Supporting Information for

Rhodium-Catalyzed asymmetric hydrogenation of exocyclic *α,β*-Unsaturated Carbonyl Compounds

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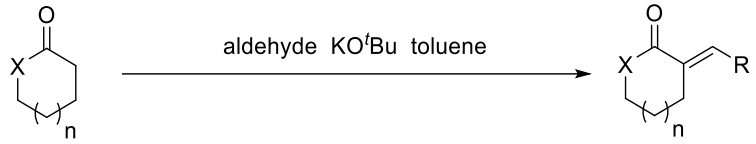
Table of Contents

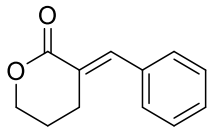
General information

All the reactions dealing with air- or moisture-sensitive compounds were carried out in a dry reaction vessel under a positive pressure of nitrogen or in the nitrogen-filled glovebox. Unless otherwise noted, all reagents and solvents were purchased from commercial suppliers and used without further purification. NMR spectra were recorded on Bruker ADVANCE III (400 MHz) spectrometers for ^{1}H NMR and ^{13}C NMR. $CDCl_3$ 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 ^{1}H NMR and relative to $CDCl_3$ (77.0 ppm) for ^{13}C NMR. Optical rotation was determined using a Perkin Elmer 343 polarimeter. HPLC analysis was conducted on an Agilent 1260 Series instrument. Column Chromatography was performed with silica gel Merck 60 (300-400 mesh).

General Preparation of exocyclic *α,β*-Unsaturated Carbonyl Compounds



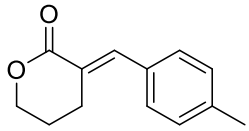
The cyclic carbonyl compound (20 mmol) was dissolved in toluene (25 mL) and the solution was cooled to 0 ℃, followed by the addition of corresponding aldehyde (10 mmol), the mixture was slowly charged to potassium *t*-butoxide (1.2 equiv.) under an ice/water bath. The mixture was heated to 55 ℃ and stirred therein for 1 h. The reaction mixture was concentrated to a slurry under vacuum, then water (100 mL) was added. The mixture was filtered, and the solid was washed with water and dried in vacuum oven overnight. The crude product was purified by recrystallization from ethyl acetate/petroleum ether or hexane.



(*E*)-3-benzylidenetetrahydro-2H-pyran-2-one (1a)[1]

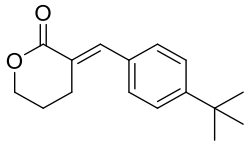
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (t, *J* = 2.2 Hz, 1H), 7.53 – 7.30 (m,

5H), 4.49 – 4.31 (m, 2H), 2.90 – 2.86 (m, 2H), 2.00 – 1.94 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.99, 141.61, 134.91, 130.21, 129.18, 128.55, 125.71, 68.72, 25.91, 22.98.



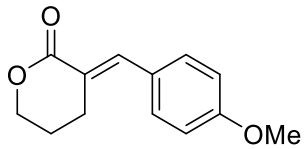
(*E*)-3-(4-methylbenzylidene)tetrahydro-2H-pyran-2-one (1b)

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (s, 1H), 7.35 (d, *J* = 8.1 Hz, 2H), 7.22 (d, *J* = 8.0 Hz, 2H), 4.53 – 4.28 (m, 2H), 2.90 – 2.86 (m, 2H), 2.38 (s, 3H), 2.06 – 1.91 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 167.26, 141.67, 139.58, 132.14, 130.36, 129.31, 124.66, 68.63, 25.99, 22.98, 21.42. HRMS (ESI): [M+Na^+] Calc. 225.0886, found 225.0883.



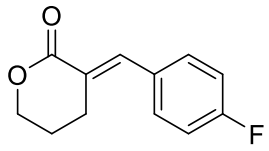
(*E*)-3-(4-(tert-butyl)benzylidene)tetrahydro-2H-pyran-2-one (1c)

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.91 (t, *J* = 2.2 Hz, 1H), 7.46 – 7.39 (m, 4H), 4.54 – 4.29 (m, 2H), 2.92 – 2.89 (m, 2H), 1.99 – 1.96 (m, 2H), 1.34 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 167.21, 152.64, 141.58, 132.15, 130.23, 125.54, 124.78, 68.64, 34.82, 31.15, 25.99, 22.99. HRMS (ESI): [M+Na^+] Calc. 267.1356, found 267.1358.



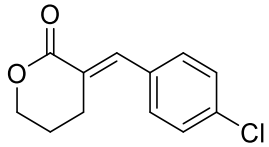
(*E*)-3-(4-methoxybenzylidene)tetrahydro-2H-pyran-2-one (1d)[2]

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (t, *J* = 2.1 Hz, 1H), 7.43 (d, *J* = 8.8 Hz, 1H), 6.98 – 6.90 (m, 1H), 4.49 – 4.30 (m, 1H), 3.85 (s, 2H), 2.89 – 2.86 (m, 1H), 2.02 – 1.96 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 167.41, 160.34, 141.40, 132.23, 127.67, 123.10, 114.04, 68.51, 55.36, 26.03, 22.97.



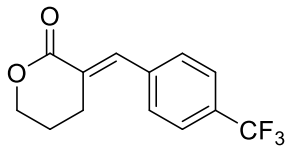
(*E*)-3-(4-fluorobenzylidene)tetrahydro-2H-pyran-2-one (1e)[3]

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (s, 1H), 7.46 – 7.42 (m, 2H), 7.21 – 6.96 (m, 2H), 4.57 – 4.25 (m, 2H), 2.88 – 2.84 (m, 2H), 2.02 – 1.96 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.87, 162.89 (d, *J* =250 Hz), 140.38, 132.21 (d, *J* = 9 Hz), 131.10 (d, *J* = 2 Hz), 125.36 (d, *J* = 2 Hz), 115.73 (d, *J* = 21 Hz), 68.66, 25.86, 22.91.



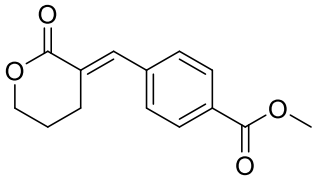
(*E*)-3-(4-chlorobenzylidene)tetrahydro-2H-pyran-2-one (1f)[4]

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86 (t, *J* = 2.3 Hz, 1H), 7.42 – 7.33 (m, 4H), 4.61 – 4.16 (m, 2H), 2.88 – 2.84 (m, 2H), 2.02 – 1.96 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.69, 140.16, 135.13, 133.29, 131.41, 128.82, 126.24, 68.69, 25.88, 22.86.



(*E*)-3-(4-(trifluoromethyl)benzylidene)tetrahydro-2H-pyran-2-one (1g)

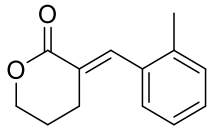
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (s, 1H), 7.67 (d, *J* = 8.2 Hz, 2H), 7.53 (d, *J* = 8.2 Hz, 2H), 4.69 – 4.21 (m, 2H), 2.90 – 2.86 (m, 2H), 2.03 – 1.97 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.34, 139.72, 138.31 (d, *J* = 2 Hz), 130.64 (d, *J* = 33 Hz), 130.16, 128.09, 125.45 (q, *J* = 4 Hz), 123.82 (q, *J* = 270 Hz), 68.85, 25.82, 22.86. HRMS (ESI): [M+Na^+] Calc. 279.0603, found 279.0603.



methyl (*E*)-4-((2-oxodihydro-2*H*-pyran-3(4H)-ylidene)methyl)benzoate (1h)[5]

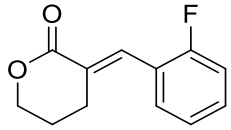
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (d, J = 8.4 Hz, 2H), 7.93 (t, J = 2.1 Hz,

1H), 7.49 (d, J = 8.3 Hz, 2H), 4.49 – 4.36 (m, 2H), 3.94 (s, 3H), 2.90 – 2.88 (m, 2H), 2.03 – 1.97 (m, 2H). ^{13}C NMR (101 MHz, CDCl3) δ 166.46, 166.42, 140.21, 139.25, 130.28, 129.94, 129.70, 127.87, 68.79, 52.30, 25.95, 22.91.



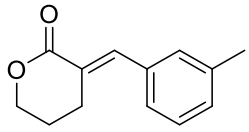
(*E*)-3-(2-methylbenzylidene)tetrahydro-2H-pyran-2-one (1i)

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (s, 1H), 7.31 – 7.18 (m, 4H), 4.50 – 4.30 (m, 2H), 2.74 – 2.70 (m, 2H), 2.32 (s, 3H), 1.96 – 1.90 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.67, 140.64, 137.66, 133.91, 130.33, 128.85, 128.56, 126.46, 125.49, 69.09, 25.40, 23.12, 19.95. HRMS (ESI): [M+Na$^+$] Calc. 225.0886, found 225.0886.



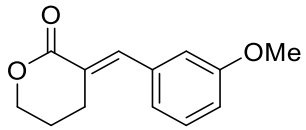
(*E*)-3-(2-fluorobenzylidene)tetrahydro-2H-pyran-2-one (1j)

White solid. ^{1}H NMR (400 MHz, CDCl3) δ 7.98 (s, 1H), 7.47 – 7.30 (m, 2H), 7.15 (m, 2H), 4.55 – 4.28 (m, 2H), 2.79 – 2.75 (m, 2H), 2.00 – 1.94 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.29, 160.57 (d, *J* = 250 Hz), 134.24 (d, *J* = 4 Hz), 130.96 (d, *J* = 8 Hz), 130.35 (d, *J* = 2 Hz), 128.25, 123.94 (d, *J* = 4 Hz), 122.85 (d, *J* = 14 Hz), 115.94 (d, *J* = 21 Hz), 69.06, 25.76 (d, *J* = 3 Hz), 22.95. HRMS (ESI): [M+Na$^+$] Calc. 229.0635, found 229.0634.



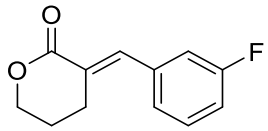
(*E*)-3-(3-methylbenzylidene)tetrahydro-2H-pyran-2-one (1k)

White solid.^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (t, *J* = 2.1 Hz, 1H), 7.34 – 7.28 (m, 1H), 7.22 (dd, *J* = 26.4, 6.1 Hz, 3H), 4.49 – 4.27 (m, 2H), 2.91 – 2.87 (m, 2H), 2.38 (s, 3H), 2.00 – 1.94 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 167.05, 141.80, 138.20, 134.88, 130.95, 129.99, 128.42, 127.26, 125.50, 68.71, 25.95, 22.99, 21.45. HRMS (ESI): [M+Na$^+$] Calc. 225.0886, found 225.0883.



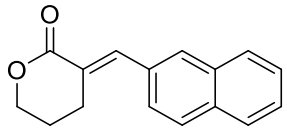
(*E*)-3-(3-methoxybenzylidene)tetrahydro-2H-pyran-2-one (1l)

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (t, *J* = 2.1 Hz, 1H), 7.33 (t, *J* = 7.9 Hz, 1H), 7.03 (d, *J* = 7.7 Hz, 1H), 6.98 – 6.88 (m, 2H), 4.55 – 4.18 (m, 2H), 3.83 (s, 3H), 2.90 – 2.87 (m, 2H), 2.19 – 1.84 (m, 2H) ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.92, 159.46, 141.48, 136.18, 129.54, 126.00, 122.59, 115.70, 114.62, 68.72, 55.29, 25.92, 22.95. HRMS (ESI): [M+Na^+] Calc. 241.0835, found 241.0834.



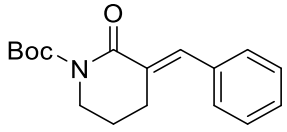
(*E*)-3-(3-fluorobenzylidene)tetrahydro-2H-pyran-2-one (1m)

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86 (t, *J* = 2.2 Hz, 1H), 7.39 (m, 1H), 7.21 (d, *J* = 7.8 Hz, 1H), 7.17 – 7.01 (m, 2H), 4.57 – 4.15 (m, 2H), 2.90 – 2.86 (m, 2H), 2.04 – 1.96 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.52, 162.47 (d, *J* = 245 Hz), 139.99 (d, *J* = 3 Hz), 136.84 (d, *J* =8 Hz), 130.07 (d, *J* = 9 Hz), 126.97, 126.06 (d, *J* = 3 Hz), 116.44 (d, *J* = 22 Hz), 115.99 (d, *J* = 21 Hz), 68.69, 25.78, 22.78. HRMS (ESI): [M+Na^+] Calc. 229.0635, found 229.0632.



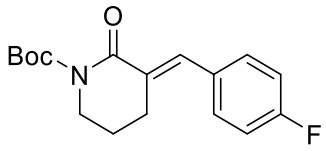
(*E*)-3-(naphthalen-2-ylmethylene)tetrahydro-2H-pyran-2-one (1n)

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.07 (t, *J* = 2.1 Hz, 1H), 7.91 (s, 1H), 7.85 (dd, *J* = 8.8, 5.7 Hz, 3H), 7.58 – 7.47 (m, 3H), 4.62 – 4.28 (m, 2H), 2.99 (m, 2H), 2.03 – 1.97 (m, 2H).^{13}C NMR (101 MHz, $CDCl_3$) δ 167.01, 141.69, 133.25, 132.99, 132.46, 130.35, 128.51, 128.18, 127.68, 127.22, 127.18, 126.64, 125.91, 68.73, 26.08, 23.03. HRMS (ESI): [M+Na^+] Calc. 261.0886, found 261.0886.



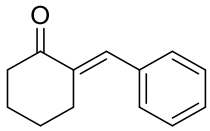
***tert*-butyl (*E*)-3-benzylidene-2-oxopiperidine-1-carboxylate (1o)**[6]

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (t, *J* = 2.0 Hz, 1H), 7.39 (d, *J* = 4.4 Hz, 4H), 7.36 – 7.28 (m, 1H), 3.92 – 3.61 (m, 2H), 2.95 – 2.60 (m, 2H), 1.91 – 1.85 (m, 2H), 1.57 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.77, 153.18, 138.51, 135.67, 130.74, 130.00, 128.57, 128.40, 82.99, 45.98, 28.08, 26.27, 22.57.



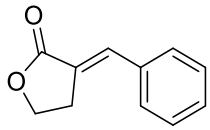
***tert*-butyl (*E*)-3-(4-fluorobenzylidene)-2-oxopiperidine-1-carboxylate (1p)**[6]

White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (s, 1H), 7.40 – 7.36 (m, 2H), 7.08 (t, *J* = 8.6 Hz, 2H), 3.84 – 3.69 (m, 2H), 2.77 (t, *J* = 5.7 Hz, 2H), 1.98 – 1.84 (m, 2H), 1.63 (s, 1H), 1.57 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.68, 162.63 (d, *J* =249 Hz), 153.15, 137.39, 131.93 (d, *J* =8 Hz), 131.82 (d, *J* =4 Hz), 130.49 (d, *J* =1 Hz), 115.56 (d, *J* =22 Hz), 83.10, 45.95, 28.11, 26.29, 22.57.



(*E*)-2-benzylidenecyclohexan-1-one (1q)[6]

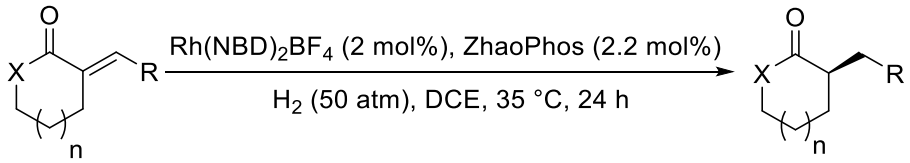
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.50 (t, *J* = 2.1 Hz, 1H), 7.43 – 7.35 (m, 4H), 7.34 – 7.30 (m, 1H), 2.86 – 2.82 (m, 2H), 2.54 (t, *J* = 6.7 Hz, 2H), 1.96 – 1.90 (m, 2H), 1.81 – 1.69 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 201.88, 136.66, 135.61, 135.59, 130.30, 128.53, 128.33, 40.34, 28.94, 23.87, 23.38.



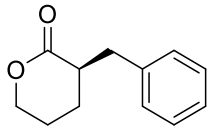
(*E*)-3-benzylidenedihydrofuran-2(*3H*)-one (1r)[6]

Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.58 (t, *J* = 2.9 Hz, 1H), 7.52 – 7.41 (m, 5H), 4.47 (t, *J* = 7.3 Hz, 2H), 3.28 – 3.24 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 172.53, 136.67, 134.64, 130.00, 129.86, 128.94, 123.53, 65.45, 27.43.

General Procedure for Asymmetric Hydrogenation of exocyclic *α,β*-Unsaturated Carbonyl Compounds

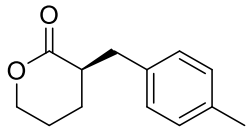


In a nitrogen-filled glovebox, the $Rh(NBD)_2BF_4$ (0.02 mmol) and ZhaoPhos (0.022 mmol) were dissolved in 1.0 mL anhydrous DCE, and the solution was stirred for 30 min at rt. Then the solution was equally divided into 10 vials charged with substrates (0.1 mmol) in anhydrous DCE solution (1.0 mL). The resulting vials were transferred to an autoclave, which was charged with 50 atm H_2, and the reaction was stirred at 35 ℃ for 24h. When the reaction was completed, the H_2 was released slowly and the solution was passed through a short column of silica gel with EA. The solution was concentrated under reduced pressure to get the target compound. The chiral compounds were the analyzed by using HPLC on a chiral stationary phase to determine the ee.



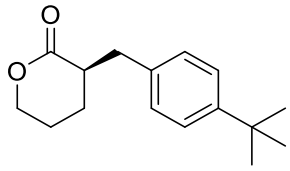
(*R*)-3-benzyltetrahydro-2H-pyran-2-one (2a)[1]

White solid; Isolated yield: 98%, 18.6 mg; 97% ee; $[\alpha]_D^{25}$ = + 61.1 (c =1, MeOH); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 97:3, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 20.0 min (major), 21.3 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32 – 7.29 (m, 2H), 7.26 – 7.18 (m, 3H), 4.31 – 4.24 (m, 2H), 3.51 – 3.21 (m, 1H), 2.83 – 2.58 (m, 2H), 1.96 – 1.85 (m, 2H), 1.81 (dd, *J* = 12.3, 6.1 Hz, 1H), 1.58 – 1.46 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.15, 138.93, 129.19, 128.54, 126.52, 68.57, 41.52, 37.18, 24.04, 21.91.



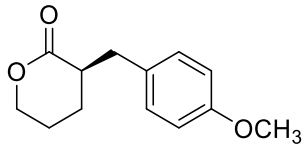
(*R*)-3-(4-methylbenzyl)tetrahydro-2H-pyran-2-one (2b)

White solid; Isolated yield: 98%, 19.9 mg; 99% ee; $[\alpha]_D^{25}$ = + 76.5 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OD-H column, hexane: isopropanol = 97:3, flow rate = 0.5 mL/min; UV detection at 210 nm; t_R = 45.4 min (major), 50.1 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.16 – 7.05 (m, 4H), 4.53 – 4.02 (m, 2H), 3.45 – 3.12 (m, 1H), 2.79 – 2.55 (m, 2H), 2.33 (s, 3H), 1.97 – 1.85 (m, 2H), 1.83 – 1.74 (m, 1H), 1.58 – 1.44 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.23, 136.03, 135.76, 129.19, 129.04, 68.56, 41.55, 36.72, 23.98, 21.88, 21.03. HRMS (ESI): [M+Na^+] Calc. 227.1043, found 227.1038.



(*R*)-3-(4-(*tert*-butyl)benzyl)tetrahydro-2H-pyran-2-one (2c)

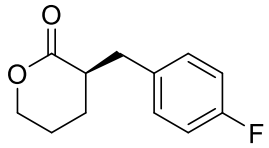
White solid. Isolated yield: 97%, 23.9 mg; 99% ee; $[\alpha]_D^{25}$ = + 76.5 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OD-H column, hexane: isopropanol = 97:3, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 16.8 min (major), 24.7 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32 (d, *J* = 8.3 Hz, 1H), 7.13 (d, *J* = 8.2 Hz, 1H), 4.39 – 4.15 (m, 1H), 3.35 (dd, *J* = 12.9, 3.1 Hz, 1H), 2.74 – 2.61 (m, 1H), 1.95 – 1.85 (m, 1H), 1.85 – 1.77 (m, 1H), 1.56 – 1.52 (m, 1H), 1.31 (s, 4H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.31, 149.34, 135.82, 128.84, 125.41, 68.55, 41.52, 36.64, 34.43, 31.39, 24.07, 21.89. HRMS (ESI): [M+Na^+] Calc. 269.1512, found 269.1512.



(*R*)-3-(4-methoxybenzyl)tetrahydro-2H-pyran-2-one (2d)[2]

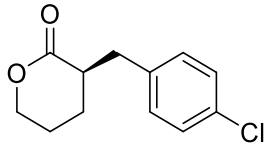
White solid; Isolated yield: 96%, 21.1 mg; 98% ee; $[\alpha]_D^{25}$ = + 71.6 (c = 1, CH_3Cl); The

enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 97:3, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 31.0 min (major), 33.7 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.12 (d, *J* = 8.6 Hz, 1H), 6.84 (d, *J* = 8.7 Hz, 1H), 4.47 – 4.08 (m, 1H), 3.79 (s, 2H), 3.28 (d, *J* = 9.7 Hz, 1H), 2.85 – 2.59 (m, 1H), 1.96 – 1.85 (m, 1H), 1.84 – 1.80 (m, 1H), 1.57 – 1.46 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.21, 158.24, 130.86, 130.18, 113.89, 68.62, 55.28, 41.70, 36.30, 24.00, 21.93.



(*R*)-3-(4-fluorobenzyl)tetrahydro-2H-pyran-2-one (2e)[3]

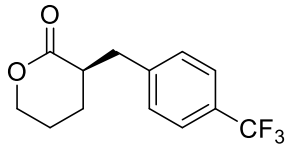
White solid; Isolated yield: 93%, 19.4 mg; 97% ee; $[\alpha]_D^{25}$ = - 12.6 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 97:3, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 22.1 min (major), 24.4 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.20 – 7.12 (m, 1H), 7.01 – 6.96 (m, 1H), 4.31 – 4.24 (m, 1H), 3.39 – 3.14 (m, 1H), 2.88 – 2.50 (m, 1H), 1.96 – 1.86 (m, 1H), 1.86 – 1.78 (m, 1H), 1.59 – 1.43 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.95, 161.64 (d, *J* = 243 Hz), 134.53 (d, *J* = 3 Hz), 130.64 (d, *J* = 8 Hz), 115.32 (d, *J* = 21 Hz), 68.58, 41.56, 36.32, 24.02, 21.92.



(*R*)-3-(4-chlorobenzyl)tetrahydro-2H-pyran-2-one (2f)[4]

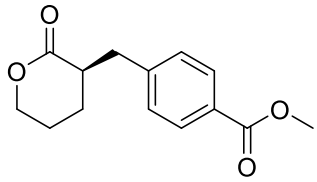
White solid; Isolated yield: 95%, 21.3 mg; 98% ee; $[\alpha]_{25}^D$ = + 45.3 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 97:3, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 23.3 min (major), 26.7 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28 (t, *J* = 2.3 Hz, 1H), 7.25 (d, *J* = 2.5 Hz, 1H), 7.18 – 7.12 (m, 2H), 4.34 – 4.24 (m, 2H), 3.41 – 3.19 (m, 1H), 2.71 (m, 2H), 1.97 – 1.86 (m, 2H), 1.94 – 1.79 (m, 1H), 1.55 – 1.48 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.81, 137.36, 132.31, 130.57, 128.62, 68.56, 41.39, 36.46, 24.04,

21.91.



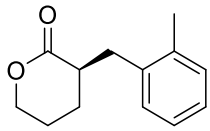
(*R*)-3-(4-(trifluoromethyl)benzyl)tetrahydro-2H-pyran-2-one (2g)

White solid; Isolated yield: 94%, 24.5 mg; 97% ee; $[\alpha]_D^{25}$ = + 31.1 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 95:5, flow rate = 0.5 mL/min; UV detection at 210 nm; t_R = 26.0 min (major), 28.6 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.56 (d, *J* = 8.0 Hz, 2H), 7.34 (d, *J* = 8.0 Hz, 2H), 4.46 – 4.16 (m, 2H), 3.41 – 3.37 (m, 1H), 2.94 – 2.63 (m, 2H), 2.00 – 1.88 (m, 2H), 1.87 – 1.78 (m, 1H), 1.62 – 1.46 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.69, 143.14 (d, *J* = 1 Hz), 129.56, 128.88 (q, *J* = 33 Hz), 125.45 (q, *J* = 4 Hz), 124.22 (q, *J* = 270 Hz), 68.54, 41.26, 36.93, 24.14, 21.91. HRMS (ESI): [M+Na^+] Calc. 281.0760, found 281.0756.



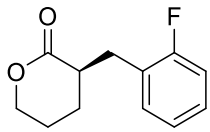
methyl (*R*)-4-((2-oxotetrahydro-2*H*-pyran-3-yl)methyl)benzoate (2h)[5]

White solid; Isolated yield: 94%, 23.3 mg; 90% ee; $[\alpha]_D^{25}$ = + 11.4 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 90:10, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 23.1 min (minor), 28.3 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, J = 8.3 Hz, 2H), 7.28 (d, J = 8.2 Hz, 2H), 4.35 – 3.91 (m, 2H), 3.91 (s, 3H), 3.40 (dd, J = 12.8, 3.5 Hz, 1H), 2.84 – 2.71 (m, 2H), 1.94 – 1.86 (m, 2H), 1.86 – 1.77 (m, 1H), 1.58 – 1.48 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.67, 166.98, 144.46, 129.87, 129.26, 128.59, 68.55, 52.11, 41.27, 37.19, 24.19, 21.96.



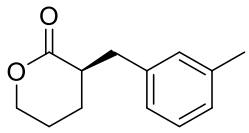
(*R*)-3-(2-methylbenzyl)tetrahydro-2H-pyran-2-one (2i)

White solid; Isolated yield: 98%, 20.0 mg; 97% ee; $[\alpha]_D^{25}$ = + 8.1 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OJ-H column, hexane: isopropanol = 95:5, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 29.6 min (major), 32.6 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.17 – 7.13 (m, 4H), 4.31 (t, *J* = 5.9 Hz, 2H), 3.66 – 3.31 (m, 1H), 2.69 – 2.60 (m, 2H), 2.34 (s, 3H), 1.95 – 1.87 (m, 2H), 1.86 – 1.75 (m, 1H), 1.61 – 1.49 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.25, 137.21, 136.34, 130.56, 129.90, 126.64, 125.95, 68.47, 40.31, 34.37, 24.17, 21.89, 19.53. HRMS (ESI): [M+Na^+] Calc. 227.1043, found 227.1042.



(*R*)-3-(2-fluorobenzyl)tetrahydro-2H-pyran-2-one (2j)

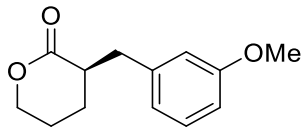
White solid; Isolated yield: 95%, 19.7 mg; 99% ee; $[\alpha]_D^{25}$ = - 4.4 (c =1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OJ-H column, hexane: isopropanol = 95:5, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 28.2 min (minor), 32.6 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27 – 7.17 (m, 2H), 7.08 – 7.01 (m, 2H), 4.43 – 4.17 (m, 2H), 3.37 (q, *J* = 9.0 Hz, 1H), 2.88 – 2.66 (m, 2H), 1.91 (m, 2H), 1.87 – 1.78 (m, 1H), 1.55 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.06, 161.30 (d, *J* = 243 Hz), 131.67 (d, *J* = 5 Hz), 128.35 (d, *J* = 8 Hz), 125.83 (d, *J* = 15 Hz), 124.17 (d, *J* = 4 Hz), 115.31 (d, *J* = 22 Hz), 68.41, 40.28 (d, *J* = 1 Hz), 30.37 (d, *J* = 2 Hz), 23.92, 21.81. HRMS (ESI): [M+Na^+] Calc. 231.0792, found 231.0789.



(*R*)-3-(3-methylbenzyl)tetrahydro-2H-pyran-2-one (2k)

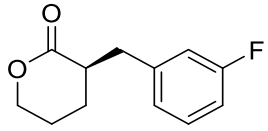
White solid; Isolated yield: 98%, 19.9 mg; 99% ee; $[\alpha]_D^{25}$ = + 91.8 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OJ-H column, hexane: isopropanol = 95:5, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 30.7 min (minor), 38.7 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.19 (t, J = 7.5 Hz, 1H), 7.07 – 6.96 (m, 3H), 4.35 – 4.22 (m, 2H), 3.36 – 3.33 (m, 1H), 2.76 – 2.64 (m, 2H), 2.33 (s,

3H), 1.92 – 1.87 (m, 2H), 1.83 – 1.73 (m, 1H), 1.51 (dd, J = 16.0, 6.5 Hz, 1H). ^{13}C NMR (101 MHz, CDCl3) δ 174.27, 138.84, 138.13, 129.91, 128.39, 127.22, 126.15, 68.55, 41.48, 37.07, 24.02, 21.86, 21.41. HRMS (ESI): [M+Na$^+$] Calc. 227.1043, found 227.1041.



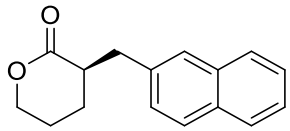
(*R*)-3-(3-methoxybenzyl)tetrahydro-2H-pyran-2-one (2l)

White solid; Isolated yield: 96%, 21.2 mg; 98% ee; $[\alpha]_D^{25}$ = + 65.7 (c = 1, CH_3Cl); 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 210 nm; t_R = 43.8 min (minor), 47.7 min (major).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.22 (t, *J* = 7.8 Hz, 1H), 6.88 – 6.59 (m, 3H), 4.49 – 4.08 (m, 2H), 3.80 (s, 3H), 3.49 – 3.25 (m, 1H), 2.74 – 2.65 (m, 2H), 1.96 – 1.86 (m, 2H), 1.83 (dd, *J* = 11.4, 5.1 Hz, 1H), 1.60 – 1.44 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.13, 159.66, 140.51, 129.49, 121.50, 114.88, 111.67, 68.57, 55.17, 41.41, 37.19, 24.02, 21.87. HRMS (ESI): [M+Na$^+$] Calc. 243.0992, found 243.0987.



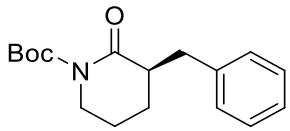
(*R*)-3-(3-fluorobenzyl)tetrahydro-2H-pyran-2-one (2m)

White solid; Isolated yield: 98%, 20.4 mg; 99% ee; $[\alpha]_D^{25}$ = + 61.4 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OJ-H column, hexane: isopropanol = 95:5, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 40.0 min (major), 49.0 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27 – 7.20 (m, 1H), 7.03 – 6.83 (m, 3H), 4.32 – 4.25 (m, 3H), 3.35 (q, *J* = 8.5 Hz, 1H), 2.87 – 2.48 (m, 3H), 1.99 – 1.76 (m, 4H), 1.60 – 1.44 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.76, 162.87 (d, *J* = 245 Hz), 141.49 (d, *J* = 9 Hz), 129.98 (d, *J* = 8 Hz), 127.85 (d, *J* = 3 Hz), 116.02 (d, *J* = 21 Hz), 113.44 (d, *J* = 21 Hz), 68.52, 41.29, 36.88, 36.87, 24.10, 21.92. HRMS (ESI): [M+Na$^+$] Calc. 231.0792, found 231.0788.



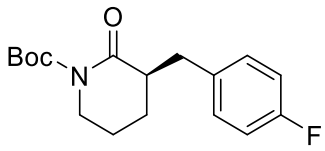
(*R*)-3-(naphthalen-2-ylmethyl)tetrahydro-2H-pyran-2-one (2n)

White solid; Isolated yield: 98%, 23.5 mg; 99% ee; $[\alpha]_D^{25}$ = + 29.2 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OJ-H column, hexane: isopropanol = 90:10, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 58.5 min (major), 65.3 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 – 7.78 (m, 3H), 7.64 (s, 1H), 7.55 – 7.39 (m, 2H), 7.34 (dd, *J* = 8.4, 1.7 Hz, 1H), 4.42 – 4.18 (m, 2H), 3.55 – 3.51 (dd, *J* = 13.2, 3.6 Hz, 1H), 2.99 – 2.74 (m, 2H), 1.96 – 1.83 (m, 2H), 1.83 – 1.73 (m, 1H), 1.62 – 1.52 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 174.11, 136.42, 133.47, 132.24, 128.23, 127.73, 127.66, 127.51, 127.40, 126.16, 125.57, 68.63, 41.48, 37.35, 24.11, 21.93. HRMS (ESI): [M+Na^+] Calc. 263.1043, found 263.1040.



***tert*-butyl (*R*)-3-benzyl-2-oxopiperidine-1-carboxylate (2o)**[6]

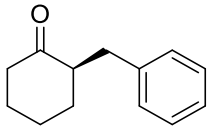
White solid; Isolated yield: 74%, 21.4 mg; 95% ee; $[\alpha]_D^{25}$ = + 33.7 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 97:3, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 12.5 min (major), 13.7 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.30 (d, *J* = 7.1 Hz, 1H), 7.23 – 7.18 (m, 3H), 3.77 – 3.65 (m, 1H), 3.61 – 3.54 (m, 1H), 3.42 (d, *J* = 9.8 Hz, 1H), 2.71 – 2.56 (m, 2H), 1.87 – 1.79 (m, 2H), 1.77 – 1.70 (m, 1H), 1.54 (s, 3H), 1.47 – 1.39 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.78, 152.97, 139.62, 129.26, 128.42, 126.28, 82.91, 45.77, 45.60, 37.08, 28.06, 25.27, 21.55.



(*R*)-1-((l1-methyl)(l1-oxidanyl)boranyl)-3-(4-fluorobenzyl)piperidin-2-one (2p)[6]

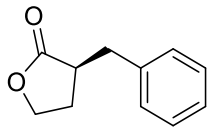
White solid; Isolated yield: 73%, 22.5 mg; 91% ee; $[\alpha]_D^{25}$ = + 48.2 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane:

isopropanol = 95:5, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 9.5 min (major), 11.3 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.16 – 7.13 (m, 2H), 6.97 (t, *J* = 8.7 Hz, 2H), 3.74 – 3.67 (m, 1H), 3.69 – 3.57 (m, 1H), 3.36 – 3.33 (m, 1H), 2.65 – 2.59 (m, 2H), 1.85 – 1.79 (m, 2H), 1.77 – 1.72 (m, 1H), 1.71 – 1.62 (m, 1H), 1.54 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 173.56, 161.55 (d, *J* = 243 Hz), 152.91, 135.21 (d, *J* = 3 Hz), 130.69 (d, *J* = 8 Hz), 115.21 (d, *J* = 21 Hz), 82.97, 45.78, 45.65, 36.27, 28.07, 25.33, 21.60.



(*R*)-2-benzylcyclohexan-1-one (2q)[6]

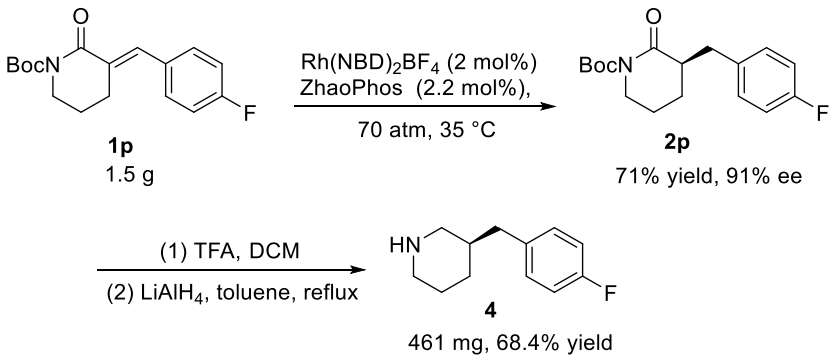
Yellow solid; Isolated yield: 98%, 18.4 mg; 91% ee; $[\alpha]_D^{25}$ = + 31.2 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OJ-H column, hexane: isopropanol = 99:1, flow rate = 1.0 mL/min; UV detection at 210 nm; t_R = 12.9 min (minor), 14.3 min (major).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29 – 7.25 (m, 2H), 7.21 – 7.11 (m, 3H), 3.26 – 3.21 (m, 1H), 2.57-2.54 (m, 1H), 2.48 – 2.39 (m, 2H), 2.39 – 2.28 (m, 1H), 2.11 – 1.99 (m, 2H), 1.86 – 1.79 (m, 1H), 1.72 – 1.58 (m, 2H), 1.39 – 1.30 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 212.66, 140.40, 129.17, 128.32, 125.99, 52.51, 42.21, 35.49, 33.43, 28.09, 25.10.



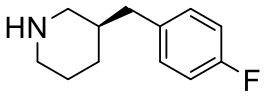
(*R*)-3-benzyldihydrofuran-2(3H)-one (2r)[6]

White solid; Isolated yield: 93%, 16.4 mg; 79% ee; $[\alpha]_D^{25}$ = + 23.5 (c = 1, CH_3Cl); The enantiomeric excess was determined by HPLC on Chiralcel OD-H column, hexane: isopropanol = 95:5, flow rate = 0.5 mL/min; UV detection at 210 nm; t_R = 22.8 min (major), 25.4 min (minor).^{1}H NMR (400 MHz, $CDCl_3$) δ 7.31 (t, *J* = 7.2 Hz, 2H), 7.27 – 7.18 (m, 3H), 4.24 – 4.11 (m, 2H), 3.27 – 3.23 (m, 1H), 2.98 – 2.58 (m, 2H), 2.32 – 2.16 (m, 1H), 2.08 – 1.92 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 178.77, 138.42, 128.88, 128.71, 126.76, 66.58, 41.12, 36.12, 28.05.

Procedure for the chiral piperdine 4[7]



In a nitrogen-filled glovebox, the $Rh(NBD)_2BF_4$ (2 mol%) and ZhaoPhos (2.2 mol%) were dissolved in anhydrous DCE (1 M), and the solution was stirred for 1h at rt. Then the benzylidenelactam **1p** (1.5g) was added. The resulting vial was transferred to an autoclave, which was charged with 70 atm H_2, and the reaction was stirred at 35 ℃ for 48h. When the reaction was completed, the H_2 was released slowly and the solution was passed through a short column of silica gel with EA. The solution was concentrated under reduced pressure to get benzyllactam **2p** in 71% yield. Benzyllactam **2p** (1.68 g) was dissolved in a mixture of CH_2Cl_2 (5 ml) and TFA (5 ml). The mixture was stirred at room temperature for 1 h and the evaporated *in vacuo*. The resulting residue was used for reduction. A dry round bottomed flask was charged with the residue followed by THF (2 M). The reaction flask was purged with N_2 for three times, then cooled to 0 ℃. 30 minutes later, $LiAlH_4$ (1.0 M in THF, 2 eq) was added dropwise. The mixture was reflux for 12 h and quenched with water. The overall yield of piperidine **4** was 68.4 %.



(*R*)-3-(4-fluorobenzyl)piperidine (**4**)

colourless liquid. ^{1}H NMR (400 MHz, CDCl3) δ 7.08 (dd, *J* = 8.4, 5.5 Hz, 2H), 6.95 (t, *J* = 8.7 Hz, 2H), 3.05 (t, *J* = 12.9 Hz, 2H), 2.58 (t, *J* = 12.0 Hz, 1H), 2.50 – 2.44 (m, 2H), 2.33 (t, *J* = 11.2 Hz, 2H), 1.74 (m, 3H), 1.52 (d, *J* = 12.9 Hz, 1H), 1.08 (m, 1H). ^{13}C NMR (101 MHz, CDCl3) δ 161.42 (d, *J* = 242 Hz), 135.28 (d, *J* = 3 Hz), 130.33 (d, *J* = 8 Hz), 115.09 (d, *J* = 21 Hz), 51.37, 46.02, 40.02, 37.94, 30.56, 25.20.

Reference

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4. M. Ferreira, T. B. Bisol, H. P. da Conceicao, T. V. C. Russo, A. J. Bortoluzzi and M. M. Sa, *Synthesis*, 2017, **49**, 667.
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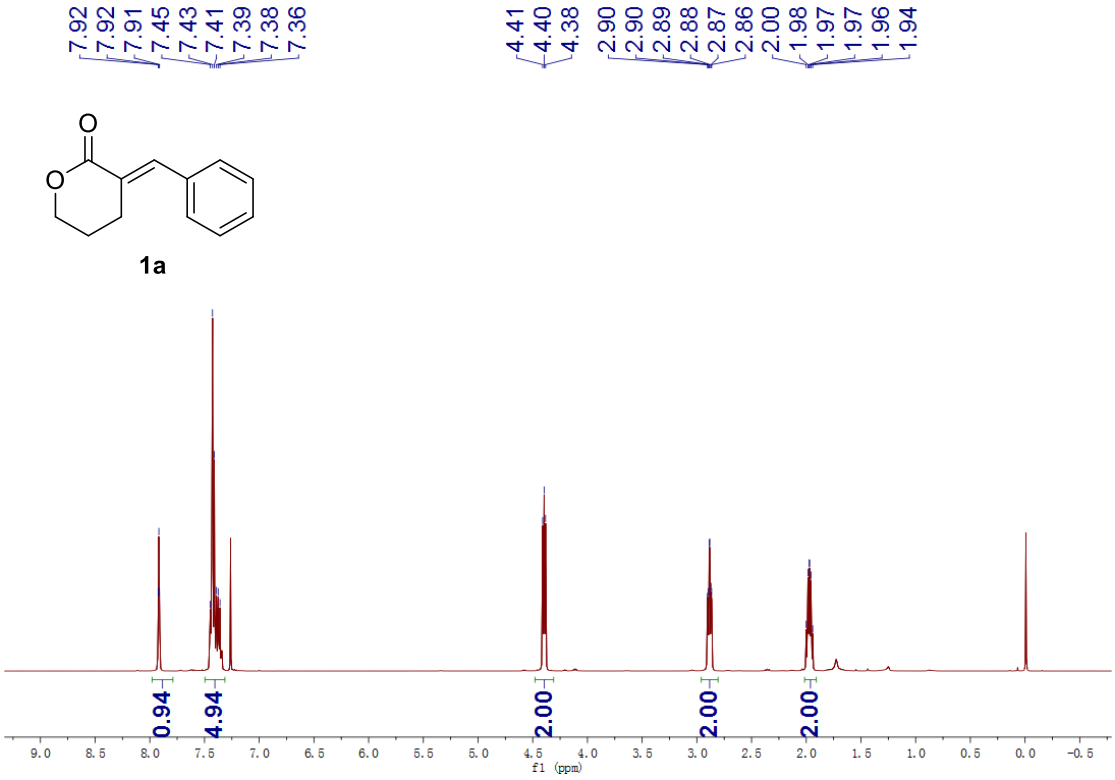
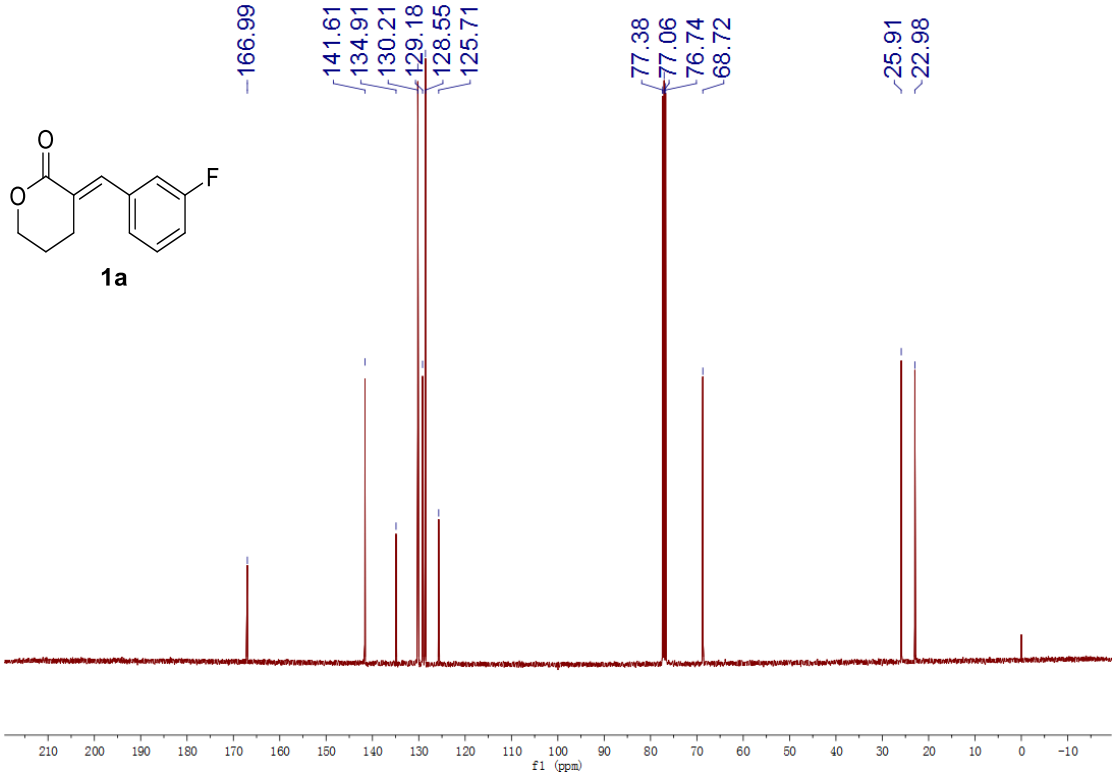
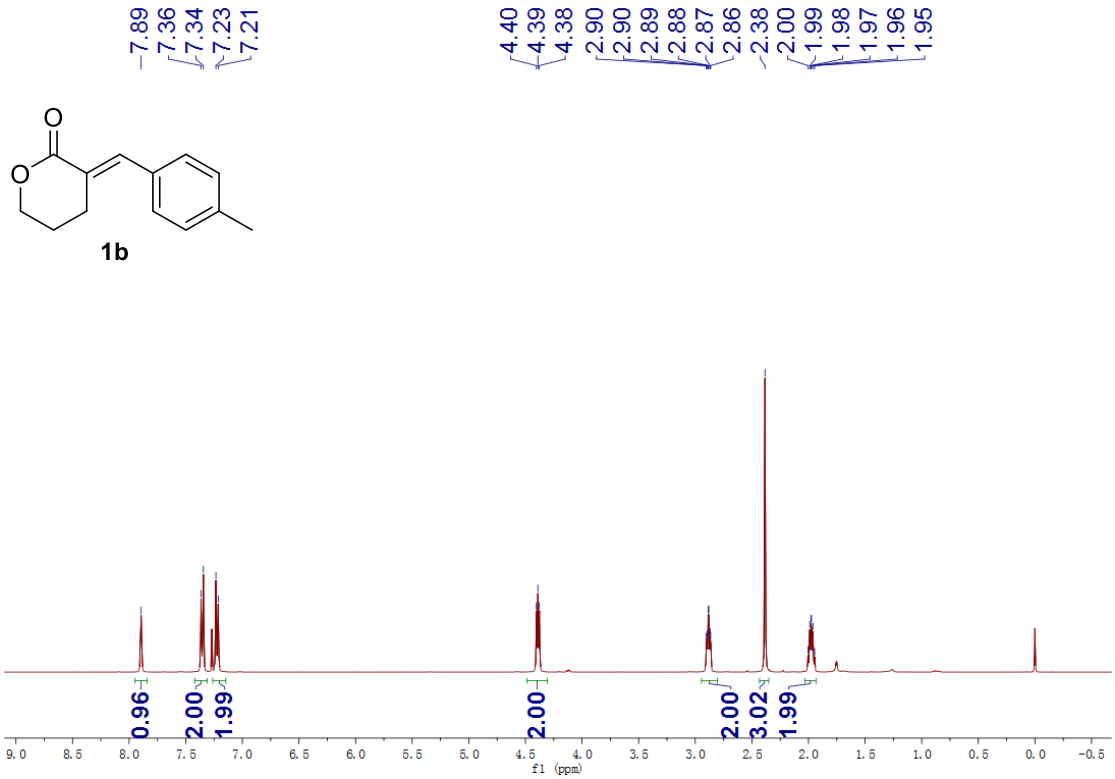
^{1}H,^{13}C NMR spectra of substrates and products



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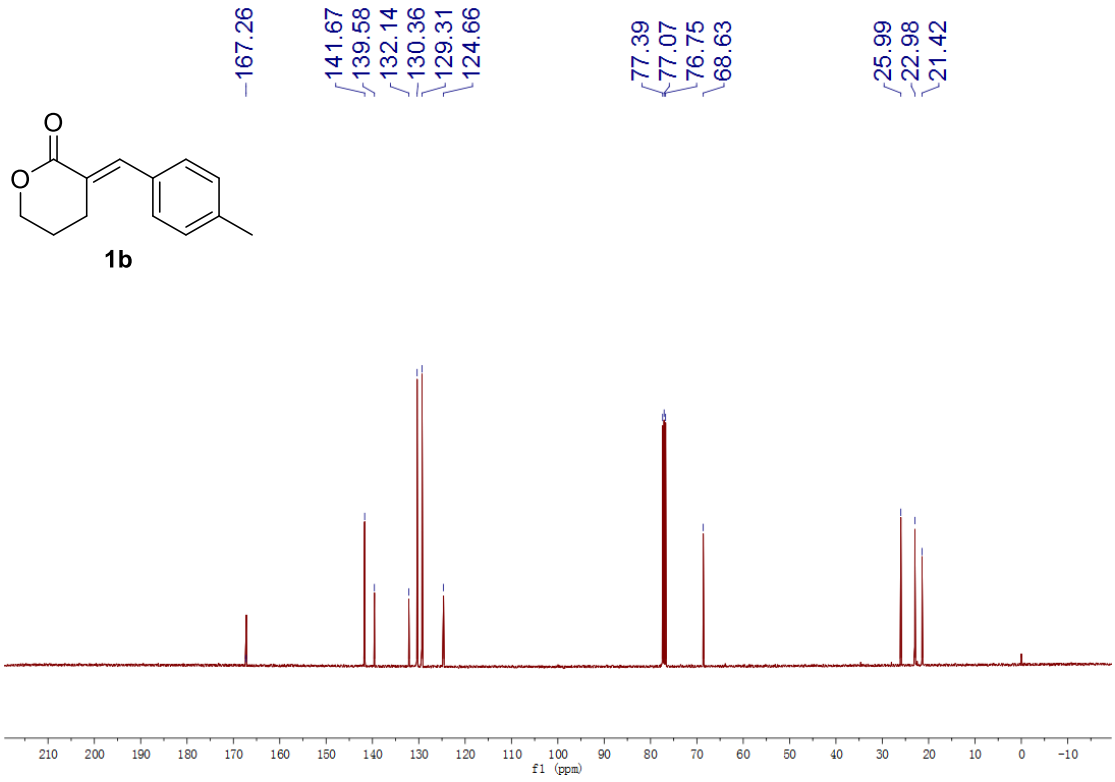
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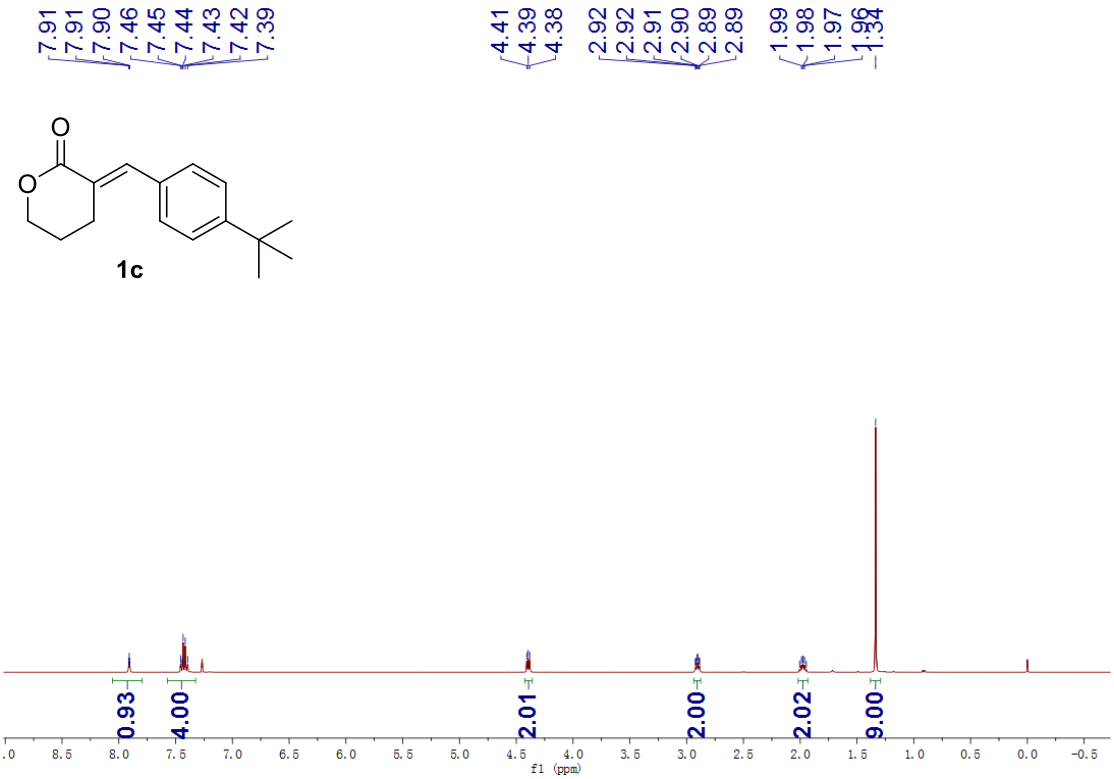
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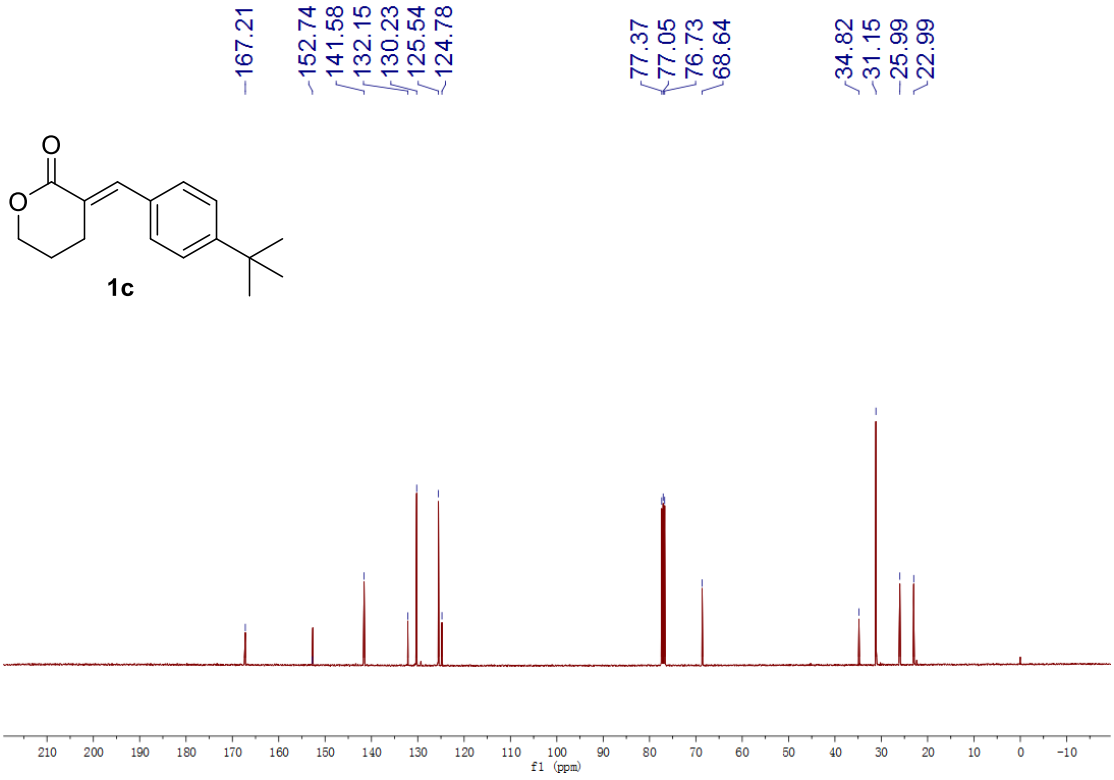
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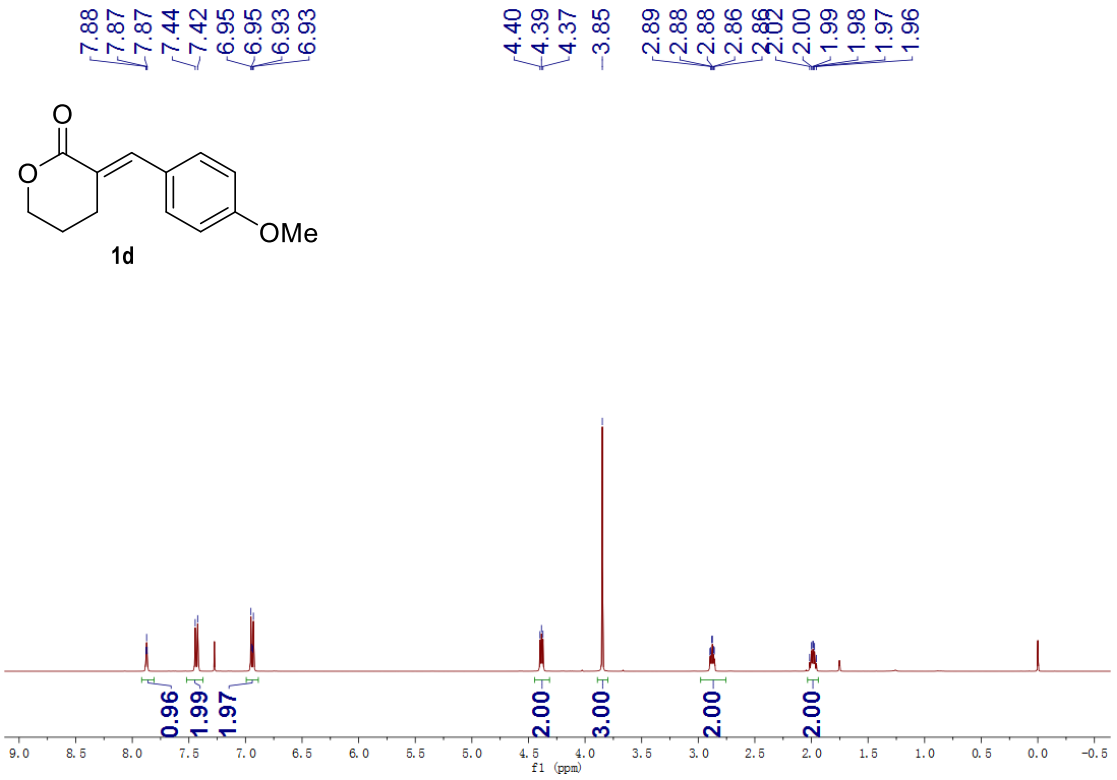
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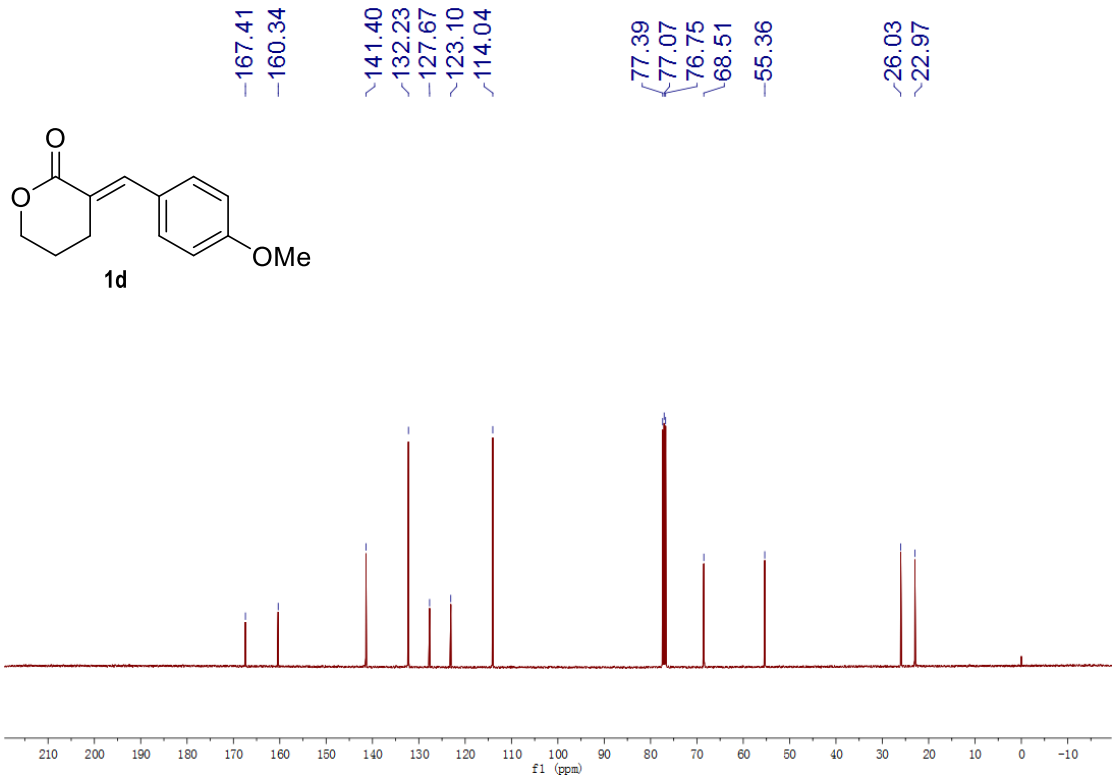
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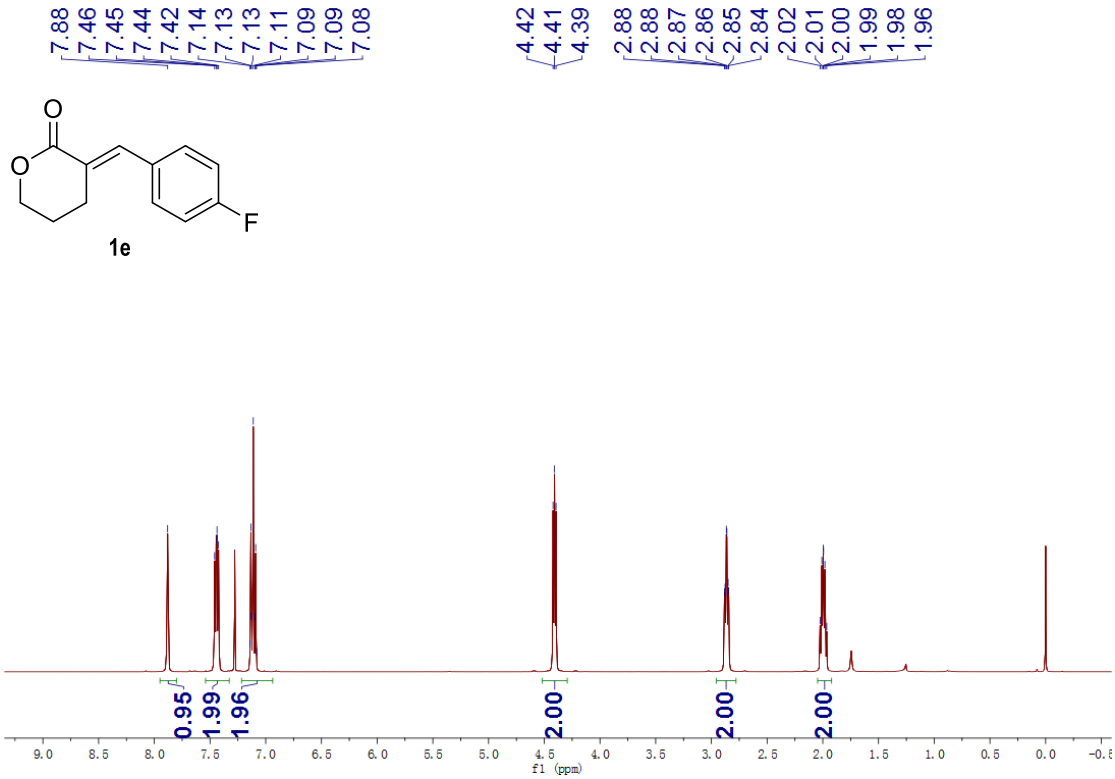
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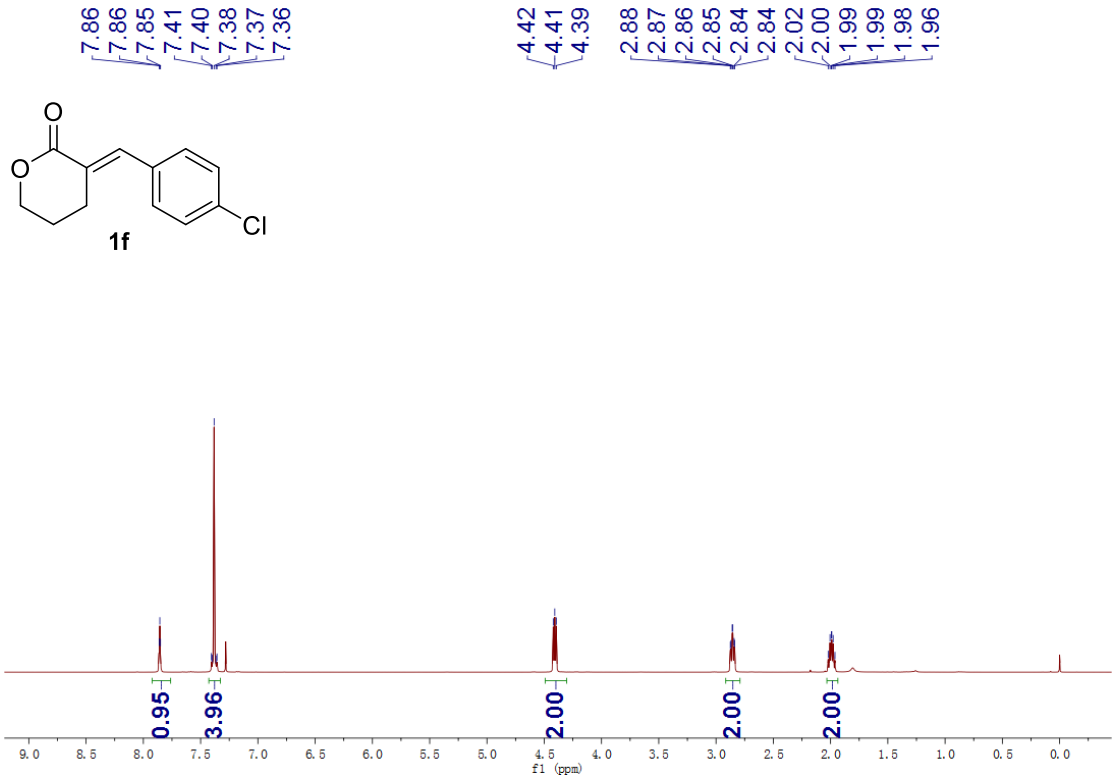
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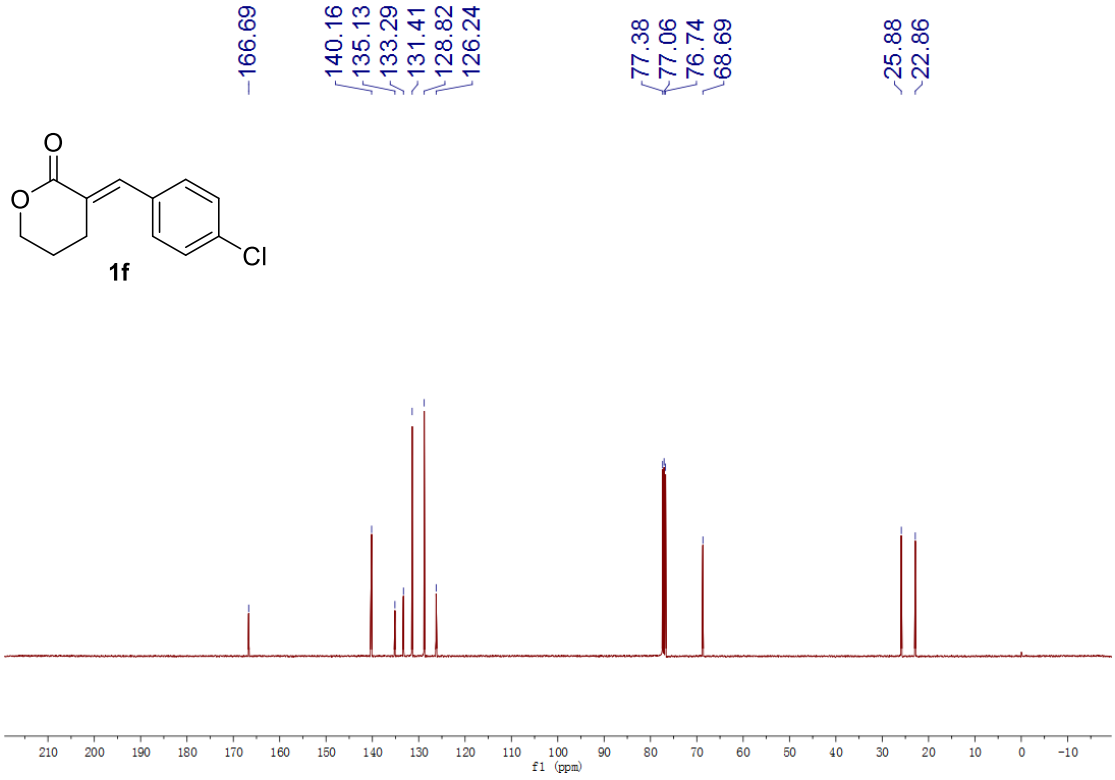
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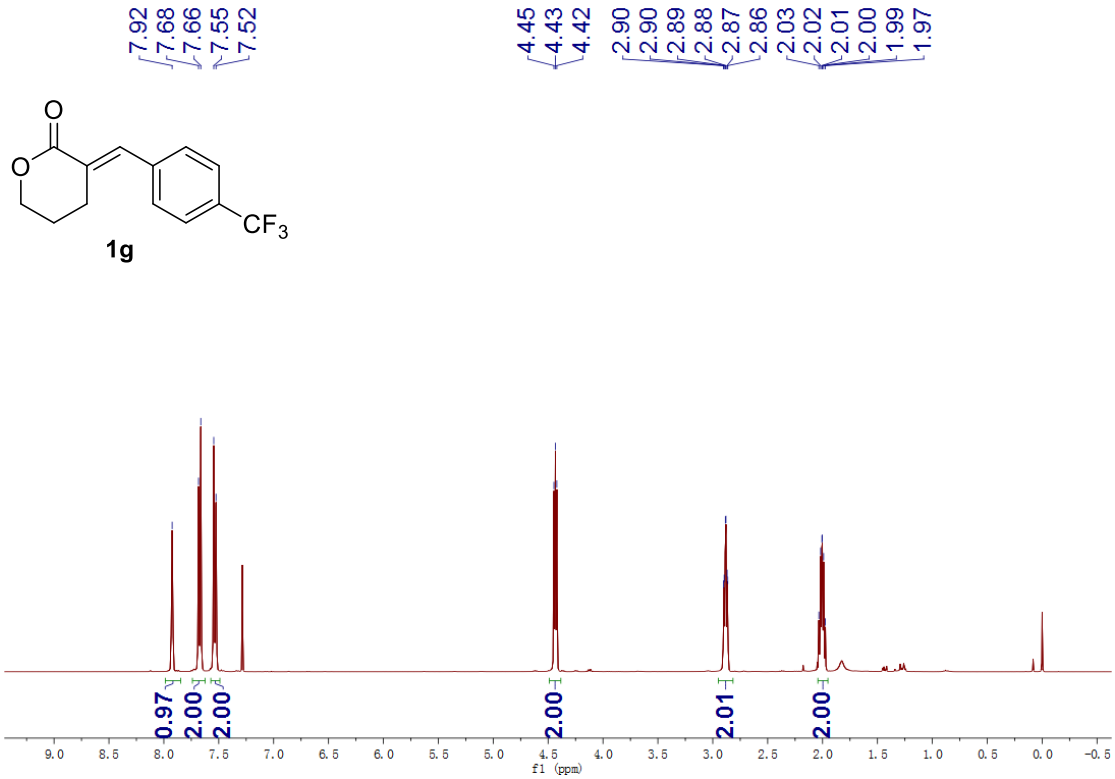
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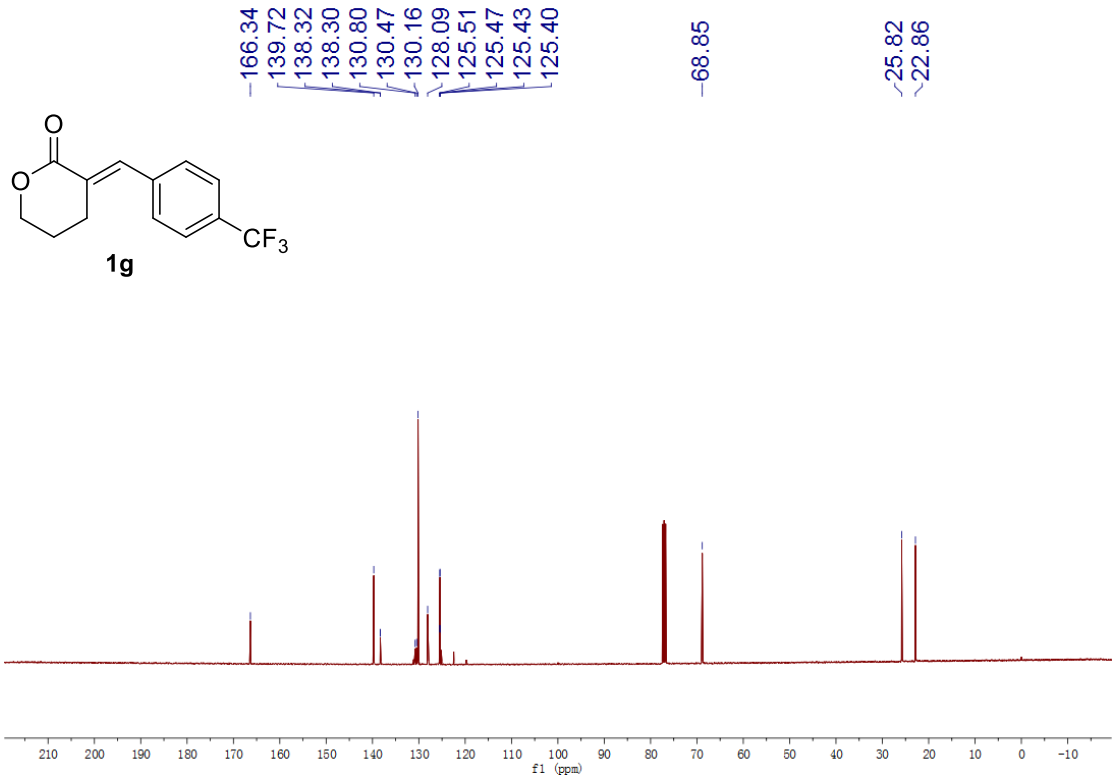
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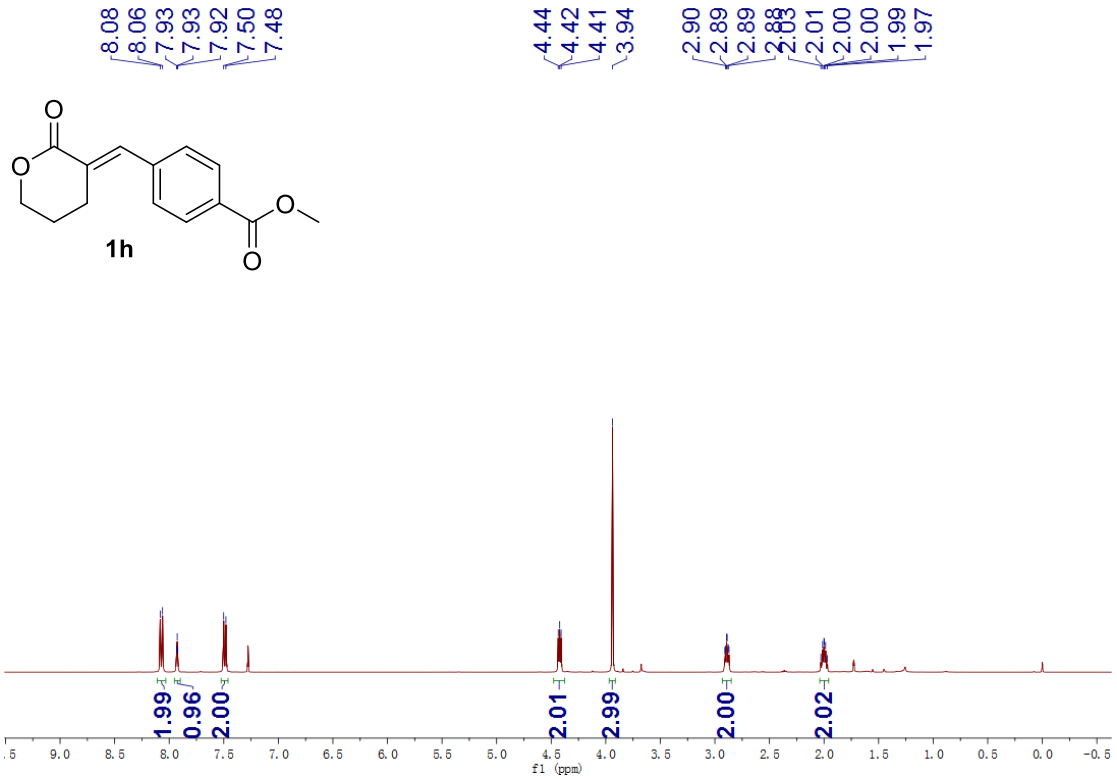
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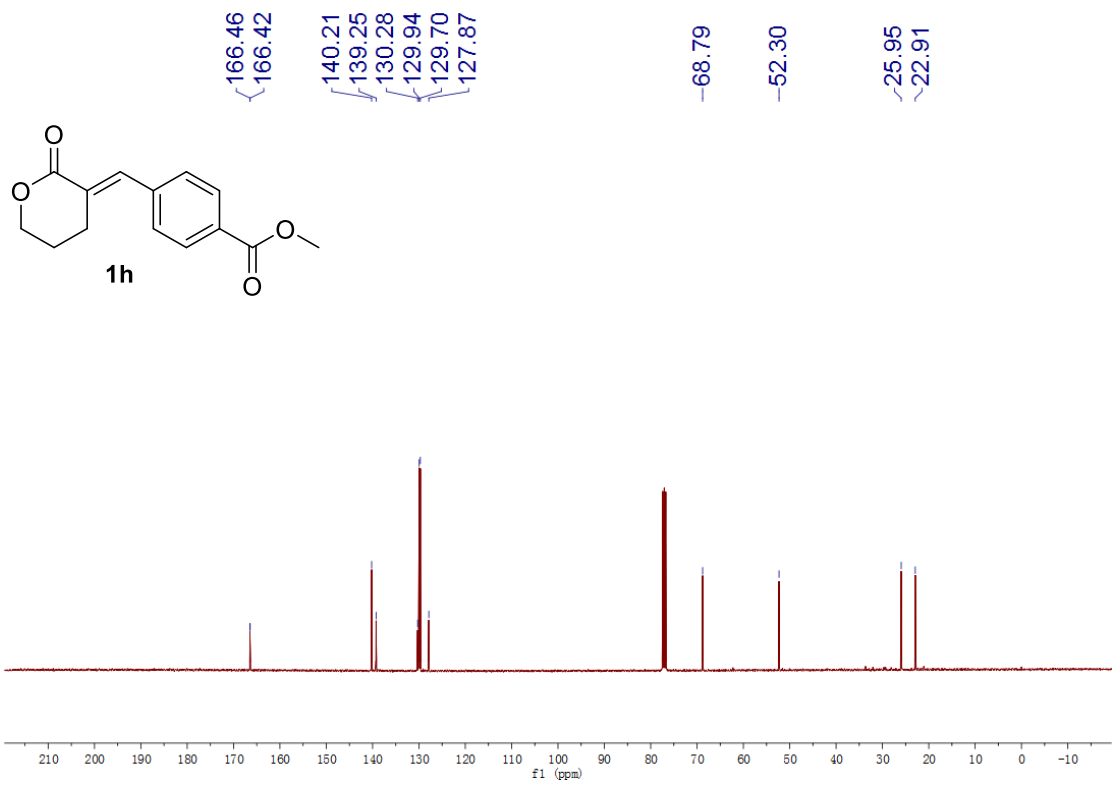
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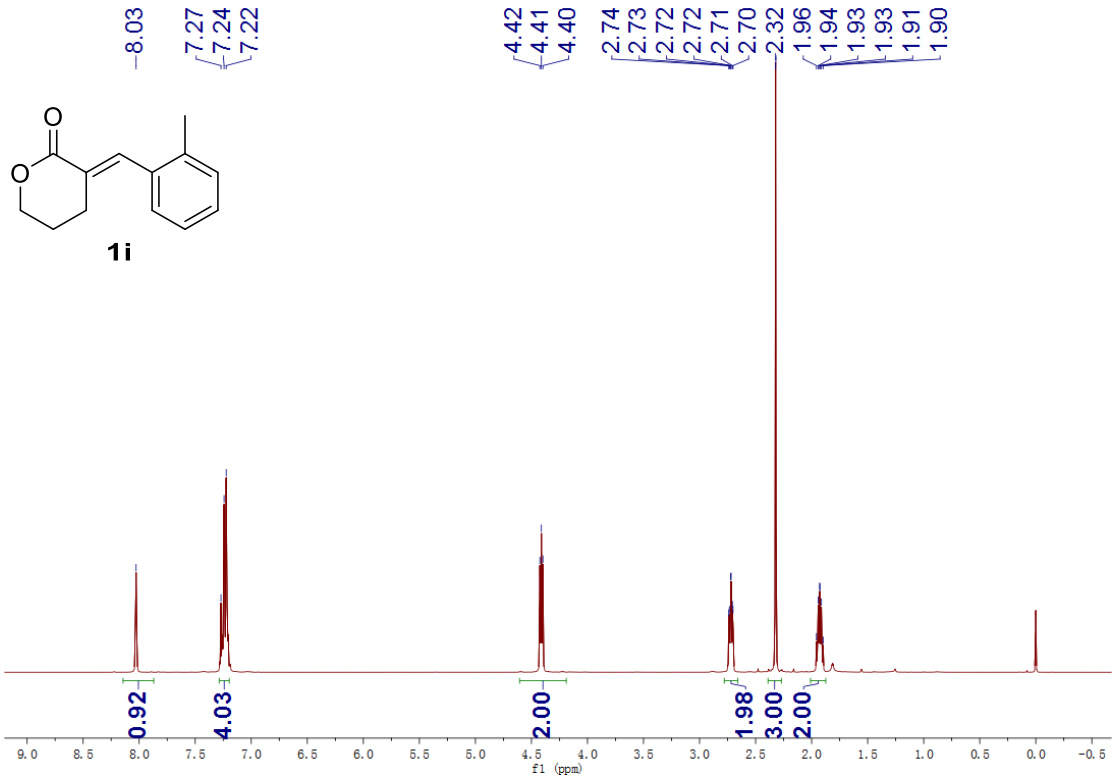
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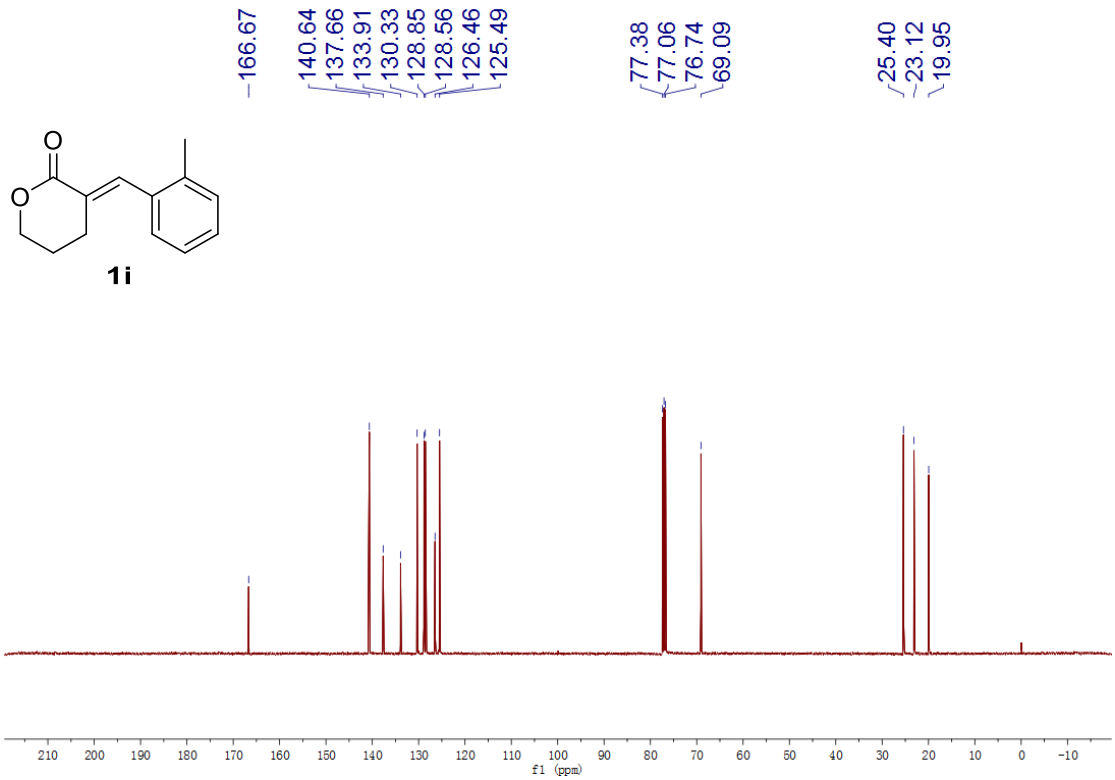
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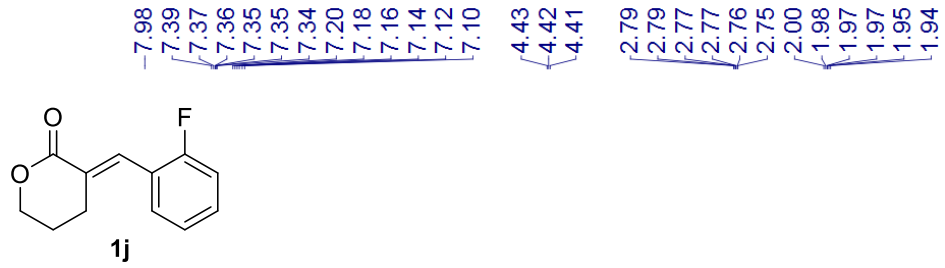
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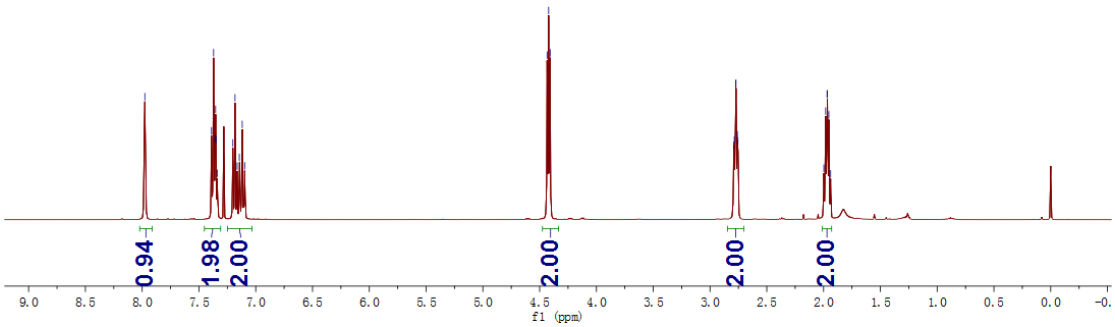
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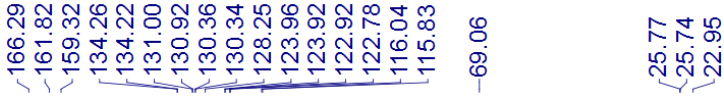
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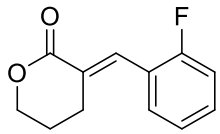
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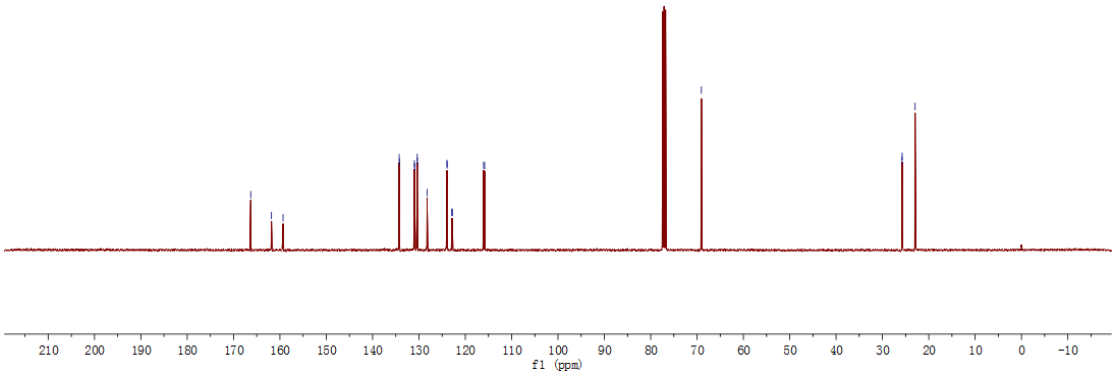
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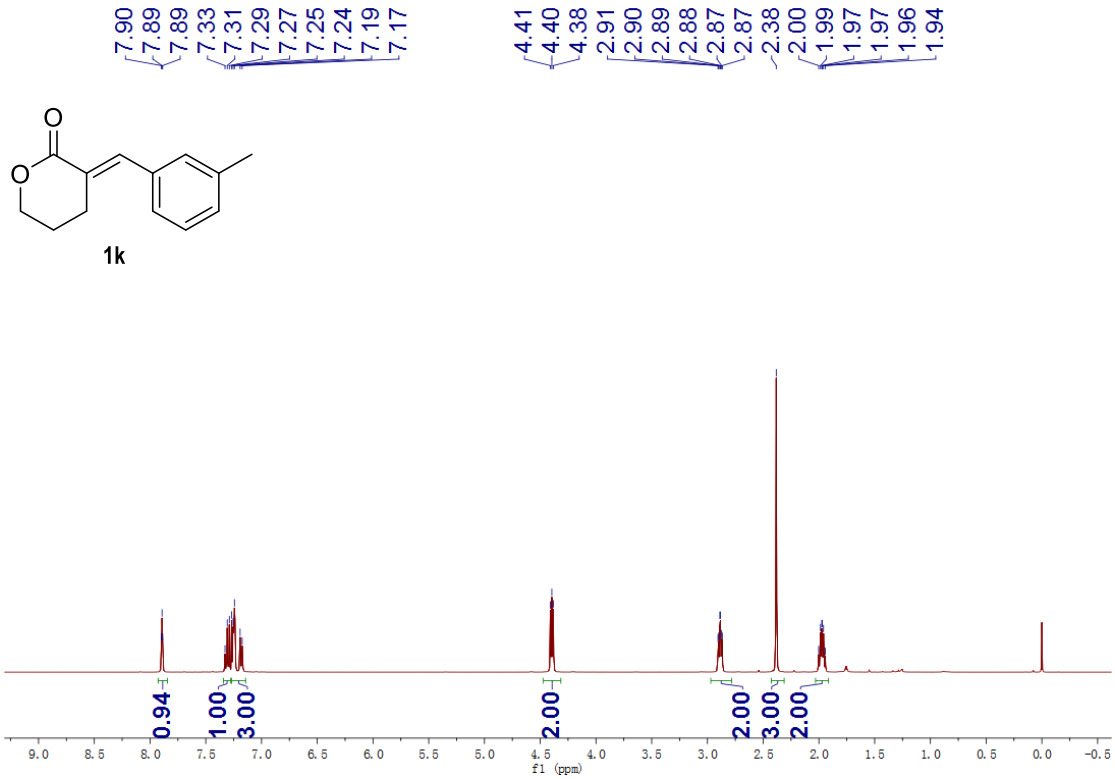
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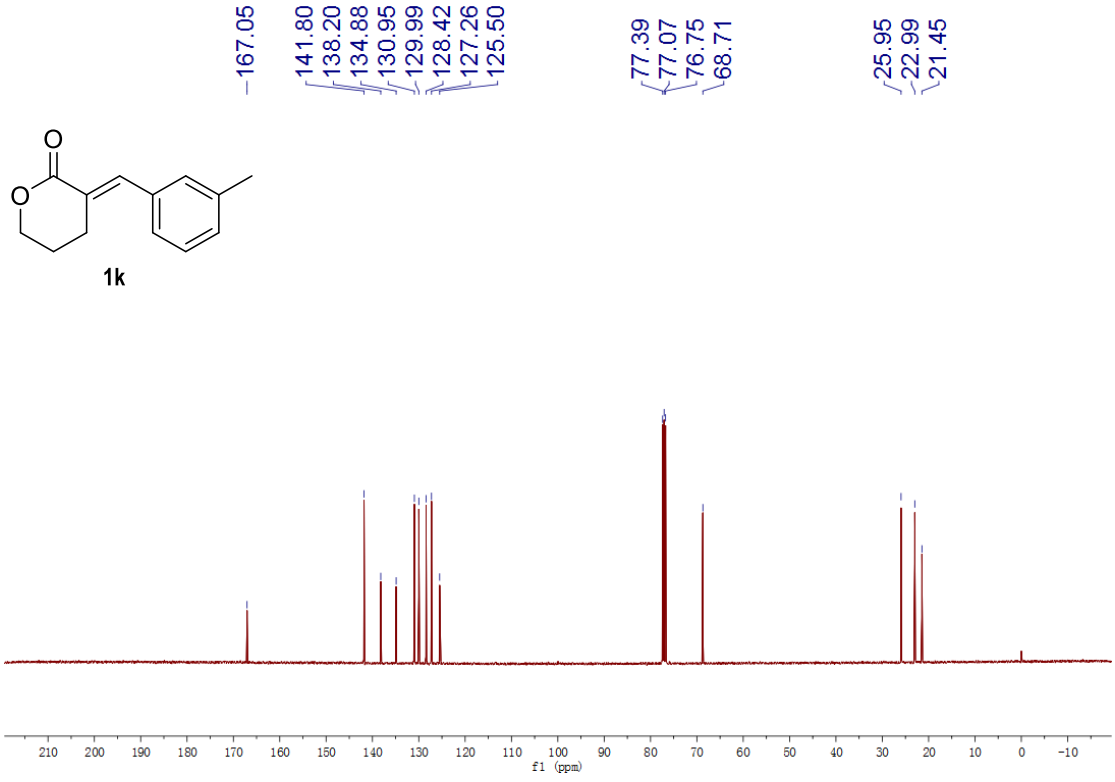
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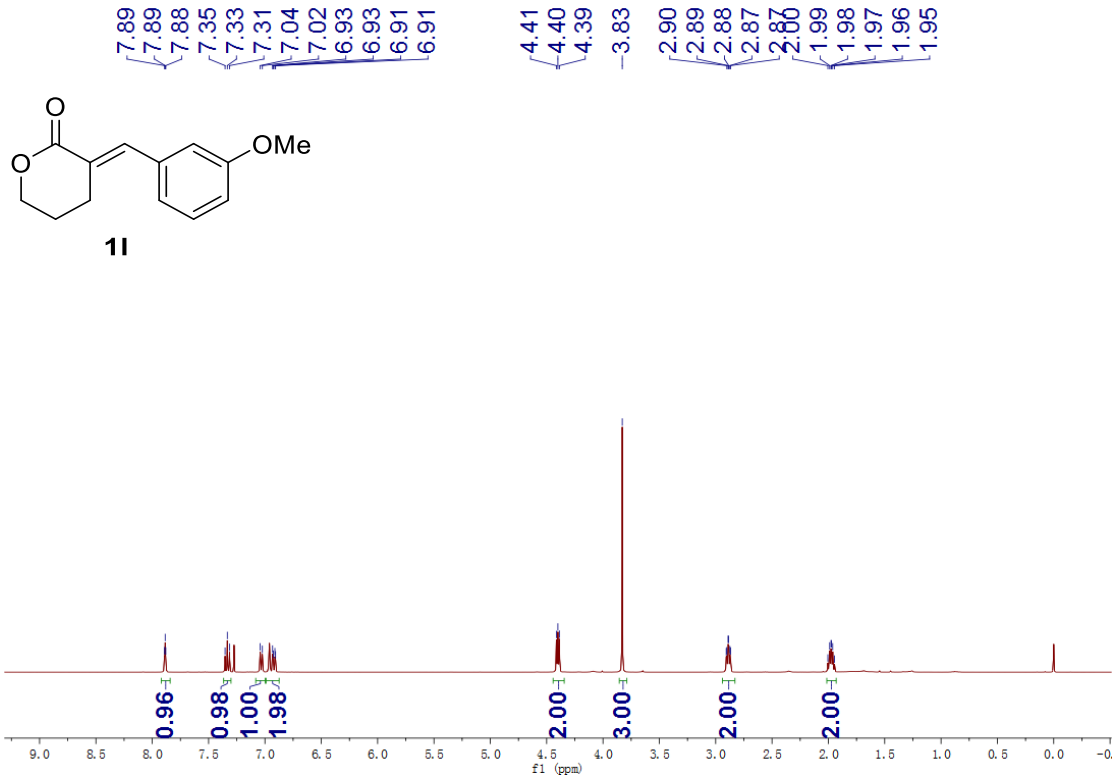
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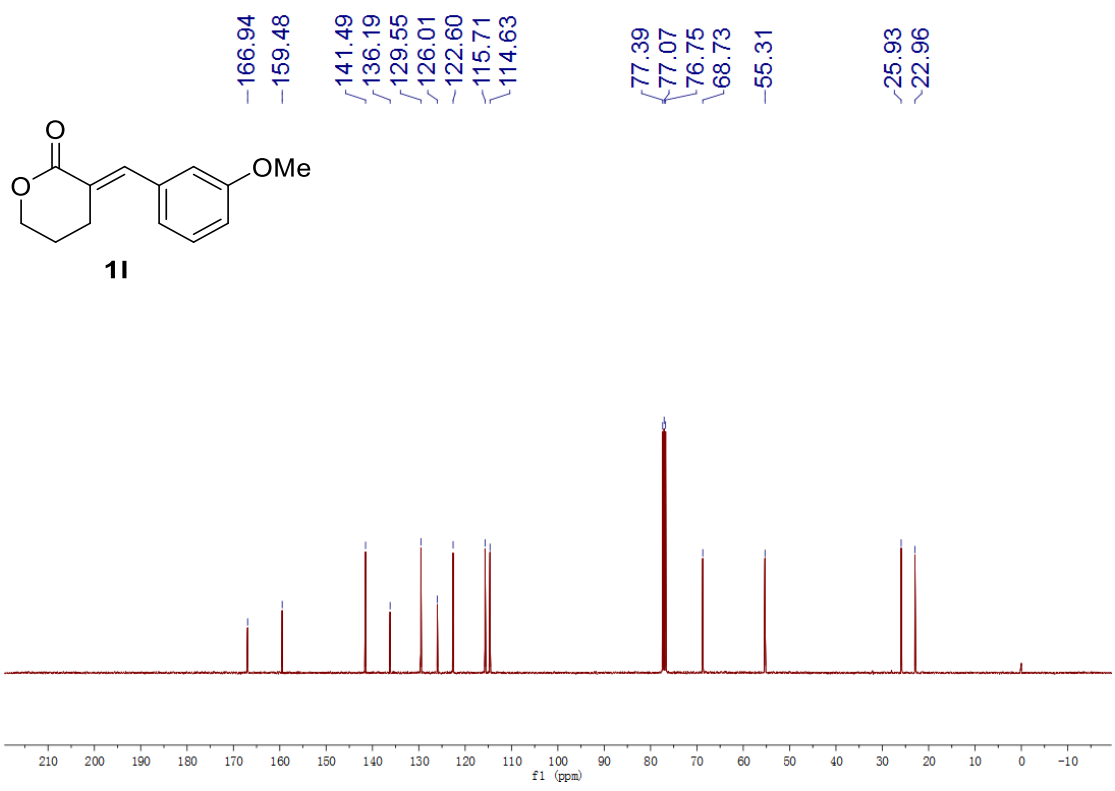
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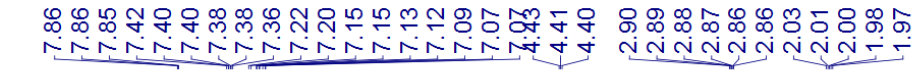
f1 (ppm)

1l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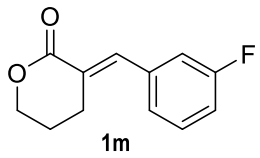
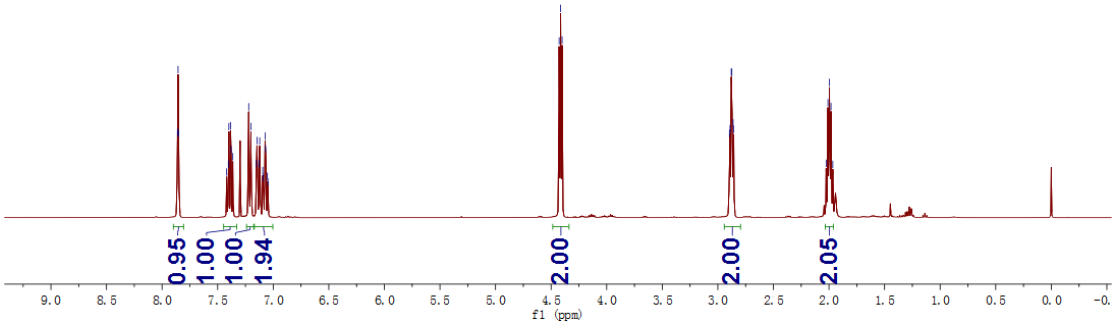
1.97


O
O
F

1m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1.00
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2.00
2.05
9.0
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8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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3.5
3.0
2.5
2.0
1.5
1.0
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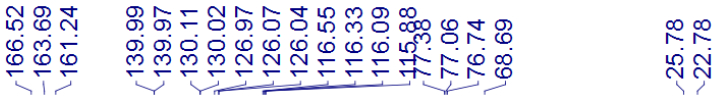
0.0
f1 (ppm)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161.24
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139.97
130.11
130.02
126.97
126.07
126.04
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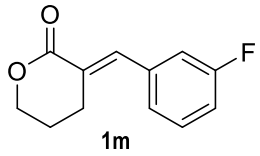
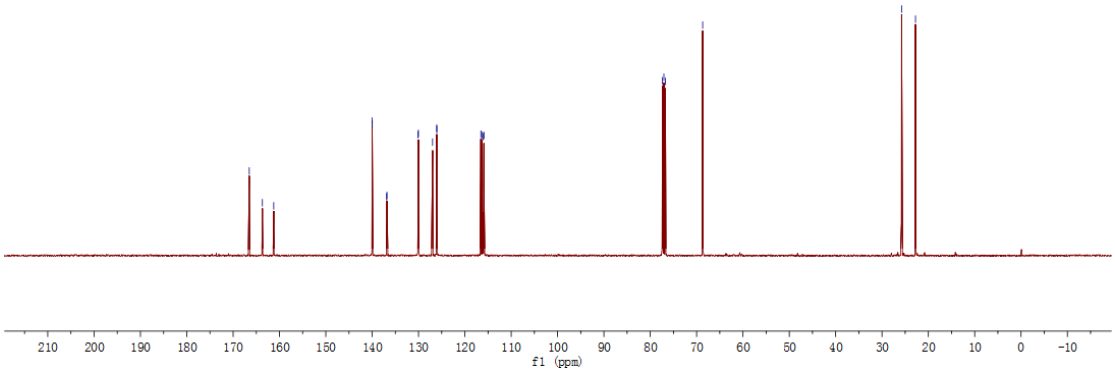
116.33
116.09
115.88
77.38
77.06
76.74
68.69
25.78
22.78


O
O
F

1m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180
170
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100
90
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60
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30
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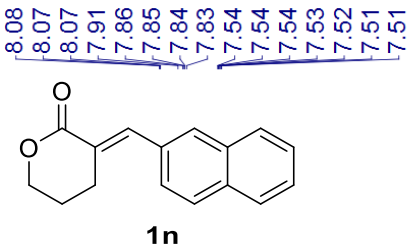
10
0
-10
f1 (ppm)


8.08
8.07
8.07
7.91
7.86
7.85
7.84
7.83
7.54
7.54
7.54
7.53
7.52
7.51
7.51
4.43
4.42
4.41
3.00
3.00
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2.97
2.97
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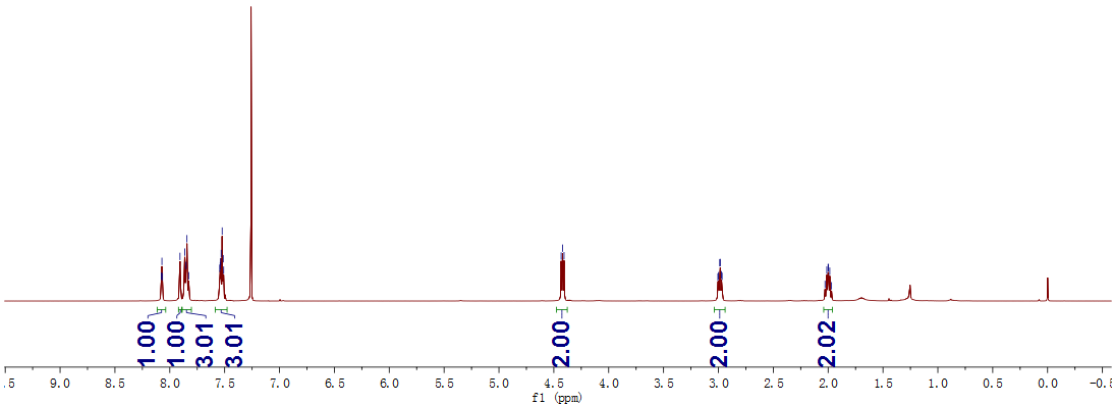
2.01
2.00
2.00
1.98
1.97
O
O

1n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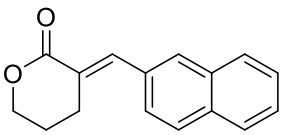
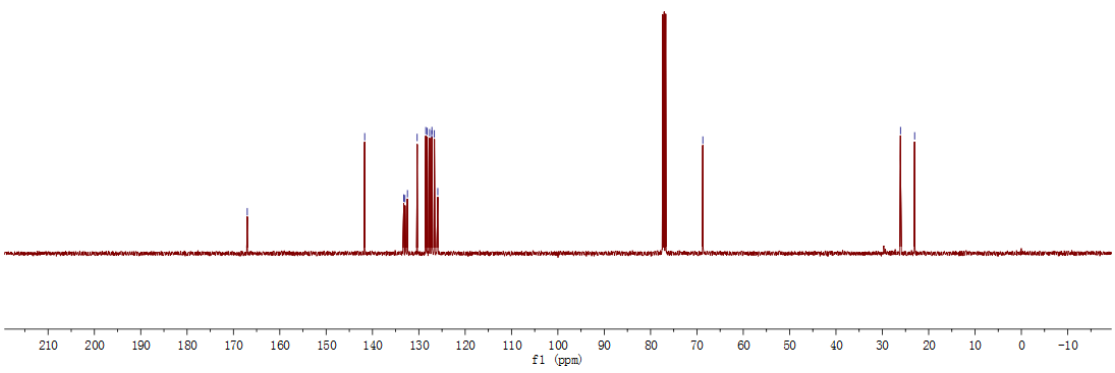
1.00
3.01
3.01
2.00
2.00
2.02
f1 (ppm)


O
O

1n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141.69
133.25
132.99
132.46
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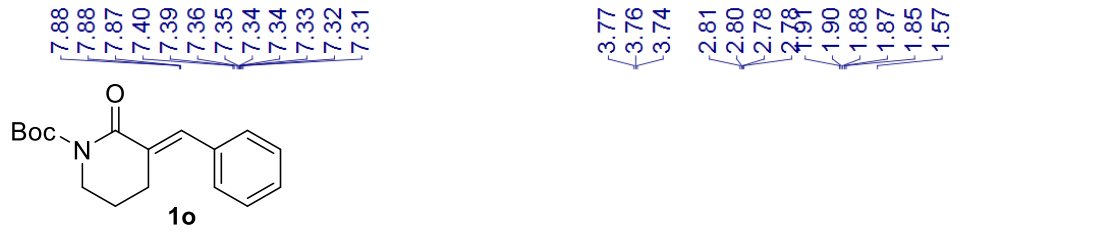
128.51
128.18
127.68
127.22
127.18
126.64
125.91
68.73
26.08
23.03
f1 (ppm)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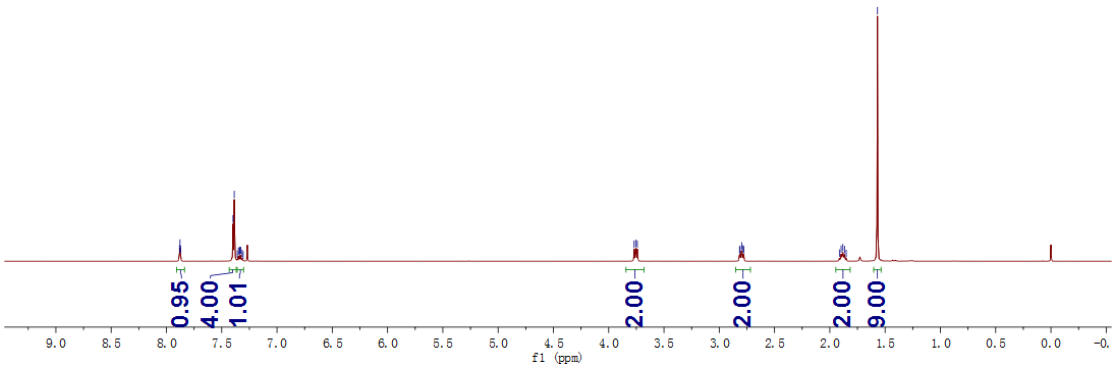
7.88
7.87
7.40
7.39
7.36
7.35
7.34
7.34
7.33
7.32
7.31
3.77
3.76
3.74
2.81
2.80
2.78
2.78
1.91
1.90
1.88
1.87
1.85
1.57
Boc
N
O

1o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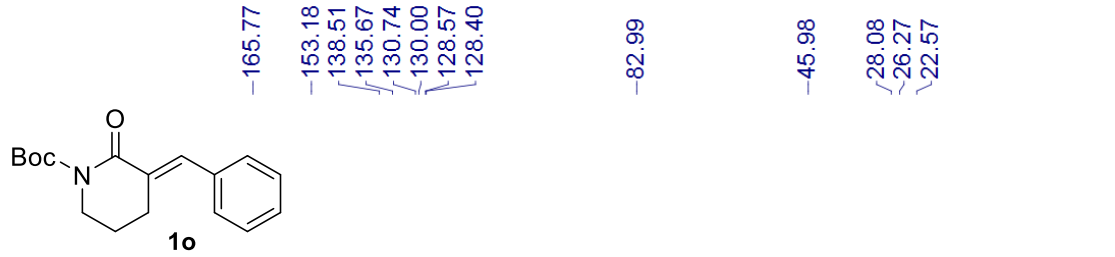
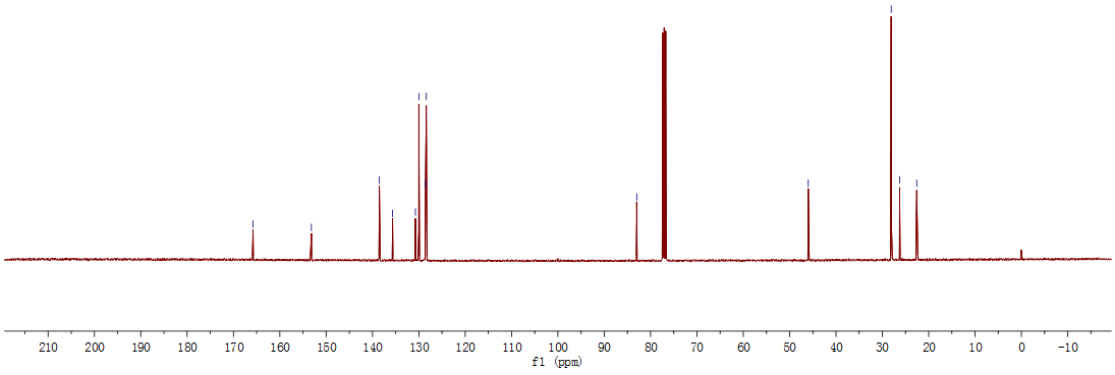
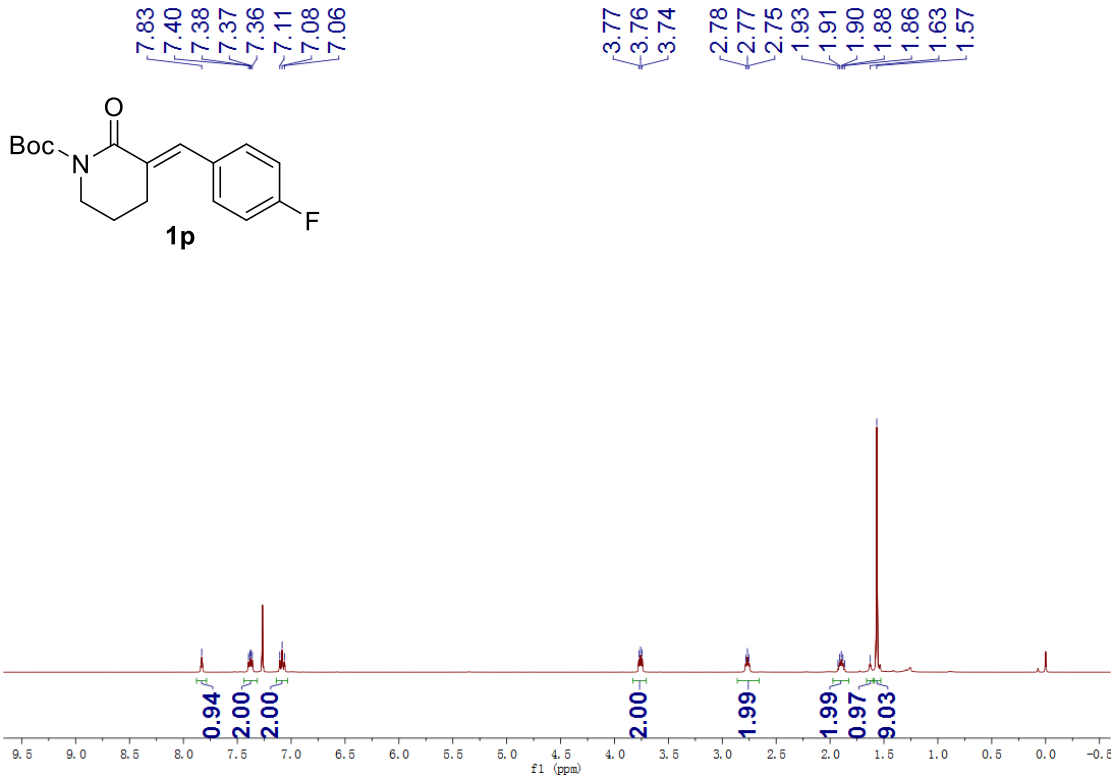
4.00
1.01
2.00
2.00
2.00
9.00
f1 (ppm)


165.77
153.18
138.51
135.67
130.74
130.00
128.57
128.40
82.99
45.98
28.08
26.27
22.57
Boc
N
O

1o


f1 (ppm)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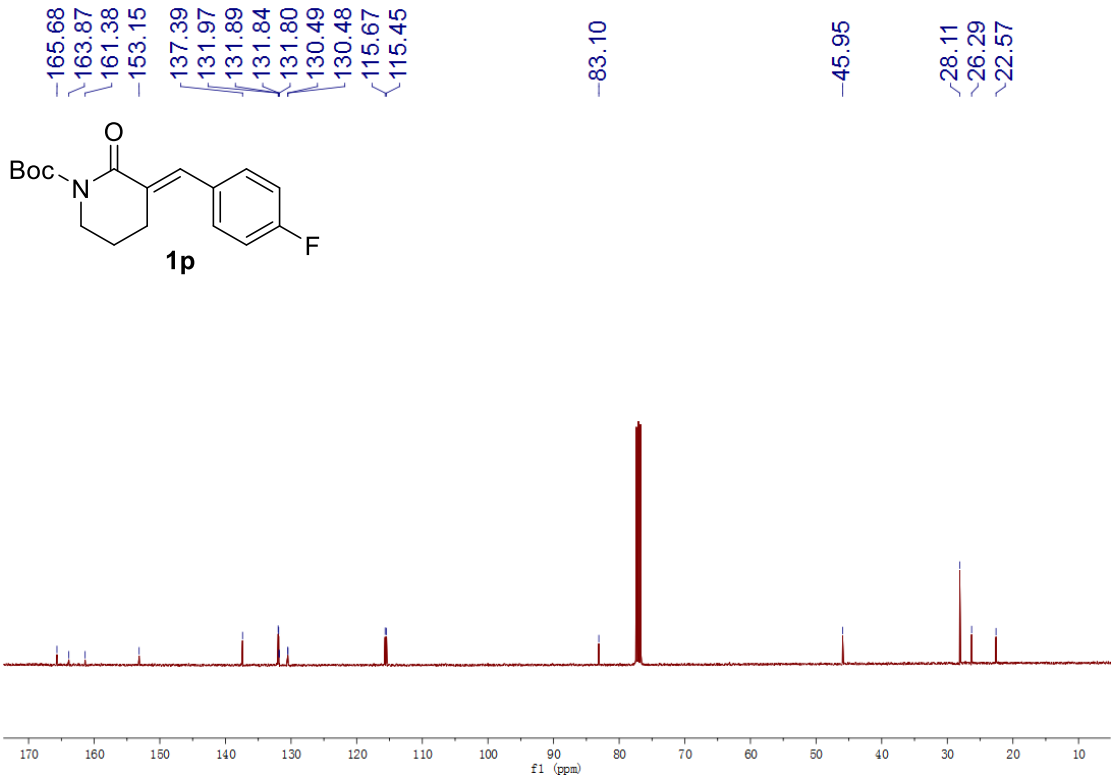
7.40
7.38
7.37
7.36
7.11
7.08
7.06
3.77
3.76
3.74
2.78
2.77
2.75
1.93
1.91
1.90
1.88
1.86
1.63
1.57
Boc
N
O
F
1p
0.94
2.00
2.00
2.00
1.99
1.99
0.97
9.03
f1 (ppm)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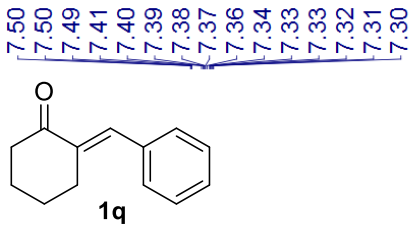
163.87
161.38
153.15
137.39
131.97
131.89
131.84
131.80
130.49
130.48
115.67
115.45
83.10
45.95
28.11
26.29
22.57
Boc
N
O
F
1p
f1 (ppm)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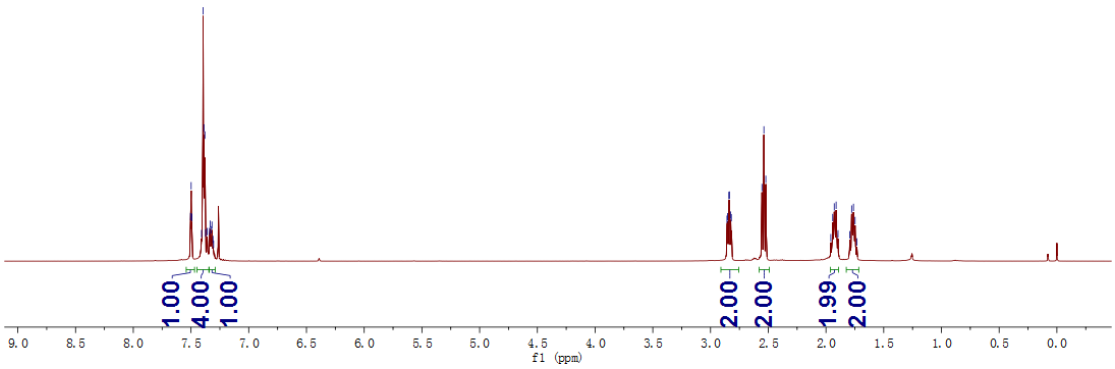
7.39
7.38
7.37
7.36
7.34
7.33
7.33
7.32
7.31
7.30
2.86
2.85
2.84
2.84
2.83
2.82
2.55
2.54
2.52
1.96
1.94
1.93
1.91
1.90
1.79
1.78
1.76
1.75
1.73
O
1q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4.00
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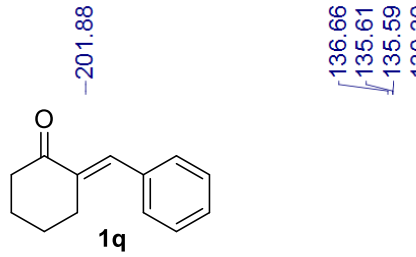
2.00
1.99
2.00
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)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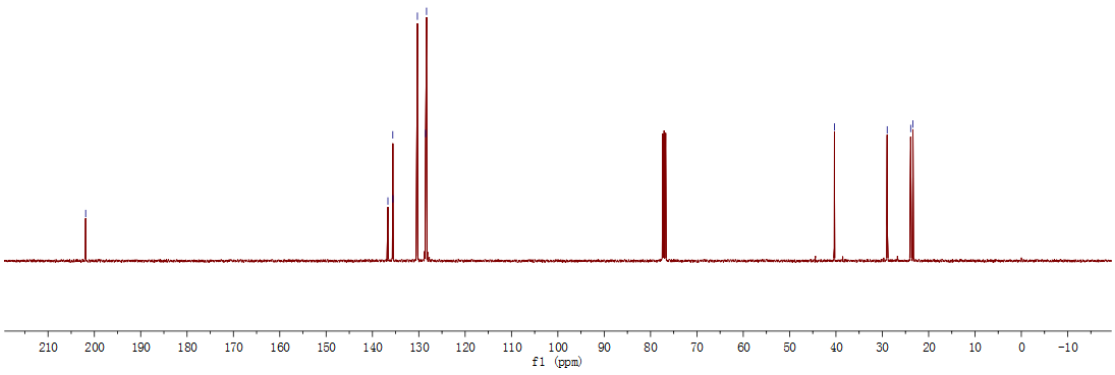
128.53
128.33
40.34
28.94
23.87
23.38
O
1q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200
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170
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100
90
80
70
60
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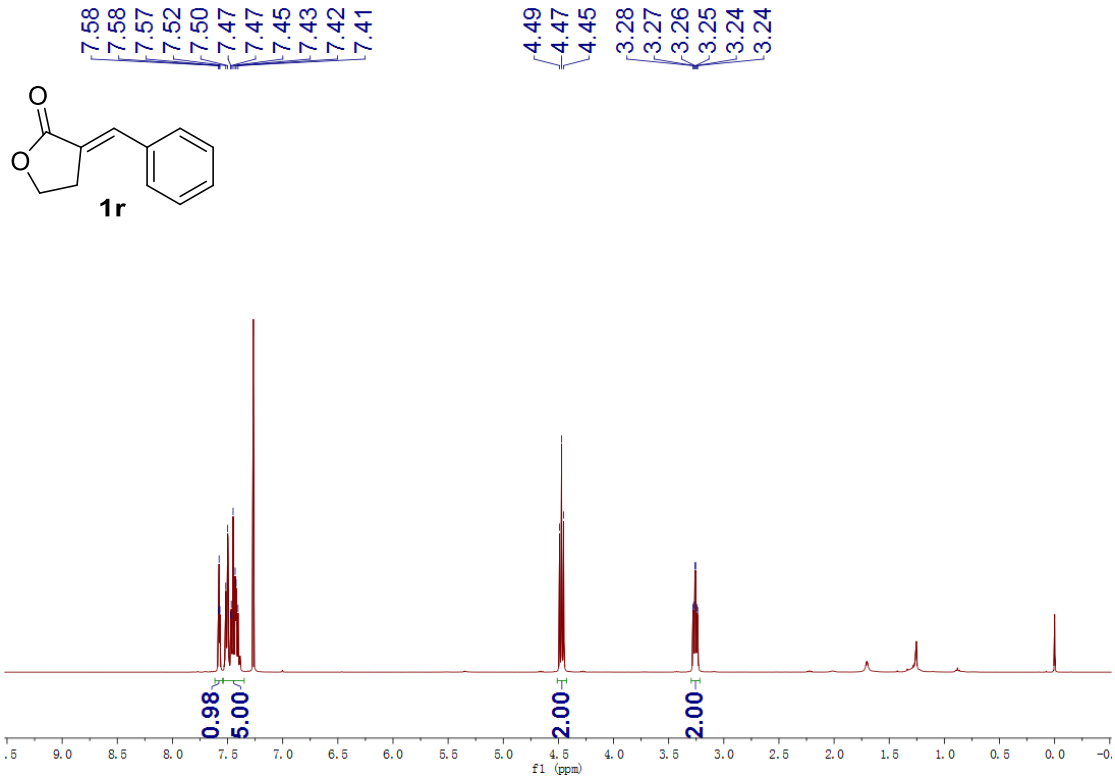
40
30
20
10
0
-10
f1 (ppm)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7.58
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7.52
7.50
7.47
7.47
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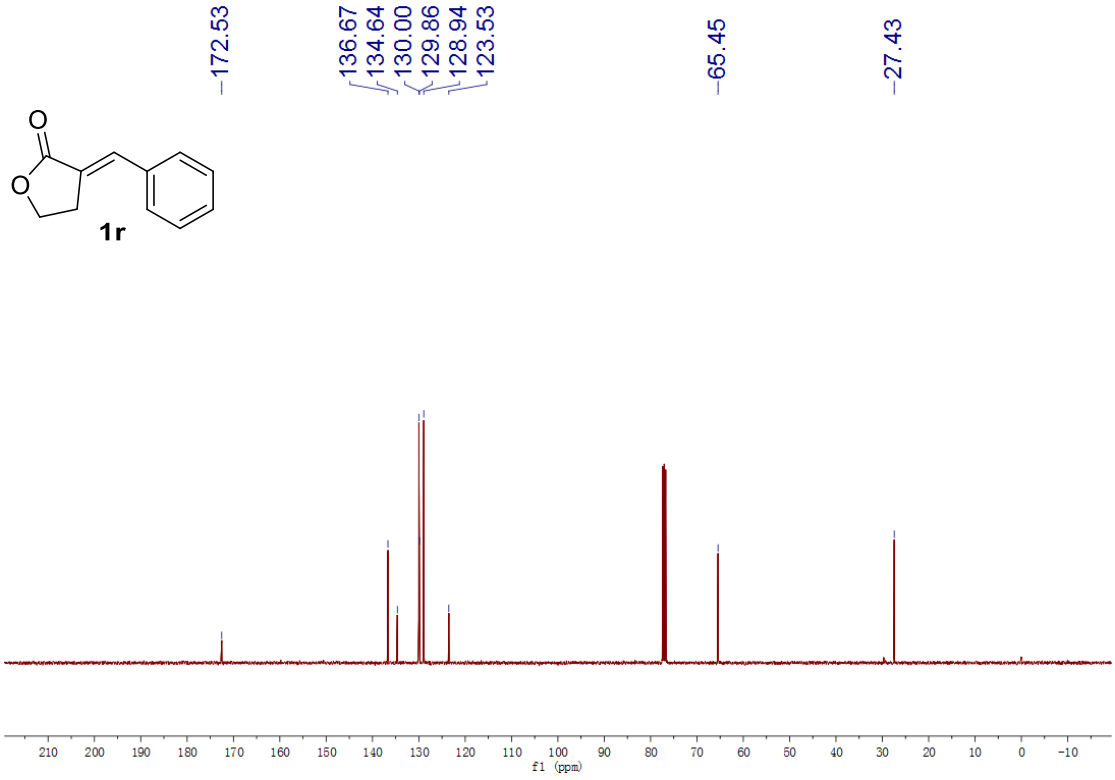
7.43
7.42
7.41
4.49
4.47
4.45
3.28
3.27
3.26
3.25
3.24
3.24
1r
0.98
5.00
2.00
2.00
f1 (ppm)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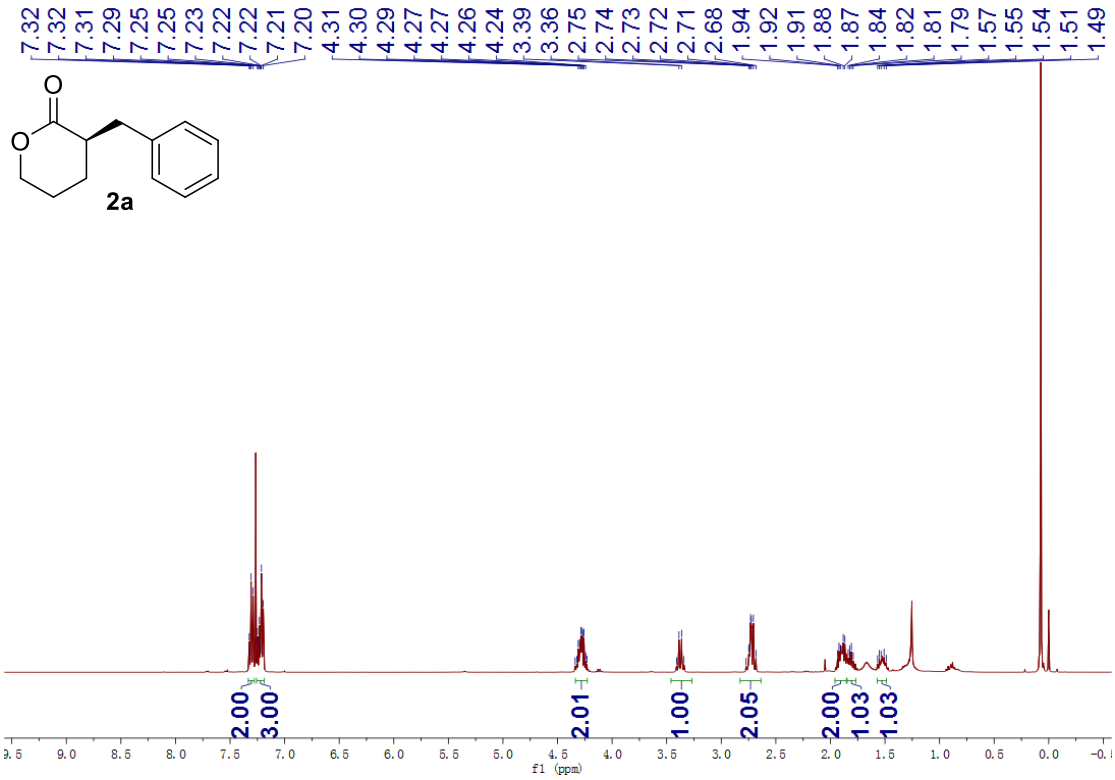
129.86
128.94
123.53
65.45
27.43
1r
f1 (ppm)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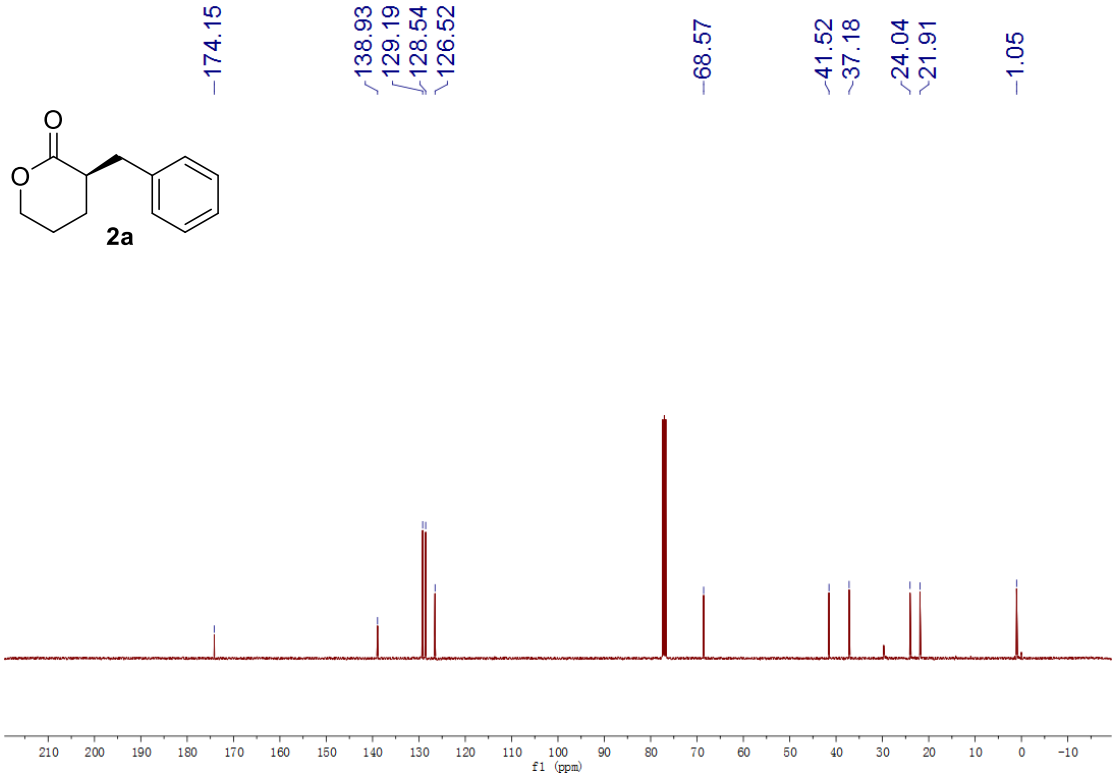
7.20
4.31
4.30
4.29
4.27
4.27
4.26
4.24
3.39
3.36
2.75
2.74
2.73
2.72
2.71
2.68
1.94
1.92
1.91
1.88
1.87
1.84
1.82
1.81
1.79
1.57
1.55
1.54
1.51
1.49
O
O
2a
2.00
3.00
2.01
1.00
2.05
2.00
1.03
1.03
f1 (ppm)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138.93
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128.54
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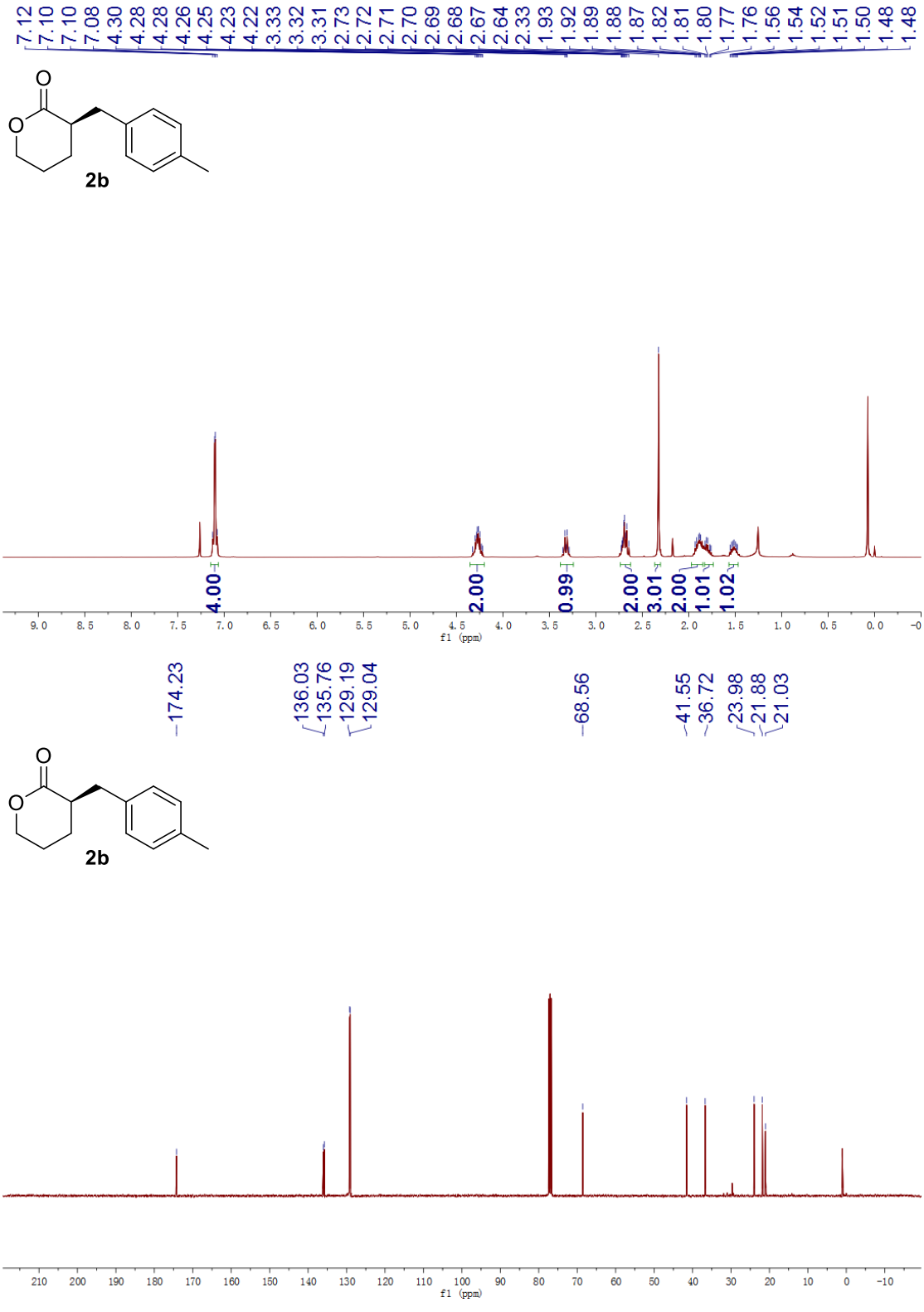
68.57
41.52
37.18
24.04
21.91
1.05
O
O
2a
f1 (ppm)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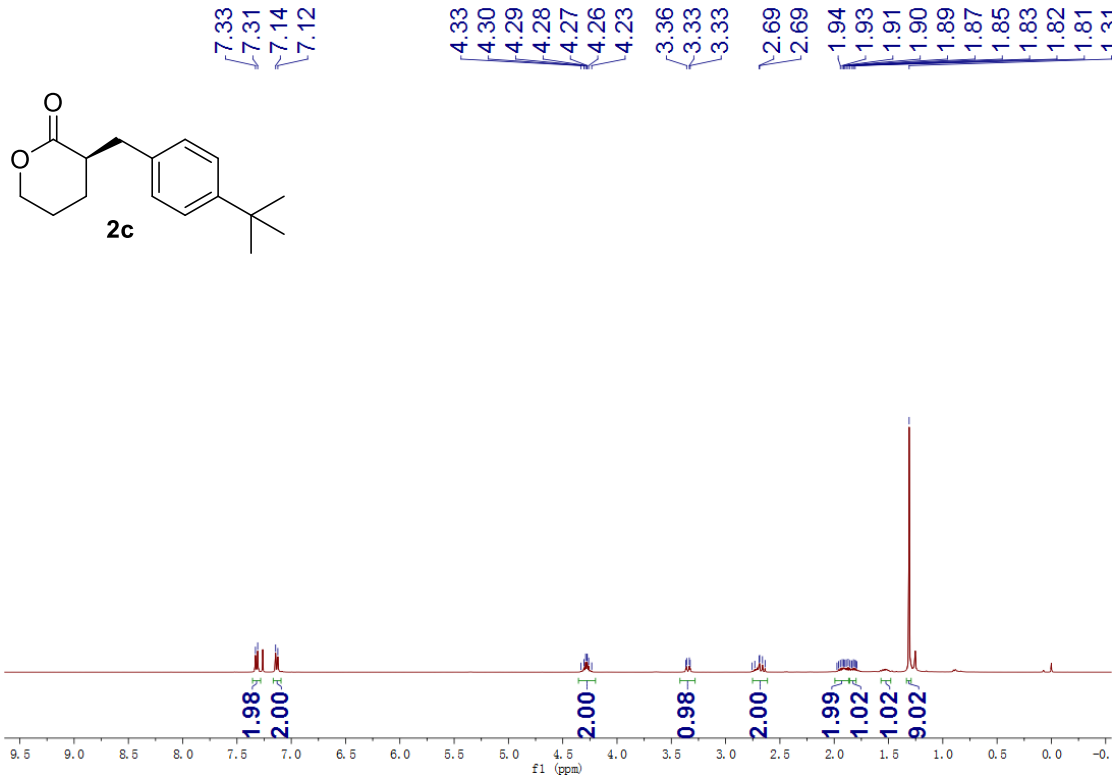
4.28
4.26
4.25
4.23
4.22
3.33
3.32
3.31
2.73
2.72
2.71
2.70
2.69
2.68
2.67
2.64
2.33
1.93
1.92
1.89
1.88
1.87
1.82
1.81
1.80
1.77
1.76
1.56
1.54
1.52
1.51
1.50
1.48
1.48
O
O
2b
4.00
2.00
0.99
2.00
3.01
2.00
1.01
1.02
f1 (ppm)
174.23
136.03
135.76
129.19
129.04
68.56
41.55
36.72
23.98
21.88
21.03
O
O
2b
f1 (ppm)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7.12
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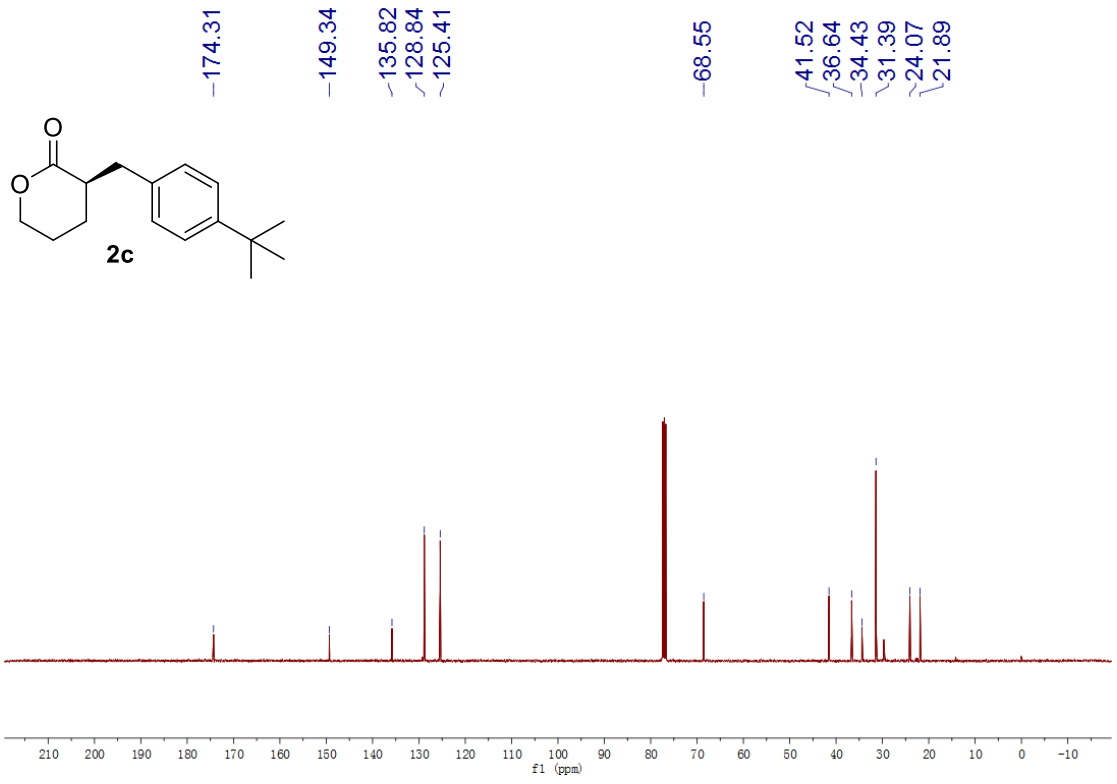
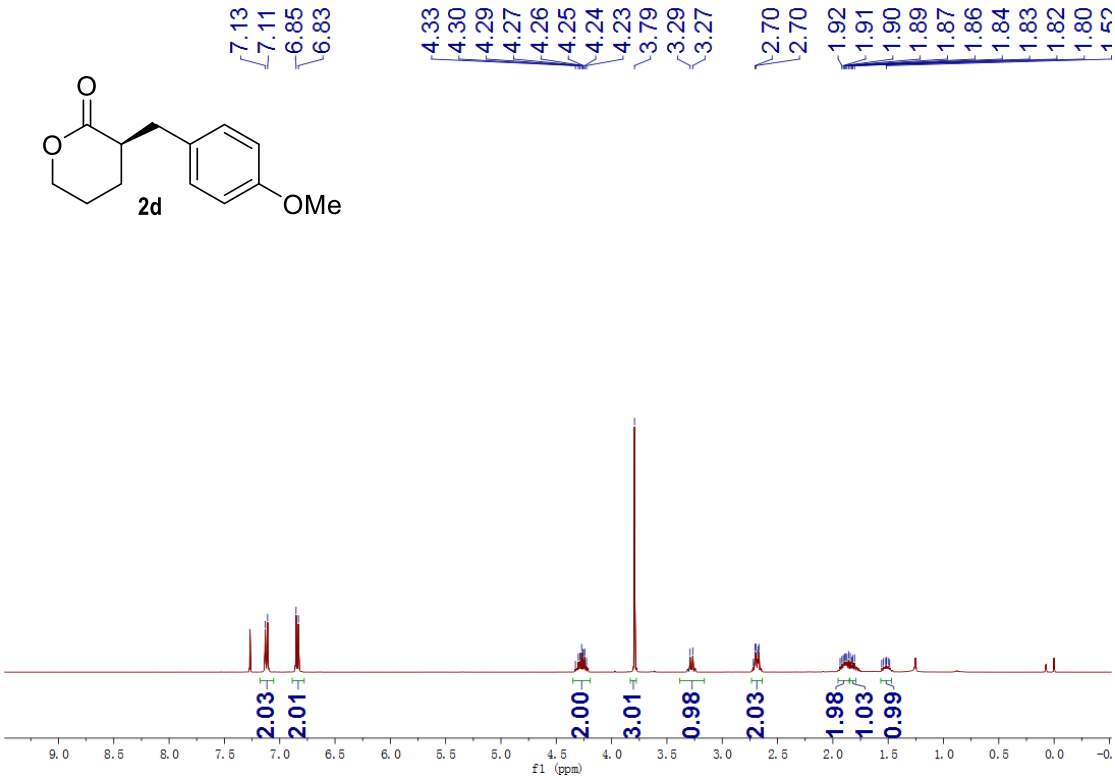
4.30
4.29
4.28
4.27
4.26
4.23
3.36
3.33
3.33
2.69
2.69
1.94
1.93
1.91
1.90
1.89
1.87
1.85
1.83
1.82
1.81
O
O
2c
1.98
2.00
2.00
0.98
2.00
1.99
1.02
1.02
9.02
f1 (ppm)


174.31
149.34
135.82
128.84
125.41
68.55
41.52
36.64
34.43
31.39
24.07
21.89
O
O
2c
f1 (ppm)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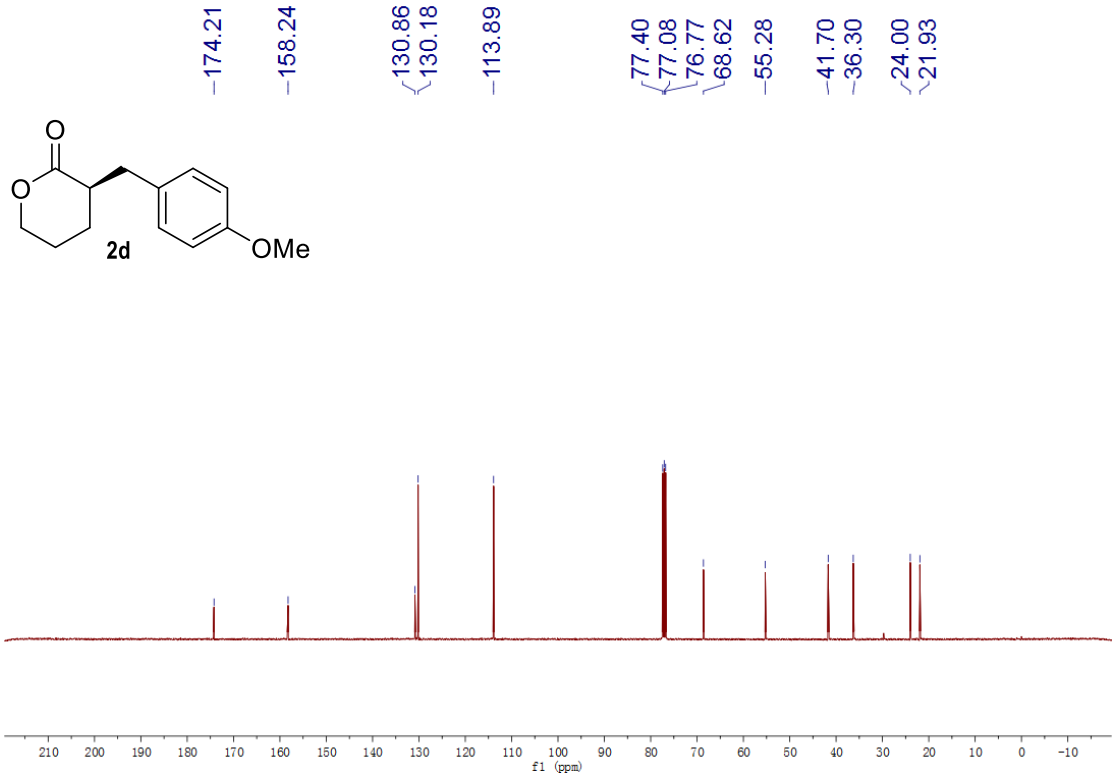
4.30
4.29
4.27
4.26
4.25
4.24
4.23
3.79
3.29
3.27
2.70
2.70
1.92
1.91
1.90
1.89
1.87
1.86
1.84
1.83
1.82
1.80
O
O
2d
OMe
2.03
2.01
2.00
3.01
0.98
2.03
1.98
1.03
0.99
f1 (ppm)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130.18
113.89
77.40
77.08
76.77
68.62
55.28
41.70
36.30
24.00
21.93
O
O
2d
OMe
f1 (ppm)


7.19
7.18
7.17
7.16
7.16
7.15
7.01
7.00
6.99
6.99
6.98
6.97
6.96
4.31
4.30
4.28
4.27
4.26
4.25
4.24
3.31
3.29
2.76
2.74
2.72
2.71
2.69
1.94
1.92
1.91
1.90
1.89
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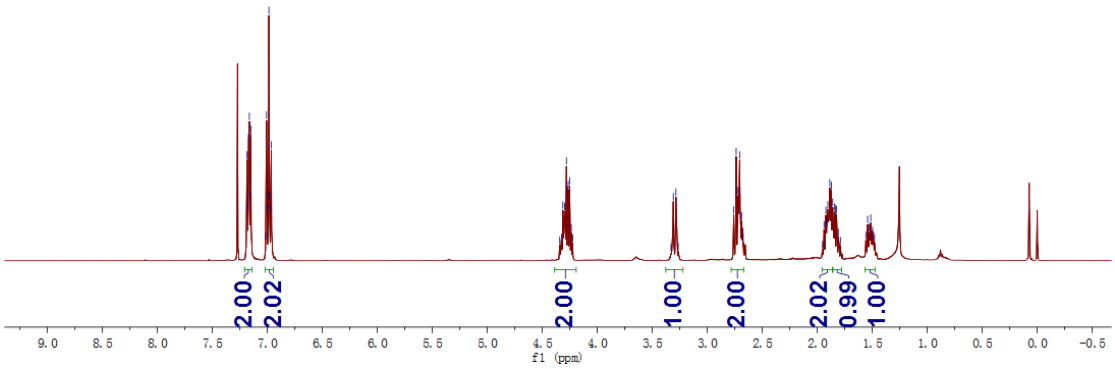
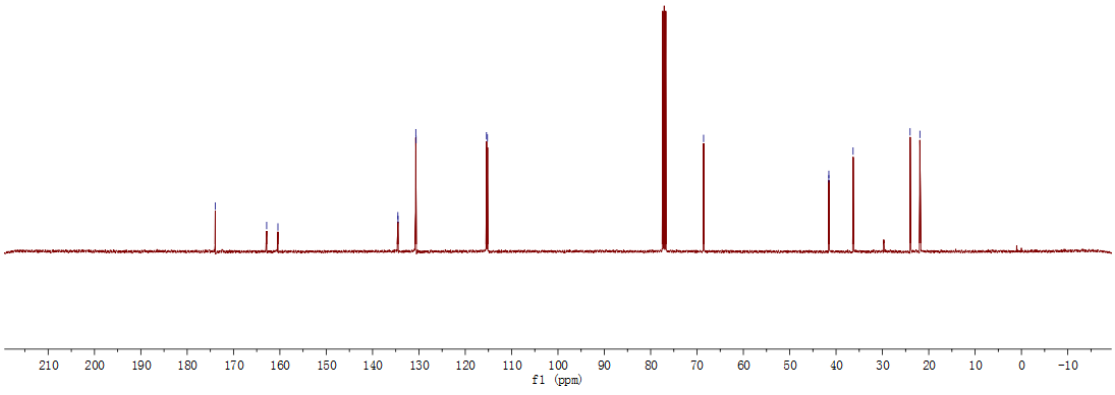
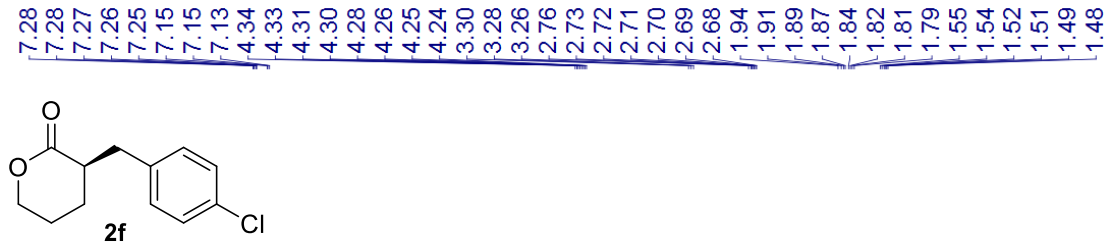
1.86
1.84
1.84
1.82
1.54
1.53
1.51
O
O
F
2e


2.00
2.02
2.00
1.00
2.00
2.02
0.99
1.00
f1 (ppm)


173.95
162.85
160.42
134.54
134.51
130.68
130.60
115.42
115.21
68.58
41.56
41.56
36.32
24.02
21.92


O
O
F
2e


f1 (ppm)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7.15
7.15
7.13
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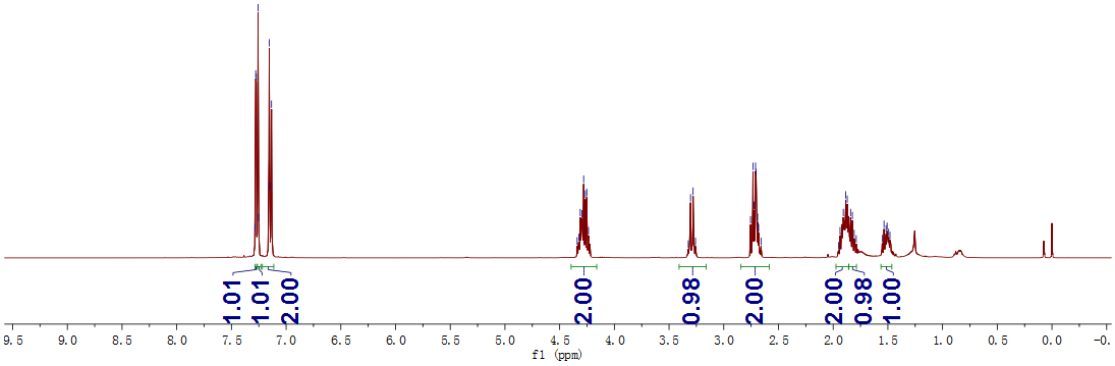
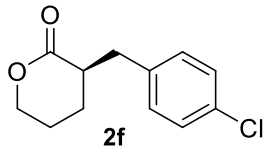
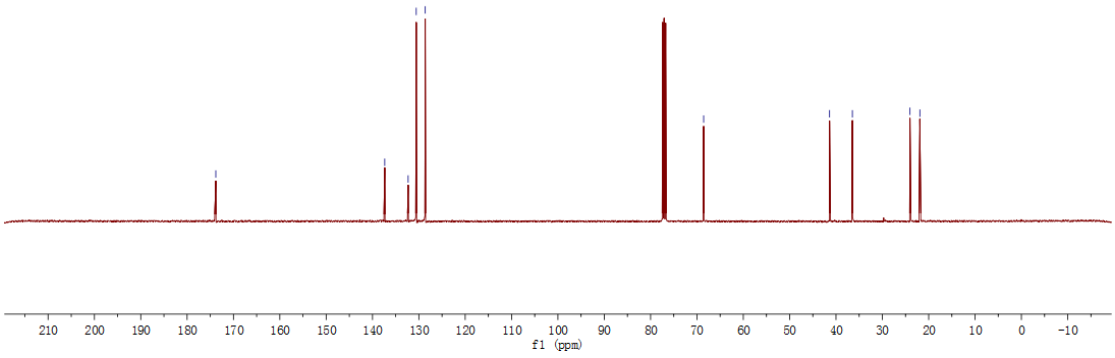
4.33
4.31
4.30
4.28
4.26
4.25
4.24
3.30
3.28
3.26
2.76
2.73
2.72
2.71
2.70
2.69
2.68
1.94
1.91
1.89
1.87
1.84
1.82
1.81
1.79
1.55
1.54
1.52
1.51
1.49
1.48

O
O
Cl
2f


1.01
1.01
2.00
2.00
0.98
2.00
2.00
0.98
1.00
f1 (ppm)


173.81
137.36
132.31
130.57
128.62
68.56
41.39
36.46
24.04
21.91


O
O
Cl
2f


f1 (ppm)


7.57
7.55
7.35
7.33
4.34
4.33
4.31
4.30
4.28
4.27
4.25
4.24
3.41
3.40
3.38
3.37
2.84
2.82
2.81
2.79
2.76
2.75
1.95
1.94
1.92
1.90
1.89
1.88
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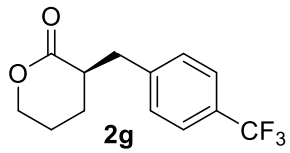
1.51
1.50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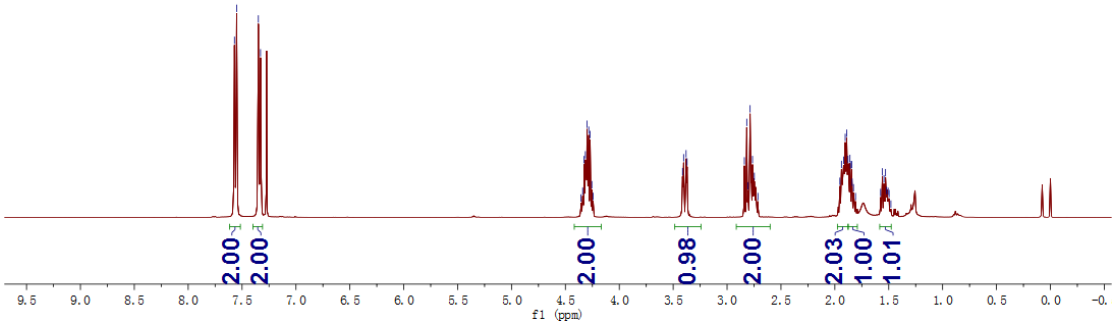
O
CF3

2g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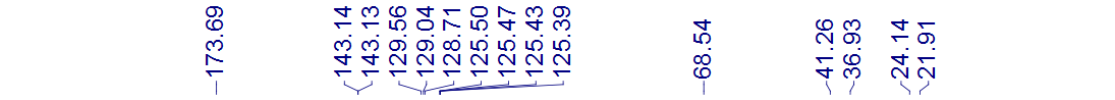
1.00
1.01
f1 (ppm)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143.14
143.13
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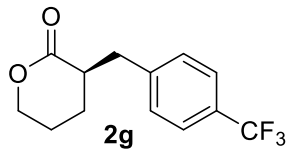
128.71
125.50
125.47
125.43
125.39
68.54
41.26
36.93
24.14
21.91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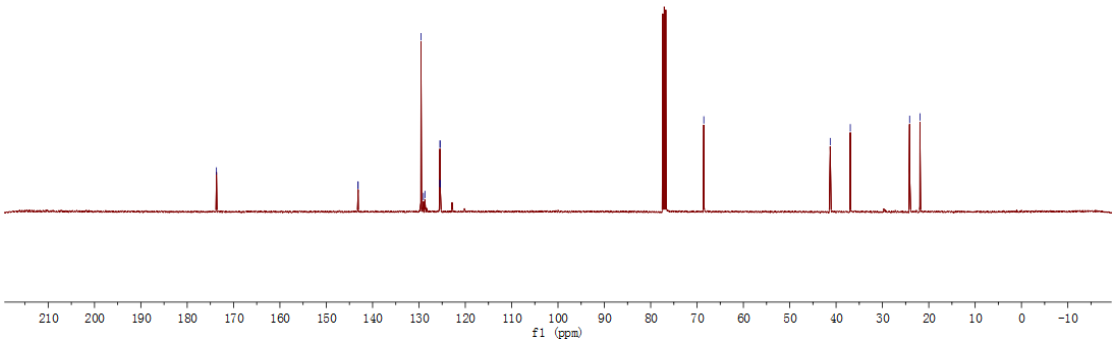
O
CF3

2g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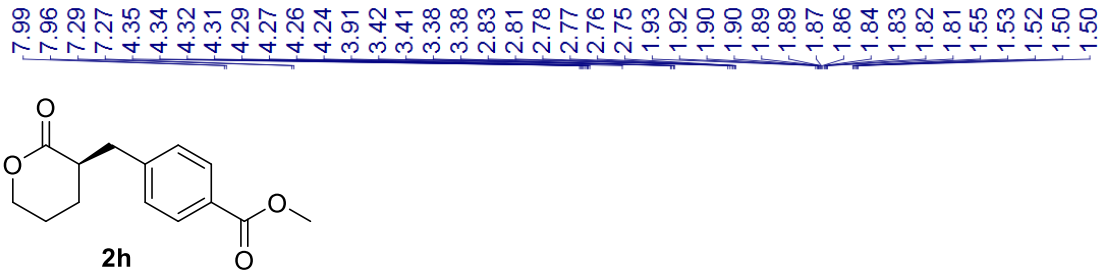
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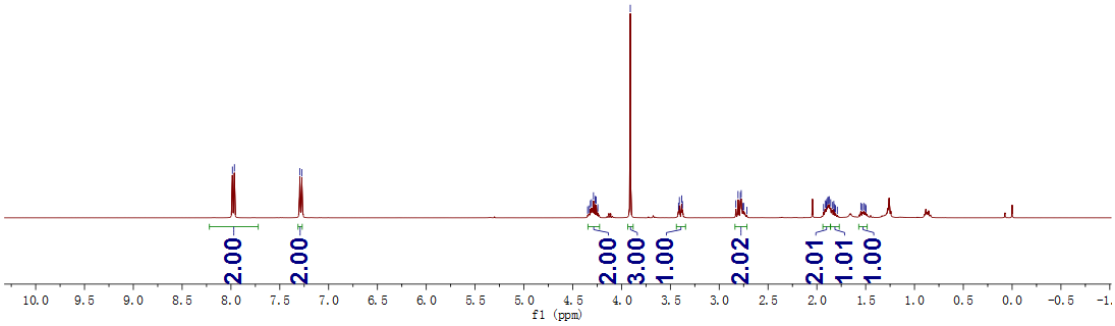
4.27
4.26
4.24
3.91
3.42
3.41
3.38
3.38
2.83
2.81
2.78
2.77
2.76
2.75
1.93
1.92
1.90
1.90
1.89
1.89
1.87
1.86
1.84
1.83
1.82
1.81
1.55
1.53
1.52
1.50
1.50

O
O
O
O

2h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2.01
1.01
1.00
f1 (ppm)


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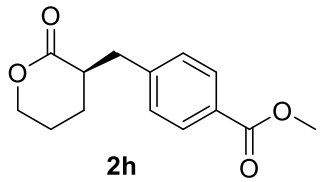
129.26
128.59
68.55
52.11
41.27
37.19
24.19
21.96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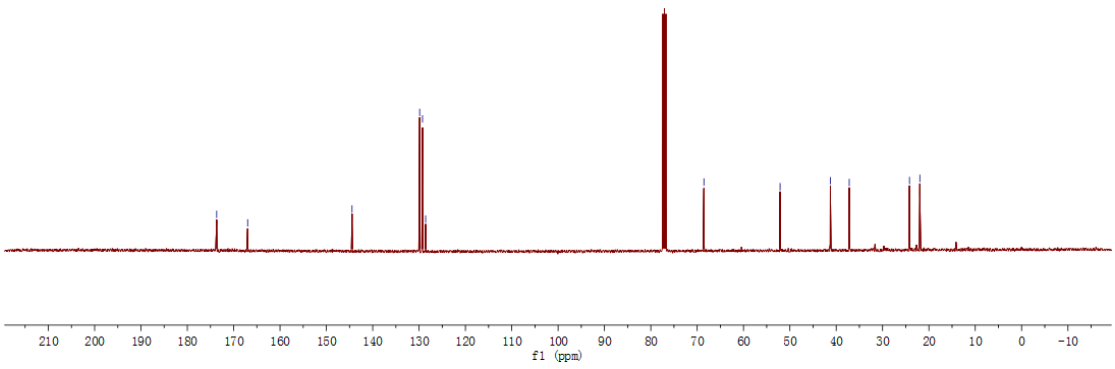
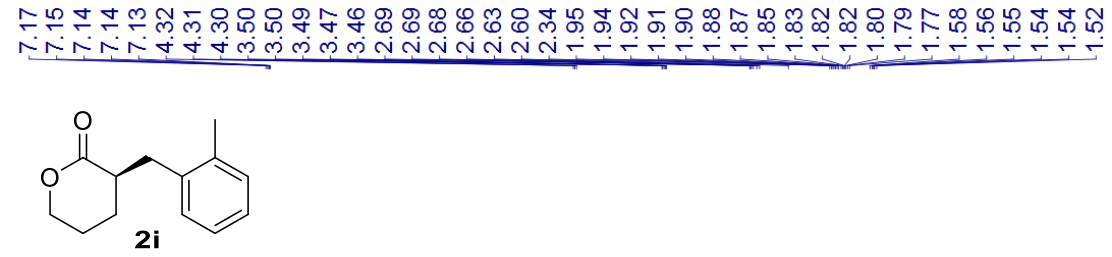
O
O
O

2h


f1 (ppm)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7.14
7.13
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4.31
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3.50
3.49
3.47
3.46
2.69
2.69
2.68
2.66
2.63
2.60
2.34
1.95
1.94
1.92
1.91
1.90
1.88
1.87
1.85
1.83
1.82
1.82
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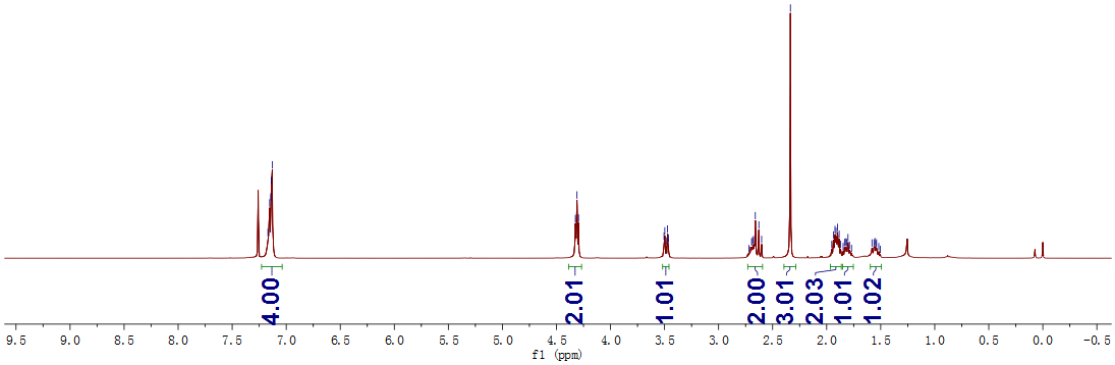
1.79
1.77
1.58
1.56
1.55
1.54
1.54
1.52

O
O

2i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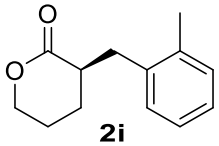
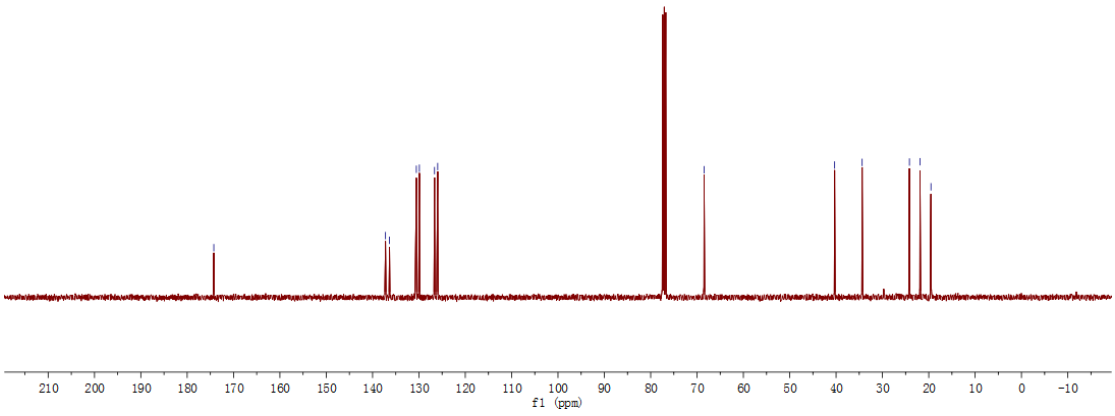
2.01
1.01
2.00
3.01
2.03
1.01
1.02
f1 (ppm)

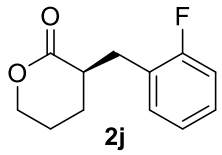

174.25
137.21
136.34
130.56
129.90
126.64
125.95
68.47
40.31
34.37
24.17
21.89
19.53


O
O

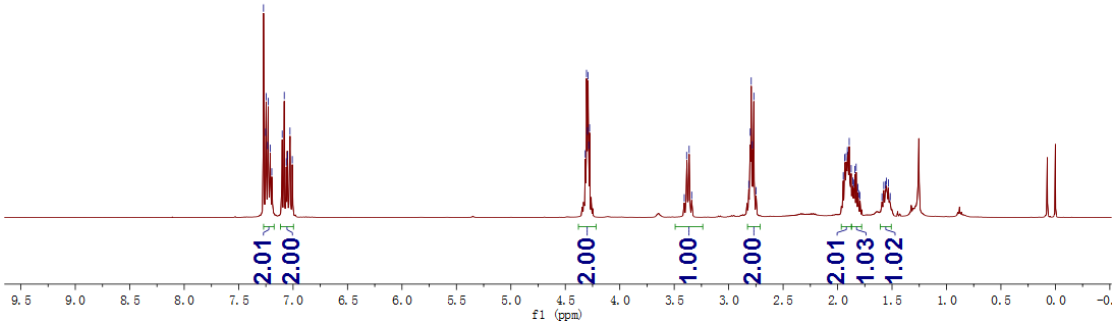
2i


f1 (ppm)


7.27
7.25
7.25
7.23
7.23
7.21
7.20
7.10
7.08
7.06
7.05
7.03
7.01
4.32
4.31
4.30
4.29
4.28
4.28
3.39
3.36
2.82
2.80
2.79
2.78
2.77
1.95
1.93
1.92
1.91
1.89
1.87
1.86
1.85
1.84
1.83
1.58
1.56
1.55
1.53


O
O
F

2j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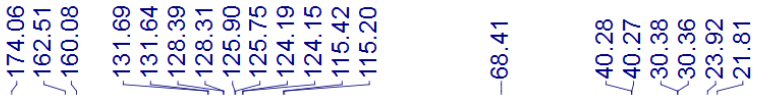
2.00
2.00
1.00
2.00
2.01
1.03
1.02
f1 (ppm)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162.51
160.08
131.69
131.64
128.39
128.31
125.90
125.75
124.19
124.15
115.42
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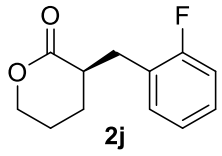
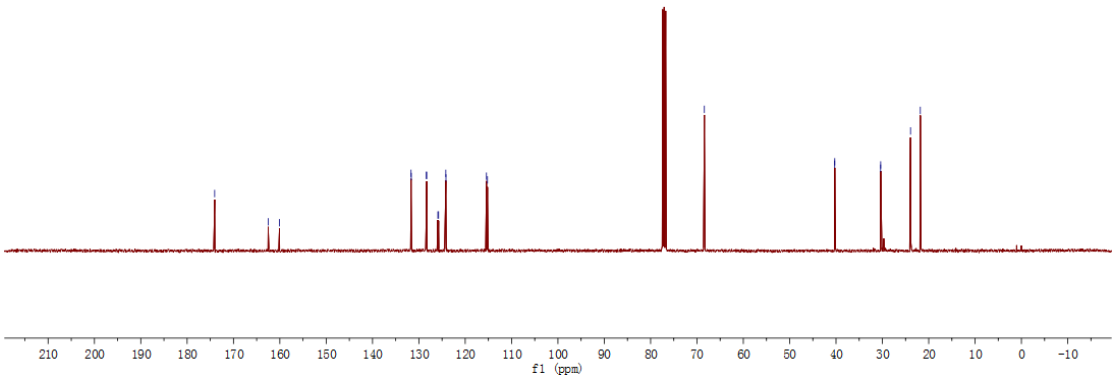
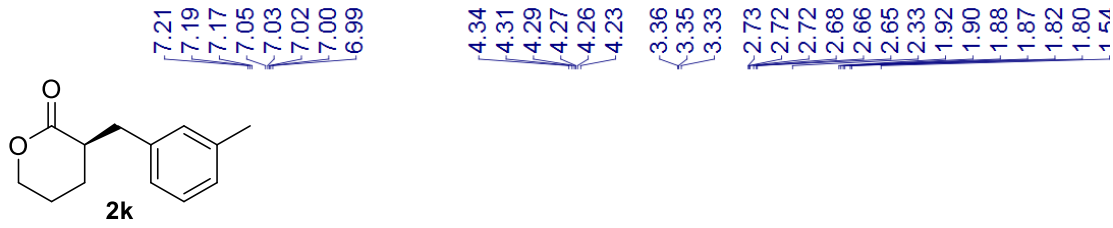
40.28
40.27
30.38
30.36
23.92
21.81


O
O
F

2j


f1 (ppm)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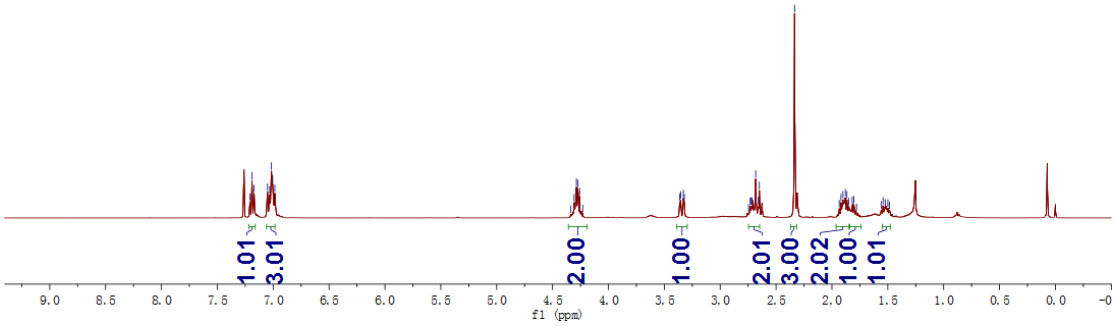
7.19
7.17
7.05
7.03
7.02
7.00
6.99
4.34
4.31
4.29
4.27
4.26
4.23
3.36
3.35
3.33
2.73
2.72
2.72
2.68
2.66
2.65
2.33
1.92
1.90
1.88
1.87
1.82
1.80

O
O

2k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3.01
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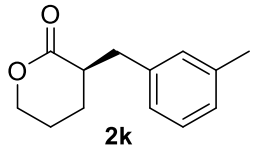
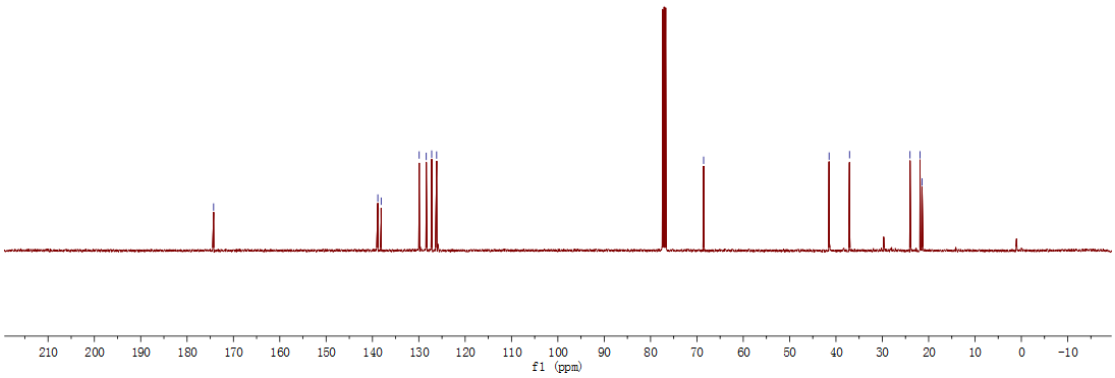
1.00
2.01
3.00
2.02
1.00
1.01
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
f1 (ppm)

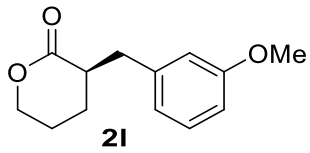

174.27
138.84
138.13
129.91
128.39
127.22
126.15
68.55
41.48
37.07
24.02
21.86
21.41


O
O

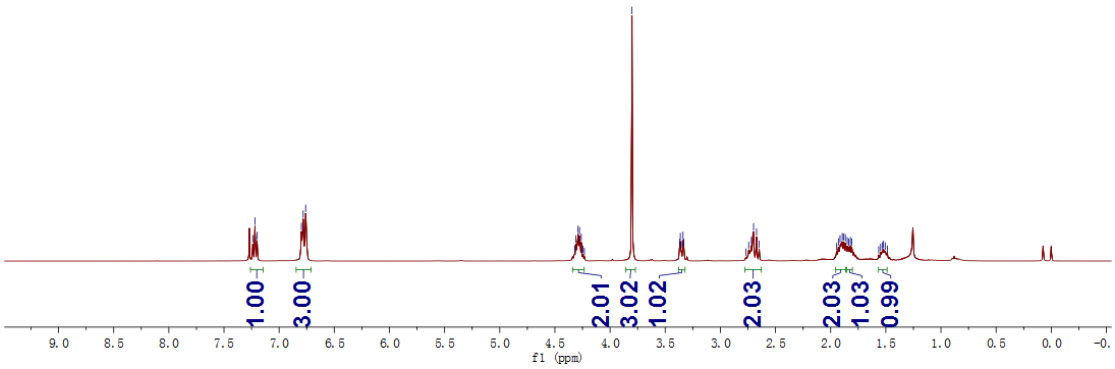
2k


210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

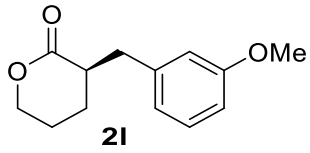

7.24
7.22
7.20
6.80
6.78
6.76
4.32
4.31
4.29
4.28
4.26
4.24
4.23
3.80
3.37
3.36
3.35
3.34
3.33
2.74
2.72
2.70
2.67
2.65
1.95
1.93
1.91
1.90
1.88
1.87
1.85
1.84
1.82
1.81
1.56
1.55
1.53
1.52
1.51
1.49


O
O
OMe

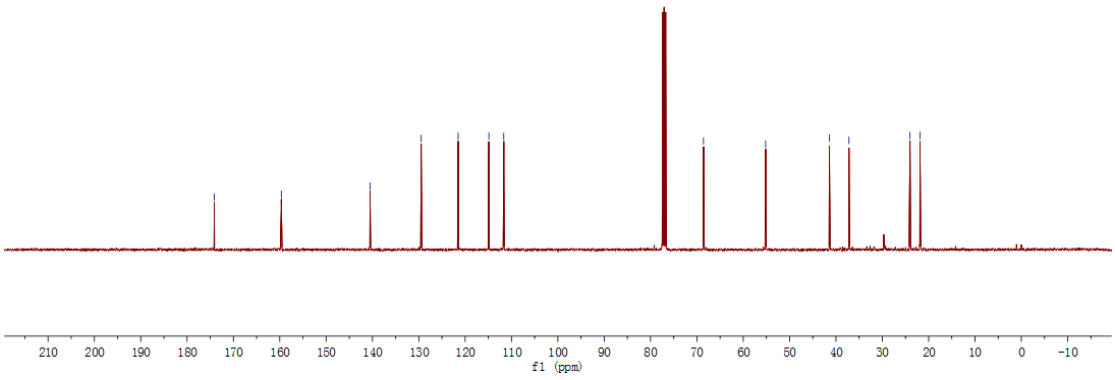
2l


1.00
3.00
2.01
3.02
1.02
2.03
2.03
1.03
0.99
f1 (ppm)


174.13
159.66
140.51
129.49
121.50
114.88
111.67
68.57
55.17
41.41
37.19
24.02
21.87


O
O
OMe

2l


f1 (ppm)


7.29
7.26
7.25
7.23
7.00
6.98
6.94
6.93
6.93
6.92
6.90
4.32
4.31
4.29
4.28
4.28
4.26
4.25
3.36
3.33
2.74
2.74
2.73
2.72
2.72
2.71
1.95
1.94
1.92
1.90
1.88
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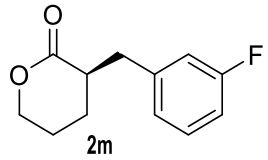
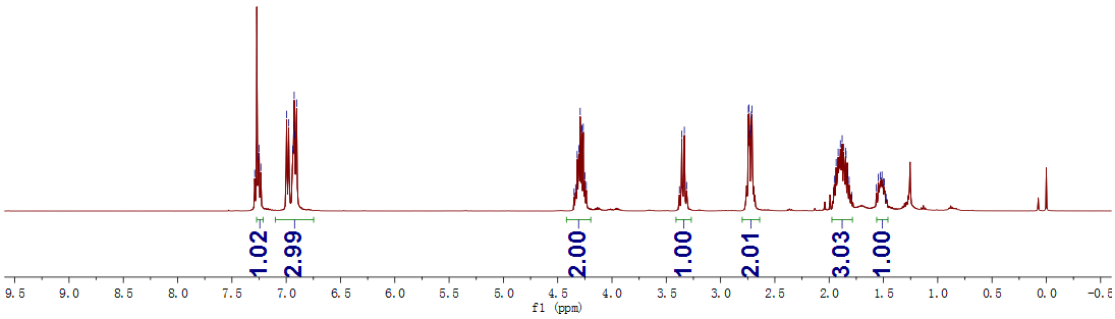
1.83
1.82
1.55
1.53
1.51
1.50


O
O
F
2m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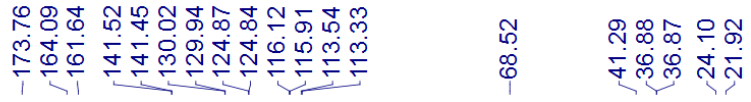
2.00
1.00
2.01
3.03
1.00
f1 (ppm)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141.52
141.45
130.02
129.94
124.87
124.84
116.12
115.91
113.54
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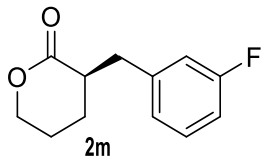
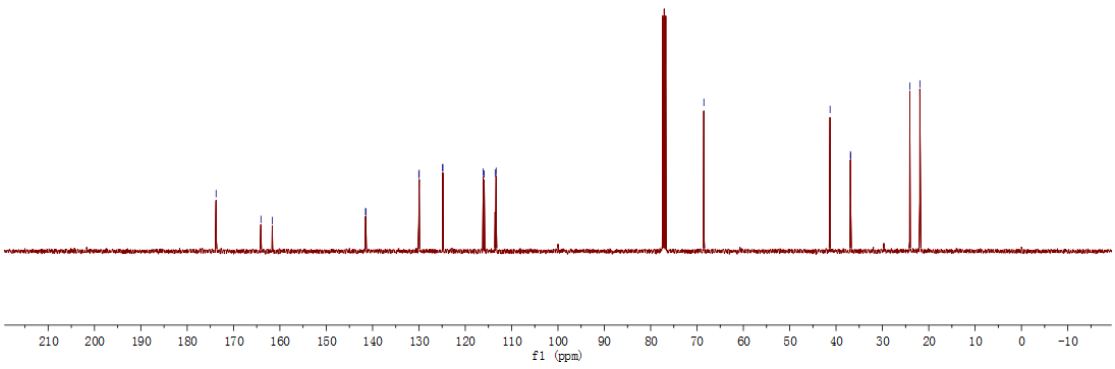
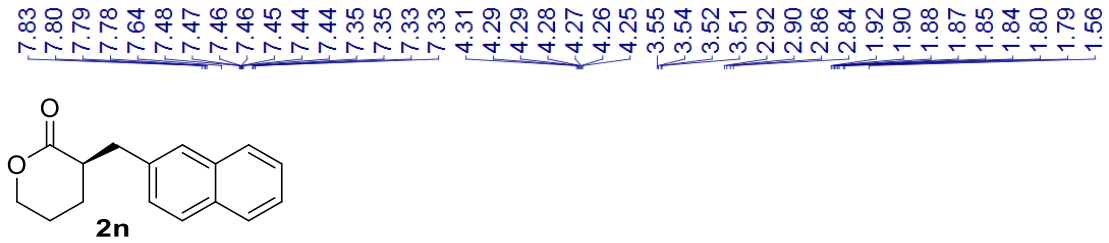
68.52
41.29
36.88
36.87
24.10
21.92


O
O
F
2m


f1 (ppm)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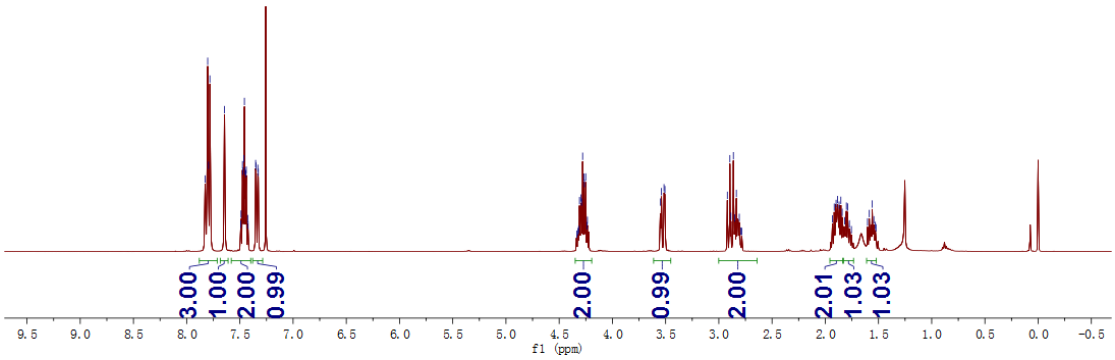
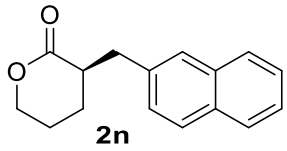
7.35
7.33
7.33
4.31
4.29
4.29
4.28
4.27
4.26
4.25
3.55
3.54
3.52
3.51
2.92
2.90
2.86
2.84
1.92
1.90
1.88
1.87
1.85
1.84
1.80
1.79
1.56

O
O

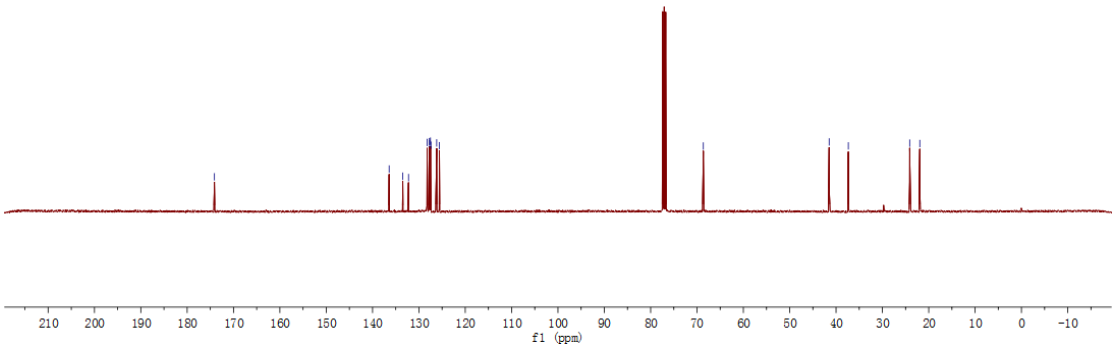
2n

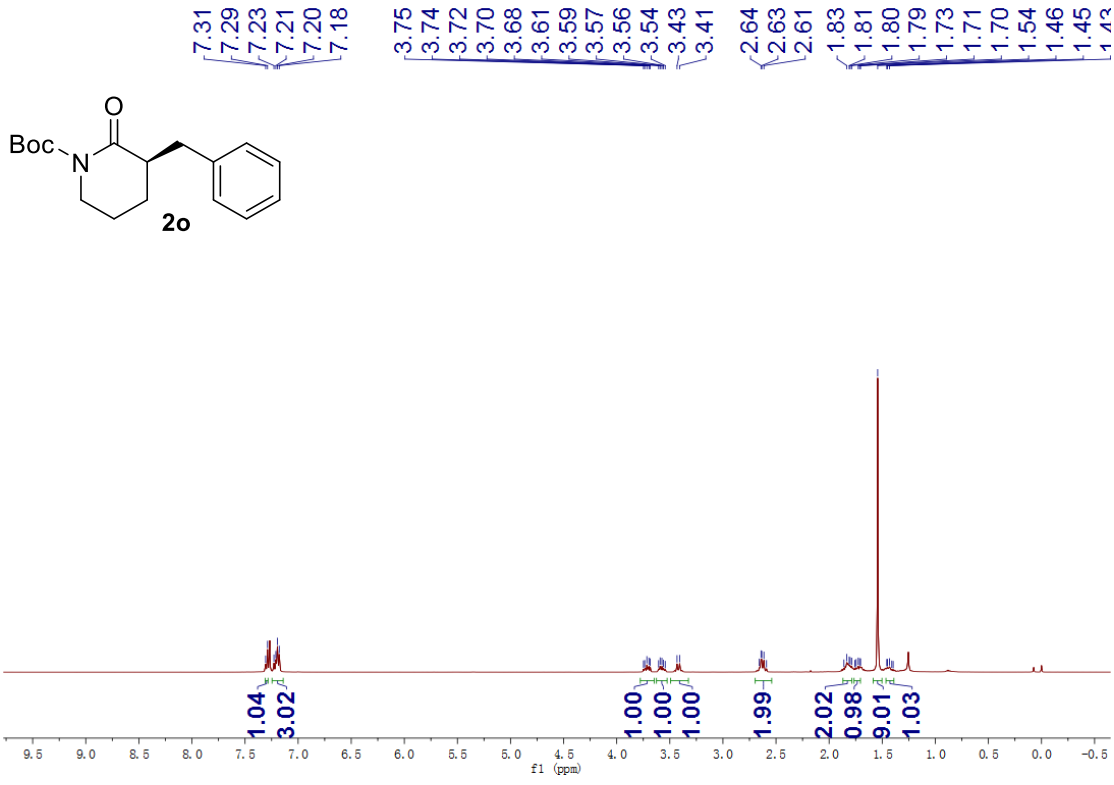

3.00
1.00
2.00
2.00
0.99
2.00
0.99
2.00
2.01
1.03
1.03
f1 (ppm)


174.11
136.42
133.47
132.24
128.23
127.73
127.66
127.51
127.40
126.16
125.57
68.63
41.48
37.35
24.11
21.93


O
O

2n


f1 (ppm)


7.31
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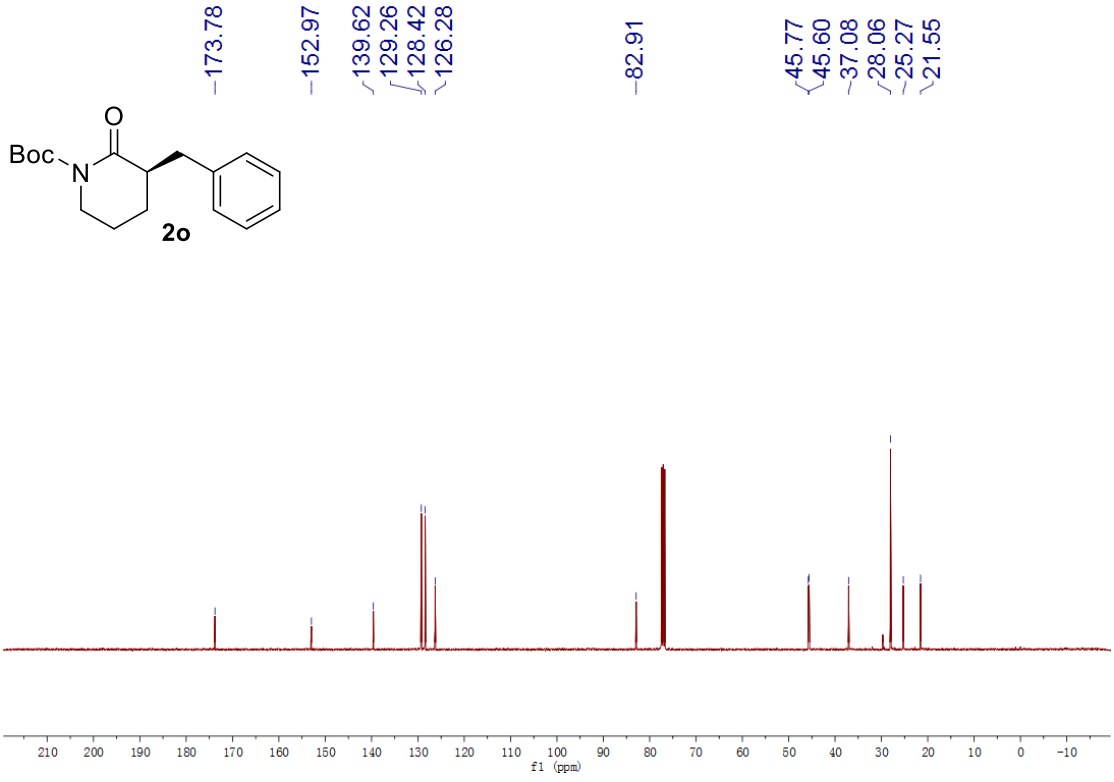
7.20
7.18
3.75
3.74
3.72
3.70
3.68
3.61
3.59
3.57
3.56
3.54
3.43
3.41
2.64
2.63
2.61
1.83
1.81
1.80
1.79
1.73
1.71
1.70
1.54
1.46
1.45
Boc
N
O
2o
1.04
3.02
1.00
1.00
1.00
1.99
2.02
0.98
9.01
1.03
f1 (ppm)


173.78
152.97
139.62
129.26
128.42
126.28
82.91
45.77
45.60
37.08
28.06
25.27
21.55
Boc
N
O
2o
f1 (ppm)


7.16
7.15
7.14
7.13
6.99
6.97
6.95
3.74
3.73
3.72
3.71
3.69
3.69
3.67
3.61
3.60
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3.57
3.36
3.36
3.33
3.33
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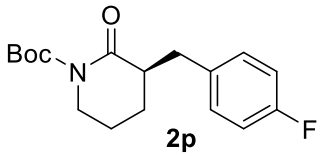
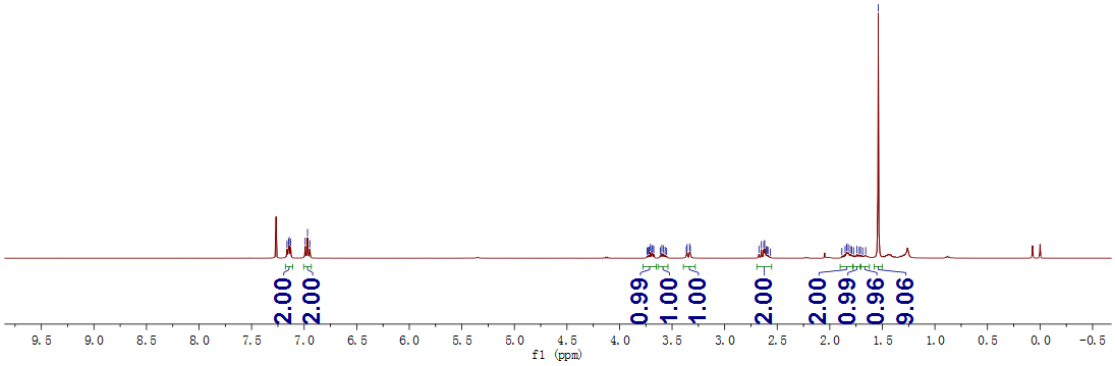
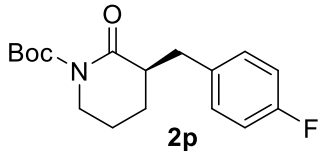
2.65
2.63
2.62
2.60
2.60
2.59
1.85
1.84
1.82
1.80
1.79
1.77
1.74
1.72
1.71
1.66
1.54


Boc
N
O
F

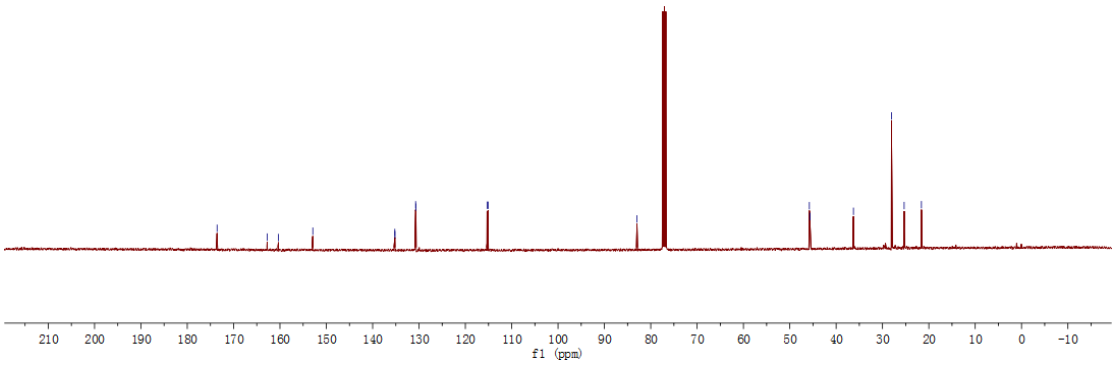
2p

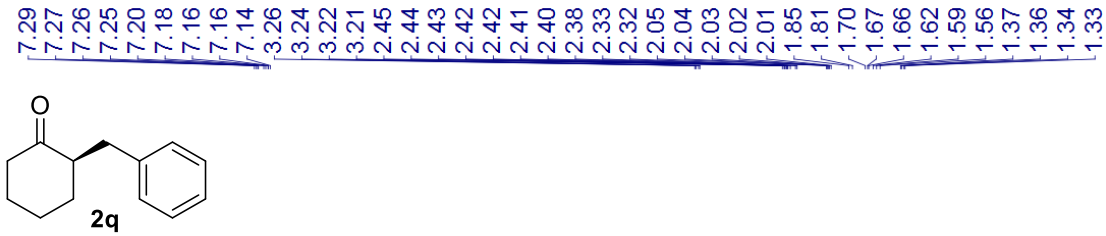

2.00
2.00
0.99
1.00
1.00
2.00
2.00
0.99
0.96
9.06
f1 (ppm)


173.56
162.76
160.33
152.91
135.22
135.19
130.73
130.65
115.31
115.10
82.97
45.78
45.65
36.27
28.07
25.33
21.60


Boc
N
O
F

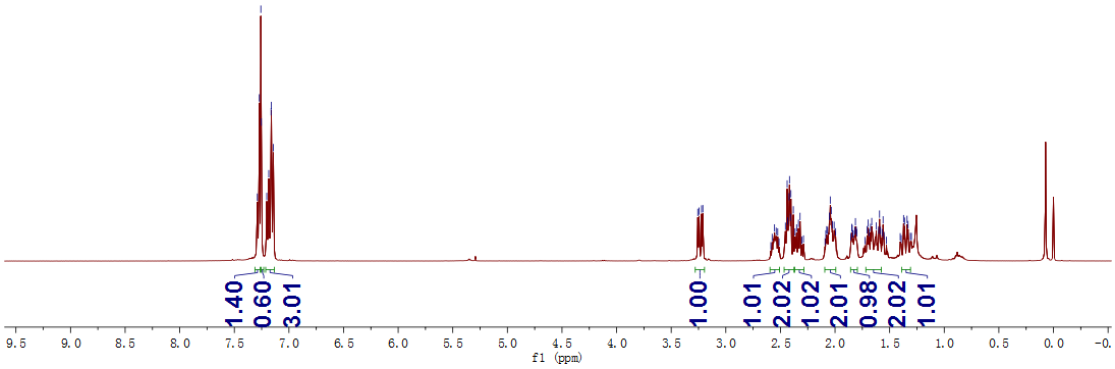
2p


f1 (ppm)

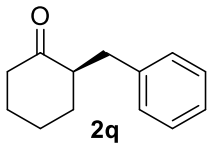

7.29
7.27
7.26
7.25
7.20
7.18
7.16
7.16
7.14
3.26
3.24
3.22
3.21
2.45
2.44
2.43
2.42
2.42
2.41
2.40
2.38
2.33
2.32
2.05
2.04
2.03
2.02
2.01
1.85
1.81
1.70
1.67
1.66
1.62
1.59
1.56
1.37
1.36
1.34
1.33

O

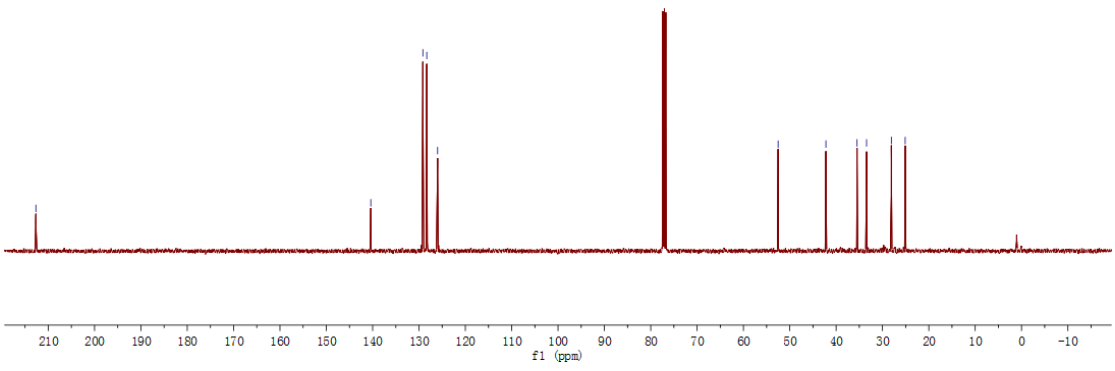
2q

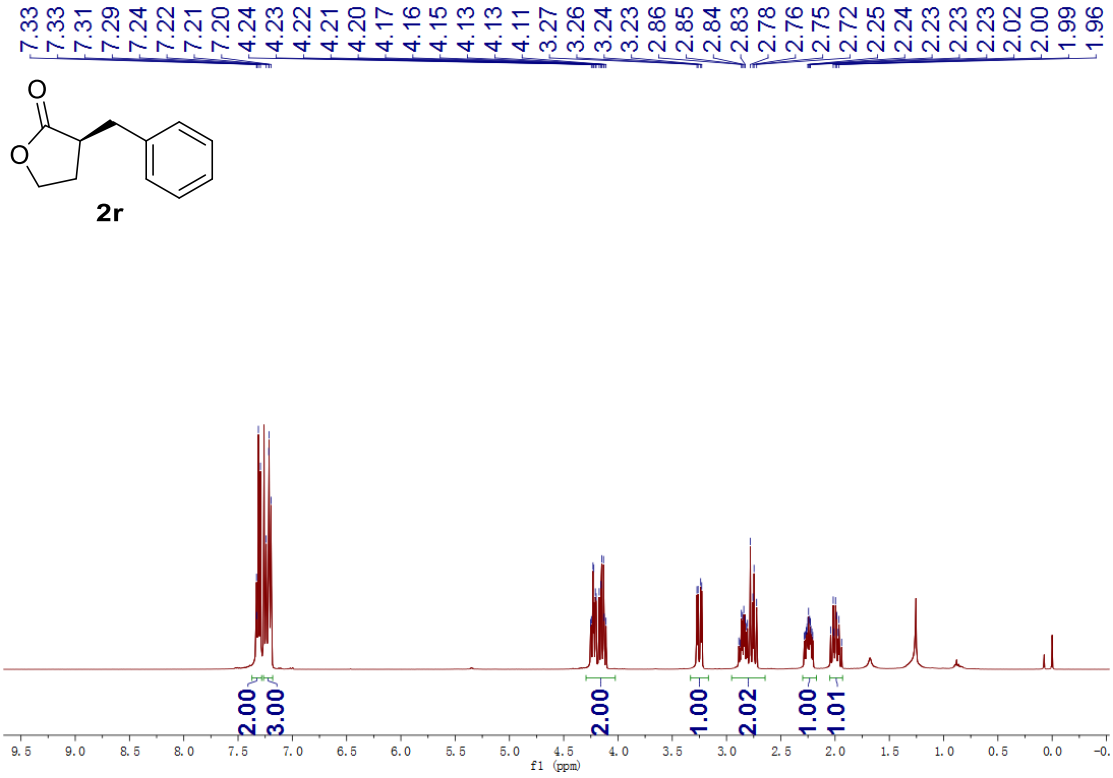

1.40
0.60
3.01
1.00
1.01
2.02
1.02
2.01
0.98
2.02
1.01
f1 (ppm)

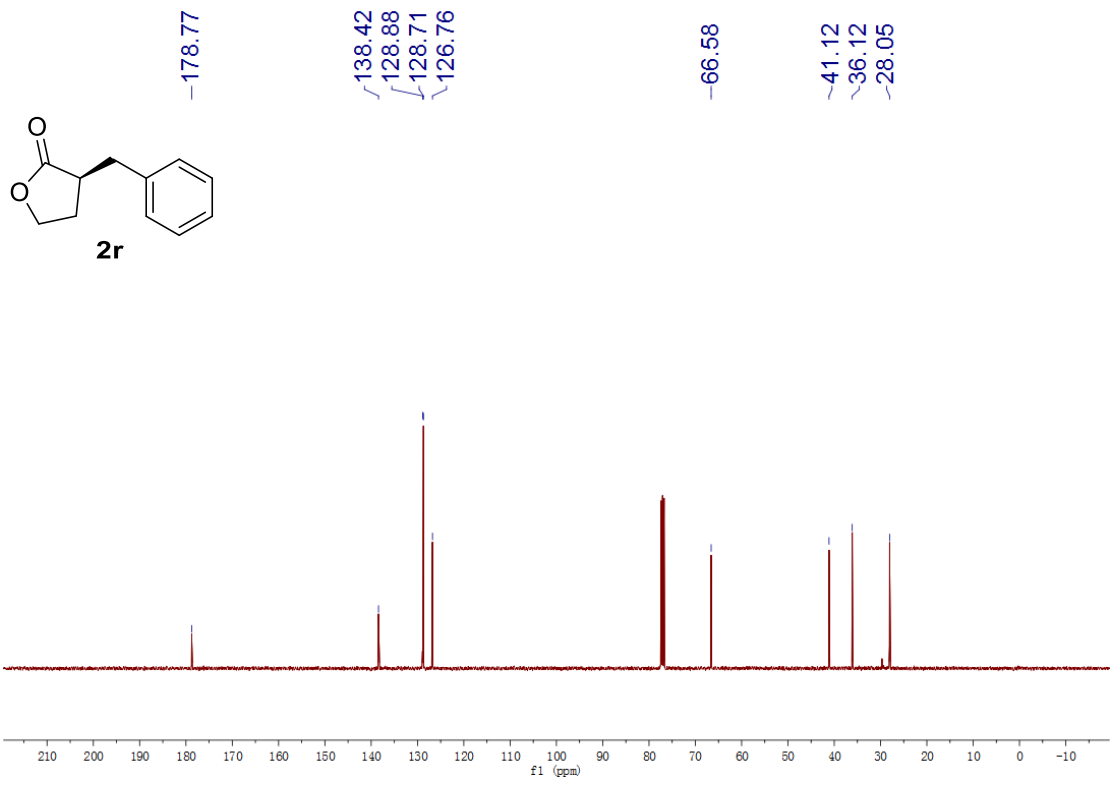

212.66
140.40
129.17
128.32
125.99
52.51
42.21
35.49
33.43
28.09
25.10

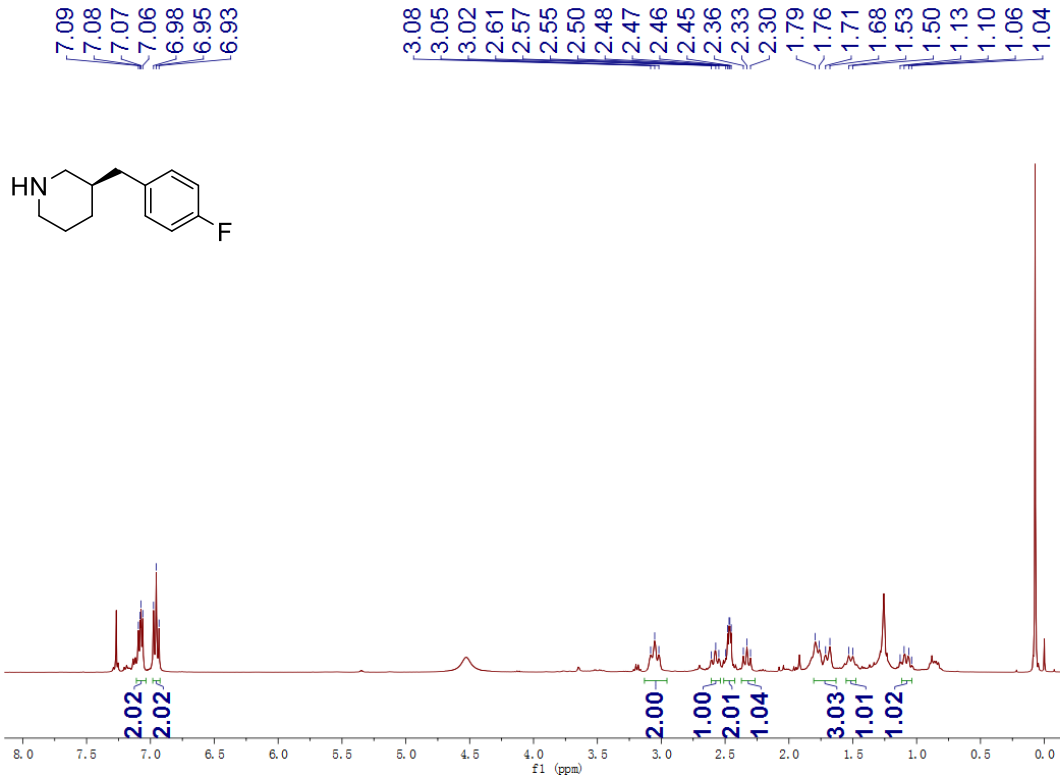

O

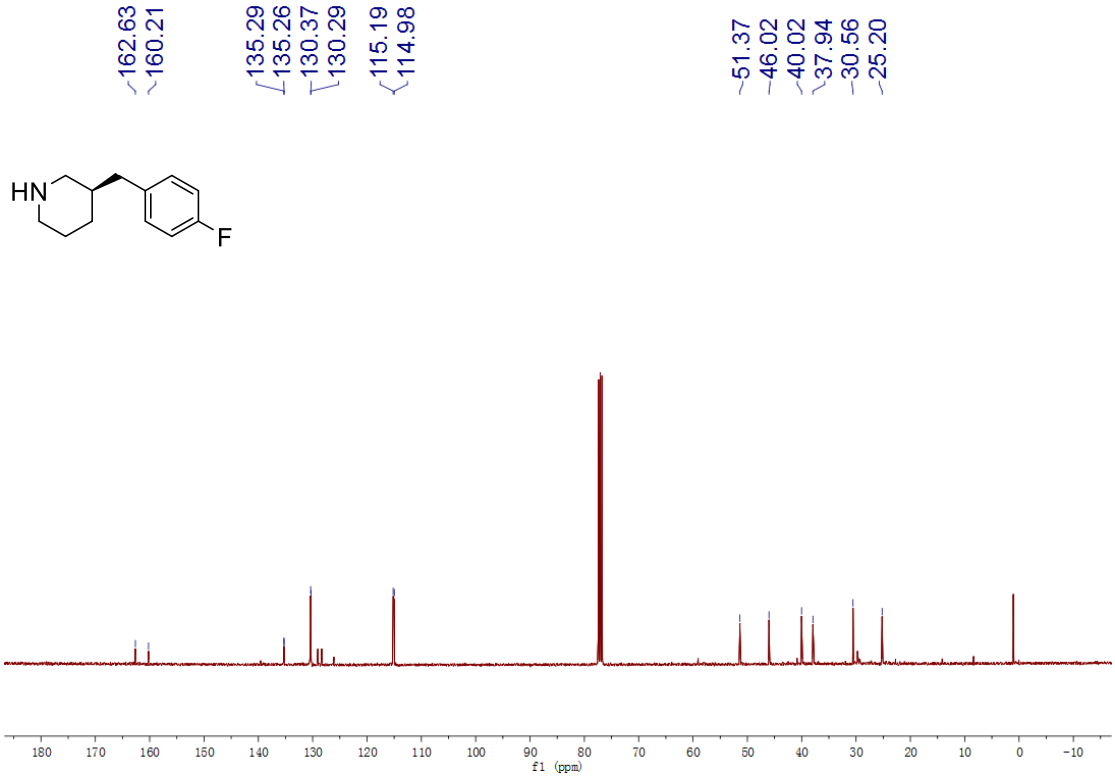
2q


f1 (ppm)


7.33
7.33
7.31
7.29
7.24
7.22
7.21
7.20
4.24
4.23
4.22
4.21
4.20
4.17
4.16
4.15
4.13
4.13
4.11
3.27
3.26
3.24
3.23
2.86
2.85
2.84
2.83
2.78
2.76
2.75
2.72
2.25
2.24
2.23
2.23
2.23
2.02
2.00
1.99
1.96
O
O
2r
2.00
3.00
2.00
1.00
2.02
1.00
1.01
f1 (ppm)


178.77
138.42
128.88
128.71
126.76
66.58
41.12
36.12
28.05
O
O
2r
f1 (ppm)


7.09
7.08
7.07
7.06
6.98
6.95
6.93
3.08
3.05
3.02
2.61
2.57
2.55
2.50
2.48
2.47
2.46
2.45
2.36
2.33
2.30
1.79
1.76
1.71
1.68
1.53
1.50
1.13
1.10
1.06
1.04
HN
F
2.02
2.02
2.00
1.00
2.01
1.04
3.03
1.01
1.02
f1 (ppm)

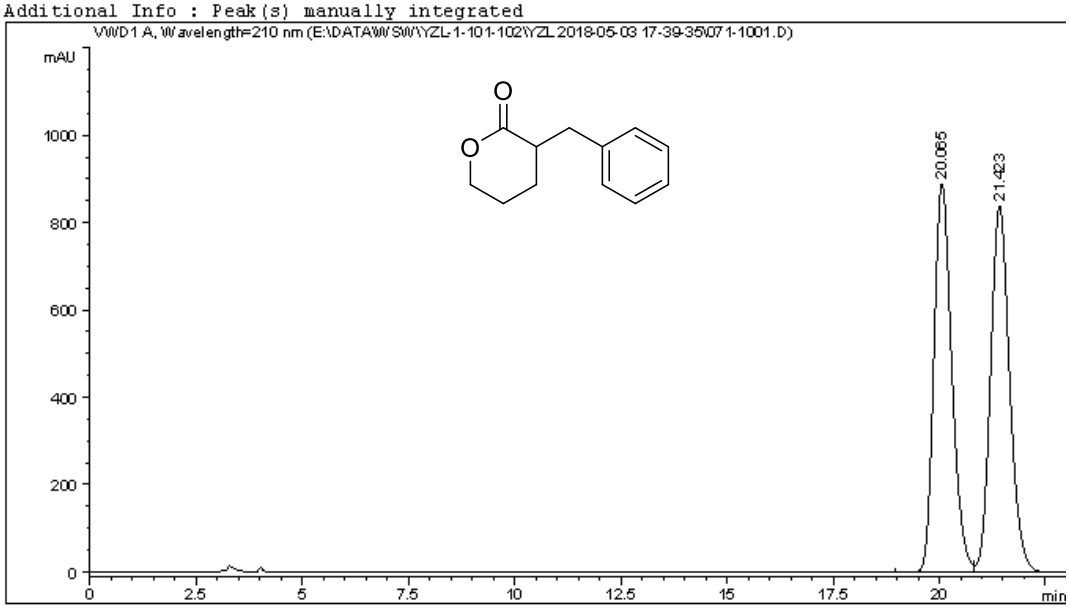

162.63
160.21
135.29
135.26
130.37
130.29
115.19
114.98
51.37
46.02
40.02
37.94
30.56
25.20
HN
F
f1 (ppm)

HPLC of substrates and products

HPLC-2a-rac

Data File E:\DATA\WSW\YZL-1-101-102\YZL 2018-05-03 17-39-35\071-1001.D
Sample Name: YJX-1-124-1-Rac

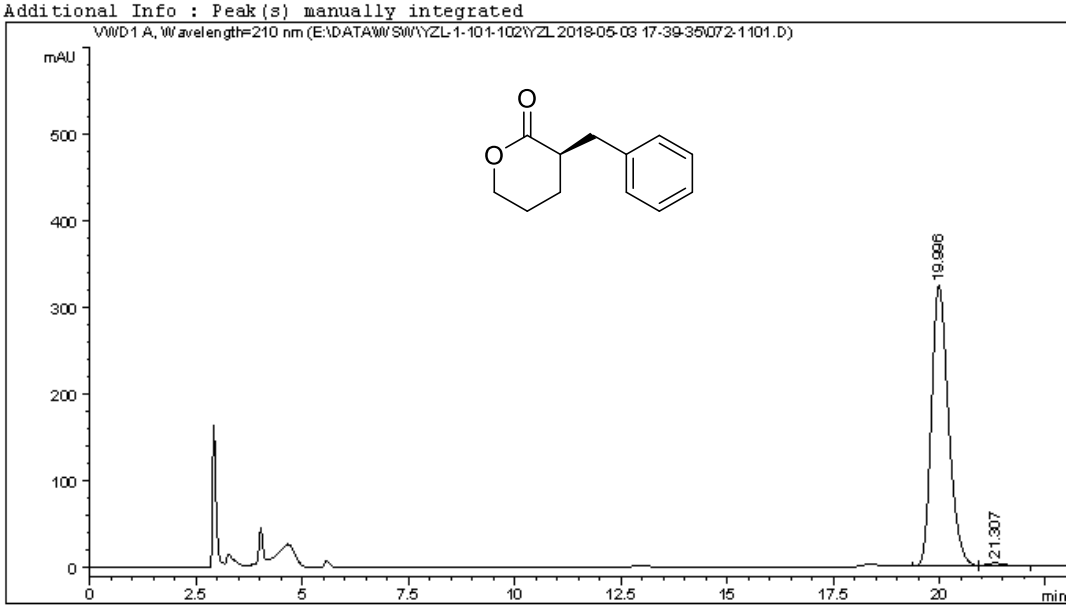
```
    ======================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :  10
    Acq. Instrument : 1260HPLC-VWD                   Location : Vial 71
    Injection Date  : 5/3/2018 9:08:48 PM                Inj :  1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\WSW\YZL-1-101-102\YZL 2018-05-03 17-39-35\VWD-AD(1-2)-97-3-1ML-
                      3UL-210NM-60MIN.M
    Last changed    : 5/3/2018 6:39:00 PM by SYSTEM
    Analysis Method : E:\DATA\WSW\YZL-1-101-102\YZL 2018-05-03 17-39-35\VWD-AD(1-2)-97-3-1ML-
                      3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:30:14 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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  20.065 BV    0.4504 2.60466e4   890.20392  49.8002
       2  21.423 VB    0.4797 2.62556e4   839.88422  50.1998

    Totals :                  5.23021e4  1730.08813


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

1260HPLC-DAD 5/4/2018 4:30:34 PM SYSTEM                        Page 1 of 1
```

HPLC-2a-cat

```
Data File E:\DATA\WSW\YZL-1-101-102\YZL 2018-05-03 17-39-35\072-1101.D
Sample Name: YJX-1-124-1

    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  11
    Acq. Instrument : 1260HPLC-VWD                    Location : Vial 72
    Injection Date  : 5/3/2018 10:09:48 PM                 Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\WSW\YZL-1-101-102\YZL 2018-05-03 17-39-35\VWD-AD(1-2)-97-3-1ML-
                      3UL-210NM-60MIN.M
    Last changed    : 5/3/2018 6:39:00 PM by SYSTEM
    Analysis Method : E:\DATA\WSW\YZL-1-101-102\YZL 2018-05-03 17-39-35\VWD-AD(1-2)-97-3-1ML-
                      3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:34:55 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

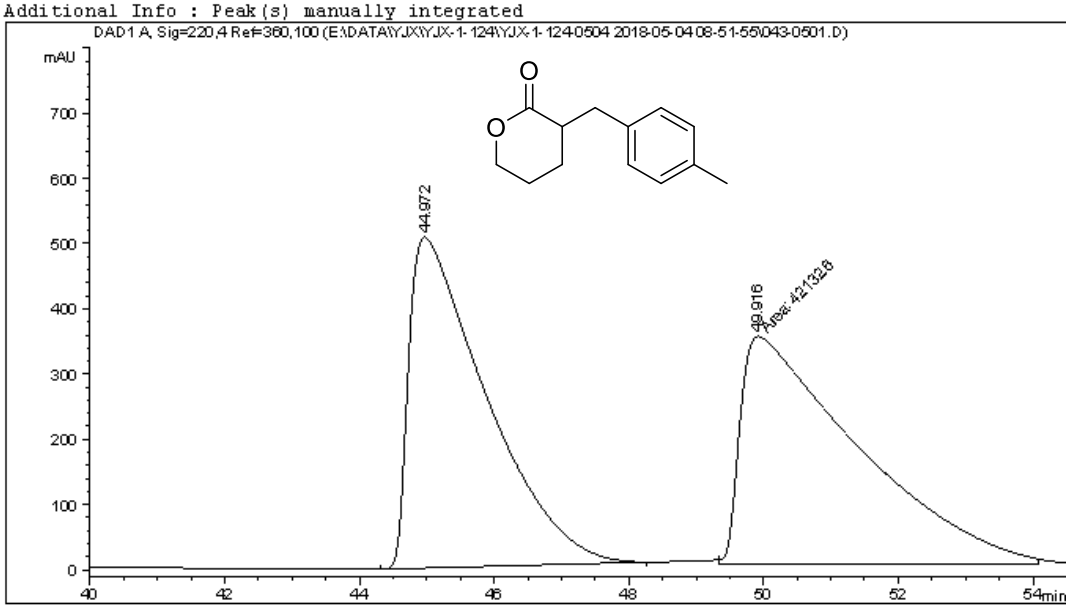



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  19.996 BV    0.4266 9040.19434  323.95499  98.6751
       2  21.307 VB    0.4797  121.37720    3.72931   1.3249

    Totals :                  9161.57153  327.68430


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

1260HPLC-DAD 5/4/2018 4:35:00 PM SYSTEM                        Page 1 of 1
```

HPLC-2b-rac

Data File E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\043-0501.D
Sample Name: YJX-1-124-2-R2

```
    ==================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :   5
    Acq. Instrument : 1260HPLC-DAD                   Location : Vial 43
    Injection Date  : 5/4/2018 11:44:10 AM               Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-0D(1-2)-97-
                      3-0.5ML-3UL-ALL-60MIN.M
    Last changed    : 5/4/2018 11:21:21 AM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-0D(1-2)-97-
                      3-0.5ML-3UL-ALL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:09:57 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```



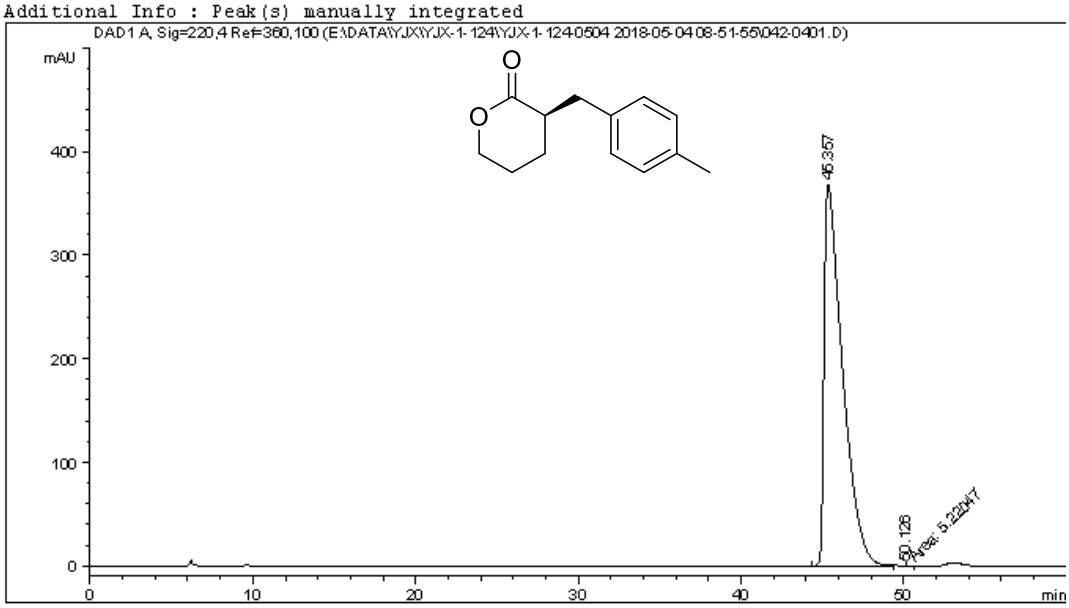

```
    ==================================================================
                            Area Percent Report
    ==================================================================

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


    Signal 1: DAD1 A, Sig=220,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  44.972 BB    1.0657 4.03312e4   507.19556  48.9077
       2  49.916 MM    2.0120 4.21326e4   349.01953  51.0923

    Totals :                  8.24638e4   856.21509


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

1260HPLC-DAD 5/4/2018 4:10:27 PM SYSTEM Page 1 of 1

HPLC-2b-cat

Data File E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\042-0401.D
Sample Name: YJX-1-124-2

```
    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :   4
    Acq. Instrument : 1260HPLC-DAD                     Location : Vial 42
    Injection Date  : 5/4/2018 10:43:13 AM                 Inj :   1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-OD(1-2)-97-
                      3-0.5ML-3UL-ALL-60MIN.M
    Last changed    : 5/4/2018 11:21:21 AM by SYSTEM
                      (modified after loading)
    Analysis Method : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-OD(1-2)-97-
                      3-0.5ML-3UL-ALL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:05:21 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```



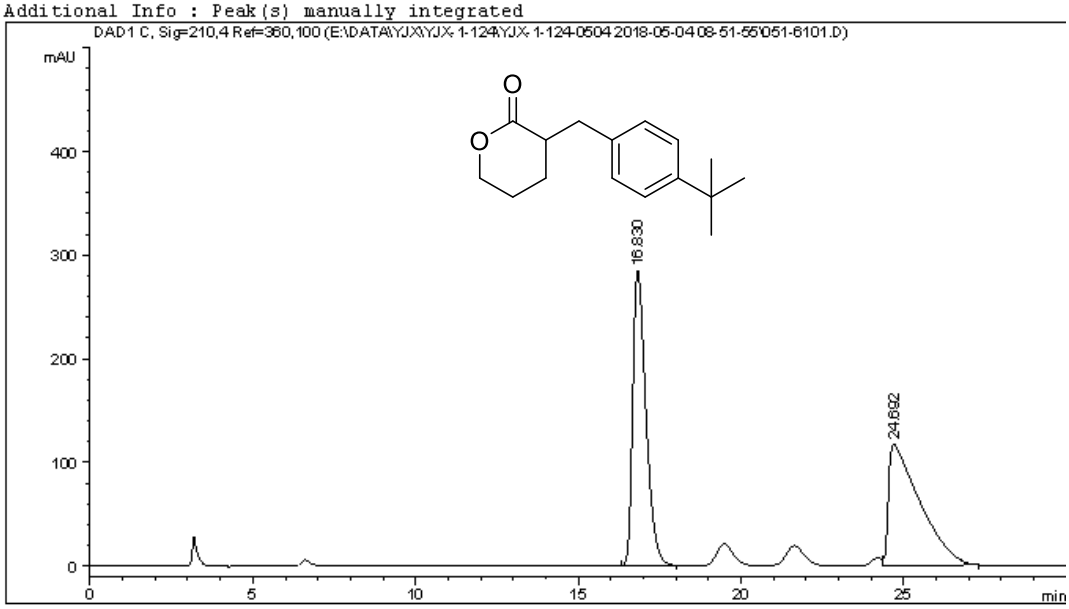

```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  45.357 BB    1.0533 2.89318e4   367.97626  99.9820
       2  50.126 MM    0.2078    5.22047 2.99043e-1   0.0180

    Totals :                  2.89371e4   368.27530


    ======================================================================
```

1260HPLC-DAD 5/4/2018 4:05:33 PM SYSTEM Page 1 of 1

HPLC-2c-rac

Data File E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\051-6101.D
Sample Name: YJX-1-124-3-R2

```
    ====================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  61
    Acq. Instrument : 1260HPLC-DAD                    Location : Vial 51
    Injection Date  : 5/5/2018 9:12:41 PM                 Inj :   1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-0D(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/5/2018 3:33:50 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-0D(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/10/2018 10:40:51 AM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

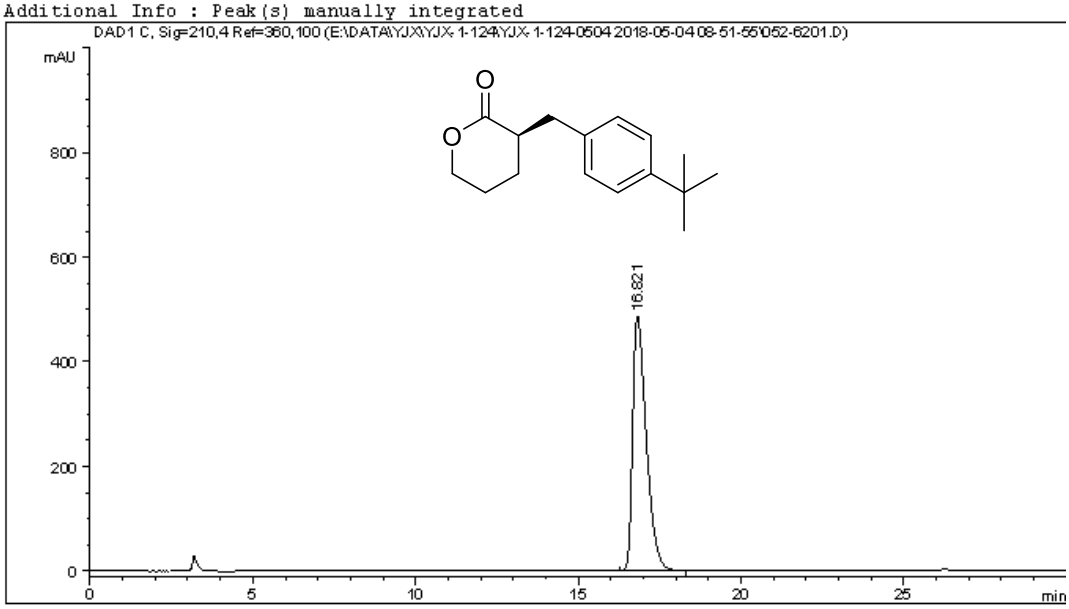



```
    ====================================================================
                            Area Percent Report
    ====================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  16.830 BB    0.4280 7988.02246  284.14053  50.6680
       2  24.692 VB    0.8598 7777.39307  116.95254  49.3320

    Totals :                  1.57654e4   401.09307


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

1260HPLC-VWD 5/10/2018 10:41:00 AM SYSTEM                    Page 1 of 1
```

HPLC-2c-cat

Data File E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\052-6201.D
Sample Name: YJX-1-124-3

```
    ================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :  62
    Acq. Instrument : 1260HPLC-DAD                   Location : Vial 52
    Injection Date  : 5/5/2018 10:13:35 PM               Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-0D(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/5/2018 3:33:50 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-0D(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/10/2018 10:42:42 AM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

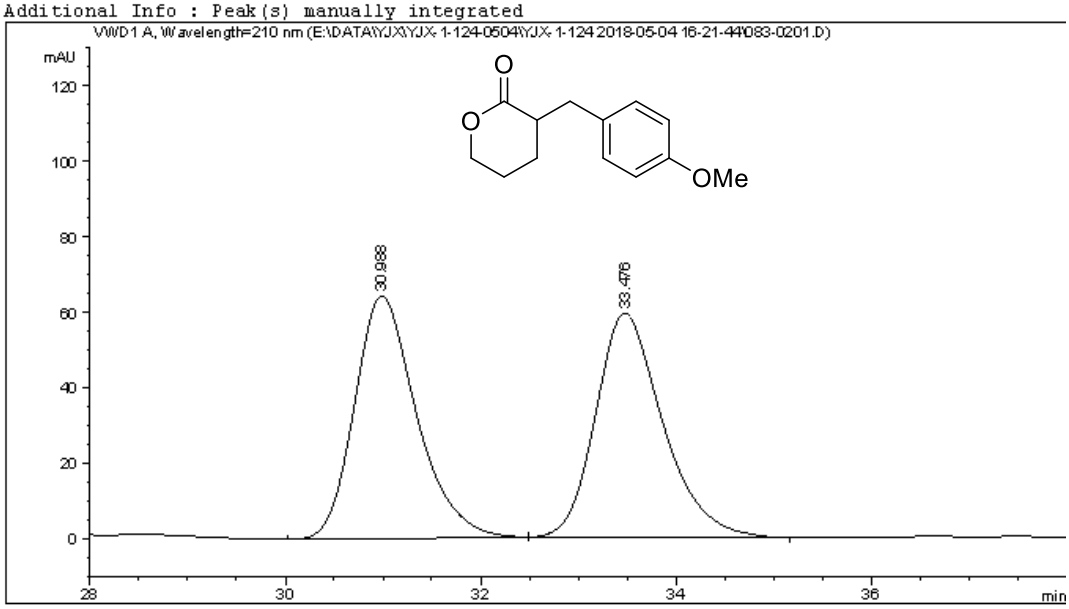



```
    ================================================================
                          Area Percent Report
    ================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|-------|
       1  16.821 BB    0.4386 1.41313e4   486.95718 100.0000

    Totals :                  1.41313e4   486.95718


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

HPLC-2d-rac

Data File E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\083-0201.D
Sample Name: YJX-1-124-6-R2

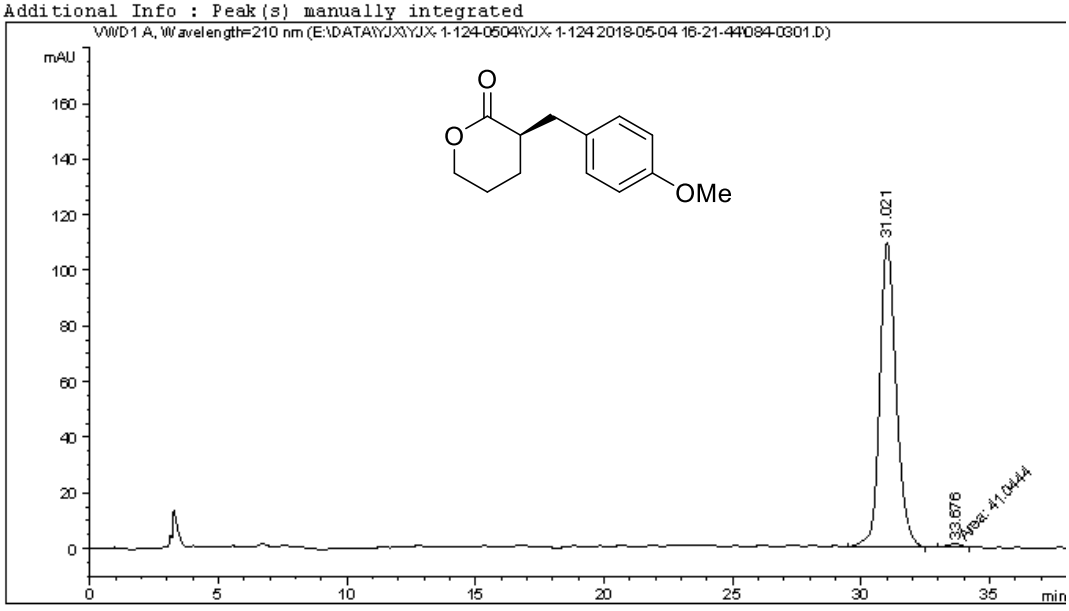
```
    ====================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :   2
    Acq. Instrument : 1260HPLC-VWD                   Location : Vial 83
    Injection Date  : 5/4/2018 4:38:23 PM                Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/4/2018 4:21:45 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 7:54:06 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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  30.988 BB    0.6696 2837.98364   64.33804  50.0257
       2  33.476 BB    0.7179 2835.06323   59.39242  49.9743

    Totals :                  5673.04688  123.73046


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

HPLC-2d-cat

```
Data File E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\084-0301.D
Sample Name: YJX-1-124-6

    ======================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :   3
    Acq. Instrument : 1260HPLC-VWD                  Location : Vial 84
    Injection Date  : 5/4/2018 5:39:08 PM              Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/4/2018 4:21:45 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 8:02:28 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

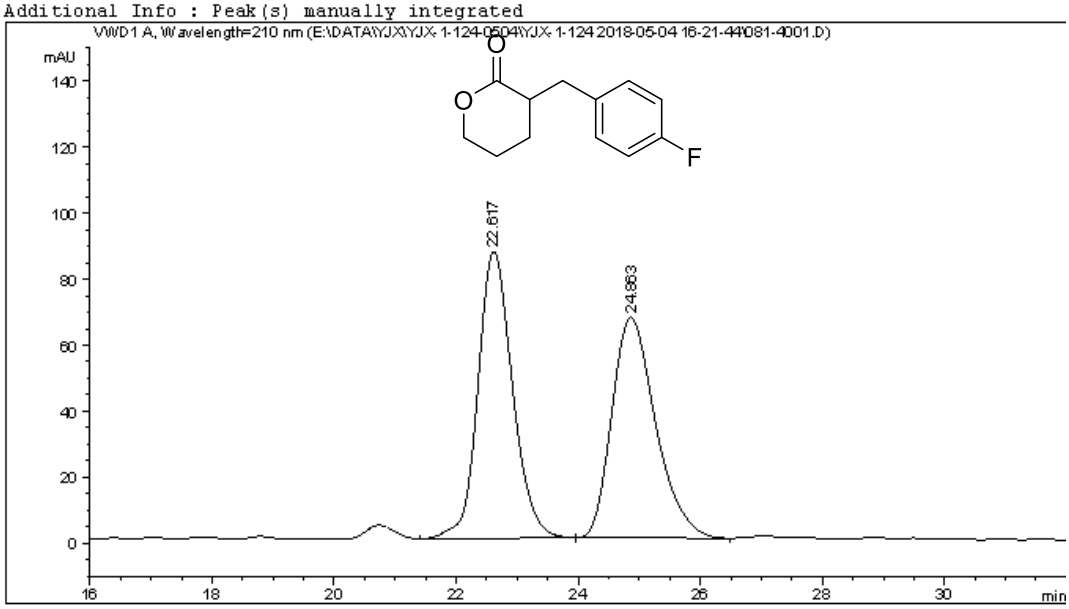



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  31.021 BB    0.6737 4889.56299  109.55953  99.1676
       2  33.676 MM    0.5666   41.04440    1.20737   0.8324

    Totals :                  4930.60738  110.76690


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

1260HPLC-VWD 5/4/2018 8:02:34 PM SYSTEM                        Page 1 of 1
```

HPLC-2e-rac

Data File E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\081-4001.D
Sample Name: YJX-1-124-9-Rac

```
    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  40
    Acq. Instrument : 1260HPLC-VWD                    Location : Vial 81
    Injection Date  : 5/5/2018 8:11:56 PM                 Inj :  1
                                                    Inj Volume : 10.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-10UL-210NM-60MIN.M
    Last changed    : 5/5/2018 4:23:57 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-10UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/6/2018 8:10:04 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

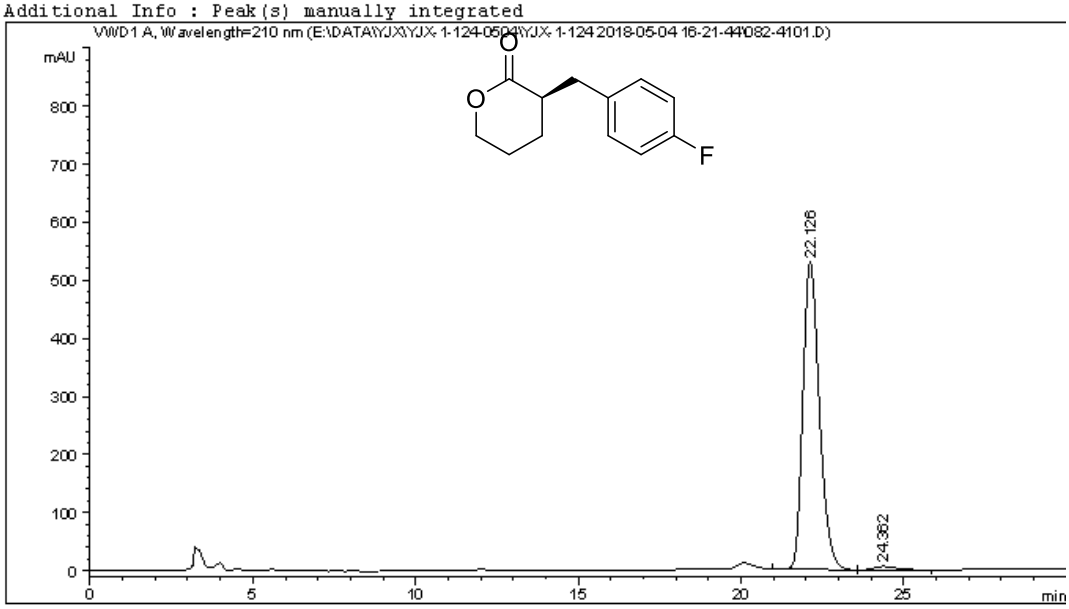



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  22.617 BB    0.6036 3412.14331   86.80087  50.7139
       2  24.863 BB    0.7639 3316.08398   66.70898  49.2861

    Totals :                  6728.22729  153.50985

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

HPLC-2e-cat

Data File E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\082-4101.D
Sample Name: YJX-1-124-9

```
    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  41
    Acq. Instrument : 1260HPLC-VWD                     Location : Vial 82
    Injection Date  : 5/5/2018 9:12:45 PM                  Inj :  1
                                                     Inj Volume : 10.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-10UL-210NM-60MIN.M
    Last changed    : 5/5/2018 4:23:57 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-10UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/6/2018 8:13:16 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

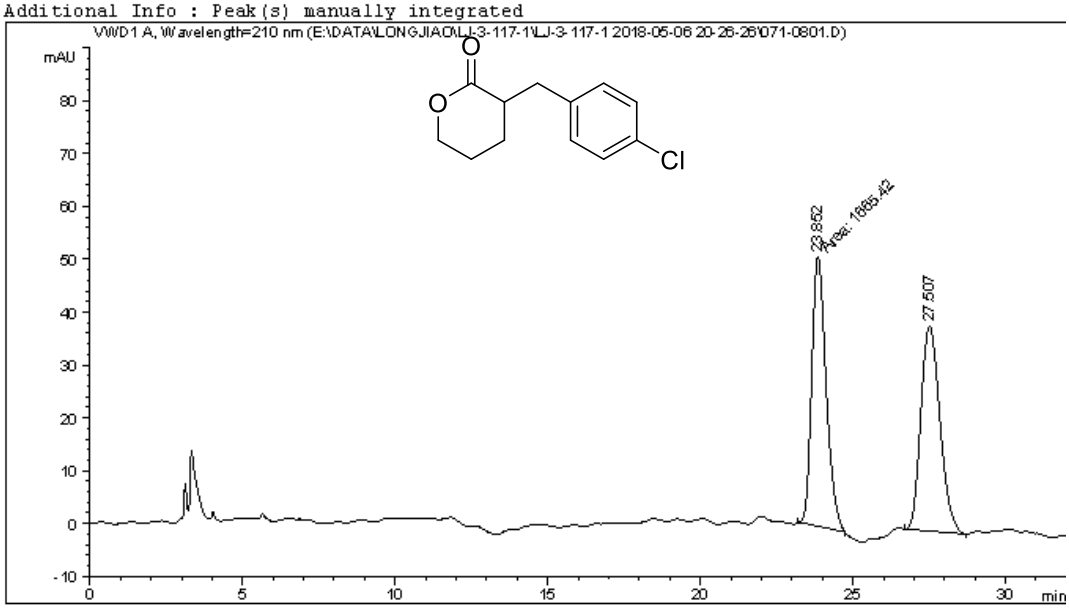



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  22.126 BB    0.5443 1.86659e4   529.49677  98.4185
       2  24.362 BB    0.7127  299.94257    6.05787   1.5815

    Totals :                  1.89658e4   535.55463


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

HPLC-2f-rac

Data File E:\DATA\LONGJIAO\LJ-3-117-1\LJ-3-117-1 2018-05-06 20-26-26\071-0801.D
Sample Name: YJX-1-124-10-R2

```
    ====================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :   8
    Acq. Instrument : 1260HPLC-VWD                   Location : Vial 71
    Injection Date  : 5/7/2018 12:07:34 AM               Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\LONGJIAO\LJ-3-117-1\LJ-3-117-1 2018-05-06 20-26-26\VWD-AD(1-2)-
                      97-3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/6/2018 8:41:25 PM by SYSTEM
    Analysis Method : E:\DATA\LONGJIAO\LJ-3-117-1\LJ-3-117-1 2018-05-06 20-26-26\VWD-AD(1-2)-
                      97-3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/7/2018 3:58:49 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

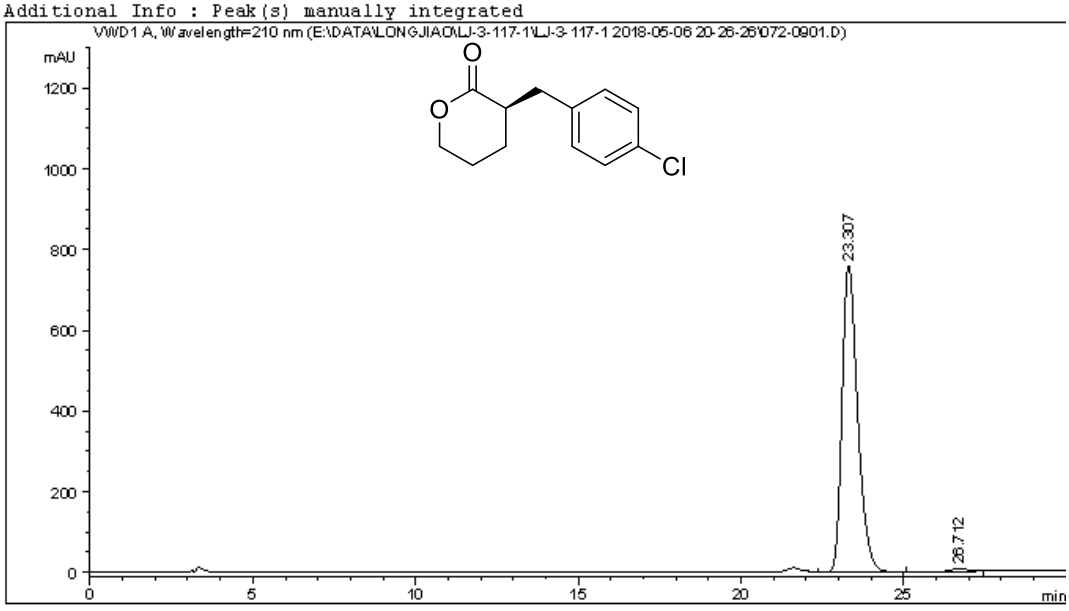



```
    ====================================================================
                           Area Percent Report
    ====================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  23.852 MM    0.5440 1665.41882   51.02635  49.7081
       2  27.507 BB    0.6541 1684.98132   38.76582  50.2919

    Totals :                  3350.40015   89.79217


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

1260HPLC-VWD 5/7/2018 3:58:56 PM SYSTEM                    Page 1 of 1
```

HPLC-2f-cat

Data File E:\DATA\LONGJIAO\LJ-3-117-1\LJ-3-117-1 2018-05-06 20-26-26\072-0901.D
Sample Name: YJX-1-124-10

```
    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :   9
    Acq. Instrument : 1260HPLC-VWD                    Location : Vial 72
    Injection Date  : 5/7/2018 1:08:15 AM                  Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\LONGJIAO\LJ-3-117-1\LJ-3-117-1 2018-05-06 20-26-26\VWD-AD(1-2)-
                      97-3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/6/2018 8:41:25 PM by SYSTEM
    Analysis Method : E:\DATA\LONGJIAO\LJ-3-117-1\LJ-3-117-1 2018-05-06 20-26-26\VWD-AD(1-2)-
                      97-3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/7/2018 4:04:06 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

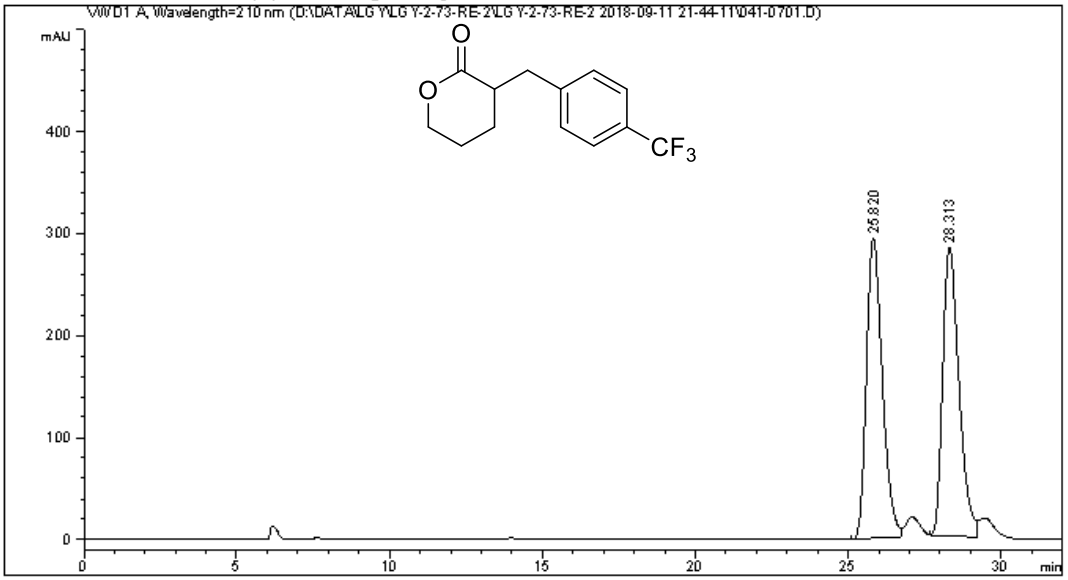



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  23.307 BB    0.5083 2.52120e4   759.48804  98.9540
       2  26.712 BB    0.5482  266.49527    7.21090   1.0460

    Totals :                  2.54785e4   766.69894

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

HPLC-2g-rac

Data File D:\DATA\LGY\LGY-2-73-RE-2\LGY-2-73-RE-2 2018-09-11 21-44-11\041-0701.D
Sample Name: YJX-P-CF3

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   7
    Acq. Instrument : Instrument 1                  Location : Vial 41
    Injection Date  : 9/12/2018 2:15:13 AM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LGY\LGY-2-73-RE-2\LGY-2-73-RE-2 2018-09-11 21-44-11\VWD-AD(1-2)-95-
                      5-0.5ML-3UL-210NM-60MIN.M
    Last changed    : 5/25/2018 4:46:08 PM
    Analysis Method : D:\METHOD\LG\VWD-AD(1-2)-99-1-0.2ML-2UL-220NM-10MIN.M
    Last changed    : 9/12/2018 3:13:41 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

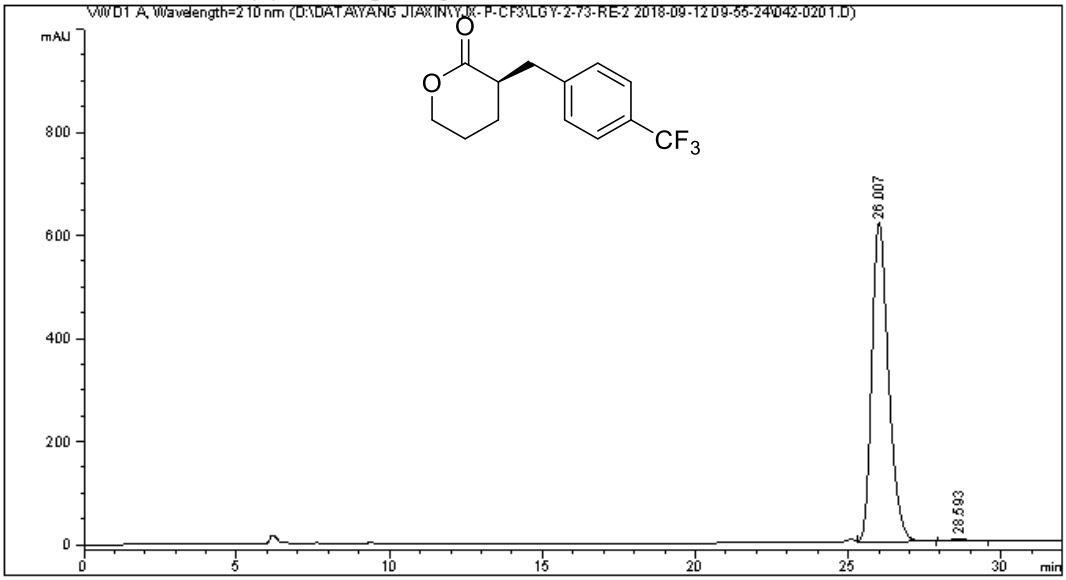



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    Sorted By             :      Retention Time
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Sig Type    Area      Height     Area
      #   [min]            [mAU*s]     [mAU]       %
    ----|-------|---|----|----------|----------|--------|
       1  25.820  1  BV   1.05729e4   293.98074  50.2931
       2  28.313  1  BV   1.04497e4   283.03693  49.7069

    Totals :              2.10227e4   577.01767


    ======================================================================
```

HPLC-2g-cat

Data File D:\DATA\YANG JIAXIN\YJX-P-CF3\LGY-2-73-RE-2 2018-09-12 09-55-24\042-0201.D
Sample Name: YJX-P-CF3

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   2
    Acq. Instrument : Instrument 1                  Location : Vial 42
    Injection Date  : 9/12/2018 10:13:56 AM              Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\YANG JIAXIN\YJX-P-CF3\LGY-2-73-RE-2 2018-09-12 09-55-24\VWD-AD(1-2)
                      -95-5-0.5ML-3UL-210NM-60MIN.M
    Last changed    : 5/25/2018 4:46:08 PM
    Analysis Method : D:\METHOD\LG\VWD-AD(1-2)-99-1-0.2ML-2UL-220NM-10MIN.M
    Last changed    : 9/12/2018 3:10:18 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```



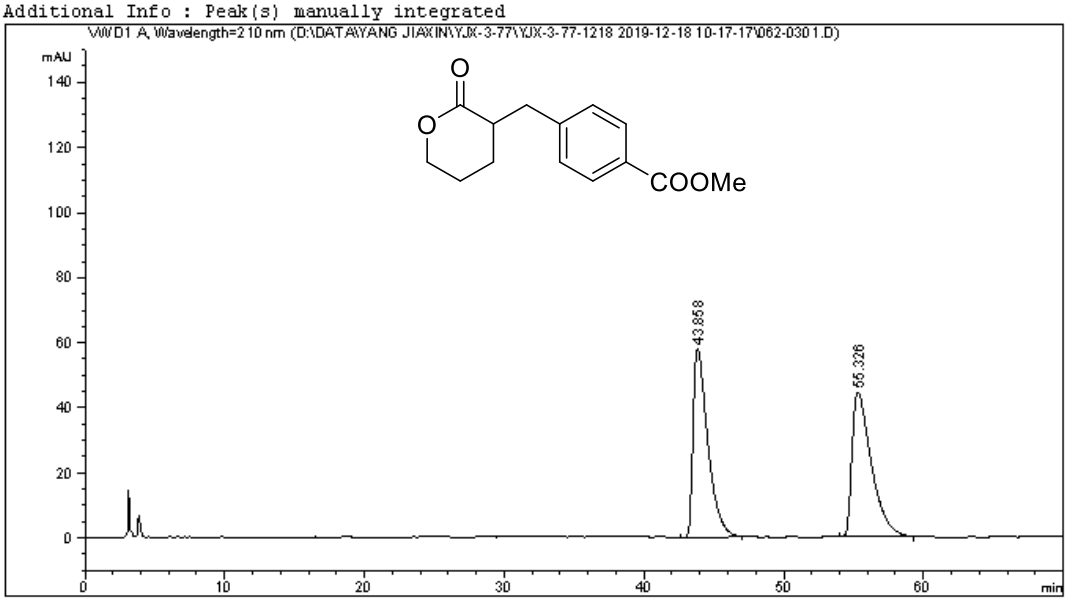

```
    ======================================================================
                            Area Percent Report
    ======================================================================

    Sorted By             :      Retention Time
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Sig Type    Area      Height     Area
      #   [min]            [mAU*s]     [mAU]       %
    ----|-------|---|----|----------|----------|--------|
       1  26.007  1  VB   2.34967e4   618.57037  99.3510
       2  28.593  1  BB    153.49924    4.27789   0.6490

    Totals :              2.36502e4   622.84827


    ======================================================================
```

Instrument 1 9/12/2018 3:10:23 PM

HPLC-2h-rac

Data File D:\DATA\YANG JIAXIN\YJX-3-77\YJX-3-77-1218 2019-12-18 10-17-17\062-0301.D
Sample Name: YJX-3-77-2

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :   3
    Acq. Instrument : Instrument 1                    Location : Vial 62
    Injection Date  : 12/18/2019 11:45:47 AM              Inj :   1
                                                    Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\YANG JIAXIN\YJX-3-77\YJX-3-77-1218 2019-12-18 10-17-17\VWD-AD(1-2)-
                      95-5-1ML-3UL-210NM-60MIN.M
    Last changed    : 12/18/2019 10:48:47 AM
                      (modified after loading)
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-2)-90-10-1ML-2UL-210NM-60MIN.M
    Last changed    : 12/22/2019 8:23:45 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

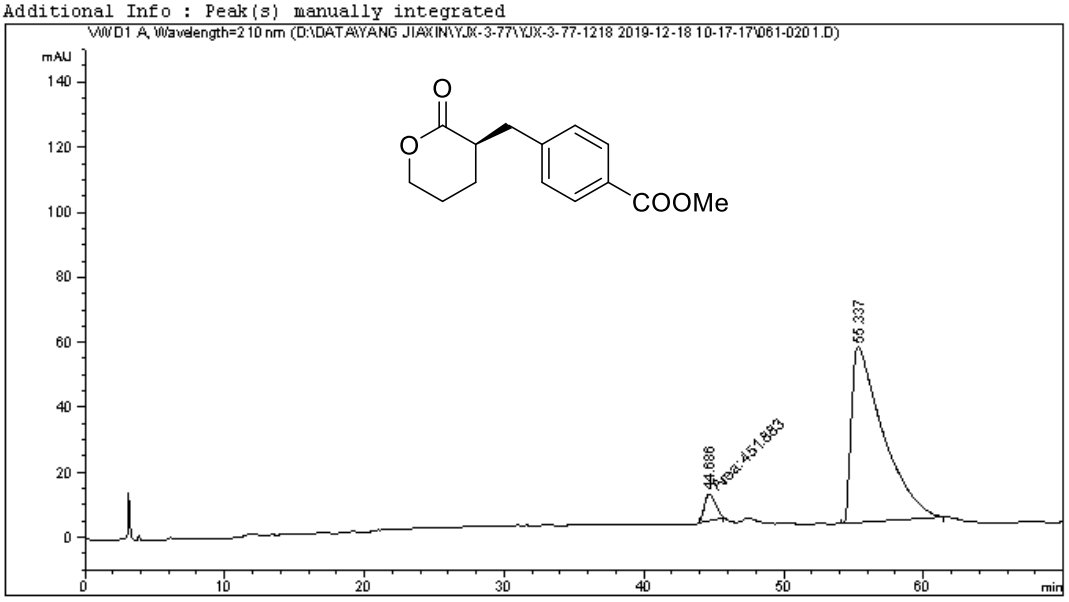



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  43.858 BB    1.0885 4263.88672   58.01106  49.9337
       2  55.326 BB    1.3871 4275.20313   44.33326  50.0663

    Totals :                  8539.08984  102.34433
```

HPLC-2h-cat

Data File D:\DATA\YANG JIAXIN\YJX-3-77\YJX-3-77-1218 2019-12-18 10-17-17\061-0201.D
Sample Name: YJX-3-77-1

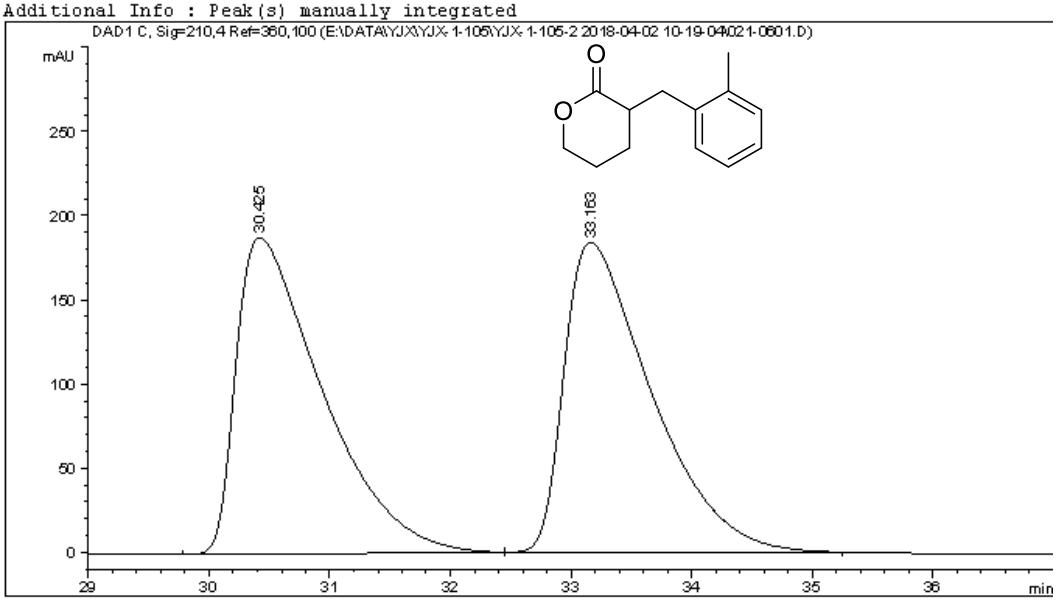
```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   2
    Acq. Instrument : Instrument 1                  Location : Vial 61
    Injection Date  : 12/18/2019 10:34:58 AM             Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\YANG JIAXIN\YJX-3-77\YJX-3-77-1218 2019-12-18 10-17-17\VWD-AD(1-2)-
                      95-5-1ML-3UL-210NM-60MIN.M
    Last changed    : 12/18/2019 10:48:47 AM
                      (modified after loading)
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-2)-90-10-1ML-2UL-210NM-60MIN.M
    Last changed    : 12/22/2019 8:23:45 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

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


    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]        %
    ----|-------|----|-------|----------|----------|--------|
       1  44.686 MM    0.9140  451.88309    8.23977   5.0676
       2  55.337 BB    2.0673 8465.24219   53.90015  94.9324

    Totals :                  8917.12527   62.13992
```

HPLC-2i-rac

```
Data File E:\DATA\YJX\YJX-1-105\YJX-1-105-2 2018-04-02 10-19-04\021-0601.D
Sample Name: YJX-1-105-2-OJ

    ======================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :   6
    Acq. Instrument : 1260HPLC-DAD                   Location : Vial 21
    Injection Date  : 4/2/2018 1:03:36 PM                Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-105\YJX-1-105-2 2018-04-02 10-19-04\DAD-OJ(1-6)-95-5-
                      1ML-3UL-60MIN.M
    Last changed    : 4/2/2018 11:35:29 AM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-105\YJX-1-105-2 2018-04-02 10-19-04\DAD-OJ(1-6)-95-5-
                      1ML-3UL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:50:45 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

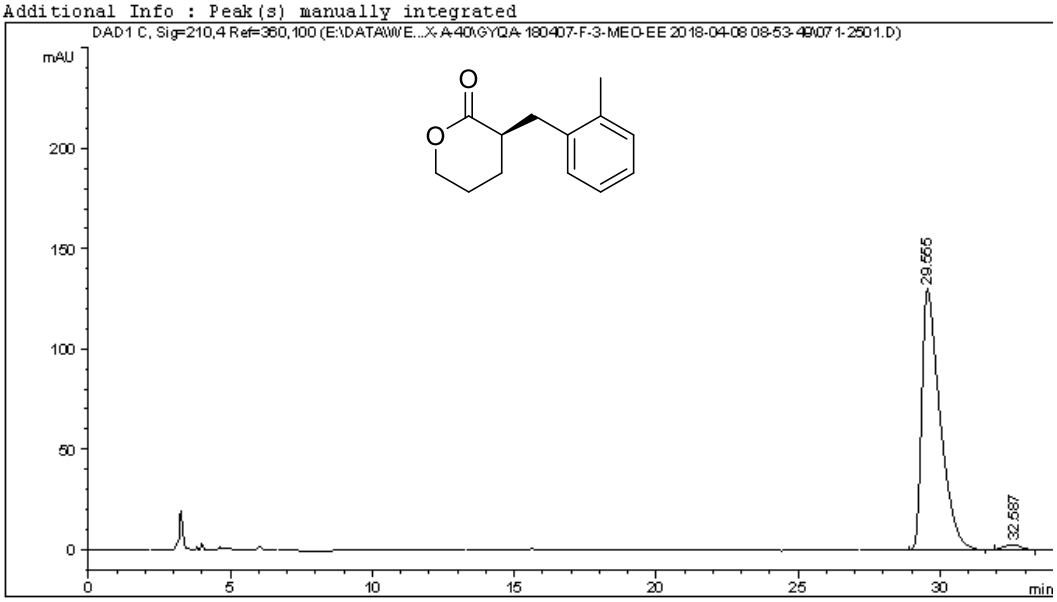



```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  30.425 BB    0.6969 9326.05957  187.95088  50.2233
       2  33.163 BB    0.7142 9243.12109  183.94333  49.7767

    Totals :                  1.85692e4   371.89421


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

1260HPLC-DAD 5/4/2018 4:50:51 PM SYSTEM                       Page 1 of 1
```

HPLC-2i-cat

Data File E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\071-2501.D
Sample Name: YJX-1-107-4

```
    ==================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :  25
    Acq. Instrument : 1260HPLC-DAD                   Location : Vial 71
    Injection Date  : 4/9/2018 2:44:42 AM                 Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\DAD-0J(1-
                      6)-95-5-1ML-3UL-60MIN.M
    Last changed    : 4/8/2018 4:02:29 PM by SYSTEM
    Analysis Method : E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\DAD-0J(1-
                      6)-95-5-1ML-3UL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:54:33 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

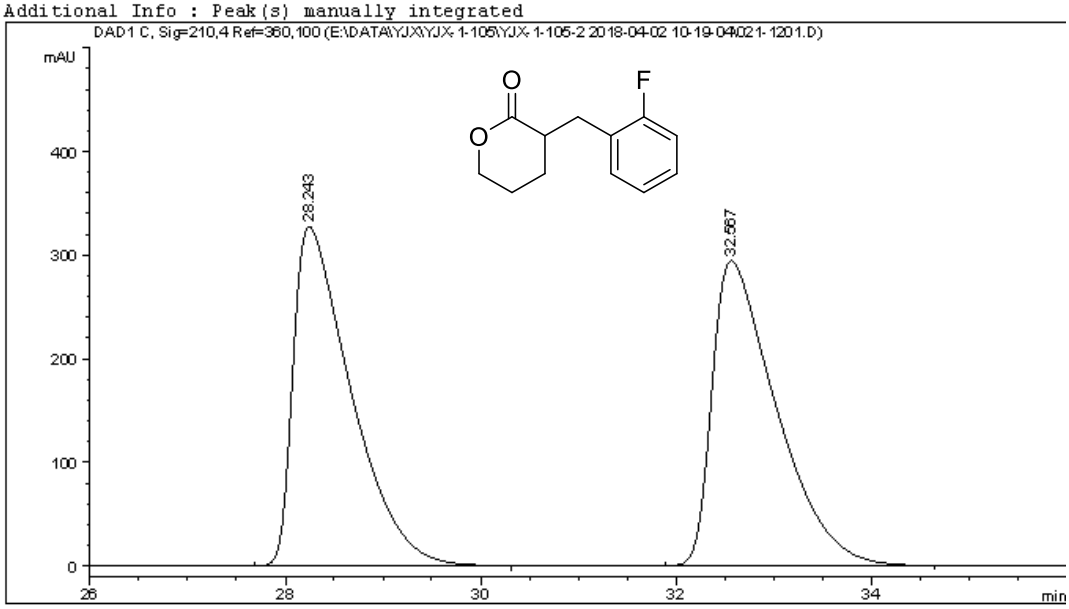



```
    ==================================================================
                            Area Percent Report
    ==================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  29.555 BB    0.6260 5788.57617  129.87875  98.2866
       2  32.587 BB    0.4821  100.91095    2.50448   1.7134

    Totals :                  5889.48712  132.38323


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

1260HPLC-DAD 5/4/2018 4:55:34 PM SYSTEM                    Page 1 of 1
```

HPLC-2j-rac

Data File E:\DATA\YJX\YJX-1-105\YJX-1-105-2 2018-04-02 10-19-04\021-1201.D
Sample Name: YJX-1-105-3

```
    ====================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  12
    Acq. Instrument : 1260HPLC-DAD                     Location : Vial 21
    Injection Date  : 4/2/2018 4:04:49 PM                  Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-105\YJX-1-105-2 2018-04-02 10-19-04\DAD-0J(1-6)-95-5-
                      1ML-3UL-60MIN.M
    Last changed    : 4/2/2018 11:35:29 AM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-105\YJX-1-105-2 2018-04-02 10-19-04\DAD-0J(1-6)-95-5-
                      1ML-3UL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:58:48 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

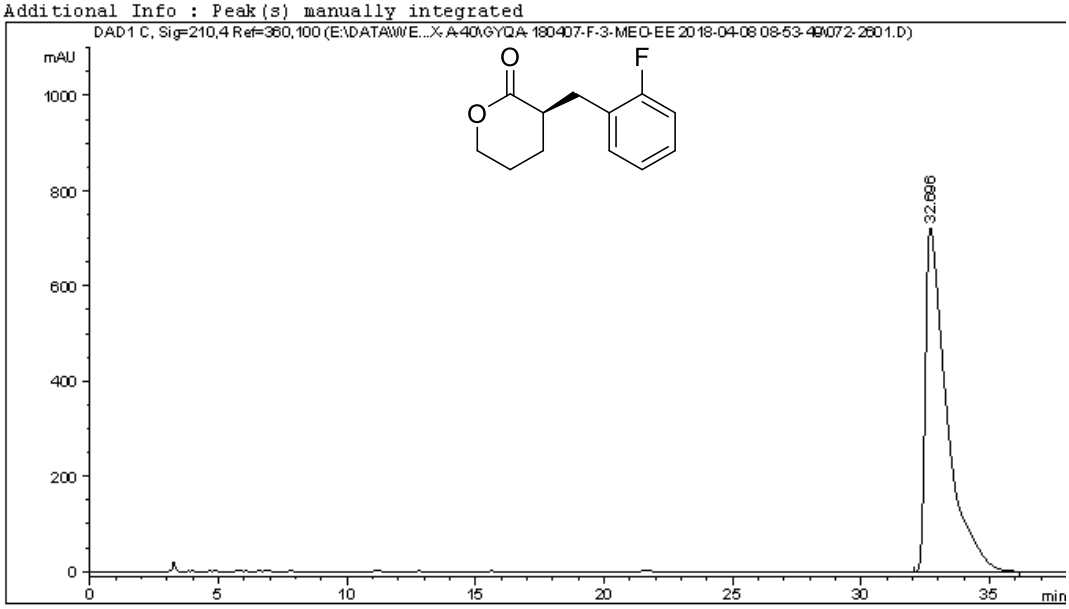



```
    ====================================================================
                           Area Percent Report
    ====================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  28.243 BB    0.5875 1.34749e4   327.84149  50.0700
       2  32.567 BB    0.6489 1.34372e4   294.19751  49.9300

    Totals :                  2.69120e4   622.03900


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

HPLC-2j-cat

Data File E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\072-2601.D
Sample Name: YJX-1-107-5

```
    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  26
    Acq. Instrument : 1260HPLC-DAD                    Location : Vial 72
    Injection Date  : 4/9/2018 3:45:35 AM                 Inj :  1
                                                    Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\DAD-0J(1-
                      6)-95-5-1ML-3UL-60MIN.M
    Last changed    : 4/8/2018 4:02:29 PM by SYSTEM
    Analysis Method : E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\DAD-0J(1-
                      6)-95-5-1ML-3UL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 5:04:58 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

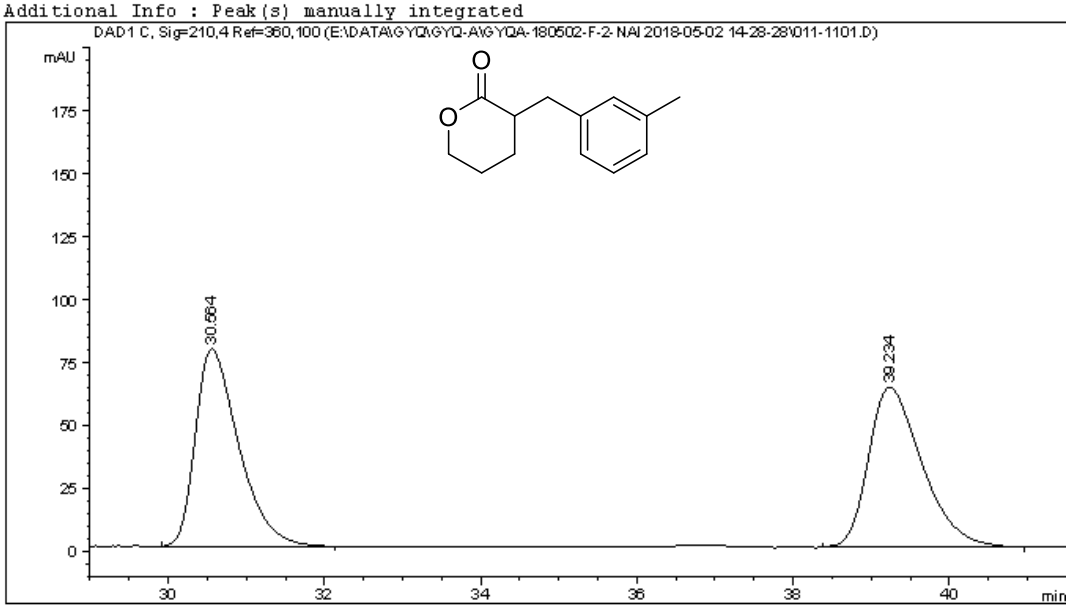



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  32.696 BB    0.7750 4.17057e4   722.93329 100.0000

    Totals :                  4.17057e4   722.93329

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

HPLC-2k-rac

Data File E:\DATA\GYQ\GYQ-A\GYQA-180502-F-2-NAI 2018-05-02 14-28-28\011-1101.D
Sample Name: YJX-1-124-4

```
    ==================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :  11
    Acq. Instrument : 1260HPLC-DAD                   Location : Vial 11
    Injection Date  : 5/2/2018 8:10:06 PM                 Inj :  1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\GYQ\GYQ-A\GYQA-180502-F-2-NAI 2018-05-02 14-28-28\DAD-0J(1-6)-95
                      -5-1ML-3UL-60MIN.M
    Last changed    : 5/2/2018 3:52:26 PM by SYSTEM
    Analysis Method : E:\DATA\GYQ\GYQ-A\GYQA-180502-F-2-NAI 2018-05-02 14-28-28\DAD-0J(1-6)-95
                      -5-1ML-3UL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:40:45 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

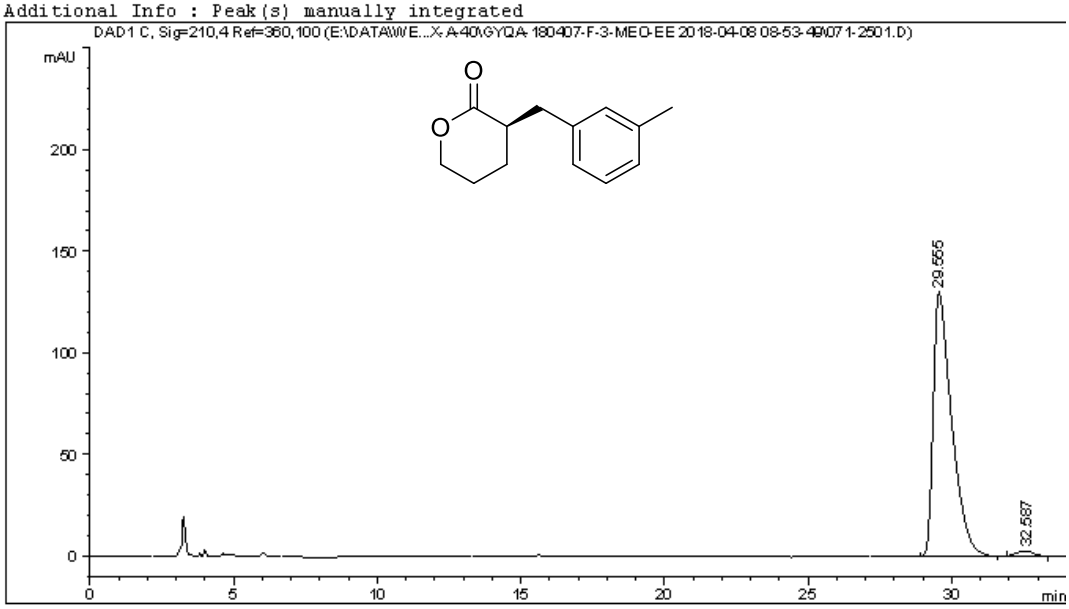



```
    ==================================================================
                            Area Percent Report
    ==================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  30.564 BB    0.5664 3027.59424   78.42869  49.9931
       2  39.234 BB    0.6603 3028.42505   63.51556  50.0069

    Totals :                  6056.01929  141.94425


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

HPLC-2k-cat

Data File E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\071-2501.D
Sample Name: YJX-1-107-4

```
    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  25
    Acq. Instrument : 1260HPLC-DAD                    Location : Vial 71
    Injection Date  : 4/9/2018 2:44:42 AM                  Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\DAD-0J(1-
                      6)-95-5-1ML-3UL-60MIN.M
    Last changed    : 4/8/2018 4:02:29 PM by SYSTEM
    Analysis Method : E:\DATA\WEF\XX-A-40\GYQA-180407-F-3-MEO-EE 2018-04-08 08-53-49\DAD-0J(1-
                      6)-95-5-1ML-3UL-60MIN.M (Sequence Method)
    Last changed    : 5/4/2018 4:54:33 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

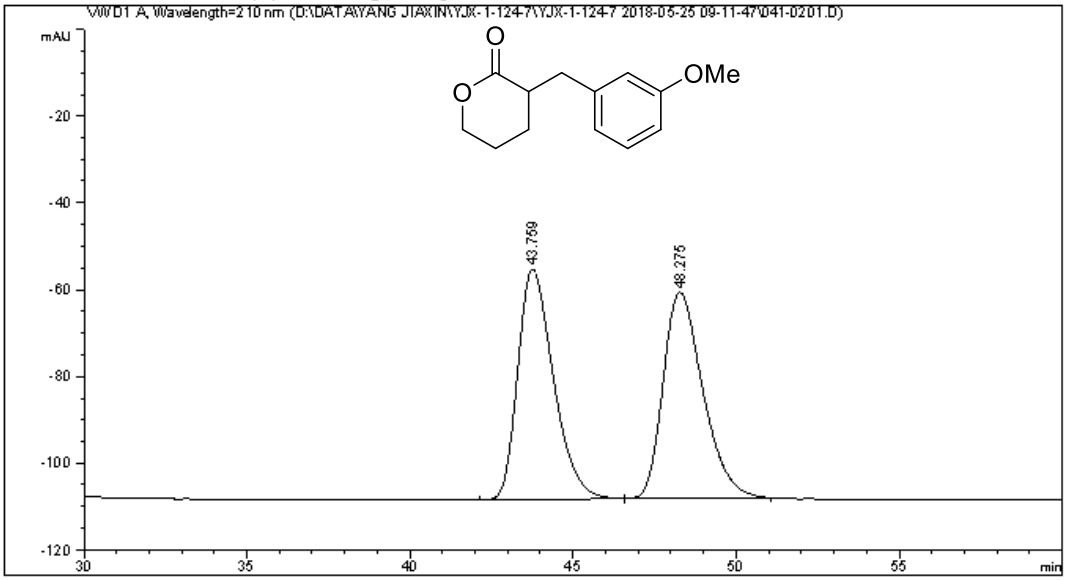



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


    Signal 1: DAD1 C, Sig=210,4 Ref=360,100

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  29.555 BB    0.6260 5788.57617  129.87875  98.2866
       2  32.587 BB    0.4821  100.91095    2.50448   1.7134

    Totals :                  5889.48712  132.38323


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

HPLC-2l-rac

Data File D:\DATA\YANG JIAXIN\YJX-1-124-7\YJX-1-124-7 2018-05-25 09-11-47\041-0201.D
Sample Name: YJX-7-R

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   2
    Acq. Instrument : Instrument 1                  Location : Vial 41
    Injection Date  : 5/25/2018 9:28:34 AM               Inj :   1
                                                  Inj Volume : 5.000 µl
    Acq. Method     : D:\DATA\YANG JIAXIN\YJX-1-124-7\YJX-1-124-7 2018-05-25 09-11-47\VWD-AS(1-6)
                      -90-10-1.0ML-5UL-210NM-60MIN.M
    Last changed    : 5/25/2018 9:09:09 AM
    Analysis Method : D:\METHOD\YANG JIAXIN\VWD-AD(1-2)-97-3-1ML-1UL-210NM-15MIN.M
    Last changed    : 5/25/2018 3:35:07 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

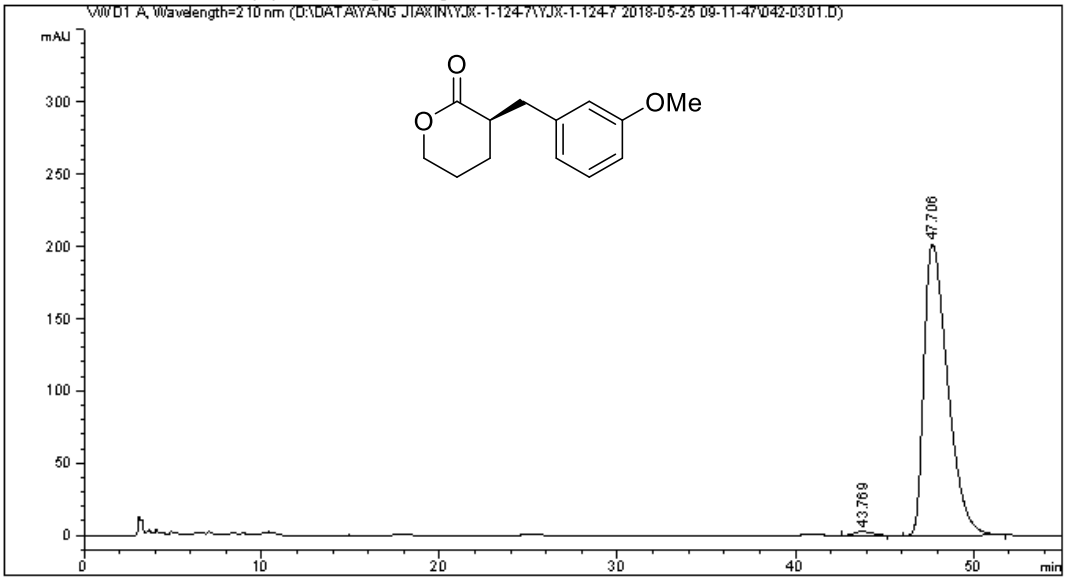



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  43.759 BB    1.1632 4027.68628   53.14627  50.0237
       2  48.275 BB    1.2755 4023.86914   47.48991  49.9763

    Totals :                  8051.55542  100.63618
```

HPLC-2l-cat

Data File D:\DATA\YANG JIAXIN\YJX-1-124-7\YJX-1-124-7 2018-05-25 09-11-47\042-0301.D
Sample Name: YJX-7

```
======================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 1                  Location : Vial 42
Injection Date  : 5/25/2018 10:29:23 AM              Inj :   1
                                               Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\YANG JIAXIN\YJX-1-124-7\YJX-1-124-7 2018-05-25 09-11-47\VWD-AS(1-6)
                  -90-10-1.0ML-5UL-210NM-60MIN.M
Last changed    : 5/25/2018 9:09:09 AM
Analysis Method : D:\METHOD\YANG JIAXIN\VWD-AD(1-2)-97-3-1ML-1UL-210NM-15MIN.M
Last changed    : 5/25/2018 3:36:40 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```

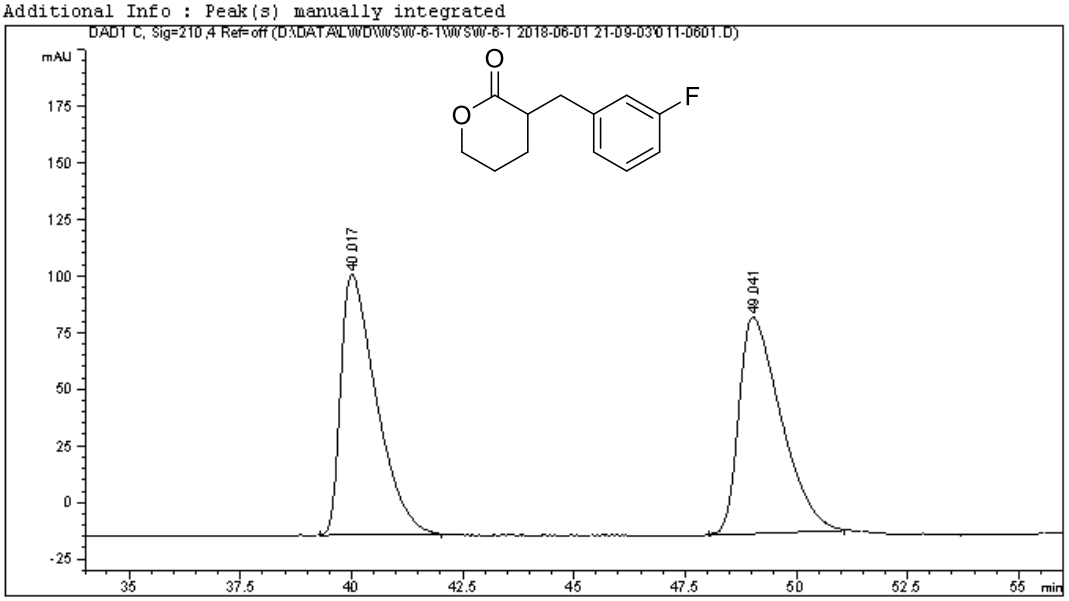



```
======================================================================
                        Area Percent Report
======================================================================

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


Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  43.769 BB    0.8248  185.21957    2.78911   0.9827
   2  47.706 BB    1.4323 1.86626e4   201.17616  99.0173

Totals :                  1.88478e4   203.96527
```

HPLC-2m-rac

Data File D:\DATA\LWD\WSW-6-1\WSW-6-1 2018-06-01 21-09-03\011-0601.D
Sample Name: YJX-1-5-R

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :   6
    Acq. Instrument : Instrument 2                    Location : Vial 11
    Injection Date  : 6/2/2018 2:00:50 AM                 Inj :   1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\WSW-6-1\WSW-6-1 2018-06-01 21-09-03\DAD-0J(1-6)-95-5-1ML-3UL-
                      ALL-60MIN.M
    Last changed    : 5/24/2018 8:19:20 PM
    Analysis Method : D:\METHOD\WEN SONGWEI\DAD-0J(1-6)-100-0-0.3ML-10UL-ALL-60MIN.M
    Last changed    : 6/2/2018 9:12:31 AM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

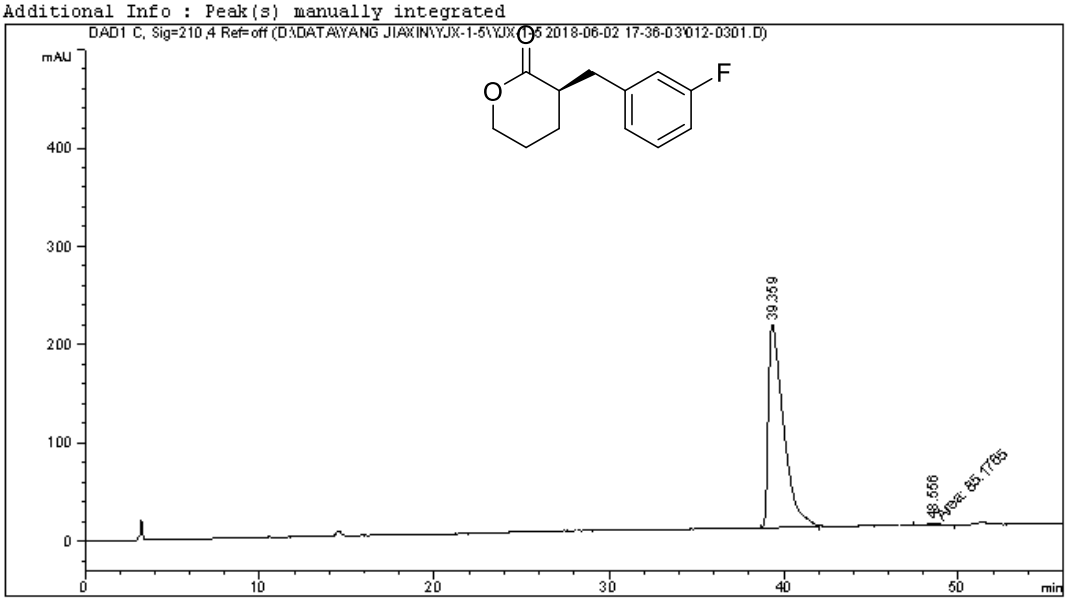



```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  40.017 BB    0.6699 6393.43799  114.77940  50.3187
       2  49.041 BB    0.7988 6312.45117   95.54179  49.6813

    Totals :                  1.27059e4   210.32119
```

HPLC-2m-cat

Data File D:\DATA\YANG JIAXIN\YJX-1-5\YJX-1-5 2018-06-02 17-36-03\012-0301.D
Sample Name: YJX-1-5

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   3
    Acq. Instrument : Instrument 2                  Location : Vial 12
    Injection Date  : 6/2/2018 6:14:09 PM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\YANG JIAXIN\YJX-1-5\YJX-1-5 2018-06-02 17-36-03\DAD-0J(1-6)-95-5-
                      1ML-3UL-ALL-60MIN.M
    Last changed    : 6/2/2018 7:08:17 PM
                      (modified after loading)
    Analysis Method : D:\METHOD\YANG JIAXIN\DAD-0J(1-6)-80-20-1ML-1UL-ALL-20MIN.M
    Last changed    : 6/2/2018 7:12:35 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

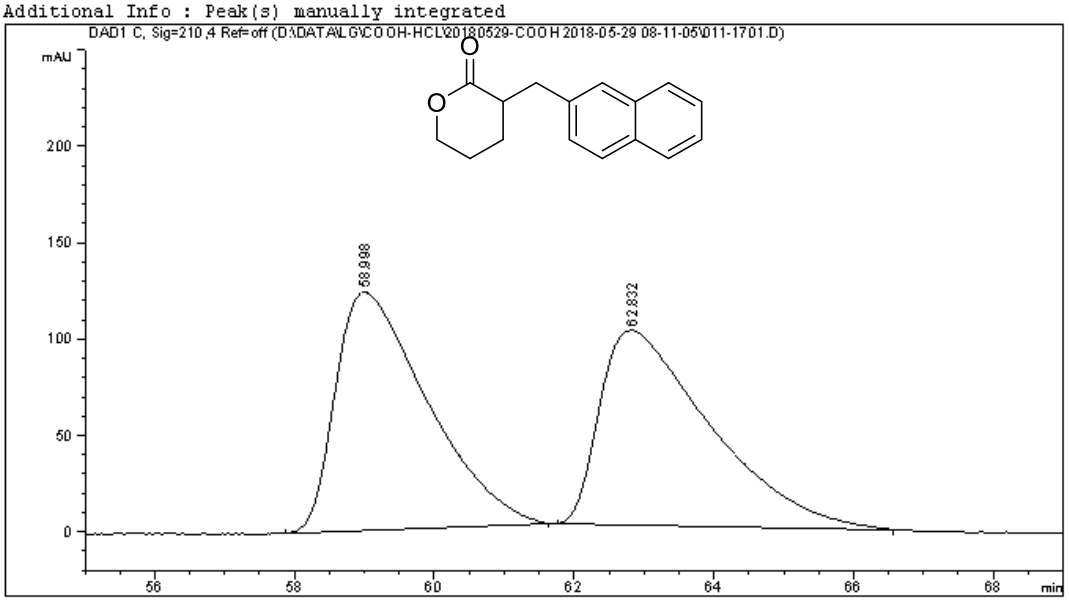



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  39.359 VB    0.8041 1.24957e4   206.44934  99.3230
       2  48.556 MM    0.8035   85.17653    1.76669   0.6770

    Totals :                  1.25809e4   208.21603
```

HPLC-2n-rac

Data File D:\DATA\LG\COOH-HCL\20180529-COOH 2018-05-29 08-11-05\011-1701.D
Sample Name: YJX-1-17-R

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  17
    Acq. Instrument : Instrument 2                    Location : Vial 11
    Injection Date  : 5/29/2018 5:00:27 PM                 Inj :  1
                                                     Inj Volume : 5.000 µl
    Acq. Method     : D:\DATA\LG\COOH-HCL\20180529-COOH 2018-05-29 08-11-05\DAD-0J(1-6)-90-10-1ML
                      -5UL-ALL-60MIN.M
    Last changed    : 5/29/2018 6:05:02 PM
                      (modified after loading)
    Analysis Method : D:\METHOD\YANG JIAXIN\DAD-0D(1-2)-95-5-1ML-5UL-ALL-15MIN.M
    Last changed    : 5/30/2018 9:42:20 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

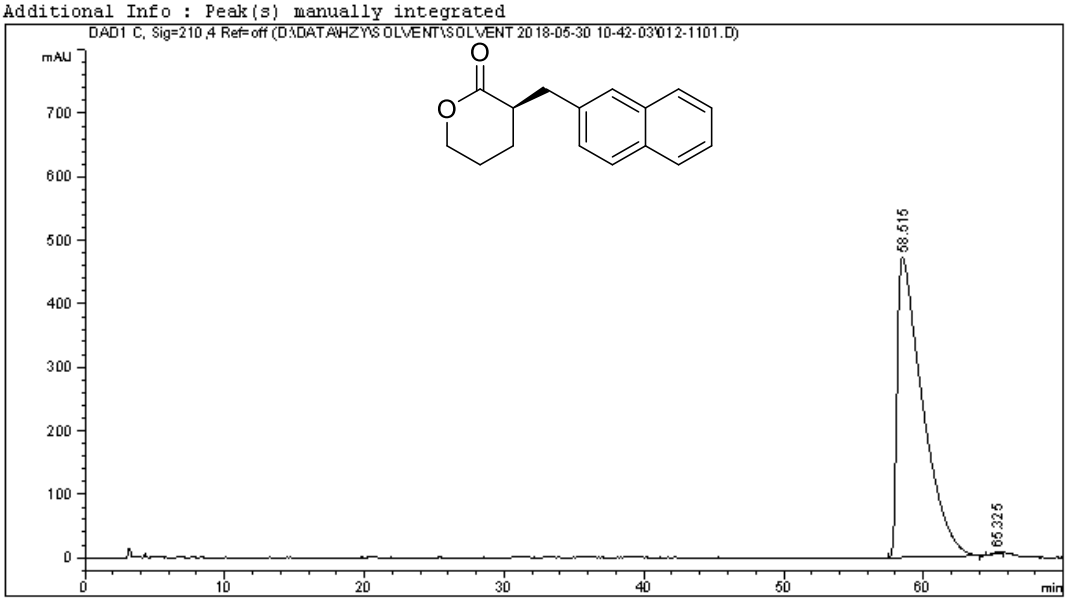



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  58.998 BB    1.1005 1.12822e4   123.65326  50.4459
       2  62.832 BB    1.2976 1.10828e4   101.20373  49.5541

    Totals :                  2.23650e4   224.85699
```

HPLC-2n-cat

Data File D:\DATA\HZY\SOLVENT\SOLVENT 2018-05-30 10-42-03\012-1101.D
Sample Name: YJX-1-17

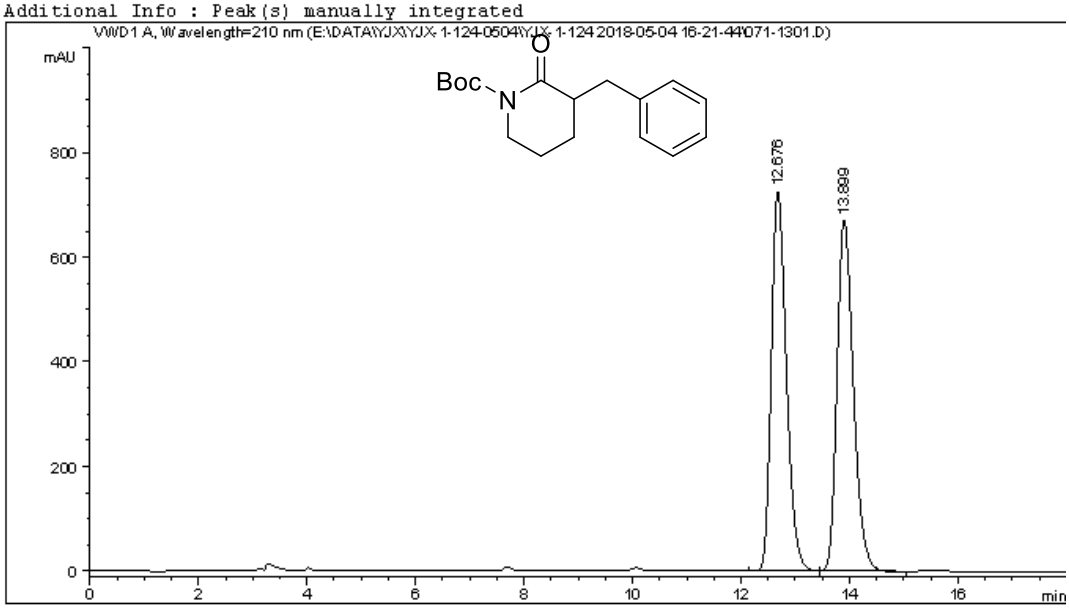
```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  11
    Acq. Instrument : Instrument 2                    Location : Vial 12
    Injection Date  : 5/30/2018 4:17:47 PM                 Inj :   1
                                                     Inj Volume : 5.000 µl
    Acq. Method     : D:\DATA\HZY\SOLVENT\SOLVENT 2018-05-30 10-42-03\DAD-0J(1-6)-90-10-1ML-5UL-
                      ALL-60MIN.M
    Last changed    : 5/30/2018 5:04:17 PM
                      (modified after loading)
    Analysis Method : D:\METHOD\YANG JIAXIN\DAD-0D(1-2)-95-5-1ML-5UL-ALL-15MIN.M
    Last changed    : 5/30/2018 9:39:20 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  58.515 BB    1.4789 5.94327e4   472.69180  99.8363
       2  65.325 BB    0.5117   97.42839    2.26560   0.1637

    Totals :                  5.95301e4   474.95740
```

HPLC-2o-rac

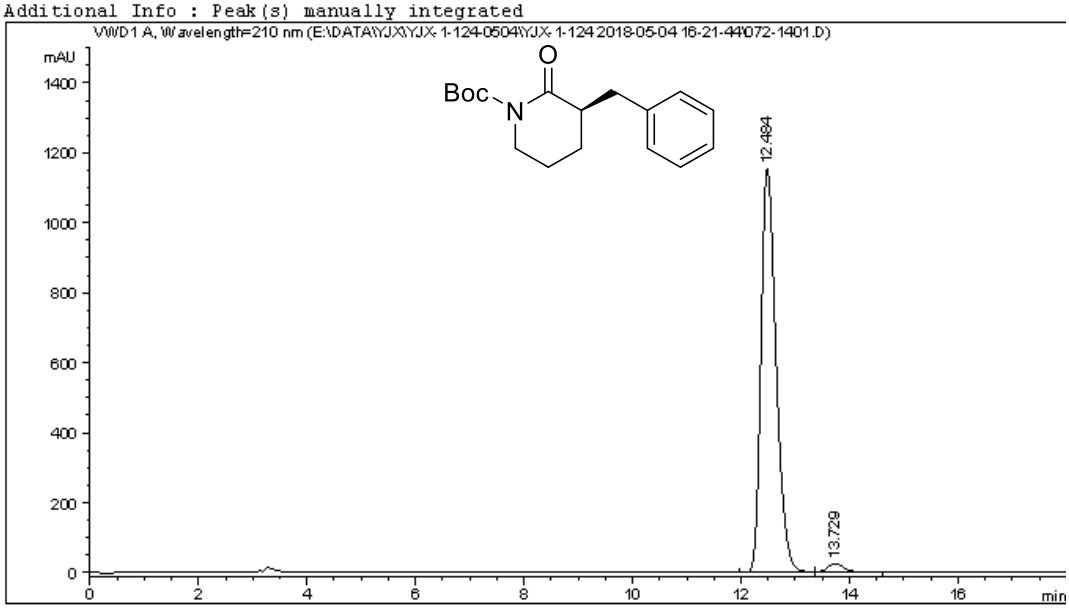
```
Data File E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\071-1301.D
Sample Name: YJX-1-124-8-R2

    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  13
    Acq. Instrument : 1260HPLC-VWD                    Location : Vial 71
    Injection Date  : 5/5/2018 12:04:15 AM                 Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/4/2018 4:21:45 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/5/2018 9:41:31 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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.676 BB    0.2957 1.39866e4   726.12280  49.9505
       2  13.899 BB    0.3207 1.40143e4   670.91998  50.0495

    Totals :                  2.80009e4  1397.04279


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

1260HPLC-VWD 5/5/2018 9:41:36 AM SYSTEM                    Page 1 of 1
```

HPLC-2o-cat

```
Data File E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\072-1401.D
Sample Name: YJX-1-124-8

    ======================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  14
    Acq. Instrument : 1260HPLC-VWD                    Location : Vial 72
    Injection Date  : 5/5/2018 1:05:04 AM                 Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M
    Last changed    : 5/4/2018 4:21:45 PM by SYSTEM
    Analysis Method : E:\DATA\YJX\YJX-1-124-0504\YJX-1-124 2018-05-04 16-21-44\VWD-AD(1-2)-97-
                      3-1ML-3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/5/2018 9:44:12 AM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

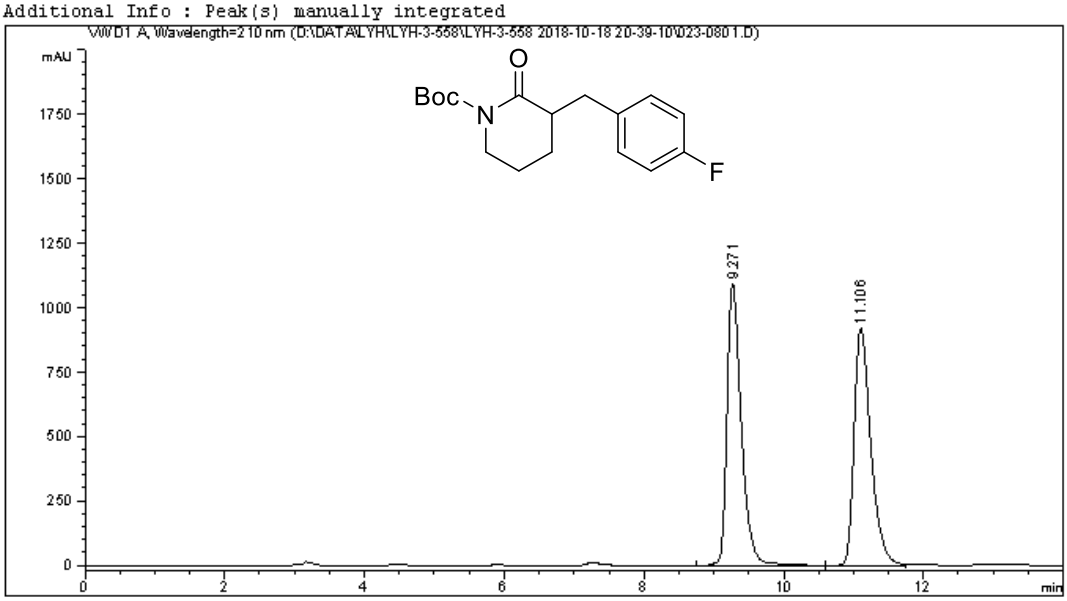



```
    ======================================================================
                            Area Percent Report
    ======================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.484 VV    0.2974 2.22944e4  1153.93469  97.4783
       2  13.729 VB    0.3319  576.73810   25.98991   2.5217

    Totals :                  2.2871le4  1179.92460


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

1260HPLC-VWD 5/5/2018 9:44:17 AM SYSTEM                        Page 1 of 1
```

HPLC-2p-rac

Data File D:\DATA\LYH\LYH-3-558\LYH-3-558 2018-10-18 20-39-10\023-0801.D
Sample Name: YJX-1-207

```
    ======================================================================
    Acq. Operator   :                               Seq. Line :   8
    Acq. Instrument : Instrument 1                   Location : Vial 23
    Injection Date  : 10/19/2018 2:20:44 AM              Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LYH\LYH-3-558\LYH-3-558 2018-10-18 20-39-10\VWD-AD(1-2)-95-5-1ML-
                      3UL-210NM-40MIN.M
    Last changed    : 6/20/2018 10:03:06 PM
    Analysis Method : D:\METHOD\CZY\DAD-OD(1-2)-98-2-1ML-3UL-ALL-70MIN.M
    Last changed    : 2/19/2019 8:56:19 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

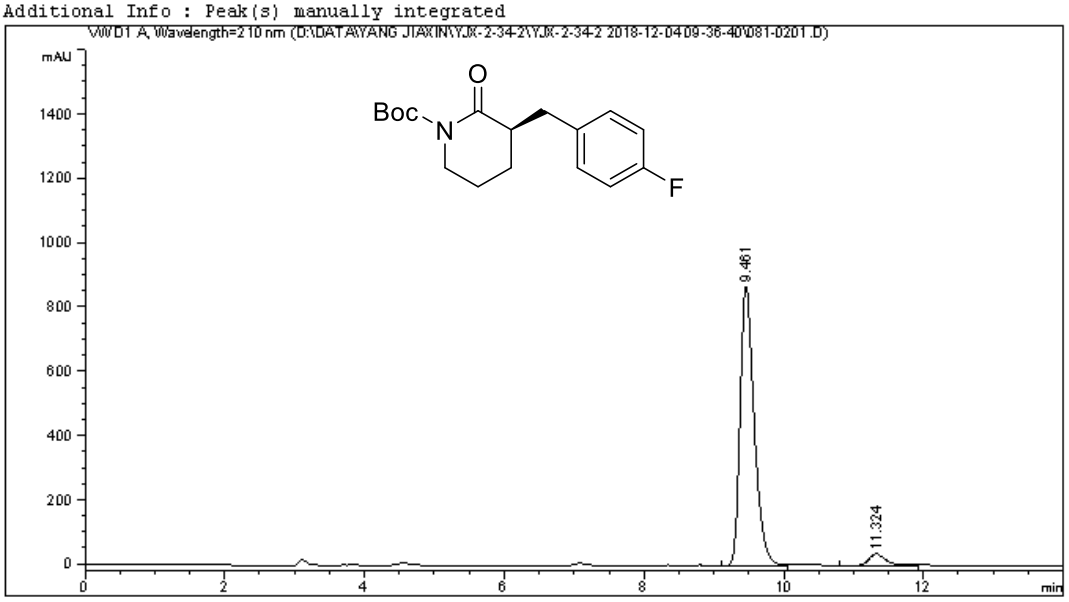



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   9.271 BB    0.2138 1.54250e4  1091.92212  50.3644
       2  11.106 BV    0.2509 1.52018e4   919.54590  49.6356

    Totals :                  3.06269e4  2011.46802
```

HPLC-2p-cat

Data File D:\DATA\YANG JIAXIN\YJX-2-34-2\YJX-2-34-2 2018-12-04 09-36-40\081-0201.D
Sample Name: YJX-2-34-2

```
==================================================================
Acq. Operator   :                              Seq. Line :   2
Acq. Instrument : Instrument 1                  Location : Vial 81
Injection Date  : 12/4/2018 9:54:40 AM               Inj :   1
                                              Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YANG JIAXIN\YJX-2-34-2\YJX-2-34-2 2018-12-04 09-36-40\VWD-AD(1-2)-
                  95-5-1ML-3UL-210NM-15MIN.M
Last changed    : 11/9/2018 9:03:20 PM
Analysis Method : D:\METHOD\CZY\DAD-OD(1-2)-98-2-1ML-3UL-ALL-70MIN.M
Last changed    : 2/19/2019 8:38:27 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```

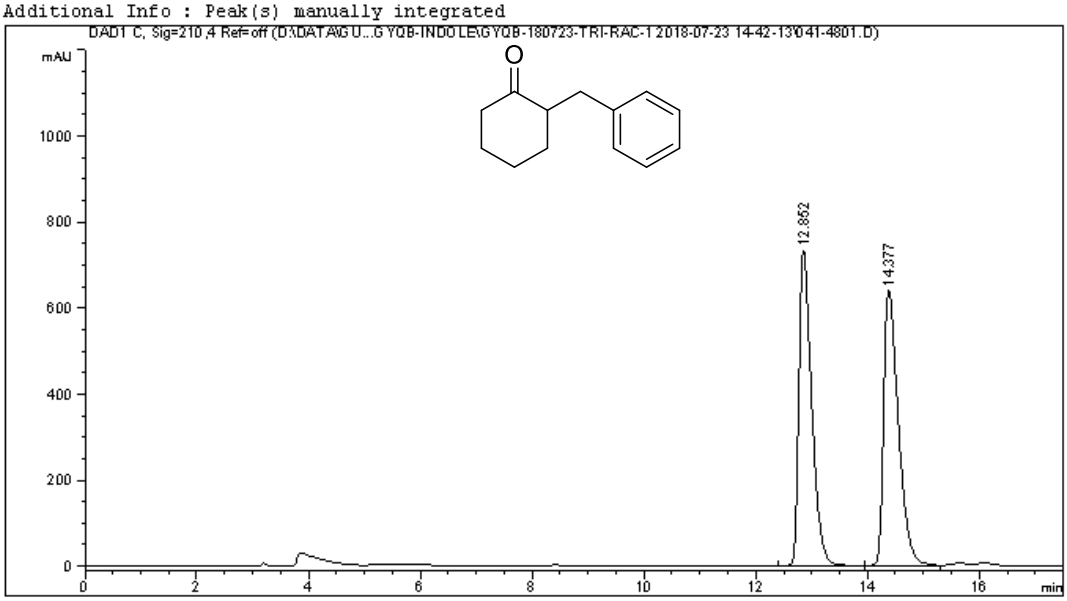



```
==================================================================
                        Area Percent Report
==================================================================

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


Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1   9.461 BV    0.2135 1.21799e4   869.22742  95.2854
   2  11.324 BV    0.2544  602.64343   35.61063   4.7146

Totals :                  1.27826e4   904.83804
```

HPLC-2q-rac

Data File D:\DATA\GU...NG\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13\041-4801.D
Sample Name: YJX-1-167-1-Rac

```
======================================================================
Acq. Operator   :                                Seq. Line :  48
Acq. Instrument : Instrument 2                    Location : Vial 41
Injection Date  : 7/24/2018 8:58:33 PM                 Inj :  1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\GUAN YUQING\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13
                  \DAD-OJ(1-6)-99-1-1ML-3UL-ALL-25MIN.M
Last changed    : 6/26/2018 9:40:46 PM
Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
Last changed    : 8/19/2018 4:35:36 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```

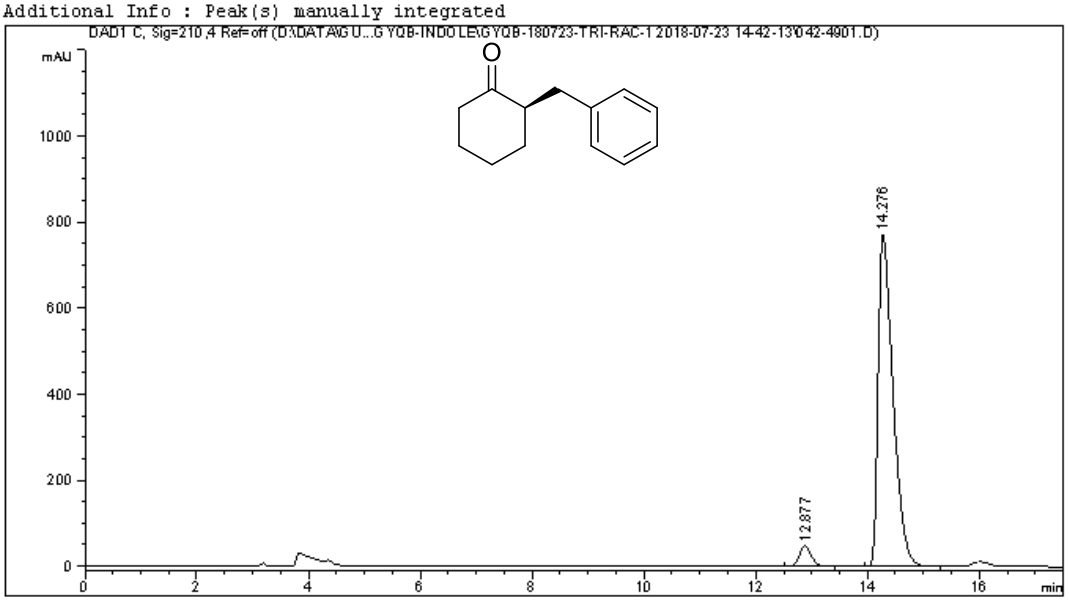



```
======================================================================
                        Area Percent Report
======================================================================

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


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

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  12.852 BB    0.2405 1.15597e4   731.00653  49.8946
   2  14.377 BB    0.2782 1.16085e4   638.26892  50.1054

Totals :                 2.31682e4  1369.27545
```

HPLC-2q-cat

Data File D:\DATA\GU...NG\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13\042-4901.D
Sample Name: YJX-1-167-1

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  49
    Acq. Instrument : Instrument 2                    Location : Vial 42
    Injection Date  : 7/24/2018 9:24:30 PM                 Inj :  1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\GUAN YUQING\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13
                      \DAD-OJ(1-6)-99-1-1ML-3UL-ALL-25MIN.M
    Last changed    : 6/26/2018 9:40:46 PM
    Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
    Last changed    : 8/19/2018 4:35:36 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

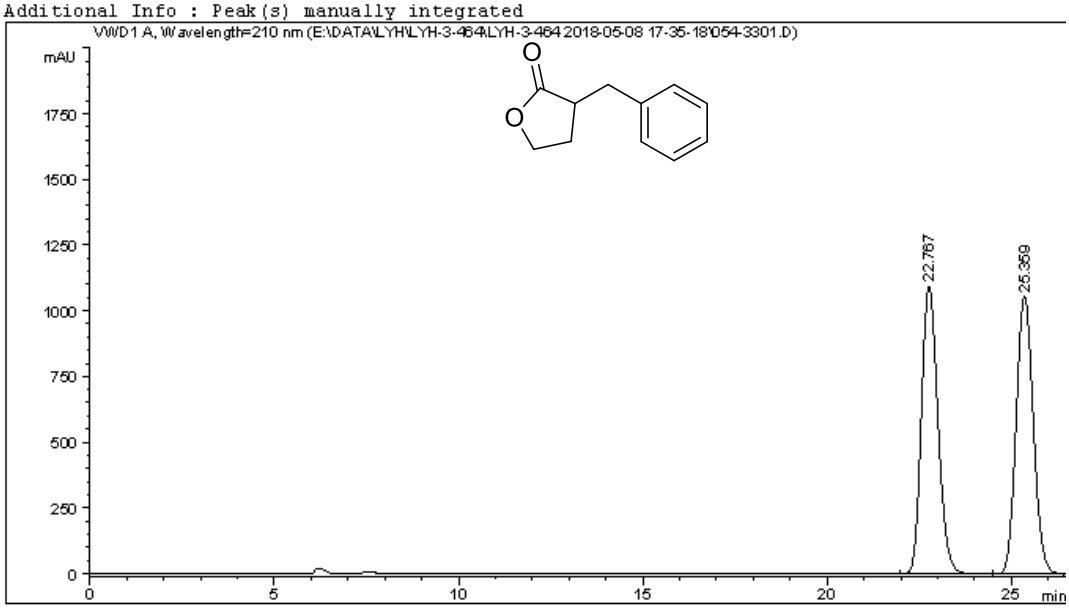



```
    ======================================================================
                            Area Percent Report
    ======================================================================

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.877 BB    0.2210  700.63464   48.35484   4.6716
       2  14.276 BB    0.2823 1.42971e4   771.15277  95.3284

    Totals :                  1.49977e4   819.50761
```

HPLC-2r-rac

Data File E:\DATA\LYH\LYH-3-464\LYH-3-464 2018-05-08 17-35-18\054-3301.D
Sample Name: YJX-1-124-19-R2

```
    ====================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  33
    Acq. Instrument : 1260HPLC-VWD                     Location : Vial 54
    Injection Date  : 5/9/2018 10:38:51 AM                 Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\LYH\LYH-3-464\LYH-3-464 2018-05-08 17-35-18\VWD-AD(1-2)-95-0.5ML
                      -3UL-210NM-60MIN.M
    Last changed    : 5/8/2018 10:25:53 PM by SYSTEM
    Analysis Method : E:\DATA\LYH\LYH-3-464\LYH-3-464 2018-05-08 17-35-18\VWD-AD(1-2)-95-0.5ML
                      -3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/9/2018 2:58:06 PM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```

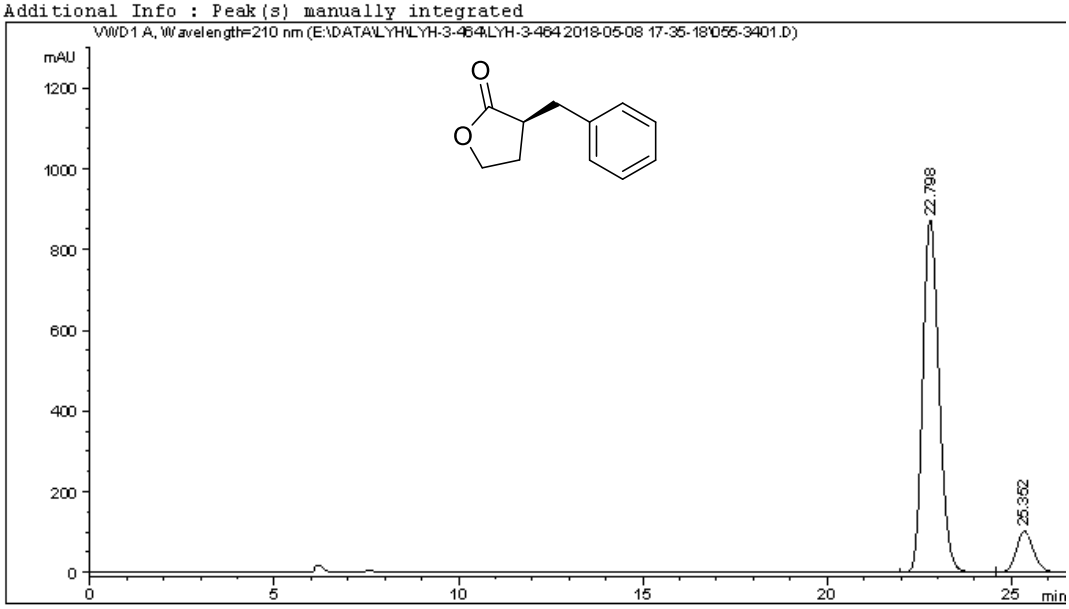



```
    ====================================================================
                           Area Percent Report
    ====================================================================

    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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  22.767 BB    0.4843 3.39700e4  1093.96716  49.9255
       2  25.359 BV    0.5060 3.40713e4  1054.36829  50.0745

    Totals :                  6.80413e4  2148.33545


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

HPLC-2r-cat

Data File E:\DATA\LYH\LYH-3-464\LYH-3-464 2018-05-08 17-35-18\055-3401.D
Sample Name: YJX-1-124-19

```
    ====================================================================
    Acq. Operator   : SYSTEM                          Seq. Line :  34
    Acq. Instrument : 1260HPLC-VWD                     Location : Vial 55
    Injection Date  : 5/9/2018 11:39:48 AM                 Inj :  1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\LYH\LYH-3-464\LYH-3-464 2018-05-08 17-35-18\VWD-AD(1-2)-95-0.5ML
                      -3UL-210NM-60MIN.M
    Last changed    : 5/8/2018 10:25:53 PM by SYSTEM
    Analysis Method : E:\DATA\LYH\LYH-3-464\LYH-3-464 2018-05-08 17-35-18\VWD-AD(1-2)-95-0.5ML
                      -3UL-210NM-60MIN.M (Sequence Method)
    Last changed    : 5/9/2018 3:01:14 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 Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  22.798 BB    0.4757 2.66837e4   872.87067  89.2262
       2  25.352 BB    0.4920 3221.97681  101.58834  10.7738

    Totals :                  2.99057e4   974.45901

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

1260HPLC-VWD 5/9/2018 3:01:32 PM SYSTEM                    Page 1 of 1
```