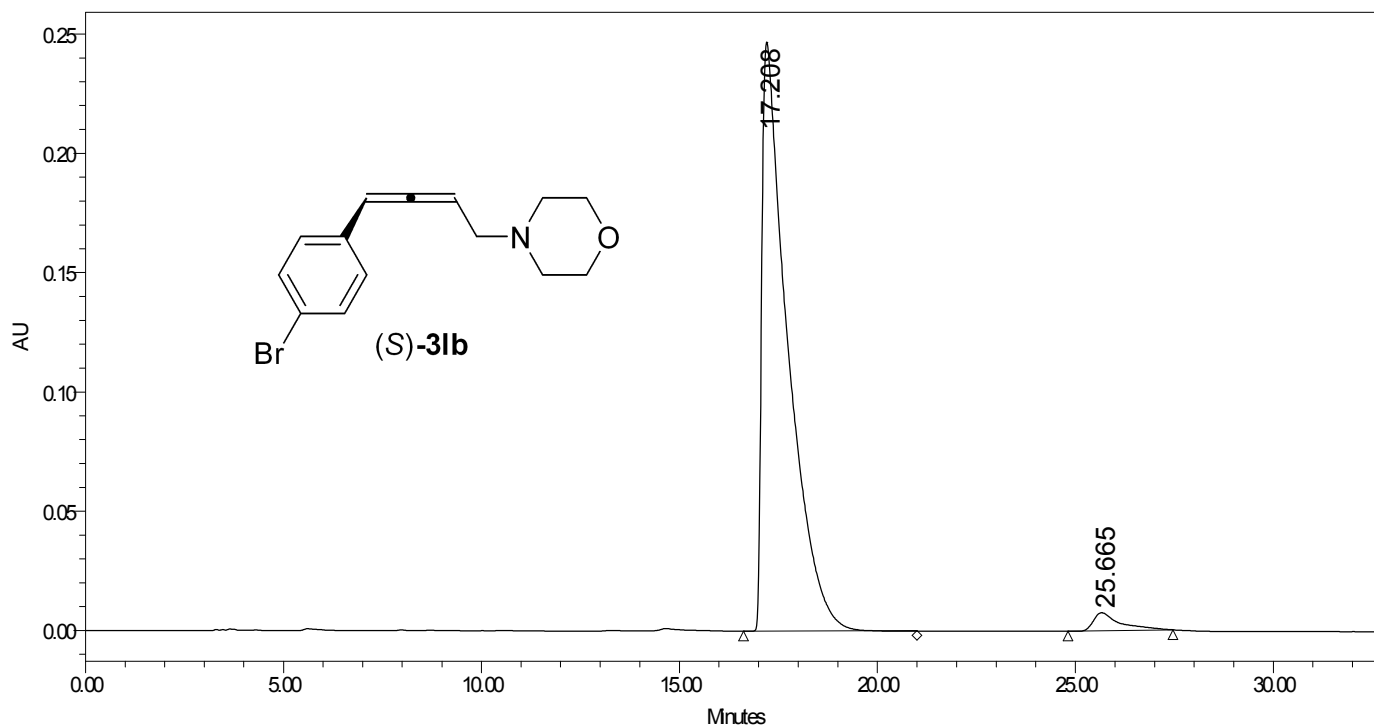
Sample Name:	cyf-3-151-ad-h-100-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	35.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/23/2020 12:43:12 PMEST		
Date Processed:	11/23/2020 8:17:11 PMEST		



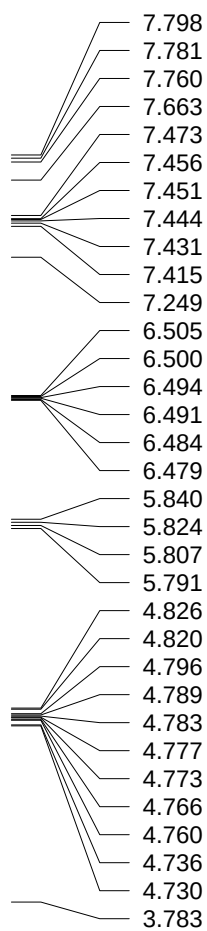
	RT	Area	%Area	Height
1	16.623	17368233	50.49	373335
2	23.205	17032720	49.51	249706

SAMPLE INFORMATION

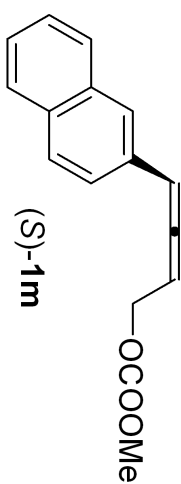
Sample Name:	cyf-5-9-2-ad-h-100-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	3	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	35.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	11/23/2020 3:02:45 PMEST		
Date Processed:	11/23/2020 8:19:09 PMEST		



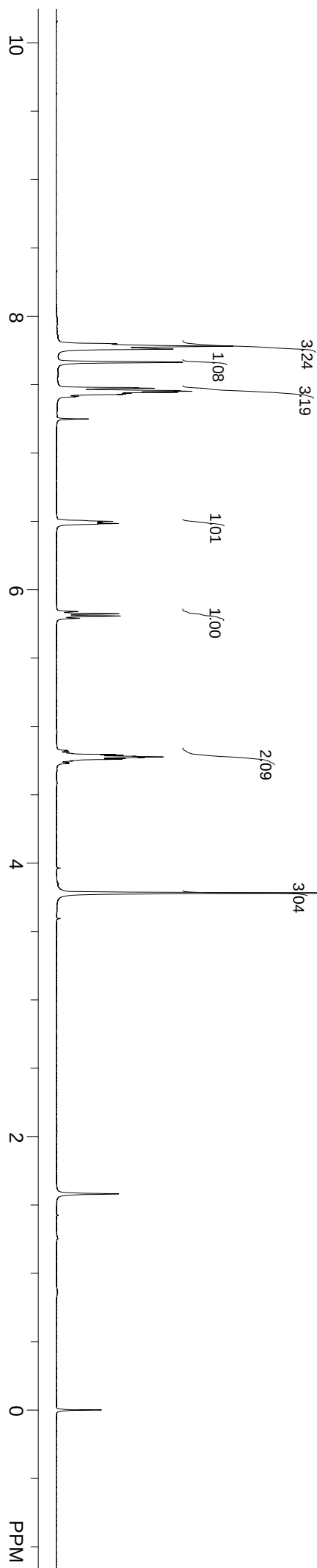
	RT	Area	%Area	Height
1	17.208	11191046	96.90	247070
2	25.665	357852	3.10	7597



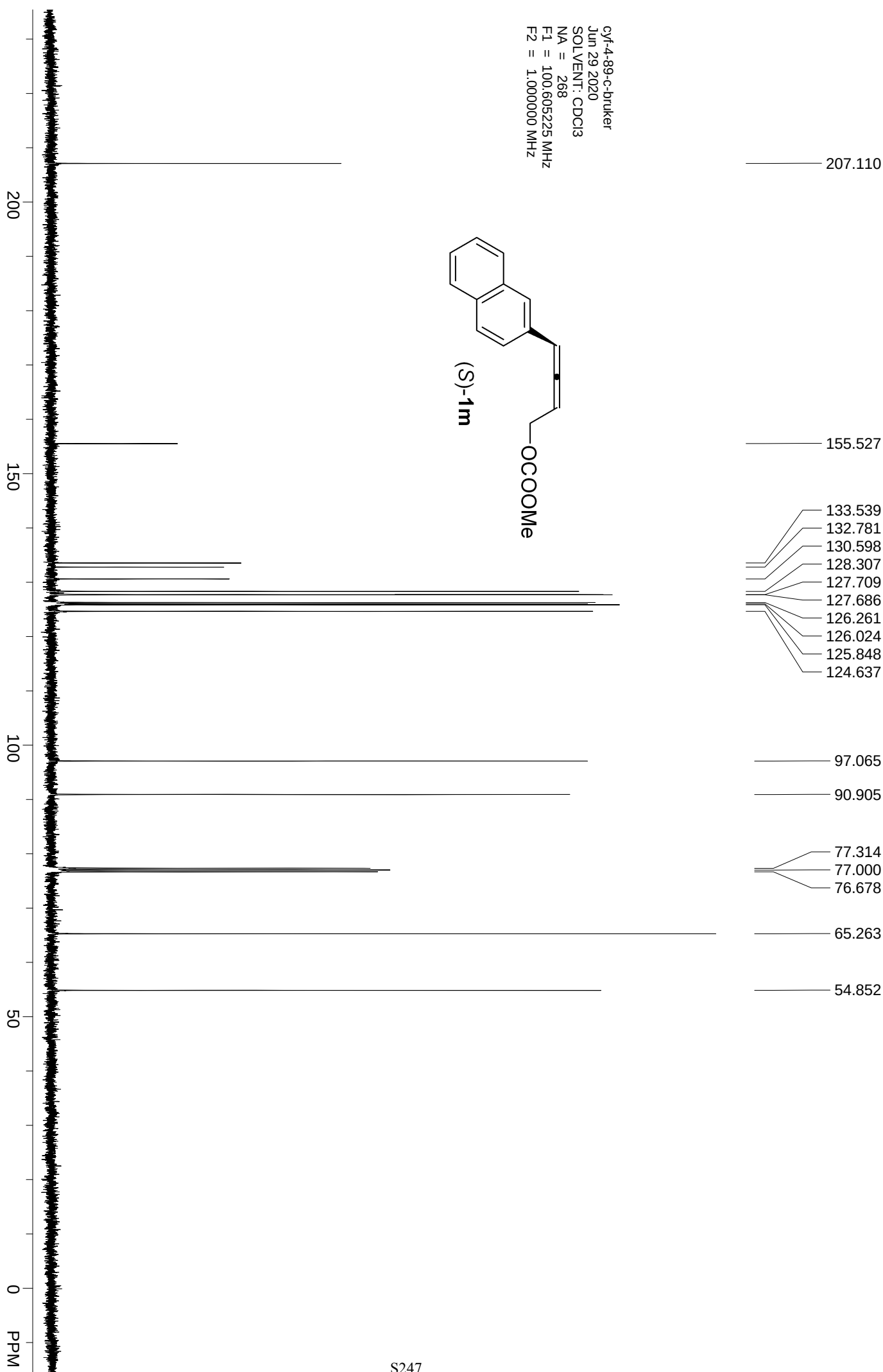
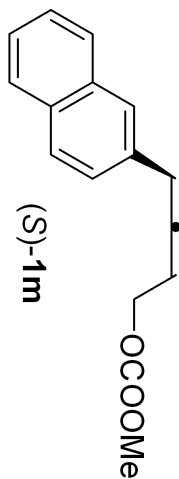
0.000



cyf-4-89-h
Jun 28 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz



cyf-4-89-c-bruker
Jun 29 2020
SOLVENT: CDCl3
NA = 268
F1 = 100.605225 MHz
F2 = 1.000000 MHz



cyf-3-115-rac

实验时间: 2020-06-30, 14:59:37

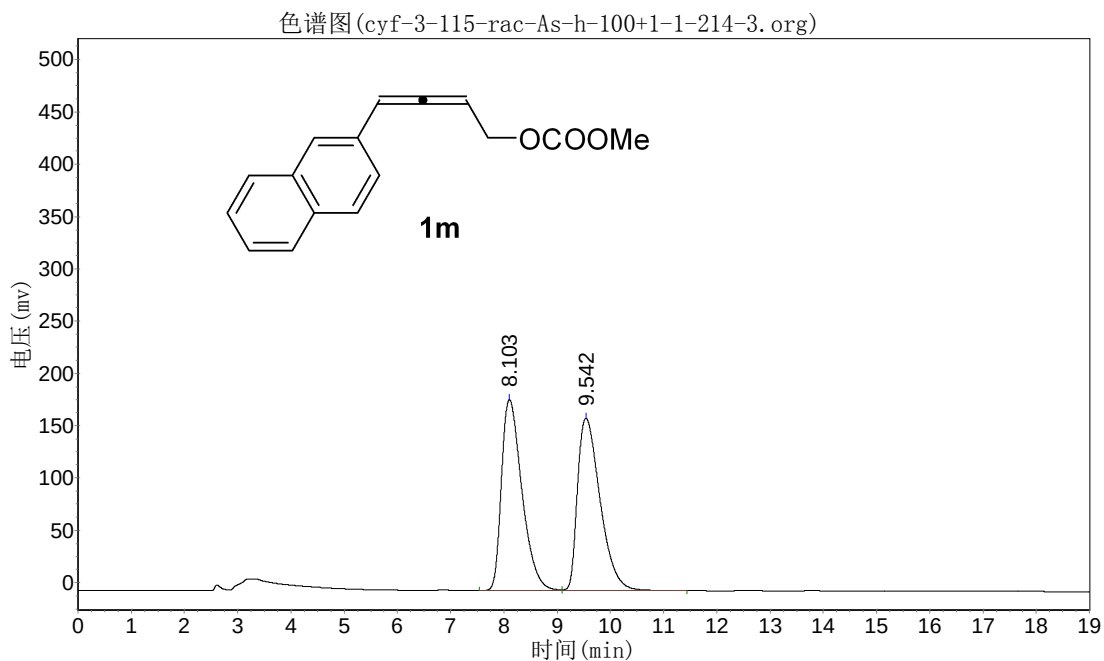
报告时间: 2020-06-30, 15:31:26

谱图文件: D:\data\slf\cyf\2020-06-30\cyf-3-115-rac-As-h-100+1-1-214-3. org

实验内容简介:

As-h 100+1

214nm 1.0ml/min



分析结果表

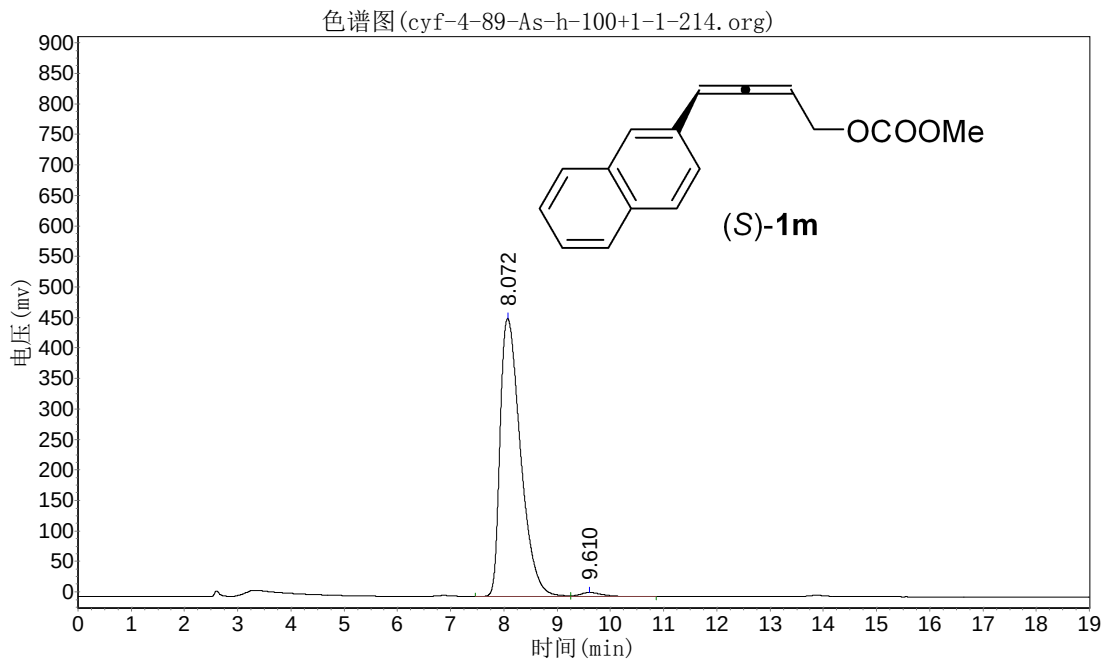
峰号	峰名	保留时间	峰高	峰面积	含量
1		8.103	182554.438	4887959.500	50.0705
2		9.542	164891.578	4874194.000	49.9295
总计			347446.016	9762153.500	100.0000

cyf-4-89

实验时间: 2020-06-30, 15:24:09
谱图文件: D:\data\slf\cyf\2020-06-30\cyf-4-89-As-h-100+1-1-214. org

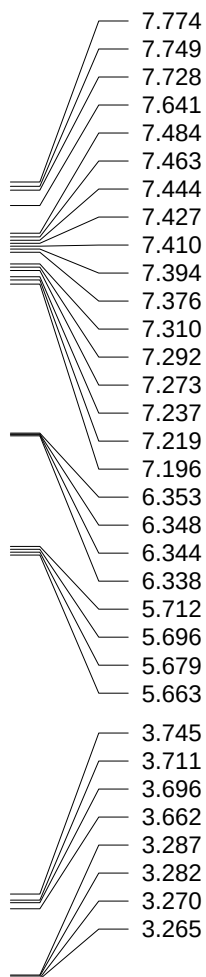
报告时间: 2020-06-30, 16:34:56

实验内容简介:
As-h 100+1
214nm 1. 0ml/min



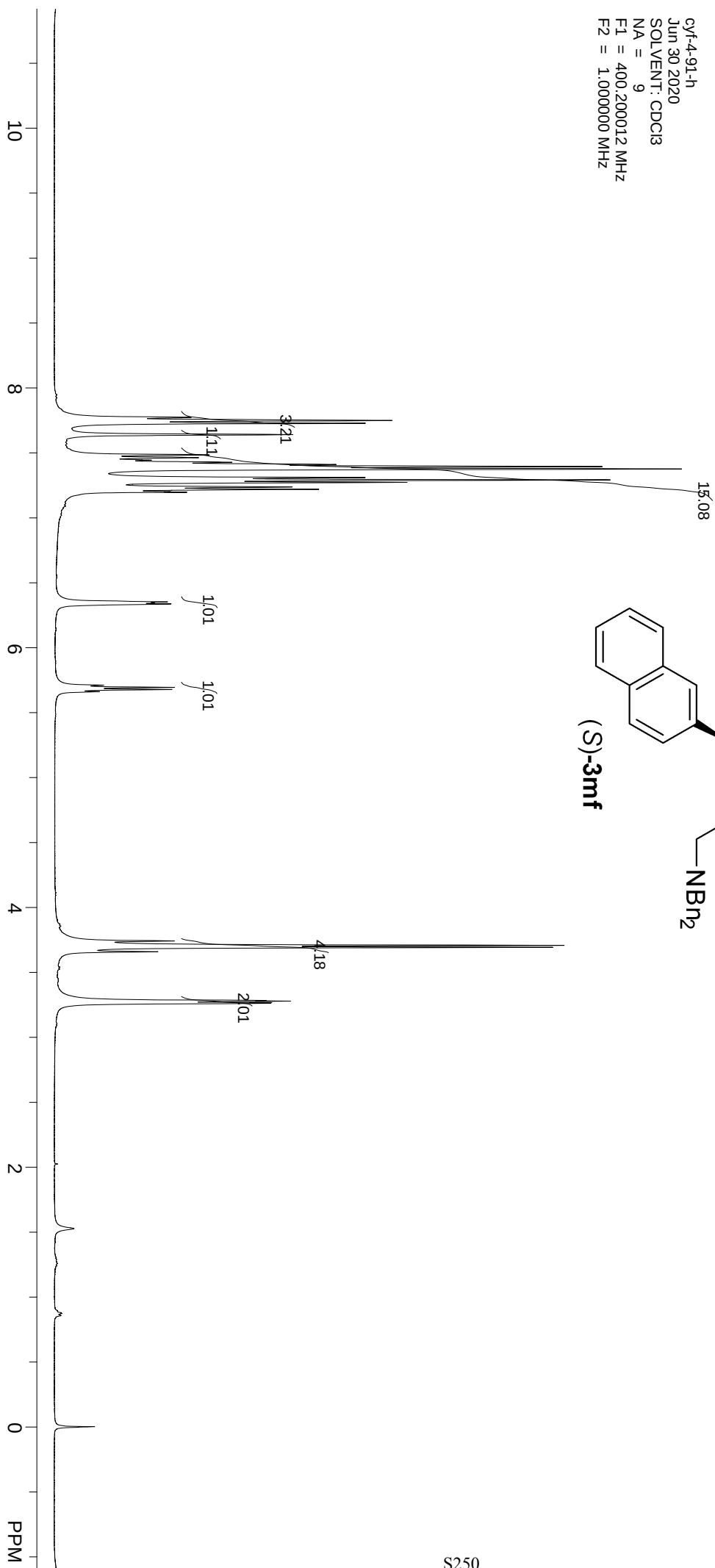
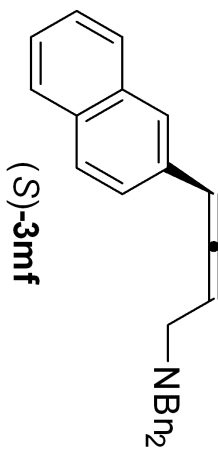
分析结果表

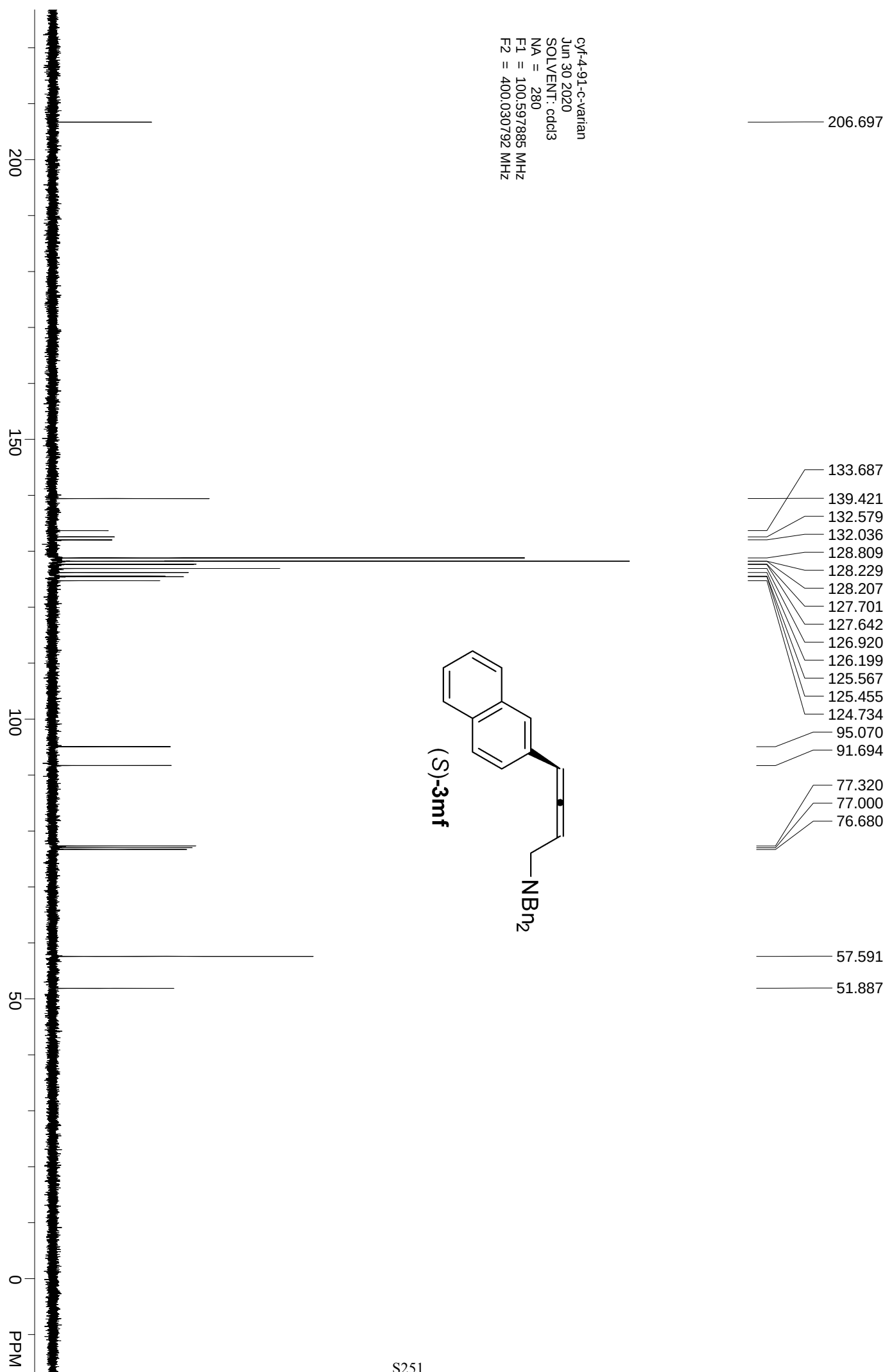
峰号	峰名	保留时间	峰高	峰面积	含量
1		8.072	455865.281	12153841.000	98.4057
2		9.610	6622.654	196908.047	1.5943
总计			462487.936	12350749.047	100.0000



0.000

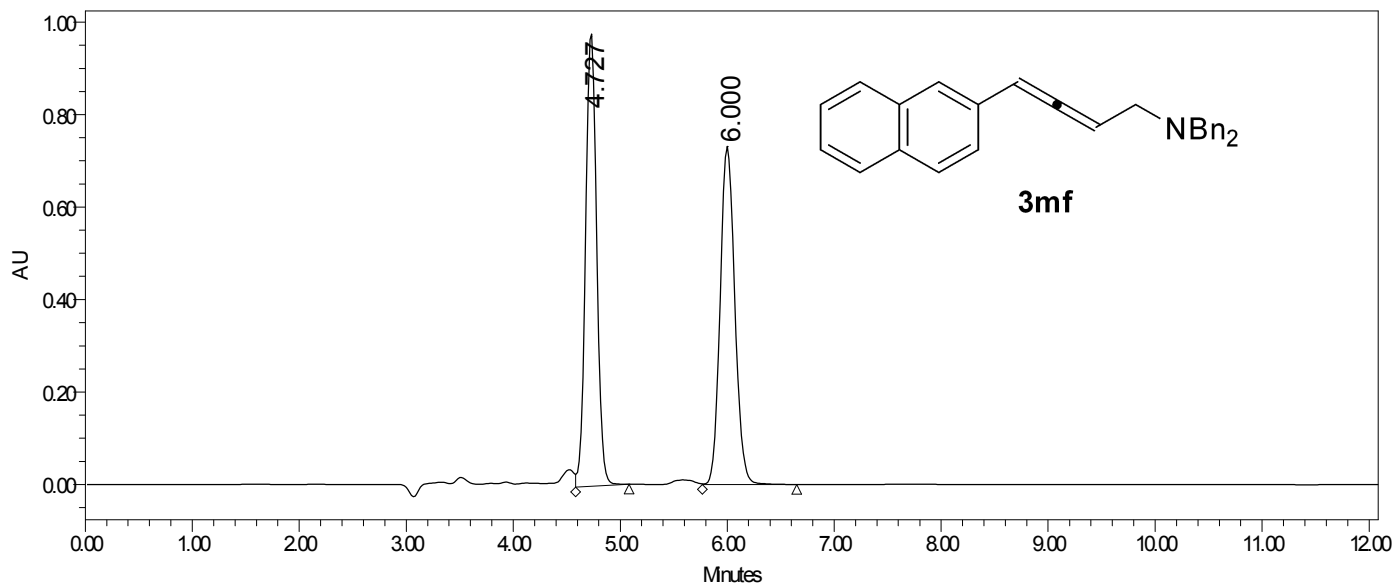
cyf-4-91-h
Jun 30 2020
SOLVENT: CDCl3
NA = 9
F1 = 400.20012 MHz
F2 = 1.000000 MHz





SAMPLE INFORMATION

Sample Name:	cyf-3-119-rac-odh-90-10-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 u	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/1/2020 1:22:35 PM CST		
Date Processed:	7/4/2020 12:23:42 AM CST		



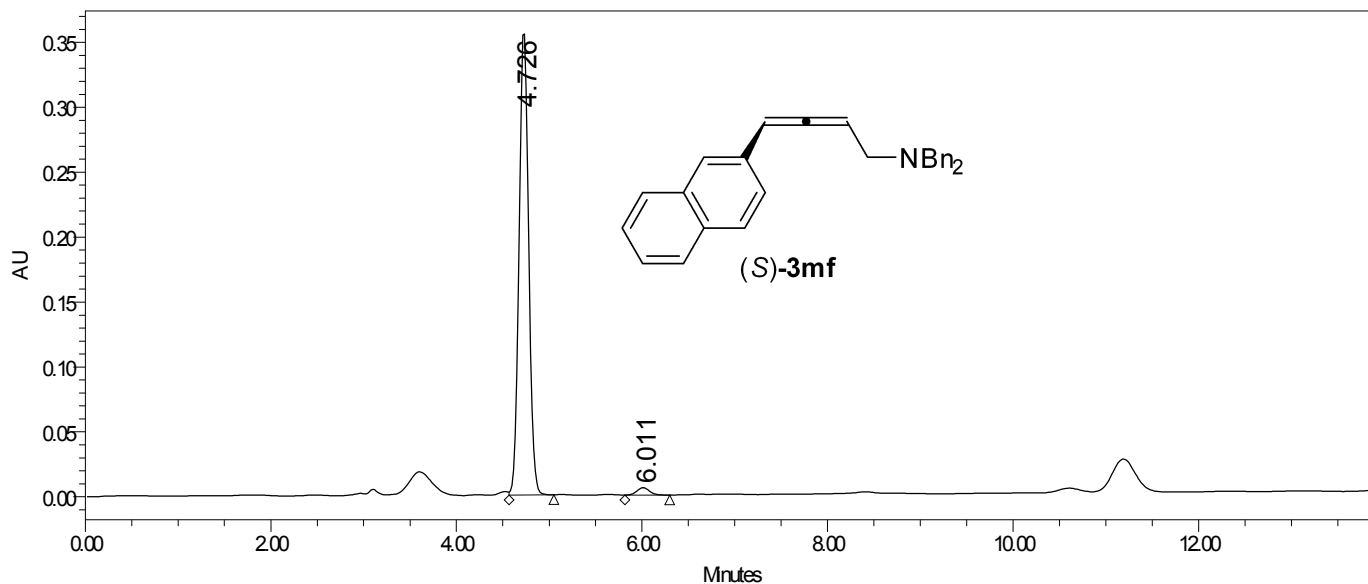
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7201; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	4.727	7051568	50.25	981887
2	W2489 ChA.214nm	6.000	6982772	49.75	730556

SAMPLE INFORMATION

Sample Name:	cyf-4-91-odh-90-10-1-214-2	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	3	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/1/2020 1:44:03 PM CST		
Date Processed:	7/4/2020 12:24:56 AM CST		



Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7202; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	4.726	2569273	97.96	357515
2	W2489 ChA.214nm	6.011	53620	2.04	5684

cyf-3-119

实验时间: 2020-07-10, 14:01:21

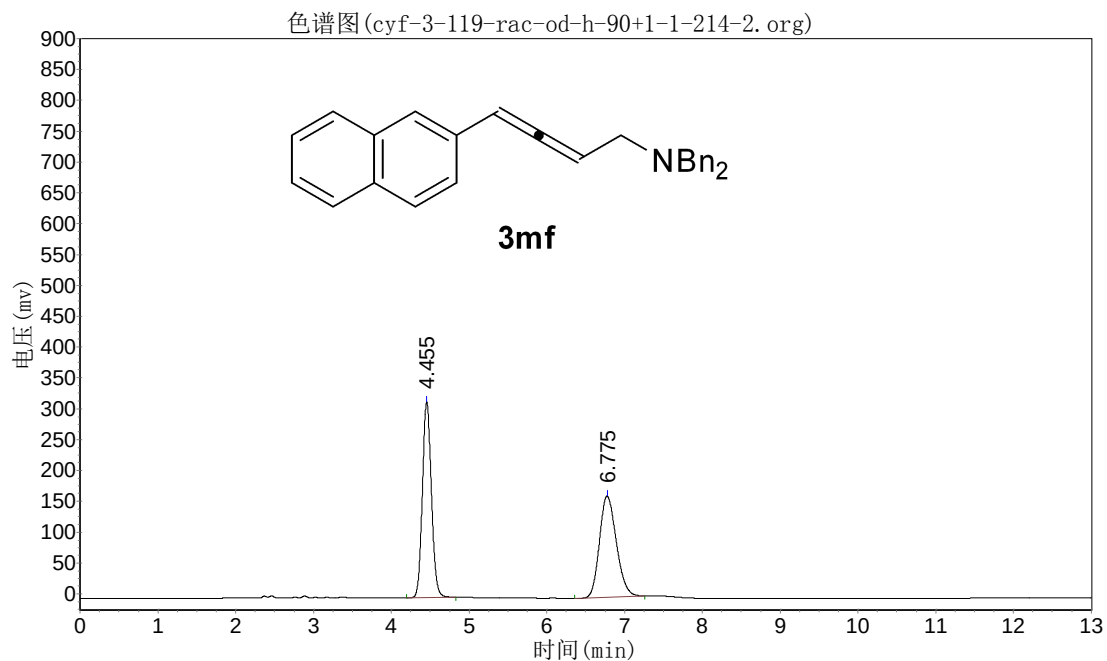
报告时间: 2020-07-10, 14:48:17

谱图文件: D:\data\slf\cyf\2020-07-10\cyf-3-119-rac-od-h-90+1-1-214-2. org

实验内容简介:

od-h 90:10

214nm 1.0ml/min



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		4.455	317473.688	2563534.500	50.9563
2		6.775	163953.609	2467311.000	49.0437
总计			481427.297	5030845.500	100.0000

CYF-4-91-RE

实验时间: 2020-07-10, 15:03:19

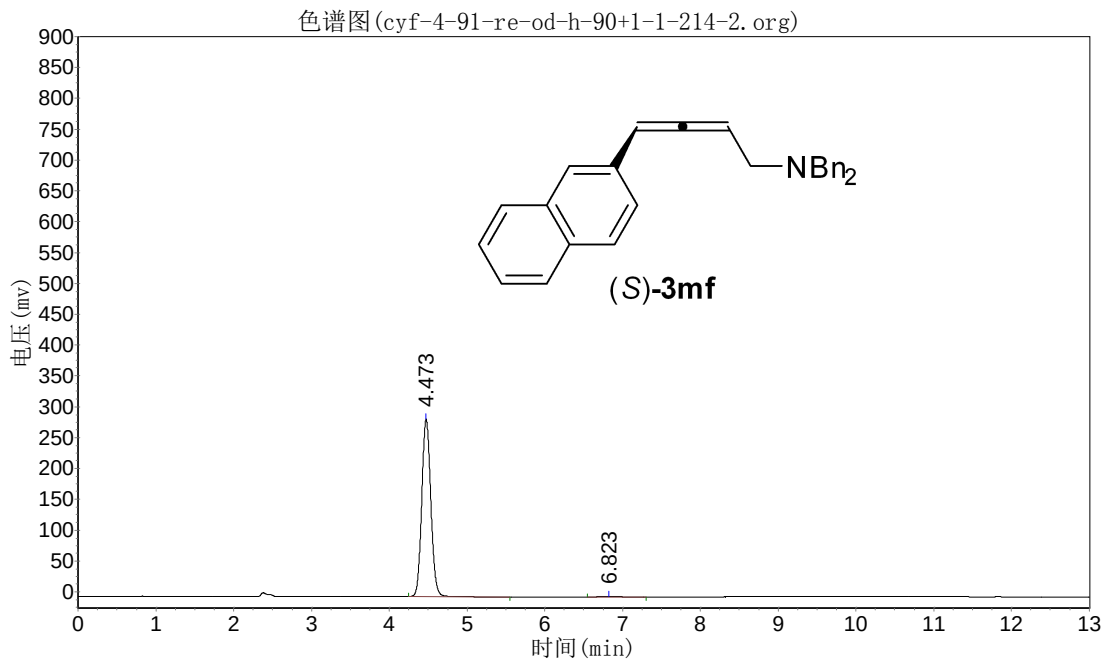
报告时间: 2020-07-10, 16:09:27

谱图文件: D:\data\slf\cyf\2020-07-10\cyf-4-91-re-od-h-90+1-1-214-2. org

实验内容简介:

od-h 90:10

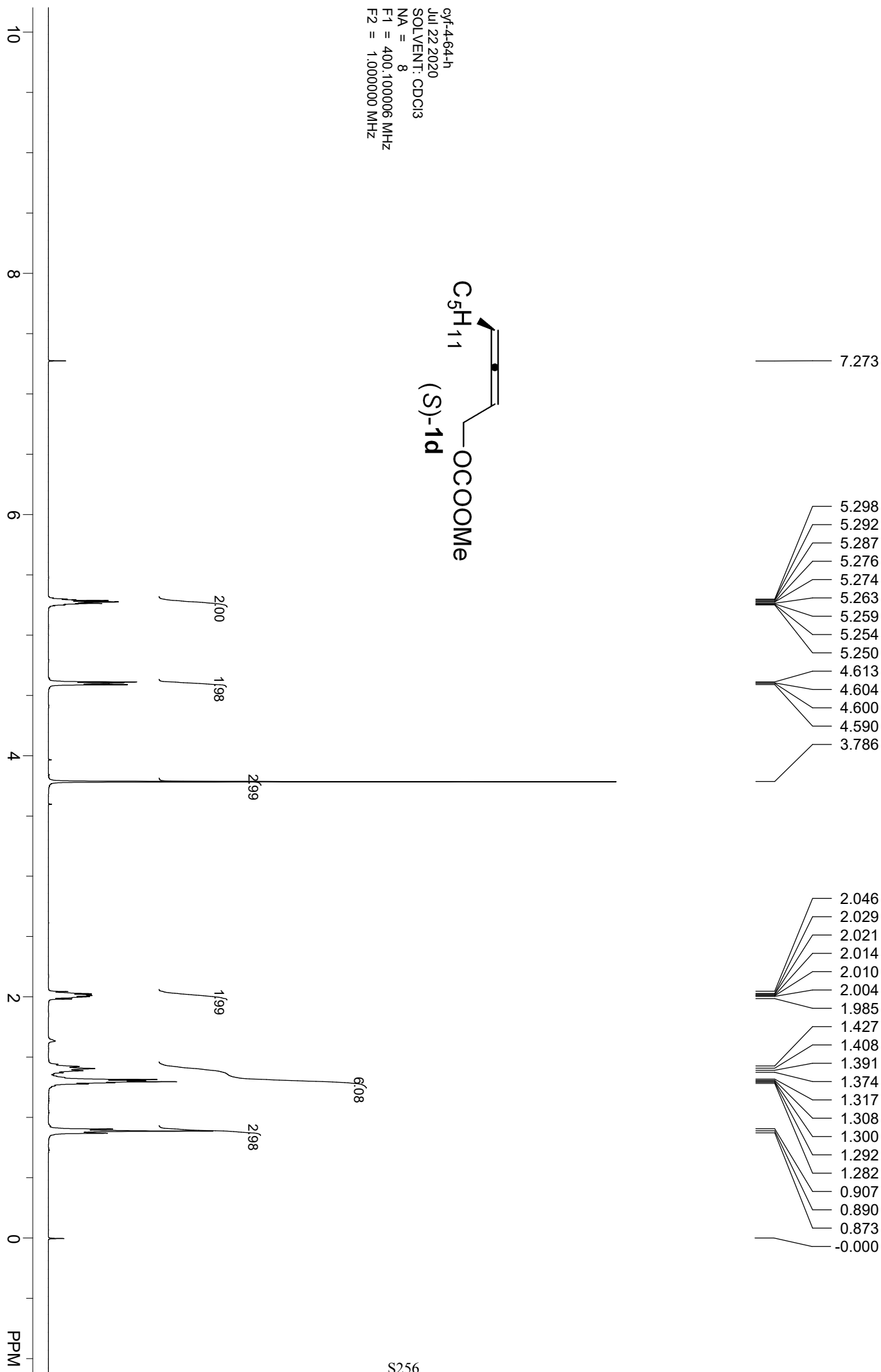
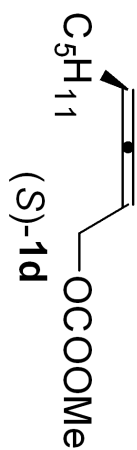
214nm 1.0ml/min



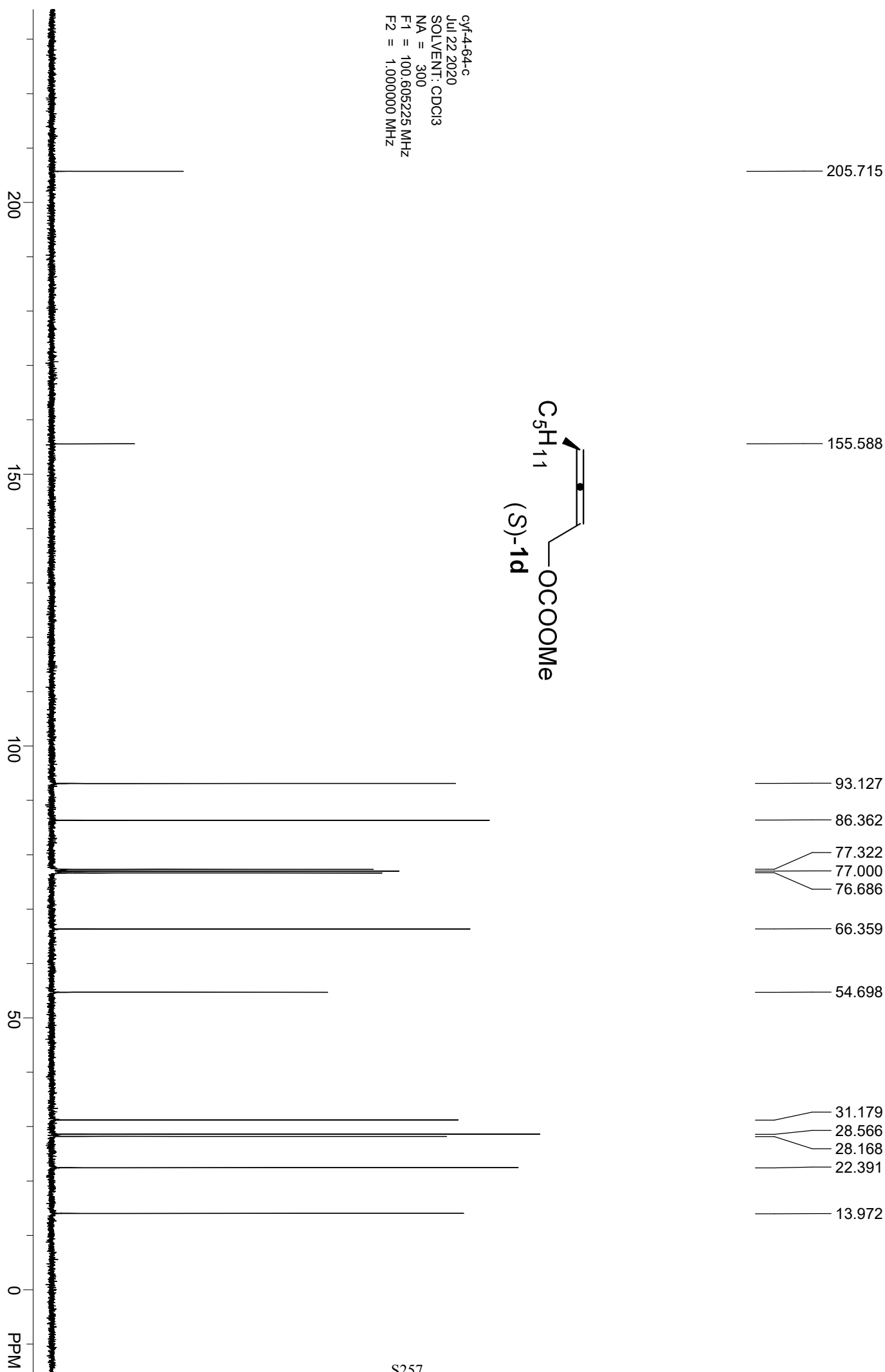
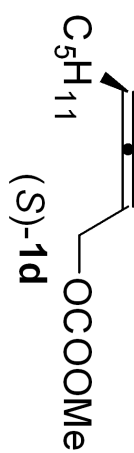
分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		4.473	288690.344	2343929.500	99.1755
2		6.823	1302.390	19486.791	0.8245
总计			289992.734	2363416.291	100.0000

cvf-4-64-h
 Jul 22 2020
 SOLVENT: CDCl₃
 NA = 8
 F1 = 400.100006 MHz
 F2 = 1.000000 MHz

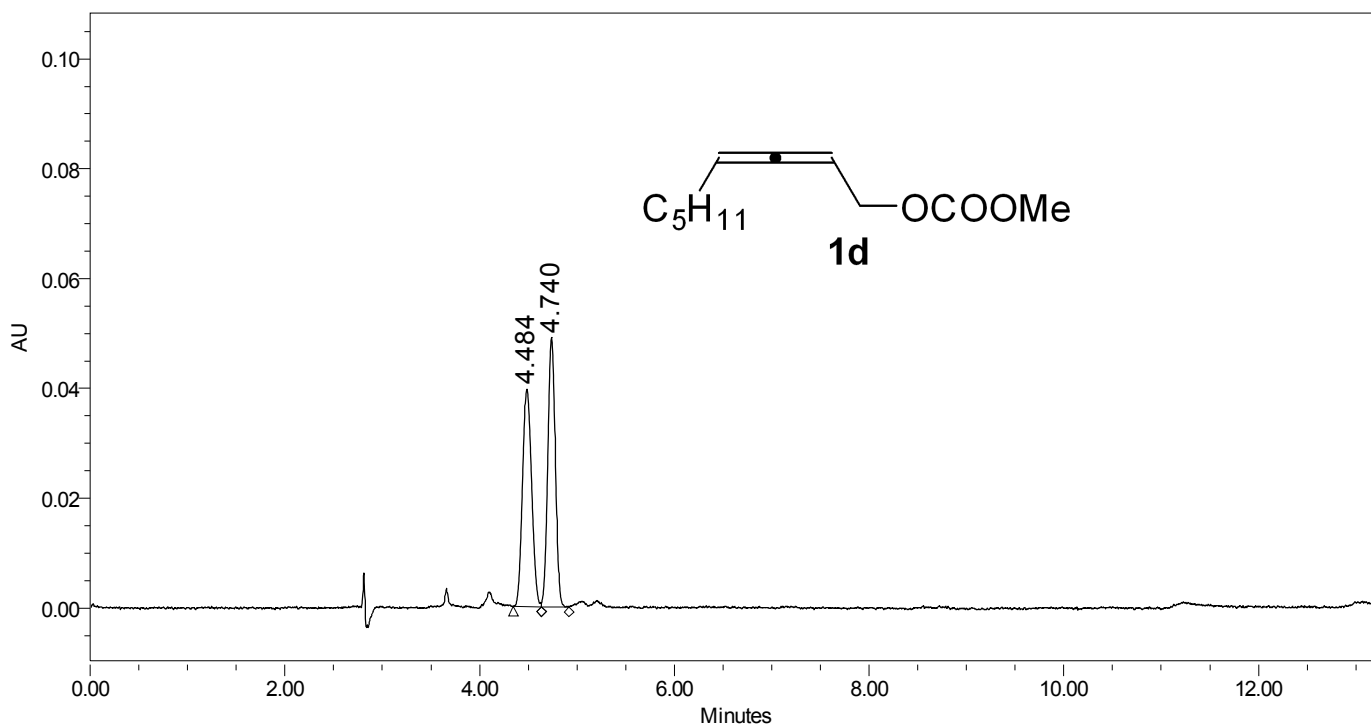


cyf-4-64-c
Jul 22 2020
SOLVENT: CDCl3
NA = 300
F1 = 100.605225 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

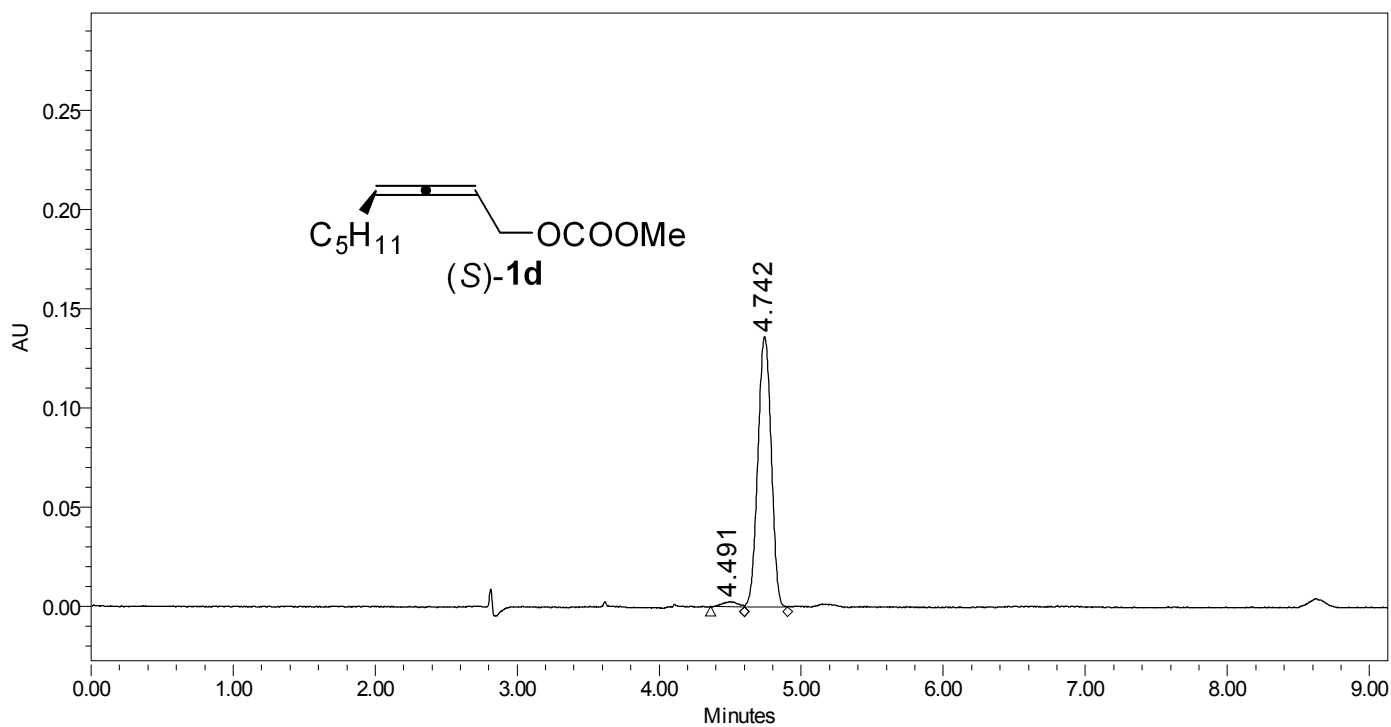
Sample Name:	cyf-3-191-rac	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	2:F,1	Acq. Method Set:	upc_pda_2019m
Injection #:	1	Processing Method:	Default
Injection Volume:	2.00 ul	Channel Name:	217.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Spectrum PDA 217.0 nm
Date Acquired:	8/10/2020 3:47:45 PM CST		
Date Processed:	8/11/2020 3:08:35 PM CST		



	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.484	Unknown	39563	17.399	258754	49.44
2	4.740	Unknown	49032	17.099	264658	50.56

SAMPLE INFORMATION

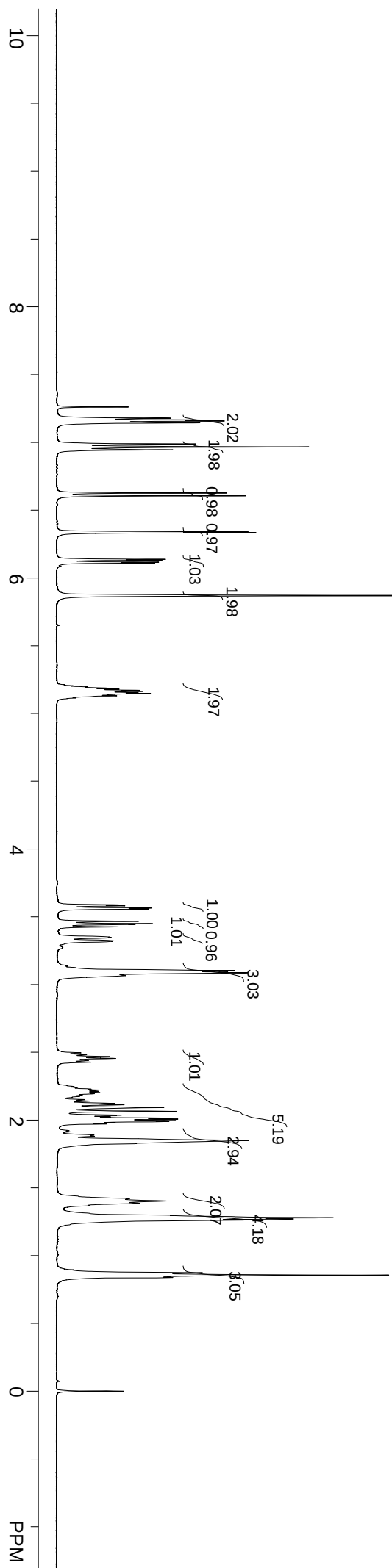
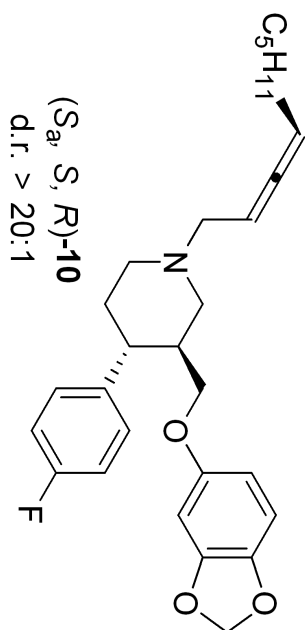
Sample Name:	cyf-4-64	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	2:F,2	Acq. Method Set:	upc_pda_2019m
Injection #:	1	Processing Method:	Default
Injection Volume:	3.00 ul	Channel Name:	217.0nm
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	PDA Spectrum PDA 217.0 nm
Date Acquired:	8/10/2020 4:02:10 PM CST		
Date Processed:	8/11/2020 3:07:58 PM CST		

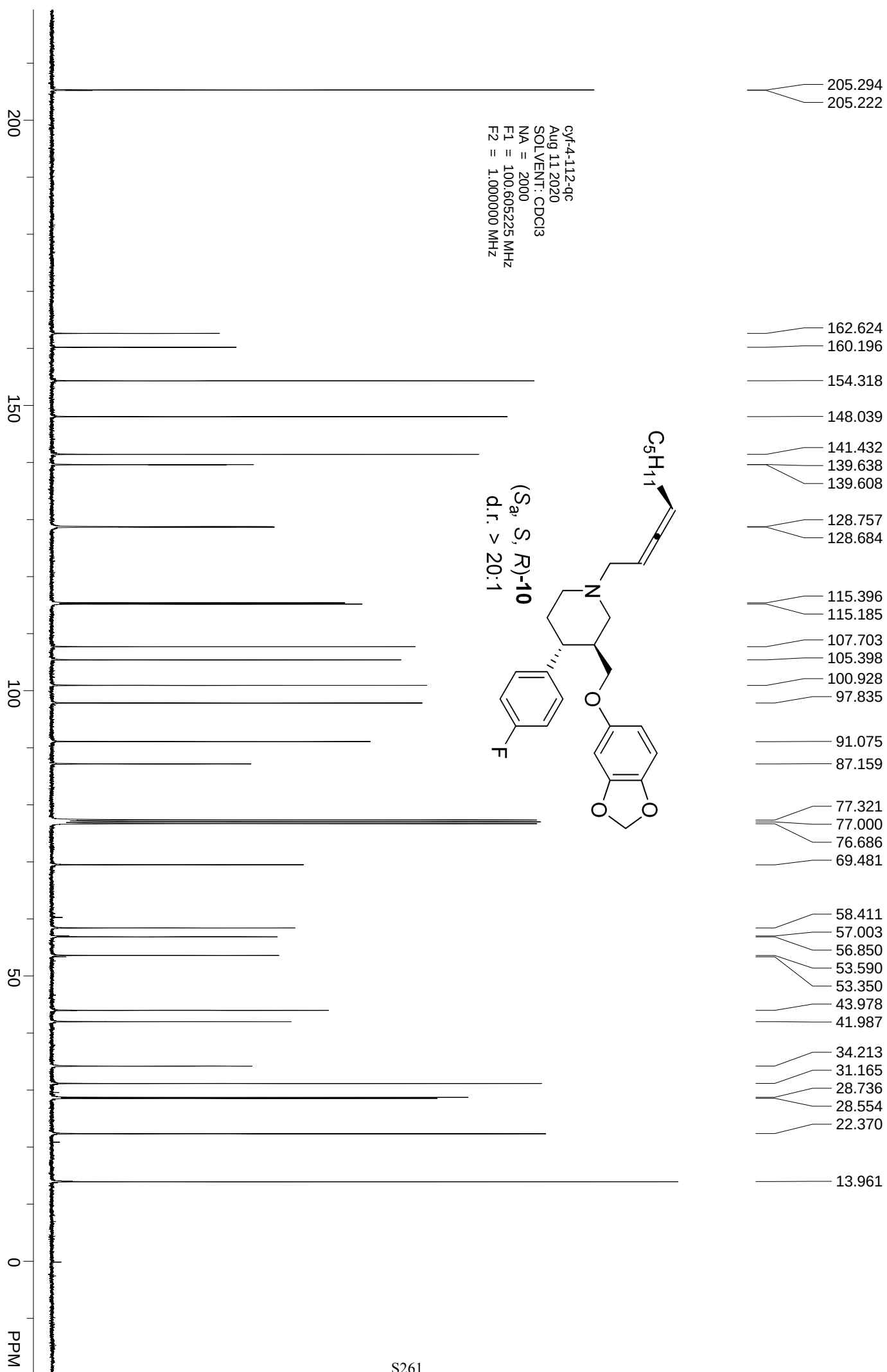


	RT	Peak Type	Height	Width (sec)	Area	% Area
1	4.491	Unknown	2554	14.299	18944	2.09
2	4.742	Unknown	136141	18.199	886991	97.91

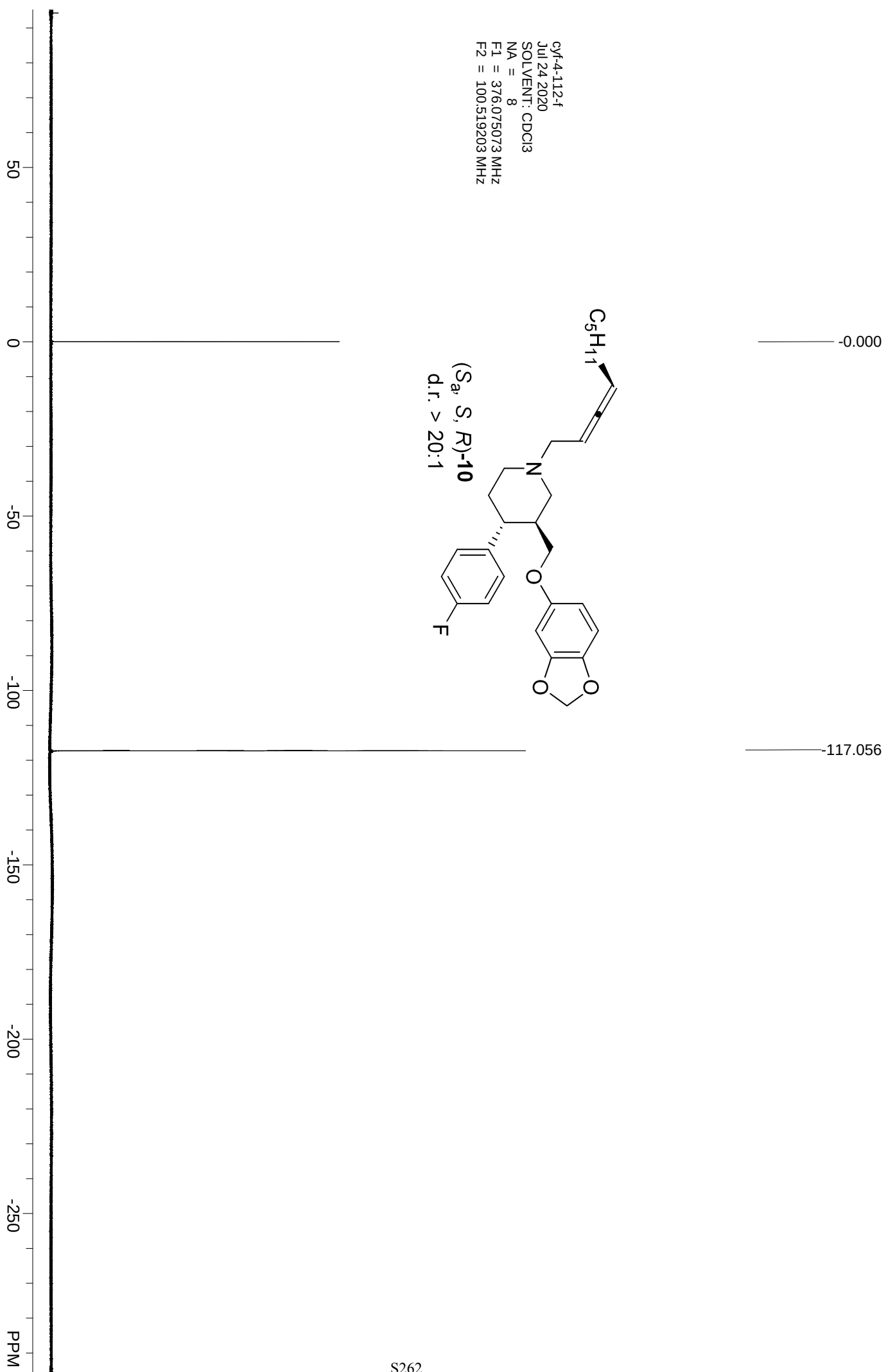
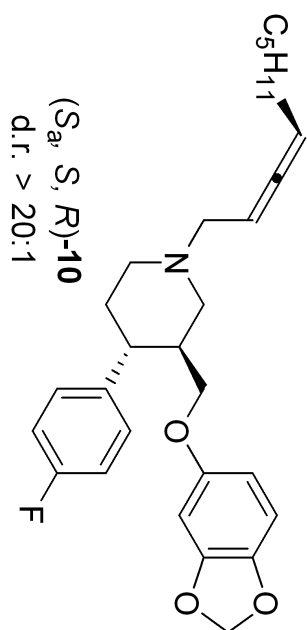
7.262
7.179
7.166
7.158
7.144
6.988
6.967
6.945
6.627
6.606
6.340
6.334
6.138
6.132
6.117
6.110
5.871
5.205
5.196
5.188
5.180
5.164
5.147
5.131
5.115
3.589
3.582
3.566
3.559
3.468
3.450
3.445
3.427
3.352
3.348
3.324
3.320
3.105
3.099
3.093
3.088
3.068
2.496
2.483
2.469
2.456
2.441
2.428
2.249
2.203
2.114
2.065
2.033
1.997
1.972
1.924
1.890
1.850
1.828
1.422
1.404
1.387
1.280
1.262
0.874
0.857
0.839
0.000

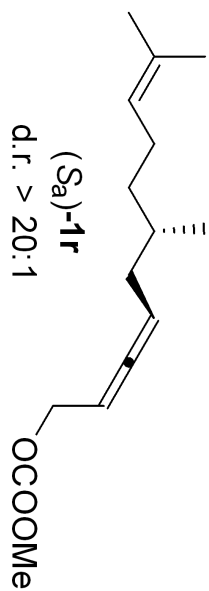
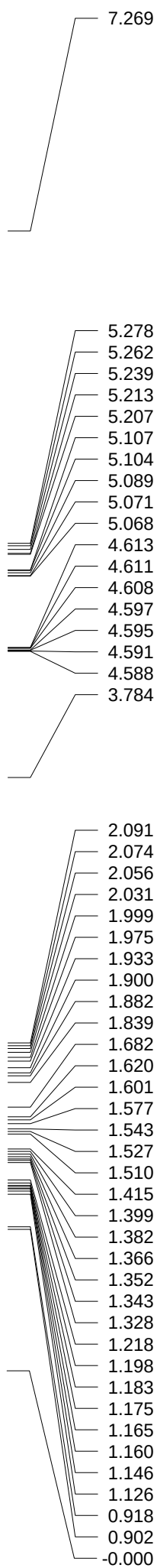
cyf-4-112-h
Jul 24 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz



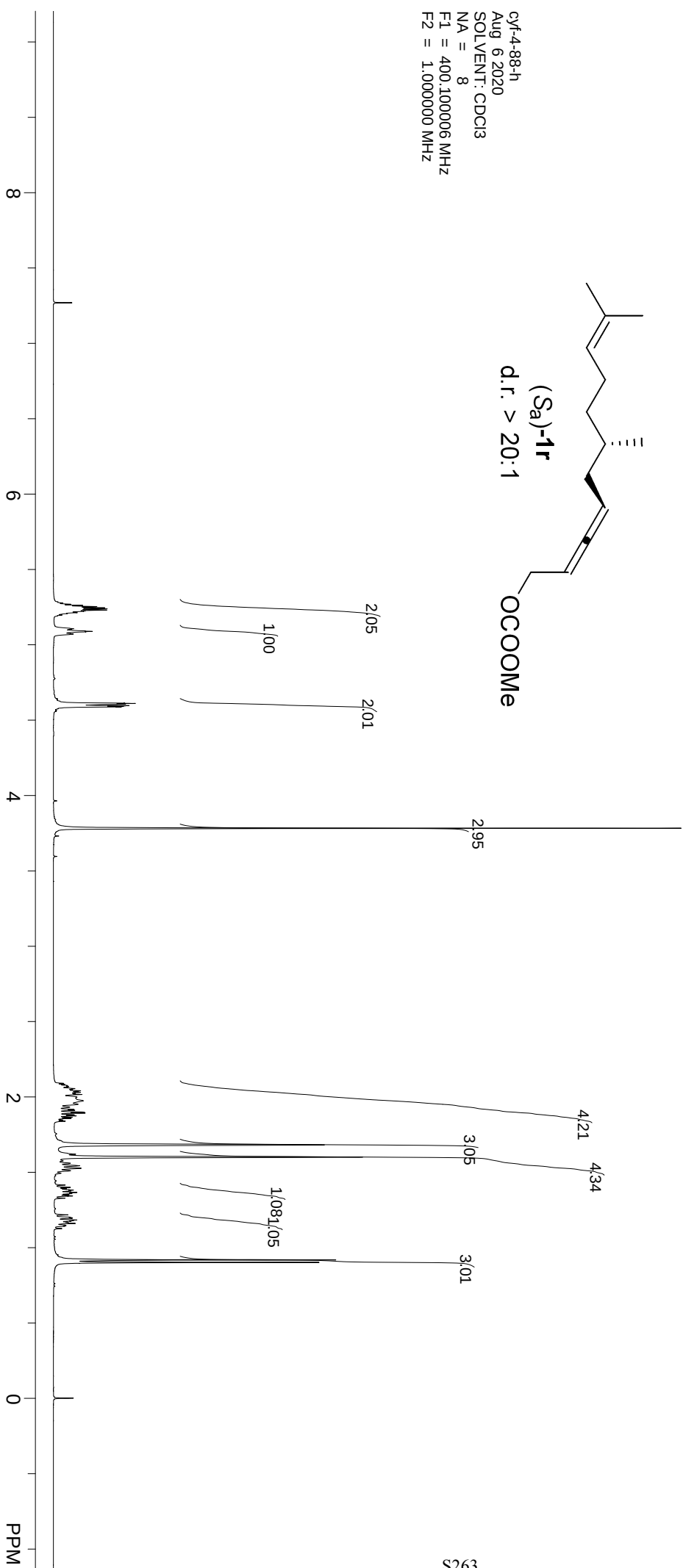


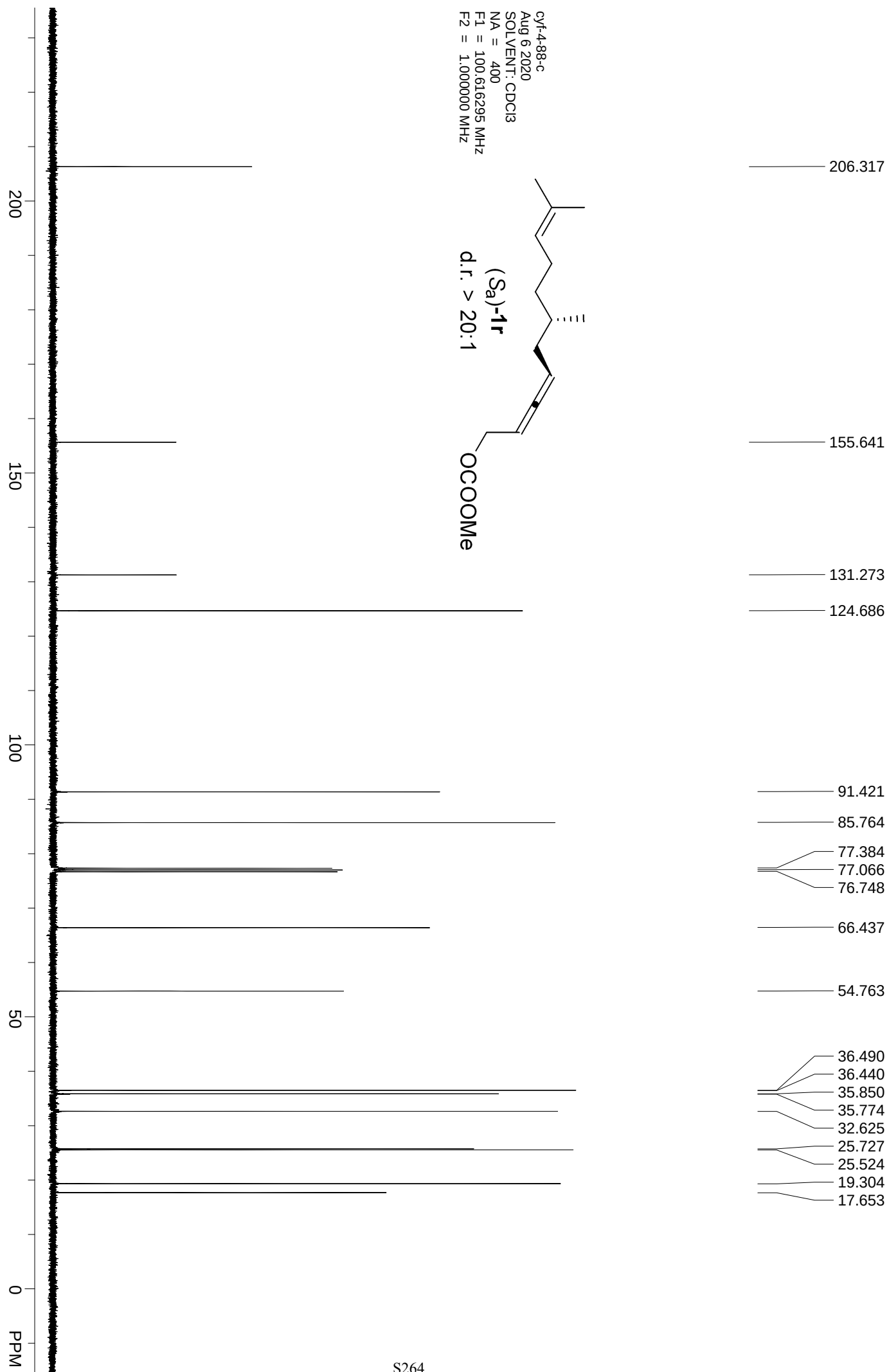
cyf-4-112-f
Jul 24 2020
SOLVENT: CDCl3
NA = 8
F1 = 376.075073 MHz
F2 = 100.519203 MHz



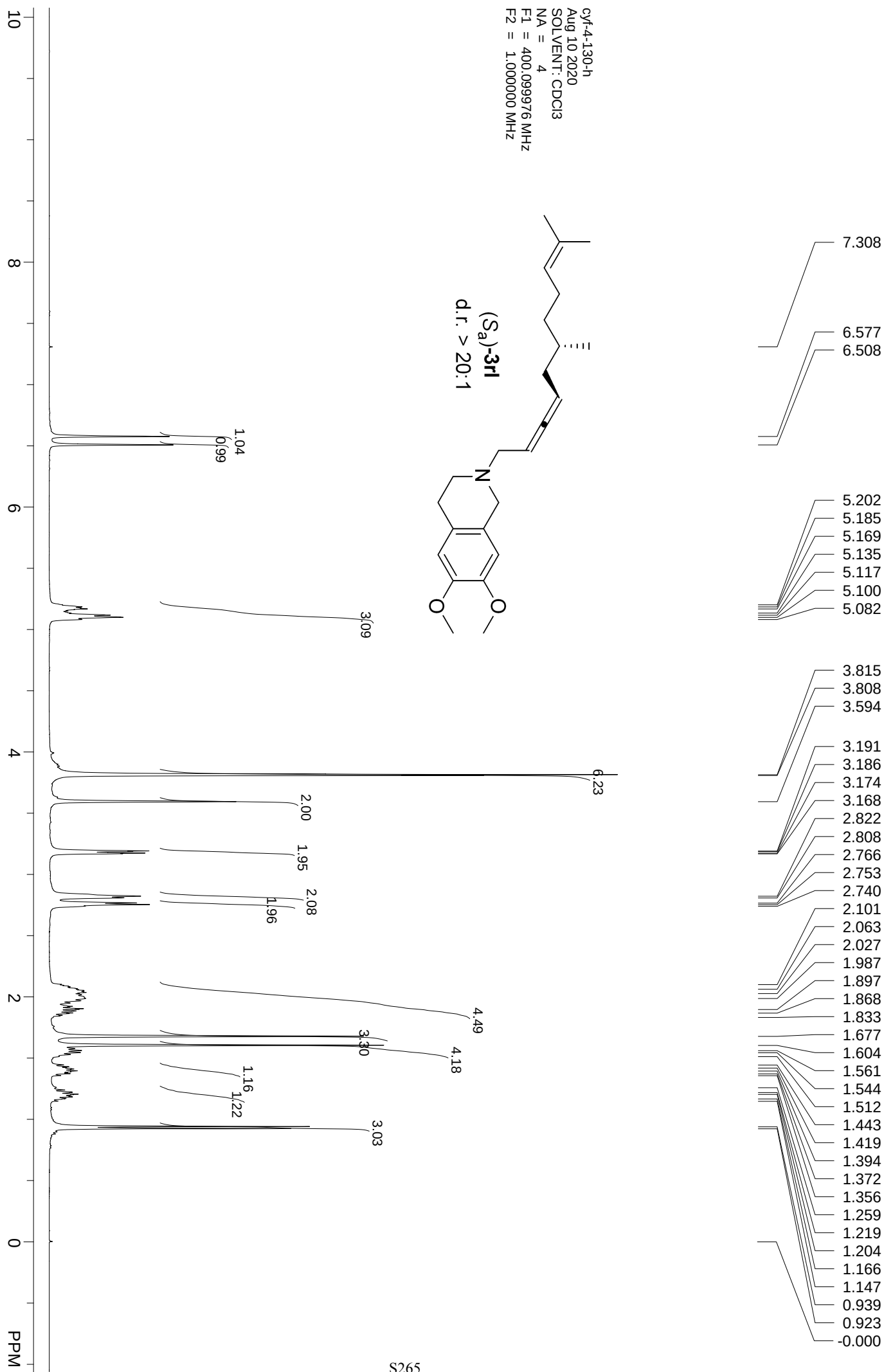
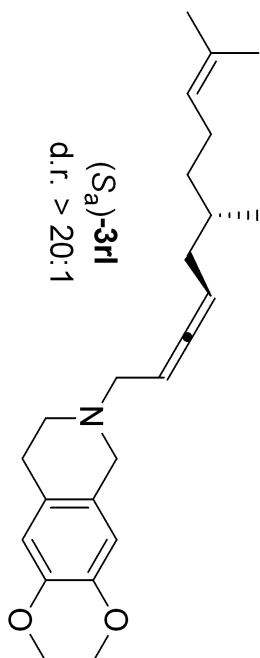


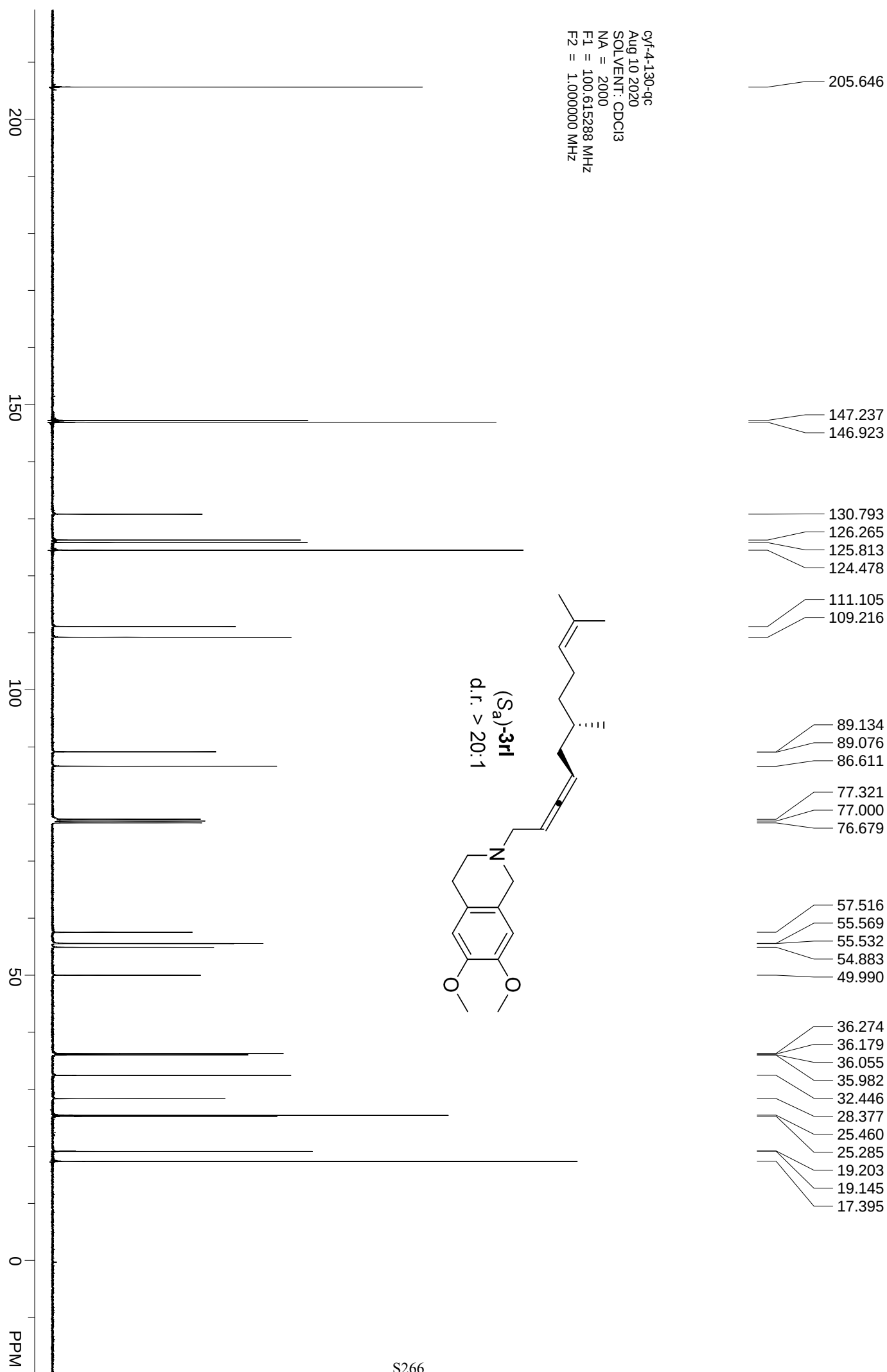
cyf-4-88-h
 Aug 6 2020
 SOLVENT: CDCl3
 NA = 8
 F1 = 400.100006 MHz
 F2 = 1.000000 MHz



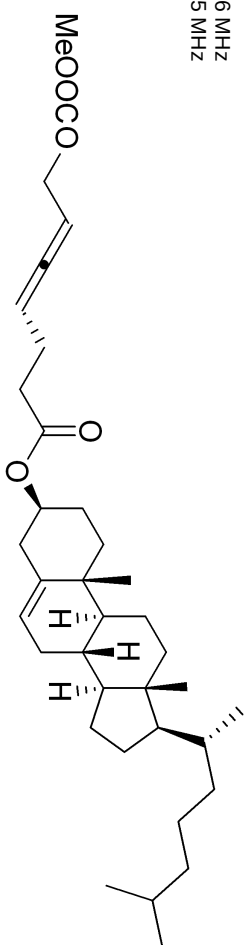


cyf-4-130-h
 Aug 10 2020
 SOLVENT: CDCl3
 NA = 4
 F1 = 400.09976 MHz
 F2 = 1.000000 MHz

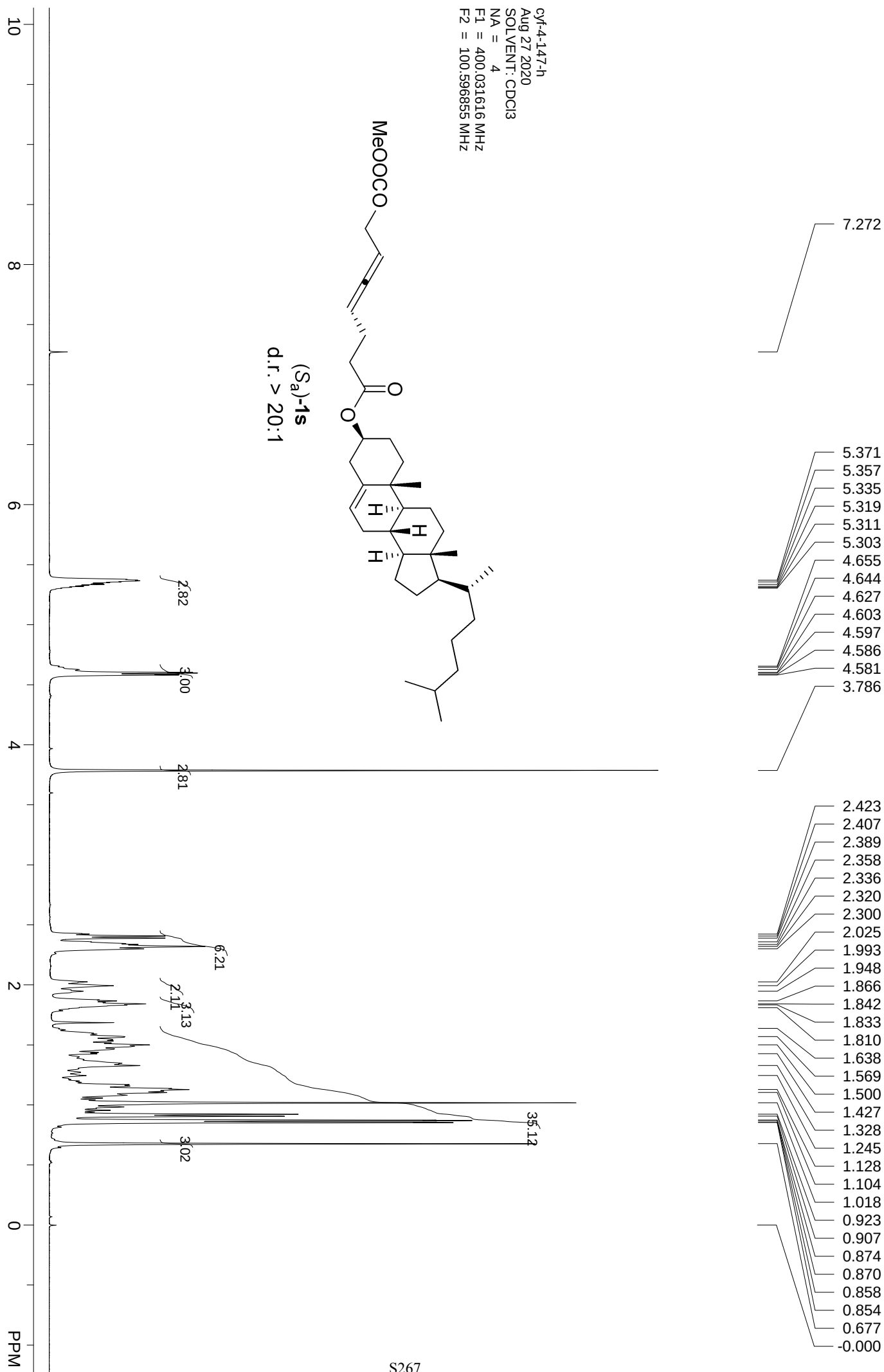




cyf-4-147-h
 Aug 27 2020
 SOLVENT: CDCl3
 NA = 4
 F1 = 400.031616 MHz
 F2 = 100.596855 MHz

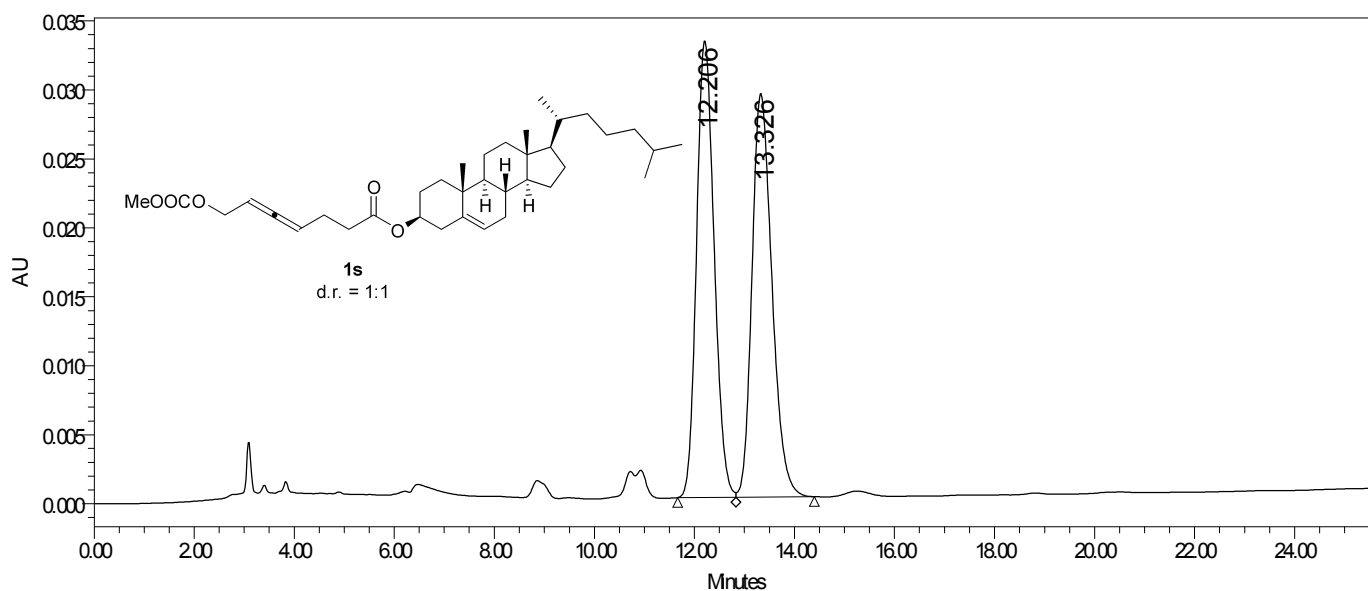


(S_a)-1s
 d.r. > 20:1



SAMPLE INFORMATION

Sample Name:	zyz-6-111-OD-h-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 µl	Channel Name:	W2489 ChA
Run Time:	30.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	9/4/2020 6:07:15 AM CST		
Date Processed:	9/4/2020 9:51:28 AM CST		



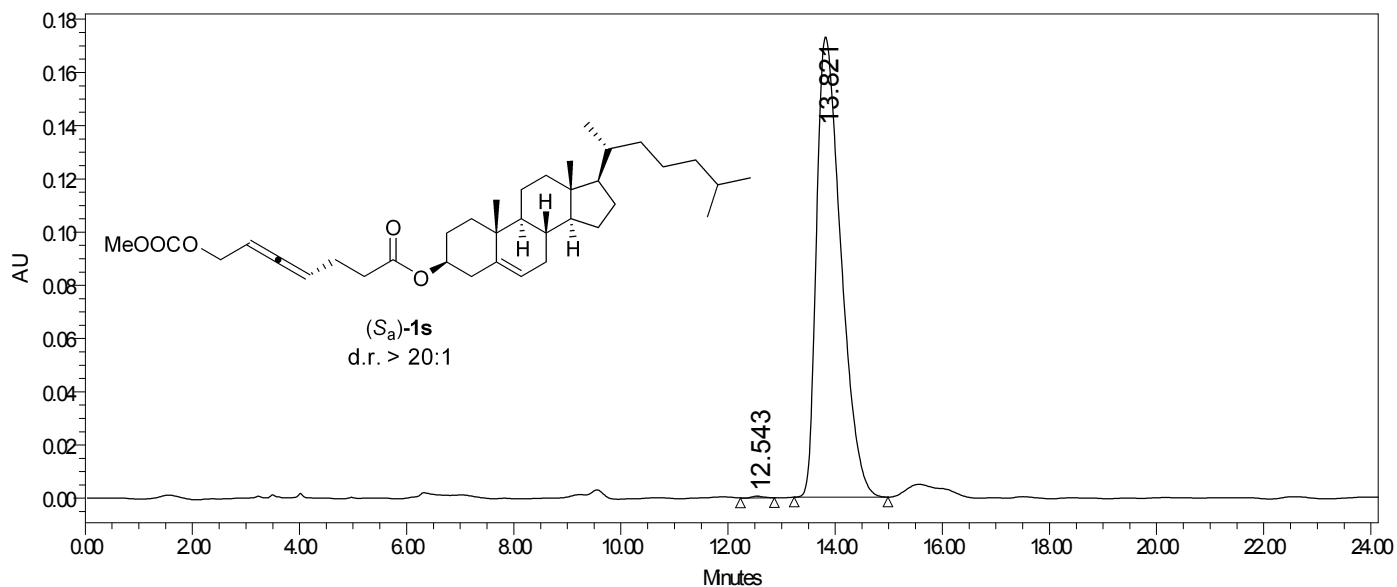
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7974; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	12.206	809659	50.00	33102
2	W2489 ChA.214nm	13.326	809591	50.00	29260

SAMPLE INFORMATION

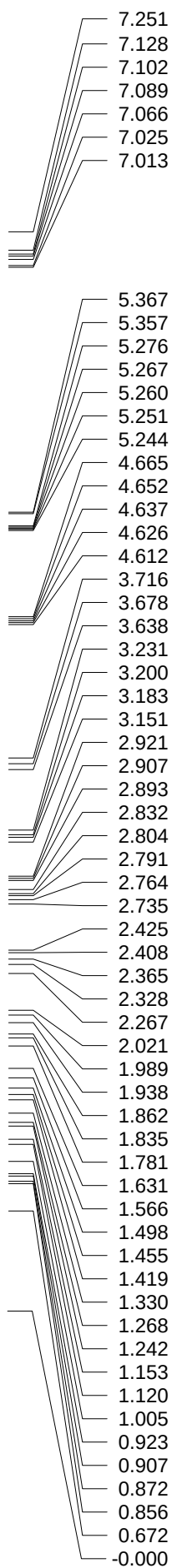
Sample Name:	cyf-4-147-OD-H-200-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	3	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	25.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	9/4/2020 10:23:37 AM CST		
Date Processed:	9/4/2020 10:51:13 AM CST		



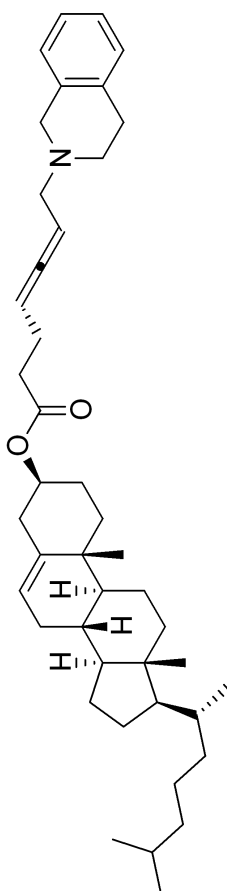
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 7982; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

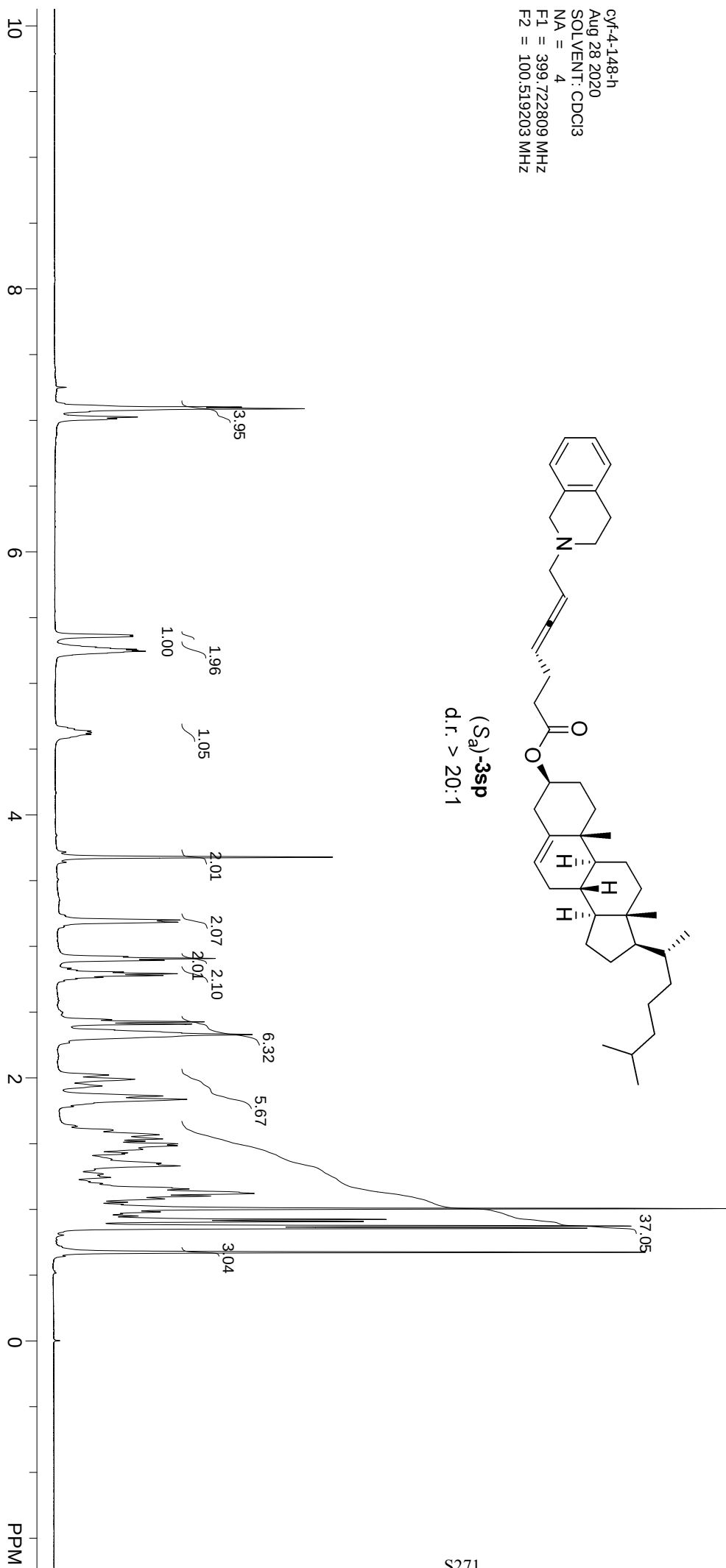
	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	12.543	8634	0.16	610
2	W2489 ChA.214nm	13.821	5460016	99.84	172971

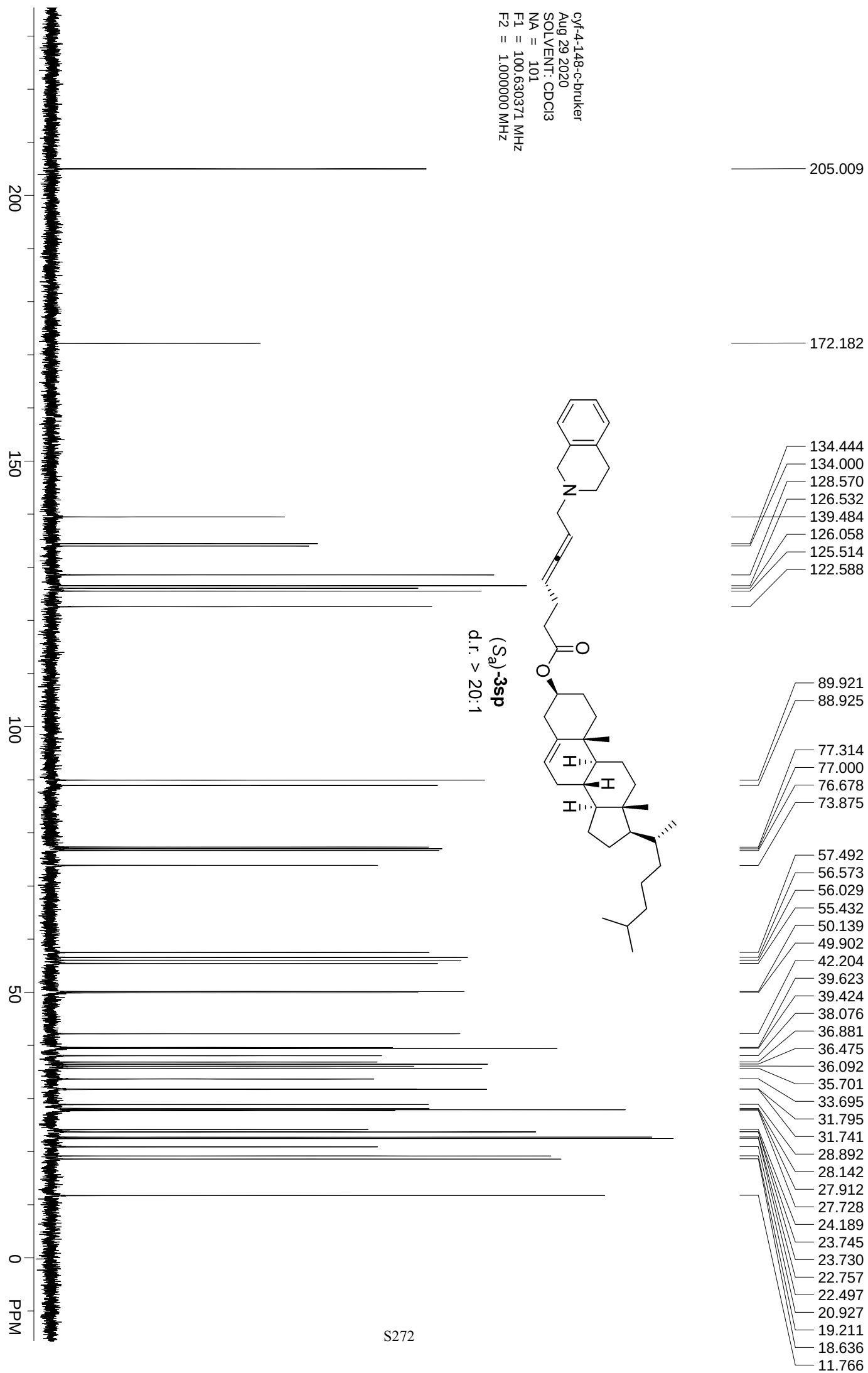


cyf-4-148-h
Aug 28 2020
SOLVENT: CDCl₃
NA = 4
F1 = 399.722809 MHz
F2 = 100.519203 MHz

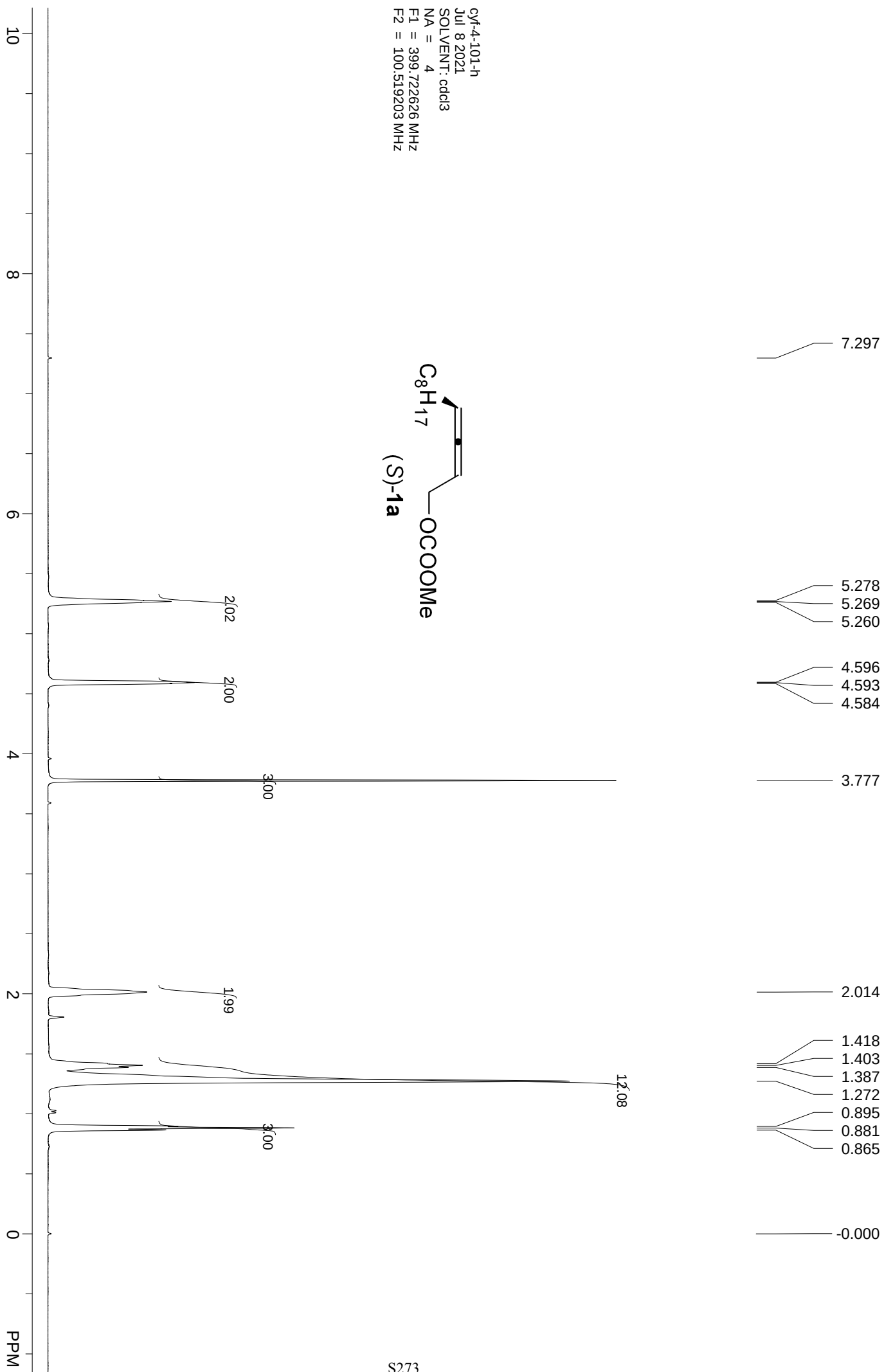
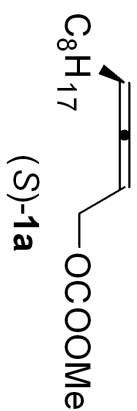


(*S_a*)-**3sp**
d.r. > 20:1

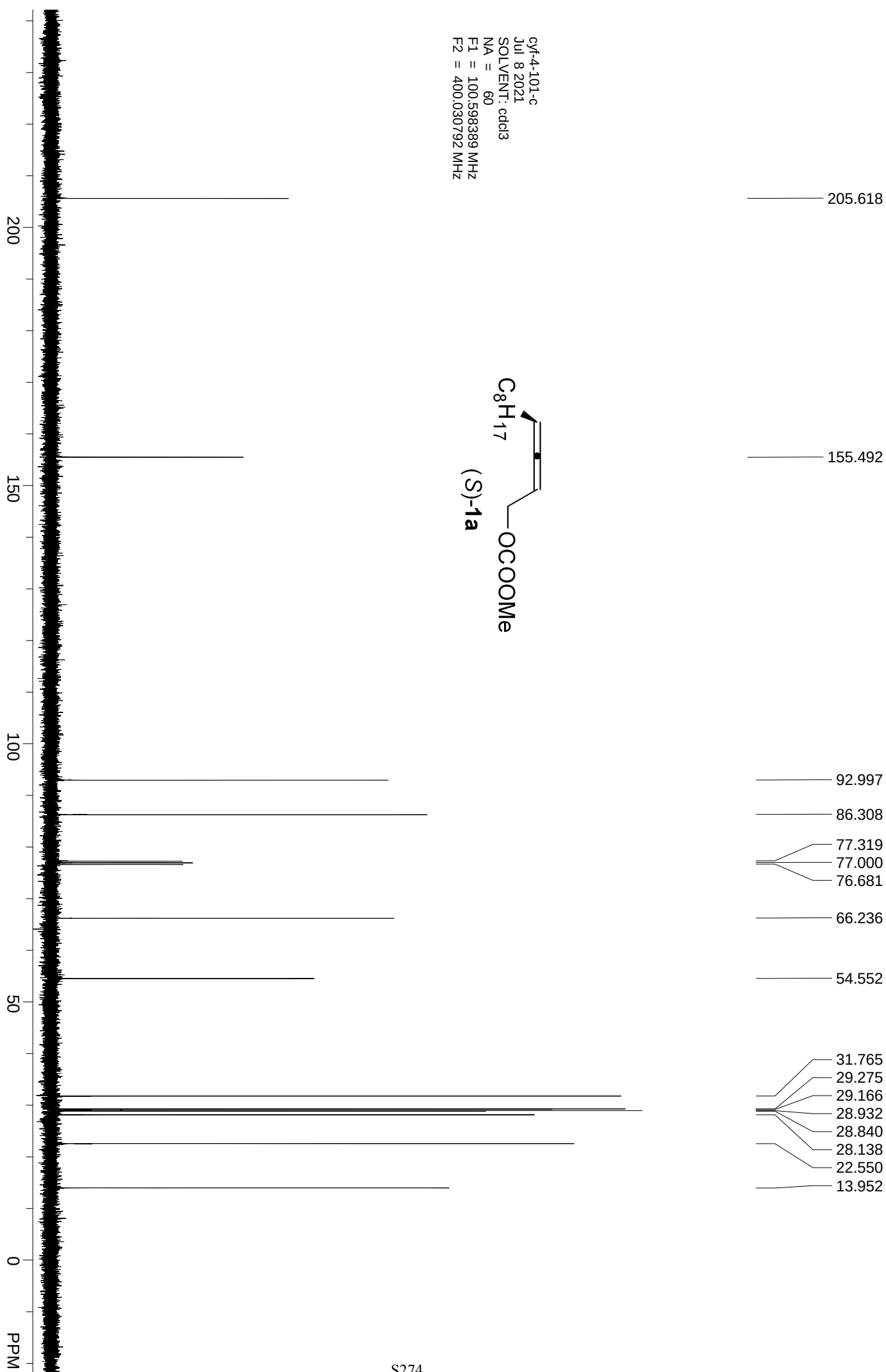
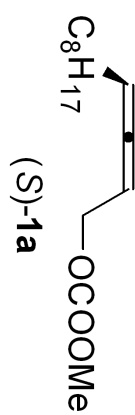




cyf-4-101-h
Jul 8 2021
SOLVENT: cdd3
NA = 4
F1 = 399.722626 MHz
F2 = 100.519203 MHz

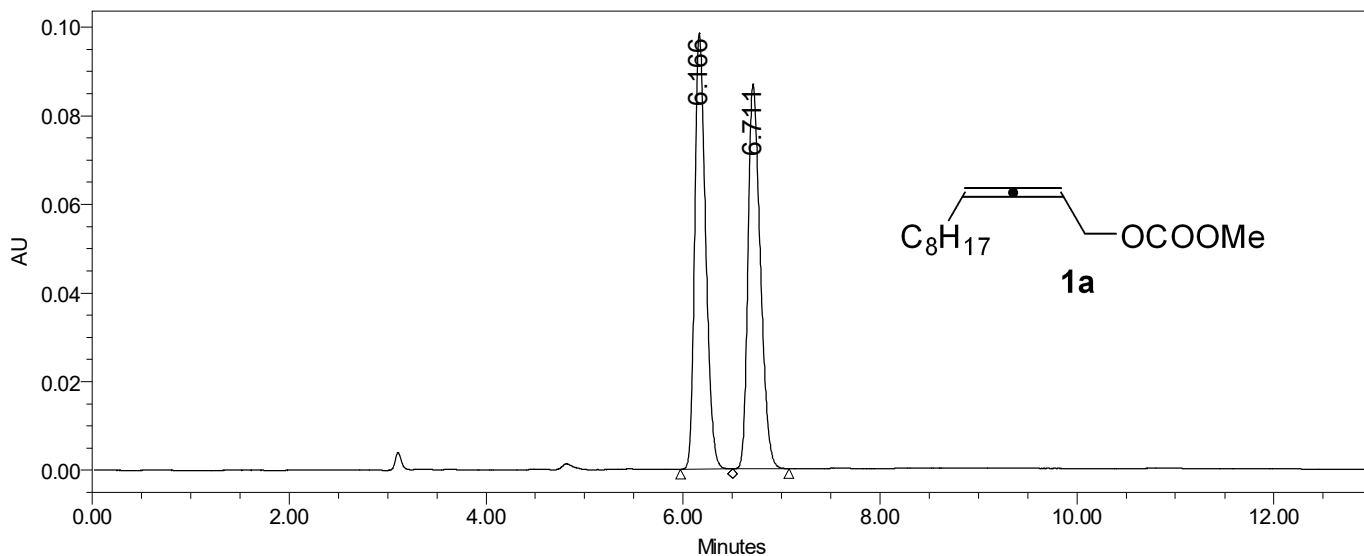


cyf-4-101-c
Jul 8 2021
SOLVENT: cdcl3
NA = 60
F1 = 100.598389 MHz
F2 = 400.030792 MHz



SAMPLE INFORMATION

Sample Name:	cyf-3-54-rac-odh-500-1	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	123
Vial:	1	Acq. Method Set:	90_10odh
Injection #:	1	Processing Method:	1234
Injection Volume:	5.00 ul	Channel Name:	214.0nm
Run Time:	13.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 214.0 nm (2998)
Date Acquired: 7/8/2021 6:33:52 PM CST			
Date Processed: 7/11/2021 7:31:35 PM CST			



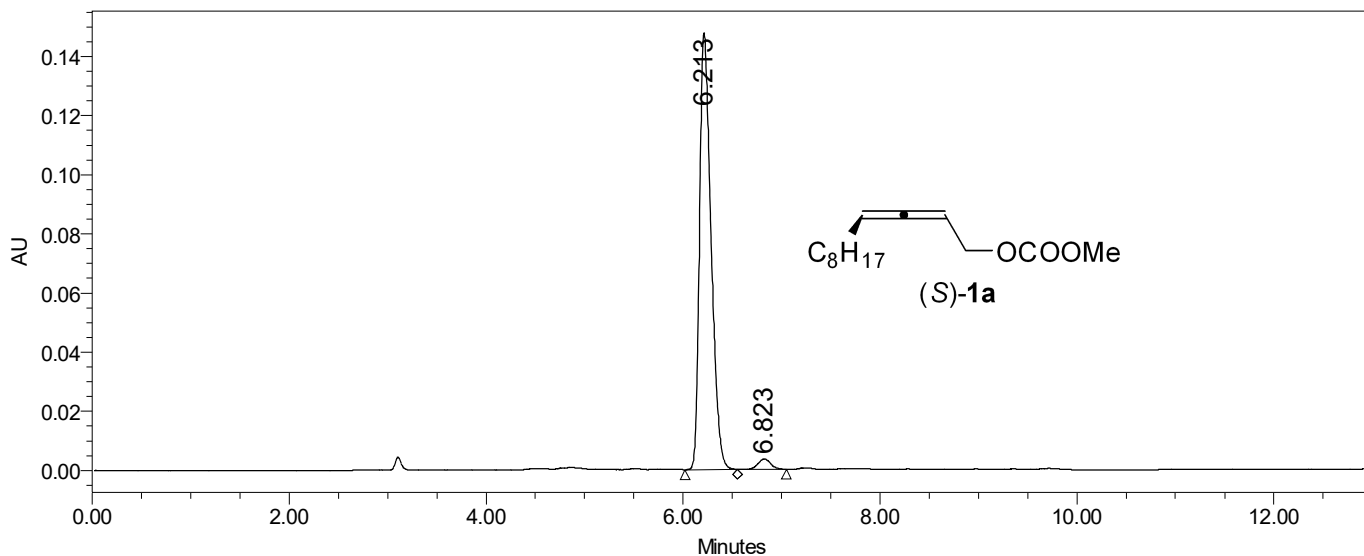
Channel: 2998; Processed Channel: 2998 PDA 214.0 nm (2998 (210-400)nm); Result Id: 1690;
Processing Method: 1234

Processed Channel Descr.: 2998 PDA 214.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 214.0 nm (2998 (210-400)nm)	6.166	758848	50.00	98385
2	2998 PDA 214.0 nm (2998 (210-400)nm)	6.711	758933	50.00	86913

SAMPLE INFORMATION

Sample Name:	cyf-4-101-odh-500-1	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	123
Vial:	2	Acq. Method Set:	90_10odh
Injection #:	1	Processing Method:	124
Injection Volume:	5.00 ul	Channel Name:	214.0nm
Run Time:	13.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 214.0 nm (2998)
Date Acquired: 7/8/2021 6:47:32 PM CST			
Date Processed: 7/11/2021 7:36:26 PM CST			

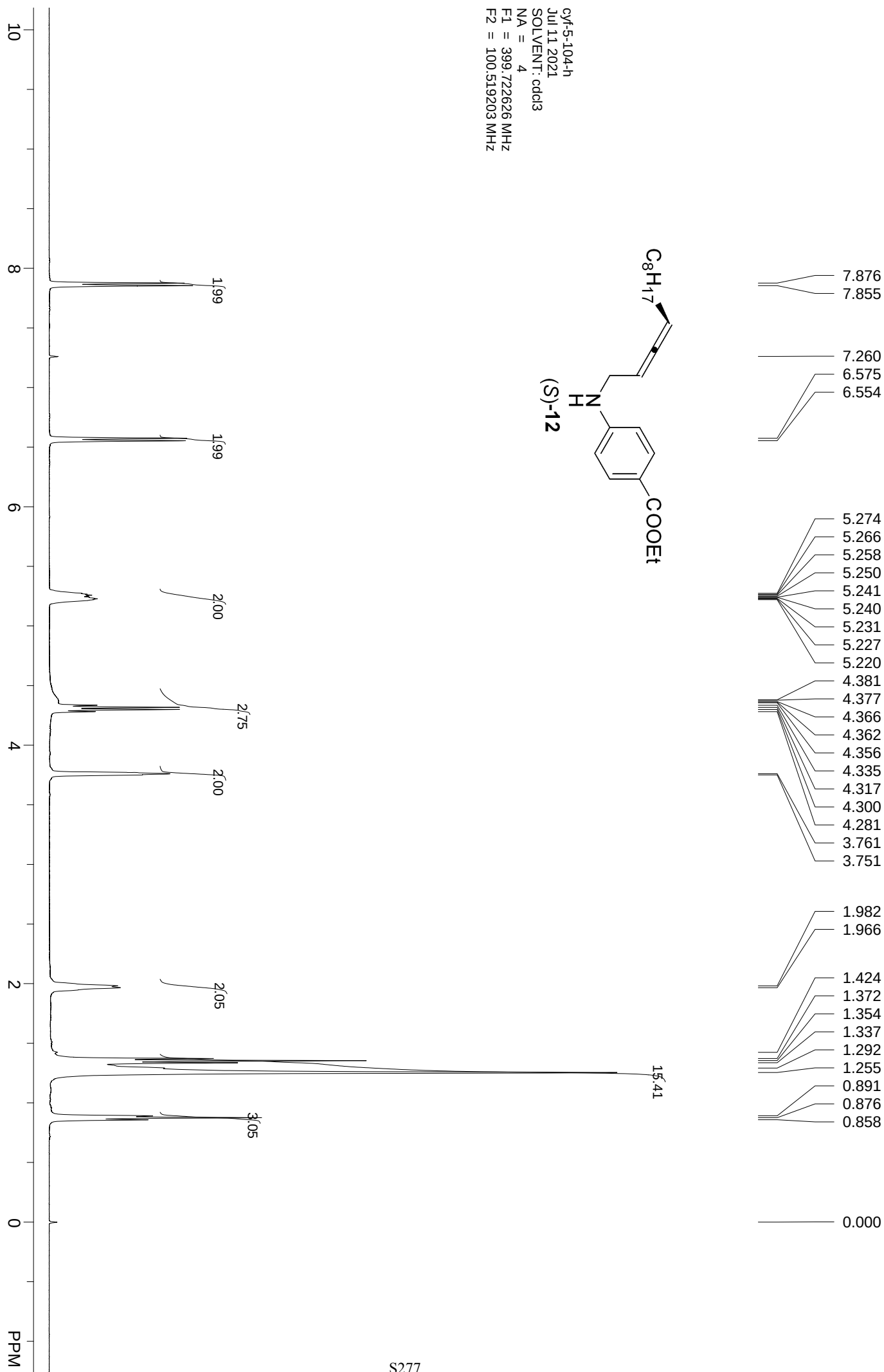
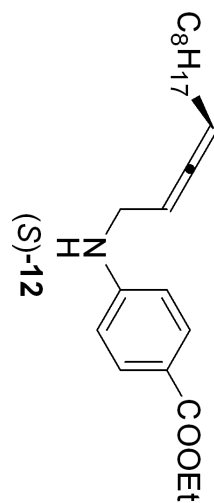


Channel: 2998; Processed Channel: 2998 PDA 214.0 nm (2998 (210-400)nm); Result Id: 1693;
Processing Method: 124

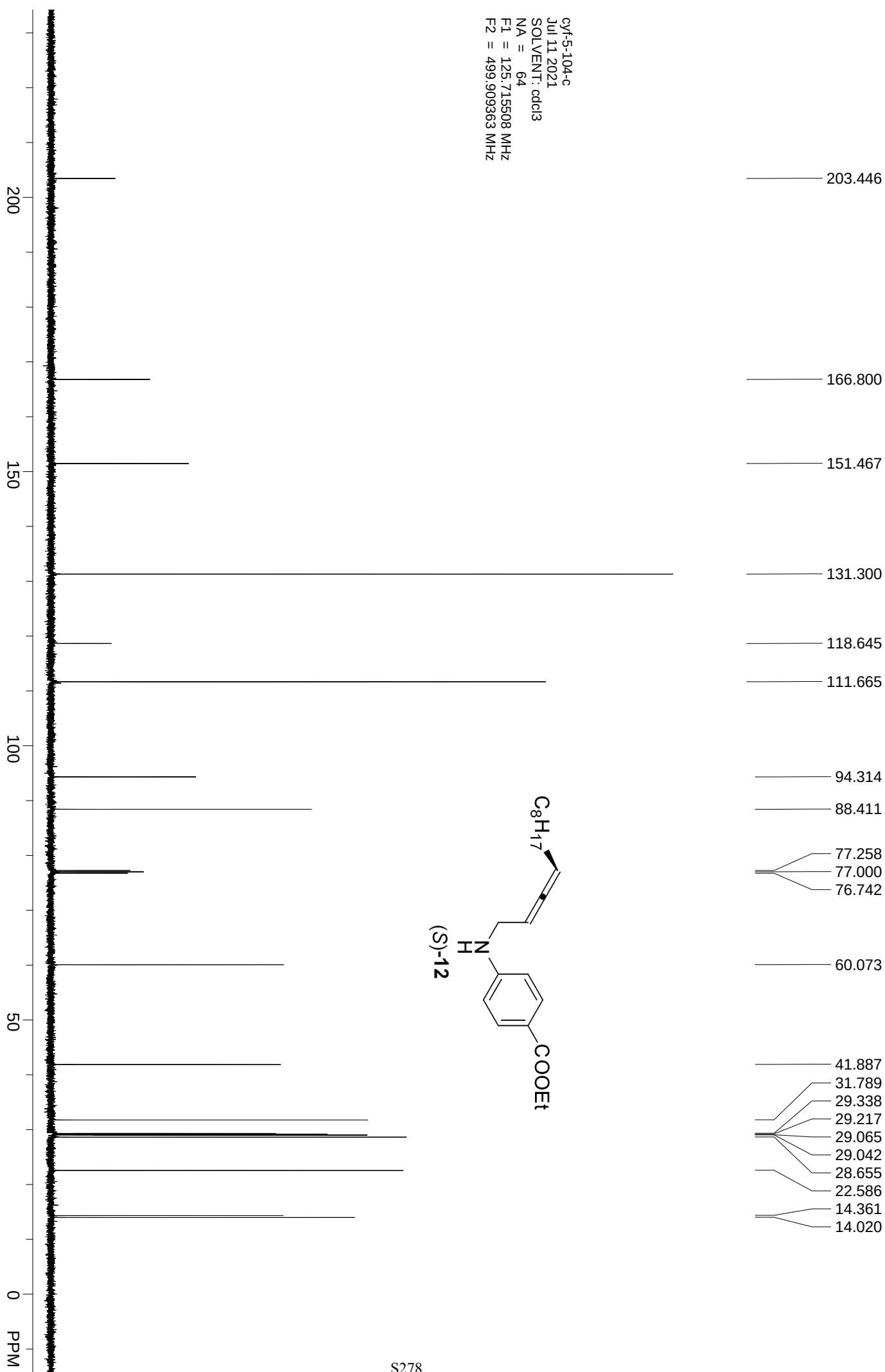
Processed Channel Descr.: 2998 PDA 214.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 214.0 nm (2998 (210-400)nm)	6.213	1198815	97.41	147596
2	2998 PDA 214.0 nm (2998 (210-400)nm)	6.823	31858	2.59	3545

cyf-5-104-h
 Jul 11 2021
 SOLVENT: cdd3
 NA = 4
 F1 = 399.722626 MHz
 F2 = 100.519203 MHz

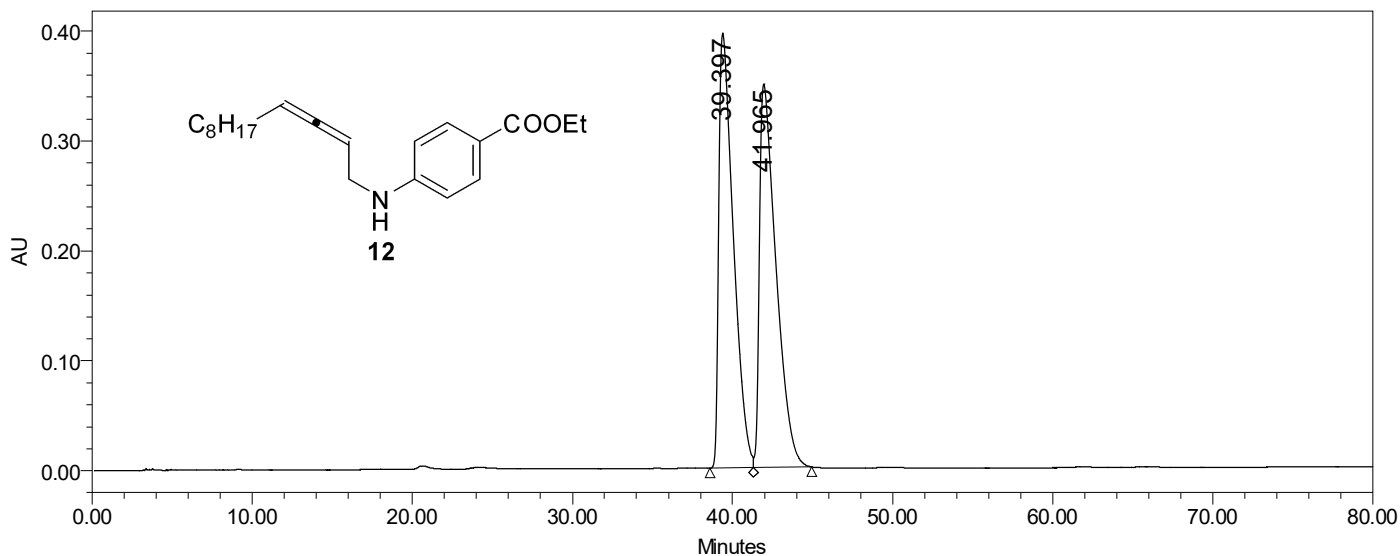


cyf-5-104-c
Jul 11 2021
SOLVENT: cdcl3
NA = 64
F1 = 125.715508 MHz
F2 = 499.909363 MHz



SAMPLE INFORMATION

Sample Name:	cyf-5-100-rac-adh-500-1	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	123
Vial:	3	Acq. Method Set:	adh_500_1
Injection #:	1	Processing Method:	123
Injection Volume:	10.00 ul	Channel Name:	284.0nm
Run Time:	80.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 284.0 nm (2998)
Date Acquired:	7/11/2021 10:54:21 AM CST		
Date Processed:	7/11/2021 7:29:00 PM CST		



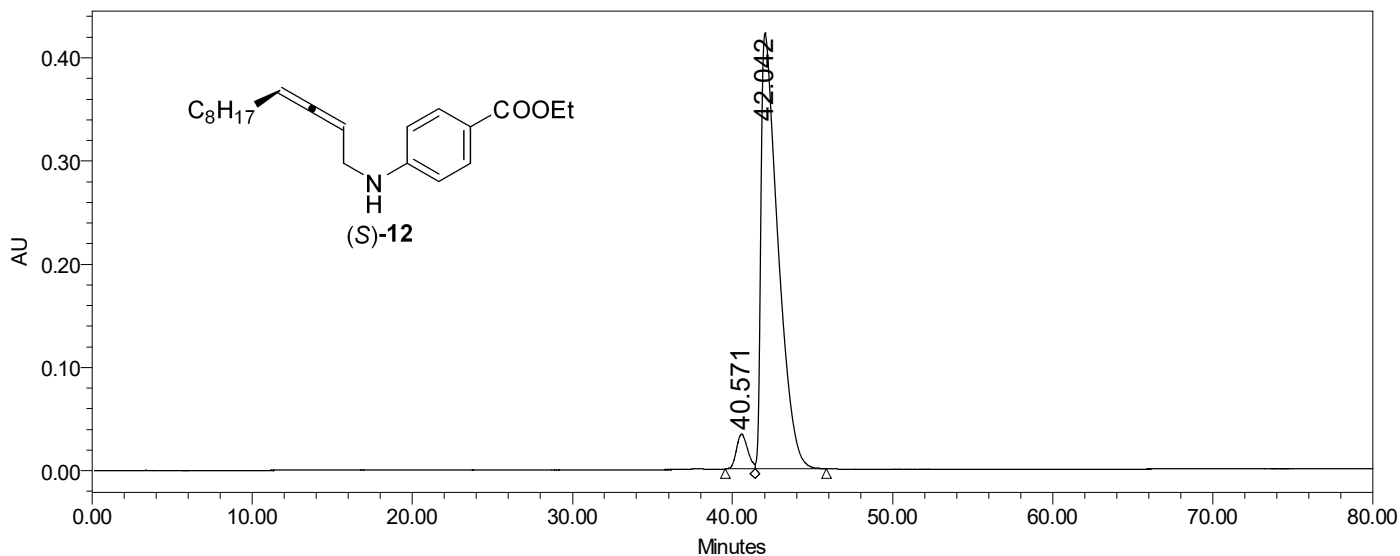
Channel: 2998; Processed Channel: 2998 PDA 284.0 nm (2998 (210-400)nm); Result Id: 1687;
Processing Method: 123

Processed Channel Descr.: 2998 PDA 284.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 284.0 nm (2998 (210-400)nm)	39.397	24989976	49.95	395564
2	2998 PDA 284.0 nm (2998 (210-400)nm)	41.965	25037138	50.05	348757

SAMPLE INFORMATION

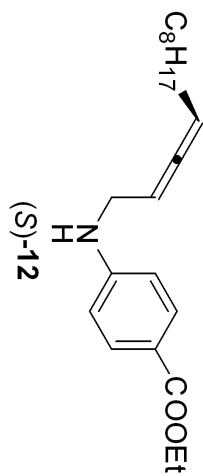
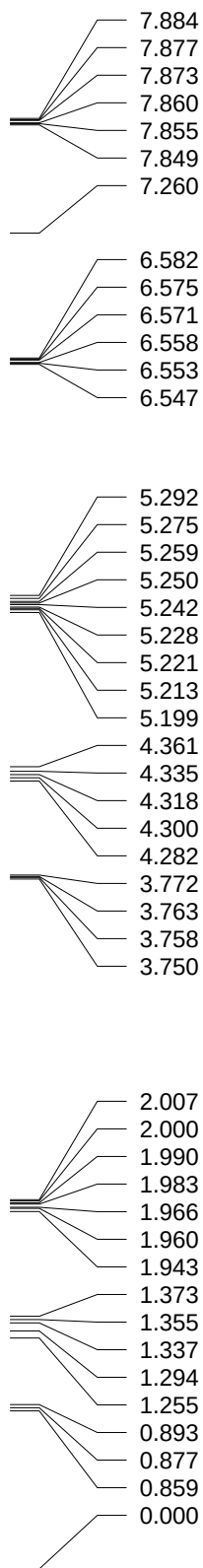
Sample Name:	cyf-5-104-adh-500-1	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	123
Vial:	4	Acq. Method Set:	adh_500_1
Injection #:	1	Processing Method:	1234
Injection Volume:	5.00 ul	Channel Name:	284.0nm
Run Time:	80.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 284.0 nm (2998)
Date Acquired: 7/11/2021 12:15:02 PM CST			
Date Processed: 7/11/2021 7:26:53 PM CST			



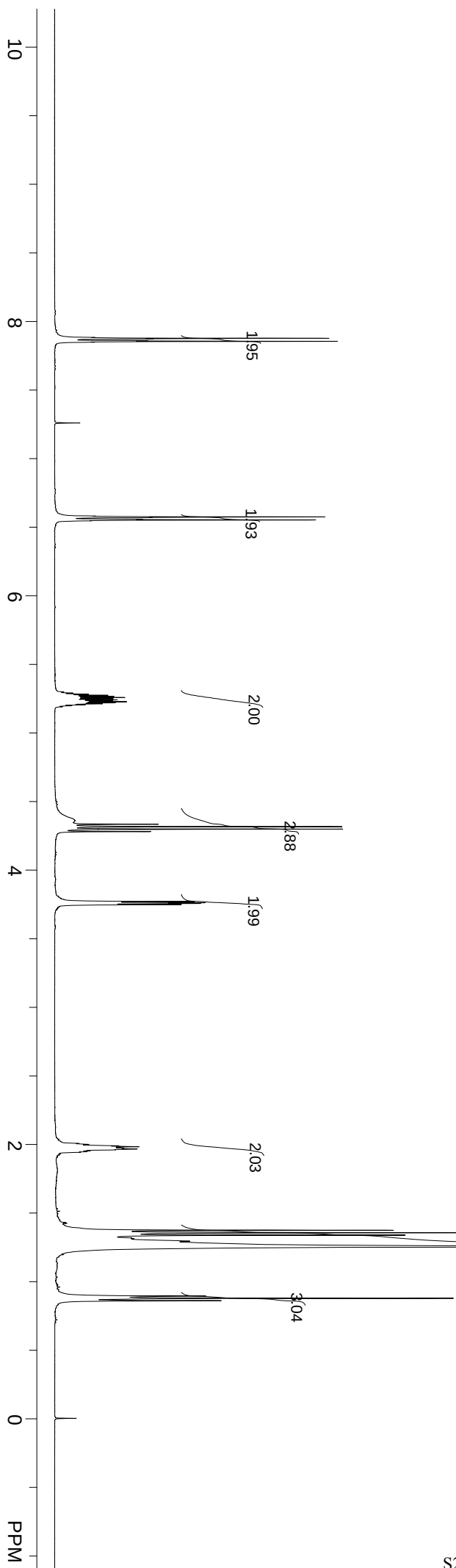
Channel: 2998; Processed Channel: 2998 PDA 284.0 nm (2998 (210-400)nm); Result Id: 1684;
Processing Method: 1234

Processed Channel Descr.: 2998 PDA 284.0 nm (2998 (210-400)nm)

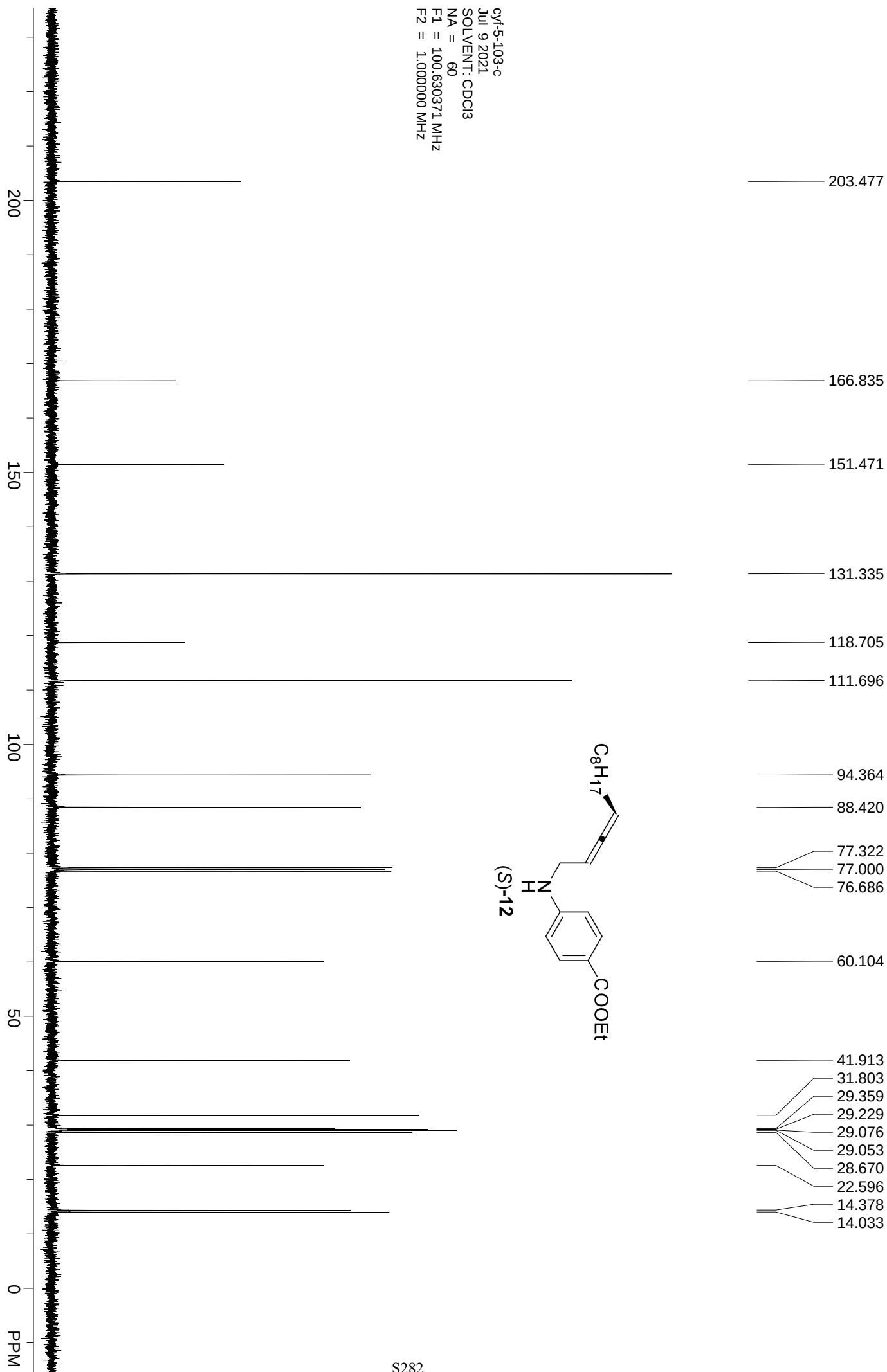
	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 284.0 nm (2998 (210-400)nm)	40.571	1638706	5.00	33681
2	2998 PDA 284.0 nm (2998 (210-400)nm)	42.042	31159315	95.00	422012



cyf-5-103-h
 Jul 9 2021
 SOLVENT: CDCl₃
 NA = 2
 F1 = 400.200012 MHz
 F2 = 1.000000 MHz

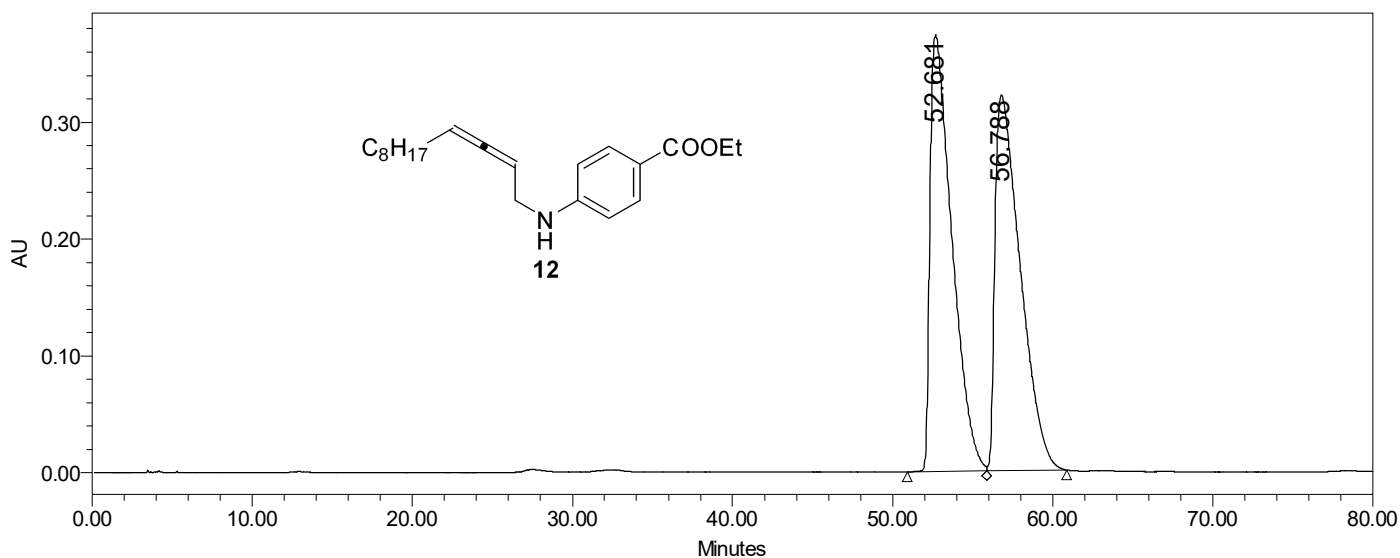


cyf-5-103-c
Jul 9 2021
SOLVENT: CDCl3
NA = 60
F1 = 100.630371 MHz
F2 = 1.000000 MHz



SAMPLE INFORMATION

Sample Name:	cyf-5-100-rac-adh-500-1	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	123
Vial:	3	Acq. Method Set:	adh_500_1
Injection #:	1	Processing Method:	123
Injection Volume:	10.00 ul	Channel Name:	284.0nm
Run Time:	80.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 284.0 nm (2998)
Date Acquired: 7/9/2021 9:00:01 PM CST			
Date Processed: 7/15/2021 10:17:15 AM CST			



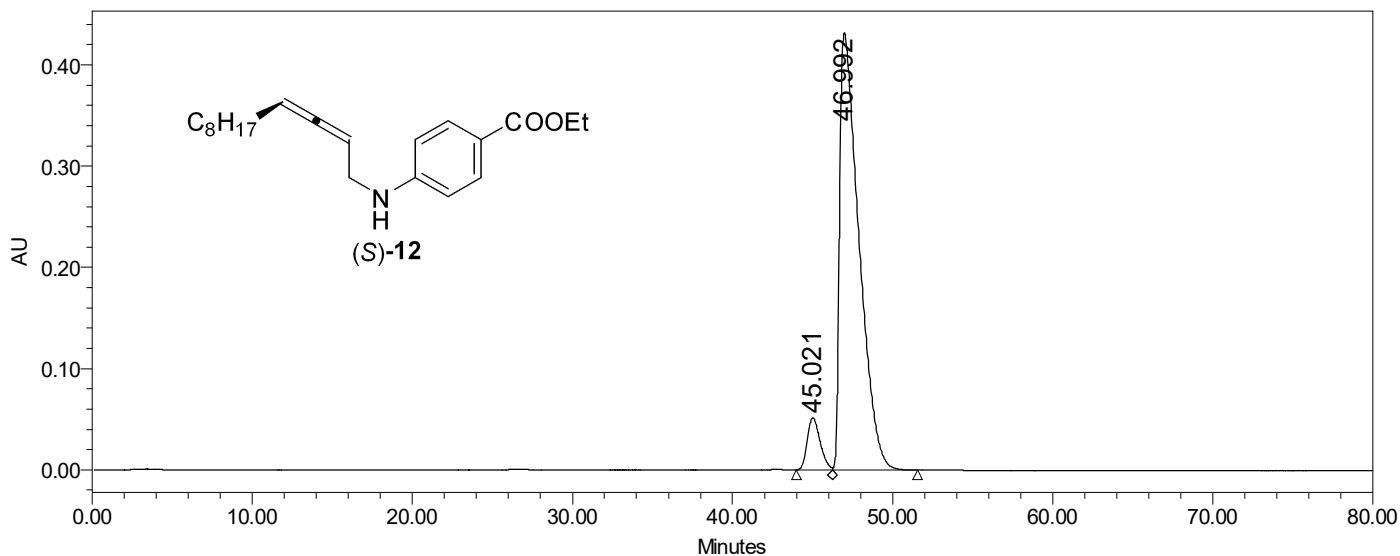
Channel: 2998; Processed Channel: 2998 PDA 284.0 nm (2998 (210-400)nm); Result Id: 1699;
Processing Method: 123

Processed Channel Descr.: 2998 PDA 284.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 284.0 nm (2998 (210-400)nm)	52.681	35354287	50.14	373482
2	2998 PDA 284.0 nm (2998 (210-400)nm)	56.788	35157548	49.86	321734

SAMPLE INFORMATION

Sample Name:	cyf-5-103-adh-500-1	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	123
Vial:	4	Acq. Method Set:	adh_500_1
Injection #:	1	Processing Method:	1234
Injection Volume:	5.00 ul	Channel Name:	284.0nm
Run Time:	80.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 284.0 nm (2998)
Date Acquired:	7/9/2021 10:20:41 PM CST		
Date Processed:	7/15/2021 10:15:43 AM CST		



Channel: 2998; Processed Channel: 2998 PDA 284.0 nm (2998 (210-400)nm); Result Id: 1696;
Processing Method: 1234

Processed Channel Descr.: 2998 PDA 284.0 nm (2998 (210-400)nm)

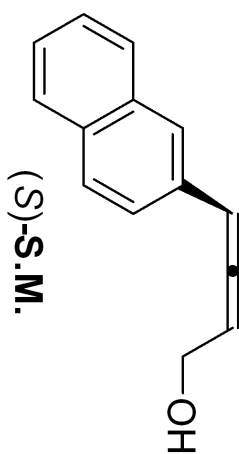
	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 284.0 nm (2998 (210-400)nm)	45.021	2870183	7.39	51468
2	2998 PDA 284.0 nm (2998 (210-400)nm)	46.992	35960311	92.61	431569

7.759
7.741
7.720
7.617
7.466
7.445
7.428
7.413
7.399
7.382
7.200
6.447
6.439
6.431
5.830
5.815
5.800
5.785

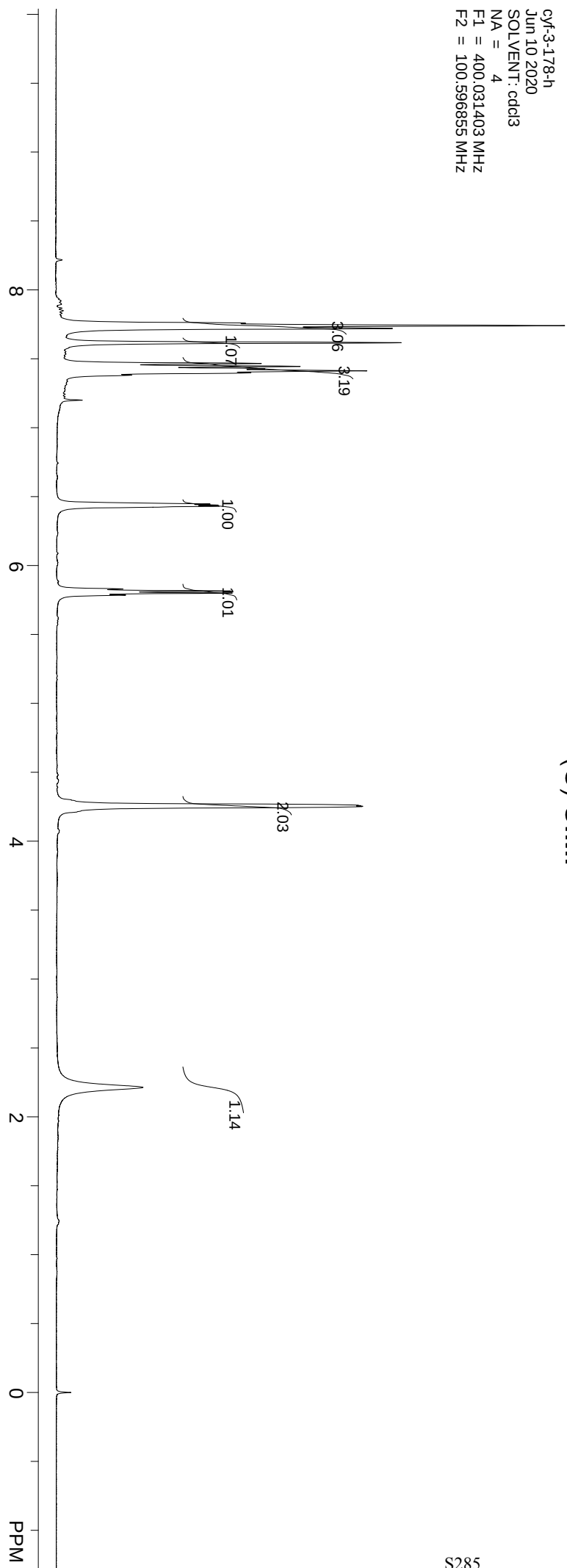
4.257
4.253
4.250

2.213

0.000



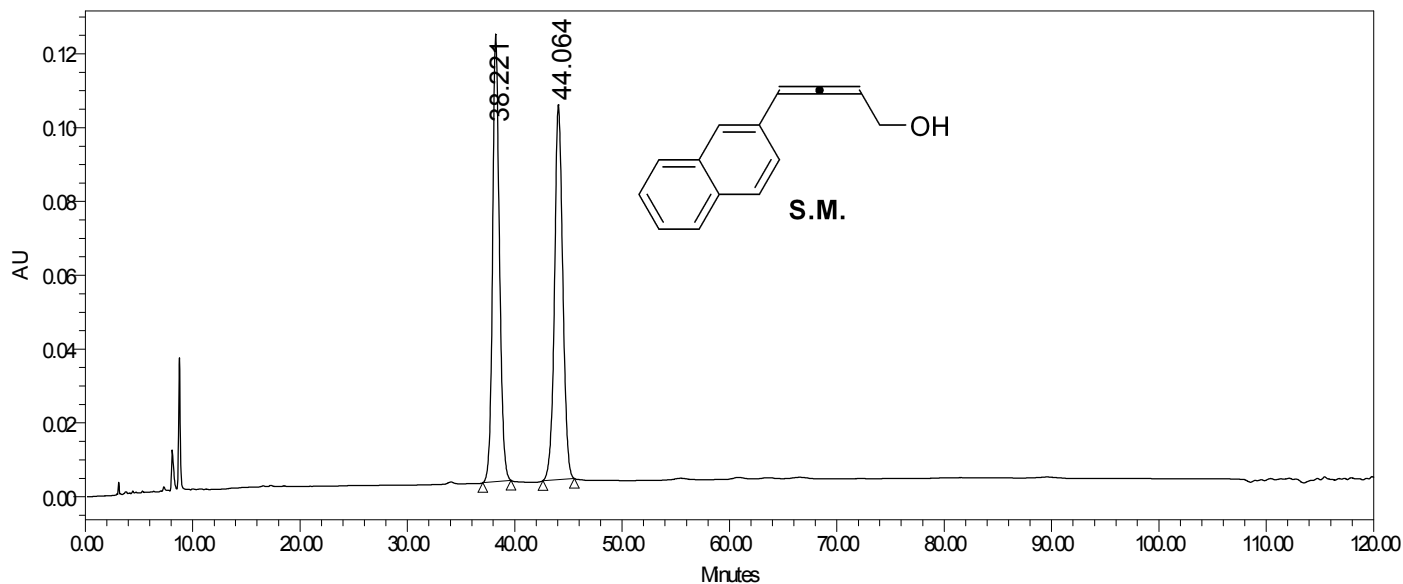
cyf-3-178-h
Jun 10 2020
SOLVENT: cdcl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz





SAMPLE INFORMATION

Sample Name:	Ic-2-168-ia-98-2-1-254	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	1	Processing Method:	Default
Injection Volume:	5.00 u	Channel Name:	W2489 ChA
Run Time:	120.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	9/11/2020 6:59:54 AM CST		
Date Processed:	9/11/2020 9:59:49 AM CST		



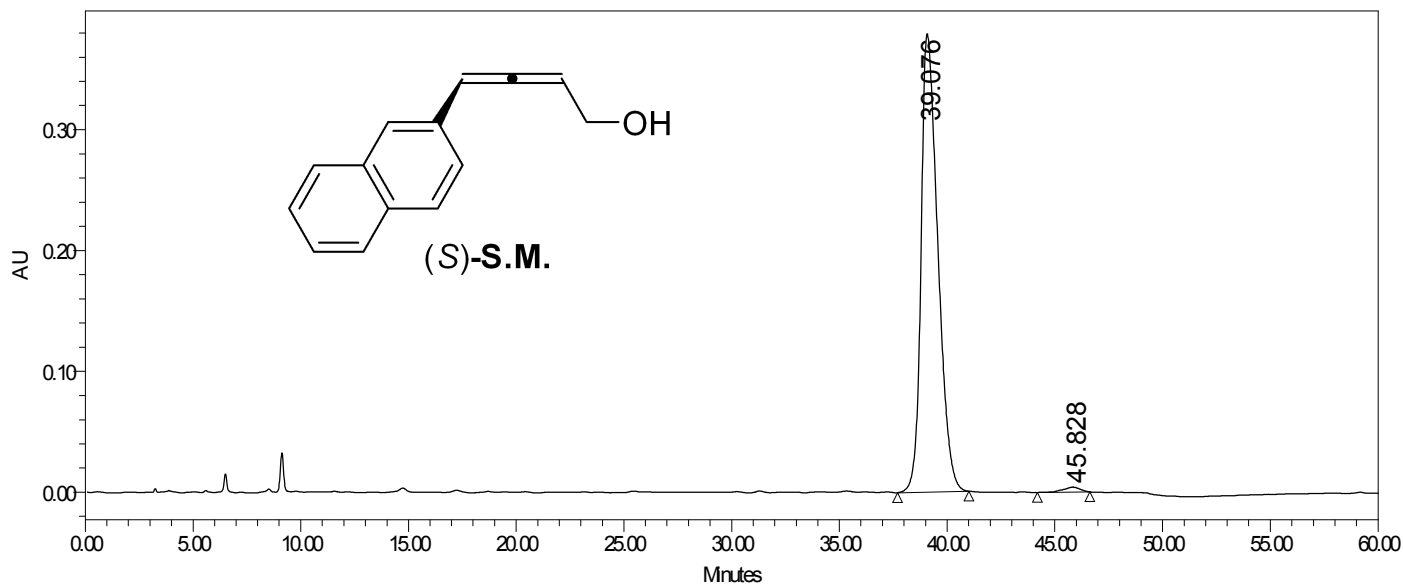
Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8143; Processing Method: Default

Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	38.221	5354598	49.63	121277
2	W2489 ChA.214nm	44.064	5433353	50.37	101584

SAMPLE INFORMATION

Sample Name:	cyf-3-182-ia-98-2-1-254	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	2	Processing Method:	Default
Injection Volume:	5.00 u	Channel Name:	W2489 ChA
Run Time:	60.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	9/11/2020 10:14:21 AM CST		
Date Processed:	9/11/2020 11:34:37 AM CST		



Channel: W2489 ChA; Processed Channel: W2489 ChA.214nm; Result Id: 8147; Processing Method: Default

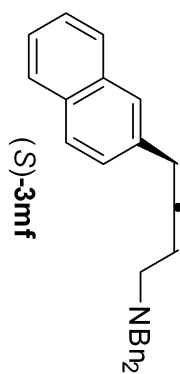
Processed Channel Descr.: W2489 ChA.214nm

	Processed Channel Descr.	RT	Area	%Area	Height
1	W2489 ChA.214nm	39.076	20439212	98.91	379237
2	W2489 ChA.214nm	45.828	225075	1.09	4068

7.787
7.759
7.739
7.654
7.492
7.471
7.444
7.426
7.405
7.401
7.384
7.318
7.300
7.281
7.246
7.228
7.210
6.363
6.357
6.354
6.347
5.724
5.707
5.691
5.674

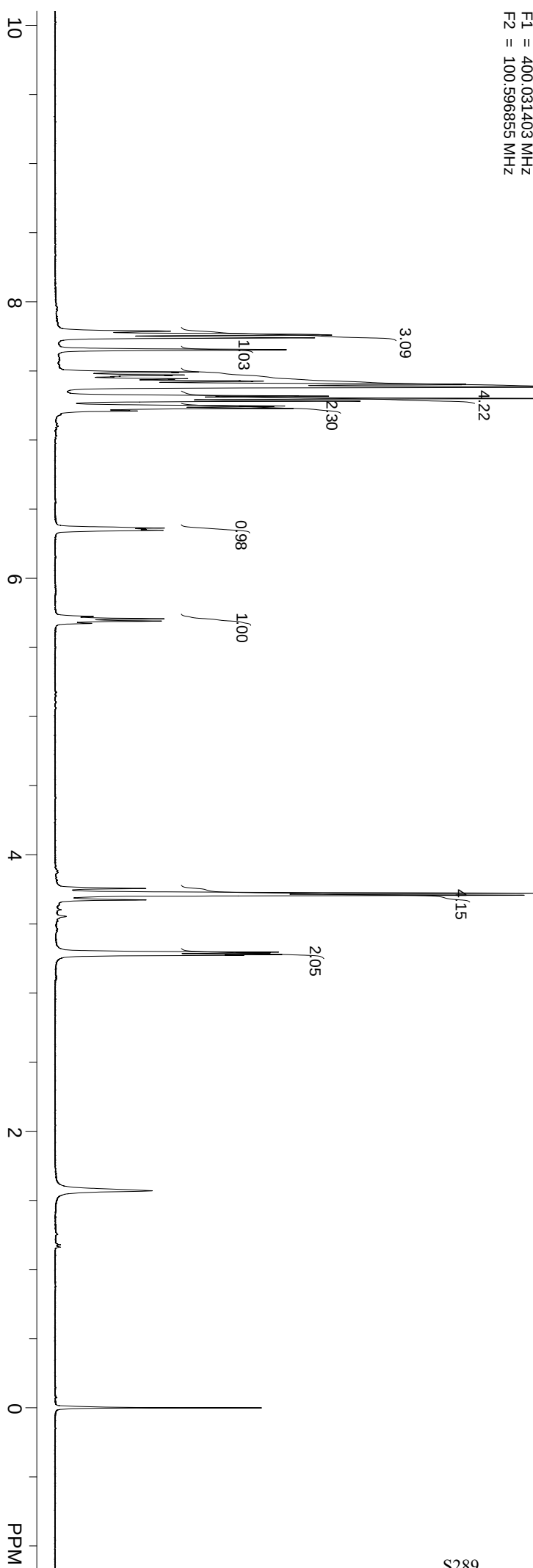
3.756
3.722
3.708
3.674
3.296
3.290
3.279
3.273

-0.000



Determination of the absolute configuration

cyf-4-70-h
Jun 11 2020
SOLVENT: CDCl3
NA = 8
F1 = 400.031403 MHz
F2 = 100.596855 MHz

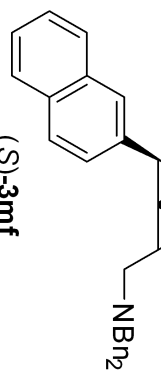


206.678

133.656
139.381
132.549
131.998
128.808
128.226
128.196
127.694
127.629
126.917
126.197
125.569
125.443
124.711
95.051
91.673
77.318
77.000
76.682

57.552

51.862



(S)-3mf

Determination of the absolute configuration

cyf-4-70-c-bruker
Jun 12 2020
SOLVENT: CDCl3
NA = 205
F1 = 100.641441 MHz
F2 = 1.000000 MHz

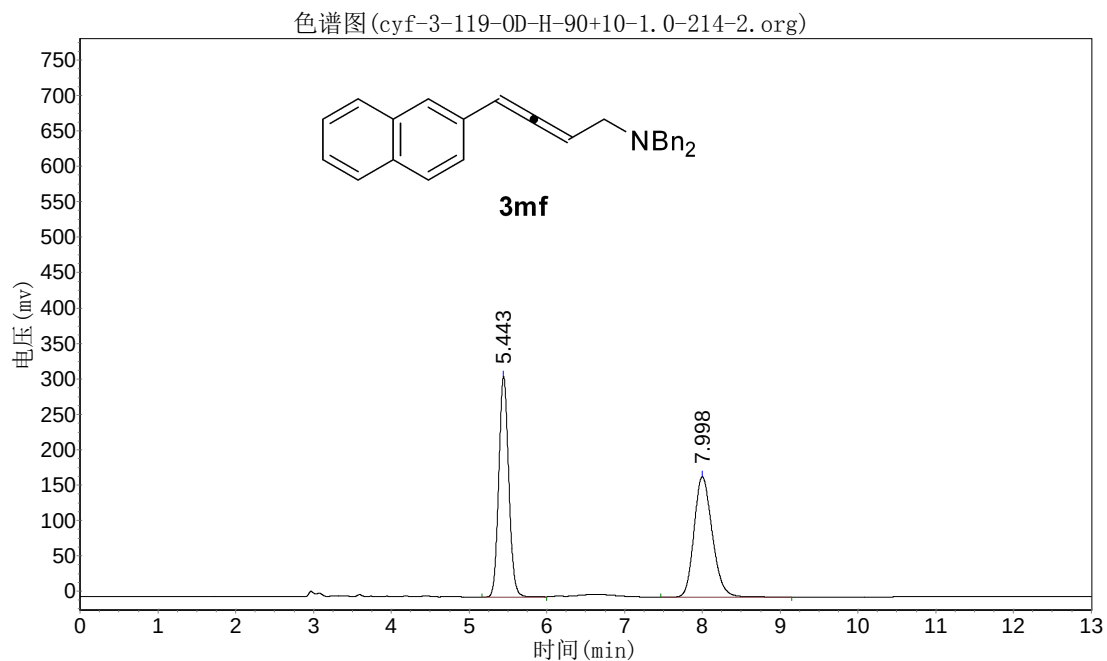


cyf-3-119

实验时间: 2020-06-16, 13:38:41
谱图文件: D:\data\slf\cyf\2020-06-16\cyf-3-119-OD-H-90+10-1.0-214-2.org

报告时间: 2020-06-16, 13:54:20

实验内容简介:
OD-H 90:10
214nm 1.0ml/min



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.443	311229.031	2779824.250	50.1345
2		7.998	169940.844	2764903.750	49.8655
总计			481169.875	5544728.000	100.0000

cyf-4-70

实验时间：2020-06-16, 13:52:39

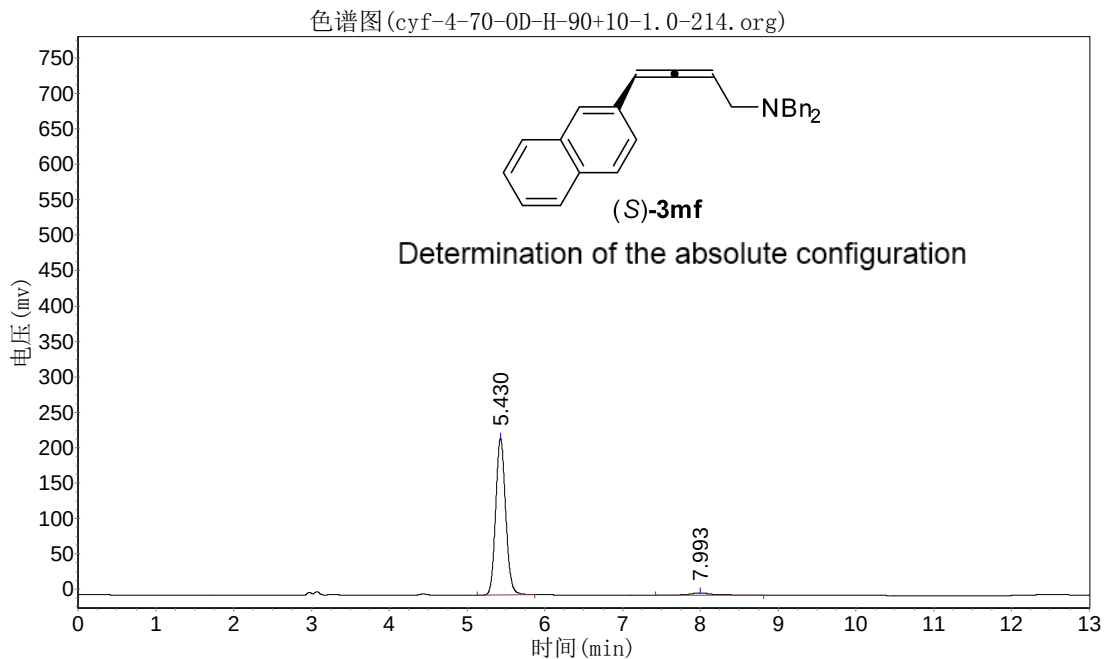
报告时间：2020-06-16, 14:08:01

谱图文件:D:\data\slf\cyf\2020-06-16\cyf-4-70-OD-H-90+10-1.0-214.org

实验内容简介:

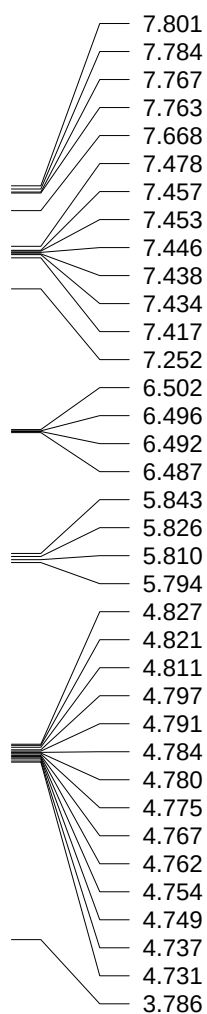
OD-H 90:10

214nm 1.0ml/min

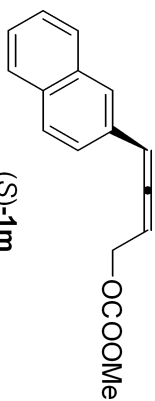


分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.430	221126.250	1966549.000	97.4366
2		7.993	2884.329	51736.551	2.5634
总计			224010.579	2018285.551	100.0000

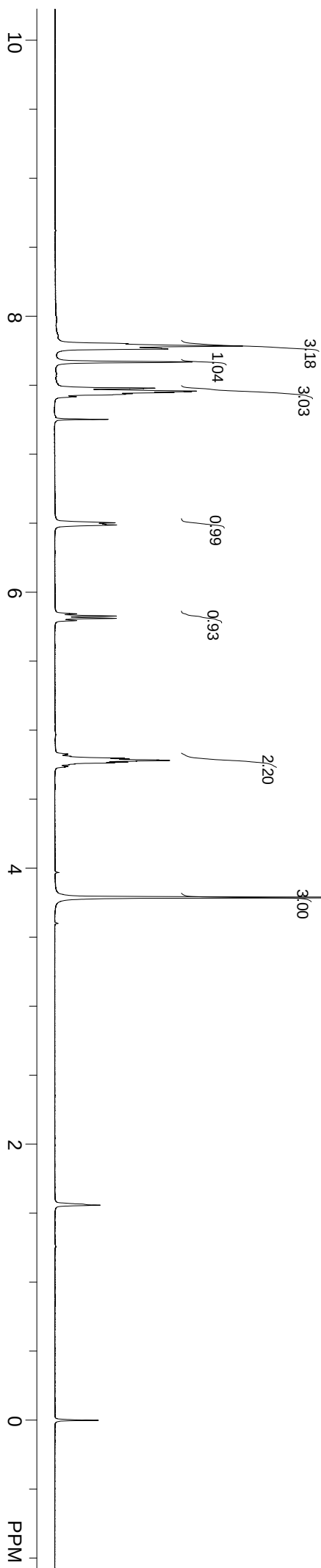


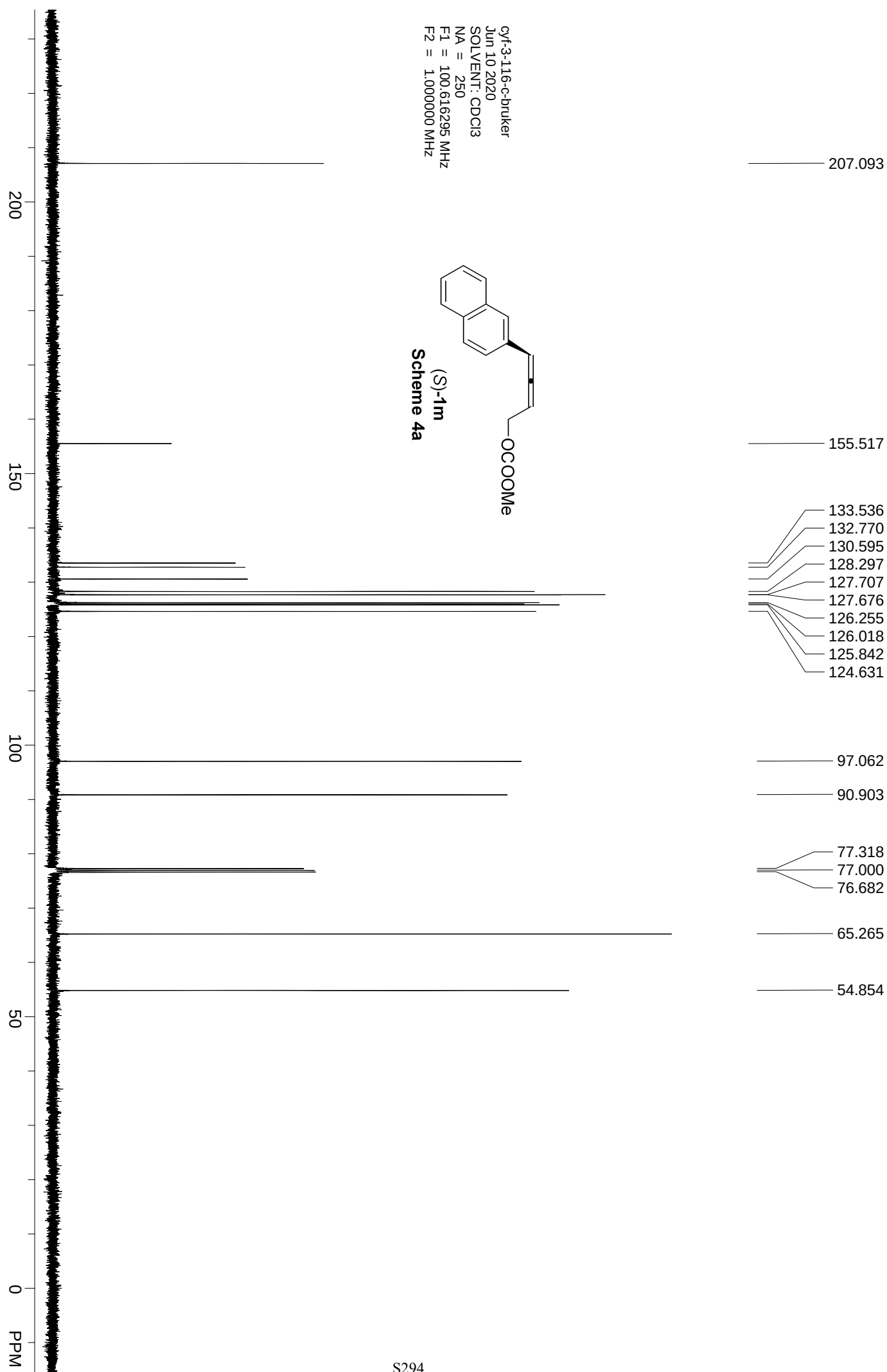
0.000



(S)-1m
Scheme 4a

cyf-3-116-h
Jun 10 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031219 MHz
F2 = 100.596855 MHz





CYF-3-115

实验时间: 2020/6/11, 10:43:07

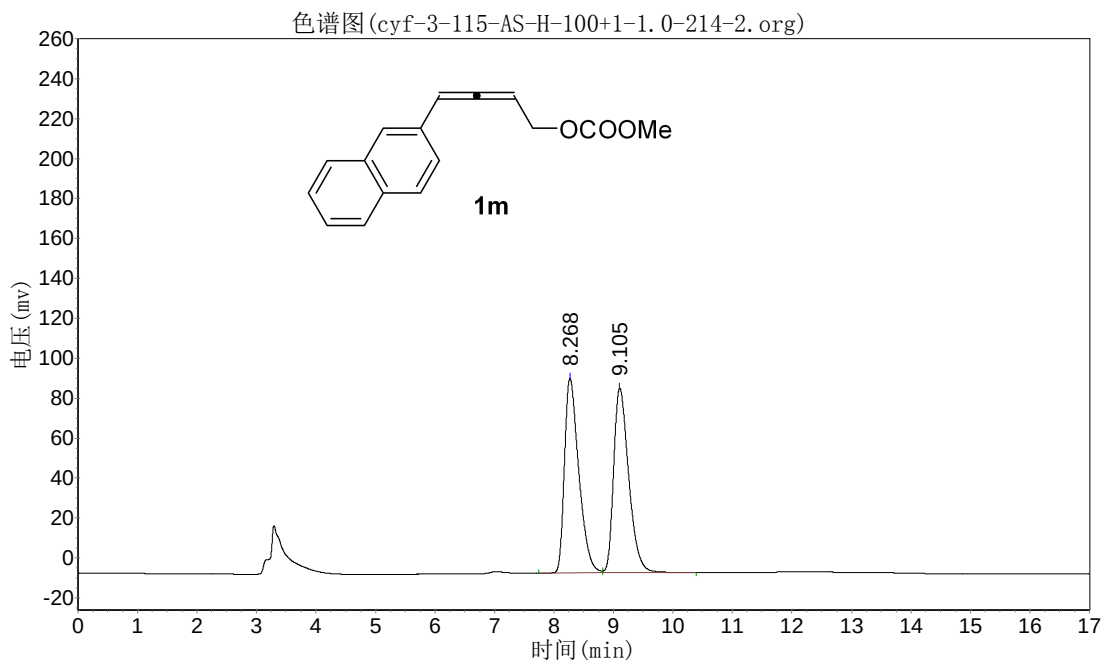
报告时间: 2020/6/11, 11:03:40

谱图文件: D:\data\slf\cyf\2020-06-11\cyf-3-115-AS-H-100+1-1.0-214-2.org

实验内容简介:

As-H 100+1

214nm 1.0ml/min



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		8.268	97520.492	1630209.500	50.0043
2		9.105	92446.664	1629931.125	49.9957
总计			189967.156	3260140.625	100.0000

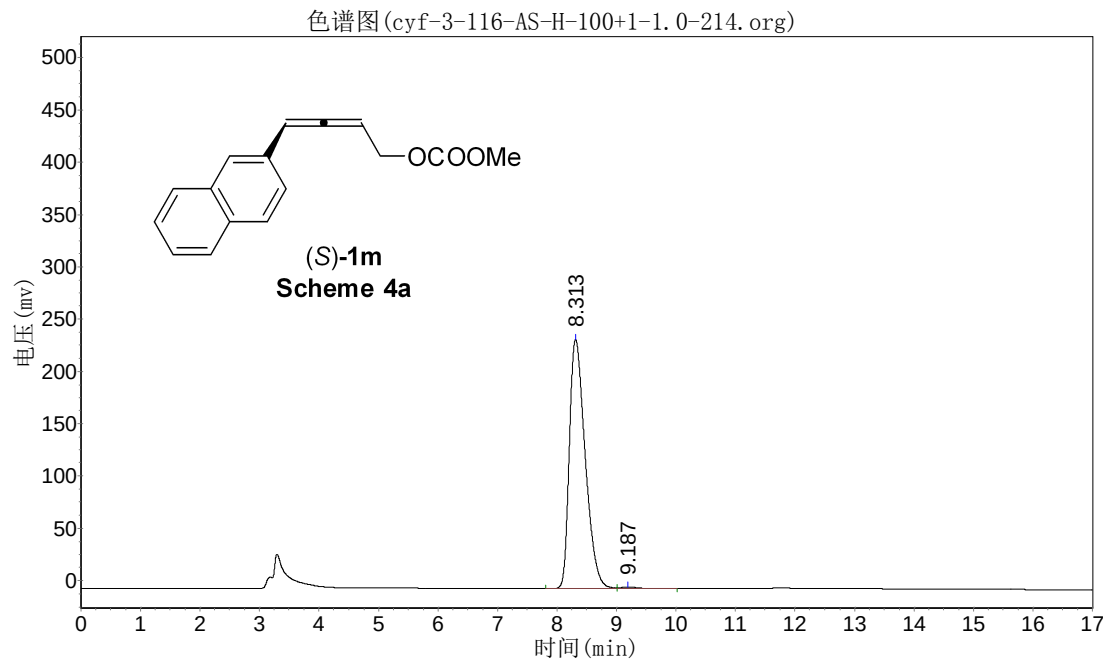
cyf-3-116

实验时间：2020/6/11, 11:02:10

报告时间：2020/6/11, 11:20:28

谱图文件:D:\data\slf\cyf\2020-06-11\cyf-3-116-AS-H-100+1-1. 0-214. org

实验内容简介:
As-H 100+1
214nm 1.0ml/min



分析结果表

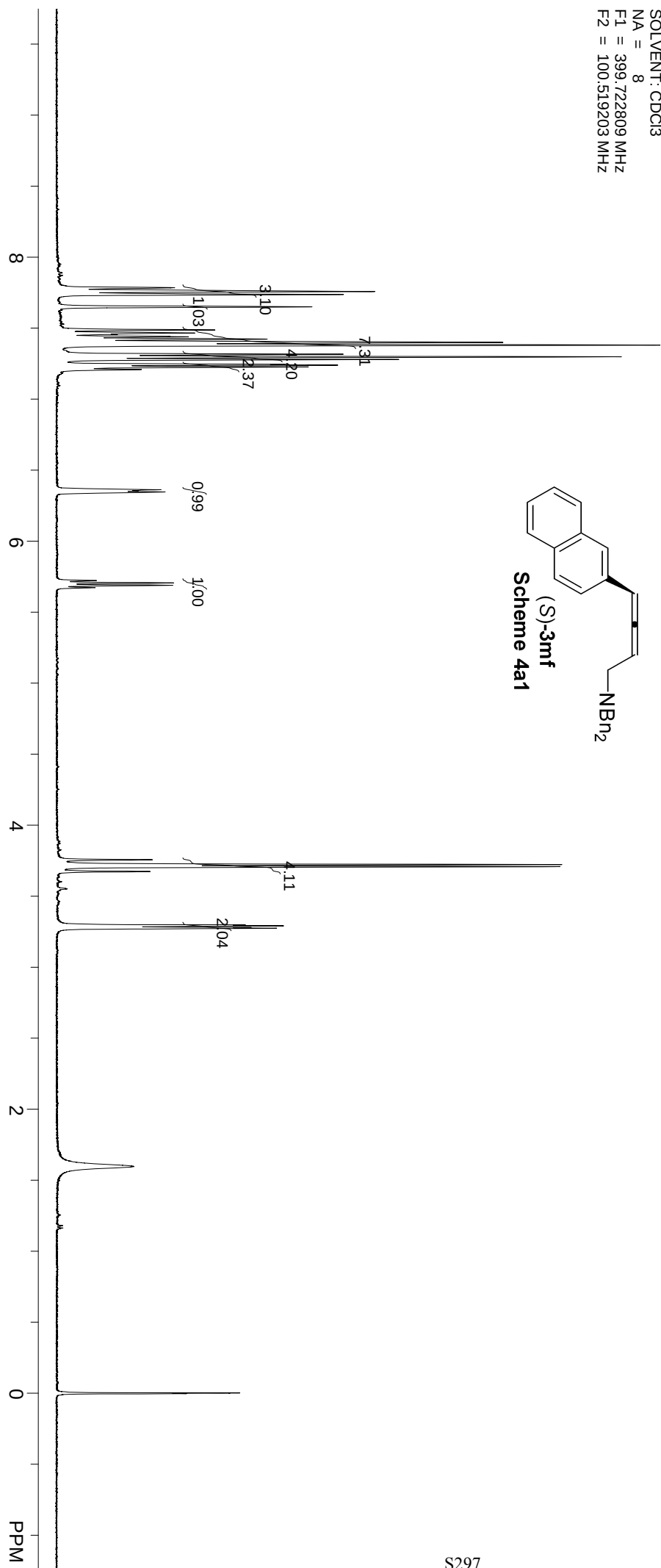
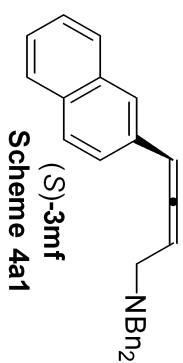
峰号	峰名	保留时间	峰高	峰面积	含量
1		8.313	238368.047	4419645.500	99.2547
2		9.187	1632.211	33184.773	0.7453
总计			240000.258	4452830.273	100.0000

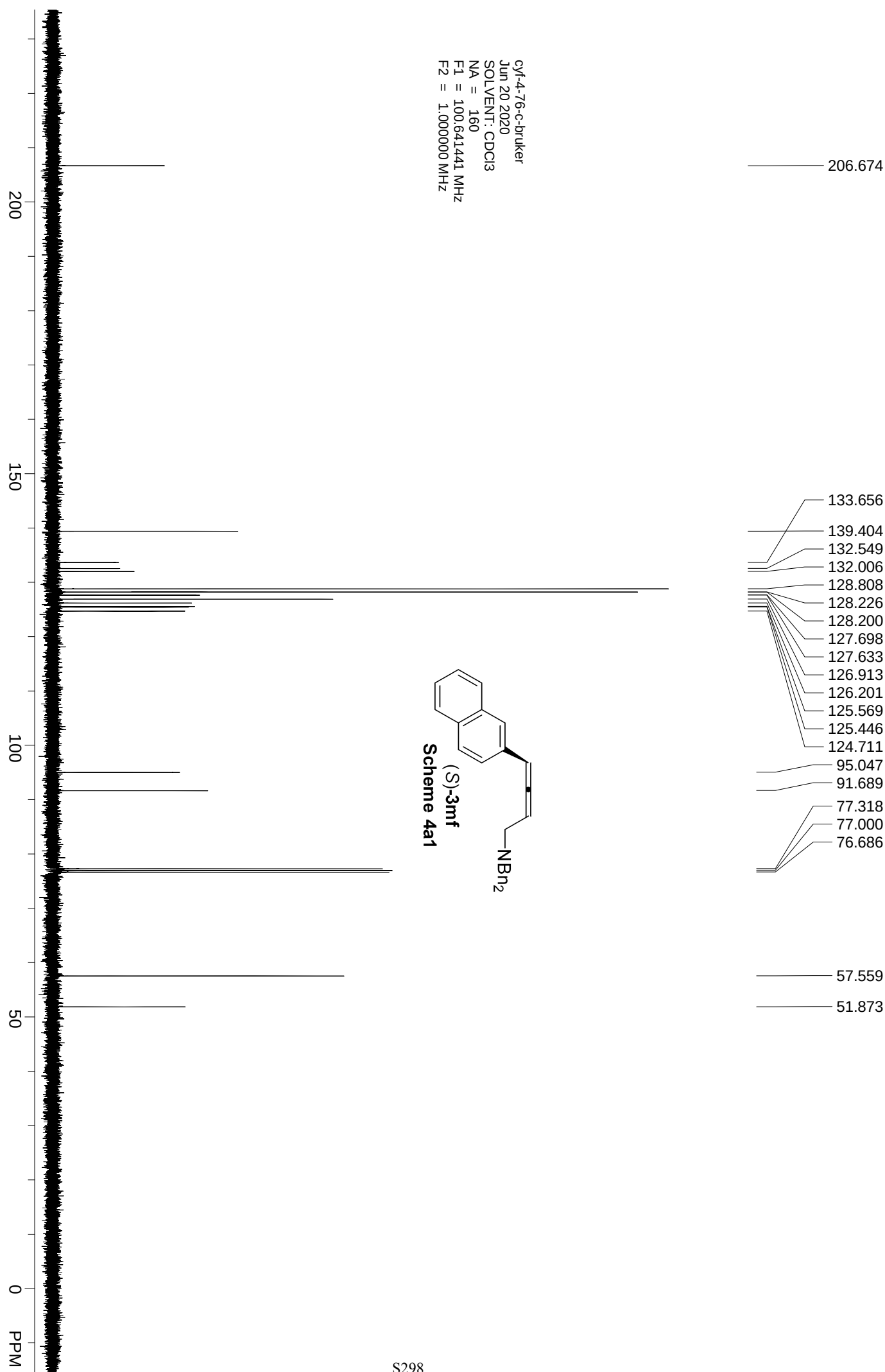
7.785
7.758
7.737
7.650
7.487
7.465
7.439
7.423
7.400
7.380
7.316
7.299
7.280
7.245
7.240
7.227
7.209
6.362
6.353
6.347
5.722
5.706
5.689
5.672

3.756
3.722
3.707
3.673
3.296
3.290
3.279
3.273

0.000

cyf-4-76-h
Jun 20 2020
SOLVENT: CDCl3
NA = 8
F1 = 399.722809 MHz
F2 = 100.519203 MHz





cyf-3-119

实验时间: 2020-06-22, 10:00:01

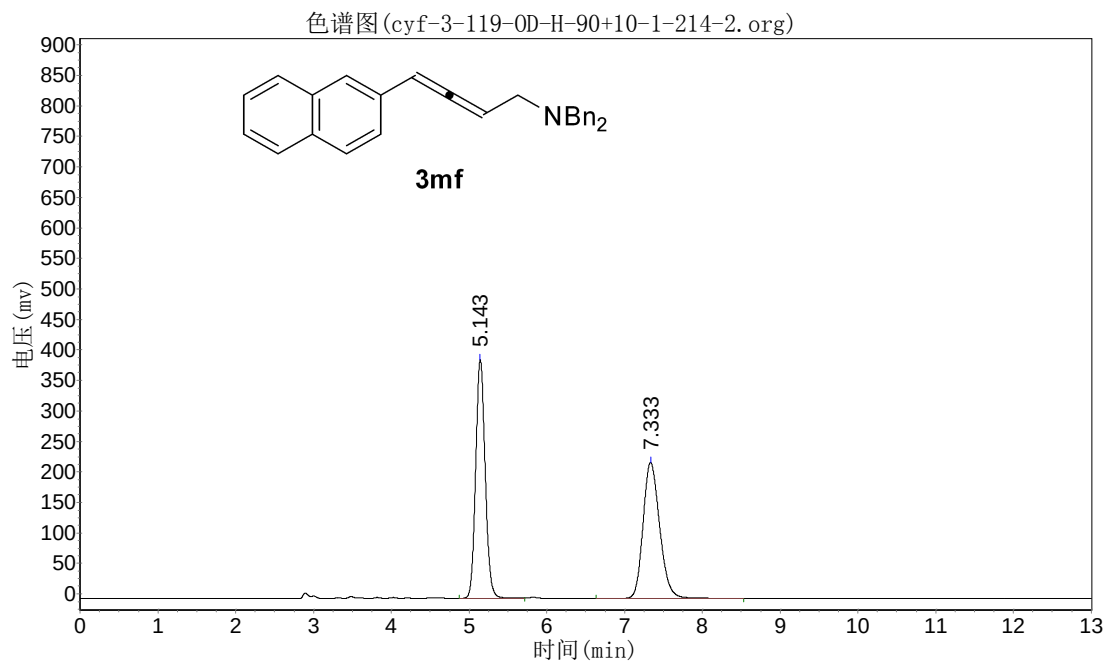
报告时间: 2020-06-22, 10:50:59

谱图文件: D:\data\slf\cyf\2020-06-22\cyf-3-119-OD-H-90+10-1-214-2. org

实验内容简介:

OD-H 90:10

214nm 1.0ml/min



分析结果表

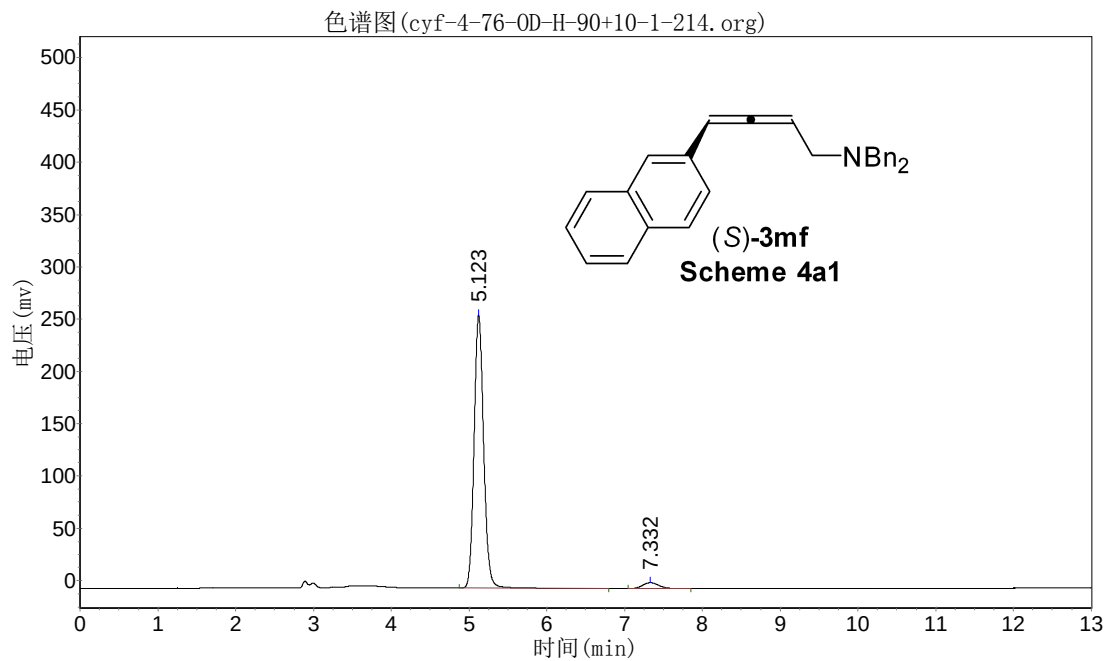
峰号	峰名	保留时间	峰高	峰面积	含量
1		5.143	391381.938	3336749.250	50.2559
2		7.333	222859.688	3302762.250	49.7441
总计			614241.625	6639511.500	100.0000

cyf-4-76

实验时间: 2020-06-22, 10:20:31
谱图文件: D:\data\slf\cyf\2020-06-22\cyf-4-76-OD-H-90+10-1-214. org

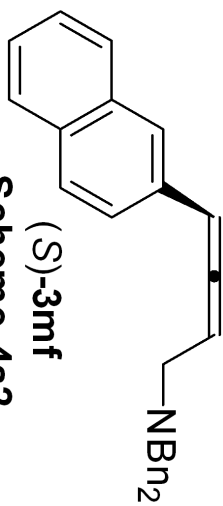
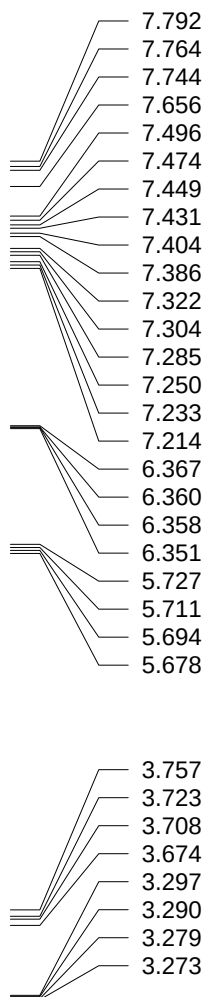
报告时间: 2020-06-22, 10:52:12

实验内容简介:
OD-H 90:10
214nm 1.0ml/min

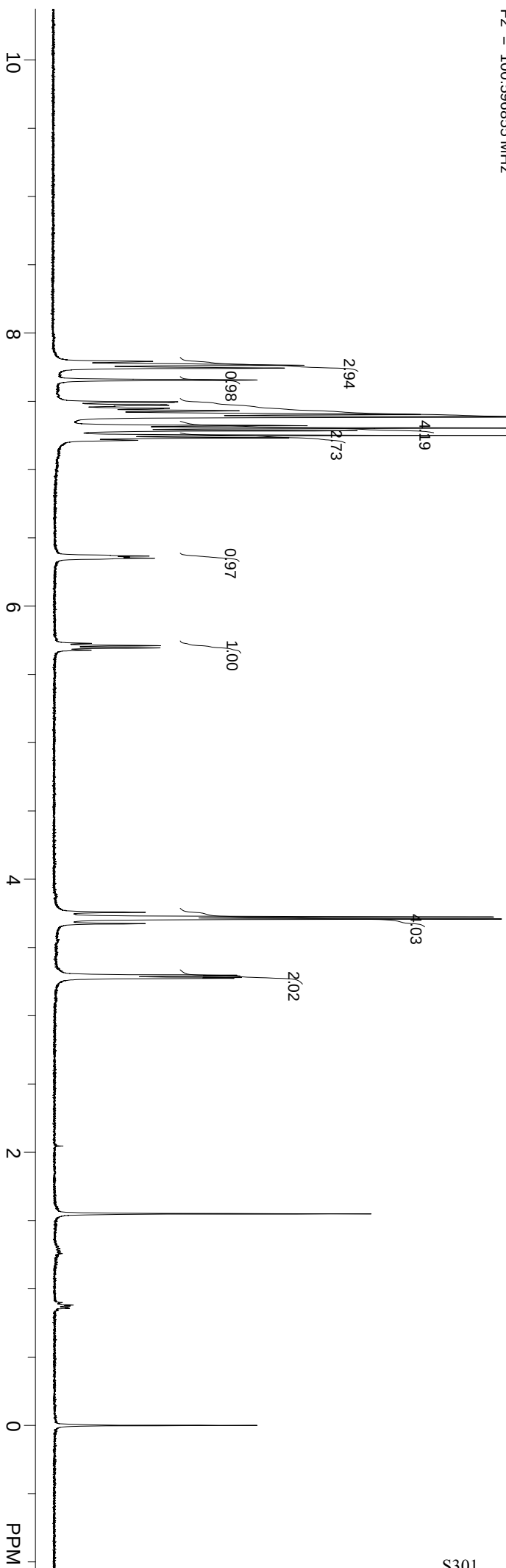


分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.123	261231.313	2228742.000	96.3865
2		7.332	5674.457	83553.820	3.6135
总计			266905.770	2312295.820	100.0000



cyf-4-68a-h
Jun 11 2020
SOLVENT: cdcl₃
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz



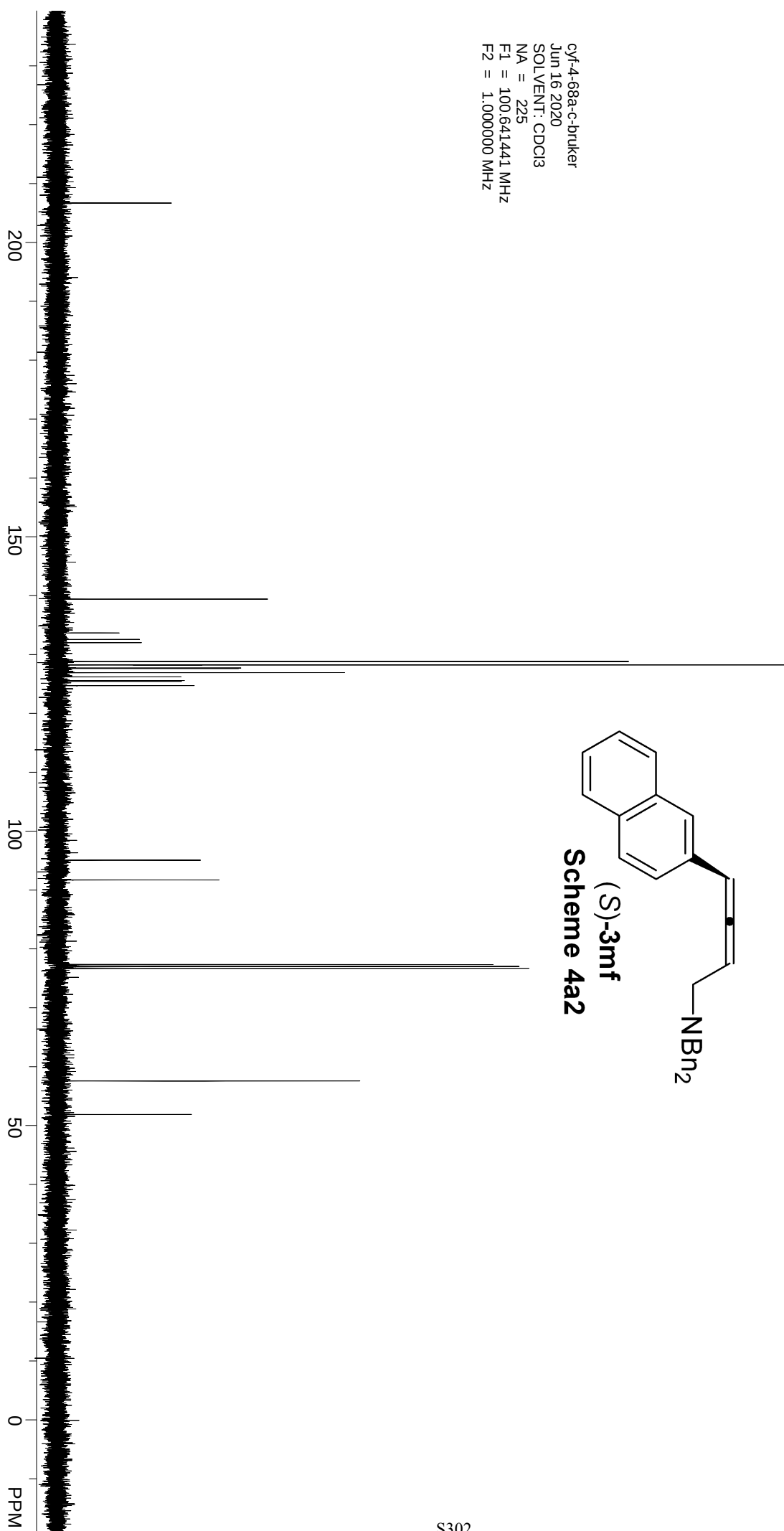
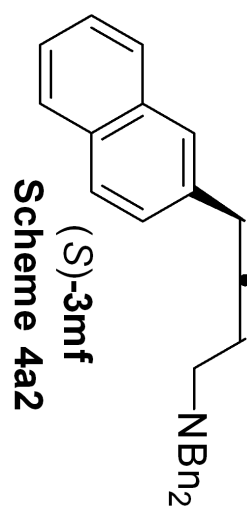
206.689

133.666
139.416
132.561
132.016
128.817
128.233
128.201
127.703
127.640
126.922
126.211
125.579
125.445
124.718
95.054
91.698
77.316
77.000
76.684

57.572

51.877

cyf-4-68a-c-bruker
Jun 16 2020
SOLVENT: CDCl3
NA = 225
F1 = 100.641441 MHz
F2 = 1.000000 MHz



cyf-3-119-rac

实验时间: 2020/6/11, 13:50:22

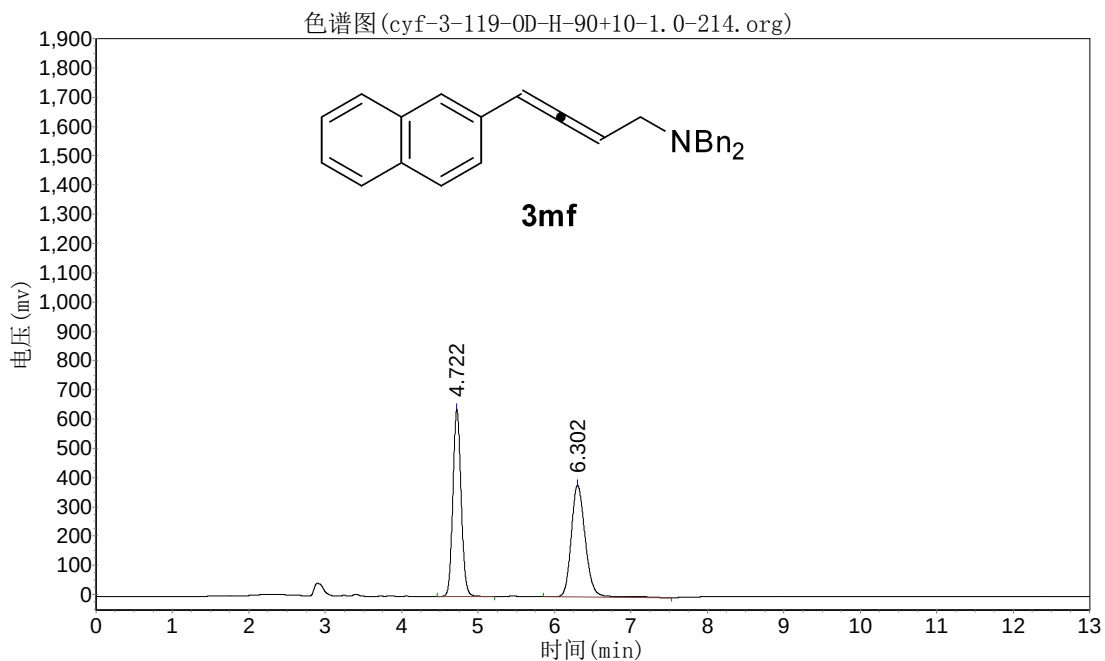
报告时间: 2020/6/11, 14:50:31

谱图文件: D:\data\slf\cyf\2020-06-11\cyf-3-119-OD-H-90+10-1. 0-214. org

实验内容简介:

OD-H 100+1

214nm 1.0ml/min



分析结果表

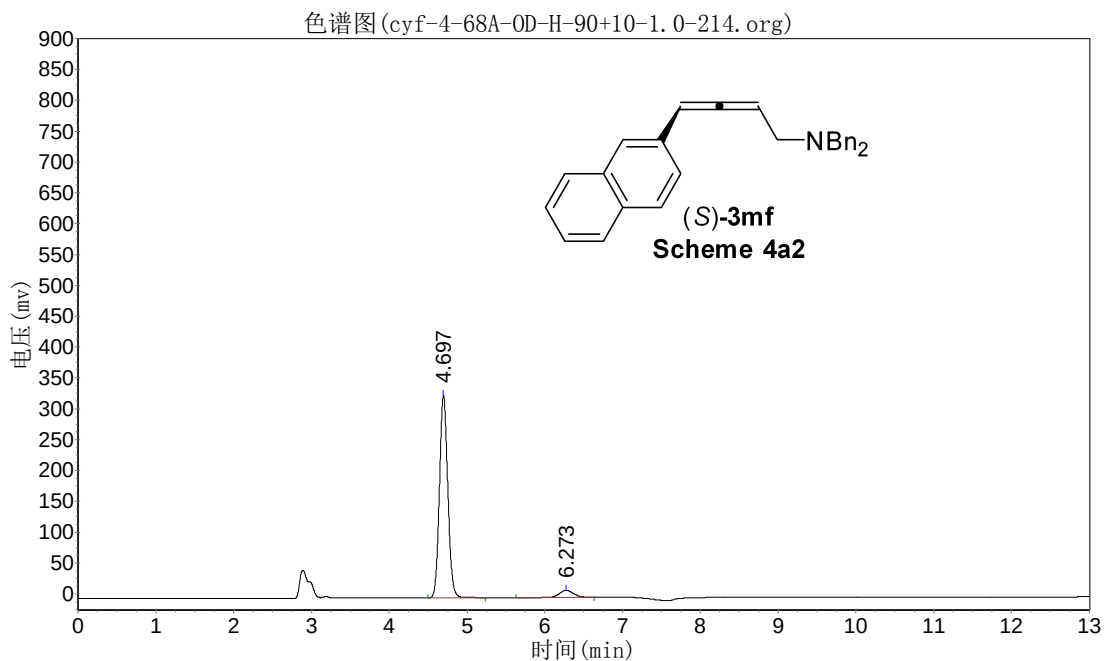
峰号	峰名	保留时间	峰高	峰面积	含量
1		4.722	639882.688	4799912.500	49.2414
2		6.302	382083.469	4947813.000	50.7586
总计			1021966.156	9747725.500	100.0000

cyf-4-68-A

实验时间: 2020/6/11, 14:18:10
谱图文件: D:\data\slf\cyf\2020-06-11\cyf-4-68A-OD-H-90+10-1.0-214.org

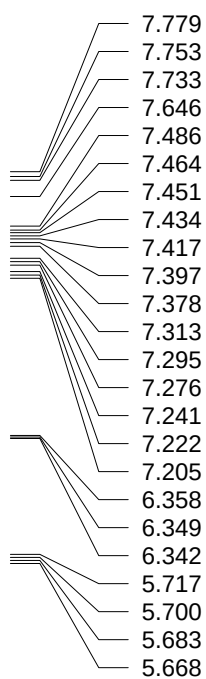
报告时间: 2020/6/11, 14:53:46

实验内容简介:
OD-H 100+1
214nm 1.0ml/min

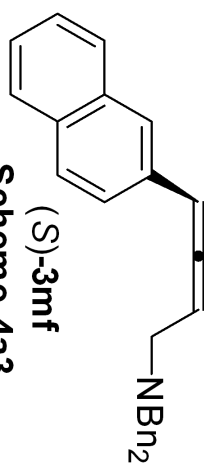


分析结果表

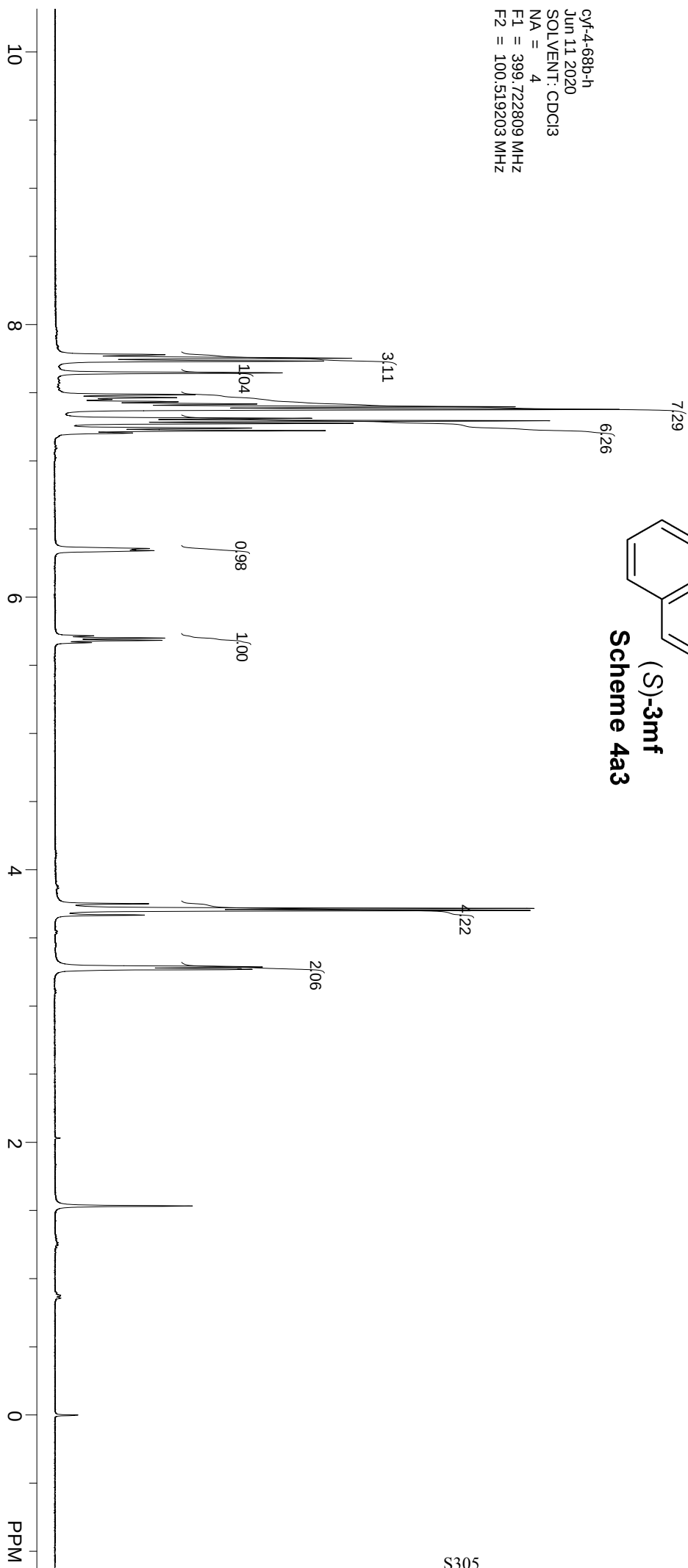
峰号	峰名	保留时间	峰高	峰面积	含量
1		4.697	328181.656	2458507.250	94.5985
2		6.273	11307.910	140378.766	5.4015
总计			339489.566	2598886.016	100.0000



-0.000



cyf-4-68b-h
Jun 11, 2020
SOLVENT: CDCl₃
NA = 4
F1 = 399.722809 MHz
F2 = 100.519203 MHz



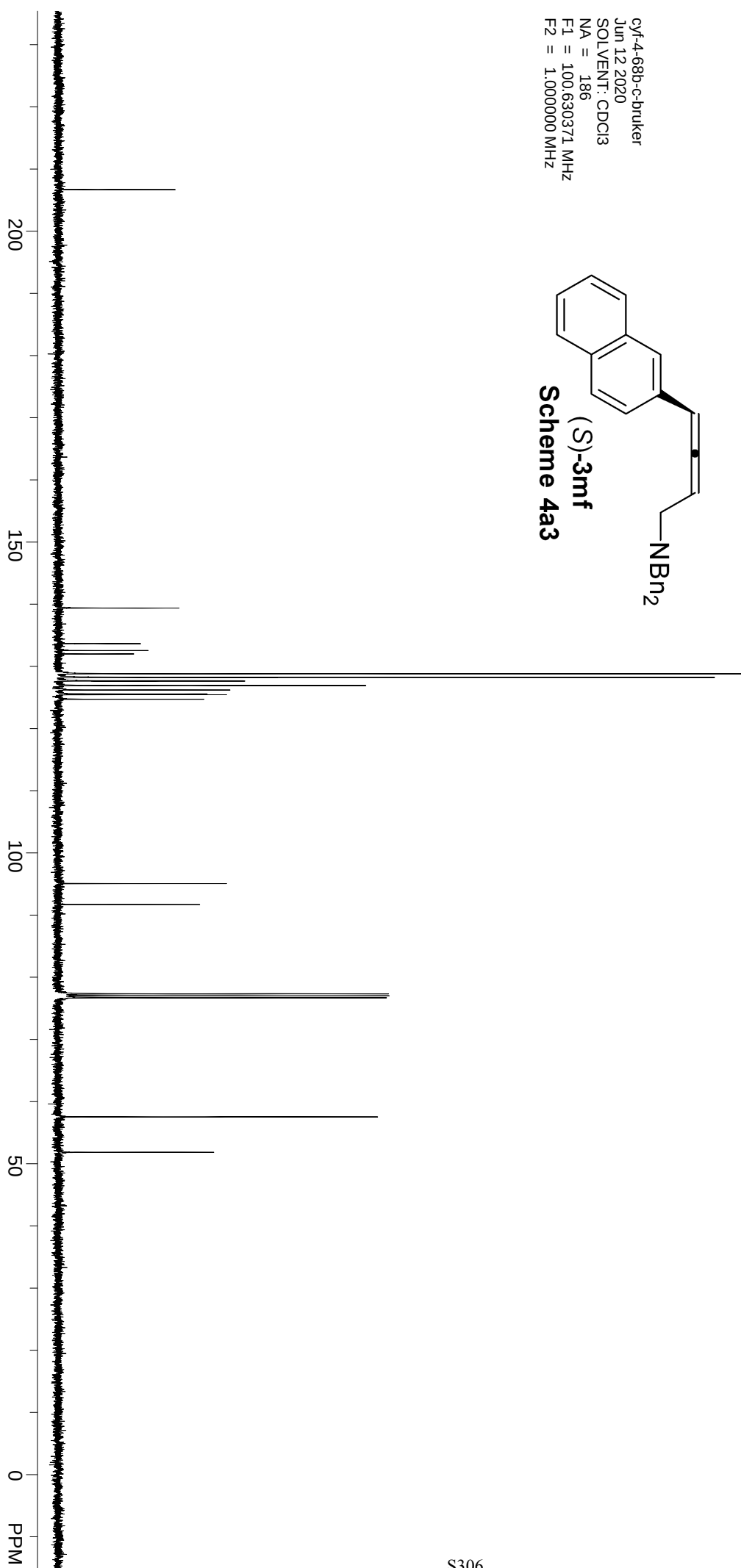
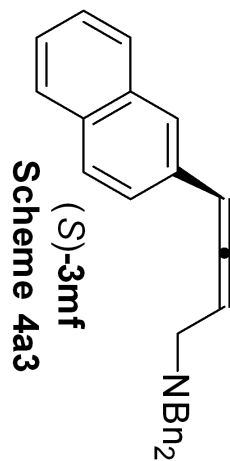
206.694

133.663
139.392
132.553
132.001
128.815
128.233
128.202
127.697
127.635
126.923
126.203
125.575
125.445
124.717
95.053
91.675
77.314
77.000
76.678

57.545

51.855

cyf-4-68b-c-bruker
Jun 12 2020
SOLVENT: CDCl3
NA = 186
F1 = 100.630371 MHz
F2 = 1.000000 MHz



cyf-3-119-rac

实验时间: 2020/6/11, 13:50:22

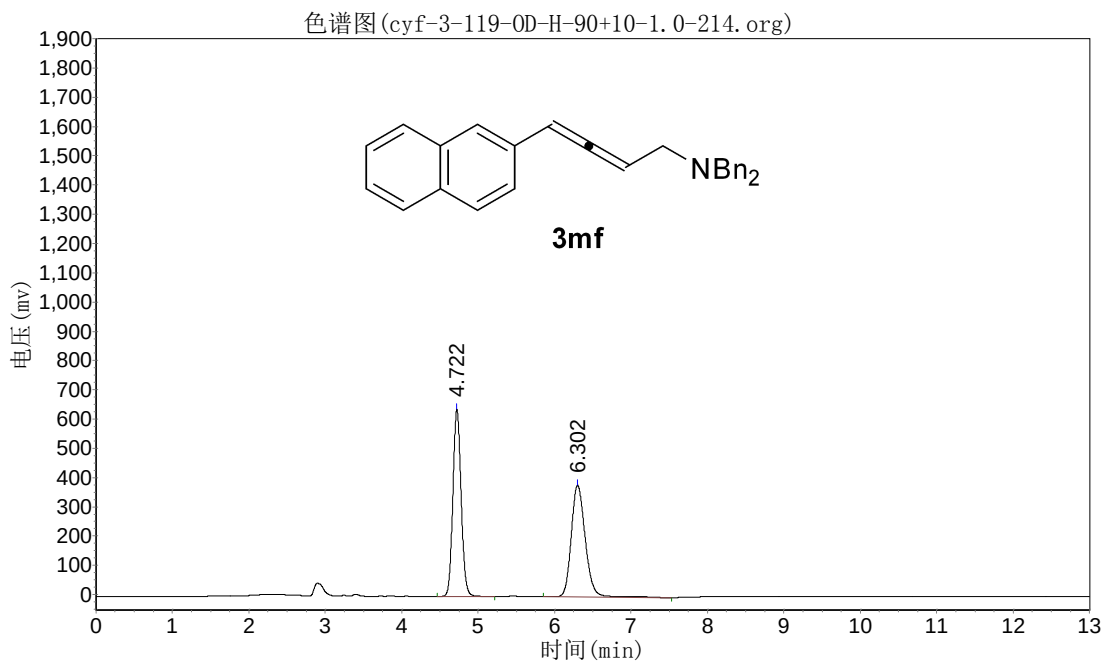
报告时间: 2020/6/11, 14:50:31

谱图文件: D:\data\slf\cyf\2020-06-11\cyf-3-119-OD-H-90+10-1.0-214.org

实验内容简介:

OD-H 100+1

214nm 1.0ml/min



分析结果表

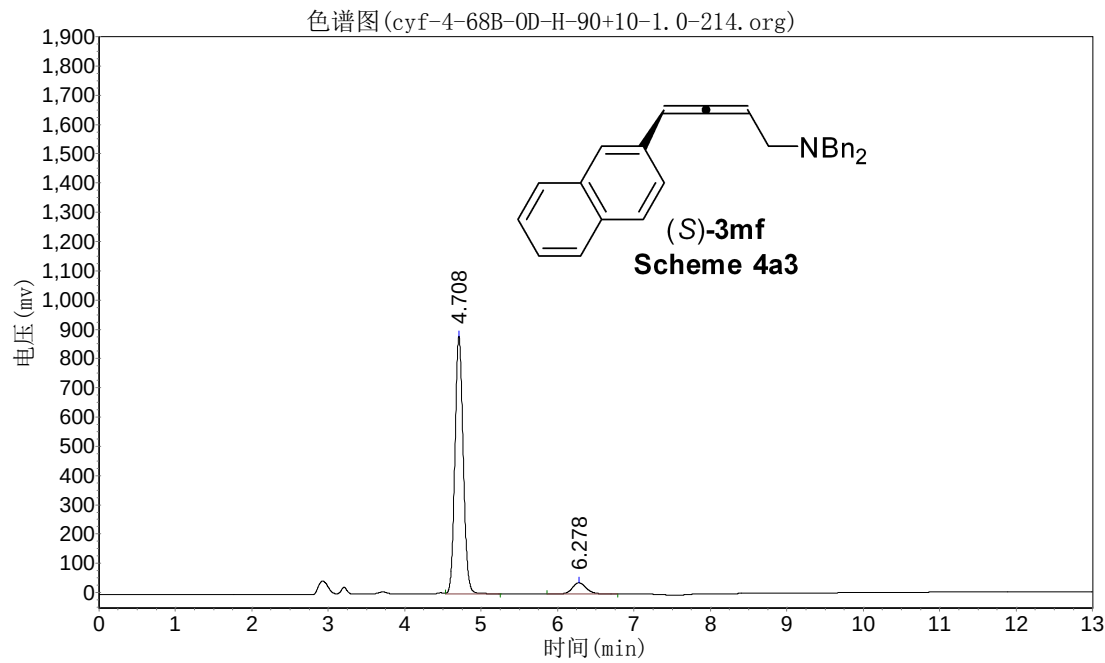
峰号	峰名	保留时间	峰高	峰面积	含量
1		4.722	639882.688	4799912.500	49.2414
2		6.302	382083.469	4947813.000	50.7586
总计			1021966.156	9747725.500	100.0000

cyf-4-68-B

实验时间：2020/6/11, 14:32:21
谱图文件:D:\data\slf\cyf\2020-06-11\cyf-4-68B-OD-H-90+10-1. 0-214. org

报告时间：2020/6/11, 14:52:39

实验内容简介：
OD-H 100+1
214nm 1. 0ml/min



分析结果表

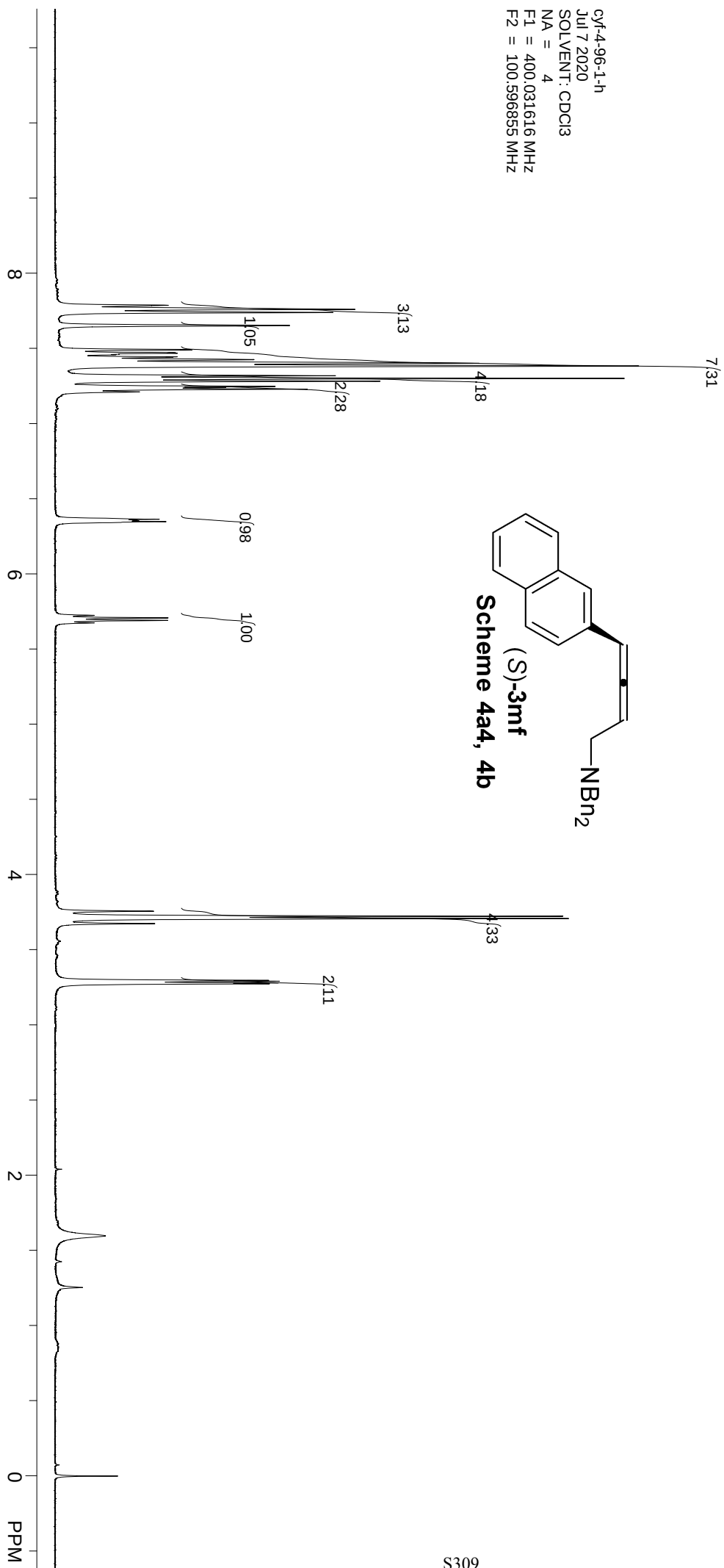
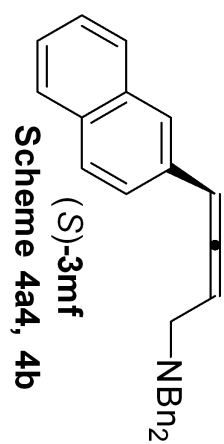
峰号	峰名	保留时间	峰高	峰面积	含量
1		4.708	881656.688	6643991.500	93.2573
2		6.278	38075.656	480372.688	6.7427
总计			919732.344	7124364.188	100.0000

7.787
7.759
7.739
7.652
7.492
7.471
7.444
7.440
7.426
7.401
7.383
7.318
7.300
7.281
7.247
7.239
7.228
6.363
6.354
6.347
5.723
5.707
5.690
5.674

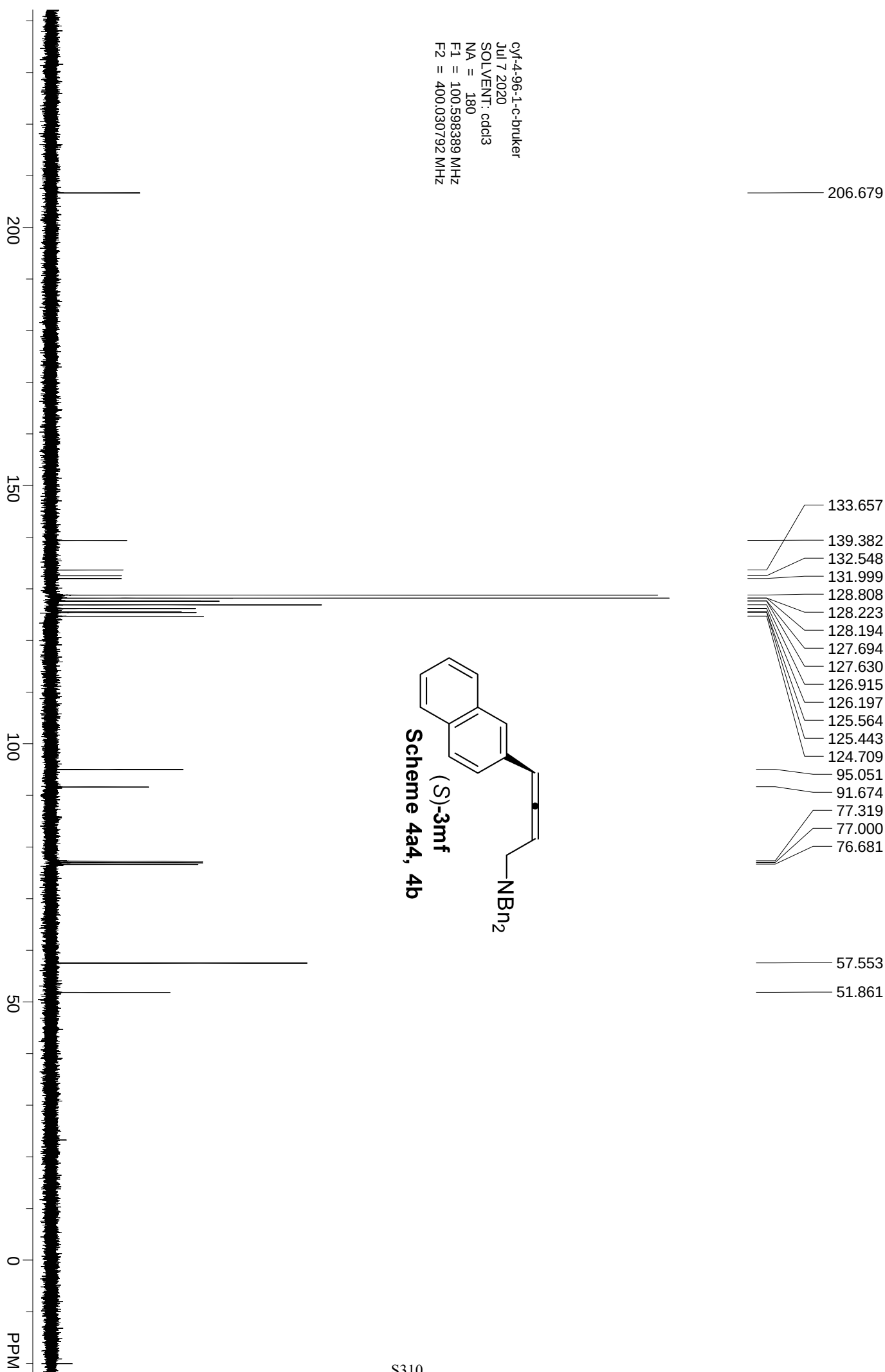
3.756
3.722
3.707
3.673
3.295
3.290
3.279
3.273

0.000

cyf-4-96-1-h
Jul 7 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031616 MHz
F2 = 100.596855 MHz



cyf-4-96-1-c-bbruker
 Jul 7 2020
 SOLVENT: cdcl3
 NA = 180
 F1 = 100.598389 MHz
 F2 = 400.030792 MHz



cyf-3-119-rac

实验时间: 2020-07-08, 9:59:47

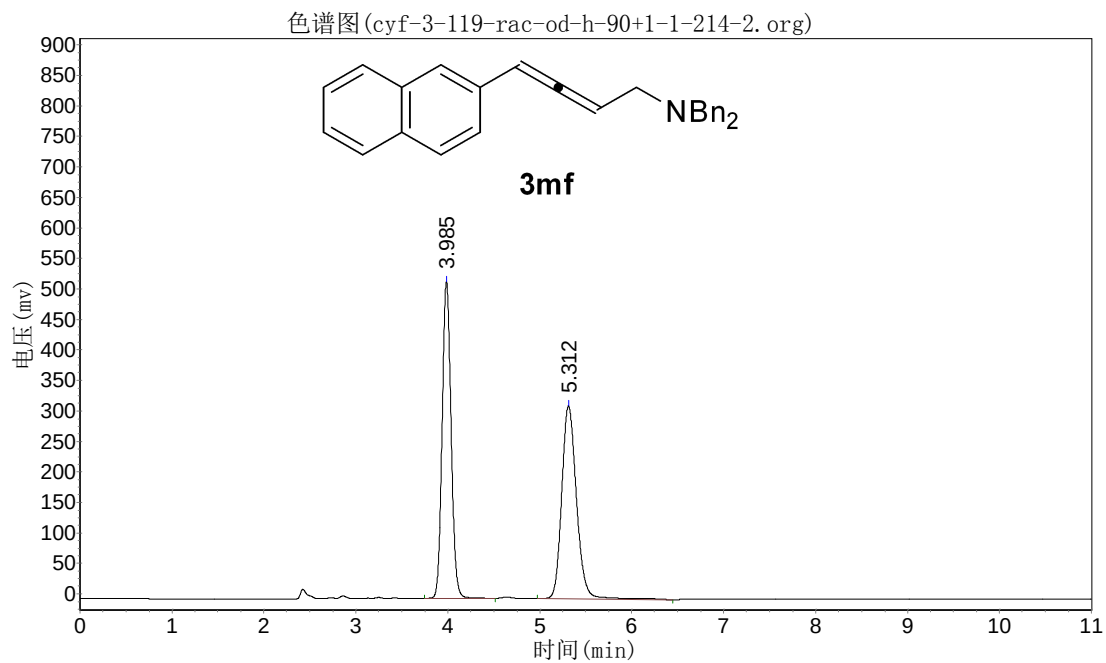
报告时间: 2020-07-08, 10:20:38

谱图文件: D:\data\slf\2020-07-08\cyf-3-119-rac-od-h-90+1-1-214-2. org

实验内容简介:

OD-H 90:10

214nm 10ml/min



分析结果表

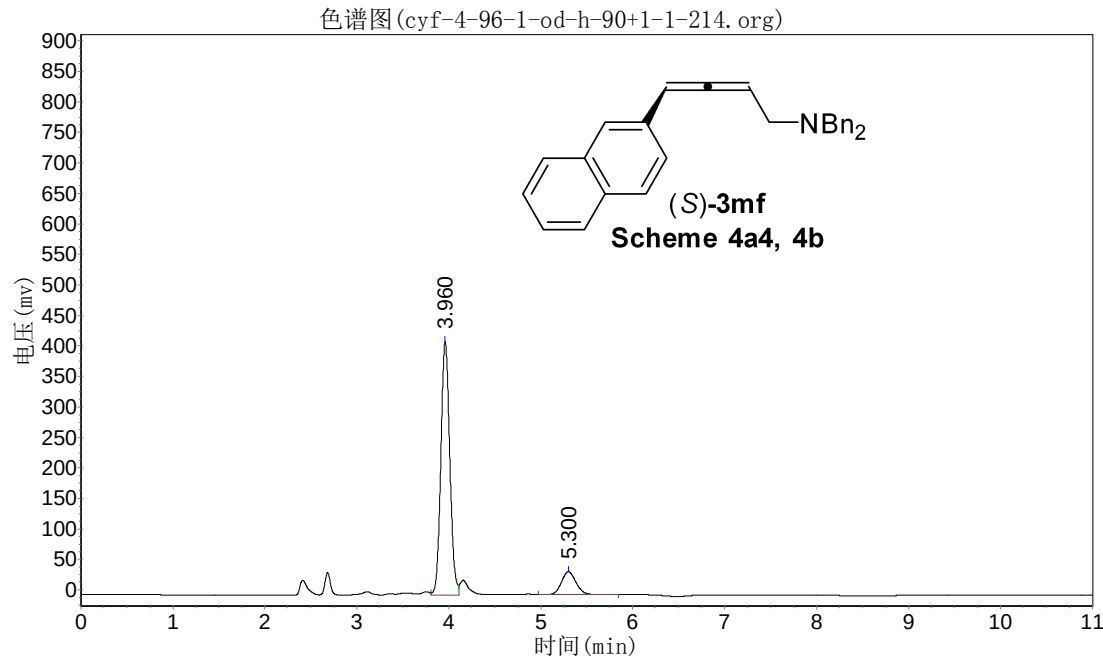
峰号	峰名	保留时间	峰高	峰面积	含量
1		3.985	519705.281	3525817.500	49.8292
2		5.312	315976.000	3549985.500	50.1708
总计			835681.281	7075803.000	100.0000

cyf-4-96-1

实验时间：2020-07-08, 10:18:41
谱图文件:D:\data\slf\2020-07-08\cyf-4-96-1-od-h-90+1-1-214. org

报告时间：2020-07-08, 10:36:58

实验内容简介：
OD-H 90:10
214nm 1.0ml/min



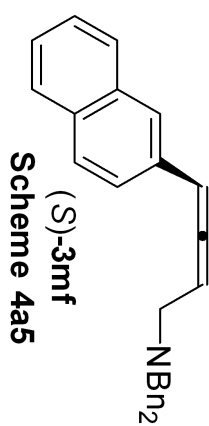
分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		3.960	415597.063	2808123.750	86.7616
2		5.300	37616.801	428473.906	13.2384
总计			453213.863	3236597.656	100.0000

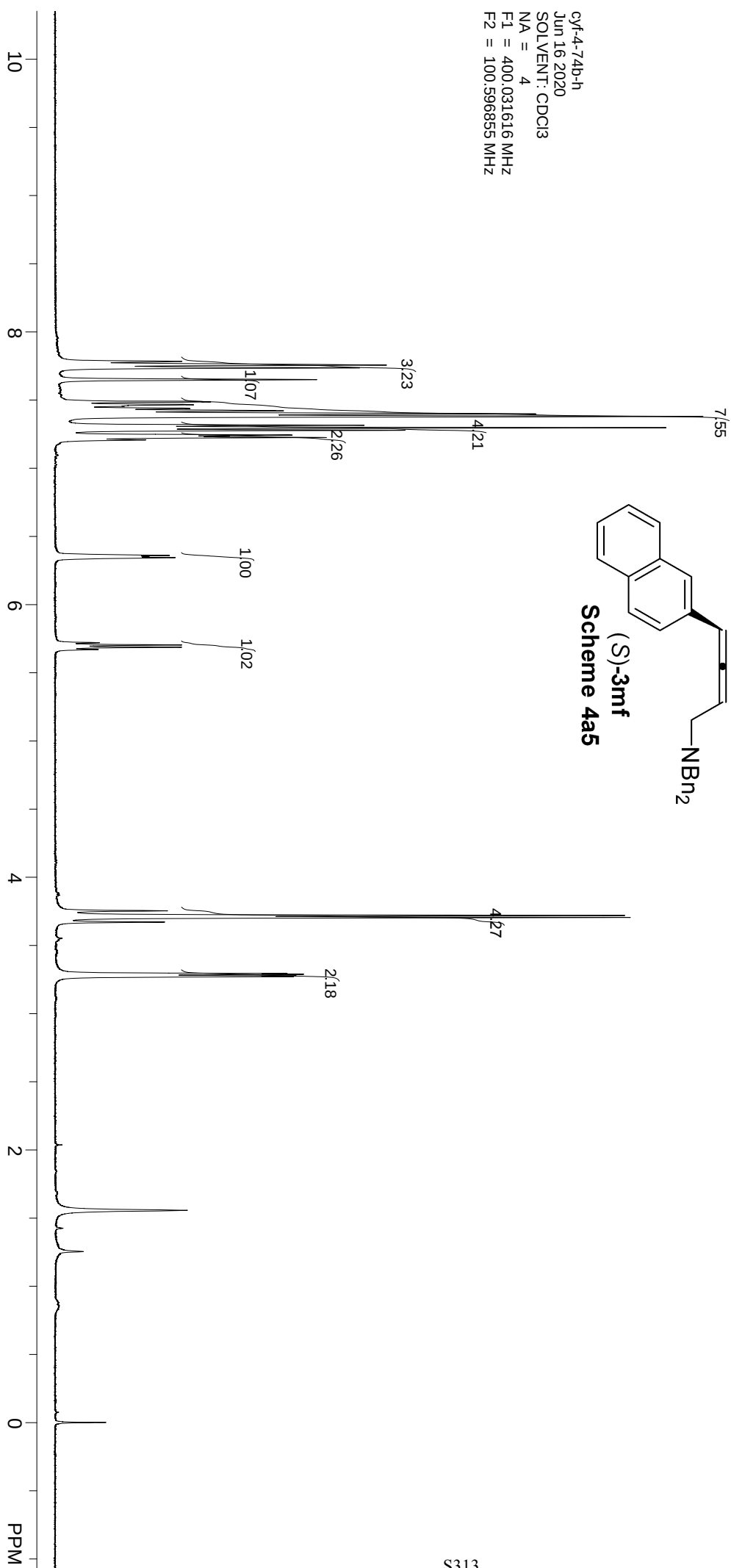
7.784
7.756
7.736
7.650
7.487
7.465
7.441
7.437
7.421
7.399
7.380
7.315
7.298
7.278
7.244
7.235
7.226
7.208
6.361
6.351
6.345
5.721
5.704
5.688
5.671

3.754
3.720
3.706
3.672
3.295
3.289
3.278
3.272

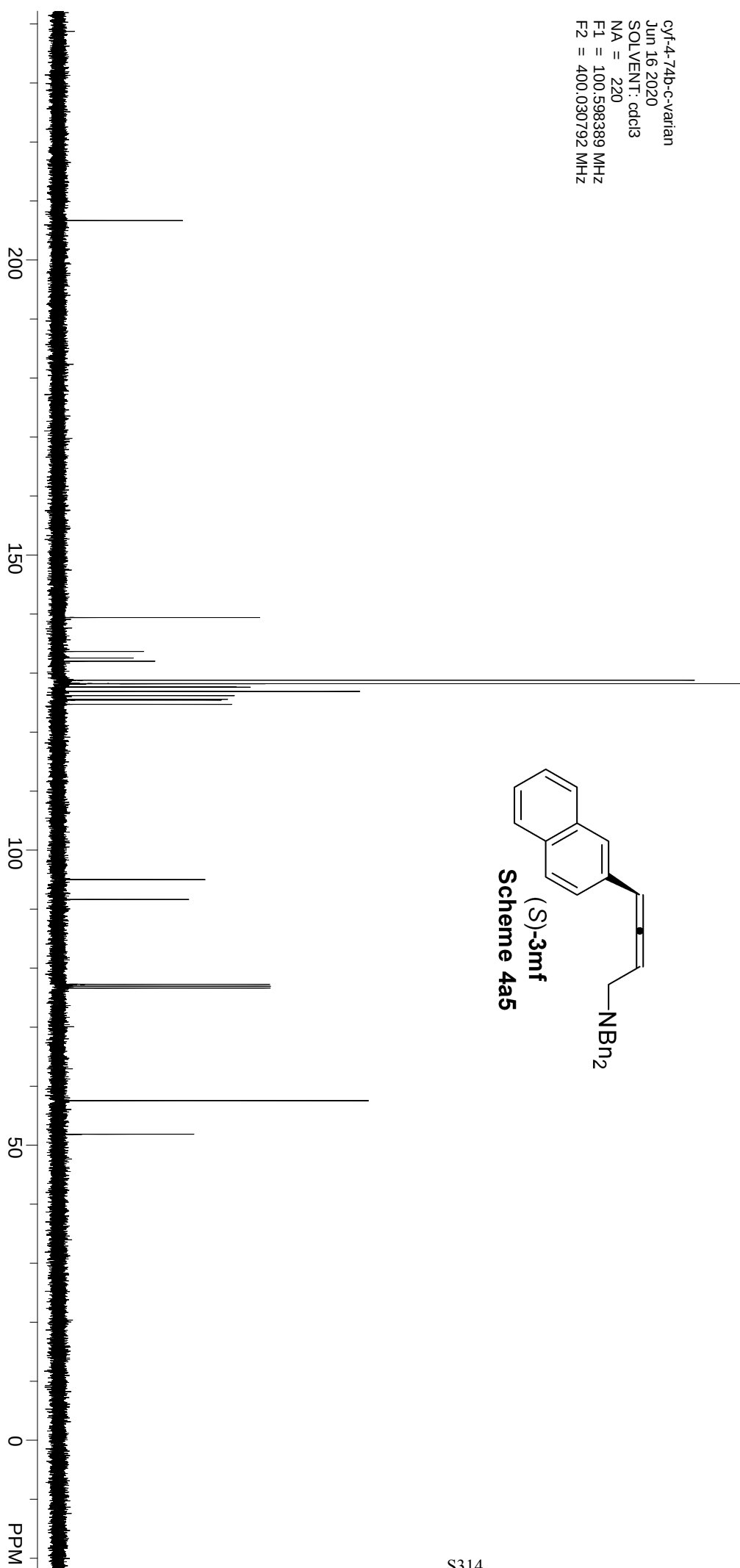
-0.000



cyf-4-74b-h
Jun 16 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031616 MHz
F2 = 100.596855 MHz



cvf-4-74b-c-varian
 Jun 16 2020
 SOLVENT: cdcl3
 NA = 220
 F1 = 100.598389 MHz
 F2 = 400.030792 MHz

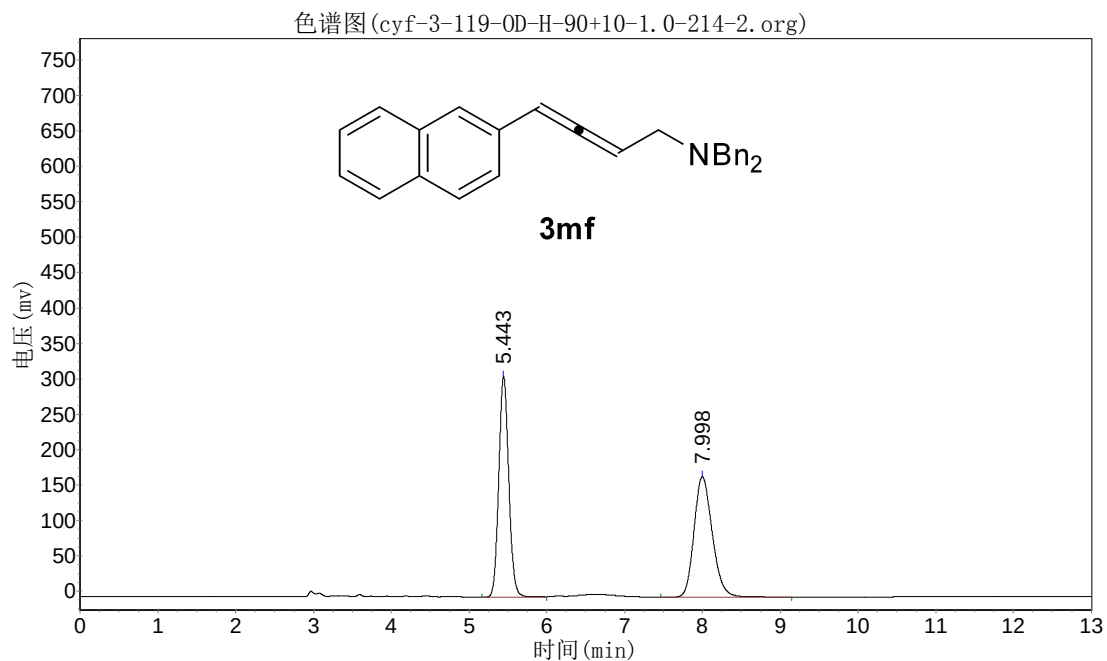


cyf-3-119

实验时间: 2020-06-16, 13:38:41
谱图文件: D:\data\slf\cyf\2020-06-16\cyf-3-119-OD-H-90+10-1.0-214-2.org

报告时间: 2020-06-16, 13:54:20

实验内容简介:
OD-H 90:10
214nm 1.0ml/min



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.443	311229.031	2779824.250	50.1345
2		7.998	169940.844	2764903.750	49.8655
总计			481169.875	5544728.000	100.0000

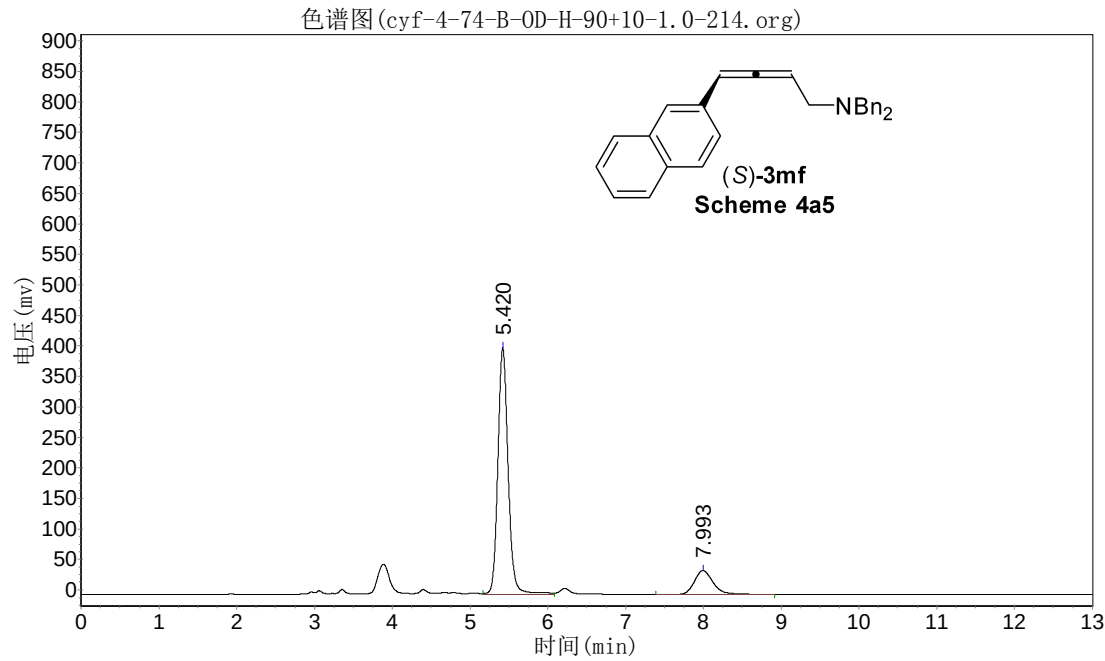
CYF-4-74-B

实验时间：2020-06-16, 14:34:51

报告时间：2020-06-16, 14:49:46

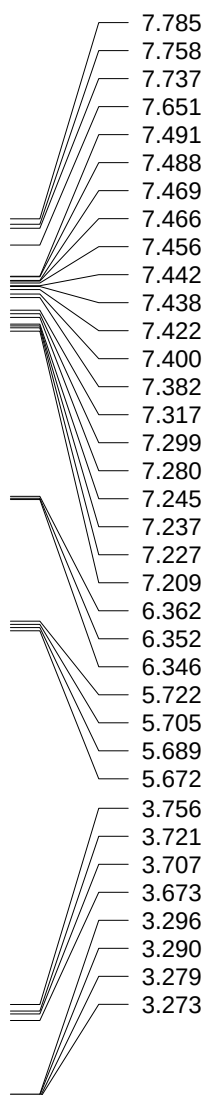
谱图文件:D:\data\slf\cyf\2020-06-16\cyf-4-74-B-OD-H-90+10-1.0-214.org

实验内容简介:
OD-H 90:10
214nm 1.0ml/min

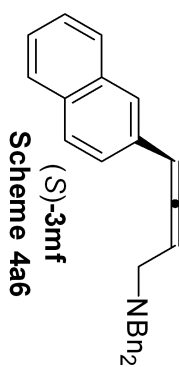


分析结果表

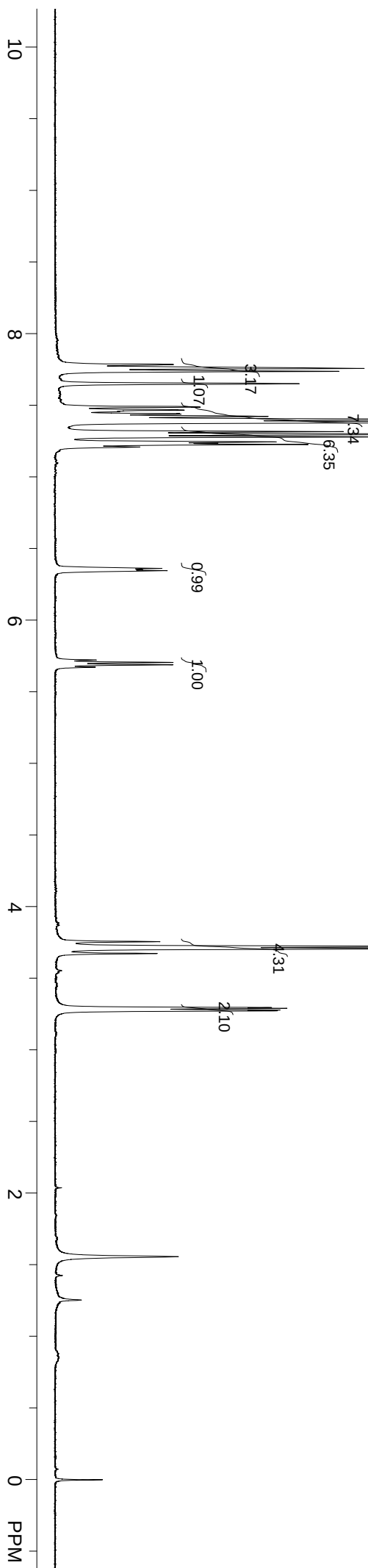
峰号	峰名	保留时间	峰高	峰面积	含量
1		5.420	403948.188	3718591.250	85.1296
2		7.993	38965.012	649562.875	14.8704
总计			442913.199	4368154.125	100.0000



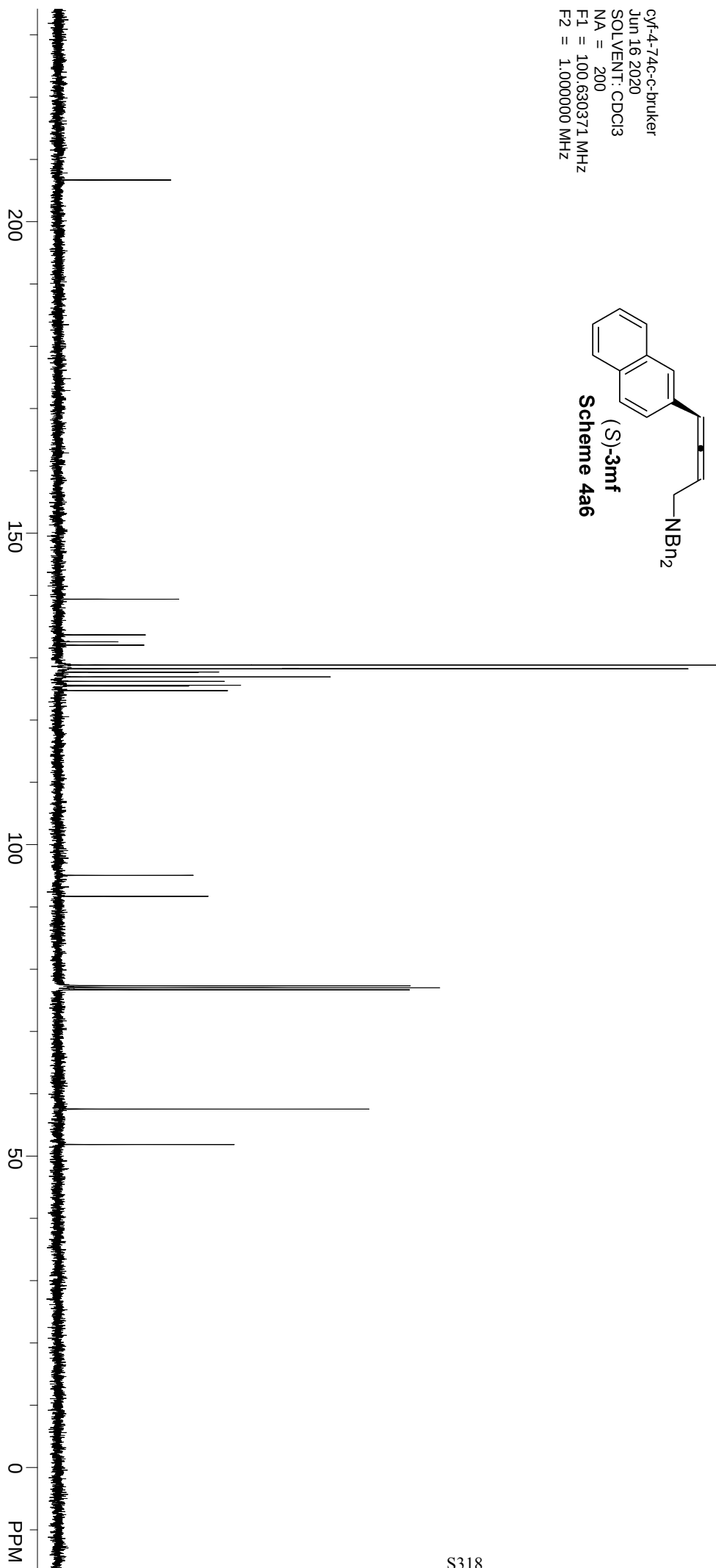
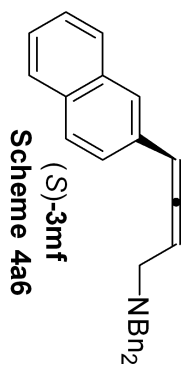
-0.000



cyf-4-74c-h
Jun 16 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031616 MHz
F2 = 100.596855 MHz



cyf-4-74c-c-bruker
 Jun 16 2020
 SOLVENT: CDCl3
 NA = 200
 F1 = 100.630371 MHz
 F2 = 1.000000 MHz



206.698

133.665
 139.395
 132.549
 132.008
 128.812
 128.227
 128.205
 127.696
 127.631
 126.927
 126.201
 125.573
 125.443
 124.717
 95.058
 91.678
 77.314
 77.000
 76.686

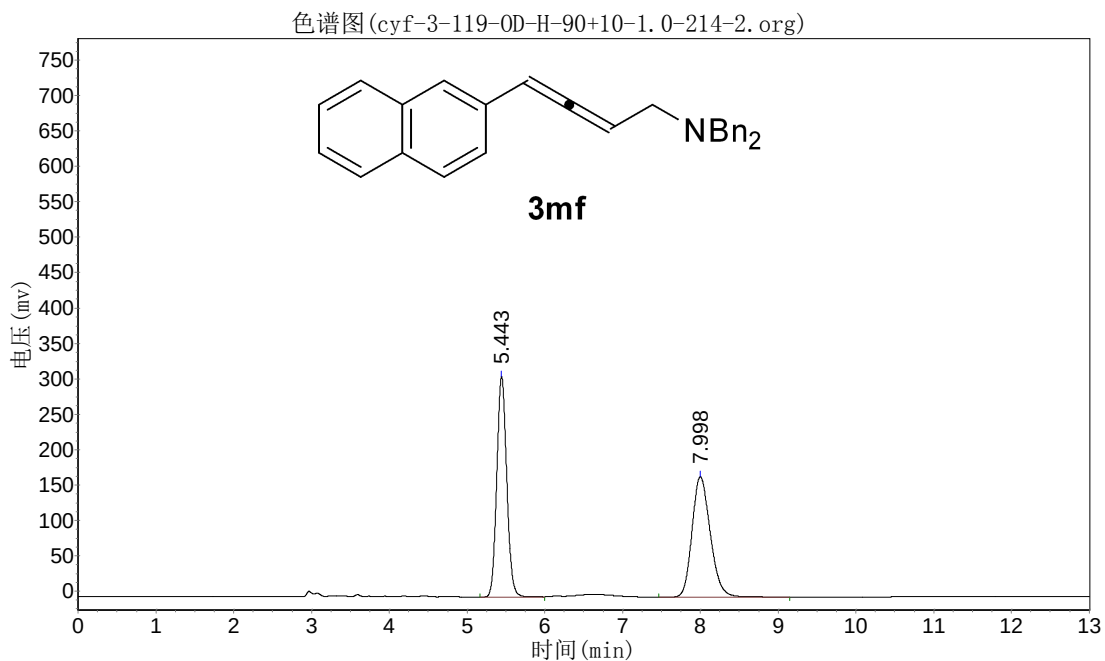
57.545
 51.858

cyf-3-119

实验时间: 2020-06-16, 13:38:41
谱图文件: D:\data\slf\cyf\2020-06-16\cyf-3-119-OD-H-90+10-1.0-214-2.org

报告时间: 2020-06-16, 13:54:20

实验内容简介:
OD-H 90:10
214nm 1.0ml/min



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.443	311229.031	2779824.250	50.1345
2		7.998	169940.844	2764903.750	49.8655
总计			481169.875	5544728.000	100.0000

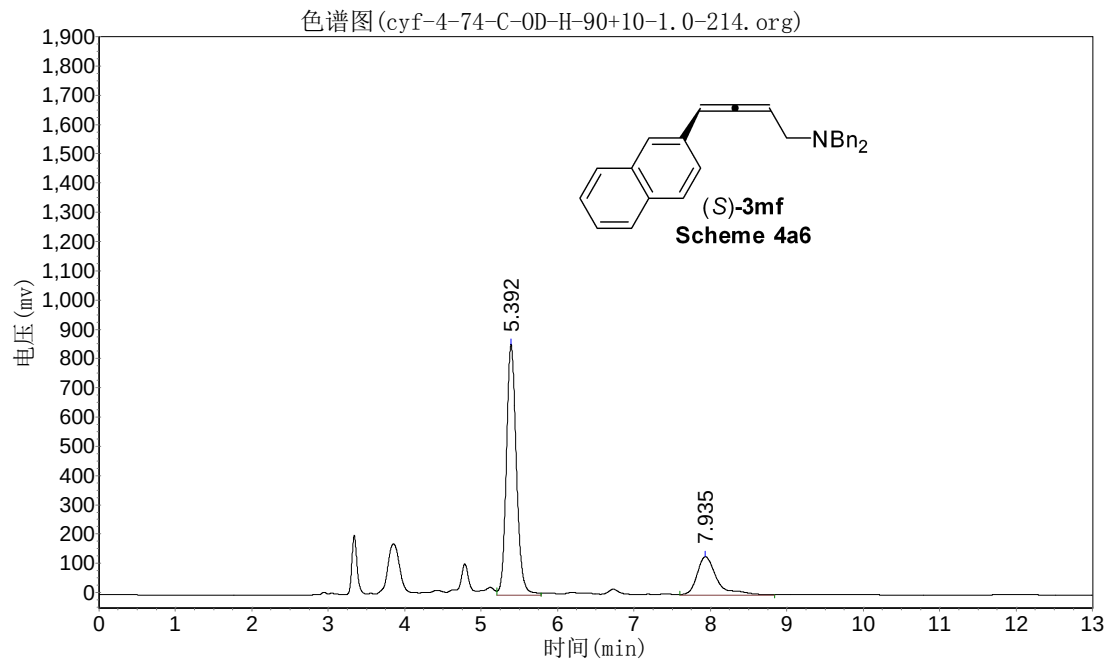
CYF-4-74-C

实验时间：2020-06-16, 14:21:01

报告时间：2020-06-16, 14:36:57

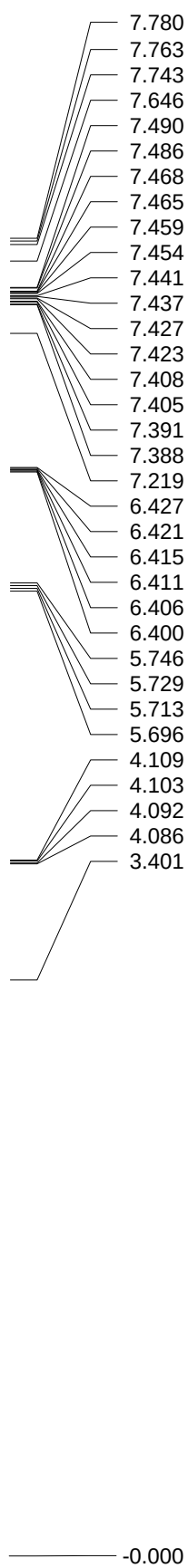
谱图文件:D:\data\slf\cyf\2020-06-16\cyf-4-74-C-OD-H-90+10-1.0-214.org

实验内容简介:
OD-H 90:10
214nm 1.0ml/min

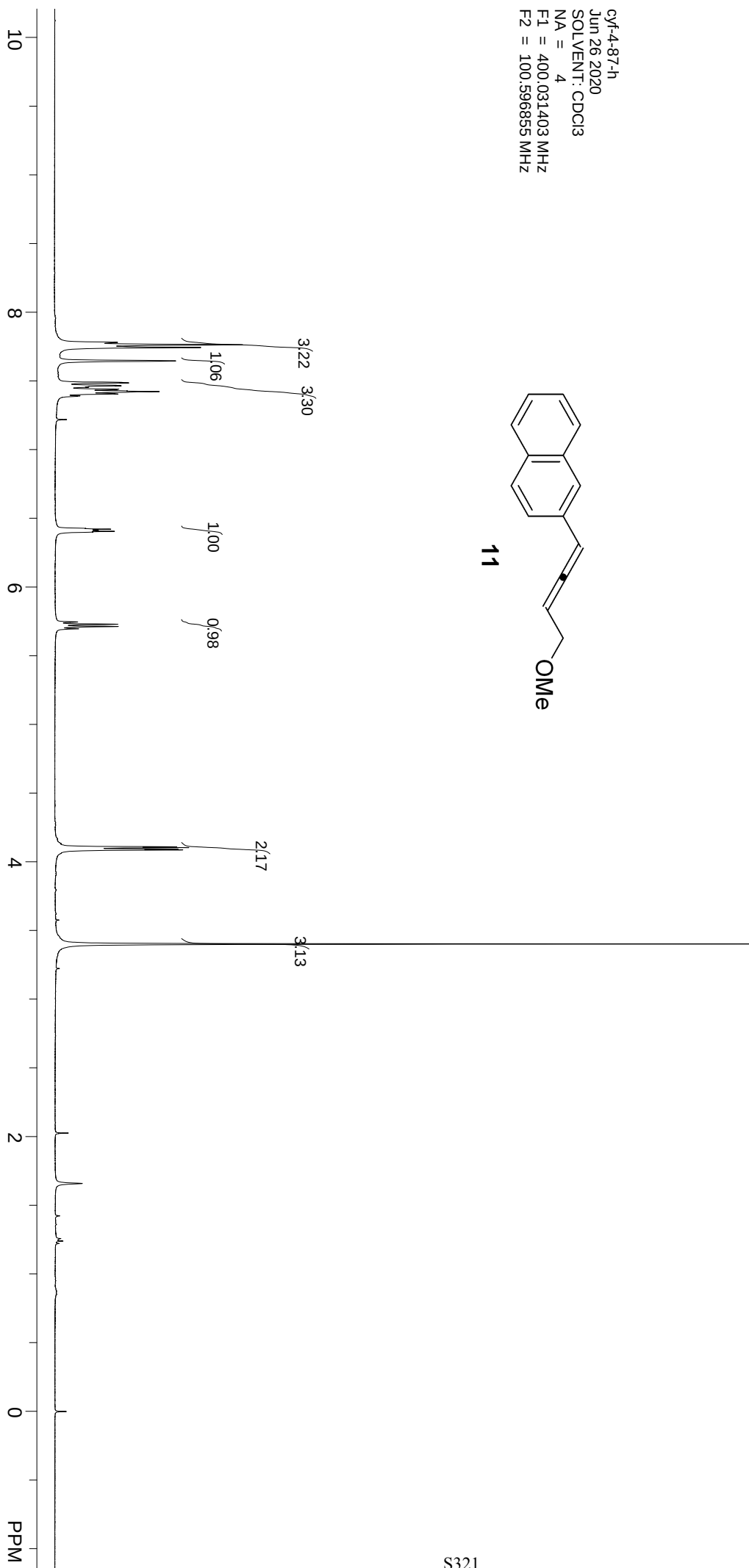
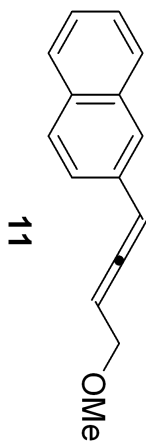


分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.392	855838.813	7814569.000	76.7078
2		7.935	130554.352	2372881.000	23.2922
总计			986393.164	10187450.000	100.0000



cyf-4-87-h
Jun 26 2020
SOLVENT: CDCl3
NA = 4
F1 = 400.031403 MHz
F2 = 100.596855 MHz



206.414

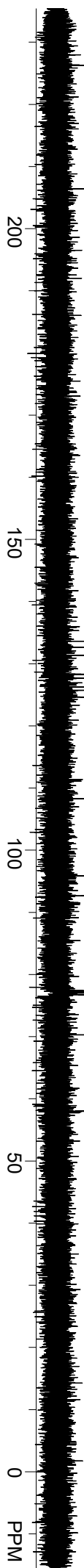
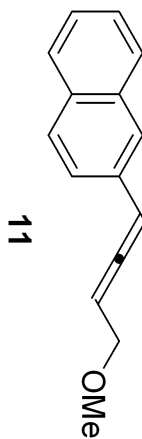
133.606
132.645
131.347
128.265
127.686
127.671
126.243
125.711
125.699
124.612

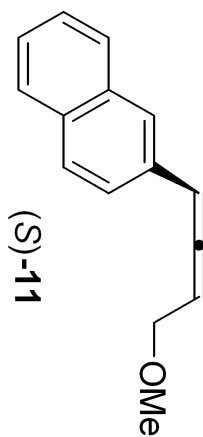
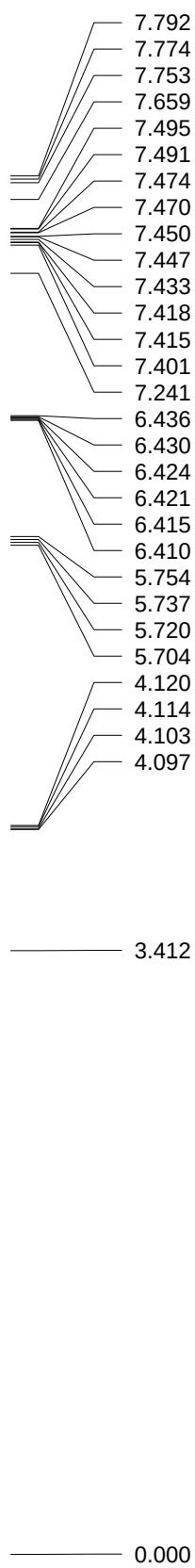
95.820
92.604

77.318
77.000
76.682
70.211

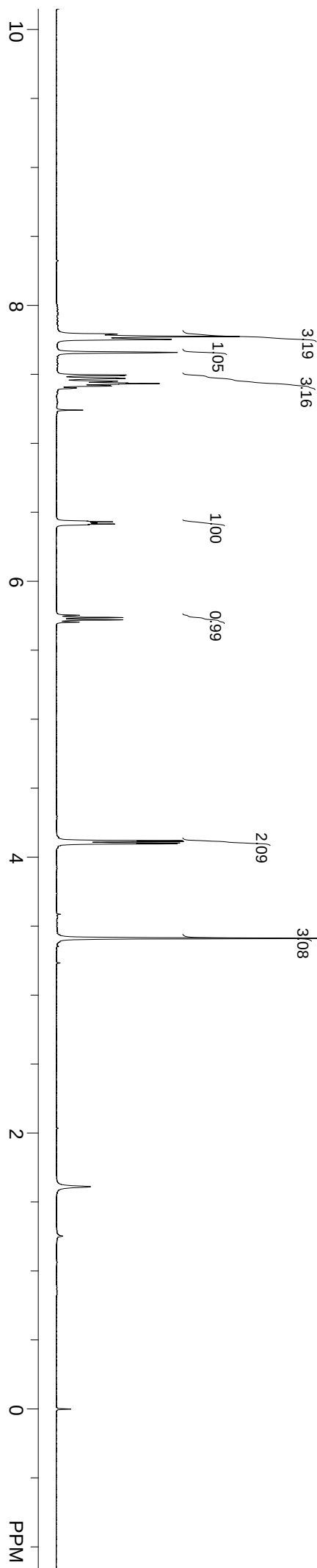
57.896

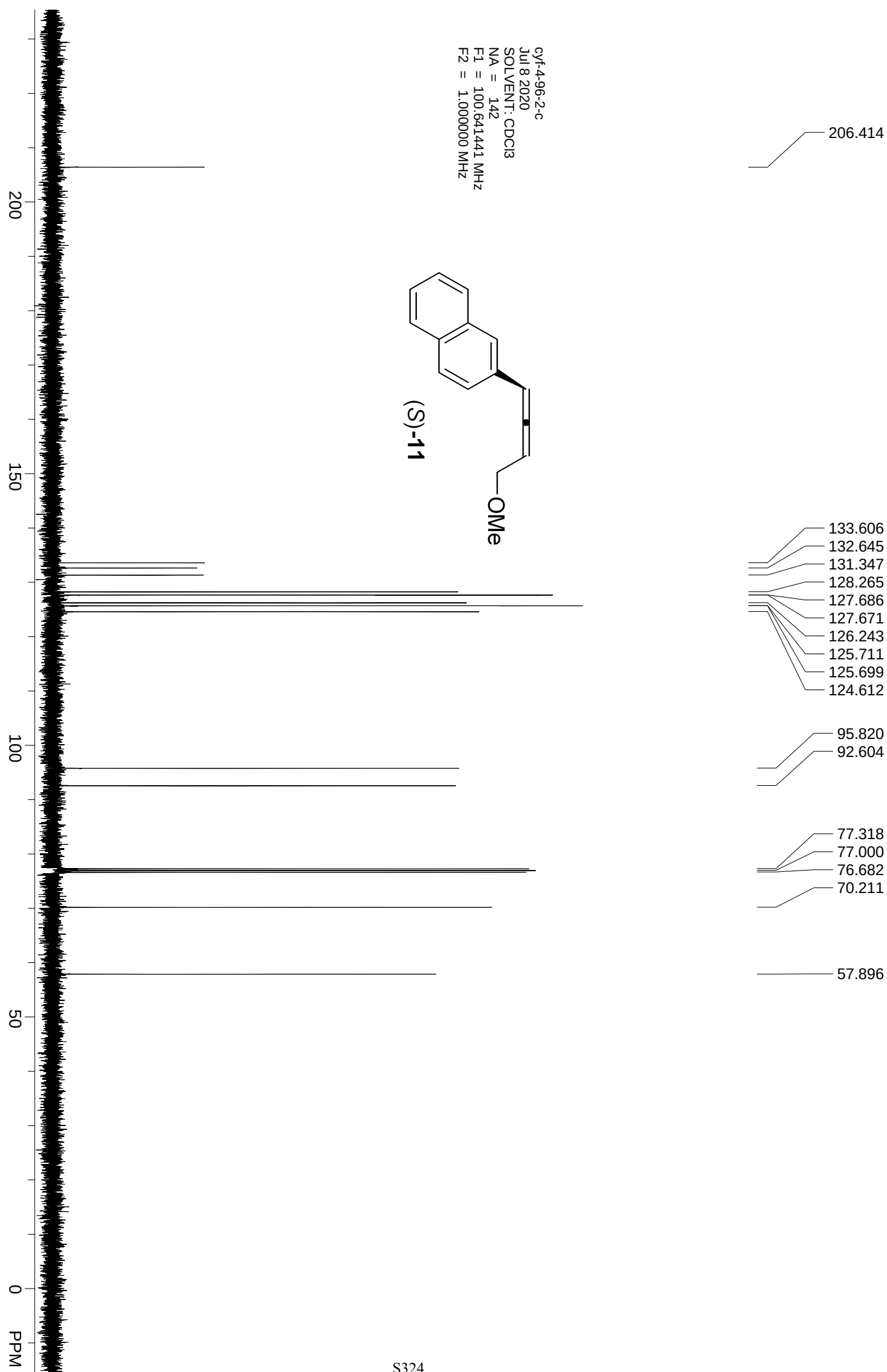
cyf-4-87-c-2
Jun 26 2020
SOLVENT: CDCl3
NA = 142
F1 = 100.641441 MHz
F2 = 1.000000 MHz





cyf-4-96-2-h
Jul 8 2020
SOLVENT: CDCl3
NA = 4
F1 = 399.722809 MHz
F2 = 100.519203 MHz



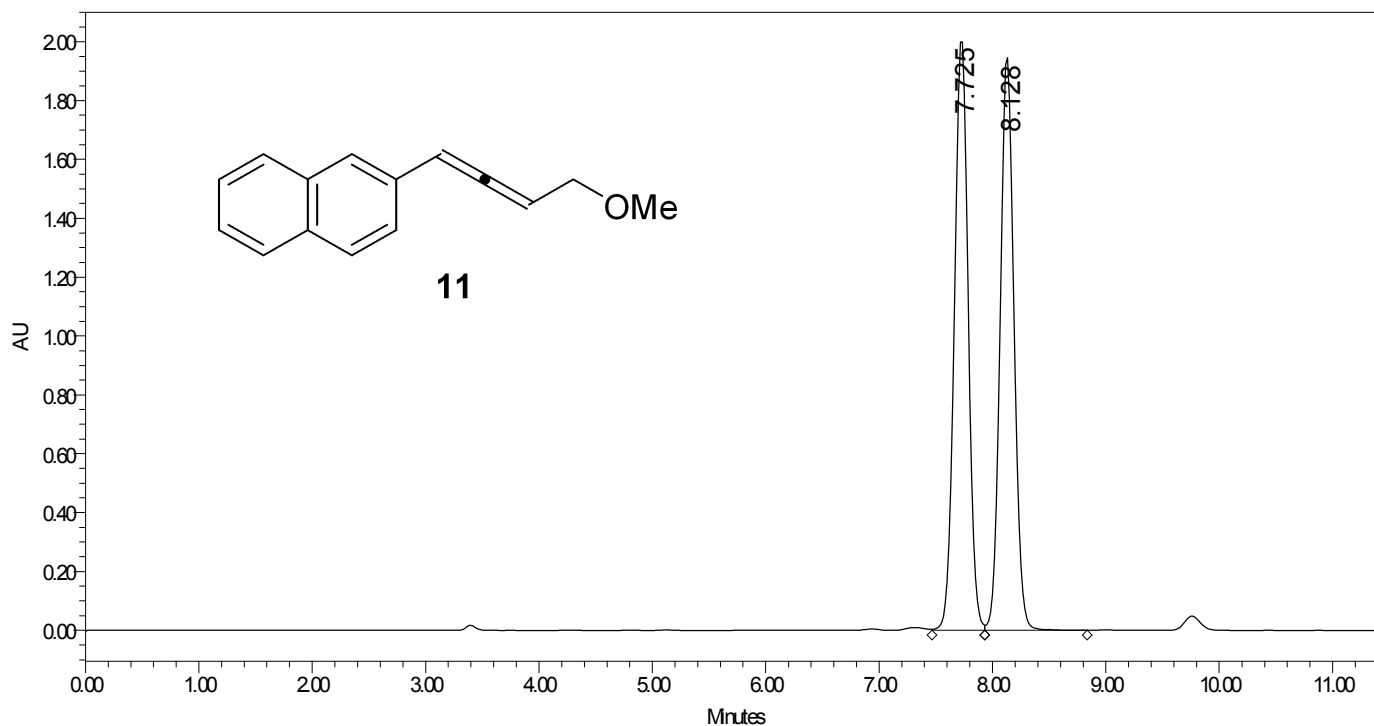


SAMPLE INFORMATION

Sample Name: cyf-4-87-if-400-1-1-214
Sample Type: Unknown
Vial: 1
Injection#: 60
Injection Volume: 10.00 µl
Run Time: 100.0 Minutes

Acquired By: System
Sample Set Name:
Acq. Method Set: HPLC
Processing Method: Default
Channel Name: W2489 ChA
Proc. Chnl. Descr.: W2489 ChA.214nm

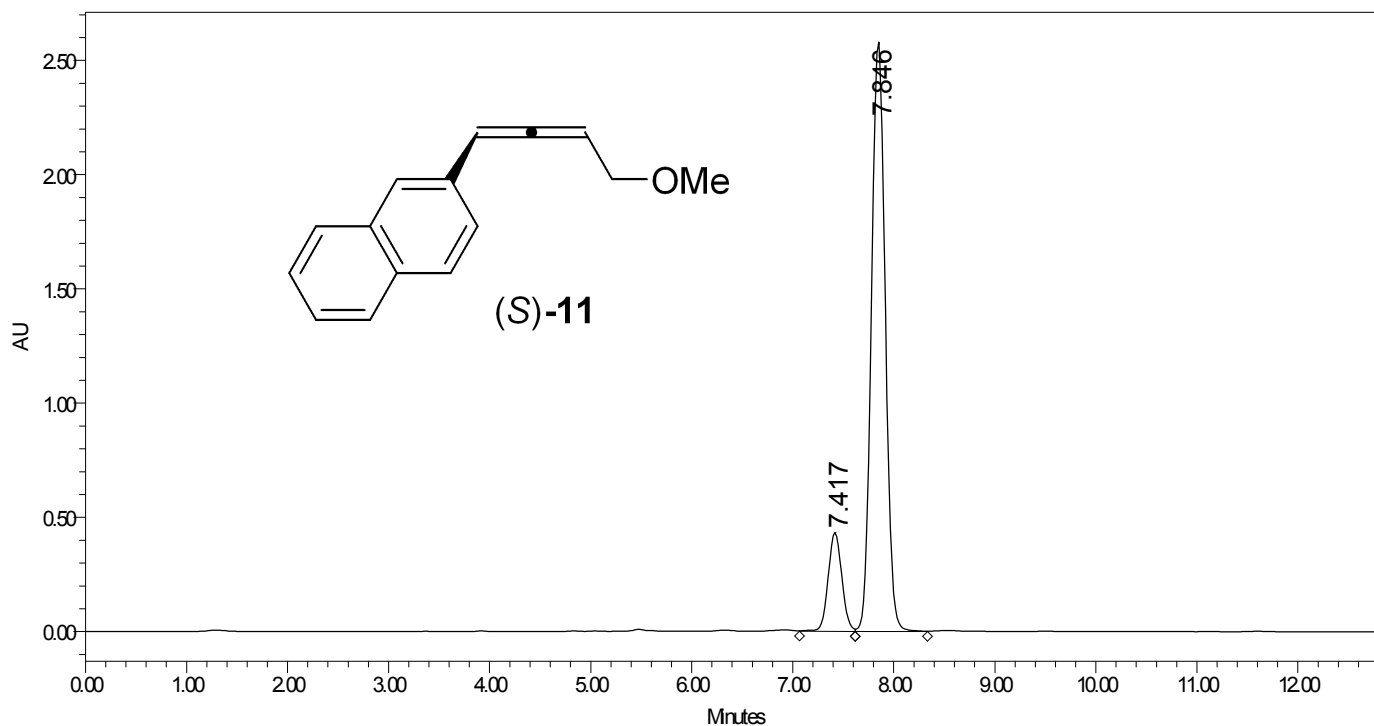
Date Acquired: 7/8/2020 12:40:37 PM EDT
Date Processed: 7/8/2020 1:35:58 PM EDT



	RT	Area	%Area	Hight
1	7.725	16936332	50.52	2013619
2	8.128	16586278	49.48	1950253

SAMPLE INFORMATION

Sample Name:	cyf-4-96-2-if-400-1-1-214	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	
Vial:	1	Acq. Method Set:	HPLC
Injection#:	61	Processing Method:	Default
Injection Volume:	10.00 µl	Channel Name:	W2489 ChA
Run Time:	15.0 Minutes	Proc. Chnl. Descr.:	W2489 ChA.214nm
Date Acquired:	7/8/2020 12:53:35 PM EDT		
Date Processed:	7/8/2020 1:36:12 PM EDT		

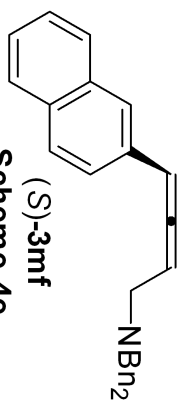


	RT	Area	%Area	Height
1	7.417	4069702	14.23	431372
2	7.846	24524714	85.77	2580714

7.783
7.758
7.736
7.650
7.491
7.470
7.457
7.440
7.422
7.402
7.382
7.316
7.298
7.279
7.244
7.224
7.208
6.360
6.351
6.345
5.704
5.688

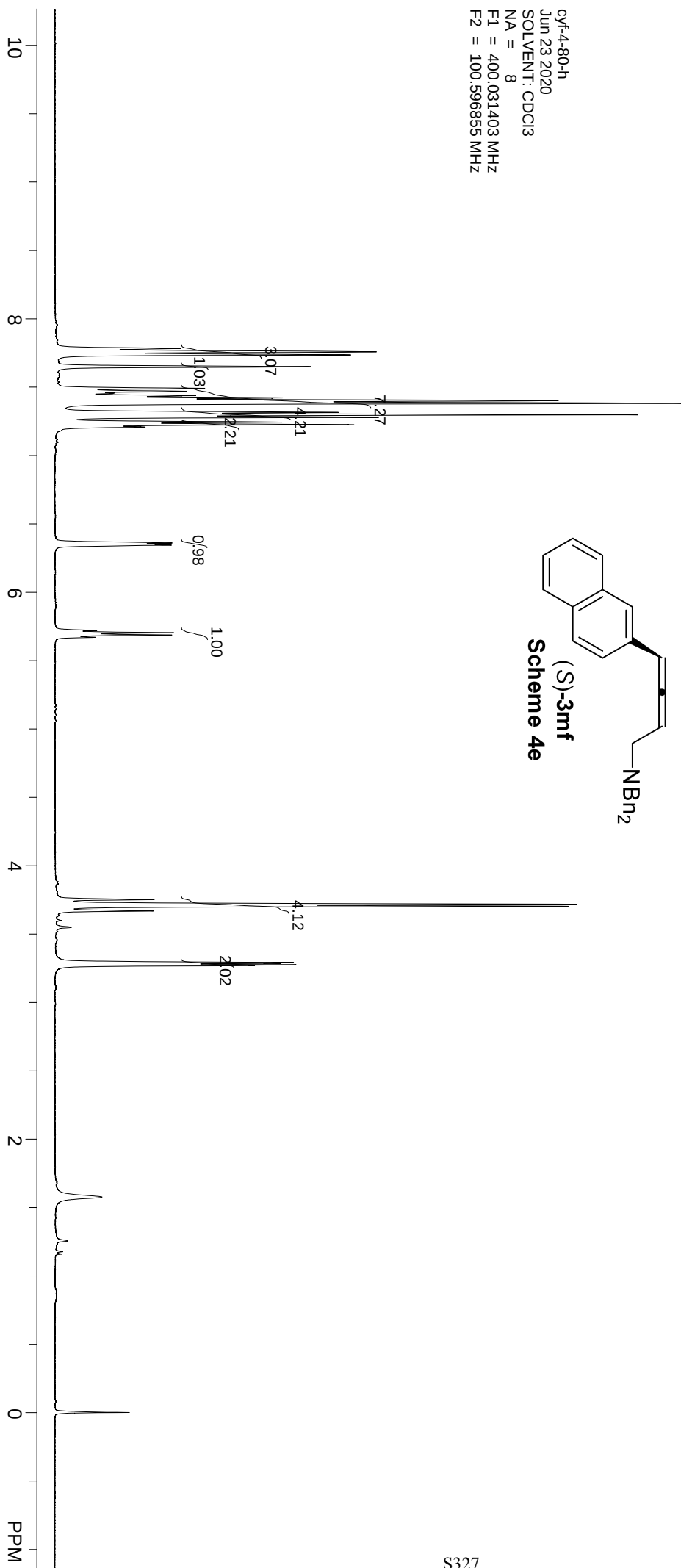
3.753
3.719
3.704
3.670
3.293
3.287
3.276
3.270

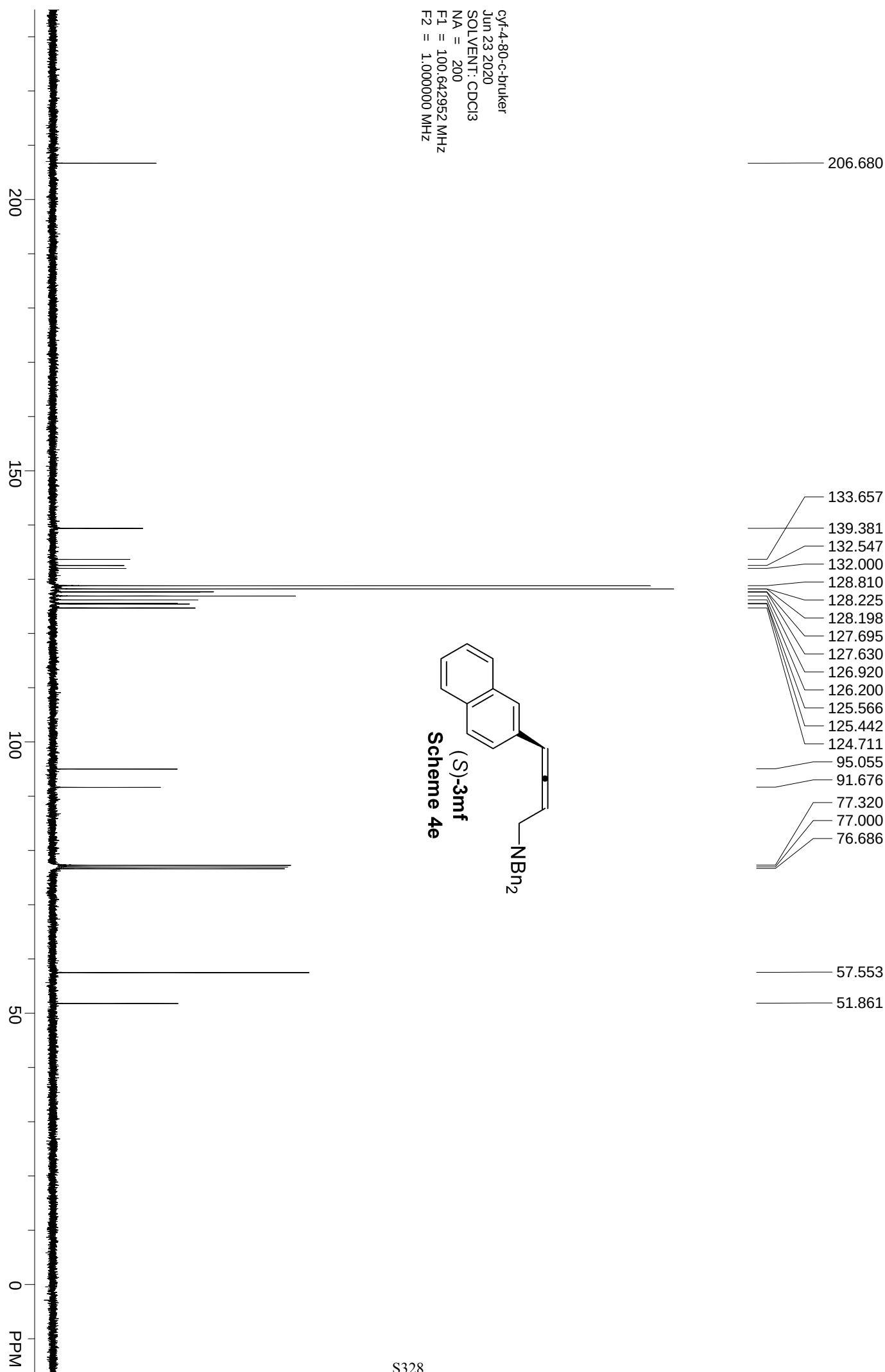
-0.000



Scheme 4e

cyf-4-80-h
Jun 23 2020
SOLVENT: CDCl₃
NA = 8
F1 = 400.031403 MHz
F2 = 100.596855 MHz





cyf-3-119

实验时间: 2020-06-23, 13:21:01

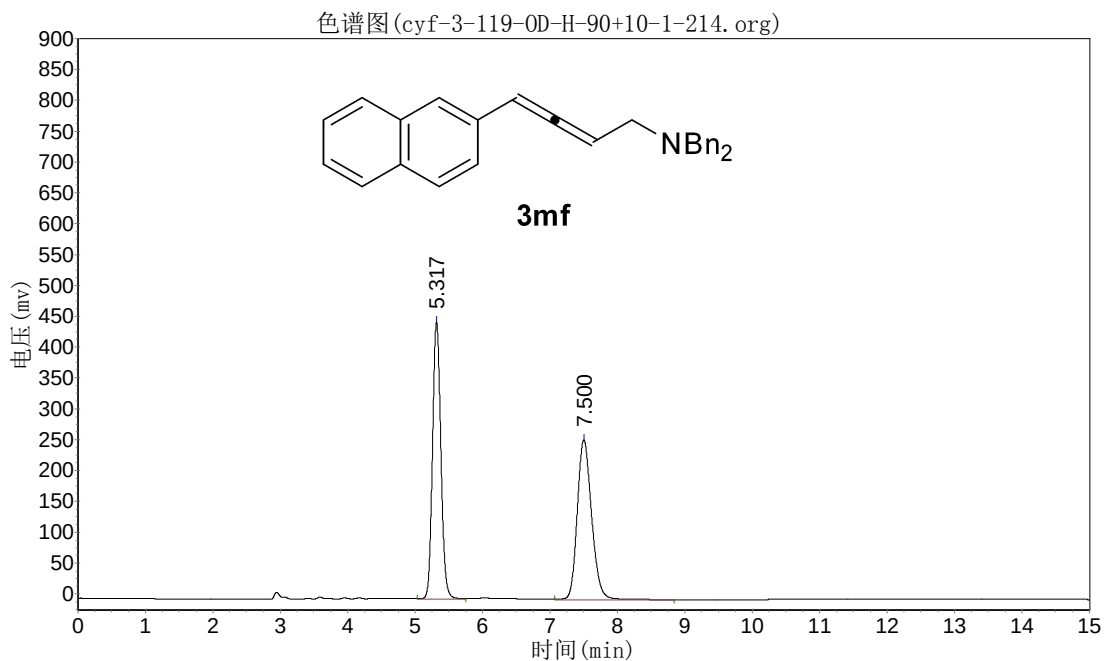
报告时间: 2020-06-23, 14:22:59

谱图文件: D:\data\slf\cyf\2020-06-23\cyf-3-119-OD-H-90+10-1-214.org

实验内容简介:

OD-H 90:10

214nm 1.0ml/min



分析结果表

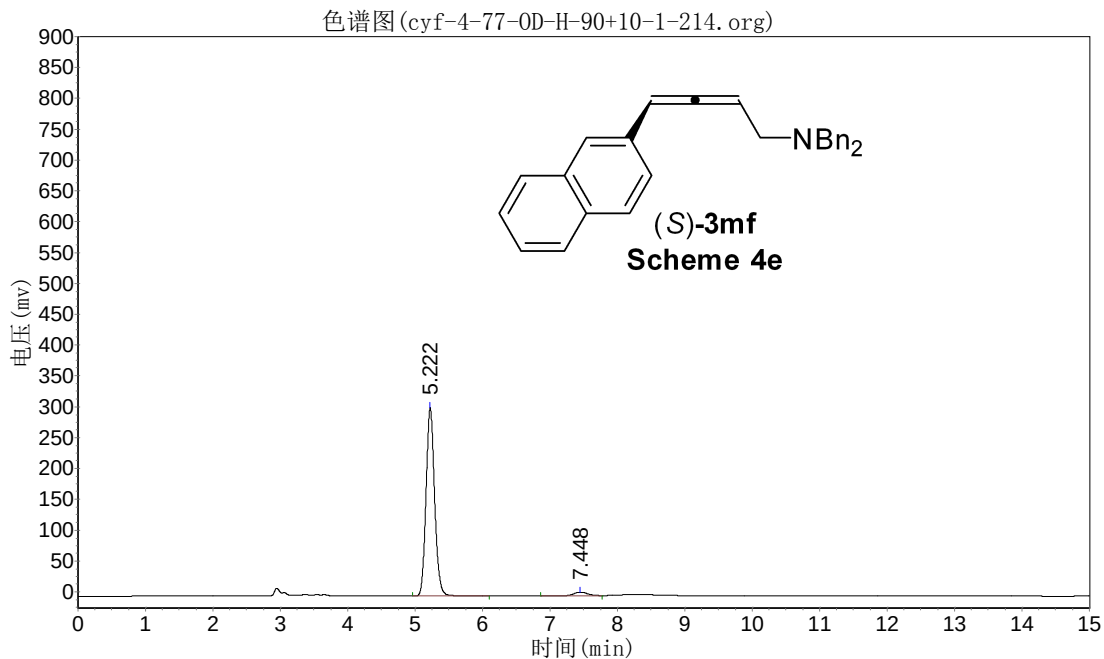
峰号	峰名	保留时间	峰高	峰面积	含量
1		5.317	450142.750	3912287.750	50.4714
2		7.500	258702.469	3839200.000	49.5286
总计			708845.219	7751487.750	100.0000

cyf-4-77

实验时间: 2020-06-23, 13:37:18
谱图文件: D:\data\slf\cyf\2020-06-23\cyf-4-77-OD-H-90+10-1-214. org

报告时间: 2020-06-23, 14:24:03

实验内容简介:
OD-H 90:10
214nm 1.0ml/min



分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.222	305667.188	2711588.000	96.3667
2		7.448	6190.685	102235.789	3.6333
总计			311857.872	2813823.789	100.0000

cyf-4-80

实验时间: 2020-06-23, 14:03:59

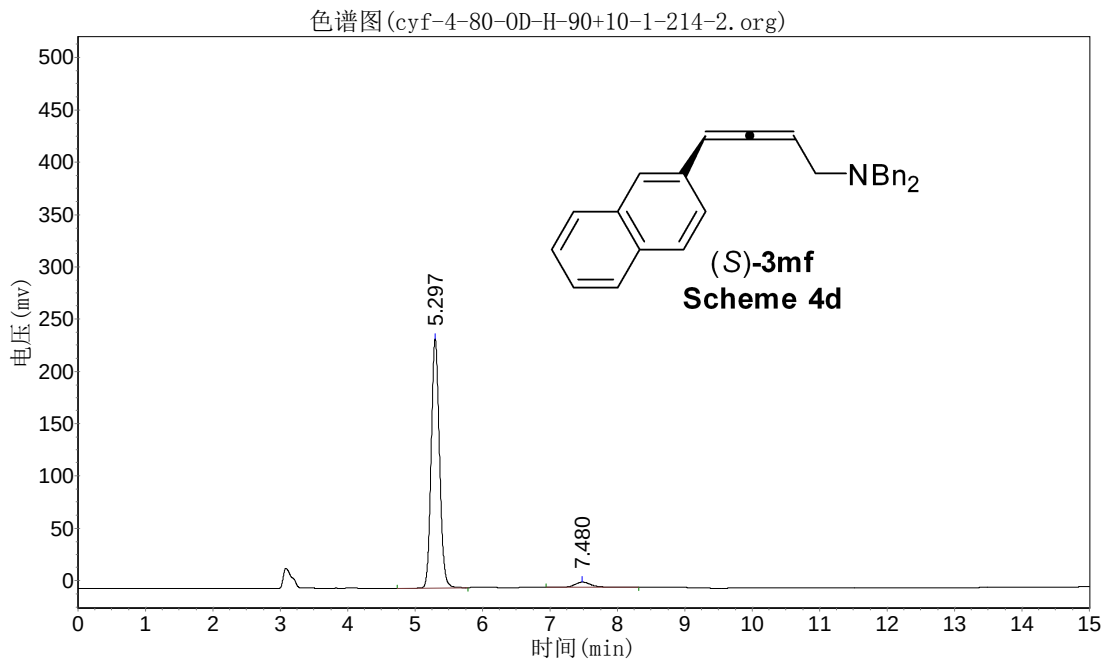
报告时间: 2020-06-23, 14:25:33

谱图文件: D:\data\slf\cyf\2020-06-23\cyf-4-80-OD-H-90+10-1-214-2. org

实验内容简介:

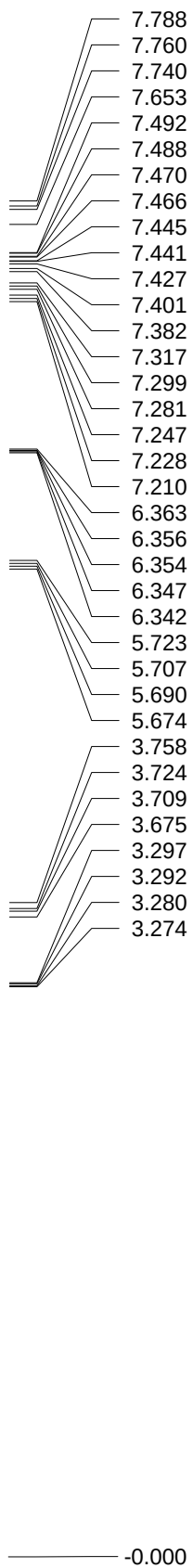
OD-H 90:10

214nm 1.0ml/min

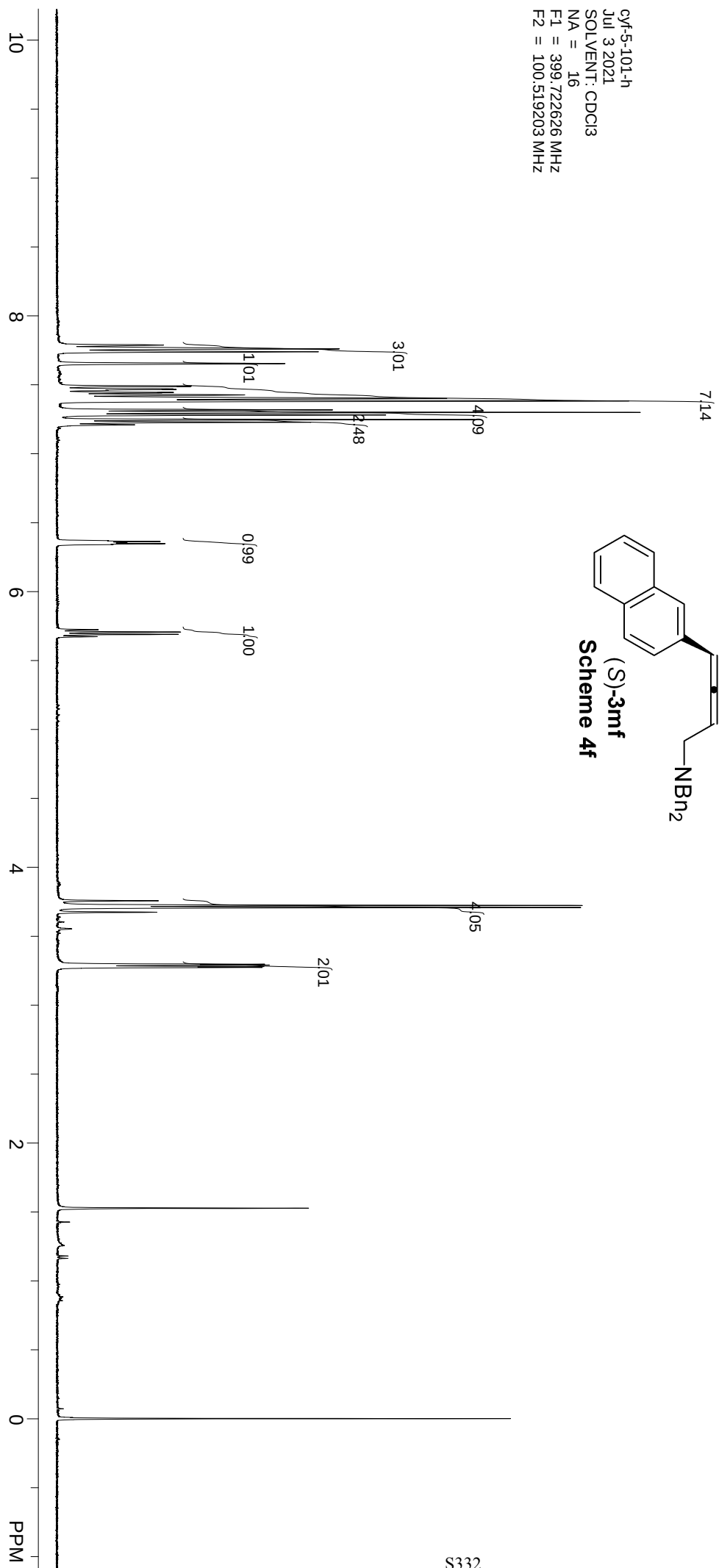
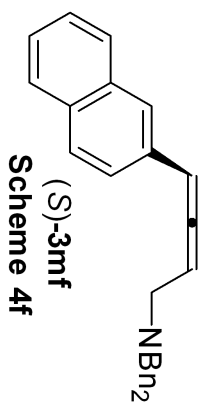


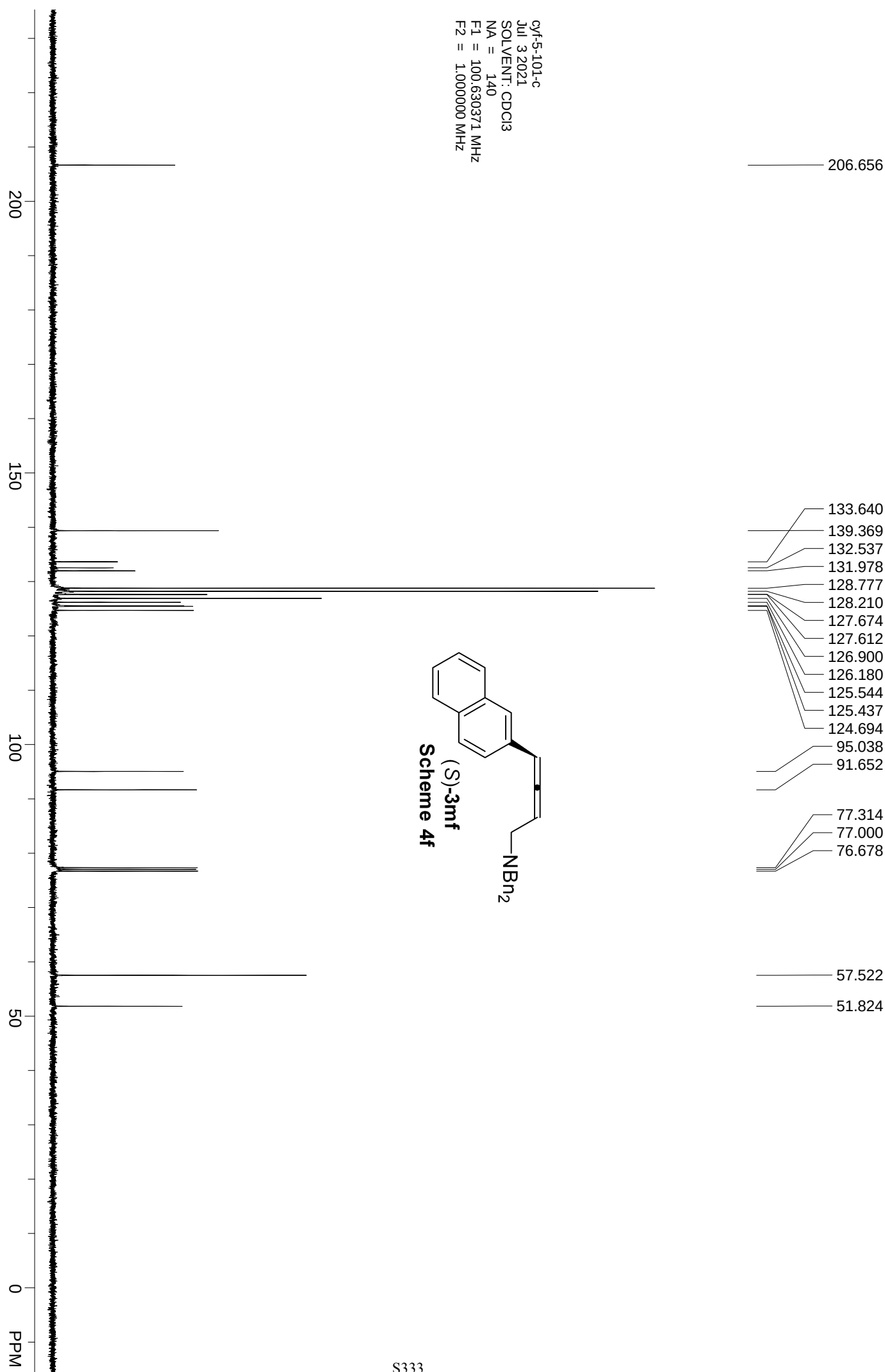
分析结果表

峰号	峰名	保留时间	峰高	峰面积	含量
1		5.297	237968.594	2041068.375	96.0871
2		7.480	4972.430	83116.313	3.9129
总计			242941.023	2124184.688	100.0000



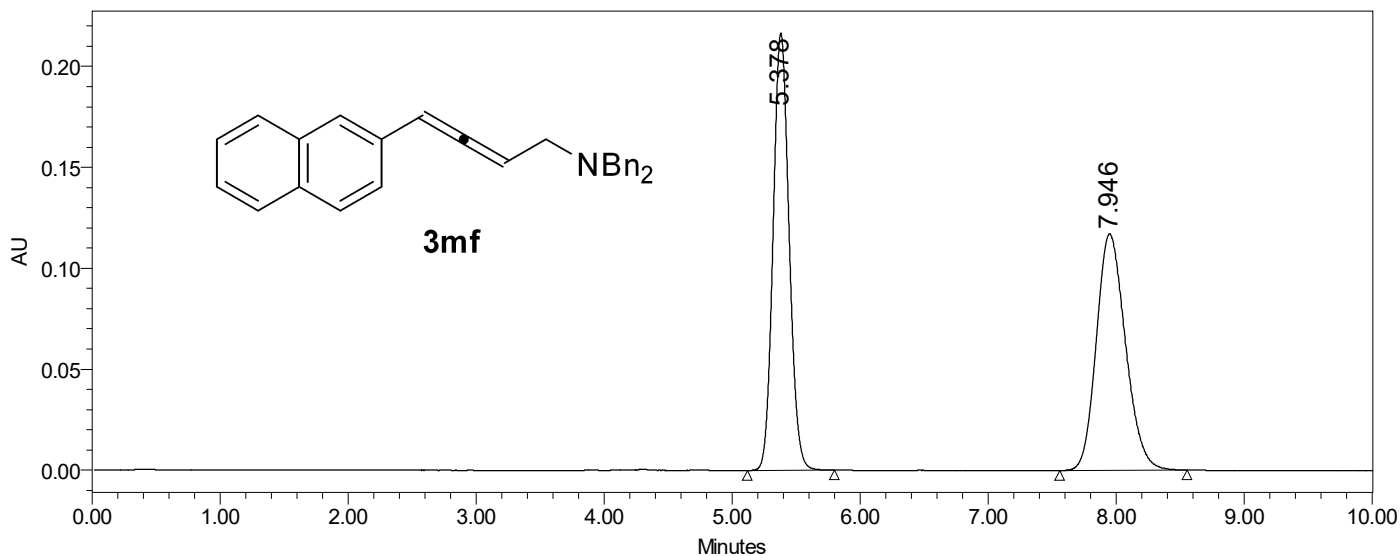
cyf-5-101-h
Jul 3 2021
SOLVENT: CDCl3
NA = 16
F1 = 399.722626 MHz
F2 = 100.519203 MHz





SAMPLE INFORMATION

Sample Name:	cyf-3-119-odh-90-10	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	cyf
Vial:	2	Acq. Method Set:	90_10odh
Injection #:	1	Processing Method:	123
Injection Volume:	5.00 ul	Channel Name:	289.0nm
Run Time:	10.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 289.0 nm (2998)
Date Acquired:	7/3/2021 5:34:25 PM CST		
Date Processed:	7/6/2021 10:28:05 AM CST		



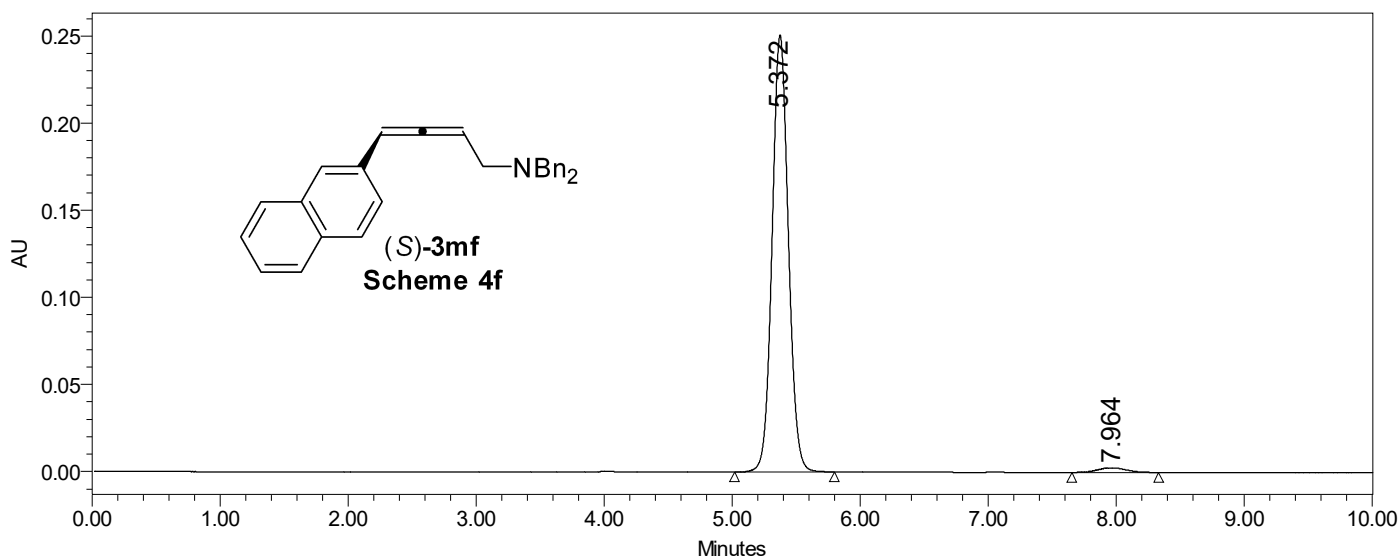
Channel: 2998; Processed Channel: 2998 PDA 289.0 nm (2998 (210-400)nm); Result Id: 1619;
Processing Method: 123

Processed Channel Descr.: 2998 PDA 289.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 289.0 nm (2998 (210-400)nm)	5.378	1880425	50.28	216552
2	2998 PDA 289.0 nm (2998 (210-400)nm)	7.946	1859507	49.72	117156

SAMPLE INFORMATION

Sample Name:	cyf-4-91-odh-90-10	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	cyf
Vial:	4	Acq. Method Set:	90_10odh
Injection #:	1	Processing Method:	1234
Injection Volume:	5.00 ul	Channel Name:	289.0nm
Run Time:	10.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 289.0 nm (2998)
Date Acquired: 7/3/2021 5:22:39 PM CST			
Date Processed: 7/6/2021 10:29:42 AM CST			



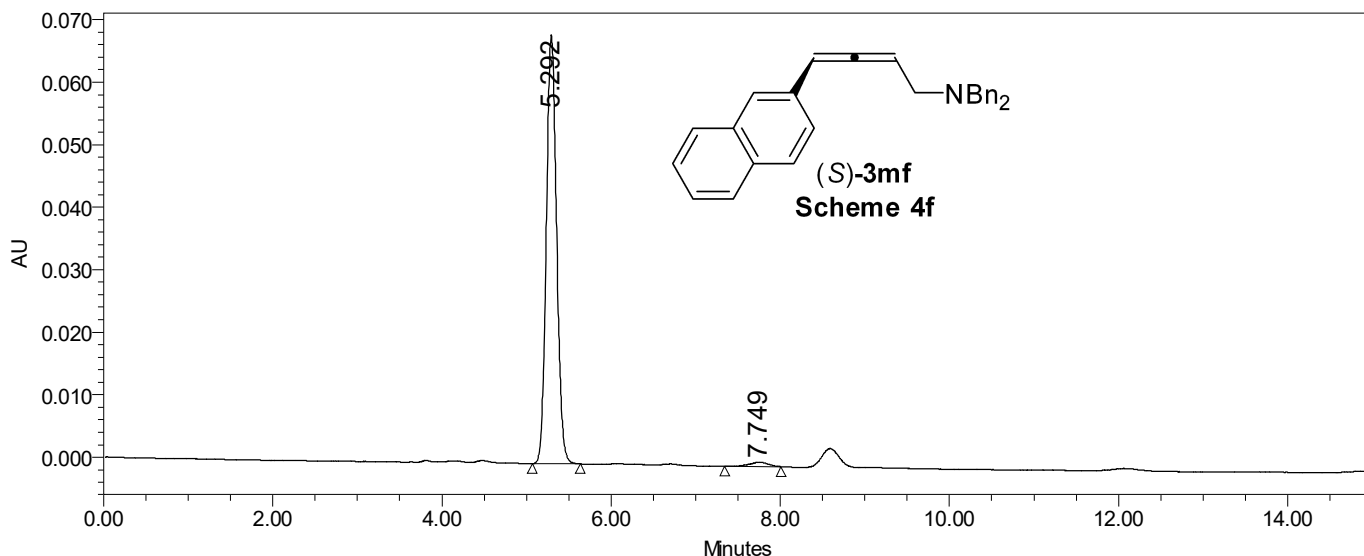
Channel: 2998; Processed Channel: 2998 PDA 289.0 nm (2998 (210-400)nm); Result Id: 1622;
Processing Method: 1234

Processed Channel Descr.: 2998 PDA 289.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 289.0 nm (2998 (210-400)nm)	5.372	2209830	98.12	250759
2	2998 PDA 289.0 nm (2998 (210-400)nm)	7.964	42377	1.88	2698

SAMPLE INFORMATION

Sample Name:	cyf-5-101-odh-90-10	Acquired By:	System
Sample Type:	Unknown	Sample Set Name:	cyf
Vial:	3	Acq. Method Set:	90_10odh
Injection #:	1	Processing Method:	124
Injection Volume:	5.00 ul	Channel Name:	289.0nm
Run Time:	15.0 Minutes	Proc. Chnl. Descr.:	2998 PDA 289.0 nm (2998)
Date Acquired: 7/3/2021 5:06:59 PM CST			
Date Processed: 7/6/2021 10:31:12 AM CST			



Channel: 2998; Processed Channel: 2998 PDA 289.0 nm (2998 (210-400)nm); Result Id: 1625;
Processing Method: 124

Processed Channel Descr.: 2998 PDA 289.0 nm (2998 (210-400)nm)

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 PDA 289.0 nm (2998 (210-400)nm)	5.292	583007	98.14	68577
2	2998 PDA 289.0 nm (2998 (210-400)nm)	7.749	11034	1.86	680