Supporting Information

Efficient Synthesis of Chiral β-Hydroxy Sulfones via Iridium-Catalyzed Hydrogenation

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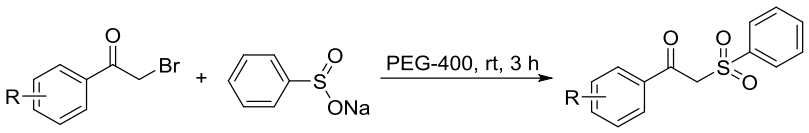
1. General remarks

All reactions and manipulations which are sensitive to moisture or air were performed in an argon-filled glovebox or using standard Schlenk techniques. Hydrogen gas (99.999%) was purchased from Shanghai Regulator Factory Co., Ltd. Anhydrous hexane, THF, 1,4-dioxane and toluene was distilled from sodium benzophenone ketyl. Anhydrous *i*-PrOH, DCE, $CHCl_3$, CH_2Cl_2 were freshly distilled from calcium hydride. Anhydrous MeOH and EtOH were freshly distilled from Mg. Solvents were transferred by syringe. $[Ir(COD)Cl]_2$ was prepared according to the literature. ^1H and ^{13}C spectra were recorded with a Bruker ADVANCE III (400 MHz) spectrometer with $CDCl_3$ as the solvent and tetramethylsilane (TMS) as the internal standard. Chemical shifts are reported in parts per million (ppm, δ scale) downfield from TMS at 0.00 ppm and referenced to the $CDCl_3$ at 7.26 ppm (for ^1H NMR) or 77.00 ppm (for ^{13}C NMR). Data are reported as: multiplicity (s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet), coupling constant in hertz (Hz) and signal area integration in natural numbers.^{13}C NMR analyses were run with decoupling. Optical rotations $[\alpha]_D$ were determined using a PERKIN ELMER polarimeter 343 instrument. HPLC analyses were performed using Daicel chiral column on an Agilent 1260 Series HPLC instrument.

2. General procedure for synthesis of β-keto sulfones

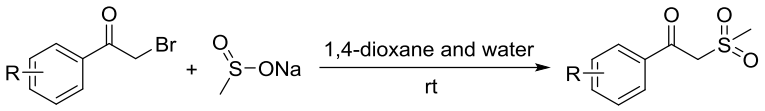
Method A:



In a 150 mL flask, bromoacetophenone (3.0 mmol) and sodium phenylsulfite (3.3 mmol) were added to the flask, and then 30 mL polyethylene glycol 400 was poured into the flask and stirred for 3 h at room temperature. The reaction system was extracted with ethyl acetate three times, then washed with water to remove polyethylene glycol three times, and then dried with anhydrous sodium sulfate. Then the reaction mixture was concentrated under reduced pressure, and the resulting residue was separated by column chromatography (petroleum ether:EtOAc = 6:1) to give the desired products.

The product can be further purified by recrystallization from dichloromethane.

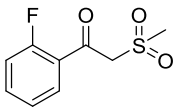
Method B:



Bromoacetophenone (3.0 mmol) was added to a 150 mL flask, and then 20 mL 1,4-dioxane was added to dissolve it. Then 20 mL water solution of sodium methylene sulfite was added to the flask, and the reaction system was reacted at room temperature for 3 h. 1,4-Dioxane in the reaction system was removed by rotary evaporator, then a small amount of water was added, and then dichloromethane was used to extract the reaction system. Then the reaction mixture was concentrated under reduced pressure, and the resulting residue was separated by column chromatography (petroleum ether:EtOAc = 6:1) to give the desired products. The product can be further purified by recrystallization from dichloromethane.

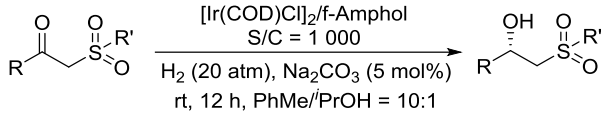
Substrates **1a**-**1j**, **1q**-**1r** were prepared through method A. [1] Substrates **1k**-**1p** were prepared through method B. [2] The absolute configuration of product **2a** was determined by comparison of analytical data (optical rotation) with the literature. [3-4] The absolute configuration of others were assigned by analogy.

1-(2-fluorophenyl)-2-(methylsulfonyl)ethanone **1l**



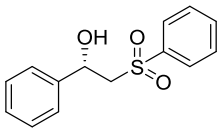
White solid, 476.3 mg, 73% yield; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 (td, *J* = 7.7, 1.9 Hz, 1H), 7.67-7.61 (m, 1H), 7.32-7.28 (m, 1H), 7.23-7.18 (m, 1H), 4.68 (s, 2H), 3.18 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 187.1 (d, *J* = 3.0 Hz), 162.1 (d, *J* = 254.0 Hz), 136.6 (d, *J* = 10.0 Hz), 131.1 (d, *J* = 1.0 Hz), 125.0 (d, *J* = 4.0 Hz), 124.2 (d, *J* = 11.0 Hz), 117.0 (d, *J* = 24.0 Hz), 64.9 (d, *J* = 9.0 Hz), 42.3.

3. General procedure for asymmetric hydrogenation



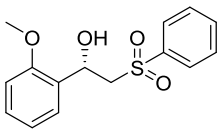
General procedure (at S/C = 1 000): To a 4.0 mL vial was added the catalyst precursor $[Ir(COD)Cl]_2$ (1.4 mg, 2.0×10^{-3} mmol), ligand **L4** (3.3 mg, 4.2×10^{-3} mmol) and anhydrous isopropanol (2.0 mL) in the argon-filled glovebox. The mixture was stirred for 2.0 h at 25 °C giving orange red solution. And then 0.2 mmol β-keto sulfones, Na_2CO_3 (1.06 mg, 0.01 mmol) were added into a 5 mL hydrogenation vessel. 1.0 mL anhydrous toluene was added as solvent and a solution of Ir/f-Amphol **L4** in anhydrous isopropanol (100 μL) was added via an injection port. Then the vessel was placed in an autoclave, closed it and moved it out from golvebox. The autoclave quickly purged with hydrogen gas for three times, then pressurized to 20 atm H_2. The reaction solution was stirred at room temperature until for 12 h, then released pressure carefully. The solution of reaction mixture was purified by a flash chromatography on a silical gel with ethyl acetate and the solvent was removed under reduced pressure. The product was analyzed by NMR spectroscopy for conversion and chiral HPLC for ee values.

(*S*)-1-phenyl-2-(phenylsulfonyl)ethan-1-ol **2a**



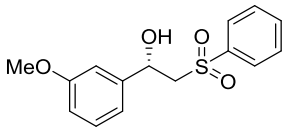
White solid, 99% yield, 51.9 mg; 95% ee; $[\alpha]_D^{25}$ = +27.2 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 °C, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 31.6 min, t_R (major) = 33.6 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99–7.96 (m, 2H), 7.72–7.68 (m, 1H), 7.63-7.58 (m, 2H), 7.35–7.28 (m, 5H), 5.30-5.27 (m, 1H), 3.68 (d, *J* = 2.1 Hz, 1H), 3.54–3.33 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 140.6, 139.1, 134.1, 129.5, 128.8, 128.4, 128.0, 125.6, 68.4, 63.9.

(*S*)-1-(2-methoxyphenyl)-2-(phenylsulfonyl)ethan-1-ol **2b**



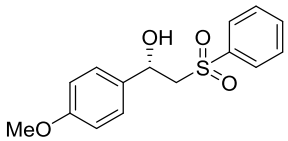
S/C = 500, 0.1 mmol substrate, Na_2CO_3 (10 mol%). White solid, 99% yield, 28.9 mg; >99% ee; $[\alpha]_D^{25}$ = +24.3 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chirapak AD-H column, 210 nm, 20 °C, *n*-hexane: *i*-PrOH = 90:10; flow 1.0 mL/min; t_R (minor) = 34.6 min, t_R (major) = 41.0 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97–7.95 (m, 2H), 7.70–7.66 (m, 1H), 7.61–7.57 (m, 2H), 7.49-7.46 (m, 1H), 7.25-7.21 (m, 1H), 6.99-6.95 (m, 1H), 6.76-6.73 (m, 1H), 5.35-5.32 (m, 1H), 3.70 (d, *J* = 4.0 Hz, 1H), 3.60 (s, 3H), 3.58–3.40 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 155.2, 139.2, 133.7, 129.2, 129.0, 128.3, 128.1, 126.4, 120.9, 110.1, 64.4, 61.9, 55.0.

(*S*)-1-(3-methoxyphenyl)-2-(phenylsulfonyl)ethan-1-ol **2c**



White solid, 98% yield, 57.3 mg; 96% ee; $[\alpha]_D^{25}$ = +17.4 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 °C, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 34.5 min, t_R (major) = 43.9 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98–7.95 (m, 2H), 7.72–7.68 (m, 1H), 7.62-7.58 (m, 2H), 7.23 (t, *J* = 7.9 Hz, 1H), 6.88–6.79 (m, 3H), 5.27-5.25 (m, 1H), 3.78 (s, 3H), 3.67 (d, *J* = 2.2 Hz, 1H), 3.53–3.32 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.9, 142.2, 139.1, 134.1, 129.8, 129.5, 128.0, 117.8, 113.9, 111.1, 68.3, 63.9, 55.3.

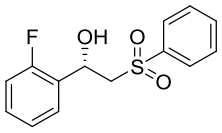
(*S*)-1-(4-methoxyphenyl)-2-(phenylsulfonyl)ethan-1-ol **2d**



White solid, 99% yield, 57.8 mg; 98% ee; $[\alpha]_D^{25}$ = +13.9 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel AD-H column, 210 nm, 20

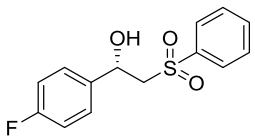
^{o}C, *n*-hexane: *i*-PrOH = 90:10; flow 0.5 mL/min; t_R (major) = 132.5 min, t_R (minor) = 141.1 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97–7.95 (m, 2H), 7.71–7.67 (m, 1H), 7.62-7.57 (m, 2H), 7.23–7.20 (m, 2H), 6.86–6.83 (m, 2H), 5.25-5.21 (m, 1H), 3.78 (s, 3H), 3.61 (d, *J* = 2.0 Hz, 1H), 3.54–3.30 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.5, 139.2, 134.1, 132.7, 129.4, 128.0, 127.0, 114.1, 68.1, 63.9, 55.3.

(*S*)-1-(2-fluorophenyl)-2-(phenylsulfonyl)ethan-1-ol **2e**



White solid, 97% yield, 54.4 mg; 90% ee; $[\alpha]_D^{25}$ = +6.6 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^{o}C, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 25.3 min, t_R (minor) = 31.4 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98–7.95 (m, 2H), 7.72–7.68 (m, 1H), 7.62–7.53 (m, 3H), 7.26–7.24 (m, 1H), 7.18-7.14 (m, 1H), 6.97-6.92 (m, 1H), 5.46-5.45 (m, 1H), 3.84 (d, *J* = 2.7 Hz, 1H), 3.50–3.48 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.0 (d, *J* = 244.0 Hz), 138.8, 134.1, 129.8 (d, *J* = 8.0 Hz), 129.4, 128.0, 127.5 (d, *J* = 12.0 Hz), 127.3 (d, *J* = 4.0 Hz), 124.6 (d, *J* = 4.0 Hz), 115.3 (d, *J* = 21.0 Hz), 63.0 (d, *J* = 3.0 Hz), 62.2 (d, *J* = 1.0 Hz).

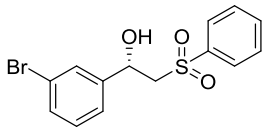
(*S*)-1-(4-fluorophenyl)-2-(phenylsulfonyl)ethan-1-ol **2f**



White solid, 98% yield, 54.9 mg; 95% ee; $[\alpha]_D^{25}$ = +24.8 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^{o}C, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 27.3 min, t_R (major) = 33.3 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98–7.95 (m, 2H), 7.73–7.68 (m, 1H), 7.63–7.58 (m, 2H), 7.30–7.26 (m, 2H), 7.03–6.99 (m, 2H), 5.29–5.27 (m, 1H), 3.76 (d, *J* = 2.1 Hz, 1H), 3.52–3.29 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 162.5 (d, *J* = 246.0 Hz),

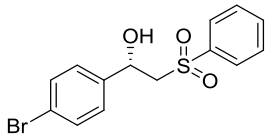
139.0, 136.4 (d, *J* = 4.0 Hz), 134.2, 129.5, 127.9, 127.4 (d, *J* = 8.0 Hz), 115.7 (d, *J* = 22.0 Hz), 67.8, 63.9.

(*S*)-1-(3-bromophenyl)-2-(phenylsulfonyl)ethan-1-ol **2g**



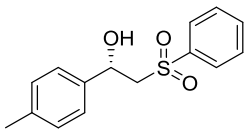
White solid, 96% yield, 65.5 mg; 94% ee; $[\alpha]_D^{25}$ = +21.5 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chirapak AD-H column, 210 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 90:10; flow 1.0 mL/min; t_R (minor) = 28.4 min, t_R (major) = 34.9 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.97–7.95 (m, 2H), 7.73–7.69 (m, 1H), 7.63–7.59 (m, 2H), 7.42–7.39 (m, 1H), 7.24–7.17 (m, 2H), 5.29-5.25 (m, 1H), 3.81 (d, *J* = 2.1 Hz, 1H), 3.50–3.31 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 142.8, 138.9, 134.3, 131.4, 130.3, 129.5, 128.8, 127.9, 124.3, 122.8, 67.8, 63.7.

(*S*)-1-(4-bromophenyl)-2-(phenylsulfonyl)ethan-1-ol **2h**



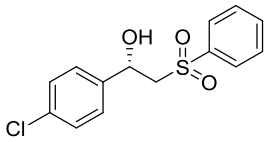
White solid, 99% yield, 67.6 mg; 94% ee; $[\alpha]_D^{25}$ = +24.5 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 39.7 min, t_R (major) = 54.8 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.96–7.94 (m, 2H), 7.73–7.69 (m, 1H), 7.63–7.58 (m, 2H), 7.47–7.43 (m, 2H), 7.20–7.17 (m, 2H), 5.28-5.24 (m, 1H), 3.78 (d, *J* = 2.2 Hz, 1H), 3.49–3.29 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 139.6, 138.9, 134.2, 131.9, 129.5, 127.9, 127.4, 122.2, 67.8, 63.7.

(*S*)-2-(phenylsulfonyl)-1-(*p*-tolyl)ethan-1-ol **2i**



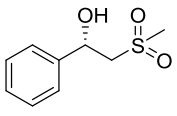
White solid, 99% yield, 54.7 mg; 96% ee; $[\alpha]_D^{25}$ = +18.5 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 23.6 min, t_R (major) = 28.2 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.98-7.95 (m, 2H), 7.71–7.67 (m, 1H), 7.62–7.57 (m, 2H), 7.19–7.12 (m, 4H), 5.25–5.22 (m, 1H), 3.61 (d, *J* = 2.1 Hz, 1H), 3.54–3.31 (m, 2H), 2.31 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 139.2, 138.2, 137.6, 134.1, 129.4, 129.4, 128.0, 125.6, 68.3, 63.9, 21.1.

(*S*)-1-(4-chlorophenyl)-2-(phenylsulfonyl)ethan-1-ol **2j**



White solid, 98% yield, 58.5 mg; 94% ee; $[\alpha]_D^{25}$ = +19.0 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 32.8 min, t_R (major) = 42.9 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.97–7.94 (m, 2H), 7.73–7.69 (m, 1H), 7.63–7.58 (m, 2H), 7.31–7.28 (m, 2H), 7.26–7.22 (m, 2H), 5.29-5.26 (m, 1H), 3.78 (d, *J* = 2.2 Hz, 1H), 3.49–3.29 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 139.0, 138.9, 134.2, 134.1, 129.5, 128.9, 127.9, 127.0, 67.8, 63.8.

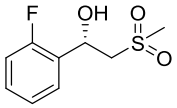
(*S*)-2-(methylsulfonyl)-1-phenylethan-1-ol **2k**



S/C = 500, 0.2 mmol substrate, Na_2CO_3 (5 mol%). White solid, 99% yield, 39.6 mg; 97% ee; $[\alpha]_D^{25}$ = +49.9 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 210 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 20.4 min, t_R (minor) = 30.9 min. ^1H NMR (400 MHz, $CDCl_3$)

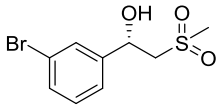
δ 7.42–7.31 (m, 5H), 5.36–5.32 (m, 1H), 3.45 (dd, *J* = 14.7, 10.3 Hz, 1H), 3.19-3.14 (m, 1H), 3.05 (s, 3H), 3.05-3.02 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 141.0, 129.0, 128.7, 125.6, 69.3, 62.4, 42.8.

(*S*)-1-(2-fluorophenyl)-2-(methylsulfonyl)ethan-1-ol **2l**



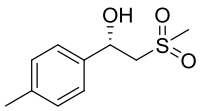
White solid, 99% yield, 43.2 mg; 95% ee; $[\alpha]_D^{25}$ = +32.1 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 13.1 min, t_R (minor) = 17.6 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57–7.53 (m, 1H), 7.35-7.30 (m, 1H), 7.23-7.19 (m, 1H), 7.10-7.05 (m, 1H), 5.61-5.58 (m, 1H), 3.48–3.40 (m, 2H), 3.34-3.29 (m, 1H), 3.07 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.2 (d, *J* = 244.0 Hz), 130.1 (d, *J* = 9.0 Hz), 127.8 (d, *J* = 13.0 Hz), 127.2 (d, *J* = 4.0 Hz), 124.8 (d, *J* = 4.0 Hz), 115.6 (d, *J* = 21.0 Hz), 63.8 (d, *J* = 3.0 Hz), 60.8 (d, *J* = 1.0 Hz), 42.6

(*S*)-1-(3-bromophenyl)-2-(methylsulfonyl)ethan-1-ol **2m**



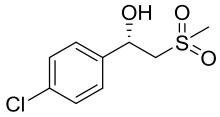
S/C = 500, 0.1 mmol substrate, Na_2CO_3 (10 mol%). White solid, 99% yield, 27.6 mg; 97% ee; $[\alpha]_D^{25}$ = +32.9 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 210 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (minor) = 32.3 min, t_R (major) = 34.2 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.58 (t, *J* = 1.8 Hz, 1H), 7.48-7.46 (m, 1H), 7.32–7.24 (m, 2H), 5.35-5.32 (m, 1H), 3.45–3.38 (m, 1H), 3.18-3.14 (m, 2H), 3.07 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 143.1, 131.7, 130.5, 128.8, 124.2, 123.1, 68.6, 62.2, 42.9.

(*S*)-2-(methylsulfonyl)-1-(*p*-tolyl)ethan-1-ol **2n**



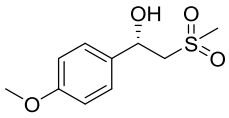
White solid, 98% yield, 50.0 mg; 98% ee; $[\alpha]_D^{25}$ = +34.1 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OD-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 11.4 min, t_R (minor) = 13.4 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.28–7.26 (m, 2H), 7.20–7.18 (m, 2H), 5.32-5.28 (m, 1H), 3.48-3.42 (m, 1H), 3.17–3.12 (m, 1H), 3.04 (s, 3H), 2.94-2.93 (m, 1H), 2.35 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 138.5, 138.0, 129.6, 125.5, 69.2, 62.4, 42.8, 21.1.

(*S*)-1-(4-chlorophenyl)-2-(methylsulfonyl)ethan-1-ol **2o**



White solid, 99% yield, 46.5 mg; 99% ee; $[\alpha]_D^{25}$ = +43.8 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 27.7 min, t_R (minor) = 31.9 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.39–7.31 (m, 4H), 5.36-5.32 (m, 1H), 3.42 (dd, *J* = 14.7, 10.3 Hz, 1H), 3.16–3.12 (m, 2H), 3.07 (s, 3H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 139.4, 134.4, 129.1, 127.0, 68.6, 62.3, 42.9.

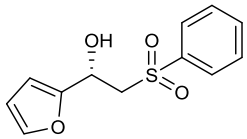
(*S*)-1-(4-methoxyphenyl)-2-(methylsulfonyl)ethan-1-ol **2p**



White solid, 99% yield, 45.6 mg; 99% ee; $[\alpha]_D^{25}$ = +46.3 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ^oC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 42.2 min, t_R (minor) = 60.0 min. ^1H NMR (400 MHz, $CDCl_3$) δ 7.32–7.28 (m, 2H), 6.93–6.89 (m, 2H), 5.30-5.27 (m, 1H), 3.81 (s, 3H), 3.49-3.42 (m, 1H), 3.14 (dd, *J* = 14.7, 2.0 Hz, 1H), 3.04 (s, 3H), 2.96–2.95 (m, 1H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 159.8, 133.1, 127.0, 114.3,

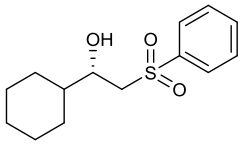
68.9, 62.4, 55.3, 42.8.

(*S*)-1-(furan-2-yl)-2-(phenylsulfonyl)ethanol **2q**



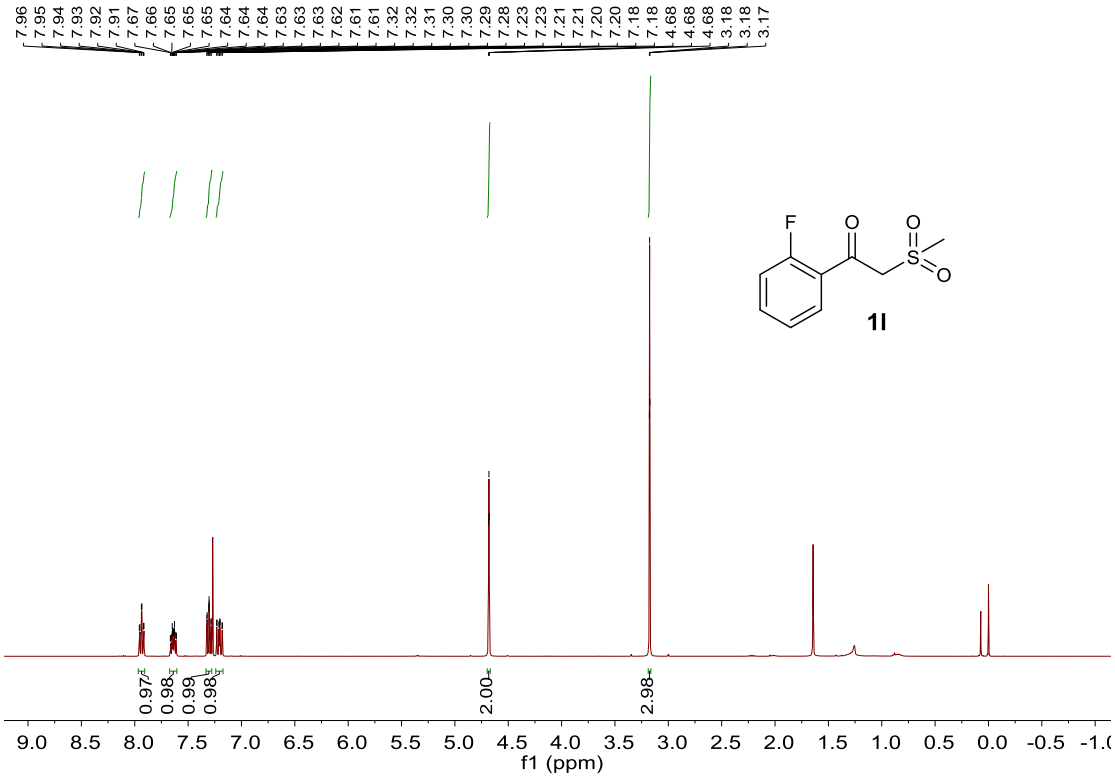
S/C = 500, 0.2 mmol substrate, Na_2CO_3 (5 mol%). White solid, 98% yield, 49.4 mg; 86% ee; $[\alpha]_D^{25}$ = +8.0 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiracel OJ-H column, 220 nm, 20 ºC, *n*-hexane: *i*-PrOH = 80:20; flow 1.0 mL/min; t_R (major) = 38.1 min, t_R (minor) = 36.0 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96-7.93 (m, 2H), 7.71-7.66 (m, 1H), 7.61-7.56 (m, 2H), 7.30 (dd, *J* = 1.7, 1.0 Hz, 1H), 6.31-6.29 (m, 2H), 5.30-5.26 (m, 1H), 3.68 (dd, *J* = 14.4, 9.4 Hz, 1H), 3.56-3.49 (m, 2H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 152.4, 142.6, 139.0, 134.1, 129.4, 128.0, 110.4, 107.4, 62.7, 60.5.

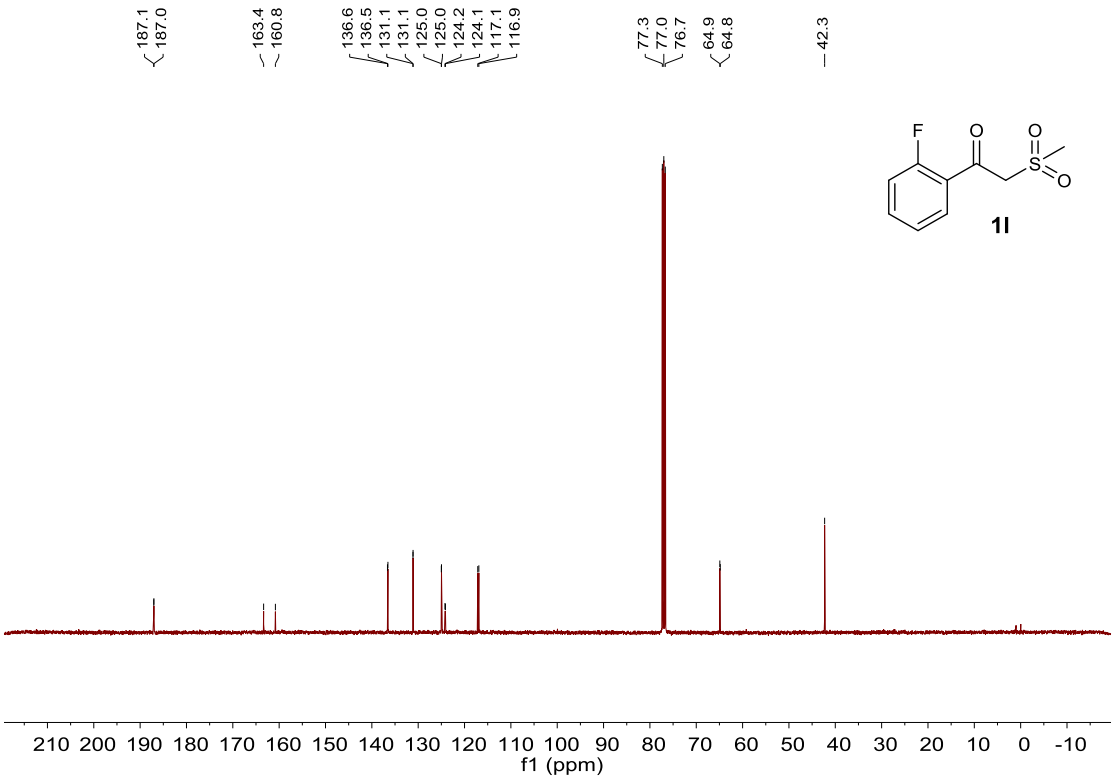
(*S*)-1-cyclohexyl-2-(phenylsulfonyl)ethan-1-ol **2r**

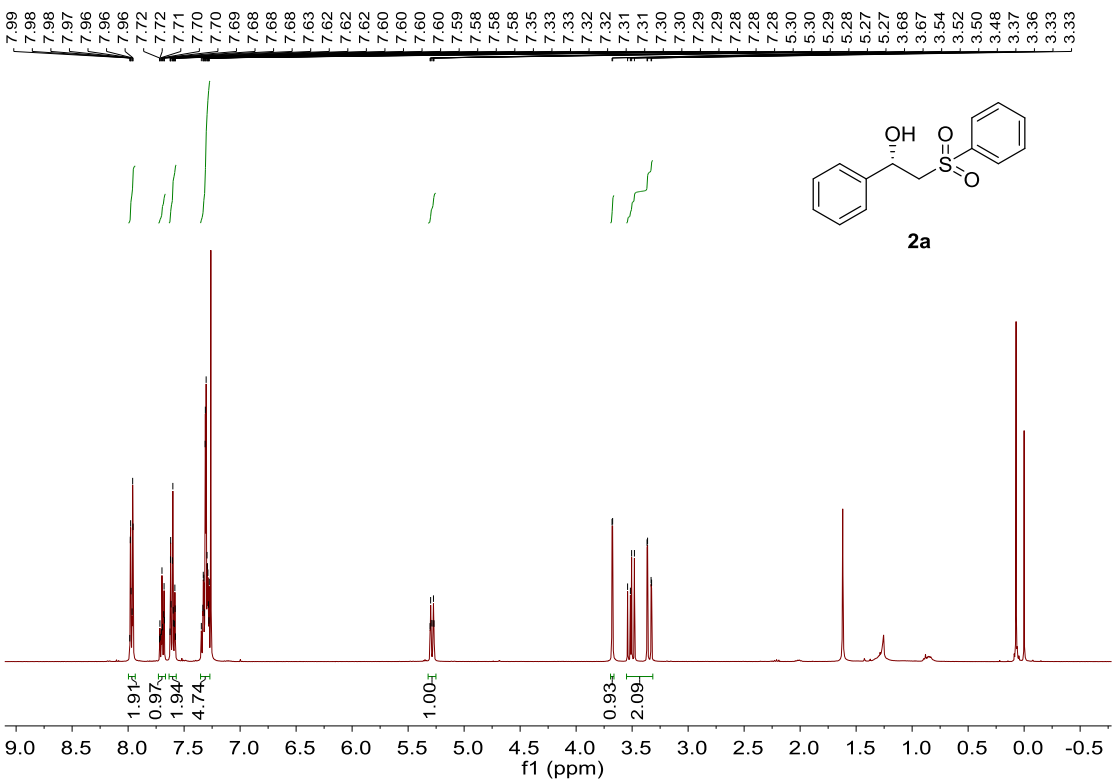


S/C = 500, 0.2 mmol substrate, Na_2CO_3 (5 mol%). Colorless liquid, 35% yield, 18.9 mg; 90% ee; $[\alpha]_D^{25}$ = +10.6 (c = 1.50, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chirapak AD-H column, 220 nm, 20 ºC, *n*-hexane: *i*-PrOH = 80:20; flow 0.7 mL/min; t_R (minor) = 18.9 min, t_R (major) = 22.1 min. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 (dd, *J* = 8.3, 1.3 Hz, 2H), 7.69-7.67 (m, 1H), 7.62-7.58 (m, 2H), 3.96-3.95 (m, 1H), 3.26 (d, *J* = 2.6 Hz, 1H), 3.26-3.22 (m, 2H), 1.74-1.63 (m, 5H), 1.46-1.36 (m, 1H), 1.27-0.99 (m, 5H). ^{13}C NMR (100 MHz, $CDCl_3$) δ 139.2, 134.0, 129.4, 127.9, 69.7, 60.2, 43.1, 28.4, 27.5, 26.2, 25.9, 25.8.

4. NMR spectra



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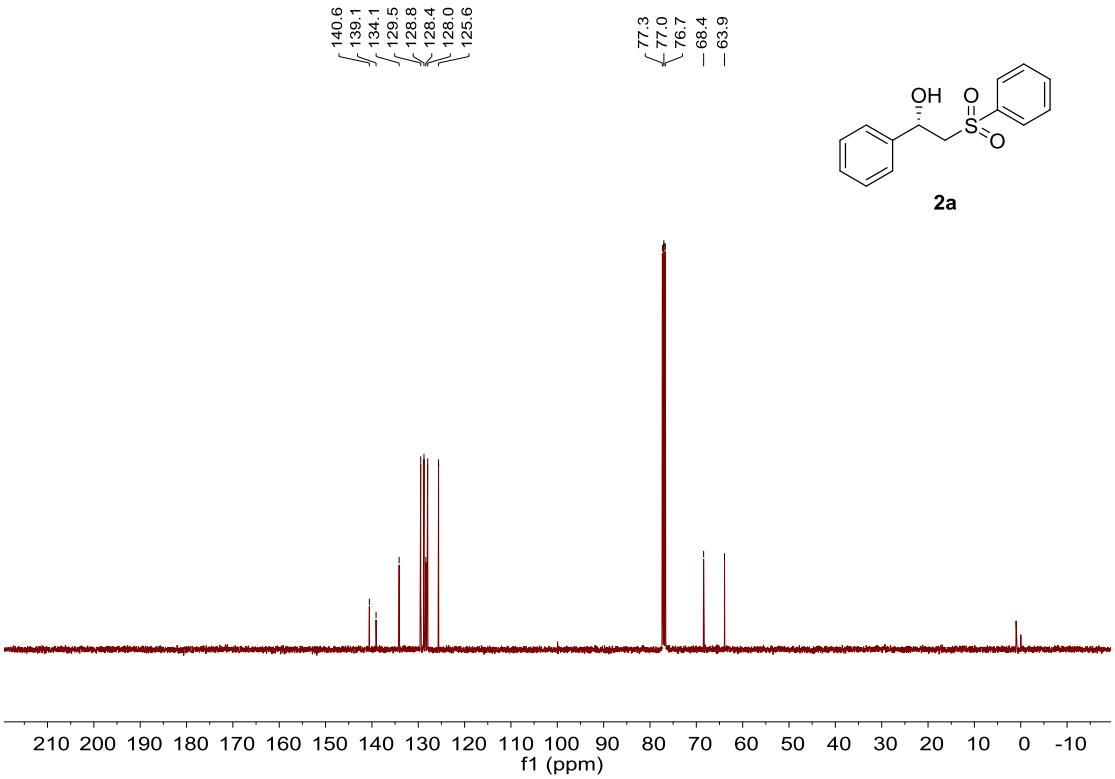
OH
O
S
O
2a
1.91
0.97
1.94
4.74
1.00
0.93
2.09
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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134.1
129.5
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128.4
128.0
125.6
77.3
77.0
76.7
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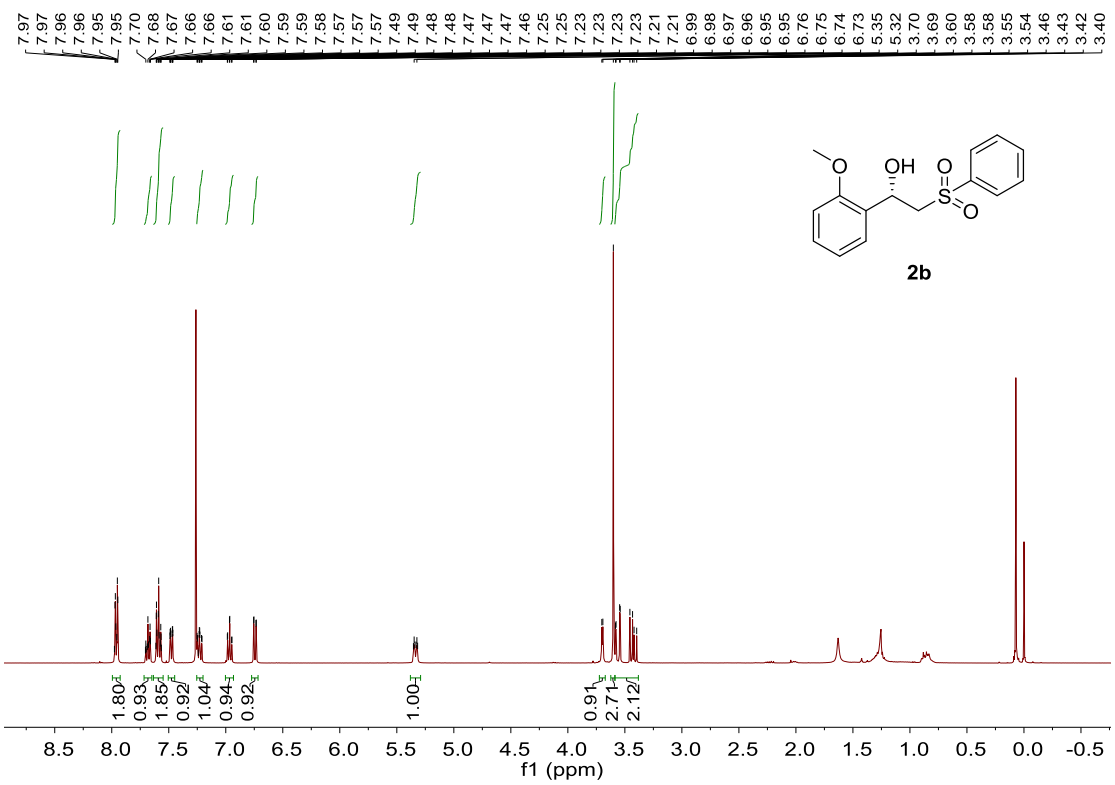
f1 (ppm)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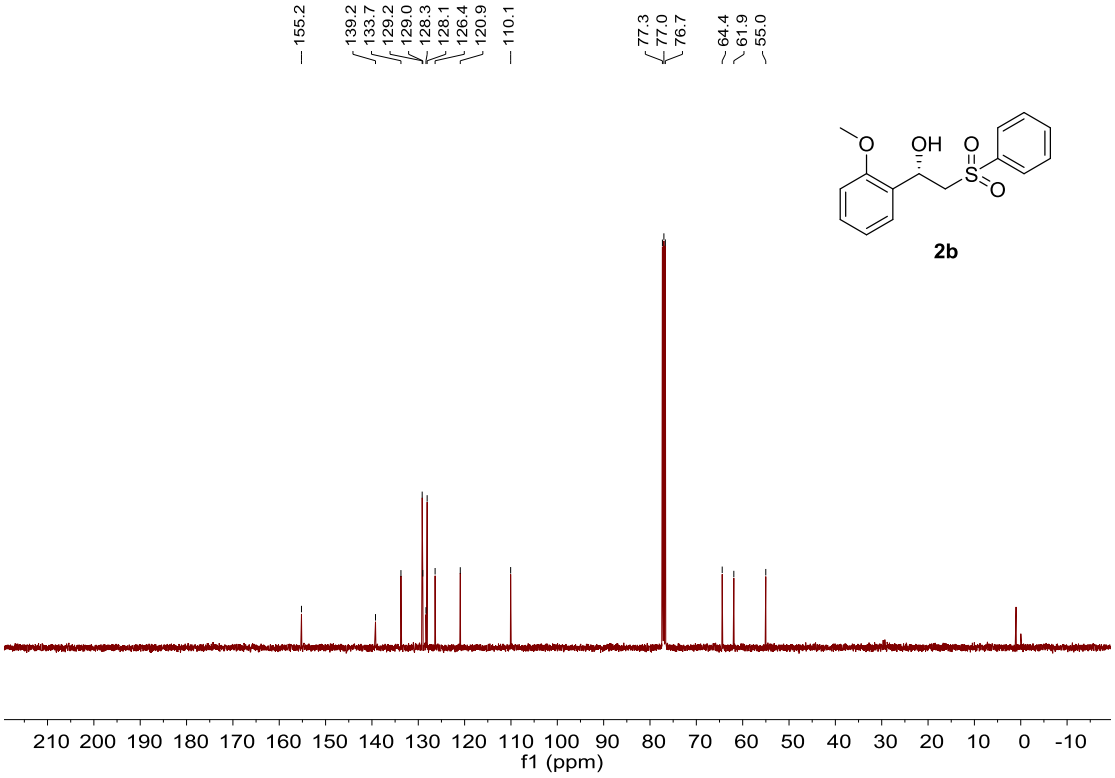
O
OH
O
S
O
2b
1.80 0.93 1.85 0.92 1.04 0.94 0.92 1.00 0.91 2.71 2.12
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


155.2 139.2 133.7 129.2 129.0 128.3 128.1 126.4 120.9 110.1 77.3 77.0 76.7 64.4 61.9 55.0
O
OH
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S
O
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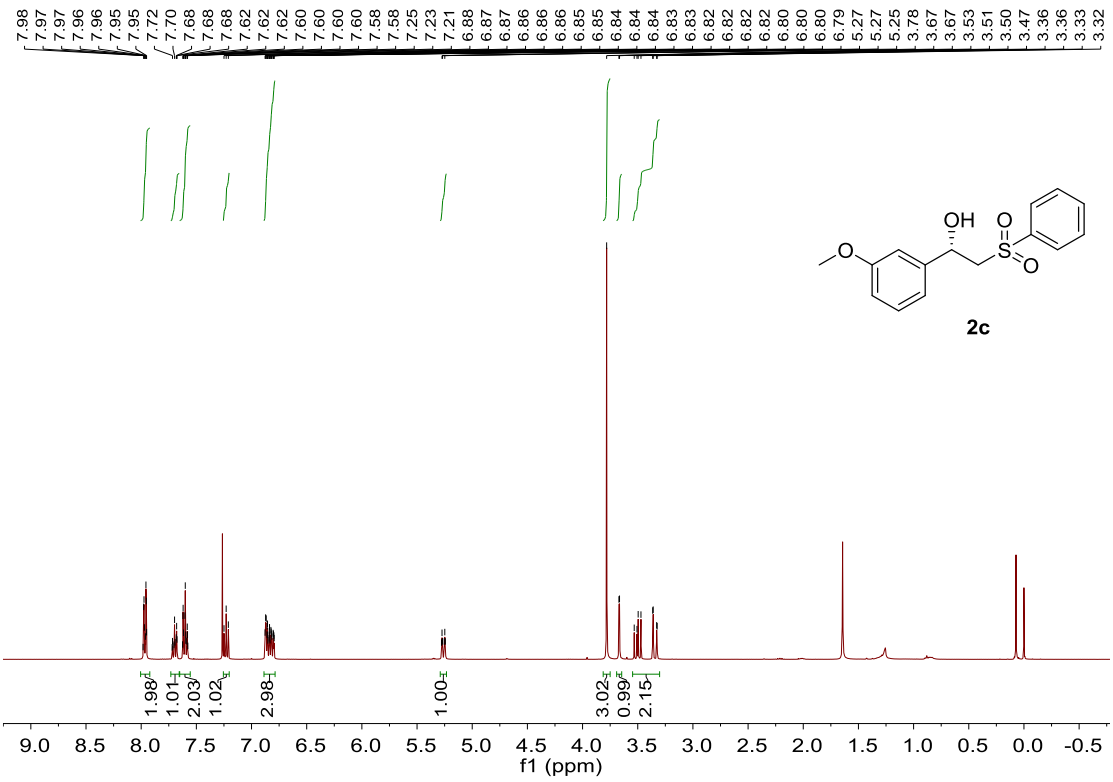
f1 (ppm)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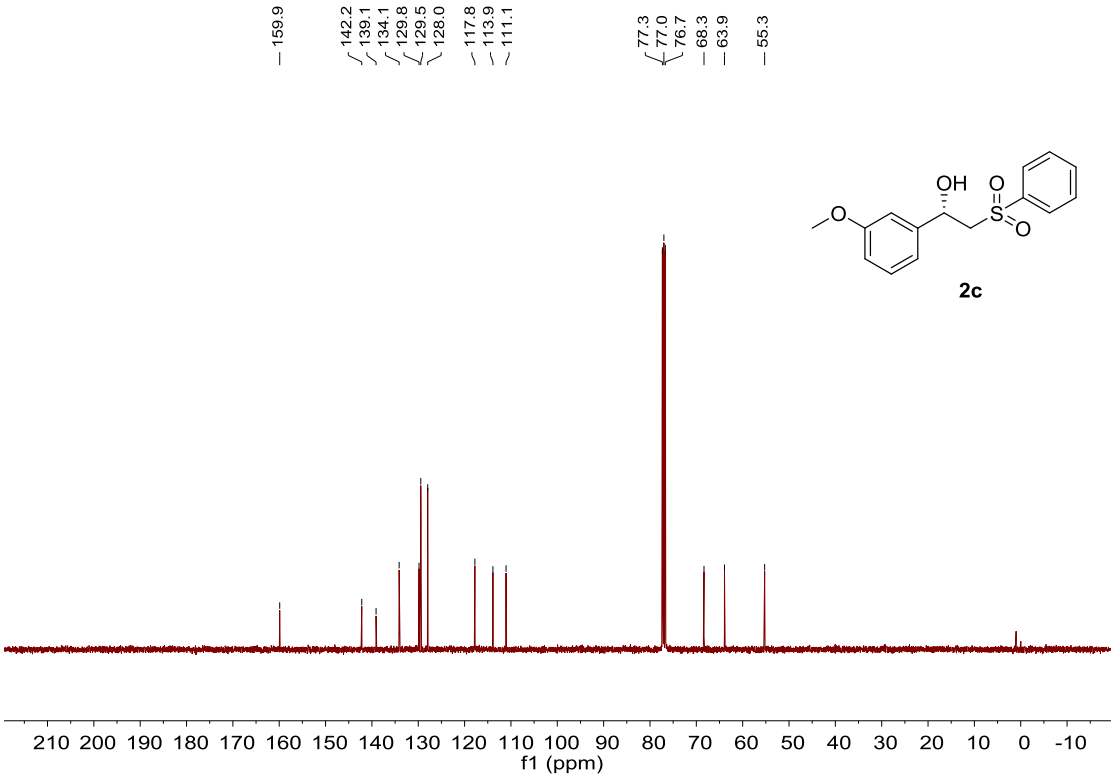
OH
O
S
O
O
2c
1.98
1.01
2.03
1.02
2.98
1.00
3.02
0.99
2.15
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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134.1
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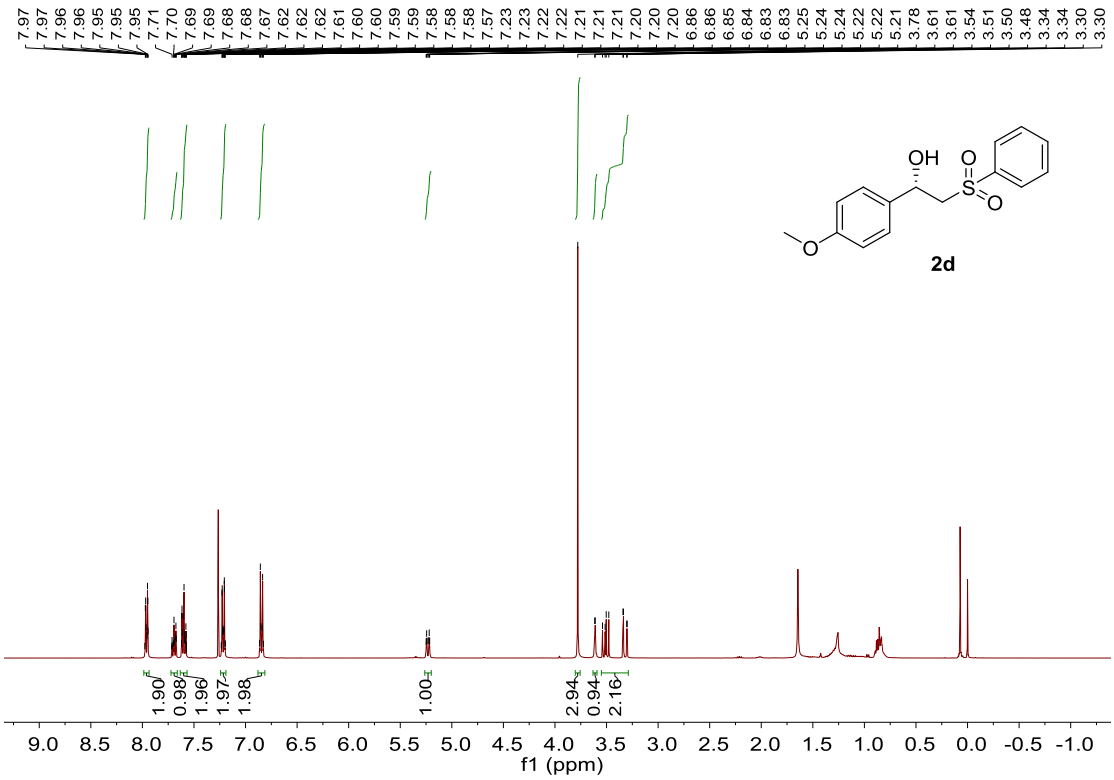
129.5
128.0
117.8
113.9
111.1
77.3
77.0
76.7
68.3
63.9
55.3
OH
O
S
O
O
2c
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)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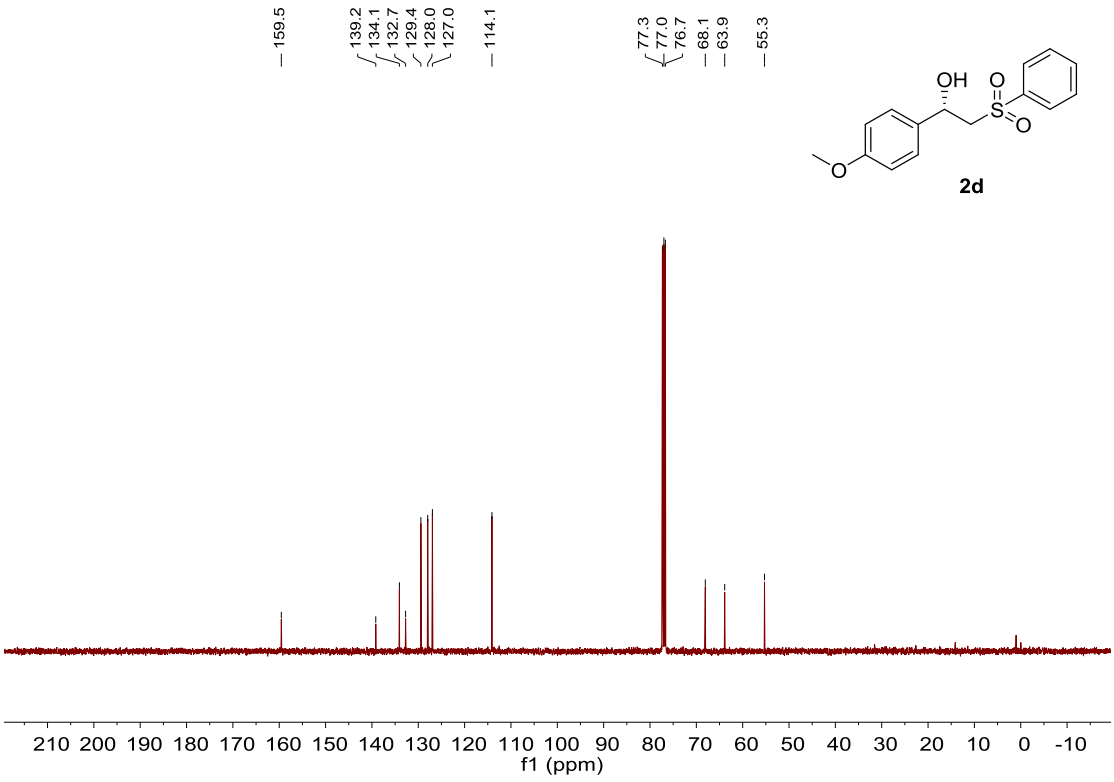
OH
O
S
O
O
2d
1.90 0.98 1.96 1.97 1.98 1.00 2.94 0.94 2.16
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)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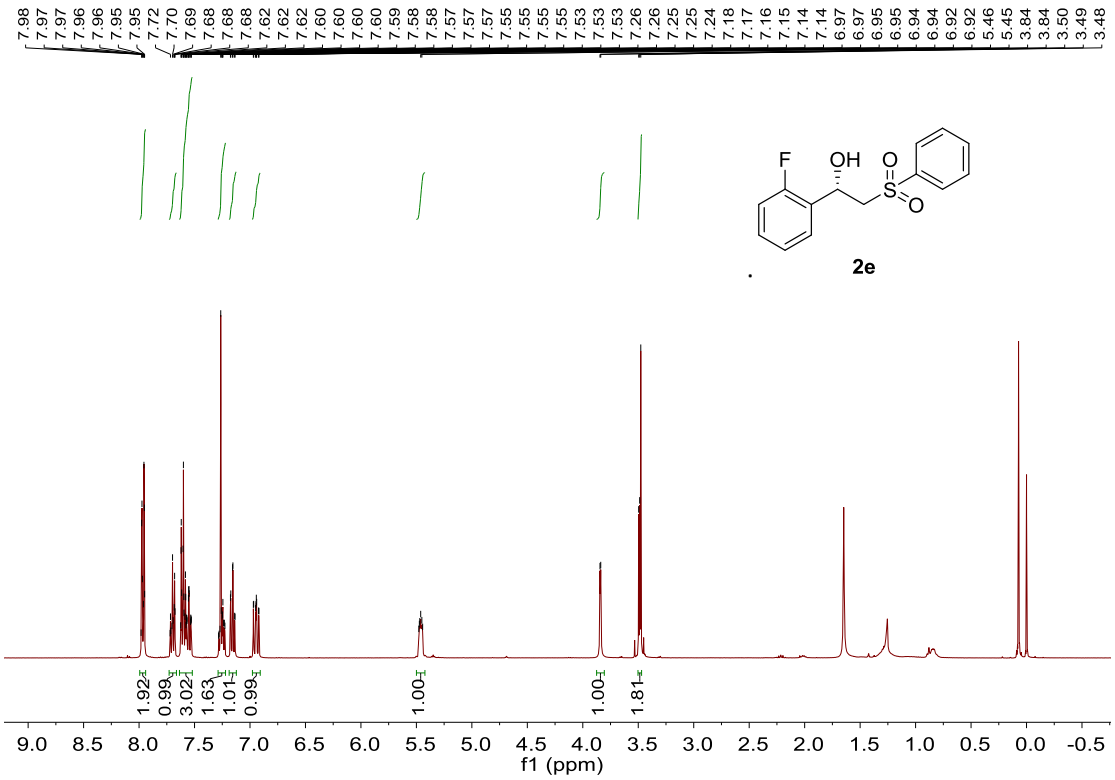
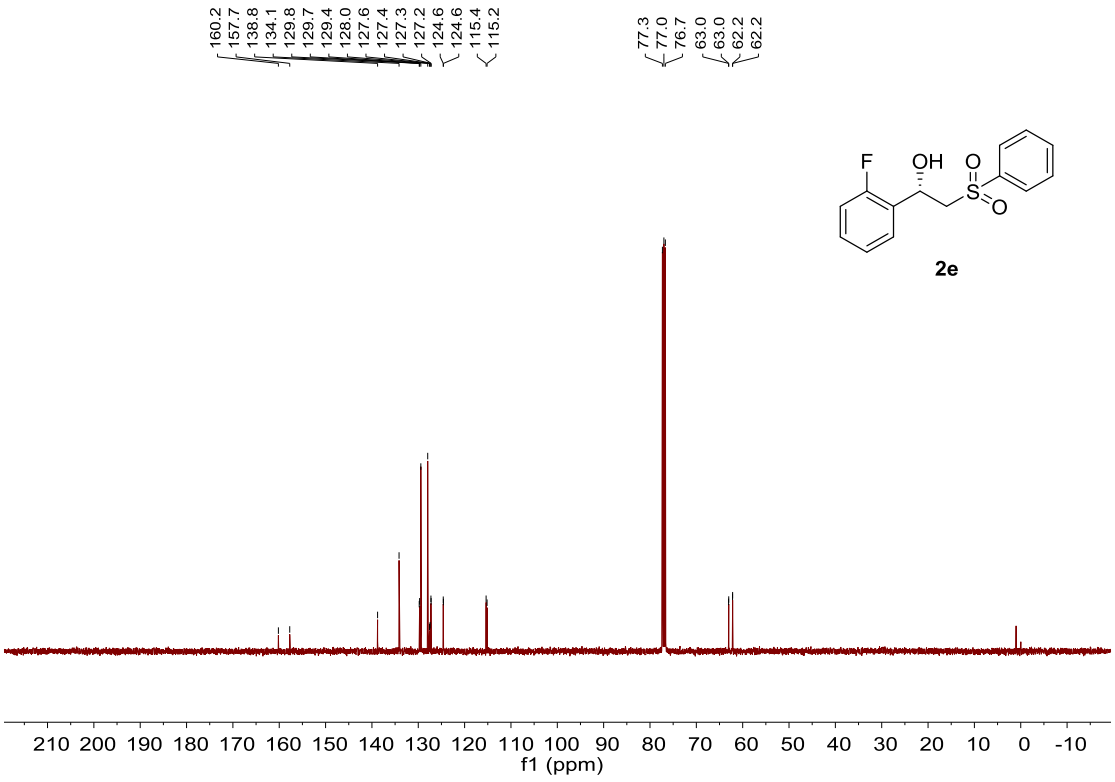
139.2 134.1 132.7 129.4 128.0 127.0
114.1
77.3 77.0 76.7
68.1
63.9
55.3
OH
O
S
O
O
2d
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


7.98 7.97 7.97 7.96 7.96 7.95 7.95 7.72 7.70 7.69 7.68 7.68 7.68 7.62 7.62 7.62 7.60 7.60 7.60 7.60 7.59 7.58 7.58 7.57 7.57 7.57 7.55 7.55 7.55 7.55 7.53 7.53 7.53 7.26 7.26 7.25 7.25 7.24 7.18 7.17 7.16 7.15 7.14 7.14 6.97 6.97 6.95 6.95 6.94 6.94 6.92 6.92 5.46 5.45 3.84 3.84 3.50 3.49 3.48
F
OH
O
S
O
2e
1.92 0.99 3.02 1.63 1.01 0.99 1.00 1.00 1.81
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 -0.5
f1 (ppm)


160.2 157.7 138.8 134.1 129.8 129.7 129.4 128.0 127.6 127.4 127.3 127.2 124.6 124.6 115.4 115.2
77.3 77.0 76.7 63.0 63.0 62.2 62.2
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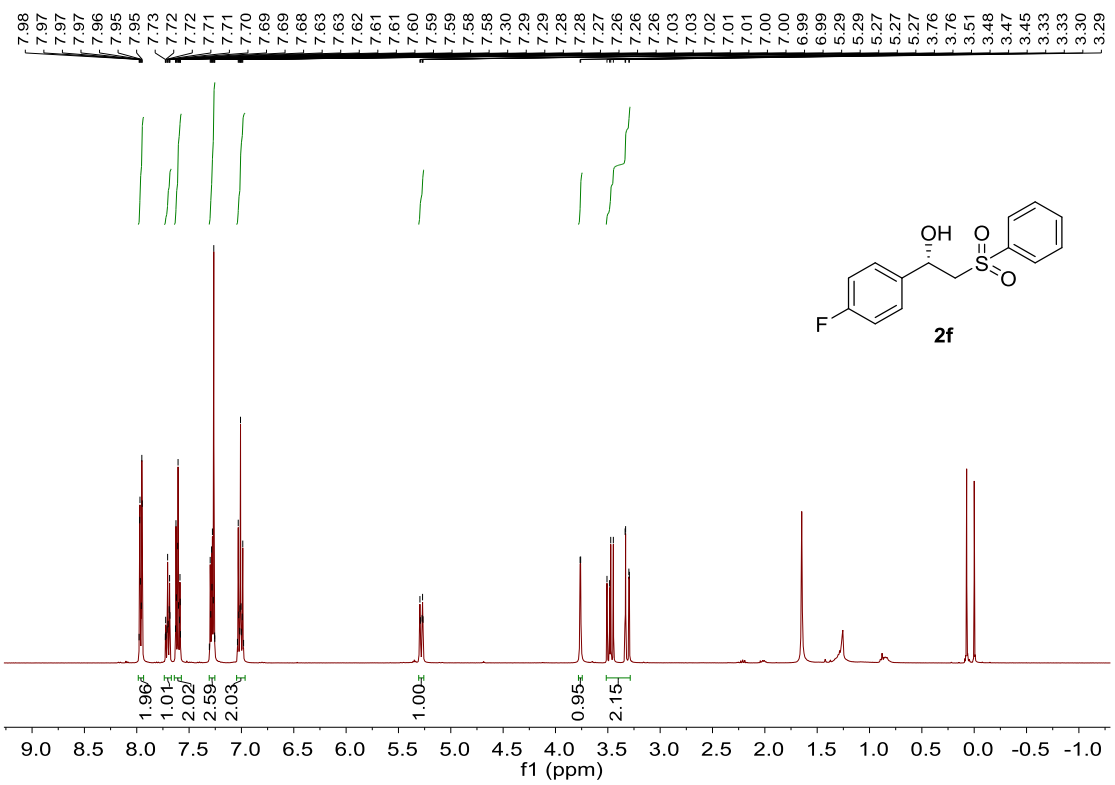
f1 (ppm)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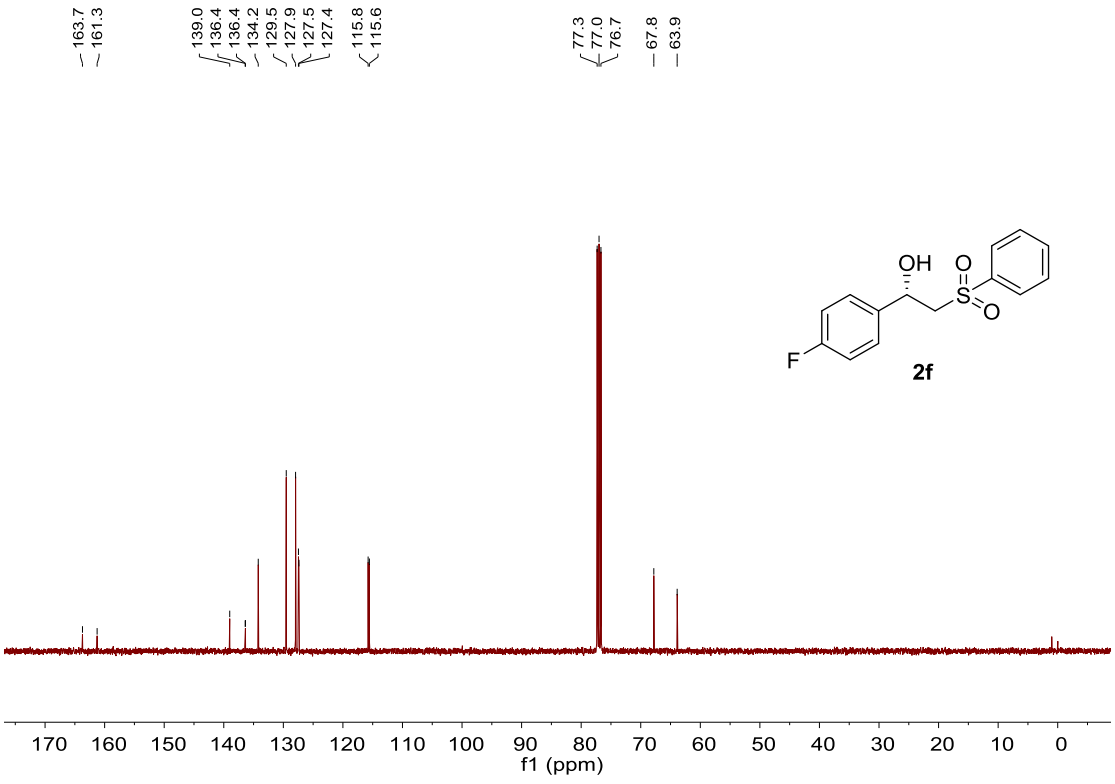
OH
O
S
O
F
2f
1.96
1.01
2.02
2.59
2.03
1.00
0.95
2.15
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)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77.3
77.0
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OH
O
S
O
F
2f
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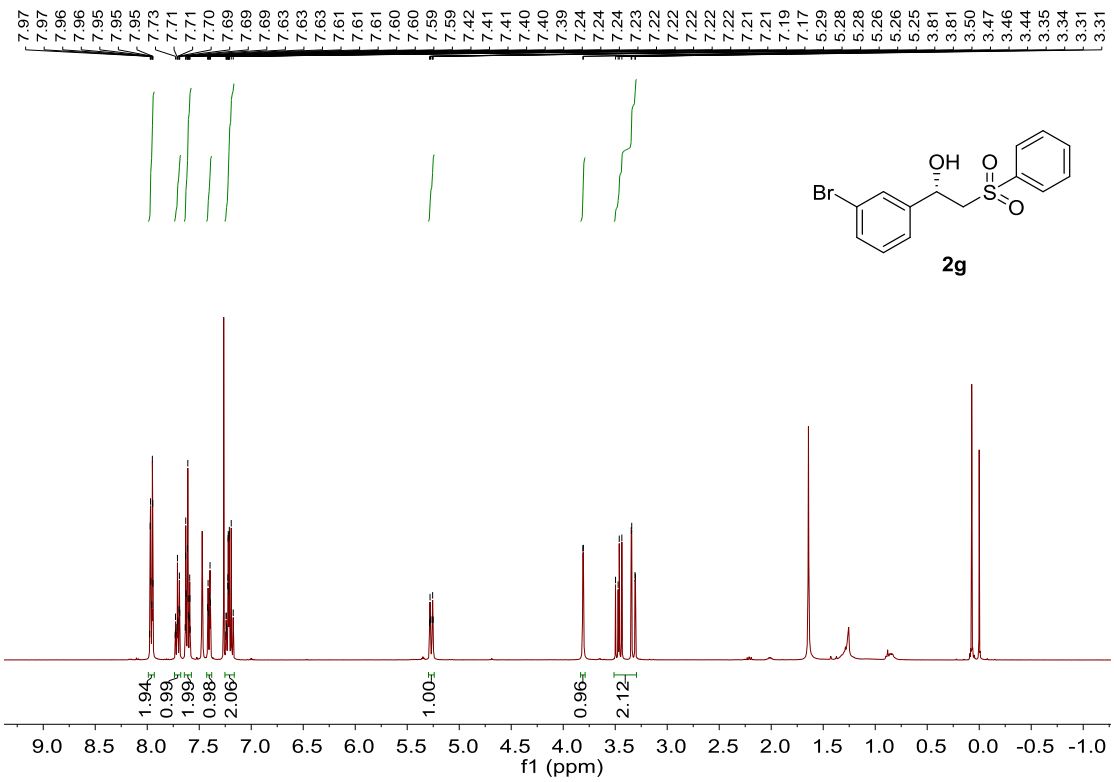
f1 (ppm)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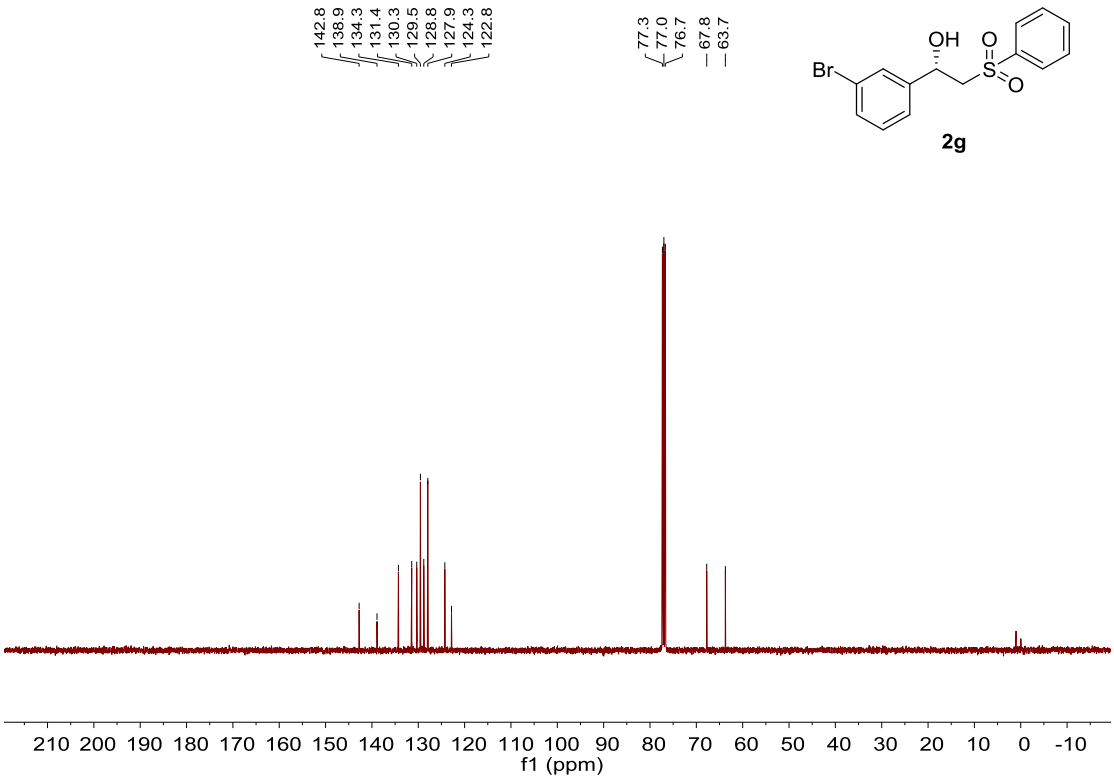
OH
O
S
O
Br
2g
1.94
0.99
1.99
0.98
2.06
1.00
0.96
2.12
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.0
f1 (ppm)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76.7
67.8
63.7
OH
O
S
O
Br
2g
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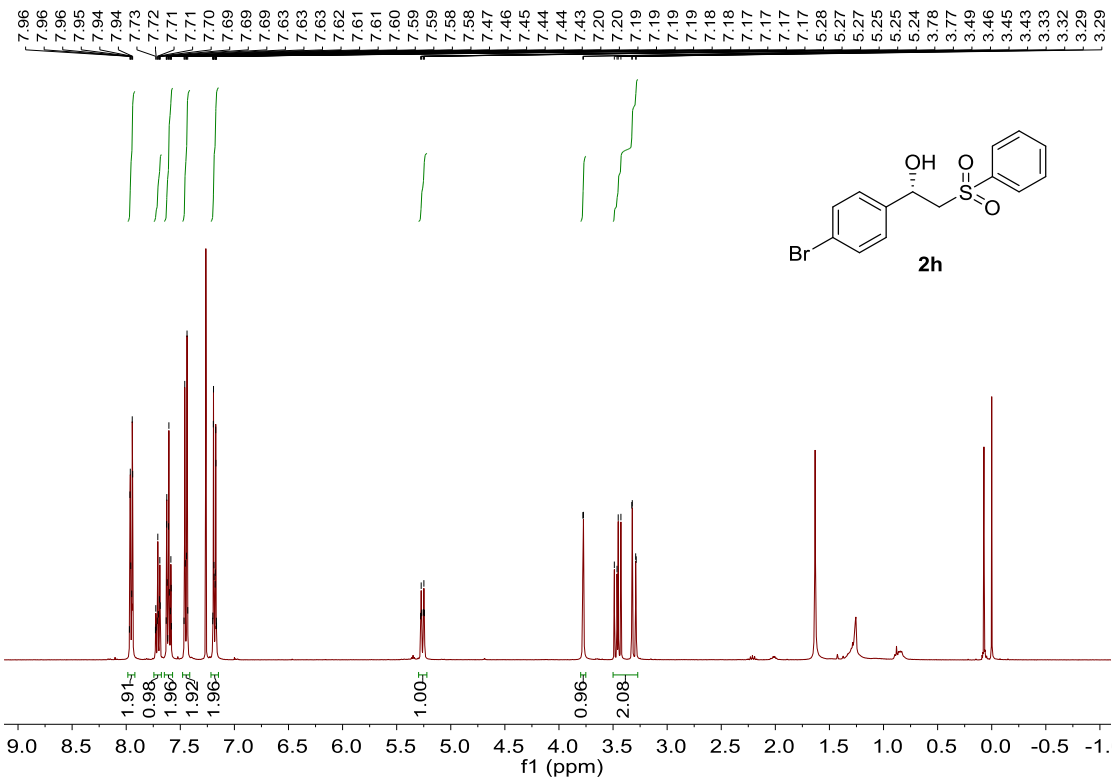
f1 (ppm)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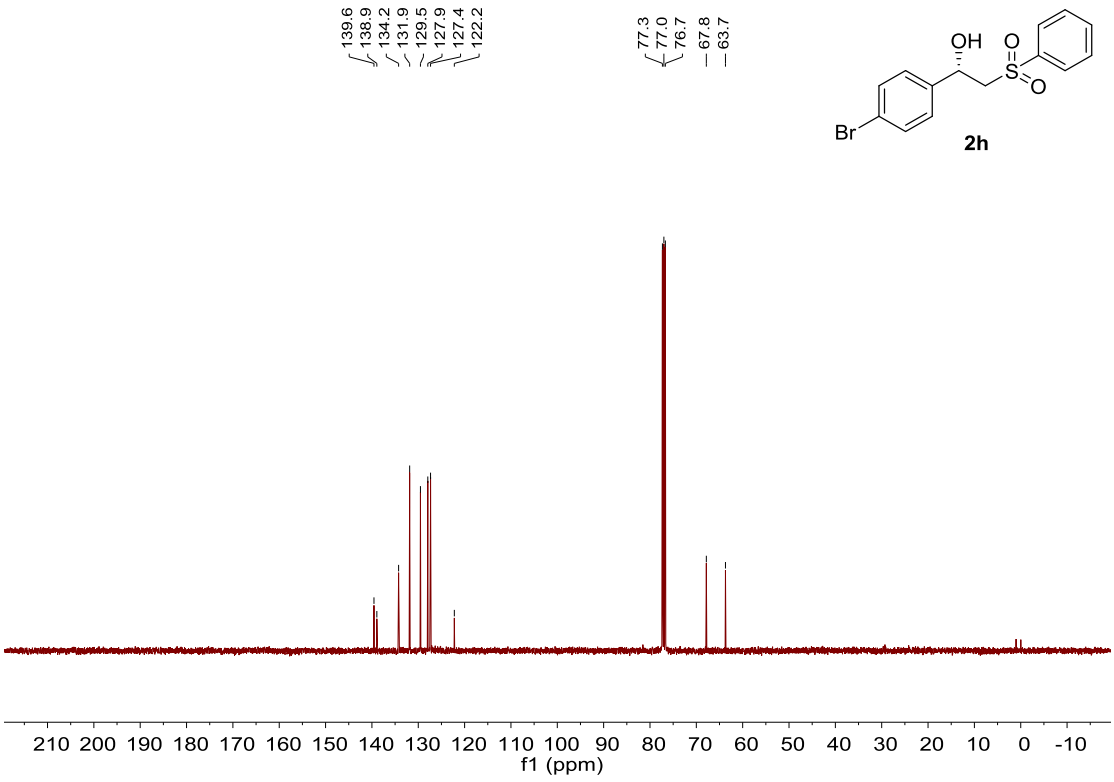
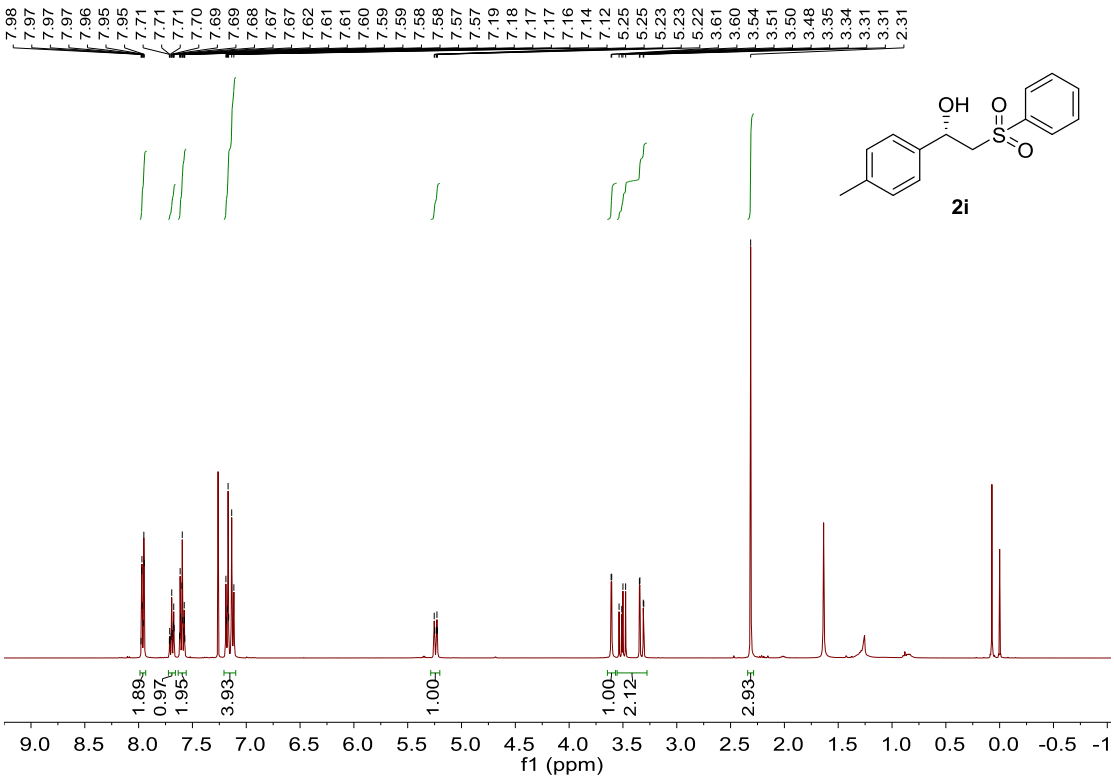
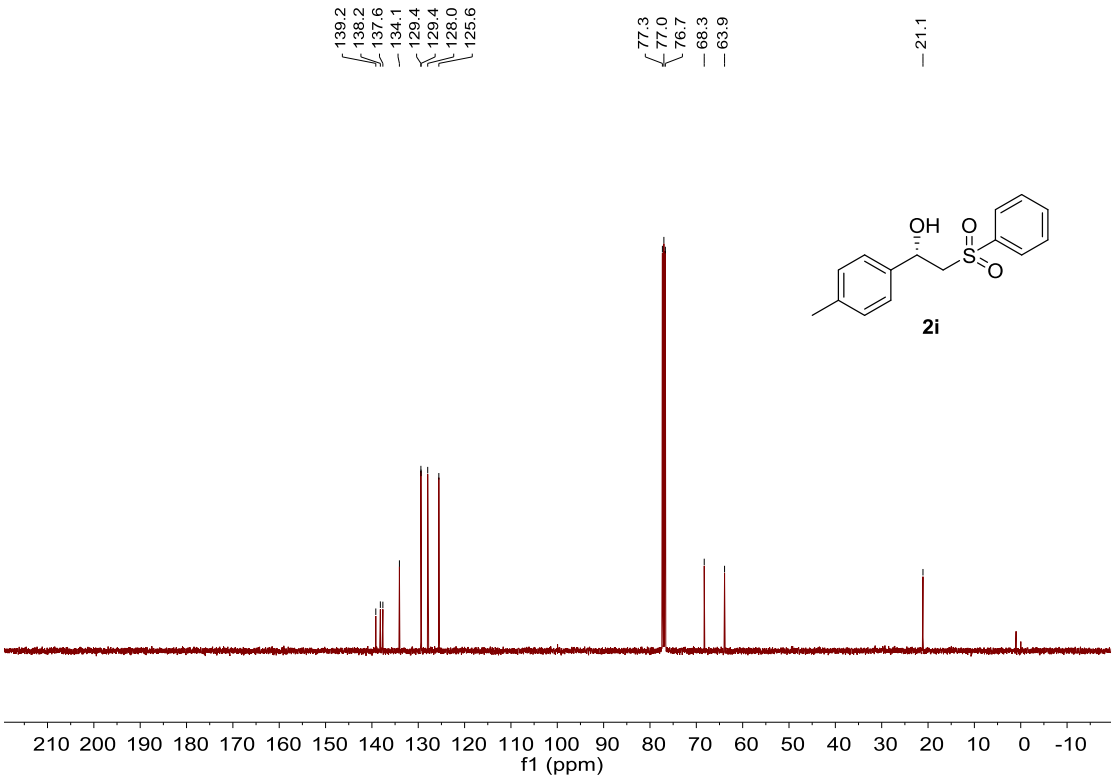
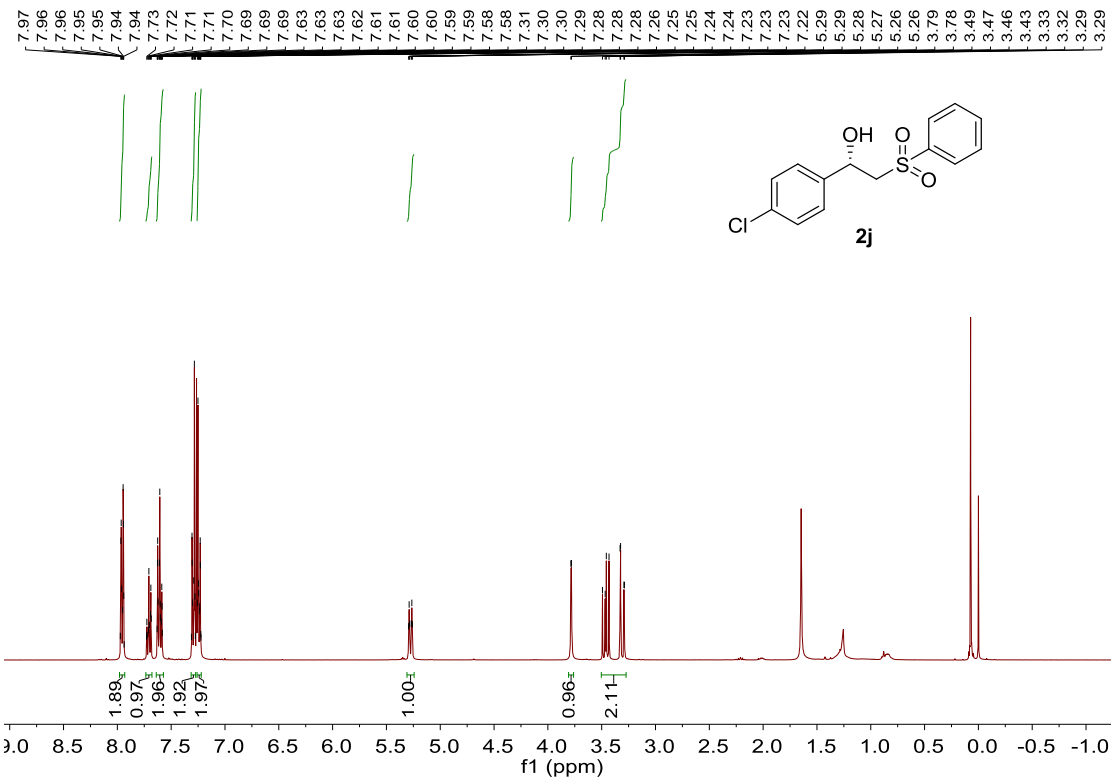
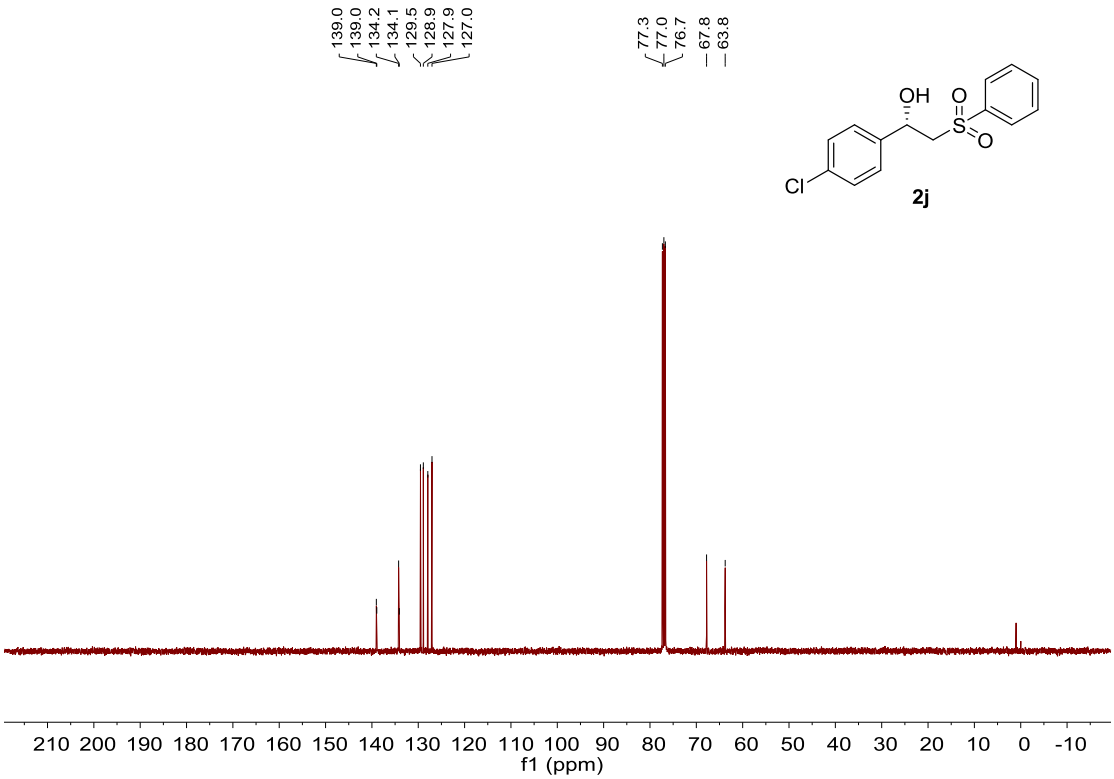
OH
O
S
O
Br
2h
1.91
0.98
1.96
1.92
1.96
1.00
0.96
2.08
9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.
f1 (ppm)

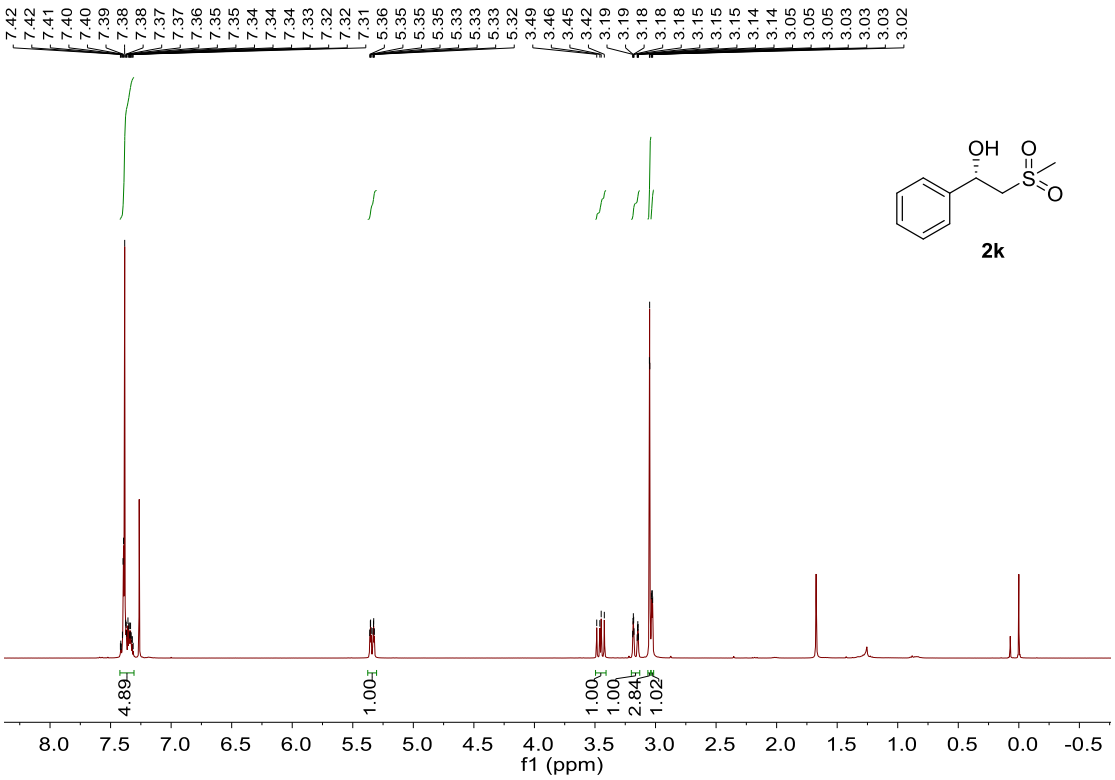

139.6
138.9
134.2
131.9
129.5
127.9
127.4
122.2
77.3
77.0
76.7
67.8
63.7
OH
O
S
O
Br
2h
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

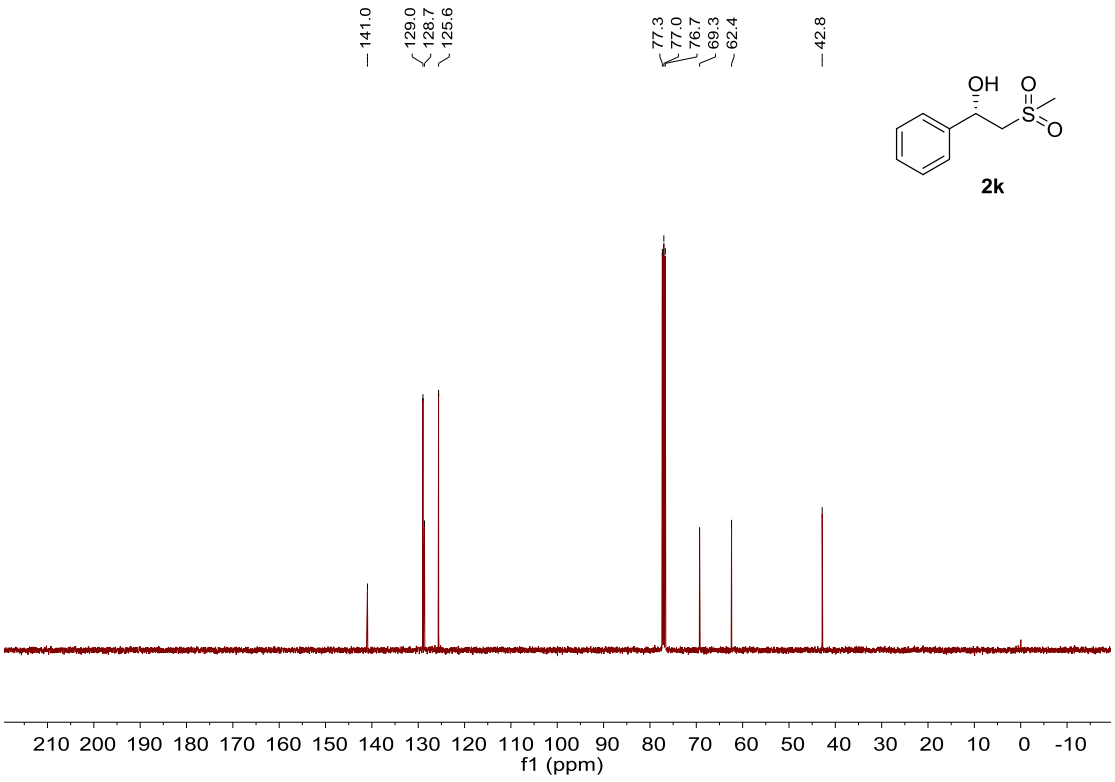

7.98 7.97 7.97 7.97 7.96 7.95 7.95 7.71 7.71 7.71 7.70 7.69 7.69 7.68 7.67 7.67 7.62 7.61 7.61 7.60 7.59 7.59 7.58 7.58 7.57 7.57 7.19 7.18 7.17 7.17 7.16 7.14 7.12 5.25 5.25 5.23 5.23 5.22 3.61 3.60 3.54 3.51 3.50 3.48 3.35 3.34 3.31 3.31 2.31
OH
O
S
O
2i
1.89 0.97 1.95 3.93 1.00 1.00 2.12 2.93
9.0 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 -0.5 -1
f1 (ppm)

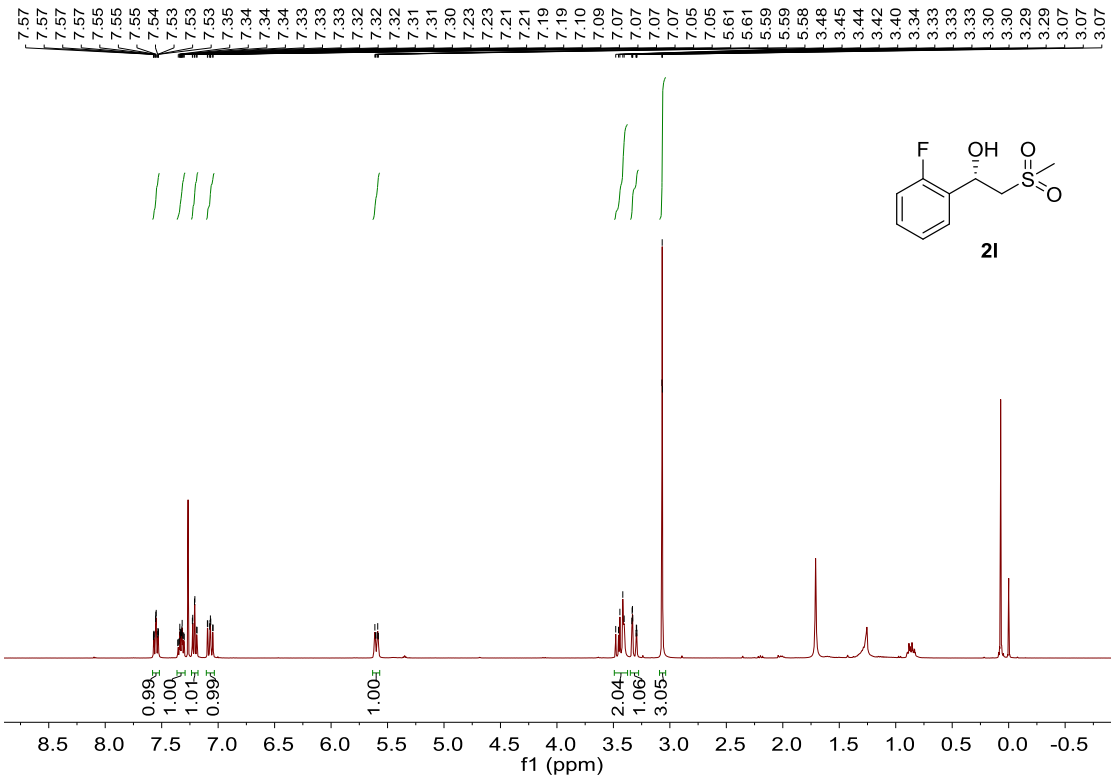

139.2 138.2 137.6 134.1 129.4 129.4 128.0 125.6
77.3 77.0 76.7 68.3 63.9
21.1
OH
O
S
O
2i
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

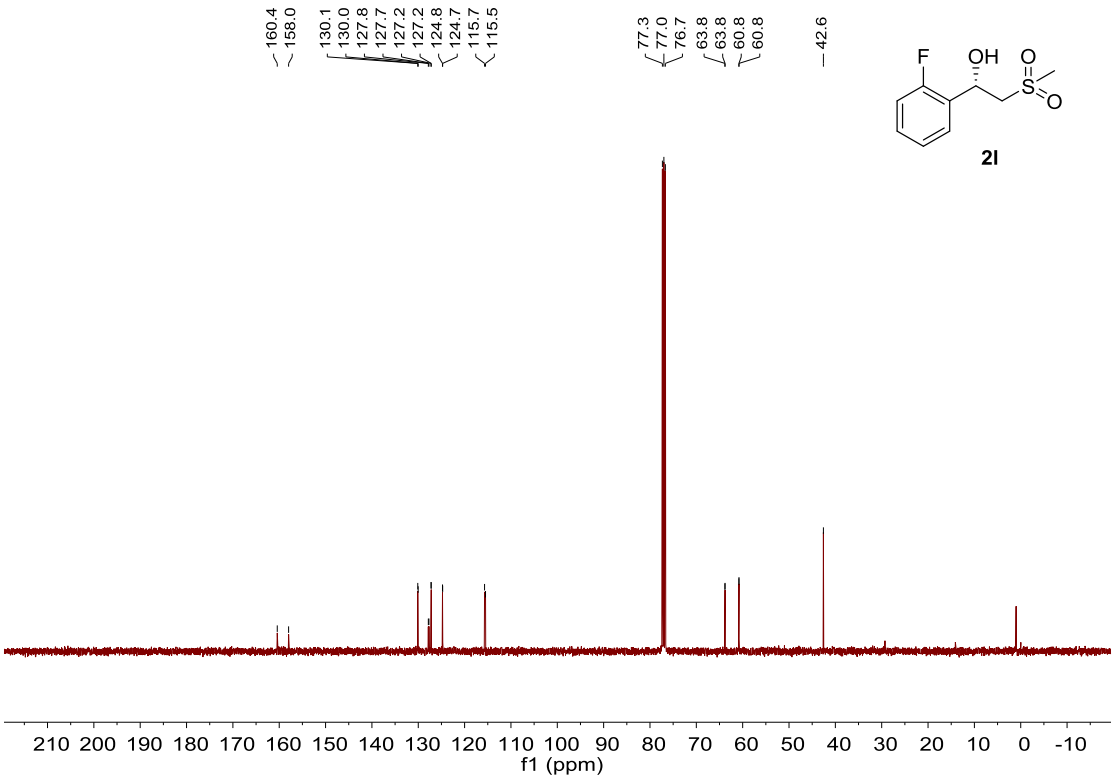

7.97 7.96 7.96 7.95 7.95 7.94 7.94 7.73 7.72 7.71 7.71 7.70 7.69 7.69 7.69 7.63 7.63 7.63 7.62 7.61 7.61 7.60 7.60 7.59 7.59 7.58 7.58 7.31 7.30 7.30 7.29 7.28 7.28 7.28 7.26 7.25 7.25 7.24 7.24 7.23 7.23 7.23 7.22 5.29 5.29 5.28 5.27 5.26 5.26 3.79 3.78 3.49 3.47 3.46 3.43 3.33 3.32 3.29 3.29
OH
O
S
O
Cl
2j
1.89
0.97
1.96
1.92
1.97
1.00
0.96
2.11
f1 (ppm)

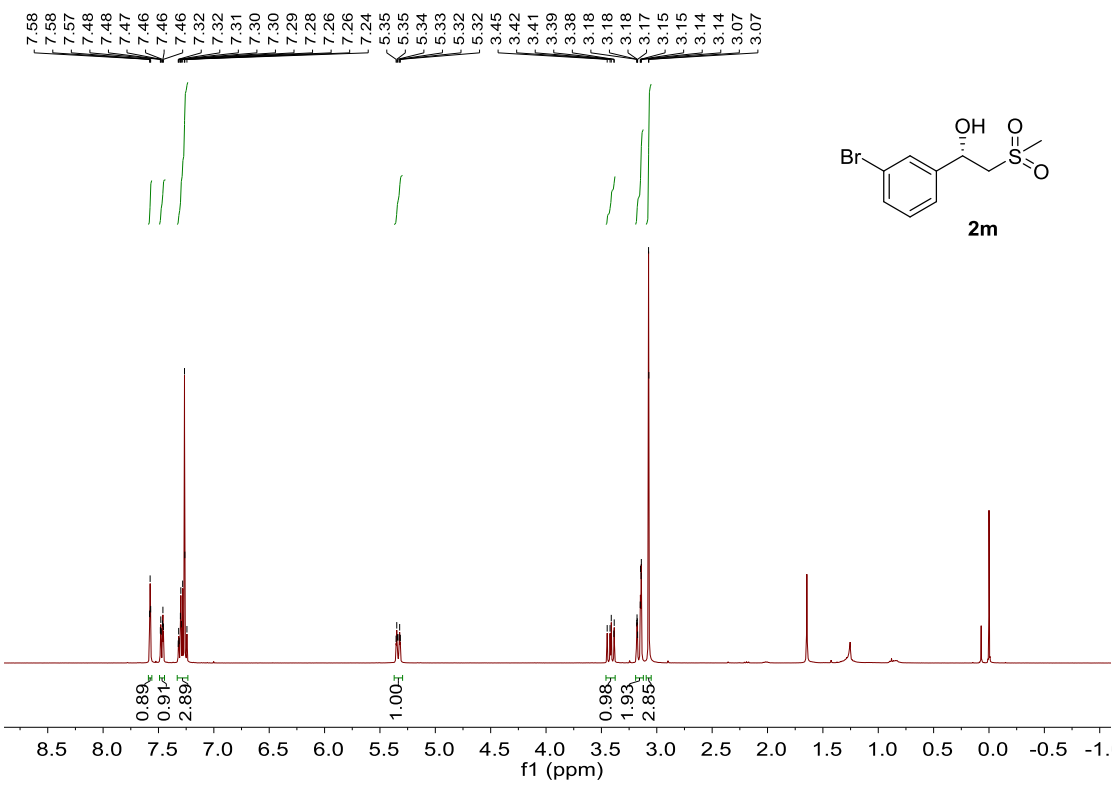

139.0
139.0
134.2
134.1
129.5
128.9
127.9
127.0
77.3
77.0
76.7
67.8
63.8
OH
O
S
O
Cl
2j
f1 (ppm)


7.42 7.42 7.41 7.40 7.40 7.39 7.38 7.38 7.37 7.37 7.36 7.35 7.35 7.34 7.34 7.34 7.33 7.32 7.32 7.31
5.36 5.35 5.35 5.35 5.33 5.33 5.32
3.49 3.46 3.45 3.42 3.19 3.19 3.18 3.18 3.18 3.15 3.15 3.15 3.14 3.14 3.05 3.05 3.05 3.03 3.03 3.03 3.02
OH
O
S
O
2k
4.89
1.00
1.00
1.00
2.84
1.02
8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


141.0
129.0
128.7
125.6
77.3
77.0
76.7
69.3
62.4
42.8
OH
O
S
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)


7.57 7.57 7.57 7.57 7.55 7.55 7.55 7.54 7.53 7.53 7.53 7.35 7.34 7.34 7.34 7.33 7.33 7.33 7.32 7.32 7.32 7.31 7.31 7.30 7.23 7.23 7.21 7.21 7.19 7.19 7.10 7.09 7.07 7.07 7.07 7.07 7.05 7.05 5.61 5.61 5.59 5.59 5.58 3.48 3.45 3.44 3.42 3.40 3.34 3.33 3.33 3.33 3.30 3.30 3.29 3.29 3.07 3.07 3.07
F
OH
O
S
O
2l
0.99
1.00
1.01
0.99
1.00
2.04
1.06
3.05
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


160.4
158.0
130.1
130.0
127.8
127.7
127.2
127.2
124.8
124.7
115.7
115.5
77.3
77.0
76.7
63.8
63.8
60.8
60.8
42.6
F
OH
O
S
O
2l
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)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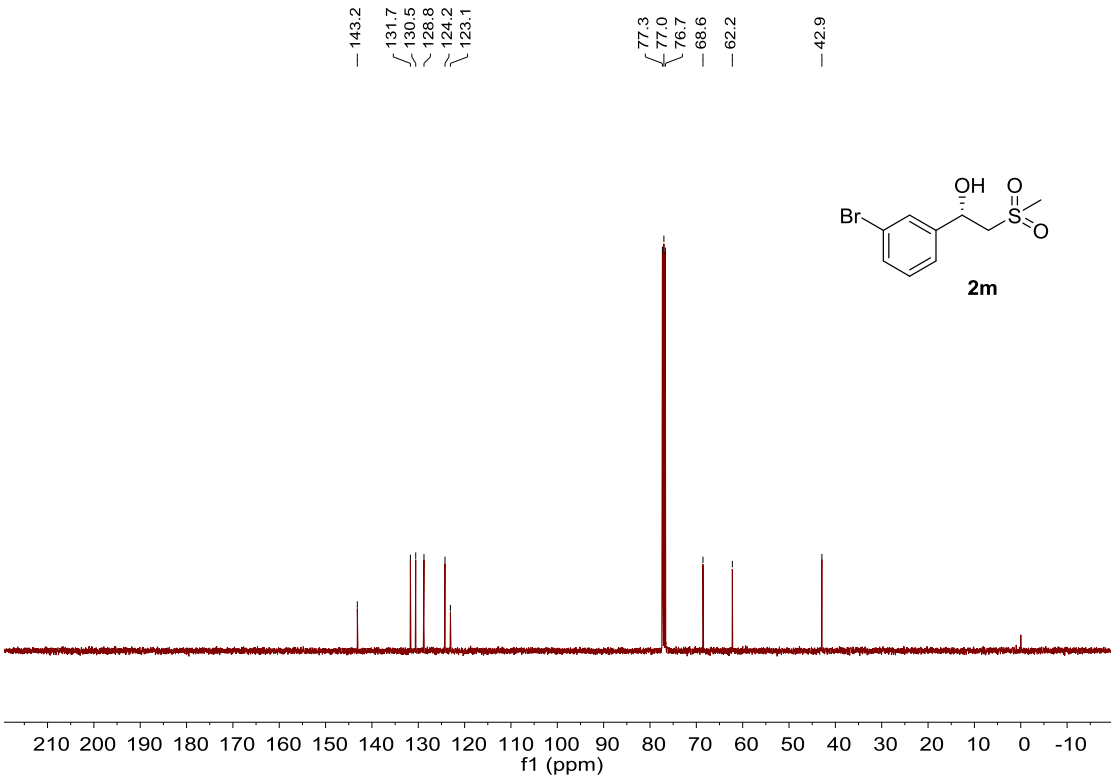
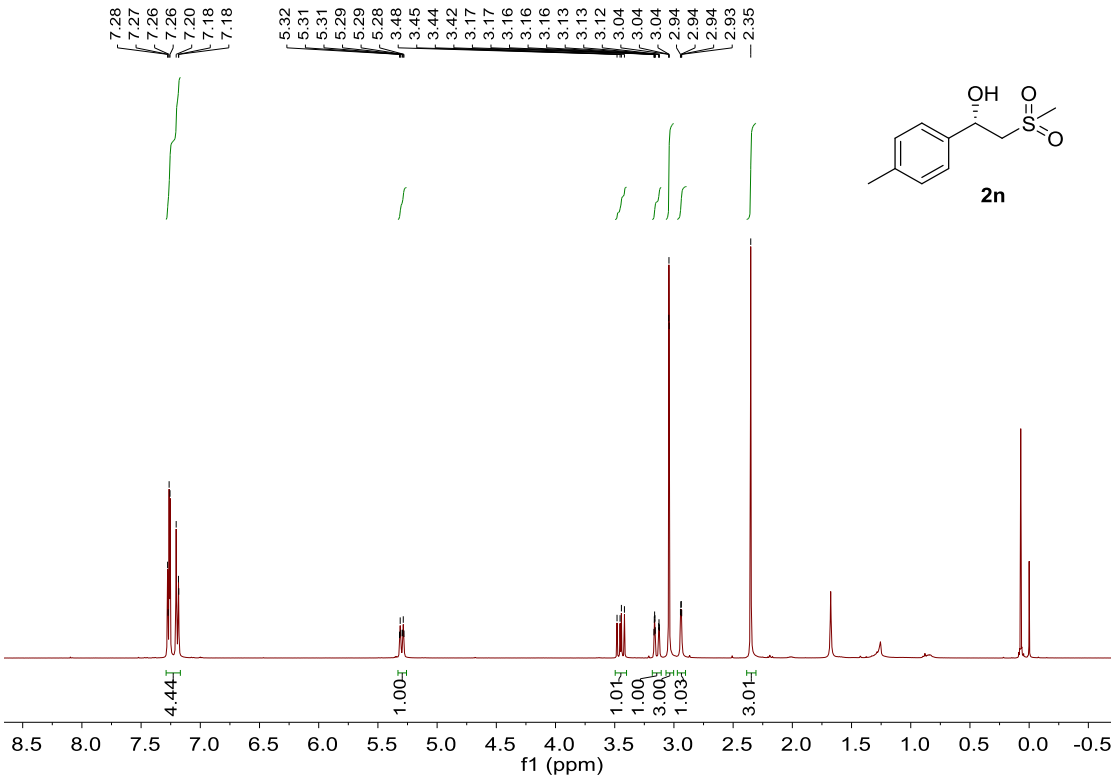
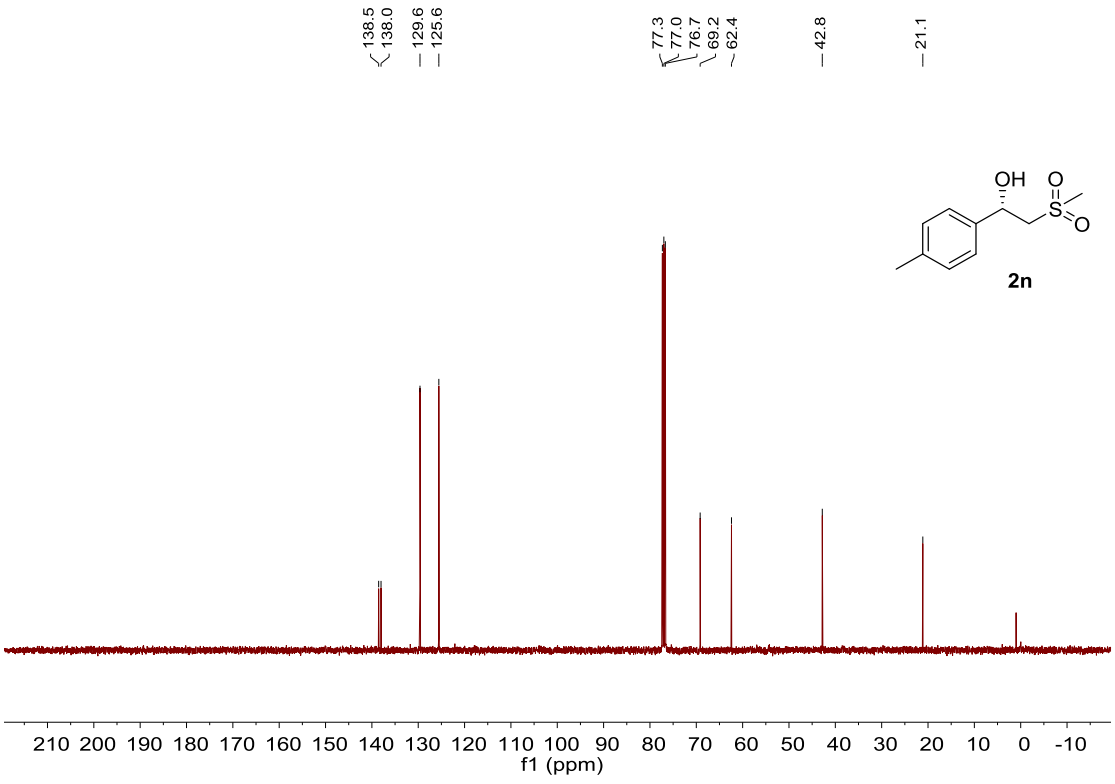
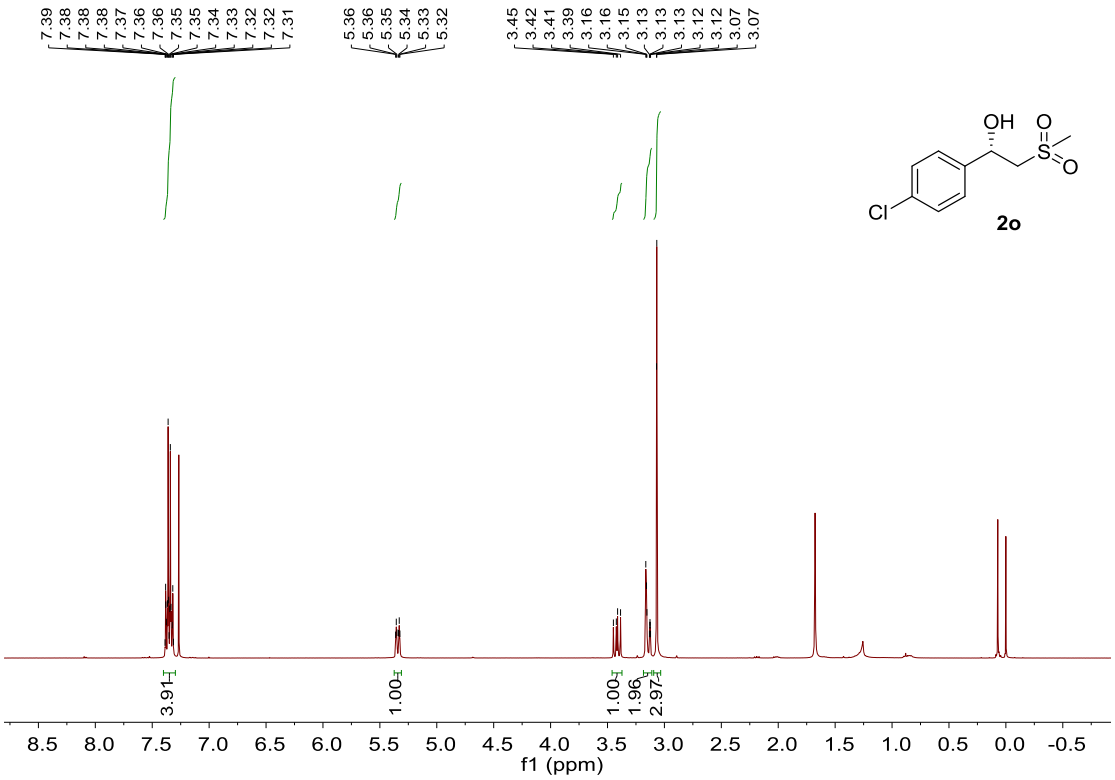
7.58
7.57
7.48
7.48
7.47
7.46
7.46
7.46
7.32
7.32
7.31
7.30
7.30
7.29
7.28
7.26
7.26
7.24
5.35
5.35
5.34
5.33
5.32
5.32
3.45
3.42
3.41
3.39
3.38
3.18
3.18
3.18
3.17
3.15
3.15
3.14
3.14
3.07
3.07
OH
O
Br
S
O
2m
0.89
0.91
2.89
1.00
0.98
1.93
2.85
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5 -1.
f1 (ppm)


143.2
131.7
130.5
128.8
124.2
123.1
77.3
77.0
76.7
68.6
62.2
42.9
OH
O
Br
S
O
2m
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)


7.28
7.27
7.26
7.26
7.20
7.18
7.18
5.32
5.31
5.31
5.29
5.29
5.28
3.48
3.45
3.44
3.42
3.17
3.17
3.16
3.16
3.16
3.13
3.13
3.12
3.04
3.04
3.04
2.94
2.94
2.94
2.93
2.35
OH
O
S
O
2n
4.44
1.00
1.01
1.00
3.00
1.03
3.01
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 -0.5
f1 (ppm)


138.5
138.0
129.6
125.6
77.3
77.0
76.7
69.2
62.4
42.8
21.1
OH
O
S
O
2n
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)


7.39
7.38
7.38
7.38
7.37
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7.36
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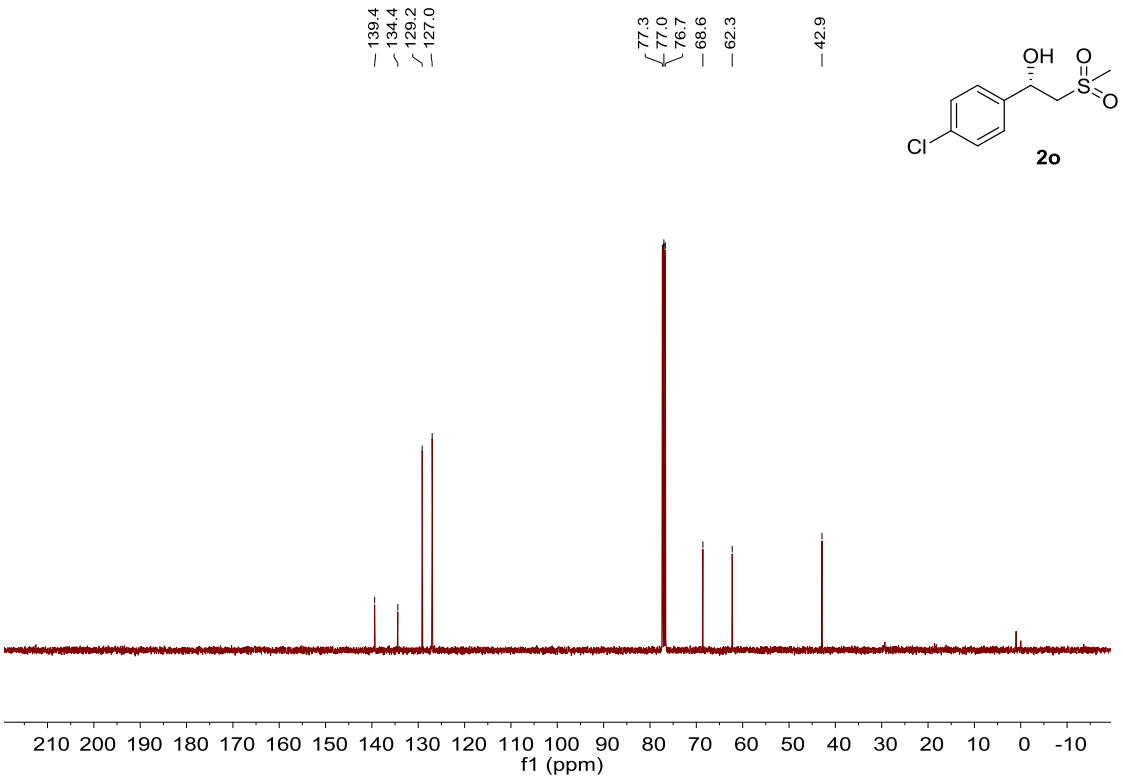
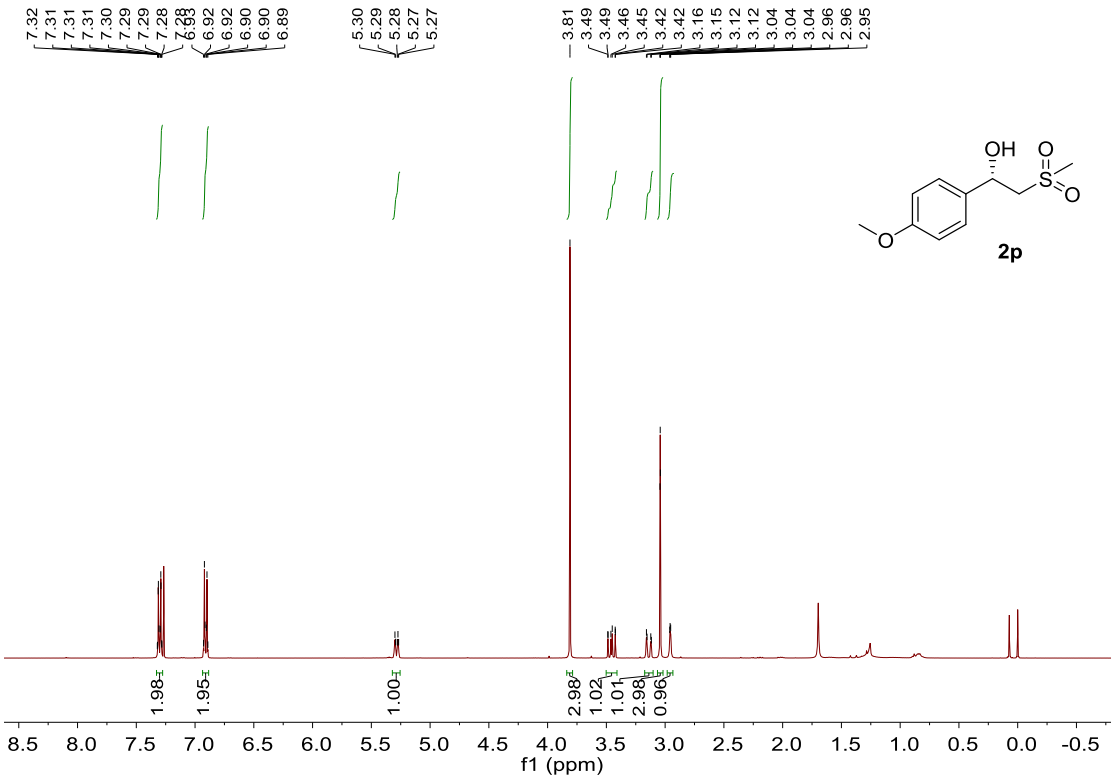
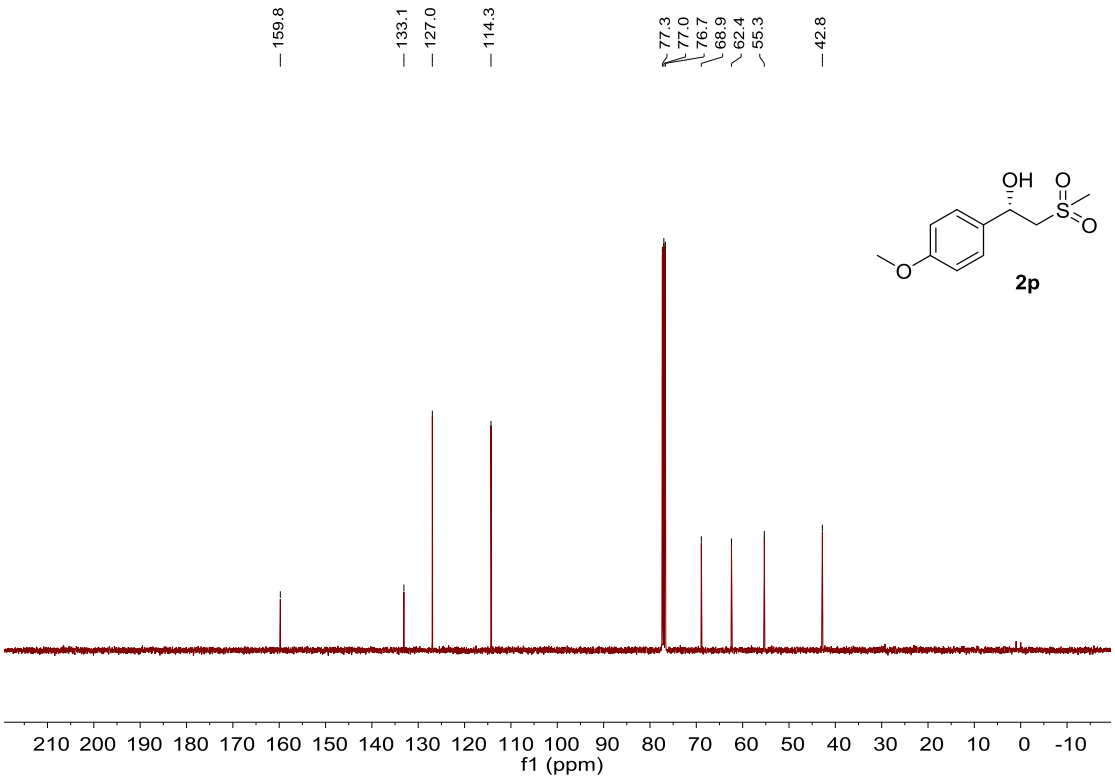
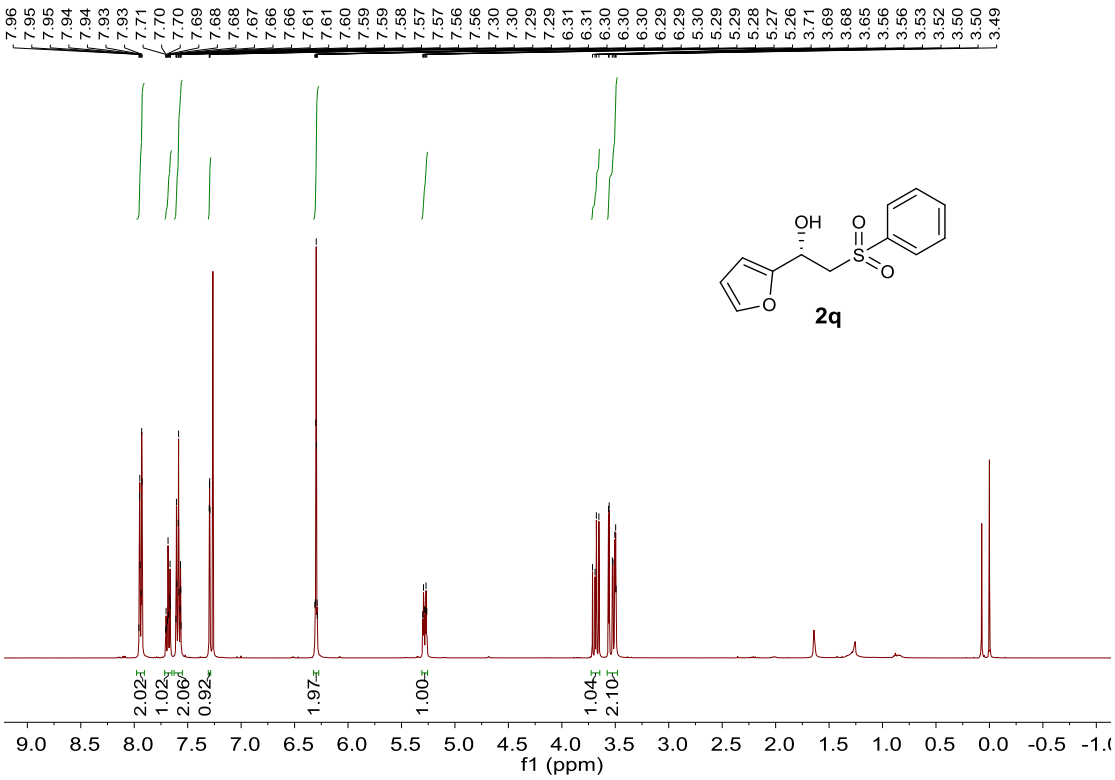
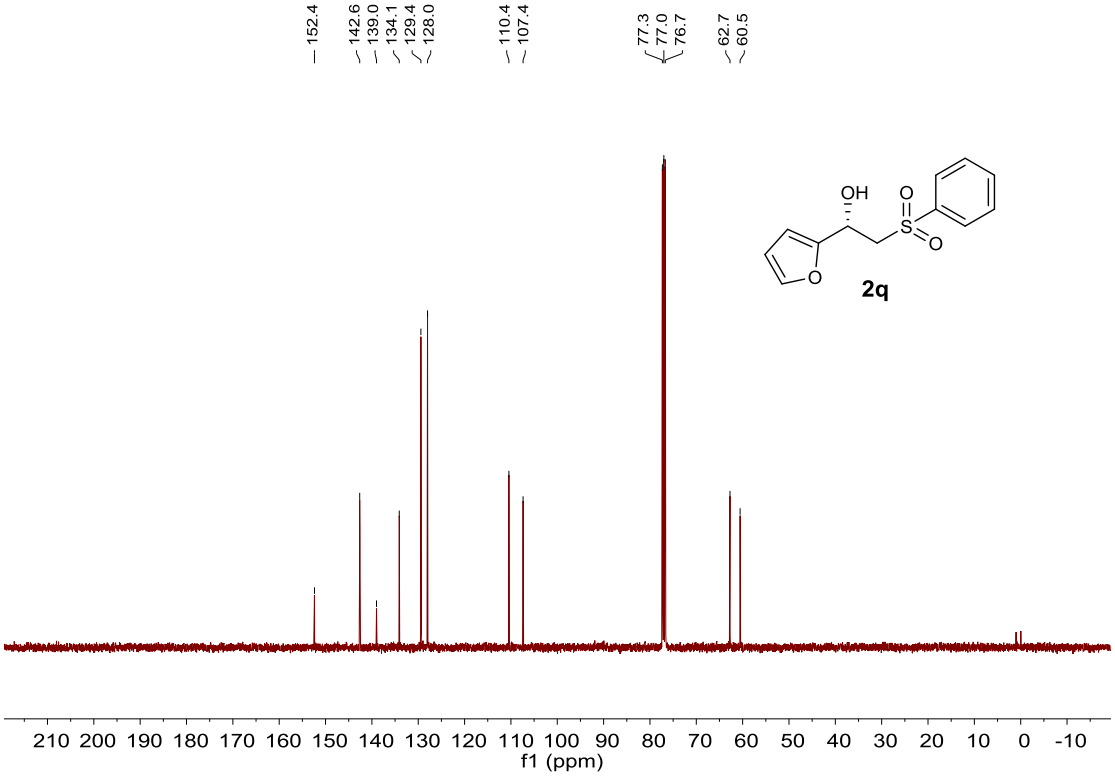
7.35
7.34
7.33
7.32
7.32
7.31
5.36
5.36
5.35
5.34
5.33
5.32
3.45
3.42
3.41
3.39
3.16
3.16
3.15
3.13
3.13
3.13
3.12
3.12
3.07
3.07
OH
O
S
O
Cl
2o
3.91
1.00
1.00
1.96
2.97
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

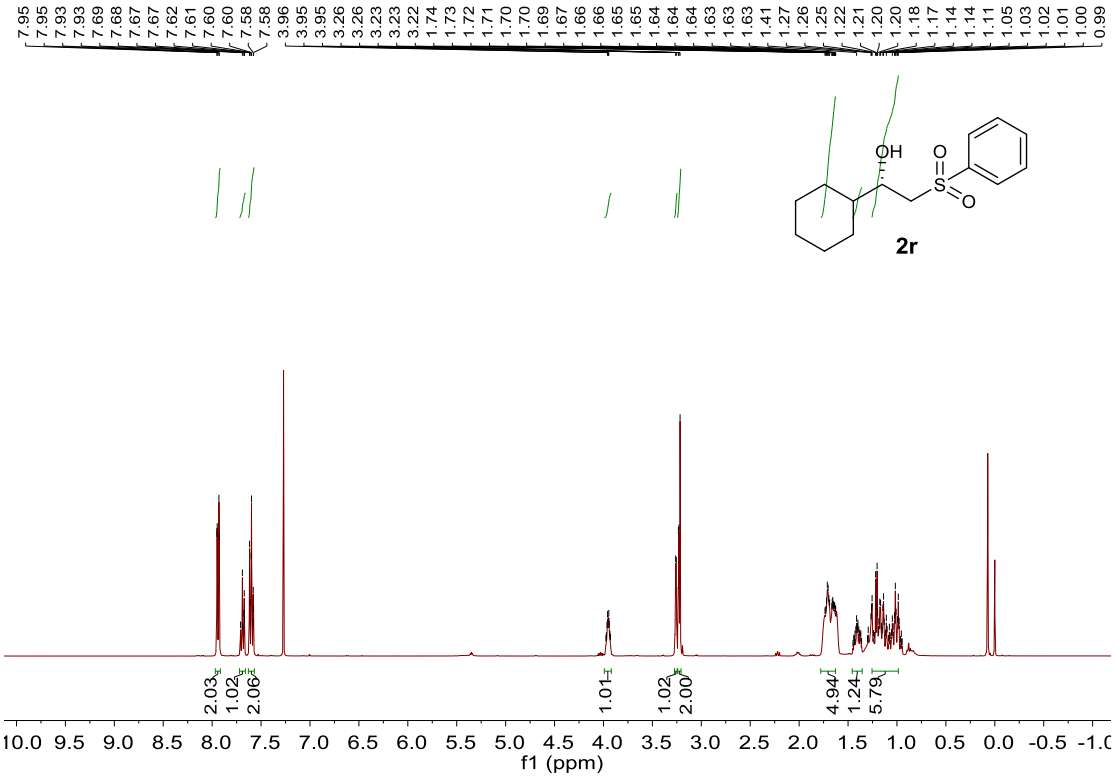

139.4
134.4
129.2
127.0
77.3
77.0
76.7
68.6
62.3
42.9
OH
O
S
O
Cl
2o
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

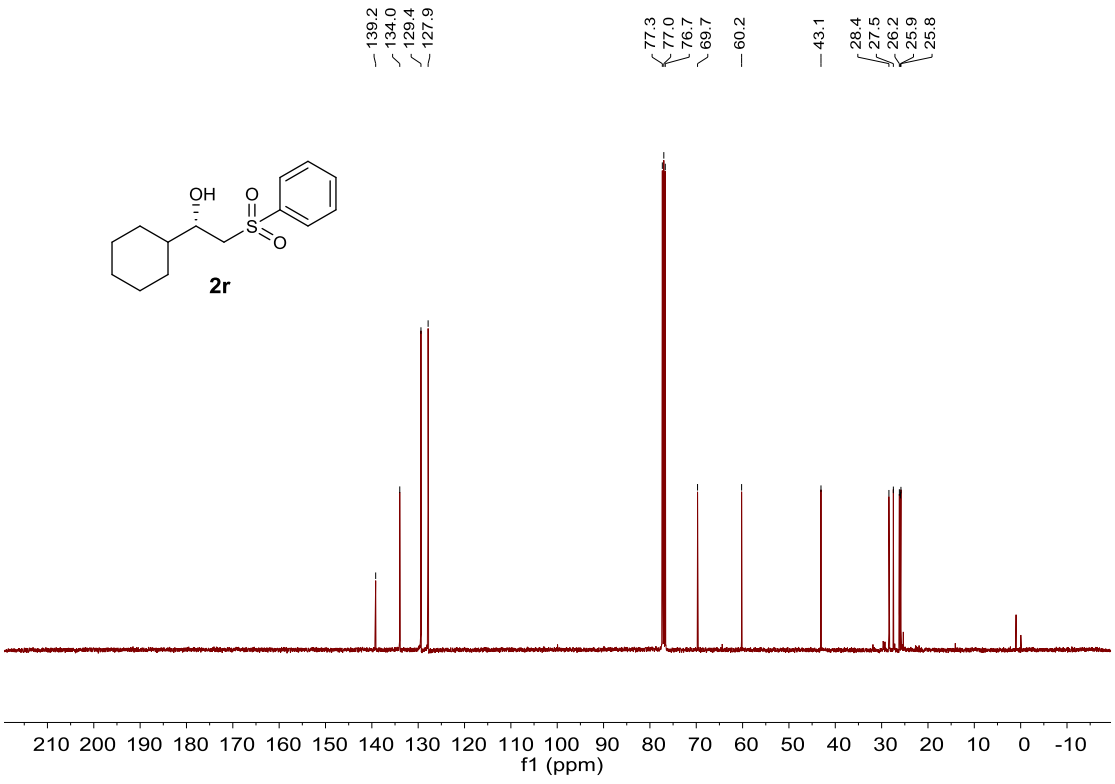

7.32
7.31
7.31
7.31
7.30
7.29
7.29
7.28
7.28
6.93
6.92
6.92
6.90
6.90
6.89
5.30
5.29
5.28
5.27
5.27
3.81
3.49
3.49
3.46
3.45
3.42
3.42
3.16
3.15
3.12
3.12
3.04
3.04
3.04
2.96
2.96
2.95
OH
O
S
O
O
2p
1.98
1.95
1.00
2.98
1.02
1.01
2.98
0.96
8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


159.8
133.1
127.0
114.3
77.3
77.0
76.7
68.9
62.4
55.3
42.8
OH
O
S
O
O
2p
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)


7.96 7.95 7.95 7.94 7.94 7.93 7.93 7.71 7.70 7.70 7.69 7.68 7.68 7.67 7.66 7.66 7.61 7.61 7.60 7.59 7.59 7.58 7.57 7.57 7.56 7.56 7.30 7.30 7.29 7.29 6.31 6.31 6.30 6.30 6.30 6.29 6.29 5.30 5.29 5.29 5.28 5.27 5.26 3.71 3.69 3.68 3.65 3.56 3.56 3.53 3.52 3.50 3.50 3.49
OH
O
S
O
O
2q
2.02
1.02
2.06
0.92
1.97
1.00
1.04
2.10
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 -0.5
f1 (ppm)


152.4
142.6
139.0
134.1
129.4
128.0
110.4
107.4
77.3
77.0
76.7
62.7
60.5
OH
O
S
O
O
2q
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)

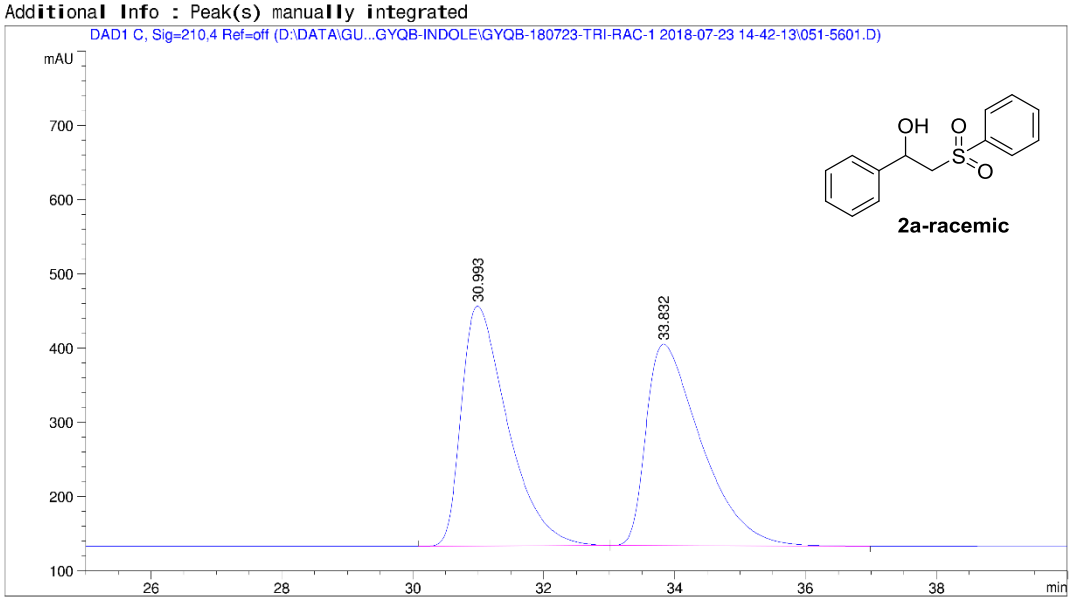

7.95 7.95 7.93 7.93 7.69 7.68 7.67 7.67 7.62 7.61 7.60 7.60 7.58 7.58 3.96 3.95 3.95 3.26 3.26 3.23 3.23 3.22 1.74 1.73 1.72 1.71 1.70 1.70 1.69 1.67 1.66 1.66 1.65 1.65 1.64 1.64 1.64 1.63 1.63 1.63 1.41 1.27 1.26 1.25 1.22 1.21 1.20 1.20 1.18 1.17 1.14 1.14 1.11 1.05 1.03 1.02 1.01 1.00 0.99
OH
O
S
O
2r
2.03
1.02
2.06
1.01
1.02
2.00
4.94
1.24
5.79
10.0 9.5 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 -0.5 -1.0
f1 (ppm)


139.2
134.0
129.4
127.9
77.3
77.0
76.7
69.7
60.2
43.1
28.4
27.5
26.2
25.9
25.8
OH
O
S
O
2r
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)

5. HPLC spectra

Data File D:\DATA\GU...NG\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13\051-5601.D
Sample Name: TL-ph-ph-rac

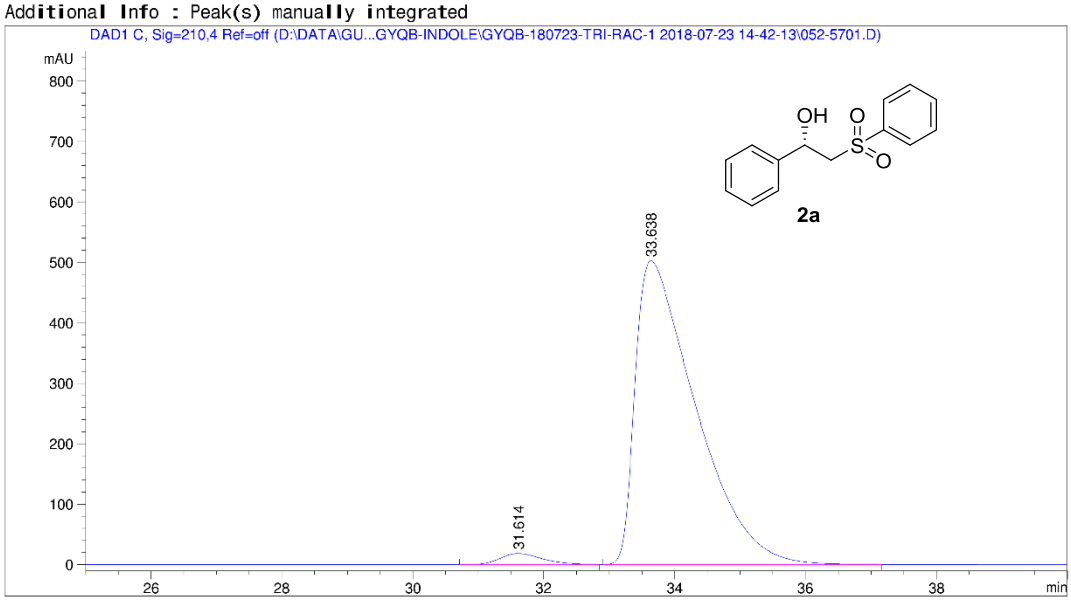
```
======================================================================
Acq. Operator   :                          Seq. Line :  56
Acq. Instrument : Instrument 2              Location : Vial 51
Injection Date  : 7/25/2018 12:27:43 AM          Inj :  1
                                          Inj 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)-80-20-1ML-3UL-ALL-70MIN.M
Last changed    : 6/28/2018 8:52:23 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-90-10-0.7ML-3UL-ALL-70MIN.M
Last changed    : 8/21/2018 9:47:34 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  30.993 BB    0.7358 1.58370e4   323.13983  49.9975
   2  33.832 BB    0.8511 1.58385e4   271.31900  50.0025

Totals :                  3.16755e4   594.45883
```

Data File D:\DATA\GU...NG\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13\052-5701.D
Sample Name: TL-ph-ph-rac

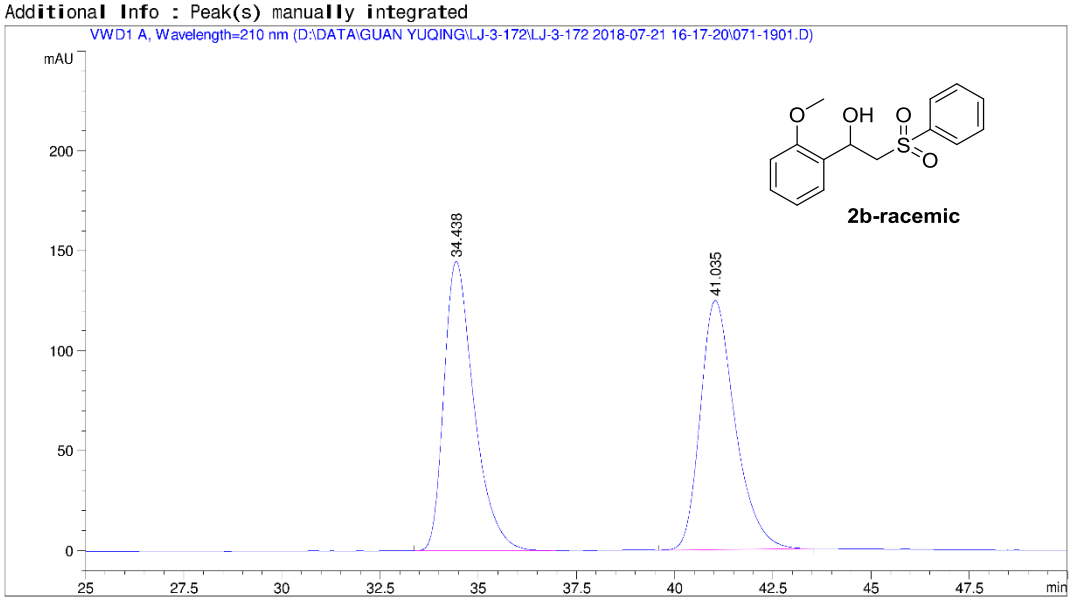
```
==========================================================================
Acq. Operator   :                                Seq. Line :  57
Acq. Instrument : Instrument 2                    Location : Vial 52
Injection Date  : 7/25/2018 1:15:41 AM                 Inj :   1
                                                 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)-80-20-1ML-3UL-ALL-70MIN.M
Last changed    : 6/28/2018 8:52:23 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-90-10-0.7ML-3UL-ALL-70MIN.M
Last changed    : 8/21/2018 9:48:33 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  31.614 BB    0.6241  828.07184   18.36459   2.5013
   2  33.638 BB    0.9194 3.22780e4   502.49078  97.4987

Totals :                  3.31061e4   520.85537
```

Data File D:\DATA\GUAN YUQING\LJ-3-172\LJ-3-172 2018-07-21 16-17-20\071-1901.D
Sample Name: TL-2-MeO-ph-rac

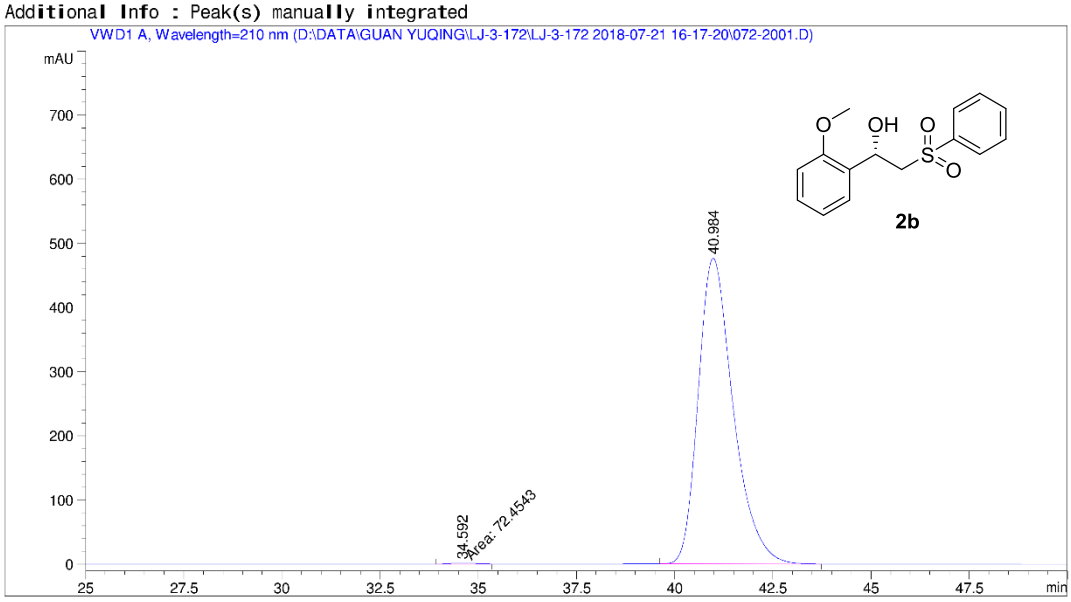
```
==========================================================================
Acq. Operator   :                                Seq. Line :  19
Acq. Instrument : Instrument 1                    Location : Vial 71
Injection Date  : 7/22/2018 6:43:23 AM                 Inj :  1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\GUAN YUQING\LJ-3-172\LJ-3-172 2018-07-21 16-17-20\VWD-AD(1-2)-90-10
                  -1ML-3UL-210NM-55MIN.M
Last changed    : 5/29/2018 8:00:31 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:14:25 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  34.438 BB    0.8071 7703.96484  144.70210  50.0026
   2  41.035 BB    0.9317 7703.17529  124.69363  49.9974

Totals :                  1.54071e4   269.39573
```

Data File D:\DATA\GUAN YUQING\LJ-3-172\LJ-3-172 2018-07-21 16-17-20\072-2001.D
Sample Name: TL-2-MeO-ph-ee

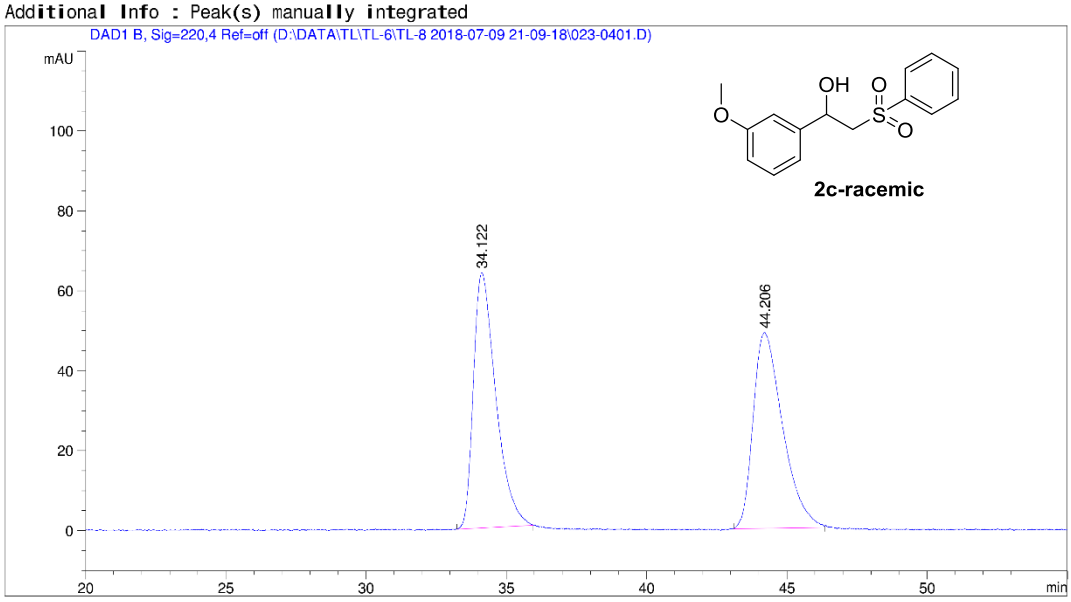
```
======================================================================
Acq. Operator   :                          Seq. Line :  20
Acq. Instrument : Instrument 1              Location : Vial 72
Injection Date  : 7/22/2018 7:39:14 AM           Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\GUAN YUQING\LJ-3-172\LJ-3-172 2018-07-21 16-17-20\VWD-AD(1-2)-90-10
                  -1ML-3UL-210NM-55MIN.M
Last changed    : 5/29/2018 8:00:31 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:20:34 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  34.592 MM    0.7966   72.45431    1.51590   0.2449
   2  40.984 BB    0.9404 2.95174e4   476.07034  99.7551

Totals :                  2.95899e4   477.58624
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\023-0401.D
Sample Name: TL-3-MeO-ph-rac

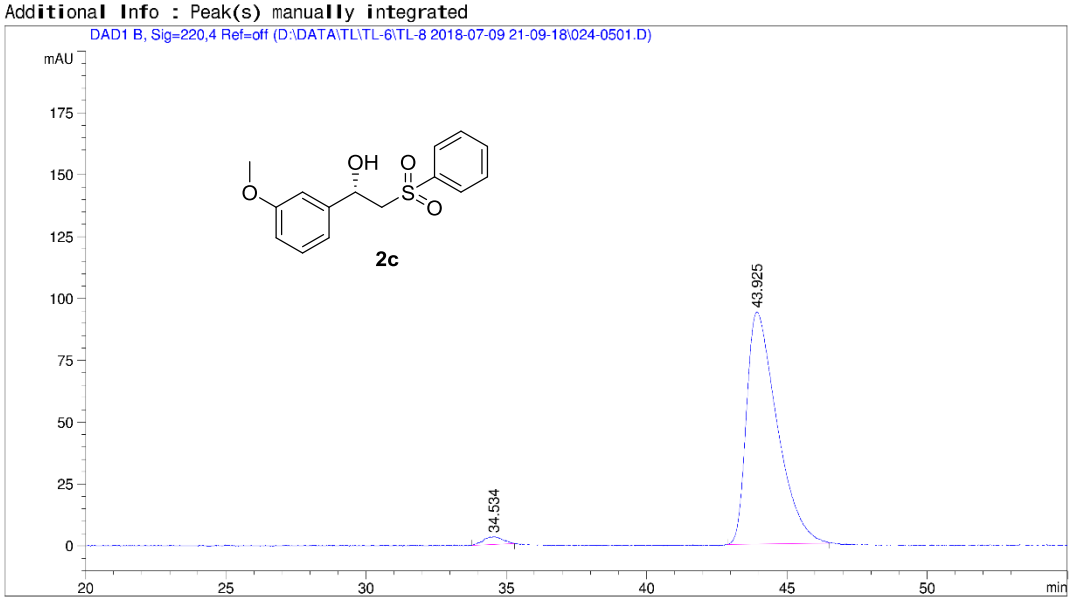
```
==========================================================================
Acq. Operator   :                                  Seq. Line :   4
Acq. Instrument : Instrument 2                      Location : Vial 23
Injection Date  : 7/9/2018 10:43:17 PM                  Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  55MIN.M
Last changed    : 7/9/2018 9:15:39 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:42:06 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  34.122 BB    0.6678 3548.98901   63.91422  49.8698
   2  44.206 BV    0.8612 3567.52515   49.01395  50.1302

Totals :                  7116.51416  112.92818
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\024-0501.D
Sample Name: TL-3-MeO-ph-ee

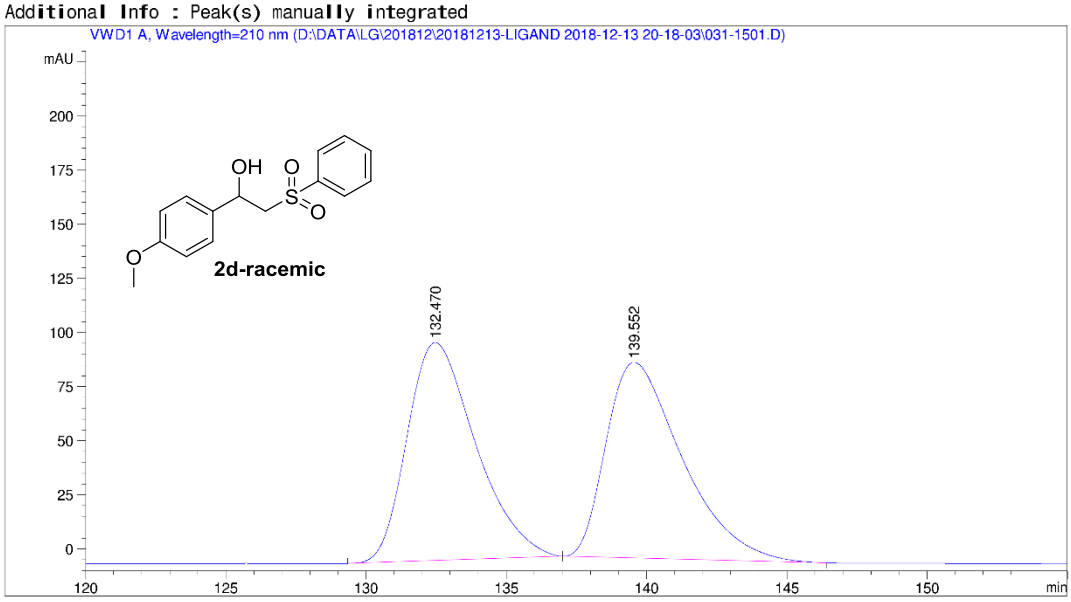
```
======================================================================
Acq. Operator   :                          Seq. Line :   5
Acq. Instrument : Instrument 2              Location : Vial 24
Injection Date  : 7/9/2018 11:39:15 PM           Inj :   1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  55MIN.M
Last changed    : 7/9/2018 9:15:39 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:42:59 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  34.534 BB    0.5624  149.22067    3.15135   2.0634
   2  43.925 BB    0.8869 7082.66650   93.80273  97.9366

Totals :                  7231.88718   96.95408
```

Data File D:\DATA\LG\201812\20181213-LIGAND 2018-12-13 20-18-03\031-1501.D
Sample Name: TL-4-MeO-PH-RAC

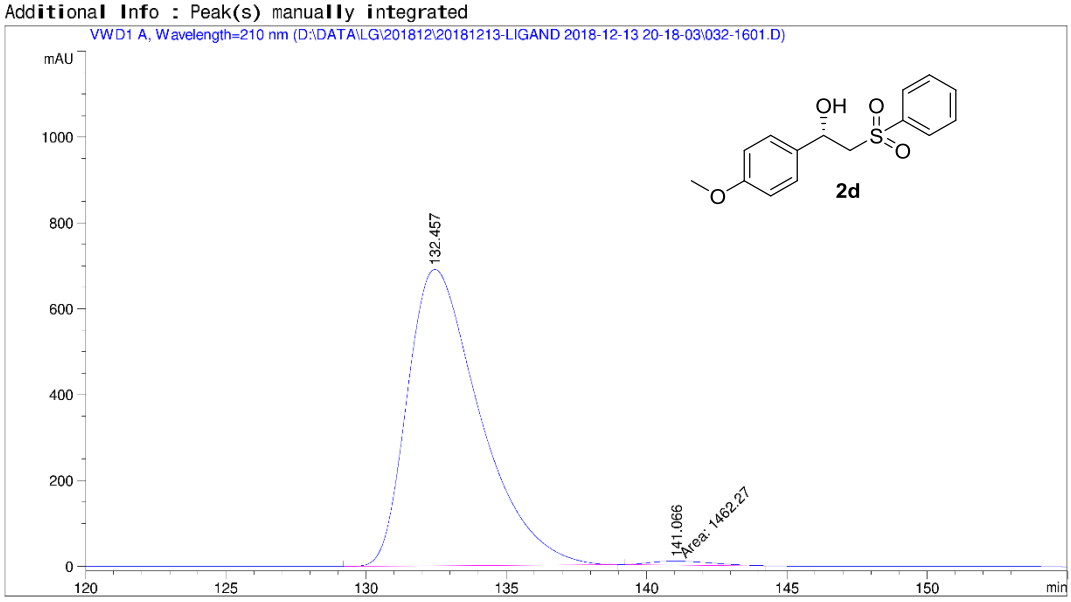
```
==========================================================================
Acq. Operator   :                                Seq. Line :  15
Acq. Instrument : Instrument 1                    Location : Vial 31
Injection Date  : 12/14/2018 3:10:21 AM               Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LG\201812\20181213-LIGAND 2018-12-13 20-18-03\VWD-AD(1-2)-90-10-0.
                  5ML-3UL-210NM-200MIN.M
Last changed    : 12/13/2018 9:25:57 PM
Analysis Method : D:\METHOD\TL\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-50MIN.M
Last changed    : 12/18/2018 8:01:06 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]       %
----|-------|----|-------|----------|----------|--------|
   1 132.470 BB    2.5083 1.70786e4   100.71841  50.0808
   2 139.552 BB    2.6355 1.70235e4    90.37720  49.9192

Totals :                  3.41022e4   191.09560
```

Data File D:\DATA\LG\201812\20181213-LIGAND 2018-12-13 20-18-03\032-1601.D
Sample Name: TL-4-MeO-PH-EE

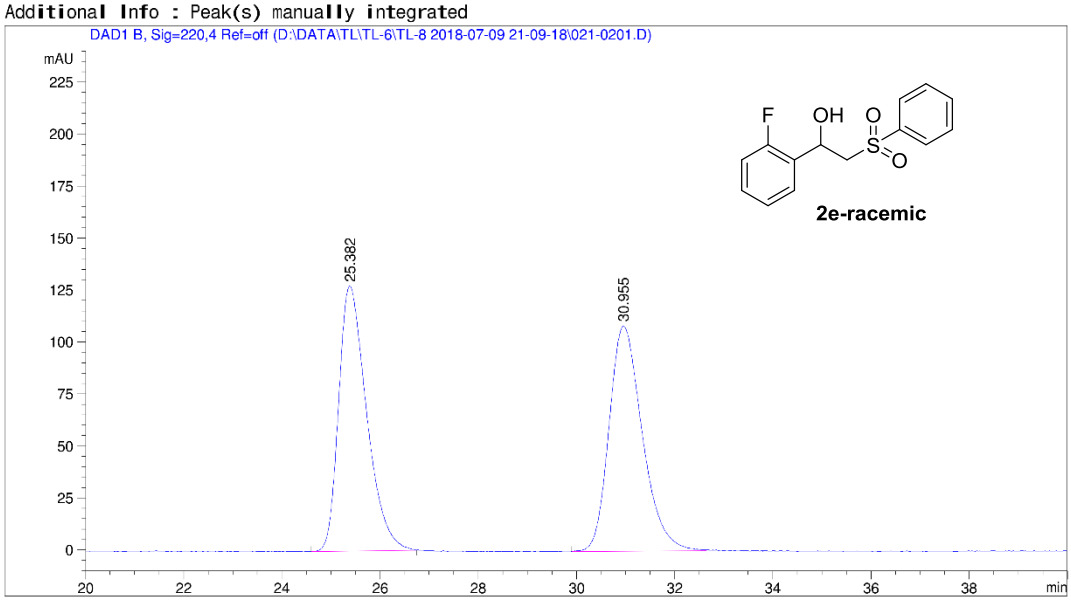
```
======================================================================
Acq. Operator   :                          Seq. Line :  16
Acq. Instrument : Instrument 1              Location : Vial 32
Injection Date  : 12/14/2018 6:31:11 AM          Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LG\201812\20181213-LIGAND 2018-12-13 20-18-03\VWD-AD(1-2)-90-10-0.
                  5ML-3UL-210NM-200MIN.M
Last changed    : 12/13/2018 9:25:57 PM
Analysis Method : D:\METHOD\TL\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-50MIN.M
Last changed    : 12/18/2018 8:03:44 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]       %
----|-------|----|-------|----------|----------|--------|
   1 132.457 BB    2.6948 1.23896e5   690.36621  98.8335
   2 141.066 MM    2.5153 1462.26697    9.68918   1.1665

Totals :                  1.25358e5   700.05539
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\021-0201.D
Sample Name: TL-2-F-ph-rac

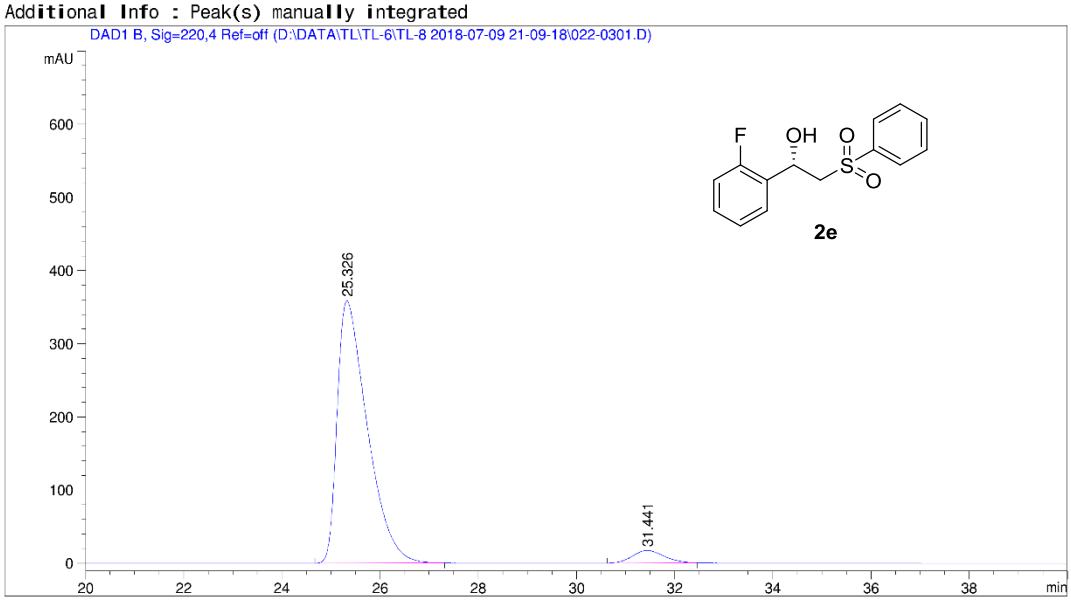
```
==========================================================================
Acq. Operator   :                                Seq. Line :   2
Acq. Instrument : Instrument 2                    Location : Vial 21
Injection Date  : 7/9/2018 9:21:21 PM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:47:55 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  25.382 BB    0.5636 5049.20996  127.61078  49.7639
   2  30.955 BV    0.6407 5097.11279  108.38634  50.2361

Totals :                  1.01463e4   235.99712
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\022-0301.D
Sample Name: TL-2-F-ph-ee

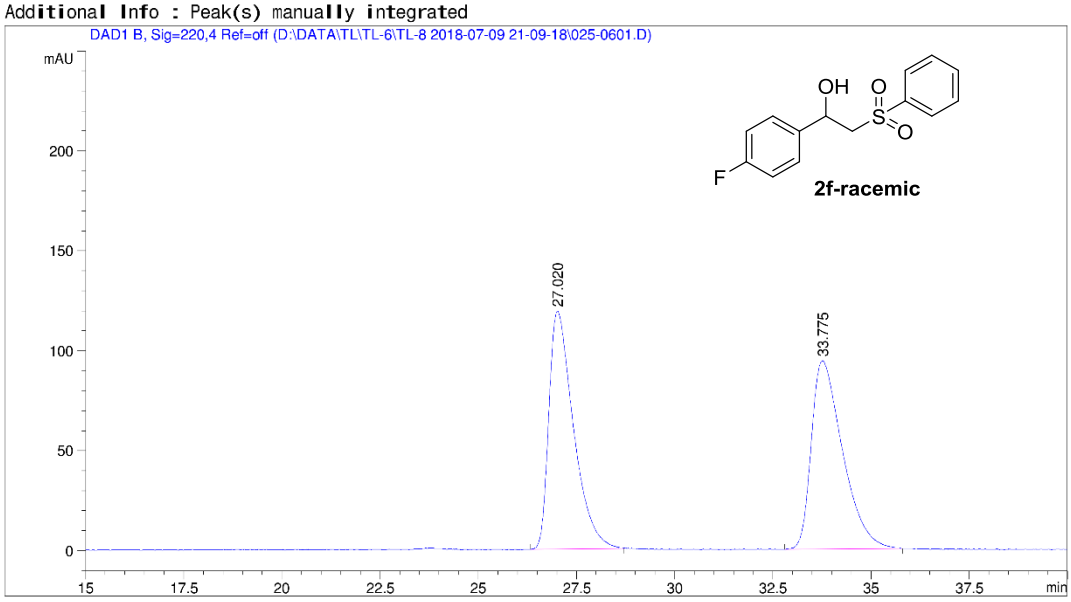
```
======================================================================
Acq. Operator   :                                Seq. Line :   3
Acq. Instrument : Instrument 2                    Location : Vial 22
Injection Date  : 7/9/2018 10:02:17 PM               Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:48:53 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  25.326 BB    0.6149 1.52677e4   358.47754  95.1553
   2  31.441 BV    0.5417  777.33984   17.12177   4.8447

Totals :                  1.60450e4   375.59930
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\025-0601.D
Sample Name: TL-4-F-ph-rac

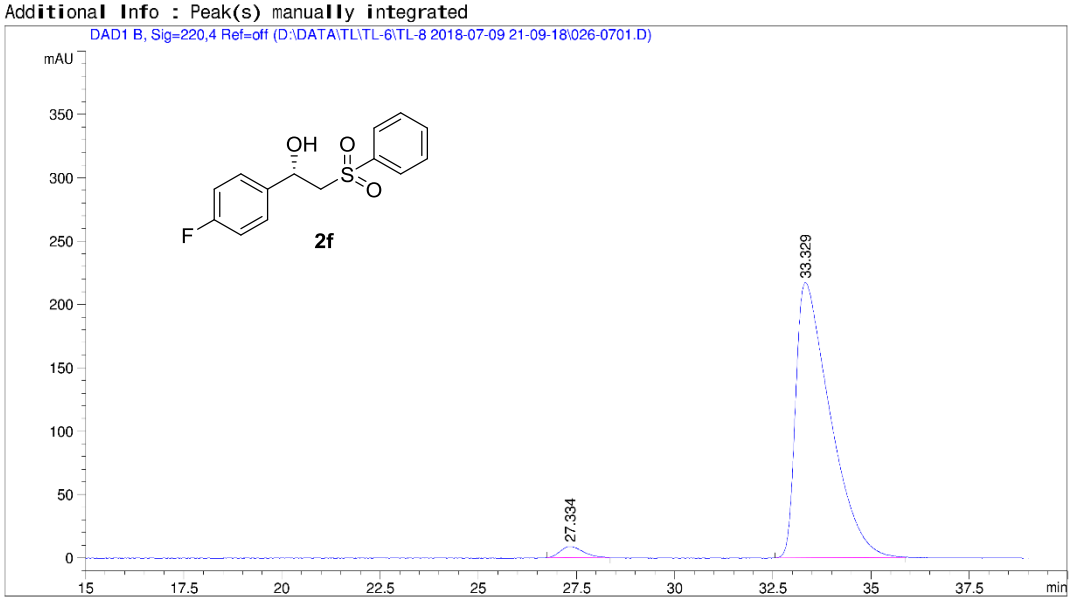
```
==========================================================================
Acq. Operator   :                                 Seq. Line :   6
Acq. Instrument : Instrument 2                     Location : Vial 25
Injection Date  : 7/10/2018 12:35:15 AM               Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  45MIN.M
Last changed    : 7/9/2018 9:24:11 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:44:35 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  27.020 BV    0.6321 5188.89307  119.14967  49.8486
   2  33.775 BB    0.6662 5220.41846   94.24884  50.1514

Totals :                  1.04093e4   213.39851
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\026-0701.D
Sample Name: TL-4-F-ph-ree

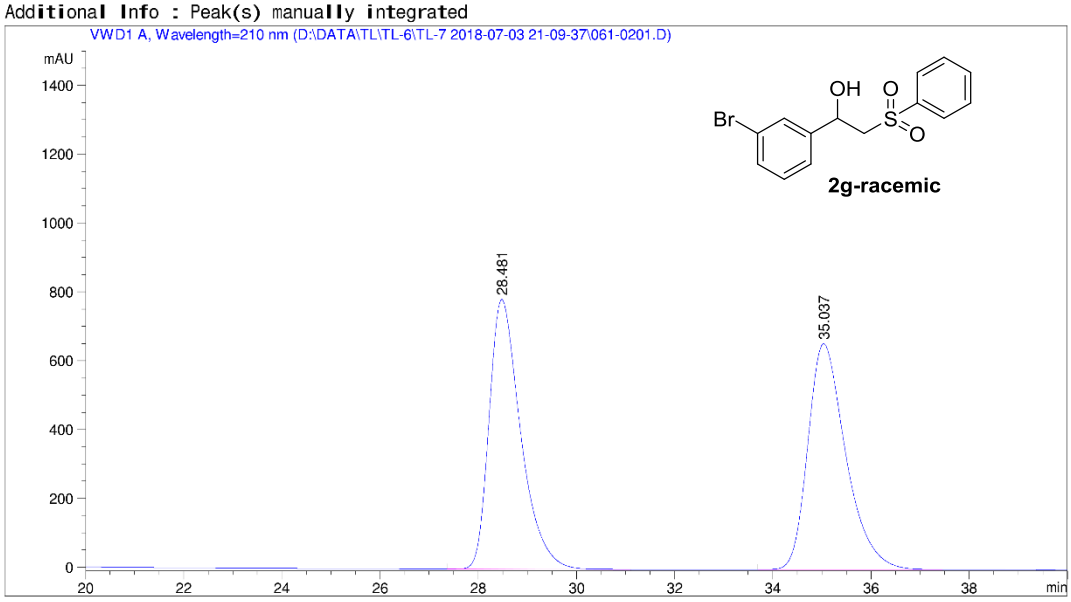
```
==========================================================================
Acq. Operator   :                                Seq. Line :   7
Acq. Instrument : Instrument 2                    Location : Vial 26
Injection Date  : 7/10/2018 1:21:13 AM                Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  45MIN.M
Last changed    : 7/9/2018 9:24:11 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:46:09 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  27.334 BV    0.4831  363.98114    8.86326   2.6803
   2  33.329 BV    0.8014 1.32157e4   217.33136  97.3197

Totals :                  1.35796e4   226.19462
```

Data File D:\DATA\TL\TL-6\TL-7 2018-07-03 21-09-37\061-0201.D
Sample Name: TL-3-Br-ph-rac

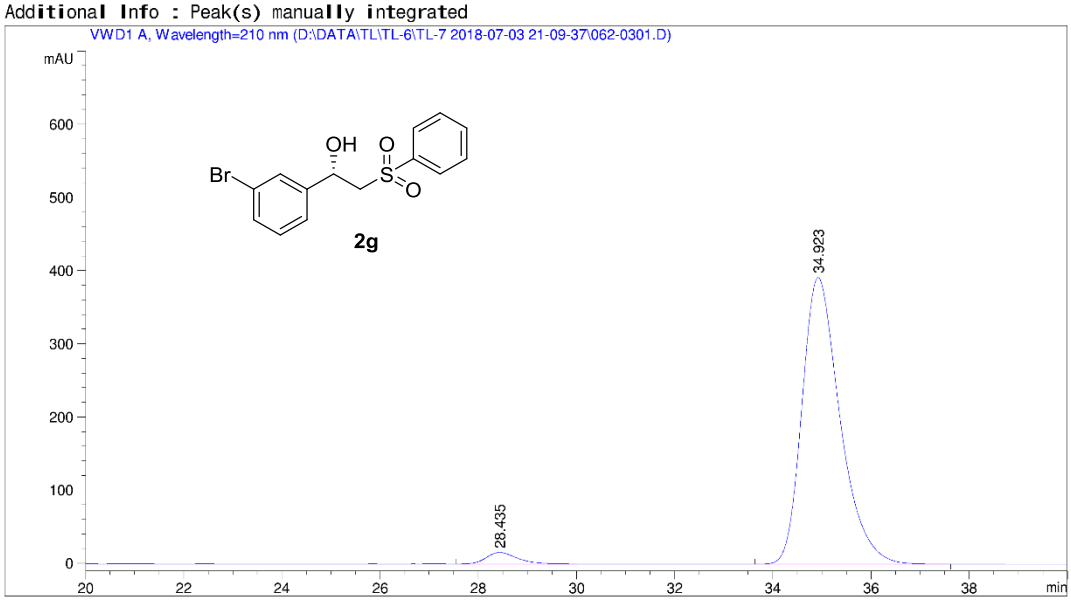
```
======================================================================
Acq. Operator   :                          Seq. Line :  2
Acq. Instrument : Instrument 1              Location : Vial 61
Injection Date  : 7/3/2018 9:21:26 PM           Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-7 2018-07-03 21-09-37\VWD-AD(1-2)-90-10-1ML-3UL-210NM-
                  40MIN.M
Last changed    : 7/3/2018 9:05:40 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:35:20 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: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  28.481 BB    0.6761 3.49141e4   783.19885  49.7706
   2  35.037 BB    0.8215 3.52360e4   656.15796  50.2294

Totals :                  7.01501e4  1439.35681
```

Data File D:\DATA\TL\TL-6\TL-7 2018-07-03 21-09-37\062-0301.D
Sample Name: TL-3-Br-ph-ree

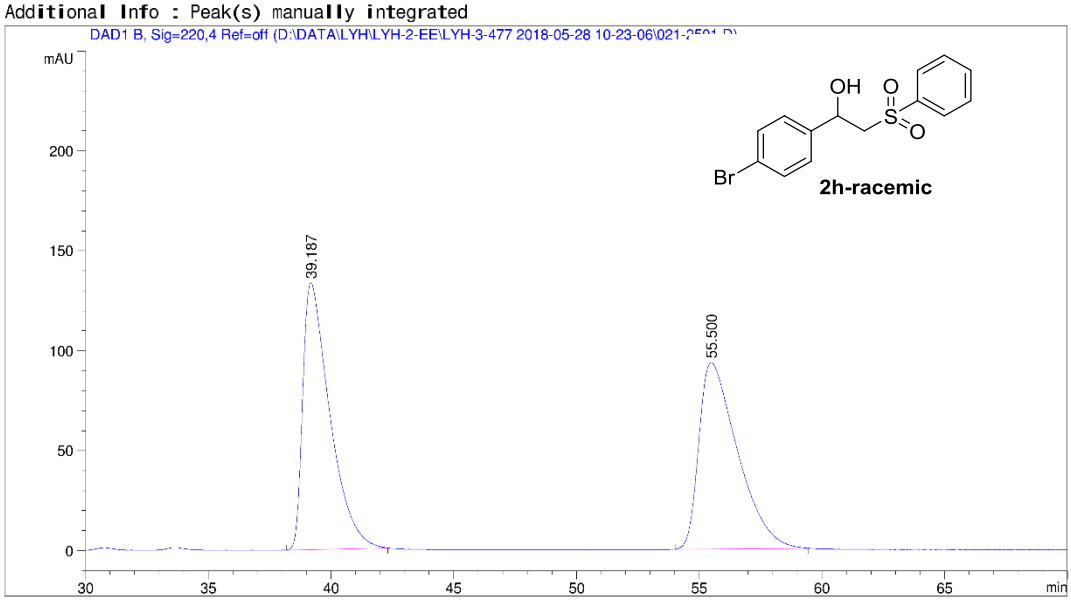
```
======================================================================
Acq. Operator   :                          Seq. Line :   3
Acq. Instrument : Instrument 1              Location : Vial 62
Injection Date  : 7/3/2018 10:02:16 PM           Inj :   1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-7 2018-07-03 21-09-37\VWD-AD(1-2)-90-10-1ML-3UL-210NM-
                  40MIN.M
Last changed    : 7/3/2018 9:05:40 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:37:46 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  28.435 BB    0.6577  694.79932   15.81091   3.2002
   2  34.923 BB    0.8195 2.10163e4   391.36459  96.7998

Totals :                  2.17111e4   407.17551
```

Data File D:\DATA\LYH\LYH-2-EE\LYH-3-477 2018-05-28 10-23-06\021-2501.D
Sample Name: tl-4-Br-ph-rac

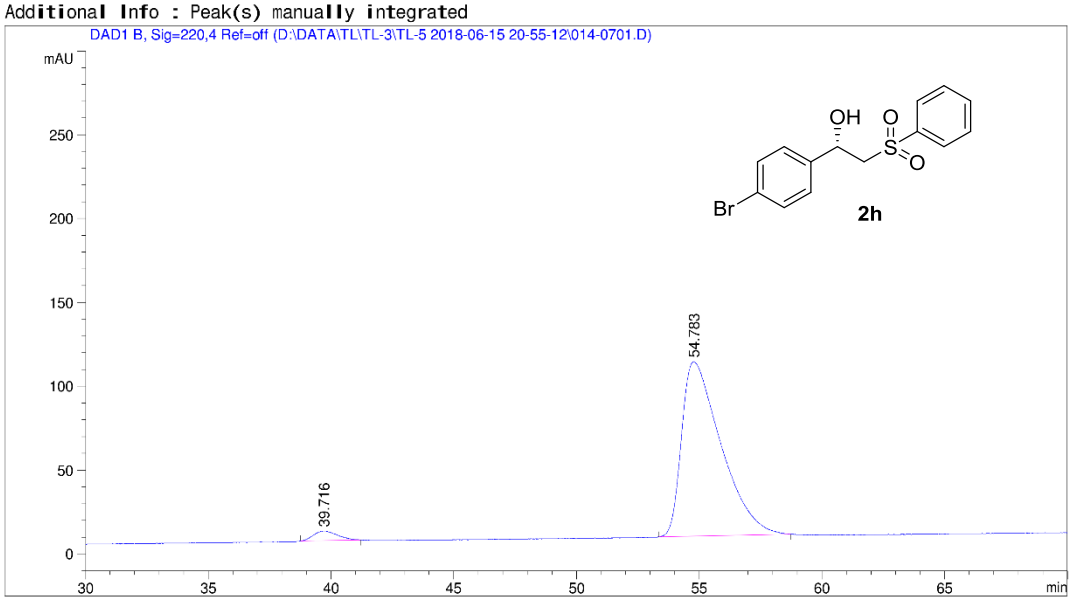
```
==========================================================================
Acq. Operator   :                                 Seq. Line :  25
Acq. Instrument : Instrument 2                     Location : Vial 21
Injection Date  : 5/29/2018 5:22:01 AM                 Inj :   1
                                                  Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LYH\LYH-2-EE\LYH-3-477 2018-05-28 10-23-06\DAD-OJ(1-6)-80-20-1ML-
                  2UL-ALL-80MIN.M
Last changed    : 5/28/2018 4:24:25 PM
Analysis Method : D:\METHOD\YCC\DAD-OJ(1-6)-80-20-1ML-1UL-ALL-60MIN.M
Last changed    : 11/6/2018 9:03:47 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  39.187 BB    0.9226 1.02205e4   133.58096  49.9718
   2  55.500 BB    1.2836 1.02320e4    93.43902  50.0282

Totals :                  2.04525e4   227.01998
```

Data File D:\DATA\TL\TL-3\TL-5 2018-06-15 20-55-12\014-0701.D
Sample Name: TL-4-Br-ph-rac

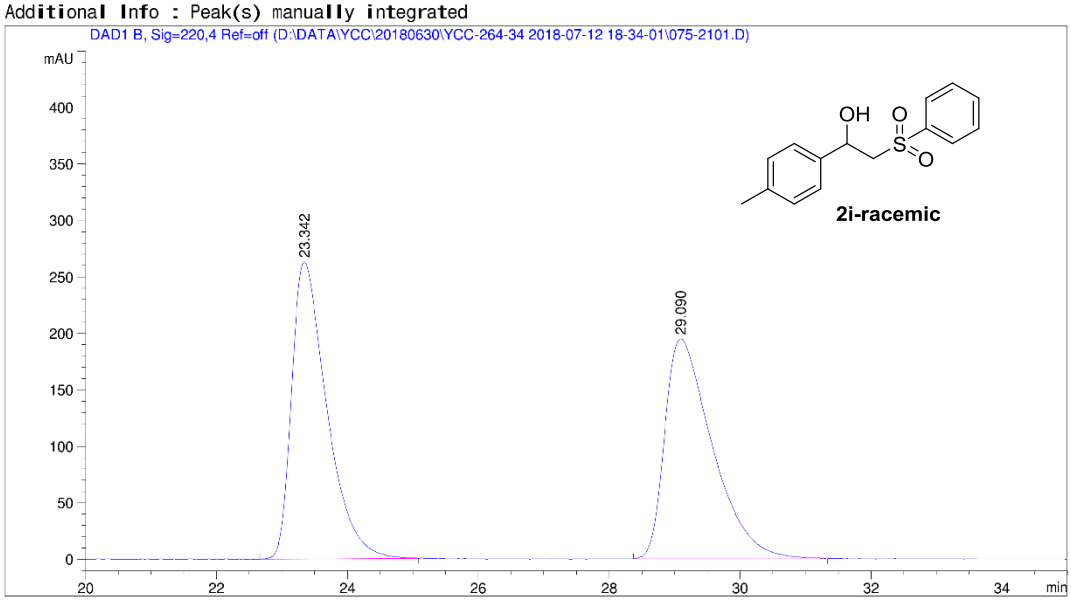
```
======================================================================
Acq. Operator   :                          Seq. Line :   7
Acq. Instrument : Instrument 2              Location : Vial 14
Injection Date  : 6/15/2018 11:22:06 PM          Inj :   1
                                          Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\TL\TL-3\TL-5 2018-06-15 20-55-12\DAD-OJ(1-6)-80-20-1ML-2UL-ALL-
                  70MIN.M
Last changed    : 6/15/2018 8:43:36 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 8:50:57 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  39.716 BB    0.7975  391.70309    5.77394   3.2672
   2  54.783 BB    1.3048 1.15972e4   104.17376  96.7328

Totals :                  1.19889e4   109.94770
```

Data File D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\075-2101.D
Sample Name: TL-4-Me-ph-rac

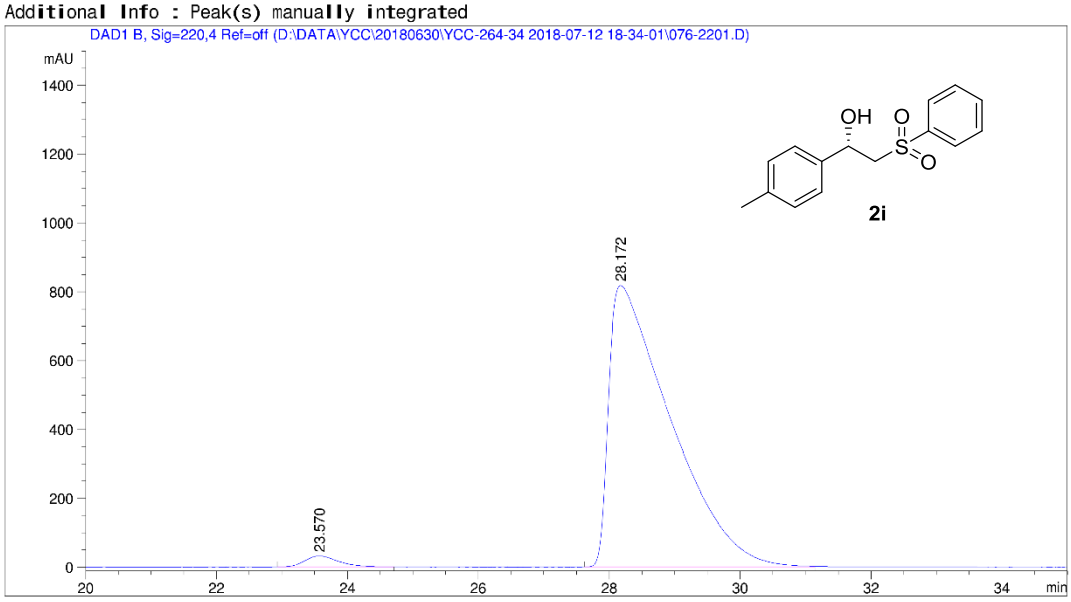
```
==========================================================================
Acq. Operator   :                                 Seq. Line :  21
Acq. Instrument : Instrument 2                     Location : Vial 75
Injection Date  : 7/13/2018 4:22:03 AM                 Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\DAD-0J(1-6)-80-20-1ML-
                  3UL-ALL-40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:50:39 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  23.342 BB    0.5393 9802.63770  262.74643  49.9829
   2  29.090 BB    0.6898 9809.33984  194.69162  50.0171

Totals :                  1.96120e4   457.43805
```

Data File D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\076-2201.D
Sample Name: TL-4-Me-ph-ee

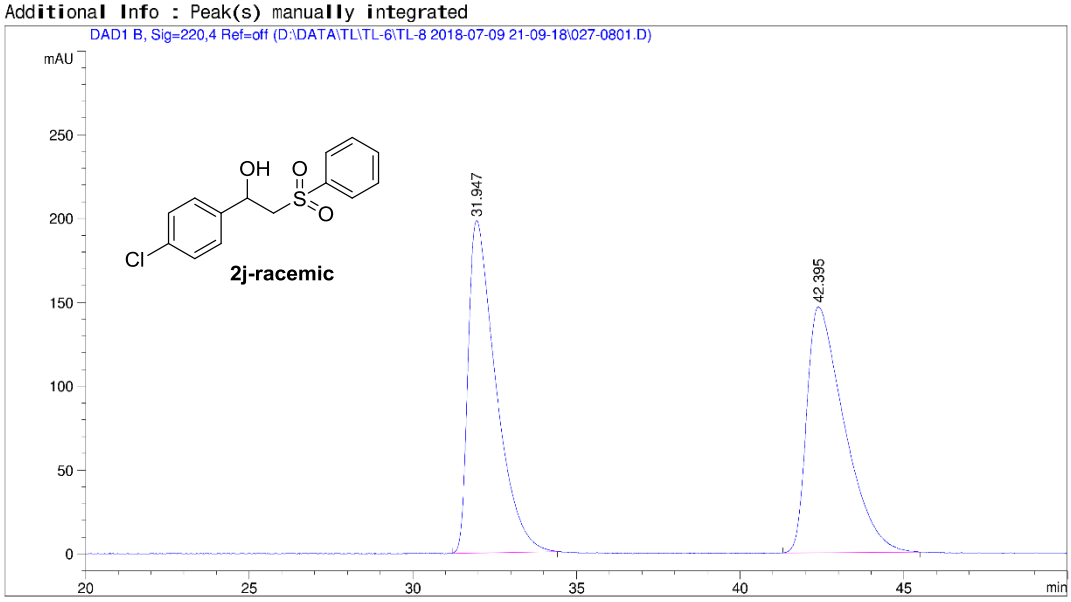
```
==========================================================================
Acq. Operator   :                                  Seq. Line :  22
Acq. Instrument : Instrument 2                      Location : Vial 76
Injection Date  : 7/13/2018 5:03:02 AM                  Inj :   1
                                                   Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\DAD-0J(1-6)-80-20-1ML-
                  3UL-ALL-40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:52:13 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  23.570 BV    0.4595 1160.58228   32.12264   2.1156
   2  28.172 BV    0.8518 5.36976e4   818.01746  97.8844

Totals :                  5.48582e4   850.14009
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\027-0801.D
Sample Name: TL-4-Cl-ph-rac

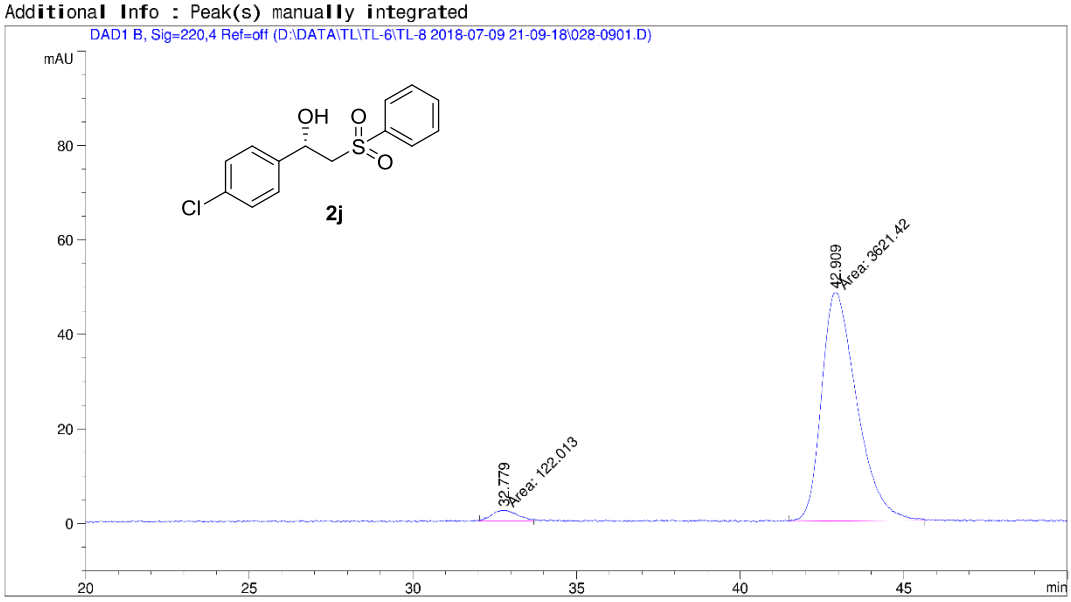
```
==========================================================================
Acq. Operator   :                                  Seq. Line :   8
Acq. Instrument : Instrument 2                      Location : Vial 27
Injection Date  : 7/10/2018 2:07:14 AM                  Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  50MIN.M
Last changed    : 7/9/2018 9:28:06 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:08:17 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  31.947 BB    0.7134 1.16421e4   198.17842  49.8995
   2  42.395 BB    0.9343 1.16890e4   146.59465  50.1005

Totals :                  2.33311e4   344.77307
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\028-0901.D
Sample Name: TL-4-Cl-ph-ree

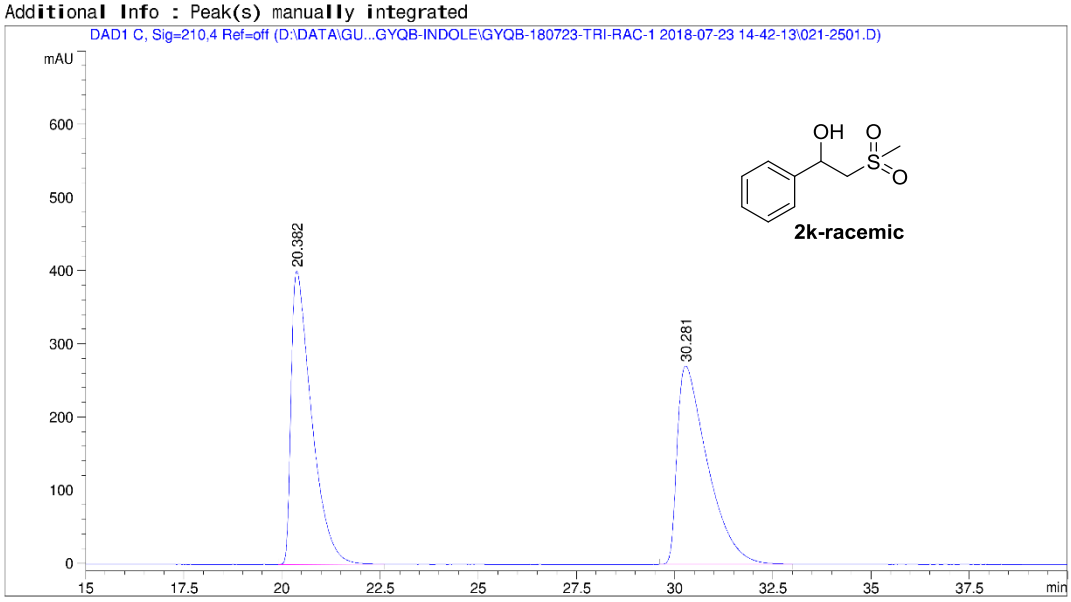
```
======================================================================
Acq. Operator   :                          Seq. Line :   9
Acq. Instrument : Instrument 2              Location : Vial 28
Injection Date  : 7/10/2018 2:58:11 AM           Inj :   1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  50MIN.M
Last changed    : 7/9/2018 9:28:06 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:10:55 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  32.779 MM    0.9080  122.01331    2.23948   3.2594
   2  42.909 MM    1.2491 3621.41577   48.31980  96.7406

Totals :                  3743.42908   50.55928
```

Data File D:\DATA\GU...NG\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13\021-2501.D
Sample Name: TL-ph-Me-rac

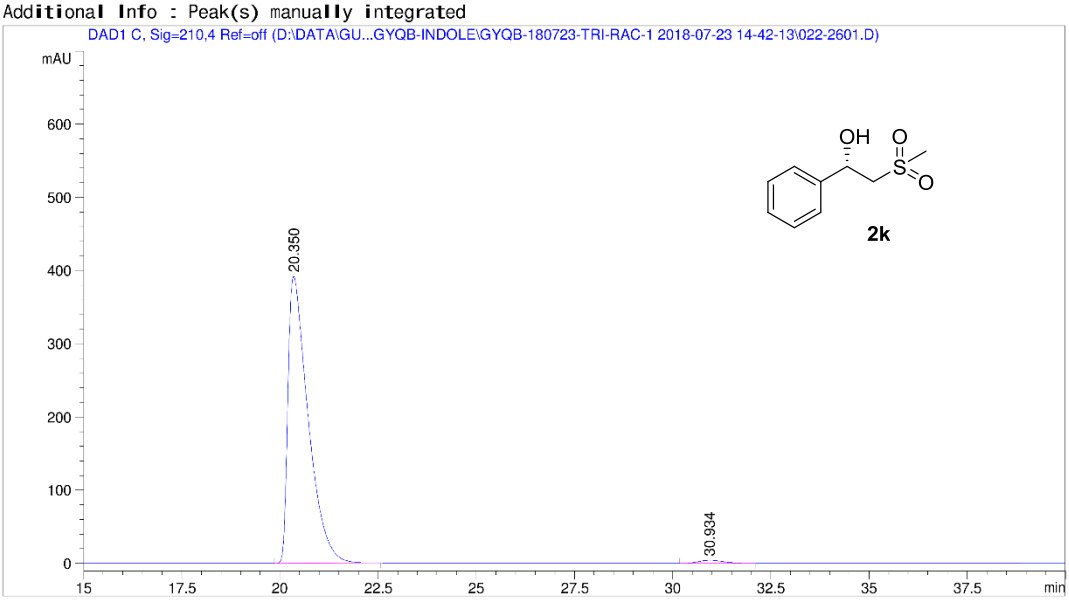
```
=====================================================================
Acq. Operator   :                          Seq. Line :  25
Acq. Instrument : Instrument 2              Location : Vial 21
Injection Date  : 7/24/2018 7:13:05 AM           Inj :  1
                                          Inj Volume : 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)-80-20-1ML-3UL-ALL-70MIN.M
Last changed    : 6/28/2018 8:52:23 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-90-10-0.7ML-3UL-ALL-70MIN.M
Last changed    : 8/21/2018 9:42:45 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  20.382 BB    0.5401 1.44845e4   400.36893  49.9424
   2  30.281 BB    0.7887 1.45179e4   271.13010  50.0576

Totals :                  2.90025e4   671.49902
```

Data File D:\DATA\GU...NG\GYQB-INDOLE\GYQB-180723-TRI-RAC-1 2018-07-23 14-42-13\022-2601.D
Sample Name: TL-ph-Me-ee

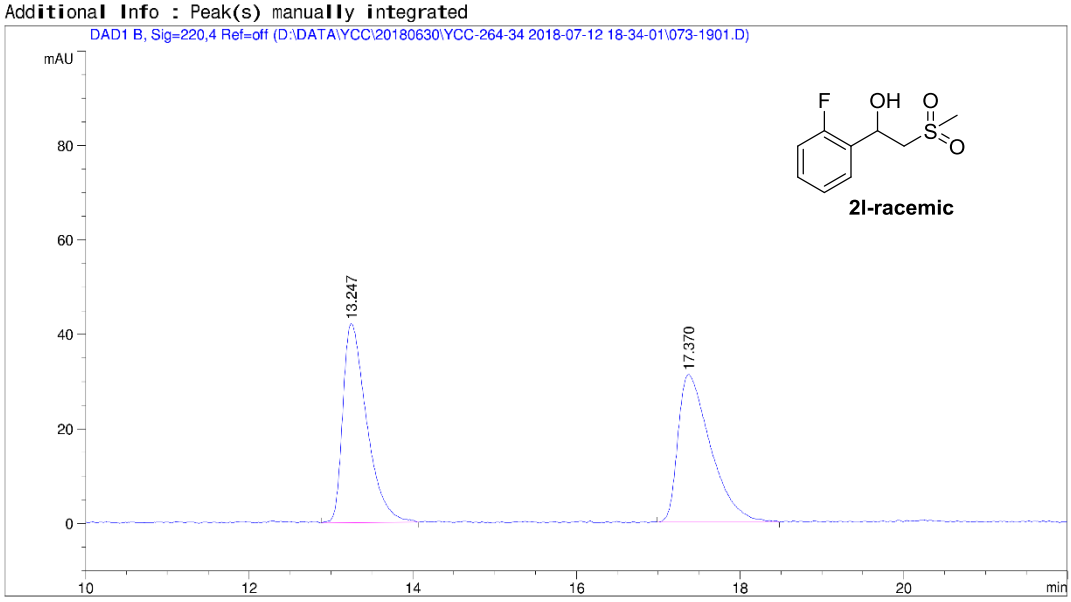
```
======================================================================
Acq. Operator   :                          Seq. Line :  26
Acq. Instrument : Instrument 2              Location : Vial 22
Injection Date  : 7/24/2018 8:24:03 AM           Inj :  1
                                          Inj 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)-80-20-1ML-3UL-ALL-70MIN.M
Last changed    : 7/24/2018 9:10:19 AM
                  (modified after loading)
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-90-10-0.7ML-3UL-ALL-70MIN.M
Last changed    : 8/21/2018 9:42:45 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  20.350 BB    0.5244 1.39980e4   392.23517  98.6656
   2  30.934 BB    0.5349  189.31180    4.23998   1.3344

Totals :                  1.41873e4   396.47515
```

Data File D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\073-1901.D
Sample Name: TL-2-F-Me-rac

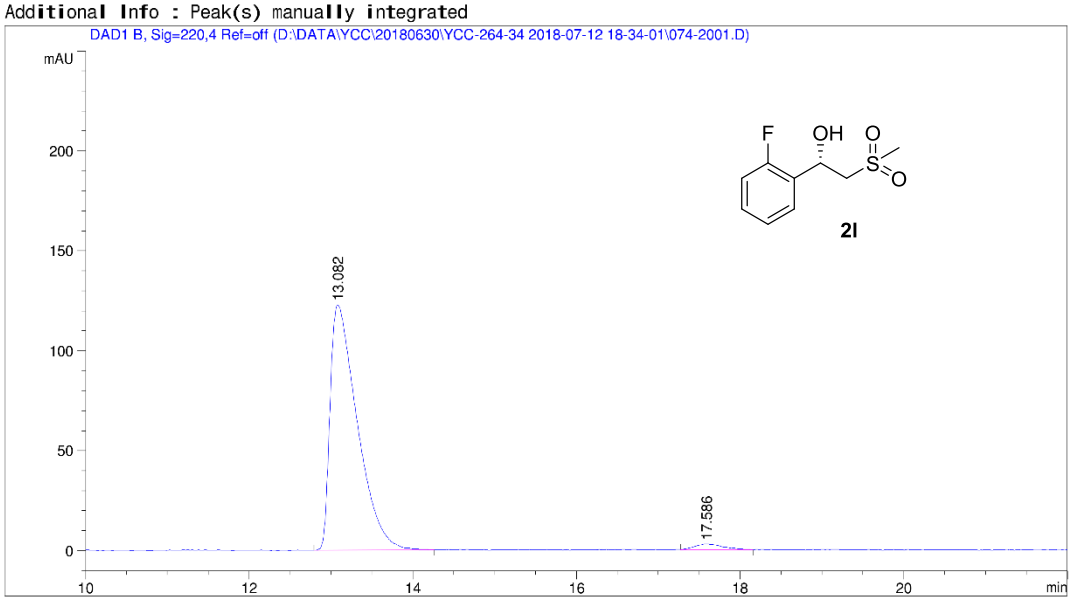
```
==========================================================================
Acq. Operator   :                                Seq. Line :  19
Acq. Instrument : Instrument 2                    Location : Vial 73
Injection Date  : 7/13/2018 3:29:59 AM                 Inj :  1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\DAD-0J(1-6)-80-20-1ML-
                  3UL-ALL-25MIN.M
Last changed    : 7/12/2018 10:13:08 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 10:03:57 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  13.247 BB    0.2888  855.37360   42.14367  49.7959
   2  17.370 BB    0.3838  862.38611   31.26658  50.2041

Totals :                  1717.75970   73.41025
```

Data File D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\074-2001.D
Sample Name: TL-2-F-Me-ee

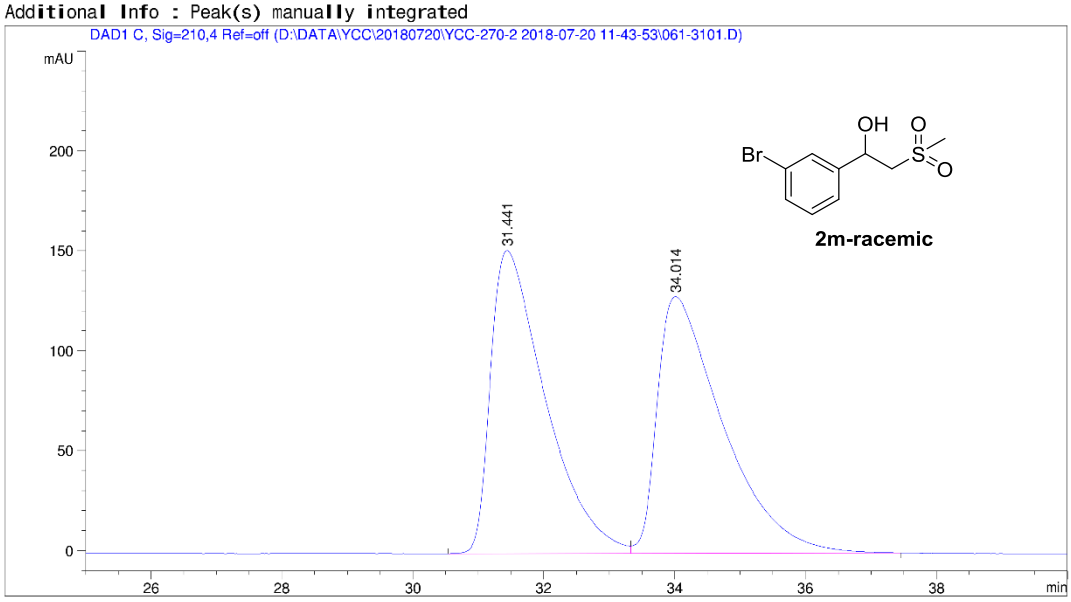
```
==========================================================================
Acq. Operator   :                                  Seq. Line :  20
Acq. Instrument : Instrument 2                      Location : Vial 74
Injection Date  : 7/13/2018 3:56:01 AM                  Inj :   1
                                                   Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\DAD-0J(1-6)-80-20-1ML-
                  3UL-ALL-25MIN.M
Last changed    : 7/12/2018 10:13:08 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 10:04:47 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  13.082 BB    0.3272 2833.36401  122.77251  97.4357
   2  17.586 VV    0.2947   74.56754    3.01312   2.5643

Totals :                  2907.93155  125.78562
```

Data File D:\DATA\YCC\20180720\YCC-270-2 2018-07-20 11-43-53\061-3101.D
Sample Name: TL-3-Br-Me-rac

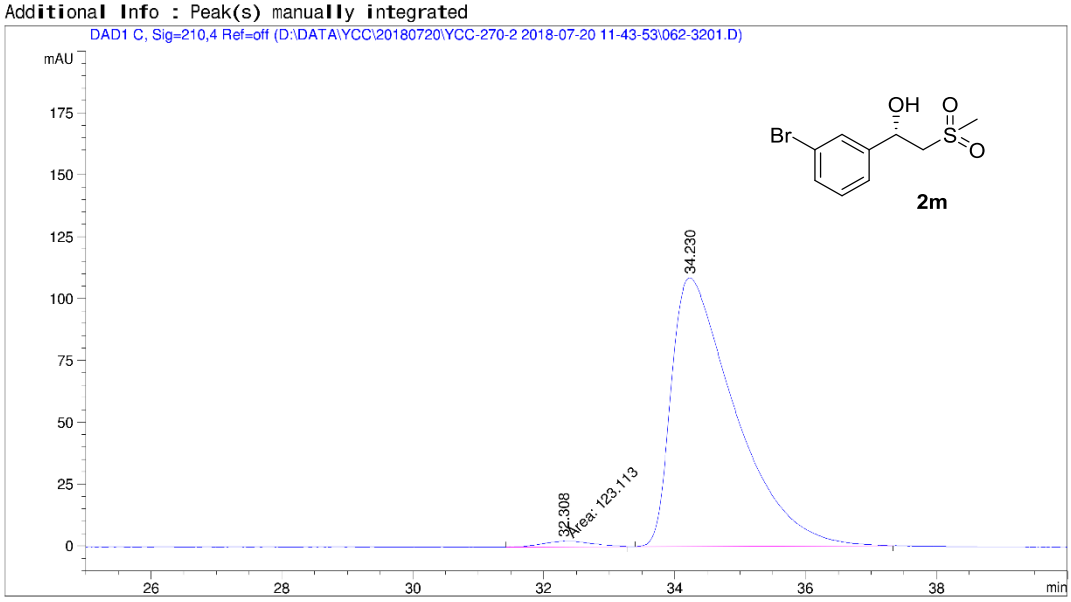
```
=====================================================================
Acq. Operator   :                          Seq. Line :  31
Acq. Instrument : Instrument 2              Location : Vial 61
Injection Date  : 7/21/2018 4:31:55 AM           Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180720\YCC-270-2 2018-07-20 11-43-53\DAD-OJ(1-6)-80-20-1ML-
                  3UL-ALL-40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 10:07:47 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  31.441 BV    0.8283 8846.16699  151.69662  49.7556
   2  34.014 VB    0.9737 8933.06934  128.39050  50.2444

Totals :                  1.77792e4   280.08713
```

Data File D:\DATA\YCC\20180720\YCC-270-2 2018-07-20 11-43-53\062-3201.D
Sample Name: TL-3-Br-Me-ee

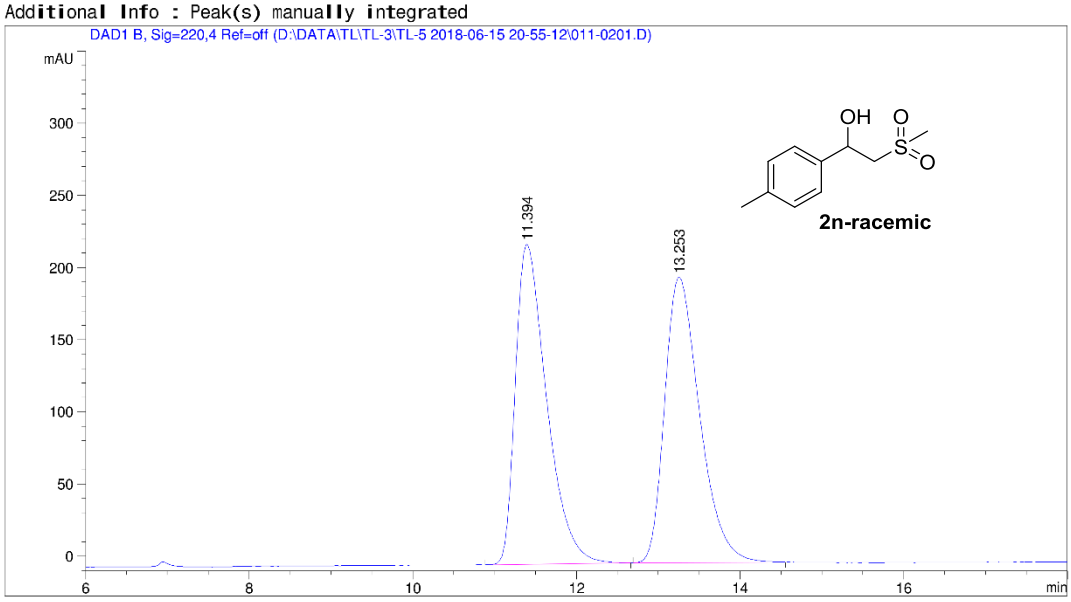
```
======================================================================
Acq. Operator   :                          Seq. Line :  32
Acq. Instrument : Instrument 2              Location : Vial 62
Injection Date  : 7/21/2018 5:12:55 AM           Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180720\YCC-270-2 2018-07-20 11-43-53\DAD-OJ(1-6)-80-20-1ML-
                  3UL-ALL-40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 10:09:09 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  32.308 MM    0.8635  123.11281    2.37613   1.6439
   2  34.230 BB    0.9462 7366.04248  108.48158  98.3561

Totals :                  7489.15529  110.85770
```

Data File D:\DATA\TL\TL-3\TL-5 2018-06-15 20-55-12\011-0201.D
Sample Name: TL-4-Me-Me-rac

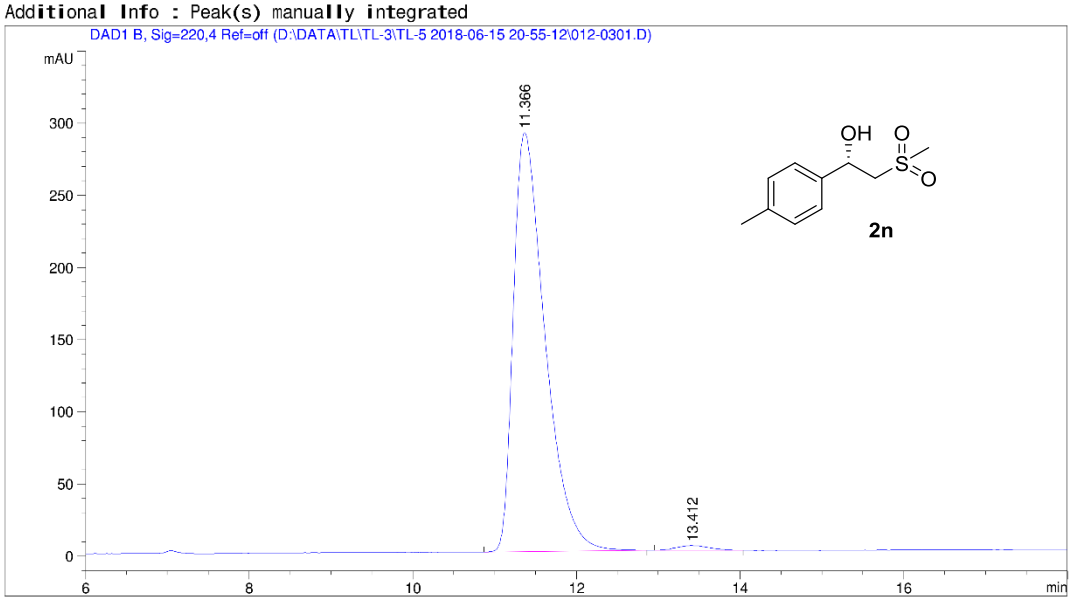
```
======================================================================
Acq. Operator   :                          Seq. Line :   2
Acq. Instrument : Instrument 2              Location : Vial 11
Injection Date  : 6/15/2018 9:07:15 PM           Inj :   1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-3\TL-5 2018-06-15 20-55-12\DAD-OD(1-2)-80-20-1ML-3UL-ALL-
                  20MIN.M
Last changed    : 6/15/2018 8:44:57 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:04:12 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.394 BB    0.3997 5879.39258  221.48277  50.0507
   2  13.253 BB    0.4544 5867.47217  197.60023  49.9493

Totals :                  1.17469e4   419.08301
```

Data File D:\DATA\TL\TL-3\TL-5 2018-06-15 20-55-12\012-0301.D
Sample Name: TL-4-Me-Me-ee

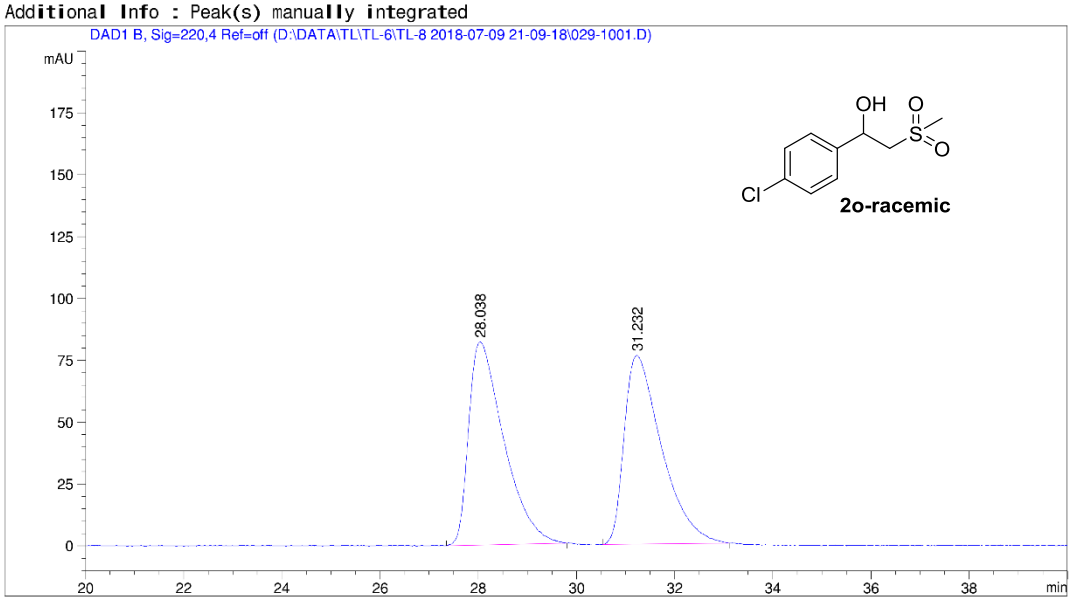
```
=====================================================================
Acq. Operator   :                          Seq. Line :   3
Acq. Instrument : Instrument 2              Location : Vial 12
Injection Date  : 6/15/2018 9:28:09 PM           Inj :   1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-3\TL-5 2018-06-15 20-55-12\DAD-OD(1-2)-80-20-1ML-3UL-ALL-
                  20MIN.M
Last changed    : 6/15/2018 8:44:57 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:04:12 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.366 BB    0.3982 7818.25342  290.28690  98.8301
   2  13.412 BB    0.3304   92.54990    3.32796   1.1699

Totals :                  7910.80331  293.61485
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\029-1001.D
Sample Name: TL-4-Cl-Me-rac

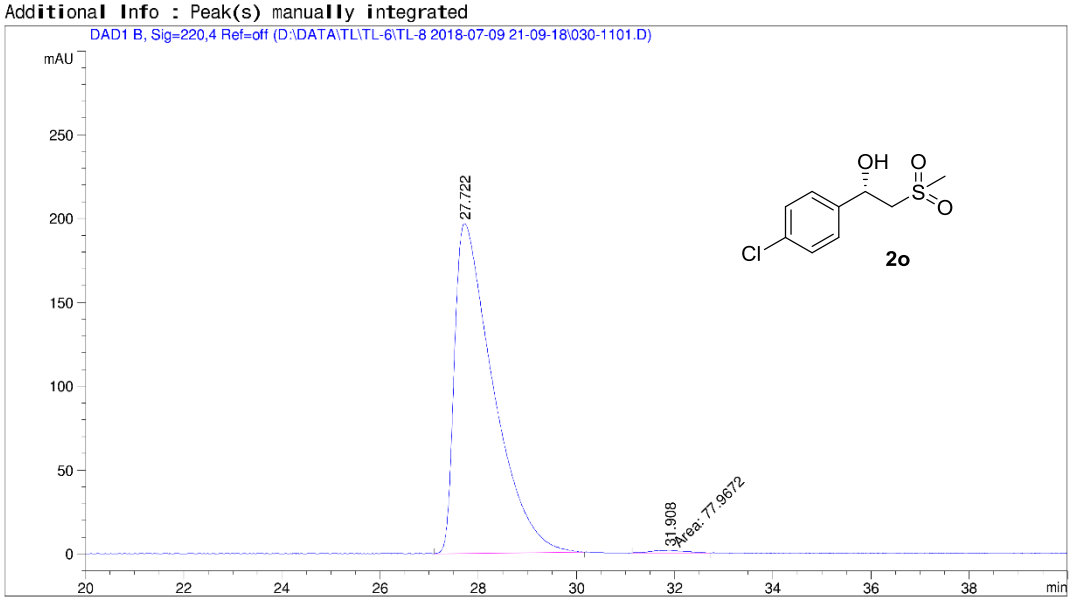
```
======================================================================
Acq. Operator   :                          Seq. Line :  10
Acq. Instrument : Instrument 2              Location : Vial 29
Injection Date  : 7/10/2018 3:49:11 AM           Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:29:35 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  28.038 BB    0.6477 4075.72192   82.03175  50.1508
   2  31.232 BB    0.6333 4051.21313   76.32463  49.8492

Totals :                  8126.93506  158.35638
```

Data File D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\030-1101.D
Sample Name: TL-4-Cl-Me-ee

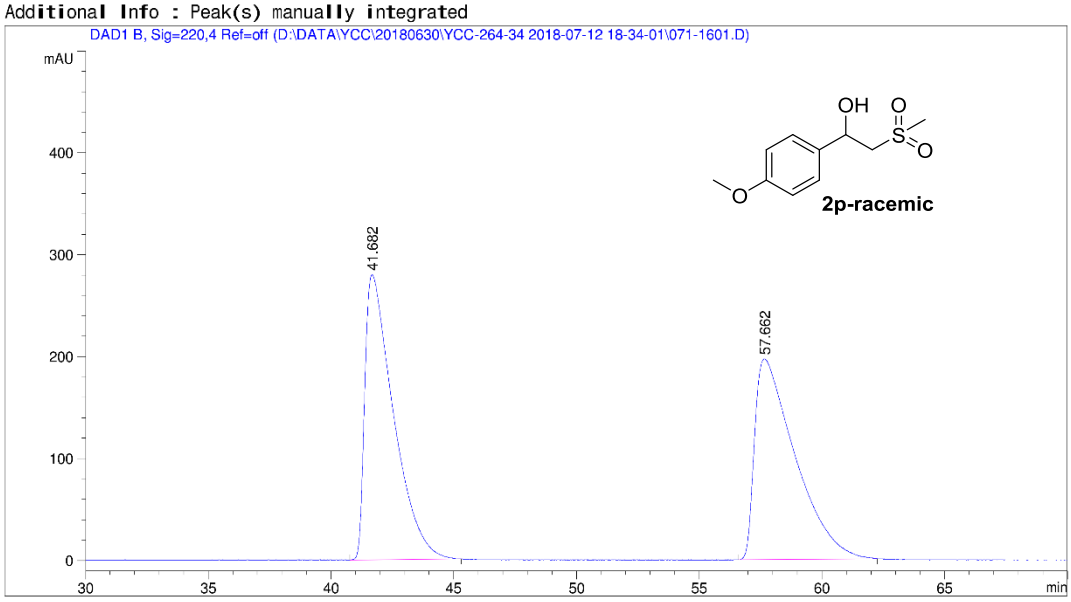
```
==========================================================================
Acq. Operator   :                                 Seq. Line :  11
Acq. Instrument : Instrument 2                     Location : Vial 30
Injection Date  : 7/10/2018 4:30:11 AM                 Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\TL\TL-6\TL-8 2018-07-09 21-09-18\DAD-OJ(1-6)-80-20-1ML-3UL-ALL-
                  40MIN.M
Last changed    : 7/9/2018 9:06:51 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:32:02 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  27.722 BB    0.7384 1.07300e4   196.69144  99.2786
   2  31.908 MM    0.8399   77.96723    1.54711   0.7214

Totals :                  1.08080e4   198.23854
```

Data File D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\071-1601.D
Sample Name: TL-4-MeO-Me-rac

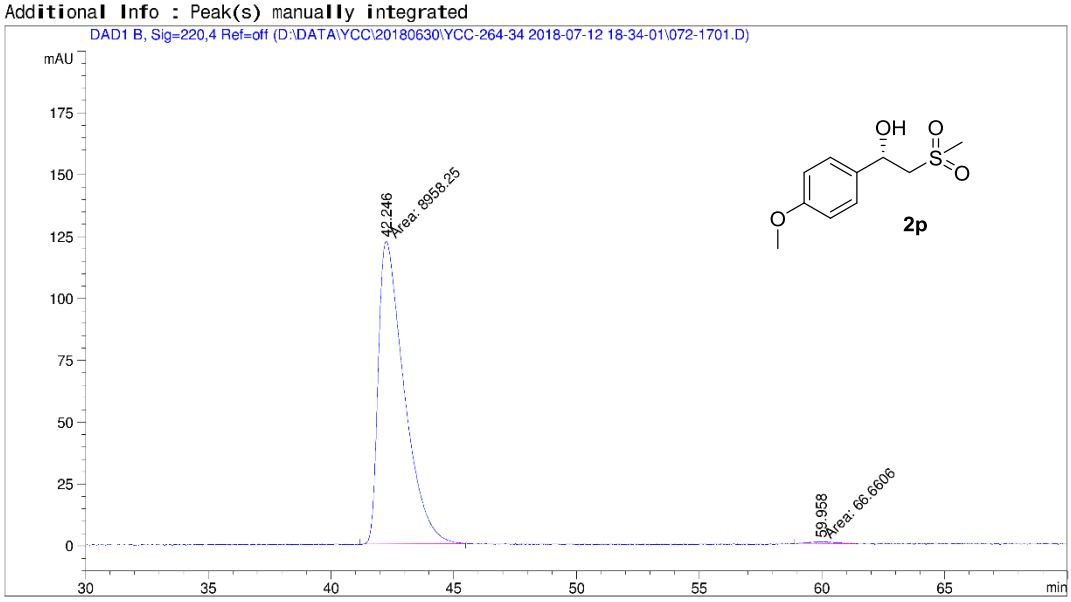
```
==========================================================================
Acq. Operator   :                                 Seq. Line :  16
Acq. Instrument : Instrument 2                     Location : Vial 71
Injection Date  : 7/13/2018 12:56:55 AM                 Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\DAD-0J(1-6)-80-20-1ML-
                  10UL-ALL-70MIN.M
Last changed    : 7/12/2018 10:08:47 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:23:56 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  41.682 BB    1.0604 2.26575e4   279.91312  50.1260
   2  57.662 BB    1.3553 2.25436e4   196.96117  49.8740

Totals :                  4.52010e4   476.87428
```

Data File D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\072-1701.D
Sample Name: TL-4-MeO-Me-ee

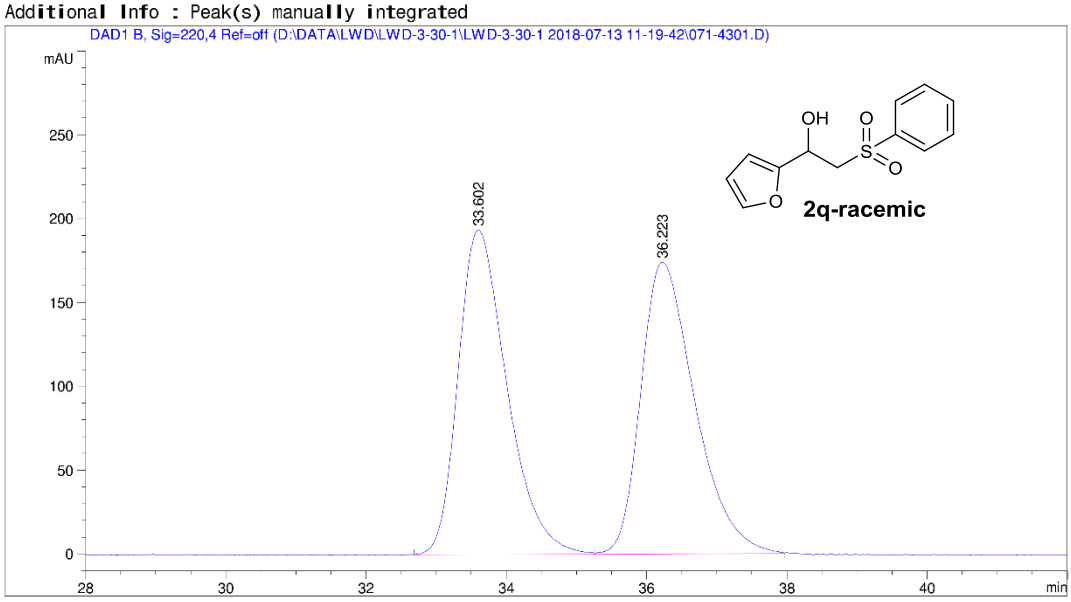
```
======================================================================
Acq. Operator   :                          Seq. Line :  17
Acq. Instrument : Instrument 2              Location : Vial 72
Injection Date  : 7/13/2018 2:07:59 AM           Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\YCC\20180630\YCC-264-34 2018-07-12 18-34-01\DAD-0J(1-6)-80-20-1ML-
                  3UL-ALL-70MIN.M
Last changed    : 6/28/2018 8:52:23 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-6)-95-5-1ML-2UL-ALL-20MIN.M
Last changed    : 8/20/2018 9:26:49 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  42.246 MM    1.2194 8958.25293  122.44077  99.2614
   2  59.958 MM    1.2371   66.66060 8.98066e-1   0.7386

Totals :                  9024.91353  123.33884
```

Data File D:\DATA\LWD\LWD-3-30-1\LWD-3-30-1 2018-07-13 11-19-42\071-4301.D
Sample Name: TL-funan-ph

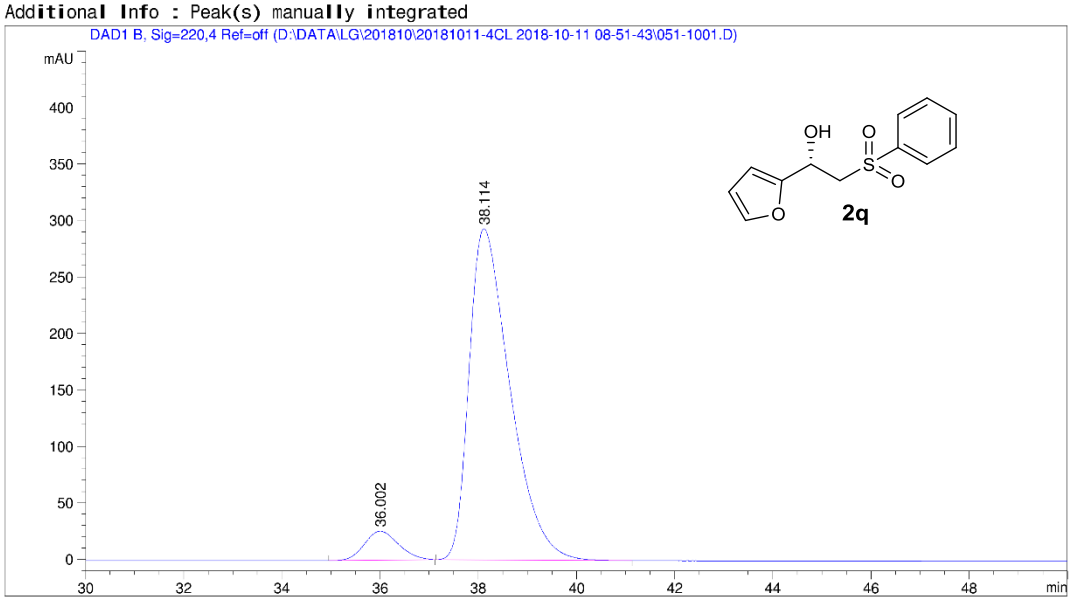
```
=====================================================================
Acq. Operator   :                          Seq. Line :  43
Acq. Instrument : Instrument 2              Location : Vial 71
Injection Date  : 7/14/2018 12:41:17 PM          Inj :  1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-30-1\LWD-3-30-1 2018-07-13 11-19-42\DAD-OJ(1-6)-80-20-1ML
                  -3UL-ALL-70MIN.M
Last changed    : 6/28/2018 8:52:23 PM
Analysis Method : D:\METHOD\YCC\DAD-OJ(1-6)-80-20-1ML-1UL-ALL-60MIN.M
Last changed    : 11/6/2018 9:10:01 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  33.602 BV    0.6659 9356.62012  193.59761  50.1146
   2  36.223 VV    0.7561 9313.82422  174.11975  49.8854

Totals :                  1.86704e4   367.71736
```

Data File D:\DATA\LG\201810\20181011-4CL 2018-10-11 08-51-43\051-1001.D
Sample Name: TL-funan-ph-ee

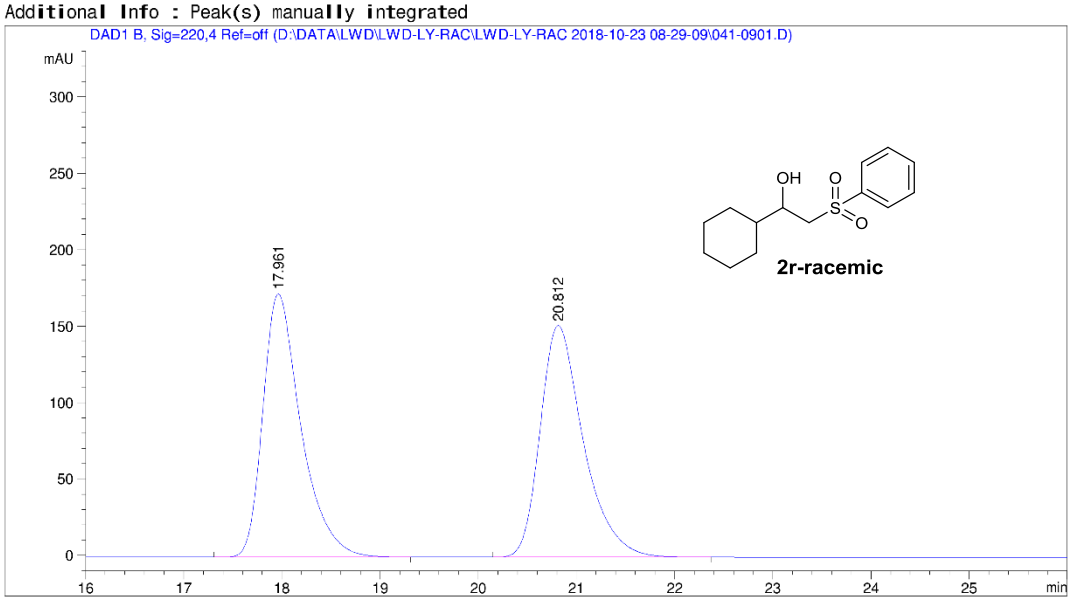
```
==========================================================================
Acq. Operator   :                                 Seq. Line :  10
Acq. Instrument : Instrument 2                     Location : Vial 51
Injection Date  : 10/11/2018 1:18:47 PM                Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LG\201810\20181011-4CL 2018-10-11 08-51-43\DAD-OJ(1-6)-80-20-1ML-
                  3UL-ALL-55MIN.M
Last changed    : 7/9/2018 9:15:39 PM
Analysis Method : D:\METHOD\YCC\DAD-OJ(1-6)-80-20-1ML-1UL-ALL-60MIN.M
Last changed    : 11/6/2018 9:13:59 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  36.002 BB    0.7172 1234.81213   25.58069   6.7816
   2  38.114 BB    0.8775 1.69735e4   293.14279  93.2184

Totals :                  1.82083e4   318.72349
```

Data File D:\DATA\LWD\LWD-LY-RAC\LWD-LY-RAC 2018-10-23 08-29-09\041-0901.D
Sample Name: TL-C-HEX-PH-RAC

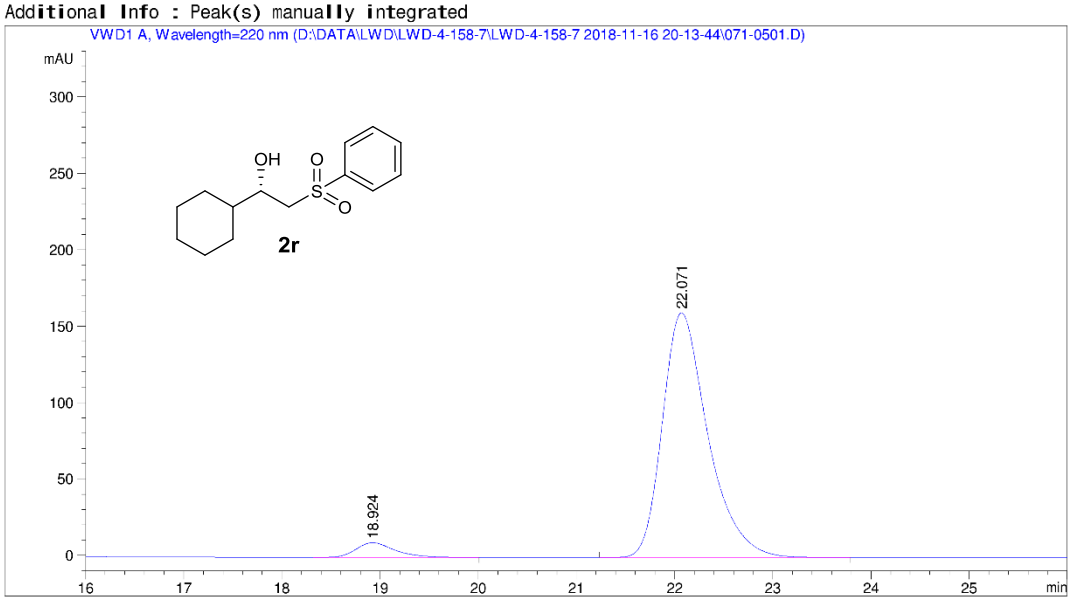
```
==========================================================================
Acq. Operator   :                              Seq. Line :   9
Acq. Instrument : Instrument 2                  Location : Vial 41
Injection Date  : 10/23/2018 12:29:02 PM             Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-LY-RAC\LWD-LY-RAC 2018-10-23 08-29-09\DAD-AD(1-6)-80-20-0.
                  7ML-3UL-ALL-60MIN.M
Last changed    : 10/23/2018 11:24:12 AM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-2)-80-20-1ML-3UL-ALL-10MIN.M
Last changed    : 11/17/2018 3:39:49 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 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  17.961 BB    0.4041 4637.86182  172.27362  50.0004
   2  20.812 BB    0.4589 4637.79004  151.59140  49.9996

Totals :                  9275.65186  323.86502
```

Data File D:\DATA\LWD\LWD-4-158-7\LWD-4-158-7 2018-11-16 20-13-44\071-0501.D
Sample Name: TL-c-hex-ph-ee

```
======================================================================
Acq. Operator   :                          Seq. Line :   5
Acq. Instrument : Instrument 1              Location : Vial 71
Injection Date  : 11/16/2018 9:47:56 PM          Inj :   1
                                          Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-4-158-7\LWD-4-158-7 2018-11-16 20-13-44\VWD-AD(1-2)-80-20-0
                  .7ML-3UL-220NM-30MIN.M
Last changed    : 11/16/2018 8:26:32 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-2)-80-20-1ML-3UL-ALL-10MIN.M
Last changed    : 11/17/2018 3:36:36 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: VWD1 A, Wavelength=220 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  18.924 BB    0.4121  263.78177    9.61526   4.8706
   2  22.071 BB    0.4855 5151.99707  160.06735  95.1294

Totals :                  5415.77884  169.68261
```

6. Reference

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2. (a) N.-C. Hsueh, H.-Y. Chen, M.-Y. Chang, *J. Org. Chem.*, 2014, **82**, 13324; (b) M.-Y. Chang, H.-Y. Chen, Y.-H. Chen, *J. Org. Chem.*, 2014, **82**, 12631; (c) C.-K. Chan and M.-Y. Chang, *ARKIVOC*, 2016, **5**, 390; (d) M.-Y. Chang, C.-K. Chan, Y.-C. Chen, *Heterocycles*, 2014, **89**, 1229.
3. G. Zhao, J. B. Hu, Z. S. Qian, W. X. Yin, *Tetrahedron: Asymmetry*, 2002, **13**, 2095.
4. P. Bertus, P. Phansavath, V. Ratovelomanana-Vidal, J.-P. Genêt, A. R. Touati, T. Homri, H. B. Ben, *Tetrahedron: Asymmetry*, 1999, **10**, 1369.