

**Design and Application of Hybrid Phosphorus Ligands for
Enantioselective Rh-Catalyzed Anti-Markovnikov Hydroformylation
of Unfunctionalized 1,1-Disubstituted Alkenes**

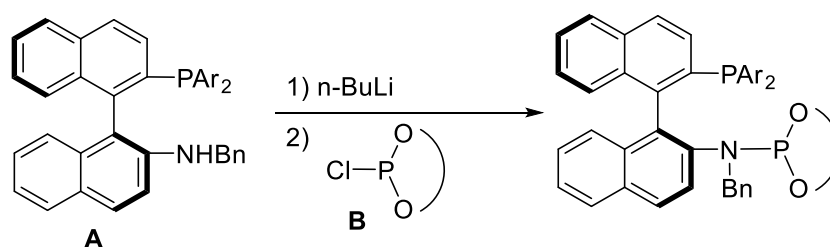
Cai You, Shuailong Li, Xiuxiu Li, Jialing Lan, Yuhong Yang, Lung Wa Chung,
Hui Lv,* Xumu Zhang*

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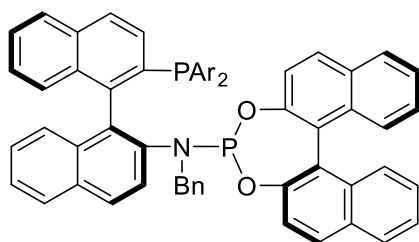
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1. General Information. All reactions and manipulations that were sensitive to moisture or air were performed in a nitrogen-filled glovebox or using standard Schlenk techniques, unless otherwise noted. Solvents were dried with standard procedures, degassed with N₂ and transferred by syringe. NMR spectra were recorded on Bruker ADVANCE III (400 MHz) spectrometers for ¹H NMR and ¹³C NMR. CDCl₃ was the solvent used for the NMR analysis, with tetramethylsilane as the internal standard. Chemical shifts were reported upfield to TMS (0.00 ppm) for ¹H NMR and relative to CDCl₃ (77.3 ppm) for ¹³C NMR. Optical rotation was determined using a Perkin Elmer 343 polarimeter. HPLC analysis was conducted on an Agilent 1260 Series instrument. GC analysis was carried out on Angilent 1200 Series instrument using chiral capillary columns. Column Chromatography was performed with silica gel Merck 60 (300-400 mesh). Thin layer chromatography (TLC) was performed on EM reagents 0.25 mm silica 60-F plates. All new products were further characterized by HRMS. A positive ion mass spectrum of sample was acquired on a Thermo LTQ-FT mass spectrometer with an electrospray ionization source.

2. Procedures for the preparation of ligands

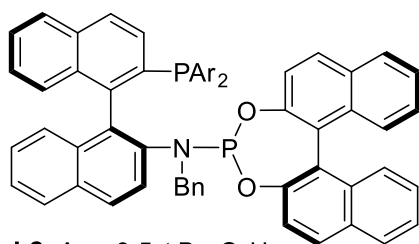


The ligands were prepared according to the literature.¹ To a solution of **A** (1 mmol) in THF (10 mL) at -78°C was added dropwise n-BuLi (1.5 mmol, 2.5 M in hexane). The reaction mixture was stirred for 1 h to give a deep red solution, and **B** (1.5 mmol) in THF (4 mL) was added dropwise. After addition, the cooling bath was removed and the mixture was stirred at room temperature overnight. The volatiles were evaporated under reduced pressure. To the residue was added CH₂Cl₂ (10 mL), and the mixture was filtered to remove the salt. The filtration was concentrated and subjected to chromatography on silica gel (eluted with hexane/EtOAc 100:1 to 10:1) to afford pure ligands.

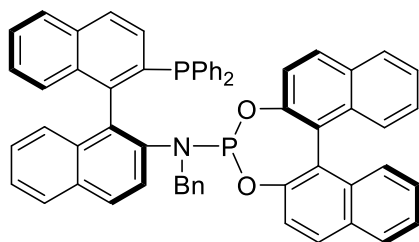


L1: Ar = 3,5-Me-C₆H₃

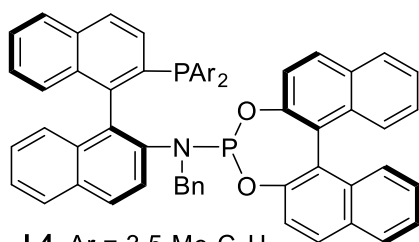
L1: Light yellow solid, 368 mg, 40% yield. $[\alpha]_{\text{D}}^{20} = 56.2$ ($c = 1.0$, CHCl_3). ^1H NMR (400 MHz, CDCl_3) δ 8.14 (dd, $J = 8.3, 5.4$ Hz, 2H), 7.96 (d, $J = 8.8$ Hz, 1H), 7.89 (d, $J = 8.1$ Hz, 1H), 7.78 (dd, $J = 8.5, 2.8$ Hz, 1H), 7.72-7.60 (m, 5H), 7.44-7.37 (m, 2H), 7.38-7.32 (m, 3H), 7.32-7.26 (m, 2H), 7.21 (d, $J = 2.7$ Hz, 2H), 7.20-7.14 (m, 2H), 7.08-7.02 (m, 7H), 6.68 (s, 1H), 6.60 (s, 1H), 6.51-6.44 (m, 1H), 6.38 (d, $J = 8.8$ Hz, 2H), 6.24 (d, $J = 8.5$ Hz, 1H), 5.94 (d, $J = 8.8$ Hz, 1H), 3.92 (d, $J = 14.8$ Hz, 1H), 3.29 (dd, $J = 14.8, 1.0$ Hz, 1H), 1.95 (s, 6H), 1.82 (s, 6H). ^{13}C NMR (101 MHz, CDCl_3) δ 150.16, 150.09, 149.81, 141.62, 141.31, 139.74, 139.58, 138.66, 138.41, 137.72, 137.59, 137.48, 137.43, 137.14, 137.05, 136.58, 136.41, 135.07, 135.05, 134.93, 134.91, 133.91, 133.71, 133.47, 133.10, 132.57, 132.08, 131.63, 131.60, 131.56, 131.20, 131.05, 130.85, 130.73, 130.64, 130.32, 129.87, 129.82, 129.48, 128.65, 128.50, 128.34, 128.22, 127.93, 127.20, 127.18, 127.02, 126.95, 126.89, 126.55, 126.13, 126.05, 125.37, 124.88, 124.77, 124.58, 124.46, 124.41, 122.89, 122.39, 122.37, 122.09, 51.32, 21.29, 21.25 ppm. ^{31}P NMR (162 MHz, CDCl_3) δ 135.64 (d, $J = 81.3$ Hz), -12.73 (d, $J = 81.3$ Hz). **HRMS** calculated $[\text{M}+\text{H}]^+$ for $\text{C}_{63}\text{H}_{50}\text{NO}_2\text{P}_2 = 914.3311$, found: 914.3295.



L2: Light yellow solid, 422 mg, 39% yield. $[\alpha]_{\text{D}}^{20} = 82.6$ ($c = 1.0$, CHCl_3). ^1H NMR (400 MHz, CDCl_3) δ 8.19 (dd, $J = 16.0, 8.4$ Hz, 2H), 7.94 (d, $J = 8.8$ Hz, 1H), 7.87 (d, $J = 8.1$ Hz, 1H), 7.81 (dd, $J = 8.4, 2.6$ Hz, 1H), 7.69-7.54 (m, 4H), 7.55 (d, $J = 8.1$ Hz, 1H), 7.44 (d, $J = 8.3$ Hz, 1H), 7.39-7.35 (m, 3H), 7.33-7.27 (m, 2H), 7.23 (dd, $J = 13.1, 6.9$ Hz, 2H), 7.18-7.15 (m, 4H), 7.13-7.05 (m, 7H), 7.02-6.96 (m, 1H), 6.69 (dd, $J = 8.8, 1.4$ Hz, 2H), 6.31 (t, $J = 7.6$ Hz, 1H), 6.21 (d, $J = 8.5$ Hz, 1H), 5.70 (d, $J = 8.8$ Hz, 1H), 3.87 (d, $J = 14.4$ Hz, 1H), 3.23 (d, $J = 14.5$ Hz, 1H), 1.05 (s, 18H), 0.79 (s, 18H). ^{13}C NMR (101 MHz, CDCl_3) δ 150.11, 150.05, 149.95, 149.85, 141.73, 141.42, 139.70, 139.56, 138.40, 138.08, 138.07, 137.95, 137.89, 137.84, 137.07, 136.95, 134.76, 134.72, 134.66, 134.62, 133.97, 133.84, 133.79, 133.11, 132.53, 132.31, 132.26, 131.71, 131.14, 130.70, 130.22, 130.08, 129.73, 129.69, 129.49, 128.55, 128.52, 128.47, 128.44, 128.30, 128.22, 128.00, 127.89, 127.53, 127.48, 127.18, 127.02, 126.86, 126.51, 125.99, 125.90, 125.60, 124.82, 124.62, 124.54, 122.84, 122.68, 122.34, 121.19, 34.81, 31.61, 31.22 ppm. ^{31}P NMR (162 MHz, CDCl_3) δ 134.07 (d, $J = 88.0$ Hz), -12.47 (d, $J = 88.0$ Hz). **HRMS** calculated $[\text{M}+\text{H}]^+$ for $\text{C}_{75}\text{H}_{74}\text{O}_2\text{NP}_2 = 1082.5189$, found: 1082.5158.

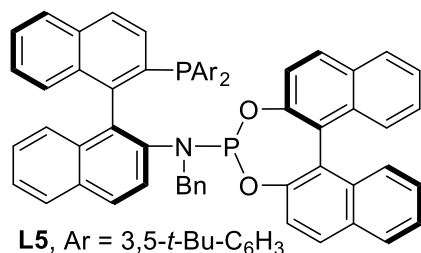


L3: Light yellow solid, 300 mg, 35% yield. $[\alpha]_{\text{D}}^{20} = -61.3$ ($c = 1.0$, CHCl_3). ^1H NMR (400 MHz, CDCl_3) δ 8.16 (d, $J = 8.6$ Hz, 1H), 7.93-7.83 (m, 5H), 7.75-7.64 (m, 3H), 7.52 (d, $J = 8.8$ Hz, 1H), 7.39-7.33 (m, 3H), 7.31 (d, $J = 3.1$ Hz, 5H), 7.23-7.16 (m, 8H), 7.15-7.06 (m, 9H), 6.90 (d, $J = 8.6$ Hz, 1H), 6.54 (t, $J = 7.5$ Hz, 1H), 6.39 (d, $J = 8.5$ Hz, 1H), 5.70 (d, $J = 8.8$ Hz, 1H), 4.27 (d, $J = 13.2$ Hz, 1H), 3.83 (d, $J = 14.0$ Hz, 1H). ^{13}C NMR (101 MHz, CDCl_3) δ 149.81, 149.75, 149.70, 143.95, 143.61, 139.45, 139.32, 138.50, 138.02, 137.85, 137.59, 136.15, 136.02, 135.78, 135.66, 135.57, 135.34, 134.60, 134.52, 134.16, 134.01, 132.97, 132.92, 132.76, 132.62, 132.31, 131.88, 131.82, 131.57, 130.90, 130.86, 130.79, 130.32, 129.70, 129.28, 128.85, 128.68, 128.64, 128.51, 128.42, 128.30, 128.08, 127.98, 127.70, 127.66, 127.56, 127.24, 127.16, 127.03, 126.96, 126.22, 126.17, 125.81, 125.38, 124.93, 124.89, 124.24, 124.19, 122.52, 122.29, 50.80 ppm. ^{31}P NMR (162 MHz, CDCl_3) δ 138.34 (d, $J = 12.0$ Hz), -14.74 (d, $J = 12.1$ Hz). **HRMS** calculated $[\text{M}+\text{H}]^+$ for $\text{C}_{59}\text{H}_{42}\text{O}_2\text{NP}_2 = 858.2685$, found: 858.2678.



L4, Ar = 3,5-Me- C_6H_3

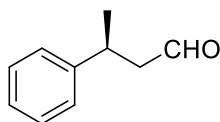
L4: Light yellow solid, 430 mg, 47% yield. $[\alpha]_{\text{D}}^{20} = -43.7$ ($c = 1.0$, CHCl_3). ^1H NMR (400 MHz, CDCl_3) δ 8.15 (d, $J = 8.6$ Hz, 1H), 7.93-7.87 (m, 3H), 7.84 (d, $J = 8.2$ Hz, 1H), 7.76 (d, $J = 8.1$ Hz, 1H), 7.69 (dd, $J = 14.4, 8.4$ Hz, 2H), 7.62 (d, $J = 8.8$ Hz, 1H), 7.52 (d, $J = 8.8$ Hz, 1H), 7.41-7.30 (m, 4H), 7.29-7.23 (m, 2H), 7.20-7.12 (m, 7H), 7.10-7.06 (m, 3H), 6.93 (d, $J = 4.7$ Hz, 3H), 6.79 (s, 1H), 6.59 (d, $J = 8.7$ Hz, 2H), 6.50 (t, $J = 7.6$ Hz, 1H), 6.28 (d, $J = 8.5$ Hz, 1H), 5.72 (d, $J = 8.8$ Hz, 1H), 4.35 (d, $J = 13.8$ Hz, 1H), 3.83 (d, $J = 14.3$ Hz, 1H), 2.24 (s, 6H), 2.07 (s, 6H). ^{13}C NMR (101 MHz, CDCl_3) δ 149.88, 149.82, 149.68, 143.20, 142.86, 139.06, 138.93, 138.75, 138.13, 138.01, 137.96, 137.73, 137.59, 137.51, 136.84, 136.70, 135.37, 135.26, 134.46, 134.39, 134.04, 133.62, 133.39, 132.95, 132.60, 132.25, 131.74, 131.68, 131.55, 131.05, 130.74, 130.69, 130.65, 130.55, 130.47, 130.30, 129.86, 129.57, 128.62, 128.49, 128.37, 128.16, 127.95, 127.48, 127.40, 127.26, 127.16, 126.90, 126.76, 126.12, 125.61, 124.94, 124.89, 124.78, 124.27, 124.23, 122.54, 122.46, 122.18, 50.36, 21.90, 21.42 ppm. ^{31}P NMR (162 MHz, CDCl_3) δ 138.50 (d, $J = 12.5$ Hz), -13.56 (d, $J = 12.2$ Hz). **HRMS** calculated $[\text{M}+\text{H}]^+$ for $\text{C}_{63}\text{H}_{50}\text{O}_2\text{NP}_2 = 914.3311$, found: 914.3295.



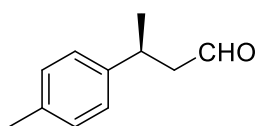
L5: Light yellow solid, 5.2 g (8 mmol **A** was used), 60% yield. $[\alpha]_D^{20} = -18.6$ ($c = 1.0$, CHCl₃). ¹H NMR (400 MHz, CDCl₃) δ 8.18 (d, $J = 8.6$ Hz, 1H), 7.97 (d, $J = 8.2$ Hz, 1H), 7.92-7.82 (m, 2H), 7.73-7.66 (m, 4H), 7.51 (d, $J = 8.9$ Hz, 1H), 7.45-7.39 (m, 2H), 7.37-7.31 (m, 3H), 7.28-7.25 (m, 3H), 7.23-7.19 (m, 4H), 7.17-7.13 (m, 4H), 7.08-7.06 (m, 3H), 7.02 (dd, $J = 7.2, 1.6$ Hz, 2H), 6.87 (dd, $J = 8.8, 1.7$ Hz, 2H), 6.40-6.28 (m, 2H), 5.77 (d, $J = 8.8$ Hz, 1H), 4.48 (d, $J = 14.4$ Hz, 1H), 3.83 (d, $J = 14.3$ Hz, 1H), 1.13 (s, 18H), 1.08 (s, 18H). ¹³C NMR (101 MHz, CDCl₃) δ 150.66, 150.61, 150.43, 150.35, 150.09, 149.60, 142.69, 142.36, 138.52, 138.32, 138.20, 137.81, 137.62, 137.56, 137.46, 134.68, 134.58, 134.27, 134.20, 134.05, 132.97, 132.60, 132.10, 131.56, 131.40, 131.32, 130.83, 130.70, 130.65, 130.53, 130.27, 129.82, 129.61, 129.38, 128.49, 128.32, 128.13, 128.00, 127.92, 127.63, 127.57, 127.39, 127.31, 127.29, 127.14, 126.84, 126.07, 125.69, 124.86, 124.72, 124.55, 124.32, 124.27, 122.89, 122.64, 122.17, 121.97, 121.86, 50.64, 35.06, 34.97, 31.68, 31.53 ppm. ³¹P NMR (162 MHz, CDCl₃) δ 139.57 (d, $J = 14.4$ Hz), -13.37 (d, $J = 14.3$ Hz). **HRMS** calculated $[M+H]^+$ for C₇₅H₇₄O₂NP₂ = 1082.5189, found: 1082.5159.

3. General procedure for asymmetric hydroformylation

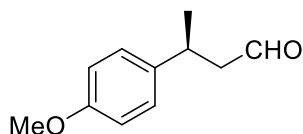
In a glovebox filled with nitrogen, to a 5 ml vial equipped with a magnetic bar was added ligand **L5** (0.03 mmol) and Rh(acac)(CO)₂ (0.01 mmol in 0.2 mL toluene). After stirring for 10 min, substrate (0.5 mmol) and additional solvent was charged to bring the total volume of the reaction mixture to 0.5 mL. The vial was transferred into an autoclave and taken out of the glovebox. Carbon monoxide (2.5 bar) and hydrogen (2.5 bar) were charged in sequence. The reaction mixture was stirred at 80 °C (oil bath) for 48 h. The reaction was cooled and the pressure was carefully released in a well-ventilated hood. The solution was concentrated and the aldehyde was isolated by column chromatography. The enantiomeric excesses of **2a-2w** were determined HPLC after NaBH₄ reduction. The d.r. ratio of **2x** and **2y** was determined GC from the crude reaction mixture.



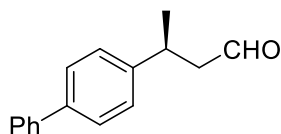
(S)-3-phenylbutanal (2a): colorless oil; Isolated yield: 92%; 87% ee; $[\alpha]_D^{20} = 21.8$ ($c = 0.5$, CHCl_3), ref 2: $[\alpha]_D^{20} = 18.4$ ($c = 0.25$, CHCl_3 , 72% ee). The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 16.2$ min (major), 20.9 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.71 (t, $J = 1.8$ Hz, 1H), 7.36-7.28 (m, 2H), 7.25-7.19 (m, 3H), 3.44-3.30 (m, 1H), 2.82-2.61 (m, 2H), 1.32 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.21, 145.71, 128.95, 127.03, 126.81, 52.00, 34.54, 22.45 ppm.



(S)-3-(p-tolyl)butanal (2b): colorless oil; Isolated yield: 92%; 87% ee; $[\alpha]_D^{20} = 28.5$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 14.9$ min (major), 20.7 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.70 (t, $J = 2.0$ Hz, 1H), 7.12 (s, 4H), 3.39-3.26 (m, 1H), 2.77-2.58 (m, 2H), 2.32 (s, 3H), 1.30 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.44, 142.65, 136.29, 129.58, 126.86, 52.01, 34.14, 22.52, 21.22 ppm.

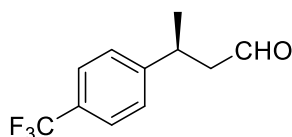


(S)-3-(4-methoxyphenyl)butanal (2c): colorless oil; Isolated yield: 90%; 89% ee; $[\alpha]_D^{20} = 35.0$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 98:2; flow rate = 1.0 mL/min; UV detection at 220 nm; $t_R = 22.1$ min (minor), 23.2 min (major). ^1H NMR (400 MHz, CDCl_3) δ 9.68 (t, $J = 2.1$ Hz, 1H), 7.17-7.11 (m, 2H), 6.89-6.81 (m, 2H), 3.78 (s, 3H), 3.32 (h, $J = 7.1$ Hz, 1H), 2.74-2.59 (m, 2H), 1.29 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.37, 158.35, 137.73, 127.90, 114.22, 55.45, 52.15, 33.74, 22.62 ppm.

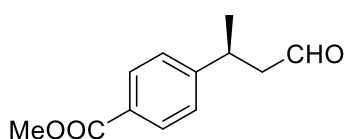


(S)-3-([1,1'-biphenyl]-4-yl)butanal (2d): white solid; Isolated yield: 95%; 90% ee; $[\alpha]_D^{20} = 34.3$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 254 nm; $t_R = 29.5$ min (major), 32.5 min (minor). ^1H NMR (400 MHz,

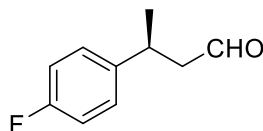
CDCl₃) δ 9.71 (s, 1H), 7.55 (dd, J = 13.3, 7.8 Hz, 4H), 7.42 (t, J = 7.6 Hz, 2H), 7.34-7.27 (m, 3H), 3.46-3.34 (m, 1H), 2.80-2.64 (m, 2H), 1.34 (d, J = 7.0 Hz, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 202.08, 144.77, 141.03, 139.69, 128.99, 127.62, 127.43, 127.41, 127.24, 51.93, 34.13, 22.41 ppm. **HRMS** calculated [M-H]⁻ for C₁₆H₁₅O = 223.1128, found: 223.1128.



(S)-3-(4-(trifluoromethyl)phenyl)butanal (2e): colorless oil; Isolated yield: 87%; 91% ee; $[\alpha]_D^{20}$ = 18.0 (c = 1.0, CHCl₃); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 99:1; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 18.1 min (major), 20.1 min (minor). ¹H NMR (400 MHz, CDCl₃) δ 9.71 (t, J = 1.6 Hz, 1H), 7.56 (d, J = 8.1 Hz, 2H), 7.34 (d, J = 8.2 Hz, 2H), 3.44 (h, J = 7.0 Hz, 1H), 2.82-2.68 (m, 2H), 1.33 (d, J = 7.0 Hz, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 201.13, 149.88 (d, J = 1.1 Hz), 129.05 (q, J = 32.4 Hz), 127.44, 125.85 (q, J = 3.8 Hz), 124.44 (q, J = 271.0 Hz), 51.67, 34.19, 22.15 ppm.

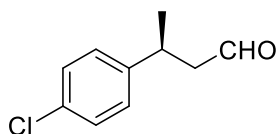


methyl (S)-4-(4-oxobutan-2-yl)benzoate (2f): white solid; Isolated yield: 91%; 90% ee; $[\alpha]_D^{20}$ = 43.0 (c = 1.0, CHCl₃); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 14.0 min (major), 19.4 min (minor). ¹H NMR (400 MHz, CDCl₃) δ 9.71 (t, J = 1.7 Hz, 1H), 7.99 (d, J = 8.4 Hz, 2H), 7.30 (d, J = 8.4 Hz, 2H), 3.90 (s, 3H), 3.43 (h, J = 7.0 Hz, 1H), 2.83-2.67 (m, 2H), 1.33 (d, J = 7.0 Hz, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 201.35, 167.11, 151.07, 130.23, 128.65, 127.07, 52.30, 51.60, 34.33, 22.12 ppm.

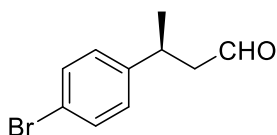


(S)-3-(4-fluorophenyl)butanal (2g): colorless oil; Isolated yield: 88%; 90% ee; $[\alpha]_D^{20}$ = 17.5 (c = 0.2, CHCl₃); The enantiomeric excess was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 15.2 min (major), 17.4 min (minor). ¹H NMR (400 MHz, CDCl₃) δ 9.70 (t, J = 1.8 Hz, 1H), 7.20-7.16 (m, 2H), 7.01-6.97 (m, 2H), 3.36 (h, J = 7.0 Hz, 1H), 2.75-2.64 (m, 2H), 1.29 (s, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 201.76, 161.68 (d, J = 244.4 Hz), 141.39 (d, J = 3.2 Hz), 128.42 (d, J = 7.8 Hz), 115.90 (d, J = 21.9 Hz), 115.65 (d, J = 21.2 Hz), 51.66, 34.17, 22.13 ppm. **HRMS** calculated [M-H]⁻

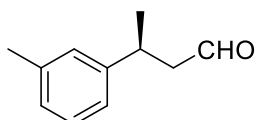
for C₁₀H₁₀OF = 165.0721, found: 165.0720.



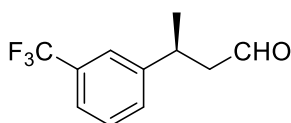
(S)-3-(4-chlorophenyl)butanal (2h): colorless oil; Isolated yield: 93%; 90% ee; $[\alpha]_D^{20}$ = 31.8 (c = 0.5, CHCl₃); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 16.3 min (major), 18.8 min (minor). ¹H NMR (400 MHz, CDCl₃) δ 9.70 (t, J = 1.8 Hz, 1H), 7.29-7.26 (m, 2H), 7.18-7.13 (m, 2H), 3.35 (h, J = 7.1 Hz, 1H), 2.77-2.63 (m, 2H), 1.29 (d, J = 7.0 Hz, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 201.63, 144.19, 132.38, 129.01, 128.41, 51.89, 33.85, 22.39 ppm.



(S)-3-(4-bromophenyl)butanal (2i): colorless oil; Isolated yield: 92%; 90% ee; $[\alpha]_D^{20}$ = 25.8 (c = 1.0, CHCl₃); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 18.6 min (major), 21.8 min (minor). ¹H NMR (400 MHz, CDCl₃) δ 9.69 (t, J = 1.7 Hz, 1H), 7.42 (d, J = 8.4 Hz, 2H), 7.10 (d, J = 8.4 Hz, 2H), 3.33 (h, J = 7.0 Hz, 1H), 2.79-2.60 (m, 2H), 1.29 (d, J = 7.0 Hz, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 201.52, 144.73, 131.95, 128.81, 120.42, 51.80, 33.89, 22.30 ppm.

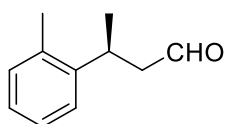


(S)-3-(m-tolyl)butanal (2j): colorless oil; Isolated yield: 88%; 86% ee; $[\alpha]_D^{20}$ = 29.6 (c = 1.0, CHCl₃); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 19.5 min (major), 28.4 min (minor). ¹H NMR (400 MHz, CDCl₃) δ 9.69 (t, J = 2.0 Hz, 1H), 7.25-7.16 (m, 1H), 7.05-6.99 (m, 3H), 3.40-3.25 (m, 1H), 2.79-2.60 (m, 2H), 2.33 (s, 3H), 1.30 (d, J = 7.0 Hz, 3H). ¹³C NMR (101 MHz, CDCl₃) δ 202.35, 145.61, 138.45, 128.78, 127.77, 127.49, 123.94, 51.91, 34.42, 22.43, 21.70.

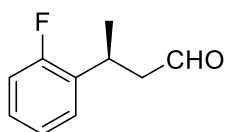


(S)-3-(3-(trifluoromethyl)phenyl)butanal (2k): colorless oil; Isolated yield: 90%; 91%

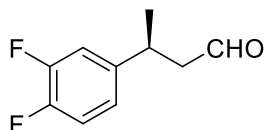
ee; $[\alpha]_D^{20} = 18.0$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 12.0$ min (major), 14.4 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.73 (t, $J = 1.5$ Hz, 1H), 7.49-7.41 (m, 4H), 3.45 (h, $J = 7.0$ Hz, 1H), 2.84-2.69 (m, 2H), 1.34 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 201.24, 146.72, 131.15 (q, $J = 32.0$ Hz), 130.61 (d, $J = 1.1$ Hz), 129.39, 129.19, 124.37 (q, $J = 272.3$ Hz), 123.72 (p, $J = 3.8$ Hz), 51.79, 34.17, 22.24 ppm.



(S)-3-(o-tolyl)butanal (2l): colorless oil; Isolated yield: 87%; 90% ee; $[\alpha]_D^{20} = 21.6$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 14.1$ min (major), 18.6 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.71 (t, $J = 1.9$ Hz, 1H), 7.20-7.09 (m, 4H), 3.67-3.54 (m, 1H), 2.81-2.62 (m, 2H), 2.37 (s, 3H), 1.27 (d, $J = 6.9$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.19, 143.81, 135.31, 130.79, 126.67, 126.44, 125.44, 51.40, 29.39, 21.80, 19.72 ppm.

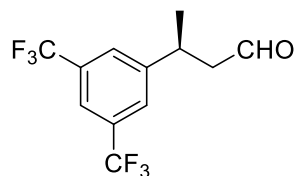


(S)-3-(2-fluorophenyl)butanal (2m): colorless oil; Isolated yield: 84%; 92% ee; $[\alpha]_D^{20} = 17.4$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 98:2; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 12.7$ min (minor), 14.2 min (major). ^1H NMR (400 MHz, CDCl_3) δ 9.72 (t, $J = 1.8$ Hz, 1H), 7.24-7.17 (m, 2H), 7.11-7.07 (m, 1H), 7.05-6.99 (m, 1H), 3.72-3.60 (m, 1H), 2.85-2.66 (m, 2H), 1.33 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 201.81, 160.75 (d, $J = 245.2$ Hz), 132.16 (d, $J = 14.1$ Hz), 128.29 (d, $J = 0.6$ Hz), 128.22 (d, $J = 2.3$ Hz), 124.55 (d, $J = 3.5$ Hz), 115.88 (d, $J = 22.5$ Hz), 50.96, 28.13, 20.84 ppm.

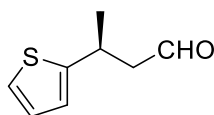


(S)-3-(3,4-difluorophenyl)butanal (2n): colorless oil; Isolated yield: 90%; 89% ee; $[\alpha]_D^{20} = 16.3$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 15.2$ min (major), 18.8 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.71 (t, $J = 1.6$ Hz, 1H), 7.13-7.00 (m, 2H), 6.97-6.91 (m, 1H), 3.35 (h, $J = 7.0$ Hz, 1H), 2.77-2.63 (m, 2H), 1.29 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3)

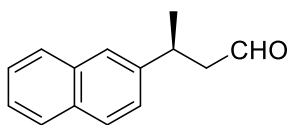
δ 201.24, 151.05 (dd, $J = 138.5, 12.6$ Hz), 148.60 (dd, $J = 136.9, 12.7$ Hz), 142.79 (dd, $J = 4.9, 4.0$ Hz), 122.94 (dd, $J = 6.1, 3.5$ Hz), 117.53 (d, $J = 17.2$ Hz), 115.83 (d, $J = 17.1$ Hz), 51.89, 33.64, 22.34 ppm.



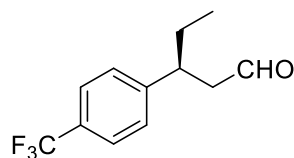
(S)-3-(3,5-bis(trifluoromethyl)phenyl)butanal (2o): colorless oil; Isolated yield: 93%; 91% ee; $[\alpha]_D^{20} = 18.4$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 90:10; flow rate = 1.0 mL/min; UV detection at 220 nm; $t_R = 24.3$ min (minor), 33.4 min (major). ^1H NMR (400 MHz, CDCl_3) δ 9.75 (s, 1H), 7.74 (s, 1H), 7.68 (s, 2H), 3.55 (h, $J = 7.0$ Hz, 1H), 2.89-2.77 (m, 2H), 1.37 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 200.18, 148.40, 132.10 (q, $J = 33.1$ Hz), 127.42 (d, $J = 2.6$ Hz), 123.56 (q, $J = 272.7$ Hz), 120.92 (dt, $J = 7.8, 3.8$ Hz), 51.62, 33.90, 22.04 ppm.



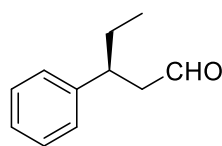
(S)-3-(thiophen-2-yl)butanal (2p): colorless oil; Isolated yield: 86%; 90% ee; $[\alpha]_D^{20} = 15.7$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 21.0$ min (major), 22.8 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.74 (t, $J = 1.8$ Hz, 1H), 7.15 (dd, $J = 5.1, 1.1$ Hz, 1H), 6.92 (dd, $J = 5.1, 3.5$ Hz, 1H), 6.86-6.81 (m, 1H), 3.68 (h, $J = 6.9$ Hz, 1H), 2.84-2.66 (m, 2H), 1.40 (d, $J = 6.9$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 201.52, 149.67, 126.96, 123.42, 123.30, 52.63, 29.95, 23.23 ppm.



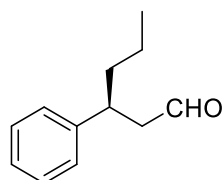
(S)-3-(naphthalen-2-yl)butanal (2q): colorless oil; Isolated yield: 94%; 85% ee; $[\alpha]_D^{20} = 36.3$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 220 nm; $t_R = 24.2$ min (major), 35.3 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.70 (t, $J = 1.8$ Hz, 1H), 7.83-7.75 (m, 3H), 7.63 (s, 1H), 7.49-7.39 (m, 2H), 7.34 (dd, $J = 8.5, 1.5$ Hz, 1H), 3.50 (h, $J = 7.0$ Hz, 1H), 2.85-2.67 (m, 2H), 1.38 (d, $J = 7.0$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.04, 143.09, 133.75, 132.53, 128.63, 127.84, 126.37, 125.77, 125.62, 125.20, 51.80, 34.57, 22.35 ppm.



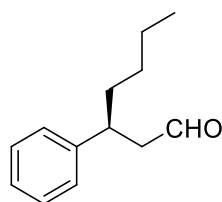
(S)- 3-(4-(trifluoromethyl)phenyl)pentanal (2r): colorless oil; Isolated yield: 92%; 93% ee; $[\alpha]_{\text{D}}^{20} = 10.2$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_{\text{R}} = 10.5$ min (major), 12.7 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.68 (t, $J = 1.6$ Hz, 1H), 7.57 (d, $J = 8.2$ Hz, 2H), 7.31 (d, $J = 8.2$ Hz, 2H), 3.25-3.13 (m, 1H), 2.77 (dt, $J = 4.3, 1.9$ Hz, 2H), 1.81-1.57 (m, 2H), 0.80 (t, $J = 7.4$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 201.43, 148.17, 129.09 (q, $J = 32.5$ Hz), 128.17, 125.79 (q, $J = 3.8$ Hz), 123.08, 50.28, 41.58, 29.55, 12.09 ppm.



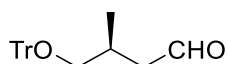
(S)-3-phenylpentanal (2s): colorless oil; Isolated yield: 90%; 91% ee; $[\alpha]_{\text{D}}^{20} = 13.5$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_{\text{R}} = 15.4$ min (major), 24.6 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.66 (t, $J = 2.1$ Hz, 1H), 7.32-7.28 (m, 2H), 7.23-7.16 (m, 3H), 3.13-3.03 (m, 1H), 2.72 (dd, $J = 7.3, 2.1$ Hz, 2H), 1.77-1.57 (m, 2H), 0.80 (t, $J = 7.4$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.45, 143.84, 128.81, 127.75, 126.79, 50.44, 41.94, 29.73, 12.15 ppm.



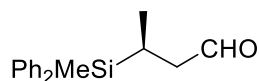
(S)-3-phenylhexanal (2t): colorless oil; Isolated yield: 93%; 90% ee; $[\alpha]_{\text{D}}^{20} = 13.0$ ($c = 0.5$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_{\text{R}} = 12.6$ min (major), 19.6 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.65 (t, $J = 2.0$ Hz, 1H), 7.32-7.28 (m, 2H), 7.22-7.17 (m, 3H), 3.24-3.12 (m, 1H), 2.70 (dd, $J = 7.3, 1.2$ Hz, 2H), 1.65-1.58 (m, 2H), 1.23-1.14 (m, 2H), 0.86 (t, $J = 7.3$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.40, 144.14, 128.84, 127.70, 126.78, 50.82, 40.05, 39.04, 20.67, 14.18 ppm.



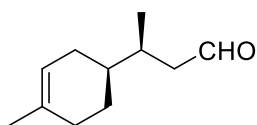
(S)-3-phenylheptanal (2u): colorless oil; Isolated yield: 93%; 90% ee; $[\alpha]_D^{20} = 6.4$ ($c = 0.5$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 11.3$ min (major), 16.8 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.65 (t, $J = 2.0$ Hz, 1H), 7.31-7.27 (m, 2H), 7.21-7.17 (m, 3H), 3.15 (dt, $J = 14.6, 7.3$ Hz, 1H), 2.70 (dd, $J = 7.3, 2.0$ Hz, 2H), 1.66-1.59 (m, 2H), 1.31-1.16 (m, 4H), 0.83 (t, $J = 7.2$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.32, 144.18, 128.81, 127.67, 126.74, 50.83, 40.27, 36.54, 29.69, 22.79, 14.16 ppm. **HRMS** calculated $[\text{M}-\text{H}]^-$ for $\text{C}_{13}\text{H}_{17}\text{O} = 189.1285$, found: 189.1283.



(S)-3-methyl-4-(trityloxy)butanal (2v): colorless oil; Isolated yield: 95%; 77% ee; $[\alpha]_D^{20} = -9.8$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 99:1; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 26.0$ min (major), 28.6 min (minor). ^1H NMR (400 MHz, CDCl_3) δ 9.75 (t, $J = 2.1$ Hz, 1H), 7.42 (dd, $J = 5.3, 3.4$ Hz, 6H), 7.33-7.26 (m, 6H), 7.24-7.20 (m, 3H), 3.08 (dd, $J = 9.0, 5.2$ Hz, 1H), 2.89 (dd, $J = 9.0, 7.3$ Hz, 1H), 2.60-2.54 (m, 1H), 2.44-2.31 (m, 1H), 2.27-2.21 (m, 1H), 0.95 (d, $J = 6.8$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 202.99, 144.28, 128.87, 128.02, 127.21, 86.78, 68.00, 48.65, 29.56, 17.63 ppm.

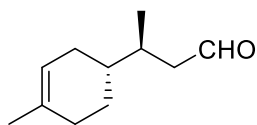


(S)-3-(methyldiphenylsilyl)butanal (2w): colorless oil; Isolated yield: 88%; 87% ee; $[\alpha]_D^{20} = 51.0$ ($c = 1.0$, CHCl_3); The enantiomeric excess was determined by HPLC on Chiralpak OJ-H column, hexane: isopropanol = 97:3; flow rate = 1.0 mL/min; UV detection at 210 nm; $t_R = 23.6$ min (minor), 29.8 min (major). ^1H NMR (400 MHz, CDCl_3) δ 9.73-9.65 (m, 1H), 7.55-7.51 (m, 4H), 7.41-7.33 (m, 6H), 2.51 (dd, $J = 16.6, 2.7$ Hz, 1H), 2.27-2.19 (m, 1H), 2.02-1.92 (m, 1H), 1.04 (d, $J = 7.3$ Hz, 3H), 0.57 (s, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 203.24, 135.37, 135.30, 135.01, 134.99, 129.78, 129.75, 128.28, 128.24, 46.24, 15.01, 12.49, -6.35 ppm. **HRMS** calculated $[\text{M}+\text{H}]^+$ for $\text{C}_{17}\text{H}_{21}\text{OSi} = 269.1356$, found: 269.1349.



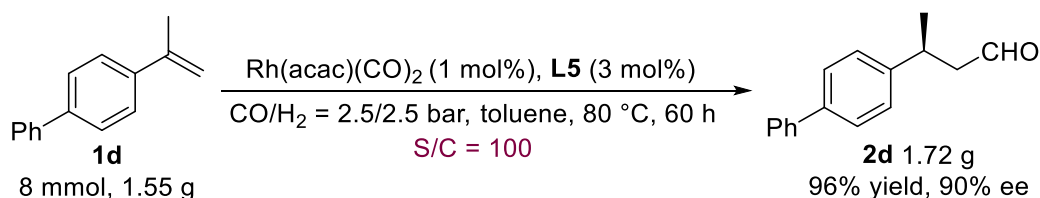
(S)-3-((S)-4-methylcyclohex-3-en-1-yl)butanal (2x): colorless oil; Isolated yield: 87%; 93:7 dr; $[\alpha]_D^{20} = -83.9$ ($c = 1.0$, CHCl_3); The diastereoselectivity determined by ^{13}C NMR analysis. ^1H NMR (400 MHz, CDCl_3) δ 9.76 (dd, $J = 2.7, 1.8$ Hz, 1H), 5.36 (d, $J = 1.9$ Hz, 1H), 2.52-2.46 (m, 1H), 2.29-2.18 (m, 1H), 2.06-1.96 (m, 4H), 1.79-1.74 (m, 2H), 1.64 (s, 3H), 1.47-1.38 (m, 1H), 1.30-1.23 (m, 1H), 0.95 (d, $J = 6.8$ Hz, 3H).

^{13}C NMR (101 MHz, CDCl_3) δ 203.55, 134.31, 120.60, 48.63, 38.78, 32.48, 30.80, 29.32, 26.00, 23.64, 17.37 ppm.



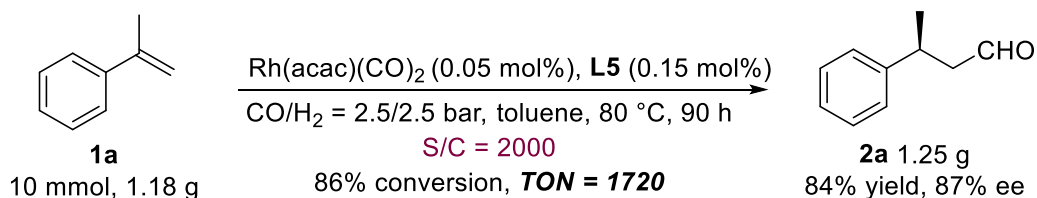
(S)-3-((R)-4-methylcyclohex-3-en-1-yl)butanal (2y): colorless oil; Isolated yield: 85%; 91:9 dr; $[\alpha]_{\text{D}}^{20} = 114.2$ ($c = 1.0$, CHCl_3); The diastereoselectivity determined by ^{13}C NMR analysis. ^1H NMR (400 MHz, CDCl_3) δ 9.77 (dd, $J = 2.8, 1.8$ Hz, 1H), 5.42-5.31 (m, 1H), 2.53-2.47 (m, 1H), 2.28-2.18 (m, 1H), 2.06-1.95 (m, 4H), 1.80-1.68 (m, 2H), 1.64 (s, 3H), 1.48-1.39 (m, 1H), 1.33-1.25 (m, 1H), 0.94 (d, $J = 6.8$ Hz, 3H). ^{13}C NMR (101 MHz, CDCl_3) δ 203.47, 134.26, 120.61, 48.87, 38.67, 32.55, 30.91, 28.22, 26.98, 23.64, 16.95 ppm.

4. Procedures for gram-scale asymmetric hydroformylation of **1d** and **1a**



Gram-scale transformation of **1d**:

A stock solution was made by mixing **L5** (0.24 mmol) with $\text{Rh}(\text{acac})(\text{CO})_2$ (0.08 mmol) in toluene (4 mL) at room temperature for 10 min in a nitrogen-filled glovebox. Then, the catalyst solution was transferred by syringe into the vial charged with substrate **1d** (8 mmol, 1.55g). The vial was transferred into an autoclave and taken out of the glovebox. Carbon monoxide (2.5 bar) and hydrogen (2.5 bar) were charged in sequence. The reaction mixture was stirred at 80 °C (oil bath) for 60 h. The reaction was cooled and the pressure was carefully released in a well-ventilated hood. The solution was concentrated and **2d** was isolated by column chromatography. Isolated yield: 96%, 1.72 g, 90% ee.



Gram-scale transformation of **1a**:

A stock solution was made by mixing **L5** (0.015 mmol) with $\text{Rh}(\text{acac})(\text{CO})_2$ (0.005 mmol) in toluene (0.25 mL) at room temperature for 10 min in a nitrogen-filled glovebox. Then, the catalyst solution was transferred by syringe into the vial charged with substrate **1a** (10 mmol, 1.18 g). The vial was transferred into an autoclave and

taken out of the glovebox. Carbon monoxide (2.5 bar) and hydrogen (2.5 bar) were charged in sequence. The reaction mixture was stirred at 80 °C (oil bath) for 90 h. The reaction was cooled and the pressure was carefully released in a well-ventilated hood. (The conversion was determined by ^1H NMR spectroscopy from the crude reaction mixture.) The solution was concentrated and **2a** was isolated by column chromatography. Isolated yield: 84%, 1.25 g, 87% ee.

5. Computational Details

Density functional theory (DFT) calculations were carried out to evaluate the relative energy of 12 conformers for the (**L5**)Rh(I)H(CO)₂ complex. M06³ method (combined with 6-31G* basis set^{4a-c} for all atoms except Rh and with SDD basis set & effective core potential (ECP)^{4d} for Rh atom, denoted as 6-31G*+SDD) was used to optimize all the structures in gas phase. The vibrational frequency calculations were then computed on the optimized structures at the same level of theory to verify every optimized structure as local minimum. The effect of the solvent (toluene) was further included by single-point calculations with an implicit solvent model SMD⁵ by M06/6-31G*+SDD as well as B3LYP-D3/6-31G*+SDD methods.⁶ All the computations were carried out by Gaussian 09 package.⁷ All 3D images of the optimized structures were illustrated by CYLview.⁸

Table S1. The absolute (in Hartree) and relative (in kcal/mol) energies of 12 conformers for the (**L5**)Rh(I)H(CO)₂ complex in gas phase by the M06/6-31G* method.

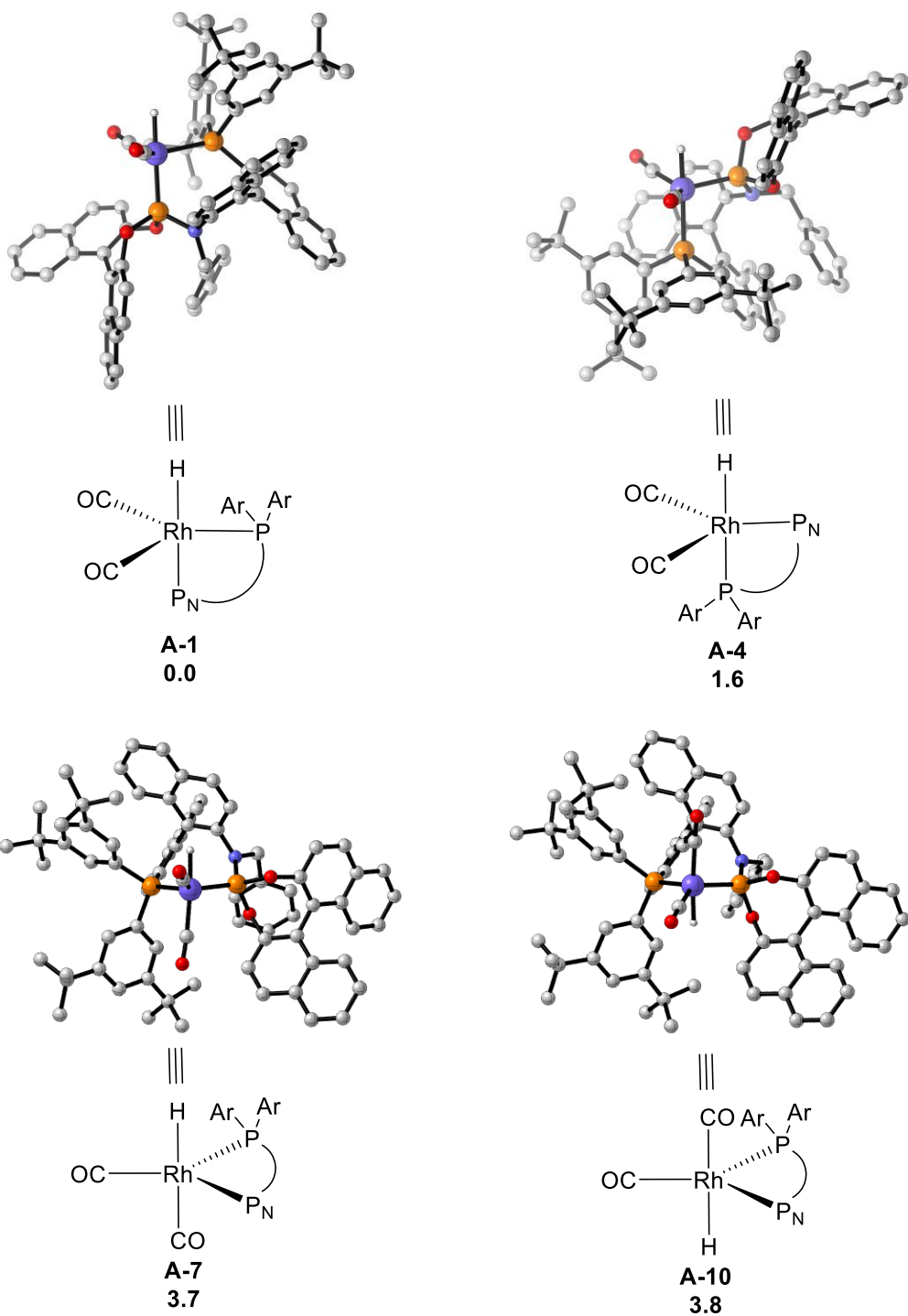
	E	E+ZPE	G	ΔE_{gas}	$\Delta E_{\text{gas+ZPE}}$	ΔG_{gas}
A-1	-4125.414323	-4124.110142	-4124.221717	0.0	0.0	0.0
A-2	-4125.414871	-4124.108577	-4124.214875	-0.3	1.0	4.3
A-3	-4125.411118	-4124.104540	-4124.214291	2.0	3.5	4.7
A-4	-4125.414262	-4124.109520	-4124.218297	0.0	0.4	2.1
A-5	-4125.413614	-4124.107562	-4124.215269	0.4	1.6	4.0
A-6	-4125.411565	-4124.105197	-4124.213596	1.7	3.1	5.1
A-7	-4125.410641	-4124.105879	-4124.216165	2.3	2.7	3.5
A-8	-4125.411753	-4124.106853	-4124.215209	1.6	2.1	4.1
A-9	-4125.407912	-4124.101984	-4124.212071	4.0	5.1	6.1
A-10	-4125.409634	-4124.105168	-4124.215790	2.9	3.1	3.7
A-11	-4125.408748	-4124.104242	-4124.215381	3.5	3.7	4.0
A-12	-4125.406609	-4124.100772	-4124.211211	4.8	5.9	6.6

Table S2. The absolute (in Hartree) and relative (in kcal/mol) of 12 conformers for the (L5)Rh(I)H(CO)₂ complex in toluene solvent by the SMD M06/6-31G* method.

	$E_{\text{solv-M06}}$	$\Delta E_{\text{solv-M06}}$	$\Delta G_{\text{solv-M06}}$
A-1	-4125.467602	0.0	0.0
A-2	-4125.469574	-1.2	3.4
A-3	-4125.465203	1.5	4.2
A-4	-4125.468427	-0.5	1.6
A-5	-4125.467099	0.3	3.9
A-6	-4125.465368	1.4	4.8
A-7	-4125.463532	2.6	3.7
A-8	-4125.465358	1.4	3.9
A-9	-4125.460832	4.2	6.3
A-10	-4125.462753	3.0	3.8
A-11	-4125.461547	3.8	4.3
A-12	-4125.460114	4.7	6.5

Table S3. The absolute (in Hartree) and relative (in kcal/mol) energies of 12 conformers for the (L5)Rh(I)H(CO)₂ complex in toluene solvent by the SMD B3LYP-D3/6-31G* method.

	$E_{\text{solv-B3LYP}}$	$\Delta E_{\text{solv-B3LYP}}$	$\Delta G_{\text{solv-B3LYP}}$
A-1	-4128.231942	0.0	0.0
A-2	-4128.230743	0.8	5.4
A-3	-4128.226961	3.1	5.8
A-4	-4128.231541	0.3	2.4
A-5	-4128.232407	-0.3	3.3
A-6	-4128.227751	2.6	6.0
A-7	-4128.226731	3.3	4.4
A-8	-4128.226139	3.6	6.1
A-9	-4128.221402	6.6	8.6
A-10	-4128.224192	4.9	5.6
A-11	-4128.225278	4.2	4.7
A-12	-4128.219716	7.7	9.4



Ar = 3,5-*t*-Bu-C₆H₃

Figure S1. Computed key representative and lowest-energy conformers for (L5)Rh(I)H(CO)₂ complex (A-1, A-4, A-7 and A-10) by the M06/6-31G* method. Their relative free energies (in kcal/mol) in toluene solvent are given. Unimportant hydrogen atoms are not shown for clarity.

Cartesian coordinates of all stationary points optimized at the M06/6-31G* level

A-1

P	1.706747	-0.636480	-0.902174
C	4.073859	-1.685698	-1.508758
C	4.766359	0.632853	-0.967749
C	7.097984	-0.634989	0.386477
H	6.902405	0.425719	0.529430
C	3.591305	1.122454	-0.434572
C	-0.995910	-2.589201	0.462494
C	-1.145622	-1.749217	1.681329
C	5.681890	1.571566	-1.546412
C	-1.425870	-0.392713	1.603878
C	-1.039125	-2.394410	2.954089
C	-1.615987	0.342521	2.805435
H	-1.852911	1.403080	2.751574
C	0.213114	-2.671761	-0.204156
C	6.421298	-2.804093	-0.497070
C	5.013873	-0.826292	-0.970835
C	5.403933	2.969248	-1.452320
C	-1.959199	-4.179312	-1.156941
C	7.568005	-3.371224	0.109460
H	7.732897	-4.443555	0.001375
C	-1.093522	-2.265682	5.404223
H	-1.228936	-1.663434	6.302672
C	-1.216106	-1.632275	4.145001
C	6.312880	3.899037	-2.011429
H	6.083868	4.961105	-1.921374
C	-3.378148	-3.298036	0.627965
H	-3.507952	-2.652894	1.496884
C	-4.438621	-4.017814	0.140505
H	-5.409145	-3.954349	0.631637
C	4.211994	3.404713	-0.825640
H	4.010166	4.474014	-0.758501
C	6.186708	-1.401815	-0.381810
C	-1.512956	-0.255507	4.032714
H	-1.664921	0.325727	4.942794
C	5.480028	-3.610729	-1.182035
H	5.681659	-4.675619	-1.296110
C	-2.108571	-3.353913	-0.003717
C	7.699937	2.098356	-2.793806
H	8.581475	1.763511	-3.337760
C	4.320396	-3.066809	-1.660526
H	3.571776	-3.671250	-2.169210
C	-3.070551	-4.921496	-1.627120

H	-2.938291	-5.553139	-2.505878
C	-0.701598	-4.246397	-1.798550
H	-0.592651	-4.875730	-2.681574
C	-0.636031	-4.364926	4.318030
H	-0.412781	-5.427675	4.392777
C	6.845495	1.171981	-2.250774
H	7.050715	0.110849	-2.373813
C	-0.752161	-3.778995	3.082770
H	-0.625712	-4.380051	2.183137
C	0.356724	-3.517167	-1.328720
H	1.321383	-3.544481	-1.834248
C	7.441857	3.478807	-2.664353
H	8.130550	4.203306	-3.094991
C	8.189898	-1.217408	0.980233
H	8.865717	-0.608034	1.577913
C	-4.283249	-4.846418	-0.992602
H	-5.130203	-5.424655	-1.359381
C	-0.807836	-3.603182	5.493276
H	-0.711839	-4.080339	6.466838
C	8.438605	-2.597921	0.832688
H	9.311305	-3.046640	1.303551
C	3.311512	2.497565	-0.341968
H	2.369165	2.800175	0.110845
O	2.860404	-1.216294	-1.962071
O	2.662189	0.257076	0.093076
N	1.327372	-1.861095	0.203341
P	-1.625189	0.409725	-0.064827
C	-3.371335	-0.051535	-0.416599
C	-4.368965	0.133725	0.545327
C	-3.693964	-0.608362	-1.646731
C	-5.688156	-0.223650	0.284010
H	-4.098907	0.568483	1.506429
C	-5.008961	-0.972558	-1.954253
H	-2.893322	-0.757454	-2.368413
C	-5.979694	-0.764312	-0.975985
H	-7.012002	-1.040229	-1.194322
C	-1.745817	2.184060	0.380211
C	-2.819435	2.965060	-0.018900
C	-0.666567	2.781314	1.042857
C	-2.853382	4.339924	0.246223
H	-3.649402	2.493039	-0.544264
C	-0.674422	4.136964	1.349599
H	0.177963	2.152217	1.334508
C	-1.776430	4.898529	0.926936

H	-1.784916	5.964241	1.144827
C	2.242449	-2.475361	1.195897
H	1.625577	-3.210731	1.733780
H	-1.359246	1.039432	-2.727871
C	-0.338699	-0.985663	-3.350593
O	-0.522499	-1.715694	-4.227647
Rh	-0.091777	0.358258	-1.991915
C	0.574410	2.172861	-2.131693
O	0.822032	3.290637	-2.279305
C	0.492717	4.801038	2.076976
C	1.341227	5.547299	1.039317
H	2.252761	5.955829	1.500684
H	1.631475	4.882391	0.213711
H	0.780705	6.382066	0.596444
C	-0.006186	5.797272	3.128533
H	0.849372	6.239579	3.657898
H	-0.576056	6.626160	2.691222
H	-0.645754	5.301851	3.872270
C	1.364436	3.776774	2.808575
H	0.763901	3.174309	3.507449
H	1.884297	3.081061	2.136195
H	2.139061	4.295936	3.389167
C	-4.075782	5.140440	-0.194079
C	-3.994842	6.607524	0.220780
H	-4.901312	7.134760	-0.106189
H	-3.920698	6.722096	1.311174
H	-3.135337	7.115041	-0.238653
C	-5.330235	4.532763	0.448284
H	-5.469894	3.478739	0.168324
H	-5.268526	4.582073	1.544832
H	-6.226938	5.085688	0.133014
C	-4.202722	5.082115	-1.720642
H	-3.310940	5.504434	-2.203409
H	-4.324260	4.054546	-2.086560
H	-5.077603	5.660426	-2.051337
C	-6.789750	-0.103040	1.334226
C	-6.316061	0.627623	2.590011
H	-5.499831	0.093243	3.096773
H	-5.968731	1.646009	2.363120
H	-7.146471	0.710644	3.304188
C	-7.989196	0.663283	0.767859
H	-8.432945	0.162763	-0.102350
H	-8.775308	0.754044	1.530970
H	-7.699211	1.677572	0.459570

C	-7.228271	-1.514728	1.742783
H	-7.614099	-2.085613	0.887234
H	-6.381427	-2.074195	2.167687
H	-8.021066	-1.467999	2.503518
C	-5.381188	-1.504166	-3.336458
C	-5.970438	-0.345857	-4.151444
H	-5.240841	0.469634	-4.254012
H	-6.245097	-0.685828	-5.160777
H	-6.871050	0.064986	-3.674274
C	-6.416558	-2.627335	-3.239166
H	-7.375218	-2.284872	-2.829120
H	-6.622179	-3.033515	-4.239346
H	-6.046622	-3.446623	-2.607661
C	-4.161816	-2.051381	-4.081551
H	-3.438183	-1.265942	-4.338535
H	-3.635810	-2.816901	-3.491275
H	-4.483425	-2.510752	-5.026122
H	3.035365	-3.048987	0.688301
C	2.854623	-1.527589	2.192672
C	4.218587	-1.590850	2.464290
C	2.073024	-0.593568	2.874638
C	4.797650	-0.727874	3.391432
H	4.844025	-2.312566	1.934333
C	2.645989	0.265842	3.800144
H	1.013792	-0.513249	2.634704
C	4.014053	0.204156	4.060850
H	5.869139	-0.783207	3.579405
H	2.018713	0.990680	4.319501
H	4.465433	0.884025	4.781799

A-2

P	1.807308	-0.503785	-0.909160
C	4.209232	-1.415181	-1.647395
C	4.825325	0.810243	-0.757870
C	7.289568	-0.547482	0.270343
H	7.091845	0.482325	0.558737
C	3.647111	1.149115	-0.121944
C	-0.990455	-2.589971	-0.038661
C	-1.229180	-1.996411	1.304560
C	5.674493	1.874123	-1.204032
C	-1.429883	-0.637120	1.489086
C	-1.339203	-2.899458	2.410110
C	-1.715875	-0.149295	2.792670
H	-1.871870	0.917551	2.942057

C	0.264264	-2.607245	-0.621699
C	6.608340	-2.597909	-0.857083
C	5.136061	-0.617507	-0.999982
C	5.330430	3.223780	-0.889622
C	-1.861624	-3.872037	-1.962949
C	7.804988	-3.204170	-0.405172
H	7.988227	-4.245725	-0.670383
C	-1.778167	-3.281994	4.793962
H	-2.010482	-2.868446	5.775889
C	-1.647490	-2.389699	3.703482
C	6.173802	4.276195	-1.320283
H	5.895834	5.298302	-1.062612
C	-3.403463	-3.201031	-0.192377
H	-3.590955	-2.690253	0.751544
C	-4.439385	-3.792797	-0.868808
H	-5.448106	-3.748040	-0.459262
C	4.137894	3.493866	-0.178658
H	3.880557	4.529506	0.045171
C	6.345789	-1.231682	-0.537764
C	-1.819656	-0.996497	3.862258
H	-2.051302	-0.604956	4.853582
C	5.659856	-3.331101	-1.608937
H	5.880671	-4.366792	-1.866458
C	-2.083520	-3.221495	-0.713869
C	7.622557	2.692207	-2.403581
H	8.502289	2.491280	-3.012415
C	4.477765	-2.757401	-1.985728
H	3.728084	-3.307376	-2.551121
C	-2.948050	-4.489374	-2.628945
H	-2.757643	-4.989120	-3.579012
C	-0.557114	-3.893775	-2.505916
H	-0.390999	-4.385677	-3.464104
C	-1.307216	-5.143058	3.342862
H	-1.174153	-6.215386	3.208781
C	6.832962	1.649149	-1.990336
H	7.086833	0.631659	-2.278991
C	-1.164274	-4.300770	2.269670
H	-0.911175	-4.710061	1.292596
C	0.472858	-3.277883	-1.851361
H	1.473134	-3.259083	-2.282742
C	7.300449	4.020973	-2.056805
H	7.937795	4.838763	-2.387812
C	8.434592	-1.166906	0.703466
H	9.137728	-0.618838	1.328097

C	-4.209428	-4.456717	-2.093705
H	-5.036879	-4.939559	-2.611965
C	-1.619501	-4.632336	4.620072
H	-1.729126	-5.311880	5.463528
C	8.705993	-2.506400	0.355426
H	9.621118	-2.983201	0.701413
C	3.298272	2.476843	0.182602
H	2.348404	2.660314	0.684884
O	2.985106	-0.909158	-2.022991
O	2.766675	0.157270	0.269739
N	1.377846	-1.896340	-0.054233
P	-1.494201	0.480842	0.006963
C	-3.245414	0.214955	-0.493084
C	-4.283604	0.332079	0.434974
C	-3.530229	-0.141381	-1.805859
C	-5.605105	0.108916	0.059152
H	-4.044213	0.604656	1.461244
C	-4.843272	-0.375281	-2.224776
H	-2.699258	-0.242481	-2.499486
C	-5.853899	-0.238025	-1.275141
H	-6.886163	-0.410473	-1.582464
C	-1.506700	2.152371	0.753808
C	-2.421886	3.106165	0.337233
C	-0.465198	2.523920	1.614420
C	-2.326203	4.437227	0.762629
H	-3.213905	2.810362	-0.351085
C	-0.373623	3.819646	2.107878
H	0.270424	1.769838	1.901453
C	-1.308798	4.763569	1.652749
H	-1.225035	5.788964	2.009427
C	2.319272	-2.659138	0.791642
H	-1.152382	1.528918	-2.518047
C	-0.159362	-0.411484	-3.421566
O	-0.347850	-1.013584	-4.389846
Rh	0.074792	0.707469	-1.868934
C	0.708870	2.533014	-1.683266
O	0.879516	3.673336	-1.627209
C	0.705969	4.241267	3.102640
C	1.646136	5.246164	2.427461
H	2.463306	5.528979	3.106706
H	2.087663	4.818362	1.515864
H	1.116615	6.162723	2.135772
C	0.055144	4.897451	4.325962
H	0.827207	5.205416	5.045479

H	-0.525032	5.790135	4.061200
H	-0.621966	4.196031	4.832787
C	1.528046	3.053677	3.603964
H	0.885979	2.288532	4.065261
H	2.110339	2.573239	2.805077
H	2.243493	3.394685	4.364433
C	-3.336160	5.450017	0.232444
C	-3.082234	6.859104	0.762841
H	-3.824095	7.551718	0.342887
H	-3.167984	6.908989	1.857328
H	-2.087288	7.227573	0.477016
C	-4.749900	5.027910	0.652196
H	-5.011663	4.026490	0.282557
H	-4.843198	5.014555	1.747347
H	-5.492529	5.735745	0.256456
C	-3.241544	5.495368	-1.298131
H	-2.225995	5.767971	-1.617245
H	-3.483911	4.528570	-1.757820
H	-3.941879	6.240979	-1.701628
C	-6.762271	0.195140	1.051529
C	-6.307297	0.670817	2.429771
H	-5.582814	-0.018757	2.885998
H	-5.848206	1.668864	2.382343
H	-7.173056	0.733083	3.102851
C	-7.820240	1.178234	0.539675
H	-8.241386	0.871891	-0.426352
H	-8.651895	1.249192	1.255269
H	-7.391953	2.182835	0.415823
C	-7.382547	-1.198465	1.205127
H	-7.767182	-1.581510	0.250296
H	-6.636150	-1.914732	1.579162
H	-8.218482	-1.173882	1.919185
C	-5.177785	-0.700822	-3.679385
C	-5.760546	0.560151	-4.329890
H	-5.041340	1.389884	-4.284961
H	-5.999816	0.371985	-5.386739
H	-6.681276	0.884624	-3.825379
C	-6.206586	-1.832572	-3.764807
H	-7.163703	-1.569988	-3.295443
H	-6.416121	-2.067314	-4.817968
H	-5.826711	-2.743523	-3.281049
C	-3.940713	-1.128202	-4.470477
H	-3.209707	-0.314650	-4.573852
H	-3.430861	-1.983818	-4.002468

H	-4.237416	-1.425372	-5.485667
H	2.320316	-3.704111	0.442323
H	3.332253	-2.275094	0.612000
C	2.044699	-2.607331	2.272743
C	2.077783	-3.780964	3.022311
C	1.844042	-1.392252	2.931030
C	1.918824	-3.749439	4.404597
H	2.221740	-4.736493	2.514777
C	1.684994	-1.357923	4.310206
H	1.811010	-0.471575	2.349948
C	1.722843	-2.535755	5.052234
H	1.934045	-4.678229	4.973245
H	1.525942	-0.402188	4.809215
H	1.591994	-2.506891	6.133056

A-3

P	1.843428	-0.040431	-0.884508
C	4.298529	-0.749505	-1.506695
C	4.754647	1.462092	-0.505506
C	7.196953	0.160138	0.659931
H	6.948552	1.177467	0.953963
C	3.519244	1.736641	0.049044
C	-0.683908	-2.474811	0.054860
C	-0.878350	-1.895289	1.410683
C	5.591358	2.568705	-0.859847
C	-1.179568	-0.548651	1.585511
C	-0.779382	-2.767336	2.541311
C	-1.331101	-0.043179	2.903537
H	-1.576303	1.006710	3.049900
C	0.507500	-2.295897	-0.629273
C	6.659365	-1.881717	-0.560114
C	5.140694	0.055088	-0.761776
C	5.178506	3.894382	-0.527997
C	-1.562532	-3.756066	-1.865526
C	7.839776	-2.463482	-0.037507
H	8.072356	-3.492883	-0.310903
C	-0.830154	-3.093238	4.974668
H	-0.944203	-2.662571	5.969850
C	-0.931907	-2.233867	3.854027
C	6.010716	4.987815	-0.868366
H	5.679972	5.991071	-0.599042
C	-2.977499	-3.456644	0.097359
H	-3.139622	-3.042272	1.091632
C	-3.976293	-4.170663	-0.514812

H	-4.923871	-4.323851	0.000140
C	3.931250	4.098038	0.107885
H	3.626744	5.114716	0.355614
C	6.333795	-0.531943	-0.227945
C	-1.197816	-0.854255	3.998819
H	-1.320953	-0.444578	5.001981
C	5.792688	-2.623942	-1.395888
H	6.057142	-3.650592	-1.648695
C	-1.736618	-3.230386	-0.552484
C	7.584340	3.489967	-1.899875
H	8.509437	3.339553	-2.453532
C	4.626893	-2.073763	-1.852583
H	3.937583	-2.628726	-2.486861
C	-2.603491	-4.507943	-2.461192
H	-2.443432	-4.910604	-3.462081
C	-0.347971	-3.512548	-2.546076
H	-0.223128	-3.894706	-3.559161
C	-0.469024	-4.972164	3.513138
H	-0.278236	-6.036243	3.384278
C	6.807566	2.408039	-1.570500
H	7.115360	1.408794	-1.870226
C	-0.537985	-4.160318	2.410011
H	-0.394581	-4.587180	1.418528
C	0.657447	-2.813149	-1.939676
H	1.595254	-2.622288	-2.462136
C	7.191812	4.795115	-1.535804
H	7.818668	5.644816	-1.799702
C	8.328296	-0.435613	1.157403
H	8.970775	0.118148	1.839787
C	-3.788559	-4.713175	-1.803204
H	-4.586617	-5.285255	-2.273791
C	-0.608035	-4.436474	4.810546
H	-0.542210	-5.091110	5.677903
C	8.663537	-1.757994	0.799459
H	9.567184	-2.215848	1.197458
C	3.105109	3.041058	0.373417
H	2.121840	3.174668	0.821667
O	3.092052	-0.258514	-1.960258
O	2.655097	0.702037	0.353983
N	1.598864	-1.530210	-0.105813
P	-1.509764	0.514562	0.090113
C	-3.169995	-0.121843	-0.382127
C	-4.167163	-0.294433	0.584759
C	-3.456096	-0.361745	-1.715734

C	-5.446873	-0.696952	0.224278
H	-3.925998	-0.087040	1.626442
C	-4.735434	-0.759810	-2.125523
H	-2.662249	-0.219263	-2.447982
C	-5.702762	-0.925571	-1.138415
H	-6.703628	-1.243665	-1.426771
C	-1.937330	2.155487	0.801851
C	-3.128191	2.778720	0.455802
C	-0.996832	2.857746	1.567179
C	-3.417579	4.083341	0.868890
H	-3.848585	2.244375	-0.161163
C	-1.261745	4.143595	2.028705
H	-0.048600	2.372225	1.804807
C	-2.475602	4.740065	1.653048
H	-2.678807	5.754760	1.986781
C	2.267655	-1.890428	1.157787
H	3.208755	-1.327959	1.185942
H	1.677524	-1.528632	2.016833
H	-1.327167	1.745103	-2.378249
C	-0.147614	-0.025588	-3.406235
O	-0.259669	-0.576395	-4.416718
Rh	-0.007511	1.018876	-1.796625
C	0.522092	2.873185	-1.600676
O	0.681534	4.016124	-1.570134
C	-0.253562	4.927089	2.868711
C	0.448402	5.938060	1.954312
H	1.226805	6.486828	2.505236
H	0.915485	5.431285	1.097805
H	-0.262024	6.671327	1.548785
C	-0.951084	5.674263	4.010753
H	-0.204914	6.206841	4.616628
H	-1.669323	6.423397	3.654992
H	-1.488228	4.977806	4.669502
C	0.798876	4.017565	3.504933
H	0.335213	3.219800	4.103432
H	1.457591	3.544089	2.765360
H	1.443014	4.607044	4.171396
C	-4.745996	4.705635	0.446239
C	-4.953309	6.095912	1.040657
H	-5.926637	6.493039	0.722503
H	-4.944428	6.075612	2.139386
H	-4.183395	6.803262	0.702869
C	-5.899826	3.808267	0.914287
H	-5.846453	2.802833	0.472540

H	-5.891642	3.696479	2.007949
H	-6.865100	4.247543	0.623599
C	-4.781311	4.824821	-1.082394
H	-3.962858	5.462618	-1.443155
H	-4.682295	3.847870	-1.574123
H	-5.732205	5.270317	-1.409130
C	2.576848	-3.350898	1.353186
C	2.647006	-3.831672	2.661457
C	2.854937	-4.228799	0.305863
C	2.991591	-5.152156	2.921248
H	2.402267	-3.164240	3.490064
C	3.178758	-5.556860	0.561029
H	2.818018	-3.872311	-0.720946
C	3.249901	-6.024253	1.869320
H	3.032726	-5.505461	3.950843
H	3.379388	-6.230709	-0.270684
H	3.503920	-7.064323	2.067579
C	-6.551014	-0.920312	1.256098
C	-6.144034	-0.440178	2.648365
H	-5.278716	-0.993923	3.039591
H	-5.896056	0.631160	2.650746
H	-6.975136	-0.593299	3.350041
C	-7.819589	-0.161244	0.852117
H	-8.220662	-0.497863	-0.112266
H	-8.605705	-0.312207	1.605555
H	-7.625434	0.918116	0.777788
C	-6.859605	-2.419900	1.337780
H	-7.175037	-2.825376	0.366528
H	-5.972378	-2.981033	1.666900
H	-7.665637	-2.609559	2.061533
C	-5.033355	-0.896569	-3.616633
C	-5.074918	0.514165	-4.219502
H	-4.114556	1.033357	-4.090733
H	-5.291618	0.465651	-5.296556
H	-5.854618	1.123095	-3.740269
C	-6.372520	-1.582352	-3.877392
H	-7.221854	-0.997998	-3.497680
H	-6.520850	-1.704945	-4.958787
H	-6.406006	-2.581576	-3.418170
C	-3.946245	-1.712409	-4.322031
H	-2.948115	-1.263825	-4.234852
H	-3.894571	-2.727175	-3.906697
H	-4.175929	-1.788665	-5.394270

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P	1.857149	-0.539160	-0.886020
C	4.306450	-1.394610	-1.581502
C	4.833562	0.861675	-0.734379
C	7.342010	-0.390003	0.343589
H	7.102354	0.635617	0.615991
C	3.629226	1.159704	-0.128069
C	-0.930730	-2.587151	-0.202628
C	-1.228914	-2.008776	1.133833
C	5.626599	1.946893	-1.228836
C	-1.396614	-0.650547	1.349357
C	-1.414216	-2.938902	2.208694
C	-1.704396	-0.192351	2.660504
H	-1.832898	0.872892	2.839327
C	0.365279	-2.665854	-0.678709
C	6.745095	-2.479367	-0.761215
C	5.201641	-0.558289	-0.935450
C	5.185503	3.288621	-1.017916
C	-1.706912	-3.814365	-2.199923
C	7.961517	-3.033594	-0.295494
H	8.185985	-4.070703	-0.546445
C	-1.966686	-3.374860	4.560177
H	-2.223715	-2.981171	5.544031
C	-1.755177	-2.457323	3.504127
C	5.971869	4.364043	-1.496791
H	5.619564	5.379959	-1.316945
C	-3.355121	-3.049705	-0.569007
H	-3.596372	-2.547368	0.368106
C	-4.364598	-3.536517	-1.360563
H	-5.401193	-3.419349	-1.044923
C	3.950906	3.523822	-0.368337
H	3.606507	4.551088	-0.244407
C	6.429191	-1.120887	-0.459023
C	-1.877128	-1.064294	3.700070
H	-2.128013	-0.691936	4.694008
C	5.830330	-3.254796	-1.512465
H	6.092019	-4.283735	-1.758908
C	-1.998326	-3.153951	-0.970502
C	7.551750	2.812229	-2.433258
H	8.460661	2.630698	-3.004276
C	4.630686	-2.729332	-1.904039
H	3.907979	-3.313021	-2.471314
C	-2.768926	-4.320220	-2.986771
H	-2.527004	-4.814874	-3.927517

C	-0.359582	-3.940536	-2.610245
H	-0.139861	-4.454804	-3.545548
C	-1.507973	-5.208726	3.071786
H	-1.410249	-6.280911	2.909833
C	6.818733	1.748646	-1.970840
H	7.147183	0.733744	-2.183154
C	-1.286906	-4.341379	2.032283
H	-1.007630	-4.731175	1.054782
C	0.642738	-3.373244	-1.874860
H	1.676621	-3.415795	-2.214282
C	7.135201	4.136793	-2.184094
H	7.728972	4.971729	-2.551480
C	8.508486	-0.959061	0.789010
H	9.187759	-0.376226	1.408719
C	-4.071788	-4.180707	-2.581959
H	-4.881943	-4.563245	-3.201131
C	-1.854360	-4.724423	4.350562
H	-2.025593	-5.424244	5.166733
C	8.831607	-2.291913	0.459910
H	9.762634	-2.728830	0.816228
C	3.174965	2.479324	0.054159
H	2.198182	2.635141	0.510751
O	3.072864	-0.938921	-1.977446
O	2.817476	0.127300	0.306964
N	1.449047	-1.960016	-0.050300
P	-1.464154	0.533565	-0.082515
C	-3.239931	0.334757	-0.541370
C	-4.208294	0.207787	0.461958
C	-3.619355	0.247228	-1.873384
C	-5.537803	-0.041482	0.148564
H	-3.902632	0.278645	1.502773
C	-4.949819	-0.011360	-2.233678
H	-2.854952	0.369556	-2.638951
C	-5.879833	-0.147948	-1.207661
H	-6.916926	-0.361740	-1.462680
C	-1.429886	2.159171	0.764064
C	-2.379351	3.128271	0.484244
C	-0.363210	2.462031	1.619915
C	-2.293272	4.409798	1.045360
H	-3.200406	2.885983	-0.191025
C	-0.264183	3.706562	2.228776
H	0.377380	1.688787	1.825482
C	-1.234860	4.670758	1.908696
H	-1.153043	5.655652	2.365123

C	2.395685	-2.728856	0.779906
H	1.227839	0.953096	-3.058876
C	-0.606831	-0.471955	-3.274989
O	-0.909482	-1.138592	-4.167918
Rh	0.164602	0.673114	-1.899400
C	0.246527	2.599465	-1.753450
O	0.370705	3.746673	-1.703145
C	0.840592	4.041587	3.229644
C	1.767714	5.103079	2.628019
H	2.561523	5.368098	3.341121
H	2.246393	4.731712	1.710822
H	1.221858	6.020998	2.372802
C	0.217511	4.585573	4.521278
H	1.004783	4.801385	5.257355
H	-0.342277	5.515234	4.358280
H	-0.470335	3.852148	4.964683
C	1.675425	2.816494	3.606412
H	1.046892	2.013234	4.019859
H	2.239214	2.407443	2.756361
H	2.409394	3.094716	4.374573
C	-3.364831	5.439400	0.697280
C	-3.169051	6.758505	1.439794
H	-3.970627	7.458084	1.167312
H	-3.203133	6.622839	2.529854
H	-2.213726	7.235317	1.180848
C	-4.744787	4.883854	1.073264
H	-4.981596	3.954150	0.538382
H	-4.801428	4.673518	2.150595
H	-5.527505	5.616014	0.828088
C	-3.318109	5.724880	-0.808222
H	-2.336774	6.122686	-1.100064
H	-3.501144	4.822099	-1.405219
H	-4.083418	6.466539	-1.079252
C	-6.604276	-0.248433	1.221171
C	-6.037015	-0.110592	2.633017
H	-5.252953	-0.856037	2.832976
H	-5.612489	0.888143	2.808202
H	-6.836902	-0.265066	3.369690
C	-7.719226	0.788394	1.048269
H	-8.207079	0.710876	0.068006
H	-8.493270	0.649998	1.816734
H	-7.321919	1.808343	1.145726
C	-7.187066	-1.660697	1.085819
H	-7.653398	-1.825339	0.105117

H	-6.402018	-2.419890	1.218908
H	-7.956323	-1.832327	1.852485
C	-5.351736	-0.101875	-3.704678
C	-5.589636	1.319705	-4.227602
H	-4.683879	1.933660	-4.127497
H	-5.868918	1.297824	-5.291182
H	-6.397805	1.815949	-3.671726
C	-6.631666	-0.918345	-3.896311
H	-7.510350	-0.440242	-3.443389
H	-6.843101	-1.024779	-4.968795
H	-6.530790	-1.927455	-3.470610
C	-4.247464	-0.763246	-4.534366
H	-3.347319	-0.141421	-4.606363
H	-3.951628	-1.733969	-4.108255
H	-4.602498	-0.930443	-5.560736
H	2.464451	-3.752543	0.377107
H	3.392103	-2.282155	0.662767
C	2.051467	-2.770197	2.245607
C	1.828388	-1.591156	2.960612
C	2.015553	-3.986255	2.923397
C	1.577438	-1.633893	4.325267
H	1.857714	-0.635703	2.437113
C	1.764409	-4.031825	4.291875
H	2.179951	-4.912223	2.369626
C	1.543982	-2.854671	4.995901
H	1.401793	-0.707199	4.870942
H	1.731966	-4.991829	4.805320
H	1.340381	-2.887075	6.065397

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P	1.658122	-0.815204	-0.876282
C	4.127879	-1.736937	-1.433685
C	4.581458	0.655552	-1.020854
C	7.148534	-0.269019	0.188633
H	6.862956	0.777412	0.271046
C	3.386155	1.012317	-0.429419
C	-1.171054	-2.675942	0.147611
C	-1.338797	-1.943772	1.428307
C	5.321690	1.664510	-1.718039
C	-1.490085	-0.569128	1.486330
C	-1.353366	-2.728004	2.627435
C	-1.670876	0.049536	2.755171
H	-1.804605	1.127273	2.813507
C	0.084555	-2.824148	-0.407142

C	6.640367	-2.549144	-0.509034
C	5.000734	-0.761844	-0.983736
C	4.842019	3.008878	-1.716838
C	-2.102971	-4.086338	-1.641790
C	7.880892	-2.956465	0.037006
H	8.149914	-4.011499	-0.021549
C	-1.514410	-2.854040	5.071989
H	-1.638896	-2.340634	6.025596
C	-1.518966	-2.083413	3.886028
C	5.569348	4.009588	-2.404824
H	5.187239	5.030406	-2.383590
C	-3.618715	-3.106981	0.008882
H	-3.779136	-2.485214	0.890405
C	-4.690166	-3.660689	-0.644379
H	-5.698612	-3.481972	-0.271391
C	3.629109	3.315470	-1.055661
H	3.260532	4.341547	-1.077802
C	6.264255	-1.174134	-0.451451
C	-1.682449	-0.680082	3.912591
H	-1.820287	-0.184390	4.874057
C	5.747729	-3.486316	-1.084139
H	6.051947	-4.530753	-1.151225
C	-2.298117	-3.290562	-0.475002
C	7.170368	2.369422	-3.129631
H	8.063700	2.120217	-3.699851
C	4.512908	-3.092649	-1.521115
H	3.805550	-3.802052	-1.947475
C	-3.227911	-4.660509	-2.281750
H	-3.064905	-5.262551	-3.175702
C	-0.790542	-4.269774	-2.138058
H	-0.646610	-4.880661	-3.028952
C	-1.195793	-4.861288	3.780754
H	-1.073173	-5.942234	3.746413
C	6.494378	1.378777	-2.462762
H	6.852394	0.352794	-2.512810
C	-1.196838	-4.139122	2.613784
H	-1.078365	-4.650327	1.659481
C	0.273230	-3.647634	-1.542076
H	1.277193	-3.736187	-1.956194
C	6.713716	3.703260	-3.093547
H	7.260954	4.480511	-3.623790
C	8.340748	-0.696045	0.717545
H	8.997923	0.018841	1.209723
C	-4.494687	-4.451308	-1.798103

H	-5.353010	-4.888626	-2.306229
C	-1.354694	-4.214774	5.024570
H	-1.350549	-4.799369	5.942664
C	8.719158	-2.052585	0.636966
H	9.668521	-2.379009	1.057515
C	2.903486	2.335124	-0.435866
H	1.948574	2.544990	0.043669
O	2.868194	-1.414538	-1.879345
O	2.617185	0.038739	0.179749
N	1.201016	-2.101589	0.140214
P	-1.592574	0.436692	-0.079734
C	-3.400736	0.283985	-0.402884
C	-4.305021	0.347223	0.664105
C	-3.866306	0.014004	-1.681925
C	-5.659041	0.108871	0.471407
H	-3.926210	0.560374	1.660465
C	-5.225808	-0.230967	-1.920542
H	-3.147722	-0.025495	-2.498792
C	-6.091424	-0.178117	-0.831539
H	-7.149623	-0.382927	-0.990541
C	-1.394685	2.131635	0.586162
C	-2.276914	3.148767	0.261673
C	-0.264352	2.411520	1.365299
C	-2.054459	4.462475	0.698733
H	-3.151211	2.918875	-0.348745
C	-0.037199	3.689257	1.861022
H	0.418177	1.595236	1.608574
C	-0.937740	4.702991	1.492087
H	-0.757411	5.711842	1.859376
C	2.067152	-2.887003	1.045117
H	1.391999	-3.596784	1.548309
H	0.962880	0.348453	-3.221922
C	-0.945127	-0.978192	-3.211155
O	-1.318421	-1.685637	-4.044411
Rh	-0.065546	0.273265	-2.004081
C	0.015995	2.198446	-2.155401
O	0.109948	3.340826	-2.298960
C	1.110220	4.001629	2.820669
C	2.066541	5.020686	2.193259
H	2.864133	5.278973	2.904536
H	2.543097	4.612848	1.291160
H	1.552036	5.950133	1.915657
C	0.528809	4.583404	4.116373
H	1.334920	4.782836	4.836772

H	-0.005812	5.527321	3.949184
H	-0.173988	3.876675	4.580126
C	1.903452	2.750820	3.196882
H	1.257348	1.992726	3.664841
H	2.402743	2.279075	2.338148
H	2.686566	3.011815	3.922597
C	-3.054665	5.548137	0.311678
C	-2.672818	6.918218	0.866372
H	-3.421224	7.661281	0.559772
H	-2.635801	6.920521	1.964638
H	-1.697946	7.255476	0.487846
C	-4.437073	5.179901	0.865734
H	-4.797032	4.215261	0.481834
H	-4.412398	5.114002	1.962543
H	-5.174938	5.945961	0.587200
C	-3.122701	5.653679	-1.216482
H	-2.136961	5.895070	-1.637227
H	-3.461680	4.718592	-1.680589
H	-3.826233	6.445494	-1.511659
C	-6.657364	0.091573	1.626764
C	-6.006696	0.463655	2.958082
H	-5.206168	-0.237369	3.236448
H	-5.581436	1.477159	2.933776
H	-6.760620	0.438493	3.756432
C	-7.789463	1.088217	1.357650
H	-8.351802	0.845705	0.446745
H	-8.501809	1.088332	2.194925
H	-7.393964	2.107359	1.247077
C	-7.234935	-1.322894	1.759621
H	-7.760158	-1.639848	0.848585
H	-6.435911	-2.052310	1.960319
H	-7.952396	-1.369385	2.591528
C	-5.728204	-0.499238	-3.337337
C	-5.977939	0.852168	-4.018890
H	-5.059414	1.454187	-4.054499
H	-6.327431	0.704830	-5.051266
H	-6.740632	1.431040	-3.478851
C	-7.033404	-1.296995	-3.339918
H	-7.868040	-0.743324	-2.889976
H	-7.323354	-1.525240	-4.374357
H	-6.924574	-2.250483	-2.802785
C	-4.694427	-1.285805	-4.148414
H	-3.797833	-0.695575	-4.372805
H	-4.373636	-2.195029	-3.617807

H	-5.127407	-1.585082	-5.112892
H	2.786262	-3.492592	0.467837
C	2.792359	-2.077532	2.083598
C	4.177714	-2.155892	2.189001
C	2.089427	-1.258326	2.968713
C	4.860961	-1.416539	3.149990
H	4.733955	-2.788925	1.495715
C	2.766428	-0.534620	3.940037
H	1.005858	-1.171426	2.876968
C	4.155646	-0.603383	4.028746
H	5.947617	-1.477402	3.202438
H	2.205108	0.093107	4.631777
H	4.683938	-0.024906	4.785224

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P	1.763332	-0.280246	-1.087617
C	4.256899	-1.020047	-1.509248
C	4.643608	1.273407	-0.706271
C	6.994893	0.114902	0.756392
H	6.726175	1.156981	0.918190
C	3.368661	1.565802	-0.264693
C	-0.866228	-2.520869	-0.215217
C	-1.062592	-1.980979	1.151538
C	5.467986	2.348368	-1.165509
C	-1.235260	-0.625475	1.381744
C	-1.071671	-2.914261	2.238340
C	-1.385266	-0.174578	2.723114
H	-1.527191	0.884854	2.922498
C	0.381530	-2.467592	-0.810422
C	6.540231	-2.048361	-0.277748
C	5.052192	-0.147079	-0.786947
C	4.971099	3.685136	-1.100643
C	-1.767798	-3.617222	-2.229452
C	7.672019	-2.568534	0.395399
H	7.919525	-3.620505	0.251248
C	-1.231757	-3.355998	4.646225
H	-1.342329	-2.968930	5.659440
C	-1.222987	-2.436060	3.570778
C	5.786081	4.752842	-1.548248
H	5.389939	5.766365	-1.481928
C	-3.278902	-3.127778	-0.373738
H	-3.449938	-2.733641	0.628150
C	-4.333158	-3.613128	-1.105114
H	-5.336098	-3.602348	-0.678173

C	3.659836	3.918244	-0.622875
H	3.277864	4.939553	-0.606694
C	6.199271	-0.671819	-0.114717
C	-1.367823	-1.046265	3.778216
H	-1.484246	-0.674246	4.796656
C	5.734507	-2.870560	-1.099670
H	6.010098	-3.917097	-1.228962
C	-1.967704	-3.101174	-0.916073
C	7.512343	3.196880	-2.166803
H	8.492761	3.010708	-2.601964
C	4.610547	-2.370461	-1.698794
H	3.972406	-2.989442	-2.327419
C	-2.873220	-4.123087	-2.953724
H	-2.702264	-4.507159	-3.959517
C	-0.469449	-3.585926	-2.788010
H	-0.319153	-3.981281	-3.792378
C	-0.976494	-5.183161	3.096785
H	-0.870591	-6.251889	2.919067
C	6.751169	2.141333	-1.732377
H	7.129434	1.126112	-1.830695
C	-0.941778	-4.312878	2.037309
H	-0.801921	-4.695945	1.027928
C	0.569085	-3.022337	-2.101357
H	1.560153	-2.952308	-2.549154
C	7.033625	4.519942	-2.065203
H	7.649512	5.348772	-2.409298
C	8.079938	-0.421721	1.401937
H	8.673074	0.202149	2.068405
C	-4.131382	-4.119788	-2.407772
H	-4.976394	-4.506905	-2.975619
C	-1.116586	-4.702913	4.415870
H	-1.133578	-5.404081	5.248550
C	8.431595	-1.775645	1.215403
H	9.297293	-2.187976	1.730414
C	2.862003	2.878914	-0.224755
H	1.835724	3.039456	0.103837
O	3.081514	-0.578010	-2.076807
O	2.550056	0.527199	0.144907
N	1.482952	-1.743079	-0.249455
P	-1.477754	0.560308	-0.043085
C	-3.286094	0.318005	-0.309785
C	-4.140269	0.224803	0.793257
C	-3.799179	0.170448	-1.592724
C	-5.495898	-0.036350	0.630372

H	-3.723397	0.341353	1.790973
C	-5.158861	-0.087964	-1.800888
H	-3.117297	0.248040	-2.435701
C	-5.977216	-0.180680	-0.676534
H	-7.038682	-0.387007	-0.818292
C	-1.391381	2.178451	0.814654
C	-2.383289	3.129468	0.637857
C	-0.260119	2.487987	1.581309
C	-2.277766	4.400823	1.217842
H	-3.254710	2.877677	0.032582
C	-0.145764	3.717675	2.219140
H	0.519831	1.733364	1.694570
C	-1.160677	4.664954	2.002658
H	-1.067799	5.638387	2.481580
C	2.082872	-2.069793	1.052509
H	3.050472	-1.552080	1.088849
H	1.484359	-1.638130	1.873124
H	0.897556	1.070730	-3.299157
C	-0.955115	-0.325436	-3.378553
O	-1.362796	-0.936916	-4.269814
Rh	-0.053908	0.782820	-2.052624
C	-0.075895	2.713431	-1.908495
O	-0.044556	3.866824	-1.852956
C	1.002646	4.043602	3.172896
C	1.810719	5.230805	2.638887
H	2.612017	5.493098	3.344551
H	2.278766	4.985678	1.675639
H	1.186377	6.122446	2.495729
C	0.420718	4.402446	4.546719
H	1.231862	4.613308	5.258150
H	-0.224953	5.288968	4.508235
H	-0.174735	3.570143	4.948016
C	1.950279	2.860342	3.370286
H	1.424548	1.979563	3.767647
H	2.455324	2.566302	2.439928
H	2.730936	3.133796	4.092901
C	-3.395360	5.413019	0.984346
C	-3.144525	6.735632	1.704277
H	-3.972320	7.428667	1.502672
H	-3.080356	6.605157	2.793618
H	-2.219296	7.217135	1.358935
C	-4.719480	4.833376	1.498961
H	-4.986928	3.895458	0.993623
H	-4.663333	4.628615	2.577471

H	-5.538189	5.547721	1.330608
C	-3.507900	5.702219	-0.517045
H	-2.563424	6.103927	-0.907833
H	-3.750254	4.801572	-1.095833
H	-4.299514	6.442310	-0.703416
C	2.300949	-3.534838	1.322879
C	2.286612	-3.970358	2.648953
C	2.559238	-4.467959	0.318800
C	2.527071	-5.300880	2.968051
H	2.066230	-3.254464	3.442860
C	2.778789	-5.804799	0.632628
H	2.581405	-4.146969	-0.720327
C	2.763968	-6.227244	1.958059
H	2.502965	-5.617647	4.009962
H	2.963711	-6.521861	-0.166009
H	2.937231	-7.274329	2.201478
C	-6.433809	-0.236084	1.817713
C	-5.732579	0.002409	3.154056
H	-4.902268	-0.700876	3.313791
H	-5.334768	1.024572	3.228785
H	-6.447925	-0.137701	3.975575
C	-7.621730	0.726882	1.724512
H	-8.203468	0.582357	0.805213
H	-8.303377	0.574184	2.573453
H	-7.282244	1.771789	1.745951
C	-6.939171	-1.684093	1.797973
H	-7.505068	-1.908143	0.883650
H	-6.096168	-2.389125	1.851083
H	-7.599249	-1.874809	2.656454
C	-5.752083	-0.224746	-3.202461
C	-6.494904	1.073178	-3.541427
H	-5.810889	1.933049	-3.520382
H	-6.936057	1.012905	-4.547002
H	-7.305618	1.270713	-2.826250
C	-6.734526	-1.399204	-3.265073
H	-7.599510	-1.265953	-2.603094
H	-7.123374	-1.506140	-4.287316
H	-6.234477	-2.338806	-2.990874
C	-4.675131	-0.469778	-4.258499
H	-3.982604	0.376580	-4.359643
H	-4.080728	-1.366269	-4.028902
H	-5.148331	-0.618434	-5.238696

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P	1.696879	-0.660335	-0.958664
C	4.089804	-1.672191	-1.583378
C	4.755819	0.638966	-0.996116
C	7.089209	-0.633115	0.358213
H	6.880757	0.422742	0.519567
C	3.567192	1.103460	-0.469790
C	-0.969780	-2.651735	0.342690
C	-1.140430	-1.843530	1.580193
C	5.659369	1.594209	-1.565212
C	-1.449154	-0.491328	1.559272
C	-1.025136	-2.540410	2.827278
C	-1.666577	0.182566	2.793457
H	-1.929183	1.238029	2.787388
C	0.256575	-2.746475	-0.287677
C	6.444832	-2.789318	-0.580681
C	5.019252	-0.817011	-1.019045
C	5.350469	2.986189	-1.481770
C	-1.902567	-4.232683	-1.303619
C	7.590256	-3.357924	0.026945
H	7.768063	-4.425825	-0.102958
C	-1.089556	-2.517841	5.280755
H	-1.241580	-1.956979	6.203097
C	-1.223400	-1.835600	4.048857
C	6.249675	3.933075	-2.028002
H	5.997259	4.990489	-1.945378
C	-3.374105	-3.303676	0.412062
H	-3.525961	-2.656022	1.275130
C	-4.434959	-3.984996	-0.128061
H	-5.427324	-3.874820	0.308246
C	4.137046	3.397628	-0.880696
H	3.907603	4.462246	-0.829545
C	6.193708	-1.392727	-0.435373
C	-1.554583	-0.463743	3.994113
H	-1.726231	0.074053	4.927150
C	5.520256	-3.588313	-1.296751
H	5.736139	-4.647289	-1.437461
C	-2.080356	-3.394991	-0.163264
C	7.687106	2.159338	-2.780254
H	8.584779	1.841126	-3.307607
C	4.358398	-3.045522	-1.771242
H	3.622504	-3.644808	-2.304235
C	-3.012171	-4.944783	-1.820948
H	-2.857875	-5.586652	-2.688614
C	-0.619554	-4.336509	-1.889357

H	-0.485751	-4.988503	-2.752375
C	-0.582846	-4.558068	4.109359
H	-0.335938	-5.617760	4.139000
C	6.842323	1.217121	-2.250060
H	7.071998	0.160342	-2.366037
C	-0.708387	-3.922563	2.899393
H	-0.564694	-4.483143	1.976793
C	0.429499	-3.611804	-1.393165
H	1.412218	-3.656012	-1.860972
C	7.398824	3.534638	-2.658989
H	8.080450	4.271914	-3.079107
C	8.180112	-1.217327	0.952064
H	8.843559	-0.614134	1.569633
C	-4.252945	-4.822415	-1.250237
H	-5.100746	-5.369239	-1.660944
C	-0.774241	-3.851246	5.314936
H	-0.670694	-4.366369	6.268155
C	8.443732	-2.592123	0.778329
H	9.314889	-3.042627	1.250418
C	3.251815	2.473393	-0.399480
H	2.294335	2.760016	0.033165
O	2.873639	-1.208305	-2.026656
O	2.662266	0.216690	0.059738
N	1.357428	-1.924376	0.129242
P	-1.667899	0.413179	-0.055239
C	-3.426391	0.000756	-0.399375
C	-4.400047	0.119696	0.597602
C	-3.775719	-0.485598	-1.651742
C	-5.719005	-0.248789	0.355063
H	-4.109847	0.502916	1.574198
C	-5.087967	-0.882064	-1.932605
H	-2.994705	-0.568915	-2.405917
C	-6.032314	-0.750309	-0.916309
H	-7.060944	-1.053320	-1.113125
C	-1.714464	2.156542	0.505169
C	-2.733132	3.015231	0.123527
C	-0.617382	2.657762	1.219629
C	-2.690310	4.378141	0.447837
H	-3.576266	2.618073	-0.442008
C	-0.553634	3.995793	1.586690
H	0.184212	1.971123	1.500309
C	-1.598563	4.839513	1.176477
H	-1.549996	5.893533	1.443871
C	2.298779	-2.549278	1.087848

H	1.711028	-3.329265	1.596039
H	-0.660982	-1.184667	-2.164103
C	-0.651909	0.336333	-3.823115
O	-0.948525	0.267936	-4.937985
Rh	-0.160287	0.341271	-1.979965
C	0.292245	2.245884	-1.913780
O	0.461800	3.384172	-1.931155
C	0.614409	4.559552	2.393472
C	1.446228	5.474205	1.486792
H	2.333018	5.845643	2.020518
H	1.782958	4.937227	0.588563
H	0.865159	6.342708	1.148903
C	0.091170	5.367474	3.586889
H	0.933764	5.760511	4.173307
H	-0.521435	6.223586	3.278251
H	-0.519204	4.738195	4.249562
C	1.512934	3.455191	2.951019
H	0.938144	2.749459	3.569869
H	2.023490	2.875437	2.169514
H	2.293701	3.898095	3.584343
C	-3.843142	5.275554	0.006862
C	-3.664395	6.722523	0.460299
H	-4.517997	7.323859	0.119450
H	-3.617216	6.807947	1.554919
H	-2.754620	7.172524	0.039545
C	-5.152112	4.746415	0.607338
H	-5.368175	3.717508	0.287811
H	-5.108170	4.753384	1.705556
H	-5.997780	5.376473	0.296232
C	-3.938056	5.264955	-1.523356
H	-3.004288	5.627893	-1.974417
H	-4.130069	4.259748	-1.919824
H	-4.757228	5.917436	-1.858246
C	-6.796999	-0.179842	1.434466
C	-6.308293	0.529883	2.696430
H	-5.475937	-0.003418	3.177498
H	-5.979994	1.557190	2.482126
H	-7.126007	0.586513	3.427627
C	-8.022184	0.580001	0.915770
H	-8.477935	0.095936	0.042535
H	-8.791985	0.636955	1.698468
H	-7.754916	1.606558	0.629052
C	-7.201878	-1.608916	1.814075
H	-7.596375	-2.162440	0.950970

H	-6.337317	-2.164183	2.207221
H	-7.979869	-1.596675	2.591153
C	-5.479290	-1.380949	-3.321582
C	-6.042532	-0.194944	-4.114428
H	-5.293215	0.603526	-4.208729
H	-6.332461	-0.510416	-5.127423
H	-6.928642	0.230219	-3.622408
C	-6.542005	-2.479563	-3.239973
H	-7.495198	-2.117317	-2.833882
H	-6.751113	-2.871157	-4.245016
H	-6.196253	-3.314599	-2.614317
C	-4.275448	-1.949298	-4.078374
H	-3.536762	-1.178582	-4.334183
H	-3.765903	-2.732517	-3.497093
H	-4.612880	-2.391958	-5.025543
H	3.110989	-3.072587	0.556517
C	2.882095	-1.628640	2.127466
C	4.245373	-1.677523	2.407109
C	2.076433	-0.748390	2.851652
C	4.799108	-0.860003	3.388779
H	4.890300	-2.351632	1.839137
C	2.624070	0.062883	3.834715
H	1.017610	-0.674341	2.606357
C	3.990161	0.012146	4.107133
H	5.870455	-0.903200	3.581020
H	1.978269	0.743993	4.389614
H	4.420623	0.655429	4.873089

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P	1.842802	-0.535802	-0.909805
C	4.267437	-1.447061	-1.612610
C	4.869268	0.790370	-0.750106
C	7.329274	-0.545673	0.322629
H	7.124961	0.487231	0.595377
C	3.678991	1.128768	-0.136097
C	-0.942517	-2.587693	-0.056104
C	-1.230973	-1.944442	1.255729
C	5.714856	1.853082	-1.205695
C	-1.455860	-0.585622	1.420342
C	-1.373687	-2.838302	2.369922
C	-1.789701	-0.093024	2.712595
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C	6.665380	-2.612590	-0.784823

C	5.188208	-0.639414	-0.966753
C	5.352966	3.206231	-0.927151
C	-1.749153	-4.032682	-1.895074
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C	-1.896512	-3.202585	4.741829
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C	-1.728110	-2.320797	3.648025
C	6.195757	4.257064	-1.362775
H	5.904694	5.281716	-1.130595
C	-3.363624	-3.136518	-0.300838
H	-3.590812	-2.524290	0.571624
C	-4.380663	-3.762009	-0.976954
H	-5.408866	-3.639084	-0.636580
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H	3.869676	4.517548	-0.051769
C	6.395277	-1.243393	-0.485427
C	-1.917615	-0.928523	3.787522
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C	5.727122	-3.357387	-1.538242
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C	-2.017795	-3.246584	-0.736709
C	7.677711	2.664540	-2.386512
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C	4.547088	-2.791945	-1.933640
H	3.807250	-3.349048	-2.505582
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H	-2.585655	-5.299903	-3.428680
C	-0.415406	-4.146423	-2.351666
H	-0.207422	-4.756166	-3.230782
C	-1.375563	-5.074780	3.325420
H	-1.237643	-6.148023	3.204372
C	6.889311	1.623153	-1.966751
H	7.157403	0.602393	-2.229897
C	-1.192497	-4.241915	2.250935
H	-0.903144	-4.663783	1.289619
C	0.592382	-3.480601	-1.711374
H	1.616878	-3.538960	-2.077587
C	7.338629	3.997176	-2.072160
H	7.975744	4.813686	-2.406849
C	8.472656	-1.155129	0.773992
H	9.168058	-0.596385	1.397936
C	-4.105310	-4.562173	-2.106484
H	-4.918961	-5.066459	-2.625772

C	-1.732594	-4.554181	4.586317
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C	8.751800	-2.497975	0.445602
H	9.665517	-2.966907	0.805898
C	3.309273	2.461171	0.122088
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O	2.810275	0.137439	0.272046
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H	-2.660068	0.029640	-2.612840
C	-5.796962	-0.408141	-1.423213
H	-6.797874	-0.696761	-1.742634
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C	0.555937	2.545871	-1.538500
O	0.718833	3.675151	-1.384600
C	0.712738	4.269164	3.065386
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H	2.004151	4.801377	1.384797
H	1.071456	6.162523	2.027315
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H	0.981663	5.247220	4.983480
H	-0.411535	5.864003	4.085629

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H	-2.654181	6.025978	-1.250307
H	-3.812604	4.700695	-1.464285
H	-4.403686	6.349549	-1.186791
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H	-5.982717	1.246774	2.362031
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H	-8.737748	0.650334	1.173241
H	-7.569122	1.756036	0.414978
C	-7.244424	-1.655365	0.971192
H	-7.598559	-2.007133	-0.007344
H	-6.435304	-2.325118	1.299233
H	-8.076452	-1.755339	1.683145
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C	-5.034460	0.675128	-4.602970
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H	-5.191917	0.504167	-5.677927
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C	-6.303023	-1.407864	-4.094699
H	-7.184800	-0.806442	-3.834640
H	-6.389060	-1.662275	-5.159647
H	-6.341227	-2.344550	-3.519290
C	-3.850924	-1.516437	-4.405142
H	-2.883793	-0.997042	-4.388573
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H	-4.058561	-1.774518	-5.453263

H	2.442273	-3.701661	0.494685
C	2.073814	-2.606136	2.307181
C	1.860643	-1.388343	2.957782
C	2.054716	-3.780300	3.055397
C	1.629955	-1.353125	4.326560
H	1.880434	-0.465107	2.379745
C	1.832390	-3.747261	4.429387
H	2.209063	-4.737220	2.553479
C	1.617558	-2.532385	5.068042
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H	1.815515	-4.675870	4.998315
H	1.434951	-2.503203	6.141370

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P	1.833311	-0.149181	-1.069555
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C	3.498120	1.661219	-0.169662
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C	5.634774	2.404802	-1.009413
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H	-1.546493	0.981016	2.933212
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C	6.574240	-2.040844	-0.333906
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C	7.689072	-2.614561	0.323973
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H	-1.118622	-2.763840	5.787373
C	-1.046153	-2.294933	3.681489
C	6.084461	4.812437	-1.187328
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H	-3.268768	-2.851874	0.809368
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H	-5.092069	-4.003648	-0.360074
C	3.930187	4.019706	-0.292143

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C	6.263084	-0.664882	-0.116357
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H	-1.388191	-0.513055	4.856156
C	5.754927	-2.811320	-1.191613
H	6.009339	-3.857291	-1.363080
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C	4.640631	-2.265175	-1.767900
H	3.988119	-2.845416	-2.418154
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H	-0.159190	-4.105189	-3.622193
C	-0.658154	-5.037983	3.295016
H	-0.495452	-6.104427	3.149039
C	6.899396	2.177573	-1.609698
H	7.218952	1.154847	-1.798037
C	-0.677818	-4.202404	2.208090
H	-0.523622	-4.614563	1.212624
C	0.691895	-2.987782	-2.010306
H	1.662946	-2.864851	-2.489315
C	7.309999	4.556975	-1.744442
H	7.966259	5.377401	-2.028718
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H	8.738280	0.059538	2.119329
C	-3.885092	-4.549823	-2.077276
H	-4.698086	-5.072928	-2.579072
C	-0.812402	-4.524452	4.599810
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C	8.459319	-1.874878	1.182521
H	9.309768	-2.329148	1.687584
C	3.079276	2.992307	0.010882
H	2.074141	3.168510	0.388933
O	3.147694	-0.429193	-2.069329
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N	1.584875	-1.613717	-0.222159
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C	3.087570	-5.981878	2.129646
H	2.832206	-5.298872	4.159313
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H	3.315997	-7.008314	2.412371
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H	-8.483088	0.063145	1.995188
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C	-6.923112	-2.152516	1.525331
H	-7.364598	-2.484896	0.575962
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H	-6.597650	-2.203406	-4.608175
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C	-4.147262	-1.253661	-4.341332
H	-3.426319	-0.434883	-4.460853
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H	-4.501642	-1.515406	-5.347739

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P	1.932251	-0.540045	-0.852250
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C	-1.473581	-0.394737	1.373418
C	-1.305669	-2.520650	2.573700
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C	7.927649	-3.027712	0.273998
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C	-3.215516	-3.171773	-0.155600
H	-3.505705	-2.476266	0.631888
C	-4.177311	-3.897421	-0.811873
H	-5.224573	-3.777733	-0.535378
C	4.205481	3.563244	-0.758680
H	3.936274	4.618589	-0.721308
C	6.455752	-1.126447	-0.229164
C	-1.988396	-0.495437	3.751647
H	-2.302965	-0.004182	4.673375
C	5.849103	-3.374737	-1.003201
H	6.097136	-4.431770	-1.098003
C	-1.845531	-3.288385	-0.506407
C	7.792279	2.440904	-2.661341
H	8.698429	2.151447	-3.190665
C	4.676402	-2.887118	-1.509183
H	3.964257	-3.528333	-2.025168
C	-2.504849	-4.945767	-2.193213
H	-2.214170	-5.635140	-2.986033
C	-0.129012	-4.344409	-1.896024
H	0.141986	-5.052010	-2.679293

C	-1.175197	-4.623003	3.789290
H	-0.961156	-5.690497	3.798956
C	6.987998	1.473577	-2.114346
H	7.258062	0.424902	-2.216253
C	-1.033287	-3.913132	2.623465
H	-0.698900	-4.425446	1.722259
C	0.824054	-3.571144	-1.293198
H	1.870653	-3.642215	-1.586459
C	7.451210	3.805411	-2.554949
H	8.101312	4.563092	-2.988429
C	8.473268	-0.834409	1.093453
H	9.134249	-0.186537	1.666529
C	-3.821434	-4.797380	-1.839563
H	-4.594564	-5.369578	-2.350457
C	-1.588824	-3.982306	4.975383
H	-1.694546	-4.556068	5.894544
C	8.777787	-2.205952	0.966489
H	9.678296	-2.607822	1.427131
C	3.354515	2.611816	-0.266690
H	2.383958	2.868947	0.155797
O	3.149650	-1.101872	-1.862560
O	2.857948	0.324826	0.217905
N	1.530277	-1.790517	0.221620
P	-1.521591	0.575468	-0.218482
C	-3.263347	0.204961	-0.700751
C	-4.286337	0.247304	0.254229
C	-3.548721	-0.221902	-1.990034
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H	-4.048941	0.574766	1.263740
C	-4.836071	-0.646083	-2.346459
H	-2.737392	-0.250926	-2.715701
C	-5.824838	-0.593685	-1.368002
H	-6.830607	-0.927886	-1.620659
C	-1.616427	2.289024	0.433530
C	-2.683972	3.127619	0.159114
C	-0.562660	2.753288	1.233054
C	-2.740311	4.427142	0.683600
H	-3.498469	2.760162	-0.464322
C	-0.595211	4.021348	1.797342
H	0.270695	2.080931	1.443730
C	-1.691961	4.846146	1.494581
H	-1.722768	5.845912	1.924031
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Rh	0.208009	0.528128	-1.959120
C	0.508516	4.529824	2.723527
C	1.306520	5.620918	2.001527
H	2.118617	5.993241	2.642722
H	1.753349	5.230258	1.076063
H	0.672172	6.474860	1.728492
C	-0.104841	5.110972	4.002720
H	0.690308	5.459047	4.677080
H	-0.761536	5.966596	3.801827
H	-0.694038	4.351898	4.535730
C	1.469131	3.416408	3.142248
H	0.930919	2.576498	3.607884
H	2.053082	3.021003	2.299527
H	2.188540	3.804751	3.875716
C	-3.959666	5.291818	0.375376
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H	-4.792299	7.237753	0.806687
H	-3.851406	6.565977	2.150366
H	-3.022589	7.237885	0.724062
C	-5.222327	4.574121	0.871682
H	-5.353308	3.588627	0.402006
H	-5.181003	4.421619	1.959687
H	-6.115604	5.173997	0.645253
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H	-3.164072	6.031407	-1.514907
H	-4.154997	4.571851	-1.688855
H	-4.935013	6.134206	-1.376238
C	-6.697050	-0.179539	0.979545
C	-6.239174	0.362812	2.332213
H	-5.421332	-0.235631	2.759591
H	-5.896245	1.405304	2.258826
H	-7.075937	0.337201	3.043154
C	-7.882427	0.666268	0.502620
H	-8.294082	0.305827	-0.448857
H	-8.692800	0.638526	1.245117
H	-7.585553	1.715233	0.363917
C	-7.148524	-1.632021	1.177758
H	-7.549034	-2.067361	0.252211
H	-6.306868	-2.258077	1.509714
H	-7.937017	-1.689923	1.941896
C	-5.141664	-1.114207	-3.768205
C	-5.528004	0.111541	-4.604045
H	-4.711916	0.847081	-4.624036

H	-5.749509	-0.180179	-5.641134
H	-6.417613	0.606888	-4.190104
C	-6.296343	-2.119002	-3.795334
H	-7.252500	-1.675800	-3.487352
H	-6.434136	-2.495760	-4.817884
H	-6.088656	-2.979040	-3.142272
C	-3.924129	-1.791699	-4.403414
H	-3.102174	-1.089967	-4.590536
H	-3.538835	-2.603738	-3.768128
H	-4.203616	-2.220170	-5.375757
C	-0.302075	-0.934956	-3.146618
O	-0.548760	-1.750767	-3.920970
H	0.765673	1.783194	-1.105504
H	2.516561	-3.441400	1.070181
H	3.460021	-1.954294	1.028024
C	2.088966	-2.053869	2.655869
C	2.144086	-3.068803	3.608786
C	1.752717	-0.762000	3.065346
C	1.869588	-2.806896	4.947617
H	2.392377	-4.083973	3.294295
C	1.481030	-0.497623	4.401303
H	1.699578	0.034652	2.323402
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H	1.901734	-3.616135	5.675907
H	1.212233	0.513781	4.706052
H	1.312579	-1.309657	6.392339

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P	1.767675	-0.730158	-0.888652
C	4.202024	-1.728869	-1.374462
C	4.750599	0.666738	-1.051799
C	7.169134	-0.321080	0.383588
H	6.924442	0.738524	0.408471
C	3.551692	1.124763	-0.544353
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C	-1.159064	-1.749282	1.622906
C	5.597328	1.602549	-1.729369
C	-1.439885	-0.393795	1.545120
C	-1.090000	-2.403037	2.896136
C	-1.662001	0.332191	2.748078
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C	6.611441	-2.603532	-0.265570
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C	-1.219738	-2.290701	5.345052
H	-1.384336	-1.693822	6.242226
C	-1.303410	-1.649927	4.086441
C	6.065927	3.908933	-2.428968
H	5.767117	4.957399	-2.439885
C	-3.366036	-3.238435	0.409841
H	-3.548330	-2.574203	1.253981
C	-4.409702	-3.920579	-0.161795
H	-5.417671	-3.793654	0.232483
C	4.011617	3.393308	-1.170511
H	3.739841	4.448373	-1.207740
C	6.296891	-1.212234	-0.291411
C	-1.595055	-0.272187	3.974112
H	-1.772636	0.304520	4.882449
C	5.718615	-3.527193	-0.861728
H	5.980881	-4.585016	-0.867118
C	-2.048923	-3.358092	-0.104278
C	7.565457	2.135416	-3.050743
H	8.464051	1.807980	-3.570837
C	4.531216	-3.101737	-1.388869
H	3.817255	-3.797641	-1.826439
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H	-2.736762	-5.608004	-2.604316
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C	-0.727153	-4.381952	4.260693
H	-0.505287	-5.445022	4.335048
C	6.780707	1.213121	-2.405591
H	7.057396	0.161283	-2.420999
C	-0.805751	-3.788423	3.025892
H	-0.649659	-4.386056	2.128737
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H	0.825553	6.386627	0.978895
C	0.072022	5.437551	3.470257
H	0.907904	5.817718	4.074254
H	-0.527382	6.302791	3.161597
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C	-3.948330	5.229136	0.042423
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H	-5.379852	3.578461	0.269300
H	-5.134830	4.543274	1.741601
H	-6.096155	5.197279	0.393768
C	-4.085632	5.282445	-1.483688
H	-3.193580	5.731476	-1.941225
H	-4.216603	4.283991	-1.920547
H	-4.957905	5.888828	-1.767742
C	-6.724733	-0.076837	1.474235
C	-6.180893	0.573261	2.745484
H	-5.351841	-0.002508	3.181340
H	-5.827781	1.597829	2.560564
H	-6.976352	0.626291	3.501093
C	-7.931129	0.742912	1.003296
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C	-7.174732	-1.501067	1.822037
H	-7.611891	-2.014574	0.954822
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C	-5.554275	-1.312246	-3.302765
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H	-5.415924	0.667102	-4.208587
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H	0.593323	1.568856	-1.261102
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C	4.255641	-1.536614	2.533841
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H	4.894398	-2.243998	2.000989
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H	5.894051	-0.684906	3.632846
H	2.002232	0.974722	4.417223
H	4.451459	0.933842	4.859668

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P	1.812696	-0.206058	-1.135282
C	4.312072	-0.919581	-1.539163
C	4.677149	1.388498	-0.741743
C	7.011775	0.254366	0.751801
H	6.731100	1.293414	0.910184
C	3.402509	1.688250	-0.303607
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C	-1.231366	-0.606589	1.435995
C	-0.912994	-2.869766	2.318953
C	-1.408932	-0.150872	2.771773
H	-1.619106	0.900259	2.957373
C	0.504140	-2.433698	-0.745952
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C	5.091411	-0.031314	-0.819505
C	5.055369	3.808753	-1.029338
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C	7.721181	-2.422341	0.408707
H	7.980001	-3.472537	0.272042
C	-1.038905	-3.289211	4.733843
H	-1.171624	-2.895057	5.741743
C	-1.091043	-2.385339	3.645916
C	5.892397	4.877630	-1.430657
H	5.519351	5.895567	-1.315554
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H	6.090899	-3.796823	-1.221796
C	-1.813285	-3.173971	-0.806536
C	7.580767	3.313994	-2.129205
H	8.555220	3.126299	-2.576868
C	4.677944	-2.268827	-1.712958
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C	-0.676442	-5.117381	3.209285
H	-0.507555	-6.180031	3.044290
C	6.797830	2.256795	-1.739634
H	7.153085	1.238820	-1.884914
C	-0.697083	-4.260941	2.138209
H	-0.539013	-4.652290	1.134850
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C	-3.931313	-4.390343	-2.214087
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H	9.326460	-2.020660	1.761959
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H	1.916855	3.174253	0.176285
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O	2.559894	0.659059	0.070823
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P	-1.507854	0.535041	-0.018006
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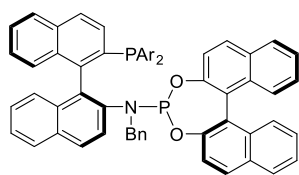
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C	-1.541878	4.661585	2.029883
H	-1.542138	5.629697	2.527701
C	2.194817	-1.872188	1.080877
H	3.142908	-1.319479	1.085802
H	1.582195	-1.412934	1.875449
C	-0.454679	2.349515	-3.129407
O	-0.655483	3.308393	-3.740163
Rh	-0.078888	0.836924	-2.034553
C	0.666073	4.222433	3.199377
C	1.370044	5.472619	2.661627
H	2.159284	5.795979	3.355458
H	1.838653	5.272689	1.687769
H	0.674197	6.311737	2.531288
C	0.058222	4.533175	4.573308
H	0.848593	4.819484	5.281755
H	-0.665492	5.357039	4.533974
H	-0.458341	3.651796	4.979003
C	1.711372	3.125282	3.398918
H	1.261951	2.202164	3.793650
H	2.243897	2.876593	2.470127
H	2.463336	3.465020	4.123979
C	-3.832347	5.213292	1.005098
C	-3.731014	6.527742	1.774741
H	-4.627266	7.134467	1.587972
H	-3.661520	6.363113	2.859140
H	-2.860551	7.119998	1.460118
C	-5.095071	4.480222	1.477003
H	-5.255213	3.540542	0.930024
H	-5.030028	4.237765	2.547478
H	-5.982240	5.111331	1.323555
C	-3.958072	5.541483	-0.487171
H	-3.062827	6.065482	-0.848588
H	-4.086010	4.640049	-1.100204
H	-4.827848	6.190935	-0.662760

C	2.473008	-3.305514	1.446042
C	2.497399	-3.634167	2.802422
C	2.766069	-4.300288	0.513246
C	2.812618	-4.919612	3.222422
H	2.250853	-2.868718	3.540435
C	3.059856	-5.594944	0.929694
H	2.765342	-4.059984	-0.548423
C	3.085667	-5.910044	2.284343
H	2.818684	-5.153668	4.286195
H	3.272025	-6.362808	0.186921
H	3.317862	-6.923931	2.606481
C	-6.544920	-0.239434	1.698873
C	-5.932076	0.167861	3.038022
H	-5.095244	-0.484706	3.325411
H	-5.565848	1.204630	3.017910
H	-6.691753	0.097105	3.828196
C	-7.745822	0.673948	1.432325
H	-8.272953	0.411678	0.506088
H	-8.469752	0.597523	2.256170
H	-7.433396	1.724470	1.354209
C	-7.022110	-1.692742	1.809923
H	-7.506397	-2.034915	0.885278
H	-6.176531	-2.365070	2.015259
H	-7.748129	-1.800072	2.628738
C	-5.606214	-0.652600	-3.261307
C	-6.339711	0.602490	-3.749211
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H	-6.721093	0.453913	-4.770023
H	-7.192600	0.849085	-3.101659
C	-6.575142	-1.839789	-3.275845
H	-7.476218	-1.659230	-2.676308
H	-6.906826	-2.036282	-4.304924
H	-6.087758	-2.749201	-2.896387
C	-4.472628	-0.967470	-4.236879
H	-3.805926	-0.108510	-4.390116
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H	-4.893081	-1.225669	-5.218346
C	-0.700308	-0.468051	-3.350094
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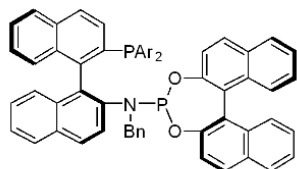
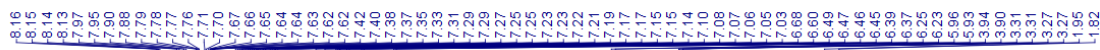
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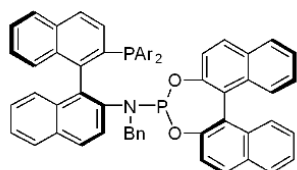
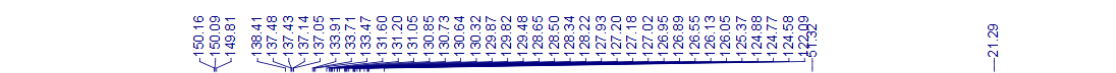
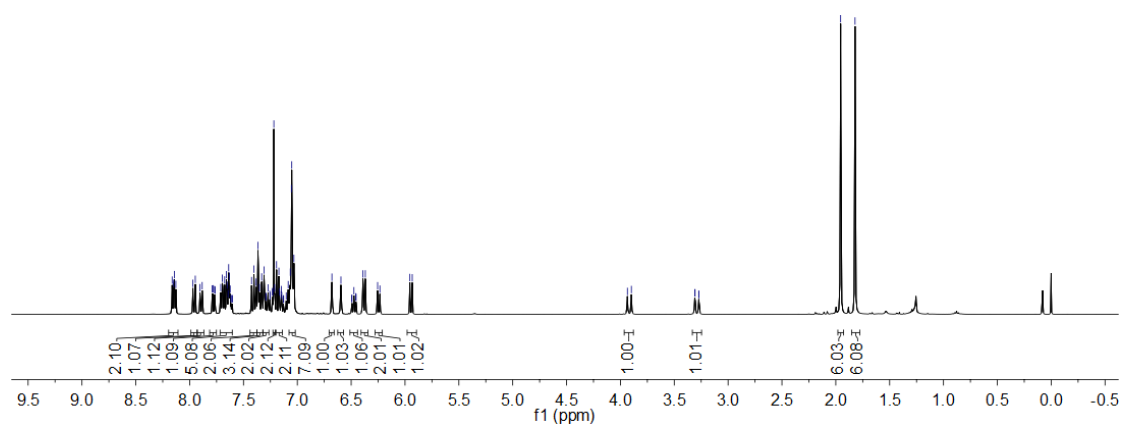
7. NMR spectra



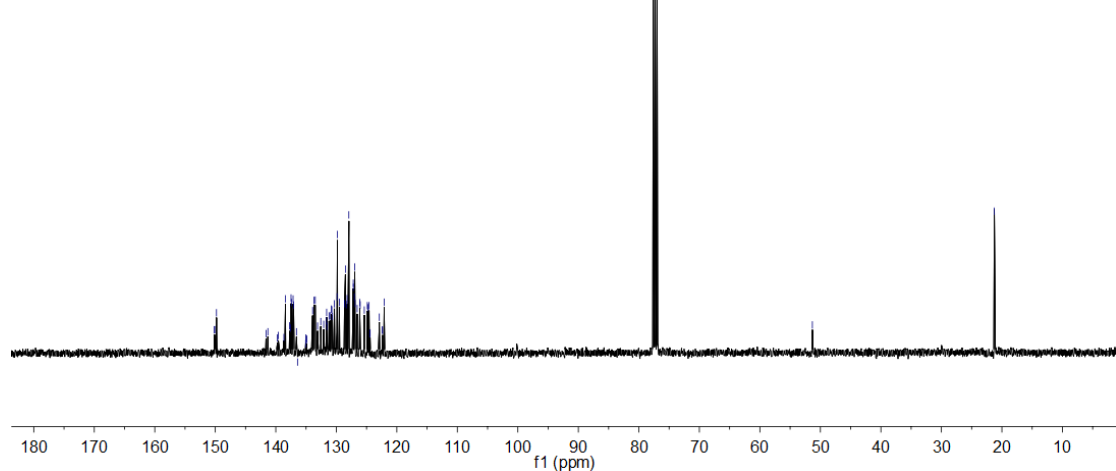
L1, Ar = 3,5-Me-C₆H₃

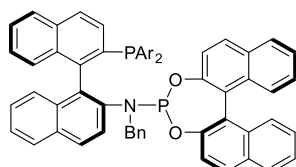


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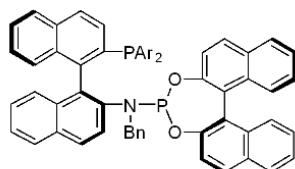
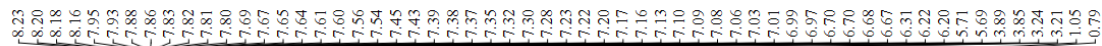


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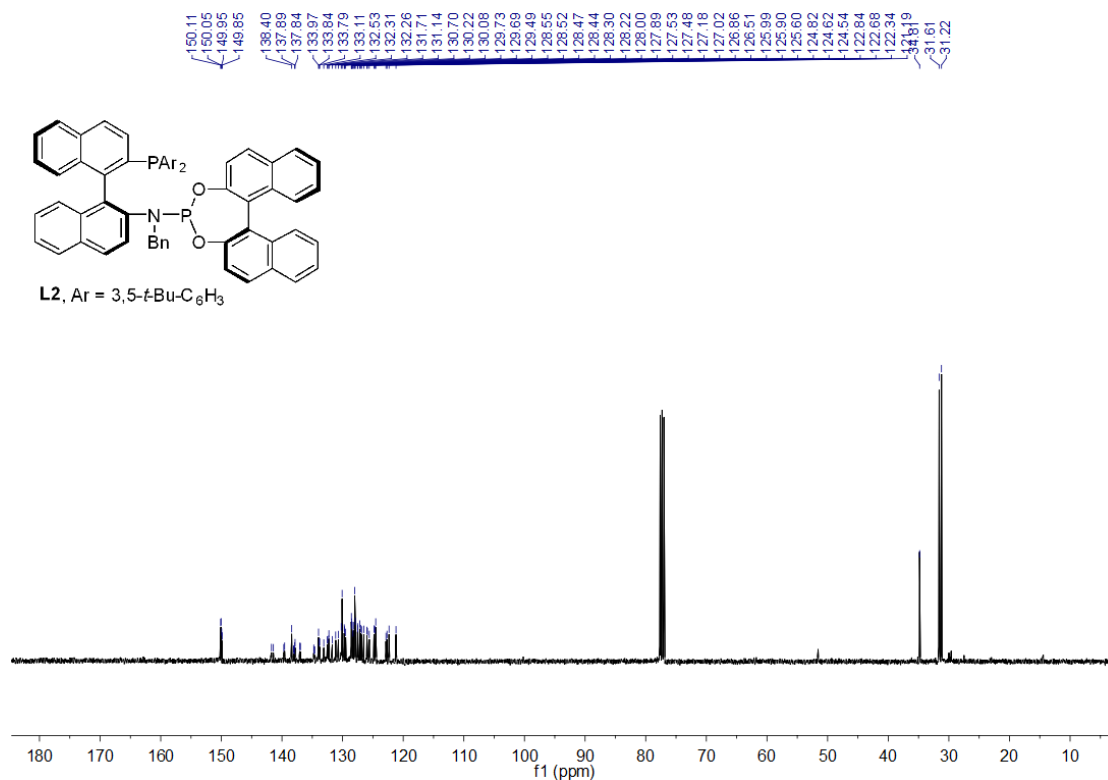
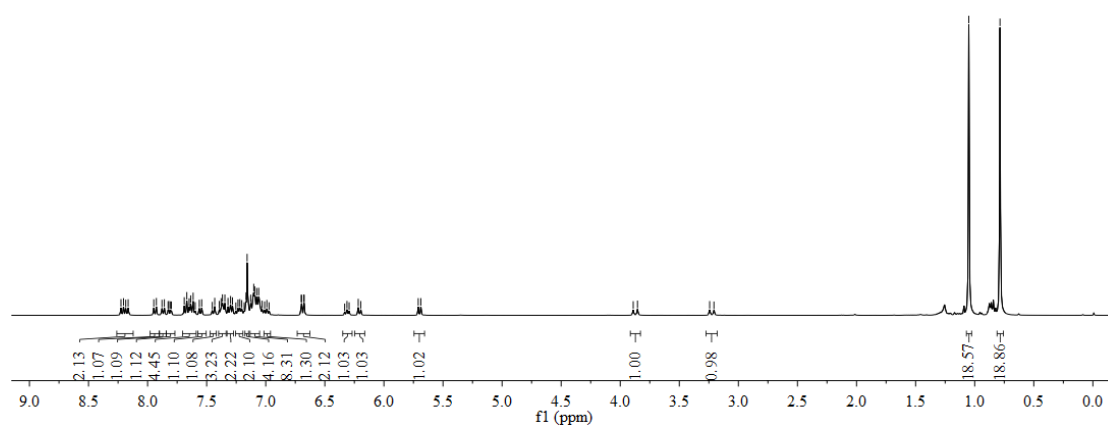


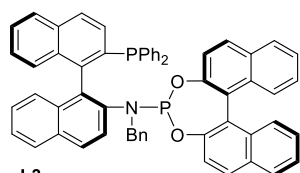


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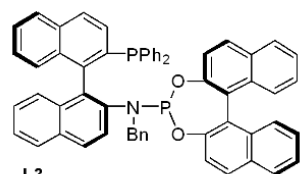
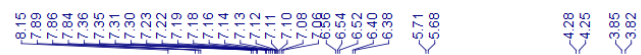


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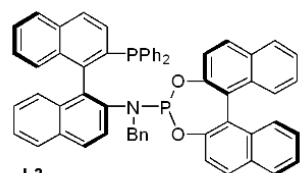
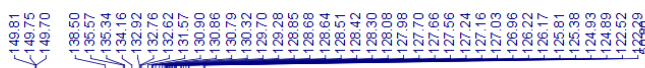
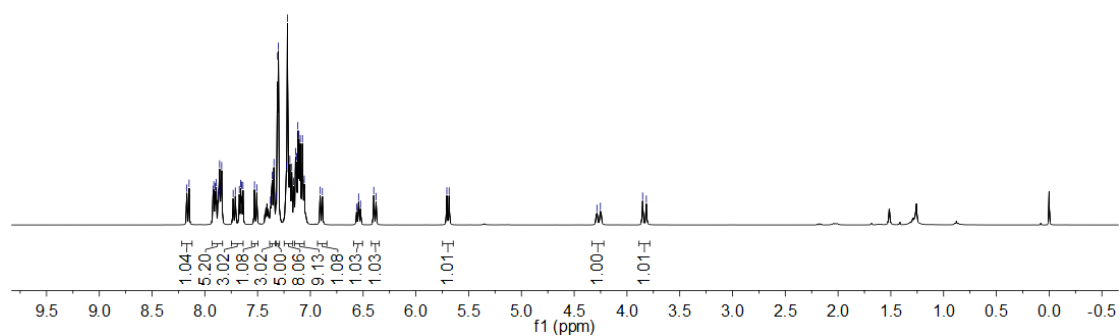




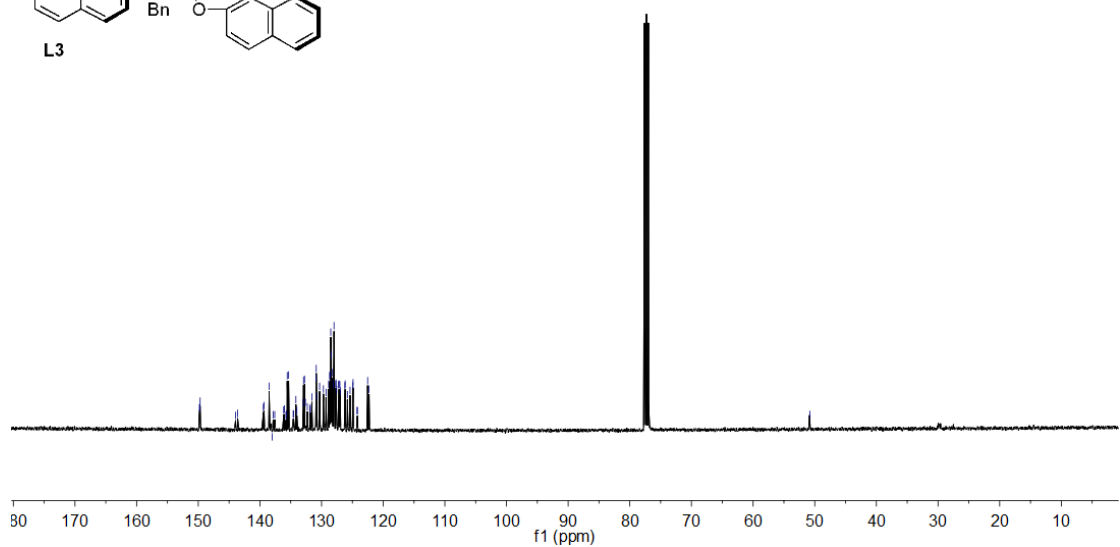
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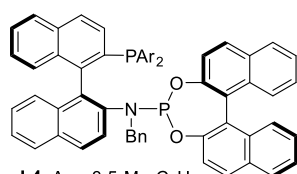


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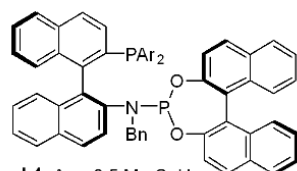
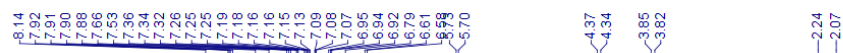


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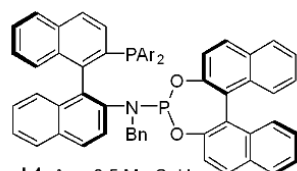
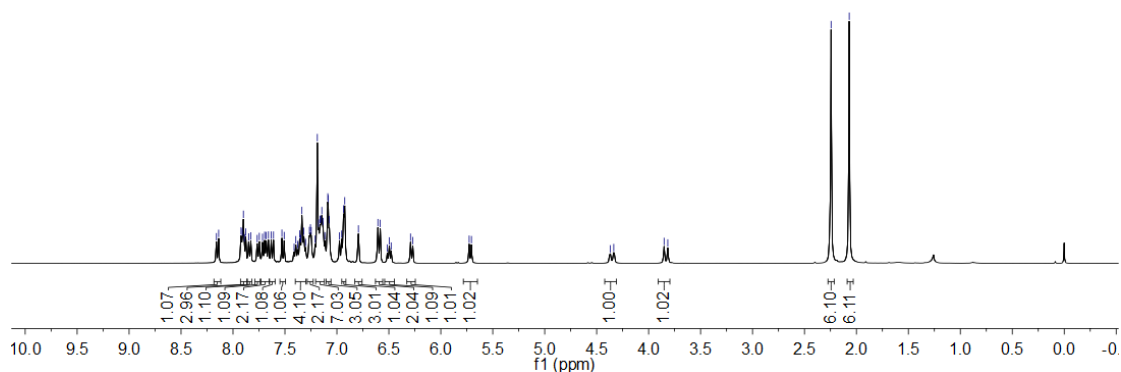




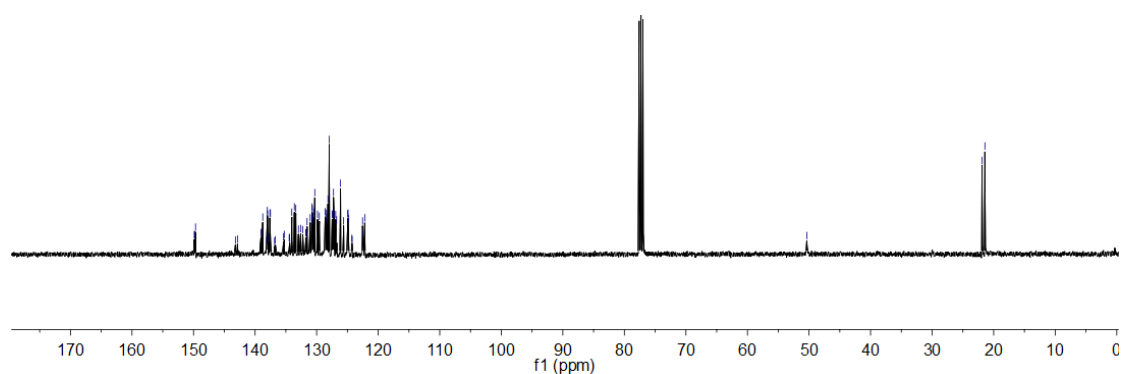
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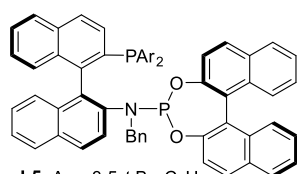


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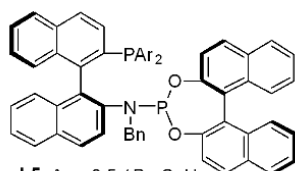


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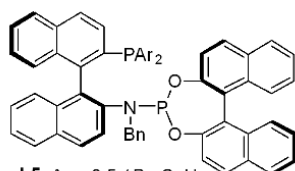
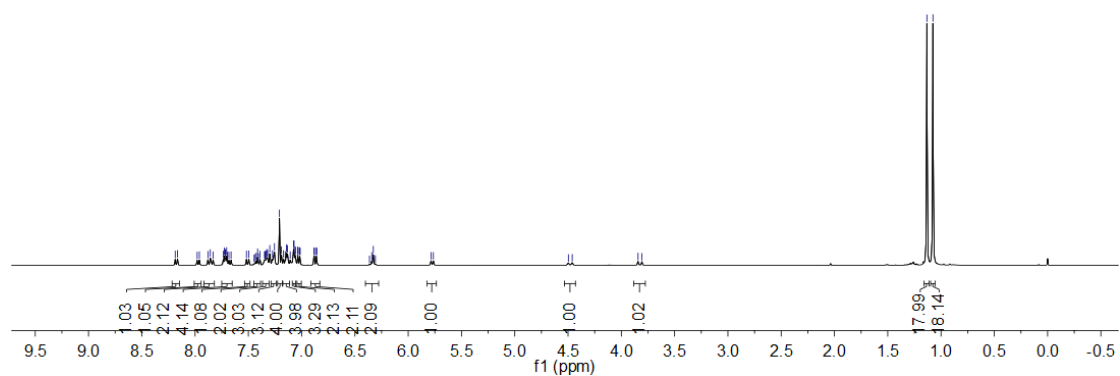




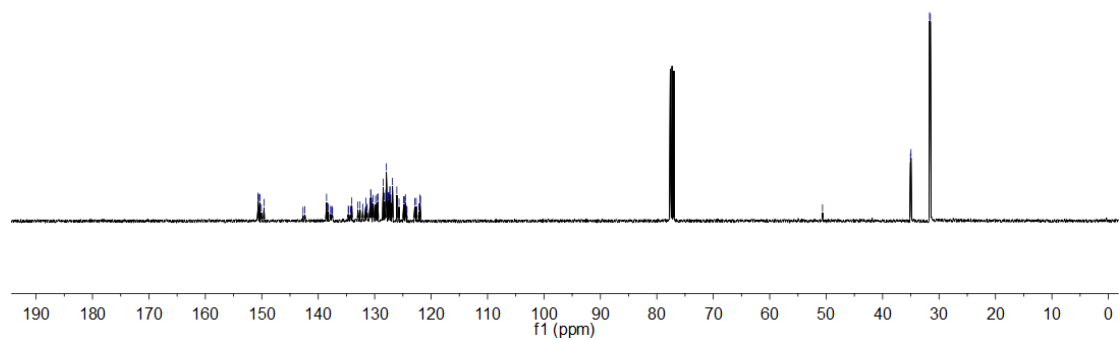
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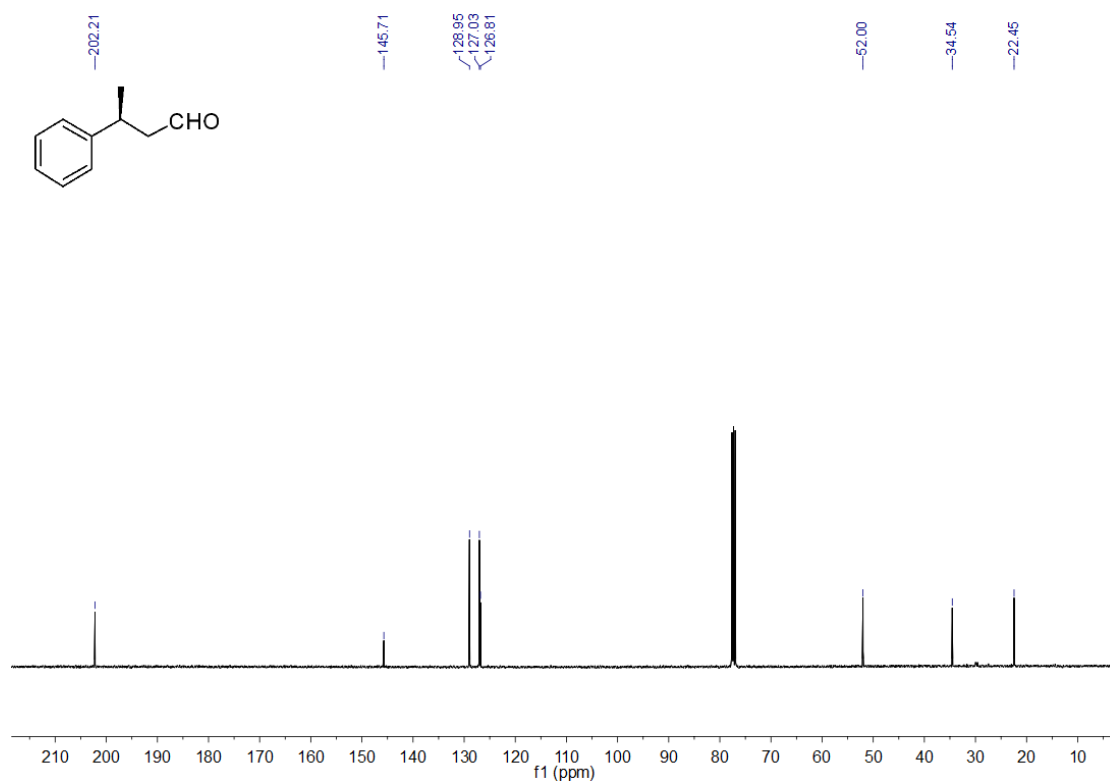
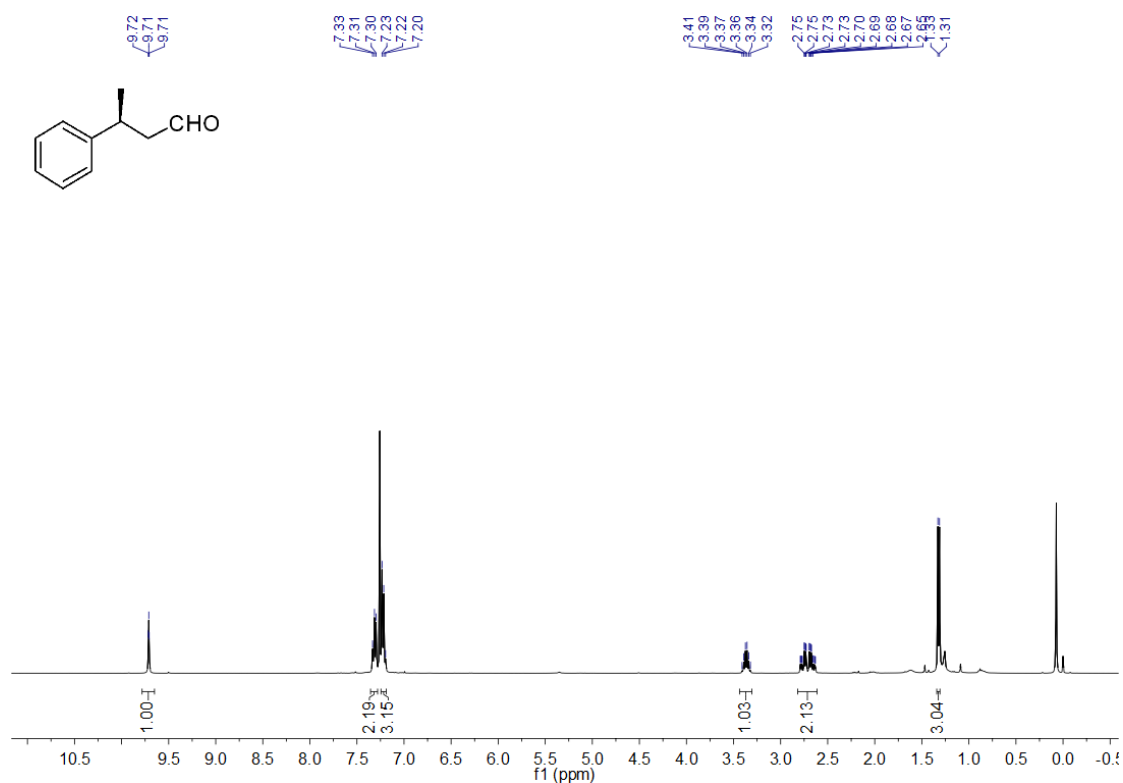
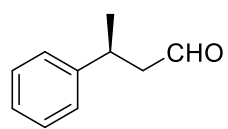


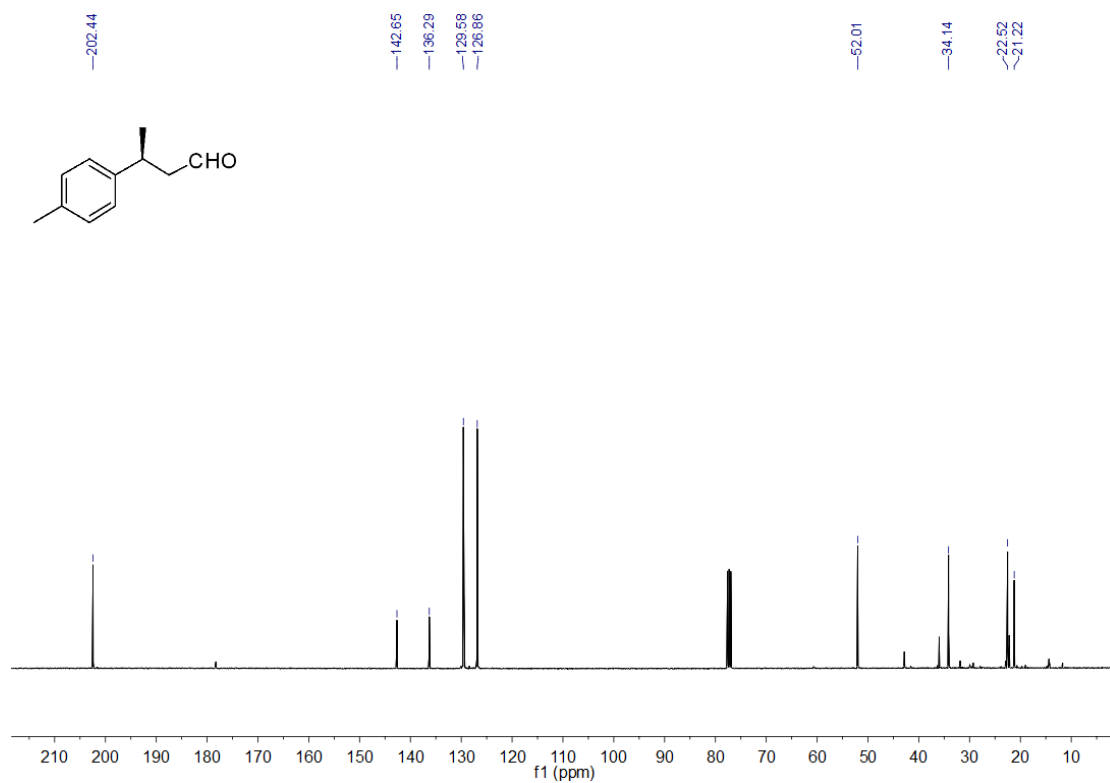
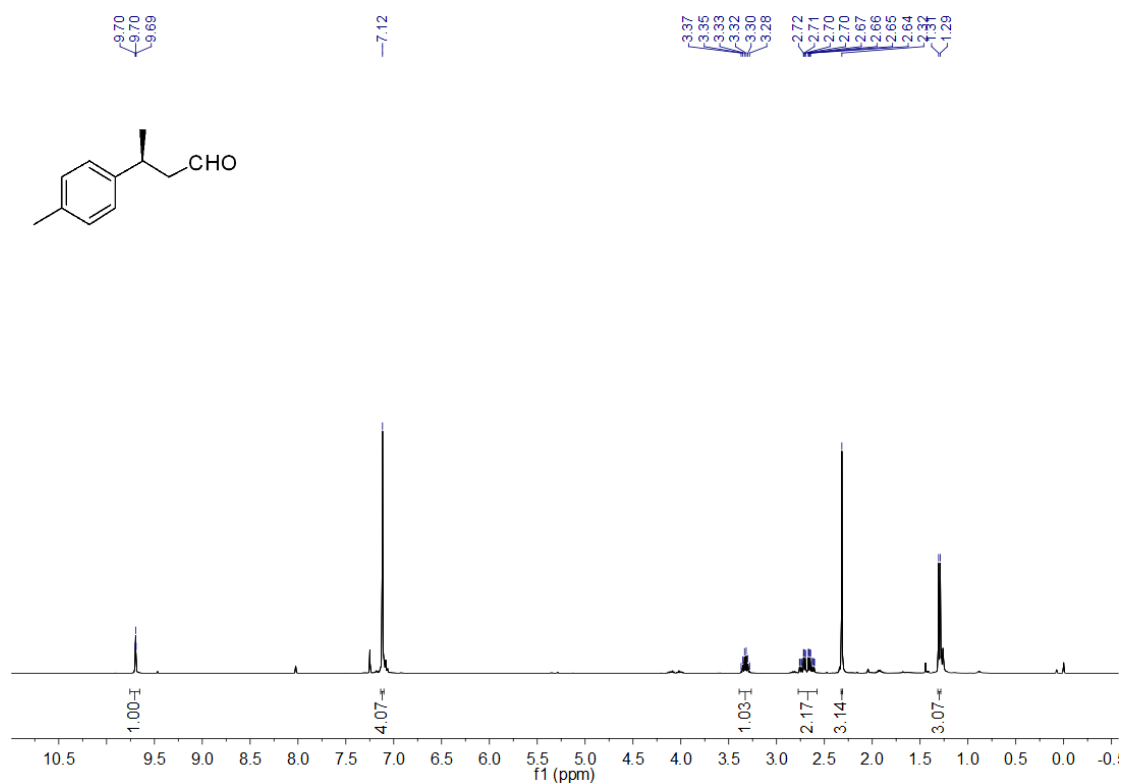
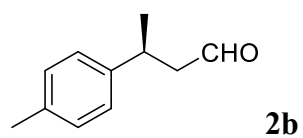
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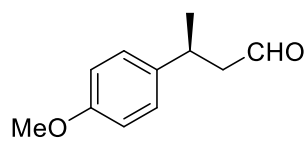


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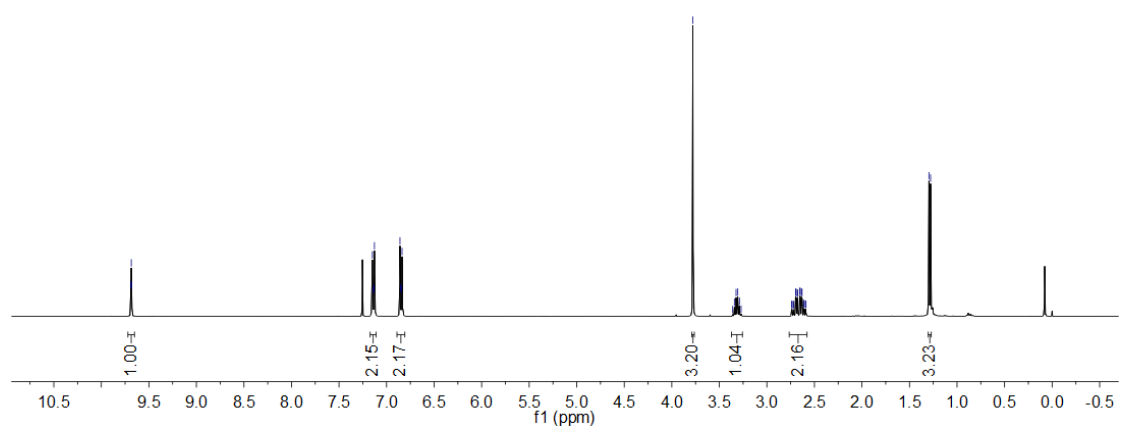
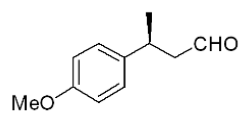


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9.68

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7.13
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6.85
6.84
6.84

3.78
3.34
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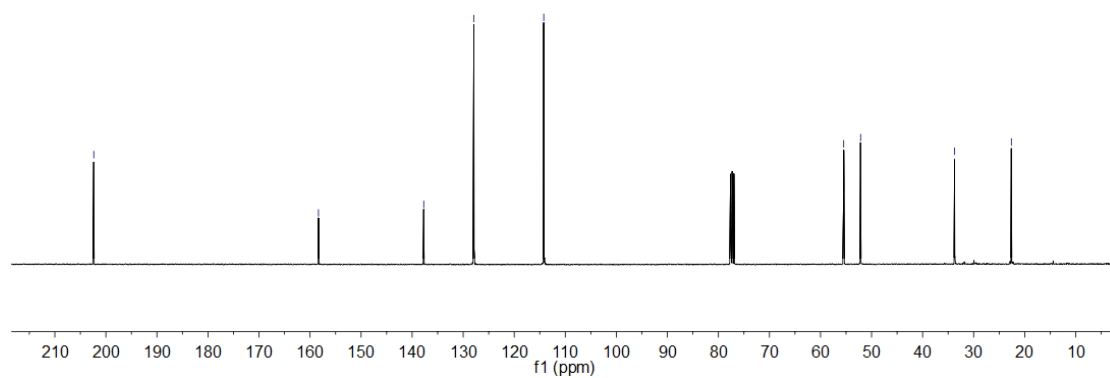
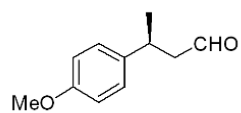
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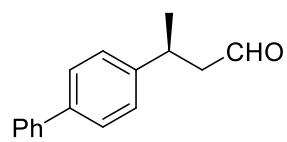
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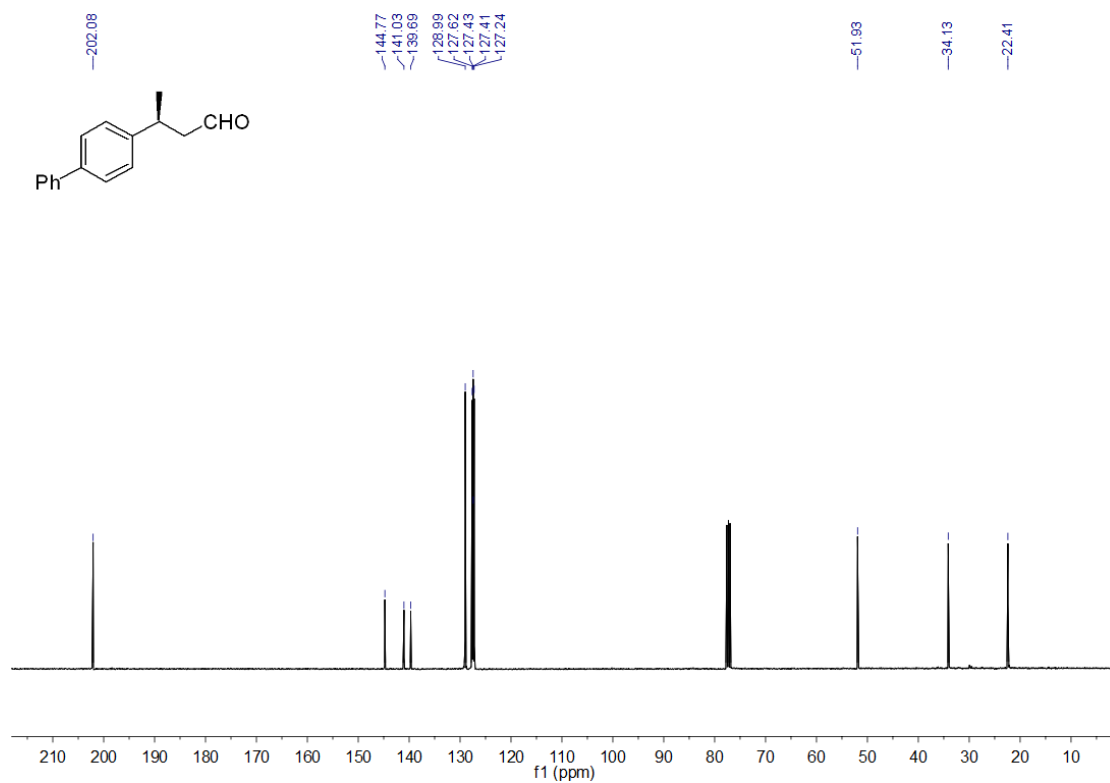
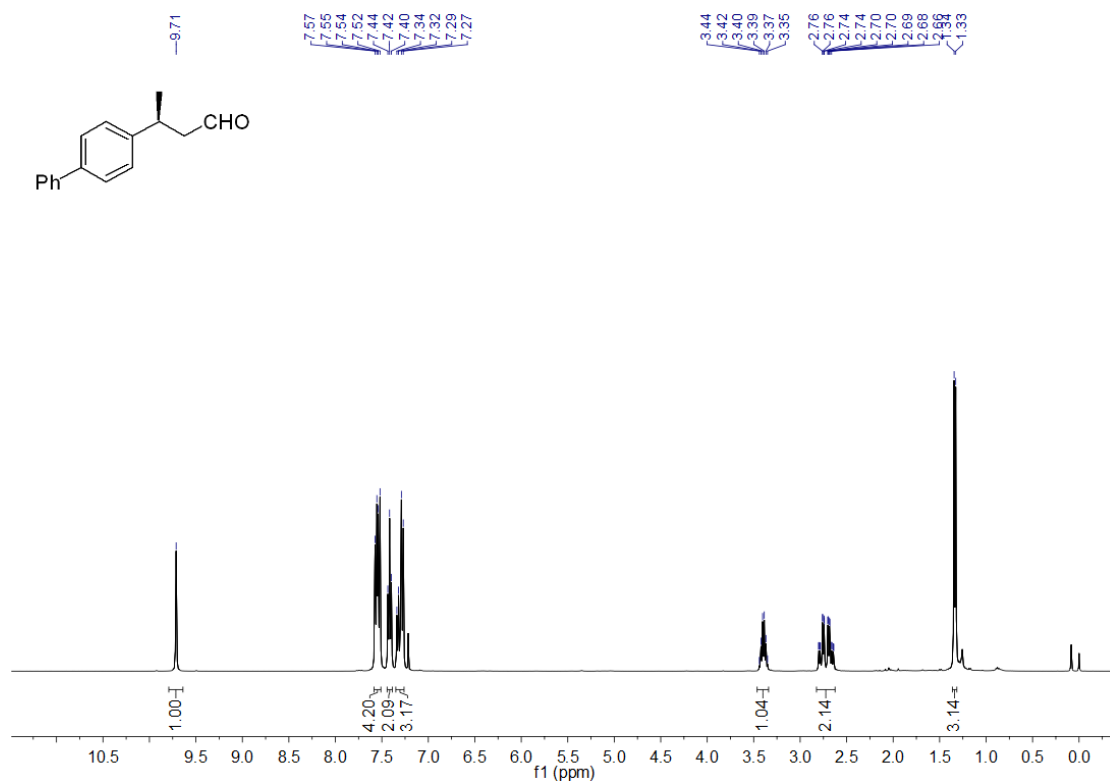
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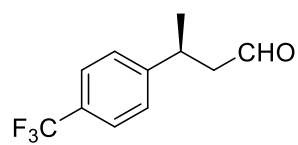
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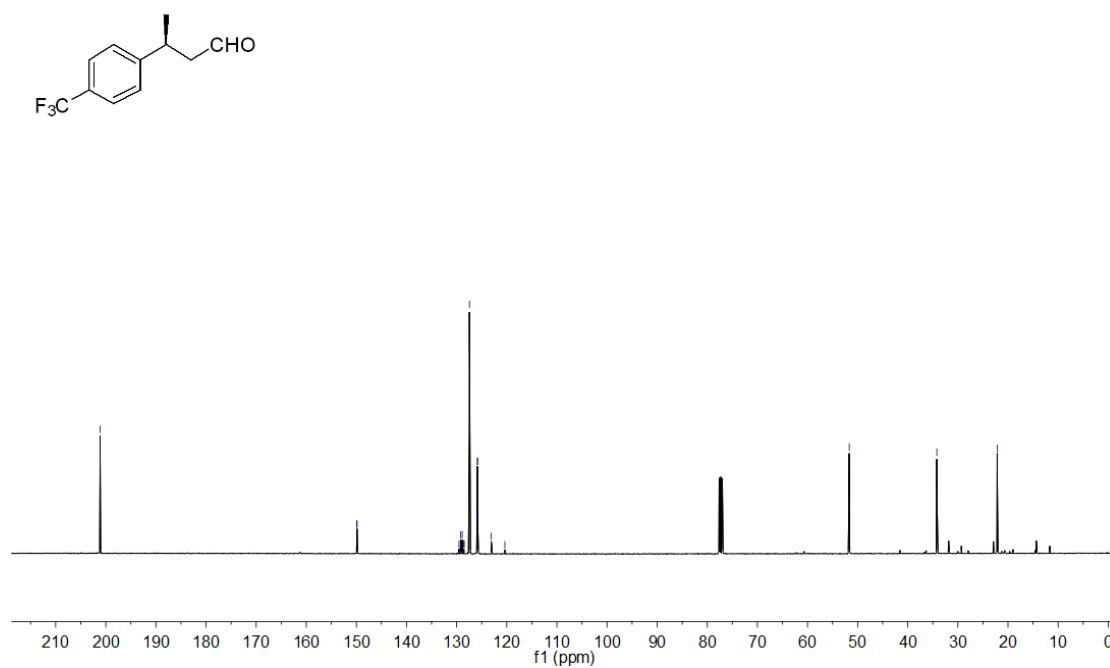
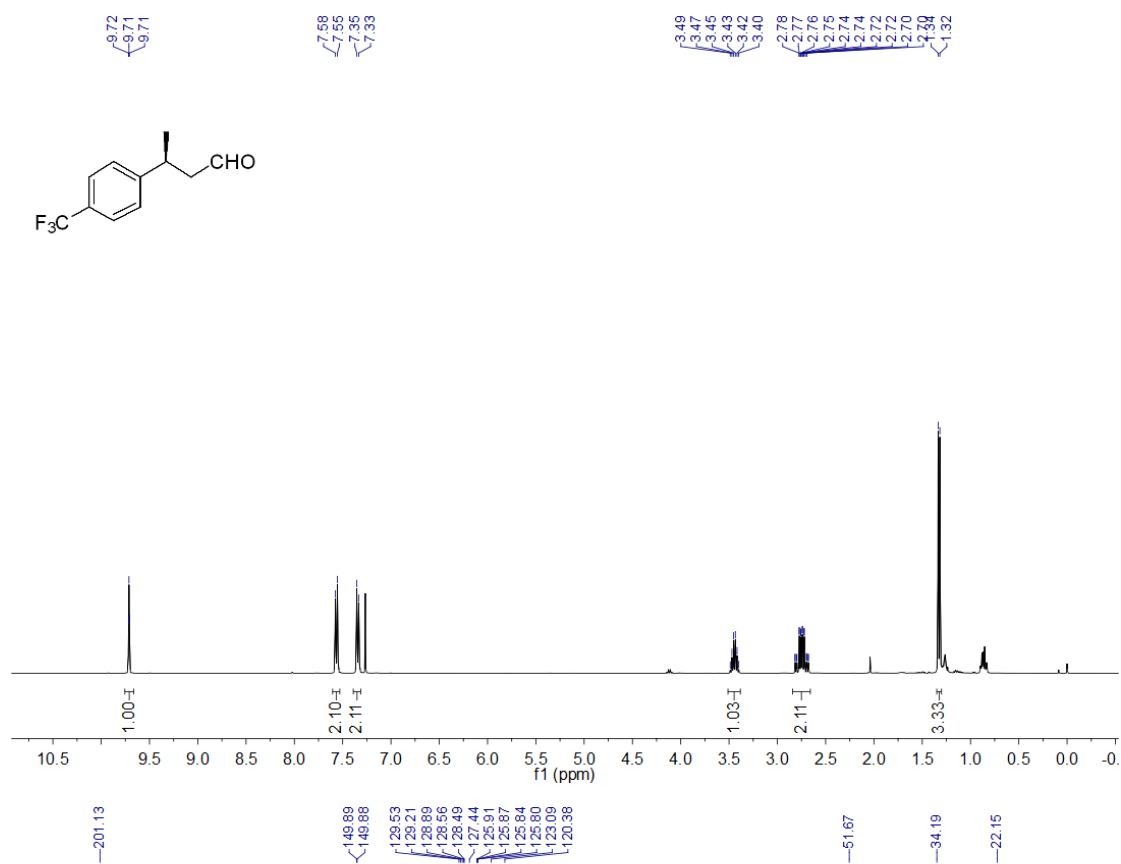


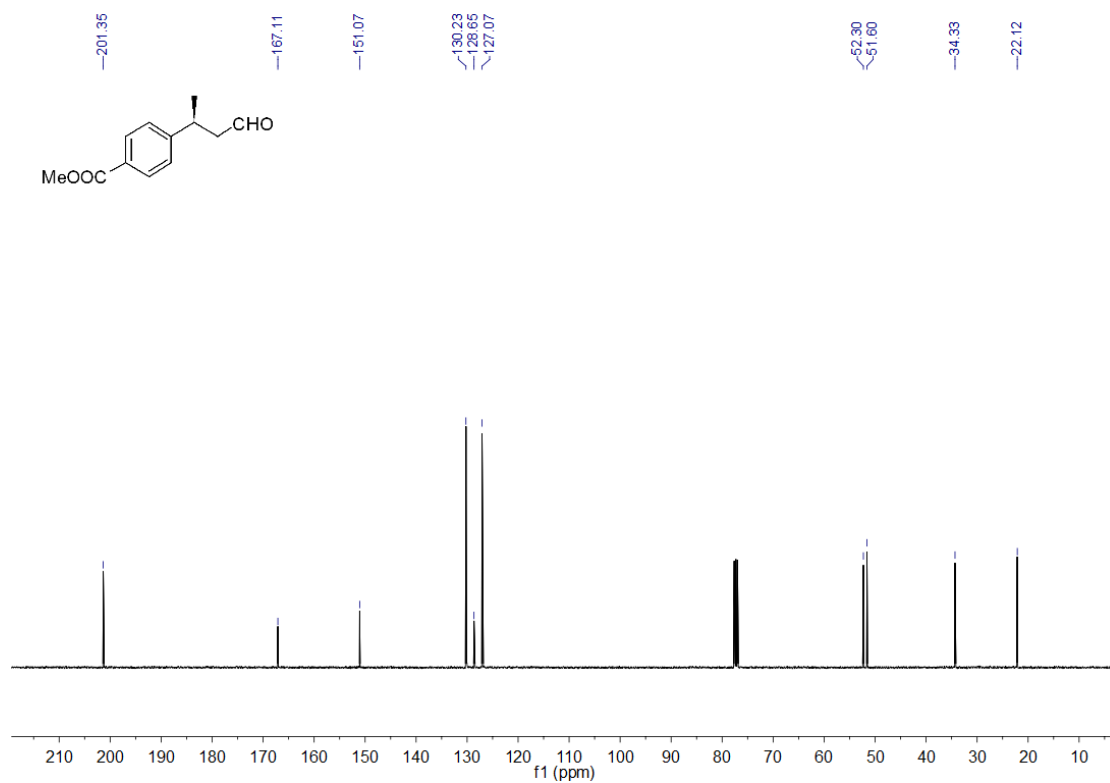
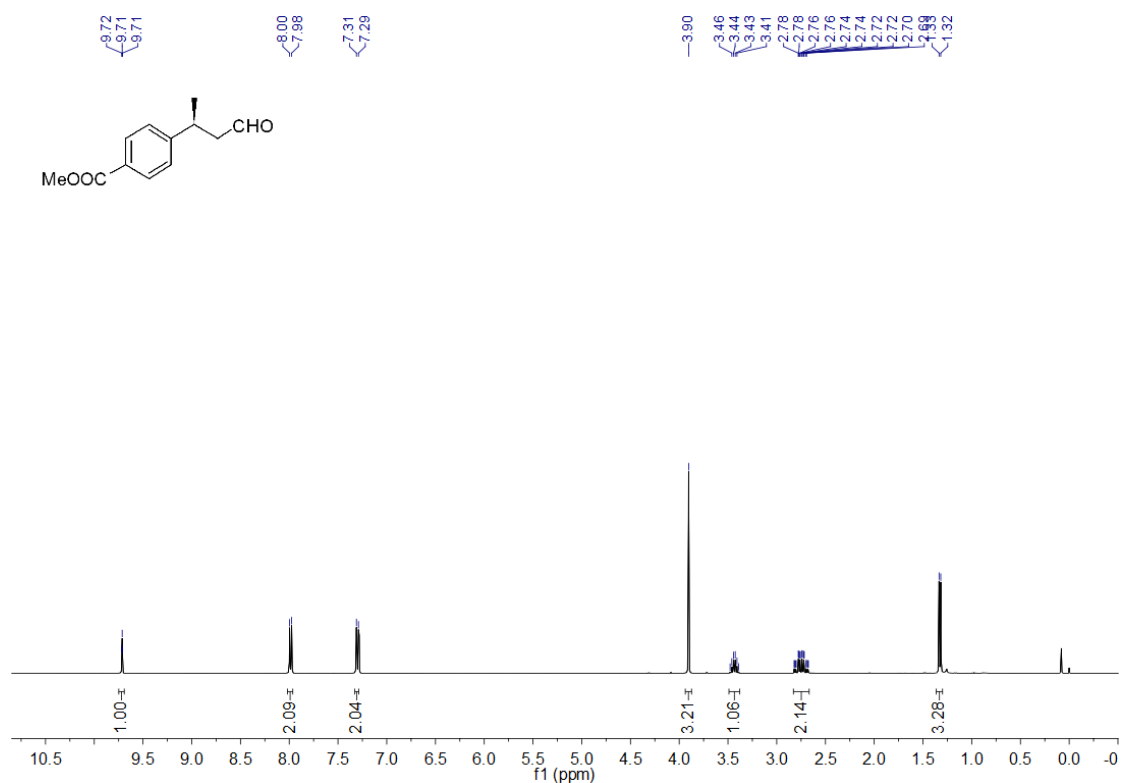
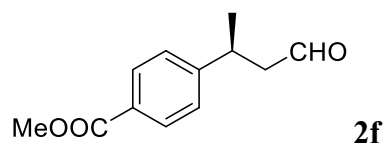
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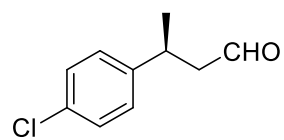




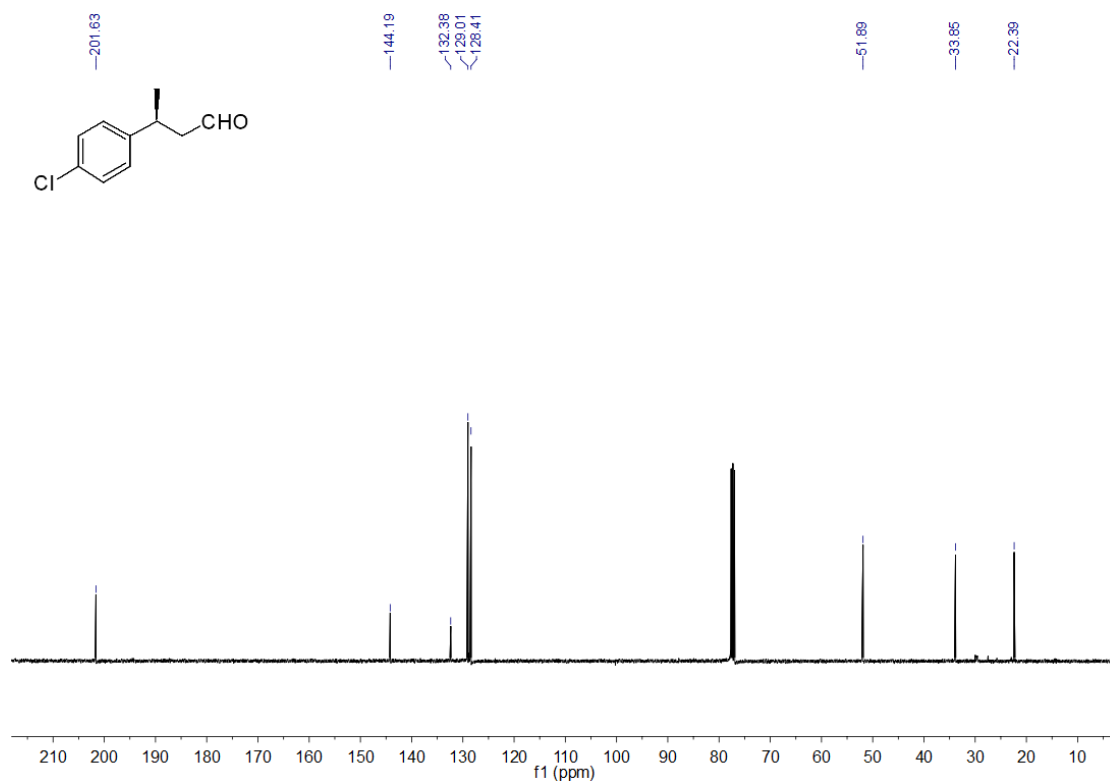
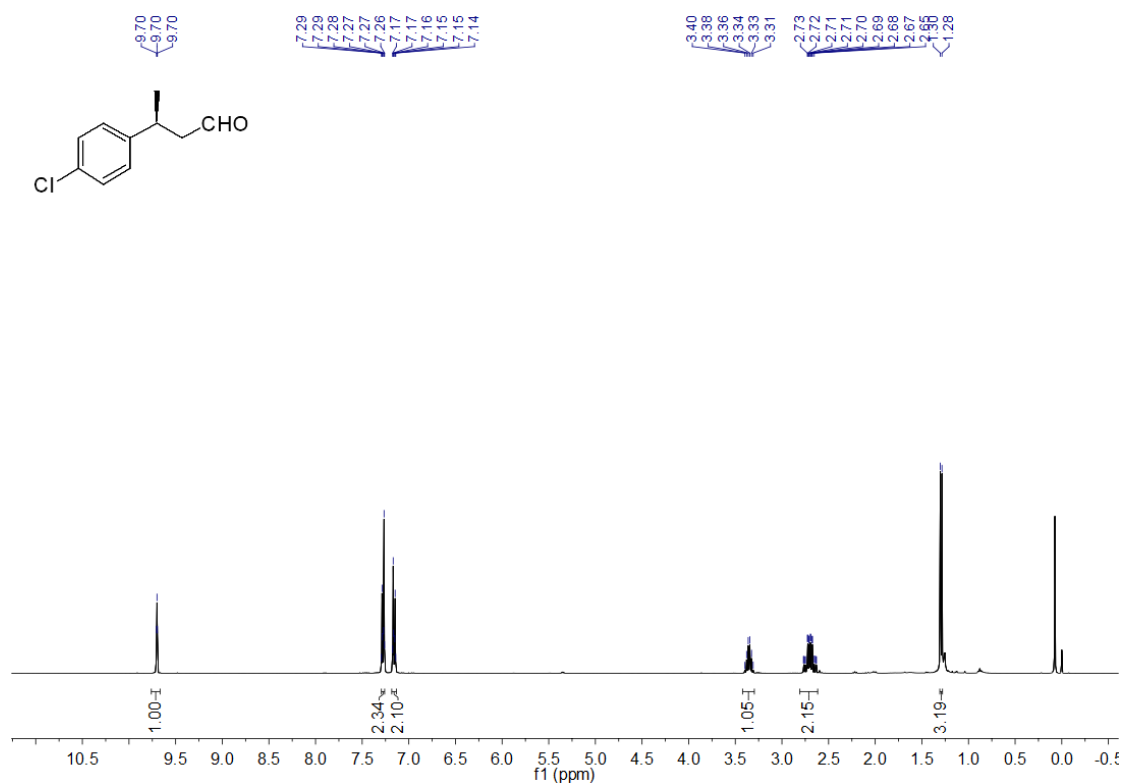
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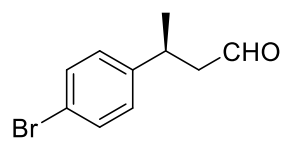




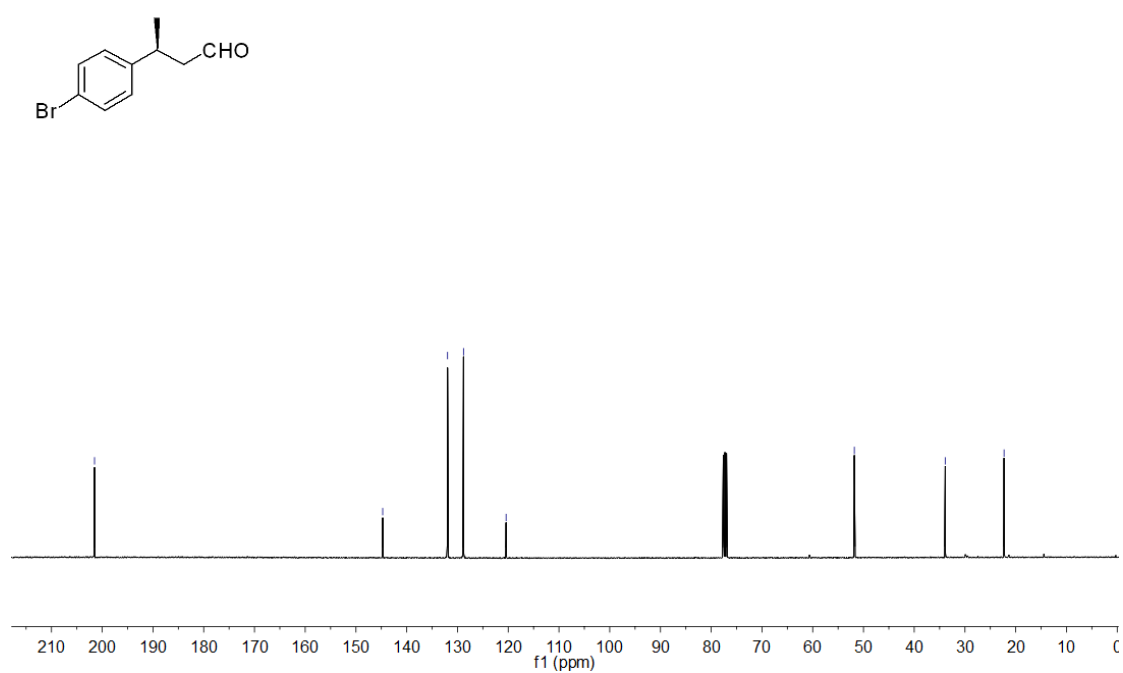
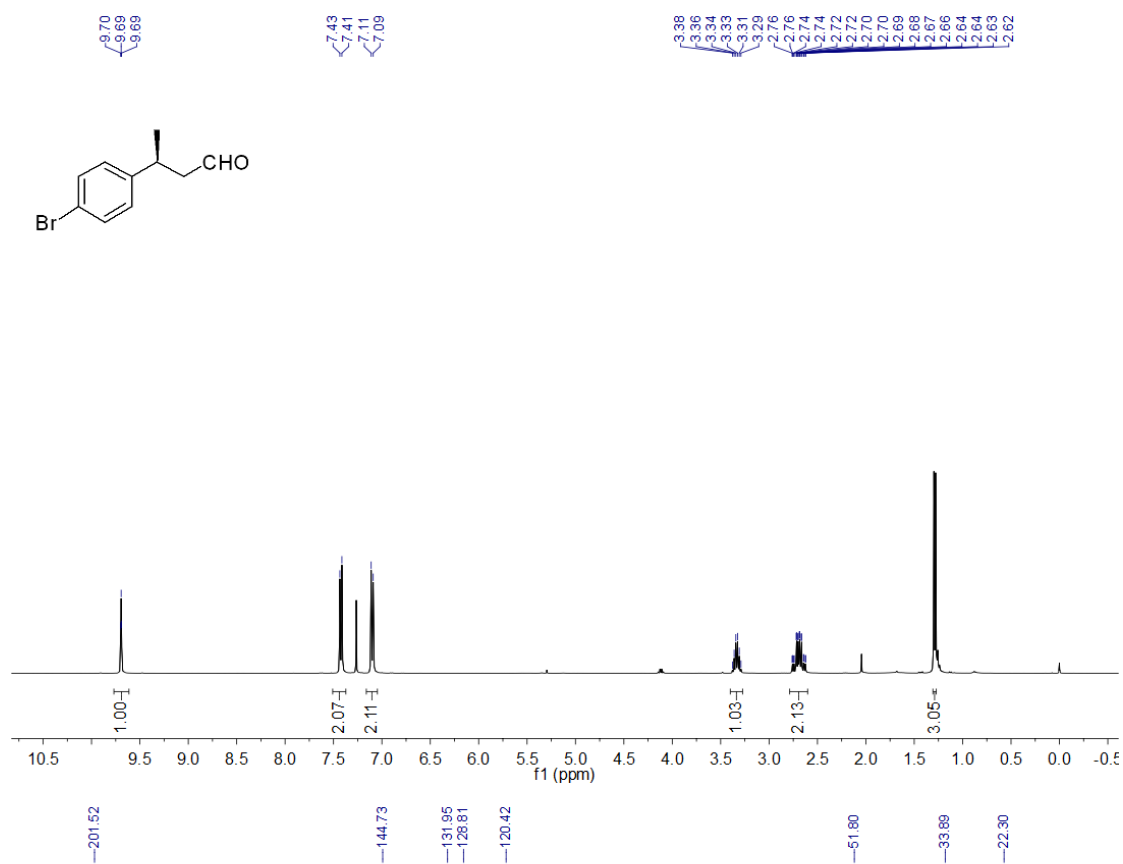


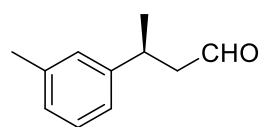
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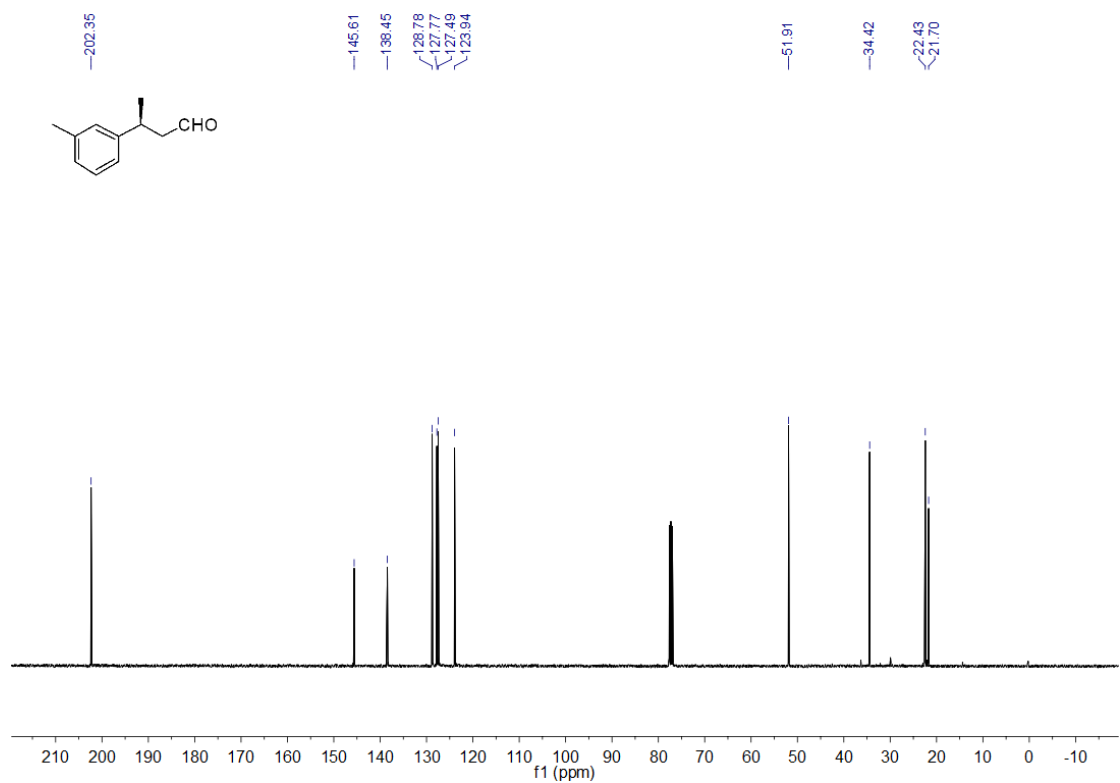
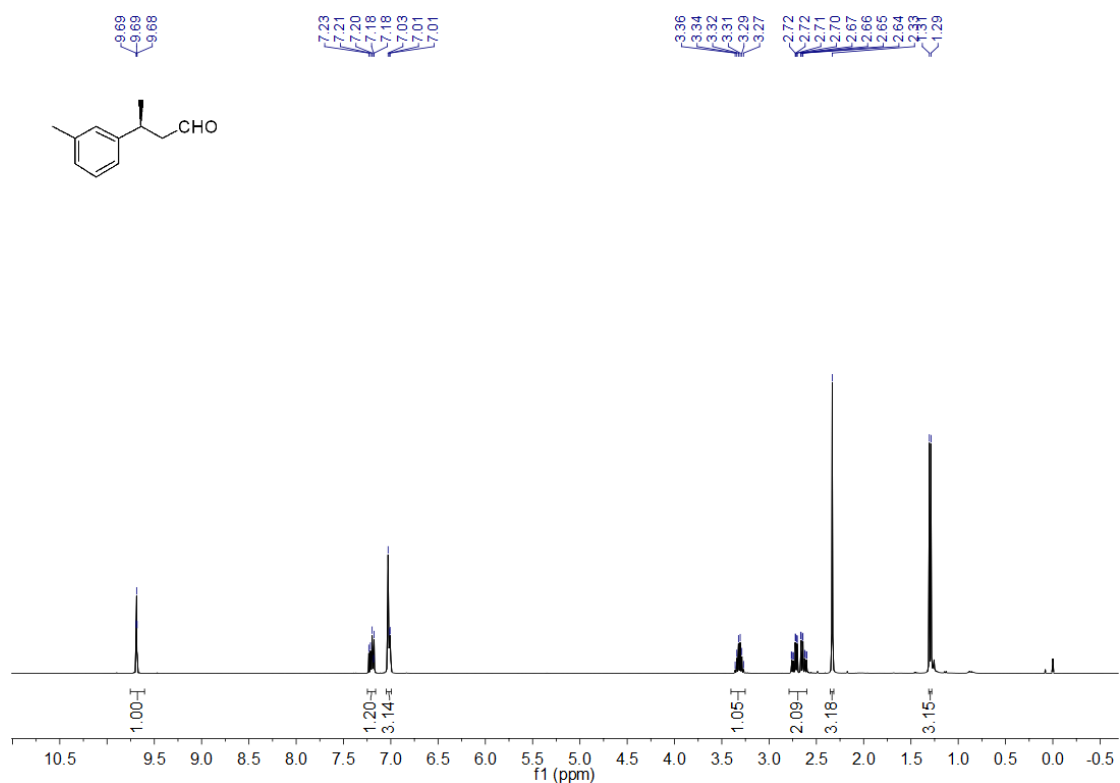


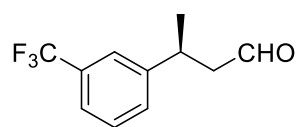
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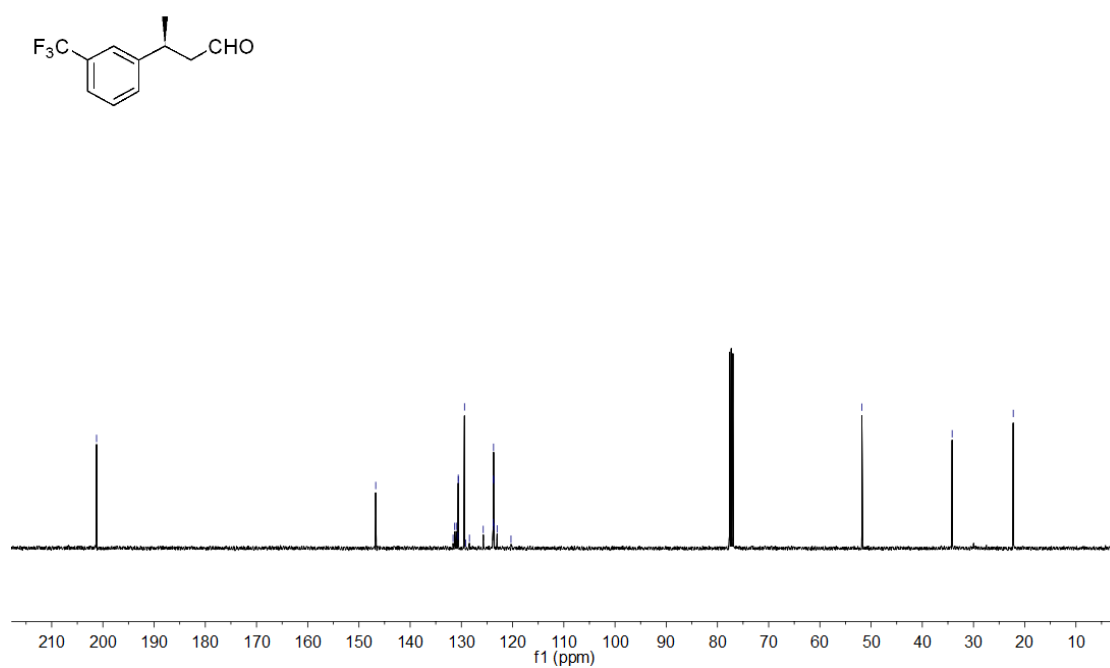
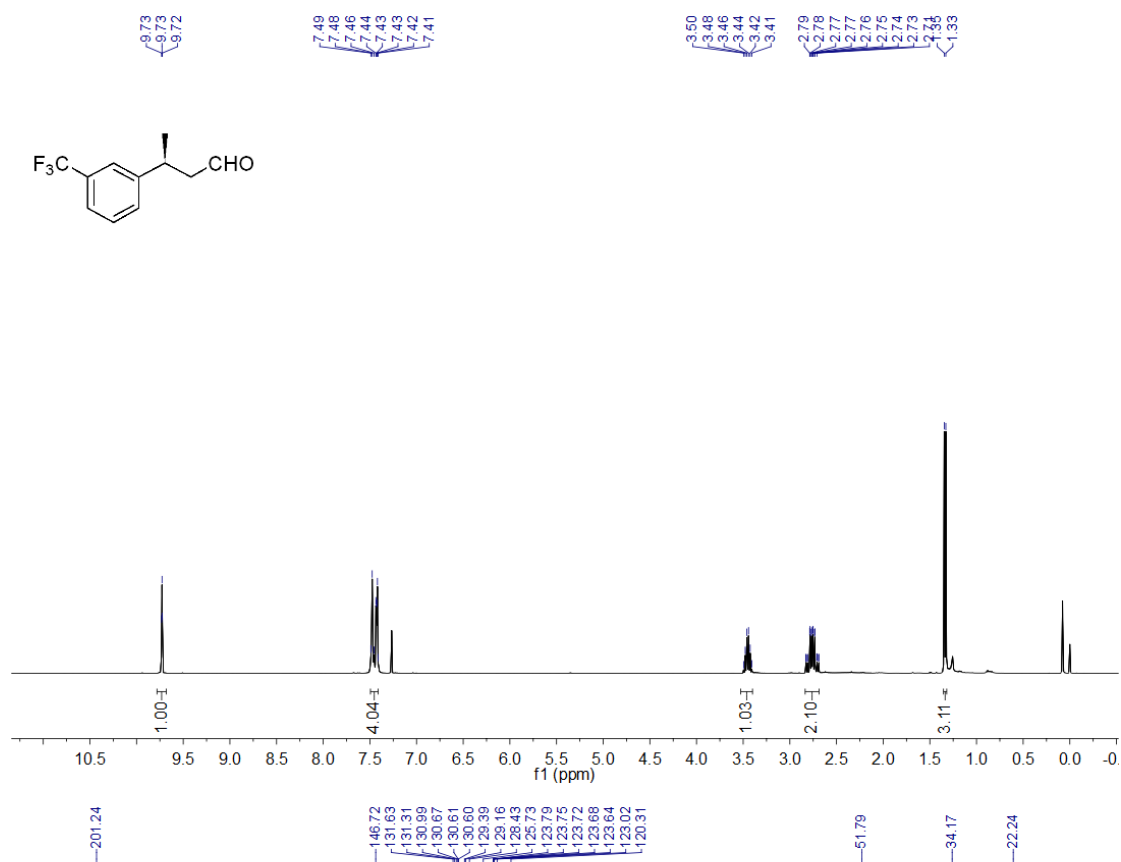


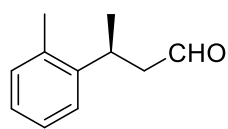
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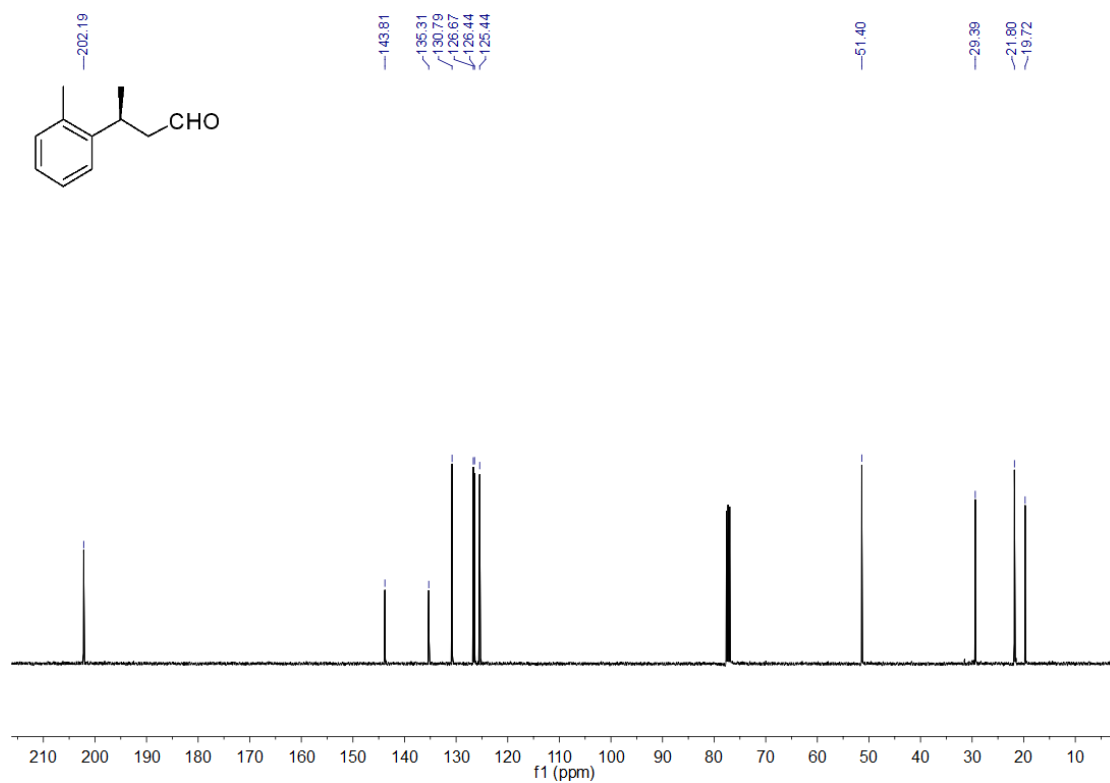
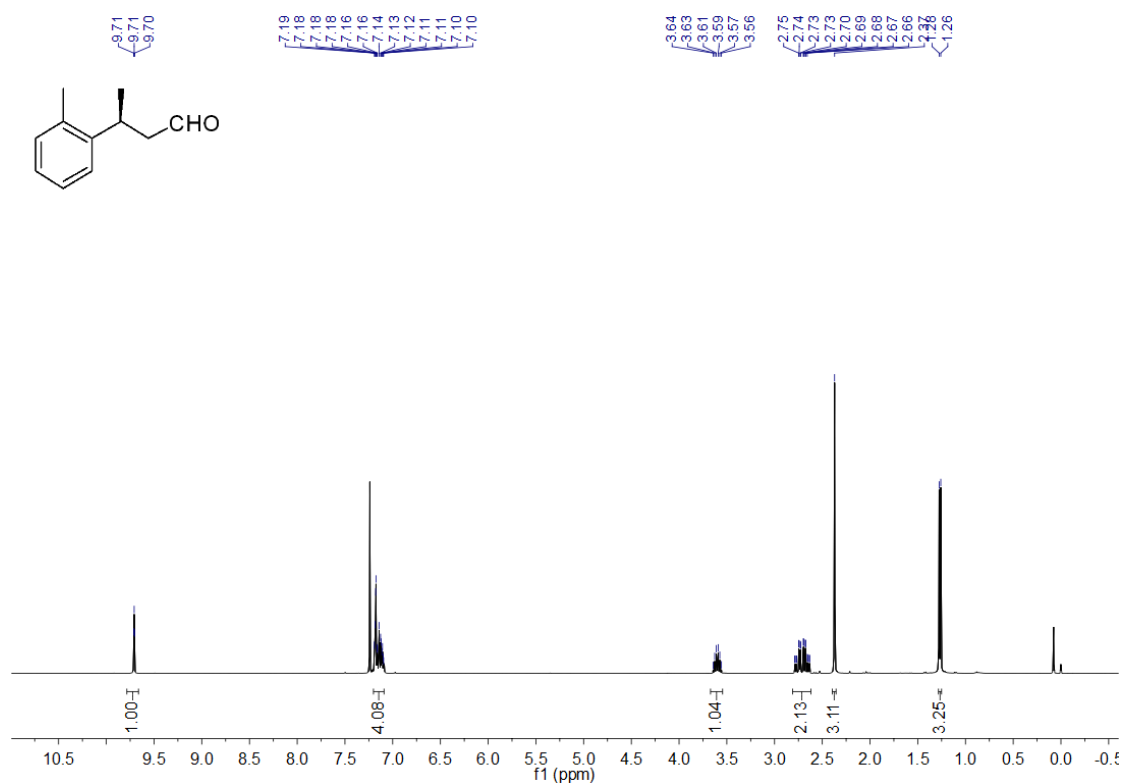


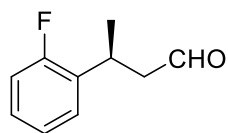
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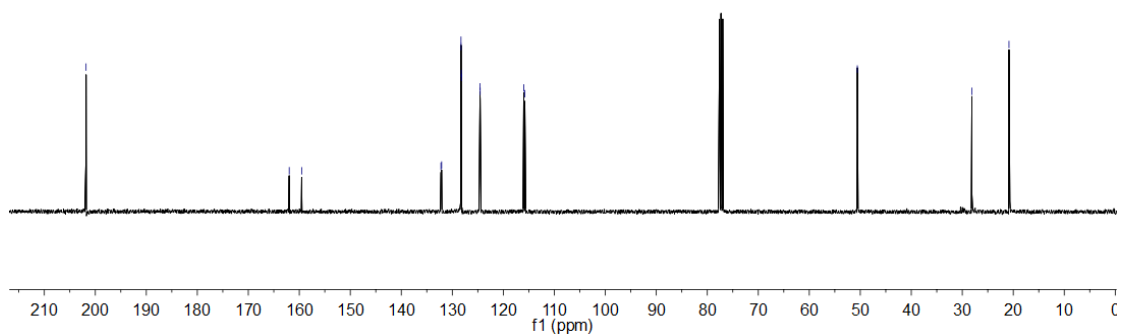
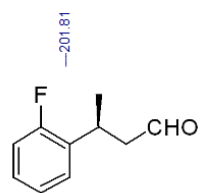
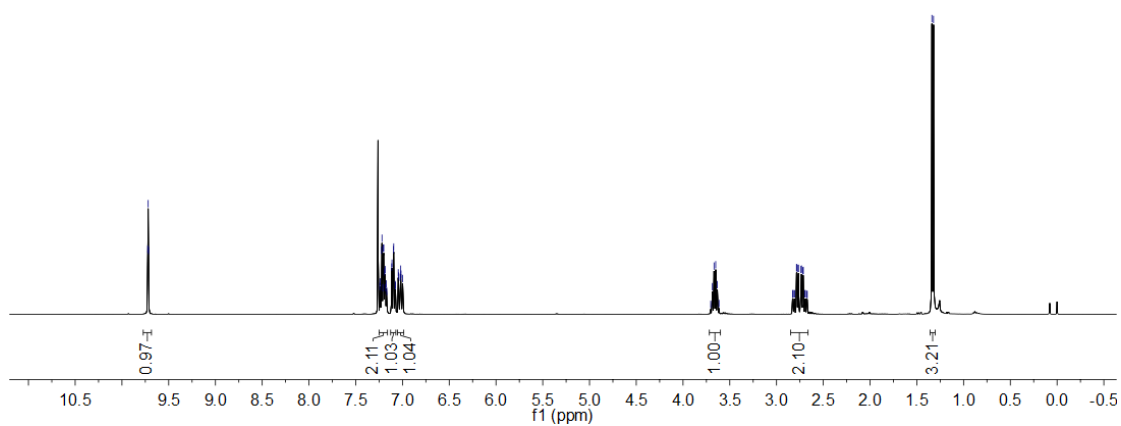
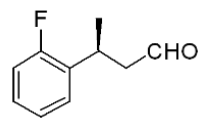


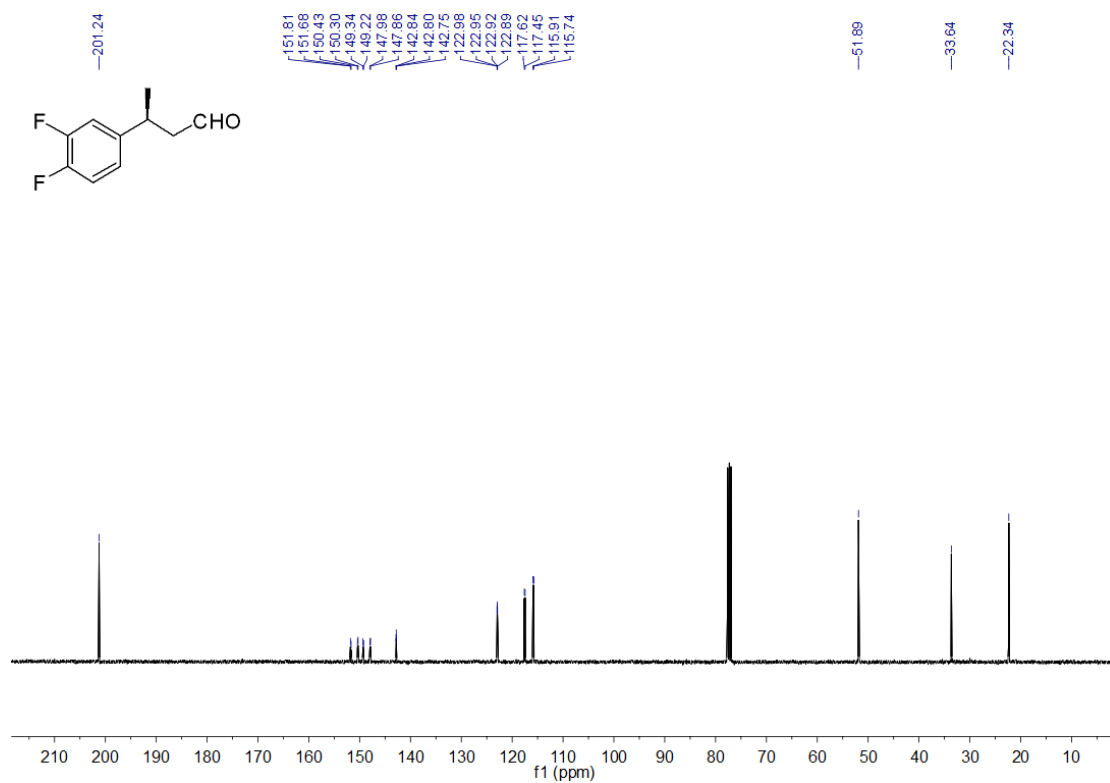
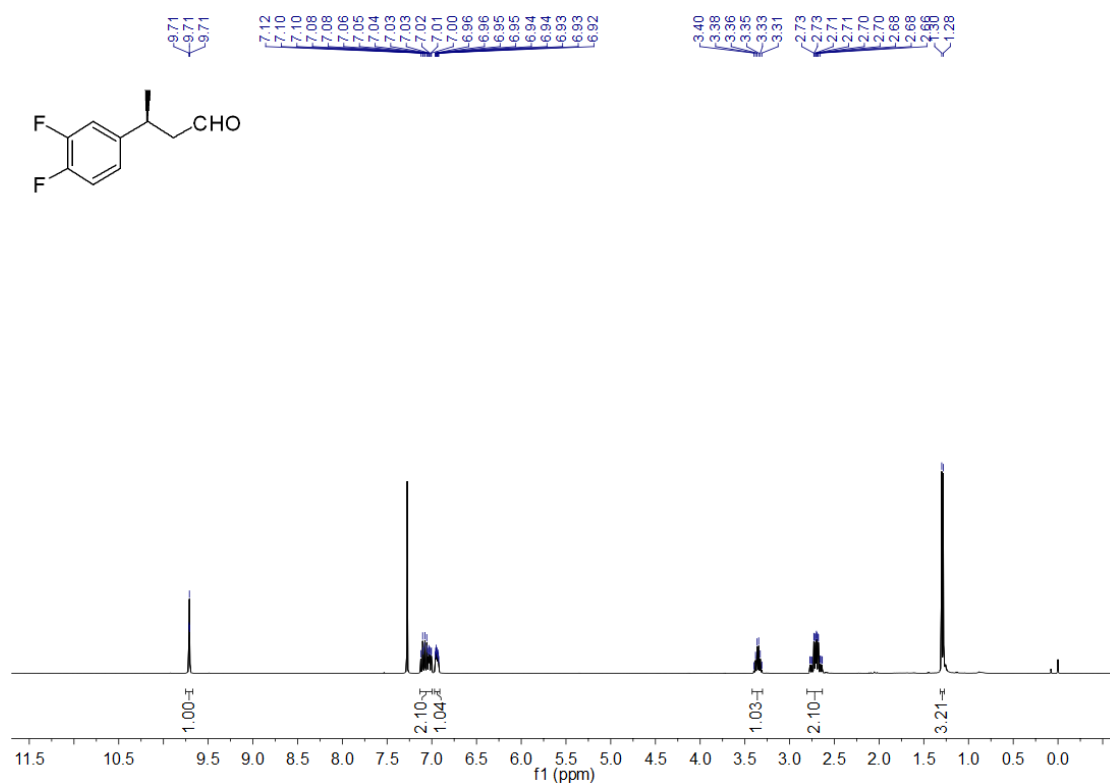
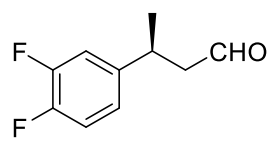
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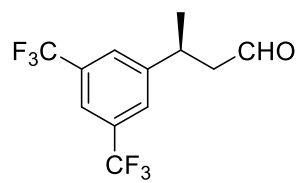




2m





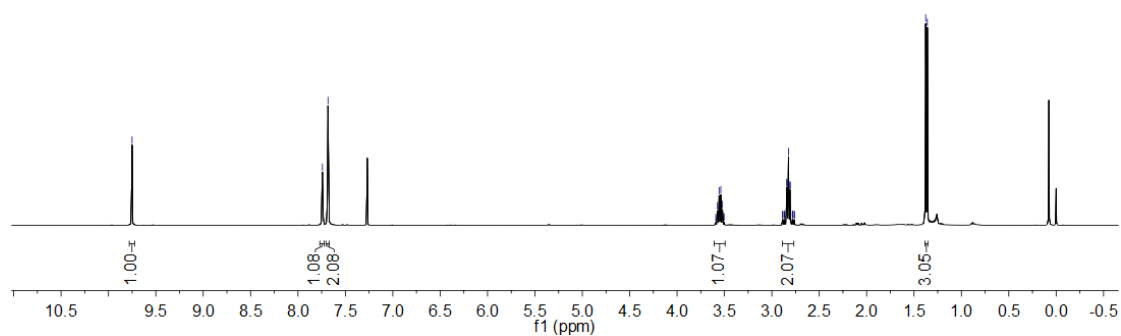
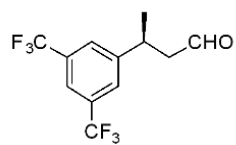


2o

9.75

7.74
7.68

3.59
3.57
3.56
3.54
3.52
3.50
2.87
2.84
2.84
2.82
2.81
2.78
2.77
1.36



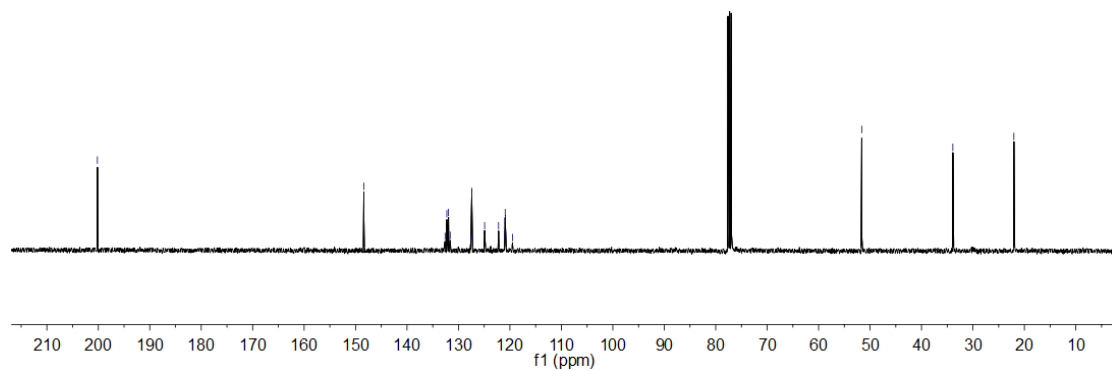
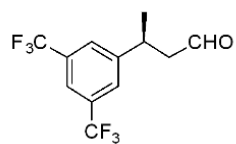
200.18

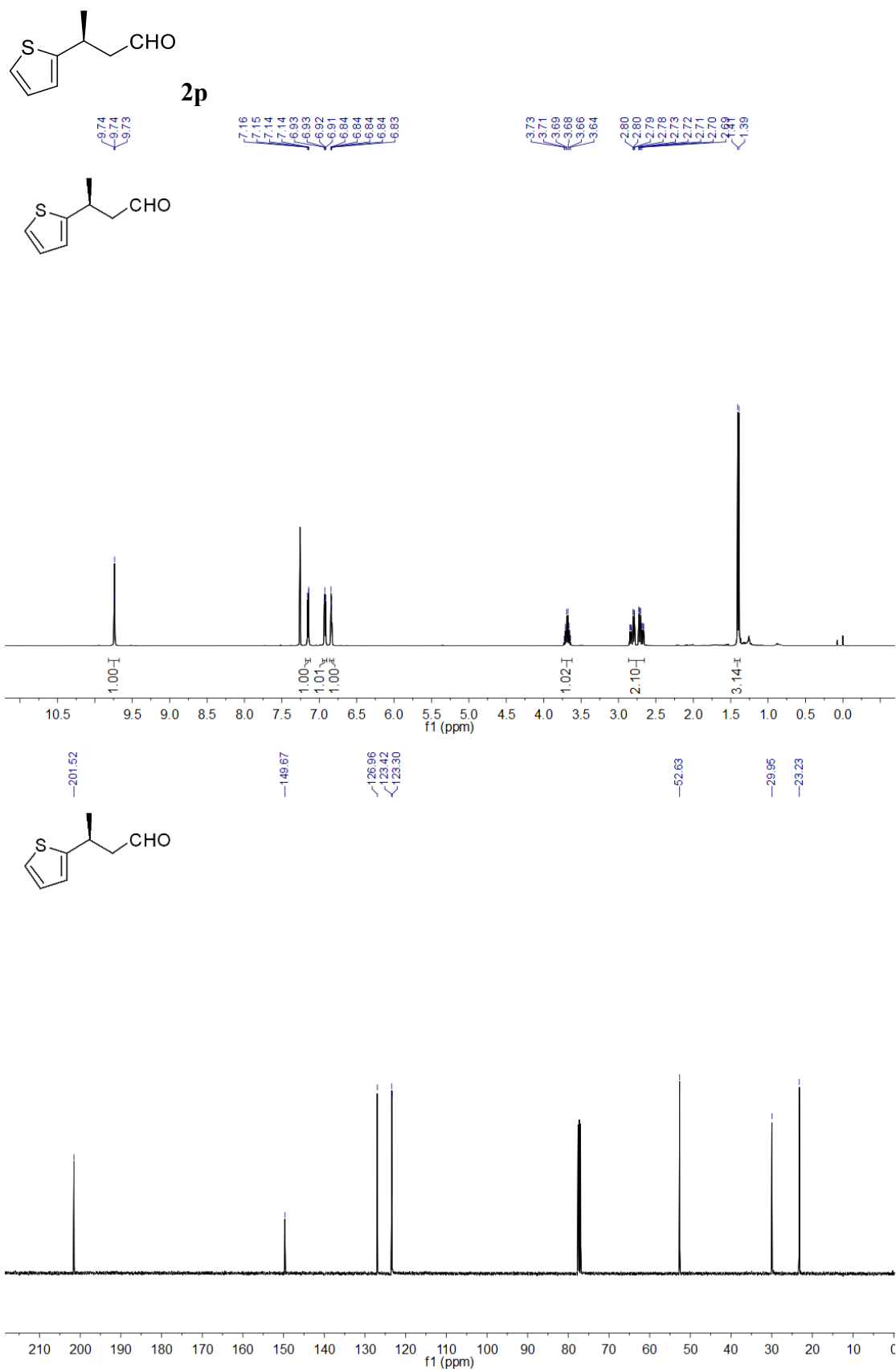
148.40
132.59
132.26
131.93
131.61
127.63
127.43
127.40
124.92
122.21
120.99
120.95
120.82
120.80
120.64
119.50

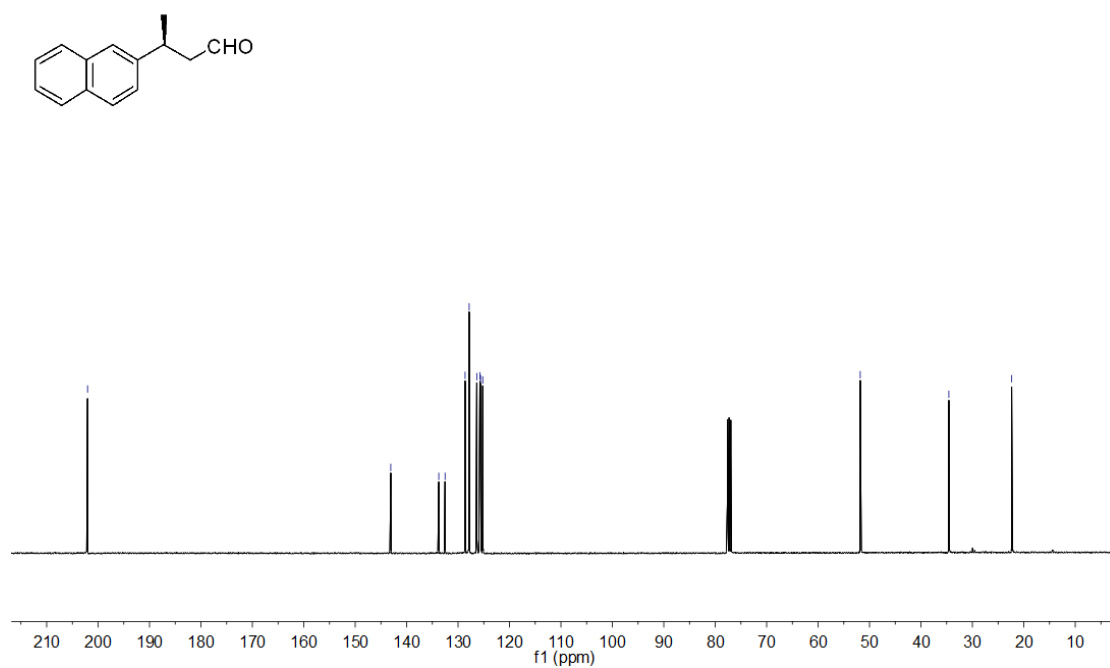
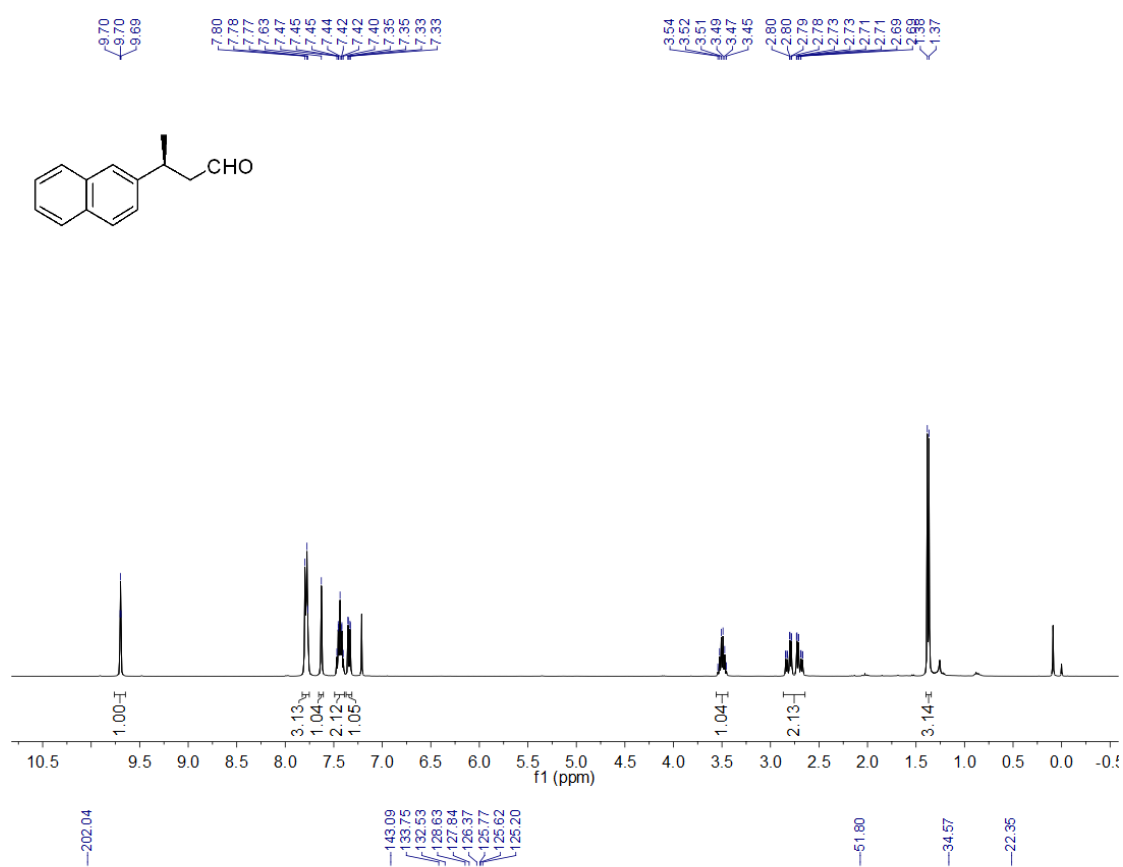
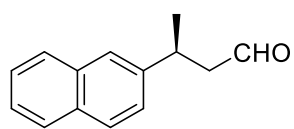
51.62

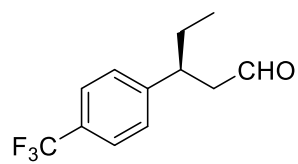
33.90

22.04

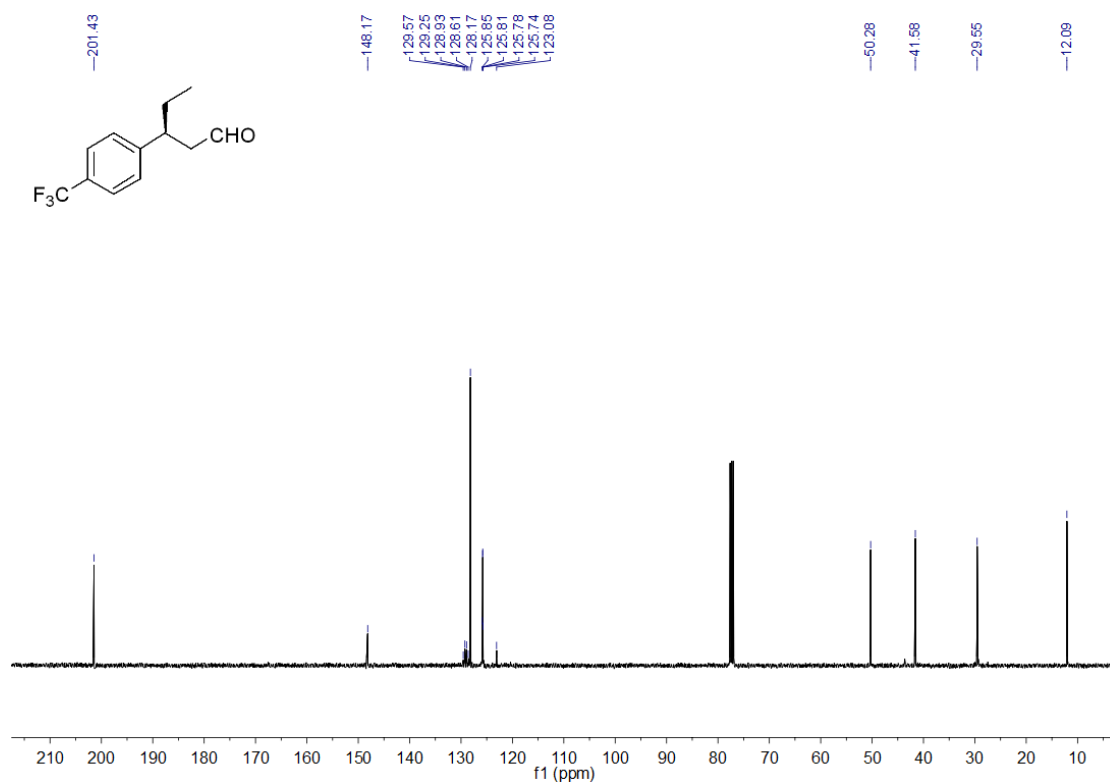
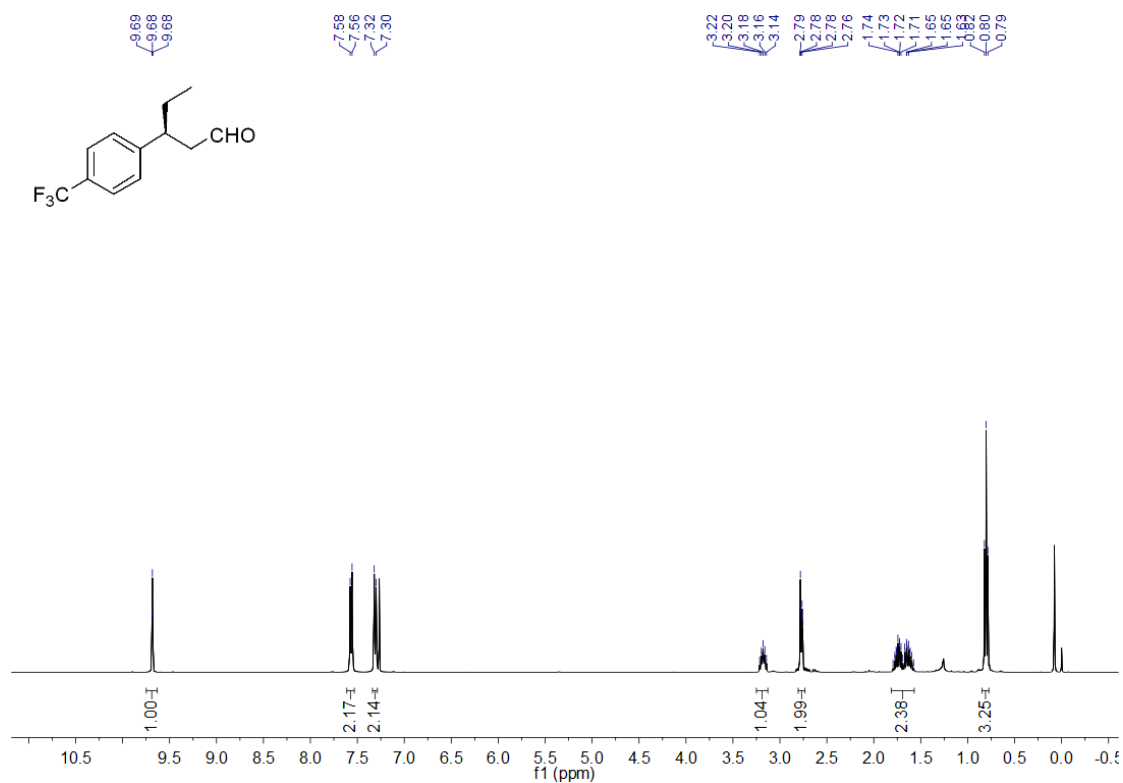


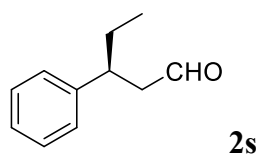






2r

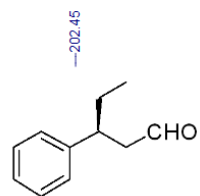
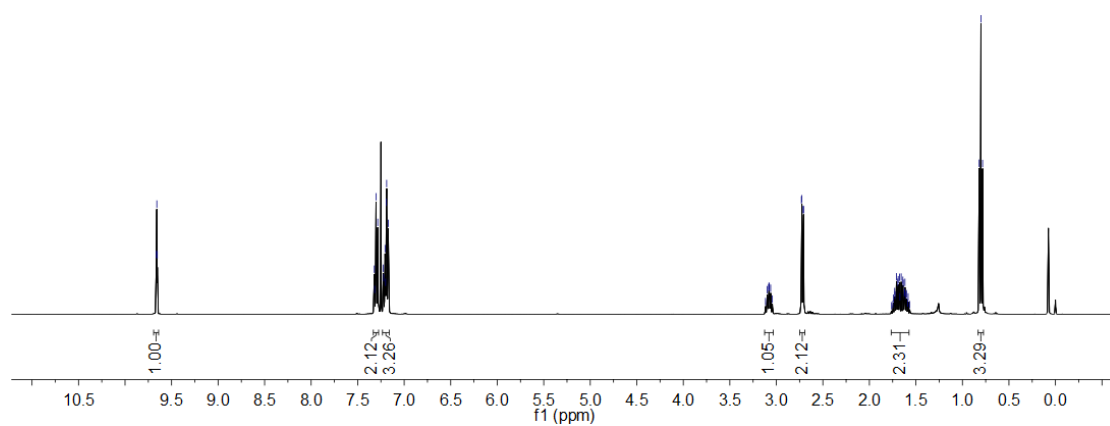
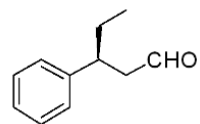




9.66
9.66
9.65

7.32
7.32
7.30
7.28
7.22
7.22
7.21
7.20
7.19
7.17

3.12
3.10
3.08
3.08
3.08
3.04
2.73
2.71
2.71
1.71
1.69
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1.66
1.64
1.62
0.80
0.78



202.45

143.84

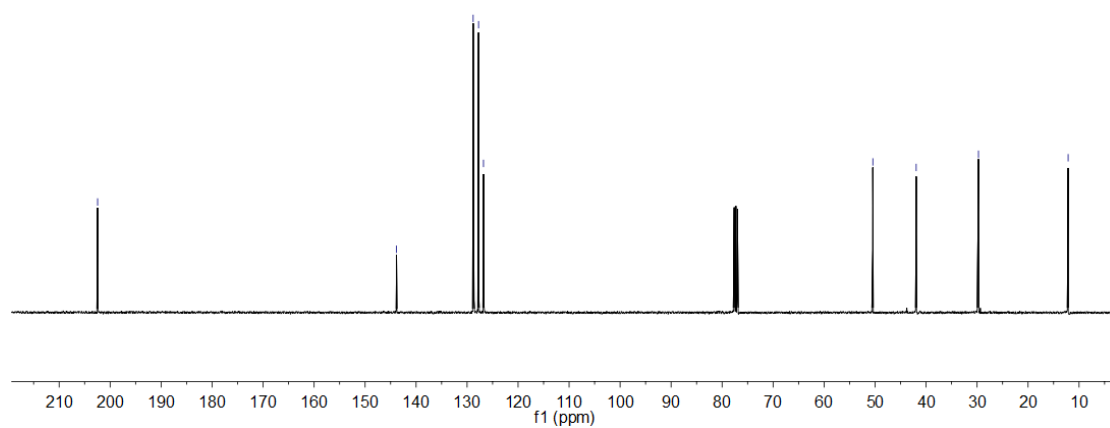
128.81
127.75
126.79

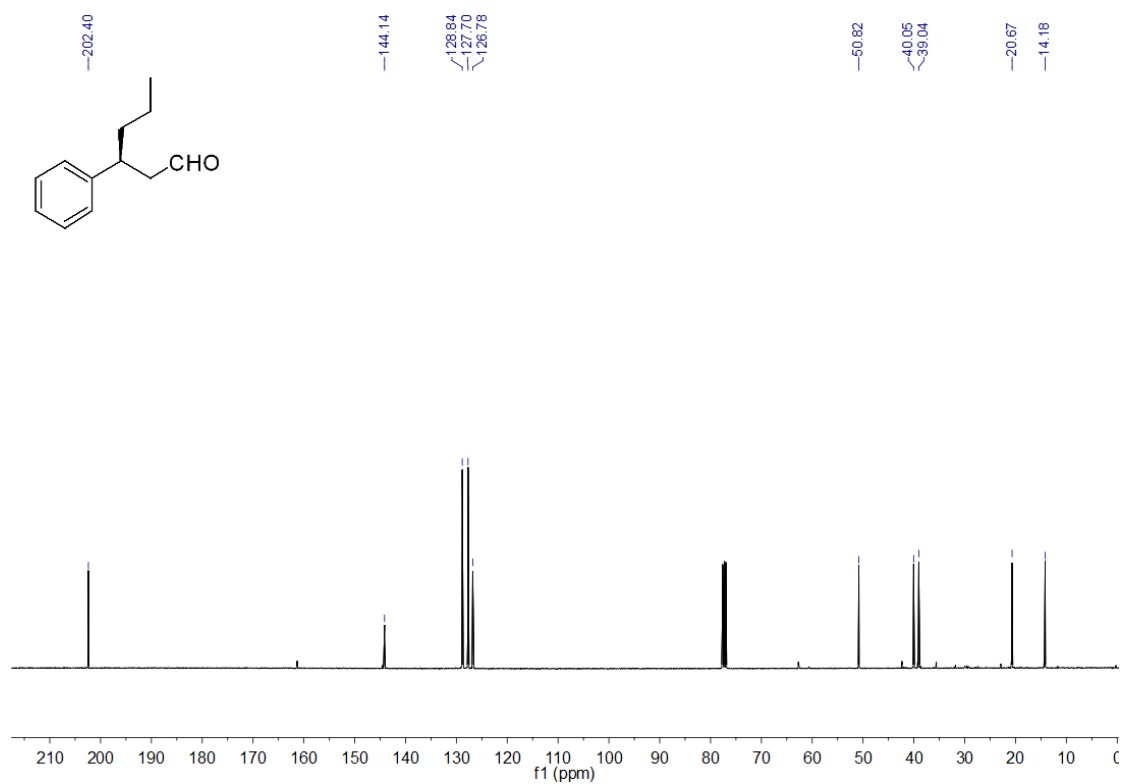
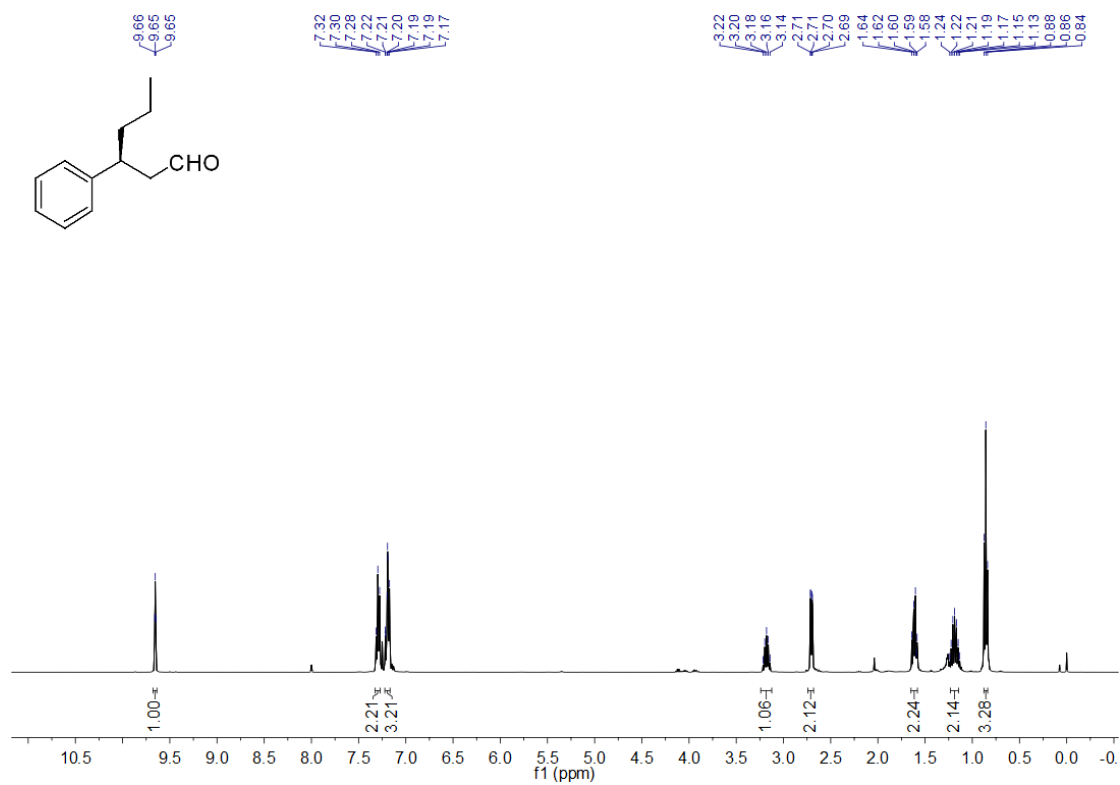
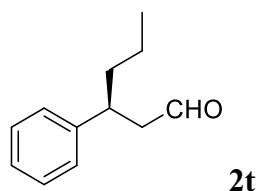
50.44

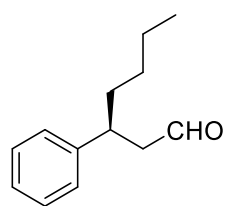
41.94

29.73

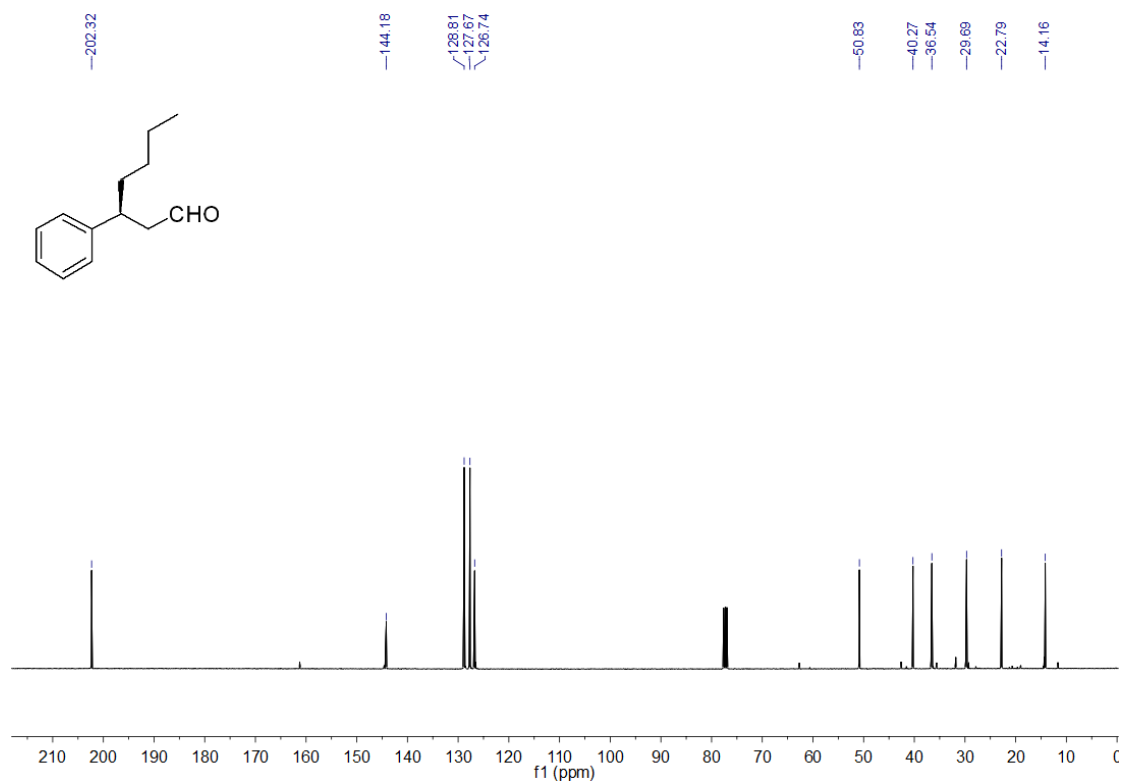
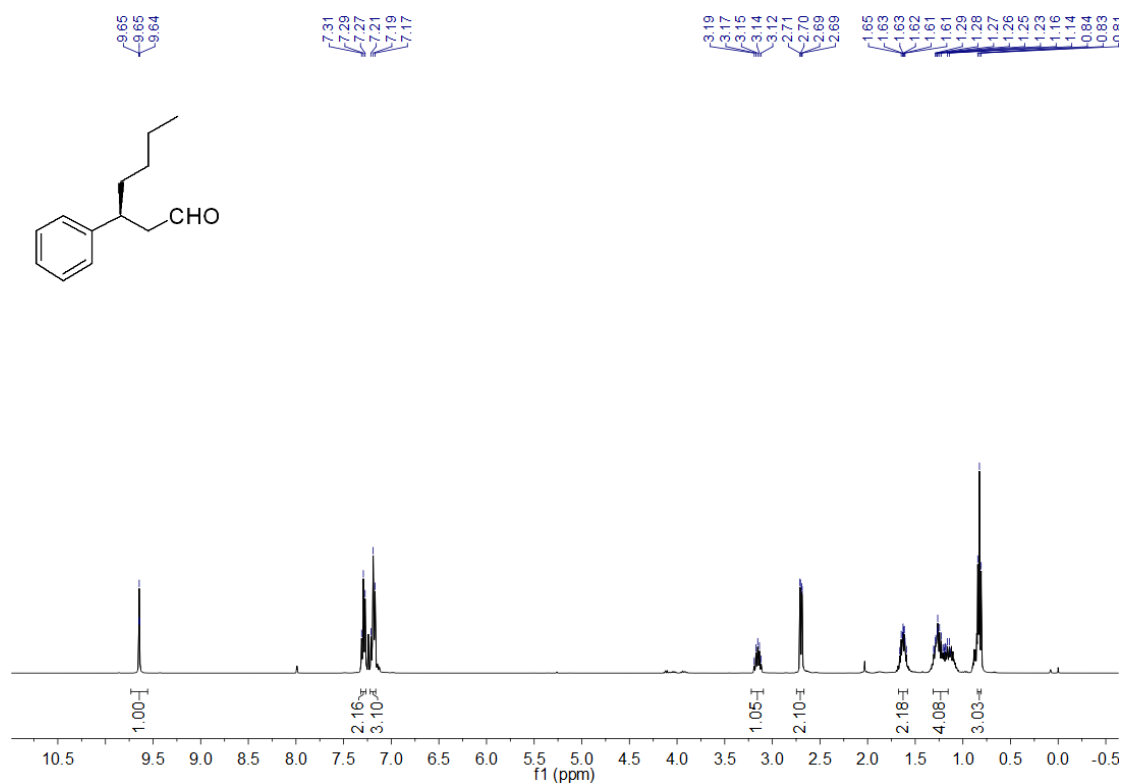
12.15

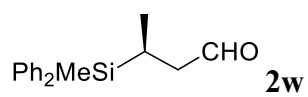
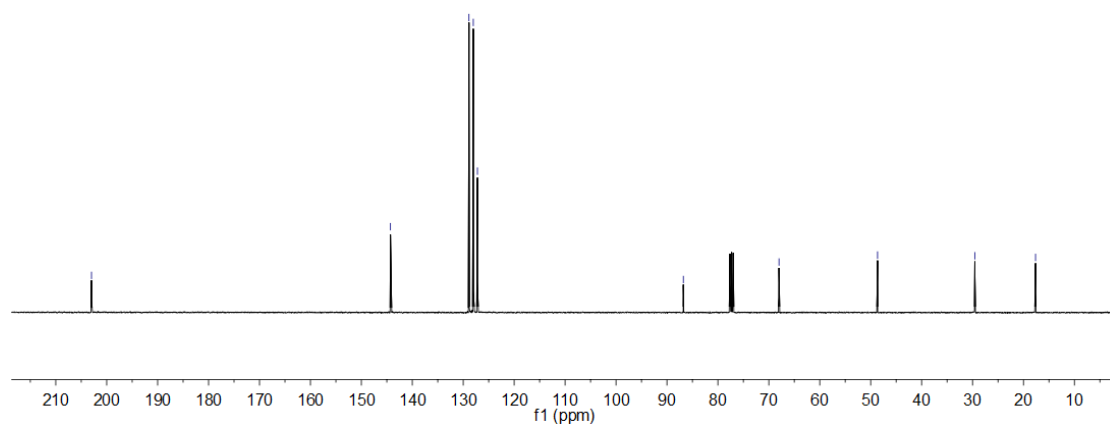
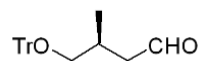
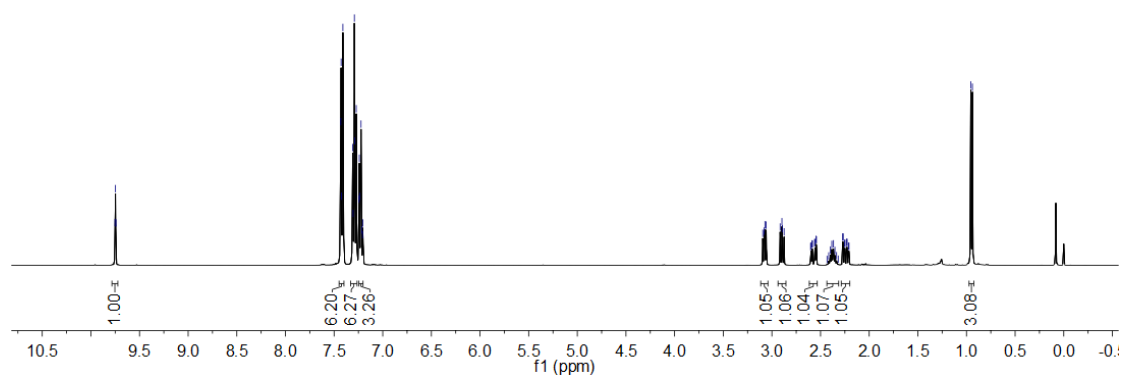
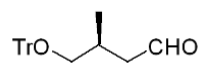
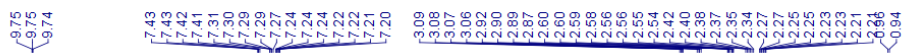
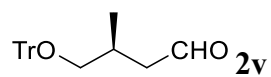


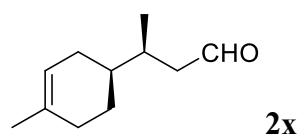




2u

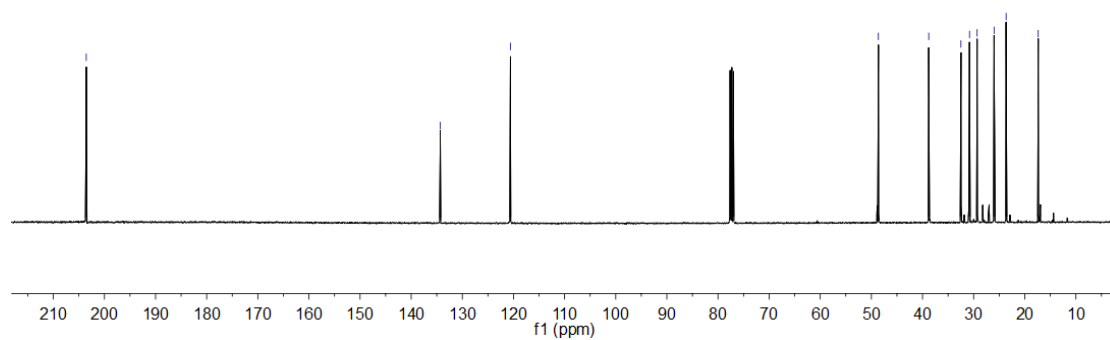
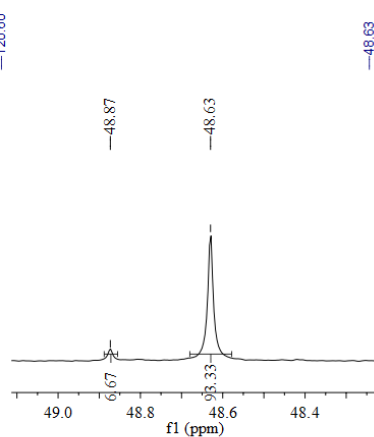
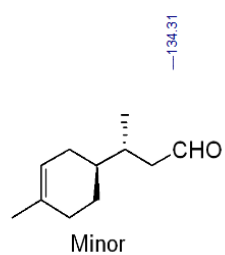
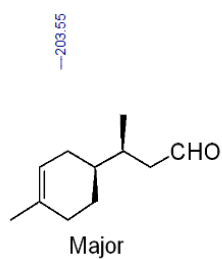
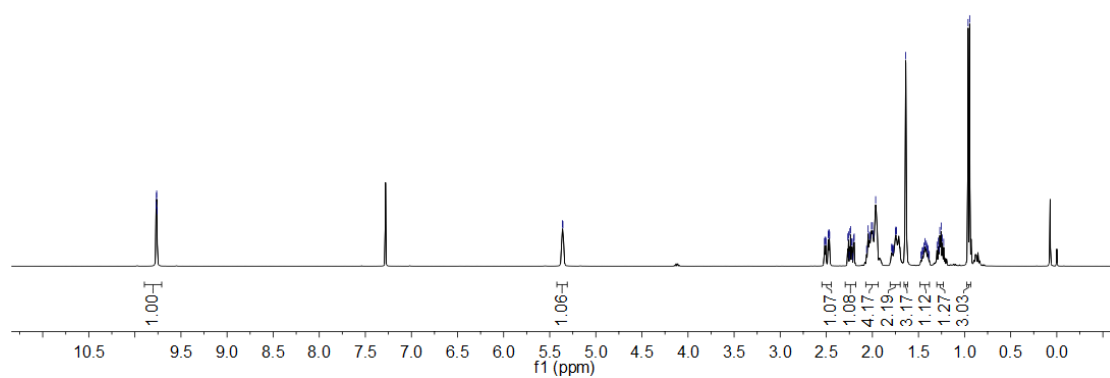
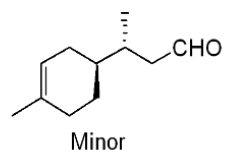
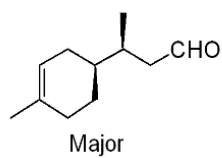


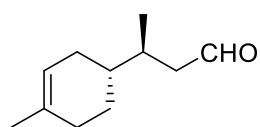




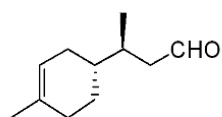
9.77
9.76
9.76

5.36
5.36
2.52
2.51
2.50
2.48
2.48
2.47
2.46
2.27
2.26
2.24
2.24
2.23
2.22
2.20
2.20
2.05
2.03
2.03
2.01
2.00
1.99
1.96
1.75
1.74
1.64
1.43
1.28
1.25
1.24
0.96
0.94

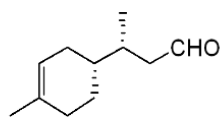




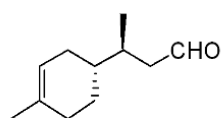
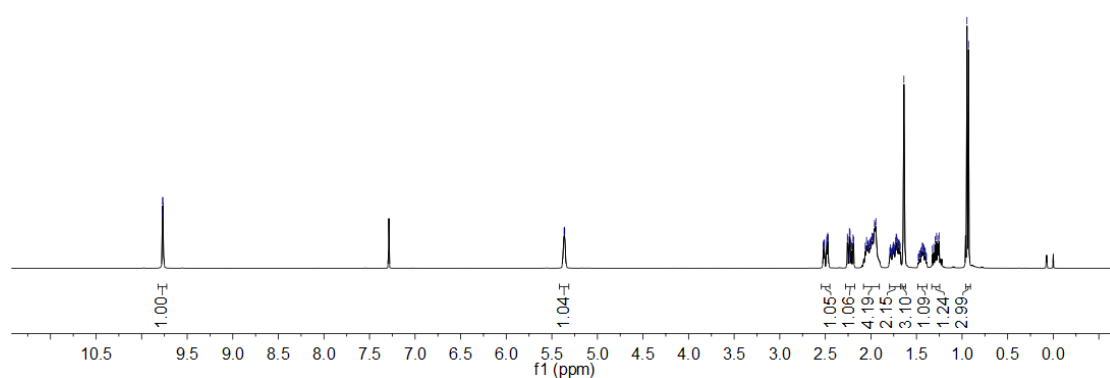
2y



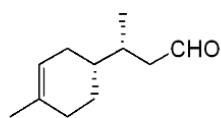
Major



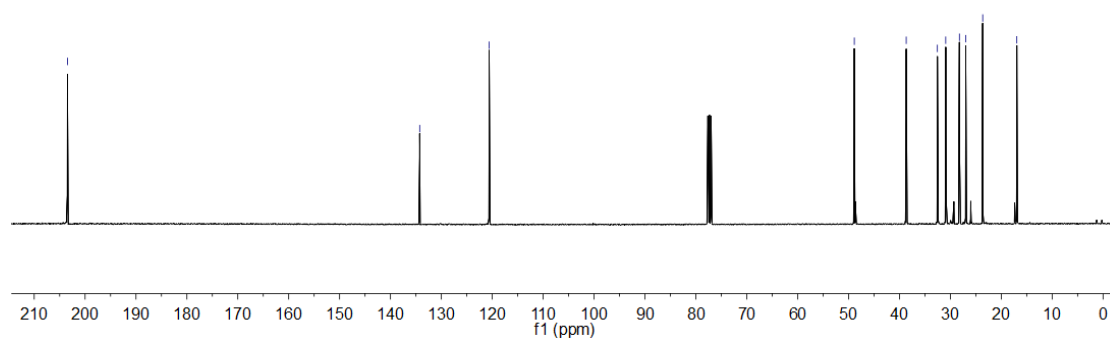
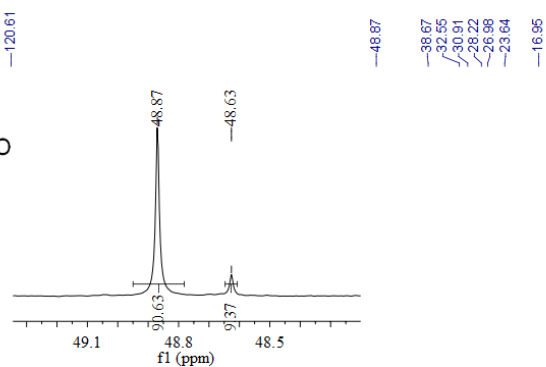
Minor



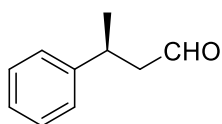
Major



Minor

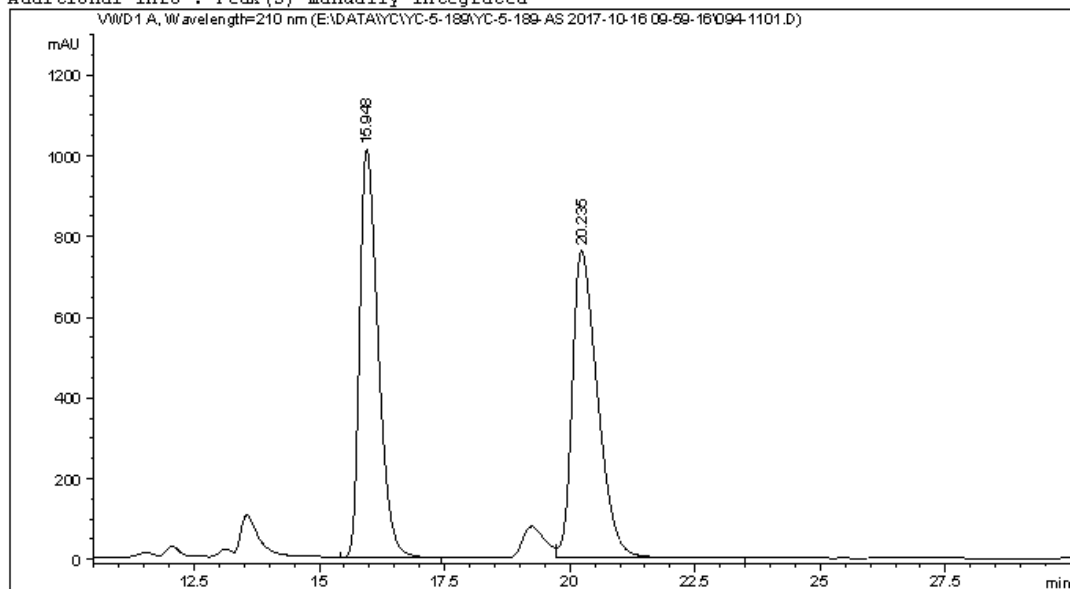


8. HPLC and GC spectra



Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\094-1101.D
Sample Name: YC-5-177-1-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   11
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 94
Injection Date  : 10/16/2017 3:38:29 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M
Last changed    : 10/16/2017 9:59:16 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/17/2017 8:38:14 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



Area Percent Report

```
=====
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: VWD1 A, Wavelength=210 nm

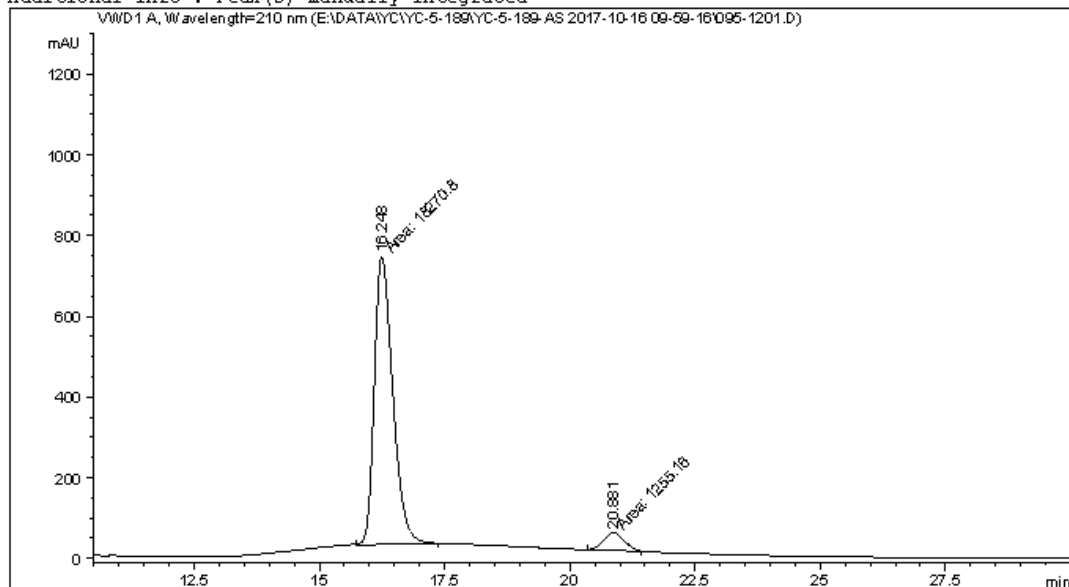
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.948	BB	0.3952	2.59073e4	1010.30176	49.1134
2	20.235	VB	0.5366	2.68427e4	762.71033	50.8866

Totals : 5.27500e4 1773.01208

*** End of Report ***

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\095-1201.D
Sample Name: YC-5-173

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   12
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 95
Injection Date  : 10/16/2017 4:19:15 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M
Last changed    : 10/16/2017 9:59:16 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/17/2017 8:38:14 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

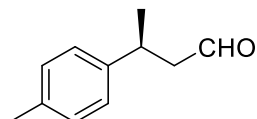
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	16.248	MM	0.4275	1.82708e4	712.24023	93.5718
2	20.881	MM	0.4841	1255.16406	43.20892	6.4282

Totals : 1.95260e4 755.44916

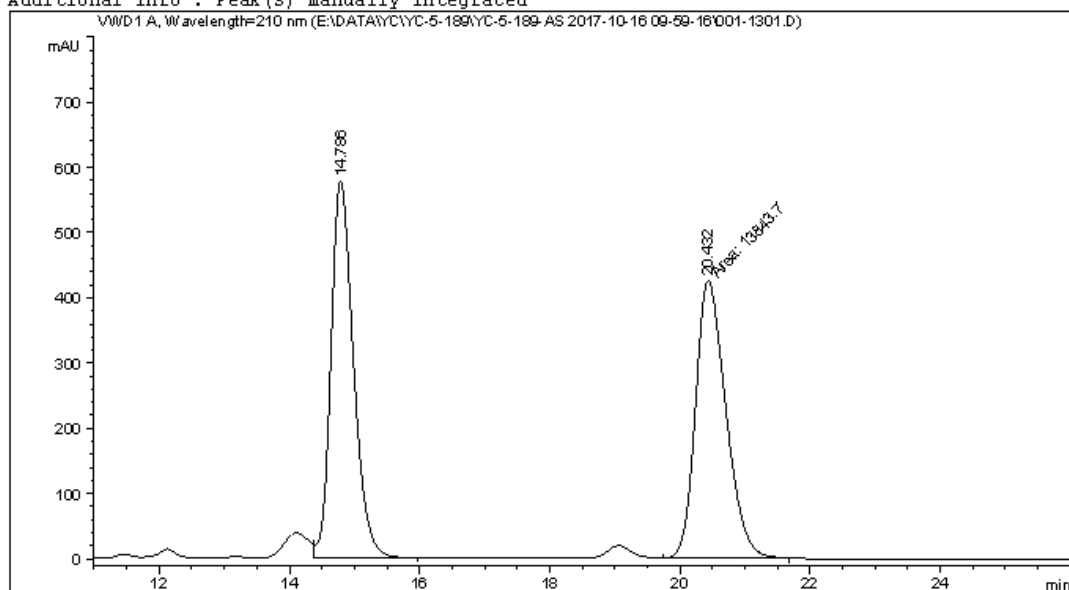
=====
*** End of Report ***



2b

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\001-1301.D
Sample Name: YC-5-174-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   13
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 1
Injection Date  : 10/16/2017 5:00:00 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M
Last changed    : 10/16/2017 9:59:16 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/17/2017 8:32:19 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	14.786	VB	0.3658	1.38191e4	578.30658	49.9555
2	20.432	MM	0.5418	1.38437e4	425.88101	50.0445

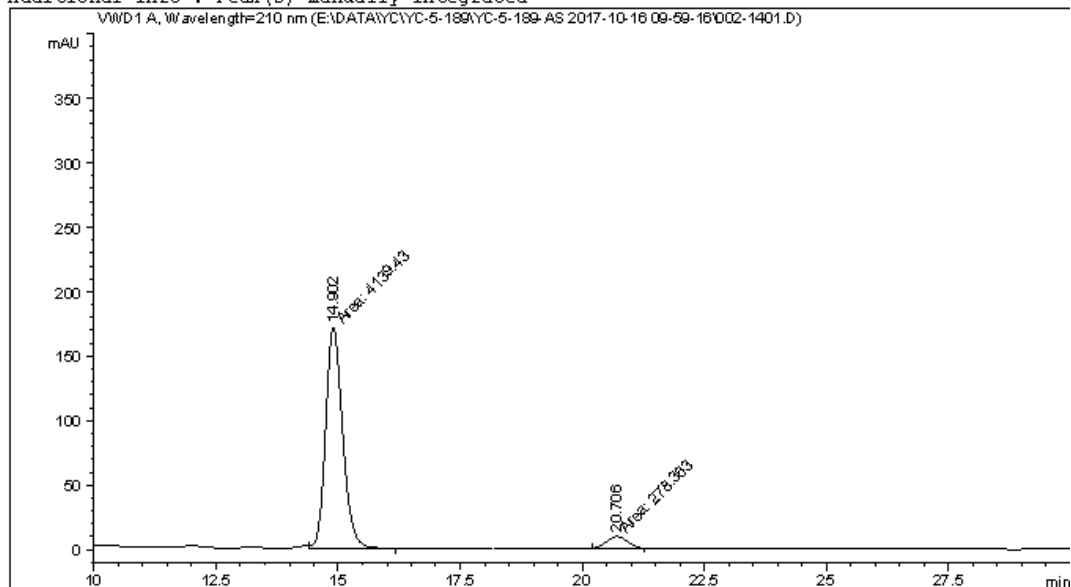
Totals : 2.76629e4 1004.18759

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

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\002-1401.D
Sample Name: YC-5-189-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   14
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 2
Injection Date  : 10/16/2017 5:40:44 PM        Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M
Last changed    : 10/16/2017 9:59:16 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/17/2017 8:33:26 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

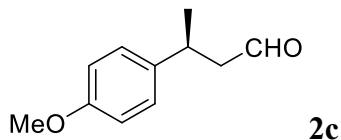
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	14.902	FM	0.4028	4139.42578	171.25958	93.6990
2	20.706	MM	0.5053	278.36307	9.18163	6.3010

Totals : 4417.78885 180.44122

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

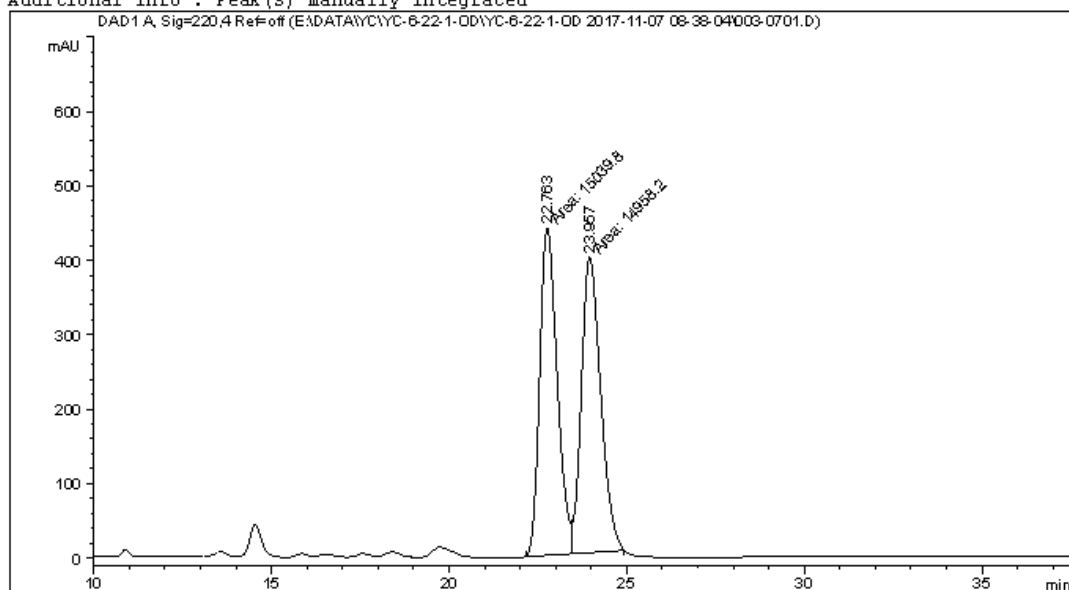


Data File E:\DATA\YC\YC-6-22-1-0D\YC-6-22-1-0D 2017-11-07 08-38-04\003-0701.D
Sample Name: YC-6-22-2-RAC

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    7
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 3
Injection Date  : 11/7/2017 11:46:54 AM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-22-1-0D\YC-6-22-1-0D 2017-11-07 08-38-04\DAD-0D(1-2)-98-
                  2-1ML-3UL-210-254NM-60MIN.M
Last changed    : 11/7/2017 11:18:16 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-22-1-0D\YC-6-22-1-0D 2017-11-07 08-38-04\DAD-0D(1-2)-98-
                  2-1ML-3UL-210-254NM-60MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:21:39 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated

```



```

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

```

```

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

```

Signal 1: DAD1 A, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	22.763	MF	0.5694	1.50398e4	440.18826	50.1360
2	23.957	FM	0.6282	1.49582e4	396.82300	49.8640

Totals : 2.99980e4 837.01126

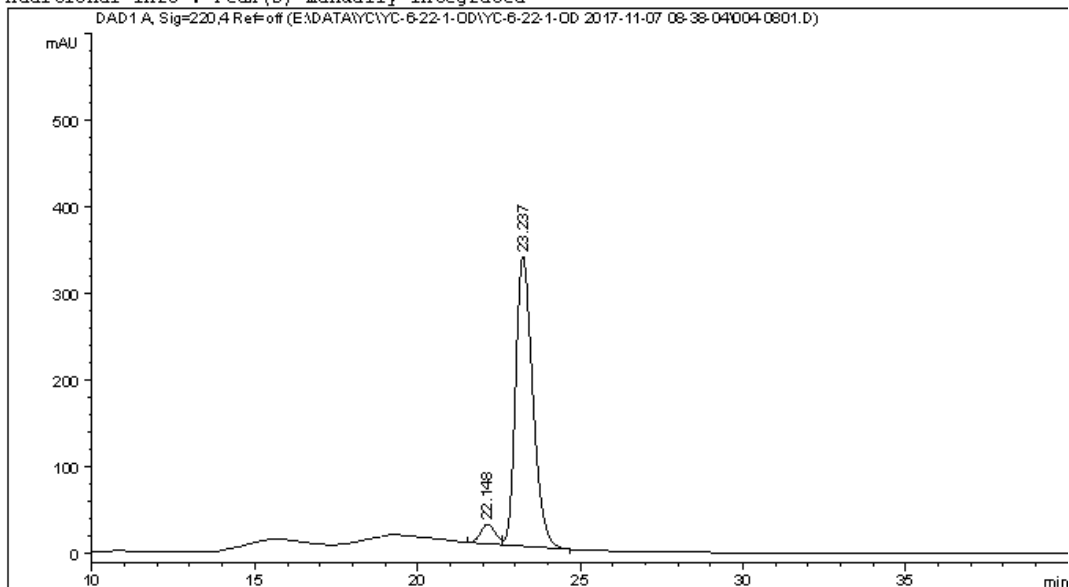
```

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

```

Data File E:\DATA\YC\YC-6-22-1-OD\YC-6-22-1-OD 2017-11-07 08-38-04\004-0801.D
Sample Name: YC-6-22-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    8
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 4
Injection Date  : 11/7/2017 12:47:48 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-22-1-OD\YC-6-22-1-OD 2017-11-07 08-38-04\DAD-OD(1-2)-98-
                  2-1ML-3UL-210-254NM-60MIN.M
Last changed    : 11/7/2017 11:18:16 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-22-1-OD\YC-6-22-1-OD 2017-11-07 08-38-04\DAD-OD(1-2)-98-
                  2-1ML-3UL-210-254NM-60MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:22:40 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

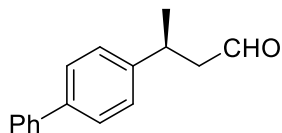
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=220,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	22.148	BV	0.4953	711.10693	22.46354	5.4959
2	23.237	VB	0.5627	1.22278e4	334.30325	94.5041

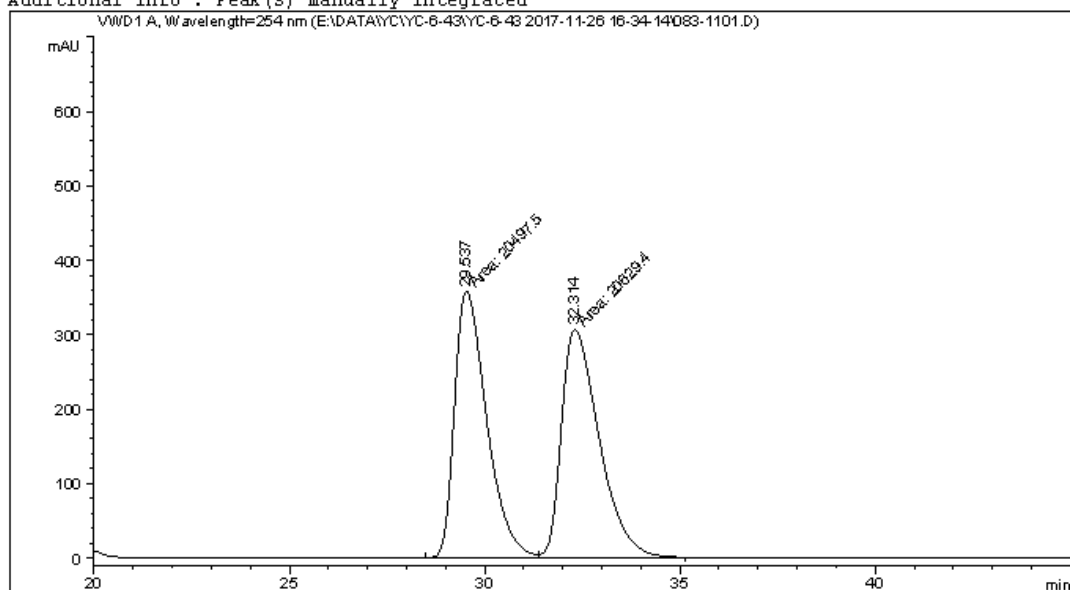
Totals : 1.29389e4 356.76679

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



Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\083-1101.D
 Sample Name: YC-6-42-3

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   11
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 83
Injection Date  : 11/26/2017 11:29:25 PM      Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  254NM-45MIN.M
Last changed    : 11/26/2017 4:34:14 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  254NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:20:36 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	29.537	MF	0.9534	2.04975e4	358.33551	49.8397
2	32.314	FM	1.1208	2.06294e4	306.76285	50.1603

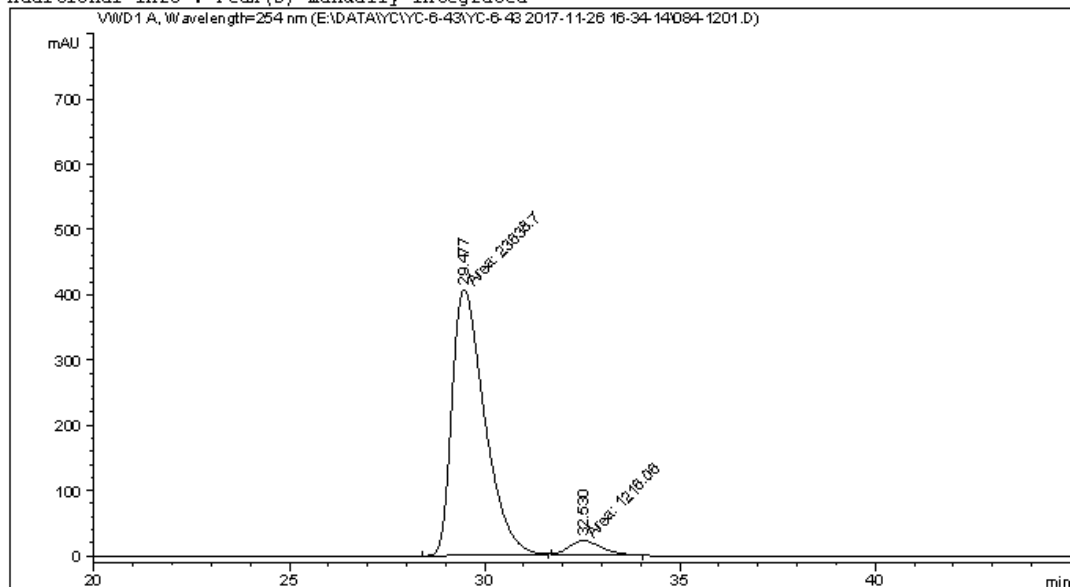
```
Totals :                      4.11268e4  665.09836
```

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

Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\084-1201.D
Sample Name: YC-6-43-6

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   12
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 84
Injection Date  : 11/27/2017 12:15:10 AM      Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  254NM-45MIN.M
Last changed    : 11/26/2017 4:34:14 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  254NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:22:57 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

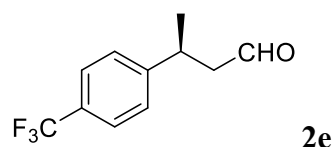
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=254 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	29.477	MM	0.9661	2.36387e4	407.78900	95.1073
2	32.530	MM	0.9488	1216.06433	21.36193	4.8927

Totals : 2.48548e4 429.15094

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

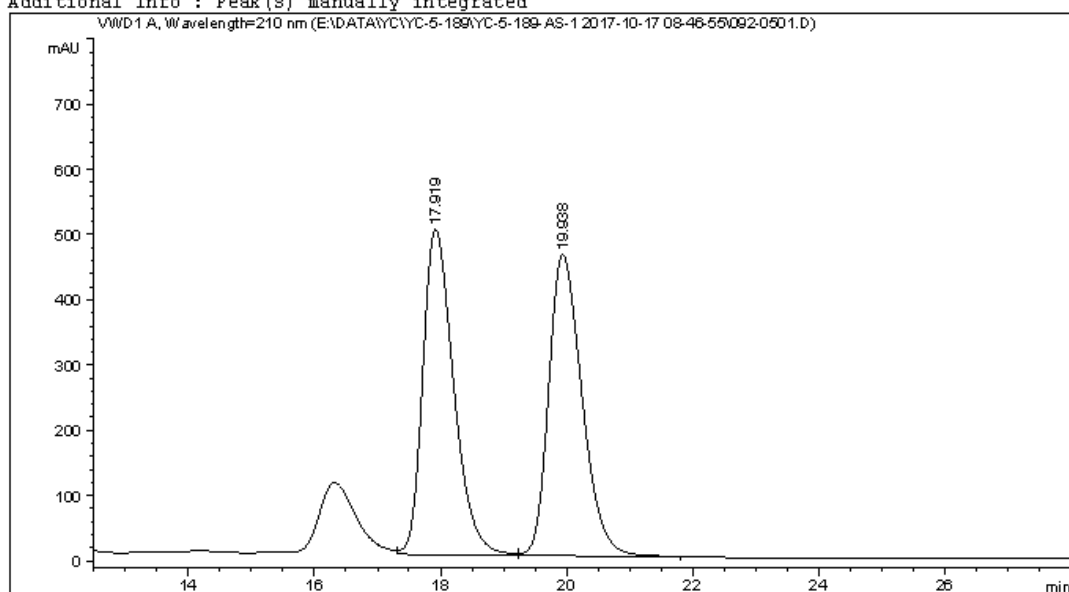


Data File E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08:46:55\092-0501.D
Sample Name: YC-5-188-4-RAC

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 92
Injection Date  : 10/17/2017 11:26:00 AM      Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08:46:55\VWD-AS(1-6)-99-1-
                  IML-3UL-210NM-60MIN.M
Last changed    : 10/17/2017 8:46:56 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08:46:55\VWD-AS(1-6)-99-1-
                  IML-3UL-210NM-60MIN.M (Sequence Method)
Last changed    : 10/17/2017 4:53:50 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====

```



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=====
                          Area Percent Report
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```

```

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	17.919	VV	0.5252	1.69683e4	498.42679	50.0546
2	19.938	VB	0.5690	1.69313e4	461.50439	49.9454

Totals : 3.38996e4 959.93118

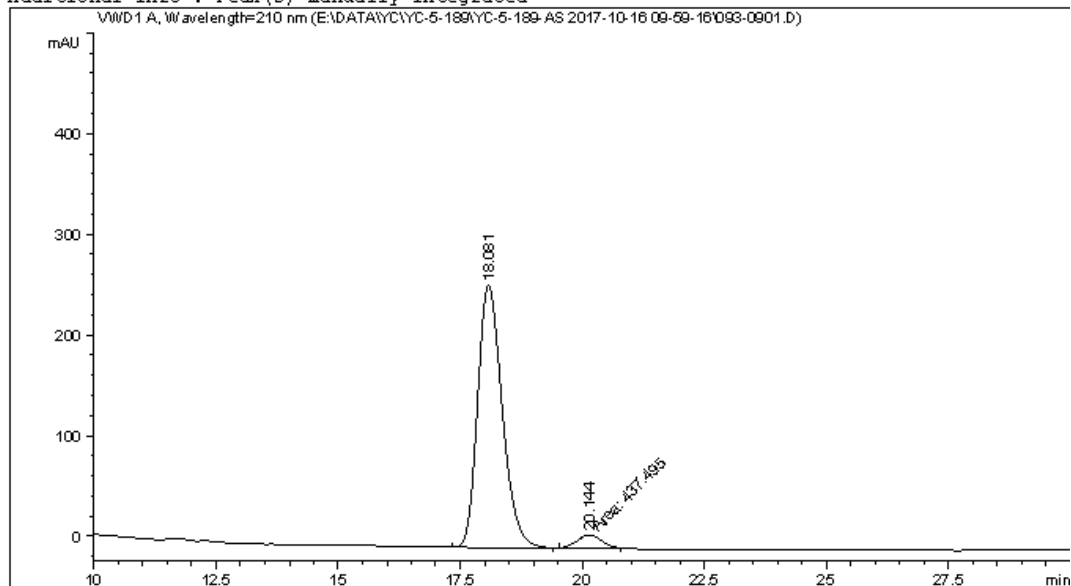
```

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

```

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\093-0901.D
Sample Name: YC-5-189-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    9
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 93
Injection Date  : 10/16/2017 2:43:37 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-99-1-1ML
                  -3UL-210NM-60MIN.M
Last changed    : 10/16/2017 3:21:53 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-99-1-1ML
                  -3UL-210NM-60MIN.M (Sequence Method)
Last changed    : 10/17/2017 4:52:36 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



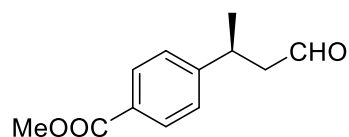
Area Percent Report

```
Sorted By      : Signal
Multiplier     : 1.0000
Dilution       : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	18.081	BB	0.5419	9092.82910	260.09250	95.4094
2	20.144	MM	0.5661	437.49530	12.87982	4.5906

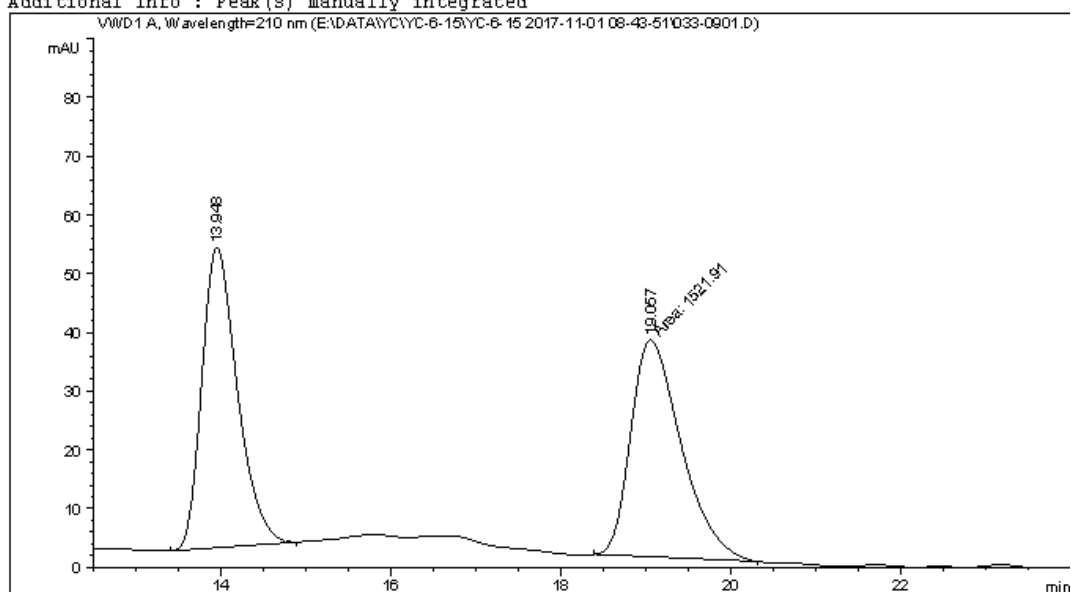
Totals : 9530.32440 272.97231



Data File E:\DATA\YC\YC-6-15\YC-6-15 2017-11-01 08-43-51\033-0901.D
 Sample Name: YC-6-14-4

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    9
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 33
Injection Date  : 11/1/2017 2:13:02 PM        Inj       :    1
                                           Inj Volume: 5.000 µl
Acq. Method     : E:\DATA\YC\YC-6-15\YC-6-15 2017-11-01 08-43-51\VWD-AS(1-6)-95-5-1ML-5UL-
                  210NM-40MIN.M
Last changed    : 11/1/2017 10:26:53 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-15\YC-6-15 2017-11-01 08-43-51\VWD-AS(1-6)-95-5-1ML-5UL-
                  210NM-40MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:19:13 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
  
```



```

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

```

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
  
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	13.948	BB	0.4445	1480.53137	51.02394	49.3110
2	19.057	MM	0.6871	1521.90540	36.91536	50.6890

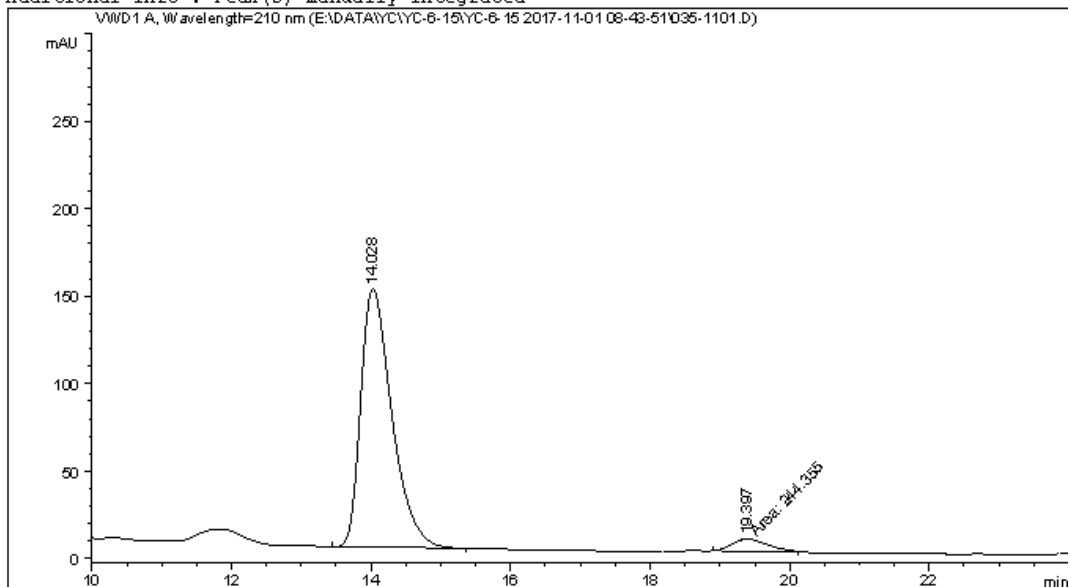
Totals : 3002.43677 87.93930

```

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

Data File E:\DATA\YC\YC-6-15\YC-6-15 2017-11-01 08-43-51\035-1101.D
Sample Name: YC-6-15-5-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   11
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 35
Injection Date  : 11/1/2017 3:43:13 PM        Inj       :    1
                                           Inj Volume: 5.000 µl
Acq. Method     : E:\DATA\YC\YC-6-15\YC-6-15 2017-11-01 08-43-51\VWD-AS(1-6)-95-5-1ML-5UL-
                  210NM-40MIN.M
Last changed    : 11/1/2017 3:42:27 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-15\YC-6-15 2017-11-01 08-43-51\VWD-AS(1-6)-95-5-1ML-5UL-
                  210NM-40MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:17:24 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

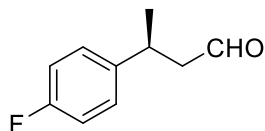
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	14.028	BB	0.4725	4575.32568	147.64362	94.9301
2	19.397	MM	0.5922	244.35526	6.87694	5.0699

Totals : 4819.68094 154.52055

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

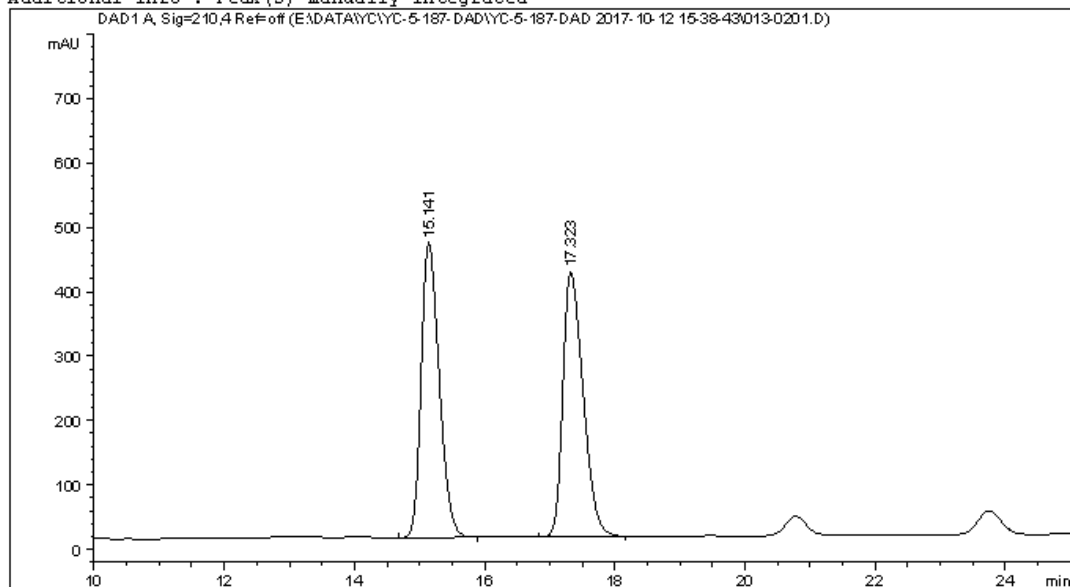


Data File E:\DATA\YC\YC-5-187-DAD\YC-5-187-DAD 2017-10-12 15-38-43\013-0201.D
Sample Name: YC-5-187-1-RAC-0J

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    2
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 13
Injection Date  : 10/12/2017 3:45:38 PM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-187-DAD\YC-5-187-DAD 2017-10-12 15-38-43\
3-1.OML-3UL-210-220-45MIN.M
Last changed    : 10/12/2017 4:28:43 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-5-187-DAD\YC-5-187-DAD 2017-10-12 15-38-43\
3-1.OML-3UL-210-220-45MIN.M (Sequence Method)
Last changed    : 10/12/2017 5:03:48 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====

```



Area Percent Report

```

=====
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution      :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
=====

```

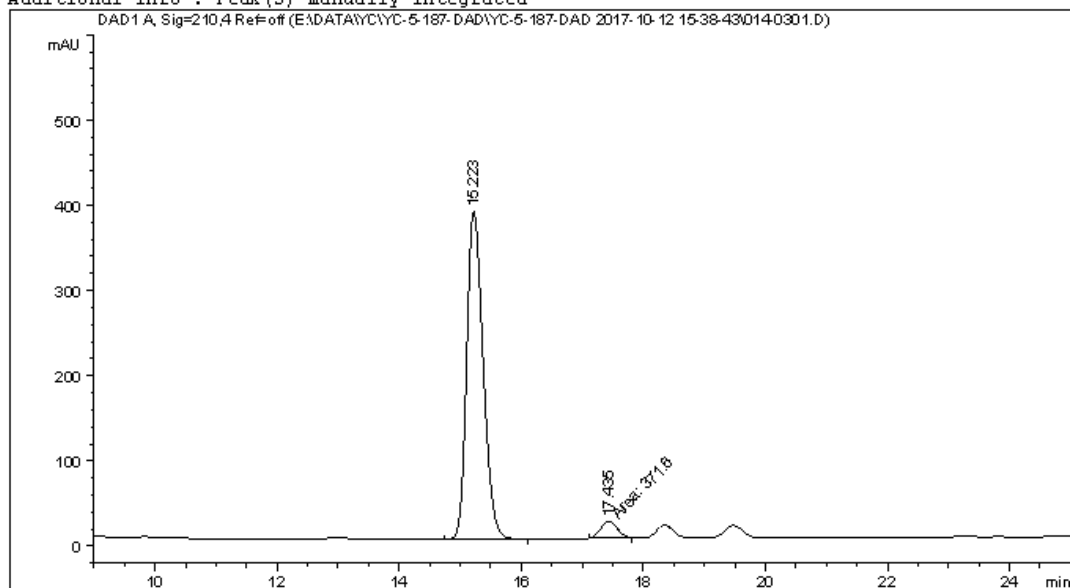
Signal 1: DAD1 A, Sig=210,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.141	BB	0.2980	8782.26660	457.43576	49.7153
2	17.323	BB	0.3362	8882.86621	410.87665	50.2847

Totals : 1.76651e4 868.31241

Data File E:\DATA\YC\YC-5-187-DAD\YC-5-187-DAD 2017-10-12 15-38-43\014-0301.D
Sample Name: YC-5-187-1-0J

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    3
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 14
Injection Date  : 10/12/2017 4:29:38 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-187-DAD\YC-5-187-DAD 2017-10-12 15-38-43\
3-1.OML-3UL-210-220-45MIN.M
Last changed    : 10/12/2017 4:58:25 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-5-187-DAD\YC-5-187-DAD 2017-10-12 15-38-43\
3-1.OML-3UL-210-220-45MIN.M (Sequence Method)
Last changed    : 10/12/2017 5:04:44 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



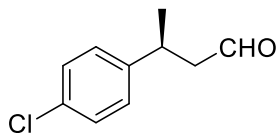
Area Percent Report

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: DAD1 A, Sig=210,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.223	BB	0.2900	7181.64795	384.29211	95.0803
2	17.435	MM	0.3216	371.59985	19.25890	4.9197

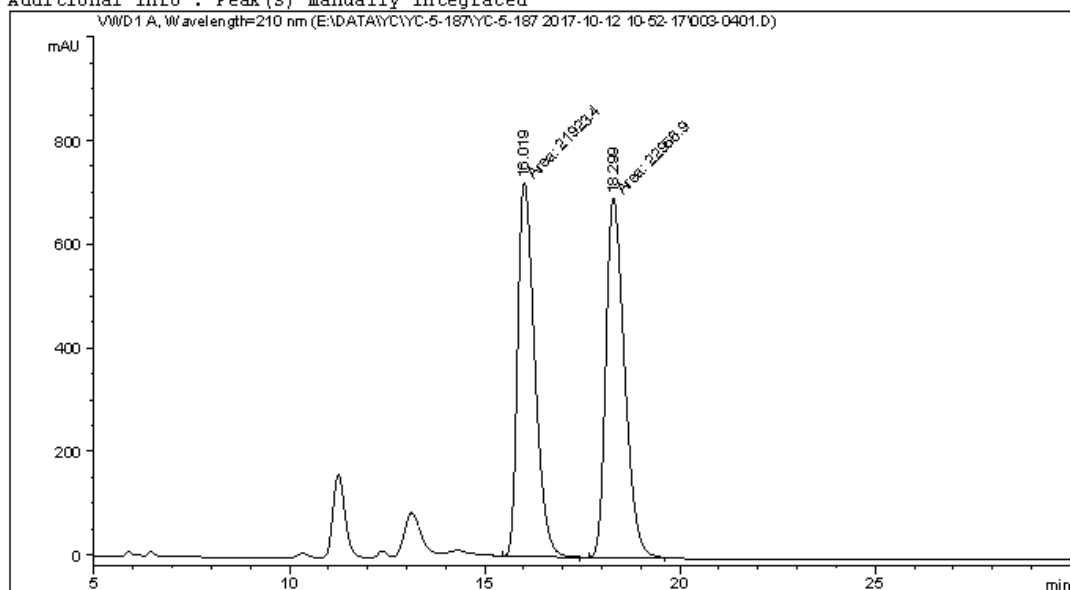
Totals : 7553.24780 403.55102



2h

Data File E:\DATA\YC\YC-5-187\YC-5-187 2017-10-12 10-52-17\003-0401.D
Sample Name: YC-5-187-2-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    4
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 3
Injection Date  : 10/12/2017 12:26:42 PM      Inj       :    1
                                           Inj Volume: 5.000 µl
Acq. Method     : E:\DATA\YC\YC-5-187\YC-5-187 2017-10-12 10-52-17\VWD-AS (1-6)-97-3-1ML-
                  SUL-210NM-60MIN.M
Last changed    : 10/12/2017 11:46:58 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-187\YC-5-187 2017-10-12 10-52-17\VWD-AS (1-6)-97-3-1ML-
                  SUL-210NM-60MIN.M (Sequence Method)
Last changed    : 10/12/2017 2:31:18 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

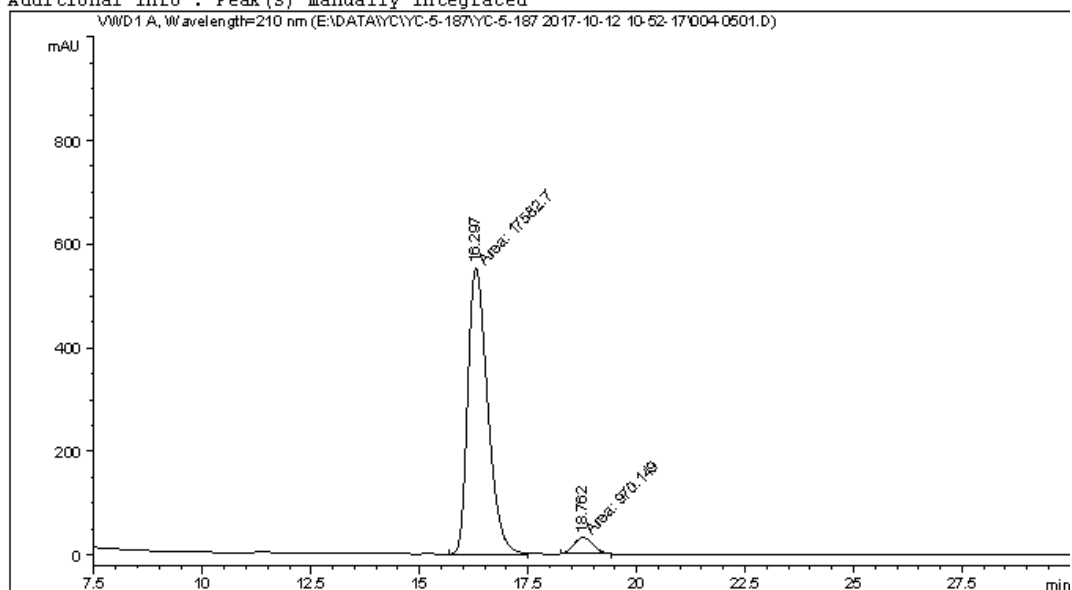
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	16.019	MM	0.5058	2.19234e4	722.34784	48.8486
2	18.299	MM	0.5520	2.29569e4	693.10028	51.1514

Totals : 4.48803e4 1415.44812

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

Data File E:\DATA\YC\YC-5-187\YC-5-187 2017-10-12 10-52-17\004-0501.D
Sample Name: YC-5-187-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 4
Injection Date  : 10/12/2017 12:57:28 PM      Inj       :    1
                                           Inj Volume: 5.000 µl
Acq. Method     : E:\DATA\YC\YC-5-187\YC-5-187 2017-10-12 10-52-17\VWD-AS (1-6)-97-3-1ML-
                  SUL-210NM-60MIN.M
Last changed    : 10/12/2017 11:46:58 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-187\YC-5-187 2017-10-12 10-52-17\VWD-AS (1-6)-97-3-1ML-
                  SUL-210NM-60MIN.M (Sequence Method)
Last changed    : 10/12/2017 2:32:15 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

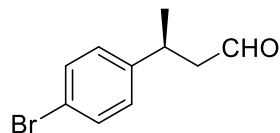
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	16.297	MM	0.5304	1.75827e4	552.51721	94.7709
2	18.762	MM	0.5170	970.14880	31.27646	5.2291

Totals : 1.85529e4 583.79367

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

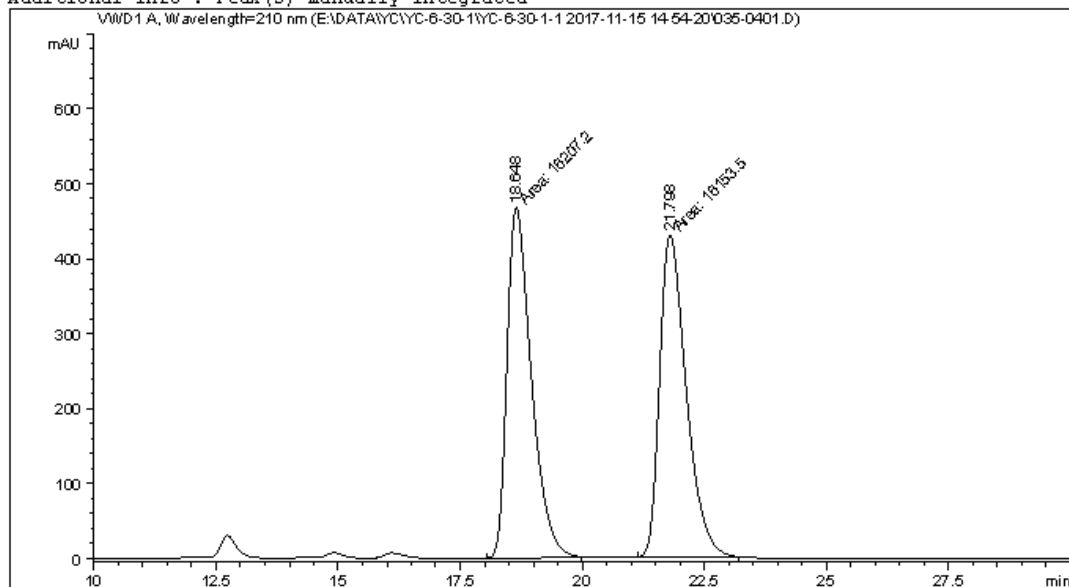


Data File E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\035-0401.D
Sample Name: YC-6-31-1-RAC

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    4
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 35
Injection Date  : 11/15/2017 4:32:27 PM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M
Last changed    : 11/15/2017 4:59:53 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 11/15/2017 9:42:01 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====

```



Area Percent Report

```

=====
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
=====

```

Signal 1: VWD1 A, Wavelength=210 nm

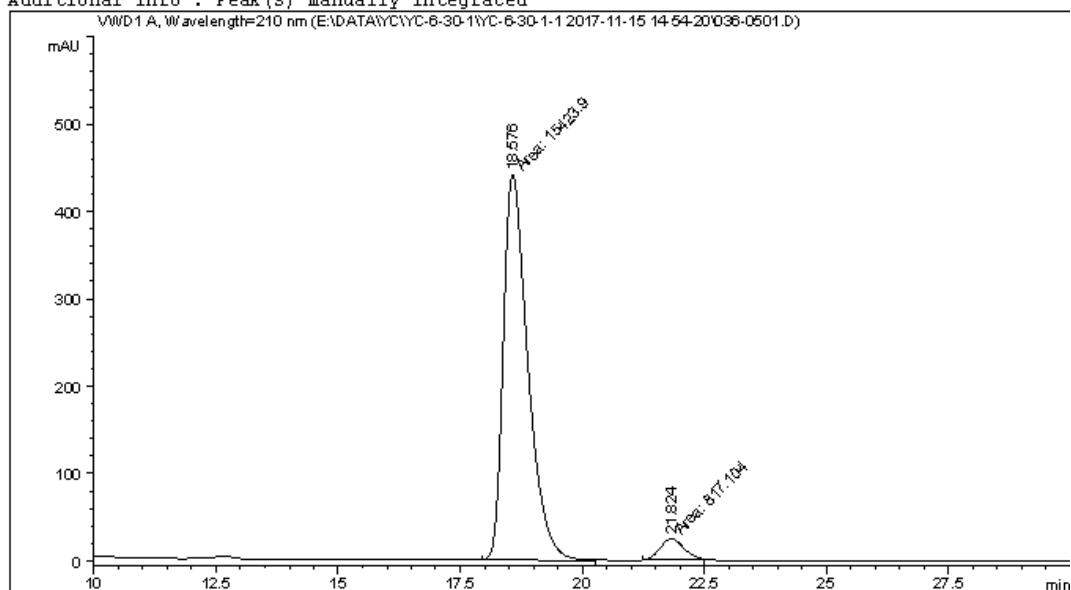
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	18.648	MM	0.5780	1.62072e4	467.32657	50.0830
2	21.798	MM	0.6283	1.61535e4	428.52493	49.9170

Totals : 3.23608e4 895.85150

Data File E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\036-0501.D
Sample Name: YC-6-31-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 36
Injection Date  : 11/15/2017 5:03:11 PM        Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M
Last changed    : 11/15/2017 4:59:53 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 11/15/2017 9:44:19 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

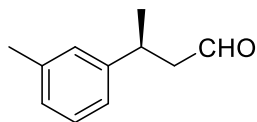
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	18.576	MM	0.5827	1.54239e4	441.12958	94.9689
2	21.824	MM	0.5616	817.10394	24.24719	5.0311

Totals : 1.62410e4 465.37677

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

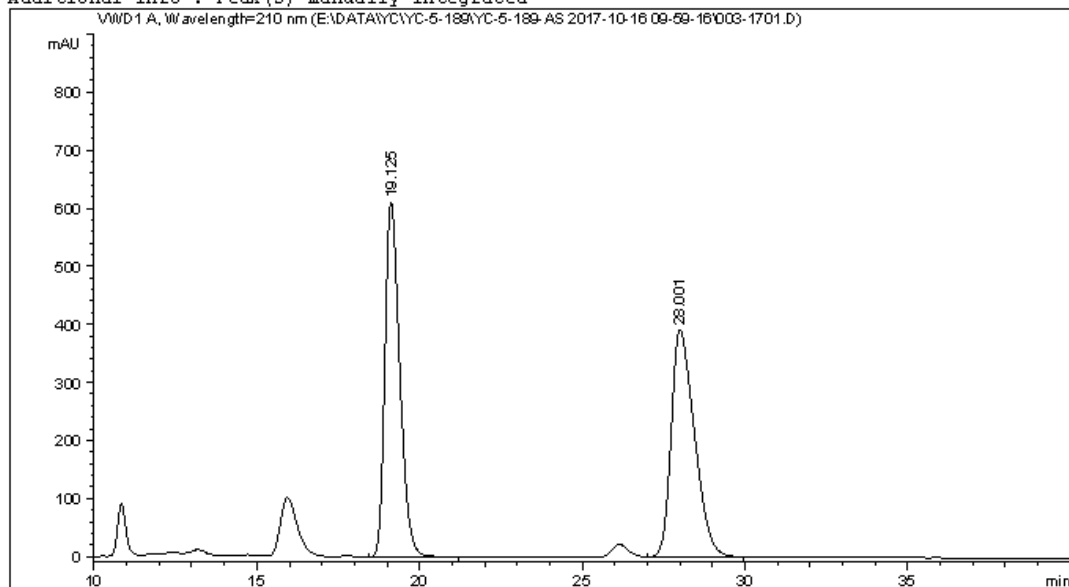


Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\003-1701.D
Sample Name: YC-5-189-3-RAC

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :   17
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 3
Injection Date  : 10/16/2017 7:43:01 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M
Last changed    : 10/16/2017 8:17:40 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/17/2017 8:41:33 AM by SYSTEM
                  (modified after loading)
Additional Info  : Peak(s) manually integrated
=====

```



Area Percent Report

```

=====
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

```

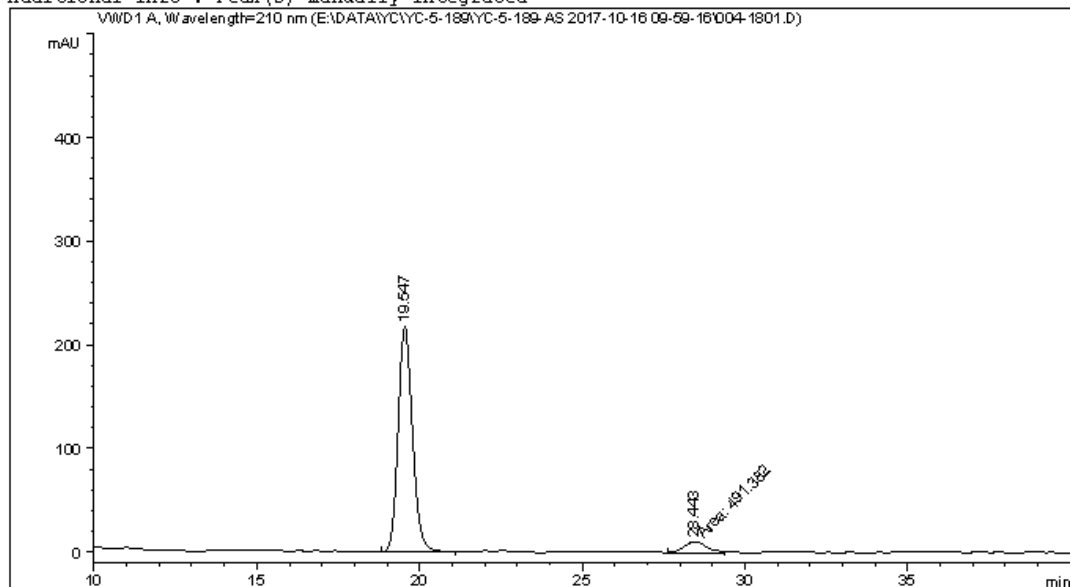
Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	19.125	BB	0.4904	1.94492e4	610.92566	50.0662
2	28.001	BB	0.7798	1.93978e4	390.97522	49.9338

Totals : 3.88470e4 1001.90088

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\004-1801.D
Sample Name: YC-5-189-3

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   18
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 4
Injection Date  : 10/16/2017 8:43:49 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-40MIN.M
Last changed    : 10/16/2017 8:24:24 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS 2017-10-16 09-59-16\VWD-AS (1-6)-97-3-1ML
                  -3UL-210NM-40MIN.M (Sequence Method)
Last changed    : 10/17/2017 8:42:30 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

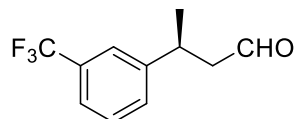
```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	19.547	BB	0.4721	6633.89453	216.73166	93.1037
2	28.443	MM	0.7987	491.38239	10.25396	6.8963

Totals : 7125.27692 226.98562

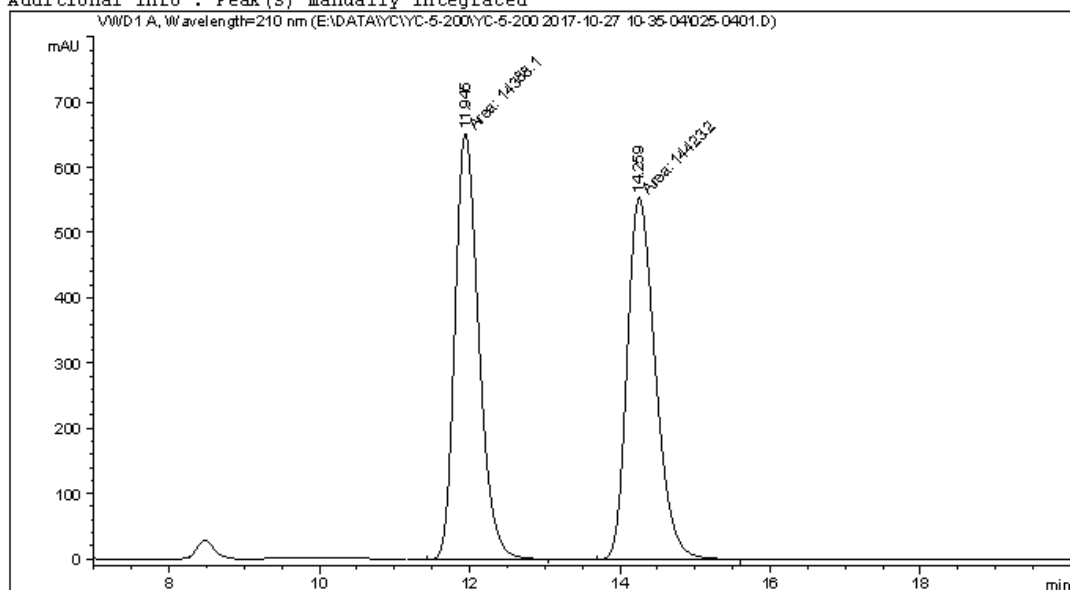
=====
*** End of Report ***



2k

Data File E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\025-0401.D
Sample Name: YC-5-196-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    4
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 25
Injection Date  : 10/27/2017 12:23:08 PM      Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
                  3UL-210NM-45MIN.M
Last changed    : 10/27/2017 10:35:05 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
                  3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/27/2017 3:53:51 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	11.945	MM	0.3675	1.43881e4	652.46832	49.9391
2	14.259	MM	0.4336	1.44232e4	554.45966	50.0609

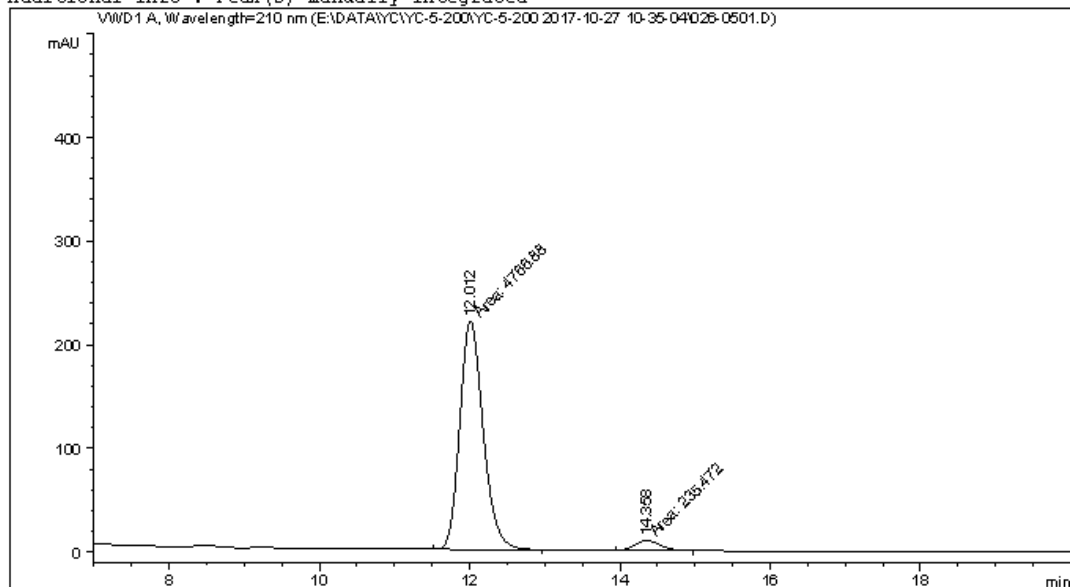
Totals : 2.88113e4 1206.92798

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

Data File E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\026-0501.D
Sample Name: YC-5-200-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 26
Injection Date  : 10/27/2017 1:08:52 PM       Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
                  3UL-210NM-45MIN.M
Last changed    : 10/27/2017 10:35:05 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
                  3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/27/2017 3:54:42 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

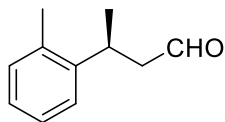
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.012	MM	0.3607	4766.88232	220.26984	95.2928
2	14.358	MM	0.4025	235.47189	9.75021	4.7072

Totals : 5002.35422 230.02005

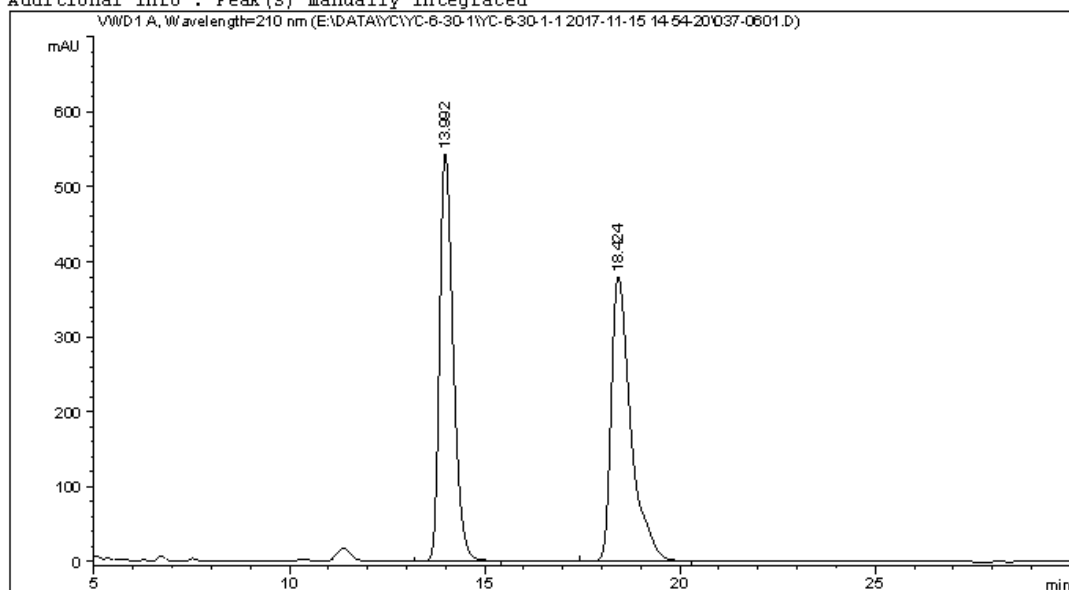
=====
*** End of Report ***



21

Data File E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\037-0601.D
Sample Name: YC-6-31-4-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    6
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 37
Injection Date  : 11/15/2017 5:33:56 PM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\VWD-AS(1-6)-97-3-
                  IML-3UL-210NM-45MIN.M
Last changed    : 11/15/2017 4:59:53 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\VWD-AS(1-6)-97-3-
                  IML-3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 11/15/2017 9:45:42 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	13.992	BB	0.3711	1.31435e4	543.52228	49.8119
2	18.424	BB	0.5263	1.32427e4	379.35104	50.1881

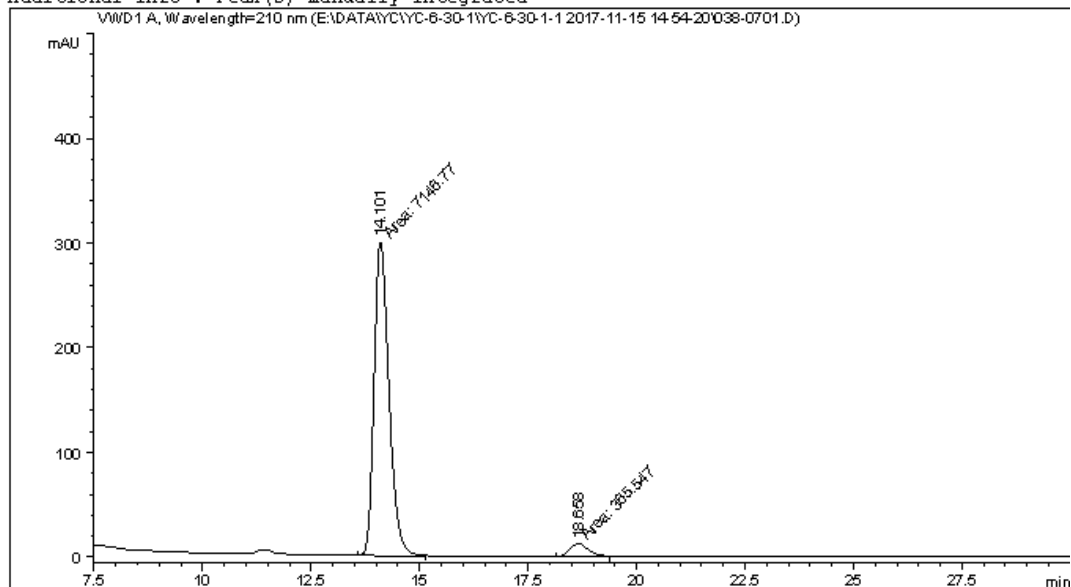
```
Totals :                      2.63862e4  922.87332
```

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

Data File E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\038-0701.D
Sample Name: YC-6-31-4

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    7
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 38
Injection Date  : 11/15/2017 6:04:42 PM       Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M
Last changed    : 11/15/2017 4:59:53 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 11/15/2017 9:49:10 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

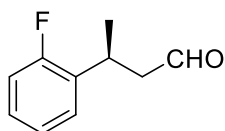
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	14.101	MM	0.3967	7146.77393	300.26013	95.1340
2	18.658	MM	0.4984	365.54730	12.22392	4.8660

Totals : 7512.32123 312.48405

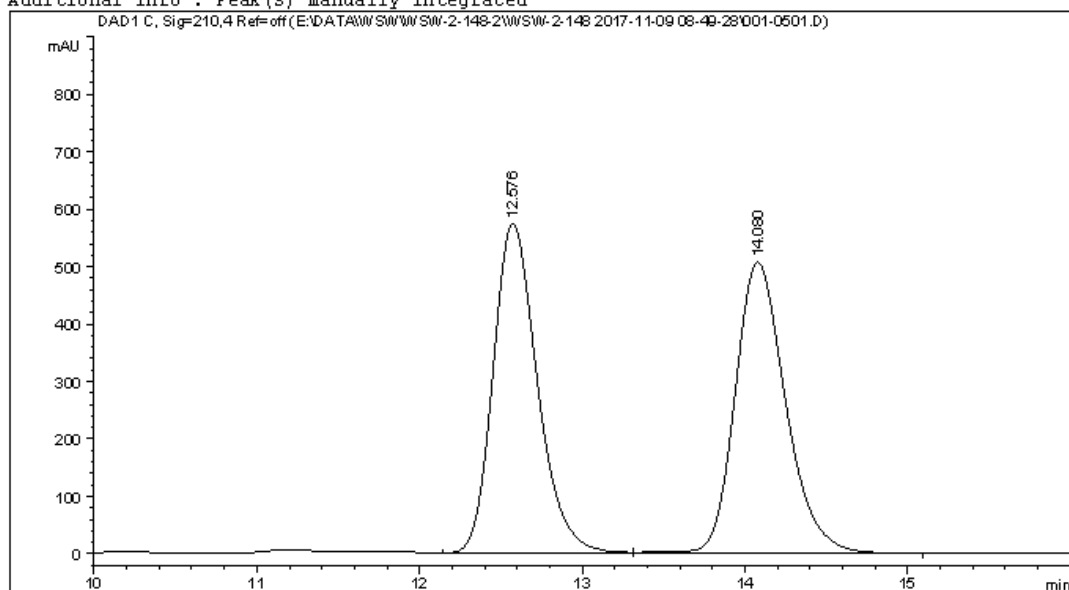
=====
*** End of Report ***



2m

Data File E:\DATA\WSW\WSW-2-148-2\WSW-2-148 2017-11-09 08-49-28\001-0501.D
Sample Name: YC-6-22-1-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 1
Injection Date  : 11/9/2017 10:28:05 AM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\WSW\WSW-2-148-2\WSW-2-148 2017-11-09 08-49-28\DAD-0D(1-2)-98-2-
                  1ML-3UL-210-254NM-60MIN.M
Last changed    : 11/9/2017 9:37:02 AM by SYSTEM
Analysis Method : E:\DATA\WSW\WSW-2-148-2\WSW-2-148 2017-11-09 08-49-28\DAD-0D(1-2)-98-2-
                  1ML-3UL-210-254NM-60MIN.M (Sequence Method)
Last changed    : 11/9/2017 2:45:54 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



Area Percent Report

```
Sorted By      : Signal
Multiplier     : 1.0000
Dilution      : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: DAD1 C, Sig=210,4 Ref=off

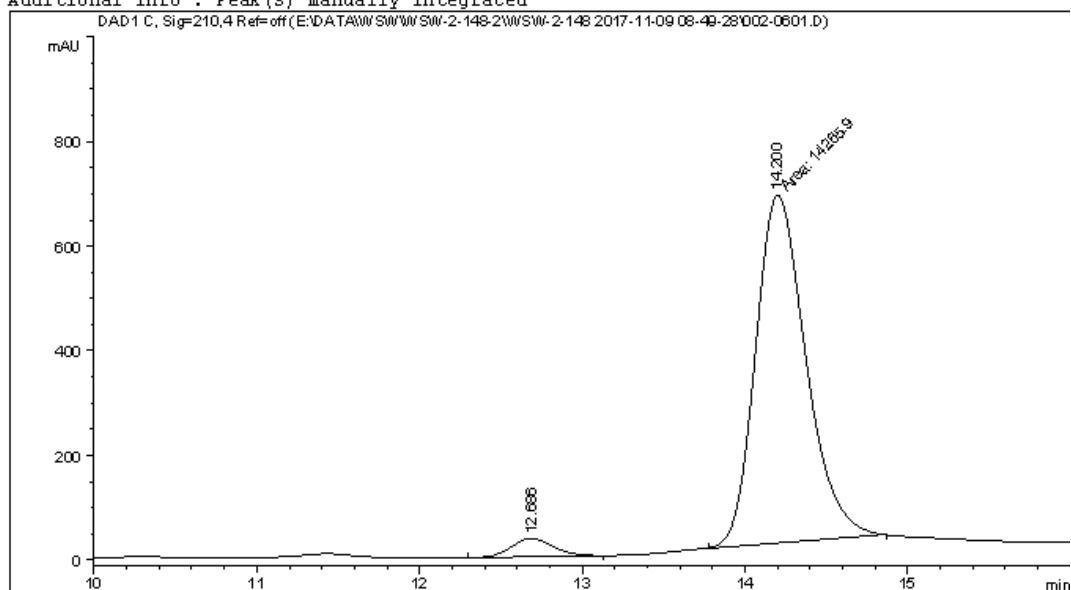
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.576	BB	0.2891	1.07837e4	574.11041	49.8176
2	14.080	BB	0.3303	1.08626e4	506.31531	50.1824

Totals : 2.16463e4 1080.42572

*** End of Report ***

Data File E:\DATA\WSW\WSW-2-148-2\WSW-2-148 2017-11-09 08-49-28\002-0601.D
Sample Name: YC-6-22-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    6
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 2
Injection Date  : 11/9/2017 11:28:58 AM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\WSW\WSW-2-148-2\WSW-2-148 2017-11-09 08-49-28\DAD-0D(1-2)-98-2-
                  1ML-3UL-210-254NM-60MIN.M
Last changed    : 11/9/2017 9:37:02 AM by SYSTEM
Analysis Method : E:\DATA\WSW\WSW-2-148-2\WSW-2-148 2017-11-09 08-49-28\DAD-0D(1-2)-98-2-
                  1ML-3UL-210-254NM-60MIN.M (Sequence Method)
Last changed    : 11/9/2017 2:43:51 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

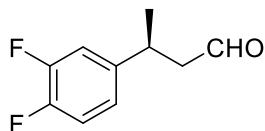
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.686	BB	0.2793	623.72296	34.77247	4.1890
2	14.200	MM	0.3574	1.42659e4	665.27515	95.8110

Totals : 1.48896e4 700.04762

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

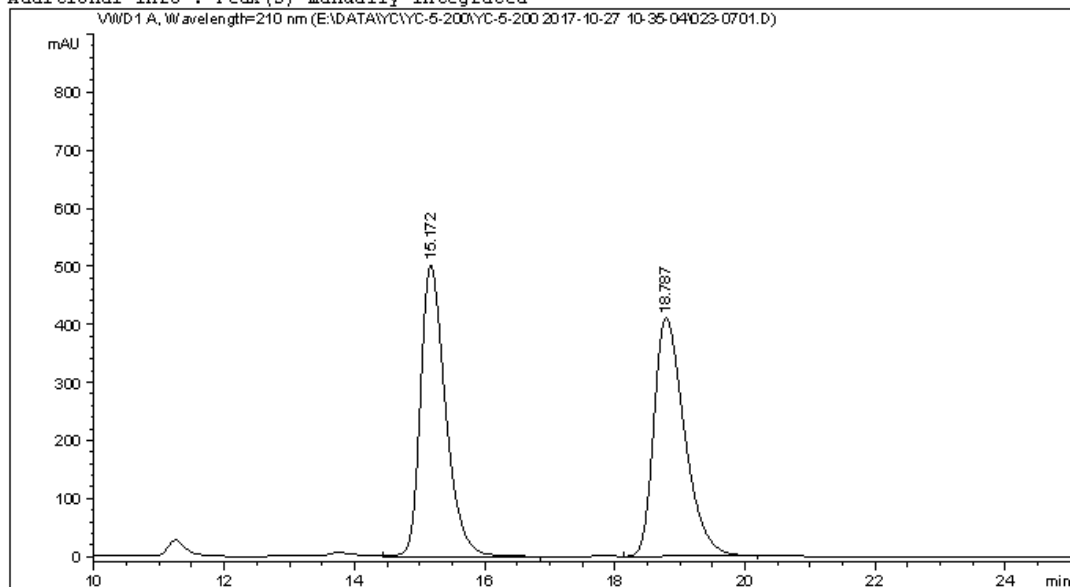


Data File E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\023-0701.D
Sample Name: YC-5-196-1-1

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    7
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 23
Injection Date  : 10/27/2017 2:29:51 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
3UL-210NM-45MIN.M
Last changed    : 10/27/2017 2:50:46 PM by SYSTEM
(modified after loading)
Analysis Method : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/27/2017 3:56:17 PM by SYSTEM
(modified after loading)
Additional Info : Peak(s) manually integrated
=====

```



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

```

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

```

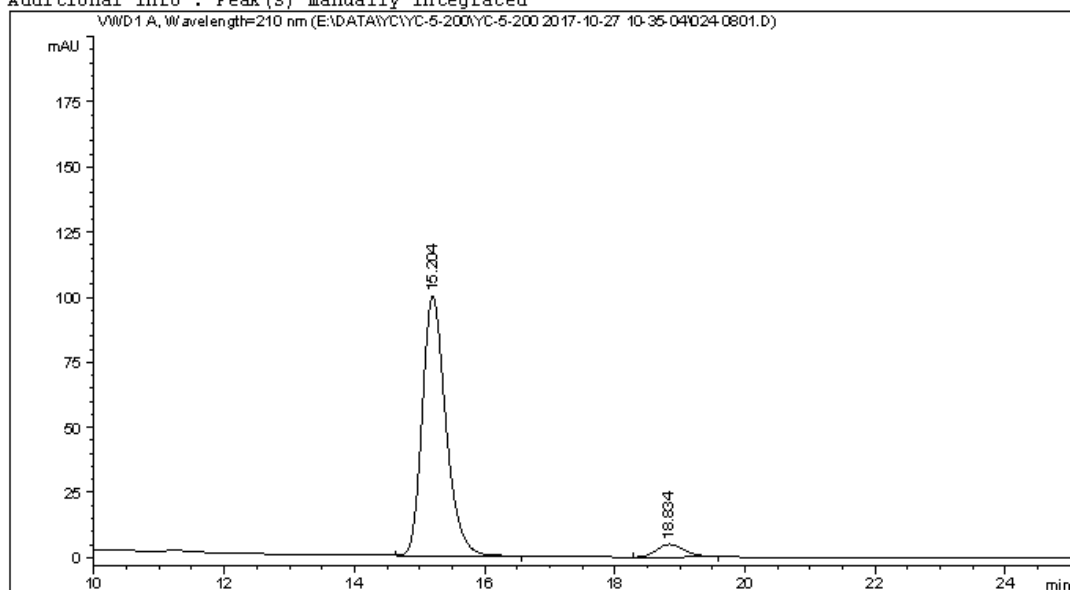
Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.172	BB	0.4070	1.33668e4	501.47607	49.9812
2	18.787	BB	0.5017	1.33768e4	409.90375	50.0188

Totals : 2.67436e4 911.37982

Data File E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\024-0801.D
Sample Name: YC-5-200-1-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    8
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 24
Injection Date  : 10/27/2017 3:05:35 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
                  3UL-210NM-45MIN.M
Last changed    : 10/27/2017 2:50:46 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-200\YC-5-200 2017-10-27 10-35-04\VWD-AS (1-6)-97-3-1ML-
                  3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 10/27/2017 3:57:37 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

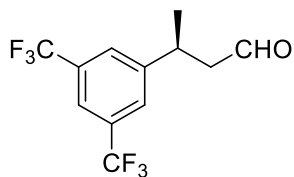
```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.204	BB	0.3848	2513.58594	99.82460	94.5187
2	18.834	BB	0.4576	145.76820	4.87800	5.4813

Totals : 2659.35414 104.70260

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



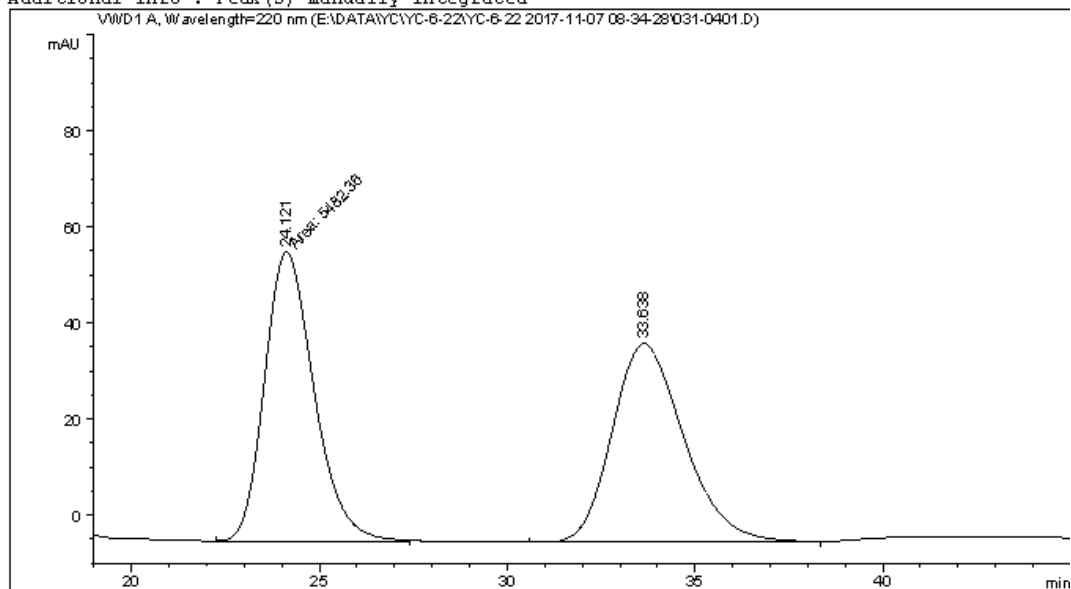
2o

Data File E:\DATA\YC\YC-6-22\YC-6-22 2017-11-07 08-34-28\031-0401.D

Sample Name: YC-6-16-1

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    4
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 31
Injection Date  : 11/7/2017 9:54:50 AM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-07 08-34-28\VWD-AS(1-6)-90-10-1ML-3UL
                  -220NM-60MIN.M
Last changed    : 11/7/2017 9:13:58 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-07 08-34-28\VWD-AS(1-6)-90-10-1ML-3UL
                  -220NM-60MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:05:10 PM by SYSTEM
                  (modified after loading)
Additional Info  : Peak(s) manually integrated
  
```



Area Percent Report

```

Sorted By      : Signal
Multiplier     : 1.0000
Dilution       : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs
  
```

Signal 1: VWD1 A, Wavelength=220 nm

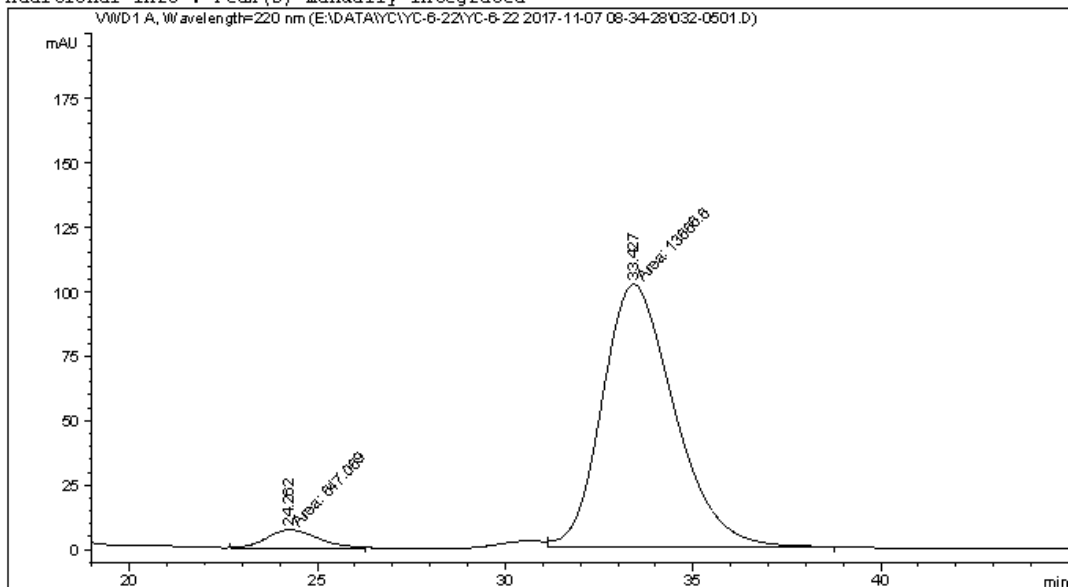
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	24.121	MM	1.5189	5482.36328	60.15530	50.1044
2	33.638	BB	1.8874	5459.52490	41.34890	49.8956

Totals : 1.09419e4 101.50420

*** End of Report ***

Data File E:\DATA\YC\YC-6-22\YC-6-22 2017-11-07 08-34-28\032-0501.D
Sample Name: YC-6-22-3

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 32
Injection Date  : 11/7/2017 10:55:34 AM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-07 08-34-28\VWD-AS(1-6)-90-10-1ML-3UL
                  -220NM-60MIN.M
Last changed    : 11/7/2017 9:13:58 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-07 08-34-28\VWD-AS(1-6)-90-10-1ML-3UL
                  -220NM-60MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:03:17 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

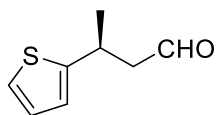
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	24.262	MM	1.5500	647.06860	6.95769	4.5206
2	33.427	FM	2.2318	1.36666e4	102.06092	95.4794

Totals : 1.43137e4 109.01861

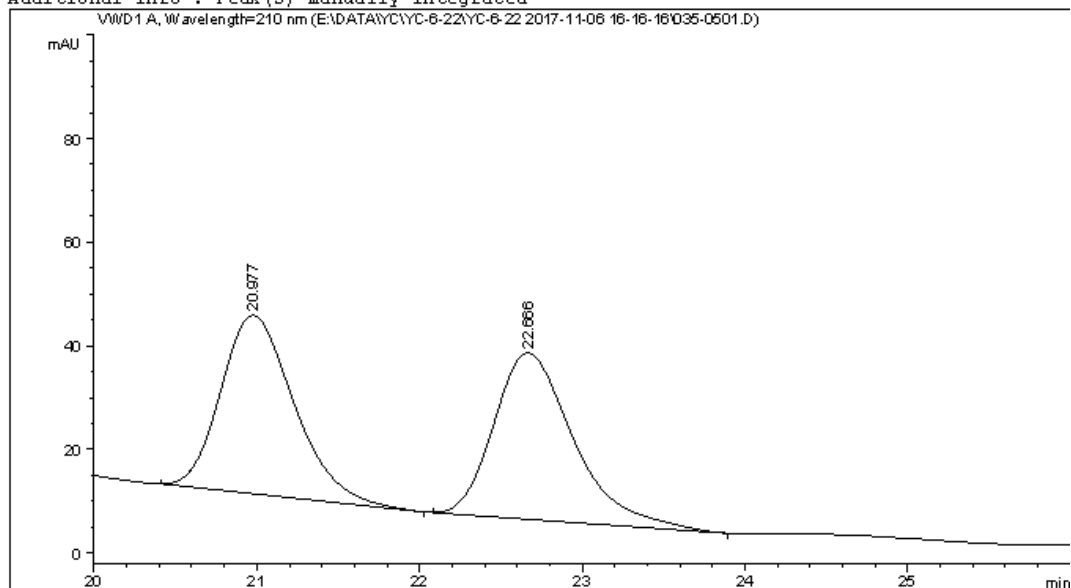
=====
*** End of Report ***



2p

Data File E:\DATA\YC\YC-6-22\YC-6-22 2017-11-06 16-16-16\035-0501.D
Sample Name: YC-6-22-5-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 35
Injection Date  : 11/6/2017 6:51:56 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-06 16-16-16\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M
Last changed    : 11/6/2017 4:16:16 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-06 16-16-16\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:09:27 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



Area Percent Report

```
=====
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	20.977	BB	0.4824	1079.11548	34.45145	49.7400
2	22.666	BB	0.5193	1090.39771	32.10065	50.2600

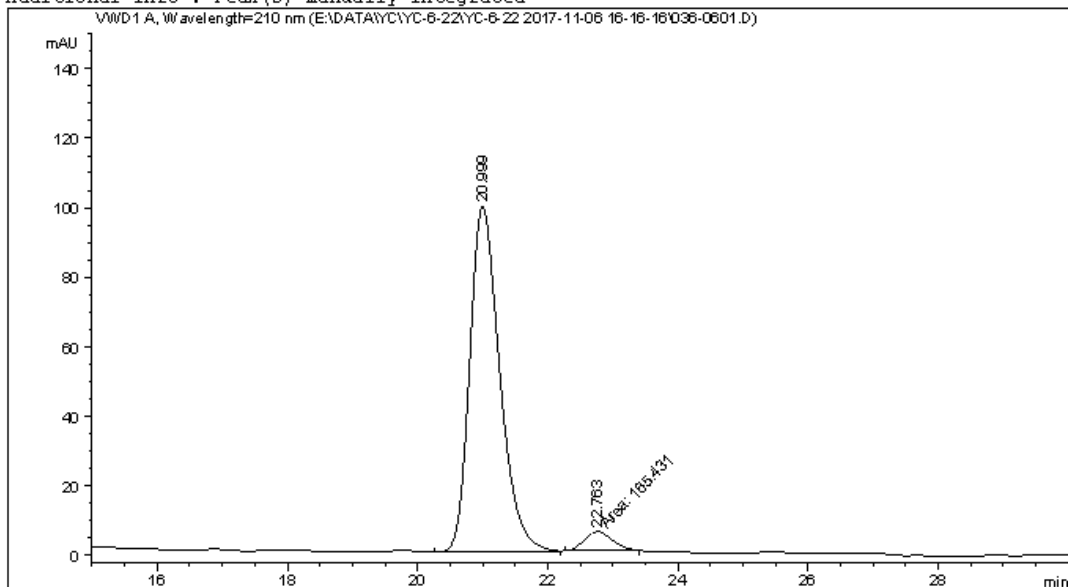
Totals : 2169.51318 66.55210

*** End of Report ***

Data File E:\DATA\YC\YC-6-22\YC-6-22 2017-11-06 16-16-16\036-0601.D
Sample Name: YC-6-22-5

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    6
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 36
Injection Date  : 11/6/2017 7:37:42 PM        Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-06 16-16-16\VWD-AS(1-6)-97-3-IML-3UL-
                  210NM-45MIN.M
Last changed    : 11/6/2017 4:16:16 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-22\YC-6-22 2017-11-06 16-16-16\VWD-AS(1-6)-97-3-IML-3UL-
                  210NM-45MIN.M (Sequence Method)
Last changed    : 11/7/2017 3:07:28 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

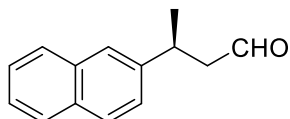
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	20.999	BB	0.4899	3173.89697	99.29301	95.0460
2	22.763	MM	0.5059	165.43105	5.45049	4.9540

Totals : 3339.32802 104.74349

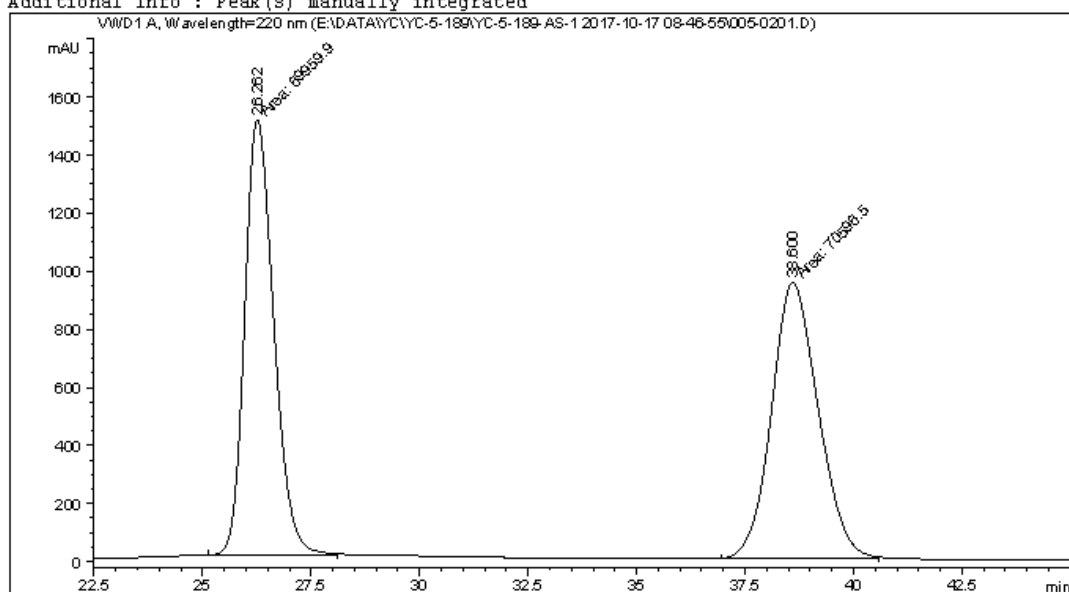
=====
*** End of Report ***



2q

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08-46-55\005-0201.D
Sample Name: YC-5-189-4-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    2
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 5
Injection Date  : 10/17/2017 9:03:35 AM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08-46-55\VWD-AS(1-6)-97-3-
                  1ML-3UL-220NM-60MIN.M
Last changed    : 10/17/2017 8:46:56 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08-46-55\VWD-AS(1-6)-97-3-
                  1ML-3UL-220NM-60MIN.M (Sequence Method)
Last changed    : 10/17/2017 4:56:41 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=220 nm

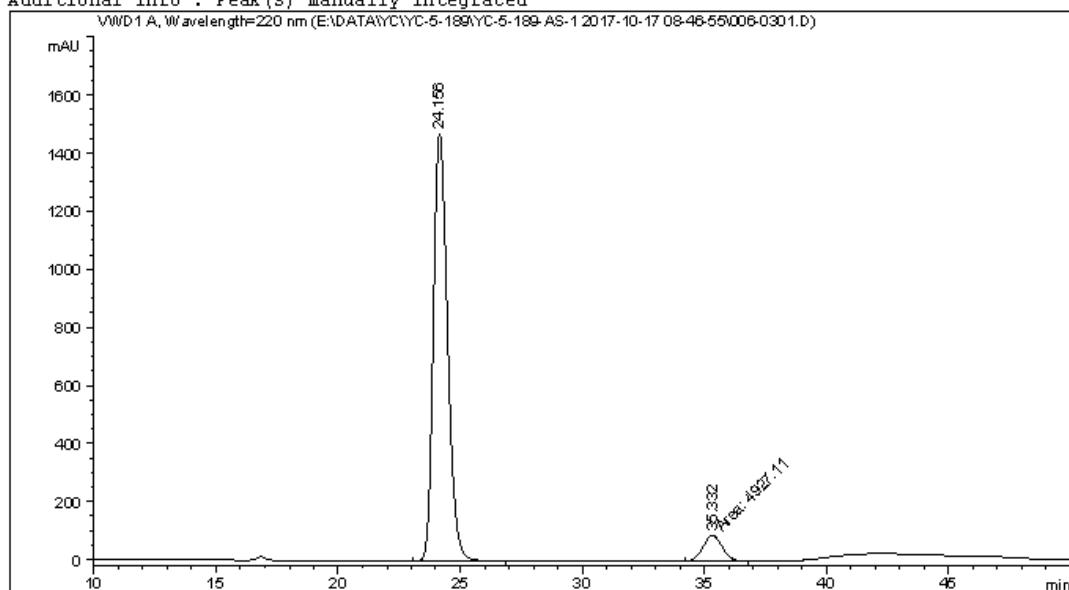
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	26.262	MM	0.7771	6.99599e4	1500.39563	49.7735
2	38.600	MM	1.2398	7.05965e4	949.02130	50.2265

Totals : 1.40556e5 2449.41693

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

Data File E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08-46-55\006-0301.D
Sample Name: YC-5-189-4

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    3
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 6
Injection Date  : 10/17/2017 10:04:21 AM      Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08-46-55\VWD-AS(1-6)-97-3-
                  1ML-3UL-220NM-60MIN.M
Last changed    : 10/17/2017 8:46:56 AM by SYSTEM
Analysis Method : E:\DATA\YC\YC-5-189\YC-5-189-AS-1 2017-10-17 08-46-55\VWD-AS(1-6)-97-3-
                  1ML-3UL-220NM-60MIN.M (Sequence Method)
Last changed    : 10/17/2017 4:55:16 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

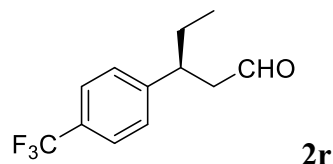
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=220 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	24.156	BB	0.6265	5.93216e4	1470.88635	92.3312
2	35.332	MM	0.9218	4927.11475	89.08327	7.6688

Totals : 6.42487e4 1559.96962

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

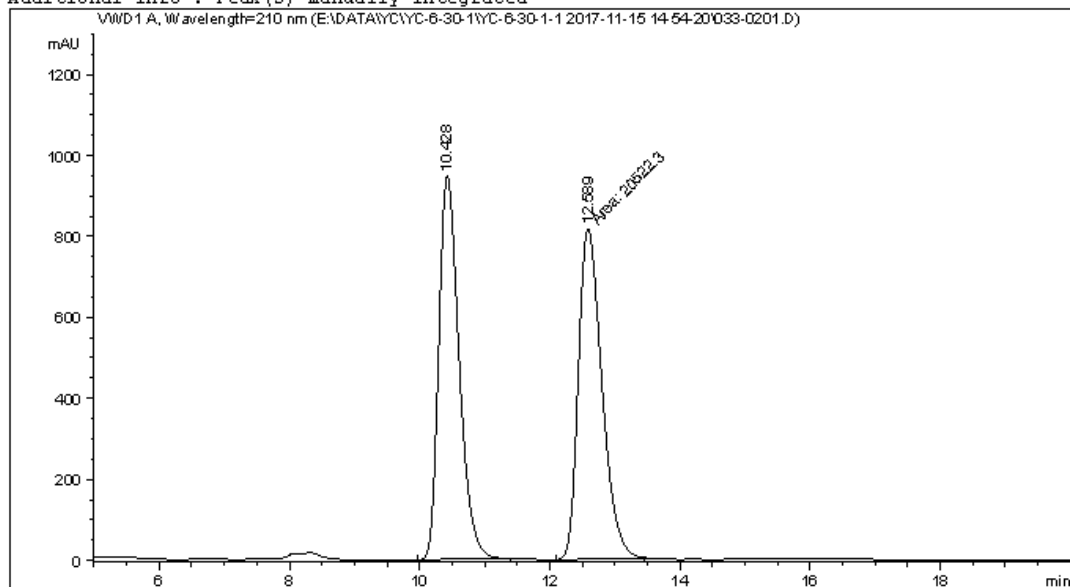


Data File E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\033-0201.D
Sample Name: YC-6-30-2

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    2
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 33
Injection Date  : 11/15/2017 3:27:33 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M
Last changed    : 11/15/2017 4:05:58 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14-54-20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 11/15/2017 9:38:17 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated

```



Area Percent Report

```

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution      :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

```

Signal 1: VWD1 A, Wavelength=210 nm

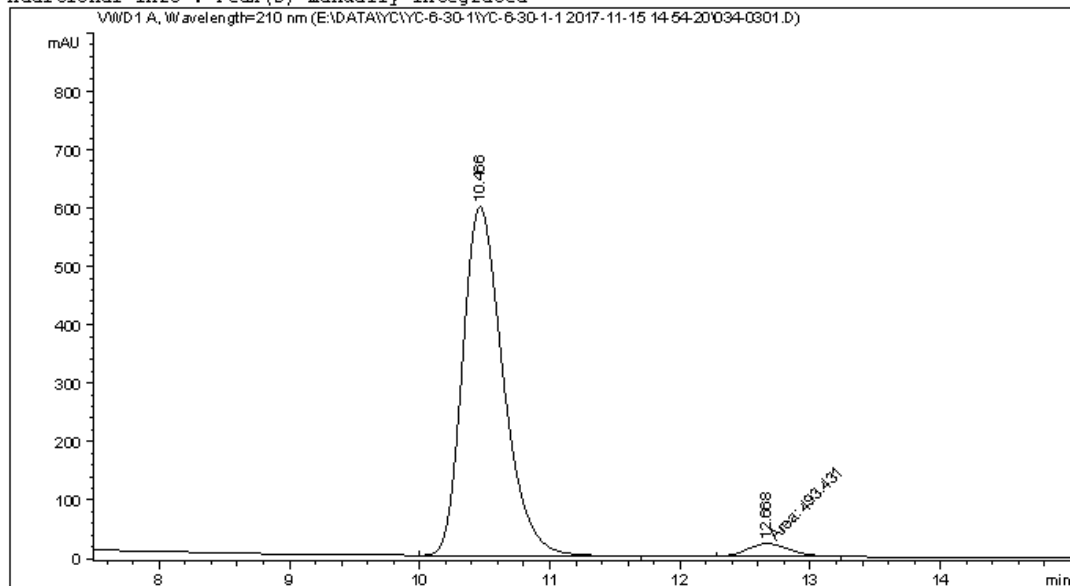
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	10.428	BB	0.3347	2.04993e4	946.56720	49.9719
2	12.589	MM	0.4188	2.05223e4	816.77307	50.0281

Totals : 4.10216e4 1763.34027

Data File E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\034-0301.D
Sample Name: YC-6-31-3

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    3
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 34
Injection Date  : 11/15/2017 4:06:42 PM        Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M
Last changed    : 11/15/2017 4:27:43 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-6-30-1\YC-6-30-1-1 2017-11-15 14:54:20\VWD-AS(1-6)-97-3-
                  1ML-3UL-210NM-45MIN.M (Sequence Method)
Last changed    : 11/15/2017 9:40:05 PM by SYSTEM
                  (modified after loading)
Additional Info  : Peak(s) manually integrated
=====
```



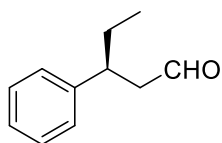
Area Percent Report

```
Sorted By      : Signal
Multiplier     : 1.0000
Dilution       : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	10.466	BB	0.3325	1.29347e4	597.69788	96.3254
2	12.668	MM	0.3808	493.43085	21.59409	3.6746

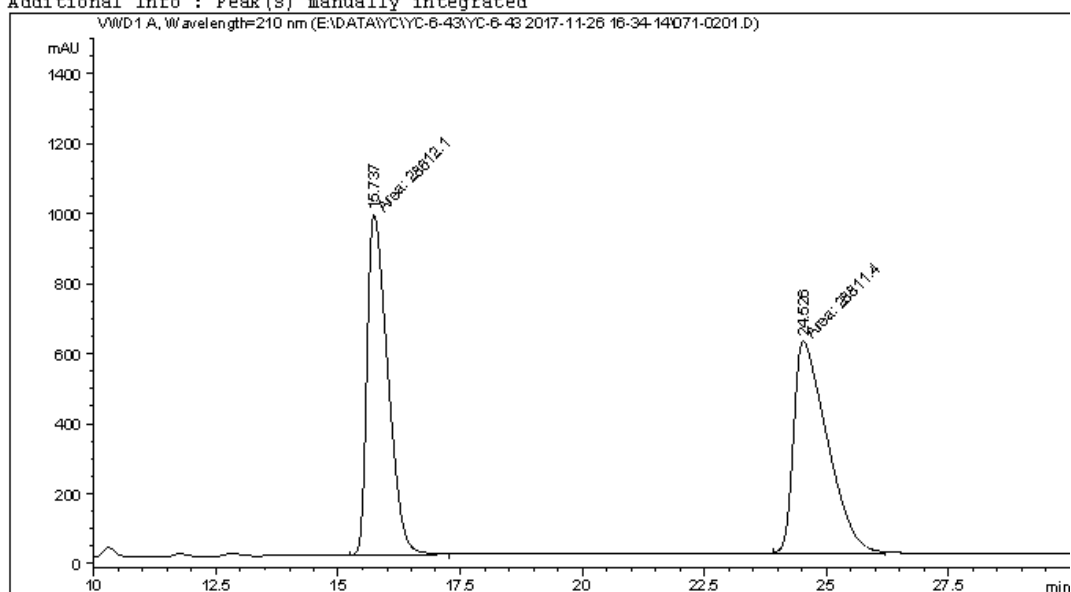
Totals : 1.34282e4 619.29197



Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\071-0201.D
 Sample Name: YC-6-37-2

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    2
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 71
Injection Date  : 11/26/2017 4:52:24 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M
Last changed    : 11/26/2017 4:34:14 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:07:18 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
  
```



```

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

```

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
  
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.737	MM	0.4911	2.86121e4	971.01831	49.8264
2	24.526	MM	0.7927	2.88114e4	605.79486	50.1736

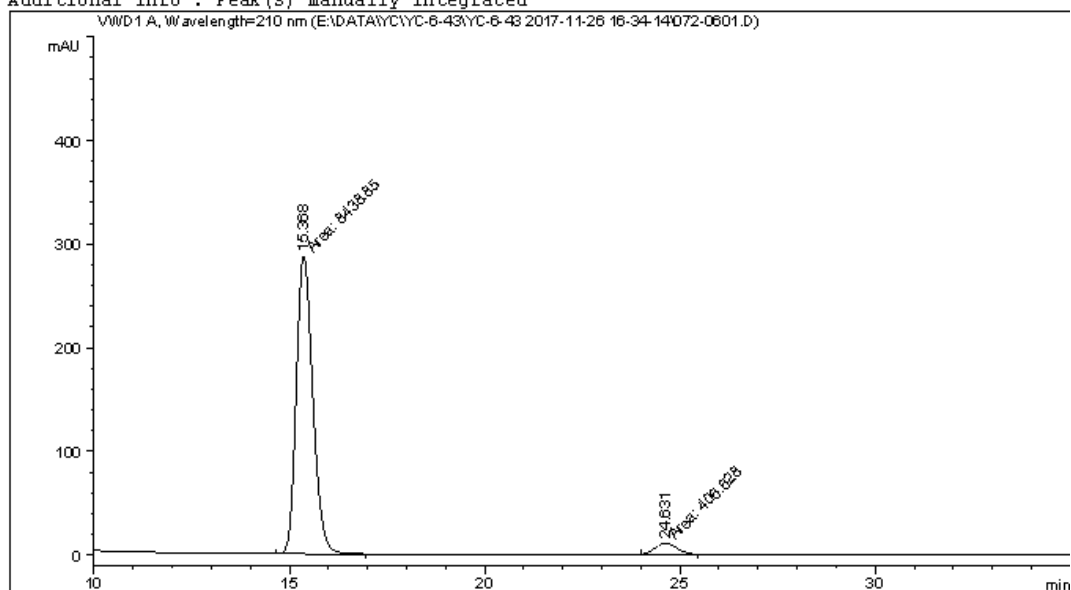
Totals : 5.74235e4 1576.81317

```

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

Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\072-0601.D
Sample Name: YC-6-43-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    6
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 72
Injection Date  : 11/26/2017 7:50:29 PM        Inj       :    1
                                           Inj Volume: 6.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-6UL-
                  210NM-40MIN.M
Last changed    : 11/26/2017 6:42:45 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-6UL-
                  210NM-40MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:06:27 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

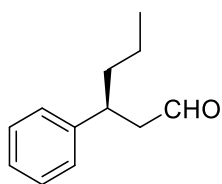
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	15.368	MM	0.4897	8438.84863	287.18961	95.4030
2	24.631	MM	0.6446	406.62817	10.51334	4.5970

Totals : 8845.47681 297.70295

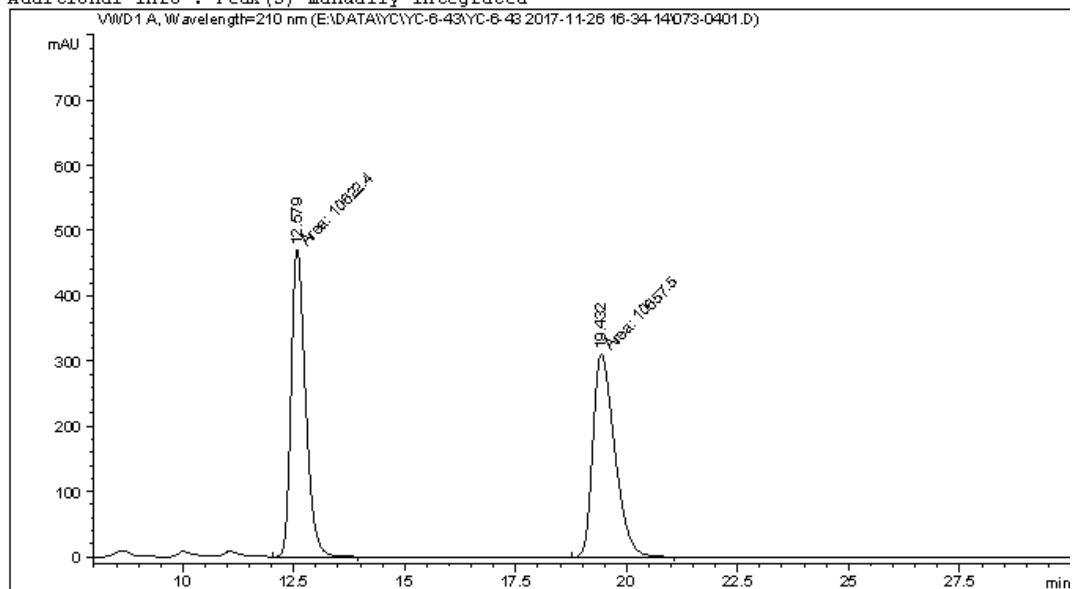
=====
*** End of Report ***



Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\073-0401.D
Sample Name: YC-6-42-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    4
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 73
Injection Date  : 11/26/2017 6:23:51 PM       Inj       :    1
                                           Inj Volume: 3.000 µl

Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
210NM-45MIN.M
Last changed    : 11/26/2017 4:34:14 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
210NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:10:33 PM by SYSTEM
                  (modified after loading)
Additional Info  : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

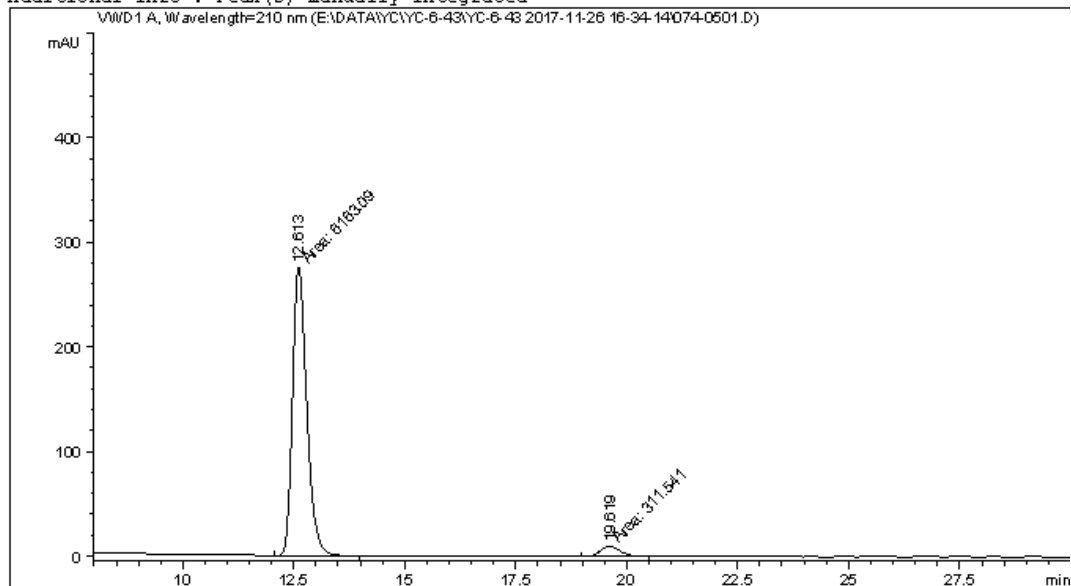
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.579	MM	0.3763	1.06224e4	470.48489	49.9175
2	19.432	MM	0.5707	1.06575e4	311.22348	50.0825

Totals : 2.12799e4 781.70837

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

Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\074-0501.D
Sample Name: YC-6-43-2

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    5
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 74
Injection Date  : 11/26/2017 7:09:39 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M
Last changed    : 11/26/2017 7:48:03 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:13:14 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



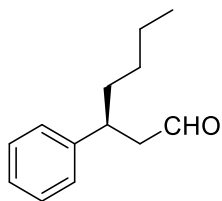
Area Percent Report

```
Sorted By      : Signal
Multiplier     : 1.0000
Dilution       : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	12.613	MM	0.3726	6163.09424	275.65656	95.1883
2	19.619	MM	0.5295	311.54056	9.80671	4.8117

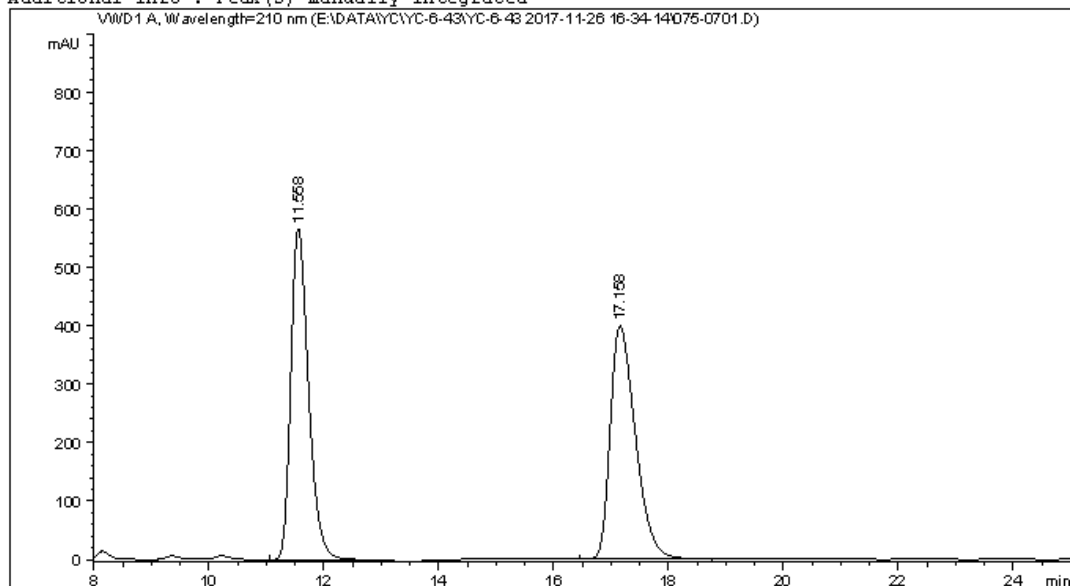
Totals : 6474.63480 285.46326



Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\075-0701.D
 Sample Name: YC-6-42-2

```

=====
Acq. Operator   : SYSTEM                      Seq. Line :    7
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 75
Injection Date  : 11/26/2017 8:31:21 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
210NM-45MIN.M
Last changed    : 11/26/2017 9:11:25 PM by SYSTEM
                  (modified after loading)
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
210NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:14:47 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
  
```



Area Percent Report

```

Sorted By      : Signal
Multiplier     : 1.0000
Dilution       : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs
  
```

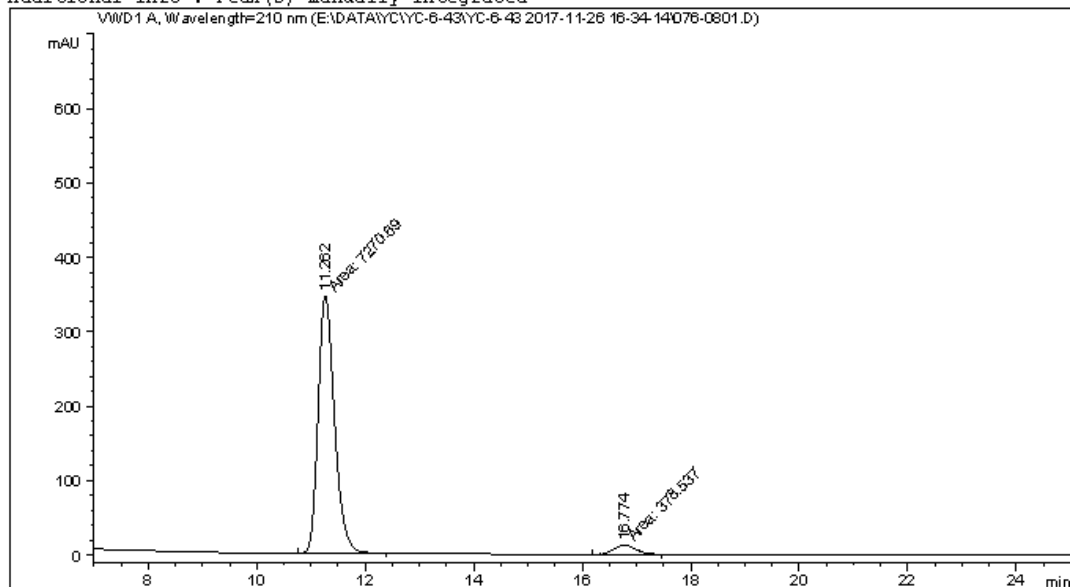
Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	11.558	BB	0.3298	1.22055e4	567.71130	50.1262
2	17.158	BB	0.4697	1.21440e4	399.46945	49.8738

Totals : 2.43495e4 967.18076

Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\076-0801.D
Sample Name: YC-6-43-3

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    8
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 76
Injection Date  : 11/26/2017 9:12:08 PM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M
Last changed    : 11/26/2017 9:11:25 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AS(1-6)-97-3-1ML-3UL-
                  210NM-45MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:15:53 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

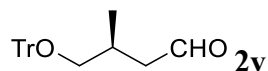
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	11.262	MM	0.3500	7270.68652	346.25479	95.0513
2	16.774	MM	0.4876	378.53723	12.93807	4.9487

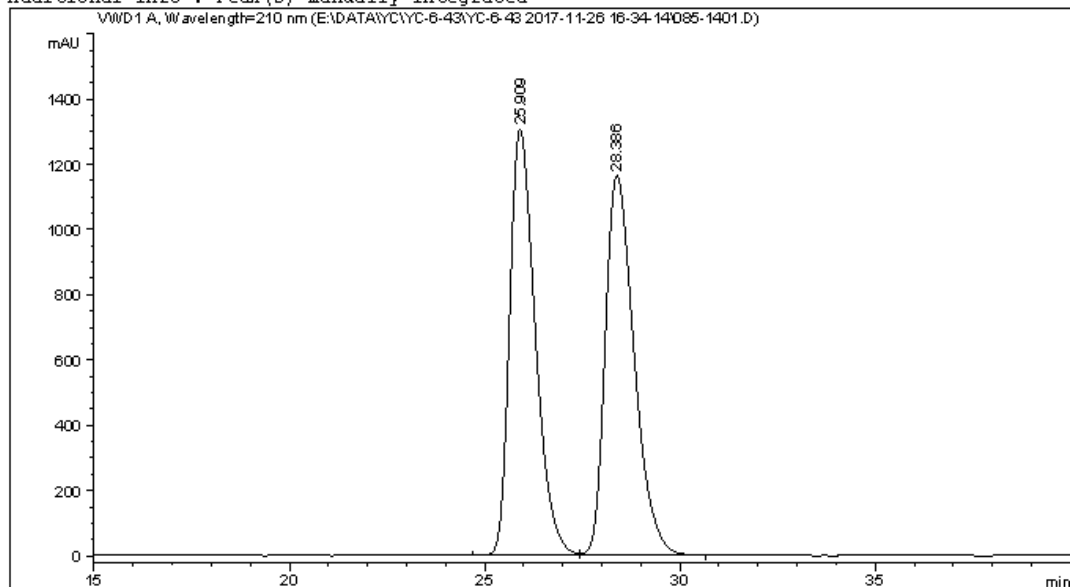
Totals : 7649.22375 359.19287

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



Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\085-1401.D
Sample Name: YC-6-37-1

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   14
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 85
Injection Date  : 11/27/2017 1:16:46 AM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AD(1-2)-99-1-1ML-3UL-
                  210NM-60MIN.M
Last changed    : 11/26/2017 4:36:55 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AD(1-2)-99-1-1ML-3UL-
                  210NM-60MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:32:45 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: VWD1 A, Wavelength=210 nm

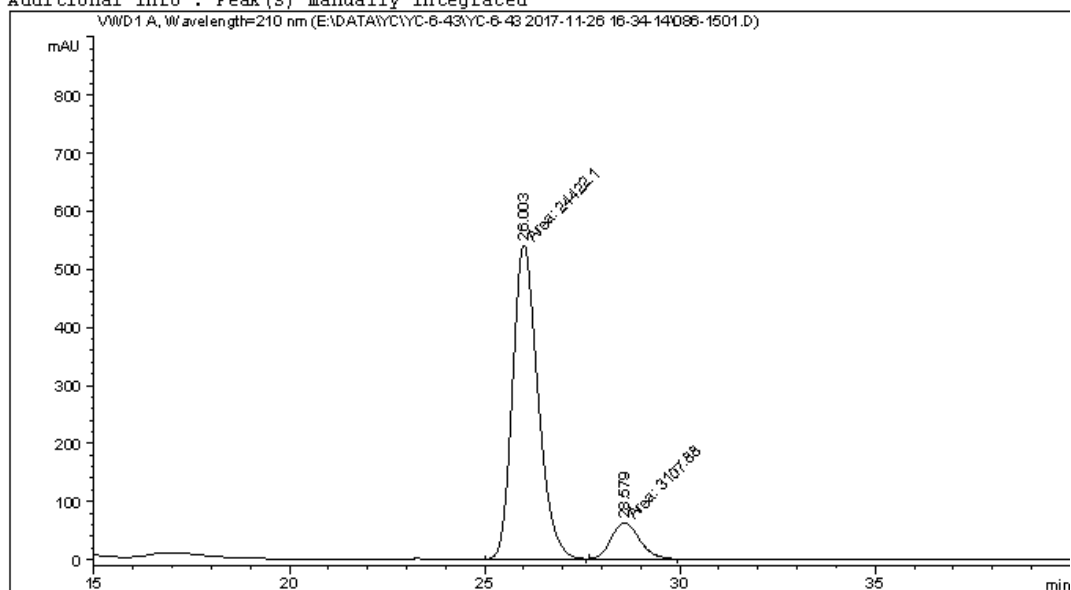
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	25.909	BV	0.7028	5.94050e4	1305.73755	49.8255
2	28.386	VB	0.7997	5.98211e4	1163.80640	50.1745

Totals : 1.19226e5 2469.54395

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

Data File E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\086-1501.D
Sample Name: YC-6-43-5

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :   15
Acq. Instrument : 1260HPLC-VWD                Location  : Vial 86
Injection Date  : 11/27/2017 2:17:30 AM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AD(1-2)-99-1-1ML-3UL-
                  210NM-60MIN.M
Last changed    : 11/26/2017 4:36:55 PM by SYSTEM
Analysis Method : E:\DATA\YC\YC-6-43\YC-6-43 2017-11-26 16-34-14\VWD-AD(1-2)-99-1-1ML-3UL-
                  210NM-60MIN.M (Sequence Method)
Last changed    : 11/29/2017 4:33:05 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

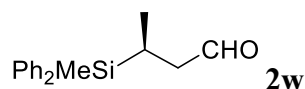
Sorted By : Signal
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: VWD1 A, Wavelength=210 nm

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	26.003	MM	0.7522	2.44221e4	541.11926	88.7109
2	28.579	MM	0.8410	3107.88477	61.59405	11.2891

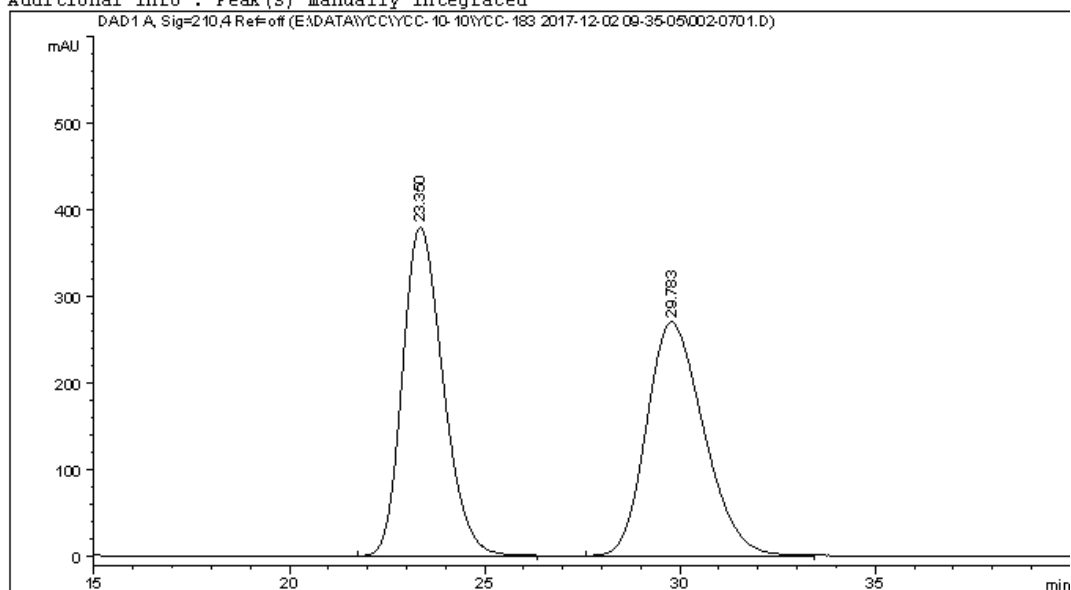
Totals : 2.75300e4 602.71331

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



Data File E:\DATA\YCC\YCC-10-10\YCC-183 2017-12-02 09-35-05\002-0701.D
Sample Name: YC-6-47-4-RAC

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    7
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 2
Injection Date  : 12/2/2017 11:41:33 AM        Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YCC\YCC-10-10\YCC-183 2017-12-02 09-35-05\DAD-0J(1-6)-97-3-1.OML
                                           -3UL-210-220-45MIN.M
Last changed    : 12/2/2017 10:16:46 AM by SYSTEM
Analysis Method : E:\DATA\YCC\YCC-10-10\YCC-183 2017-12-02 09-35-05\DAD-0J(1-6)-97-3-1.OML
                                           -3UL-210-220-45MIN.M (Sequence Method)
Last changed    : 12/4/2017 5:01:08 PM by SYSTEM
                                           (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



Area Percent Report

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution      :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: DAD1 A, Sig=210,4 Ref=off

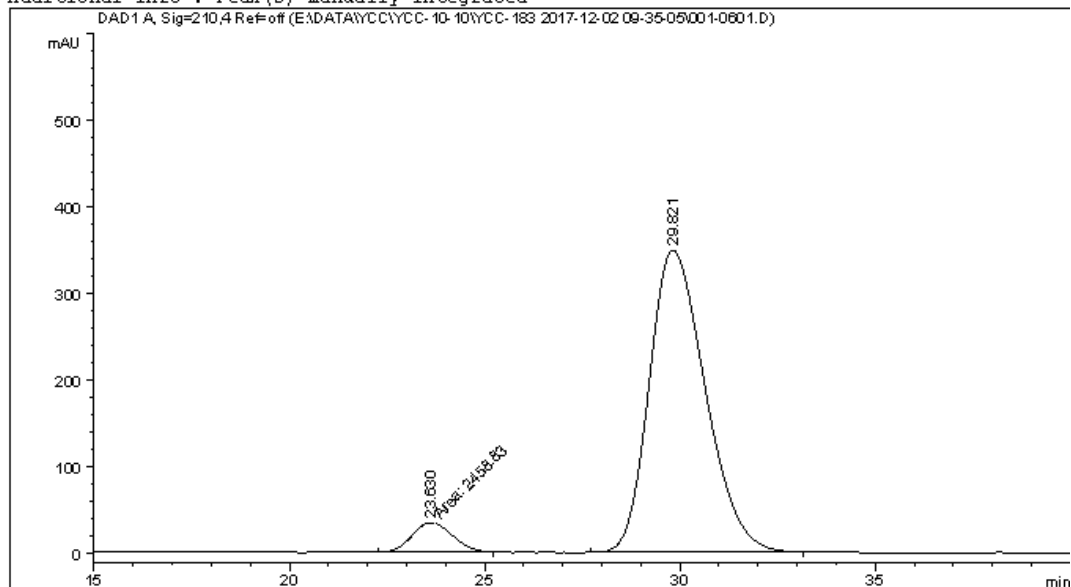
Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	23.350	BB	1.1241	2.73049e4	379.20364	49.9797
2	29.783	BB	1.5199	2.73271e4	269.75638	50.0203

Totals : 5.46320e4 648.96002

*** End of Report ***

Data File E:\DATA\YCC\YCC-10-10\YCC-183 2017-12-02 09-35-05\001-0601.D
Sample Name: YC-6-47-4

```
=====
Acq. Operator   : SYSTEM                      Seq. Line :    6
Acq. Instrument : 1260HPLC-DAD                Location  : Vial 1
Injection Date  : 12/2/2017 10:55:39 AM       Inj       :    1
                                           Inj Volume: 3.000 µl
Acq. Method     : E:\DATA\YCC\YCC-10-10\YCC-183 2017-12-02 09-35-05\DAD-0J(1-6)-97-3-1.OML
                                           -3UL-210-220-45MIN.M
Last changed    : 12/2/2017 10:16:46 AM by SYSTEM
Analysis Method : E:\DATA\YCC\YCC-10-10\YCC-183 2017-12-02 09-35-05\DAD-0J(1-6)-97-3-1.OML
                                           -3UL-210-220-45MIN.M (Sequence Method)
Last changed    : 12/4/2017 5:01:08 PM by SYSTEM
                                           (modified after loading)
Additional Info : Peak(s) manually integrated
=====
```



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

```
Sorted By      :      Signal
Multiplier     :      1.0000
Dilution       :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs
```

Signal 1: DAD1 A, Sig=210,4 Ref=off

Peak #	RetTime [min]	Type	Width [min]	Area [mAU*s]	Height [mAU]	Area %
1	23.630	MM	1.1919	2458.82910	34.38219	6.6046
2	29.821	BB	1.4788	3.47704e4	348.86694	93.3954

Totals : 3.72292e4 383.24914

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